OPERATION & MAINTENANCE MANUAL

DFI No. : D00164
Facility Type: Water Quality Biofiltration Swale

JUNE, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	**D00164**
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Number) 26V-092
Location:	District: 1 (Old 2A)
	Highway No.: 092
	Mile Post: 25.97; 25.97 (beg./end)
	Description: This facility is located along the east side the Columbia River Highway (Hwy. 092) adjacent to the northbound travel lanes in between the highway and Old Portland Road. Unobstructed access can be obtained from Old Portland Road.

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 Hydro Unit Manager

Or

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

3. Construction

Engineer of Record: Consultant Designer - W&H Pacific, William Evans, P.E., (503) 362-4675

Facility construction: 1996
Contractor: N/A

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.

This facility is located along the east side the Columbia River Highway (Hwy. 092) adjacent to the northbound travel lanes in between the highway and Old Portland Road. Unobstructed access can be obtained from Old Portland Road.. The swale was constructed to convey stormwater from the Columbia River Highway drainage system and swales toward an existing roadside ditch along the east side of Old Portland Road. Flows from a swale located near Bay Hill Lane (D00056) and from Hwy. 092 enter the swale from the west via a series of pipes. As the water flows east it is treated as it slows and spreads out within the swale before exiting the swale through a 24-inch culvert pipe buried beneath Old Portland Road and reaching an outfall at the existing ditch; see Point C on the Operational Plan, Appendix A.

A. Maintenance equipment access:
   Unobstructed access can be obtained from the left shoulder of Old Portland Road, heading north.

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 at the water quality swale from the railroad grade. Old Portland Road is located straight ahead, nearly perpendicular to the swale.

Photo 2: Looking east at the rock outfall/entrance to the water quality swale from the railroad grade. Old Portland Road is located straight ahead, nearly perpendicular to the swale.

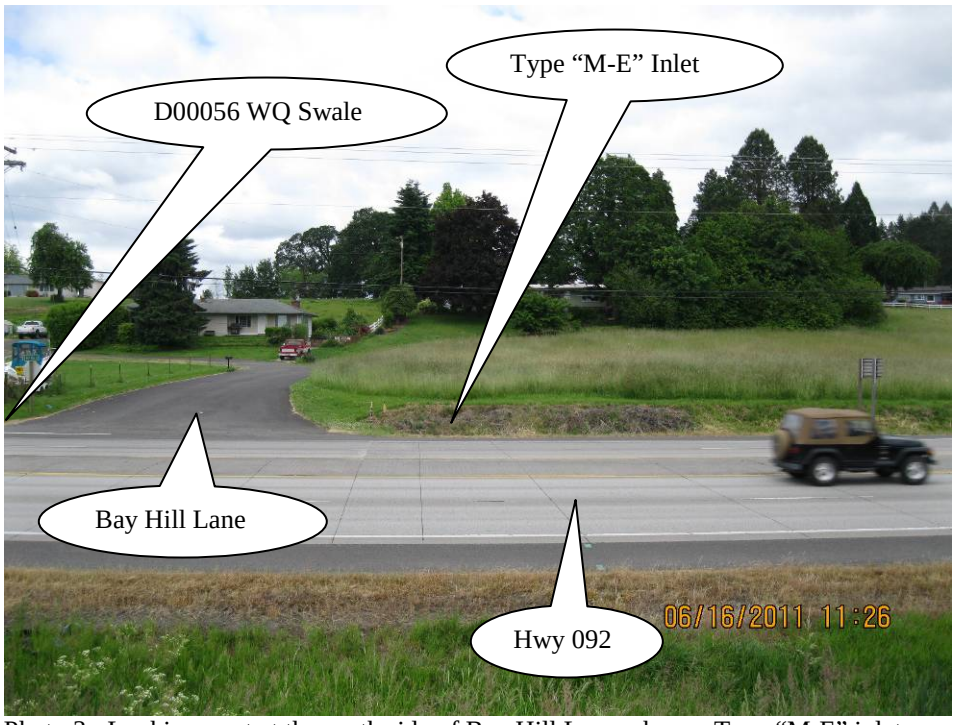


Photo 3: Looking west at the north side of Bay Hill Lane where a Type “M-E” inlet conveys water from swale D00056. Hwy 092 is located straight ahead.

5. Facility Haz Mat Spill Feature(s)

The water quality biofiltration swale can be used to store a volume of liquid by blocking the 24-inch culvert outlet pipe located at the outlet of the swale on the west side of Old Portland Road. Sandbags may be one way to best accomplish this.

