OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: June, 2019

DFI No. D00961

Figure 1: DFI No. D00961, looking [west]

Identification

Drainage Facility ID (DFI):	D00961
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 49V-028
Location:	District: 4
	Highway No.: 33
	Mile Post: 16.95 to 17.03, [left]

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

Flow direction: West

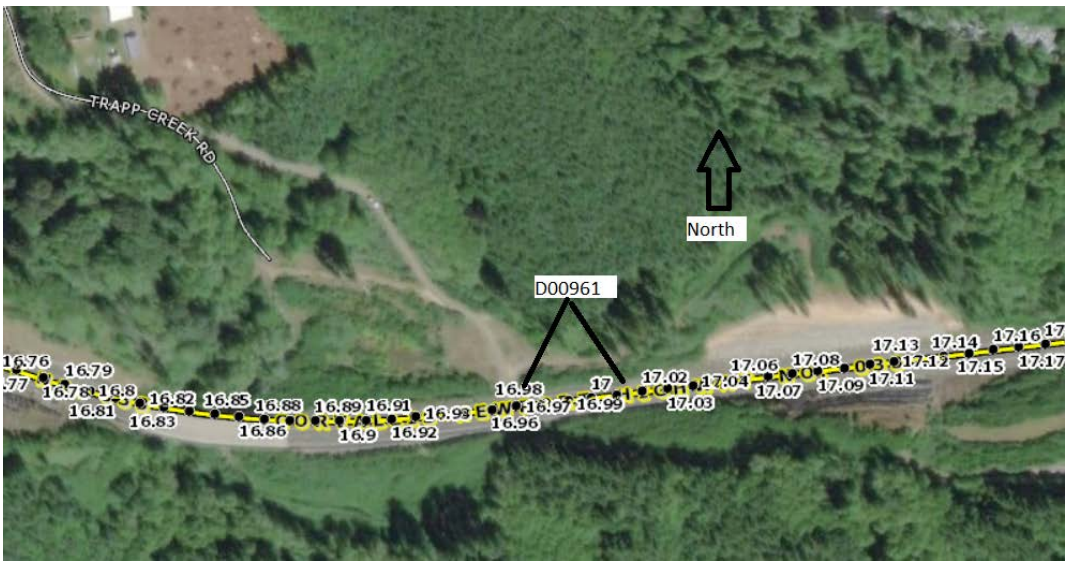


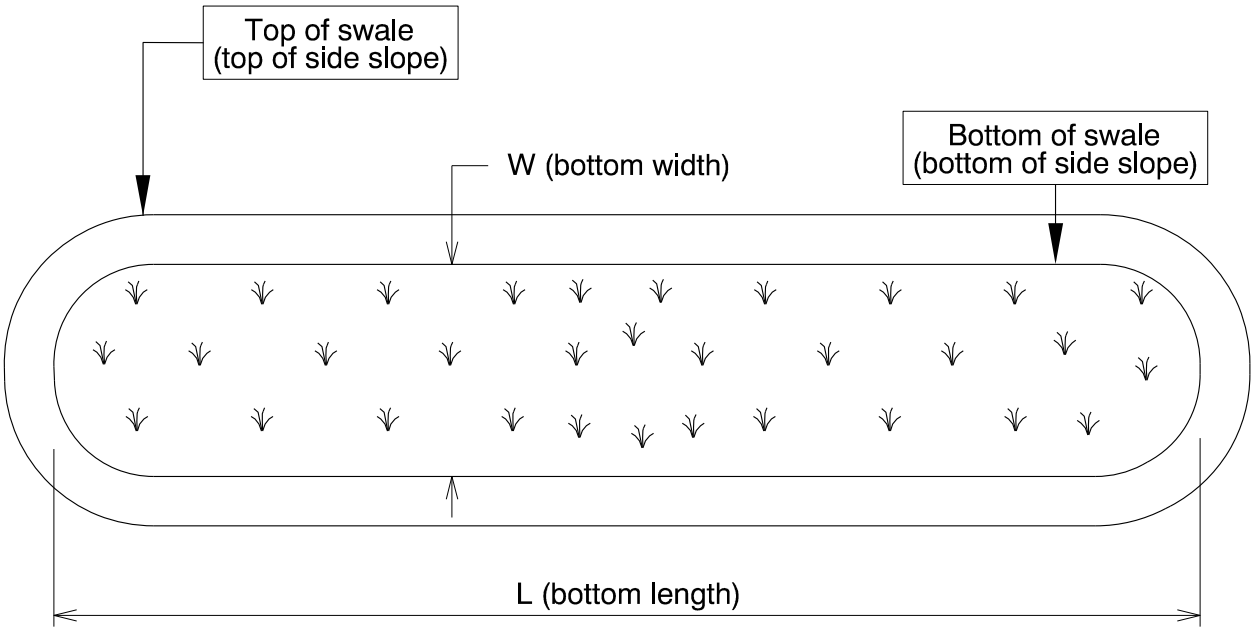
Figure 2: Facility location map

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:

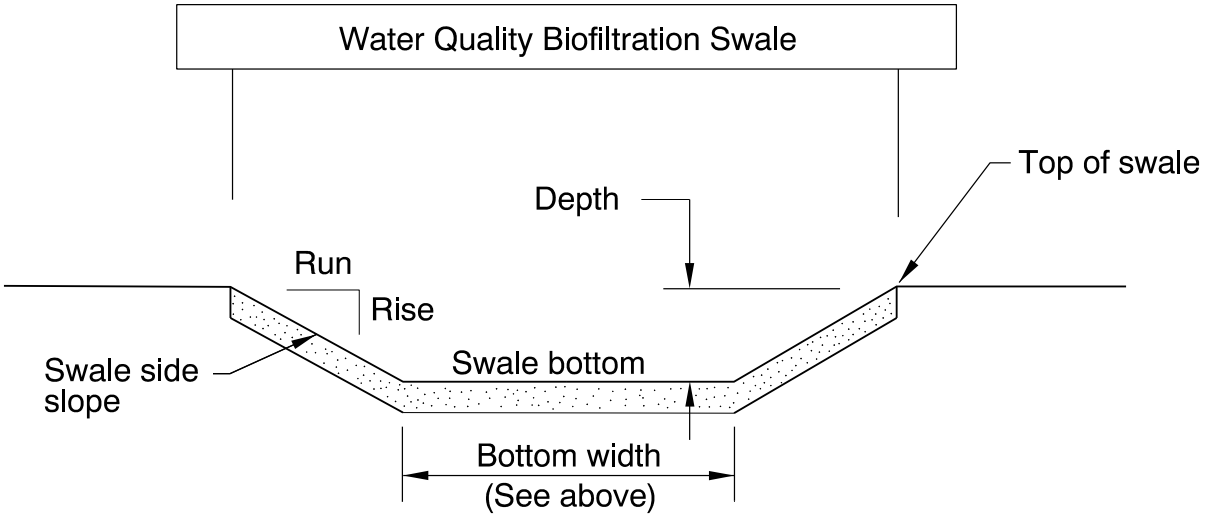
Bottom Length (feet)	Bottom Width (feet)
422	varies



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)
varies	**1**	**3**



Site Specific Information: Soil and vegetation used to treat runoff. Water quality soil does not exist. Simply maintain vegetation. Do **not** follow:

- Table 3 (Maintenance of Water Quality or Biofiltration Swales): Contains maintenance information for swales

The check dams alluded to in the construction plan(appendix B) were not constructed.

4. Facility Access

Maintenance access to the facility:

☐Roadside pad	☒Roadside shoulder
☐Access road with Gate	☐Access road without Gate

Figure 3: [looking west]

5. Operational Components / Maintenance Items

Classification

This facility is classified as an:

☒ On-line Swale	☐ Off-line Swale
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:

☒ No	☐ Yes
There is no bypass component. High flows drains 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:

☒ Operational Plan A	☐ Operational Plan B	☐ Operational Plan C
An on-line swale with roadside ditches	**An on-line swale with piped inlets and outlets**	**An off-line swale with a piped high flow bypass**
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 #**
Manholes/Structures		
Pre-treatment manhole	☐	**S1**
Weir type flow splitter/flow splitter manhole	☐	**S2**
Orifice type flow splitter/flow splitter manhole	☐	**S3**
Standard manhole	☐	**S4**
Swale Inlet		
Pavement sheet flow	☒	**S5**
Inlet Pipe (s)	☐	**S6**
Open channel inlet	☒	**S7**
Riprap pad	☐	**S8**
Ground Cover		
Grass bottom	☒	**S9**
Grass side slopes	☒	**S10**
Granular drain rock	☐	**S11**
Plantings	☐	**S12**
Underground Components		
Geotextile fabric	☐	**S13**
Water quality mix	☐	**S14**
Perforated pipe	☐	**S15**
Porous pavers (access grid)	☐	**S16**
Flow Spreader		
Rock basin (used at inlet)	☐	**S17**
Anchored board (midpoint of swale or every 50 feet along swale bottom)	☐	**S18**
Other: N/A	☐	**S19**
Swale Outlet		
Catch basin with grate	☐	**S20**
Outlet Pipe (s)	☒	**S21**
Open channel outlet	☐	**S22**
Auxiliary Outlet: N/A	☐	**S23**
Outfall Type		
Waterbody (**C**reek/**L**ake/**O**cean)	☐ **C** ☐ **L** ☐**O**	**S24**
Ditch	☒	**S25**
Storm drain system	☐	**S26**
Outfall Components		
Riprap pad	☐	**S27**
Riprap bank protection	☐	**S28**

