

State Highway 95 & 96 Fish Baffles

A. Project Location



Figure 1. Location map for State Highway 95 & 96 Fish Baffles.

Project Location	Immediate Waterbodies Impacted	BMP Performance
<p>The fish baffles are located in the State Highway 96 and State Highway 95 culverts immediately upstream from the St. Croix River confluence within the City of Stillwater, MN (see Figure 1 for a Location Map).</p>	<p>Brown's Creek</p>	<p>Stream Habitat Improvement: baffles improve ease of fish passage through the culverts</p>

B. Description of Facility

I. General Site Description

In 2009, routine District inspections identified that the Hwy 95 & 96 crossing of Brown's Creek posed a barrier to fish migration, particularly during periods of low flow. Via a search of MnDOT records, it was uncovered that MnDOT extended and modified both the Hwy 95 & 96 crossings in the 1990's. At this time MnDOT attempted to enhance fish passage through both culverts by installing thirteen baffles (concrete curb stops) within the structures. In 2009 the baffles, which had shifted from plan location, were found to inadequately improve fish passage. Furthermore, the 1990's extension of the Hwy 95 box culvert created a severe slope which exacerbated the passage. In 2011, Scandia Trucking of Scandia Minnesota was awarded a BCWD contract to improve fish passage in both the Hwy 95 & 96 culverts by installing an additional 17 concrete "curb-stop" baffles across the two culverts.

Partners	Project Purpose	Drainage Size	Project Completed	Maintenance Requirement
BCWD, MNDOT	To improve fish passage in Brown's Creek	NA	2011	Entire life of baffles
Note 1: BCWD has maintenance responsibilities for the baffles in the culverts. MN DOT is the landowner, and has the maintenance responsibilities for the culverts.				
Costs				
Total Project Cost: \$7,675 (including design and construction)				

II. Parts Inventory

Item #	MN/DOT SPEC. NO.	Item	Quantity	
1	2104.523	SALVAGED 7' CURB	1	EA
2	2533.3.D.2	INSTALL 7' CURB	10	LF
3	2533.3.D.2	INSTALL 6' CURB	7	EA

III. Stormwater Management Facilities

Not Applicable for this project

IV. Accessibility

The baffle culverts can be accessed from any of the three roads running alongside the project site. However, Boom Road will likely be the best road to access the site from due to its lower traffic volumes.

V. Start-Up and Operating Procedures

a. Process Description

Not Applicable for this project

b. Controls

Not Applicable for this project

c. Start – Up Procedures

Not Applicable for this project

d. Normal Operating Procedures

The following personnel can be contacted for normal operating procedure questions.

Contact Personnel		Contact Number	Organization
Primary	Karen Kill, Administrator	651-330-8220 x26	BCWD
Secondary	Kevin Biehn, Project Designer	651-770-8448	Emmons & Olivier Resources, Inc.

e. Common Operating Problems

Degradation of the concrete and debris build up are the potential issues that may lead to decreased functionality of the culvert baffles.

C. Maintenance and Inspection Requirements

I. Planning Maintenance and Inspections

Inspections should be made one to two times per year between the months of April and November. The system should be cleaned of debris if it appears to be impeding flow or the ability for fish passage.

a. Inspection Procedures

Item	Item Location	Parameter Measured	Inspection Frequency
West Culvert Baffle	Culvert crossing Hwy 96	Debris, sediment buildup, or blockage in culvert.	1 – 2 times per year
East Culvert Baffle	Culvert crossing Hwy 95	Debris, sediment buildup, or blockage in culvert.	1 – 2 times per year

Inspections should include the following documentation (*Outlined in Section E, Record of Annual Inspection and Maintenance Program*):

1. Document the presence of large wood or other large debris that could affect flows.
2. Document any movement of the baffles (both the 2011 install and those previously installed by MNDOT).
3. Document any damage or degradation of the baffles.
4. Document any erosion noticed upstream or downstream of the culverts.

b. Maintenance Procedures

Item	Corrective Action	Maintained by	Maintenance Frequency	Est. Annual Cost (Based on 2026 Est.)
Clear large debris for	Clear with hand tools and hand labor; if required	BCWD or Contracted Party	As determined by inspections	\$125 (BCWD) \$1,500 (Contractor)

Hwy 95 & 96 culverts	secure mini excavator for removal			
Baffle Replacement	Replace damaged baffles	Contracted Party	As determined by inspections	\$1,250 (each)
Patch and/or secure baffles	Repair damage to baffles, secure baffles to prevent movement	Contracted party	As determined by inspections	\$750 (each)
Annual Inspection	N/A	BCWD	1-2 times per year	\$650
Anticipated Total Yearly Cost:				\$650 + TBD

Buildup of debris can obstruct flow through the culverts making it difficult for the passage of fish. This may result in ineffective operation or complete failure of the system. The (BCWD) will perform between one and two inspections from April through November. The District shall complete inspection summaries at the time of each visit.

