OPERATION & MAINTENANCE MANUAL

DFI No. : D00148
Facility Type: Water Quality Biofiltration Swale

MARCH, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	**D00148**
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Number) 26V-105
Location:	District: 2B (Old 2A)
	Highway No.: 001
	Mile Post: 286.24 (beg./end)
	Description: This facility is located on the southwest quadrant of the I-5 (Hwy 001) and SW Boones Ferry/Elligsen Road Interchange. Access can be obtained from the shoulder area of the eastbound travel lanes of SW Boones Ferry 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:	ODOT Designer – Region 2 Tech. Center, John Marks, P.E., 503-986-2990
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 sediment occurs when stormwater runoff flows through the grass.

This facility is located on the southwest quadrant of the I-5 (Hwy 001) and SW Boones Ferry/Elligsen Road Interchange. Access can be obtained from the shoulder area of the eastbound travel lanes of SW Boones Ferry Road; see the Operational Plan, Appendix A.

A split-flow inlet is located upstream of the facility (Photo 1) and bypasses the higher flows from the water quality facility while conveying the lower water quality flows directly to the facility. The higher flows are directed into a 24-inch conveyance line that crosses underneath the swale. At the bypass inlet, the water quality flows are conveyed through a 12-inch diameter pipe and outlet at the southeast end of the swale (Refer to Photo 1, Photo 2, and Photo 3). From this point, the flows are conveyed through the 179-foot long swale to the northwest. After treatment, the stormwater is collected by an 18-inch outlet pipe located at the northwest end (Refer to Photo 7 for a view of the northwest end of the swale. This area is severely overgrown so the swale outlet was not visible). The outlet pipe is situated at a less than desirable angle to the swale flow path of 135-degrees. The 18-inch outlet pipe directs the stormwater back towards the southeast and discharges into an 18-foot deep manhole (Point D; Photo 5). From the manhole, the flow is directed into the same 24-inch storm pipe that the higher flows are directed into. This pipe, approximately 14-feet below the ground surface, conveys the water south and east underneath the adjacent Chevron Gas Station.

The swale was observed as needing maintenance, particularly in regards to control of the vegetation (blackberries and overgrown grass).

A. Maintenance equipment access:
   The maintenance crews can access the facility by the shoulder area of SW Boones Ferry 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: Looking towards the water quality swale and the SW Boones Ferry Road/I-5 (Hwy 001) Interchange.

Photo 2: Looking toward the swale facility inlet.

Photo 3: Looking southeast toward the swale facility's inlet. This photo depicts overgrown vegetation.

Photo 4: Looking southeast toward the facility outlet and the connecting manhole (Point D). This photo depicts overgrown vegetation.

Photo 5: Looking northwest toward the facility outlet and the connecting manhole (Point D). The swale is located to the right of this structure. This photo depicts overgrown vegetation.

Photo 6: Looking toward a flow spreader/check dam and the facility inlet in the background.

Photo 7: Looking toward the facility outlet. Overgrown vegetation makes it difficult to view the rock basin.

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 water quality biofiltration swale. This pipe is noted as Point C in the Operation Plan in Appendix A.

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
A high flow bypass is located immediately upstream from the facility. This bypass inlet allows the higher flows to stay within the conveyance piping while allowing the water quality flows to enter the 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

