OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: December 2019

DFI No. D01209

Figure 1: DFI No. D01209, looking North (Placeholder for future photo)

Identification

Drainage Facility ID (DFI):	D01209
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 52V-27
Location:	District: 05
	Highway No.: 069
	Mile Post: 069 AN1 - MP 9.95 to 9.94

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: Interchange

Flow direction: North

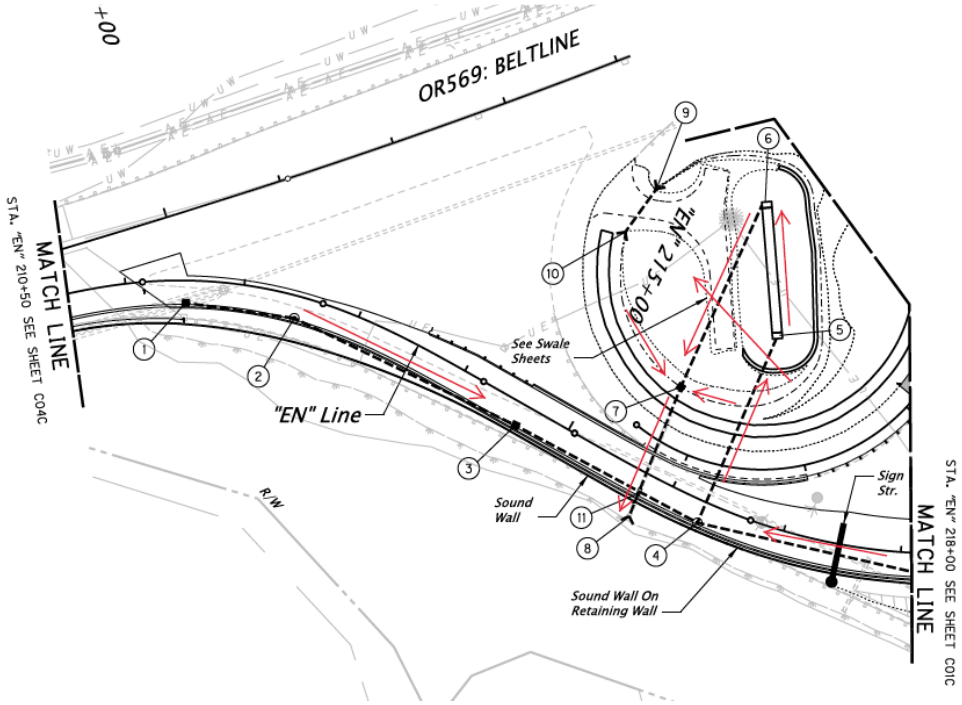


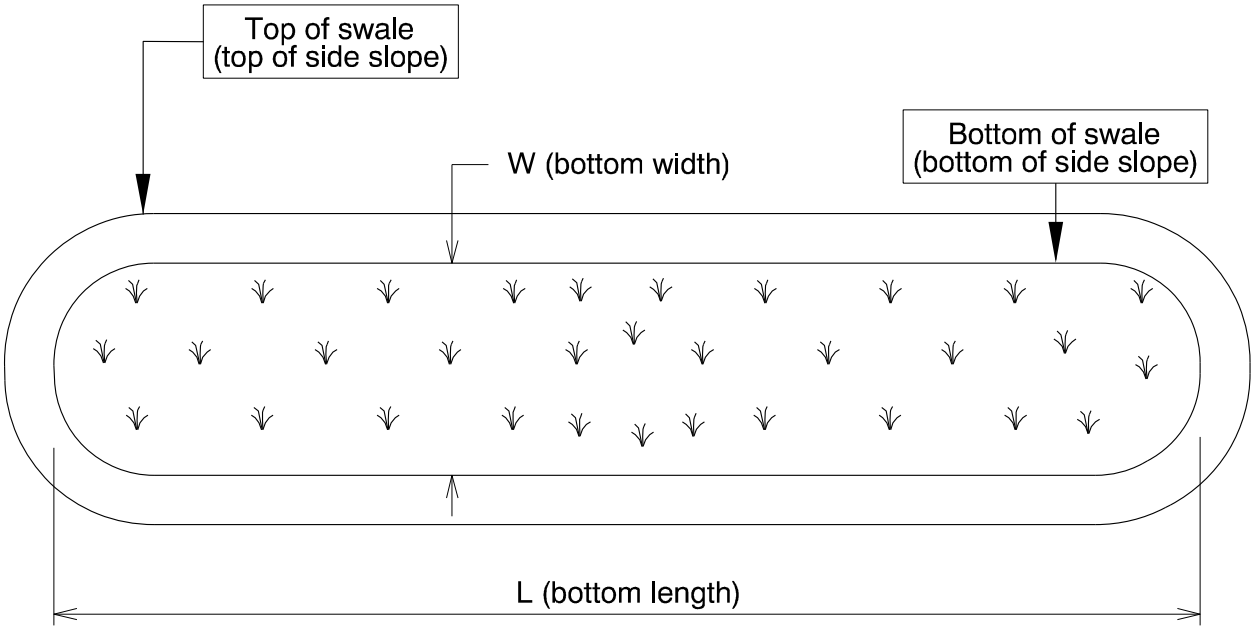
Figure 2: Facility location map (Placeholder)

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:

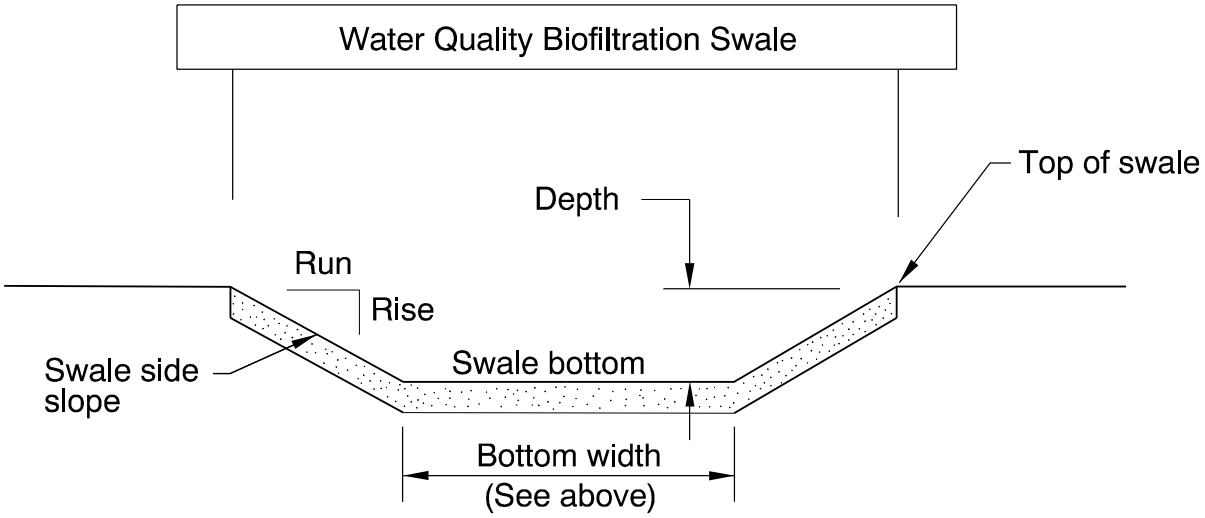
Bottom Length (feet)	Bottom Width (feet)
115	8.25



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)
6	6	24



Site Specific Information:

Access this facility from Southwest Beltline On-Ramp Ramp (069 AN1); there are two bollards and a gate at the entrance to the maintenance road. The facility is a bioswale with riprap lined inlet and outlet basins. The outlet basin discharges through a piped system to a field inlet. The field inlet picks up flow from Filter Strip “D01211” conveyed to the inlet through a “V” Ditch. Both systems, “D01209” and “D01211” discharge to Debrick Slough through a piped system. The pipe from the field inlet to the slough passes under a sound wall through a steel casing prior to discharge.

