OPERATION & MAINTENANCE MANUAL

DFI No.: D00116
Facility Type: Water Quality Biofiltration Swale

June, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	D00116
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Number) 33V-100
Location:	District: 2B (Old 2A)
	Highway No.: 047
	Mile Post: 71.10 to 71.14 (beg./end)
	Description: This facility is located South of US 26 (Hwy 047) between the frontage road and the District 2A Sylvan Maintenance District Office.

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 1 Tech. Center, Bruce Council, (503) 731-8319, Magnolia Bartley, (503) 731-8499
Facility construction:	2000
Contractor:	Mowatt Construction Company

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 facility is located south of US26 (Hwy 047) between the frontage road to SW Scholls Ferry Road (Sylvan exit) and the ODOT District 2A Maintenance Offices. The drainage basin for this facility includes the eastbound portion of US26 east of the facility. The swale is an off-line facility where the water quality flow is bypassed from the primary conveyance and directed to the swale through a 12-inch storm pipe represented by Point C in the Operational Plan found in Appendix A. The flow is bypassed with a high-low split flow structure approximately 223 feet east of the facility. After leaving the split flow facility the water quality flow is directed toward and pretreated in the swale.

The drainage area for this facility includes the frontage road to SW Scholls Ferry Road. After treatment through the nearly 148 foot long swale, the water is directed into a 12-inch storm pipe beneath SW Raab Road just south and west of the swale; see Photo 2 and a picture of the swale outlet structure.

The swale facility is a grass lined facility with HDPE porous pavers, lining the bottom.

A. Maintenance equipment access:
   The facility can be accessed either SW Raab Road or from an access road off of the frontage road.

B. Heavy equipment access into facility:

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

C. Special Features:

   ☐ Amended Soils
   ☒ Porous Pavers – HDPE Porous Pavers
   ☐ Liners
   ☐ Underdrains

Photo 1: WQ swale facility looking towards the west.

Photo 2: WQ swale outlet structure for the south swale.

Photo 3: WQ swale outlet structure for the south swale.

Photo 4: Access road from US 26 (Hwy 47) looking east. ODOT District Maintenance to the right.

5. Facility Haz Mat Spill Feature(s)

The swale can be used to store a volume of liquid by blocking either one of the swale outlet structures with either a steel plate or set of sandbags. See Photo 2 and the Operational Plan.

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: This facility is an offline facility where only the water quality flow is directed into the swale.

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

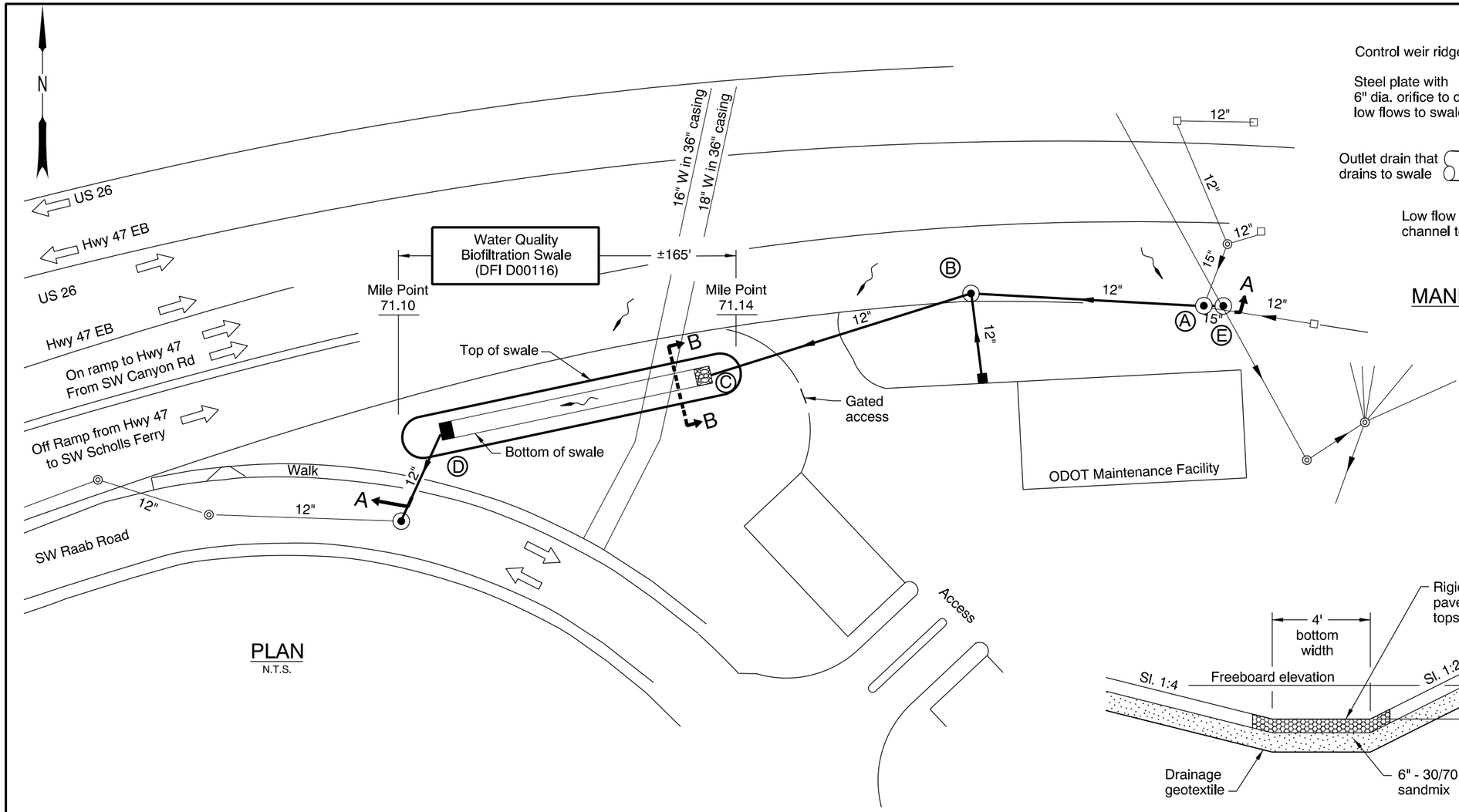
Contact any of the following for more detailed information about management of waste materials found on site:

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

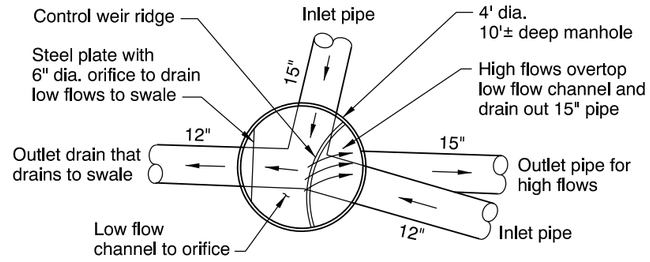
Appendix A

Content:

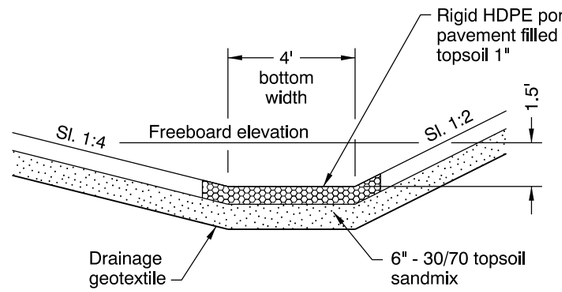
- **Operational Plan and Profile Drawing(s)**



