OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: November 2018

DFI No. D00843 and D00844

Figure 1: DFI No. D00843, looking North

Figure 2: DFI No. D00844, looking [cardinal direction]

1. Identification

Drainage Facility ID (DFI):	D00843
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 47V-052
Location:	District: 1
	Highway No.: 009
	Mile Post: 43.07 to 43.09 [left side]

Drainage Facility ID (DFI):	D00844
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 47V-052
Location:	District: 1
	Highway No.: 009
	Mile Post: 43.16 to 43.09 [left 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: South

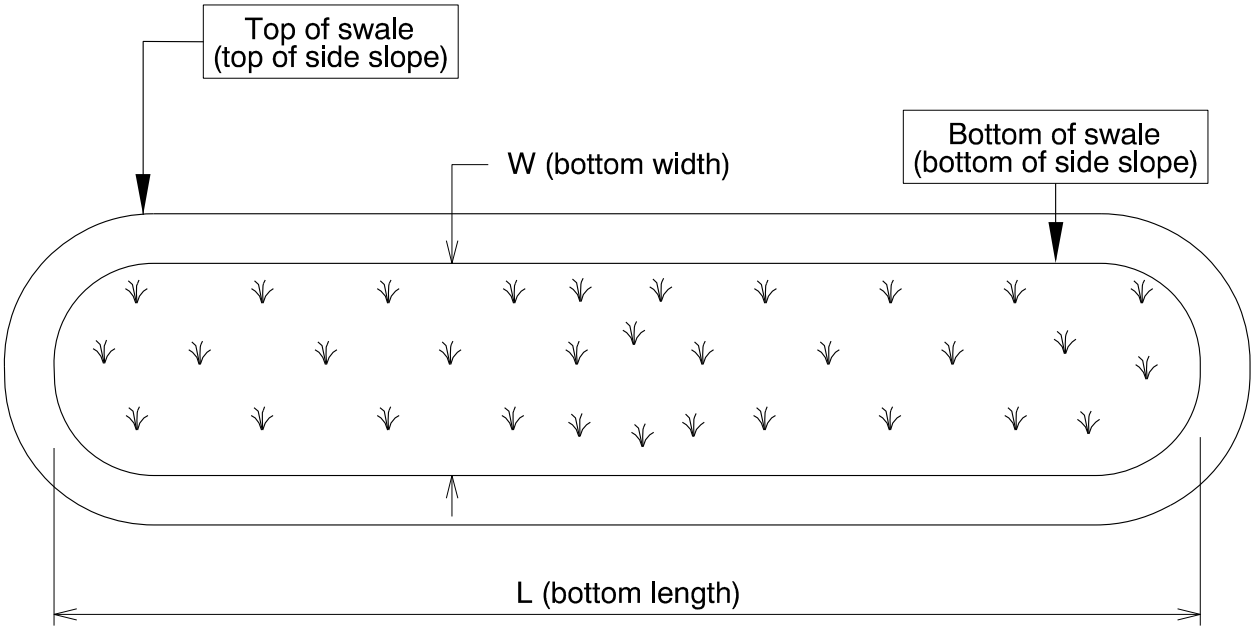
Figure 3: Facility location map

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:

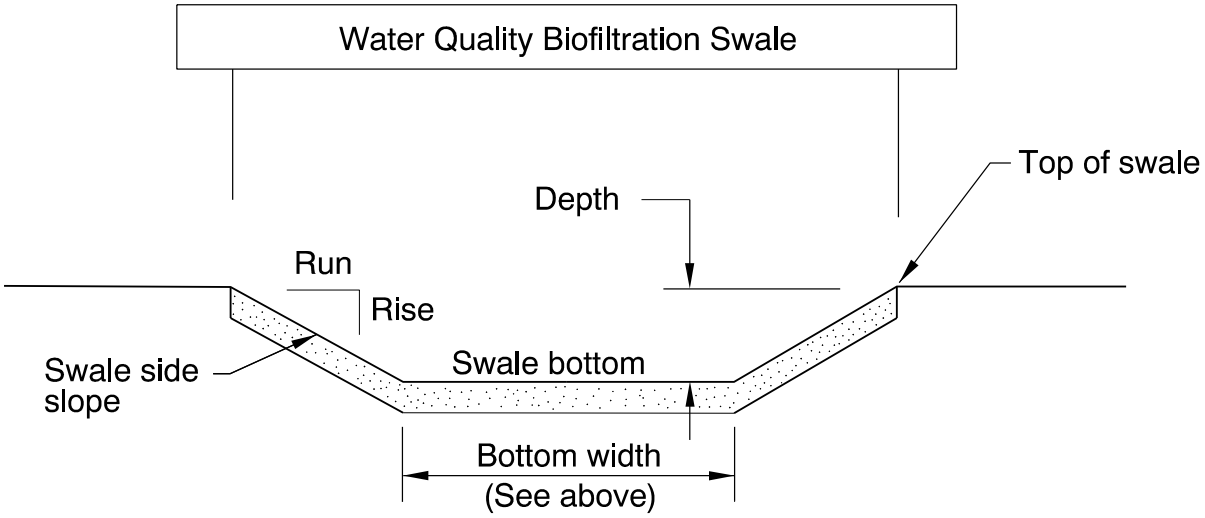
Facility ID	Bottom Length (feet)	Bottom Width (feet)
D00843	**107**	**4**
D00844	**400**	**4**



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)
2 minimum	**1**	**6**



Site Specific Information: Both of these facilities are designed with a Water Quality mix consisting of 70/30 topsoil to sand mixture. The facilities also contain flow spreaders and a riprap basin located between the outlets of both facilities to mitigate erosion.

5. Facility Access

Maintenance access to the facility:

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

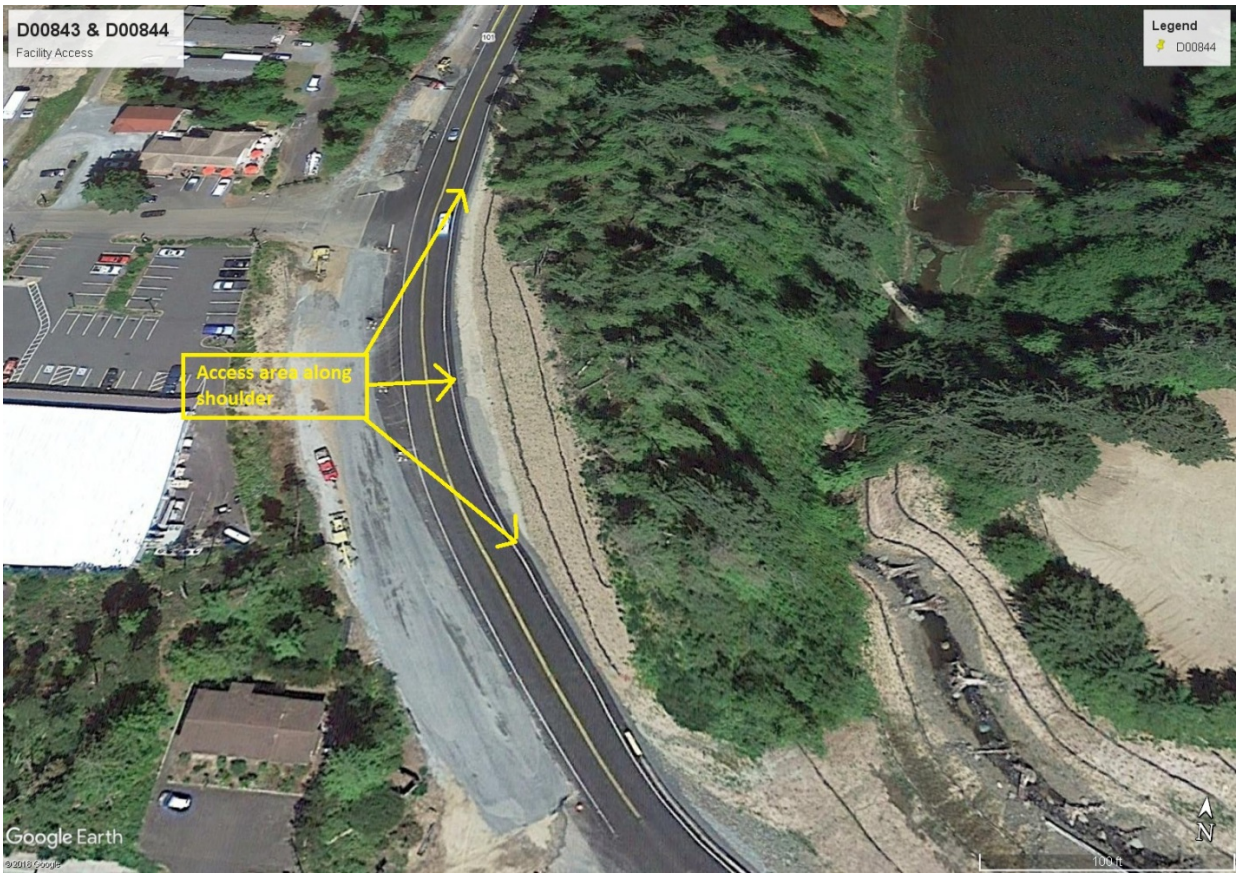


Figure 4: Facility Access

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: describe type	☐	**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**	**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 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.