4. Facility Access

Maintenance access to the facility:

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

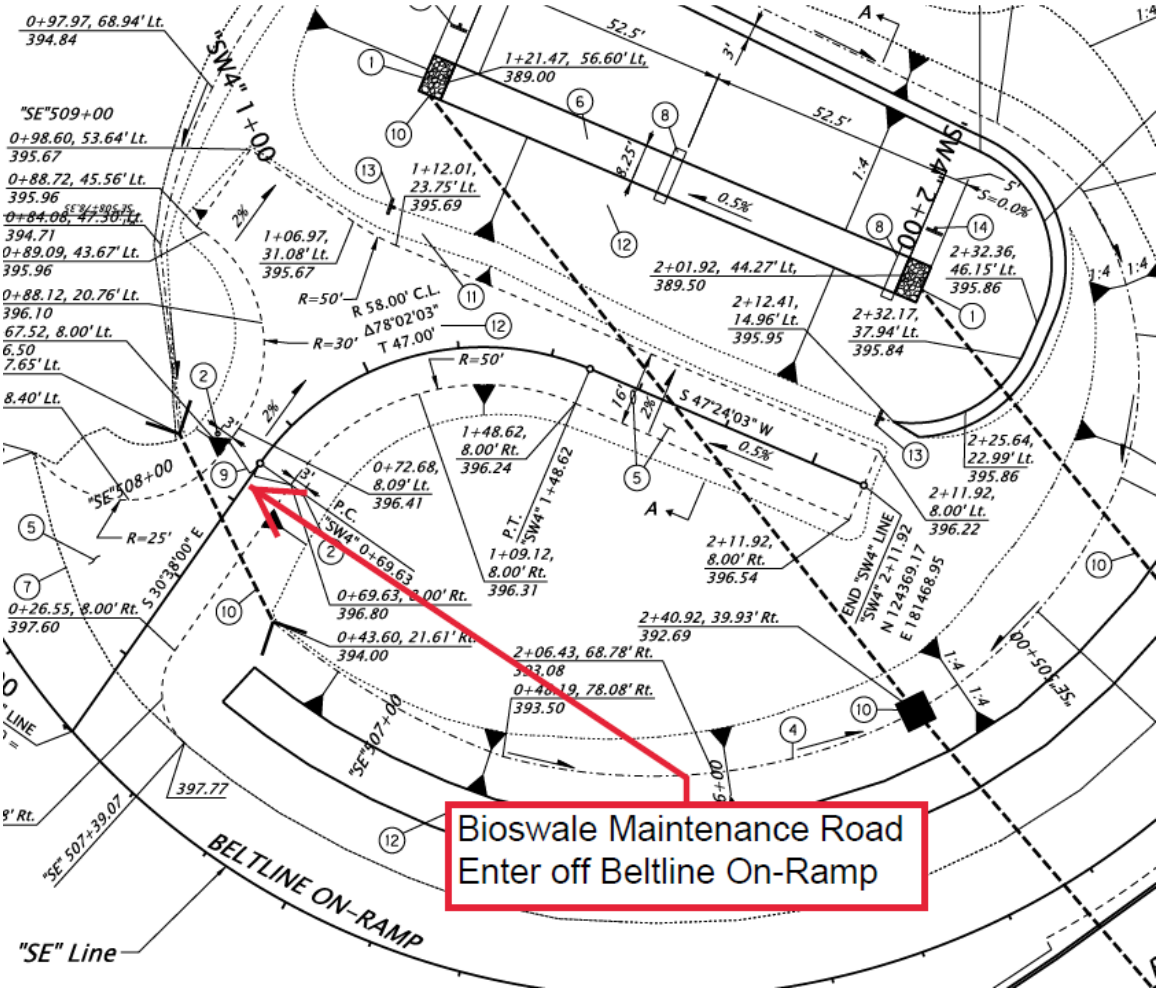


Figure 3: Facility Access (Placeholder)

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:	☐	**S19**

Swale Outlet		
Catch basin with grate	☐	**S20**
Outlet Pipe (s)	☒	**S21**
Open channel outlet	☐	**S22**
Auxiliary Outlet:	☐	**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
- 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

7. Limitations

Access grid installed:

☐ No	☒ Yes
Medium Duty Porous Pavers	

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

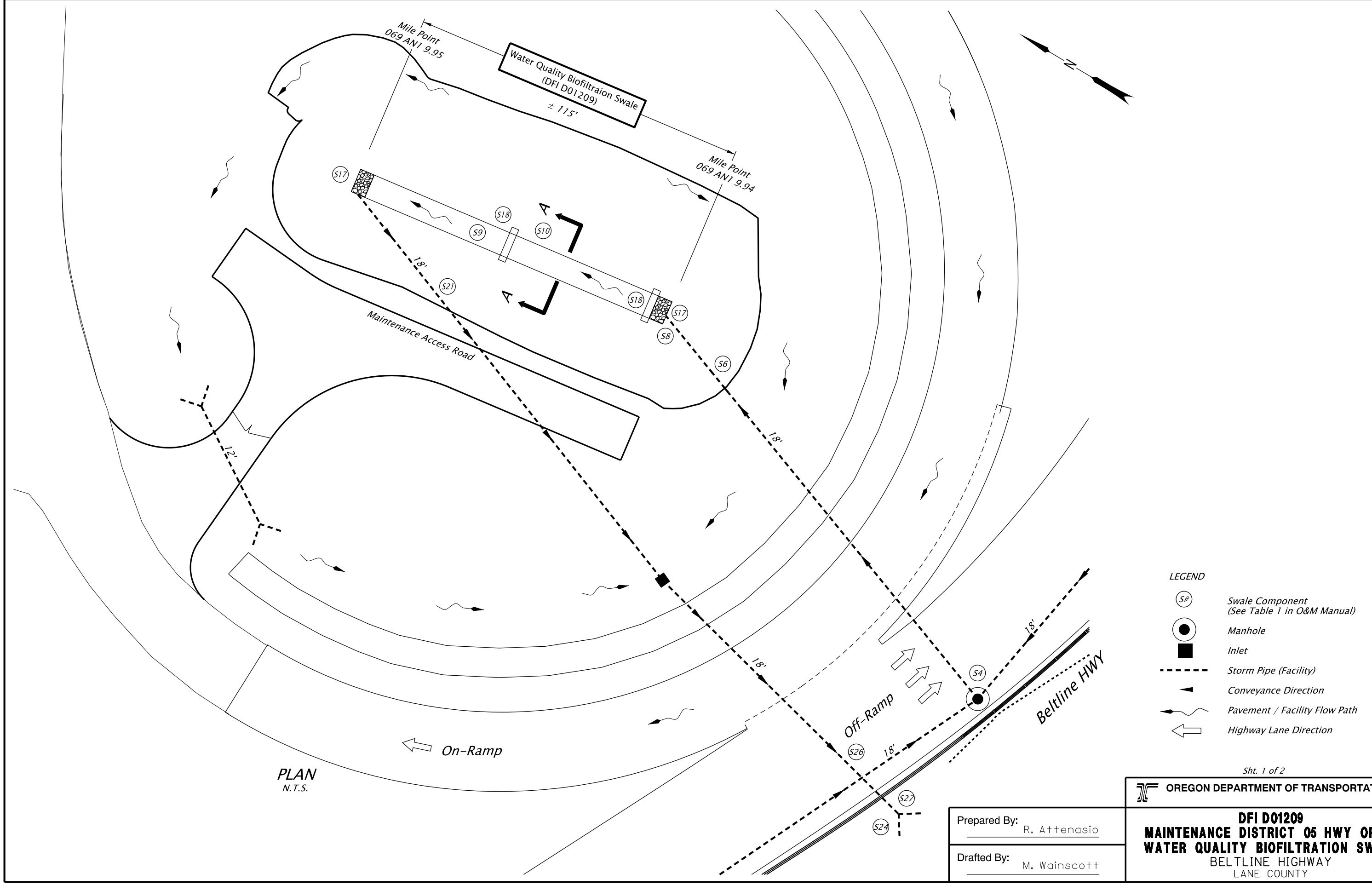
Contact any of the following for more detailed information about management of waste materials found on site:

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 D01209



PLAN
N.T.S.

