OPERATION & MAINTENANCE MANUAL

DFI No. : D00180
Facility Type: Water Quality Biofiltration Swale

JUNE, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	**D00180**
Facility Type:	Water Quality Bifiltration Swale
Construction Drawings:	(V-File Number) 26V-92
Location:	District: 1 (Old 2A)
	Highway No.: 092
	Mile Post: 31.34; 31.40 (beg./end)
	Description: This facility is located along the west side Hwy. 92 adjacent to the southbound travel lane where “A”-Street and Highway 92 intersect. Unobstructed access can be obtained from the right shoulder of the roadway just north of “A”-Street.

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 water quality biofiltration swale is located along the west side Columbia River Highway (Hwy092) adjacent to the southbound travel lane where “A”-Street and Hwy. 92 intersect. Unobstructed access can be obtained from the right shoulder of the roadway just north of “A”-Street. The swale is approximately 300 feet in length and constructed as part of an existing roadside ditch. Flows from both the roadway and ditch enter the swale from the north, overtopping riprap and a small 6-inch by 3-inch concrete knee wall flow spreader represented by points A and C, respectively, on the Operational Plan; Appendix A.

As the water flows south it is treated while it slows and spreads out within the swale before entering a manhole with a grated-cover, serving as the facility outlet. This manhole ties two different pipes together. One of the pipes is a 24-inch culvert, conveying stormwater from a swale (D00181) located on the south side of “A”-Street. The manhole connects this pipe to the second 24-inch pipe that conveys water from both swales eastward, crossing beneath Hwy. 92, to an outfall at the Columbia River.

A. Maintenance equipment access:

There are no gates that surround the facility, so access is very easy. All they will have to do is pull over on the side of the road.

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: A view of the riprap and small 6” x 3” concrete knee wall flow spreader.

Photo 2: Looking south toward Hwy. 92 and D00181 Swale beyond “A” Street.

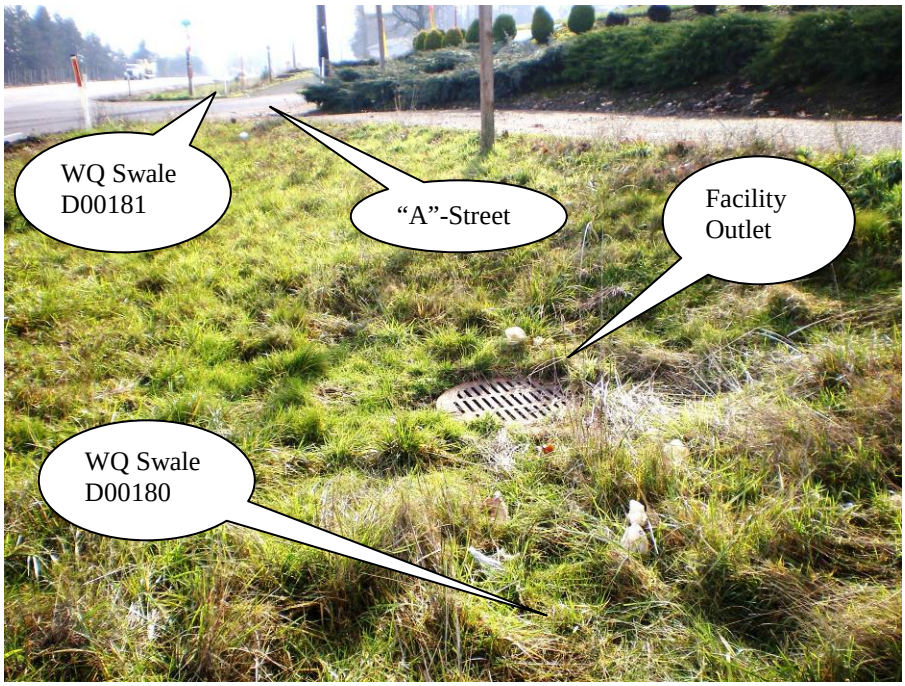


Photo 3: Looking south toward "A"-Street and the facility outlet.

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-diameter outlet pipe located at the manhole of the water quality biofiltration swale. This pipe is noted as point B.

