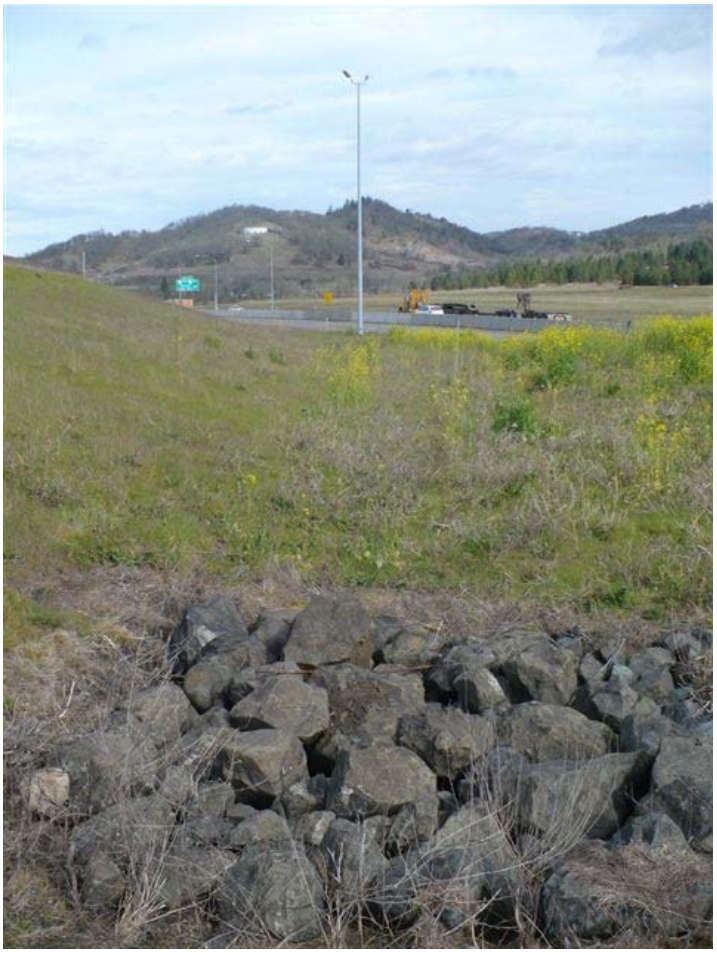
# OPERATION & MAINTENANCE MANUAL

## DFI No.: D00375
## Facility Type: Water Quality Biofiltration Swale



**MARCH, 2011**

**INDEX**

## 1. Identification

| | |
|---|---|
| Drainage Facility ID (DFI): | **D00375** |
| Facility Type: | Water Quality Biofiltration Swale |
| Construction Drawings: | (V-File Number) 38V-097 |
| Location: | District: 7 |
| | Highway No.: 001 |
| | Mile Post: 117.70 / 117.72 (beg./end) |
| | Description: This facility is located in gore area between the southbound lanes of I-5 (Hwy 001, Pacific Highway) and the off-ramp, leading from southbound OR42. Access can be obtained from the outside shoulder of SB I-5 or from the OR42 overcrossing. |

## 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 is conveyed to the facility from the highway OR42 overcrossing and piped into a ditch immediately upstream from the swale. The stormwater transitions from the ditch to the swale by running through a riprap pad that functions as an energy dissipater and flow spreader. Stormwater from the southbound travel lanes of I-5 also contribute sheet flow to the swale. 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 and into a roadside ditch, which is then conveyed to an unnamed stream that is located to the north of the swale.

A. Maintenance equipment access:

Maintenance crew can access the swale from the outside shoulder of I-5 southbound or from the OR42 overcrossing.

