OPERATION & MAINTENANCE MANUAL

DFI No.: D00119
Facility Type: Water Quality Biofiltration Swale

MARCH 2010

INDEX

1. Identification

Drainage Facility ID (DFI):	**D00119**
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Number) 32V-022
Location:	District: 2B (Old 2A)
	Highway No.: 001
	Mile Post: 291.29 to 291.34 (beg./end)
	Description: This facility is located on the western side of the SW Carman Dr. off ramp from southbound I-5 (Hwy 001).

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

Or

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

3. Construction

Engineer of Record:	ODOT Designer – Region 1 Tech. Center, Jeffery Scheick, P.E./Mngr., (503) 731-8200
Facility construction:	1999
Contractor:	Kiewit Pacific

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.

The water quality swale is located just north of Carman Drive along the western edge of the I-5 (Hwy 001) off-ramp. The swale is approximately 410-feet in length and is sized to handle the water quality flow from the western portion of S.W. Carman Dr. overpass. A split flow structure is located at the upper end of the swale (Refer to **Point A of the Operational Plan in Appendix A; Photo 1**). The split flow structure directs the high flow events to continue in the 12-inch storm pipe to the north while sending the lower flows (water quality flows from the smaller storm events) to the WQ Swale. The water quality flows are directed to the swale through a 12-inch storm pipe that crosses the off ramp and outlets at the start of the swale (**Point B; Photo 2**). After treatment through the swale, the water is collected by a swale outlet (**Point C; Photo 5**) and conveyed into a storm pipe system. Both the high flows and water quality flows are directed into this storm pipe system which conveys the water to the north of the facility.

Photo 1: Split flow structure located on east side of Carman Drive off-ramp (southbound) of I-5 (Hwy 001).

Photo 2: 12-inch low flow storm pipe outlet to upper end (south end) of WQ Swale.

Photo 3: WQ Swale looking towards the south along the southbound off-ramp of I-5 (Hwy 001).

Photo 4: WQ Swale looking towards the north. To the right is the southbound off-ramp of I-5 (Hwy 001).

Photo 5: Swale outlet at north most portion of the swale. Photo is looking to the south with the southbound off-ramp of I-5 (Hwy 001) located to the left.

A. Maintenance equipment access:

Maintenance crew can access the facility from the southbound off-ramp at S.W. Carman Dr. of I-5 (Hwy 001).

B. Heavy equipment access into facility:

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

C. Special Features:

☐ Amended Soils
☐ Porous Pavers
☐ Liners
☐ Underdrains

5. Facility Haz Mat Spill Feature(s)

The WQ swale can be used to store a volume of liquid by blocking the swale outlet (**Point C in the Operational Plan of Appendix A**). This outlet can be blocked by either blocking the grate of the inlet or plugging the outlet pipe.

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 or 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)

