OPERATION & MAINTENANCE MANUAL

Manual prepared: May 2018

DFI No. D01119

Figure 1: DFI No. D01119, looking [cardinal direction]

1. Identification

Drainage Facility ID (DFI):	D01119
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 51V-087
Location:	District: 3
	Highway No.: 91
	Mile Post: 49.78 to 49.81, East Side

2. Manual Purpose

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

3. 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.

Flow direction: [note cardinal direction]

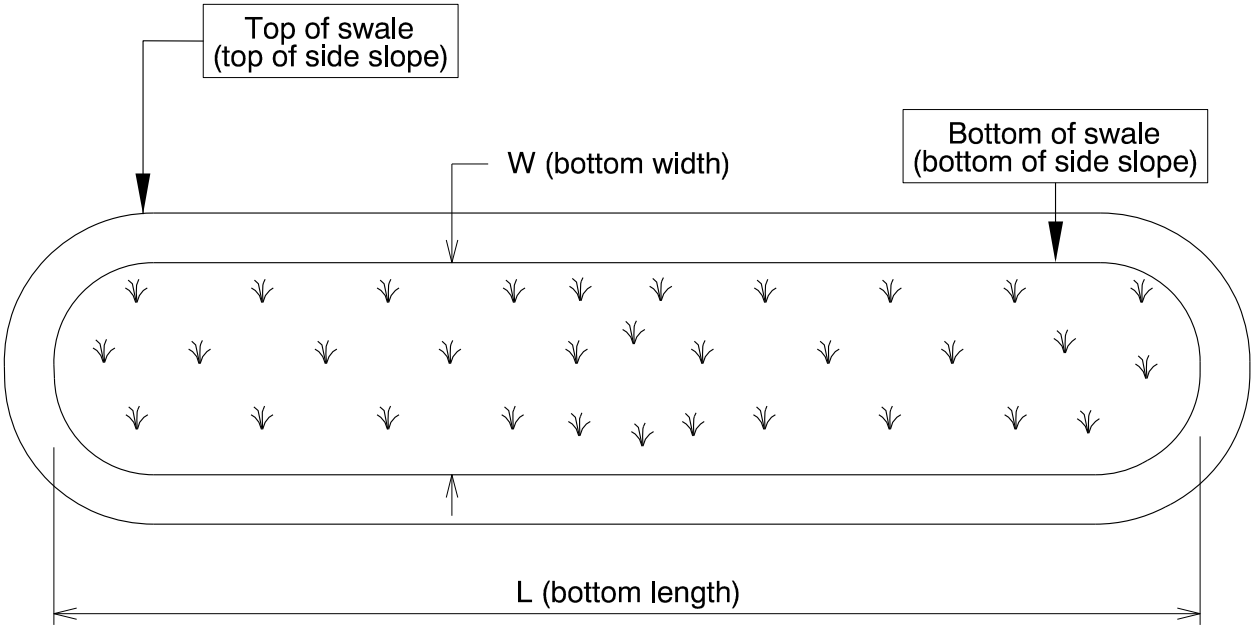
Figure 2: Facility location map

4. 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:

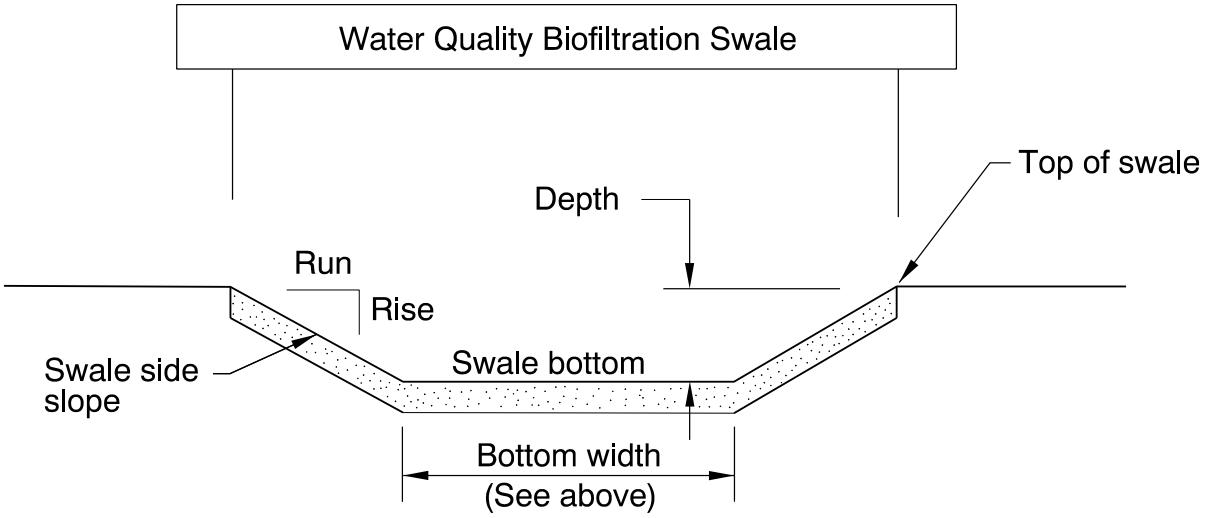
Bottom Length (feet)	Bottom Width (feet)
168	**4**