Sht. 1 of 2

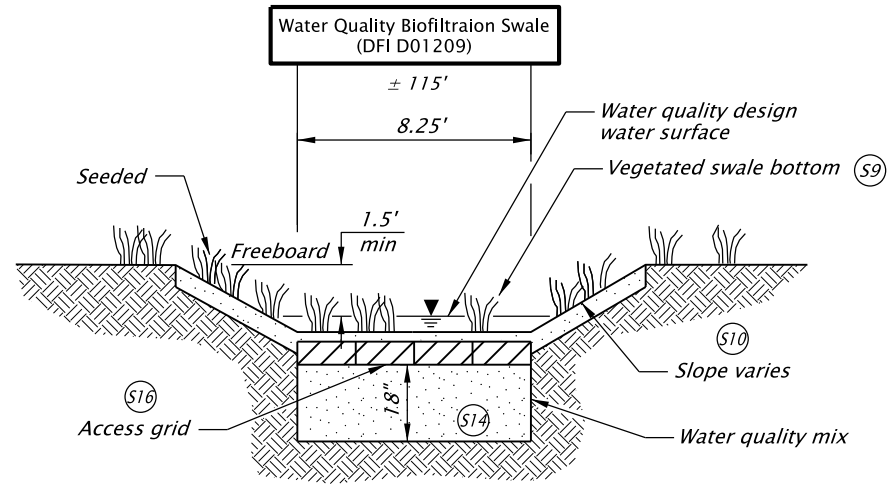
OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: R. Attenasio

Drafted By: M. Wainscott

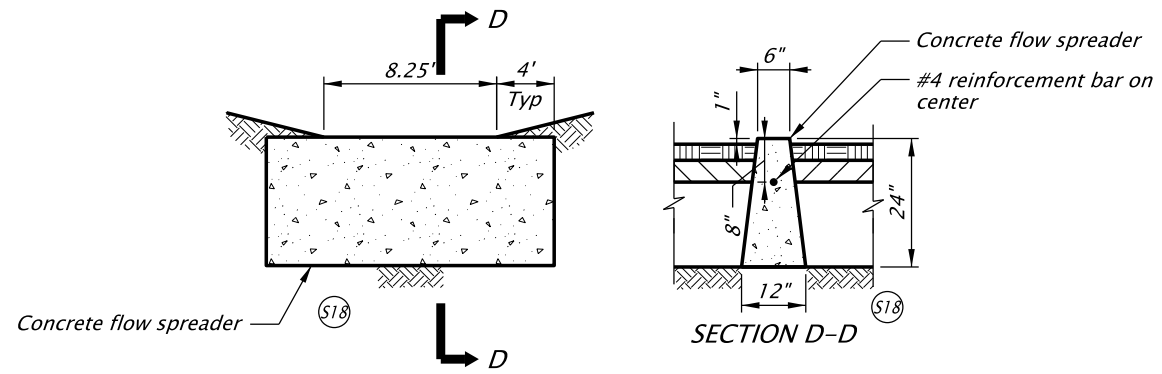
DFI D01209
MAINTENANCE DISTRICT 05 HWY OR569
WATER QUALITY BIOFILTRATION SWALE
BELTLINE HIGHWAY
LANE COUNTY

DFI_D00004.dgn



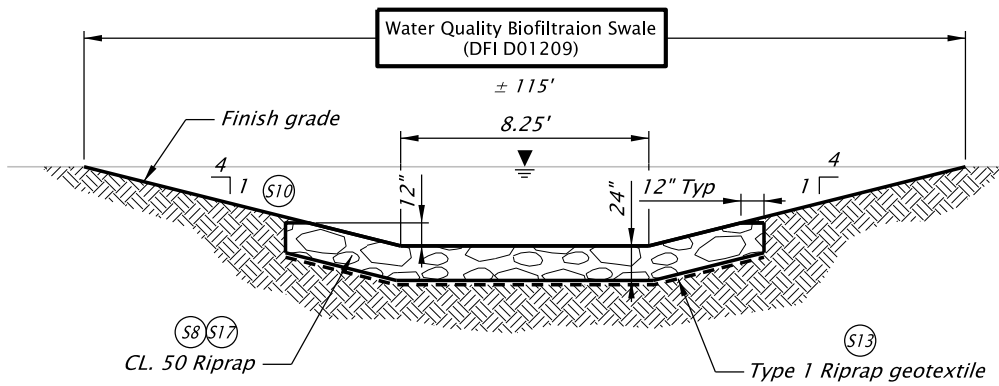
SECTION A-A

N.T.S.



FLOW SPREADER

N.T.S.



RIPRAP BASIN

N.T.S.

Sht. 2 of 2

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: R. Attenasio

Drafted By: M. Wainscott

DFI D01209
MAINTENANCE DISTRICT 05 HWY OR569
WATER QUALITY BIOFILTRATION SWALE
BELTLINE HIGHWAY
LANE COUNTY

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 52V-27

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
A01	Title Sheet
A02	Title Sheet
A03	Title Sheet
A04	Plan Sheet Layout

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

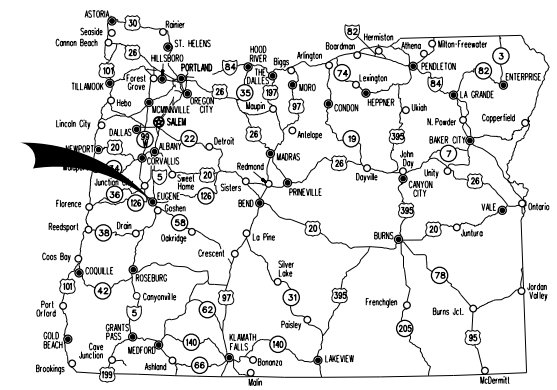
GRADING, DRAINAGE, STRUCTURES, PAVING, SIGNING, ILLUMINATION, SIGNALS, ITS & ROADSIDE DEVELOPMENT

OR569: BELTLINE @ DELTA HIGHWAY - INTERCHANGE SEC.

