OPERATION & MAINTENANCE MANUAL

DFI No.: D00388
Facility Type: Water Quality Biofiltration Swale

MARCH, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	**D00388**
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Number) 38V-055
Location:	District: 7
	Highway No.: 001
	Mile Post: 126.52 / 126.54 (beg./end)
	Description: This facility is located on the eastern side of I-5 (Hwy 001, Pacific Highway) in the interior area of the Edenbower loop on-ramp. Access can be obtained from the northbound loop on-ramp.

2. Facility Contact Information

Contact the Engineer of Record, Region Technical Center, or Geo-Environmental's Senior Hydraulics Engineer for:

- Operational clarification
- Maintenance clarification
- Repair or restoration assistance

Engineering Contacts:

Region Technical Center Hydraulics Engineer (541) 957-3693

Or

Geo-Environmental Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record:	ODOT Designer – Region 3 Tech. Center, James Bauman, 541-957-3573
Facility construction:	2007
Contractor:	CH2M Hill, Inc., (Design – Build)

4. Storm Drain System and Facility Overview

A water quality swale is a flat-bottomed open channel designed to treat stormwater runoff from highway pavement areas. This type of facility is lined with grass. Treatment by trapping sedimentation occurs when stormwater runoff flows through the grass.

Stormwater for the facility is conveyed to the facility through a roadside ditch. The ditch collects stormwater from sheet flow generated by the northbound loop on-ramp. Refer to the Operational Plan in Appendix A for further information. Water conveyed into the swale undergoes treatment as it flows through the length of the channel. The treated water flows out of the swale through an inlet/outlet control structure connected to an 18-inch storm pipe. This storm pipe discharges into a roadside ditch on the south side of the loop ramp. The flow from this roadside ditch is conveyed in a southerly direction along the northbound lanes of I-5.

A. Maintenance equipment access:

Maintenance crew can access the facility from the northbound shoulder of I-5 or from the northbound Edenbower Road off-ramp.

B. Heavy equipment access into facility:

☒ Allowed (no limitations)
☐ Allowed (with limitations)
☐ Not allowed

C. Special Features:

☒ Amended Soils
☐ Porous Pavers
☐ Liners
☐ Underdrains

Photo 1: Looking east, flow into the swale is generated from the northbound loop on-ramp shown in the picture. Water is flowing towards the bottom of the picture.

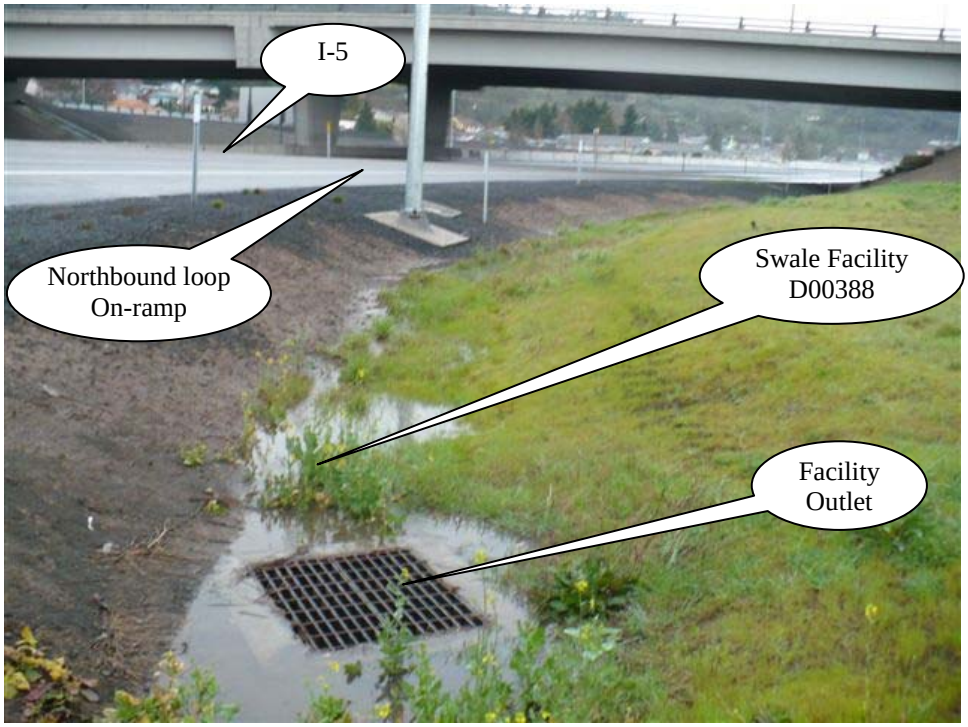


Photo 2: Looking north, flow into the swale is generated from the northbound loop on-ramp on the left side of the picture. Water is collected in the inlet/outlet structure shown at the bottom of the picture.

Photo 3: Looking east, flow into the swale is generated from the northbound loop on-ramp shown in the picture. Water is flowing towards the bottom of the picture.

5. Facility Haz Mat Spill Feature(s)

The water quality biofiltration swale can be used to store a volume of liquid by blocking the 18-inch diameter outlet pipe located at the outlet of the swale facility; see Photo 2. Covering the inlet/outlet control structure with sandbags or a steel plate may help accomplish this task.