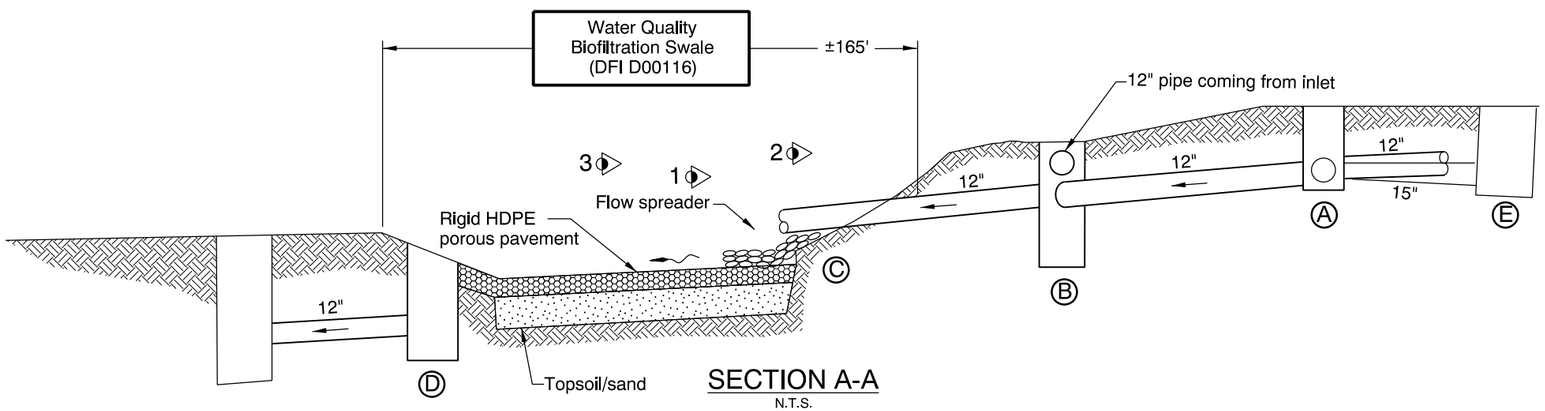
PLAN
N.T.S.



SPLIT FLOW
MANHOLE DETAIL AT POINT Ⓐ
N.T.S.



SECTION B-B
N.T.S.



SECTION A-A
N.T.S.

LEGEND:

- Photo Location / Direction
- Ⓐ Split flow drop manhole
- Ⓑ Water quality manhole
- Ⓒ Water quality swale inlet/flow spreader
- Ⓓ Water quality swale outlet
- Ⓔ Drop manhole/high flow
- and/or ◎ Manhole
- and/or □ Inlet
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path
- Rigid HDPE Porous Pvmt. Filled With Topsoil (1")
- 30/70 Topsoil/Sand Mixture - (6")
- Traffic direction/flow

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Bob Knorr

Drafted By: Rodney Schultz

DFI D00116
MAINTENANCE DISTRICT 2B HWY 047
WATER QUALITY BIOFILTRATION SWALE
SUNSET HWY MP 71.10-71.14
MULTNOMAH & WASHINGTON COUNTIES

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
1A-2	Index Of Sheets Cont'd.
1A-3	Standard Drawing Nos.
2, 2A Thru 2A-18 Incl.	Typical Sections
2B Thru 2B-11 Incl.	Details
2C Thru 2C-8 Incl.	Traffic Control Plans
2CA-1 Thru 2CA-27 Incl.	Traffic Control Plans - Pointer Road Work Area
2CB-1 Thru 2CB-22 Incl.	Traffic Control Plans - South Side Work Area
2CC-1 Thru 2CC-61 Incl.	Traffic Control Plans - Sylvan Work Area
2D Thru 2D-9 Incl.	Water Quality Plans
2E Thru 2E-15 Incl.	Erosion Control Plans
2F	Hazardous Material Remediation Plans
2G Thru 2G-6 Incl.	Pipe Data
3	Alignment & All Construction
4	Alignment
4A	Right Of Way
4B, 4B-2	General Construction Plans
4C, 4C-2	Drainage Plans
4D, 4E	Profiles
5	Alignment
5A	Right Of Way
5B, 5B-2	General Construction Plans
5C	Drainage Plan
5D, 5E	Profiles
6	Alignment
6A	Right Of Way
6B, 6B-2	General Construction Plans
6C	Detour Plan
6D, 6D-2	Drainage Plans
6E, 6F, 6G, 6H, 6J	Profiles
7	Alignment
7A	Right Of Way
7B, 7B-2	General Construction Plans
7C	Detour Plan
7D, 7D-2	Drainage Plans
7E, 7F, 7G, 7H	Profiles
8	Alignment
8A	Right Of Way
8B, 8B-2	General Construction Plans
8C, 8C-2	Drainage Plans
8D, 8E, 8F	Profiles
9	Alignment
9A	Right Of Way
9B, 9B-2	General Construction Plans
9C	Detour Plan
9D, 9D-2	Drainage Plans

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

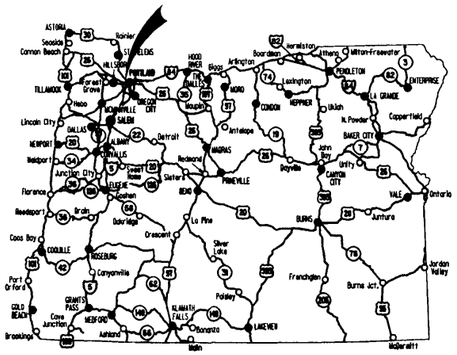
GRADING, STRUCTURES, PAVING, SIGNING, ILLUMINATION, SIGNALS, ROADSIDE DEVELOPMENT & UTILITY RELOCATIONS

CAMELOT INTCHGE. - SYLVAN INTCHGE. (PHASE 2) SEC.