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**	**4**



Site Specific Information: Add site specific information that is not standard to the Operation Manual

5. Facility Access

Maintenance access to the facility:

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

Figure 3: [insert post construction facility access photo and caption text]

6. 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
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: matting	☒	**S19**
Swale Outlet		
Catch basin with grate	☐	**S20**
Outlet Pipe (s)	☐	**S21**
Open channel outlet	☒	**S22**
Auxiliary Outlet: describe type	☐	**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**

7. 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

8. Limitations

Access grid installed:

☒ No	☐ Yes
There are (Choose applicable weight: no, light, med., heavy) duty 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.

9. 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

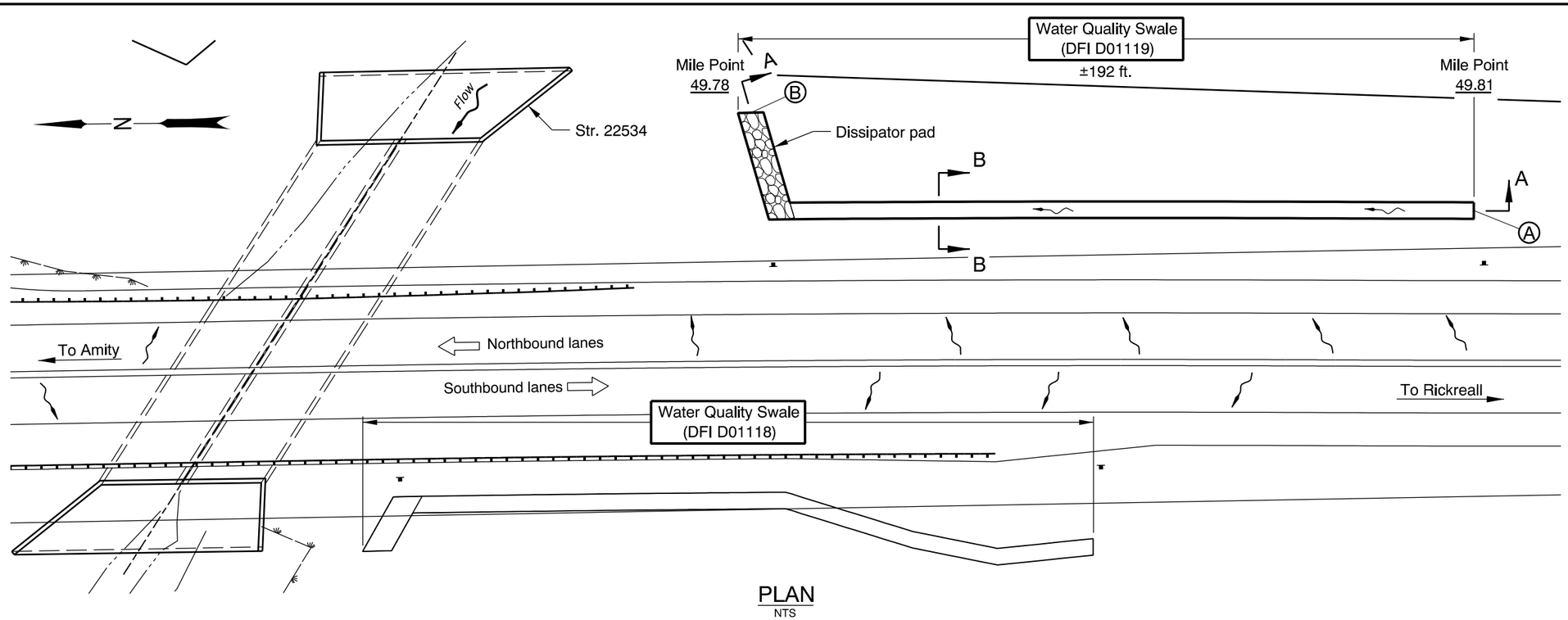
Contact any of the following for more detailed information about management of waste materials found on site:

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

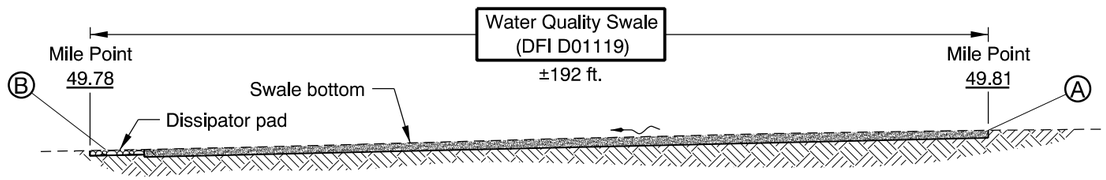
A Appendix A – Site Specific Operational Plan

Contents:

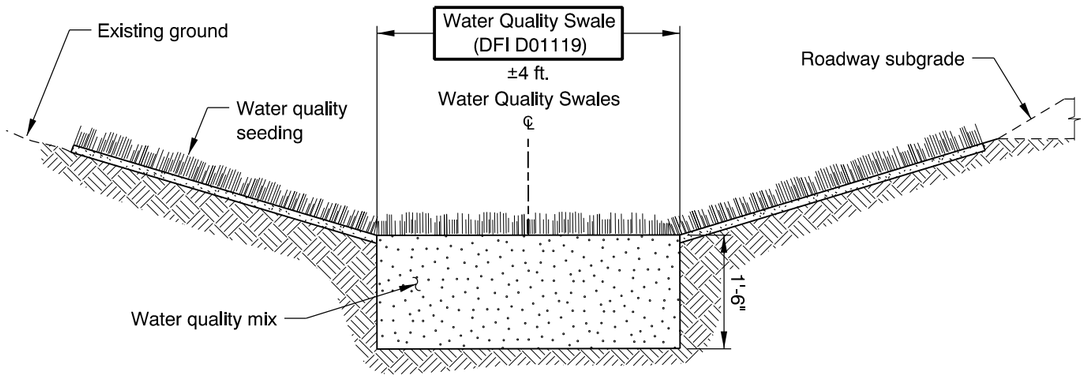
Operational Plan: DFI D01119



PLAN
NTS



SECTION A-A
NTS



SECTION B-B
NTS

LEGEND:
- Photo Location / Direction
- Swale Inlet
- Swale Outlet
- Storm Facility
- Conveyance Direction
- Pavement / Facility Flow Path

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: *Bruce Carmichael*

Drafted By: *Michael Skelton*

DFI D01119
MAINTENANCE DISTRICT 3 HWY 101
WATER QUALITY BIOFILTRATION SWALE
PACIFIC HIGHWAY MP 49.78-49.81
POLK COUNTY

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan Vxxx-xx

51V-087

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
A01	Title Sheet
A02	Index Of Sheets Cont'd.
A03	Std. Drg. Nos.
A04	Survey Control Data
A05	Survey Control Data
A06	Survey Control Data

No.	DATE	REVISIONS	BY
3	10-02-18	Changed bid let date, updated text	S.T.

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

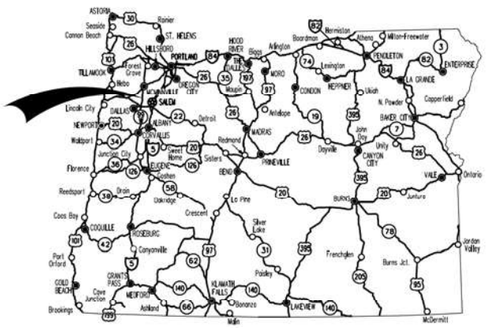
GRADING, DRAINAGE, STRUCTURES, PAVING, SIGNING, SIGNALS & ROADSIDE DEVELOPMENT

OR99W: ASH SWALE & PLUM CREEK BRIDGES SEC.

PACIFIC HIGHWAY WEST

POLK COUNTY

3 OCTOBER 2018



Overall Length Of Project - 0.68 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.)

