

# OPERATION & MAINTENANCE MANUAL

## **Water Quality Biofiltration Swale**

Manual prepared: March 2022

DFI No. D01333



Figure 1: DFI No. D01333, Looking south (South 9<sup>th</sup> Street, south of HWY 033)

## Identification

Drainage Facility ID (DFI): D01333  
Facility Type: Water Quality Biofiltration Swale  
Construction Drawings: 55V-057  
Location: District: 4  
Highway No.: 033  
Description: The biofiltration swale is located offsite, on the east side of South 9th Street, south of HWY 033 (EB US20, aka "Applegate Street").

### 1. Manual Purpose

The purpose of this manual is to outline inspection needs and summarize maintenance actions.

## 2. Facility Location

The location map below details the facility location. The highway, mile posts, side streets, access location, and stormwater flow directions are noted on the map.

Facility location type: Roadway shoulder (OFFSITE)

Flow direction: North to South

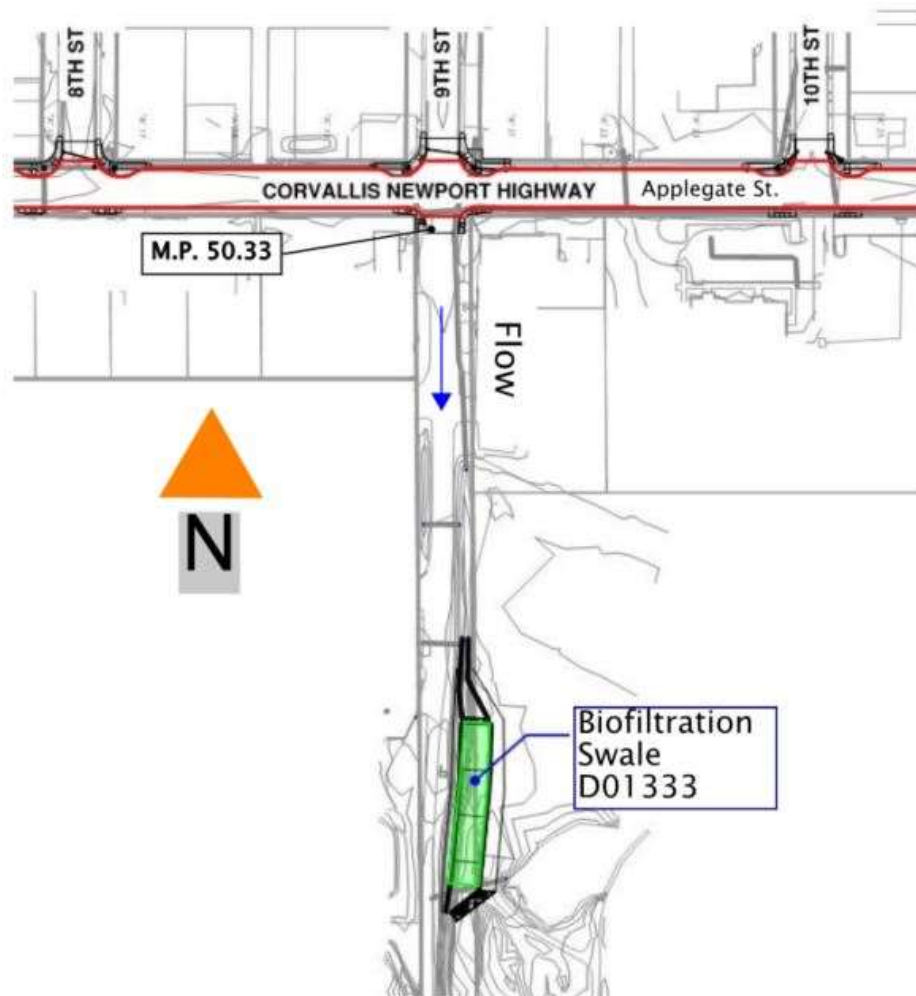


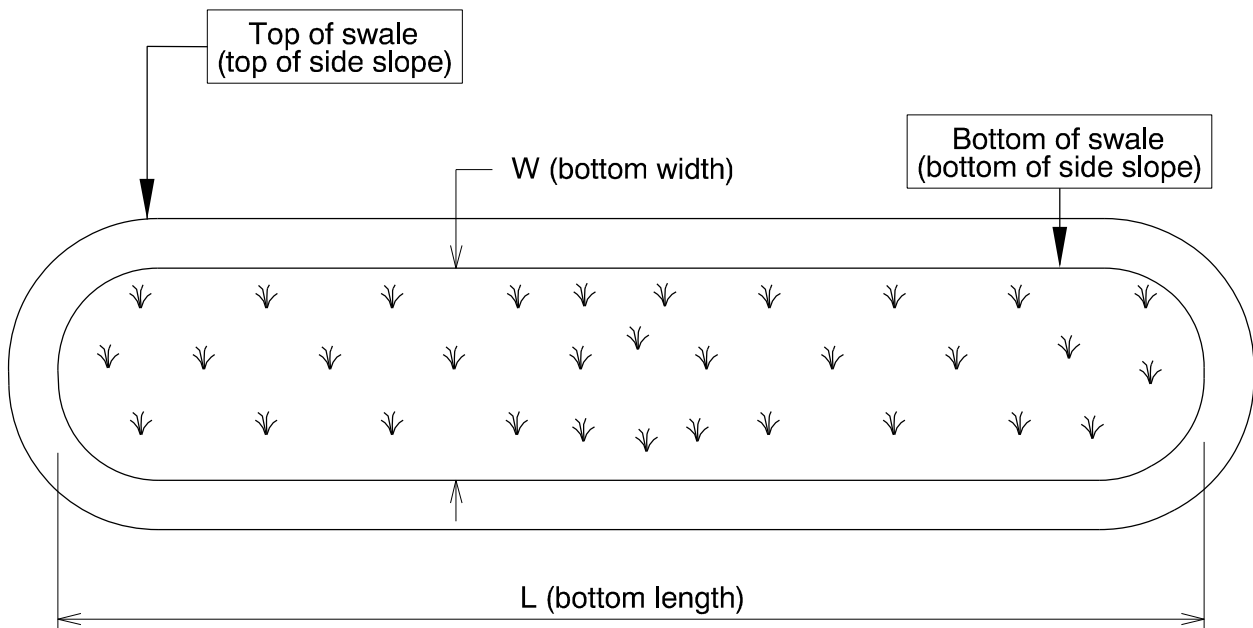
Figure 2: Facility location map

### 3. Facility Summary

The length and width of a swale is based on the bottom dimensions.