SUNSET HIGHWAY

MULTNOMAH & WASHINGTON COUNTIES

OCTOBER 2000

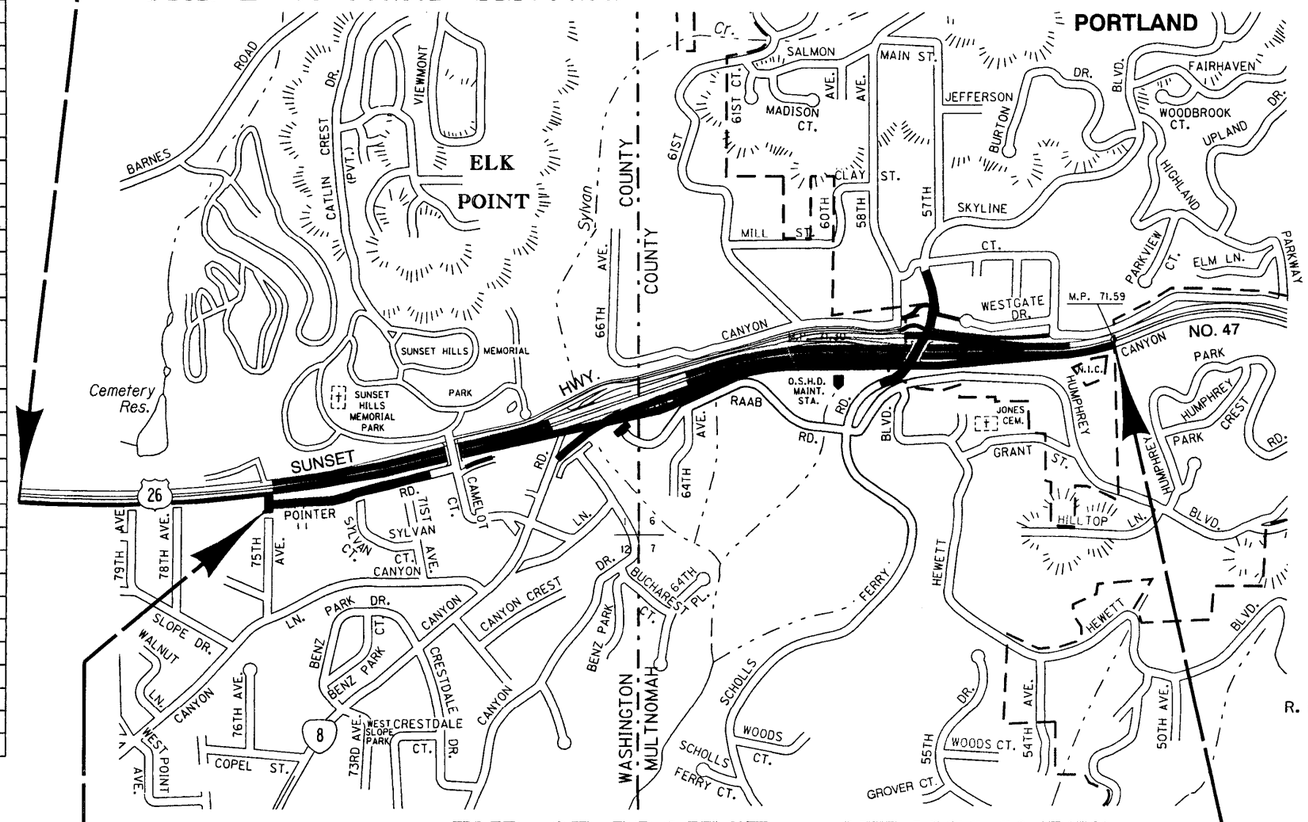


Overall Length Of Project - 2.013 km (1.25 Miles)

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

BEGIN. OF CONTRACT
STA. "L" 98+700.801 (M.P. 70.06)



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

NH-MGS-S047(32)
BEGINNING OF PROJECT
STA. "L" 99+197.000 (M.P. 70.37)

END OF PROJECT NH-MGS-S047(32)
STA. "L" 101+210 (M.P. 71.62)

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, 2002

Jeffrey Scheick

TECHNICAL SERVICES MANAGING ENGINEER

CAMELOT INTCHGE. - SYLVAN INTCHGE. (PHASE 2) SEC.
SUNSET HIGHWAY
MULTNOMAH & WASHINGTON COUNTIES

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
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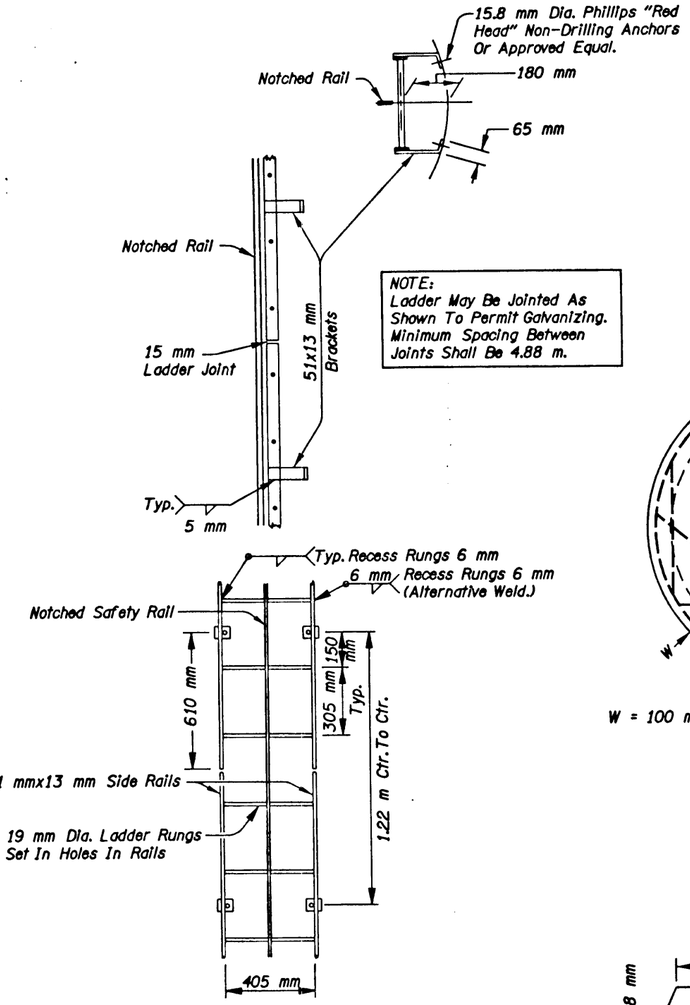
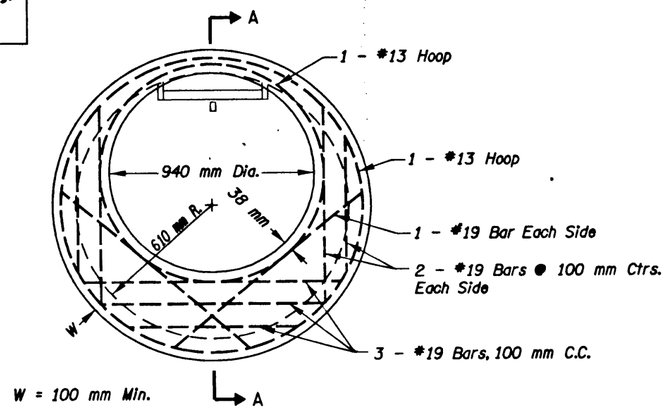


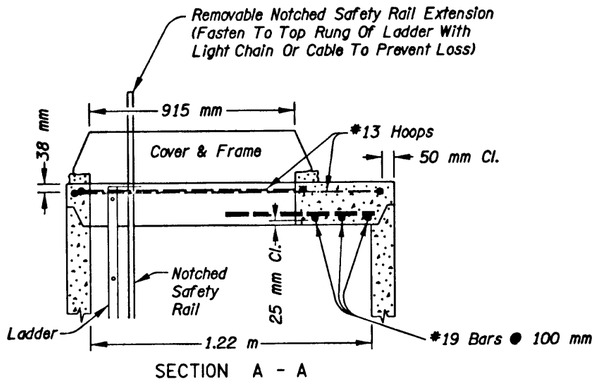
NOTE:
All Structural Steel Shall Be A36M.
All Bolts Shall Be A307.
All Material Shall Be Hot - Dipped Galvanized After Fabrication.