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 feature 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:

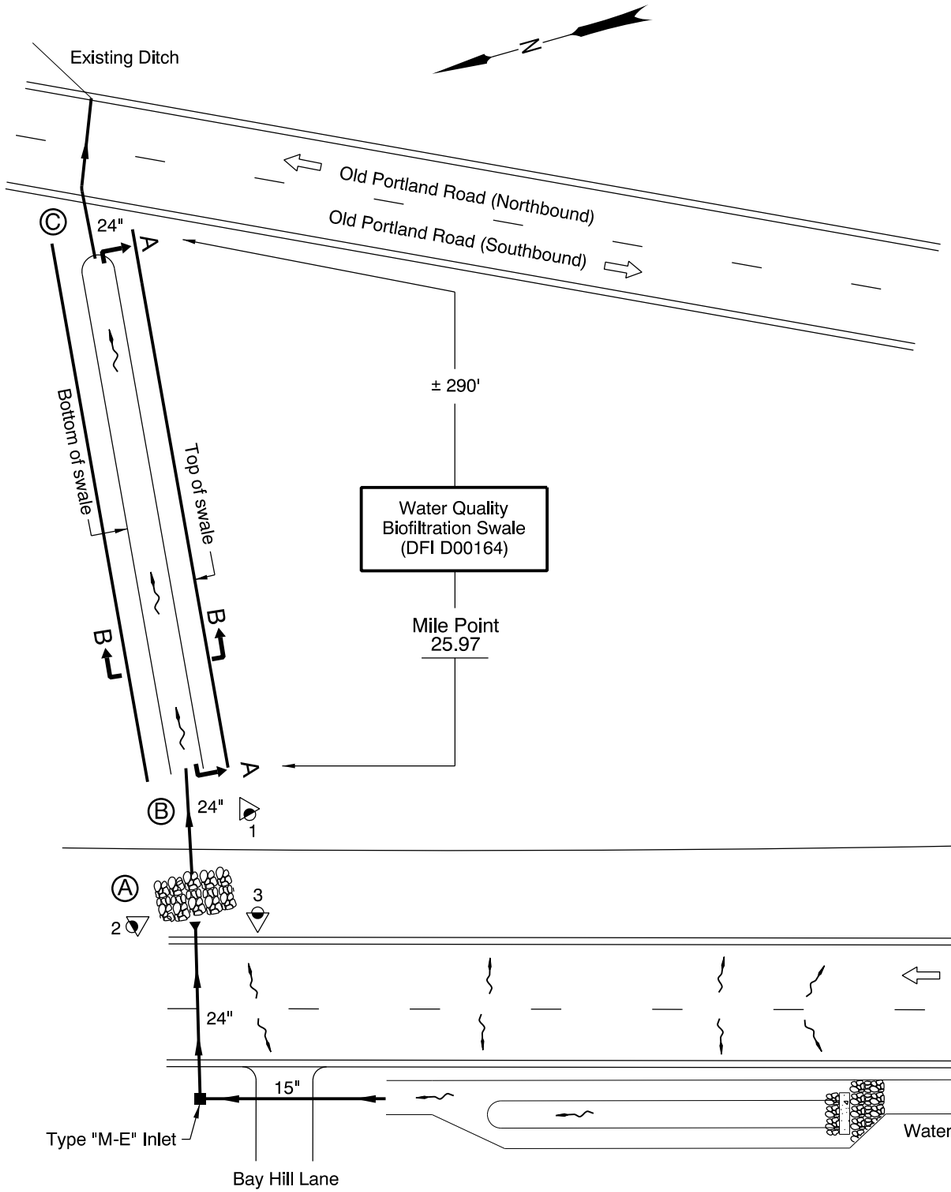
ODOT Clean Water Unit (503) 986-3008

ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region Hazmat Coordinator	(503) 731-8304
ODEQ Northwest Region Office	(503) 229-5263