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

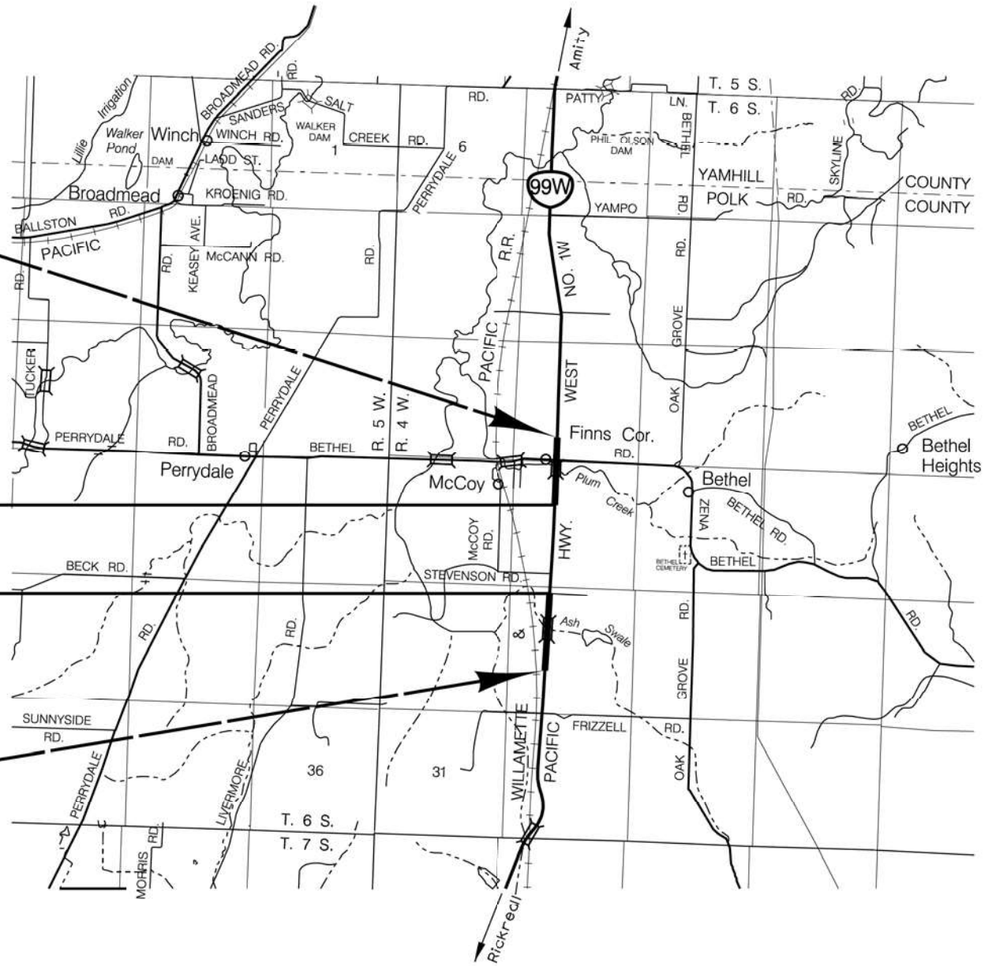
S091(079)
BEGINNING OF PROJECT
STA. "L" 286+56.95 (M.P. 49.69)

STA. "L" 304+71.93 (M.P. 50.03)

NO WORK AREA

STA. "A" 356+19.10 (M.P. 50.89)

S091(079)
END OF PROJECT
STA. "A" 374+42.59 (M.P. 51.23)



N

T. 6 S., R. 4 W., W.M.

OREGON TRANSPORTATION COMMISSION

Tammy Baney	CHAIR
Bob Van Brocklin	VICE-CHAIR
Alando Simpson	COMMISSIONER
Julie Brown	COMMISSIONER
Martin Callery	COMMISSIONER
Matthew L. Garrett	DIRECTOR OF TRANSPORTATION

3

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: _____ Oct 3 2018 2:14 PM
Signature & date

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

Steven B Cooley Oct 4 2018 3:05 PM
Concurrence by ODOT Chief Engineer

OR99W: ASH SWALE & PLUM CREEK BRIDGES SEC.
PACIFIC HIGHWAY WEST
POLK COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	S091(079)	A01

