OPERATION & MAINTENANCE MANUAL

DFI No. D00165
Facility Type: Water Quality Biofiltration Swale

JUNE, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	**D00165**
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Number) 37V-041
Location:	District: 2B (Old 2A)
	Highway No.: 047
	Mile Post: 67.17/67.19 (beg./end)
	Description: This facility is located on the northeast quadrant of the US 26 (047) and Murray Blvd. overcrossing - between the westbound off ramp and the westbound travel lanes. Access to this facility can be obtained from the off ramp.

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, Henry Minton Allen, (503) 731-8200
Facility construction:	2004
Contractor:	Mowat 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 swale, approximately 103 feet in length, is located on the northeast quadrant of the Murray Blvd and US 26 (Hwy 047) interchange. The swale is located between the off ramp and the highway itself. Access to the swale can be obtained from the off ramp via a gravel access road along the north side of the facility.

Stormwater runoff from the Murray Blvd Interchange and the off ramp is collected by a series of inlets and conveyed through a 15-inch storm pipe. A high-low split flow manhole is located on the east side of the off ramp. The swale is considered an off-line structure as only the water quality flow is directed to the swale. After the split flow manhole the stormwater is pretreated with a pollution control manhole before entering the swale. After treatment through the swale, the water is discharged into an outlet control structure. The outlet control structure discharges into a 12-inch storm pipe upsizing to an 18-inch storm pipe that drains towards the east.

A. Maintenance equipment access:
   The facility can be accessed for maintenance on the north side from the off ramp from westbound US 26 (Hwy 047). Refer to Photo 6 for a photo of the access 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: Water quality swale looking towards the west at the Murray Blvd overpass on US 26.

Photo 2: Water quality swale looking towards the west.

Photo 3: Water quality swale looking towards the west.

Photo 4: Water quality swale looking towards the west.

Photo 5: Outlet control structure of water quality swale.

Photo 6: Access road looking north towards the intersection of the US 26 off ramp and Murray Road.

5. Facility Haz Mat Spill Feature(s)

The water quality biofiltration swale can be used to store a volume of liquid by blocking the 12-inch diameter outlet pipe located at the outlet of the water quality biofiltration swale. This pipe is noted as point E in the Operational Plan and shown in Photo 5.

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
A high-low split flow manhole is located prior to the facility. The facility is considered an offline structure and should not receive high flows as a result. The high flow bypass, designed into the swale's outlet control structure, includes a secondary inlet/outlet device. In the event runoff flowing to the swale exceeds the primary outlet for the swale, the water level will rise and exit through the secondary inlet/outlet part of the structure.

☐ Other, as noted below

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)
- ☐ 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

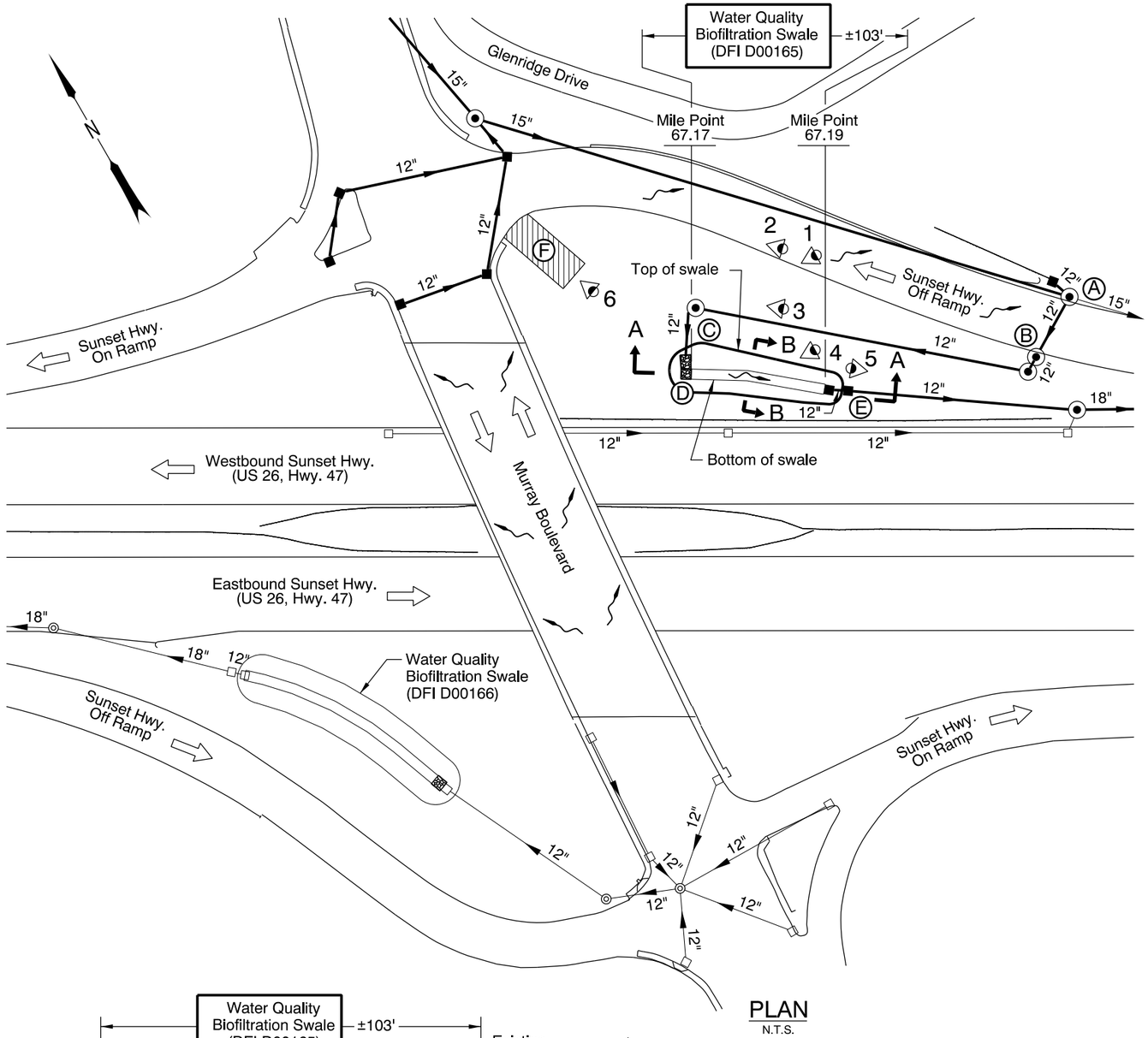
Contact any of the following for more detailed information about management of waste materials found on site:

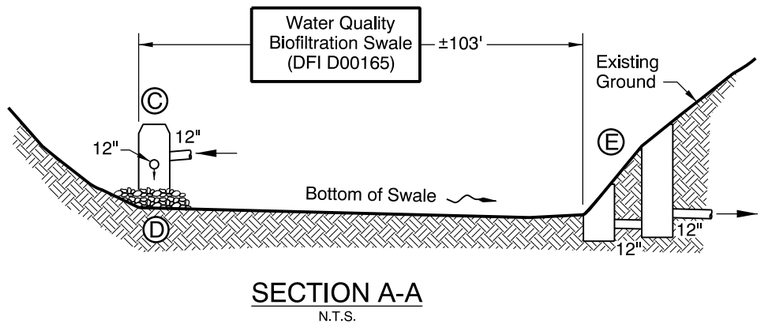
ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region Hazmat Coordinator	(503) 731-8304
ODEQ Northwest Region Office	(503) 229-5263

Appendix A

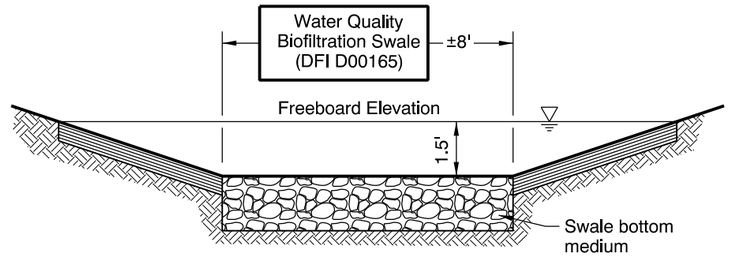
Content:

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





SECTION A-A
N.T.S.



SECTION B-B
N.T.S.

LEGEND:

- Photo Location / Direction
- Flow Splitter/Diversion Manhole splits high flows from low flows
- Pollution Control Manhole
- Pipe Outfall to Start of Swale
- Riprap Channel
- Swale Outlet
- Gravel Access Road
- Manhole
- Inlet
- Traffic Flow/Direction
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path
- Maintenance Access

Sht. 1 of 2

OREGON DEPARTMENT OF TRANSPORTATION

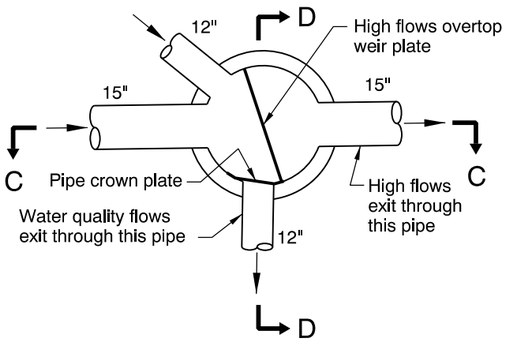
Prepared By: Wynee Hu

Drafted By: H. Gonsior/HDR

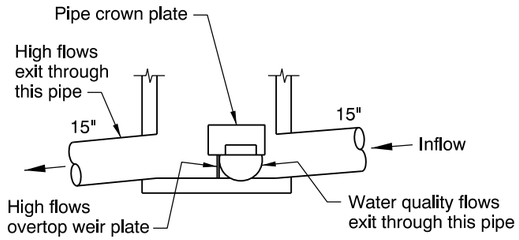
DFI D00165
MAINTENANCE DISTRICT 2B HWY 047
WATER QUALITY BIOFILTRATION SWALE
SUNSET HIGHWAY MP 67.17-67.19
WASHINGTON COUNTY

Z:\Hydraulics\Hydraulics OM\Completed_Facility_Files\Dist_2B\Hwy_047\2B_047_D00165\Operational Plan\DFI_D00165.dgn :: Sheet 1/16/2014 8:33:33 AM hwyr33e

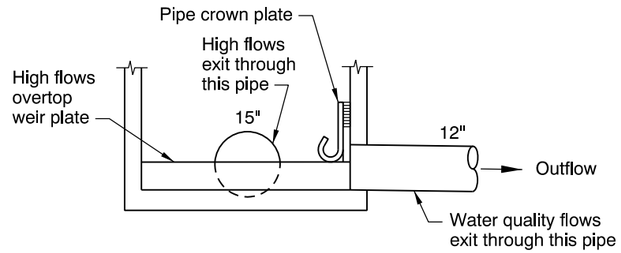
DFI_D00165_1.dgn



PLAN
N.T.S.



SECTION C-C
N.T.S.



SECTION D-D
N.T.S.

FLOW SPLITTER/DIVERSION MANHOLE AT POINT Ⓐ
N.T.S.

Note:
Manhole is 6' dia., 11.5' deep.

PLAN
N.T.S.

SECTION E-E
N.T.S.

POLLUTION CONTROL MANHOLE AT POINT Ⓑ
N.T.S.

Sht. 2 of 2

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Wynee Hu

Drafted By: H. Gonsior/HDR

DFI D00165
MAINTENANCE DISTRICT 2B HWY 047
WATER QUALITY BIOFILTRATION SWALE
SUNSET HIGHWAY MP 67.17-67.19
WASHINGTON COUNTY

Appendix B

Content:

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

37V-41

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A, 1A-2	Index Of Sheets Cont'd.
1A-3	Std. Drg. Nos.
1B	Sheet Layout
2, 2A, 2A-2 Thru 2A-65 Incl.	Typical Sections
2B, 2B-2 Thru 2B-18 Incl.	Details
2C, 2C-2	Traffic Control Details
2CA, 2CA-2, 2CA-2A, 2CA-3 Thru 2CA-57 Incl.	Traffic Control Plans - Murray Work Area
2CB, 2CB-2 Thru 2CB-12 Incl.	Traffic Control Plans - Cornell Work Area
2D, 2D-2, Thru 2D-12, Incl.	Pipe Data Sheet

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

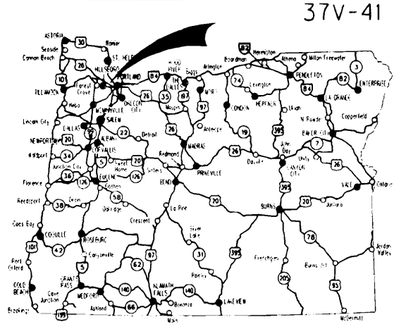
PLANS FOR PROPOSED PROJECT

GRADING, DRAINAGE, STRUCTURES, PAVING, SIGNING, ILLUMINATION, SIGNALS, & ROADSIDE DEVELOPMENT

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.

SUNSET HIGHWAY

WASHINGTON COUNTY
MARCH 2004

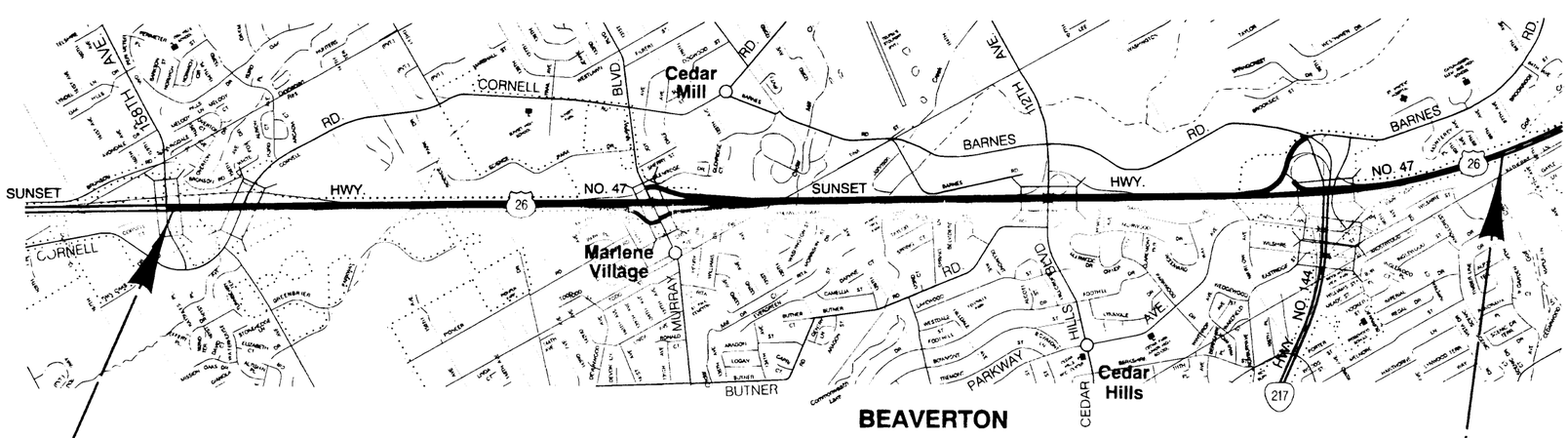


Overall Length Of Project - 6.51 km (4.05 Miles)

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 By Calling The Center. (Note: The Telephone Number For The Oregon Utility Center Is (503) 232-1987.)