6. Auxiliary Outlet (High Flow Bypass)

Auxiliary Outlets are provided if the primary outlet control structure can not safely pass the projected high flows. Broad-crested spillway weirs and over flow risers are the two most common auxiliary outlets used in stormwater treatment facility design. The auxiliary outlet feature is either a part of the facility or an additional storm drain feature/structure.

The auxiliary outlet feature for this facility is:

☐ Designed into facility

☒ Other, as noted below
There is no auxiliary outlet for this facility.

7. Maintenance Requirements

Routine maintenance table for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance requirements for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance requirements in addition to the routine requirements are noted below when applicable.

The ODOT Maintenance Guide can be viewed at the following website:

http://www.oregon.gov/ODOT/HWY/OOM/MGuide.shtml

Maintenance requirements for proprietary structures, such as underground water quality manholes and/or vaults with filter media are noted in Appendix C when applicable.

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual or follow the Maintenance requirements outlined in Appendix C when proprietary structure is selected below:

- ☒ Table 1 (general maintenance)
- ☐ Table 2 (stormwater ponds)
- ☒ Table 3 (water quality biofiltration swales)
- ☐ Table 4 (water quality filter strips)
- ☐ Table 5 (water quality bioslopes)
- ☐ Table 6 (detention tank)
- ☐ Table 7 (detention vault)
- ☐ Appendix C (proprietary structure)
- ☐ Special Maintenance requirements:

Note: Special maintenance Requirements Require Concurrence from ODOT SR Hydraulics Engineer.

8. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options: http://egov.oregon.gov/ODOT/HWY/OOM/EMS.shtml

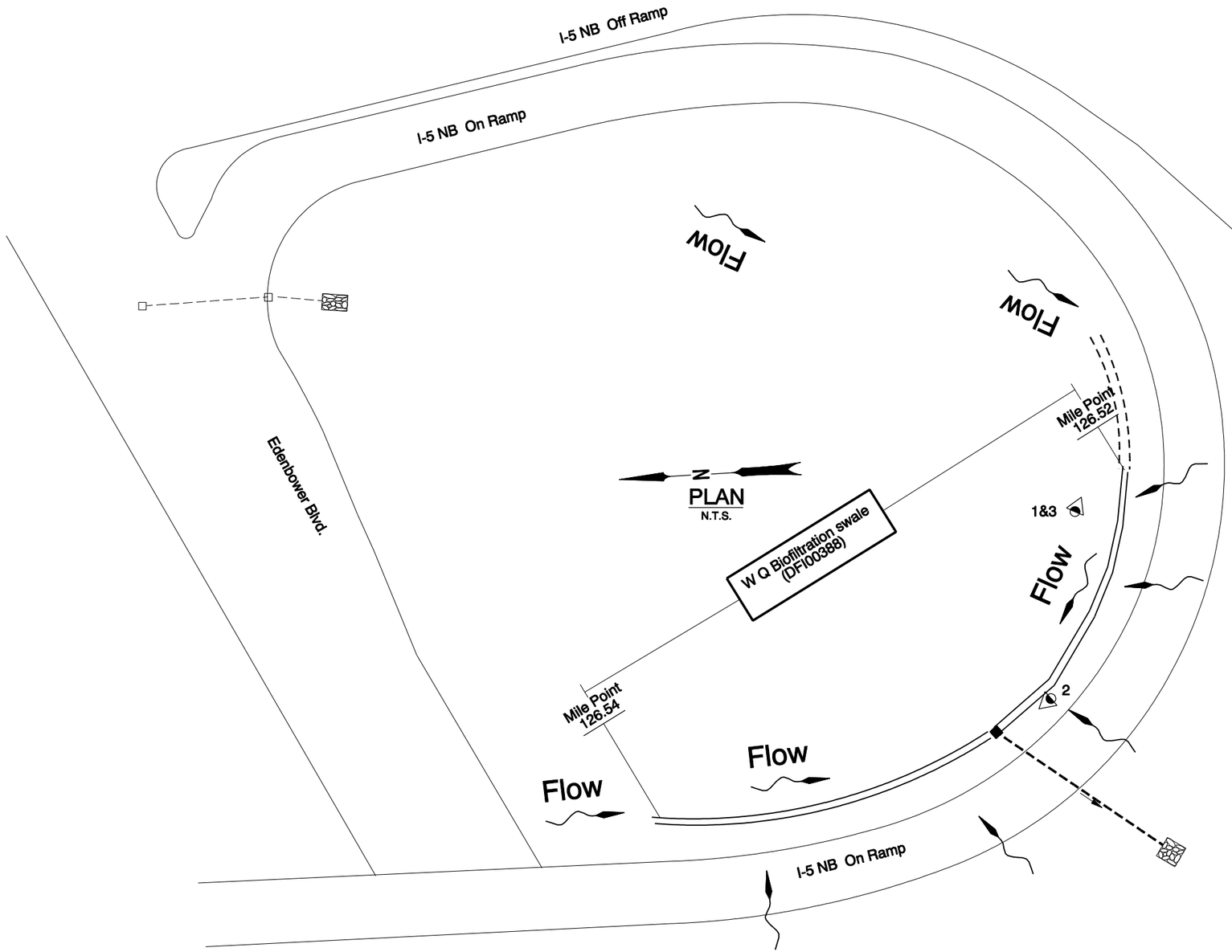
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region Hazmat Coordinator	(541) 957-3594
ODEQ Northwest Region Office	(503) 229-5263