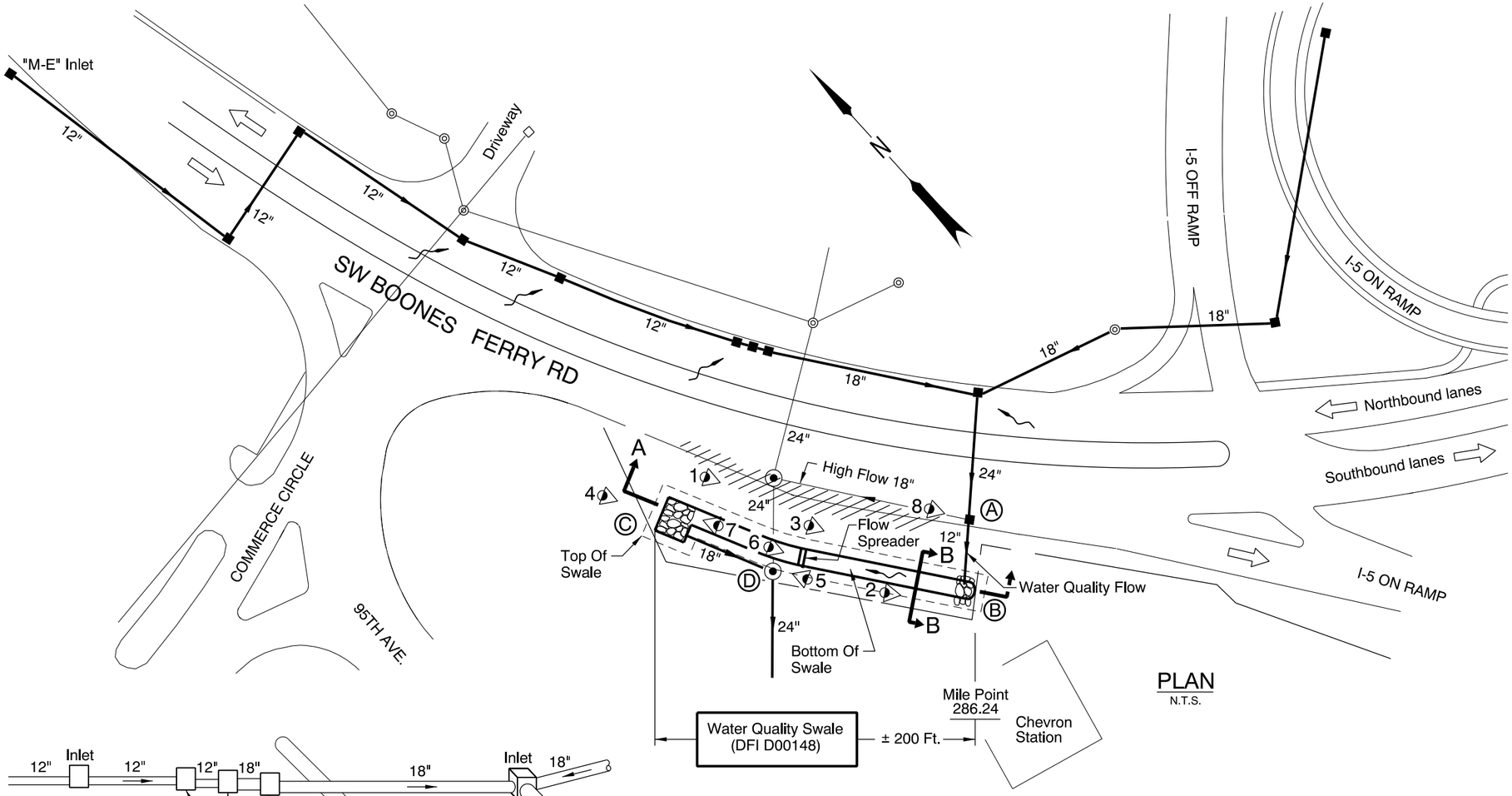
Contact any of the following for more detailed information about management of waste materials found on site:

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

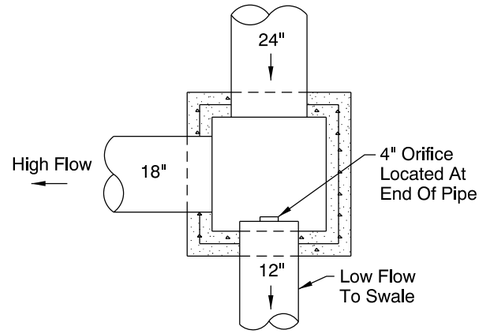
Appendix A

Content:

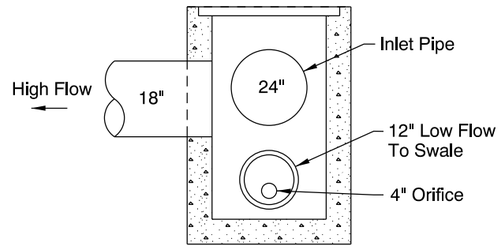
- **Operational Plan and Profile Drawing(s)**



PLAN
N.T.S.