OTIA
OREGON TRANSPORTATION INVESTMENT ACT

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE



BEGINNING OF PROJECT
NH-OTIA-S047(052)
STA. "LW" 91+660.00 (M.P. 65.68)

END OF PROJECT
NH-OTIA-S047(052)
STA. "L" 98+160.00 (M.P. 69.73)

T. 1 N., R. 1 W., W.M.

OREGON TRANSPORTATION COMMISSION

Stuart Foster	CHAIRMAN
Gail L. Achterman	COMMISSIONER
Mike Nelson	COMMISSIONER
Randall Papé	COMMISSIONER
John Russell	COMMISSIONER
Bruce A. Warner	DIRECTOR OF TRANSPORTATION

REGISTERED PROFESSIONAL ENGINEER
13,704
OREGON
JULY 16, 1987
CATHERINE M. NELSON
Expires Dec. 31, 2004

Catherine M. Nelson
TECHNICAL SERVICES MANAGING ENGINEER

METRIC

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	NH-OTIA-S047(052)	1

PE000656/C0341403-011

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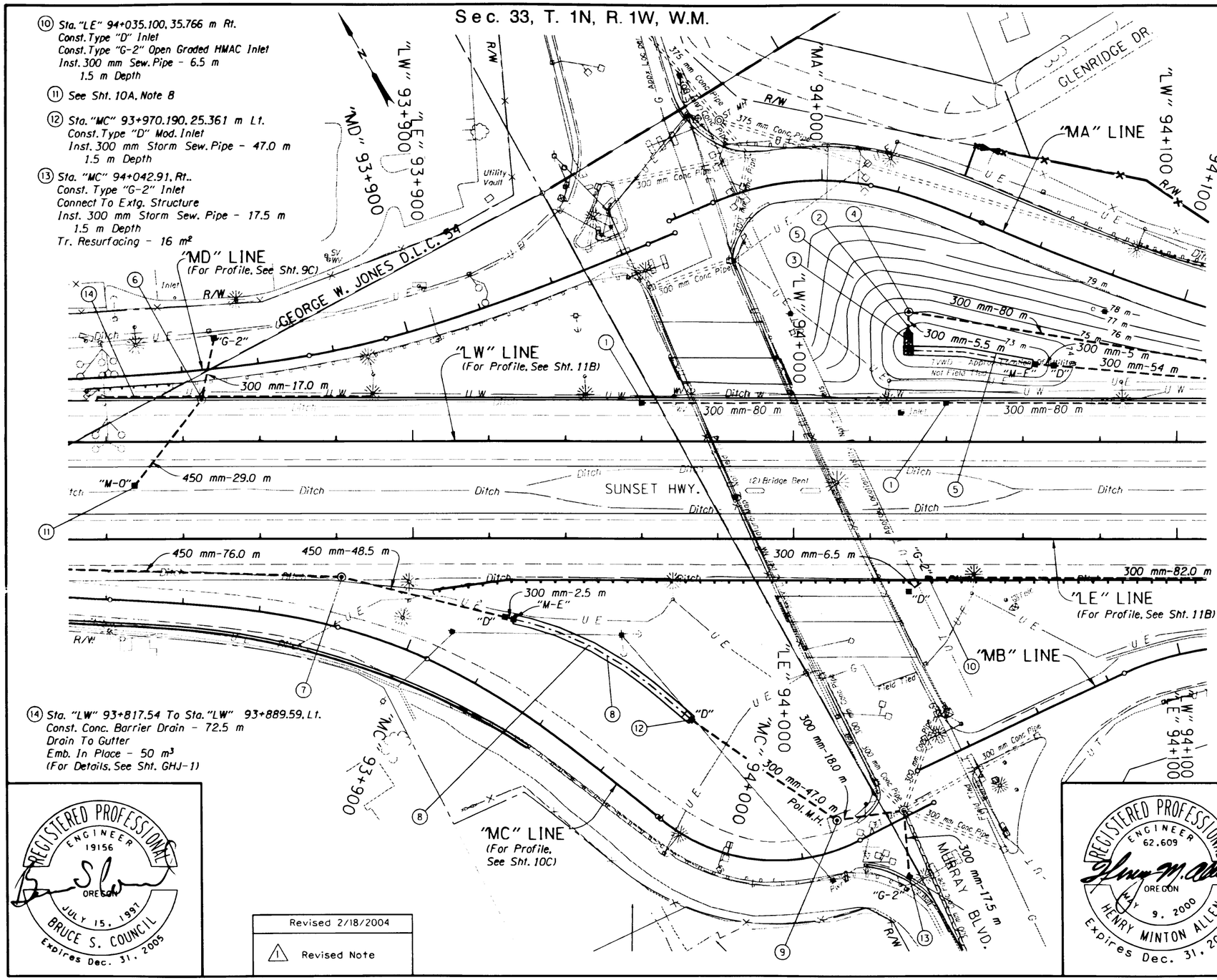
Sec. 33, T. 1N, R. 1W, W.M.

37V-41



(10) Sta. "LE" 94+035.100, 35.766 m Rt.
Const. Type "D" Inlet
Const. Type "G-2" Open Graded HMAC Inlet
Inst. 300 mm Sew. Pipe - 6.5 m
1.5 m Depth

(11) See Sht. 10A, Note 8

(12) Sta. "MC" 93+970.190, 25.361 m Lt.
Const. Type "D" Mod. Inlet
Inst. 300 mm Storm Sew. Pipe - 47.0 m
1.5 m Depth

(13) Sta. "MC" 94+042.91, Rt..
Const. Type "G-2" Inlet
Connect To Extg. Structure
Inst. 300 mm Storm Sew. Pipe - 17.5 m
1.5 m Depth
Tr. Resurfacing - 16 m²

(14) Sta. "LW" 93+817.54 To Sta. "LW" 93+889.59, Lt.
Const. Conc. Barrier Drain - 72.5 m
Drain To Gutter
Emb. In Place - 50 m³
(For Details, See Sht. GHJ-1)

(1) Sta. "LW" 94+039.86, Lt.
Const. Type "G-2" Open Graded HMAC Inlet - 2
Inst. 300 mm Storm Sew. Pipe - 80.0 m
1.5 m Depth

(2) Sta. "LW" 94+030.06, Lt.
Inst. 300 mm Storm Sew. Pipe - 5.5 m
3 m Depth
Const. Paved End Slope - 2.2 m²

(3) Sta. "LW" 94+030.08, Lt.
Const. Loose Riprap Channel
(Class 25) - 9 MG
Riprap Geotextile, Type 2 - 15 m²
(For Details, See Sht. GHJ-8)

(4) Sta. "LW" 94+030.10, Lt.
Const. Manhole
Inst. 300 mm Storm Sew. Pipe - 80 m
3 m Depth

(5) Const. Basin
Const. Water Quality Swale "MA1"
Clearing And Grubbing - 0.4 ha
Gen. Exc. - 4300 m³
(For Details, See Shts. GHJ-41 & GHJ-42)

(6) Sta. "LW" 93+844.827, 10.912 m Lt.
Const. Manhole
Const. Type "G-2" Inlet
Inst. 300 mm Sew. Pipe - 17.0 m
1.5 m Depth
Tr. Resurfacing - 11 m²
(See Drg. No. RD302)

(7) Sta. "LE" 93+881.257, 10.010 m Rt.
Const. Manhole
Const. Type "M-E" Detention Mod. Inlet
Const. Type "D" Detention Mod. Inlet
Inst. 300 mm Storm Sew. Pipe - 2.5 m
1.5 m Depth
Inst. 450 mm Storm Sew. Pipe - 51.0 m
1.5 m Depth

(8) Const. Water Quality Swale
(For Details, See Shts. R-28 & GHJ-40)

(9) Sta. "MC" 94+032.343, 7.225 m Lt.
Const. Pollution Control Manhole
Inst. 300 mm Sew. Pipe - 18.0 m
3 m Depth
Trench Resurfacing - 14 m²
(For Details, See Sht. GHJ-26)

REGISTERED PROFESSIONAL ENGINEER
19156
OREGON
JULY 15, 1997
BRUCE S. COUNCIL
Expires Dec. 31, 2005

Revised 2/18/2004
1 Revised Note

REGISTERED PROFESSIONAL ENGINEER
62.609
OREGON
MAY 9, 2000
HENRY MINTON ALLEN
Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

US26: CORNELL RD. -
OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - Eileen J. Phelan
Designed By - Bruce S. Council & Henry M. Allen
Drafted By - Tien Nguyen

DRAINAGE & UTILITIES

SHEET NO. 11A

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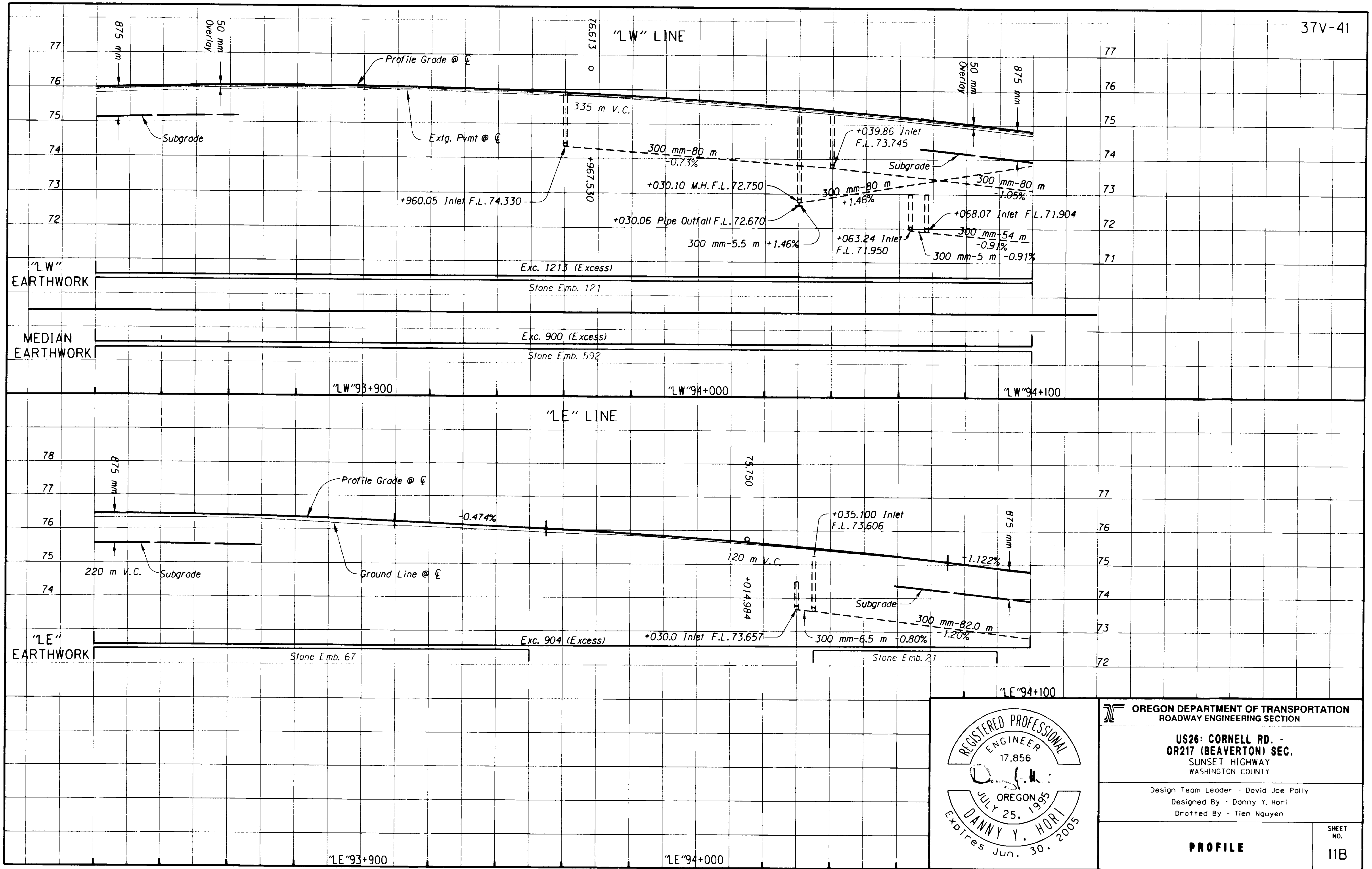


REGISTERED PROFESSIONAL ENGINEER 17,856 OREGON JULY 25, 1995 DANNY Y. HORI Expires Jun. 30, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