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

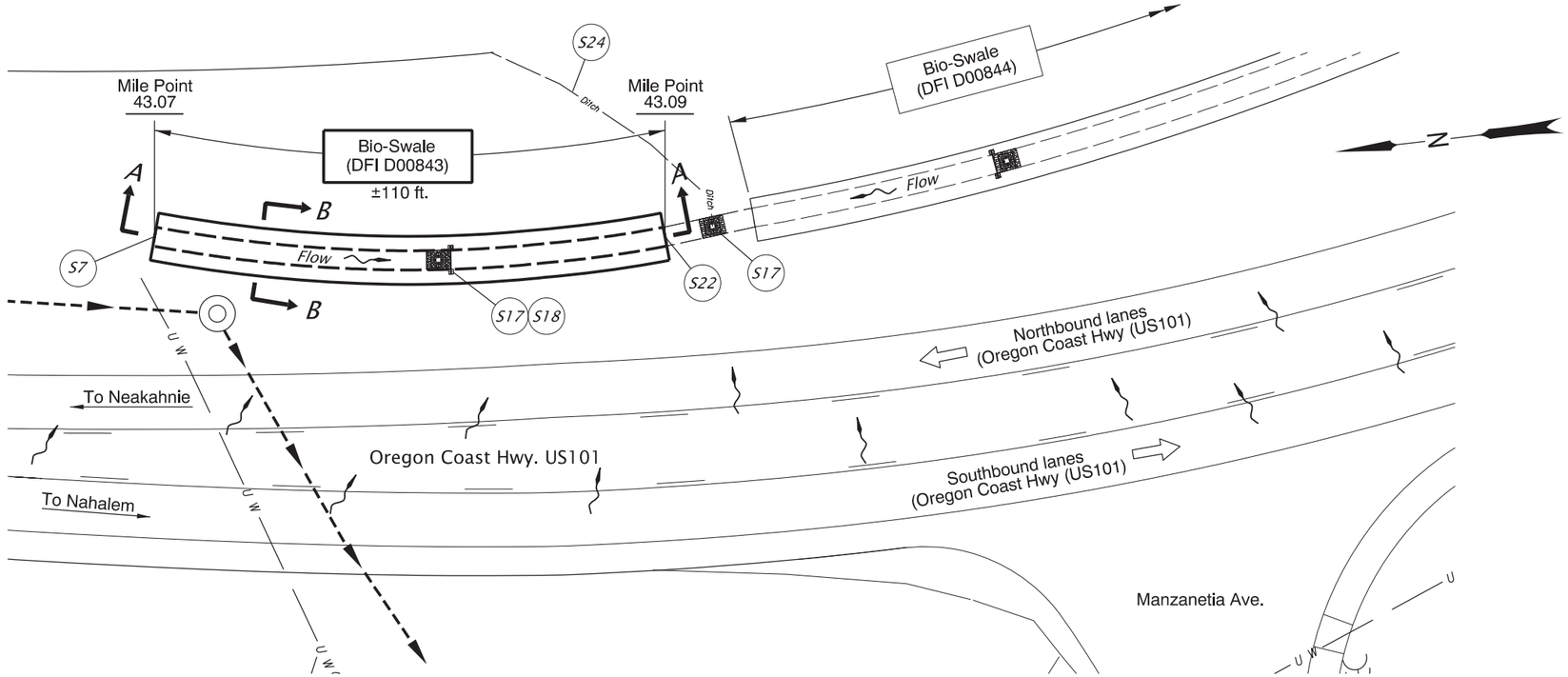
Contact any of the following for more detailed information about management of waste materials found on site:

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

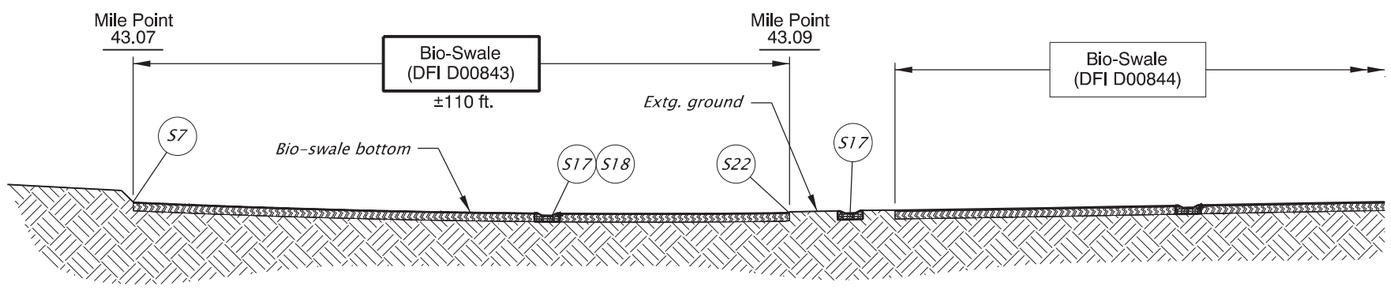
A Appendix A – Site Specific Operational Plan

Contents:

Operational Plan: DFI D00843 and D00844



PLAN
N.T.S.



SECTION A-A
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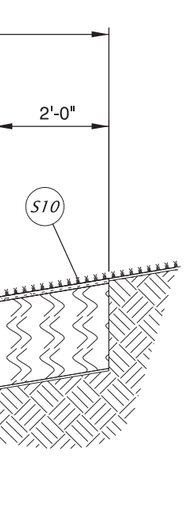

SECTION B-B
N.T.S.

LEGEND:

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

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Consultant

Drafted By: Michael Skelton

DFI D00843
MAINTENANCE DISTRICT 1 HWY US101
WATER QUALITY BIOFILTRATION SWALE
OREGON COAST HIGHWAY MP 43.07
TILAMOOK COUNTY

DFI_D00843.dgn :: DFI_D00843 12/11/2018 8:30:35 AM hwye93l

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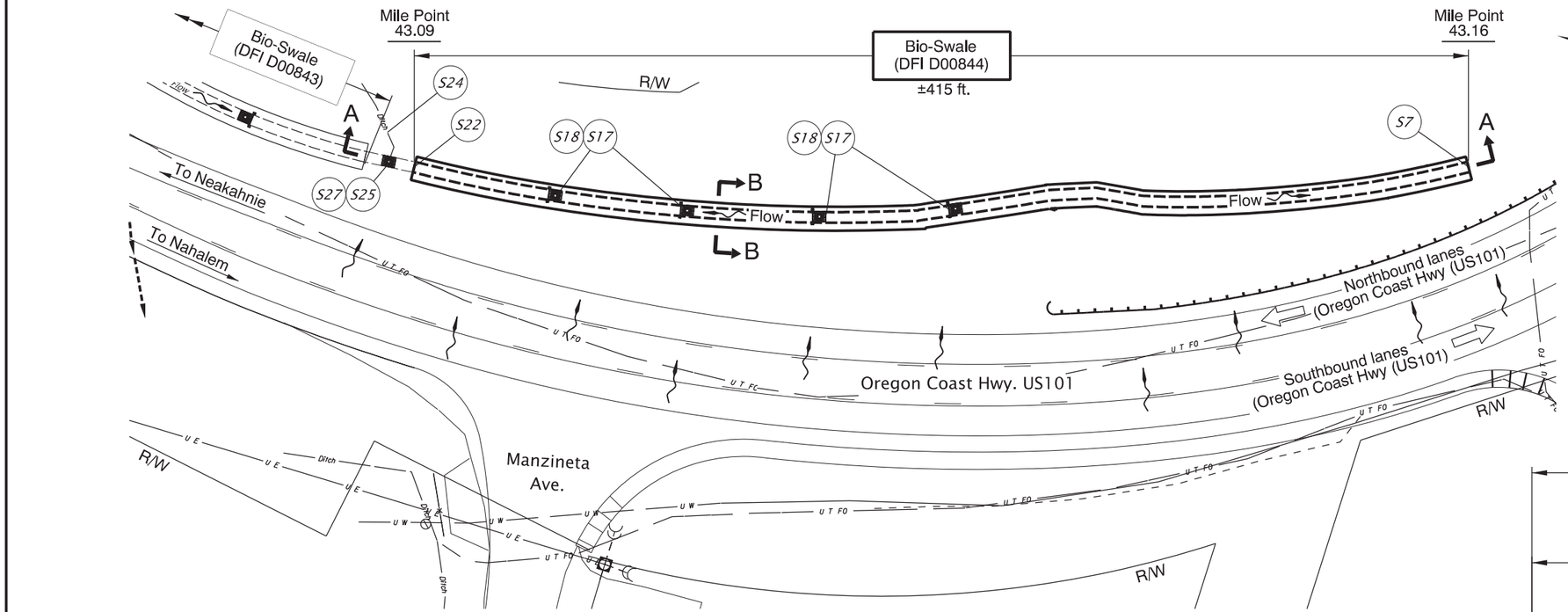