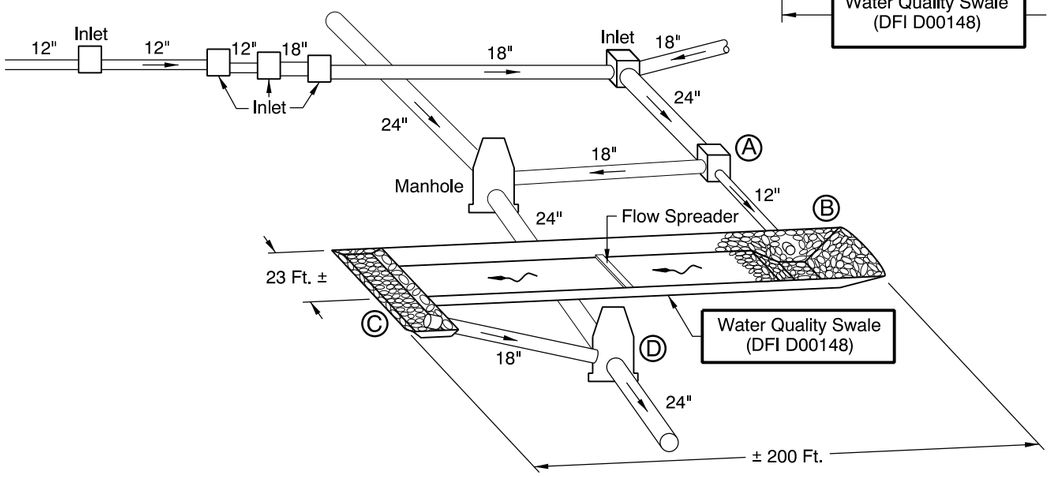


PLAN VIEW

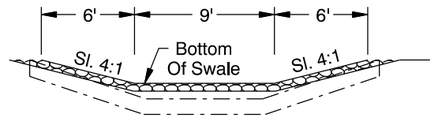


PROFILE VIEW

High Flow Bypass Inlet
DFI D00148
N.T.S.



SECTION A-A OF SWALE DFI D00148 AND SCHEMATIC OF PIPE DRAINAGE SYSTEM
N.T.S.



SECTION B-B
N.T.S.

LEGEND:

- Photo Location / Direction
- (A) High Flow Bypass Inlet
- (B) Swale Inlet
- (C) Swale Outlet
- (D) Connecting Manhole
- Manhole (and or)
- Inlet (and or)
- Access Area
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Bob Knorr

Drafted By: Jim Holeman

DFI D00148
MAINTENANCE DISTRICT 2B HWY 1
WATER QUALITY BIOFILTRATION SWALE
PACIFIC HIGHWAY MP 286.24
WASHINGTON 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-8 Incl.	Typical Sections
2B Thru 2B-14 Incl.	Details
2C Thru 2C-25 Incl.	Traffic Control Plans
2D Thru 2D-13 Incl.	Erosion Control Plans
2E Thru 2E-3 Incl.	Pipe Data
2F Thru 2F-2 Incl.	Summary
3	Plan
3A	Drainage
3B, 3C	Profiles
4	Plan
4A	Drainage
4B, 4C	Profiles
5	Plan
5A	Drainage
6	Plan
6A	Drainage
6B	Profile
7, 7A	Plans
7B, 7C	Drainage
7D	Plan
7E	Drainage
7F	Plan
7G, 7H	Drainage
7J, 7K, 7L, 7M, 7N, 7P	Profiles
8	Plan
8A, 8B	Drainage
8C, 8D	Profiles
9	Plan
9A	Drainage
10, 11, 12, 13, 14, 14A, 14B, 14C, 15, 16, 16A, 16B, 16C, 17, 17A, 18, 18A, 18B	Landscaping Plans

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

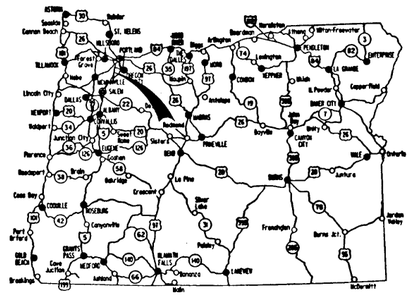
GRADING, STRUCTURE, PAVING, SIGNING, ILLUMINATION, & SIGNALS

STAFFORD INTCHGE. & I-5 SUBSIDENCE SEC.