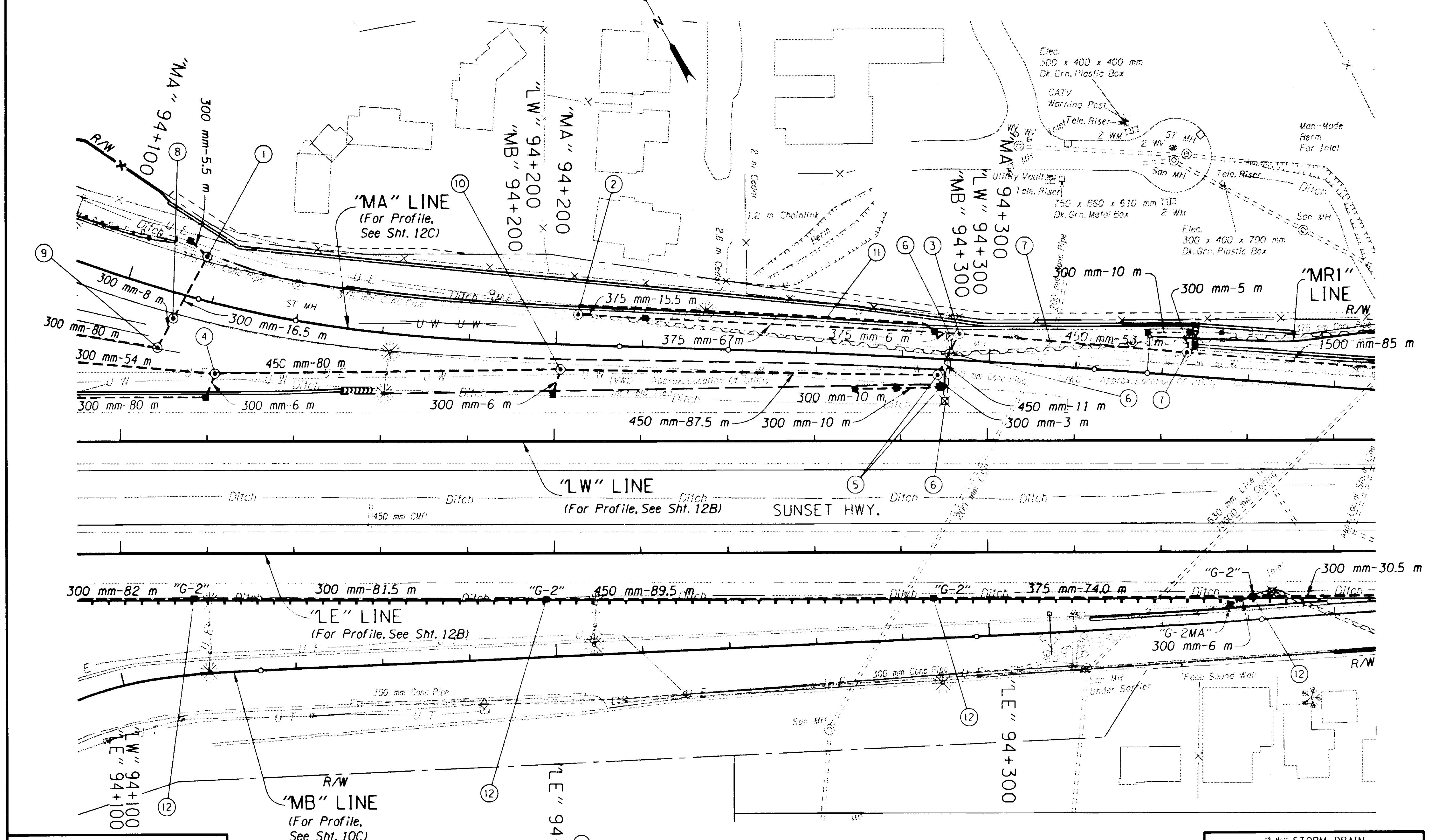
Design Team Leader - David Joe Polly
Designed By - Danny Y. Hori
Drafted By - Tien Nguyen

PROFILE

SHEET NO. 11B

Remove Extg. Pipe, Shown Thus:

Sec. 33, T. 1N, R. 1W, W.M.



⑩ Sta. "LW" 94+201.53. Lt.
Const. Manhole
Const. Type "G-2" Open Graded HMAC Inlet
Inst. 300 mm Storm Sew. Pipe - 6 m
3 m Depth
Inst. 450 mm Storm Sew. Pipe - 80 m
3 Depth

⑪ Sta. "MA" 94+205.00 To Sta. "MA" 94+287.25. Lt.
Const. Conc. Barrier Drain - 83.0 m
Drain To Inlet +287.31
Emb. In Place - 107 m^3
(For Details, See Sht. GHJ-1)

⑫ See Sht. 13A, Note 8

⑧ Sta. "MA" 94+112.34. Rt.
Const. Manhole, Type Pollution Control
Inst. 300 mm Storm Sew. Pipe - 16.5 m
6 m Depth
Trench Resurfacing - 19 m^2
(For Details, See Sht. GHJ-27)

⑨ Sta. "LW" 94+108.61. Lt.
Const. Manhole
Inst. 300 mm Storm Sew. Pipe - 8 m
6 m Depth

① Sta. "MA" 94+116.23. Lt.
Const. Manhole Type Diversion, "High-Low"
Const. Type "G-2MA" Inlet
Inst. 300 mm Storm Sew. Pipe - 5.5 m
3 m Depth
(For Details, See Sht. GHJ-17)

② Sta. "MA" 94+205.01. Lt.
Const. Manhole
Connect To Extg. Pipe

③ Sta. "MA" 94+292.88. Lt.
Const. Manhole
Const. Type "G-2" Inlet - 2
Inst. 375 mm Storm Sew. Pipe - 88.5 m
3 m Depth
Inst. 450 mm Storm Sew. Pipe - 11 m
3 m Depth

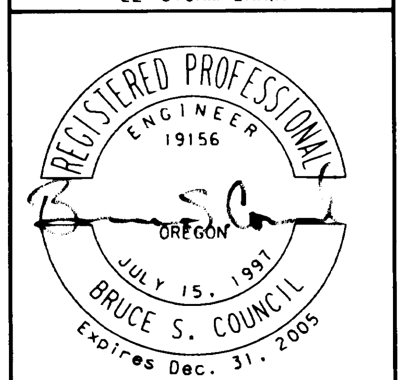
④ Sta LW 94+121.84. Lt.
Const. Manhole
Const. Type "G-2" Open Graded HMAC Inlet
Const. Type "M-E" Detention Mod. Inlet
Const. Type "D" Inlet
Lip Elev. 73.200
Inst. 300 mm Storm Sew. Pipe - 85.0 m.
1.5 m Depth
Inst. 300 mm Storm Sew. Pipe - 60.0 m.
3 m Depth
(For Details, See Sht. GHJ-5)

⑤ Sta. "LW" 94+288.56. Lt
Const. Manhole
Const. Type "G-2" Open Graded HMAC Inlet - 3
Inst. 300 mm Storm Sew. Pipe - 20.0 m
1.5 m Depth
Inst. 300 mm Storm Sew. Pipe - 3.0 m.
3 m Depth
Inst. 450 mm Storm Sew. Pipe - 87.5 m.
3 m Depth

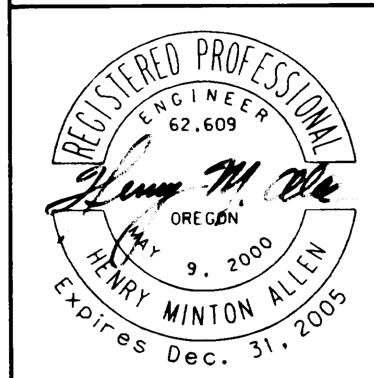
⑥ Remove Manhole
Remove Inlet - 2

⑦ Sta. "LW" 94+346.12. Lt.
Const. Manhole, Large, 2400 mm Dia.
Const. Type "G-2" Open Graded HMAC Inlet - 2
Inst. 300 mm Storm Sew. Pipe - 10 m.
1.5 m Depth
Inst. 300 mm Storm Sew. Pipe - 5 m.
3 m Depth
Inst. 450 mm Storm Sew. Pipe - 53 m.
3 m Depth
Conc. Encase San. Sew. If Pipe Joint
Over Storm Sew. Pipe
(See Drg. no. RD306)

"LE" STORM DRAIN



"LW" STORM DRAIN



OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

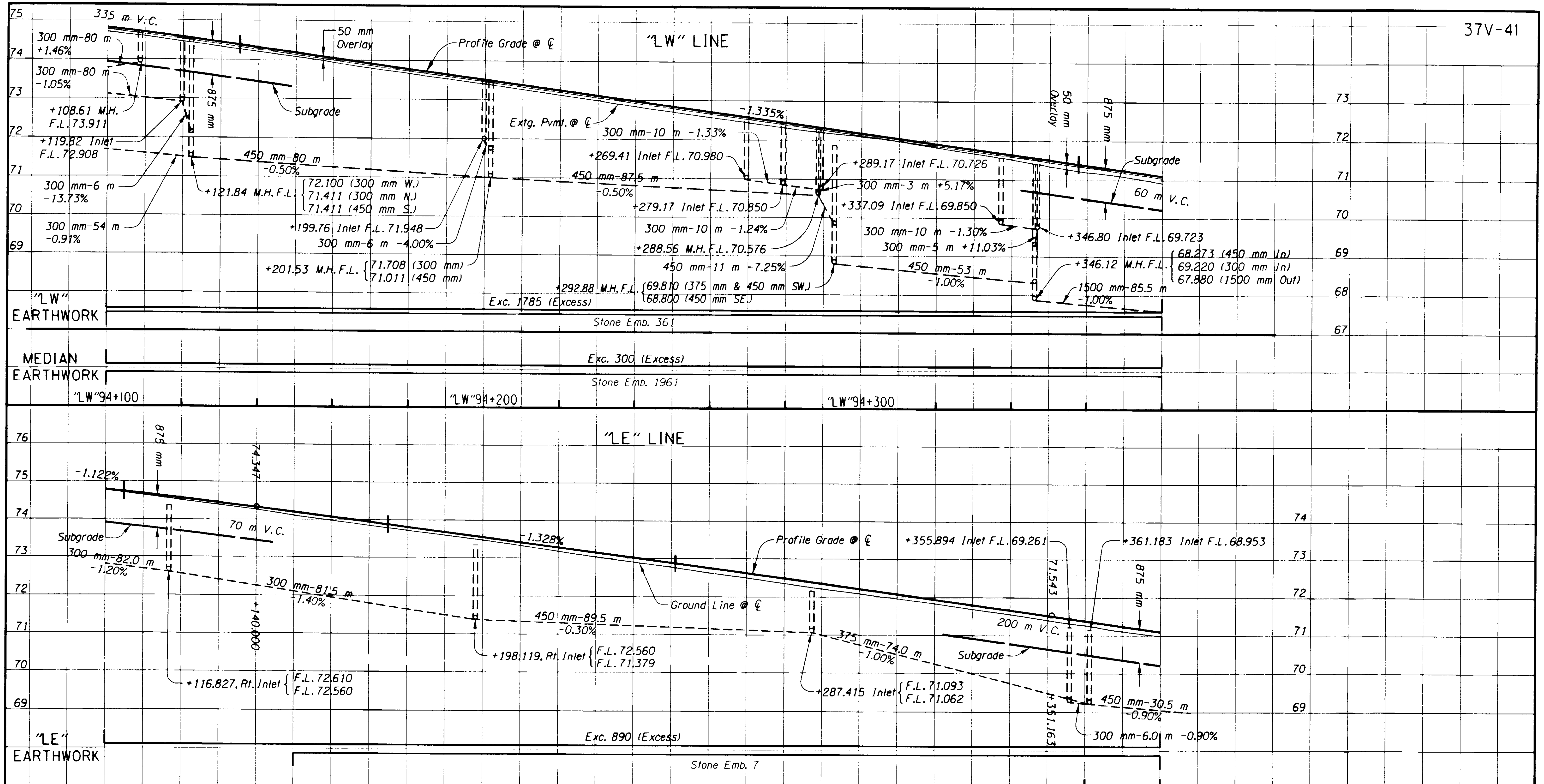
US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - Eileen J. Phelan
Designed By - Bruce S. Council & Henry M. Allen
Drafted By - Tien Nguyen

DRAINAGE & UTILITIES

SHEET NO. 12A

37V-41



REGISTERED PROFESSIONAL ENGINEER 17,856
OREGON
JULY 25, 1995
DANNY Y. HORI
Expires Jun. 30, 2005

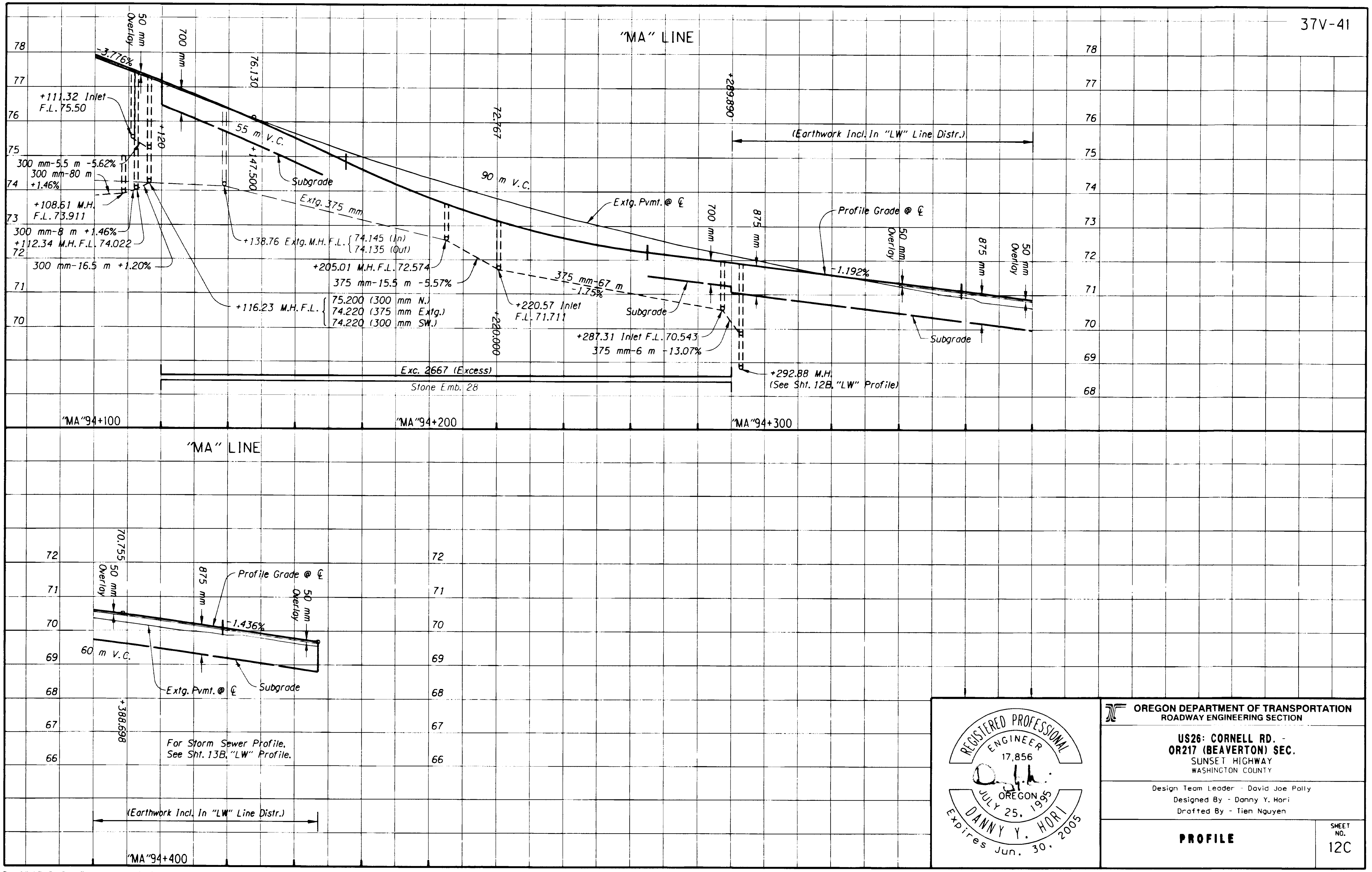
OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - David Joe Polly
Designed By - Danny Y. Hori
Drafted By - Tien Nguyen

