OPERATION & MAINTENANCE MANUAL

DFI No. D00084
Facility Type: Detention Pond

JUNE, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	**DFI D00084**
Facility Type:	Detention Pond
Construction Drawings:	(V-File Number) 37V-041
Location:	District: 2B (Old 2A)
	Highway No.: 047
	Mile Post: 68.36 / 68.36 (beg./end)
	Description: This facility is located at the southeastern quadrant of OR26 (Hwy 047) and SW Cedar Hills Blvd. Access may be obtained from access pads located at either the south or north sides of the facility.

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:	March 2004
Contractor:	Mowatt Construction Company.

4. Storm Drain System and Facility Overview

A detention pond is designed to control the quantity of runoff, by reducing the peak discharge and only detaining runoff for some short period of time. These facilities are designed to store and gradually release or attenuate stormwater runoff via a control structure or release mechanism, and completely drain after the design storm has passed. The most common detention facilities include:

- Dry ponds - these are depressed storage areas that store runoff during wet weather and are dry the rest of the time. Usually they are earthen depressions.
- Tanks - these are underground storage facilities that are typically constructed from large diameter pipe.
- Vaults - these are enclosed underground storage facilities. They are typically constructed from reinforced concrete.

This facility is located at the southeastern quadrant of OR26 (Hwy 047) and SW Cedar Hills Blvd. Access may be obtained from the south side of the facility from SW Butner Rd. – a frontage road adjacent to SW Cedar Hills Blvd. Additional access may be obtained from the north side of the facility from a maintenance pad located along the eastbound on-ramp to OR26 (Hwy 047).

Stormwater runoff from US26 (Hwy 047) is collected by a series of inlets along the south side of the highway and along the eastbound onramp to US26 (Hwy 047) for an approximate distance of 1,900 feet east of the facility. The drainage is conveyed by a 12-inch storm pipe where a portion of it is bypassed into a treatment swale (DFI D00083) at a high low flow splitter (See Point A on the Operational Plan). The water is then detained through the detention pond.

The detention pond discharges to an outlet control structure (combination of two ditch inlets) into the backside of a catch basin located on the north east corner of Cedar Hills Boulevard and SW Butner Road; see points E and F on the Operational Plan, Appendix A. This catch basin drains into a 24-inch storm pipe in Cedar Hills Blvd that drains towards the north.

The detention pond contains a low flow channel (riprap) that accommodates the flow prior to detention at the outlet structure. Refer to Photo 1 for a photograph of this channel.

A. Maintenance equipment access:
   Access may be obtained from the south side of the facility from SW Butner Rd. – a frontage road adjacent to SW Cedar Hills Blvd. Additional access may be obtained from the north side of the facility from a maintenance pad located along the eastbound on-ramp to OR26 (Hwy 047).