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 are no auxiliary outlet features 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:

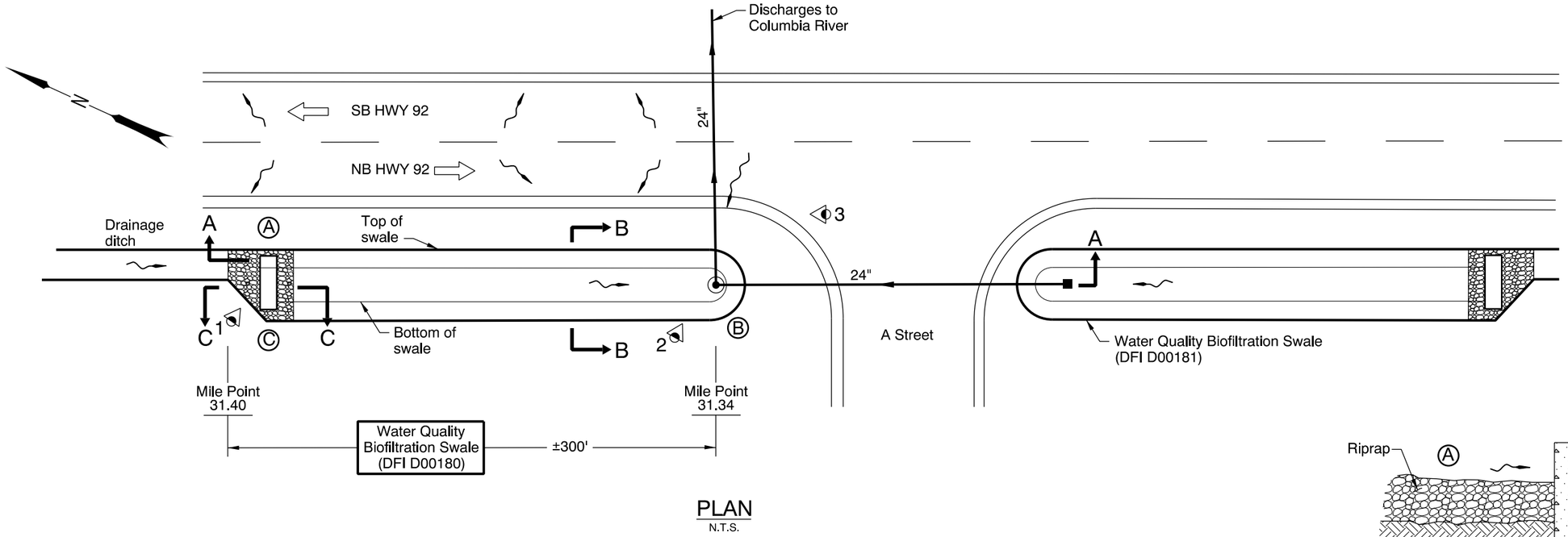
ODOT Clean Water Unit (503) 986-3008

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

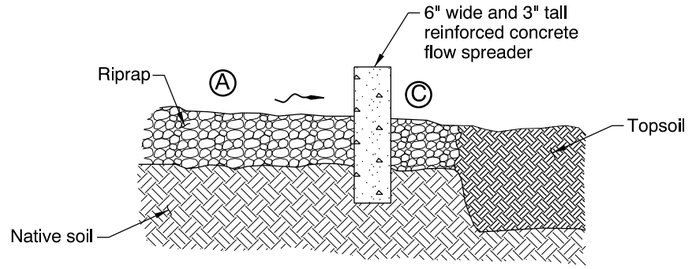
Appendix A

Content:

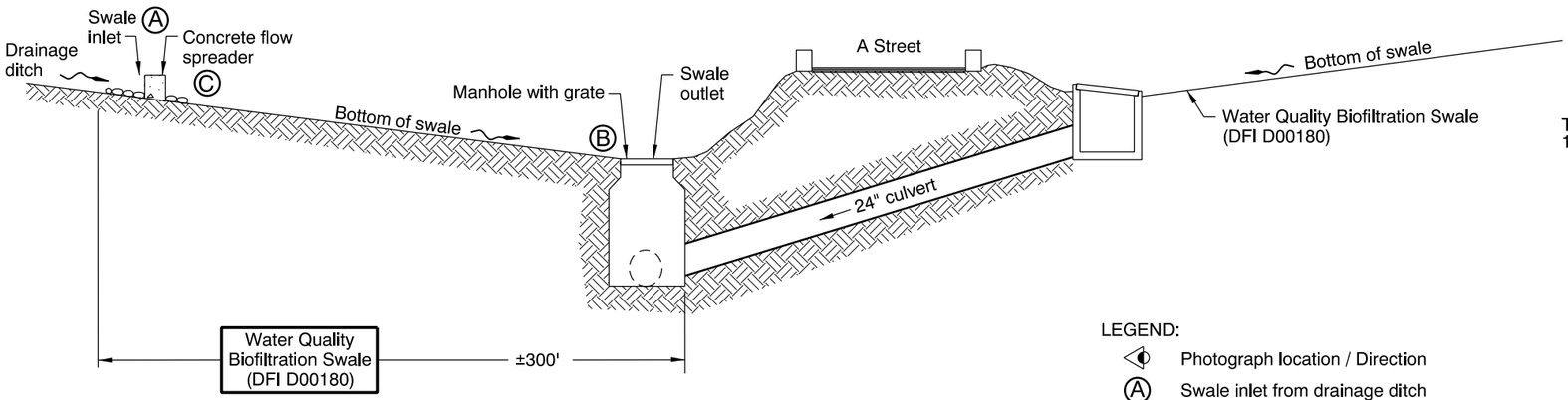
- **Operational Plan and Profile Drawing(s)**



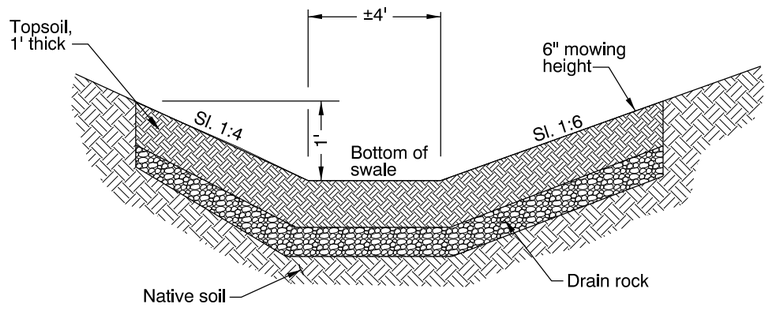
PLAN
N.T.S.



SECTION C-C
N.T.S.



SECTION A-A
N.T.S.



SECTION B-B
N.T.S.

LEGEND:

- Photograph location / Direction
- Ⓐ Swale inlet from drainage ditch
- Ⓑ Swale outlet, manhole with grate
- Ⓒ Riprap and flow spreader at inlet
- ◉ and or ◎ Manhole
- ■ and or □ Inlet
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path
- Traffic Flow / Direction