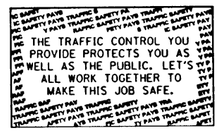
PACIFIC HIGHWAY

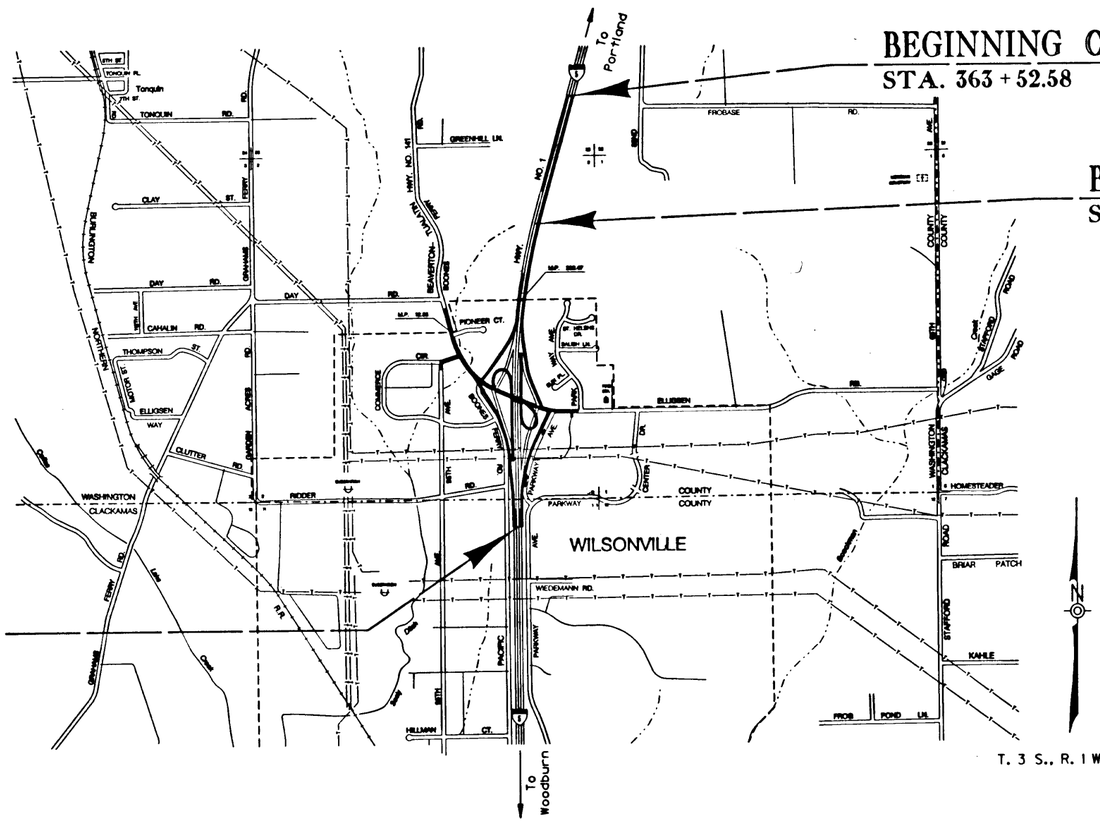
WASHINGTON & CLACKAMAS COUNTIES

JANUARY 1996



Overall Length Of Project - 1.33 Miles





T. 3 S., R. 1 W., W.M.

BEGINNING OF CONTRACT PROJECT
STA. 363 + 52.58

IM-S001(28)
BEGINNING OF PROJECT
STA. 371 + 00 (M.P. 287.19)

IM-S001(28)
END OF PROJECT
STA. 441 + 42 (M.P. 285.86)

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

REGISTERED PROFESSIONAL ENGINEER 8496 OREGON AUGUST 22, 1975 THOMAS D. LULAY Expires Dec. 31, 1996

Thomas D. Lulay

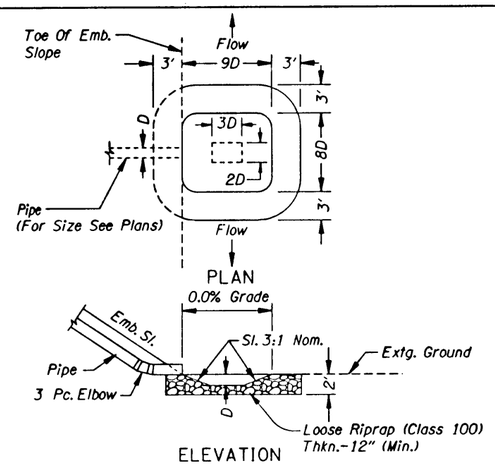
TECHNICAL SERVICES MANAGING ENGINEER

STAFFORD INTCHGE. & I-5 SUBSIDENCE SEC.
PACIFIC HIGHWAY
WASHINGTON & CLACKAMAS COUNTIES

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	IM-S001(28)	1

11-DEC-1995 09:25
Formerly : 0327ifd.tsl
/usr/fd/08232fd.tsl
VIEW A1 C634-1964/C634-1461