BELTLINE HIGHWAY

LANE COUNTY

FEBRUARY 2019

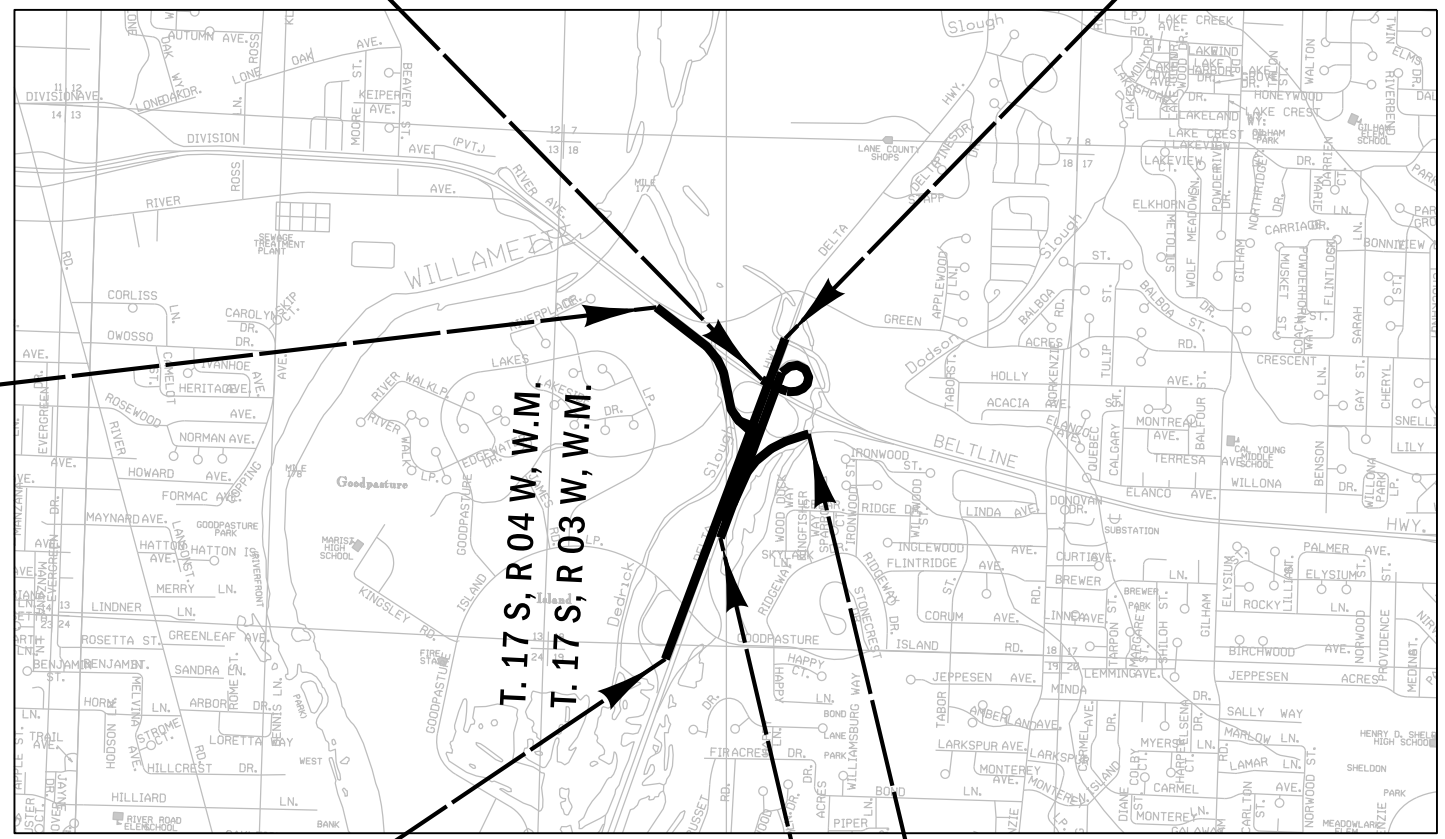


Length Of Project : 0.6 Miles

BEGINNING OF PROJECT
STA. "NW" 100+00
(OR 569 MP 10.04)

BEGINNING OF PROJECT
STA. "DH" 416+00

BEGINNING OF PROJECT
STA. "EN" 200+00
(OR 569 MP 9.73)



END OF PROJECT
STA. "DH" 447+00

END OF PROJECT
STA. "NW" 126+21.52

BEGINNING OF PROJECT
STA. "NE" 10+75.00

N

T. 17 S, R. 03 W, W.M.
T. 17 S, R. 04 W, W.M.

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.)

OREGON TRANSPORTATION COMMISSION

Tammy Baney	CHAIR
Bob Van Brocklin	COMMISSIONER
Alando Simpson	COMMISSIONER
Martin Callery	COMMISSIONER
Julie Brown	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.

Approving Authority: _____
Signature & date

_____
Print name and title

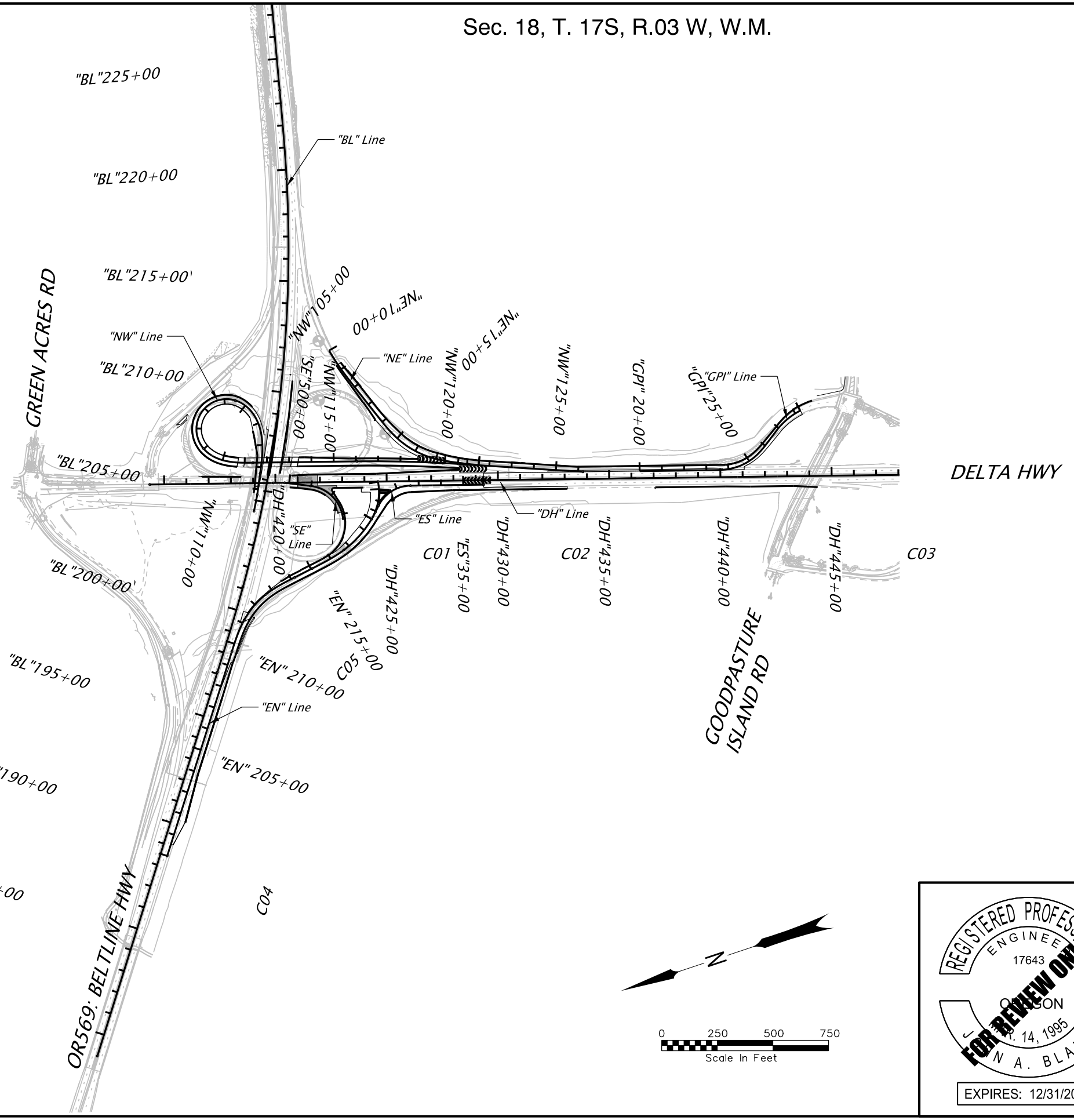
_____
Concurrence By ODOT
Chief Engineer

OR569:
BELTLINE @
DELTA HIGHWAY - INTERCHANGE SEC.
BELTLINE HIGHWAY
LANE COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	S0-S069(019)	1A

Sec. 18, T. 17S, R.03 W, W.M.

52V-27



REGISTERED PROFESSIONAL ENGINEER
17643
OREGON
JULY 14, 1995
JINA A. BLAND
FOR REVIEW ONLY
EXPIRES: 12/31/2019

ch2m.
2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

OREGON DEPARTMENT OF TRANSPORTATION

OR569: BELTLINE @ DELTA HIGHWAY - INTERCHANGE SEC.