The bottom length and bottom width of the swale is:

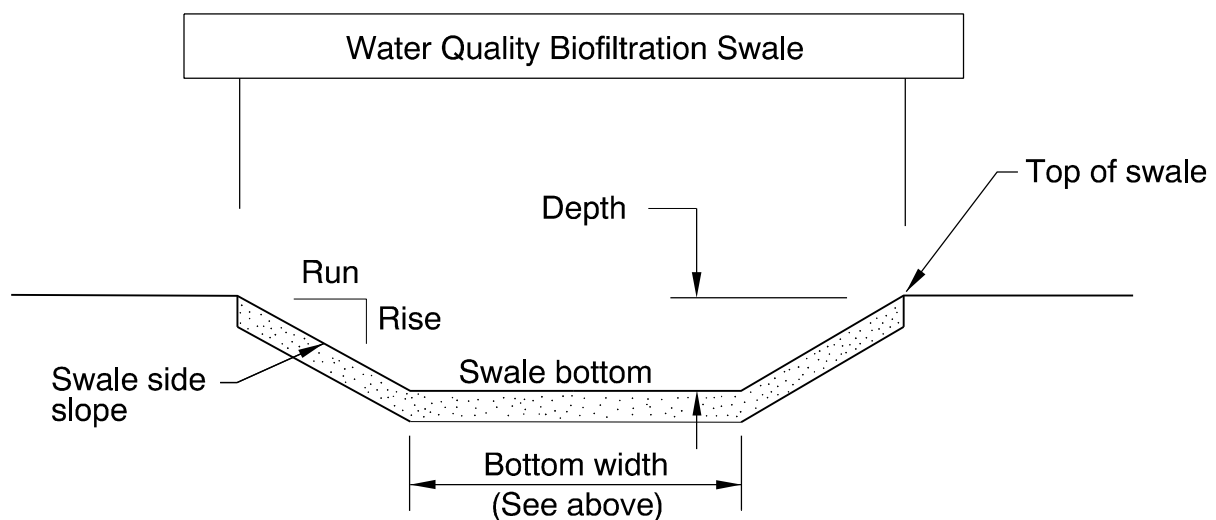
Bottom Length (feet)	Bottom Width (feet)
180	32



The depth of the swale is the vertical distance measured from the bottom of the swale to the top. The slope of the swale sides is presented by a vertical distance (rise) followed by the horizontal distance (run).

Depth and side slopes:

Depth (feet)	Rise (feet)	Run (feet)
1.5	1	3



**Site Specific Information:**

The biofiltration swale is located on the east side of South 9<sup>th</sup> Street, south of HWY 033 (EB US20, aka "Applegate Street") and in line with the existing South 9th Street Ditch.

In the 9th Street Basin (i.e. west of 12th Street), stormwater runoff is collected in inlets and catch basins (both existing and proposed) and routed via the piped public storm system to the 9th Street Ditch and proposed biofiltration swale (to be located in line with the ditch), before ultimately discharging to the Marys River. To mitigate potential for erosion of the soil media and channelization of flow, the biofiltration swale will be constructed with a rock basin flow spreader at the upstream end and flow spreader boards every 50 feet, on center.

## 4. Facility Access

Maintenance access to the facility:

<input type="checkbox"/> Roadside pad	<input type="checkbox"/> Roadside shoulder
<input type="checkbox"/> Access road with Gate	<input checked="" type="checkbox"/> Access road without Gate



Figure 3: Water Quality Biofiltration Swale looking south toward Marys River. HWY 033 is north of the facility.

## 5. Operational Components / Maintenance Items

### Classification

This facility is classified as an:

<input checked="" type="checkbox"/> <b>On-line Swale</b>	<input type="checkbox"/> <b>Off-line Swale</b>
A swale that does not include a high flow bypass component; flow drains into and through the facility	A swale that treats low/small flows and diverts high flows using a bypass component

### Bypass Component

This facility includes a high flow bypass component:

<input checked="" type="checkbox"/> <b>No</b>	<input type="checkbox"/> <b>Yes</b>
There is no bypass component. High flows drain into and through the facility	There is a bypass component. Only low/small flows drain into the swale. High flows are diverted around the swale using a bypass component

### Operational Components

A swale has many components that assist with treatment, conveyance, and reducing flow velocity to minimize erosion. The components in use can vary depending if the facility was designed to operate on-line or off-line. The facility components table (**Table 1**) has been provided to highlight the applicable components for this facility. The component is in use when the box contains an “x” (e.g.  ).

The Standard Operation Manual for Water Quality Biofiltration Swales (implemented March 2017) outlines facility operation, typical footprint configuration, and component definitions and details. A link to the manual is attached to the feature marker in TransGIS.

<https://gis.odot.state.or.us/TransGIS/>

### Operational Plan

The applicable standard operational plan for this facility is:

<input checked="" type="checkbox"/> <b>Operational Plan A</b>	<input type="checkbox"/> <b>Operational Plan B</b>	<input type="checkbox"/> <b>Operational Plan C</b>
<b>An on-line swale with roadside ditches</b>	<b>An on-line swale with piped inlets and outlets</b>	<b>An off-line swale with a piped high flow bypass</b>
A standard operational plan illustrates the general facility footprint configuration and explains the purpose of each facility component. Operational plans (A, B, C) are provided in the Standard Operation Manual.		

See Appendix A for the site specific operational plan.

### Maintenance Items

Operational components marked in **Table 1** should be inspected and maintained according to Section 7. Each facility component is defined and detailed in the Standard Operation Manual using the associated ID number indicated below.

Table 1: Swale Components		ID #
<b>Manholes/Structures</b>		
Pre-treatment manhole	<input type="checkbox"/>	<b>S1</b>