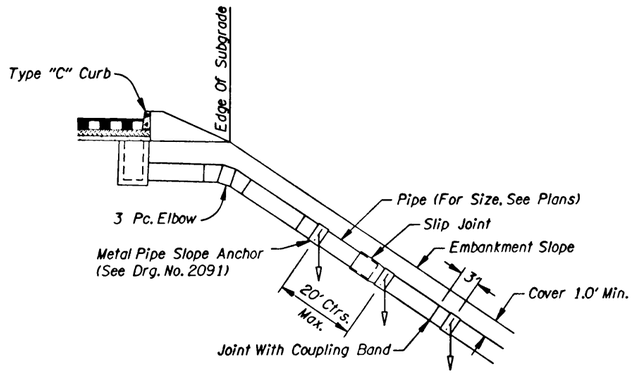
D E T A I L S



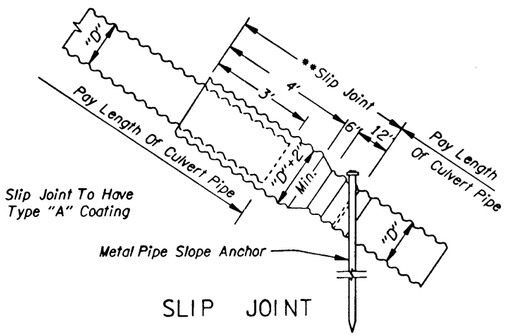
OUTLET BASIN

(For Location, See Plans)

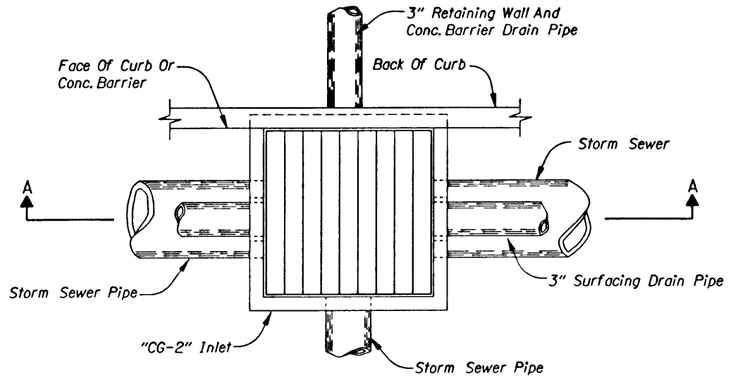
ENERGY DISSIPATORS



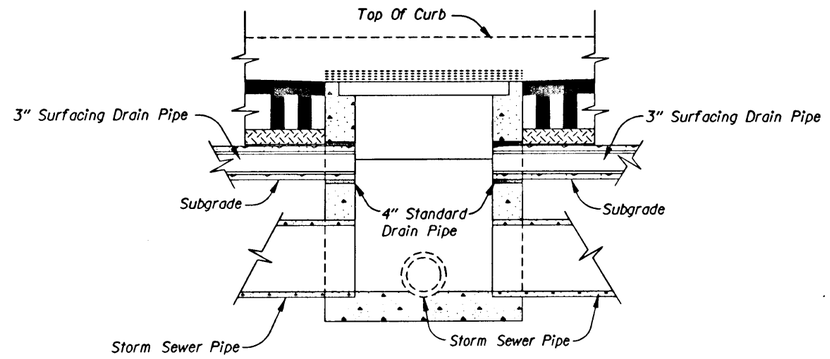
PIPES DOWN SLOPES



SLIP JOINT



PLAN



SECTION A-A

SURFACING DRAIN CONNECTIONS AT INLETS

(For Details Not Shown, See Drg. No. 2105)

STAFFORD INTCHGE. & I-5 SUBSIDENCE SEC.
PACIFIC HIGHWAY
WASHINGTON & CLACKAMAS COUNTIES

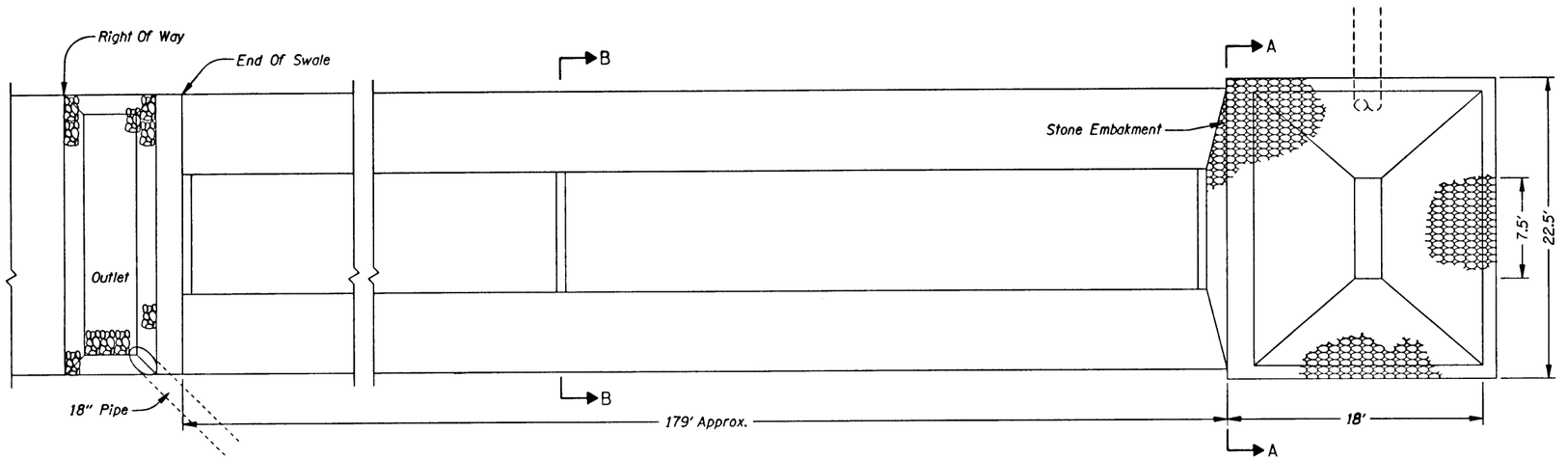
FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		2B-12