PROFILE

SHEET NO. 12B



REGISTERED PROFESSIONAL ENGINEER 17,856 OREGON JULY 25, 1995 DANNY Y. HORI Expires Jun. 30, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

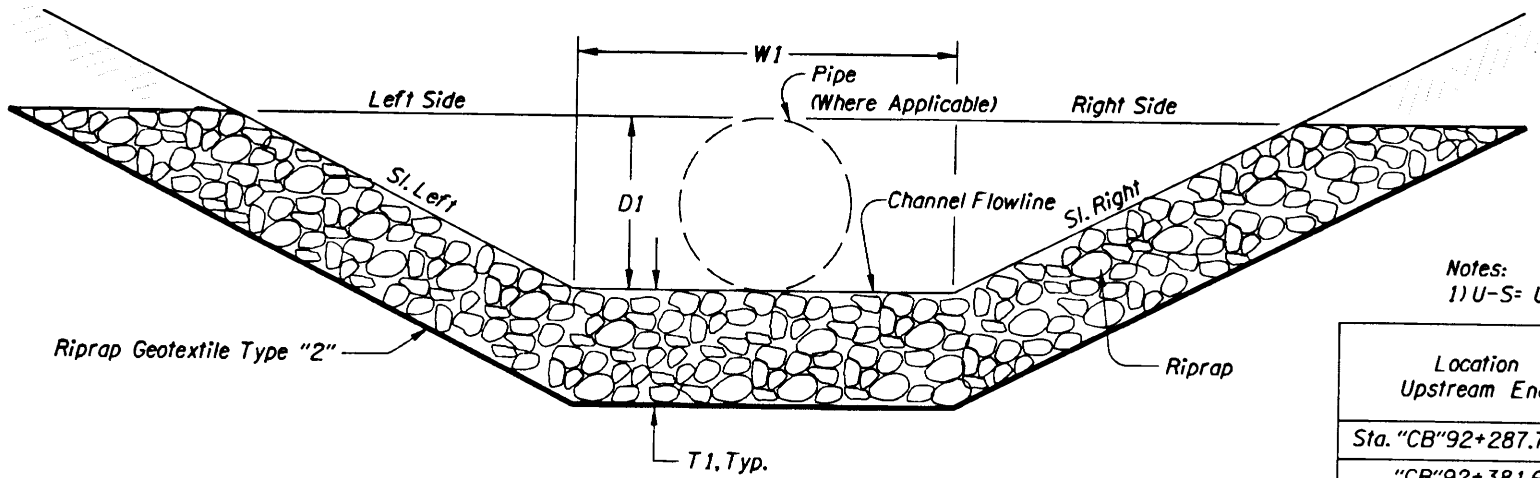
US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - David Joe Polly
Designed By - Danny Y. Hori
Drafted By - Tien Nguyen

PROFILE

SHEET NO. 12C

RIPRAP CHANNEL

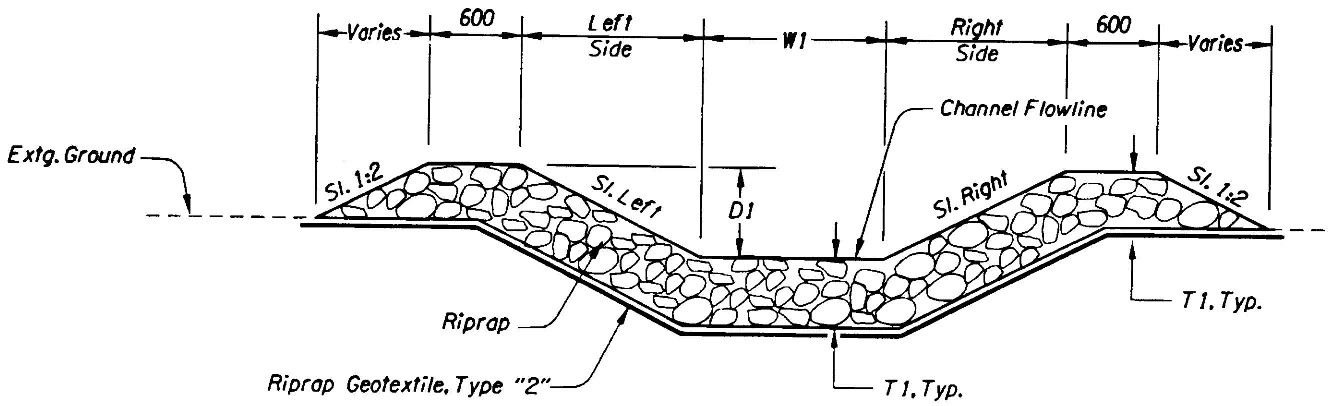


LOOKING DOWNSTREAM

RIPRAP CHANNEL, TYPE 1

Notes:
1) U-S= Upstream, D-S= Downstream

Location Upstream End	Type, (1 Or 2)	Length, L1 (m)	W1, (m)	D1, (mm)	T1, (mm)	F.L. U-S (m)	F.L. D-S (m)	Sideslope Left	Sideslope Right	Riprap Class	Outlet Structure
Sta. "CB"92+287.79, Lt.	1	7.5	0.6	450	300	66.192	64.839	1:2	1:2	25	Extg. Inlet
"CB"92+381.62, Lt	1	14.8	0.6	300	300	68.864	67.400	1:3	1:3	25	Flow Spreader
"LW"92+890.69, Lt	2	10.5	0.6	450	450	70.875	69.800	1:2	1:2	25	Wetlands
"LW"92+964.84, Lt	1	11	0.6	450	450	68.814	68.364	1:2	1:2	25	Flow Spreader
"LE"93+407.59, Rt.	1	10.3	0.6	300	450	70.073	69.600	1:4	1:4	25	Tributary 3 Wetlands
"LE"93+491.375, Rt.	1	10.3	0.6	300	450	70.073	69.600	1:4	1:4	25	Tributary 3 Wetlands
"LW"94+030.08, Lt	1	3.5	0.9	300	450	72.670	72.210	1:2	1:2	25	Swale "MA1"
"LW"94+546.19, Lt	2	92.1	1.2	600	450	65.700	65.300	1:2	1:2	25	Extg. Ground
"LW"94+638.35, Lt	2	31.5	1.2	450	450	66.490	66.400	1:2	1:2	25	Extg. Ground
"LW"94+487.16, Lt	2	3	1.2	600	525	65.460	65.447	1:2	1:2	50	Riprap Channel
"LE"95+268.02, Rt.	1	122	1.8	600	525	71.350	59.600	1:2	1:2	50	Johnson Creek
"LW"95+308.28, Lt	1	122.5	1.2	450	450	69.800	60.200	1:2	1:2	25	Johnson Creek
"LW"95+456.20, Lt	1	3	2.4	150	450	82.005	81.760	1:4	1:4	25	Downstream Swale
"LW"95+474.20, Lt	1	3	2.4	150	450	81.500	80.960	1:4	1:4	25	Downstream Swale
"LW"95+490.20, Lt	1	3	2.4	150	450	80.700	80.400	1:4	1:4	25	Downstream Swale
"LW"95+506.20, Lt	1	3	2.4	150	450	79.900	79.800	1:4	1:4	25	Downstream Swale
"D"95+963.17, Rt	2	26.5	1.2	450	450	90.950	90.800	1:2	1:2	25	ME Inlet
"D"95+973.85, Rt	1	10	2.4	300	450	93.370	90.950	1:2	1:2	25	Riprap Basin
"SC"96+034.54, Rt	1	5	0.6	300	450	101.800	101.280	1:4	1:4	25	Riprap Channel
"BR"96+068.63, Rt	1	30	0.6	300	450	101.650	101.200	1:4	1:4	25	Inlet
"NW"96+098.56, Lt	1	3	1.6	300	450	104.241	104.200	1:4	1:4	25	Flow Spreader
"BR"96+103.82, Lt	1	3.5	1.5	450	750	94.000	93.300	1:2	1:2	350	Riprap Basin
"BR"96+115.61, Lt	2	37	1.5	600	450	93.300	93.100	1:2	1:2	25	ME Inlet



LOOKING DOWNSTREAM

RIPRAP CHANNEL, TYPE 2

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

REGISTERED PROFESSIONAL ENGINEER
62,609
OREGON
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WASHINGTON COUNTY

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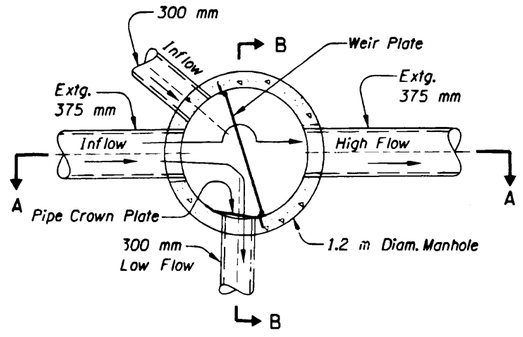
Designed By - Henry M. Allen
Drafted By - Martin G. Casillas

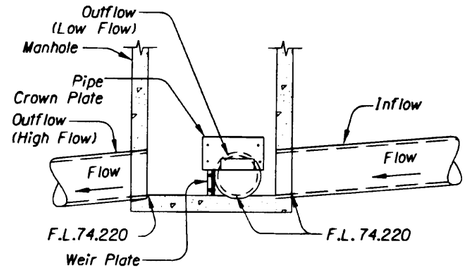
WATER QUALITY DETAILS

SHEET NO. GHJ-8

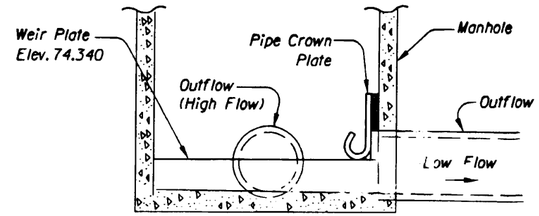
1/15/2004 6:56:58 PM



PLAN



SECTION A-A

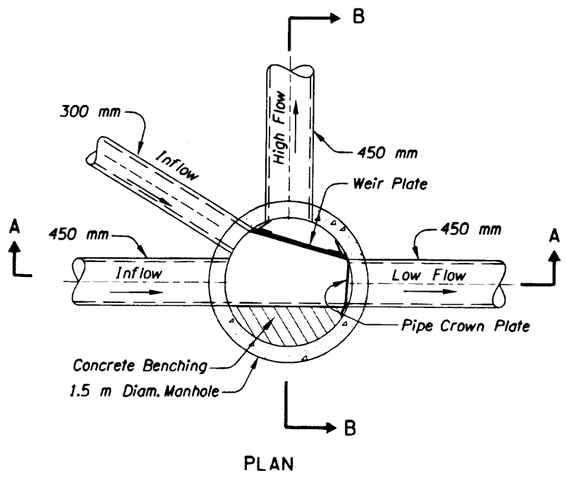


SECTION B-B

For Details Not Shown, See Sht. GHJ-20

DIVERSION MANHOLE "HIGH-LOW", LOW FLOW TO SIDE

Sta. "MA" 94+116, Lt.



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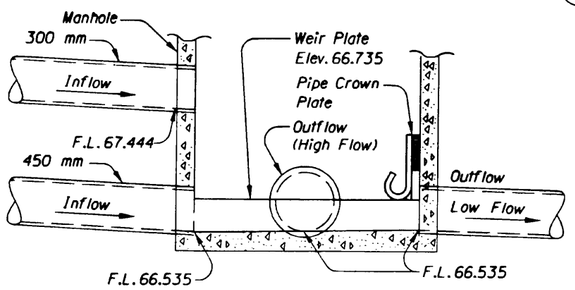

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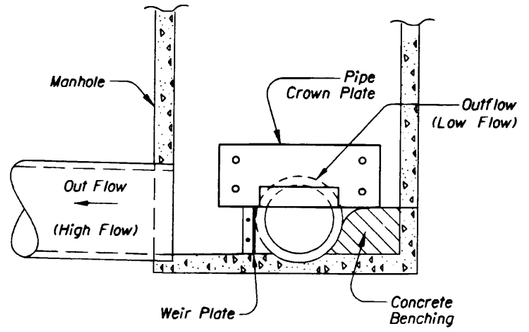

SECTION B-B

For Details Not Shown, See Sht. GHJ-20

DIVERSION MANHOLE "HIGH-LOW", LOW FLOW STRAIGHT THROUGH

Sta. "LW" 94+489, Lt.