SAFETY LADDER

(For Details Not Shown, See Drg. Nos. RD324 & RD327)

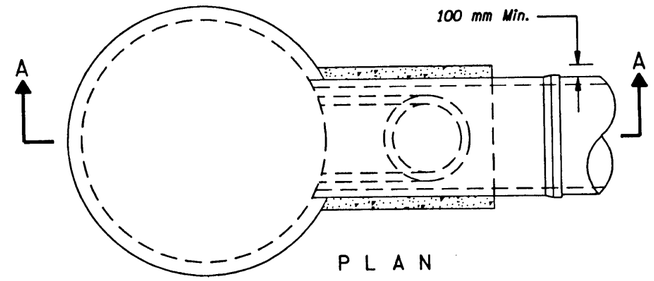


TOP VIEW

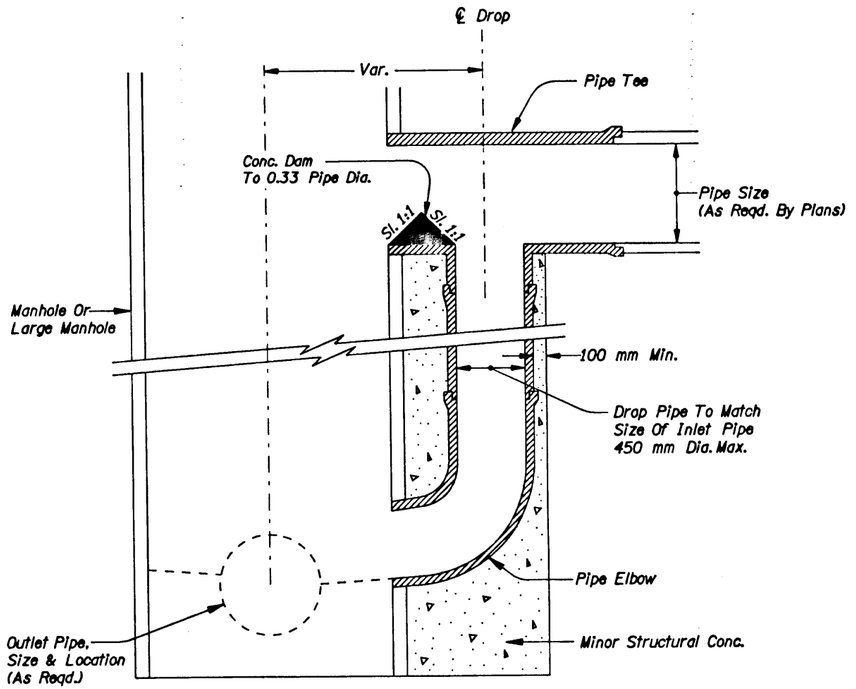


SECTION A - A

NOTE:
Provide Steel Notched Safety Rail, Removable Extension And All Required Mounting Hardware At Each Access Manhole Similar To That Manufactured By D.B.I. Enterprises Inc., (612) 388-8282 (See Special Provisions)



PLAN



SECTION A-A

DROP MANHOLE

(For Details Not Shown, See Drg. Nos. RD324, RD327 & RD330)

All Dimensions Are In Meters (m) Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER 19156 OREGON JULY 15, 1997 BRUCE S. COUNCIL Expires Dec. 31, 2001

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

CAMELOT INTCHGE. -
SYLVAN INTCHGE. (PHASE 2) SEC.
SUNSET HIGHWAY
MULTNOMAH & WASHINGTON COUNTIES

Design Team Leader - David Joe Polly
Designed By - Magnolia M. Bartley
Drafted By - Larry D. Garrison & Sandra Gish

DETAILS

SHEET NO. 2B-6

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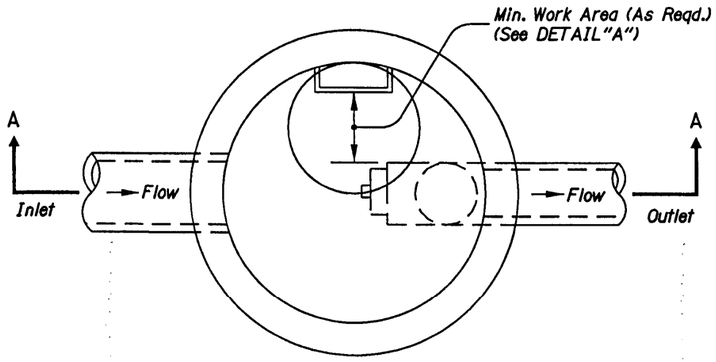
VIEW 2

WATER QUALITY MANHOLE - VARIOUS LOCATIONS



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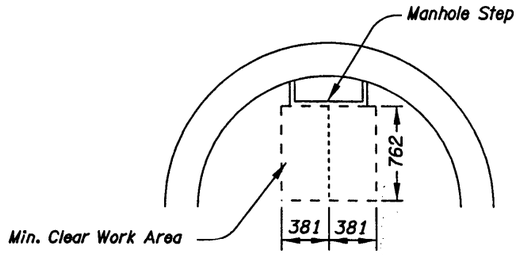
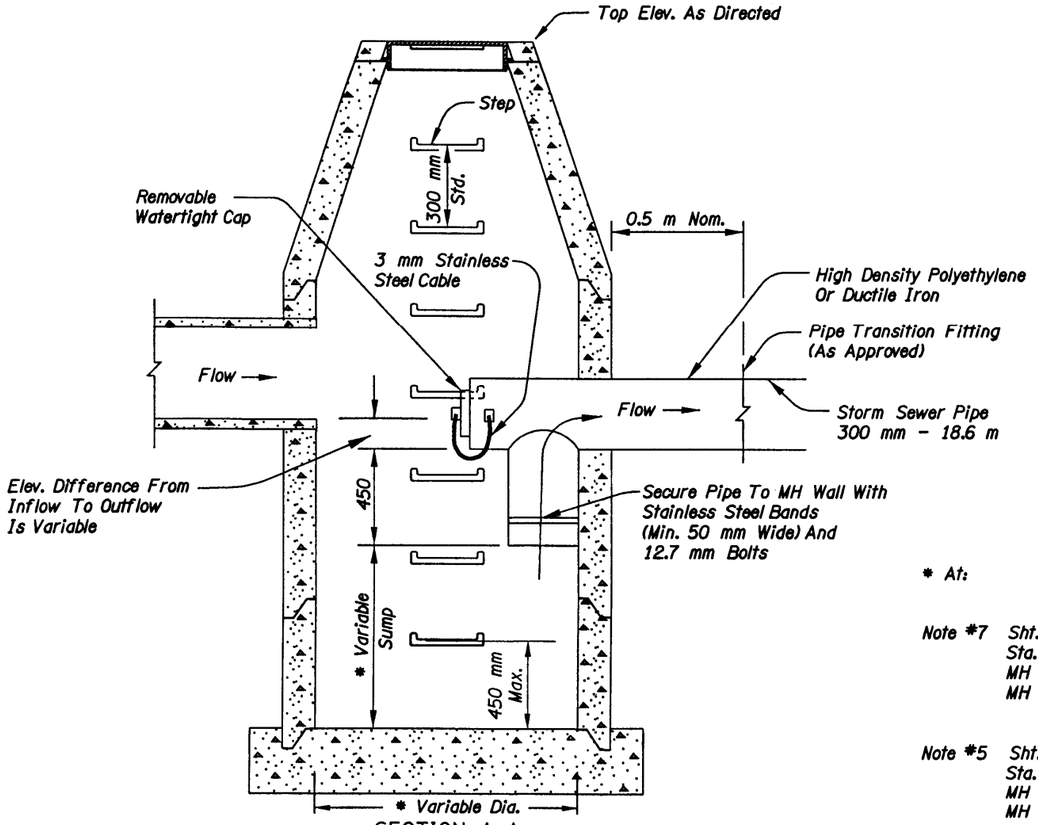


DETAIL "A"

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



SECTION A-A
(For Details Not Shown, See RD324, RD327 & RD330)

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

* At:

Note #7 Sht. 7D-2
Sta. "SES" 100+064.5 m Rt.
MH Sump = 900 mm
MH Dia. = 1800 mm

Note #5 Sht. 8C-2
Sta. "SES" 100+436.4.9 m Rt.
MH Sump = 900 mm
MH Dia. = 1500 mm

Note #9 Sht. 9D-2
Sta. "SEE" 100+704.2, 18.83 Lt.
MH Sump = 1800 mm
MH Dia. = 1800 mm

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.