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

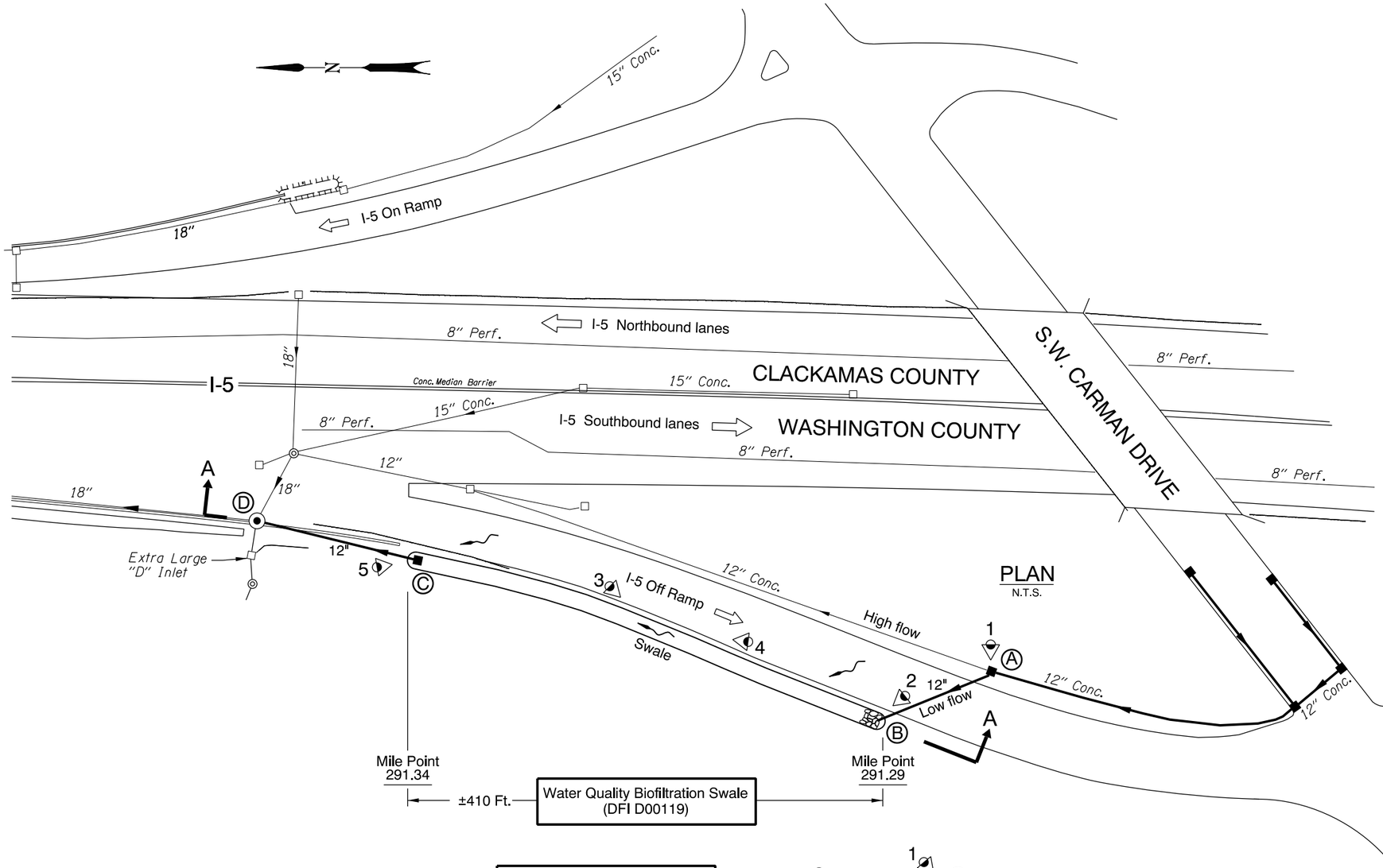
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region Hazmat Coordinator	(503) 731-8290
ODEQ Northwest Region Office	(503) 229-5263

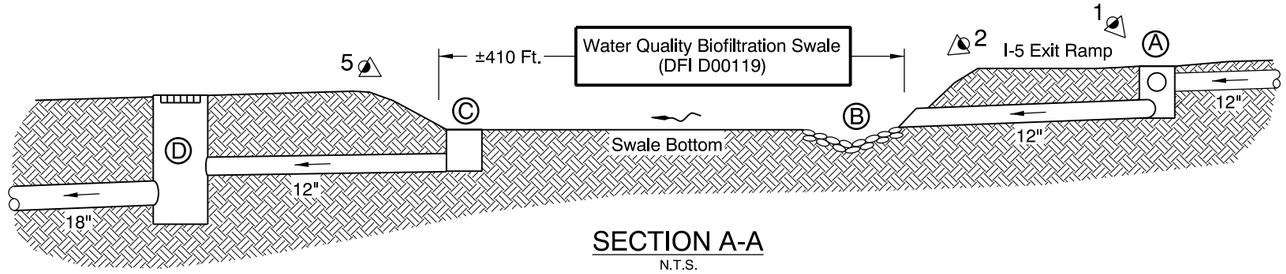
Appendix A

Content:

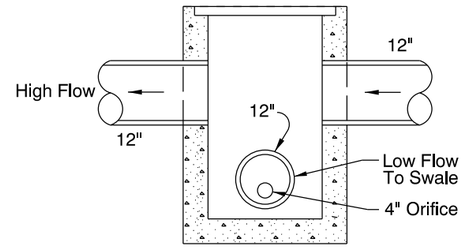
- **Operational Plan and Profile Drawing(s)**



PLAN
N.T.S.



SECTION A-A
N.T.S.



SPLIT FLOW INLET FOR
WATER QUALITY BIOFILTRATION SWALE
(DFI D00119)

LEGEND:

- Photo Location/Direction
- Split Flow Structure
- Swale Inlet and Riprap Basin
- Swale Outlet
- Manhole With Inlet Top
- Manhole
- Inlet
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: M. Wittenbrink

Drafted By: Jim Holeman

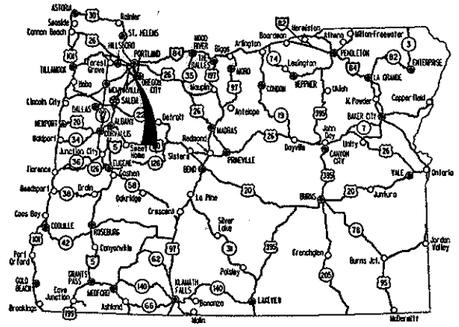
DFI D00119
MAINTENANCE DISTRICT 2B HWY 1
WATER QUALITY BIOFILTRATION SWALE
PACIFIC HIGHWAY MP 291.29-291.34
WASHINGTON COUNTY