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: J.D. Koziol

Drafted By: Rodney Schultz

DFI D00180
MAINTENANCE DISTRICT 1 HWY 92
WATER QUALITY BIOFILTRATION SWALE
COLUMBIA HWY MP 31.34-31.40
COLUMBIA COUNTY

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

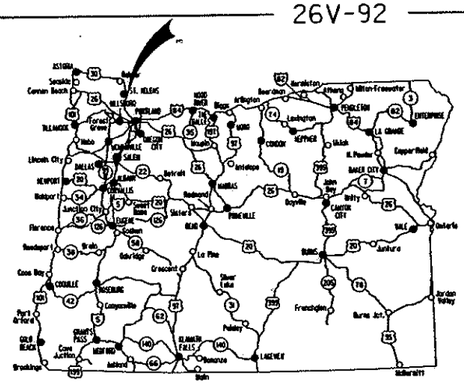
CONT'D. ON SHT. 1A

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

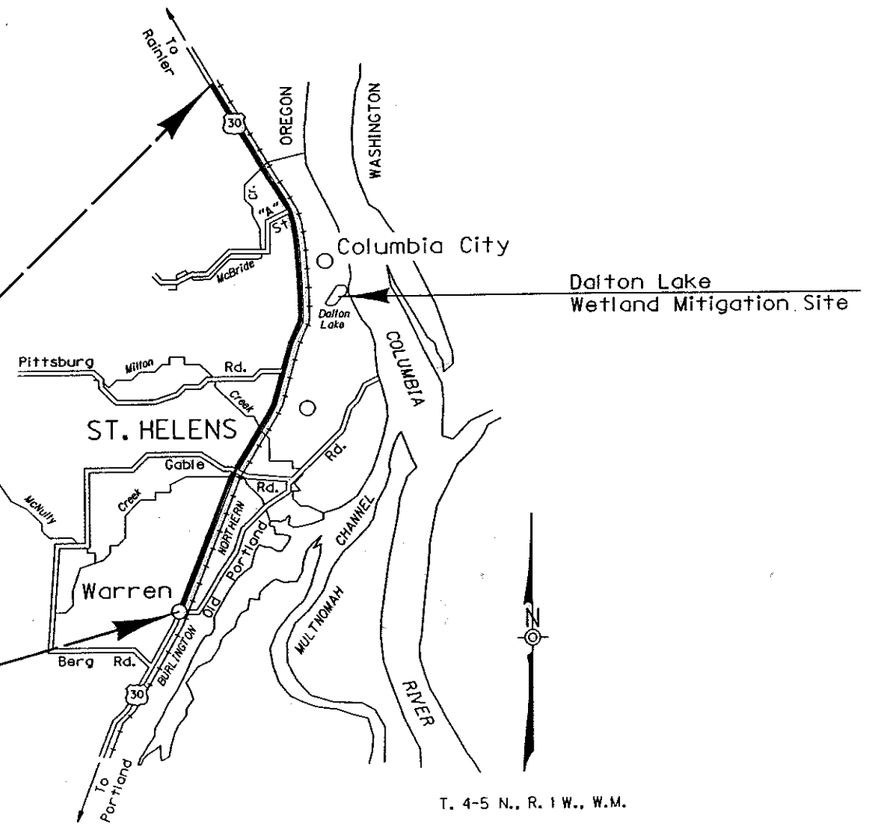
GRADING, STRUCTURES, PAVING, SIGNING, SIGNALS, & LANDSCAPING

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
6405 S.W. Nimbus Avenue
BEAVERTON, OREGON 97005
(503) 626-0455

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

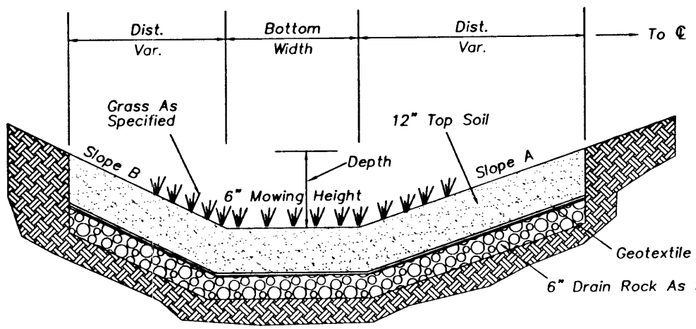
27-NOV-1995 10:48
/usr/td/00981cs.tsl
VIEW B3 C005-1802