BELTLINE HIGHWAY
LANE COUNTY

Designer: B. Niameogo	Reviewer: S. Litchfield
Drafter: M. Wainscott	Checker: J. Bland

PLAN SHEET LAYOUT

SHEET NO. A04

(1) *Sta. "EN" 211+50.97, 18.68' Rt.*
Const. type "G-2" conc. inlet with sump
Grate Elev. = 396.54
I.E. (OUT) = 392.33 (SE)

(2) *Sta. "EN" 212+48.02, 18.68' Rt.*
Inst. 12" DI storm sew. pipe - 91' (NW)
5' depth
Const. storm manhole 48" dia. with inlet grate
Rim Elev. = 397.24
I.E. (IN) = 391.89 (NW)
I.E. (OUT) = 391.89 (S)

(3) *Sta. "EN" 214+59.31, 18.73' Rt.*
Inst. 18" storm sew. pipe - 206' (N)
5' depth
Const. type "G-2" Conc. inlet with sump
Grate Elev. = 396.39
I.E. (IN) = 391.35 (N)
I.E. (OUT) = 391.15 (S)

(4) *Sta. "EN" 216+20.00, 18.73' Rt.*
Inst. 18" storm sew. pipe - 174' (N)
10' depth
Inst. 18" storm sew. pipe - 201' (SE)
10' depth
Const. storm manhole 48" dia. with inlet grate
Grate Elev. = 398.05
I.E. (IN) = 390.70 (N)
I.E. (IN) = 390.70 (SE)
I.E. (OUT) = 390.50 (E)

(5) *Sta. "EN" 216+29.25, 149.57' Rt.*
Inst. 18" storm sew. pipe with sloped end section - 169' (W)
10' depth
I.E. (OUT) = 389.78 (W)

(6) *Sta. "EN" 215+28.92, 170.07' Rt.*
See sheet HA07
I.E. (IN) = 389.00

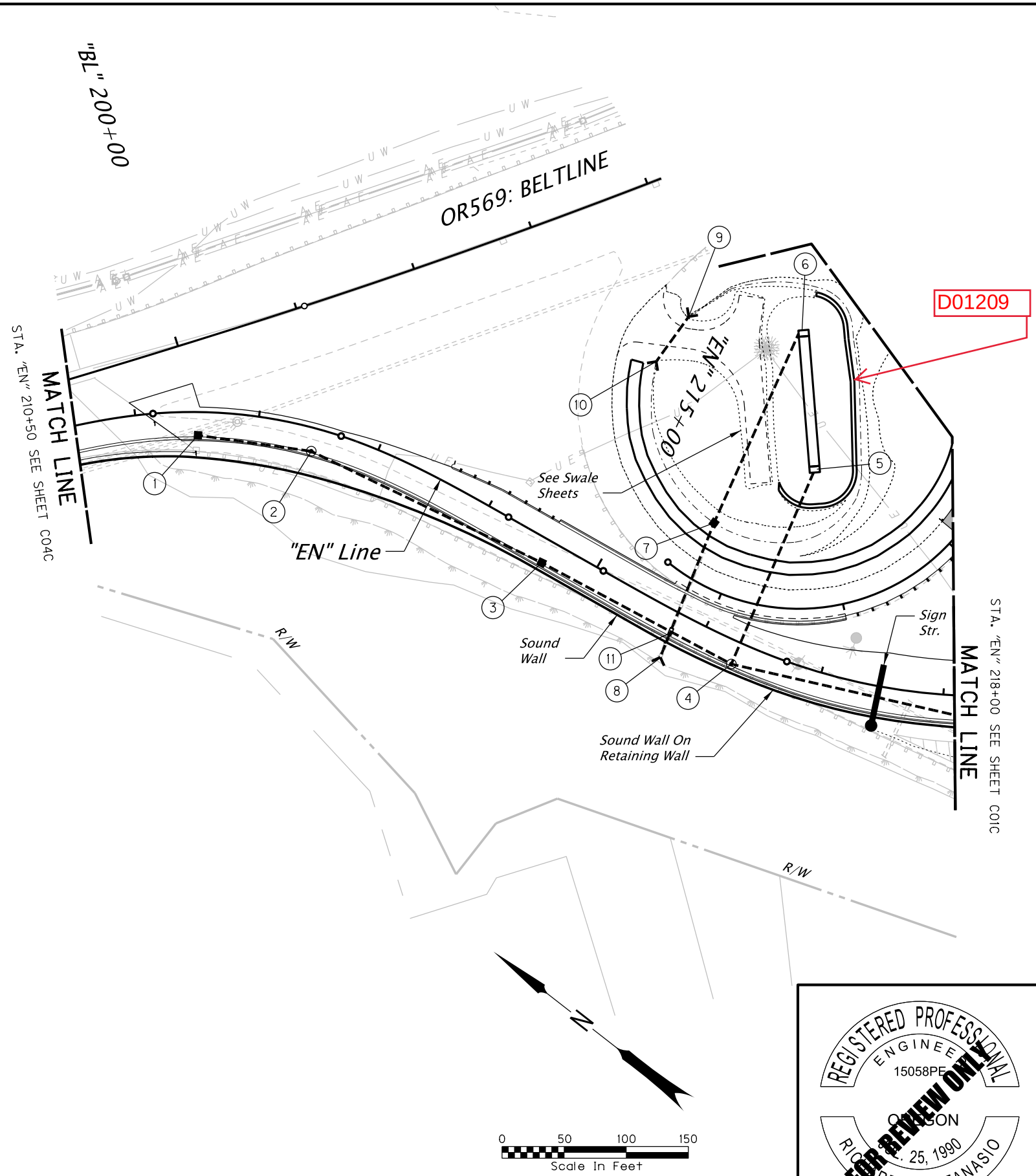
(7) *Sta. "EN" 215+55.66, 74.85' Lt.*
Inst. 18" storm sew. pipe with sloped end section - 167 '
5' depth
Const. ditch inlet Type D
Grate Elev. = 392.69
I.E. (IN) = 388.00 (E)
I.E. (OUT) = 387.80 (W)

(8) *Sta. "EN" 215+65.84, 38.08' Rt.*
Inst. 18" storm sew. pipe with sloped end section - 113' (E)
10' depth
I.E. (OUT) = 387.42
Riprap Outlet (Cl. 50)(18" depth)

(9) *Sta. "EN" 214+70.02, 220.03' Lt.*
Const. sloped end
I.E. (IN) = 394.63

(10) *Sta. "EN" 214+57.22, 174.88' Lt.*
Inst. 18" culv. pipe - 47' (E)
5' depth
I.E. (OUT) = 394.20
Const. sloped end

(11) *Sta. "EN" 215+77.00, 25.74' Rt.*
Install 6' steel casing under soundwall
Min. dia. 34" smooth steel casing
0.313" thickness per ASTM A 53 grade B
or ASTM A 252 grade 2