B. Heavy equipment access into facility:

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

C. Special Features:

☒ Amended Soils
☐ Porous Pavers
☐ Liners
☐ Underdrains

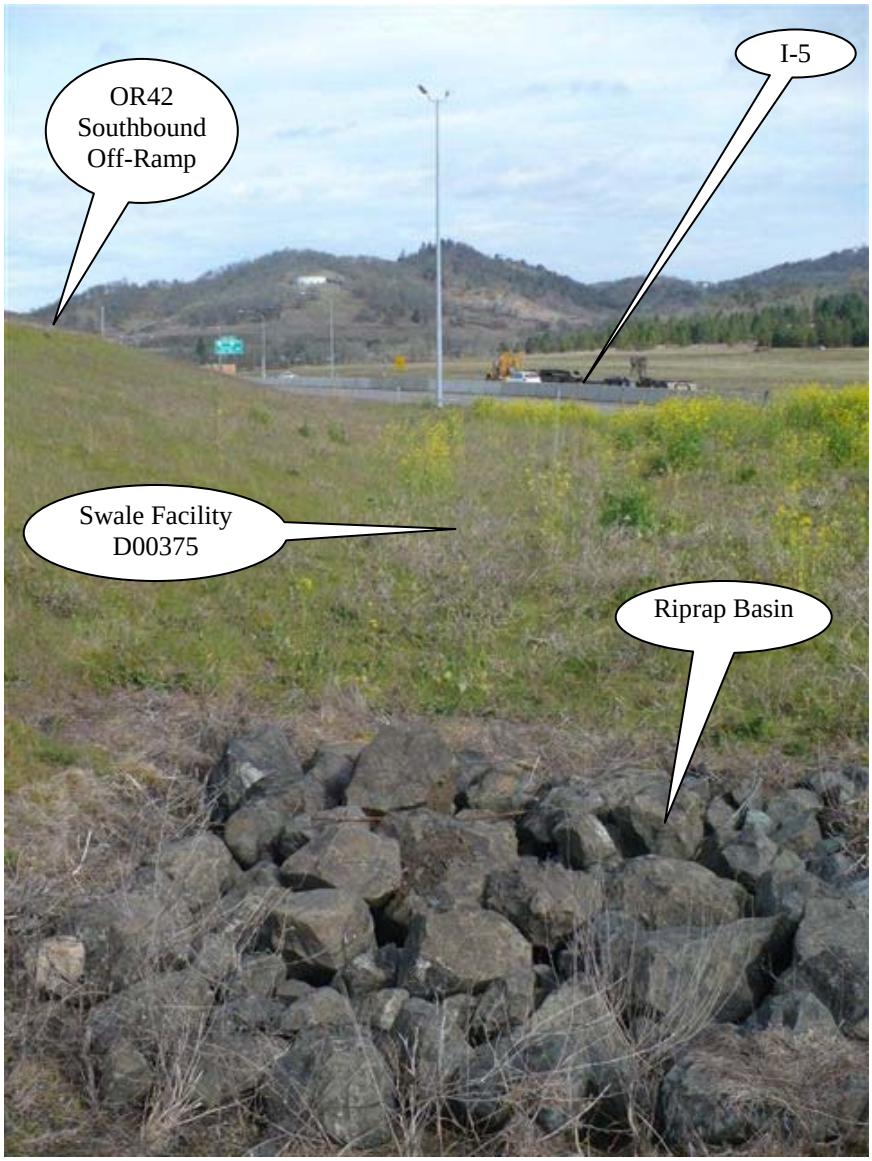



Photo 1: Looking north, stormwater is conveyed into the swale by flowing overtop the riprap basin shown at the bottom of the photo. Additional Sheet flow is generated from I-5, shown on right side of the picture.