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

The *Blue Book* can be viewed at the following website:
http://www.oregon.gov/ODOT/Maintenance/Documents/blue_book.pdf

7. Limitations

Access grid installed:

☒ No	☐ Yes
There are NO 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

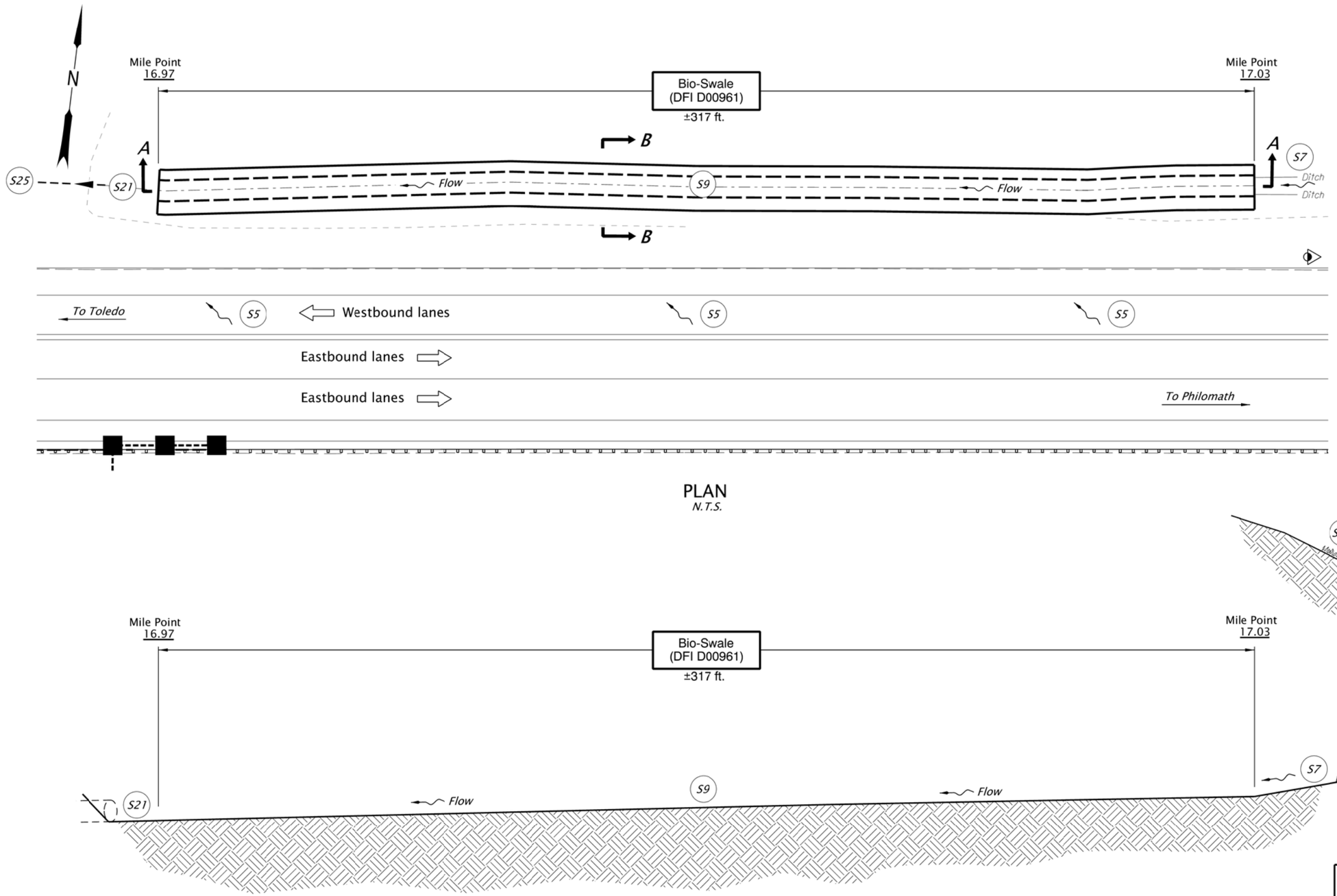
Contact any of the following for more detailed information about management of waste materials found on site:

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

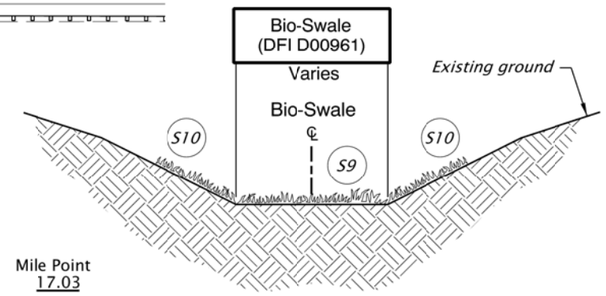
A Appendix A – Site Specific Operational Plan

Contents:

Operational Plan: DFI D00961



PLAN
N.T.S.