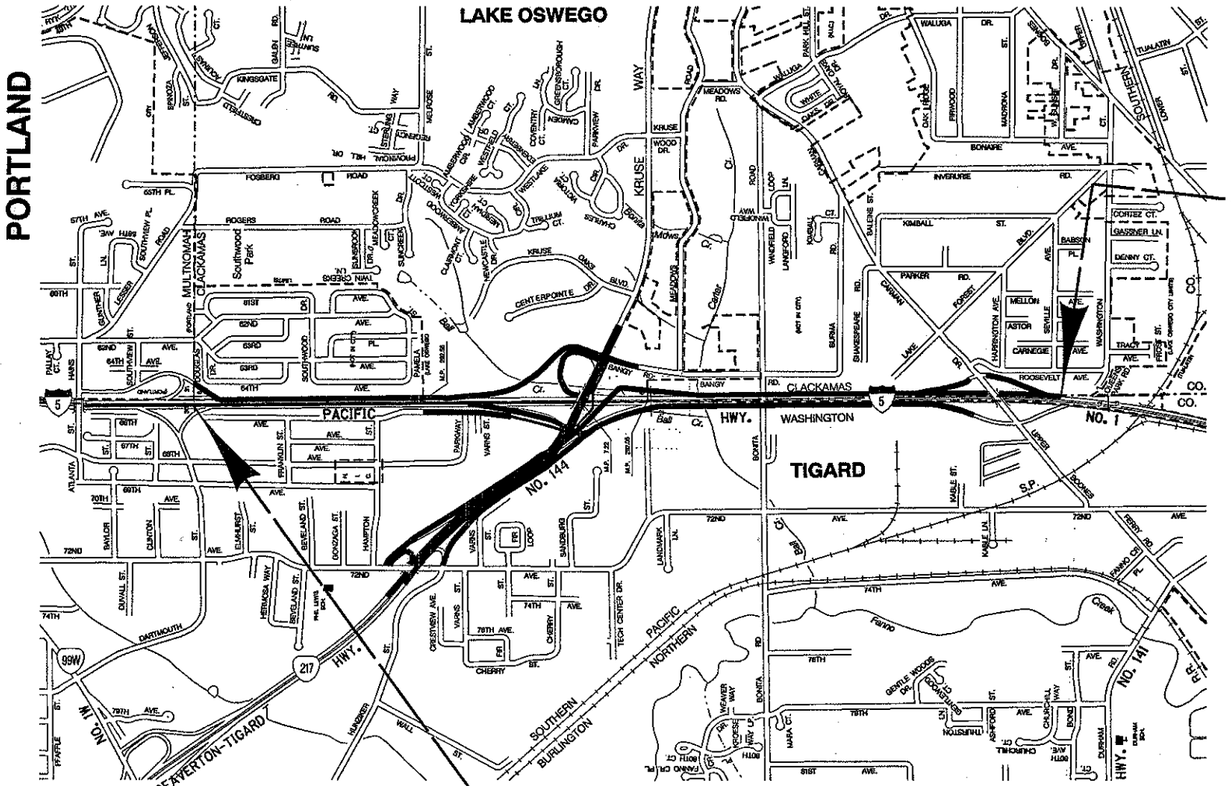
DFI_D00119.dgn

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	Offsite Wetland Mitigation Vicinity Map & Index Of Sheets Contd.
1A-2	Index Of Sheets Contd. & Standard Drawing Nos.
1A-3	Standard Drawing Nos.
1B	Signature Sheet
1C	Colored Sheet Layout
1D	Colored Photo
2, 2A Thru 2A-30 Incl.	Typical Sections
2B Thru 2B-21 Incl.	Details
2C, 2C-2	Traffic Control Details
2C-3	Traffic Control Detour Plan
2C-4 Thru 2C-26 Incl., 2C-26A, 2C-7 Thru 2C-35 Incl., 2C-35A, 2C-36 Thru 2C-95 Incl.	Traffic Control Plans
2D Thru 2D-4 Incl., 2D-4A, 2D-5, 2D-6	Water Quality Details
2D-7 Thru 2D-14 Incl.	Water Quality Plans
2E, 2E-2, 2E-2A, 2E-3	Erosion Control Details
2E-4 Thru 2E-22 Incl.	Erosion Control Plans
2F Thru 2F-5 Incl.	Pipe Data
3	Alignment Plan
3A	General Construction Plan
3B	Utility & Drainage Plan
3C	Profile & Super Rate Chart
4	Alignment Plan
4A	General Construction Plan
4B	Utility & Drainage Plan
5	Alignment Plan
5A	General Construction Plan
5B	Utility & Drainage Plan
6	Alignment Plan
6A	General Construction Plan
6A-2	Construction Notes
6B	Utility & Drainage Plan
6C	Profile
7	Alignment & Plan
7A	General Construction Plan
7A-2	Construction Notes
7B, 7B-2,	Utility & Drainage Plan & Notes
7C, 7C-2, 7D	Profile & Super Rate Charts
8	Alignment Plan
8A	General Construction Plan
8A-2	Construction Notes
8A-3	Intersection Construction Plan
8B	Utility & Drainage Plan
8B-2, 8B-3	Sanitary Sewer Relocate Plans And Details
8C	Contour Grading Plan
8D, 8D-2, 8E, 8F, 8F-2, 8F-3, 8G	Profile & Super Rate Charts

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

GRADING, STRUCTURES, PAVING, SIGNING, SIGNALS, & ILLUMINATION

I-5 AT HWY. 217/ KRUSE WAY (UNIT 1) SEC.

PACIFIC HIGHWAY

CLACKAMAS & WASHINGTON COUNTIES
NOVEMBER 1999

Overall Length Of Project – 3.13 km (1.95 Miles)
Overall Length Of Work Area – 4.80 km (2.98 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 From The Center, Or Answers To Questions About The Rules By Calling (503) 232-1987.