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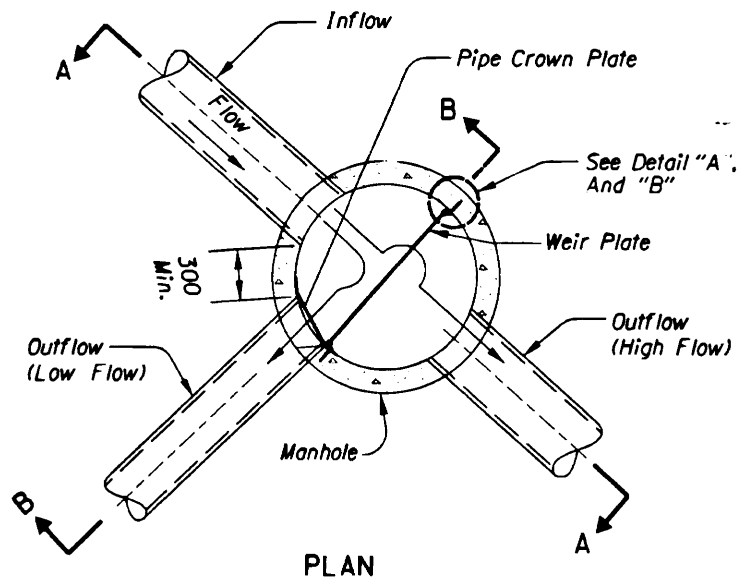
WATER QUALITY DETAILS

SHEET NO. GHJ-17

VIEW 5

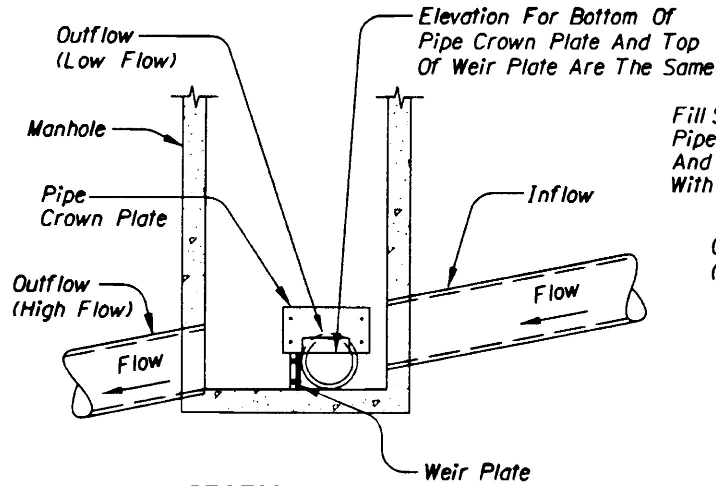
VIEW 5

DIVERSION MANHOLE HIGH-LOW, PIPE CROWN PLATE, AND WEIR PLATE GENERAL DETAILS

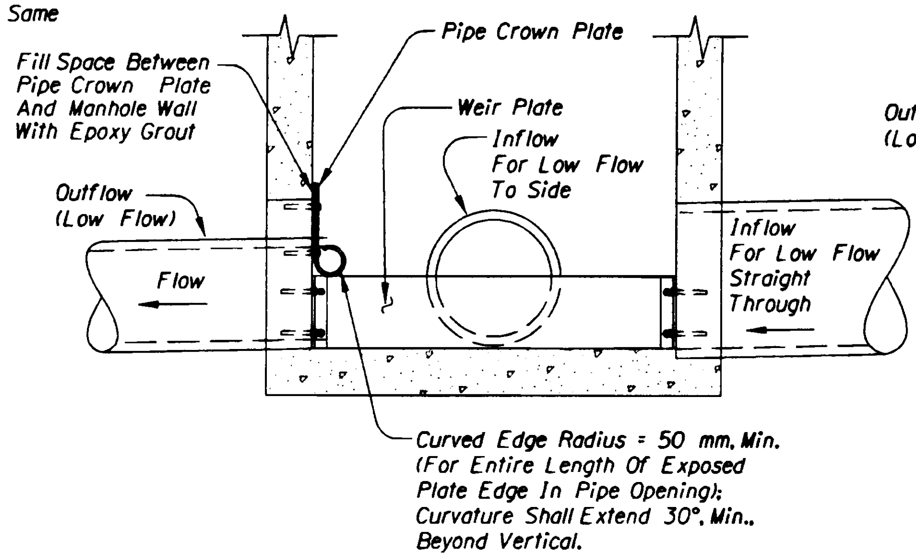


PLAN

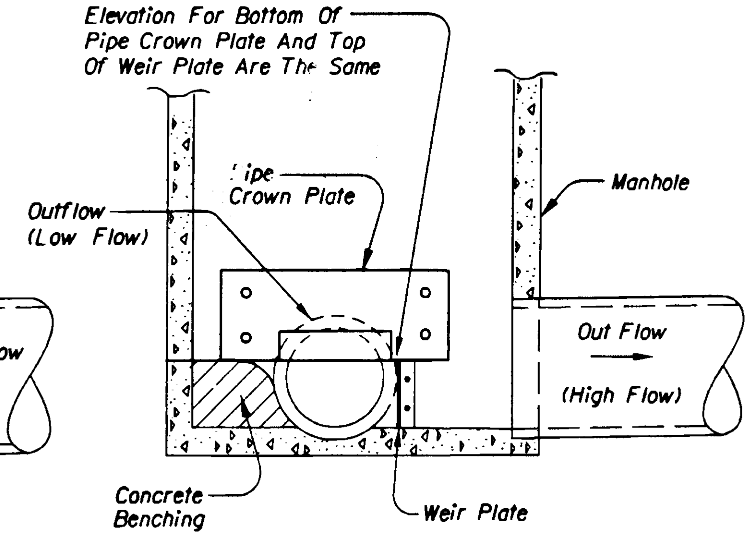
GENERAL-LOW FLOW TO SIDE



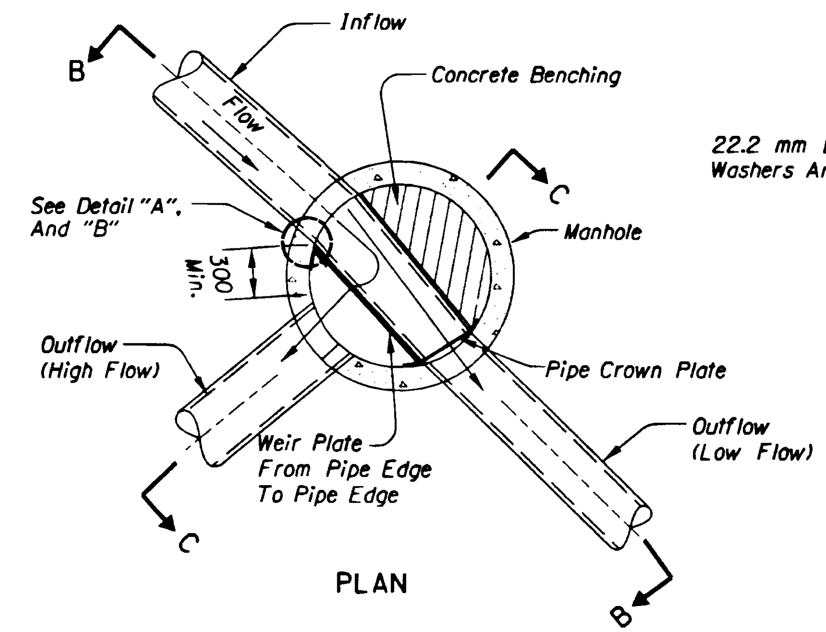
SECTION A-A



SECTION B-B

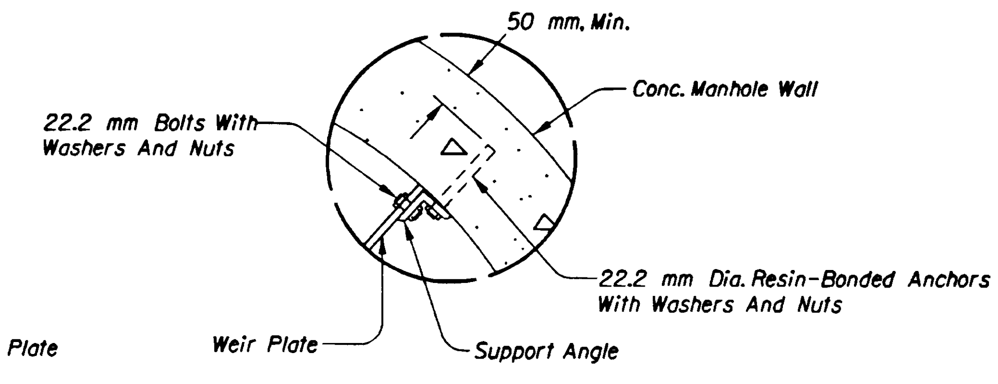


SECTION C-C

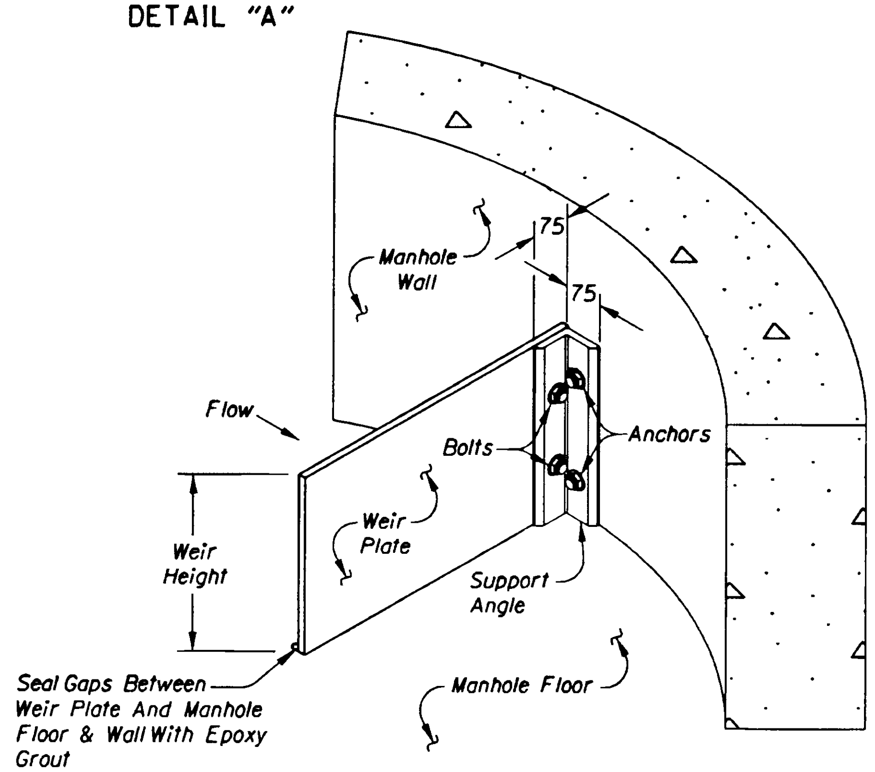


PLAN

GENERAL-LOW FLOW STRAIGHT THROUGH

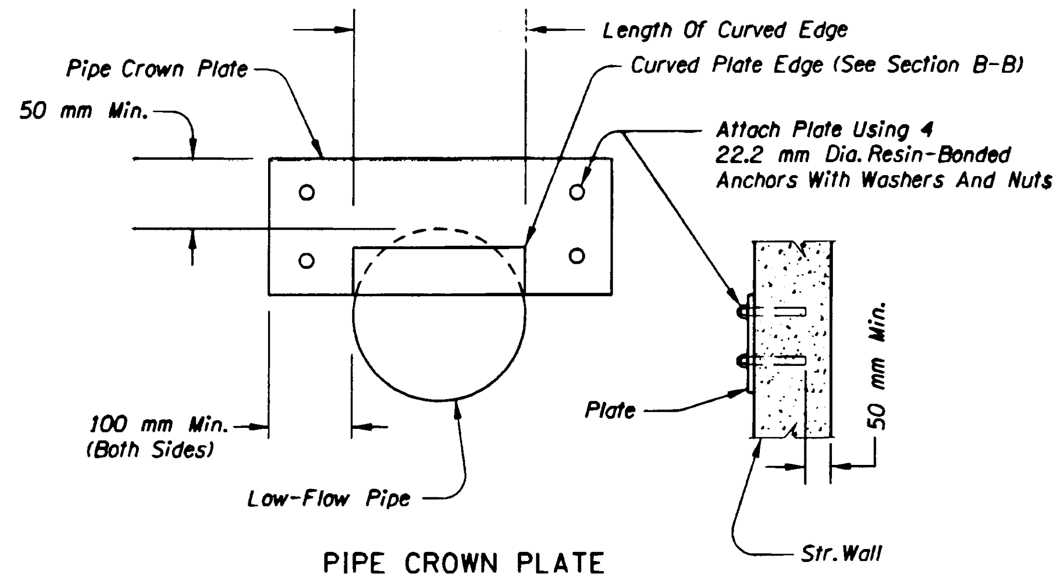


DETAIL "A"



DETAIL "B"

(Typ. Both Ends Of Weir)



PIPE CROWN PLATE

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

Notes:

1. When Connecting To Extg. Pipes Their Sizes, Types, And Invert Elevations Are To Be Verified In The Field.
2. Pipe Crown Plate, Weir Plate, And Support Angles Shall Be Steel And Shall Be At Least 12.7 mm Thick, Min.
3. Center Curved Edge Of Pipe Crown Plate On Center Of Outflow Pipe.
4. Embed Resin-Bonded Anchors 100 mm, Min., Into Concrete. Use High Or Low Strength Resin From ODOT's Qualified Products List, Suitable For Wet Or Submerged Locations.
5. For Resin-Bonded Anchors, Use Steel Threaded Rods.
6. Anchors Shall Be 25 mm, Min., Inside Pipe Crown Plate, Weir Plate, And Support Angle Edges.
7. Hole Diameters In The Plates And Angles For The Anchors And Bolts Shall Be 3.2 mm Larger Than The Anchor Or Bolt Diameters.
8. Metal Plates And All Hardware Shall Be Stainless Steel Or Hot-Dipped Galvanized.
9. The Curved Edge On The Pipe Crown Plate May Be Achieved By Bending The Plate Edge, Or By Welding A Section Of 100 mm Pipe To The Bottom Edge Of The Plate, Or Other Durable Device That Produces A Rounded Edge, To Be Approved By The Engineer.