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

REGISTERED PROFESSIONAL ENGINEER 19156 OREGON JULY 15, 1997 BRUCE S. COUNCIL Expires Dec. 31, 2001

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

CAMELOT INTCHGE. -
SYLVAN INTCHGE. (PHASE 2) SEC.
SUNSET HIGHWAY
MULTNOMAH & WASHINGTON COUNTIES

Design Team Leader - David Joe Polly
Designed By - Magnolia M. Bartley
Drafted By - Larry D. Garrison & Sandra Gish

DETAILS

SHEET NO. 2B-7

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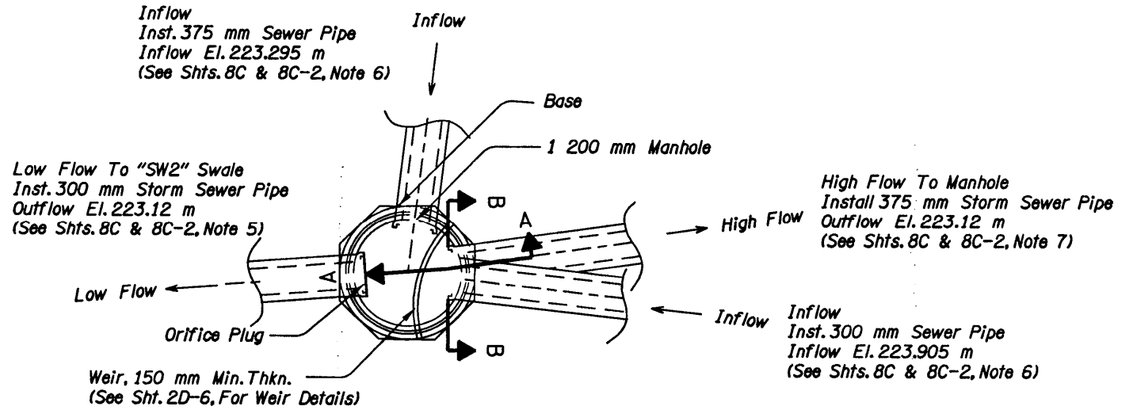
VIEW 3

VIEW 3



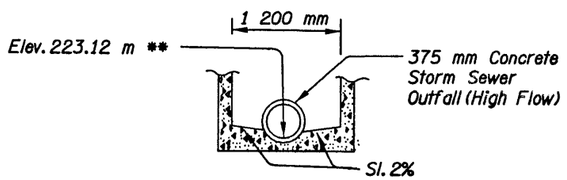
PLAN

SPLIT FLOW DROP MANHOLE
@ "SES" 100+468, Rt.

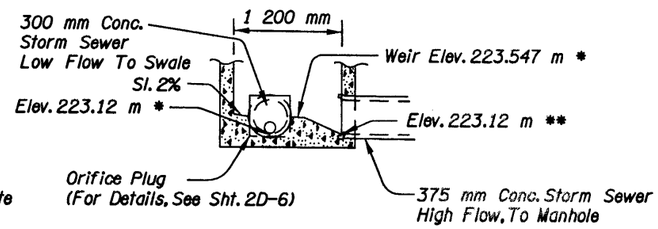
(For Details Not Shown, See Drg. Nos. RD327 & RD330)

* Field Verify Elevation, Adjust Weir Height To 0.427 m Above Actual F.L. Height

** Outfall (High Flow) 375 mm Storm Sew. To Manhole Outflow El. 223.12 m



SECTION B-B



SECTION A-A

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

REGISTERED PROFESSIONAL ENGINEER 19156 Bruce S. Council OREGON JULY 15, 1997 BRUCE S. COUNCIL Expires Dec. 31, 2001

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

CAMELOT INTCHGE. - SYLVAN INTCHGE. (PHASE 2) SEC.
SUNSET HIGHWAY
MULTNOMAH & WASHINGTON COUNTIES

Reviewed By - Bruce S. Council
Designed By - Magnolia Bartley
Drafted By - Martin G. Casillas

WATER QUALITY DETAILS

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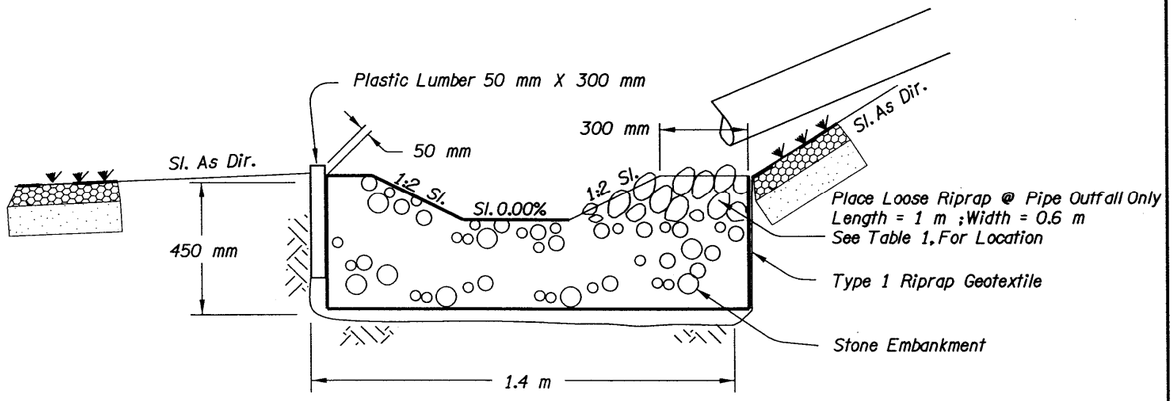
VIEW 2