PLAN
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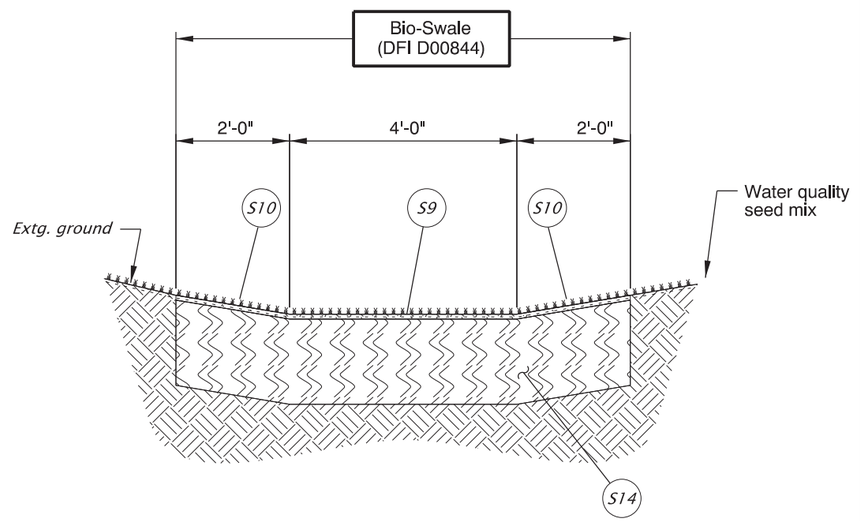
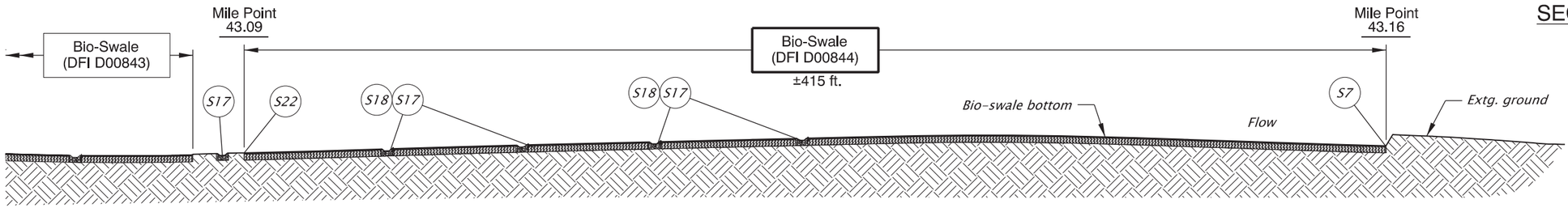
- Pavement / Facility Flow Path



SECTION B-B
N.T.S.



OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Consultant

Drafted By: Michael Skelton

DFI D00844
MAINTENANCE DISTRICT 1 HWY US101
WATER QUALITY BIOFILTRATION SWALE
OREGON COAST HIGHWAY MP 43.09
TILAMOOK COUNTY

DFI_D00844.dgn :: DFI_D00844 12/11/2018 8:31:08 AM hwye93l

Rotation: 285.024° Scale: 1"=30'

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 47V-052

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

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

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

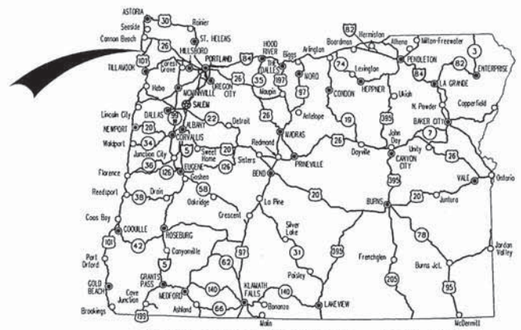
FFO - US101: MANZANITA AVE. - NEAHKAHNIE CREEK SEC.

OREGON COAST HIGHWAY

TILLAMOOK COUNTY

NOVEMBER 2014

47V-052



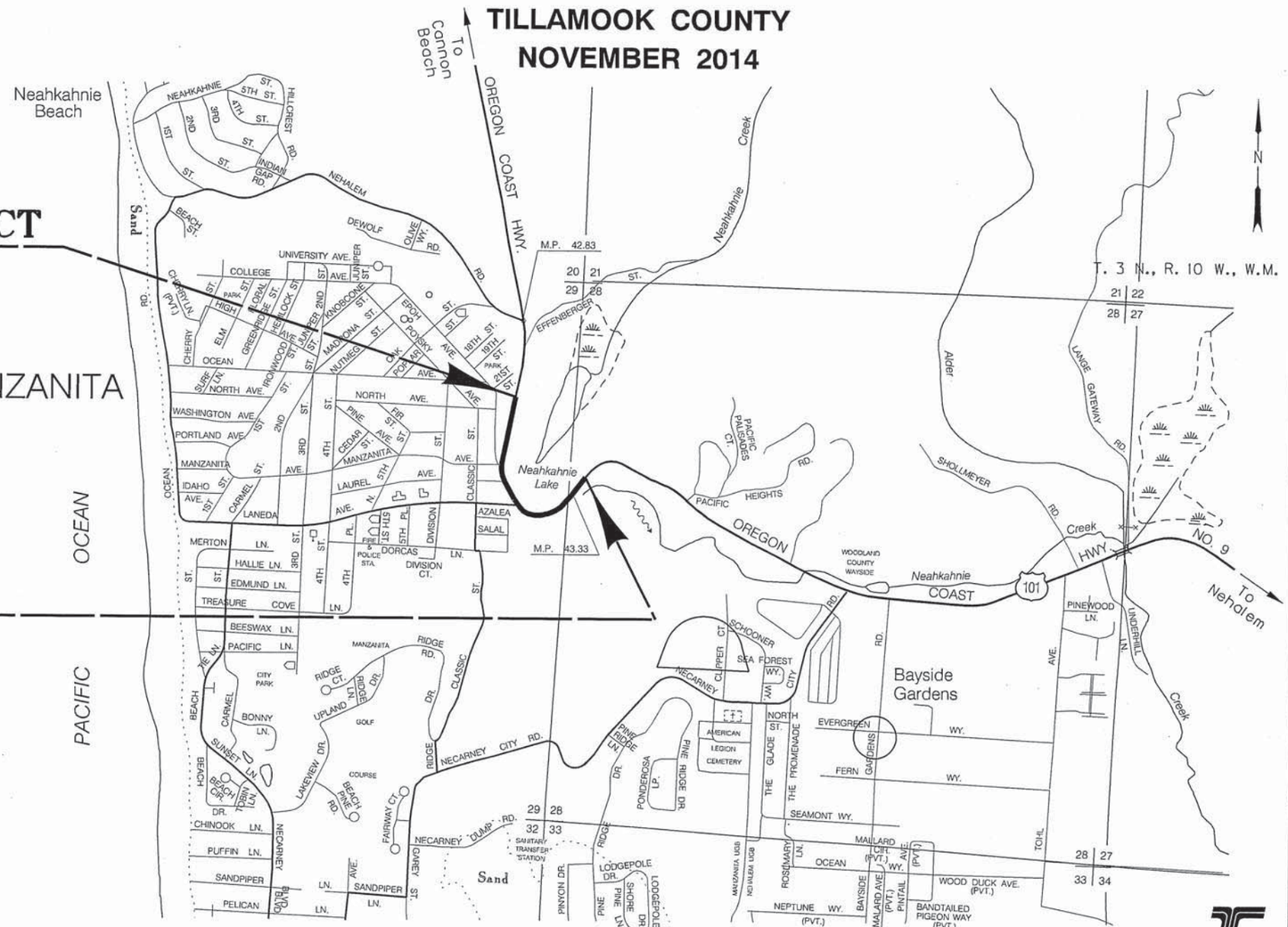
Overall Length Of Project - 0.34 Miles

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

STP-S009(420)
BEGINNING OF PROJECT
STA. "L" 17+12 (M.P. 43.00)