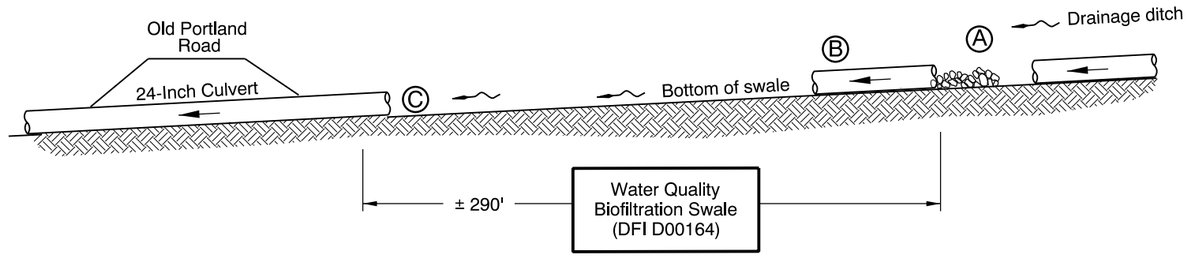
Appendix A

Content:

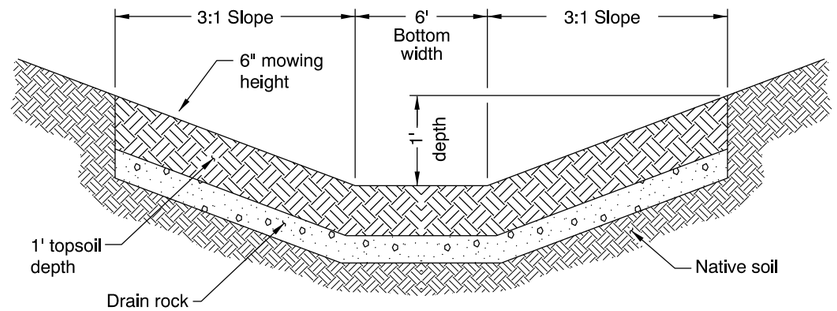
- **Operational Plan and Profile Drawing(s)**



PLAN
N.T.S.



SECTION A-A
N.T.S.



SECTION B-B
N.T.S.

LEGEND:

- Photo Location / Direction
- (A) Riprap Outfall to Swale
- (B) Swale Inlet from 24-Inch Pipe
- (C) Water Quality Swale Outlet to 24-Inch Culvert
- Manhole
- Inlet
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path
- Traffic Direction / Flow

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Bob Knorr

Drafted By: Bob Knorr

DFI D00164
MAINTENANCE DISTRICT 1 HWY 92
WATER QUALITY BIOFILTRATION SWALE
COLUMBIA HIGHWAY MP 25.97
COLUMBIA COUNTY

Z:\Hydraulics\Hydraulics OM\WORKING\1_092_D00164\Operational Plan\DFI_D00164.dgn :: Default 1/13/2014 5:54:14 PM hwyr33e

DFI_D00164.dgn

Appendix B

Content:

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

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd. & Standard Drawing Nos.
2, 2A Thru 2A-6 Incl.	Typical Sections
2B Thru 2B-8 Incl., 2B-8A, 2B-9, 2B-9A, 2B-10, 2B-11, 2B-12, 2B-13 Thru 2B-16 Incl., 2B-16A, 2B-17 Thru 2B-26 Incl.	Details
2C Thru 2C-19 Incl.	Temporary Protection & Direction Of Traffic
2D Thru 2D-9 Incl.	Pipe Data
2E, 2E-2, 2E-3	Summary
3, 3A, 3B, 4, 5, 6, 7, 7A, 7B, 8, 8A, 8B, 8C, 9, 9A, 10, 10A, 10B, 11, 12, 12A, 12B, 13, 14, 14A, 14B, 14C, 15, 16, 16A, 17, 18, 19, 19A, 20, 20A, 21, 21A, 21B, 22, 22A, 22B, 23, 23A, 23B, 23C, 24, 24A, 25, 26, 26A, 26B, 27, 27A, 28, 28A, 29, 30, 30A, 30B, 30C, 31, 32, 33, 33A, 34, 35, 35A, 35B, 36,	Plans & Profiles
37, 37A, 37B	Landscaping