VIEW 2



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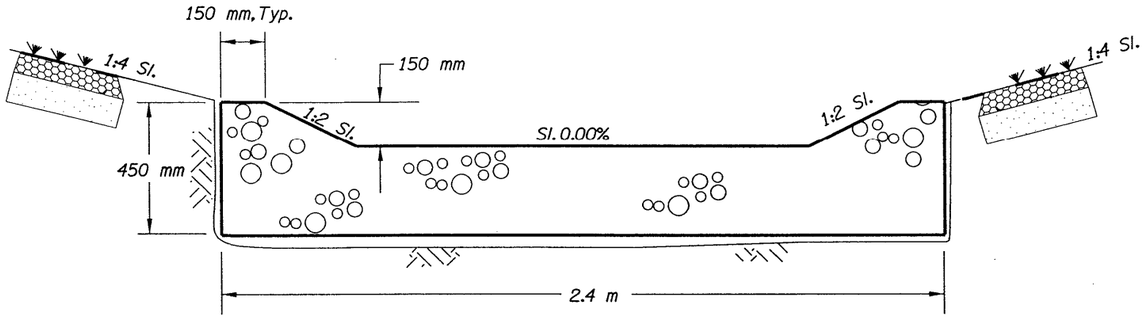
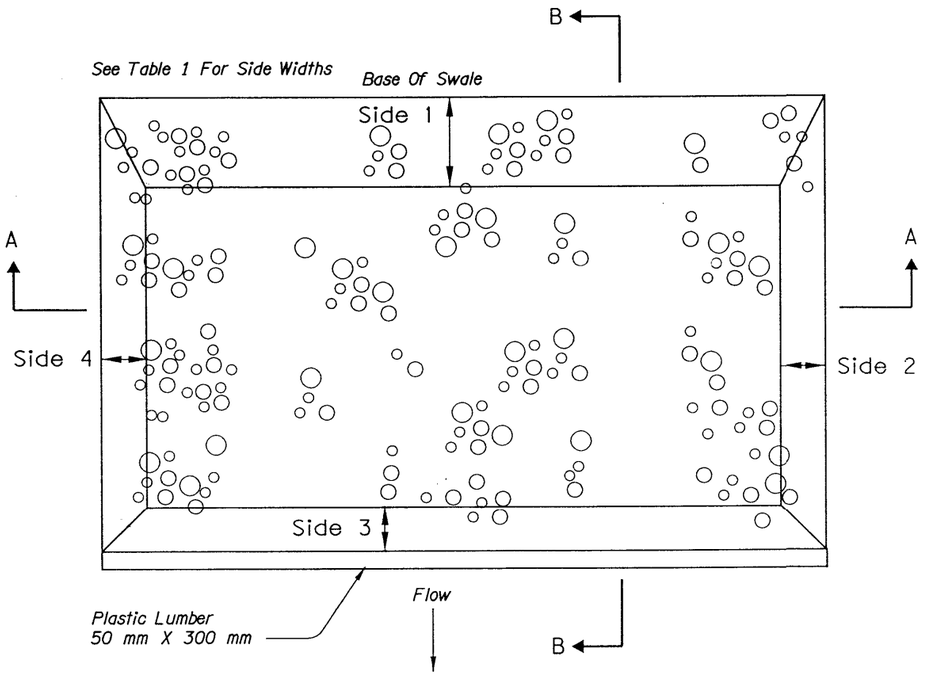


SECTION A-A

Table 1

	Side Widths (mm)				
Swale	1	2	3	4	Pipe Outfall Side
SW1	150	300	150	150	2
SW2	300	150	150	150	1
TSW	300	150	150	150	1



PLAN

W = Width of Swale Bottom*

SWALE FLOW SPREADER

No.	REVISION	DATE	BY
1	*Added The Word "Swale"*	*10-04-00*	*BSC*

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

REGISTERED PROFESSIONAL ENGINEER 19156 OREGON JULY 15, 1997 BRUCE S. COUNCIL Expires Dec. 31, 2001

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

CAMELOT INTCHGE. -
SYLVAN INTCHGE. (PHASE 2) SEC.
SUNSET HIGHWAY
MULTNOMAH & WASHINGTON COUNTIES

Reviewed By - Bruce S. Council
Designed By - Magnolia Bartley
Drafted By - Magnolia Bartley

WATER QUALITY DETAILS

SHEET NO. 2D-3

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VIEW 3
VIEW

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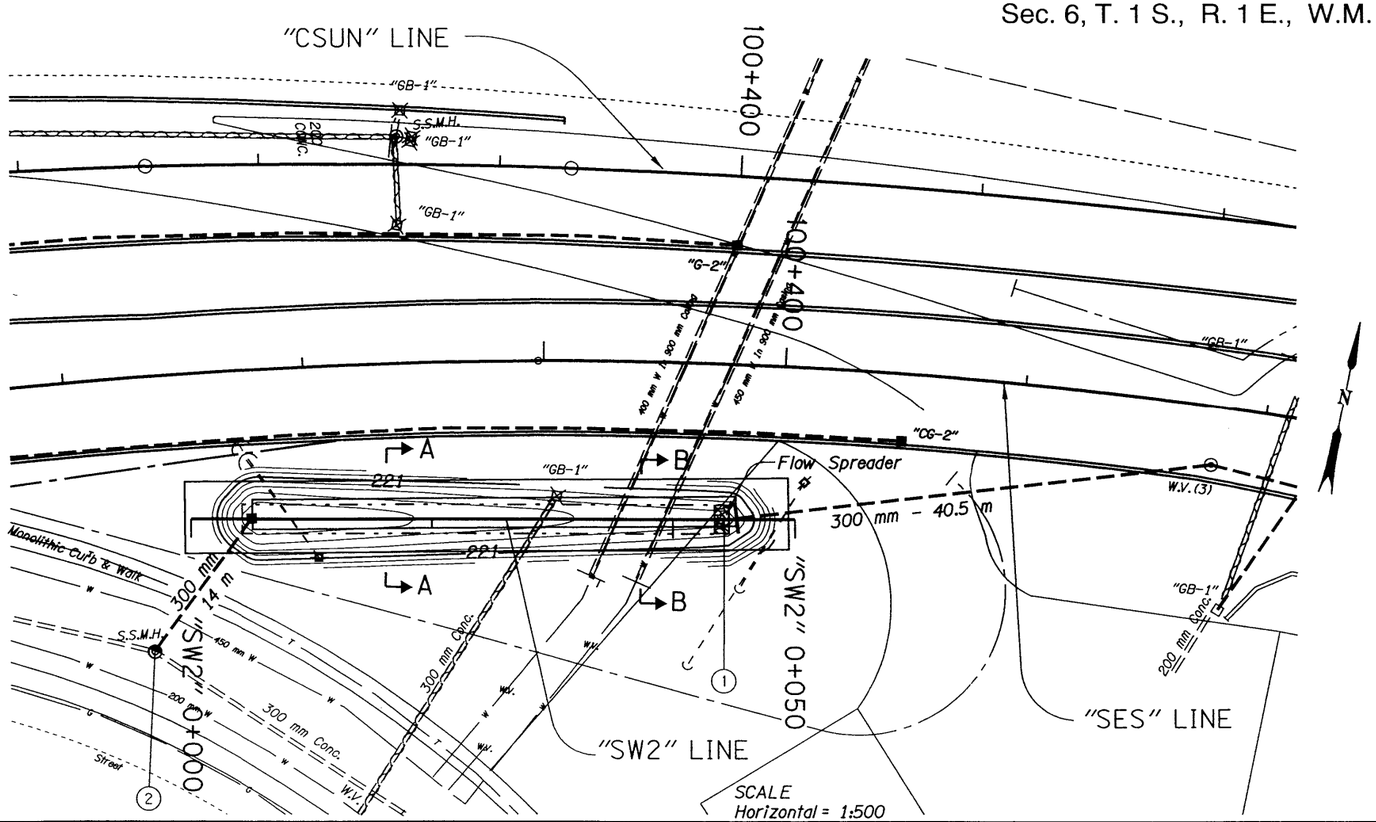
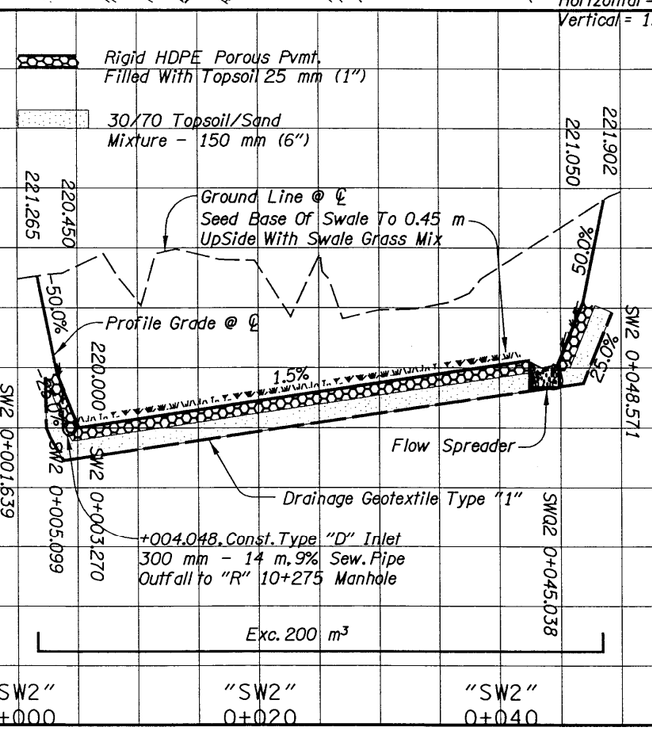