LET'S ALL
WORK TOGETHER
TO MAKE THIS
JOB SAFE

HPP-ACHPP-ACNH-S001(80)
END OF PROJECT
STA. "L5" 27 + 730.500 (M.P. 291.15)

BEGINNING OF PROJECT HPP-ACHPP-ACNH-S001(80)
STA. "L5" 24 + 673 (M.P. 293.05)

T. 2 S.,
R. 1 W., 1 E., W.M.

METRIC

OREGON TRANSPORTATION COMMISSION

Henry H. Hewitt	CHAIRMAN
Susan Brody	VICE CHAIRMAN
Steven H. Corey	COMMISSIONER
Stuart Foster	COMMISSIONER
John Russell	COMMISSIONER
Grace Crunican	DIRECTOR OF TRANSPORTATION

REGISTERED PROFESSIONAL ENGINEER 18,458 OREGON MAY 14, 1996 JEFFREY SCHEICK Expires Jun. 30, 2000

Jeffrey Scheick

TECHNICAL SERVICES MANAGING ENGINEER

I-5 AT HWY. 217/
KRUSE WAY (UNIT 1) SEC.
PACIFIC HIGHWAY
CLACKAMAS & WASHINGTON COUNTIES

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION	HPP-ACHPP-ACNH-S001(80)	1

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VIEW A1 C603-1401

WATER QUALITY PLAN

CLACKAMAS CO.

N

"CU" LINE

"CU1" LINE

"L5" LINE

"UB" LINE

"AU" LINE

CU 27+300

CU 27+400

CU 4+300

CU 4+400

CU1 4+500

L5 27+300

L5 27+400

L5 27+500

UB 4+300

UB 4+400

UB 4+500

AU 27+300

AU 27+400

AU 27+500

S.W. ROOSEVELT AVE.

S.W. HARRINGTON AVE.

S.W. CARMAN DR.

Access Control Line

Tigard City Limits

I-5

Sec. 17, T. 2S., R. 1E., W.M.

Sec. 12, T. 2S., R. 1W., W.M.

WASHINGTON CO.

Type "G-2MA"

Type "G-1"

Type "CG-1"

Type Extra Large "D"

S.S.M.H.

E. Meter

E. Jct. Box

Utility Access M.H.

Std. Catch Basin

Pol. Control

C.V.

Luminaire Conduit

Signal Conduit

Ditch

375 mm Conc.

300 mm Conc.

450 mm Conc.

200 mm Perf.

300 mm W

300 mm W Abandoned

150 mm W

900mm Steel Casing Pipe

① Const. Water Quality Swale
Sta. "AU" 27+325 To Sta. "AU" 27+470
(Earthwork Included In Main Rdwy. Dist.)
(For Typical Sections, See Sht. 2D-5)

② Const. Type "G2 Split Flow" Inlet
Inst. 300 mm Pipe - 31 m
Tr. Exc. - 68 m³
(For Details, See Sht. 2D-4)

③ Const. Type "M-E" Inlet
Inst. 300 mm Pipe - 41.5 m
Tr. Exc. - 60 m³

④ Const. Riprap Basin
(For Details, See Sht. 2B-3)