II. Corrective Actions and Modifications

Corrective actions and modifications will be necessitated based on the performance of the baffle installation, change in drainage land use, and (or) size of precipitation events.

III. In-house Verses Contracted Labor

To be determined on an as-needed basis.

D. Maintenance Responsibilities and Agreements

BCWD is responsible for addressing any blockages or removing any debris that stems from the baffles.

I. Manufacturer's Recommendations

Not Applicable for this project

II. Safety

Culverts should not be accessed for inspection and/or repair when flow rates are above baseflow rates. Before entering the culverts, ensure all OSHA and local safety regulations are being followed. Only personnel with appropriate confined space permits and personal protective equipment should be allowed to enter the system.

E. Records and Reporting

Records and reporting should be submitted to and maintained by BCWD.

Record of Annual Inspection and Maintenance Program:

Inspector Information				
Visit Number:				
Name				
Date:				
Identifier Number	Structure Description	Debris / Sediment	Sediment Depth (in)	Notes/Condition
1.	West Culvert	Y / N		
	West Culvert Baffles	Y / N		
	Upstream Erosion	Y / N		
	Downstream Erosion	Y / N		
2.	East Culvert	Y / N		
	East Culvert Baffles	Y / N		
	Upstream Erosion	Y / N		
	Downstream Erosion	Y / N		
Maintenance Description:				
Contractor / Maintenance Crew Information				
Date:				
Name:				
Phone:				
Address:				
Maintenance Description:				

I. Sampling and Performance Monitoring

a. Sampling and Analysis

Not Applicable for this project

b. Performance Monitoring

Not Applicable for this project

F. Emergency Plan and Operating Procedures

II. Emergency Plan

Always call 911 in a situation that presents a risk of immediate bodily harm to yourself or the surrounding community.

III. Emergency Operating Procedures

In the event on an operational emergency, please contact the following personnel for further assistance.

Contact Personnel		Contact Number	Organization
Primary	Karen Kill, Administrator	651-330-8220 x26	BCWD
Primary	Denise Workcuff	651-234-7502	MnDOT Metro District
Secondary	Kevin Biehn, Project Designer	651-770-8448	Emmons & Olivier Resources, Inc.

G. Appendices

I. Construction Plan Set

II. Agreements

- a. Maintenance – BCWD/MNDOT

STATEMENT OF ESTIMATED QUANTITIES

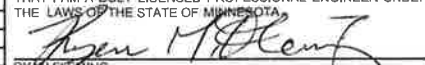
ITEM NO.		ITEM	APPROX. QUANT.	UNIT
1	2021.501	MOBILIZATION	1	LS
2	1710.8	TRAFFIC CONTROL	1	LS
3	2104.509	ROCK & DEBRIS REMOVAL	1	LS
4	2104.523	INSTALL SALVAGED 7' CURB	1	EA
5		INSTALL 7' CURB	10	EA
6		INSTALL 6' CURB	7	EA
7	2575.555	ACCESS RESTORATION	1	LS
8	2554.505	GUARDRAIL REMOVAL/REPLACE	25	LF