NOT REVISED AS CONSTRUCTED
10/98 CONTRACT 11695

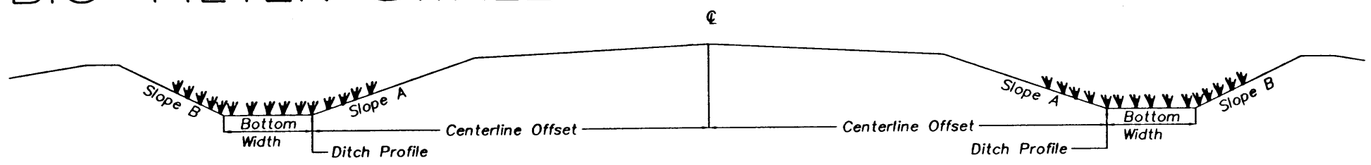
BIO-FILTER SWALE

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



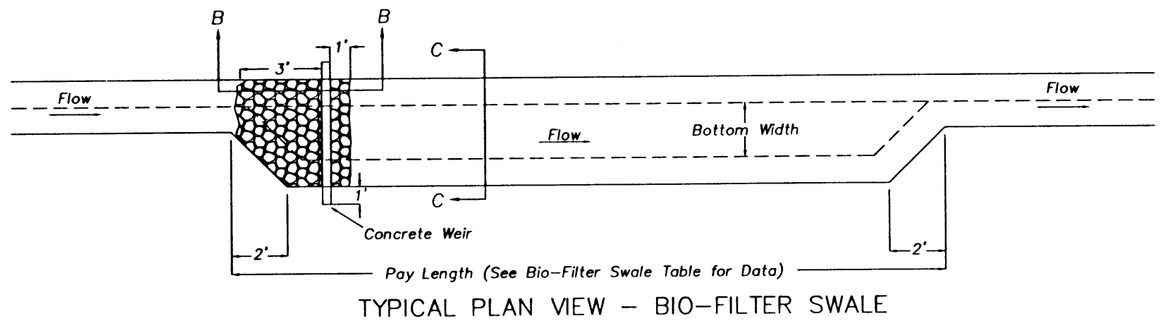
TYPICAL SECTION C–C



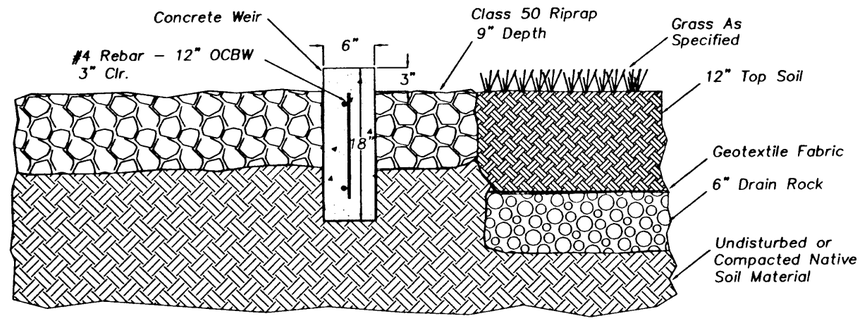
Swale On Left Side

BIO-FILTER SWALE CROSS SECTION
(See Bio-Filter Swale Table For Data)

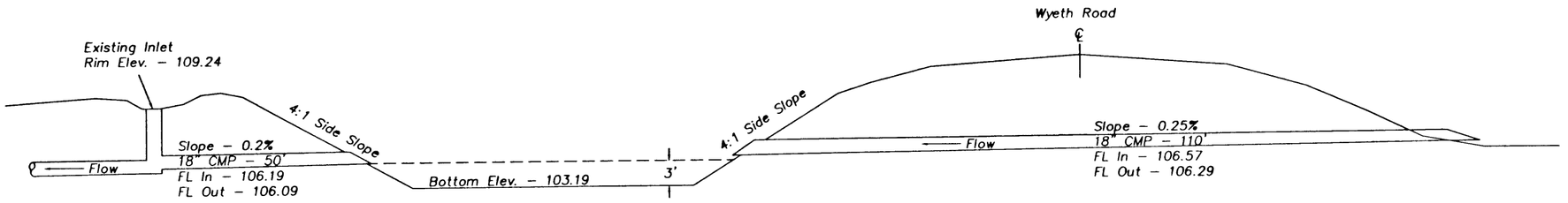
Swale On Right Side



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

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

Sec. 21, T. 5N., R. 1W., W.M.

REVISED AS CONSTRUCTED
10/98 CONTRACT 11695

RR R/W
RR R/W & R/W
BURLINGTON NORTHERN RAILROAD
Temp. Const. Easement
CONST. ℄
MATCH LINE SEE SHEET 10A
"A" 614+51.62 = 10+00.00
24"-132'
24"-175'
R/W
Access Control Line
"PATH" ℄
(For Profile, See Sht. 8B)
NW GAS Property
City Property
14" Cast Iron Water Line
"A" LINE
(For Profile, See Sheet 10B)
"A" ST.
Paving Limit
1° C.R.
TΔ 24°10'38"
Ts 1427.36'
2-400' Sp.
S 2°
a 0.25
e 0.04'/ft.