STP-S009(420)
END OF PROJECT
STA. "L" 34+29.07 (M.P. 43.34)



PLANS PREPARED FOR
OREGON DEPARTMENT OF TRANSPORTATION

Murray, Smith & Associates, Inc.
121 S.W. Salmon, Suite 900, Portland, Oregon 97204-2919
503.225.9010

MSA

OREGON TRANSPORTATION COMMISSION

Catherine Mater	CHAIR
David Lohman	COMMISSIONER
Tammy Baney	COMMISSIONER
Susan Morgan	COMMISSIONER
Alando Simpson	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: W.H. Hollings 8/29/14
Signature & date
W.H. Hollings / Princ. Eng.
Print name and title

Concurrence by ODOT Chief Engineer

FFO - US101: MANZANITA AVE. - NEAHKAHNIE CREEK SEC.
OREGON COAST HIGHWAY
TILLAMOOK COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	STP-S009(420)	1

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Rotation: 0° Scale: 1"=100'

47V-052

INDEX OF SHEETS, CONT'D.

SHEET NO.	DESCRIPTION
2, 2A Thru 2A-7 Incl.	Typical Sections
2B Thru 2B-4 Incl.	Details
2C Thru 2C-9 Incl.	Traffic Control Plans
2D	Pipe Data Sheet
3	Alignment and General Const.
3A	Drainage and Utilities
3B	Profile
4	Alignment and General Const.
4A	Construction Notes
4B	Drainage and Utilities
4C	Profile
4D	Profile
GEO/HYDRO - EROSION CONTROL	
GA Thru GA-3 Incl.	Erosion Control Details
GA-4 Thru GA-5 Incl.	Erosion Control Plans
GEO/HYDRO - GEOTECHNICAL DATA	
GB	Geotechnical Data
GEO/HYDRO - RETAINING WALLS	
GC Thru GC-2 Incl.	Wall W5 Plan, Elevation and Details
GEO/HYDRO - CULVERTS	
GE	Plan and Elevation
GE-2	General Notes
GE-3	Construction Staging Plan
GE-4	Culvert Elevation
GE-5 Thru GE-7 Incl.	Construction Sequence
GE-8	Temporary Construction Access Ramp
GE-9	Box Culvert Details
GE-10	Culvert Portal Details
GE-11 Thru GE-20 Incl.	Wing Wall Plans and Details
GEO/HYDRO - TEMPORARY WATER MANAGEMENT	
GG	Temporary Water Management Plan
GG-2	Temporary Water Management Details
GEO/HYDRO - WATER QUALITY	
GJ Thru GJ-5 Incl.	Water Quality Plan and Details
GEO/HYDRO - ROADSIDE DEVELOPMENT	
GN Thru GN-5 Incl.	Roadside Development
GEO/HYDRO - WATERWAY ENHANCEMENT	
GP Thru GP-5 Incl.	Waterway Enhancement
PERMANENT PAVEMENT MARKINGS	
ST Thru ST-3 Incl.	Striping Plans and Details
PERMANENT SIGNING	
S-14443 Thru S-14444 Incl.	Signing Plans
S-14445 Thru S-14446 Incl.	Signing Details
S-14447 Thru S-14449 Incl.	Sign and Post Data Sheet
ILLUMINATION	
I-0001 Thru I-0006 Incl.	Illumination Legend and Plan and Details

Standard Drg. Nos.	
RD300	- Trench Backfill, Bedding, Pipe Zone and Multiple Installations
RD312	- Subsurface Drain
RD326	- Coupling Bands for Corrugated Metal Pipe Types A, B, D, & E
RD364	- Concrete Inlets Type G-1, G-2, G-2M & G-2MA
RD365	- Frame and Grates for Concrete Inlets
RD380	- Fill Height Tables for Aluminum and Steel Corrugated Pipe
RD386	- Fill Height Table for Circular Concrete Pipe
RD388	- Fill Height Table for PVC Pipe
RD393	- Fill Height Tables for Polypropylene Pipe
RD398	- Culvert ID Marker
RD399	- Stormwater Treatment and Storage Facility Field Markers
RD400	- Guardrail and Metal Median Barrier
RD405	- Guardrail and Metal Median Barrier Parts
RD415	- Guardrail and Metal Median Barrier Parts
RD420	- Energy Absorbing Terminal
RD450	- Guardrail Anchors (Steel)
RD610	- Asphalt Pavement Details
RD700	- Curbs
RD701	- Drainage Curbs
RD715	- Approaches and Non-Sidewalk Driveways
RD720	- Sidewalks
RD725	- Separated Sidewalk Driveways or Alleys (Options A, B and C) ODOT Hwys.
RD755	- Sidewalk Ramp Details
RD756	- Sidewalk Ramp Placement Options Curb Radii =15'
RD757	- Sidewalk Ramp Placement Options Curb Radii >15'
RD759	- Truncated Dome Detectable Warning Surface Details & Locations
RD815	- Chain Link Fence
RD1000	- Construction Entrances
RD1010	- Inlet Protection (Type 1, 2 and 3)
RD1055	- Matting
TM200	- Sign Installation Details
TM201	- Misc. Sign Placement Details
TM211	- Signing Details US and Interstate Route Shields
TM223	- Conventional Roads Directional Sign Layout Street Name Signs
TM302	- Pad-Mount Illumination Control Cabinet
TM500	- Pavement Marking Standard Detail Blocks
TM501	- Pavement Marking Standard Detail Blocks
TM502	- Pavement Marking Standard Detail Blocks
TM503	- Pavement Marking Standard Detail Blocks
TM515	- Pavement Markers
TM517	- Recessed Pavement Markers
TM521	- Durable Pavement Markings Method "A" & Method "B" Surface & Groove Installed Non-Profiled
TM530	- Intersection Pavement Markings (Crosswalk, Stop Bar, & Bike Lane Stencil)