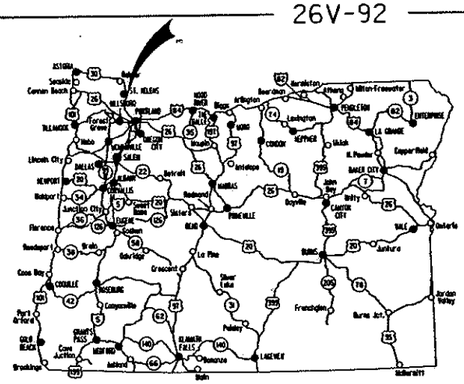
CONT'D. ON SHT. 1A

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

REVISED AS CONSTRACTED
10/1998 CONTRACT C11695
PROJ. MGR. _____



Overall Length Of Project - 7.25 Miles

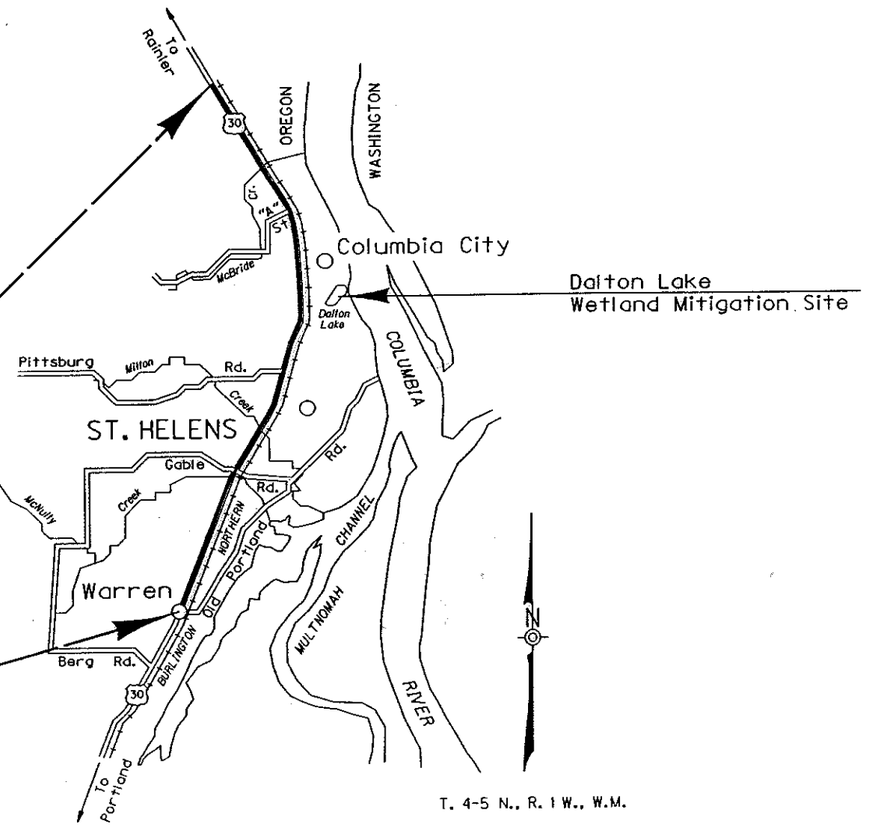
GRADING, STRUCTURES, PAVING, SIGNING, SIGNALS, & LANDSCAPING

COLUMBIA CITY N.C.L. - WARREN SEC.

COLUMBIA RIVER HIGHWAY (LOWER)

COLUMBIA COUNTY
JANUARY 1996

THE TRAFFIC CONTROL YOU PROVIDE PROTECTS YOU AS WELL AS THE PUBLIC. LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE.



NH-S02W(9)

BEGINNING OF PROJECT
STA. 525 + 00 M.P. 33.02)

END OF PROJECT NH-S02W(9)
STA. 906 + 50 M.P. 25.77)

OREGON TRANSPORTATION COMMISSION

Henry H. Hewitt	CHAIRMAN
Susan Brody	VICE CHAIRMAN
Cynthia J. Ford	COMMISSIONER
Steven H. Corey	COMMISSIONER
Stuart Foster	COMMISSIONER
Kenneth E. Husby	INTERIM DIRECTOR OF TRANSPORTATION

PLANS PREPARED BY:

W&H PACIFIC
6400 S.W. Nimbus Avenue
BEAVERTON, OREGON 97005
(503) 626-6444

REGISTERED PROFESSIONAL ENGINEER
M.947
OREGON
JULY 25, 1980
WILLIAM J. EVANS
Expires Dec. 31, 1995

OREGON DEPARTMENT OF TRANSPORTATION
CONCURRENCE

TECHNICAL SERVICES MANAGING ENGINEER — DATE 11/30/95

COLUMBIA CITY N.C.L. - WARREN SEC.
COLUMBIA RIVER HIGHWAY (LOWER)
COLUMBIA COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	NH-S02W(9)	1