Appendix A

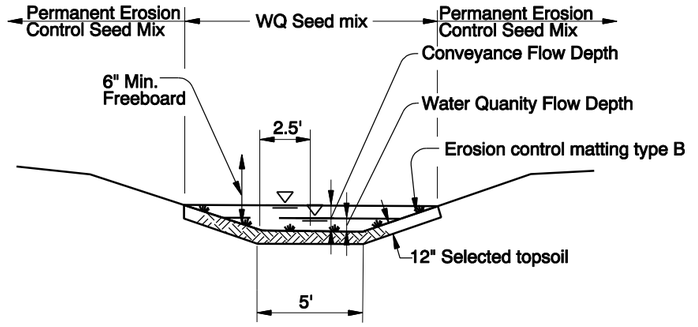
Content:

- **Operational Plan and Profile Drawing(s)**



LEGEND:

- Photo Location / Direction
- Inlet (and or)
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path



BIOFILTRATION SWALE

N.T.S.

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: J. Carpenter

Drafted By: B. Shafer

DFI D00388
MAINTENANCE DISTRICT 7 HWY 001
WATER QUALITY BIOFILTRATION SWALE
PACIFIC HIGHWAY MP 126.52/126.54
DOUGLAS COUNTY

Appendix B

Content:

- **ODOT Project Plan Sheets**
  - ***Cover/Title Sheet***
  - ***Water Quality/Detention Plan Sheets***
  - ***Other Details***

Index Of Roadway And Bridge Drawings On Sheet 1A Thru 1N

Standard Drg. Nos.

BR140	Expansion Joint with Compression Seal or Poured Sealant
BR145	Single Strip Seal Expansion Joint
BR155	Bridge Joint Details (Joints A through F)
BR203	Transition Concrete Bridge Rail to Guardrail
BR236	Trailing End Br. Connection Concrete Rail to Guardrail
BR240	Protective Fencing
BR241	Protective Fencing
BR350	Temporary Diaphragm Beam for Prestressed Concrete Beams
RD300	Trench Backfill, Bedding, Pipe Zone and Muliple Installations
RD302	Street Cut
RD312	Subsurface Drain
RD314	Open Grade HMAC Drainage Details
RD318	Sloped Ends For Concrete Pipe
RD320	Paved End Slope For Culverts
RD336	Standard Storm Sewer Manhole
RD348	Manhole With Inlet
RD356	Manhole Covers And Frames
RD364	Concrete Inlets Types G-1, G-2 & G-2M
RD368	Concrete Inlets, Type ME, M-O, And B-SL
RD370	Ditch Inlet, Type D
RD374	Area Drainage Basin or Field Inlet
RD376	Miscellaneous Drainage Structures, Siphon Box and Inlet Adj. Cap
RD386	Circular Concrete Pipe Fill Height Table
RD400	Guardrail And Metal Median Barrier
RD405	Guardrail And Metal Median Barrier Parts
RD410	Guardrail Parts (Thrie Beam)
RD415	Guardrail And Metal Median Barrier Parts
RD425	2'6" - 4'0" Flared Terminal
RD440	Guardrail Installation At Bridge Ends
RD450	Guardrail Anchors (Steel)
RD500	Precast Concrete Barrier Pin And Loop Assembly
RD530	Guardrail Connection To Concrete Barrier
RD545	Precast Tall (42") Concrete Barrier
RD550	Cast In Place Tall Concrete Barrier Transition To Bridge Rail
RD560	Cast In Place Tall Barrier Transition To Standard Concrete Barrier
RD610	Asphalt Pavement Details
RD700	Curbs
RD720	Sidewalks
RD755	Sidewalk Ramp Details
RD760	Sidewalk Ramp Placement
RD800	Traffic Delineators
RD805	Traffic Delineator Installations
RD810	Barbed And Woven Wire Fences
RD900	Traffic Control Plans (Details)
RD905	Traffic Control Plans (Intersection Details)
RD906	Traffic Control Plans (Signalized Intersection Details)
RD907	Traffic Control Plans (Multi-Lane Signalized Intersection Details)
RD910	Traffic Control Plans (2-Lane, 2-Way and 3-Lane, 2-Way Roadways)
RD915	Traffic Control Plans (Non-Freeway, Multi-Lane Sections)
RD920	Traffic Control Plans (Freeway Section)
RD925	Traffic Control Plans (Freeway Section)
RD930	Traffic Control Plans (Freeway Section)
RD945	Traffic Control Plans (Details)
RD950	Barricades
RD955	Temporary Impact Attenuators
RD960	Temporary Impact Attenuators
RD1005	Check Dams
RD1010	Inlet Protection (Type 1, 2, & 3)
RD1040	Sediment Fence, Supported Sediment Fence, Unsupported
TM100	Temporary Wood Post Sizing Chart
TM105	Orange Flag Board Mounting Details
TM200	Sign Installation Details
TM201	Sign Installation Details for Secondary Signs
TM205	Aluminum Panels And Installation
TM206	Sign Bracing Details Sign Mountain Details
TM207	Additional Mountain Details
TM211	Sign Details US And Interstate Route Shields
TM212	Signing Details Oregon Route Shields