REGISTERED PROFESSIONAL ENGINEER 62,609
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WASHINGTON COUNTY

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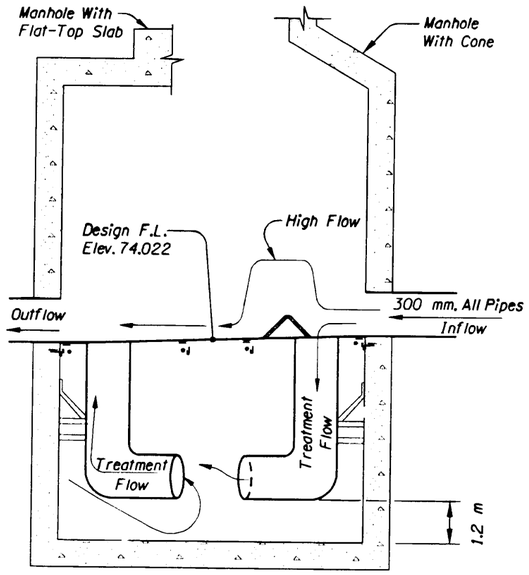
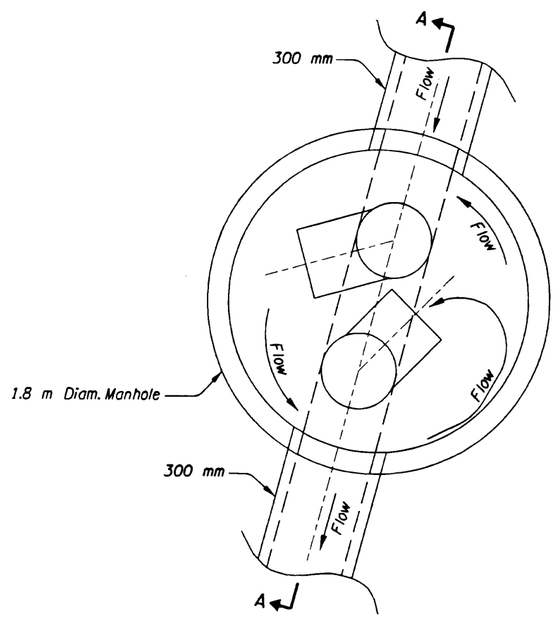
Drafted By - Martin G. Casillas

WATER QUALITY DETAILS

SHEET NO. GHJ-20



SECTION A-A



PLAN

For Details Not Shown. See Sht. GHJ-31

POLLUTION CONTROL MANHOLE

Sta. "MA" 94+112. Rt.

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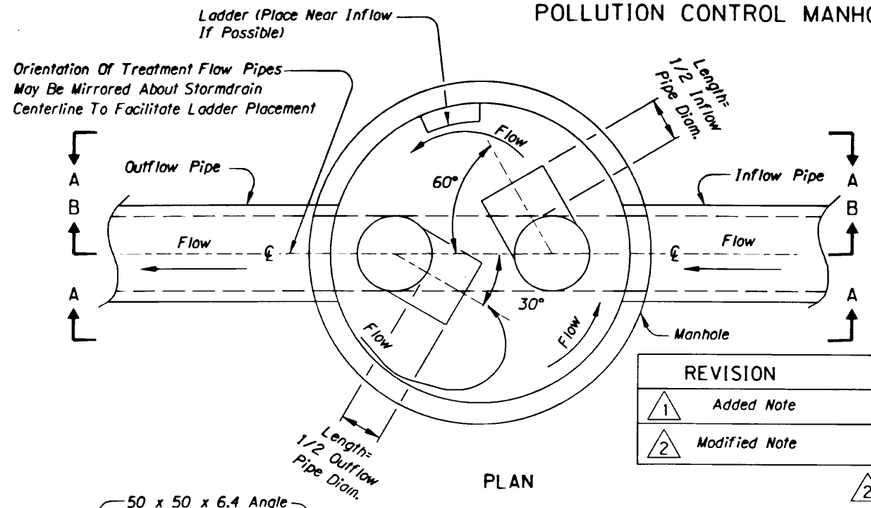
WATER QUALITY DETAILS

SHEET NO. GHJ-27

VIEW 3

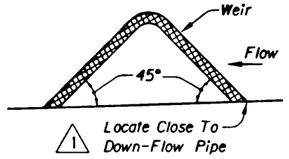
VIEW 3

POLLUTION CONTROL MANHOLE GENERAL DETAILS



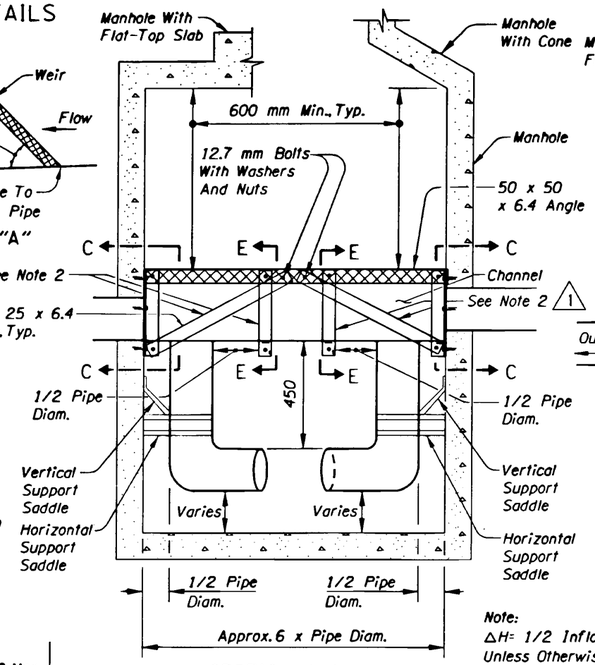
PLAN

REVISION	DATE	BY
1 Added Note	2-19-04	HMA
2 Modified Note	2-19-04	HMA



1 Locate Close To Down-Flow Pipe

DETAIL "A"



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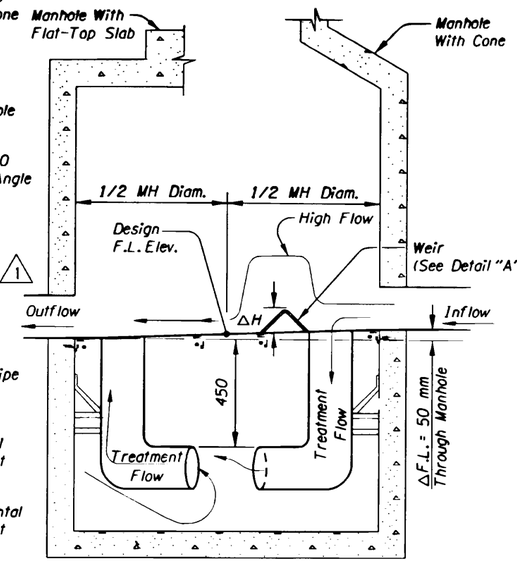
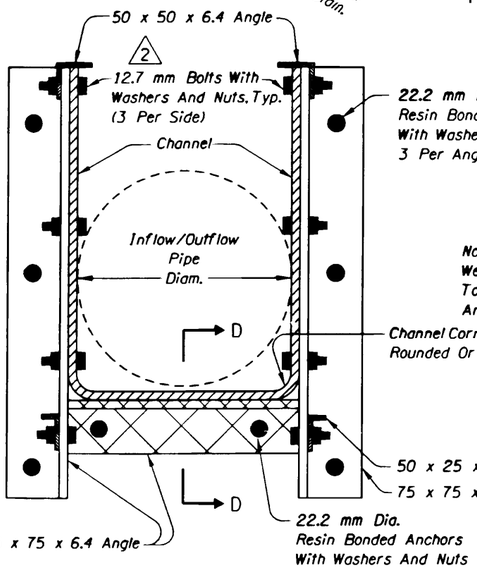
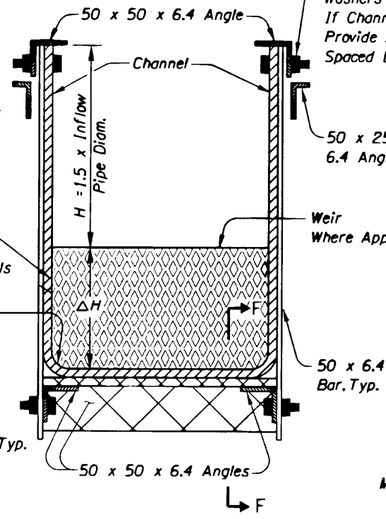


Note:
ΔH = 1/2 Inflow Pipe Diam. Unless Otherwise Specified

INSIDE SECTION B-B



SECTION C-C



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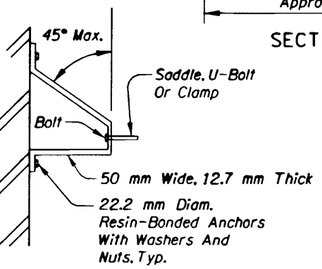
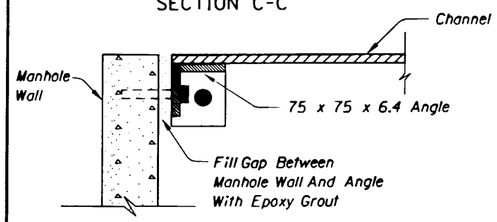


ELEVATION
VERTICAL PIPE SUPPORT



SECTION D-D
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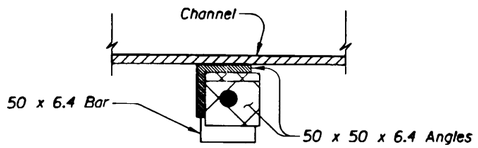
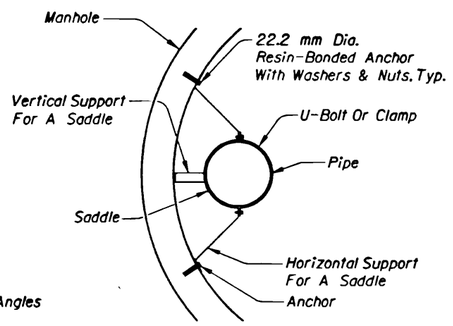


SECTION F-F
(Typ. Both Sides)



PLAN
HORIZONTAL PIPE SUPPORT

Notes:
1. Channel And Weir To Be Made Of 12.7 mm Thick HDPE Or 4.8 mm Thick. Min., Stainless Steel. Any Joints In Channel To Be Permanent, Strong And Watertight.
2. Angles And Bars Shall Be A36 Steel Or Stronger. Vertical And Diagonal Supports For Channel Span Not Necessary If Channel Is Steel.
3. Pipes Within Manhole To Be Corrugated HDPE, HDPE SDR26, PVC Sch. 40 Or 3.2 mm Min. Thick Stainless Steel. Flanges (12 Bolts) To Be Of These Materials.
4. Pipes And Channel Must Have Water Tight Joints And Smooth Interior Walls With Manning's "n" ≤ 0.013
5. Fasten Pipes To Wall Using 50 mm Wide By 12.7 mm Thick Straps With 22 mm Diameter U-Bolts Or Clamps.
6. Vertical Pipes To Be Set Away From Wall So That There Is A Clear Space Between The Manhole Wall And The Outside Pipe Wall Equal To At Least , But Not Much More Than, 1/2 Pipe Diameter.
7. Provide Permanent Watertight Seals Between Channel End And Manhole Wall, Between Channel Floor And Pipes Within The Manhole And Between The Weir And Channel.
8. All Hardware Shall Be Stainless Steel Or Hot-Dipped Galvanized.
9. For Resin-Bonded Anchors, Use Steel Threaded Rods.
10. Embed Resin-Bonded Anchors 100 mm, Min. Into Concrete. Use High Or Low Strength Resin From ODOT's Qualified Products List, Suitable For Wet Or Submerged Locations.
11. Dimensional Relationships, Ratios, And Pipe Rotation Angles Shown Are Typical For All Pollution Control Manholes Except Where Otherwise Noted At Specific Location(s).
12. For Other Details Not Shown, See Sht. GHJ-20 And Drawing No. RD340.
13. All Dimensions Are In Millimeters (mm) Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER
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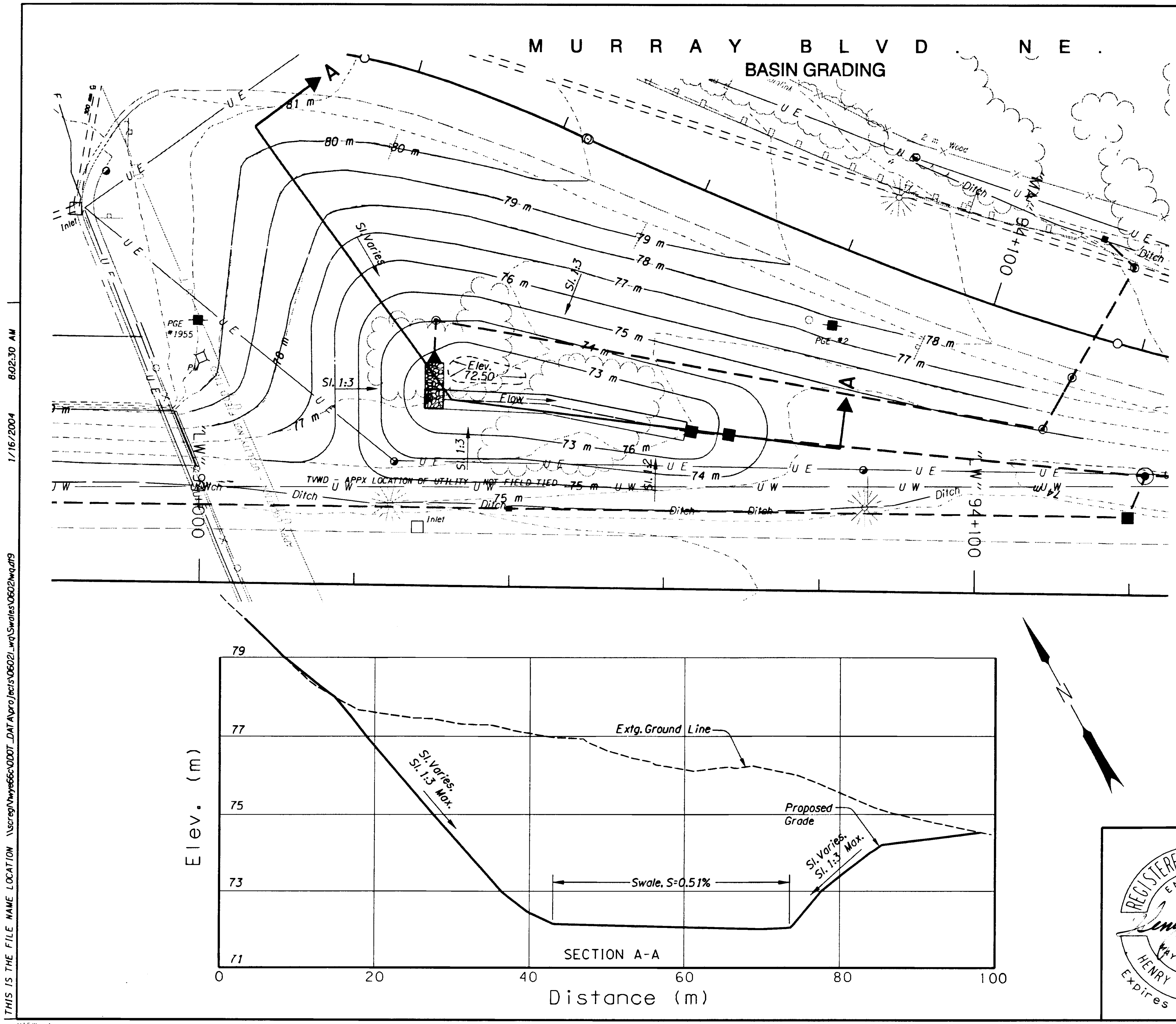
WATER QUALITY DETAILS