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

PE002545

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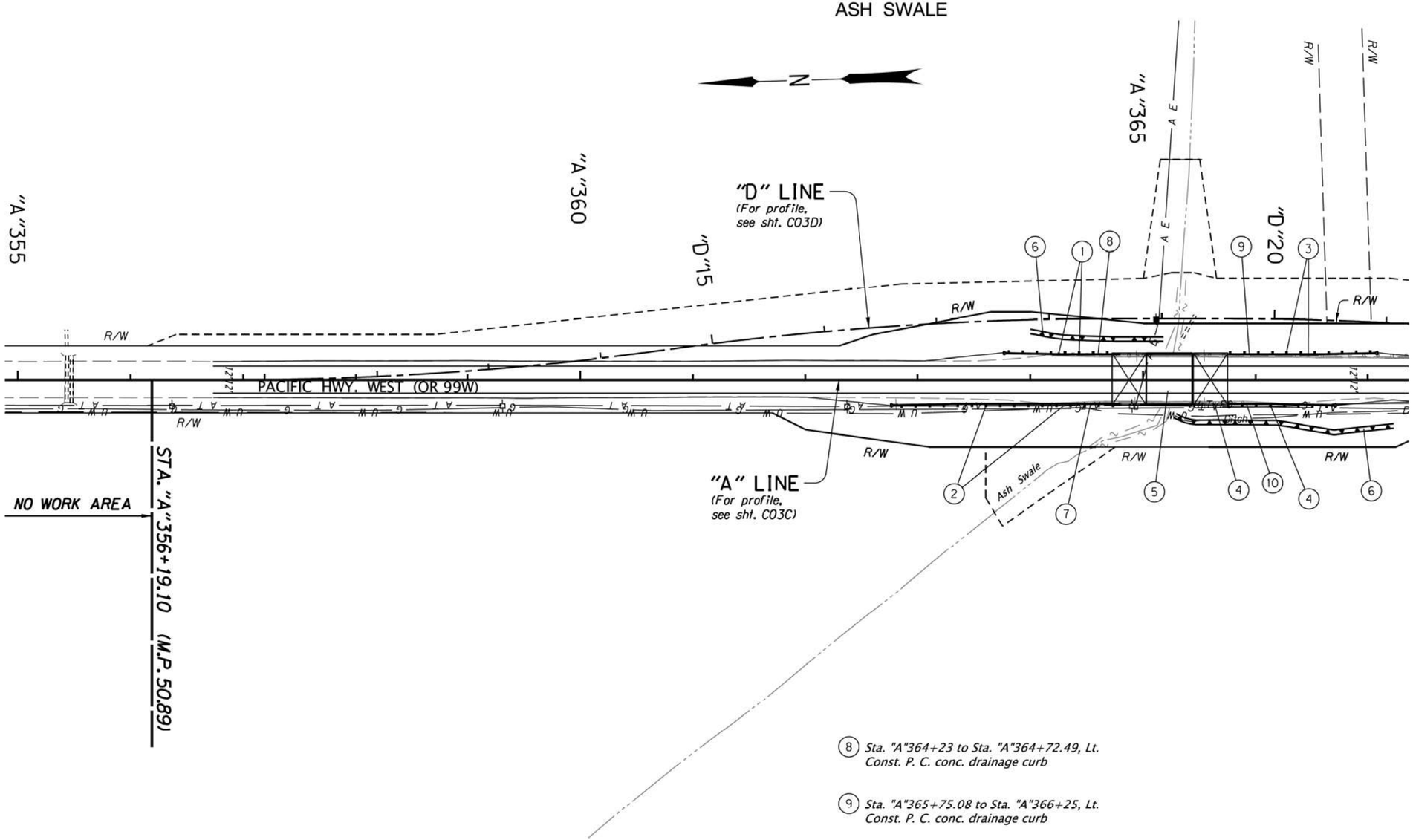
Sec. 29, T. 6 S., R. 4 W., W.M.

ASH SWALE



(1) *Sta. "A"363+78.5 to Sta. "A"364+72.49, Lt.*
Remove extg. guardrail – 87.5'
Const. 31" guardrail – 50' (Type 2A)
Const. 31" guardrail – 12.5' (Type 3)
W=1', E=2'
Const. guardrail terminal, non-flared
Test level 3
Const. 31" guardrail to bridge transition
(See drg. nos. RD440, RD482 & BR203)

(2) *Sta. "A"362+78.49 to Sta. "A"364+72.48, Rt.*
Remove extg. guardrail – 87.5'
Const. 31" guardrail – 150' (Type 2A)
Const. 31" guardrail – 12.5' (Type 3)
W=1', E=2'
Const. guardrail terminal, non-flared
Test level 3
Const. 31" guardrail to bridge transition

(3) *Sta. "A"365+75.08 to Sta. "A"367+06.57, Lt.*
Remove extg. guardrail – 275'
Const. 31" guardrail – 87.5' (Type 2A)
Const. 31" guardrail – 12.5' (Type 3)
W=1', E=2'
Const. guardrail terminal, non-flared
Test level 3
Const. 31" guardrail to bridge transition