Note: See Sht. 1A For Additional Standard Drawings

Rev. No.	Date	Revision
1	11/21/06	As Constructed

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

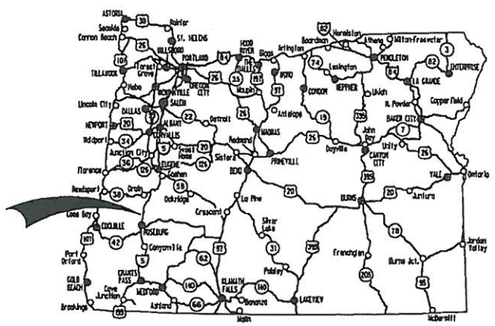
PLANS FOR PROPOSED PROJECT

GRADING, DRAINAGE, STRUCTURE AND PAVING

I-5: SUTHERLIN - ROSEBURG SEC.
DESIGN-BUILD PROJECT

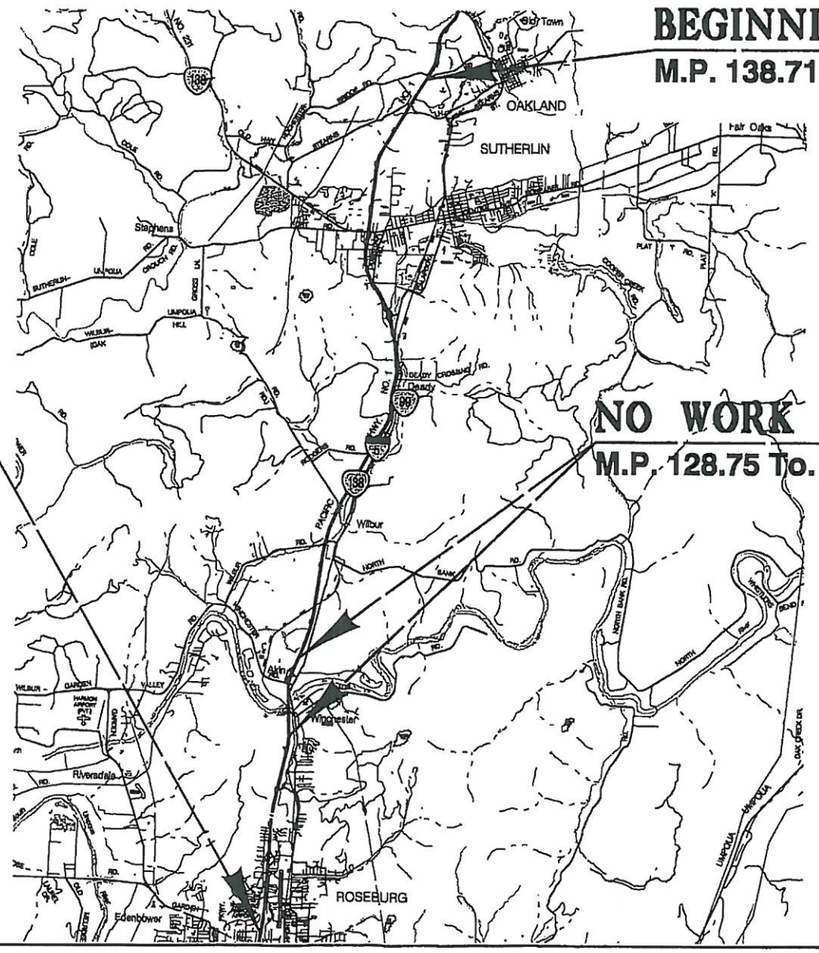
PACIFIC HIGHWAY
DOUGLAS COUNTY

MAY 2007



Overall Length Of Project - 13.33 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.)



BEGINNING OF PROJECT
M.P. 138.71

END OF PROJECT
M.P. 125.38

NO WORK ZONE
M.P. 128.75 To M.P. 129.80

REVISED AS CONSTRUCTED
5/06 CONTRACT 13070
DESIGN MGR. James Bauman

N

T. 25 S., R. 5 W., W.M.
T. 26 S., R. 5 W., W.M.
T. 26 S., R. 6 W., W.M.
T. 27 S., R. 6 W., W.M.

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

OREGON TRANSPORTATION COMMISSION

Stuart Foster	CHAIRMAN
Gail L. Achterman	COMMISSIONER
Mike Nelson	COMMISSIONER
Randall Pape	COMMISSIONER
Janice J. Wilson	COMMISSIONER
Matt Garrett	DIRECTOR OF TRANSPORTATION