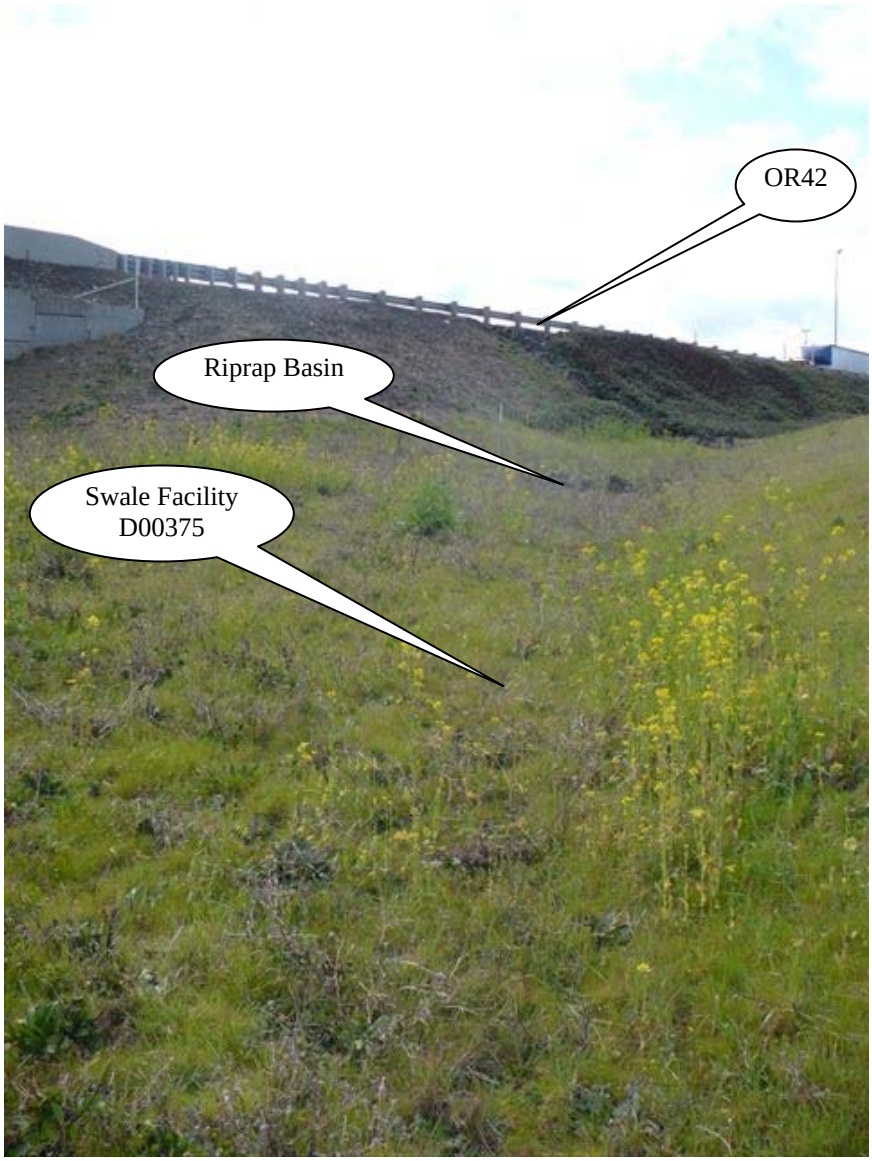



Photo 2: Looking south, flow into the swale is generated from highway OR42, shown at the top of the picture. The flow is collected in a ditch and enters the swale by flowing overtop the riprap basin that is shown in the upper right portion of the picture.

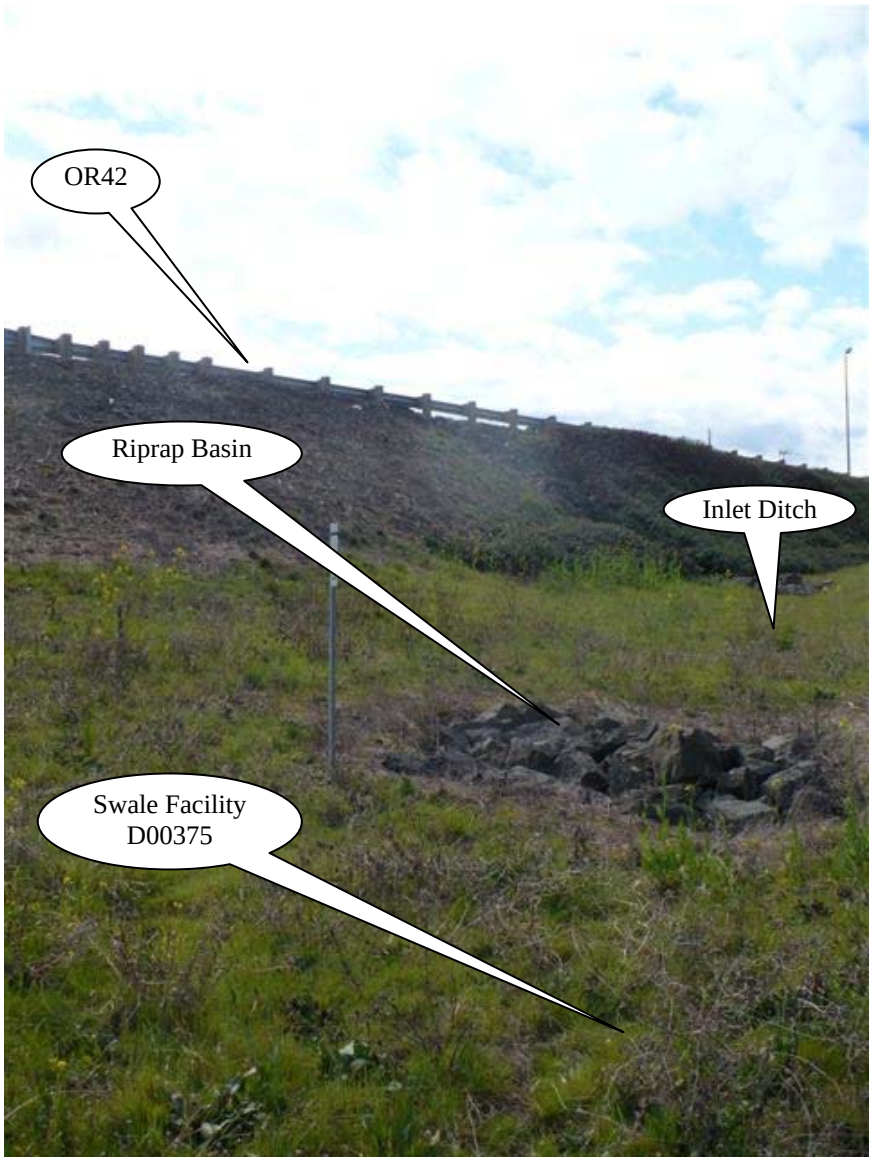



Photo 3: Looking south, flow into the swale is generated from Highway OR42, shown at the top of the picture. The flow is collected in a ditch and enters the swale by flowing overtop the riprap basin that is shown in the center portion of the picture.