9-DEC-1995 08:43

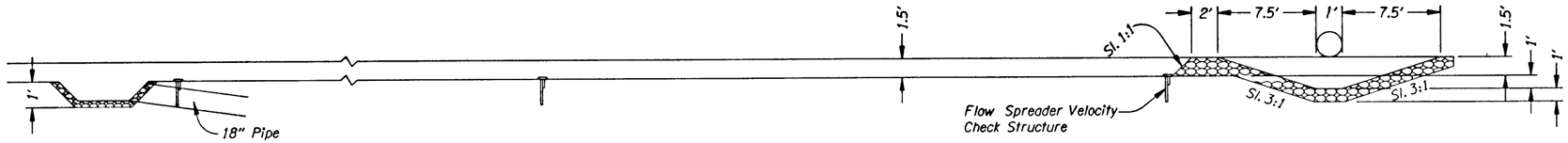
032717.dn2

VIEW B3

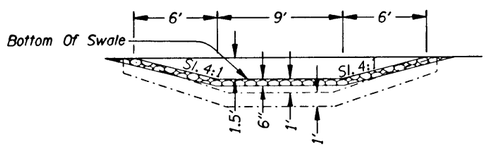
STORMWATER DETAILS



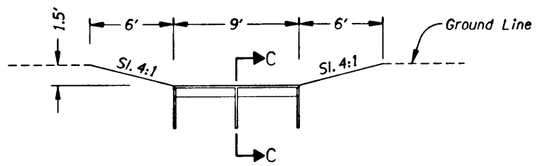
PLAN



ELEVATION

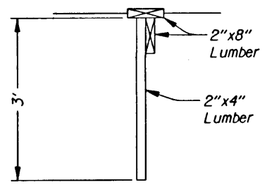


SECTION A-A



FLOW SPREADER VELOCITY
CHECK STRUCTURE

SECTION B-B



SECTION C-C

NOTE:

Construct Water Quality Swale On A Uniform 2% Slope. With 9' Bottom Width, 4:1 Side Slopes.

Use 3:1 Slopes If Necessary To Remain In Right Of Way.

Place New Manhole To Old Existing Ground Raise In Swale.

Seed Swale Using Seed Mix No. 1

Line Forebay And Outlet With 3" To 6" Stone Embankment Material.

Velocity Check Structure To Be Constructed Using Presure Treated Standard Grade Or Better Lumber.

Place Velocity Check Structures At Both Ends Of Swale And At 50' Intervals Along Swale.

WATER QUALITY SWALE

STA. "SR2" 117+56 To STA. "SR2" 119+38, Lt.

EROSION CONTROL PLANS & DETAILS			STAFFORD INTCHGE. & I-5 SUBSIDENCE SEC. PACIFIC HIGHWAY WASHINGTON & CLACKAMAS COUNTIES		
Design Team Leader	Jill Mosqueda-Designer	OREGON DEPARTMENT OF TRANSPORTATION	FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
REGISTERED PROFESSIONAL ENGINEER 9687 John R. Marks OREGON JULY 14, 1978 JOHN R. MARKS Expires Dec. 31, 1996	Bruce J. Jenkins-Drafter		REGION 10 / OREGON DIVISION		2D

jenkins 14-DEC-1995 07:38 032711.dn3

VIEW A3

26V-105

DRAINAGE AND EXTG. UTILITIES

Sec. 2, T. 3 S., R. 1 W., W.M.