REGISTERED PROFESSIONAL ENGINEER
15058PE
OREGON
JULY 25, 1990
RICHARD E. ATTANASIO
FOR REVIEW ONLY
EXPIRES: 12/31/2019

ch2m.
2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

OREGON DEPARTMENT OF TRANSPORTATION

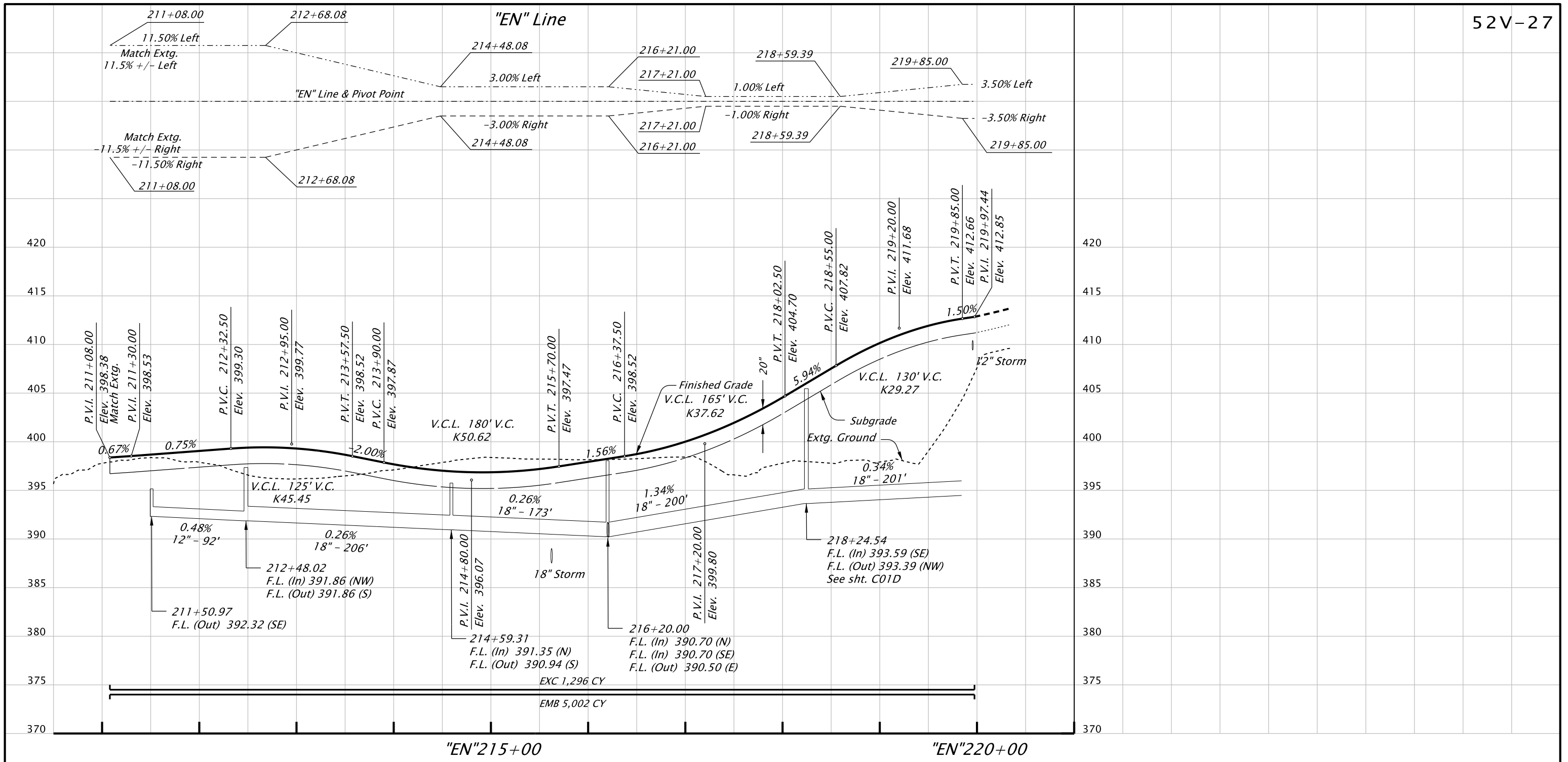
OR569: BELTLINE @
DELTA HIGHWAY - INTERCHANGE SEC.

BELTLINE HIGHWAY
LANE COUNTY

Designer: D. Alves
Drafter: M. Wainscott
Reviewer: S. Litchfield
Checker: R. Attanasio

DRAINAGE AND UTILITIES

SHEET NO.
C05B



0 50 100 150
Horizontal Scale In Feet

0 5 10 15
Vertical Scale In Feet

DRAINAGE

REGISTERED PROFESSIONAL ENGINEER
15058PE
OREGON
JULY 25, 1990
RICHARD E. ATTANASIO
FOR REVIEW ONLY
EXPIRES: 12/31/2019

ROADWAY

REGISTERED PROFESSIONAL ENGINEER
17643
OREGON
JULY 14, 1995
JENNA A. BLAND
FOR REVIEW ONLY
EXPIRES: 12/31/2019

ch2m:
2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

OREGON DEPARTMENT OF TRANSPORTATION

OR569: BELTLINE @ DELTA HIGHWAY - INTERCHANGE SEC.

BELTLINE HIGHWAY
LANE COUNTY

Designer: B. Niameogo
Drafter: M. Wainscott
Reviewer: S. Litchfield
Checker: J. Bland

PROFILE

SHEET NO.
C05C

BIOSWALE 4 PLAN
DFI #: D01209

BELTLINE - OR 569

1+25.07, 88.69' Lt, 396.10
1+25.97, 95.29' Lt, 395.10
1+17.87, 97.24' Lt, 395.03
1+17.94, 90.20' Lt, 396.03
1+10.62, 89.56' Lt, 394.97
1+12.16, 83.70' Lt, 395.97
1+43.52, 79.34' Lt, 396.79
1+43.77, 86.33' Lt, HP 395.80
2+06.92, 75.03' Lt, 396.16
2+07.80, 81.98' Lt, 395.16
2+25.23, 66.71' Lt, 395.97
2+30.44, 75.80' Lt, 394.87
2+52.53, 52.25' Lt, 394.35
2+61.63, 22.94' Lt, 393.83
0+97.97, 68.94' Lt. 394.84
"SE"509+00
0+98.60, 53.64' Lt. 395.67
0+88.72, 45.56' Lt. 395.96
0+84.08, 47.30' Lt. 394.71
0+89.09, 43.67' Lt. 395.96
0+88.12, 20.76' Lt. 396.10
0+67.52, 8.00' Lt. 396.50
0+64.92, 17.65' Lt. 394.38
0+47.22, 18.40' Lt. 397.90
398.63
"SE" 508+18.27
0+26.55, 8.00' Rt. 397.60
0+16.70, 11.68' Rt. 397.81
397.77
1+21.47, 56.60' Lt, 389.00
1+12.01, 23.75' Lt. 395.69
1+06.97, 31.08' Lt. 395.67
2+01.92, 44.27' Lt, 389.50
2+12.41, 14.96' Lt. 395.95
2+32.36, 46.15' Lt. 395.86
2+32.17, 37.94' Lt. 395.84
2+25.64, 22.99' Lt. 395.86
2+11.92, 8.00' Lt. 396.22
1+48.62, 8.00' Rt. 396.24
0+72.68, 8.09' Lt. 396.41
1+09.12, 8.00' Rt. 396.31
2+11.92, 8.00' Rt. 396.54
0+69.63, 8.00' Rt. 396.80
0+43.60, 21.61' Rt. 394.00
2+40.92, 39.93' Rt. 392.69
2+06.43, 68.78' Rt. 393.08
0+48.19, 78.08' Rt. 393.50
2+56.47, 10.21' Rt. 393.31

"SW4" 1+00
"SW4" 2+00
"SE"502+00
"SE"503+00
"SE"504+00
"SE"505+35"
"SE"506+00
"SE"507+00
"SE" 507+39.07
"SE" 508+78.33
"SE"508+00
"SW4" 0+69.63
"SW4" 1+48.62
"SW4" 2+11.92

52.5'
3'
8.25'
5'
S=0.0%
0.5%
2%
1:4
R=50'
R=30'
R=25'
R 58.00' C.L.
Δ78°02'03"
T 47.00'
S 47°24'03" W
S 30°38'00" E
16'
P.C.
P.T.
END "SW4" LINE
"SW4" 2+11.92
N 124369.17
E 181468.95
BEGIN "SW4" LINE
"SW4" 0+00.00 =
"SE" 507+58.45
0.00' RT.
N 124544.17
E 181490.71