PLANS PREPARED FOR
ODOT
BY:
CH2MHILL

REGISTERED PROFESSIONAL ENGINEER
16,901
OREGON
NOVEMBER 13, 1993
JAMES F. BAUMAN
ORIGINAL
SEALED

EXPIRES: 12/31/07

OREGON DEPARTMENT OF TRANSPORTATION
CONCURRENCE

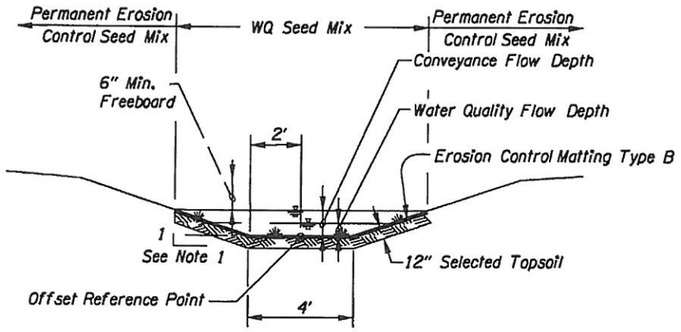
TECHNICAL SERVICES MANAGING ENGINEER _____ DATE _____

I-5: SUTHERLIN-ROSEBURG SEC.
DESIGN-BUILD PROJECT
PACIFIC HIGHWAY
DOUGLAS COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	OTIA-IM-S001(192)	1

CH2MHILL

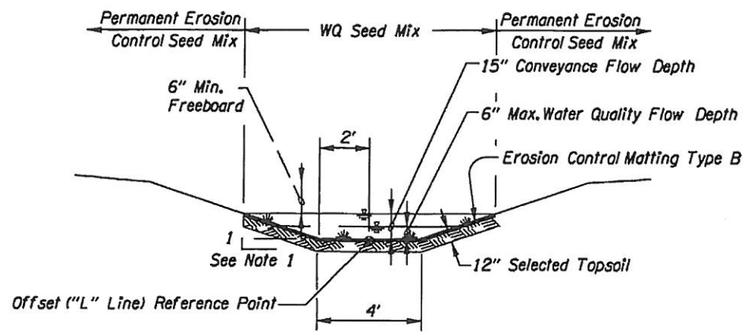
REVISED AS CONSTRUCTED
11/06 CONTRACT 13070



Notes:

1. Sideslopes In The Water Quality Section Of The Swale Shall Be 4H:1V Maximum. Sideslopes Above The Water Quality Flow Depth Shall Match Roadway Embankment Slopes.
2. Erosion Control Matting Materials And Installation Per ODOT Std. Spec. Section 280.

BIOSWALE SECTION - TYPICAL



Notes:

1. Sideslopes In The Water Quality Section Of The Swale Shall Be 4H:1V Maximum. Sideslopes Above The Water Quality Flow Depth Shall Match Roadway Embankment Slopes.
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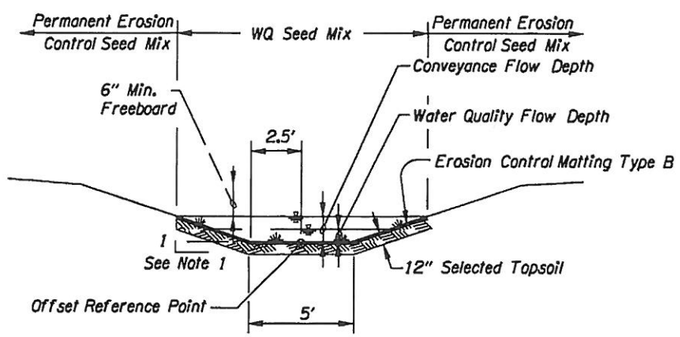
BIOSWALE SECTION - SUTHERLIN INTERCHANGE



Notes:

1. Sideslopes In The Water Quality Section Of The Swale Shall Be 4H:1V Maximum. Sideslopes Above The Water Quality Flow Depth Shall Match Roadway Embankment Slopes.
2. Erosion Control Matting Materials And Installation Per ODOT Std. Spec. Section 280.

BIOSWALE SECTION - NORTH ROSEBURG INTERCHANGE

Rev. No.	Date	Revision
3	11/21/06	As Constructed
2	2/1/07	Revision - Addition Of Bioswale Section
1	12/9/05	Revision - Addition Of Non-Specific Bioswale Section

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: SUTHERLIN-ROSEBURG SEC.
DESIGN-BUILD PROJECT
PACIFIC HIGHWAY
DOUGLAS COUNTY

Reviewed By - Mark Anderson
Designed By - Scott Christopherson
Drafted By - Priscilano Peralta-Ramirez