Weir type flow splitter/flow splitter manhole	<input type="checkbox"/>	<b>S2</b>
Orifice type flow splitter/flow splitter manhole	<input type="checkbox"/>	<b>S3</b>
Standard manhole	<input type="checkbox"/>	<b>S4</b>
<b>Swale Inlet</b>		
Pavement sheet flow	<input type="checkbox"/>	<b>S5</b>
Inlet Pipe (s)	<input type="checkbox"/>	<b>S6</b>
Open channel inlet	<input checked="" type="checkbox"/>	<b>S7</b>
Riprap pad	<input checked="" type="checkbox"/>	<b>S8</b>
<b>Ground Cover</b>		
Grass bottom	<input type="checkbox"/>	<b>S9</b>
Grass side slopes	<input type="checkbox"/>	<b>S10</b>
Granular drain rock	<input type="checkbox"/>	<b>S11</b>
Plantings	<input checked="" type="checkbox"/>	<b>S12</b>
<b>Underground Components</b>		
Geotextile fabric	<input type="checkbox"/>	<b>S13</b>
Water quality mix	<input checked="" type="checkbox"/>	<b>S14</b>
Perforated pipe	<input type="checkbox"/>	<b>S15</b>
Porous pavers (access grid)	<input checked="" type="checkbox"/>	<b>S16</b>
<b>Flow Spreader</b>		
Rock basin (used at inlet)	<input checked="" type="checkbox"/>	<b>S17</b>
Anchored board (midpoint of swale or every 50 feet along swale bottom)	<input checked="" type="checkbox"/>	<b>S18</b>
Other: describe type	<input type="checkbox"/>	<b>S19</b>
<b>Swale Outlet</b>		
Catch basin with grate	<input type="checkbox"/>	<b>S20</b>
Outlet Pipe (s)	<input type="checkbox"/>	<b>S21</b>
Open channel outlet	<input checked="" type="checkbox"/>	<b>S22</b>
Auxiliary Outlet: describe type	<input type="checkbox"/>	<b>S23</b>
<b>Outfall Type</b>		
Waterbody (Creek/Lake/Ocean)	<input type="checkbox"/> C	<b>S24</b>
	<input type="checkbox"/> L	
	<input type="checkbox"/> O	
Ditch	<input checked="" type="checkbox"/>	<b>S25</b>
Storm drain system	<input type="checkbox"/>	<b>S26</b>
<b>Outfall Components</b>		
Riprap pad	<input type="checkbox"/>	<b>S27</b>
Riprap bank protection	<input checked="" type="checkbox"/>	<b>S28</b>



## 6. Maintenance

### Maintenance Frequency/Maintain Records

- a. Inspect annually. Preferably prior to the rainy season.
- b. Clean and maintain as necessary. Refer to Activity 125 for conditions when maintenance is needed.
- c. Keep a record of inspections, maintenance, and repairs.

### Maintenance Guide/Maintenance Actions

The ODOT Routine Road Maintenance Water Quality and Habitat Guide (the *Blue Book*) outlines the standard maintenance actions for water quality facilities under Activity 125.

There are standard maintenance tables for standard ODOT designs. The maintenance tables describe the maintenance component, the defect or problem, the condition when maintenance is needed, and the recommended maintenance to correct the problem. Use the following tables to maintain ODOT swales:

- Table 1 (General Maintenance): Contains general maintenance and inspection guidelines that are applicable to all ODOT water quality facilities
- Table 3 (Maintenance of Water Quality or Biofiltration Swales): Contains maintenance information for swales

The *Blue Book* can be viewed at the following website:

[http://www.oregon.gov/ODOT/Maintenance/Documents/blue\\_book.pdf](http://www.oregon.gov/ODOT/Maintenance/Documents/blue_book.pdf)

## 7. Limitations

Access grid installed:

<input type="checkbox"/> No	<input checked="" type="checkbox"/> Yes
There are porous pavers installed in this swale	

Swales are designed to allow equipment access along the bottom. If an access grid is **NOT** installed, vehicles entering the swale can create depressions (tire ruts), damage vegetation, and damage structural components (e.g. flow spreaders). These conditions may result in poor treatment and drainage performance.

Equipment wheels should be kept on the tops and side slopes. Mower arms may be run along the swale bottom.

## 8. Waste Material Handling

Material removed from the facility is defined as waste by the Department of Environmental Quality (DEQ). Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options:

[http://www.oregon.gov/ODOT/Maintenance/Documents/ems\\_manual.pdf](http://www.oregon.gov/ODOT/Maintenance/Documents/ems_manual.pdf)

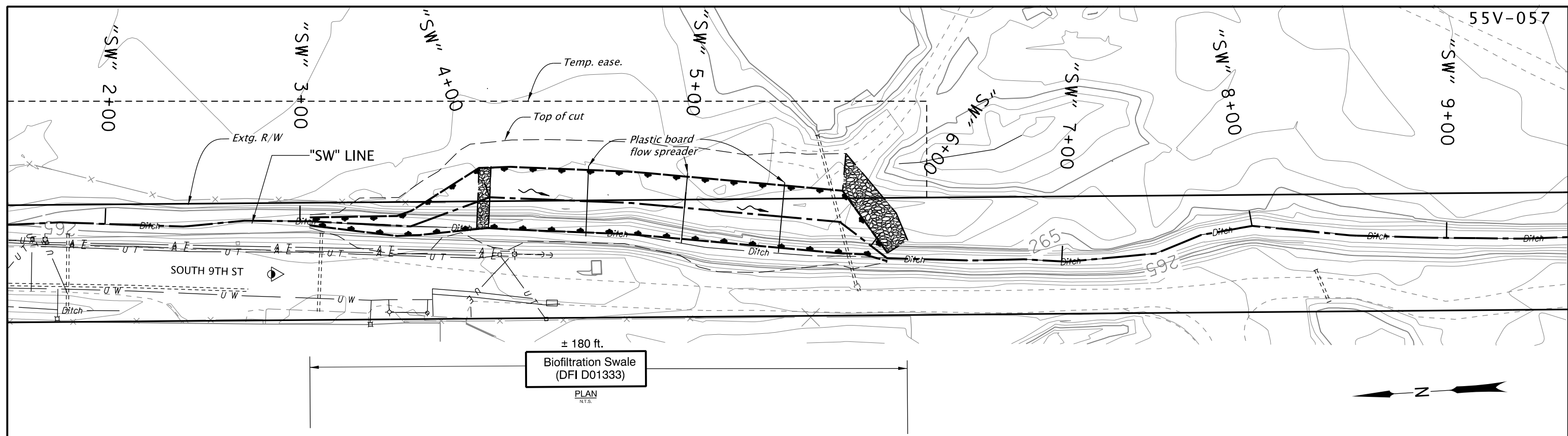
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 667-7442
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODOT Region 2 Hazmat Coordinator	(503) 986-2647
ODOT Region 3 Hazmat Coordinator	(541) 957-3594
ODOT Region 4 Hazmat Coordinator	(541) 388-6186
ODOT Region 5 Hazmat Coordinator	(541) 963-1590
ODEQ Northwest Region Office	(503) 229-5263