CITY LIMITS OF WILSONVILLE

"SR2" LINE

PIONEER CT.

SEE SHEET 7B MATCH LINE "A"

SEE SHEET 7B MATCH LINE "C"

"CC" LINE

"95th" LINE

COMMERCE CIRCLE

95TH AVE.

CITY LIMITS OF WILSONVILLE

Plug Or Remove Extg. Inlet, Shown Thus: ⊠

STAFFORD INTCHGE. & I-5 SUBSIDENCE SEC. PACIFIC HIGHWAY WASHINGTON & CLACKAMAS COUNTIES			
FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		7G

jenkins 15-DEC-1995 11:14 032711.pl4

VIEW A2

(1) *Sta. "SR2" 125+80 To Sta. "SR2" 127+00, Rt.*
Inst. 12" Culv. Pipe - 116'
Connect To Extg. Inlet
Tr. Exc. - 60 C.Y.

(2) *Sta. "SR2" 125+80, Rt.*
Const. Manhole
Const. Type "CG-2" Inlet
Inst. 12" Sewer Pipe - 16'
Connect To Extg. Pipe
Tr. Exc. - 8 C.Y.
(For Details, See Sht. 2B-12)

(3) *Sta. "SR2" 118+80, Lt.*
Const. Manhole
Inst. 18" Sewer Pipe - 126'
Inst. 24" Sewer Pipe - 8'
Connect To Extg. Pipe
Tr. Exc. - 105 C.Y.

(4) *Sta. "SR2" 118+91, Rt.*
Const. Type "CG-2" Inlet - 4
Inst. 12" Sewer Pipe - 150'
Inst. 18" Sewer Pipe - 148'
Tr. Exc. - 140 C.Y.
(For Details, See Sht. 2B-12)

(5) *Sta. "SR2" 118+76, Lt.*
Const. Manhole
Inst. 18" Sewer Pipe - 72'
Const. Stone Embankment - 2 C.Y.
Tr. Exc. - 62 C.Y.

(6) *Sta. "SR2" 117+56 To Sta. "SR2" 119+38*
Const. Water Quality Swale
9' Bottom, 4:1 Slopes
Const. Stone Embankment - 8 C.Y.
Dt. Exc. - 90 C.Y.
(For Details, See Sht. 2D)

(7) *Sta. "SR2" 117+56*
Const. Type "CG-2" Inlet - 2
Inst. 12" Sewer Pipe - 52'
Inst. 24" Sewer Pipe - 82'
Tr. Exc. - 70 C.Y.
(For Details, See Sht. 2B-12)

(8) *Adjust Manhole - 3*
(For Details, See Sht 2B-14)

(9) *Reconst. Manhole - 3*

(10) *Sta. "SR2" 122+40*
Const. Type "M-E" Inlet
Const. Type "CG-2" Inlet - 2
Const. Type "B" Inlet
Inst. 12" Sewer Pipe - 436'
Tr. Exc. - 180 C.Y.
(For Details, See Sht. 2B-12)

(11) *Const. Surfacing Drain - 4*
(For Details, See Sht. 2B-11)