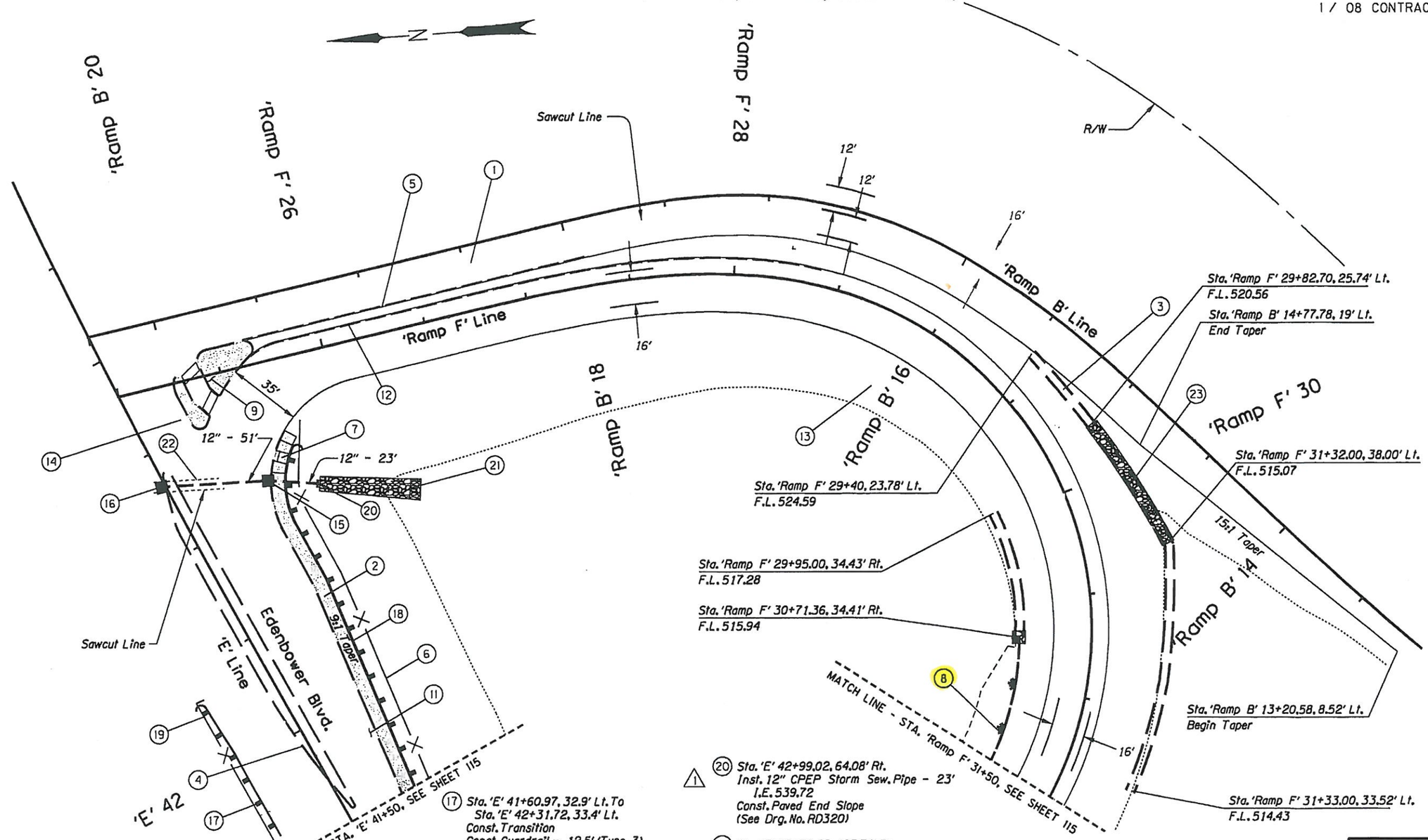
DRAINAGE DETAILS
TYPICAL BIOSWALE SECTION

SHEET NO. 2B-20

Sec. 1, T. 27 S., R. 6 W., W.M.

REVISED AS CONSTRUCTED
1 / 08 CONTRACT 13070

CH2MHILL



(1) Remove Existing Guardrail - 427'

(2) Remove Existing Fence - 290'

(3) Const. Ditch
"V" Bottom, 3:1 Slopes

(4) Sta. 'E' 41+55.50 To Sta. 'E' 43+49.50
Const. Type CA Island With
Mountable Curb - 393'
(See Sht. 2A-38 & Std. Drg. No. RD705)

(5) Sta. 'Ramp B' 17+91.00, Lt. To
Sta. 'Ramp B' 19+64.15, Lt.
Const. Mountable Curb
Low Profile
(See Std. Drg. No. RD700)

(6) Const. CL-4 Fence - 199'
Connect To Existing (See Drg. No. RD810) △2

(7) Const. Sidewalk Ramp (Parallel)
(See Drg. No. RD755)

(8) Const. Bioswale
(See Sht. 115, Note 7) △1

(9) Const. Raised Right Turn
Cut Through Channelization Island
With Type "C" Curb
(See Sht. 2B-26 And Drg. No. RD710)

(11) Remove Existing Curb And Sidewalk

(12) Sta. 'Ramp F' 25+63.80, Lt. To
Sta. 'Ramp F' 28+40.00, Lt.
Const. Mountable Curb
Low Profile
(See Sht. 2B-26 And Drg. No. RD700)

(13) △2
Remove Existing Survey Monument And
Rebuild Embankment

(14) Cap Inlet And Plug Connecting Pipe
Fill Inlet With Granular MH
(See Drg. No. 376)

(15) Sta. 'E' 43+11.68, 44.13' Rt.
Const. Type "G-2" Inlet
Grate Elev. 543.61±
F.L. 539.96 S (Out)
Inst. 12" Storm Sew. Pipe, CPEP - 51'
I.E. 540.16 N (In)
(See Drg. Nos. RD300 & RD364)

(16) Sta. 'E' 43+33.38, 1.80' Lt.
Const. Type "G-2" Inlet
Grate Elev. 545.62±
F.L. 542.12
(See Drg. No. RD364)