## 5. Facility Haz Mat Spill Feature(s)

The water quality biofiltration swale can be used to store a volume of liquid by blocking the flow path and outlet channel of the water quality biofiltration swale. Constructing a sandbag dam across the swale outlet channel may help facilitate this process; see the photos, above.

## 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

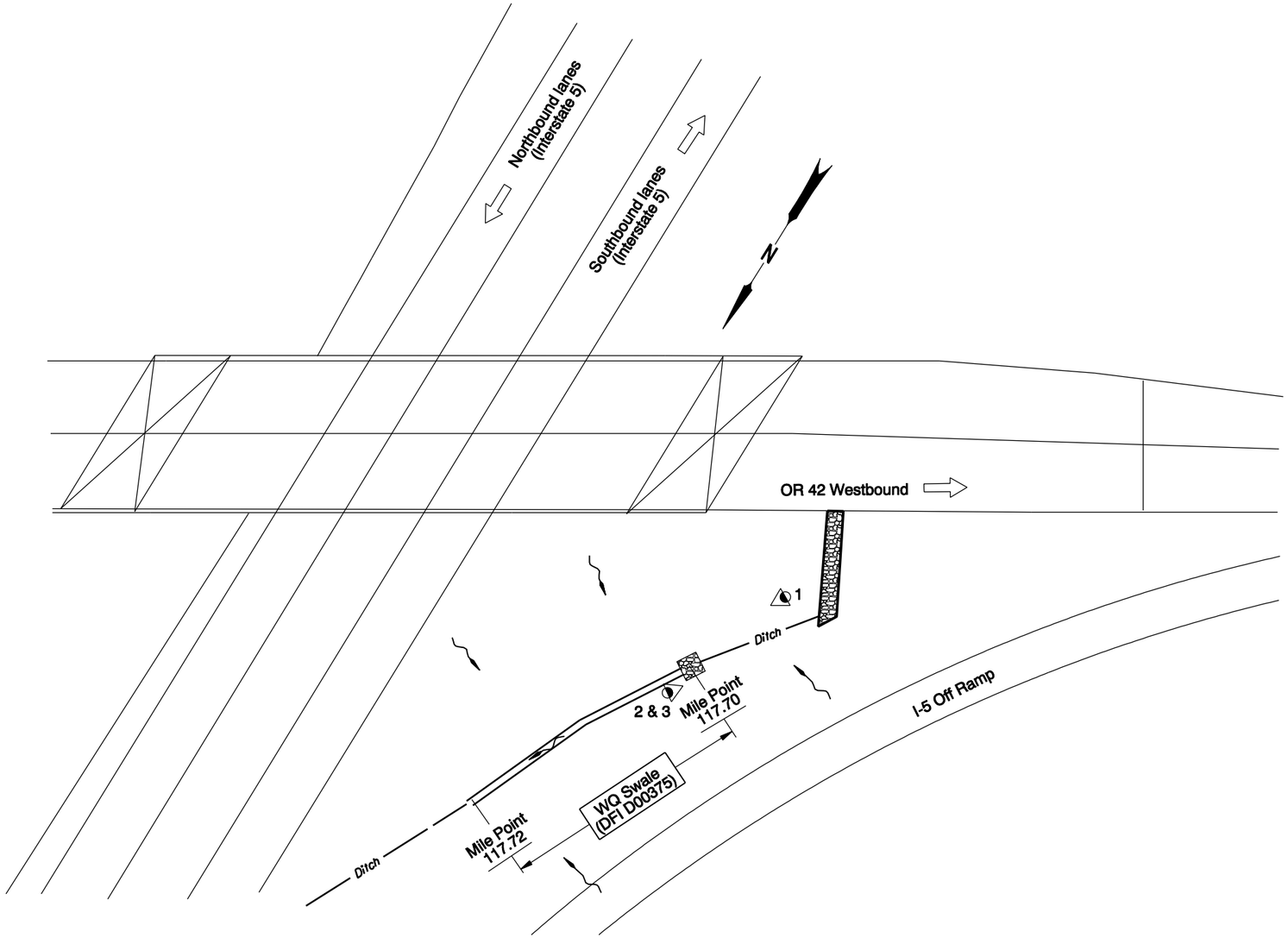
Contact any of the following for more detailed information about management of waste materials found on site:

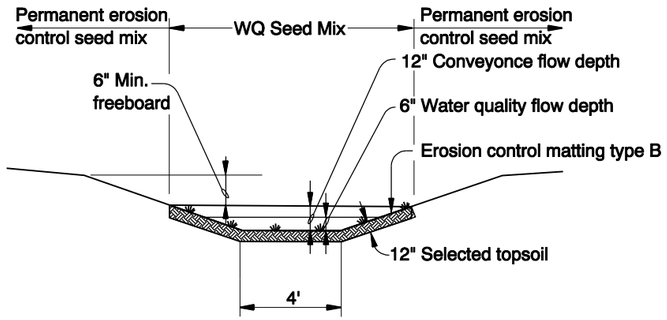
| | |
|---|---|
| ODOT Clean Water Unit | (503) 986-3008 |
| ODOT Statewide Hazmat Coordinator | (503) 229-5129 |
| ODOT Region Hazmat Coordinator | (541) 957-3594 |
| ODEQ Northwest Region Office | (503) 229-5263 |

# Appendix A

**Content:**

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




## TYPICAL WQ SWALE SECTION

N.T.S.

LEGEND:

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

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: J. Carpenter

Drafted By: B. Shafer

**DFI D00375**
**MAINTENANCE DISTRICT 7 HWY 1**
**WQ QUALITY BIOFILTRATION SWALE**
PACIFIC HIGHWAY MP 117.70/117.72
DOUGLAS COUNTY

# Appendix B

**Content:**

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

*Index Of Roadway Drawings On Sheet 1A*

*Standard Drg. Nos.*

| | |
|---|---|
| BR150 | Double Strip Seal Expansion Joint |
| BR155 | Bridge Joint Details |
| BR203 | Standard Transition Concrete Bridge Rail to Guardrail |
| BR236 | Trailing End Br. Connection Concrete Br. Rail to Guardrail |
| BR240 | Protective Fencing |
| BR241 | Protective Fencing |
| BR350 | Temp. Diaphragm Beam for Prestressed Concrete Beams |
| RD364 | Concrete Inlets Types G-1, G-2 & G-2M |
| RD376 | Misc. Drainage Structures, Siphon Box & Inlet Adj. Cap |
| RD400 | Guardrail and Metal Median Barrier |
| RD405 | Guardrail and Metal Median Barrier Parts |
| RD415 | Guardrail and Metal Median Barrier Parts |
| RD425 | 2'6" - 4'0" Flared Terminal |
| RD440 | Guardrail Installation at Bridge Ends |
| RD450 | Guardrail Anchors (Steel) |
| RD470 | Guardrail Over Low-Fill Culverts |
| RD500 | Precast Concrete Barrier Pin and Loop Assembly |
| RD515 | Median Barrier Anchoring Details |
| RD516 | Securing Concrete Barrier To Roadway |
| RD530 | Guardrail Transition to Concrete Barrier |
| RD545 | Precast Tall (42") Concrete Barrier |
| RD550 | Cast-In-Place Concrete Barrier Transition To Bridge Rail |
| RD560 | Cast-In-Place Barrier Transition To Standard Concrete Barrier |
| RD570 | Guardrail Transition to Tall Concrete Barrier |
| RD600 | Portland Cement Concrete Pavement |
| RD605 | Continuously Reinforced Concrete Pavement |
| RD610 | Asphalt Pavement Details |
| RD700 | Curbs |
| RD810 | Barbed And Woven Wire Fences |
| RD900 | Traffic Control Plans Details |
| RD920 | Traffic Control Plans Freeway Sections |
| RD945 | Traffic Control Plans Details |
| RD950 | Temporary Barricades |
| RD955 | Temporary Impact Attenuators |
| RD960 | Temporary Impact Attenuators |

STATE OF OREGON

# DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

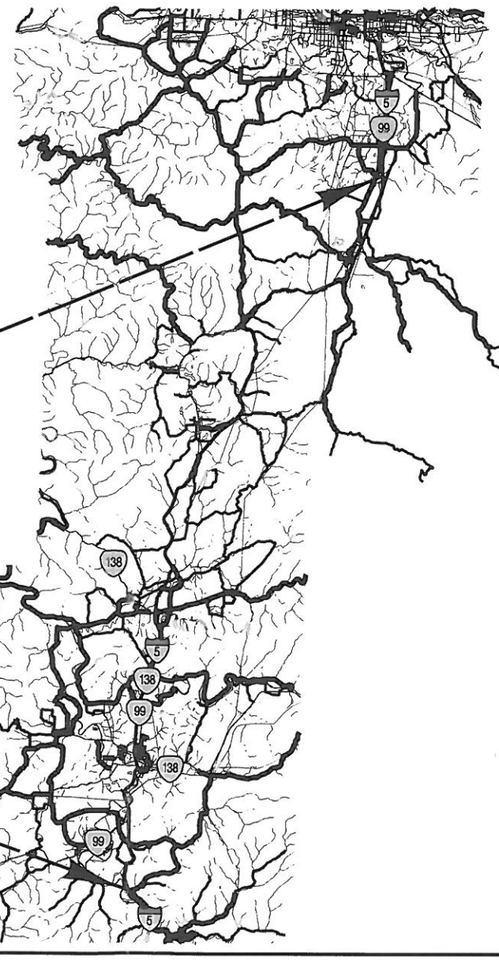
## GRADING, DRAINAGE, STRUCTURES & PAVING