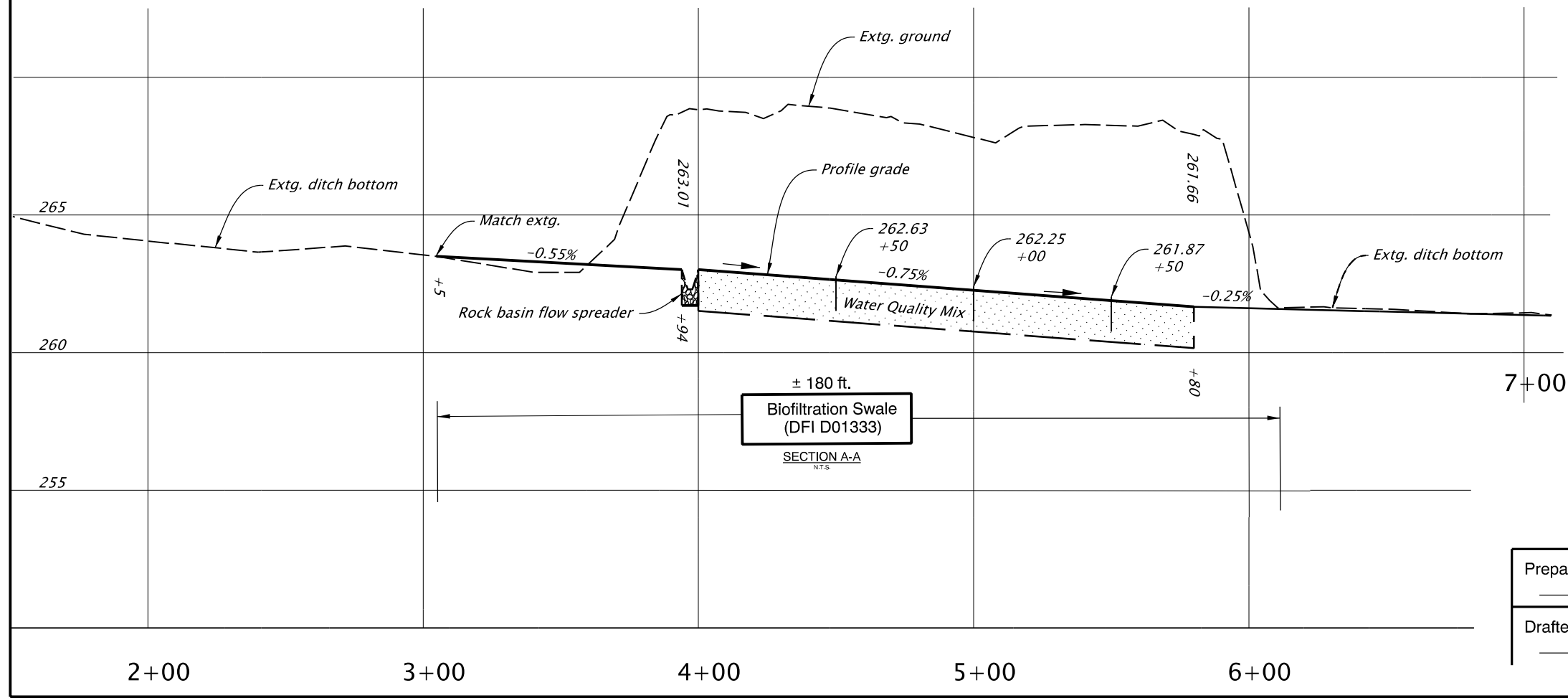
## **A Appendix A – Site Specific Operational Plan**

### **Contents:**

**Operational Plan: DFI D01333**



± 180 ft.  
Biofiltration Swale  
(DFI D01333)  
PLAN  
N.T.S.



± 180 ft.  
Biofiltration Swale  
(DFI D01333)  
SECTION A-A  
N.T.S.

- LEGEND:
- Rip Rap
  - Conveyance Direction
  - Flow Spreader
  - Flow Direction
  - Photo Location / Direction

777 High Street, Suite 200  
Eugene, OR 97401  
P 541.741.2975  
**murraysmith**

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Merritt Allen  
Drafted By: Merritt Allen

DFI01333  
MAINTENANCE DISTRICT 4 HWY 033  
WATER QUALITY BIORETENTION CELL  
HWY MP 50.48  
BENTON COUNTY

## **B Appendix B – Project Contract Plans**

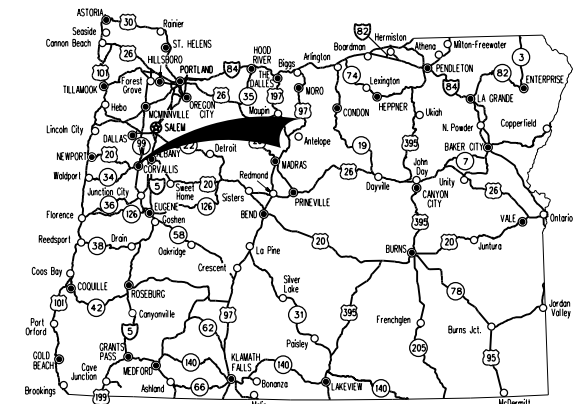
### **Contents:**

**Site Specific Subset of Project Contract Plan 55V-057**

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
A01	Title Sheet
A02 Thru A03	Index Of Sheets Cont. & Std. Dwg. Nos.

STATE OF OREGON  
**DEPARTMENT OF TRANSPORTATION**  
 PLANS FOR PROPOSED PROJECT  
**GRADING, DRAINAGE, PAVING, CURB RAMPS, SIGNING, ILLUMINATION,  
 SIGNALS, & ROADSIDE DEVELOPMENT**  
**US20: PHILOMATH COUPLET SEC.**  
**CORVALLIS-NEWPORT HIGHWAY**