LEGEND

- BMP Vegitative Buffer Strip
- Water Quality Swale
- Place Pipe
- Abandon Pipe

I-5 AT HWY. 217/KRUSE WAY (UNIT 1) SEC.
PACIFIC HWY. (I-5)
CLACKAMAS AND WASHINGTON COUNTIES

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		2D-13

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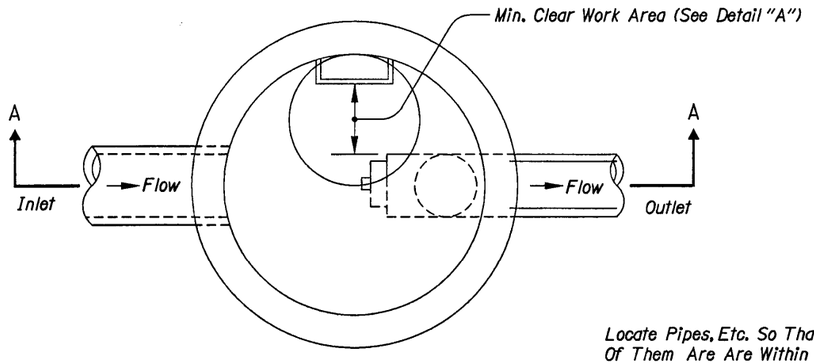
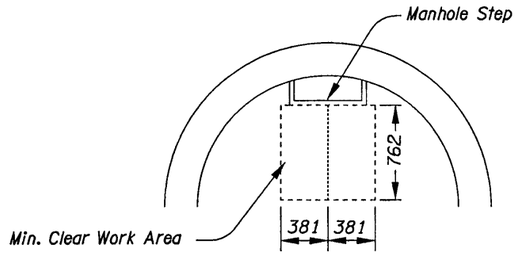
VIEW 3

VIEW 3

WATER QUALITY DETAIL

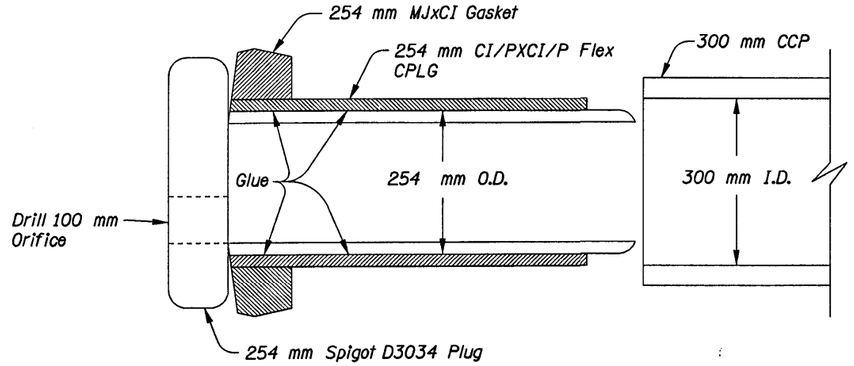


PLAN



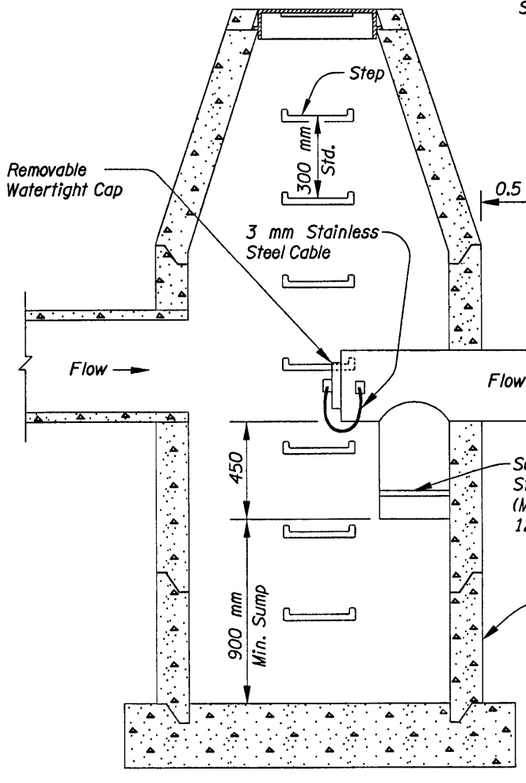
DETAIL "A"

Locate Pipes, Etc. So That No Portion Of Them Are Are Within Min. Clear Work Area



ORIFICE PLUG

(For Location, See Plans)



SECTION A-A

(For Details Not Shown, See Manhole Standard Drawing No. RD327)