(17) Sta. 'E' 41+60.97, 32.9' Lt. To
Sta. 'E' 42+31.72, 33.4' Lt.
Const. Transition
Const. Guardrail - 12.5' (Type 3)
Const. Guardrail - 12.5' (Type 2A)
Const. Non-Flared Terminal,
Test Level 2
(See Sht. SRS-EB1 And Drg.
Nos. RD400, RD405, RD415,
RD420, RD450, BR206 & BR207)

(18) Const. Guardrail
(See Sht. 115, Note 17)

(19) Remove And Install CL-4 Fence - 84.5'
Connect To Existing (See Drg. No. RD700) △2

△1 (20) Sta. 'E' 42+99.02, 64.08' Rt.
Inst. 12" CPEP Storm Sew. Pipe - 23'
I.E. 539.72
Const. Paved End Slope
(See Drg. No. RD320)

(21) Sta. 'E' 42+72.28, 105.74' Rt.
Const. Riprap Pad (Class 50)
5' (Top) x 10' (Bottom) x 50' x 2'
Underlay With Riprap
Geotextile - Type 1

(22) Replace Pavement - 13 S.Y.
(See Drg. No. RD302)

(23) Sta. 'Ramp F' 29+78.28, 26.27' Lt.
Sta. 'Ramp F' 30+34.22, 37.80' Lt.
Const. Riprap Pad
(Class 50) - 6' x 68' x 2'
Underlay with Riprap
Geotextile - Type 1

Rev. No.	Date	Revision
△2	9/07	As Constructed
△1	7/31/07	Revised Guardrail And Island Requirements - NDC 10

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: SUTHERLIN-ROSEBURG SEC.
DESIGN-BUILD PROJECT
PACIFIC HIGHWAY
DOUGLAS COUNTY

Reviewed By - Sharl Munroe
Designed By - Andy Kutansky
Drafted By - Prisciliano Peralta-Ramirez

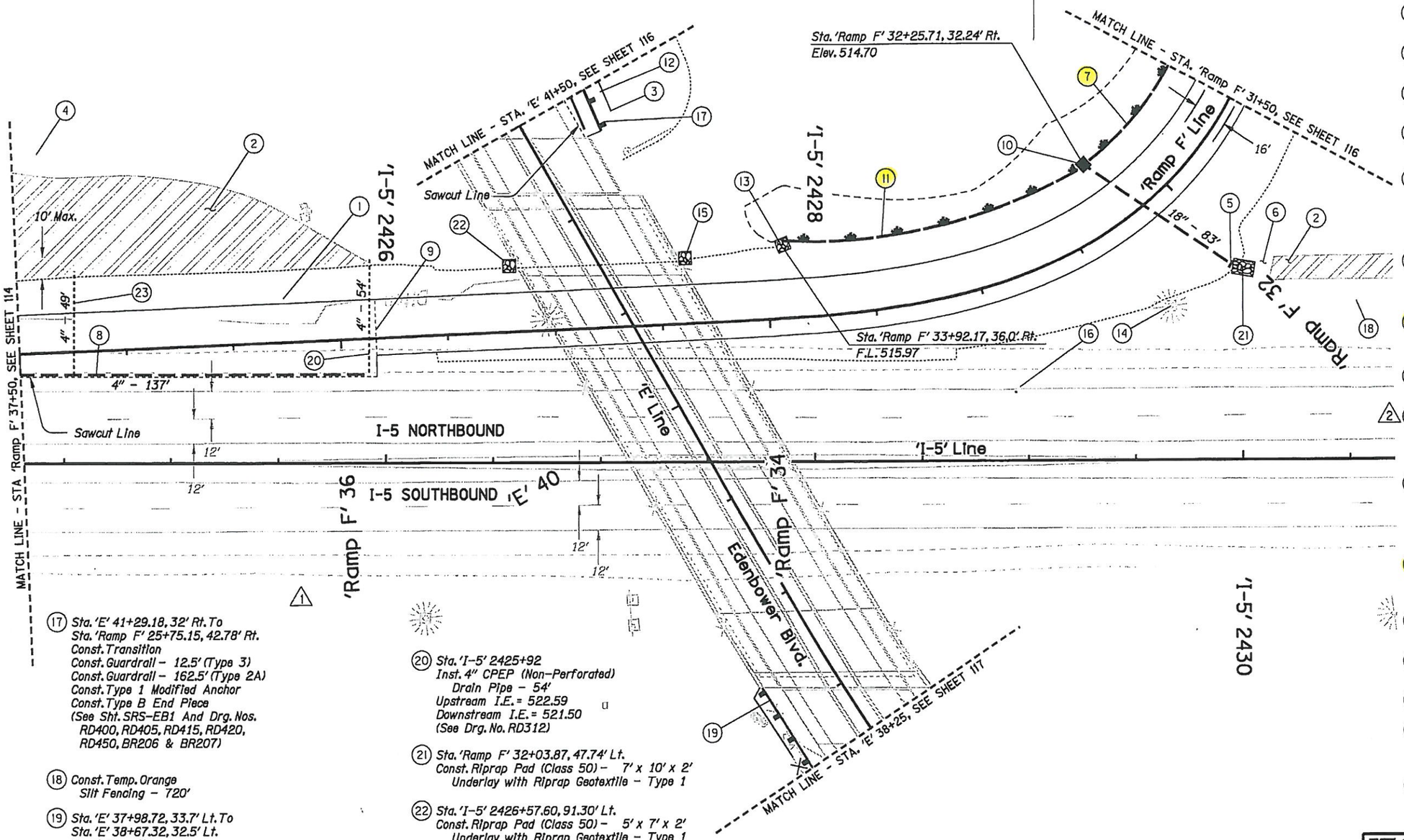
NORTH ROSEBURG INTERCHANGE
ROADWAY PLAN
'RAMP B' & 'RAMP F'

SHEET NO. 116

Sec. 1, T. 27 S., R. 6 W., W.M.