SECTION B–B
N.T.S.

SECTION A–A
N.T.S.

LEGEND:

- X# — *Facility Component (see table 1 in O&M Manual)*
- *Manhole*
- *Inlet*
- *Storm Pipe (Facility)*
- *Storm Pipe*
- *Ditch Line*
- *Swale Boundary*
- *Conveyance Direction*
- *Pavement / Facility Flow Path*
- *Traffic Flow Direction*
- *Photo Location / Direction*

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Chris Carman

Drafted By: Jeff Coon

DFI D00961
MAINTENANCE DISTRICT 4 HWY 33
WATER QUALITY BIOFILTRATION SWALE
CORVALLIS-NEWPORT HIGHWAY MP 16.97
LINCOLN COUNTY

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 49V-028

49V-028

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd.
1A-2	Std. Drg. Nos.

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

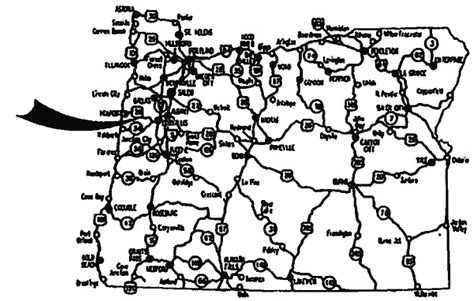
GRADING, DRAINAGE, STRUCTURE, PAVING, SIGNING & ROADSIDE DEVELOPMENT

FFO - US20 PME: UPRR - EDDYVILLE (PHASE 4) SECTION

CORVALLIS - NEWPORT HIGHWAY

LINCOLN COUNTY

APRIL 2016

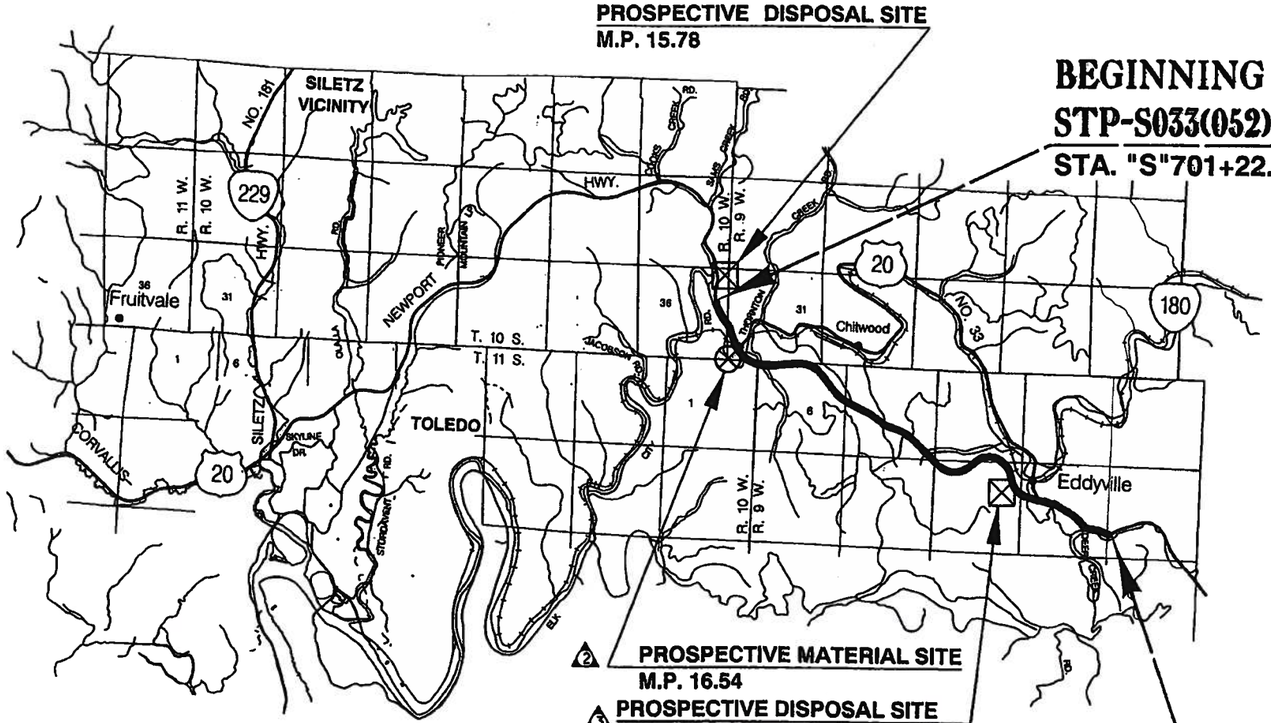


Overall Length Of Project - 5.61 Miles

ATTENTION:
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0010 Through OAR 952-001-0090. You May Obtain Copies Of The Rules By Calling The Center. (Note: The Telephone Number For The Oregon Utility Center Is (503) 232-1987.)

OTIA
OREGON TRANSPORTATION INVESTMENT ACT

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE



OREGON TRANSPORTATION COMMISSION

Tammy Baney	CHAIR
David Lohman	COMMISSIONER
Susan Morgan	COMMISSIONER
Alando Simpson	COMMISSIONER
Sean O'Halloran	COMMISSIONER
Matthew L. Garrett	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.

By: _____ 4-11-16
Signature & date

James E. West - R2 Tech Center Manager
Print name and title

Concurrence by ODOT Chief Engineer

No.	DATE	REVISIONS	BY
2	4-04-16	Added Prospective Material Site	D.D.J.
3	4-14-16	Added Prospective Disposal Site	D.D.J.

N

T. 10 & 11 S.,
R. 9 & 10 W., W.M.

FFO-US20 PME: UPRR - EDDYVILLE (PHASE 4) SECTION
CORVALLIS - NEWPORT HIGHWAY
LINCOLN COUNTY

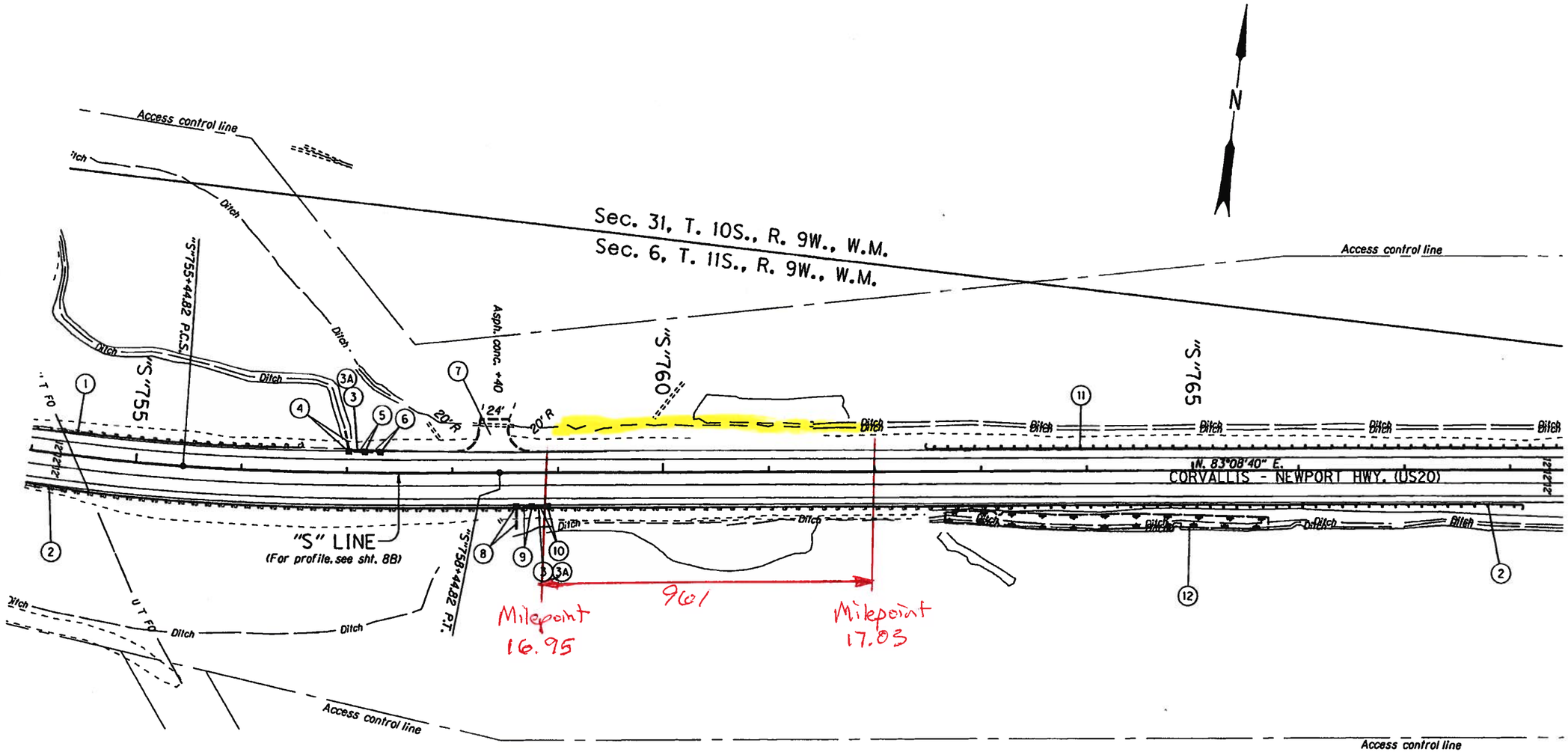
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	STP-S033(052)	1