1. Const. Road Conn.
2. Sta. 615+20, Rt. Const. "D" Inlet
3. Sta. 613+50, Rt. Const. Manhole With Grate Inst. 24" Sew. Pipe - 175' Tr. Exc. - 180 C.Y. (See Drg. No. 2050)
4. Sta. 613+50, Lt. Const. Manhole With Grate Inst. 24" Sew. Pipe - 132' Tr. Exc. - 220 C.Y.
5. Sta. 610+50 To Sta. 613+50, Rt. Const. Swale - 465 S.Y. Dt. Exc. - 230 C.Y. (For Details, See Sheet 2B-17)
6. Sta. 613+50 Const. Canc. Cap (Type A) - 20 Lin. Ft. (For Details, See Sheet 2B-26)

Ped Path P.I.'s Shown Thus: (+99 111')

Const. Swale Rt.
Profile Grade 32' Rt.
-0.300
+0.15
+0.46
Subgrade
Ditch Right
Ditch Left
-0.16
-0.49
-1.72
-2.31
200' V.C.
+0.300
+0.52
+0.28 (Dt. Rt.)
+1.0
24"-175'
+29 F.L. Lt. 79.5 F.L. Rt. 78.5
+50 F.L. Lt. 75.5 F.L. Rt. 77.2
+50 Manhole F.L. Lt. In 68.97 F.L. Lt. Out 64.62 Manhole F.L. Lt. 73.19 F.L. Rt. 70.25 F.L. Rt. 75.48
+20 Inlet F.L. Rt. 72.0 F.L. Rt. 74.5

Exc. 4,760
Emb. 470
STAGE I
Exc. 970
Emb. 2,830
STAGE II

605 610 615

12-OCT-1995 TJT
10_PLAN.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		10

Sec. 21, T. 5N., R.1W.

REVISED AS CONSTRUCTED
10/98 CONTRACT 11695

(2) Sta. "A OUTFALL" 24+30 ℄
Const. Manhole
Inst. 24" Sew. Pipe - 365'
Under Railroad - 148'
Tr. Exc. - 195 C.Y.
(For Detail, See Sheet 2B-6)

(3) Sta. "A OUTFALL" 27+50 ℄
Const. Manhole
Inst. 24" Sew. Pipe - 320'
Tr. Exc. - 285 C.Y.

(4) Sta. "A OUTFALL" 28+34 ℄
Const. Special Manhole
Inst. 10" Sew. Pipe - 1.5'
Inst. 18" Sew. Pipe - 100'
Const. Loose Riprap (Class 100) - 12 C.Y.
Const. Loose Riprap (Class 700) - 314 C.Y.
Filter Blanket - 25 C.Y.
Inst. Riprap Geotextile - 70 Sq.Yds.
Tr. Exc. - 150 C.Y.
Toe Tr. Exc. - 15 C.Y.
(For Details, See Sheets 2B-7 & 2B-8)

BURLINGTON NORTHERN RAILROAD

"A OUTFALL" LINE
(For Profile, See Sheet 10B)

N 74°28'17" E

24"-320'

18"-100'

10"-1.5'

24"-365'

Perm. Ease. - Drainage Facilities

Temp. Ease. - Work Area

10'or 25'

+70

COLUMBIA RIVER

MATCH LINE (SEE SHEET 10)