# I-5: CLARKS BRANCH TUNNEL MILL RACE SEC. DESIGN-BUILD PROJECT

## PACIFIC HIGHWAY

### DOUGLAS AND LANE COUNTIES

### April 11, 2007




REVISED AS CONSTRUCTED
04/07 CONTRACT 13111
DESIGN MGR. JAMES BAUMAN

**BEGINNING OF PROJECT**
**M.P. 180.49**

**END OF PROJECT**
**M.P. 113.44**

N

Sec. 26, T. 19 S., R. 3 W., W.M.
Sec. 35, T. 19 S., R. 3 W., W.M.
Sec. 2, T. 20 S., R. 3 W., W.M.
Sec. 11, T. 20 S., R. 3 W., W.M.
Sec. 1, T. 28 S., R. 6 W., W.M.
Sec. 2, T. 28 S., R. 6 W., W.M.
Sec. 11, T. 28 S., R. 6 W., W.M.
Sec. 12, T. 28 S., R. 6 W., W.M.
Sec. 13, T. 28 S., R. 6 W., W.M.
Sec. 14, T. 28 S., R. 6 W., W.M.
Sec. 23, T. 28 S., R. 6 W., W.M.
Sec. 24, T. 28 S., R. 6 W., W.M.

| Rev. No. | Date | Revision |
|---|---|---|
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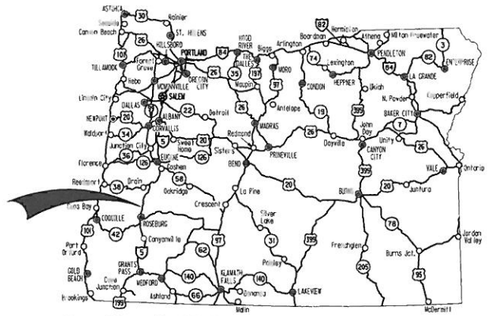
| | | |
| 1 | 4/11/07 | As Constructed |



*Overall Length Of Project - 67.05 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

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
JAMES F. BAUMAN
ORIGINAL SEALED
EXPIRES: 12/31/07

OREGON DEPARTMENT OF TRANSPORTATION
CONCURRENCE

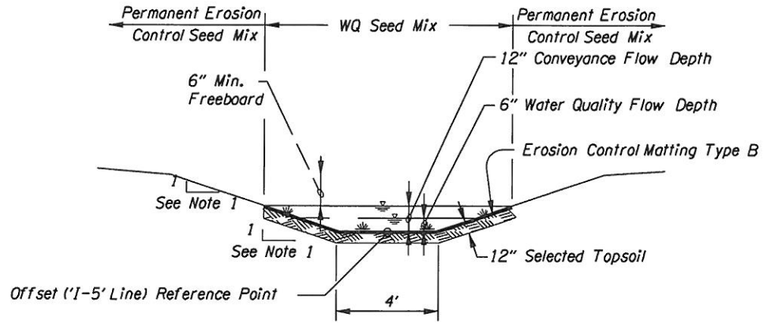
TECHNICAL SERVICES MANAGING ENGINEER _____ DATE _____

**I-5: CLARKS BRANCH TO TUNNEL MILL RACE SEC. DESIGN-BUILD PROJECT**
PACIFIC HIGHWAY
LANE AND DOUGLAS COUNTIES

| FEDERAL HIGHWAY ADMINISTRATION | PROJECT NUMBER | SHEET NO. |
|---|---|---|
| OREGON DIVISION | OTIA-SO-S001(197) | 1 |

CH2MHILL

REVISED AS CONSTRUCTED
04/07 CONTRACT 13111




Notes:

1. Sideslopes In The Water Quality Section Of The Swale Shall Be 4H:1V Maximum. Sideslopes In the Conveyance Flow Depth Section Above The Water Quality Flow Depth Shall Match Embankment Slopes, Not To Exceed 3H:1V.
2. Erosion Control Matting Materials And Installation Per ODOT Std. Spec. Section 280.