SHEET NO. GHJ-31

VIEW



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WATER QUALITY PLAN

SHEET NO. GHJ-41

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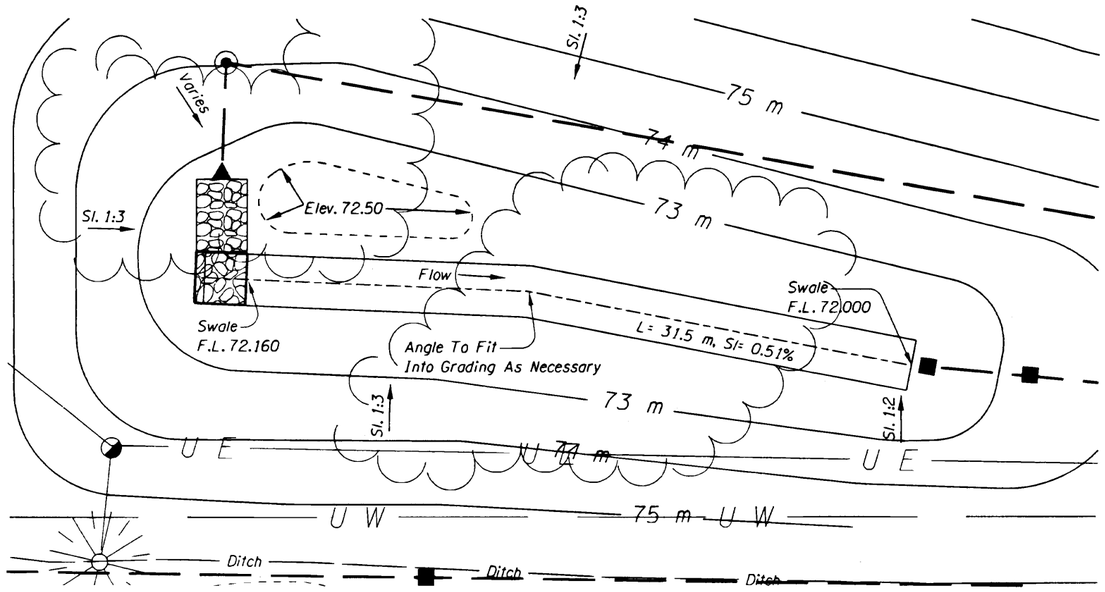
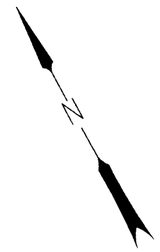
WATER QUALITY SWALE "MA1"





REVISION	DATE	BY
1 Added Note	2-19-04	HMA

1 *Notes:*
1. *For Details Not Shown, See Sht. GHJ-48*
2. *All Dimensions Are In Meters (m) Unless Otherwise Noted.*

REGISTERED PROFESSIONAL ENGINEER
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OREGON
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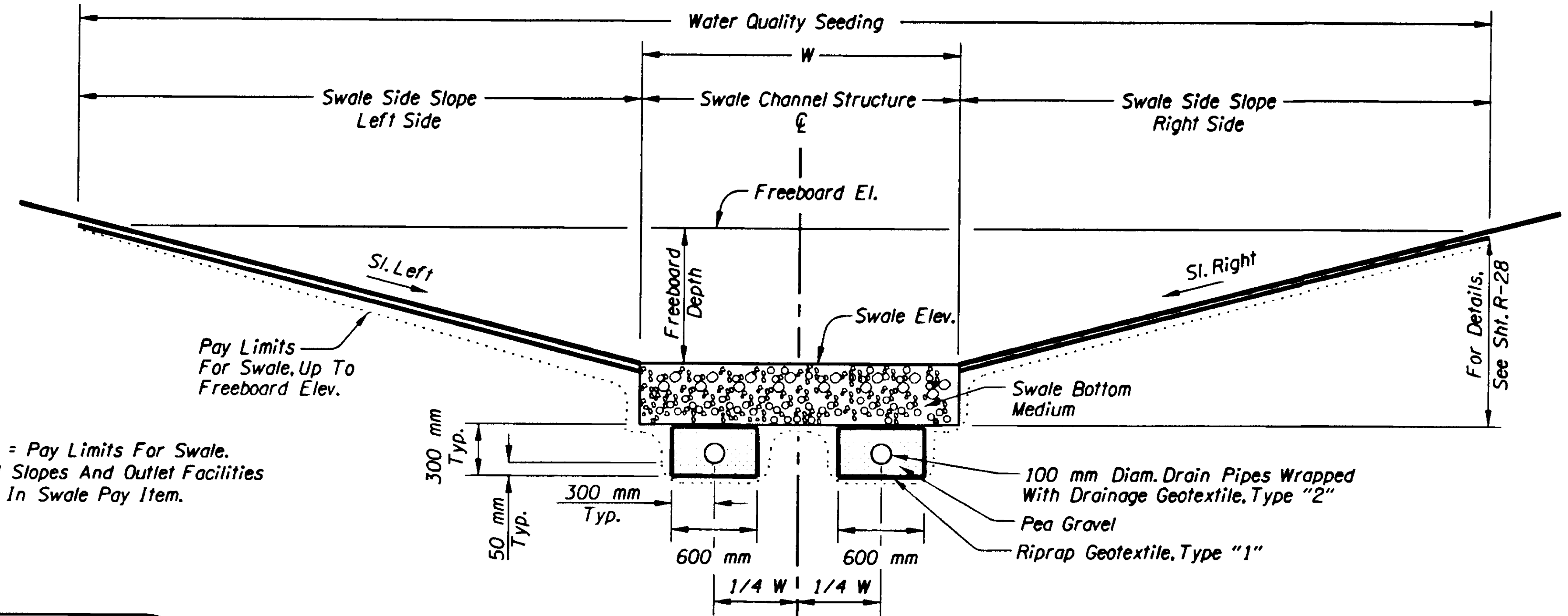
Drafted By - Martin G. Casillas

WATER QUALITY PLAN

SHEET NO. GHJ-42

VIEW

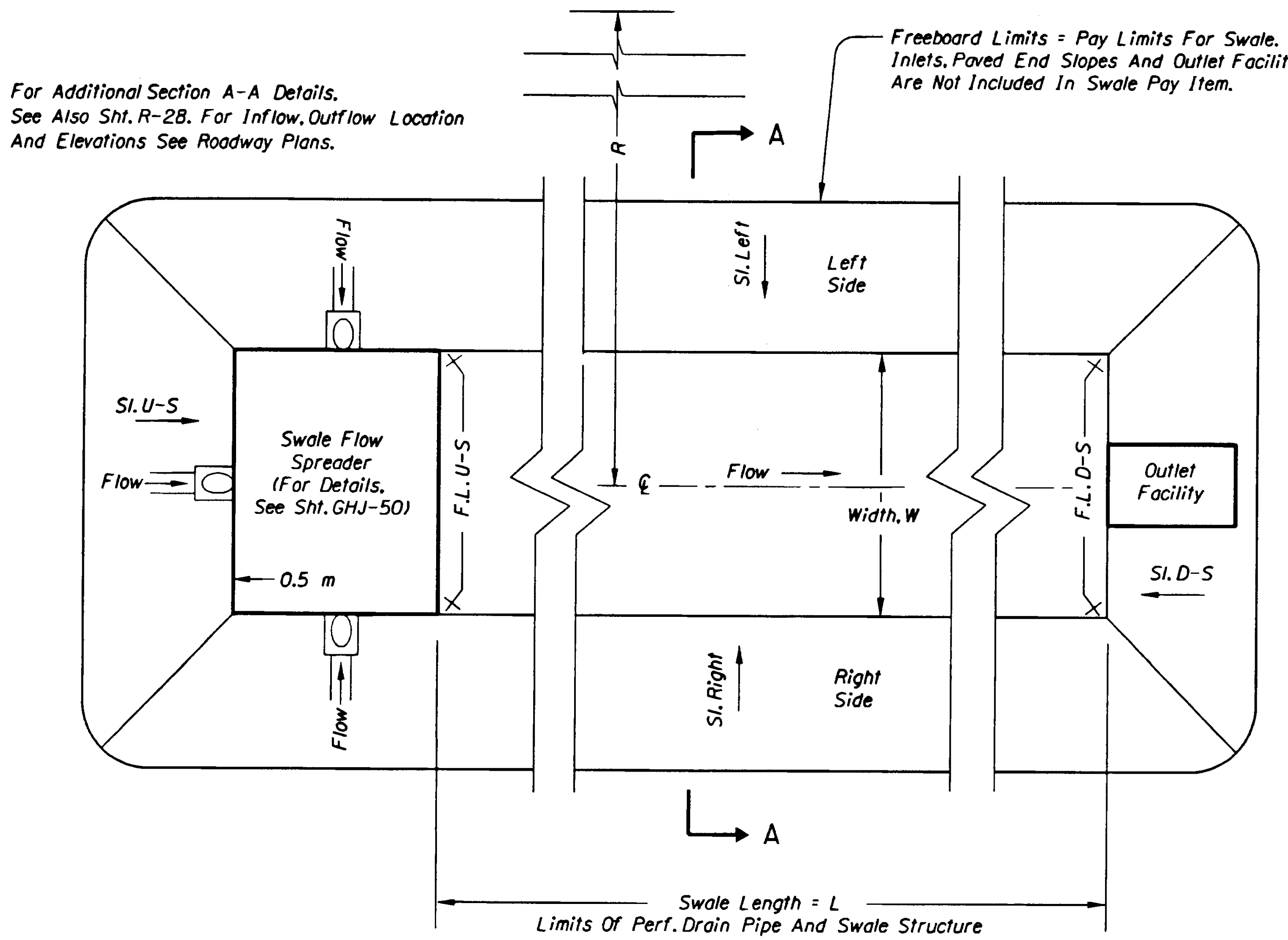
WATER QUALITY SWALE GENERAL DETAILS
PLAN AND TYPICAL CROSS-SECTION



Note:
See Sht. R-28 For Seeding, Planting, And Swale Bottom Medium Details.

SECTION A-A, AND UNDER DRAIN

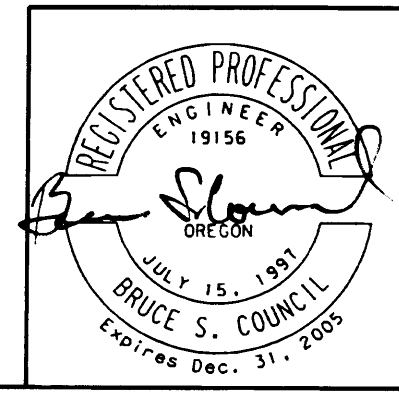
For Additional Section A-A Details, See Also Sht. R-28. For Inflow, Outflow Location And Elevations See Roadway Plans.



Note:
For Swale Specifics, See Sht. GHJ-49.

PLAN

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



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WATER QUALITY DETAILS

SHEET NO. GHJ-48

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VIEW 5

WATER QUALITY SWALES
SITE SPECIFIC INFORMATION

Notes:
1) U-S= Upstream, D-S= Downstream
2) See Site Plans For Pipe Inverts At Inlets.
3) "C-T Blend" = Compost-Topsoil Blend,
"Rock+C-T" = Drain Rock With Compost-Topsoil Blend.