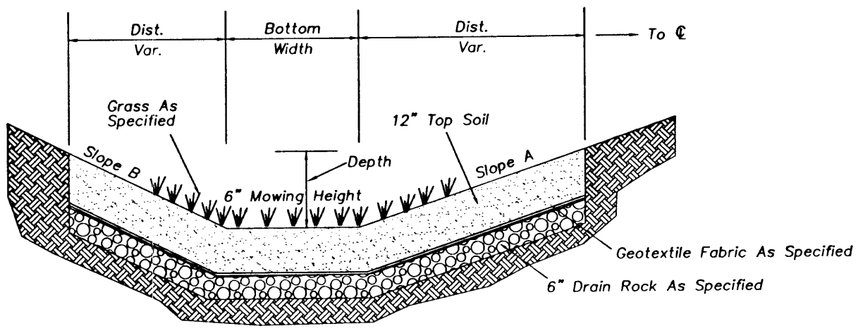
27-NOV-1995 10:48
/usr/td/00981ds.tsl
VIEW B3 C005-1802

NOT REVISED AS CONSTRUCTED
10/98 CONTRACT 11695

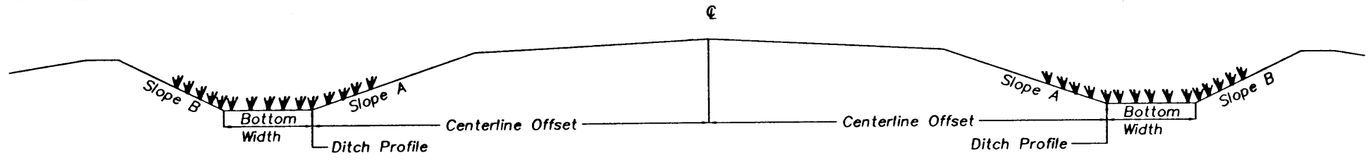
BIO-FILTER SWALE

Bio-Filter Swale Table

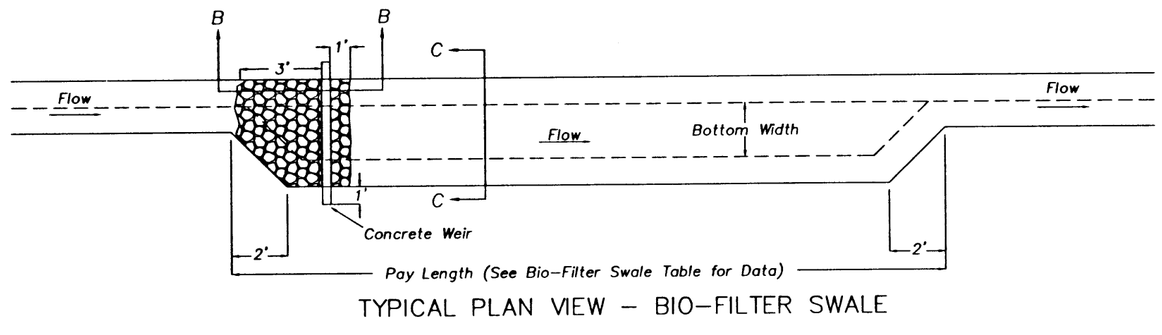
Station From	Station To	Left Or Right	Slope A	Slope B	Bottom Width (Ft)	Depth (Ft)	Length (Ft)	Channel Slope (%)
573+00	575+50	Rt	6:1	4:1	4	1	250	1.83
610+50	613+50	Rt	6:1	4:1	4	1	300	1.10
615+20	618+20	Rt	6:1	1½:1	4	1	300	0.57
719+70	720+90	Rt	6:1	4:1	4	1	120	1.57
720+90	722+60	Rt	6:1	4:1	4	1	170	1.33
797+90	800+08	Lt	3:1	2:1	4	1	218	0.83
839+45	–	Lt	2:1	2:1	10	1	160	3.12
856+70	860+75	Lt	4:1	4:1	4	1	405	0.75–2.0
897+37	–	Lt	3:1	3:1	6	1	290	1.20
898+50	900+75	Rt	4:1	1½:1	4	1	225	0.98