N

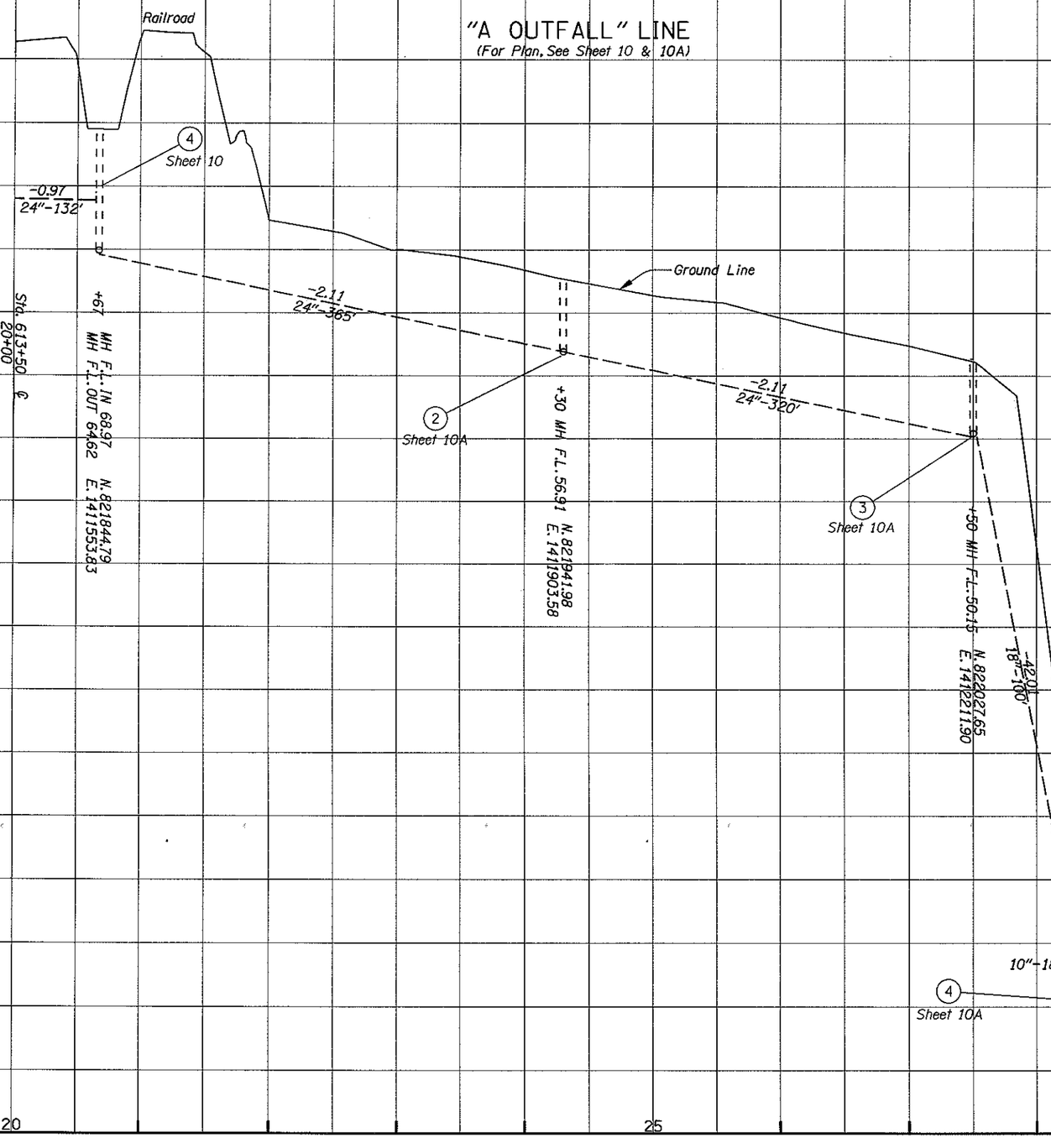
10A_PLAN.DGN 25-JUL-1995 TJT ##########################

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

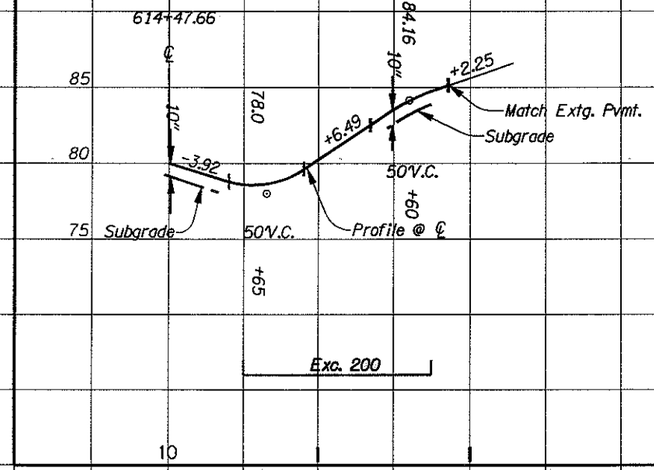
FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		10A

REVISED AS CONSTRUCTED
10/98 CONTRACT 11695

"A OUTFALL" LINE
(For Plan, See Sheet 10 & 10A)



"A" LINE PROFILE
(For Plan, See Sheet 10)



12-OCT-1995 TJT
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10B_PROLOGN