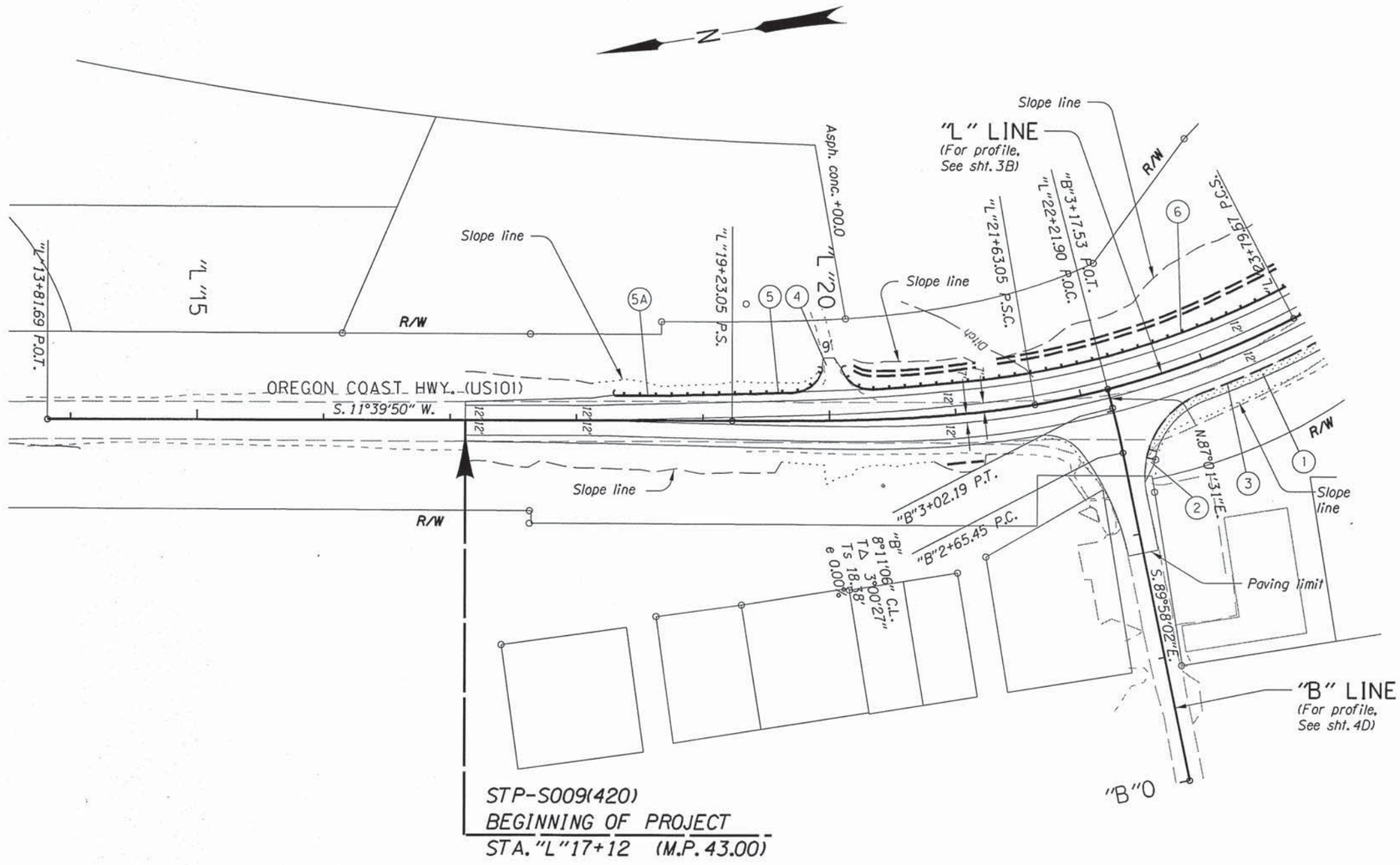
Standard Drg. Nos. Contd.	
TM531	- Turn Arrow Marking Details
TM539	- Median and Left Turn Channelization Details
TM560	- Alignment Layout: General
TM561	- Alignment Layout: Left Turn Lane, Centerline, & Medians
TM570	- Traffic Delineators
TM576	- Traffic Delineator Installation For Non-Freeways
TM629	- Slip Base and Fixed Base Luminaire Supports (Details and Design Criteria)
TM630	- Slip Base and Fixed Base Luminaire Supports (Base Plate and Footing Details
TM635	- Breakaway Sign and Luminar Supports (Location Guidelines)
TM671	- 3 Second Gust Wind Speed Map
TM676	- Sign Attachments
TM678	- Secondary Sign Mounting Details
TM681	- Perforated Steel Square Tube (PSST) Sign Support Installation
TM687	- Perforated Steel Square Tube (PSST) Anchor Foundation
TM688	- Perforated Steel Square Tube (PSST) Slip Base Foundation
TM800	- Tables, Abrupt Edge And PCMS Details
TM810	- Temporary Reflective Pavement Markers
TM820	- Temporary Barricades
TM821	- Temporary Sign Supports
TM830	- Temporary Concrete Barrier And Rumble Strip Details
TM831	- Temporary Impact Attenuators
TM850	- 2-Lane, 2 Way Roadways

FFO - US101: MANZANITA AVE. - NEAHKAHNIE CREEK SEC.
OREGON COAST HIGHWAY
TILLAMOOK COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	STP-S009(420)	1A

Sec. 29, T. 3 N., R. 10 W., W.M.

47V-052



1. Const. P.C. conc. sidewalk (See drg. no. RD720)
2. Const. sidewalk ramp (option F) (See drg. nos. RD755, RD756 & RD759)
3. Const. standard curb (See drg. no. RD700)
4. Const. appr. (For details, see sht. 2B-4)
5. Sta. "L" 18+31.4 to Sta. "L" 19+94.4, Lt.
   Const. guardrail - 175' (Type 2A)
   Flare rate=0, W=1', E=0'
   Const. anchor - 2 (Type 1 Mod.)
   Inst. end piece (Type B)
5A. Const. guardrail terminal, non-flared
   Test level - 3
   (See drg. nos. RD400, RD405, RD415, RD420 & RD450)
6. Sta. "L" 20+10.2 to Sta. "L" 30+96.8, Lt.
   Const. guardrail - 1037.5' (Type 2A)
   Flare rate=0, W=1', E=0'
   Const. anchor - 2 (Type 1 Mod.)
   Inst. end piece (Type B)

REGISTERED PROFESSIONAL ENGINEER
74,338
OREGON
DEC 31, 2007
CHRISTOPHER S. LINK
RENEWS: 12-31-2014

OREGON DEPARTMENT OF TRANSPORTATION

Murray, Smith & Associates, Inc.
121 S.W. Salmon, Suite 900, Portland, Oregon 97204-2919
503.225.9010

MSA

FFO - US101: MANZANITA AVE. - NEAHKAHNIE CREEK SEC.
OREGON COAST HIGHWAY
TILLAMOOK COUNTY

Reviewed By - William H. Hollings
Designed By - Chris S. Link
Drafted By - Rhonda L. Freeman

ALIGNMENT & GENERAL CONSTRUCTION

SHEET NO. 3

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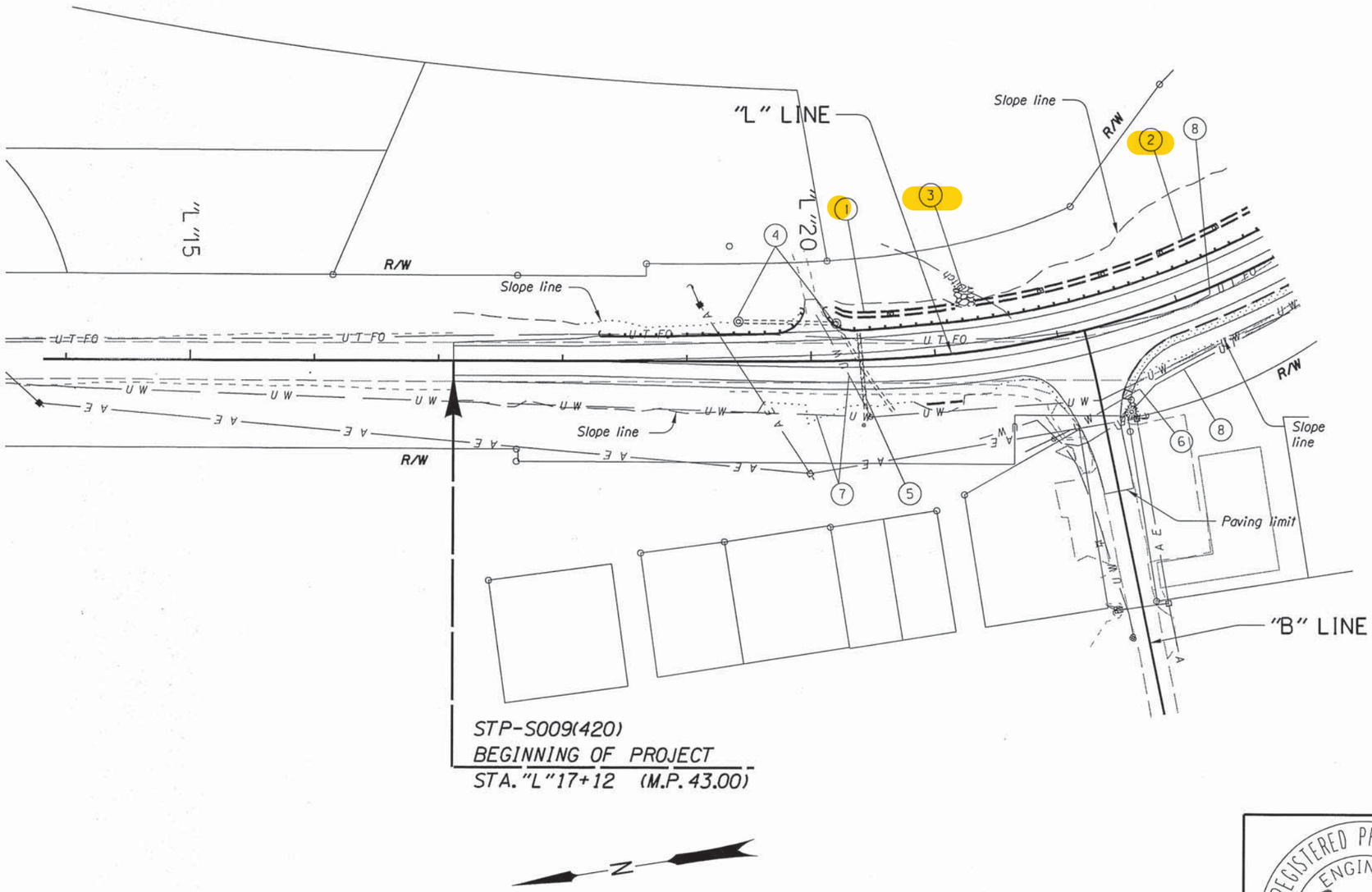
Sec. 29, T. 3 N., R. 10 W., W.M.