REVISED AS CONSTRUCTED
10/08 CONTRACT 13070

CH2MHILL



(1) Remove Existing Luminaire
(For Details, See Sht. I-013)

(2) Protect Existing Wetlands And Waters
Per Wetland Removal/Fill Permits

(3) Tie Into Existing Fence

(4) Const. Temp. Orange
Silt Fencing - 871'

(5) Sta. 'Ramp F' 32+03.87, 47.74' Lt.
Inst. 18" CPEP Culv. Pipe - 83'
I.E. 508.82
Const. Paved End Slope
(See Drg. No. RD320)

(6) Minimize Temp. Wetland Impacts,
And Restore Impacted Wetlands
Per Wetland Removal/Fill Permits
Upon Completion Of Work

(7) Const. Bioswale - 125'
At 1.0% Grade
(For Details, See Sht. 2B-20)

(8) Const. Subgrade Drain
(See Sht. 114, Note 9)

(2) (9) Sta. 'Ramp F' 35+83.45, 8' Lt to 18' Rt.
End Dense HMAC Paving
Begin Open Graded HMAC Paving

(10) Sta. 'Ramp F' 32+25.71, 32.24' Rt.
Const. Type "G-2" Inlet
Grate Elev. 514.70
F.L. 509.65
(See Drg. No. 364)

(11) Const. Bioswale - 145'
At 0.85% Grade
(For Details, See Sht. 2B-20)

(12) Remove Existing Fence - 290'
(See Sht. 116, Note 2)

(13) Const. Riprap Pad (Class 50) - 5' x 7' x 2'
Underlay with Riprap Geotextile - Type 1

(14) Protect Existing Luminaire - 1

(15) Sta. 'I-5' 2427+39.00, 94.90' Lt.
Const. Riprap Pad (Class 50) - 5' x 7' x 2'
Underlay with Riprap Geotextile - Type 1

(16) Sta. 'I-5' 2428+95.88, 34.3' Lt.
End Rumble Strips
(See Interstate Maint. Plans)

(17) Sta. 'E' 41+29.18, 32' Rt. To
Sta. 'Ramp F' 25+75.15, 42.78' Rt.
Const. Transition
Const. Guardrail - 12.5' (Type 3)
Const. Guardrail - 162.5' (Type 2A)
Const. Type 1 Modified Anchor
Const. Type B End Piece
(See Sht. SRS-EB1 And Drg. Nos.
RD400, RD405, RD415, RD420,
RD450, BR206 & BR207)

(18) Const. Temp. Orange
Silt Fencing - 720'

(19) Sta. 'E' 37+98.72, 33.7' Lt. To
Sta. 'E' 38+67.32, 32.5' Lt.
Const. Transition
Const. Guardrail - 12.5' (Type 3) (2)
Const. Non-Flared Terminal, Test Level 2
(See Sht. SRS-EB1 And Drg. Nos. RD400, RD405,
RD415, RD420, RD450, BR206 & BR207)

(20) Sta. 'I-5' 2425+92
Inst. 4" CPEP (Non-Perforated)
Drain Pipe - 54'
Upstream I.E. = 522.59
Downstream I.E. = 521.50
(See Drg. No. RD312)

(21) Sta. 'Ramp F' 32+03.87, 47.74' Lt.
Const. Riprap Pad (Class 50) - 7' x 10' x 2'
Underlay with Riprap Geotextile - Type 1

(22) Sta. 'I-5' 2426+57.60, 91.30' Lt.
Const. Riprap Pad (Class 50) - 5' x 7' x 2'
Underlay with Riprap Geotextile - Type 1

(23) Sta. 'I-5' 2424+54.60
Inst. 4" CPEP (Non-Perforated)
Drain Pipe - 49'
Upstream I.E. = 526.41
Downstream I.E. = 525.43
(See Drg. No. RD312)

Rev. No.	Date	Revision
(2)	10/08	As Constructed
(1)	7/31/07	Revised Guardrail Requirements - NDC 10

0 25 50 75
Scale In Feet

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: SUTHERLIN-ROSEBURG SEC.
DESIGN-BUILD PROJECT
PACIFIC HIGHWAY
DOUGLAS COUNTY

Reviewed By - Shari Munroe
Designed By - Andy Kutansky
Drafted By - Prisciliano Peralta-Ramirez

NORTH ROSEBURG INTERCHANGE
ROADWAY PLAN
STA. 'Ramp F' 31+50 TO STA. 'Ramp F' 37+50

SHEET NO. 115

FINAL PLANS DESIGN UNIT EB

NDW -SRSshl115.dw 10/8/2008 9:21:36 AM pperalta