**BENTON COUNTY  
 MAY 2022**



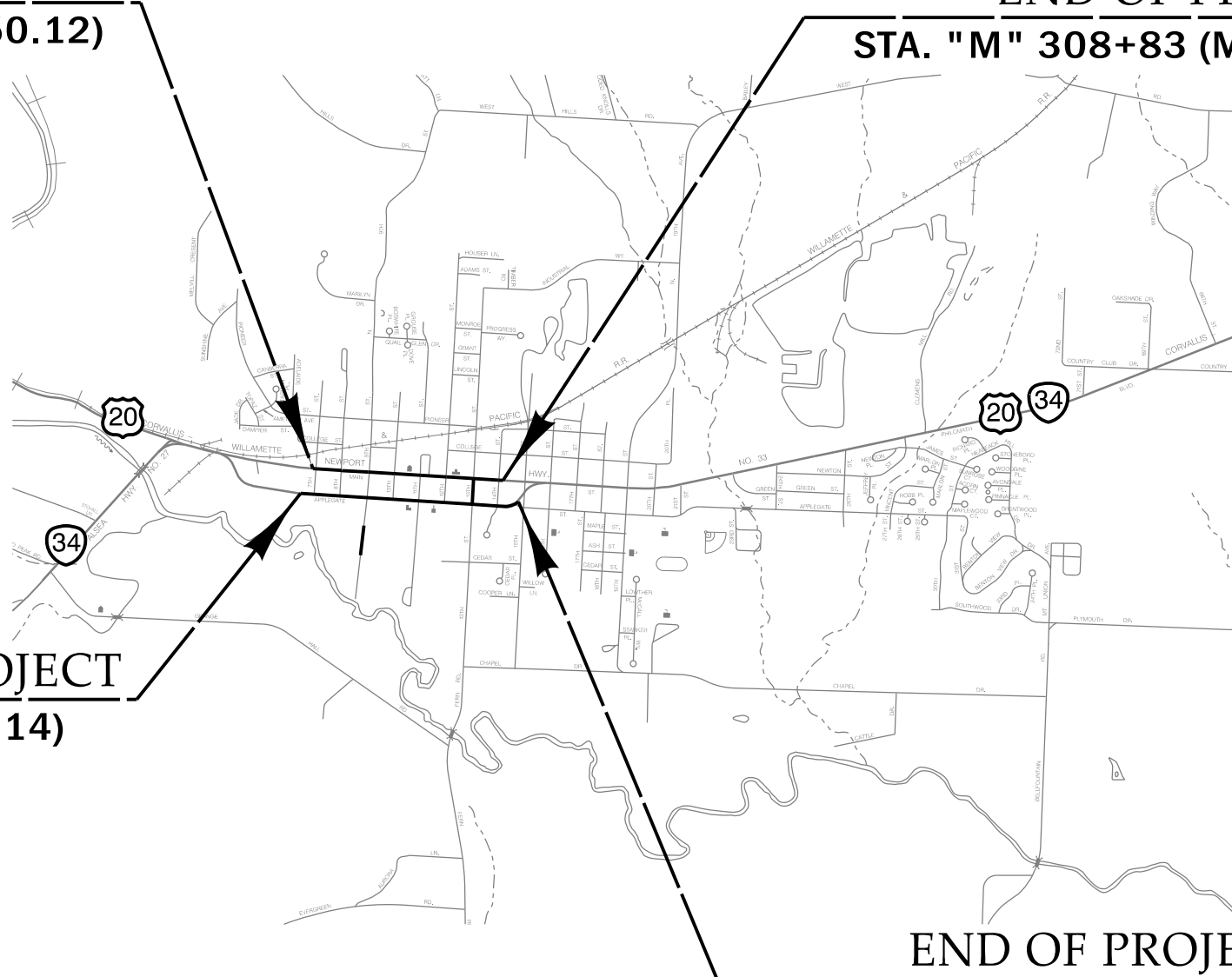
Overall Length Of Project - 1.16 Miles

**ATTENTION:**  
 Oregon Law Requires You To Follow Rules Adopted  
 By The Oregon Utility Notification Center.  
 Those Rules Are Set Forth In OAR 952-001-0001  
 Through OAR 952-001-0090.  
 You May Obtain Copies Of The Rules By Calling  
 The Center (Note: The Telephone Number For  
 The Oregon Utility Notification Center Is  
 (503) 232-1987).



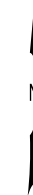
**BEGINNING OF PROJECT**  
**STA. "M" 280+27 (MP 50.12)**

**END OF PROJECT**  
**STA. "M" 308+83 (MP 50.66)**



**BEGINNING OF PROJECT**  
**STA. "A" 10+25 (MP 50.14)**

**END OF PROJECT**  
**STA. "B" 43+10 (MP 50.76)**



T. 12S., R. 06W., W.M.



**OREGON TRANSPORTATION COMMISSION**  
 Robert Van Brocklin CHAIR  
 Alando Simpson VICE CHAIR  
 Julie Brown COMMISSIONER  
 Sharon Smith COMMISSIONER  
 Marclynn Burke COMMISSIONER  
 Kris Strickler DIRECTOR OF TRANSPORTATION

These plans were developed using ODOT design standards. Exceptions to these standards, if any, have been submitted and approved by the ODOT Chief Engineer or their delegated authority.

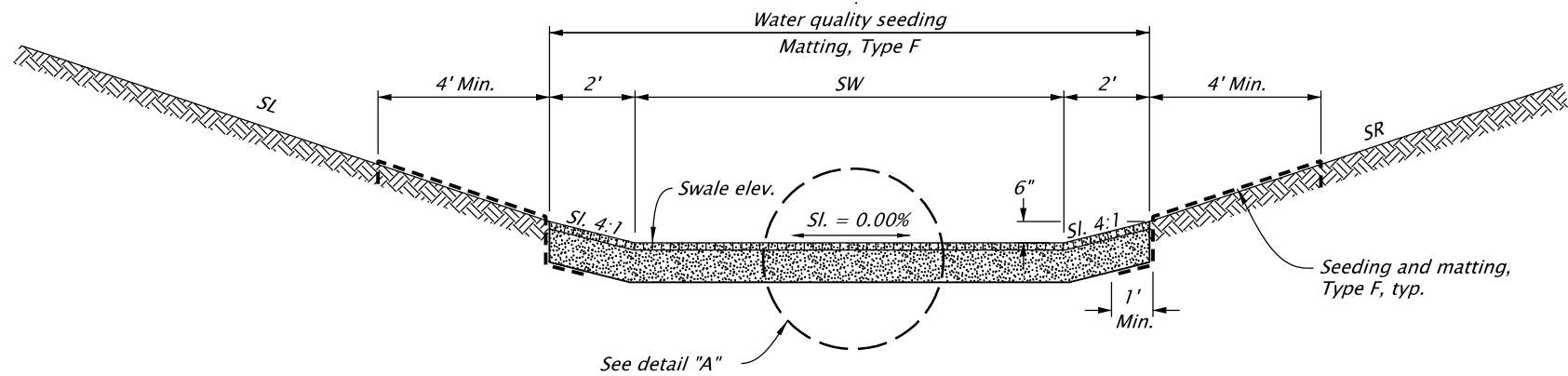
Approving Authority: \_\_\_\_\_  
 Signature & date  
 \_\_\_\_\_  
 Print name and title  
 \_\_\_\_\_  
 Concurrence by ODOT Chief Engineer