PE001973 010

F:\ODOT_DATA\Projects\18323_PME_ph4\18323r2.tsl :: Default 4/11/2016 11:03:53 AM tdb081

1:1200 - 001

49V-028



NOTE:
Preserve and protect extg. instrumentation.

REGISTERED PROFESSIONAL ENGINEER
58,879
OREGON
JULY 13, 2004
DERRYL D. JAMES
RENEWS: 06-30-2017

OREGON DEPARTMENT OF TRANSPORTATION

REGION 2 TECH CENTER

FFO-US20 PME: UPRR - EDDYVILLE
(PHASE 4) SECTION
CORVALLIS - NEWPORT HIGHWAY
LINCOLN COUNTY

Design Team Leader - B. Scott Nelson
Designed By - Derryl James
Drafted By - Charlotte Gerken

GENERAL CONSTRUCTION

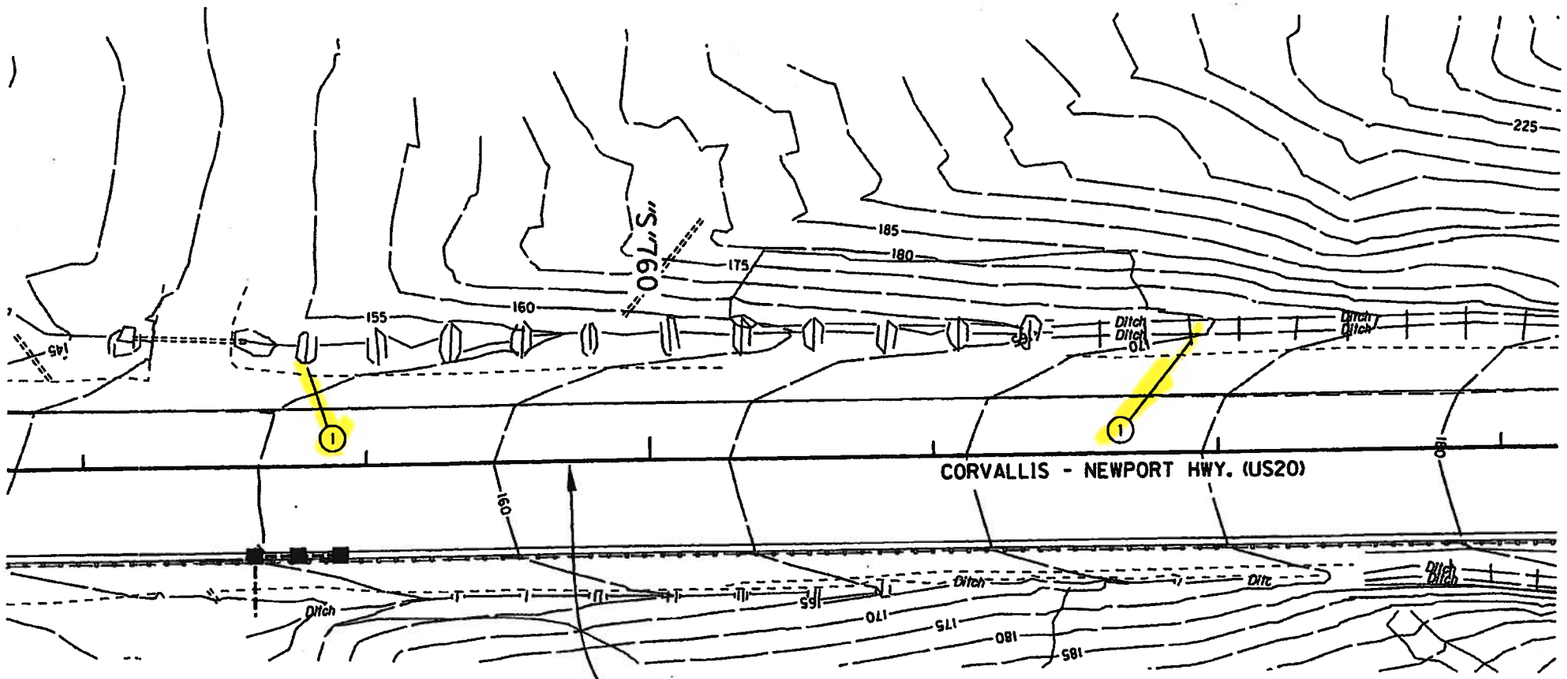
SHEET NO. 8

F:\ODOT_DATA\Projects\18323_PME_ph4\18323f.pll :: Default 2/11/2016 6:35:09 PM tdb081