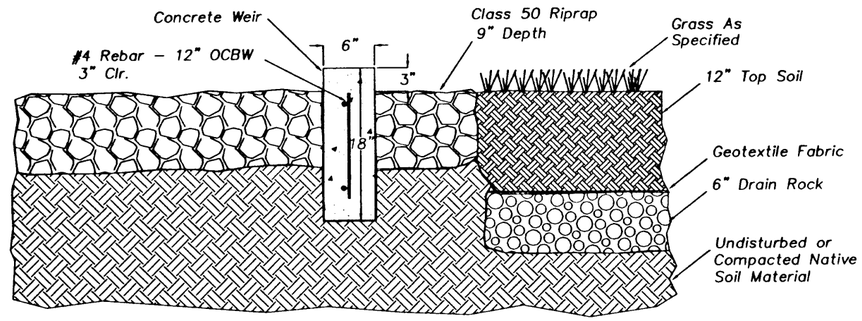
TYPICAL SECTION C–C



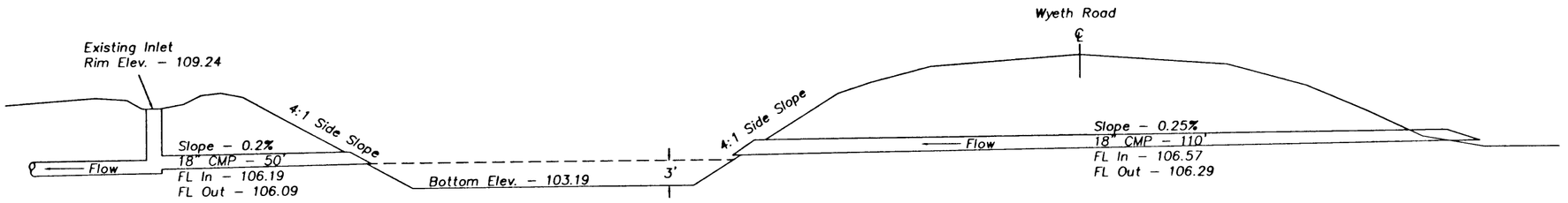
Swale On Left Side — BIO-FILTER SWALE CROSS SECTION (See Bio-Filter Swale Table For Data) — Swale On Right Side