TYPICAL BIOSWALE SECTION

| Rev. No. | Date | Revision |
|---|---|---|
| | | |
| | | |
| | | |
| 1 | 4/11/2007 | As Constructed |

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: CLARKS BRANCH TO TUNNEL MILL RACE SEC.
DESIGN-BUILD PROJECT
PACIFIC HIGHWAY
LANE AND DOUGLAS COUNTIES

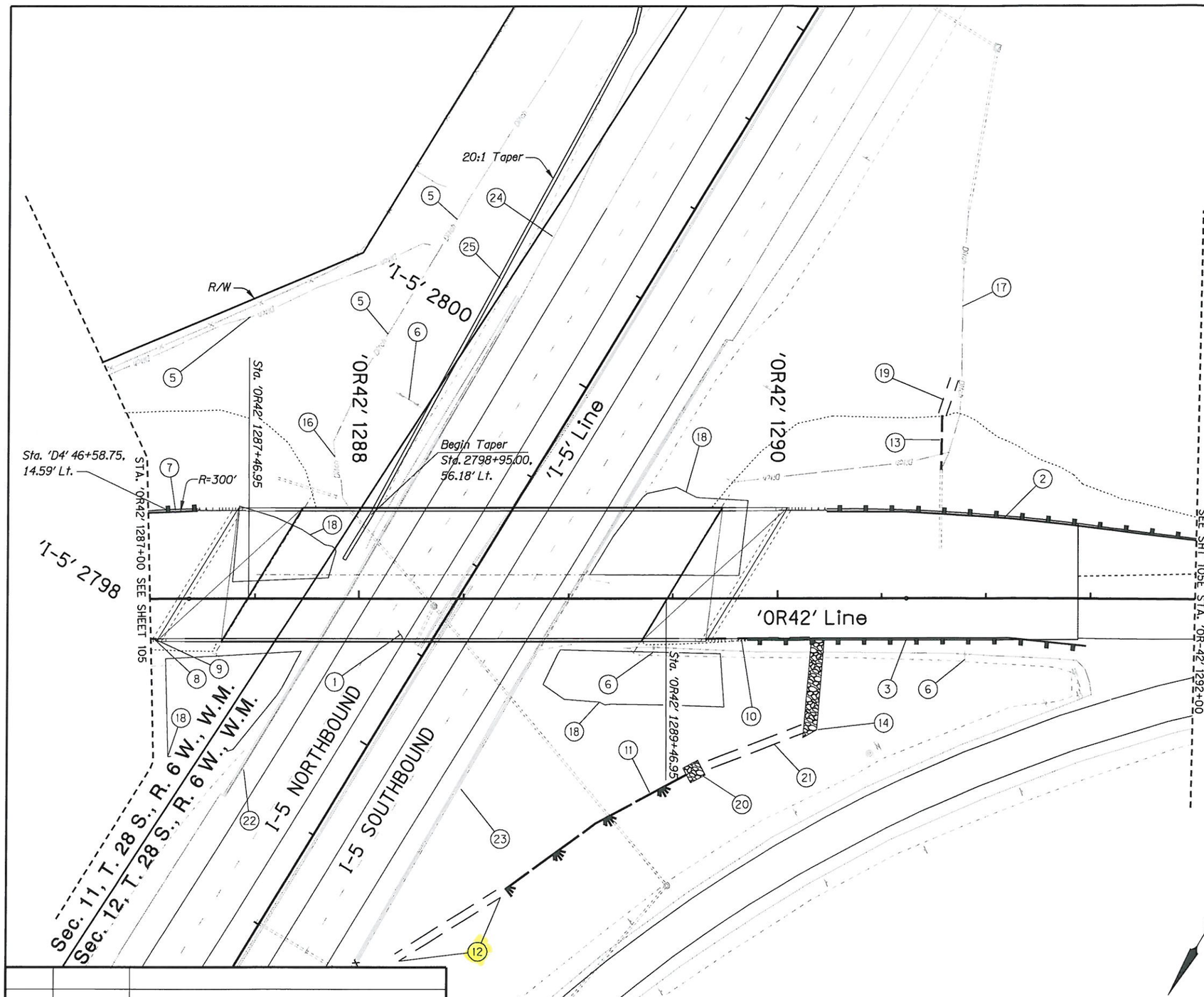
Reviewed By - Tim Yamada
Designed By - Chris Allen
Drafted By - Robert Luke

DRAINAGE DETAILS

SHEET NO. 2B-5

CH2MHILL

REVISED AS CONSTRUCTED
09/07 CONTRACT 13111




| Rev. No. | Date | Revision |
|---|---|---|
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| | | |
| | | |
| 1 | 9/12/2007 | As Constructed |