47V-052



(1) Sta. "L" 20+20 to Sta. "L" 21+25
Const. water quality swale "D00843" - 105'
Gen Exc. - 47 cu. yd.
Water quality soil mixture - 47 cu. yd.
Flow Spreader - 1
Facility marker, type S1 - 2
Facility marker, type S2 - 2
(For details, see shts. GJ-2, GJ-3 & GN)
(See drg. no. RD399)

(2) Sta. "L" 21+37 to Sta. "L" 25+87
Const. water quality swale "D00844" - 417'
Gen. Exc. - 190 cu. yd.
Water quality soil mixture - 190 cu. yd.
Flow Spreader - 7
Facility marker, type S1 - 2
Facility marker, type S2 - 2
(For details, see sht. GJ-2, GJ-3 & GN)

(3) Sta. "L" 21+28
Const. riprap basin
Loose riprap, (class 50) - 6 cu. yd.
(For details see sht. 2B)

(4) Adjust manhole - 2 (by others)

(5) Plug pipe and fill with CLSM

(6) Abandoned water line

(7) Protect water line in place

(8) Abandon communication line (by others)

Plug, fill with CLSM and abandon pipe shown thus: ~~~~~~~~~~

REGISTERED PROFESSIONAL ENGINEER
74,338
OREGON
DEC 31, 2007
CHRISTOPHER S. LINK
RENEWS: 12-31-2014

OREGON DEPARTMENT OF TRANSPORTATION

Murray, Smith & Associates, Inc.
121 S.W. Salmon, Suite 900, Portland, Oregon 97204-2919
503.225.9010

MSA

FFO - US101: MANZANITA AVE. - NEAHKAHNIE CREEK SEC.
OREGON COAST HIGHWAY
TILLAMOOK COUNTY

Reviewed By - Chris S. Link
Designed By - Adam N. Blair
Drafted By - Rhonda L. Freeman

DRAINAGE & UTILITIES

SHEET NO. 3A

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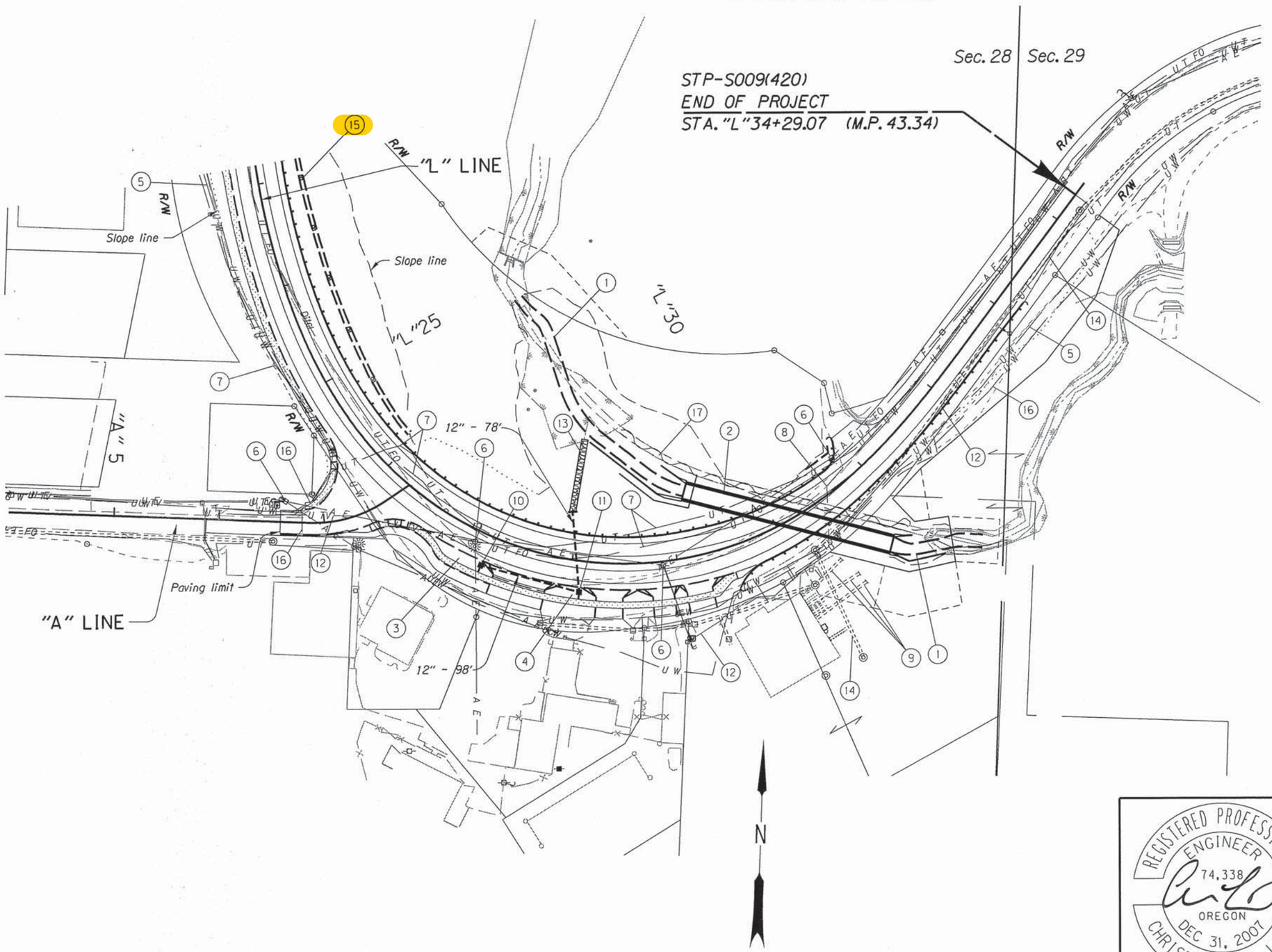
Rotation: 0° Scale: 1"=100'

T. 3 N., R. 10 W., W.M.



Plug, fill with CLSM and abandon pipe shown thus: ▭▭▭▭▭▭▭▭

47V-052

(1) Const. channel
(For details, see sht. GG and GP thru GP-5)

(2) Const. culvert
Culvert drainage marker, type 1
Culvert drainage marker, type 2
(For details, see shts. GE thru GE-14)
(See drg. no. RD398)

(3) Const. stormwater planter "SP-1"
(For details, see shts. GJ, GJ-4 & GJ-5)

(4) Const. stormwater planter "SP-2"
(For details, see shts. GJ, GJ-4 & GJ-5)

(5) Abandoned water line

(6) Relocate elec. (overhead, underground, poles) (By others)

(7) Abandon communication lines (By others)

(8) Relocate water line (By others)

(9) Protect extg. pipes in place

(10) Sta. "L" 27+22 Rt.
Const. Type G-1 inlet
Inst. 12" storm sew. pipe - 98'
5' depth
(For details, see sheets GJ and GJ-4)
(See drg. nos. RD300, RD364, RD365, RD380, RD388, & RD393)

(11) Sta. "L" 28+10 Rt.
Const. Type G-1 inlet
Inst. 12" storm sew. pipe - 78'
5' depth
(For details, see sheets GJ and GJ-4)

(12) Relocate/adjust communication lines (By others)