(4) *Sta. "A"367+75.06 to Sta. "A"366+69.06, Rt.*
Remove extg. guardrail – 87.5'
Const. 31" guardrail – 50' (Type 2A)
Const. 31" guardrail – 12.5' (Type 3)
W=1', E=2'
Const. guardrail terminal, non-flared
Test level 3
Const. 31" guardrail to bridge transition

(5) *Structure no. 22533*
Const. structure – 40'
Rdwy. width 44'
and reinf. panel at bridge ends
(For sht. nos. see sht. A02)

(6) *Const. bio-swale*
(For details, see sht. HA02)

(7) *Sta. "A"364+26 to Sta. "A"364+72.49, Rt.*
Const. P. C. conc. drainage curb
(See drg. no. RD701)

(8) *Sta. "A"364+23 to Sta. "A"364+72.49, Lt.*
Const. P. C. conc. drainage curb

(9) *Sta. "A"365+75.08 to Sta. "A"366+25, Lt.*
Const. P. C. conc. drainage curb

(10) *Sta. "A"365+75.08 to Sta. "A"365+96, Rt.*
Const. P. C. conc. drainage curb

REGISTERED PROFESSIONAL ENGINEER
77754PE
Digitally Signed Aug 15 2018 3:34 PM
OREGON
DEC. 12, 2012
TROY MICHAEL JOHNSON
RENEWS: 06-30-2019

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OREGON DEPARTMENT OF TRANSPORTATION

OR99W: ASH SWALE & PLUM CREEK BRIDGES SEC.