Rotation: 0° Scale: 1"=100'

D00961

49V-028



① *Inst. stormwater facility markers (For details, see sht. GJ-20)*

REGISTERED PROFESSIONAL ENGINEER
72619PE
OREGON
JUNE 11, 2008
TAMARA S. CONNOLLY
2/16/16
RENEWS: 12/31/2017

OREGON DEPARTMENT OF TRANSPORTATION

Otak Inc.
A Member of the Global Partner
808 SW Third Avenue, Suite 300
Portland, Oregon 97204
Phone: (503)287-6825 Fax: (503)415-2304

FFO-US20 PME: UPRR - EDDYVILLE
(PHASE 4) SECTION
CORVALLIS - NEWPORT HIGHWAY
LINCOLN COUNTY

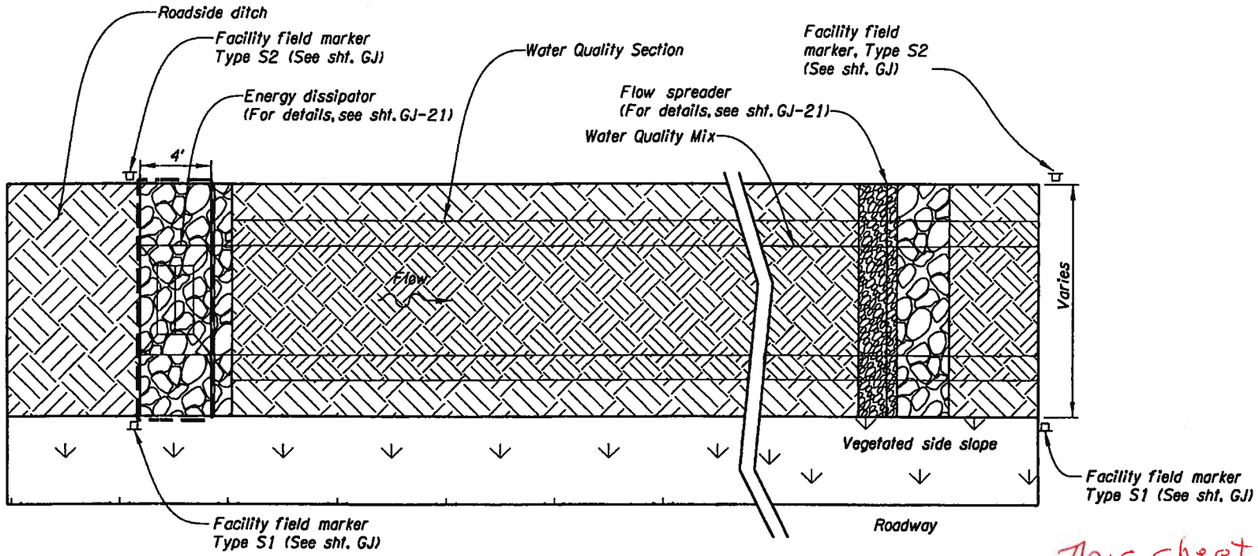
Design Team Leader - Melanie McCandless
Designed By - Jeremy Tanargo
Drafted By - Sadie Reiter