(13) Sta. "L" 27+91
Const. riprap slope protection
Loose riprap, class 50 - 17 cu. yd.
Riprap geotextile (Type 2) - 504 sq. yd.
(For details see sheet 2B)

(14) Protect san. sew. in place

(15) See sht. 3A, note 2
Const. water quality swale "D00844"

(16) Protect water line in place

(17) Plug pipe and fill with CLSM

REGISTERED PROFESSIONAL ENGINEER
74,338
OREGON
DEC 31, 2007
CHRISTOPHER S. LINK
RENEWS: 12-31-2014

OREGON DEPARTMENT OF TRANSPORTATION

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503.225.9010

MSA

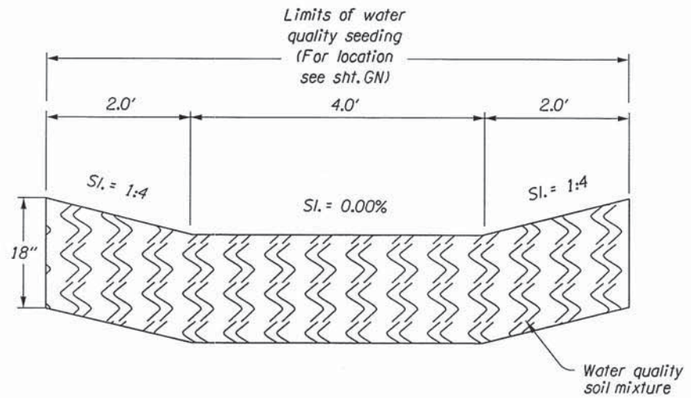
FFO - US101: MANZANITA AVE. - NEAHKAHNIE CREEK SEC.
OREGON COAST HIGHWAY
TILLAMOOK COUNTY

Reviewed By - Chris S. Link
Designed By - Adam N. Blair
Drafted By - Rhonda L. Freeman

DRAINAGE & UTILITIES

SHEET NO. 4B

WATER QUALITY SWALE



WATER QUALITY SWALES "D00843" & "D00844"

REGISTERED PROFESSIONAL ENGINEER
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DEC 31, 2007
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WATER QUALITY DETAILS

SHEET NO. GJ-2

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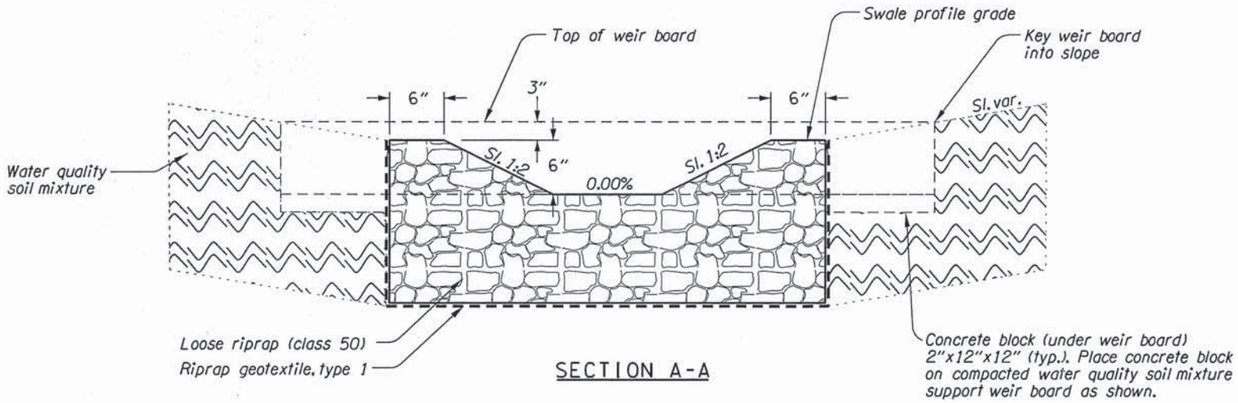
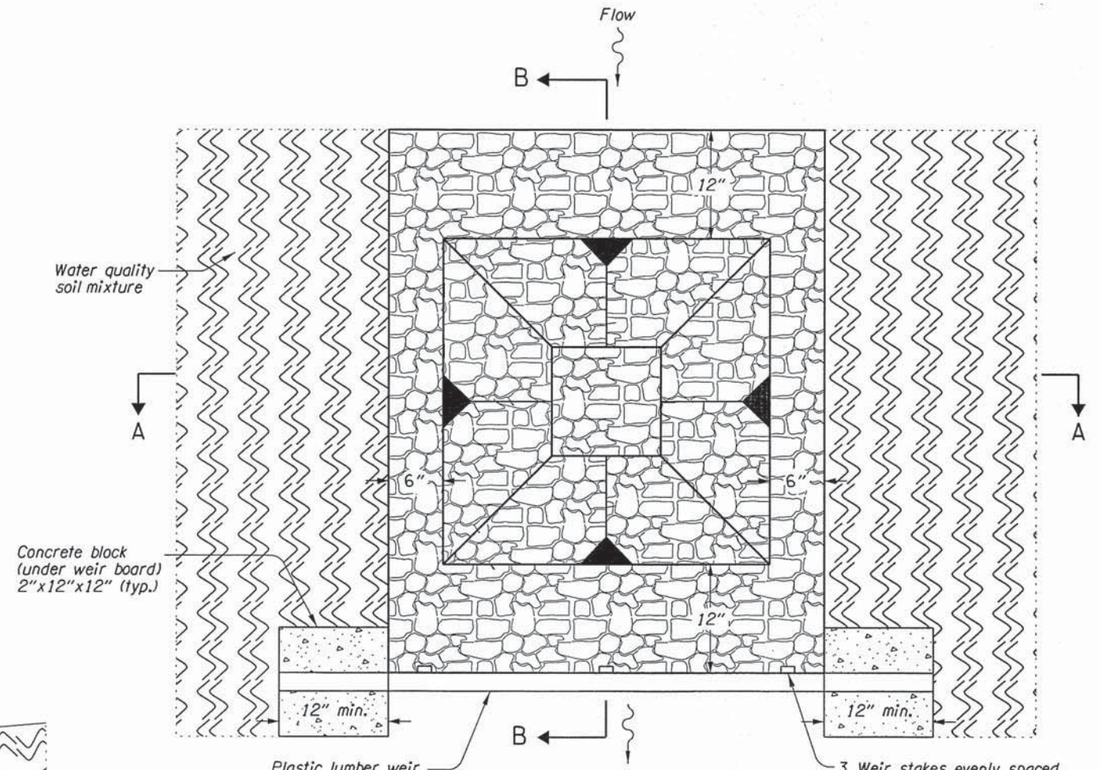
Rotation: 0° Scale: 1"=100'

WATER QUALITY SWALE FLOW SPREADER

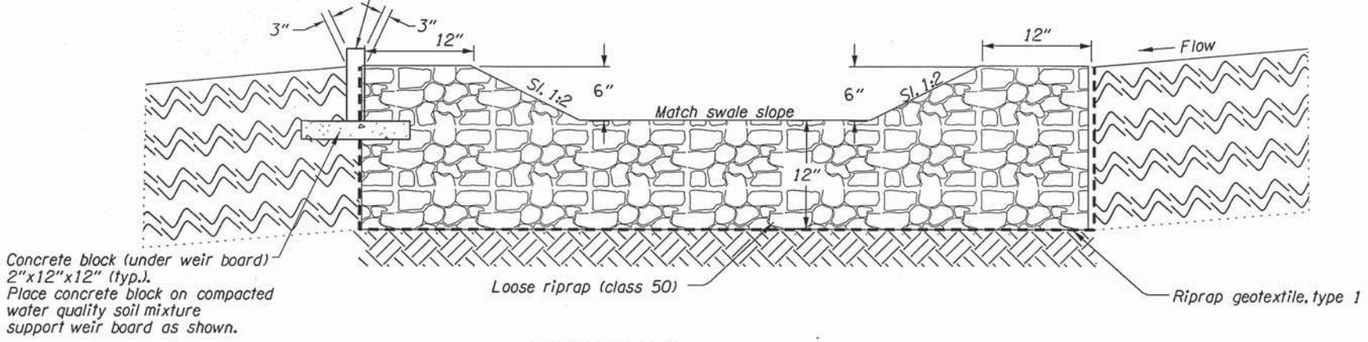
47V-052



SECTION A-A



PLAN



SECTION B-B

Notes:

1. Place flow spreader at 50' spacing in swale.
2. Approx. 0.75 cu. yds. loose riprap, (class 50) per flow spreader.
3. Approx. 4 sq. yds. riprap geotextile, (type 1).