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

**I-5: CLARKS BRANCH TO TUNNEL MILL RACE SEC.**
**DESIGN-BUILD PROJECT**
PACIFIC HIGHWAY
LANE AND DOUGLAS COUNTIES

Reviewed By - Shari Munroe
Designed By - Andy Kutansky
Drafted By - Robert Luke

**STA. 'OR42' 1287+00 TO STA. 'OR42' 1292+00**
**ROADWAY PLAN**

SHEET NO. 105C

NDM: 326831:CBT4Apl105C.dlv 9/2/2008 3:21:45 PM drobidea

Final Plans DESIGN UNIT 4A

CH2MHILL

REVISED AS CONSTRUCTED
09/07 CONTRACT 13111

(1) Bridge No. 07806
Const. Structure - 200'
Rdwy. Width 61'
And Reinf. Panel At Bridge Ends
For Details, See Bridge Drawings

(2) Sta. 'OR42' 1290+04.08 To
Sta. 'OR42' 1293+46.50 ⚠1
Const. Guardrail Type 2A - 312.5'
Const. Guardrail Type 3 - 12.5'
Const. Guardrail Transition - 1
Const. Flared Terminal - 1
W=4', E=0
(See Std. Drg. No. RD400, RD405, RD415, RD425, RD440)

(3) Sta. 'OR42' 1289+65.97 To
Sta. 'OR42' 1291+47.96
Const. Guardrail Type 2A - 112.5'
Const. Guardrail Type 3 - 12.5'
Const. Guardrail Transition - 1
Const. Flared Terminal - 1
W=4', E=0
(See Std. Drg. No. RD400, RD405, RD415, RD425, RD440)

(5) Protect Extg. Jurisdictional Ditch

(6) Protect Extg. Sign

(7) Const. Guardrail
(See Sht. 105, Note 1)

(8) Const. Guardrail
(See Sht. 105, Note 5)

(9) Const. Drainage Curb
(See Sht. 105, Note 6)

(10) Sta. 'OR42' 1289+65.88, 19.3' Rt. To
Sta. 'OR42' 1290+15.57, 18.8' Rt.
Const. Drainage Curb - 50'
(See Std. Drg. No. RD700)

(11) Sta. 'I-5' 2798+67.00, 138.00' Rt.
I.E. 537.50 To
Sta. 'I-5' 2797+75.00, 92.00' Rt.
I.E. 536.70
Const. Water Quality Swale - 100'
@ 0.8% Grade
(For Swale Details See Sht. 2B-5)

(12) Grade From Water Quality Swale
To Extg. Ditch To Drain

(13) Extend Extg. 18" Conc. Culvert to
Toe of Fill - 27', Prevent Water From
Flowing Through Disturbed Soils

(14) Sta. 'OR42' 1290+19.00, 19.80' Rt.
Const. 6' x 45' x 2' Riprap Pad (Class 50)

(16) Limit Ditch Disturbance To Temporary
Access Road And Maintain Drainage

(17) Limit Impacts To Ditch To Minimum
Neccessary For Realignment To
Culvert Extension

(18) Salvage Vegetation Ground Cover By
First Mowing Plants, Then Strip
Excavating Soil Containing Plant Roots
To 12" Depth. Avoid Weed Infested
Areas. Stockpile And Cover Selected
Topsoil For Reapplication To Finish
Grade Of New Abutment Slopes

(19) Grade Extg. Ditch Impacted By New Fill
To Drain To Extended 24" Culvert.
Immediately Apply Erosion Control

(20) Sta. 'I-5' 2798+70.34, 140.0' Rt. (Center of Pad)
Const. 8' x 8' x 1' Riprap Pad (Class 50)

(21) Grade From Uphill Riprap Pad
To Top of Water Quality Swale to Drain, As Needed

(22) Remove Extg. Conc. Shldr. Barrier - 276'

(23) Remove Extg. Conc. Shldr. Barrier - 600'

(24) Remove Extg. Guardrail - 125'

(25) Sta. 'I-5' 2798+70.00, 56.18' Lt. To
Sta. 'I-5' 2801+57.18, 69.29' Lt.
Const. Conc. Shldr. Barrier - 287.5'
(See Std. Drg. No. RD500)

| Rev. No. | Date | Revision |
|---|---|---|
| | | |
| | | |
| ⚠2 | 4/11/2007 | As Constructed |
| ⚠1 | 4/25/2006 | Guardrail End Station And Length Revision |

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: CLARKS BRANCH TO TUNNEL MILL RACE SEC.
DESIGN-BUILD PROJECT
PACIFIC HIGHWAY
LANE AND DOUGLAS COUNTIES

Reviewed By - Shari Munroe
Designed By - Andy Kutansky
Drafted By - Robert Luke

C3
ROADWAY NOTES

SHEET NO. 105D