**US20: PHILOMATH COUPLET SEC.**  
**CORVALLIS-NEWPORT HIGHWAY**  
**BENTON COUNTY**

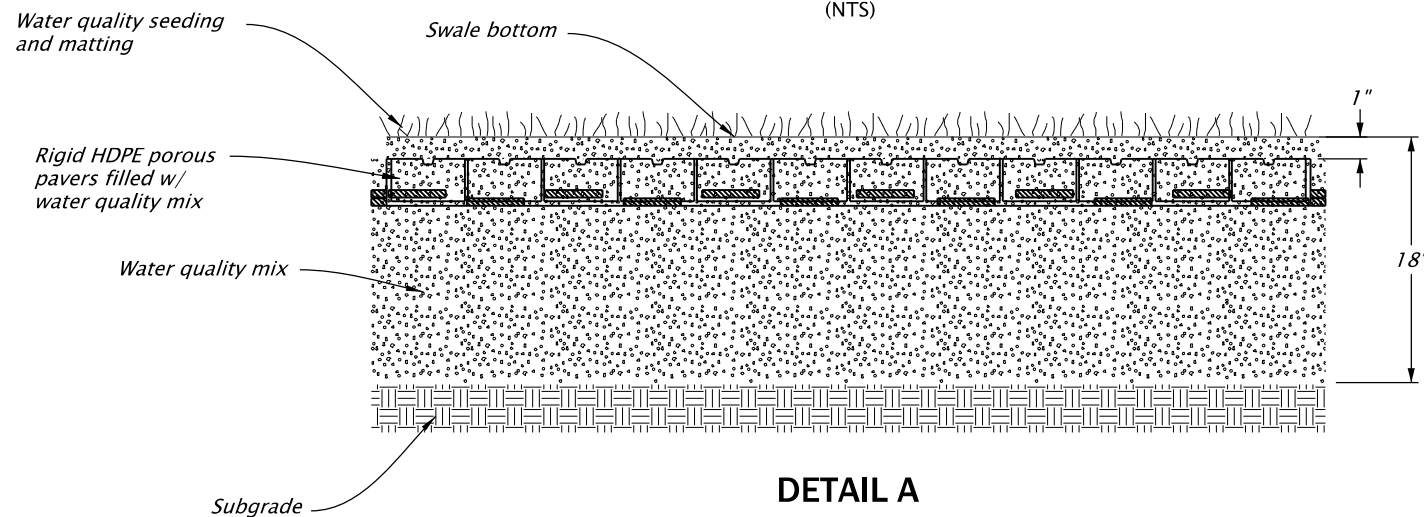
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	S033(065)	A01

# WATER QUALITY BIOFILTRATION SWALE DETAILS

55V-057



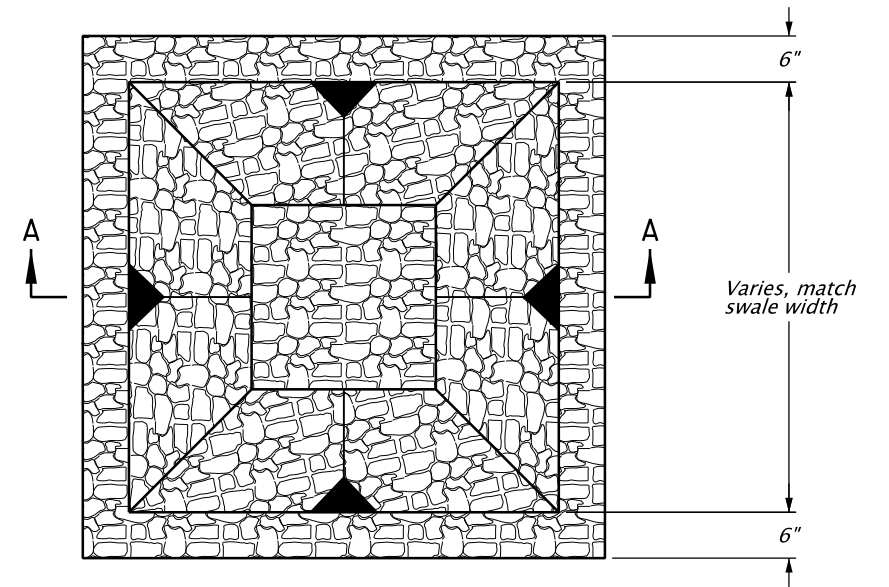
## WATER QUALITY BIOFILTRATION SWALE (NTS)



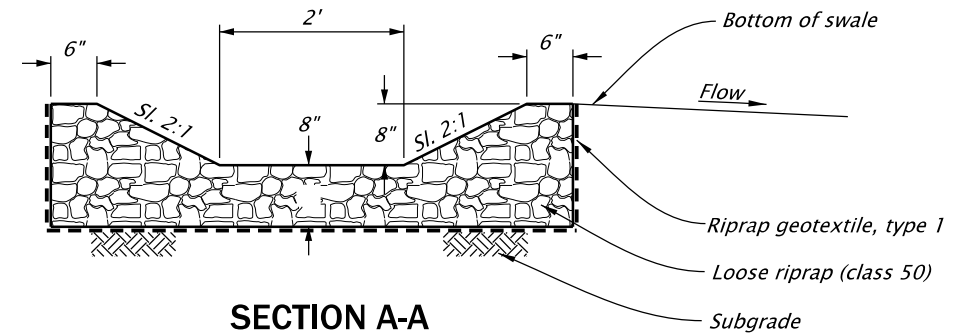
DETAIL A

SWALE TABLE

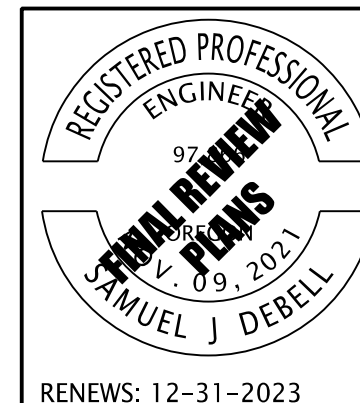
Station	Facility	SL (V:H)	SR (V:H)	SW (FT)	Length (FT)
"SW" 4+00 to 5+80	D01333	3:1	2:1	32	180



## ROCK BASIN FLOW SPREADER (NTS)



SECTION A-A



RENEWS: 12-31-2023

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Eugene, OR 97401  
P 541.741.2975  
**murraysmith**