SCALE
Horizontal = 1:500
Vertical = 1:50

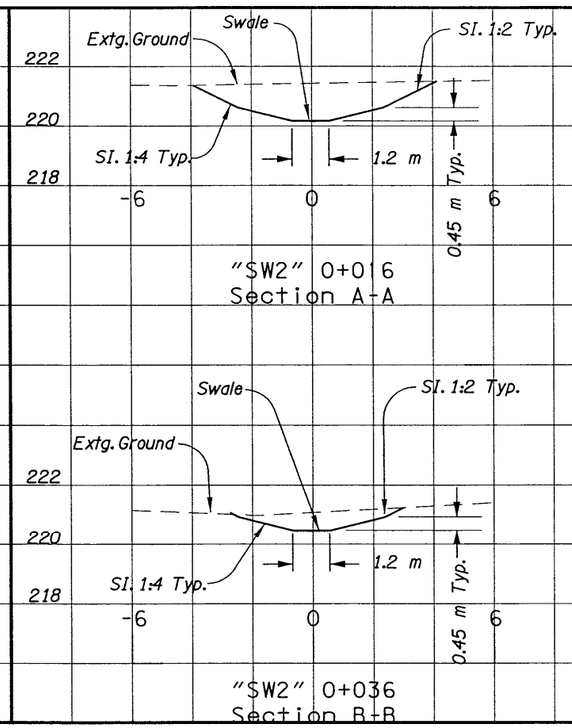
① Sta. "SW2" 0+044.608, 0.05 m Rt
Const. Swale Flow Spreader, △1
Stone Emb. Matl. - 1.2 m³
Loose Riprap, Class 25 - 0.1 m³
Const. Water Quality Swale, "SW2"
Inst. Rigid HDPE Porous Pvmt. System - 211 m²
Exc. 200 m³
Riprap Geotextile, Type 1 - 4 m²
(For Details, See Shts. 2D-3 & 2D-4)

② Sta. "SW2" 0+004.048
Reconst. Manhole
Const. Mod. Inlet Type "D"
See Shts. 8C & 8C-2, Note 4

No.	REVISION	DATE	BY
△1	Changed "Flow Spreader" To "Swale Flow Spreader"	10-04-00	BSC
△2	Changed "Cellular Confinement System" To "Rigid HDPE Porous Pvmt. System"	10-04-00	BSC



"SW2" 0+000 "SW2" 0+020 "SW2" 0+040 "SW2" 0+060



"SW2" 0+016
Section A-A

"SW2" 0+036
Section B-B

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

REGISTERED PROFESSIONAL ENGINEER 19156 OREGON JULY 15, 1997 BRUCE S. COUNCIL Expires Dec. 31, 2001

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

CAMELOT INTCHGE. -
SYLVAN INTCHGE. (PHASE 2) SEC.
SUNSET HIGHWAY
MULTNOMAH & WASHINGTON COUNTIES

Reviewed By - Henry Allen
Designed By - Bruce Council
Drafted By - Bruce Council

WATER QUALITY PLAN

SHEET NO. 2D-8

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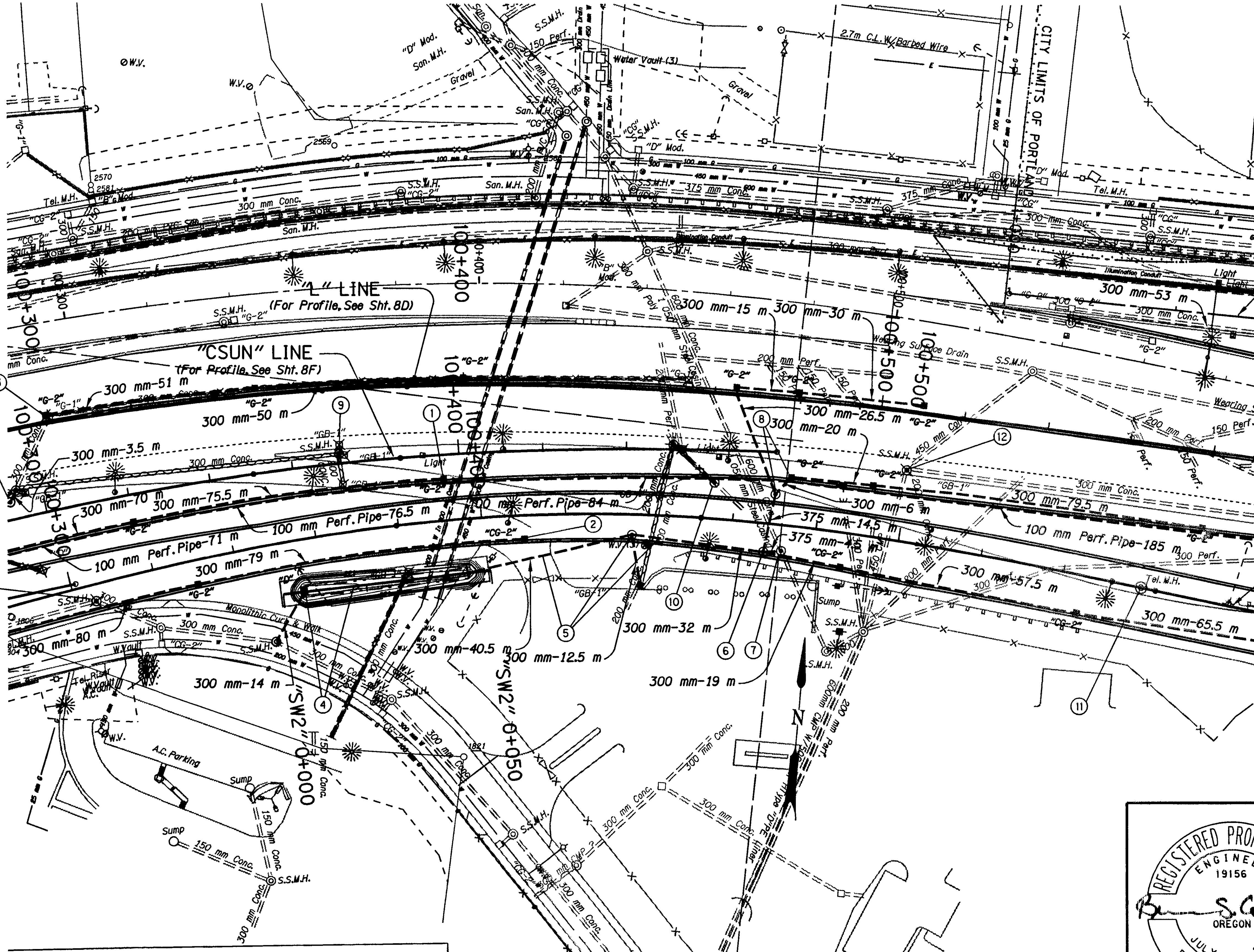
VIEW 2

VIEW 2



Plug & Abandon Pipe Shown Thus:

NOTE: Field Verify With The Engr. All Locations Of Drainage Structures & Pipes.