CONSTRUCTION NOTES

1. CONSTRUCT AND INSTALL CONCRETE CURBS IDENTICAL TO THOSE INSTALLED PREVIOUSLY. USE IDENTICAL MATERIALS AND METHODS EXCEPTING THE REBAR IS REPLACED ON NEW CURB INSTALLATION (16) AND RE-INSTALLATION (1) WITH 15 INCH LONG WEDGE ANCHOR BOLT, WASHER, AND LOCK NUT.
2. WORK TO BE CONDUCTED DURING LOW FLOW CONDITIONS LESS THAN 7 CUBIC FEET PER SECOND.
3. DEWATERING IS NOT ANTICIPATED FOR THE PROJECT, THOUGH TEMPORARY DIVERSION OF FLOW TO ONE SIDE OF THE CULVERT OR THE OTHER DURING WORK MAY BE NECESSARY. ANY DIVERSION OF FLOW SHALL ONLY OCCUR WHILE CONTRACTOR AND ENGINEER ARE ON SITE. NO DIVERSION OF FLOW SHALL OCCUR OVERNIGHT.
4. CONTRACTOR TO SUBMIT PLAN FOR WORK METHOD, ACCESS, AND TIMING FOR APPROVAL.
5. TREE OR OTHER VEGETATED DISTURBANCES DUE TO MOBILIZATION SHALL BE REPAIRED CONSISTENT WITH MN/DOT STANDARDS. ALL EQUIPMENT ACCESS PATHS OR DISTURBED AREAS SHALL BE RE-SEEDED WITH 35-221 MIX.
6. MATERIAL STORAGE IS NOT TO OCCUR ON ROADWAYS OR SHOULDERS OVERNIGHT. PROPER TRAFFIC CONTROL SHALL BE PROVIDED FOR ALL CONSTRUCTION ACTIVITIES, AS NEEDED.
7. ACCESS TO THE SITE SHALL BE FROM THE NORTHWEST OFF OF BOOM ROAD. ACCESS MAY REQUIRE REMOVAL OF GUARDRAIL. ADEQUATE TRAFFIC CONTROL AND BARRIERS DURING CONSTRUCTION WILL BE NECESSARY. GUARDRAIL TO BE IN PLACE FROM DUSK UNTIL DAWN SHOULD PROJECT SCHEDULE EXTEND OVERNIGHT. GUARDRAIL SHALL BE CONSTRUCTED OF SAME MATERIALS AND FITTINGS AS IS IN PLACE.

File Path: G:\0202011
 Drawing Name: R:\Data\100_GNIS_Project\Drawings\Proposed Fish Baffles_B01_110802.dwg
 Xref:

NO	DATE	BY	REVISION
6			
5			
4			
3			
2			
1			

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.

 RYAN FLEMING
 DATE: 8-2-2011 LICENSE # 46214

SUBMISSION DATE: 8-2-2011
 DESIGN BY: RF DRAWN BY: RF
 EOR PROJECT NO. 00041-0162


Emmons & Olivier Resources, Inc.
 651 Hale Avenue North
 Oakdale, MN 55128
 Tele: 651.770.8448
 www.eorinc.com

BCWD
 1380 WEST FRONTAGE ROAD,
 HIGHWAY 36
 STILLWATER, MN, 55082

FISH BAFFLES
 Brown's Creek & St. Croix River
 STILLWATER, WASHINGTON CNTY, MN
 STATE PROJECT NO. CITY PROJECT NO.

STATEMENT OF ESTIMATED QUANTITIES
 &
 CONSTRUCTION NOTES
 SHEET 2 OF 4 SHEETS

ADDENDUM NUMBER 1
to the
CONSTRUCTION DOCUMENTS
August 11, 2011

General

The following changes, additions, or deletions shall be made to the construction documents as indicated; and all other conditions shall remain the same:

- I. Sheet 2 – CONSTRUCTION NOTES**
- a. Paragraph 1: Replace reference of total quantity of NEW CURB INSTALLATION (16) to a total quantity NEW CURB INSTALLATION (17). Replace text “15 INCH LONG” to “OWNER-SUPPLIED”.
 - b. ADD paragraph “8. ROCK AND RIPRAP REMOVED FROM HIGHWAY 95 CULVERT TO BE DISPOSED OF ON SITE PER ENGINEER.”
- II. Sheet 3 – CURB DETAILS**
- a. ADD note: INSTALL CURB WITH OWNER-SUPPLIED WEDGE ANCHOR BOLTS. TORQUE TO 90 FT-LB.
 - b. Revise embedment depth of anchor bolt to 4 INCHES in the culvert slab.
 - c. Revise wedge anchor bolt dimensions to 14 INCH LONG 5/8 INCH DIAMETER.
 - d. Revise drilled hole diameter to 5/8 INCH.
 - e. Revise curb quantity to 10 required.
- III. Sheet 4 – CURB DETAILS**
- a. ADD note: INSTALL CURB WITH OWNER-SUPPLIED WEDGE ANCHOR BOLTS. TORQUE TO 90 FT-LB.
 - b. Revise embedment depth of anchor bolt to 4 INCHES in the culvert slab.
 - c. Revise wedge anchor bolt dimensions to 14 INCH LONG 5/8 INCH DIAMETER.
 - d. Revise drilled hole diameter to 5/8 INCH.

END OF ADDENDUM NUMBER 1