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Reviewed By - Chris S. Link
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Drafted By - Rhonda L. Freeman

WATER QUALITY DETAILS

SHEET NO. GJ-3

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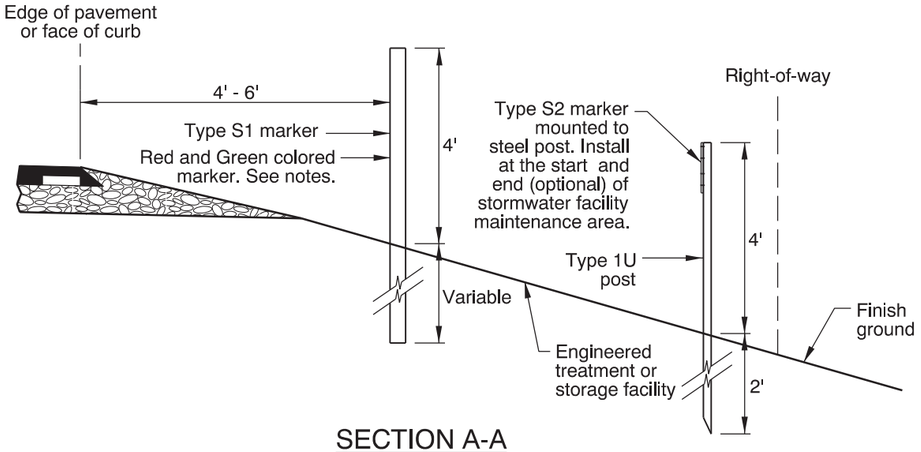
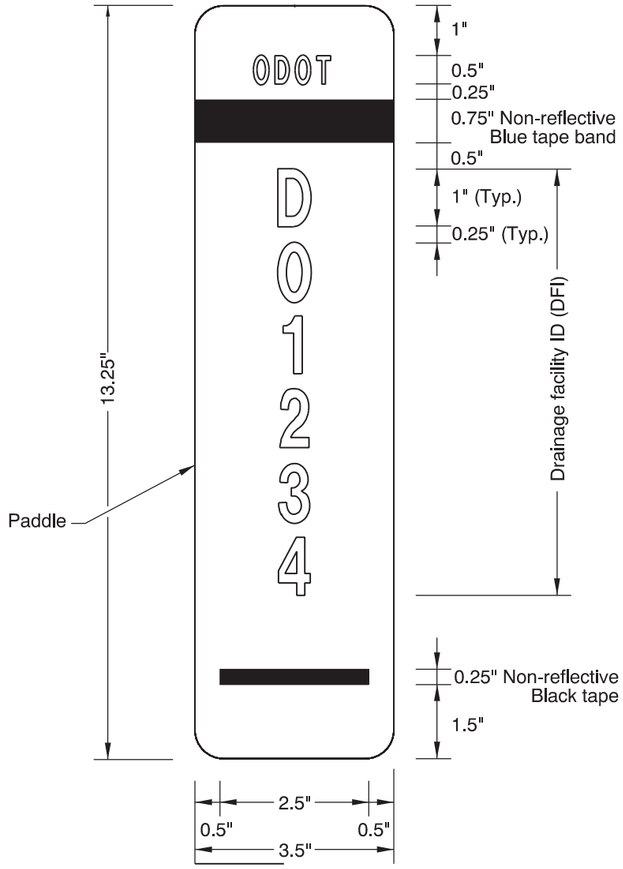
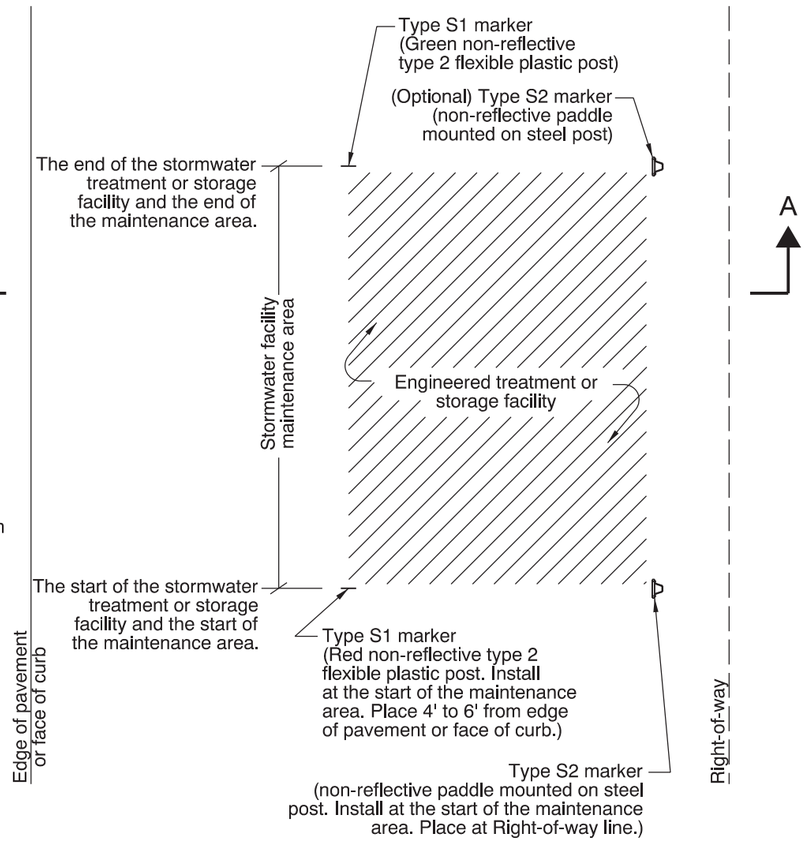
Rotation: 0° Scale: 1"=100'



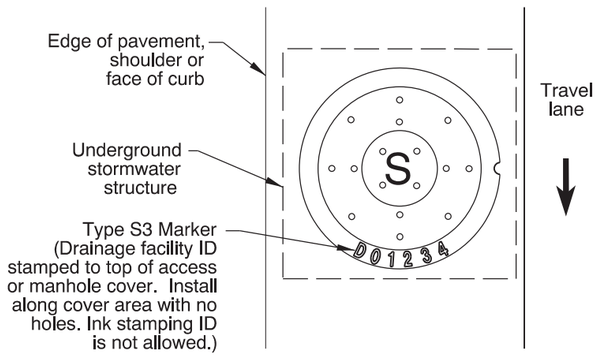
SECTION A-A



TYPE S2 MARKER



TYPE S1 & S2 MARKERS INSTALLATION DETAIL



TYPE S3 MARKER INSTALLATION DETAIL

Notes:

Stormwater Facility Field Marker Type S1:
1. See Standard Drawing TM570 for Type 2 flexible plastic post dimensions. Do not mount reflective sheeting to flexible plastic post.
2. A red Type S1 marker is used to mark the start of a stormwater facility maintenance area. A green Type S1 marker is used to mark the end of a stormwater facility maintenance area.
3. Place 4 to 6 feet from edge of pavement or face of curb.
4. See marker table for installation locations.

Stormwater Facility Field Marker Type S2:
1. Paddle:
   - Aluminum sheet, nominal thickness 0.050"
   - White non-reflective background
   - Mount paddle to one (1) Type 1U steel post using 3/16" diameter aluminum blind rivets and washers. See Standard Drawing TM570 detail labeled "Steel Posts" for mounting a traffic target. Install paddle onto Type 1U steel post using the same hole pattern.
   - Text and numbers are Type C font in non-reflectorized black
   - Band is non-reflective blue tape
   - Do not mount paddle to other highway signing posts
   - Install paddle parallel to travel lane
   - Prepare paddle for each "DFI" noted in the marker table
2. Steel Posts:
   - See Standard Drawing TM571 for Type 1U steel post dimensions

Stormwater Facility Field Marker Type S3:
1. The top of access or manhole cover shall be stamped with the drainage facility ID. Ink stamping ID is not allowed.

CALC. BOOK NO. N/A

BASELINE REPORT DATE 01-JAN-2013

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

OREGON STANDARD DRAWINGS
STORMWATER TREATMENT
AND
STORAGE FACILITY
FIELD MARKERS

2012

DATE	REVISION DESCRIPTION

rd399.dgn 01-30-2012

RD399