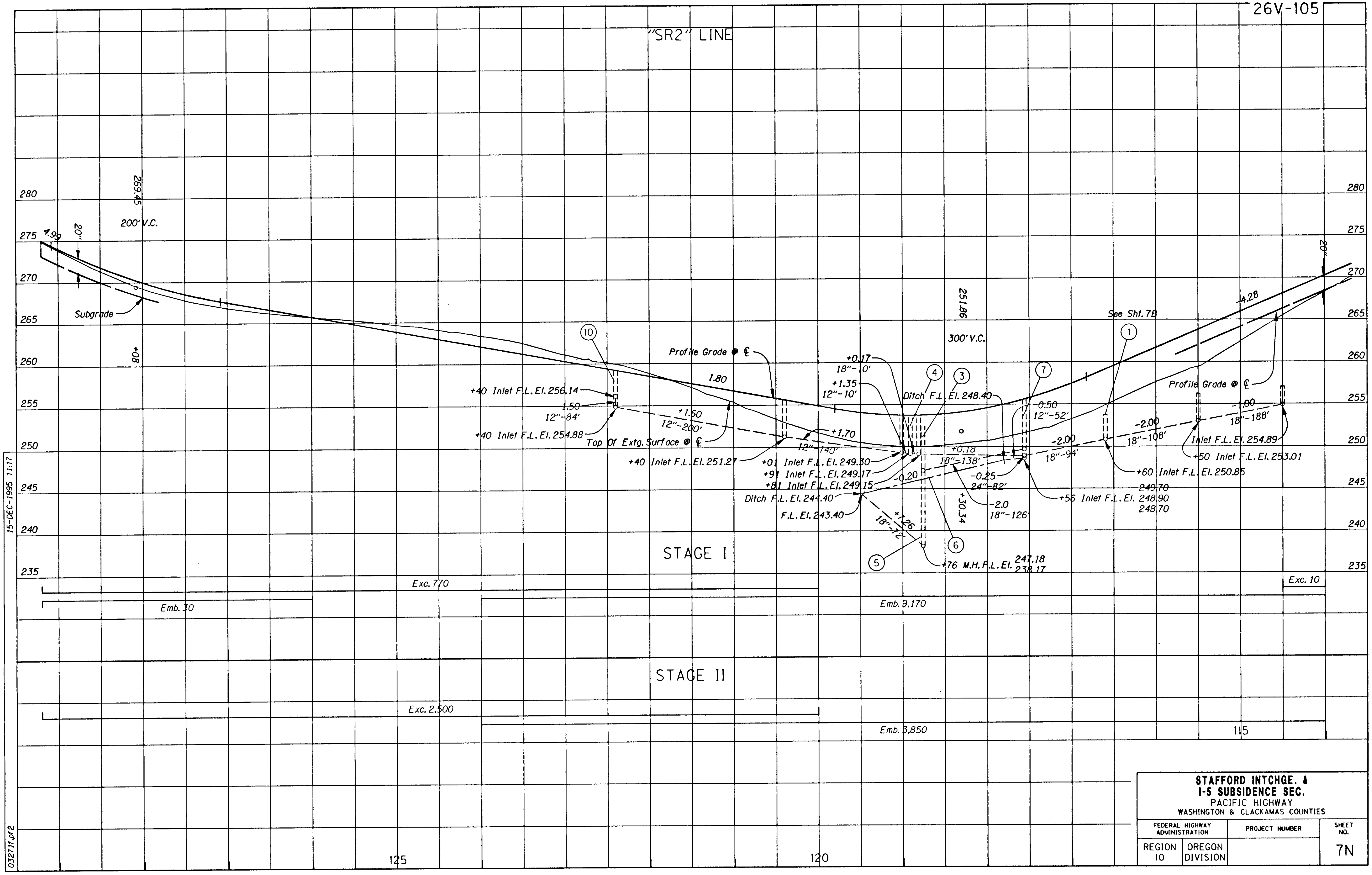
(12) *Sta. 118+62*
Reconst. Extg. Inlet
Remove Extg. Inlet

(13) *Adjust Valve - 4*

jenkins
15-DEC-1995 11:16
03271f.n11
VIEW A3

STAFFORD INTCHGE. & I-5 SUBSIDENCE SEC.
PACIFIC HIGHWAY
WASHINGTON & CLACKAMAS COUNTIES

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		7H


26V-105
"SR2" LINE
269.45
200' V.C.
4.99
20'
Subgrade
+08
251.86
300' V.C.
See Sht. 7B
Profile Grade @ ℄
1.80
+40 Inlet F.L. El. 256.14
1.50
12"-84'
+40 Inlet F.L. El. 254.88
+1.60
12"-200'
Top Of Extg. Surface @ ℄
+40 Inlet F.L. El. 251.27
+1.70
12"-140'
+0.17
18"-10'
+1.35
12"-10'
Ditch F.L. El. 248.40
+01 Inlet F.L. El. 249.30
+91 Inlet F.L. El. 249.17
+81 Inlet F.L. El. 249.15
-0.20
Ditch F.L. El. 244.40
F.L. El. 243.40
+1.26
18"-72'
+30.34
+0.18
18"-138'
-0.25
24"-82'
-2.0
18"-126'
+76 M.H. F.L. El. 247.18 238.17
-0.50
12"-52'
-2.00
18"-94'
+56 Inlet F.L. El. 248.90 249.70 248.70
-2.00
18"-108'
+60 Inlet F.L. El. 250.85
Profile Grade @ ℄
-1.00
18"-188'
Inlet F.L. El. 254.89
+50 Inlet F.L. El. 253.01
4.28
STAGE I
Exc. 770
Emb. 30
Emb. 9,170
Exc. 10
STAGE II
Exc. 2,500
Emb. 3,850
125
120
115
15-DEC-1995 11:17
03271.pf2
VIEW B1

STAFFORD INTCHGE. &
I-5 SUBSIDENCE SEC.
PACIFIC HIGHWAY
WASHINGTON & CLACKAMAS COUNTIES

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		7N