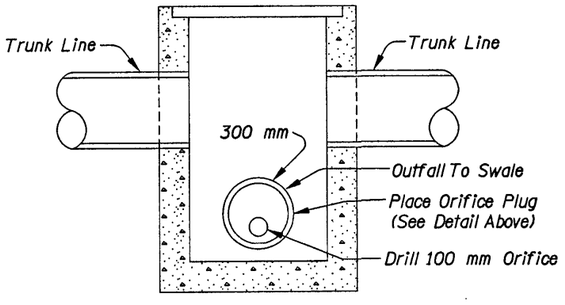
SUMP VOLUME REQUIREMENTS

Single Family Residential	*.245 m^3/hectare*
Multi Family Residential	*1.539 m^3/hectare*
Commercial/Industrial	*6.577 m^3/hectare*

NOTES:

1. *Hardware, Fasteners And Anchors To Be Stainless Steel; Use 3 mm Stainless Steel Cable*
2. *See Pipe Data Sheet And Plan Sheets For Pipe Size(s).*
3. *See Pipe Data Sheet And Plan Sheets For Manhole Size(s).*
4. *See Pipe Data Sheet And Plan Sheets For Sump Depth.*
5. *Manhole And Base Per Manhole Standard Drawings.*
6. *Hardware, Fasteners, Anchors, Fittings, Appurtenances, Labor And Equipment Is Incidental To Water Quality Manhole Item.*

WATER QUALITY MANHOLE



"G2 SPLIT FLOW" INLET

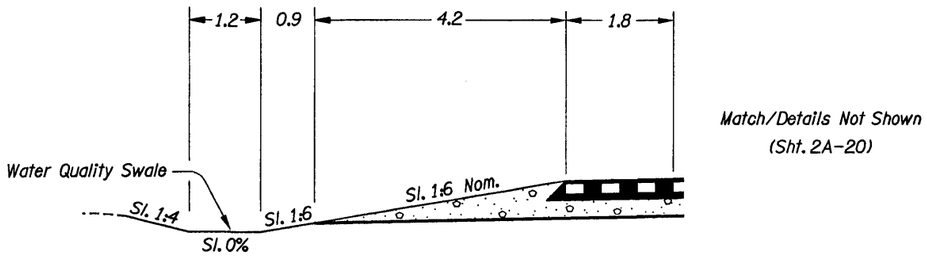
(For Details, See Drg. No. RD336)

All Dimensions Shown Are In mm (Millimeters) Unless Otherwise Noted

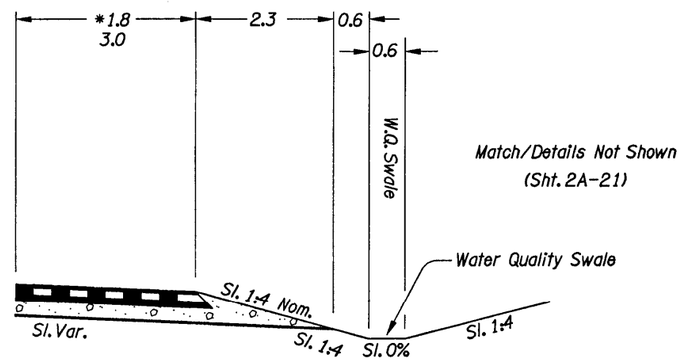
I-5 AT HWY. 217/KRUSE WAY (UNIT 1) SEC.
PACIFIC HWY. (I-5)
CLACKAMAS AND WASHINGTON COUNTIES