PACIFIC HIGHWAY WEST

POLK COUNTY

Designer: Troy Johnson, PE | Reviewer: Derryl James, PE

Drafter: Jeff Larson | Checker: N/A

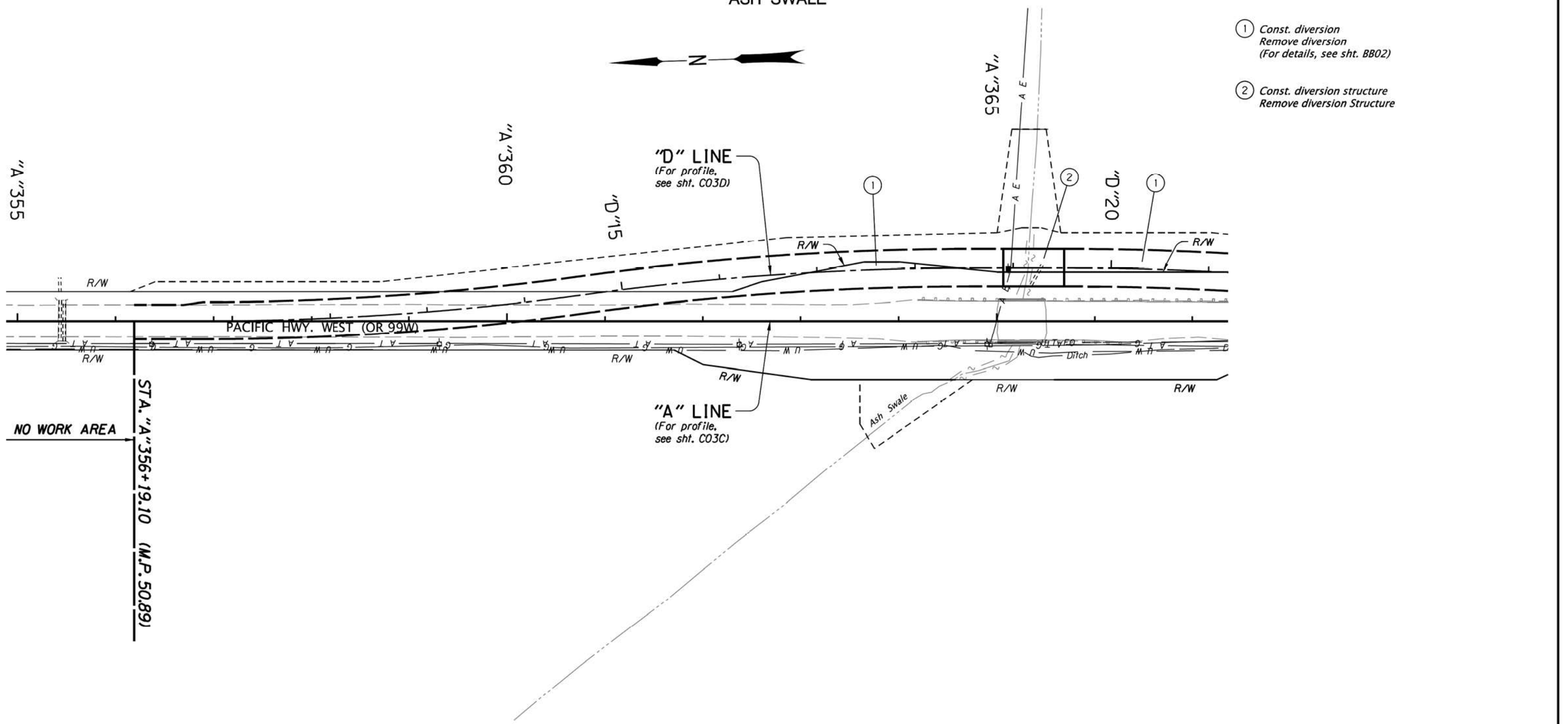
GENERAL CONSTRUCTION

SHEET NO. C03A

51V-087

Sec. 29, T. 6 S., R. 4 W., W.M.

ASH SWALE



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OREGON
DEC. 12, 2012
TROY MICHAEL JOHNSON
RENEWS: 06-30-2019

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OREGON DEPARTMENT OF TRANSPORTATION

OR99W: ASH SWALE & PLUM CREEK BRIDGES SEC.

PACIFIC HIGHWAY WEST

POLK COUNTY

Designer: Troy Johnson, PE | Reviewer: Derryl James, PE

Drafter: Jeff Larson | Checker: N/A

DIVERSION PLAN

SHEET NO. C03B

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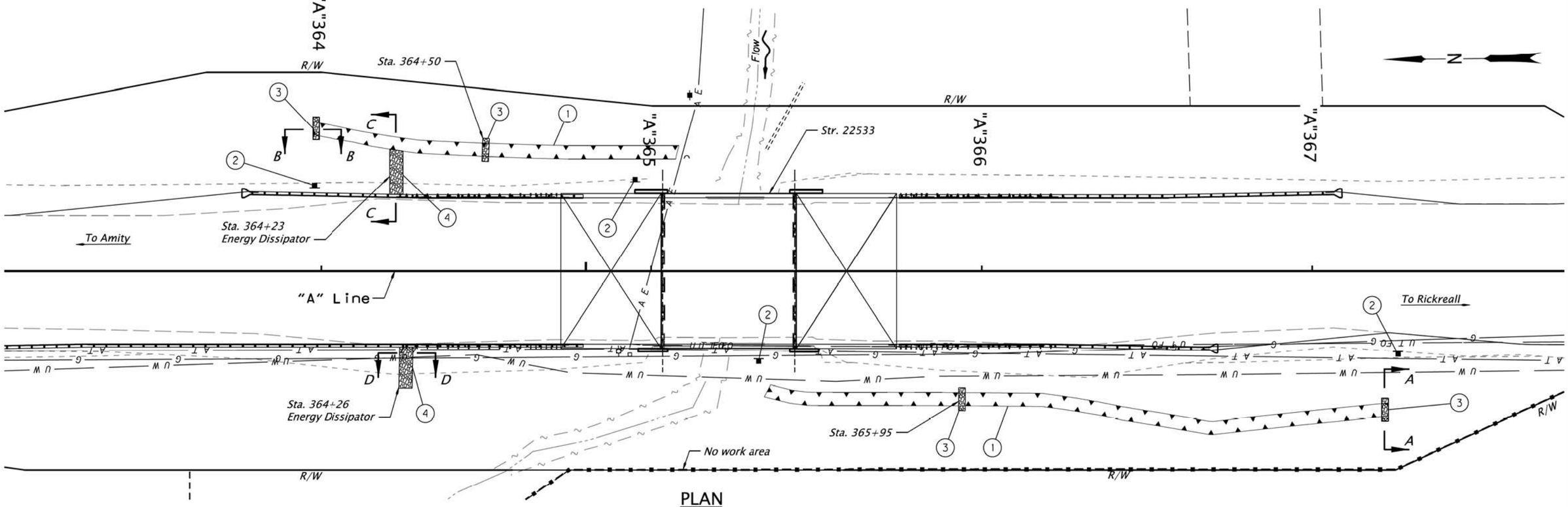
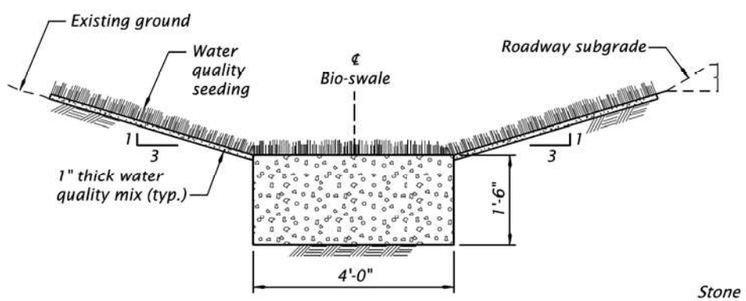
Rotation: 0° Scale: 1"=100'