REGISTERED PROFESSIONAL ENGINEER 19156 OREGON JULY 15, 1997 BRUCE S. COUNCIL Expires Dec. 31, 2001

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

CAMELOT INTCHGE. - SYLVAN INTCHGE. (PHASE 2) SEC.
SUNSET HIGHWAY
MULTNOMAH & WASHINGTON COUNTIES

Reviewed By-Bruce S. Council
Designed By-Magnolia Bartley-Lam Han
Drafted By-Martin G. Casillas

DRAINAGE & UTILITIES

SHEET NO. 8C

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VIEW 5

(1) *See Sht. 7D-2, Note 10*

(2) *See Sht. 7D-2, Note 11*

(3) *Sta. "L" 100+299.3, Lt.*
Remove Extg. Inlet - 2
Remove Extg. Pipe - 153.5 m
Const. Type "G-2" Inlet - 3
Inst. 300 mm Sew. Pipe - 101 m
Under Pvmt. - 101 m
Conn. To Extg. Pipe
Const. Open Grade Wearing Surface Drain - 13.5 m
Const. Wearing Surface Drain Outlet
Tr. Exc. - 134 m³

(4) *Sta. "SES" 100+345.82, 23.1 m Rt.*
Remove Inlet
Const. Water Quality Swale, "SW2"
Const. Type "D" Inlet
Reconst. Manhole
Inst. 300 mm Sew. Pipe - 14 m
Under Pvmt. - 5 m
Tr. Exc. - 27 m³
(For Details, See Shts., 2D-3, 2D-4, 2D-8)

(5) *Sta. "SES" 100+436, 4.9 m Rt.*
Remove Inlet
Const. Type "G-2" Inlet
Const. WQ Manhole With Bolt Down Cover
1.5 m Dia., 0.9 m Sump
Inst. 300 mm Pipe - 85 m
Tr. Exc. - 125 m³
(For Details, See Shts. 2B & 2B-7)

(6) *Sta. "SES" 100+468.7 m Rt.*
Const. Split-Flow Drop Manhole With Bolt Down Cover
Const. Type "CG-2" Inlet - 3
Inst. 300 mm Sew. Pipe - 142 m
Inst. 375 mm Sew. Pipe - 14.5 m
Tr. Exc. - 75 m³
(For Details, See Shts. 2B, 2B-6, 2D-2 & 2D-6)

(7) *Sta. "SES" 100+472.3, 6.3 m Rt.*
600 mm Sew. Pipe - In Place
Remove 1.2 m
Const. Drop Manhole
Inst. 375 mm Sew. Pipe - 4.5 m
Const. Open Grade Wearing Surface Drain - 13.5 m
Const. Wearing Surface Drain Outlet
Tr. Exc. - 8 m³
(For Details, See Sht. 2B-6)

(8) *Sta. "L" 100+476.5, 23 m Rt.*
Const. Manhole
Const. Type "G-2" Inlet - 6
Inst. 300 mm Sew. Pipe - 177 m
Inst. 100 mm Perf. Pipe - 185 m
Drainage Geotextile Type "1" - 86 m²
Tr. Exc. - 172 m³
Inst. 900 mm Steel Casing - 26.5 m
Const. Subsurface Drain Outlet - 3
Under Pvmt. - 45 m
(For Details, See Sht. 2B-11)

(9) *Remove Manhole*
Remove Inlets - 3

(10) *Sta. "L" 100+461.4, 21.4 m Rt.*
Remove Extg. Manhole
Remove Extg. Inlet - 2
Const. Manhole
200 mm Perf. Pipe - In Place
Extend - 28 m
Tr. Exc. - 33 m³

(11) *Sta. "SES" 100+559, Lt*
Remove Telephone Manhole - By Others

(12) *Sta. "L" 100+507.69, 14.08 Rt.*
Adjust Manhole, Use Method "B"
(For Details, See Sht. 2B)

(13) *See Sht. 7D-2, Note 14*

(14) *See Sht. 7D-2, Note 18*

REGISTERED PROFESSIONAL ENGINEER
19156
Bruce S. Council
OREGON
JULY 15, 1997
BRUCE S. COUNCIL
Expires Dec. 31, 2001

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

CAMELOT INTCHGE. - SYLVAN INTCHGE. (PHASE 2) SEC.
SUNSET HIGHWAY
MULTNOMAH & WASHINGTON COUNTIES

Reviewed By - Bruce S. Council
Designed By - Magnolia Bartley
Drafted By - Heather Gonsior

DRAINAGE NOTES

SHEET NO. 8C-2

VIEW 4

"SES" LINE

700 mm
300 mm
Subgrade
Subbase Grade
5.3%
300 mm-65.5 m
+545 Inlet, Rt.
F.L. 228.000 m
Profile Grade @ ℄
From "L" 100+476.5 M.H.
+2.5%, 375 mm-14.5 m
5.4%
300 mm-57.5 m
+3.25%, 300 mm-40.5 m
To SW2 Swale
+5.000%
+487 Inlet, Rt.
F.L. 224.845
5.0%
300 mm-19 m
2% 300 mm-32 m
Low Flow
8.0%
375 mm-4.5 m
High Flow
+468 Split Flow Drop M.H., 7.0 m Rt.
F.L. 223.120
Subbase Grade
Subgrade
+4.8%
300 mm-79 m
+410 Inlet, Rt.
F.L. 221.206
+436 M.H., 4.9 m Rt.
F.L. 221.900
Ground Line @ ℄
+355.2 Inlet, 12.55 m Rt.
F.L. 219.40
Swale "SW2" Outlet
+9%
300 mm-14 m
"R" 10+275 Extg. M.H., 0.013 m Lt.
F.L. 217.60
+330 Inlet, Rt.
F.L. 217.314
+472.300 M.H., 6.3 m Rt.
F.L. 219.263
Extg. 600 mm Pipe
with 1050 mm Steel Casing
+600.000
Exc. 1480 (Excess)
Granular Emb. 2660
+320.000
100+600
100+300
100+400
100+500

234 233 232 231 230 229 228 227 226 225 224 223 222 221 220 219 218 217 216

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VIEW 2

REGISTERED PROFESSIONAL ENGINEER
19,279
OREGON
JULY 15, 1997
DAVID JOE POLLY
Expires Dec. 31, 2000

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

CAMELOT INTCHGE. -
SYLVAN INTCHGE. (PHASE 2) SEC.
SUNSET HIGHWAY
MULTNOMAH & WASHINGTON COUNTIES

Design Team Leader - David Joe Polly
Designed By - Daniel J. McMillen
Drafted By - Sandra Gish

PROFILES

SHEET NO. 8E

VIEW 2