WATER QUALITY SWALE PLAN

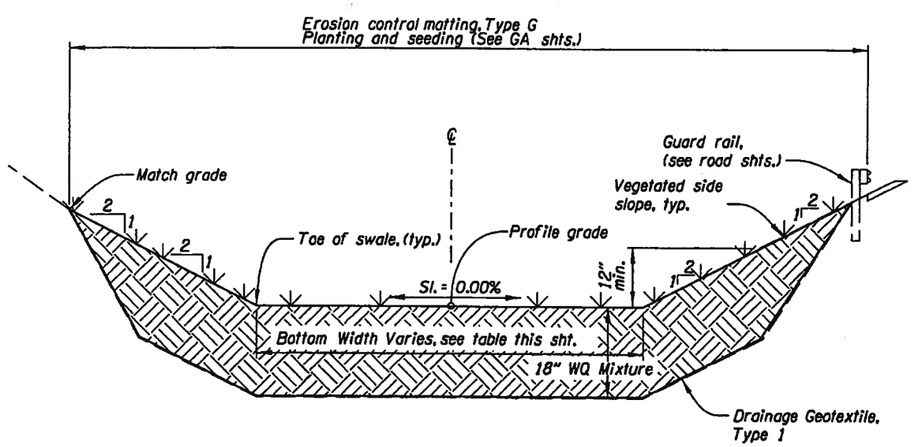
SHEET NO. GJ-5

L:\Project\16900\16962\Dgn_Phase 4\18323GJ4.dgn :: Default 2/12/2016 11:08:24 AM melaniem

Rotation: 0° Scale: 1"=50'



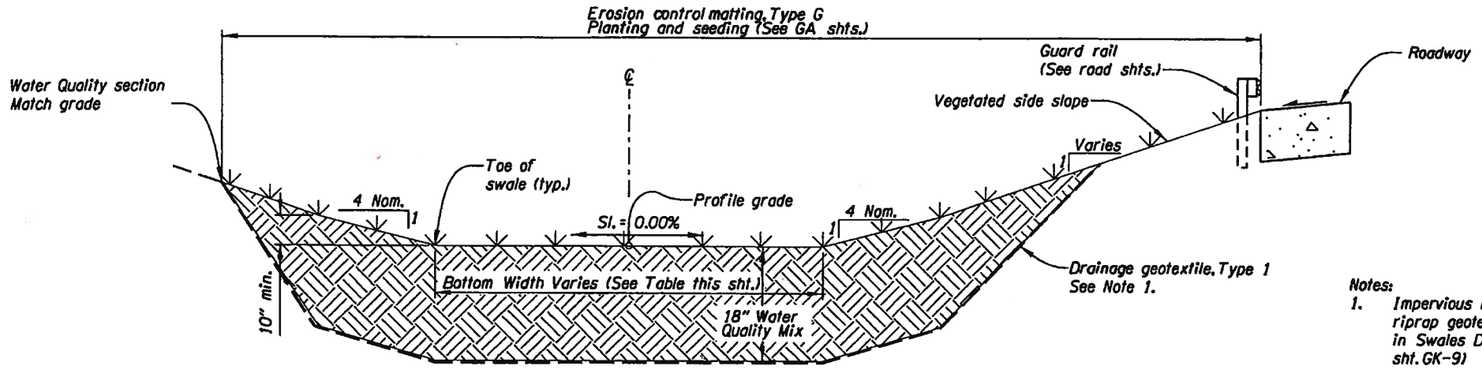
PLAN



WATER QUALITY SECTION - TYPE 1

This sheet only for field marker.
No water quality mix was used at DF1 961.

SWALE DATA TABLE		
SWALE	BOTTOM WIDTH (FT)	TYPE
D00955	6.0	1
D00956	6.0	1
D00957	6.0	1
D00958	6.0	1
D00959	8.0	1
D00962	6.0	2
D00963	6.0	2
D00964	6.0	2
D00965	6.0	2
D00966	8.0	2
D00967	6.0	2
D00968	4.0	2
D00969	6.0	2
D00970	8.0	2
D00971	10.0	2
D00972	6.0	2



WATER QUALITY SECTION - TYPE 2

Notes:
1. Impervious liner shall replace riprap geotextile and drainage geotextile in Swales D00965 and D00970. (For details, see sht. GK-9)

WATER QUALITY SWALE DETAIL

Not to Scale

REGISTERED PROFESSIONAL ENGINEER
72619PE
OREGON
JUNE 11, 2008
TAMARA S. CONNOLLY
2/16/16
RENEWS: 12/31/2017

OREGON DEPARTMENT OF TRANSPORTATION

Otak Inc.
A Kennil Global Partner
808 SW Third Avenue, Suite 300
Portland, Oregon 97204
Phone: (503)287-6825 Fax: (503)415-2304

FFO-US20 PME: UPRR - EDDYVILLE
(PHASE 4) SECTION
CORVALLIS - NEWPORT HIGHWAY
LINCOLN COUNTY

Design Team Leader - Melanie McCandless
Designed By - Tammi Connolly
Drafted By - Sadie Reiter

WATER QUALITY SWALE DETAILS

SHEET NO. GJ-20