Swale ID	L, m	W, m	F.L. U-S, m	F.L. D-S, m	Long. Slope, %	Centerline Curve Radius, m	Swale Sideslopes U-S	Swale Sideslopes Left	Swale Sideslopes Right	Swale Sideslopes D-S	Freeboard Depth, m	Swale Bottom Medium	No. Under-Drain Segments	Under Drain Tie-In Location	Swale Outlet Facility
WCW	340	1.2	See GHJ-32	See GHJ-32	Varies	None	1:3	1:4	1:6	1:4	0.3	Rock+C-T	2	"G-2MA" Mod. Inlet	"G-2MA" Mod. Inlet
WCE	322	2.4	See GHJ-33	See GHJ-33	Varies	None	1:20	1:6	1:4	1:18	0.3	Rock+C-T	2	"G-2MA" Mod. Inlet	"G-2MA" Mod. Inlet
WC1	82	2.4	68.062	66.543	1.85	None	1:4	1:3	1:6	1:4	0.3	C-T Blend	2	"D" Mod. Inlet	"M-E" Mod. Inlet
WC2A	30	0.6	70.673	70.197	1.50	None	1:2	1:2	1:2	1:2	0.3	C-T Blend	1	"D" Mod. Inlet	"D" Mod. Inlet
WC2B	474	0.7	70.815	70.637	0.32	None	1:3	1:3	1:3	1:3	0.3	C-T Blend	1	"D" Mod. Inlet	"D" Mod. Inlet
WC2C	37	0.8	71.042	70.839	0.55	None	1:4	1:4	1:4	1:4	0.45	C-T Blend	1	"D" Mod. Inlet	"D" Mod. Inlet
WC2D	41	0.9	72.556	71.634	Varies	None	1:5	1:5	1:5	1:5	0.3	Rock+C-T	1	"D" Mod. Inlet	"D" Mod. Inlet
WC3A	50	2.4	70.195	69.961	0.5	None	1:4	Var.	Var.	1:4	.8	C-T Blend	2	"D" Mod. Inlet	"V"-Bottom Ditch
WC3B	50	2.4	74.408	74.158	0.5	80	1:4	1:4	1:6	1:4	0.45	C-T Blend	2	"D" Mod. Inlet	"M-E" Mod. Inlet
MA1	31.5	2.4	72.160	72.000	0.51	None	1:3	1:3	Var.	1:6	0.45	C-T Blend	None	N.A.	"M-E" Mod. Inlet
CBR	See GHJ-43	2.4	See GHJ-43	See GHJ-43	Varies	None	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	"D" Inlet
N1a	23	2.4	102.150	102.035	0.5	100	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Riprap Basin
N1b	12.3	2.4	101.812	101.750	0.5	25	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Channel
N2	36	2.4	102.750	102.570	0.5	100	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Pipe
N3	36	2.4	103.350	103.170	0.5	100	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Pipe
N4	36	2.4	103.850	103.670	0.5	100	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Pipe
N5a	12.6	2.4	104.404	104.341	0.5	None	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Channel
N5b	24	2.4	104.150	104.030	0.5	100	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Pipe
S1	36	2.4	93.550	93.370	0.5	20, Each	1:4	1:4	1:4	1:4	0.45	C-T Blend	None	N.A.	Channel

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

REGISTERED PROFESSIONAL ENGINEER 19156 OREGON JULY 15, 1997 BRUCE S. COUNCIL Expires Dec. 31, 2005

REGISTERED PROFESSIONAL ENGINEER 62,609 OREGON MAY 9, 2000 HENRY MINTON ALLEN Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
GEO / HYDRO SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Project Leader - Naveen Chandra
Designed By - Henry M. Allen
Drafted By - Martin C. Casillas

WATER QUALITY DETAILS

SHEET NO. GHJ-49

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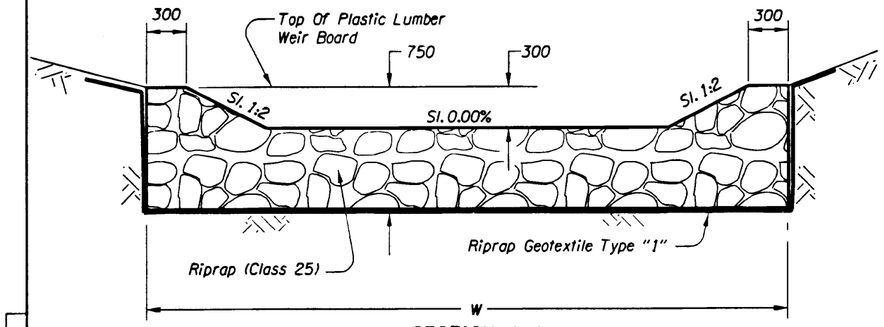
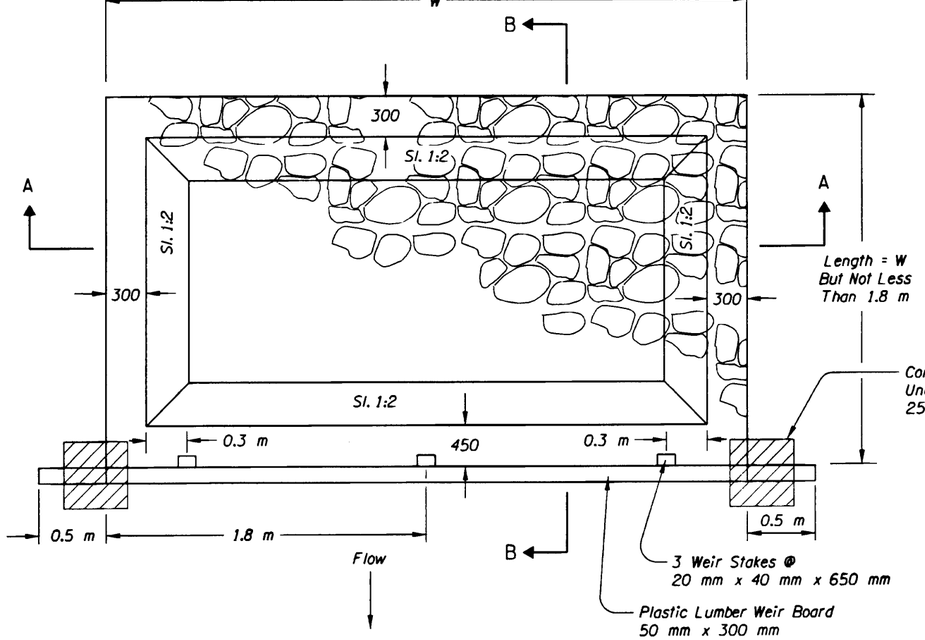
WATER QUALITY SWALE FLOW SPREADER



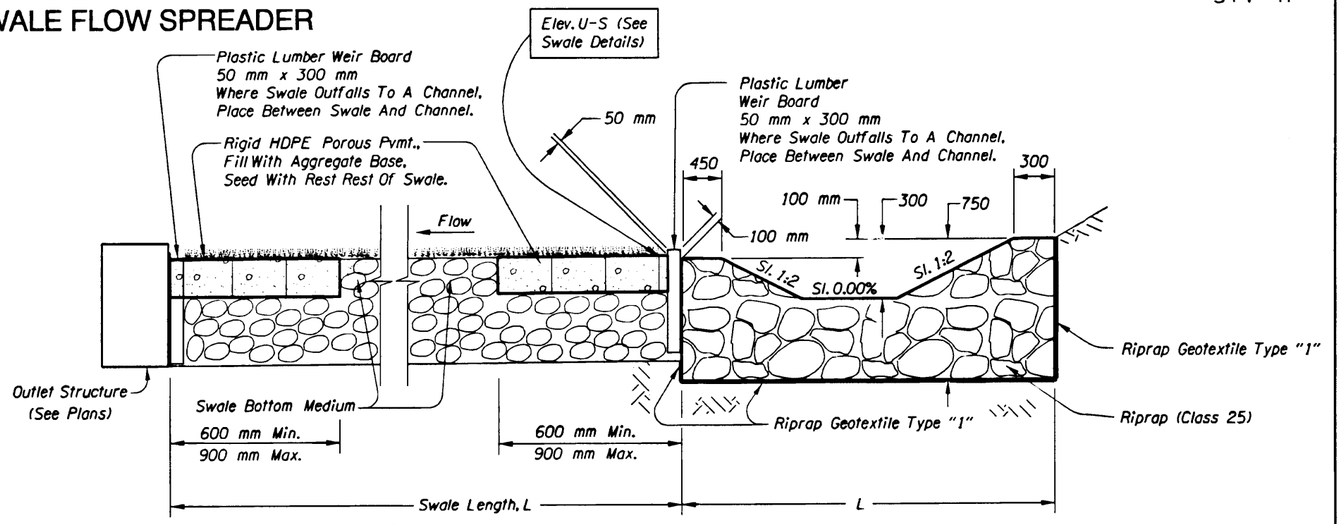
SECTION A-A



Note:
Swale Bottom Medium May Consist Of Compost-Topsoil Blend Or Drain Rock With Compost-Topsdoil Blend.

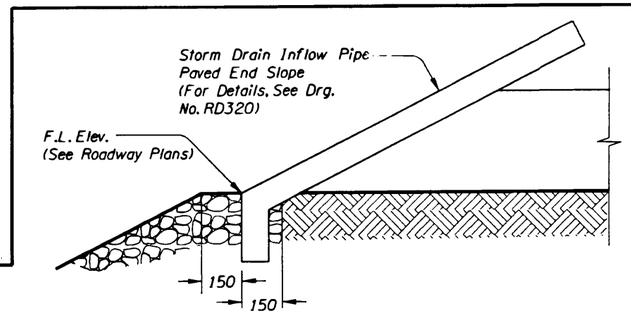
PLAN

SWALE FLOW SPREADER



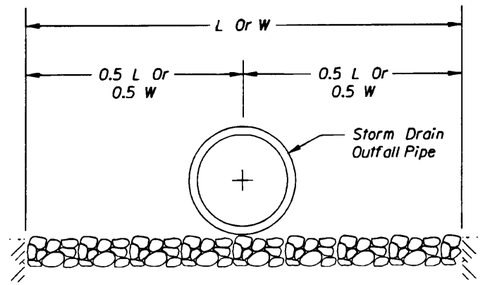
SECTION B-B

Note:
Place A Section Of Rigid HDPE Porous Pavement At The Upstream And Downstream Ends Of Each Swale Or Swale Segment.



Note:
Pipe F.I. Elev. And Top Of Weir Board Elev. Are The Same.

SECTION THROUGH SIDE PIPE OUTLET



LOOKING AT A SIDE

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

REGISTERED PROFESSIONAL ENGINEER 62,609 OREGON MAY 9, 2000 HENRY MINTON ALLEN Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
GEO / HYDRO SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Project Leader - Naveen Chandra
Designed By - Henry M. Allen
Drafted By - Martin G. Casillas

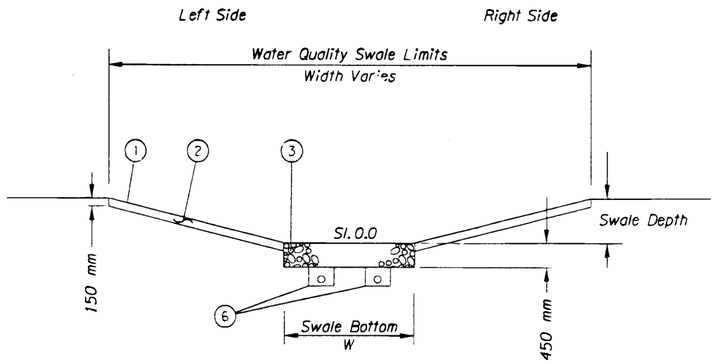
WATER QUALITY DETAILS

SHEET NO. GHJ-50

R O A D S I D E D E V E L O P M E N T

CEDAR MILL CREEK ENHANCEMENT AREA

12/02/03

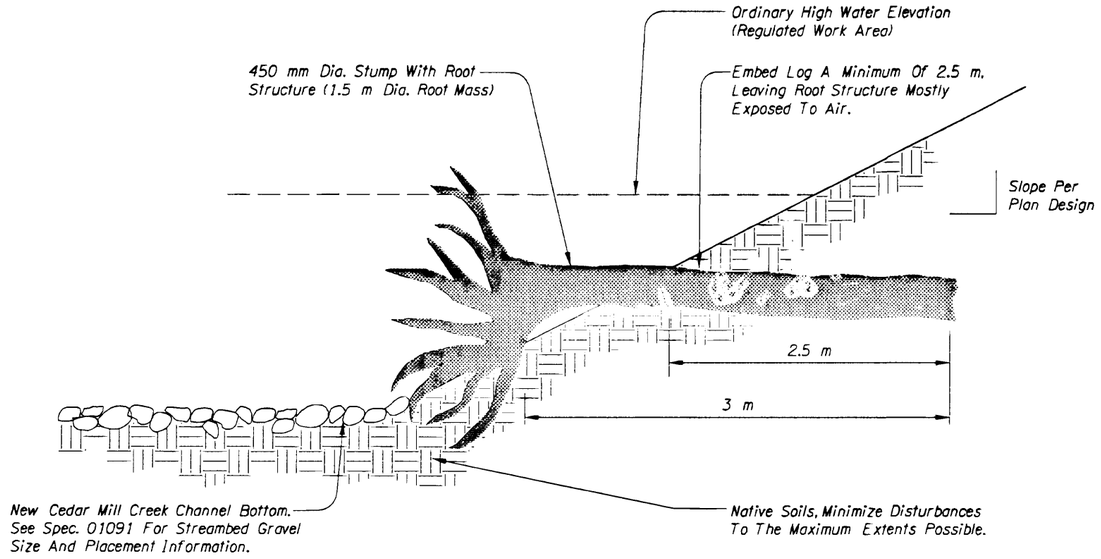


Min. Swale Length - 33 m
Min. (Max.) Longitudinal Swale Slope - .005 (0.5%)
Min. Swale Depth - 0.45 m

VEGETATED STORM WATER QUALITY SWALE

Detail Shown For Reference Only. Design By H. Allen (ODOT).

1. Provide And Install Jute Mat Per Specifications.
2. Provide And Place 150 mm Deep Topsoil Throughout Swale.
3. Swale Bottom Medium - Provide And Place 450 mm Deep Medium In Bottom Of Swale, Continuous Full Length Of Swale. Medium Composed Of Compost-Topsoil Blend Or Drain Rock With Compost-Topsoil Blend.
4. Not Used
5. Seed Swale Using Mix No. 4. See Specifications.
6. Under Drains, Where Recommended By The Engineer. Contact Henry Allen 503-731-8299.
7. For Details Not Shown, See Water-Quality Swale Details In GHJ Series Sheets.



STREAM BANK LOG WITH ROOT WAD

NOTE:
Recruit Log With Root Wad From Conifer Material Within Project Clearing Limits. See Specs.

The Log Must Be Anchored And/Or Ballasted To Maintain Design Placement. Details Of The Anchoring And/Or Ballast Will Be Provided By The Engineer At The Time Of Installation.

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REGISTERED
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MICHAEL D. SMYTH
OREGON
4/4/94
LANDSCAPE ARCHITECT

OREGON DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL SECTION

US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Reviewed By - Mark A. Hadley
Designed By - Mike D. Smyth
Drafted By - Tammy J. Taggart

BIO-STABILIZATION DETAILS

SHEET NO. R28

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VIEW 2

VIEW 2