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		2D-4

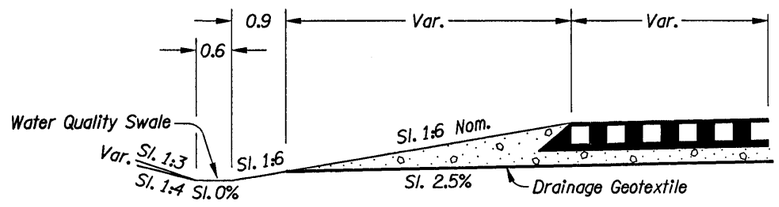
WATER QUALITY TYPICAL SECTIONS



STA. "KC" 25+633.3 To STA. "KC" 25+768 Lt.
"KC" 25+768 To "KC" 25+840 Lt. (Taper Section)



STA. "AU" 27+321 To STA "AU" 27+368 Rt.
"AU" 27+368 To "AU" 27+440 Rt. (Taper Section)
* "AU" 27+440 To "AU" 27+470 Rt.



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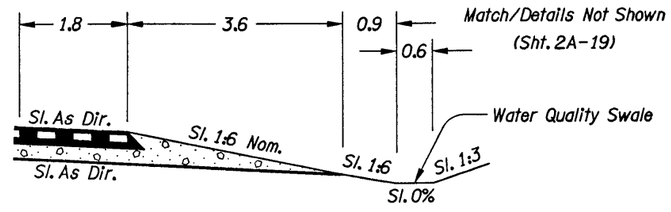
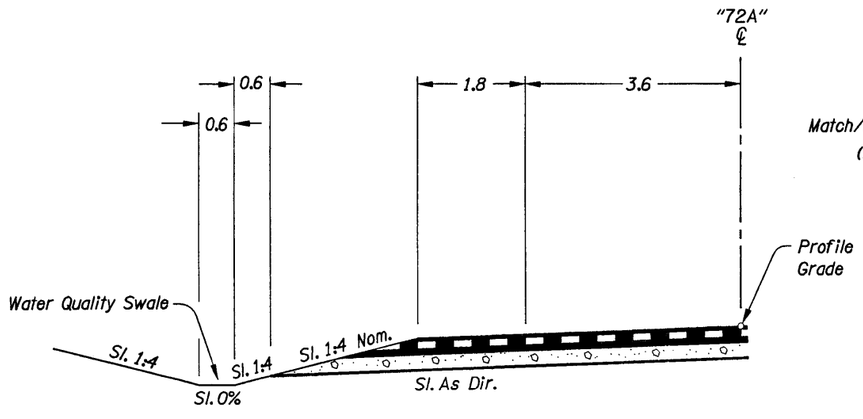
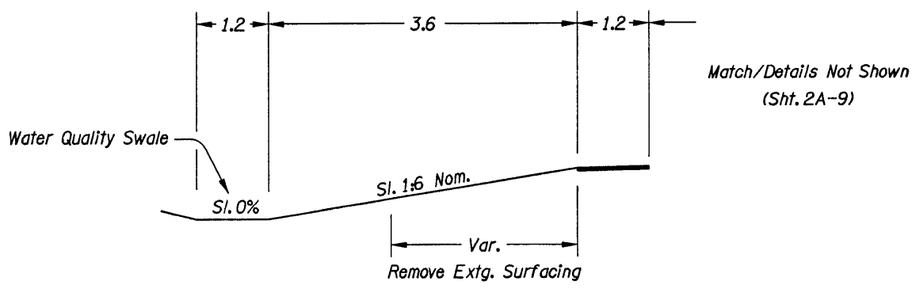


STA. "KA" 12+163.45 To STA. "KA" 12+351 Rt.



STA. "72A" 10+800 To STA. "72A" 10+915 Lt.



STA. "L217" 11+726 To STA. "L217" 11+793

All Dimensions Shown Are In Meters
Unless Otherwise Noted

I-5 AT HWY. 217/KRUSE WAY (UNIT 1) SEC.
PACIFIC HWY. (I-5)
CLACKAMAS AND WASHINGTON COUNTIES

FEDERAL HIGHWAY ADMINISTRATION		PROJECT NUMBER	SHEET NO.
REGION 10	OREGON DIVISION		2D-5