**US20: PHILOMATH COUPLET SEC.**  
CORVALLIS-NEWPORT HIGHWAY  
BENTON COUNTY

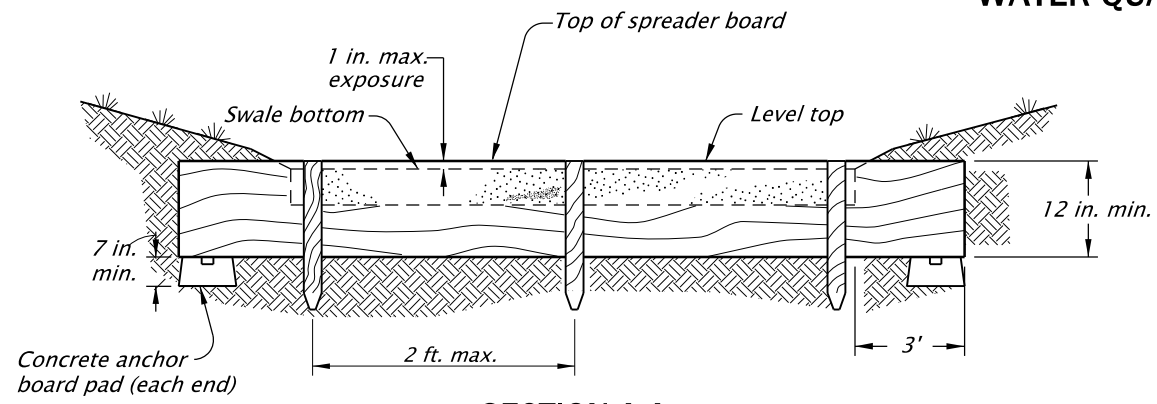
Designer: Merritt Allen  
Reviewer: Sam Debell  
Drafter: Serge Chernishoff  
Checker: Chris Link

**STORMWATER DETAILS**

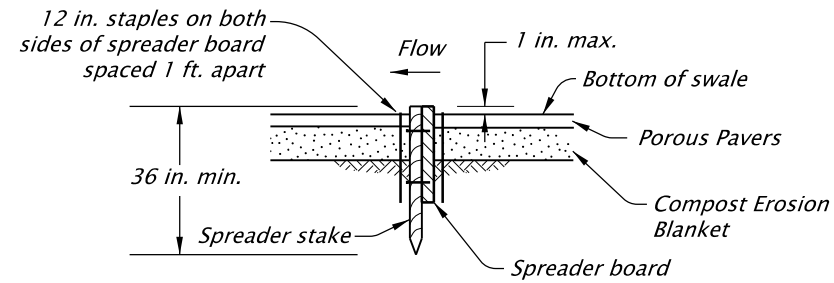
SHEET NO.  
HA04

**WATER QUALITY BIOFILTRATION SWALE DETAILS**

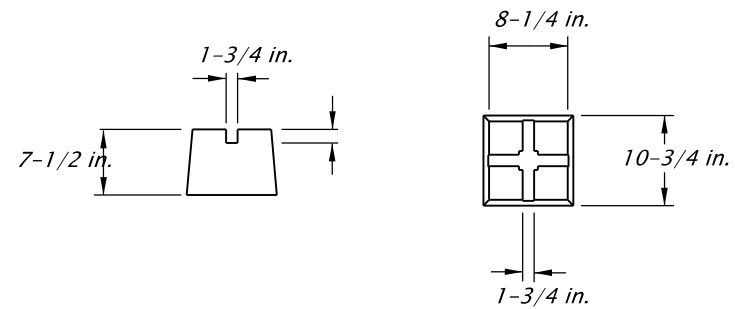
55V-057



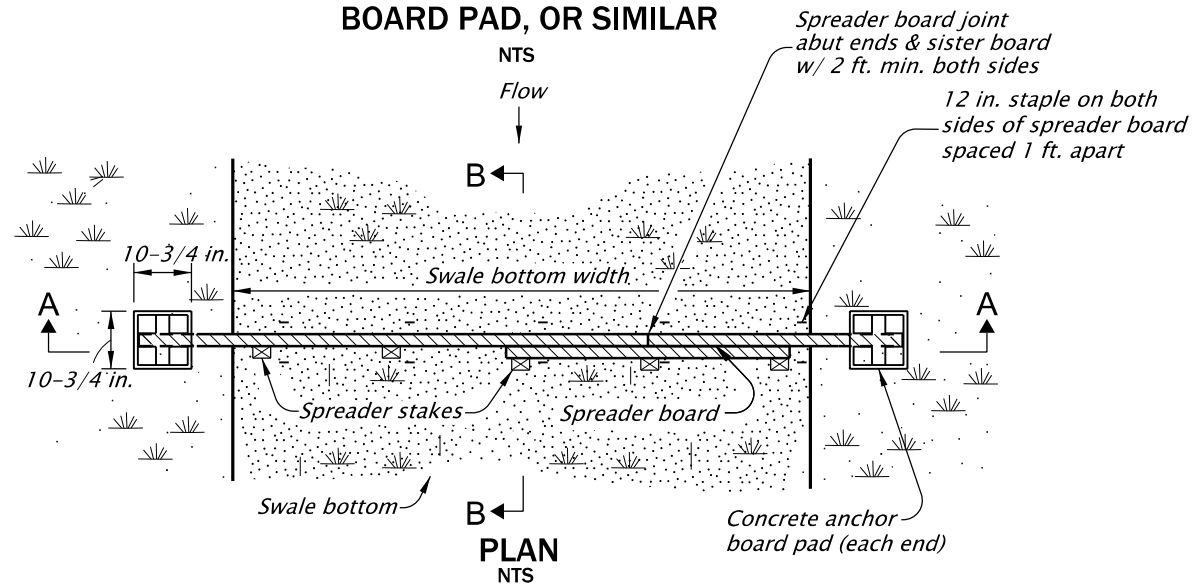
**SECTION A-A**  
NTS



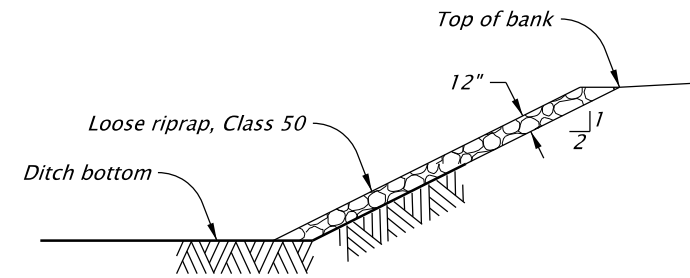
**SECTION B-B**  
NTS



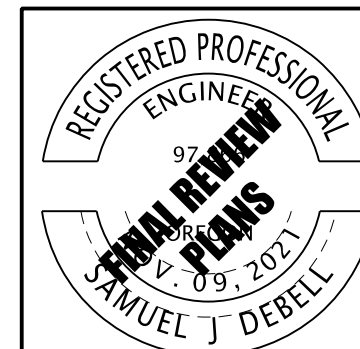
**CONCRETE ANCHOR BOARD PAD, OR SIMILAR**  
NTS