BELTLINE ON-RAMP
BELTLINE OFF-RAMP
"SE" Line
"EN" Line

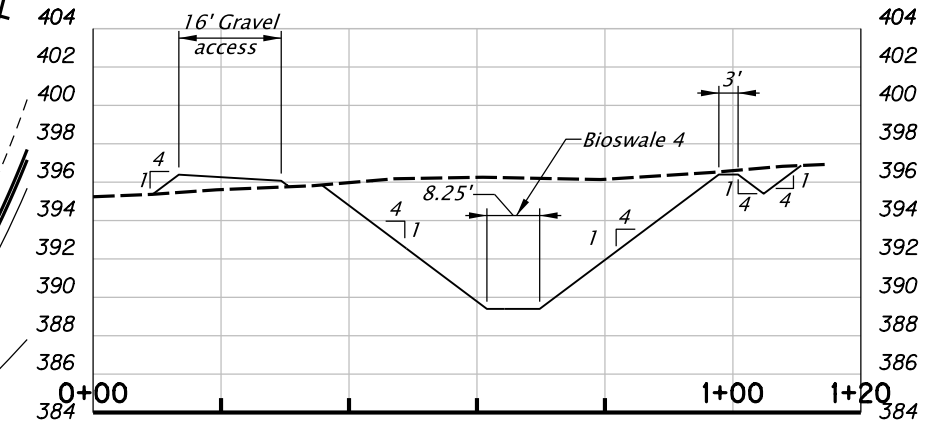
A

N

0 15 30 45
Horizontal Scale In Feet

0 5 10 15
Vertical Scale In Feet

1. Inst. riprap basin - 2 (For details, see sht. HA10)
2. Inst. bollard, non-removable - 2 (See drg no. RD130)
3. For filter strip construction, (See sht. HA09)
4. Const. ditch, "V" bottom, 1:4 slopes, (For details, see sht. HA10)
5. Const. gravel access road, (For details, see sht. HA10)
6. Const. Bioswale 4, (For details, see sht. HA10)
7. Match existing grade with AC pavement
8. Inst. flow spreader - 2 (For details, see sht. HA10)
9. Inst. 18' double swing locked gate, (See drg. no. RD820)
10. For culvert and storm drain piping, See sht. no. C01D and C05B.
11. Protect existing light pole.
12. For reroute of buried electrical line, see sht. PA02 and PA06.
13. Inst. Stormwater Facility Field Marker - 2 Type S1, (see drg. no. RD399).
14. Inst. Stormwater Facility Field Marker - 2 Type S2, (see drg. no. RD399) .



SECTION A-A

REGISTERED PROFESSIONAL ENGINEER
15058PE
OREGON
JULY 25, 1990
RICHARD E. ATTANASIO
EXPIRES: 12/31/2019

FOR REVIEW ONLY

ch2m:
2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

OREGON DEPARTMENT OF TRANSPORTATION

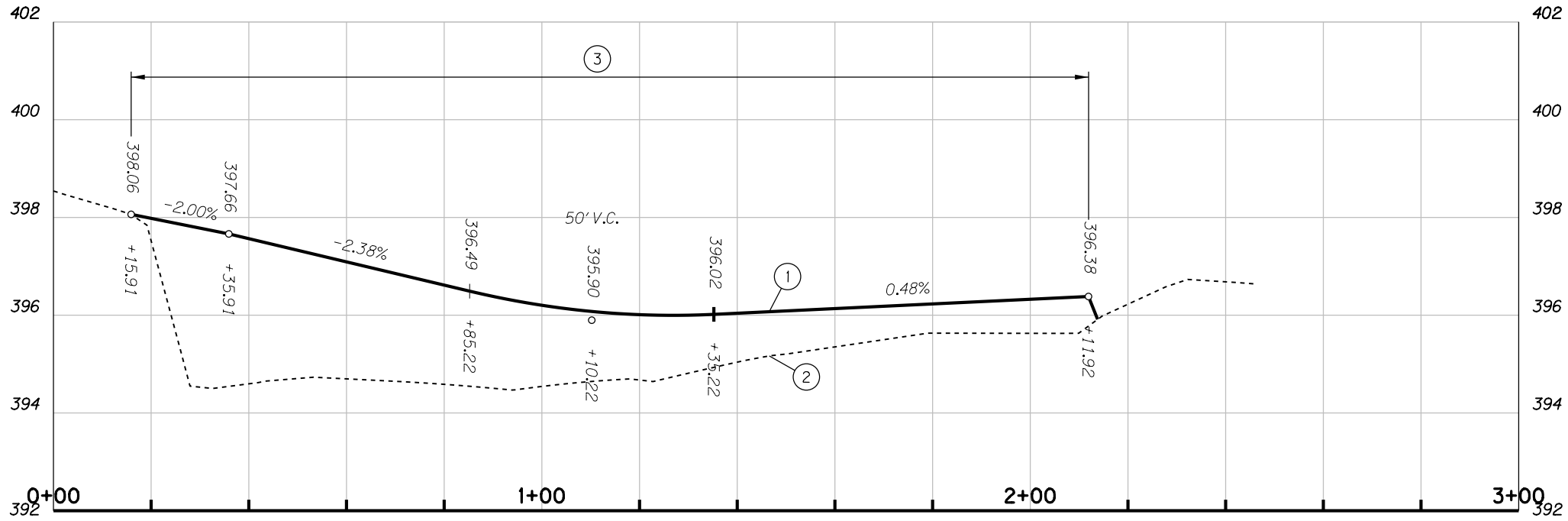
OR569: BELTLINE @ DELTA HIGHWAY - INTERCHANGE SEC.

BELTLINE HIGHWAY
LANE COUNTY

Designer: M. Little
Drafter: J. Pfeifer
Reviewer: S. Litchfield
Checker: R. Attanasio

WATER QUALITY

SHEET NO. HA07



1 Finish grade
2 Existing grade
3 Gravel access road

PROFILE "SW4"

0 15 30 45
Horizontal Scale In Feet

0 1.5 3 4.5
Vertical Scale In Feet

REGISTERED PROFESSIONAL ENGINEER
15058PE
OREGON
JULY 25, 1990
RICHARD E. ATTANASIO
FOR REVIEW ONLY
EXPIRES: 12/31/2019

ch2m.
2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

OREGON DEPARTMENT OF TRANSPORTATION

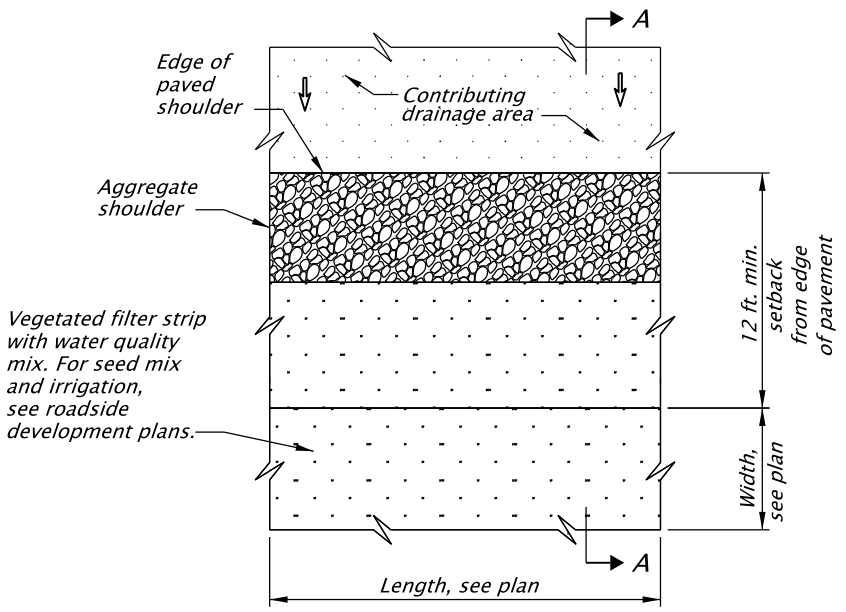
OR569: BELTLINE @ DELTA HIGHWAY - INTERCHANGE SEC.