TYPICAL PLAN VIEW – BIO-FILTER SWALE



SECTION B – B

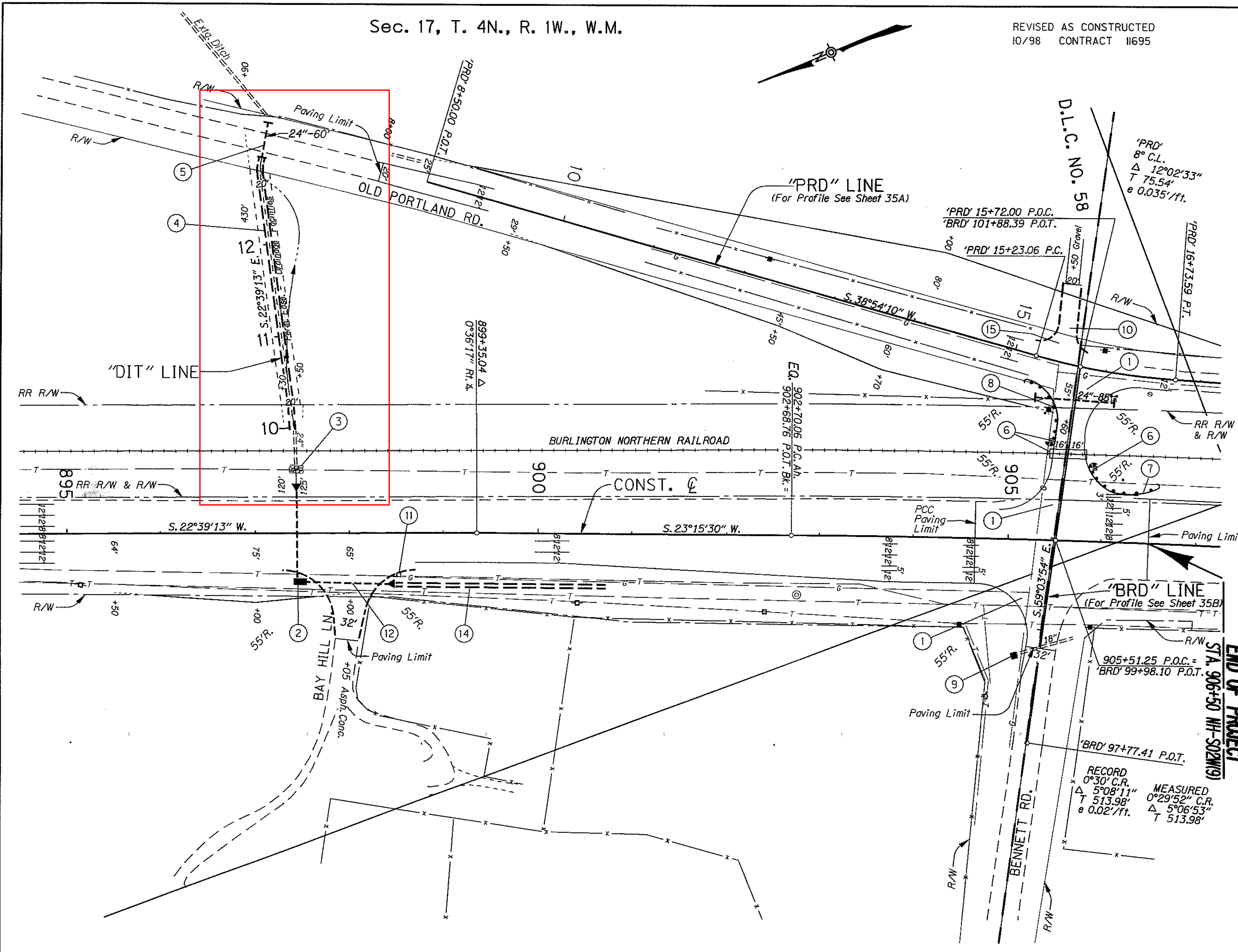


WYETH POND – SECTION A–A (FOR LOCATION SEE SHT 21)

COLUMBIA CITY N.C.L. - WARREN SEC.
COLUMBIA RIVER HIGHWAY (LOWER)
COLUMBIA COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		2B–17

2B-17.DWG 05-OCT-1995 WOM



① Const. Road Conn. - 3

② Sta. 897+43, Rt.
Const. Type "M-E" Inlet
Inst. 24" Culv. Pipe - 115'
Const. Paved End Slope
Tr. Exc. - 60 C.Y.
(See Drg. No. 2105A)

③ Sta. 897+43, Lt.
Const. Loose Riprap (Class 100) - 3 C.Y.

④ Sta. "DIT" 10+00 To Sta. "DIT" 12+95
Const. Swale - 390 S.Y.
Dt. Exc. - 690 C.Y.
(For Profile, See Sheet 35B)
(For Details, See Sheet 2B-17)

⑤ Sta. "PRD" 6+70
Inst. 24" Culv. - 60'
Under Pvmt. - 20'
Tr. Exc. - 80 C.Y.

⑥ Const. Conc. R.R. Xing (By Others)
Inst. R.R. Xing Gate Signals - 2 (By Others)

⑦ Const. Guard Rail - 50' (Type 2A)
- 12.5' (Type 3)
Flare Rate=9:1, W=10', E=0
Const. Anchor (Type 1 Mod.)
Inst. End Piece (Type B)
Inst. SRT-100 End Terminal

⑧ Const. Guard Rail - 75' (Type 2A)
- 12.5' (Type 3)
Flare Rate=9:1, W=10', E=0
Const. Anchor (Type 1)
(Type 1 Mod.)
Inst. End Piece (Type B)
(Type C)

⑨ Const. Type "D" Inlet

⑩ Sta. "PRD" 15+50, Lt.
Const. Appr.

⑪ Inst. Multiple Mailbox Support
Const. Conc. Collar

⑫ Sta. 898+00, Rt.
Const. Appr.
Inst. 15" Culv. Pipe - 105'
Const. Paved End Slope
Const. Type "M-O" Inlet
Tr. Exc. - 40 C.Y.
(See Drg. No. 2105A)

⑭ Sta. 898+50 To Sta. 900+75, Rt.
Const. Swale - 235 S.Y.
Dt. Exc. - 120 C.Y.
(For Details, See Sheet 2B-17)

⑮ Inst. 24" Culv. Pipe - 85'

COLUMBIA CITY N.C.L. - WARREN SEC.
COLUMBIA RIVER HIGHWAY (LOWER)
COLUMBIA COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		35

03-OCT-1995 TJT

35_PLAN.DGN

REVISED AS CONSTRUCTED
10/98 CONTRACT 11695

Const. Swale Rt.

98.70'

32.36

400'V.C.

17"

-0.875

-0.87

Subgrade

Ditch Right

-1.07

Ditch Left

-1.06

+00

+40

Profile Grade 32' Rt.

+0.750

+0.99

+1.37

Ditch Right

Ditch Left

+1.73

+00 F.L. Rt. 31.6

Inlet F.L. Lt. 26.1
Inlet F.L. Rt. 29.0

+50 F.L. Lt. 28.9

902+68.76 P.O.T. Bk. = EQU/A.
902+70.06 Ah.

39.35

200'V.C.