**PLASTIC BOARD FLOW SPREADER**  
NTS



**RIPRAP SLOPE PROTECTION**



RENEWS: 12-31-2023

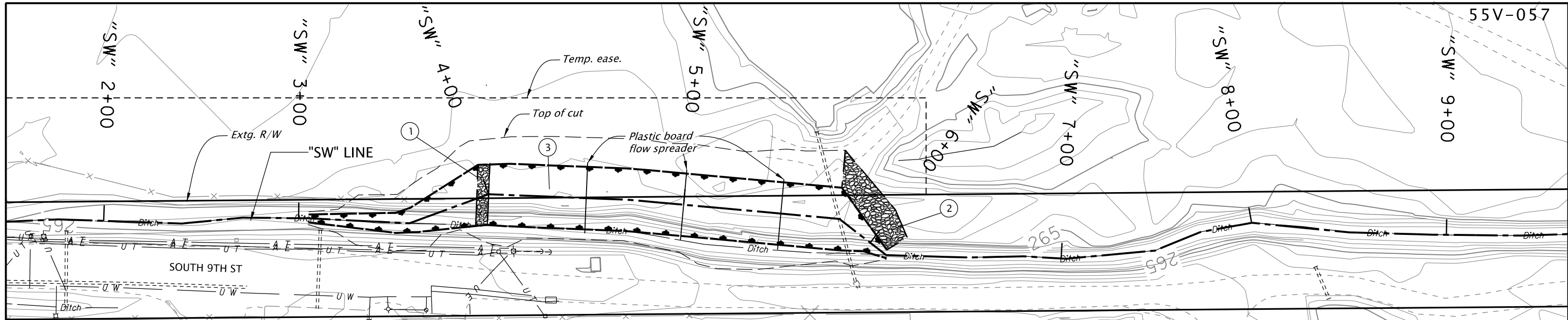
777 High Street, Suite 200  
Eugene, OR 97401  
P 541.741.2975  
**murraysmith**

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CORVALLIS-NEWPORT HIGHWAY  
BENTON COUNTY

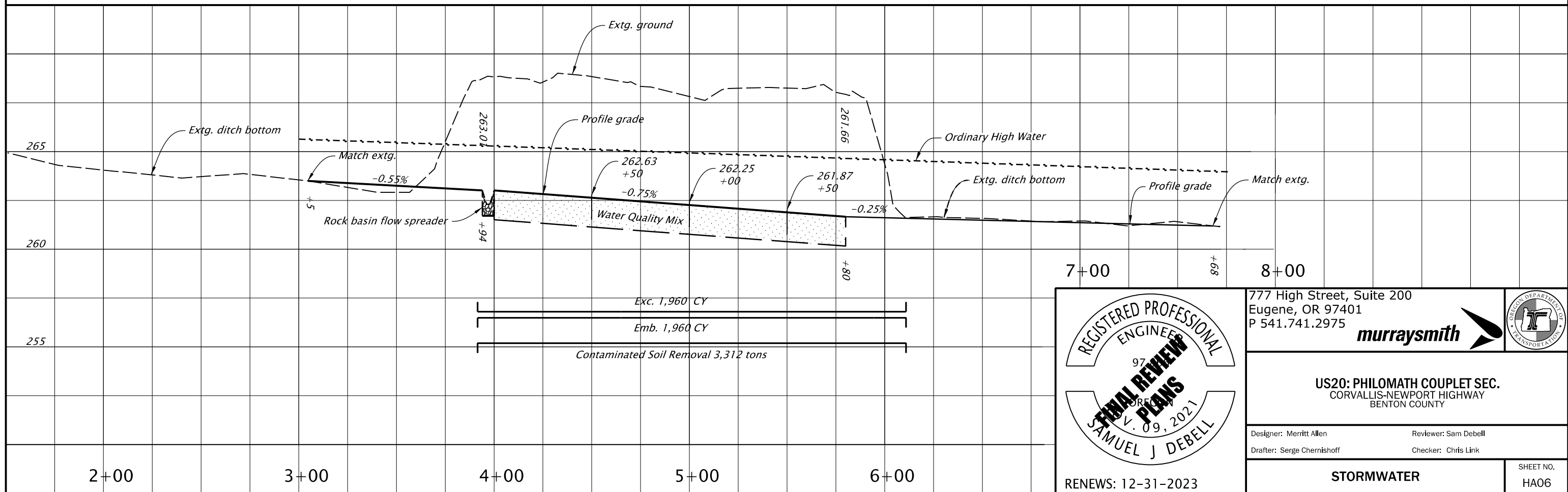
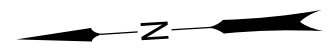
Designer: Merritt Allen  
Reviewer: Sam Debell  
Drafter: Serge Chernishoff  
Checker: Chris Link

**STORMWATER DETAILS**  
SHEET NO. HA05





- ① Sta. "SW" 3+94  
Const. rock basin flow spreader  
Loose riprap class 50 - 10 cu. yd.  
Riprap geotextile, type 1 - 32sq. yd.  
(For details, see sht. HA04)
- ② Sta. "SW" 5+80 to "SW" 6+10  
Const. Riprap slope protection - 15 cu. yd.  
(For details, see sht. HA05)
- ③ Sta. "SW" 4+00 to "SW" 5+80  
Const. 32' water quality biofiltration swale D01333 - 180'  
Water quality mixture - 360 cu. yd.  
Porous Pavers - 6,500 sq. ft.  
Water quality seeding - 720 sq. yd.  
Plastic board flow spreader - 114 ft.  
Compost erosion blanket - 640 sq. yd.  
Matting, type F - 1,000 sq. yd.  
(For details, see sht. HA04 and HA05)



REGISTERED PROFESSIONAL  
ENGINEER  
97  
**FINAL REVIEW**  
PLANS  
V. 09, 2021  
SAMUEL J DEBELL

RENEWS: 12-31-2023

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P 541.741.2975

**murraysmith**

**US20: PHILOMATH COUPLET SEC.**  
CORVALLIS-NEWPORT HIGHWAY  
BENTON COUNTY

Designer: Merritt Allen      Reviewer: Sam Debell  
Drafter: Serge Chernishoff      Checker: Chris Link

**STORMWATER**

SHEET NO.  
HA06