51V-087

ASH SWALE



PLAN



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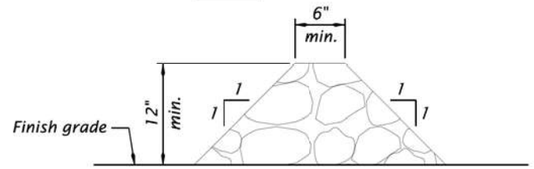
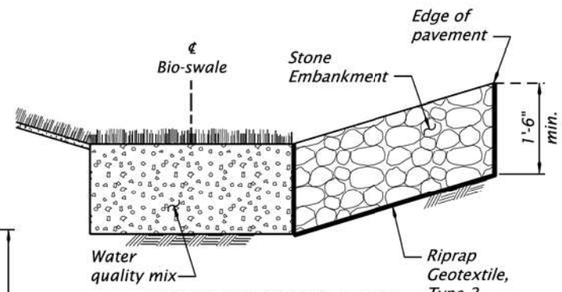
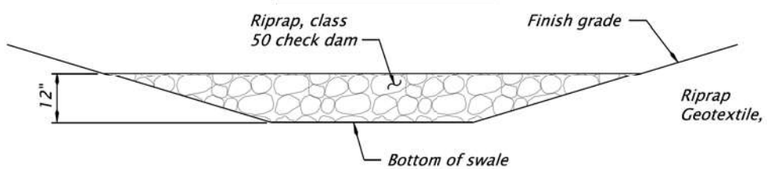


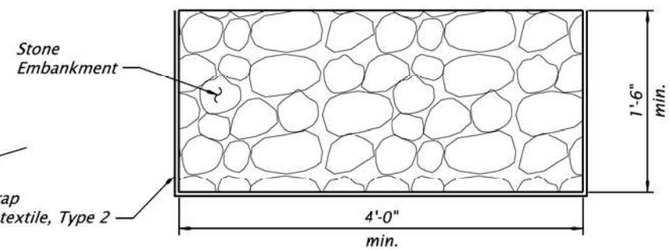
SECTION B-B



ENERGY DISSIPATOR
SECTION C-C



SECTION A-A



ENERGY DISSIPATOR
SECTION D-D

1. Const. Bio-swale - see table for information
   Water quality cell excavation - 74 cu. yd.
   Water quality mix - 74 cu. yd.
   (See detail for information)
2. Install Type S2 markers - 4
   (For details see sht. RD399)
3. Const. Check Dam - 4
   (Riprap, class 50)
4. Const. Energy Dissapator - 2
   (Stone Embankment)

Bio-swale bottom width

Note:
Station offsets are at the center of the bio-swale bottom.

Bio-Swale Table

Facility	DFI #	Inlet Station, Offset	Outlet Station, Offset	Inlet Flowline Elevation	Outlet Flowline Elevation	Bottom Width (Ft.)	Length (Ft.)	Slope (%)
West	D01164	"A"367+23.00, 40.93 Rt.	"A"365+35.00, 32.63 Rt.	165.9	162.8	4	190	1.6
East	D01163	"A"364+00.00, 42.59 Lt.	"A"365+07.00, 35.64 Rt.	164.6	164.2	4	108	0.3

REGISTERED PROFESSIONAL ENGINEER
56,342
Digitally Signed Jul 27 2018 1:45 PM
OREGON
JANUARY 15, 2002
DUSTIN J. HAAS
RENEWS: 06-30-2019

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OREGON DEPARTMENT OF TRANSPORTATION

OR99W: ASH SWALE & PLUM CREEK BRIDGES SEC.

PACIFIC HIGHWAY WEST
POLK COUNTY

HWY: 99W
M.P.: 51.06
UNIT FILE CODE: N/A
DFI/TSSU NO.: D01163 & D01164

Designer: Dustin Haas Reviewer: Bruce Carmichael
Drafter: Michael Skelton Checker: —

STORMWATER PLAN AND DETAILS

SHEET NO. HA02