17"

+1.13

Subgrade

+00 F.L. Lt. & Rt. 36.9

END OF PROJECT
STA. 906+50

STAGE I

Exc. 2,540

Emb. 440

STAGE II

Exc. 1,600

Emb. 580

895

900

905

'PRD' LINE

"PRD" 15+72.00
"BRD" 101+88.39

42.90

500'V.C.

+00

39.43

Profile Grade @ ℄

35.35

300'V.C.

+00

10"

+1.53

Match Extg. Pvmt.

Subgrade

27.30

300'V.C.

+50

10"

Match Extg. Pvmt.

+0.22

+2.673

Subgrade

Exc. 280

Emb. 10,600

Exc. 120

10

15

20

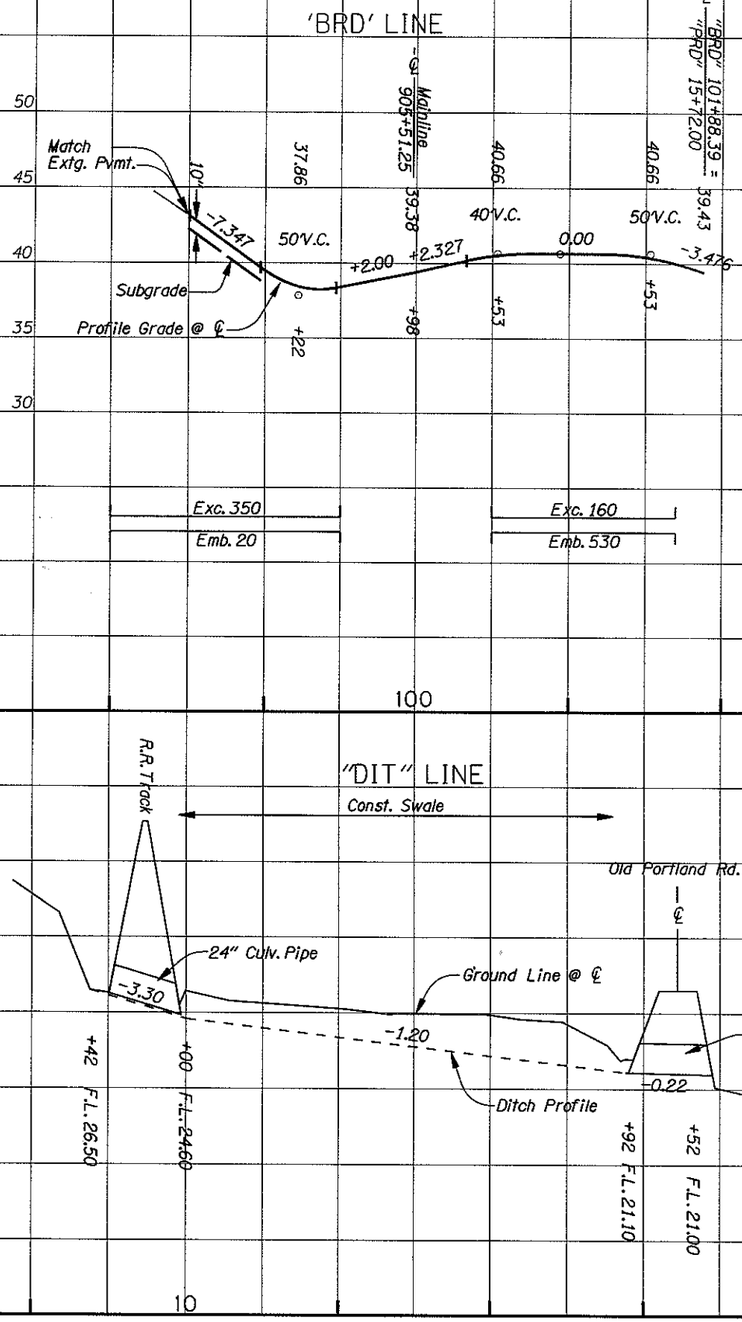
14-OCT-1995 TJT

35A_PRO.DGN

COLUMBIA CITY N.C.L. - WARREN SEC.
COLUMBIA RIVER HIGHWAY (LOWER)
COLUMBIA COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		35A

REVISED AS CONSTRUCTED
10/98 CONTRACT 11695



26-JUL-1995 TJT

35B_PROJDN

COLUMBIA CITY N.C.L. - WARREN SEC.
COLUMBIA RIVER HIGHWAY (LOWER)
COLUMBIA COUNTY

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		35B