BELTLINE HIGHWAY
LANE COUNTY

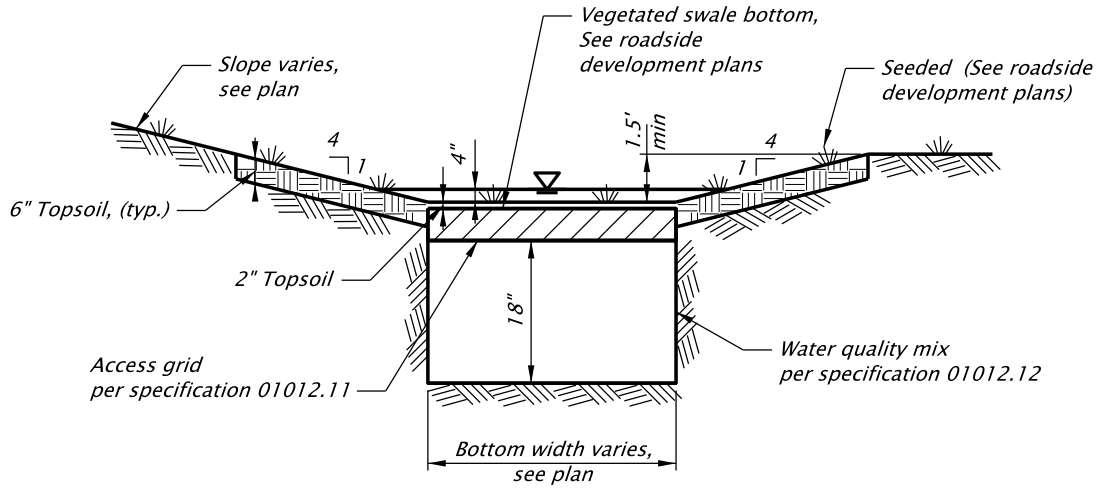
Designer: M. Little
Drafter: J. Pfeifer
Reviewer: S. Litchfield
Checker: R. Attanasio

WATER QUALITY

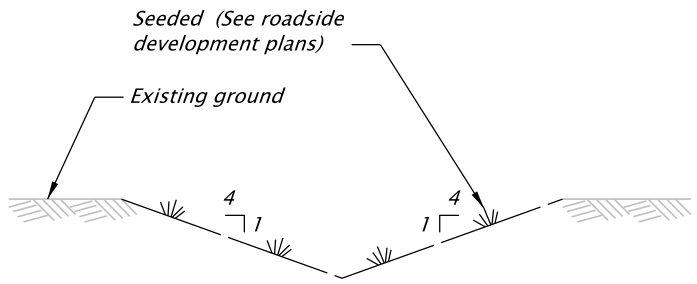
SHEET NO.
HA08



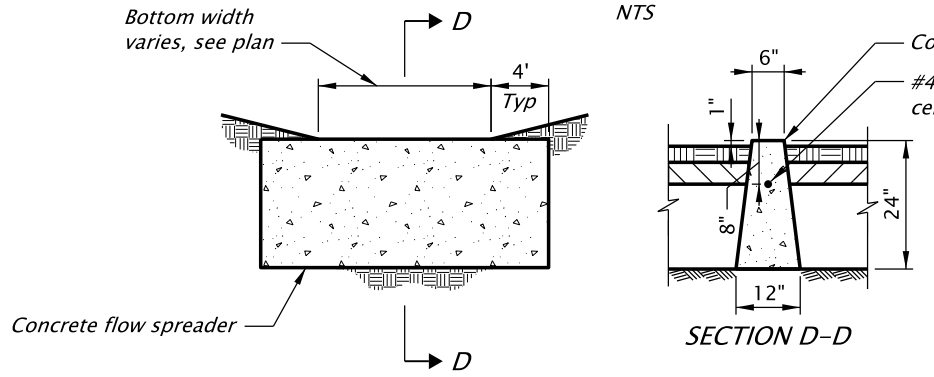
PLAN VIEW



BIOSWALE
NTS

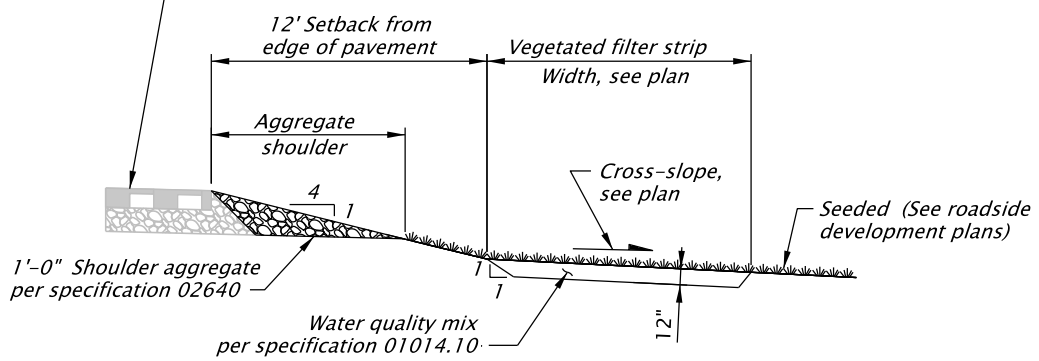


V - DITCH
NTS



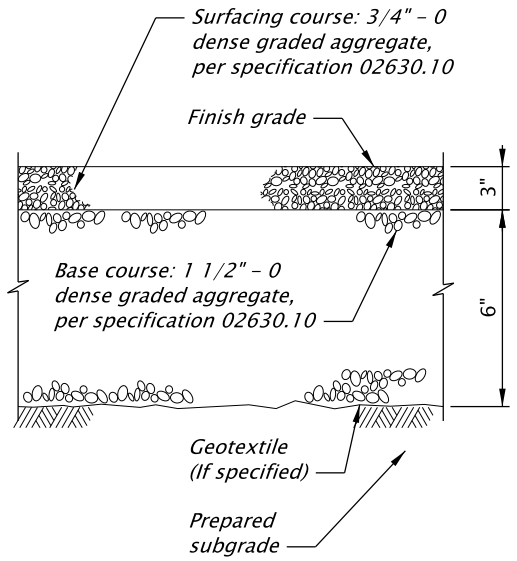
SECTION D-D

FLOW SPREADER
NTS

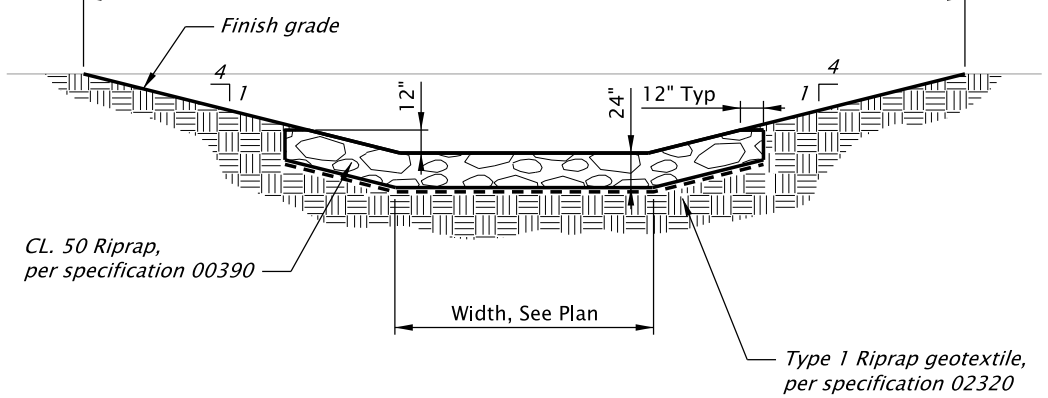


SECTION A-A

FILTER STRIP
NTS



GRAVEL ACCESS ROAD SECTION
NTS



RIPRAP BASIN
NTS

REGISTERED PROFESSIONAL ENGINEER
15058PE
OREGON
JULY 25, 1990
RICHARD E. ATTANASIO
FOR REVIEW ONLY
EXPIRES: 12/31/2019

ch2m:
2020 SW 4TH AVE. - 3RD FLOOR
PORTLAND, OR 97201-4953
TEL. 503.235.5000

OREGON DEPARTMENT OF TRANSPORTATION

OR569: BELTLINE @ DELTA HIGHWAY - INTERCHANGE SEC.

BELTLINE HIGHWAY
LANE COUNTY

Designer: M. Little
Drafter: J. Pfeiffer
Reviewer: S. Litchfield
Checker: R. Attanasio

WATER QUALITY

SHEET NO.
HA10