B. Heavy equipment access into facility:

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

C. Special Features:

☐ Amended Soils
☐ Porous Pavers
☐ Liners
☐ Underdrains

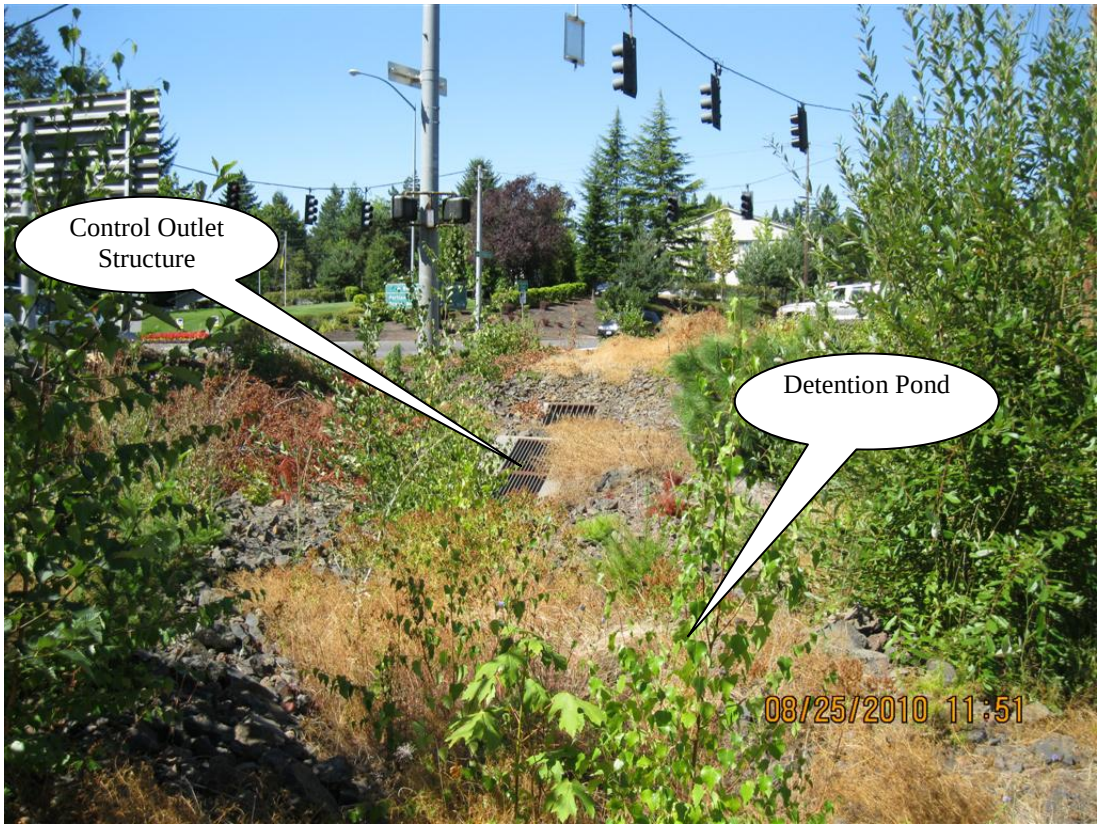


Photo 1: Detention pond facility looking west towards Cedar Hills Blvd. The riprap in the bottom of the pond forms a low-flow channel.

Photo 2: Access maintenance pad on eastbound onramp to US 26 (Hwy 47) looking east.

Photo 3: Control Outlet Structure to the Detention Pond; Point E, Ops Plan.

5. Facility Haz Mat Spill Feature(s)

The detention pond can be used to store a volume of liquid by blocking the 12-inch diameter outlet pipe located at the outlet structure of the detention pond. This pipe and the outlet structure are noted as Point E on the Operational Plan, Appendix A. Another option may include blocking the grated inlets to the outlet structure through the use of either sandbags, or a metal plate.

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 secondary auxiliary inlet/outlet grated catch basin has been designed as part of the facility's outlet control structure, and acts as an emergency overflow in the event the primary outlet control device is plugged.

Before flows ever reach the higher level of the secondary inlet/outlet device, however, they are typically released through a primary inlet/outlet grated catch basin located below the secondary device. If runoff should ever exceed the water quality event, where flows normally are directed to the lower primary outlet, the pond level will rise and flows will be released through the secondary auxiliary inlet/outlet device located just above the primary outlet.

☐ 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

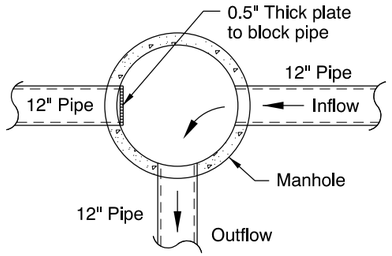
Contact any of the following for more detailed information about management of waste materials found on site:

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

Appendix A

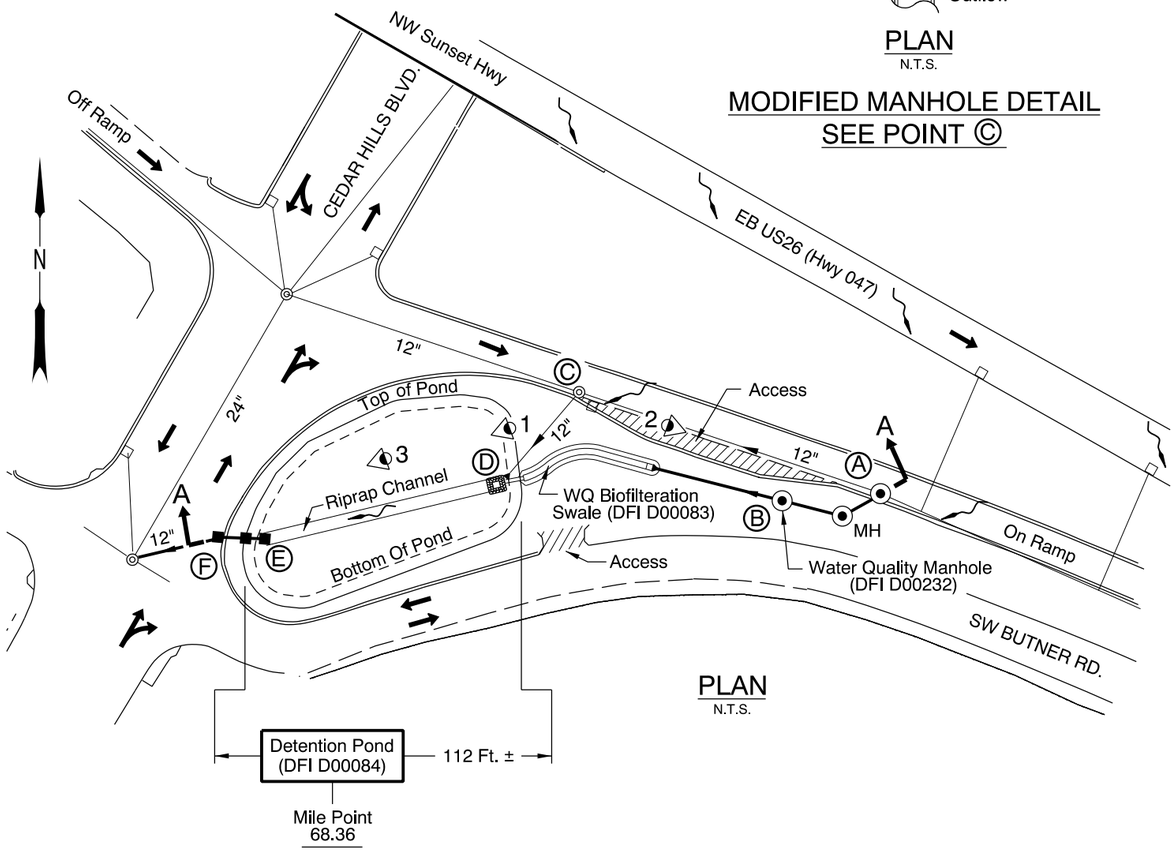
Content:

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



PLAN
N.T.S.

MODIFIED MANHOLE DETAIL
SEE POINT Ⓒ



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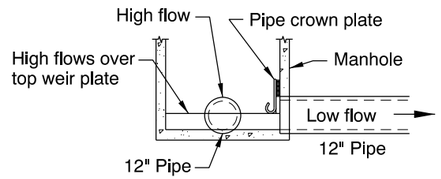
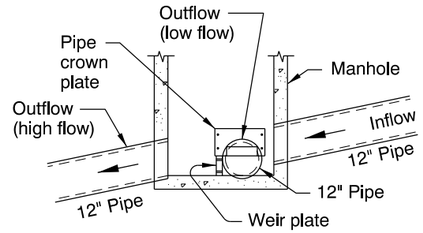


SECTION C-C
N.T.S.



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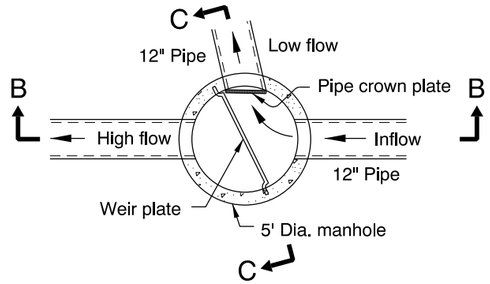
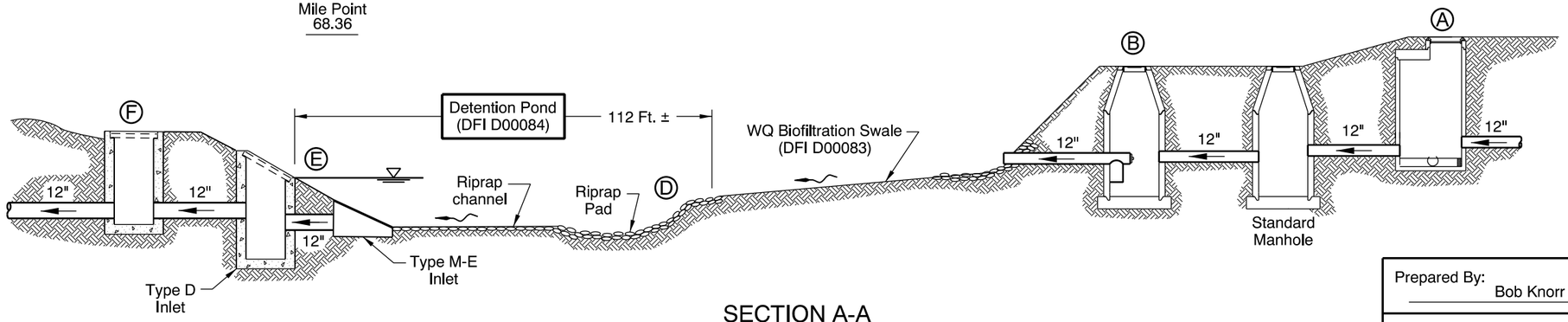
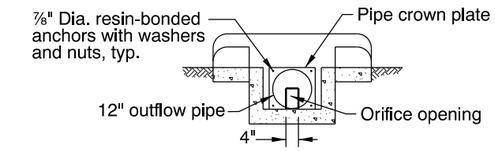


PLAN
N.T.S.

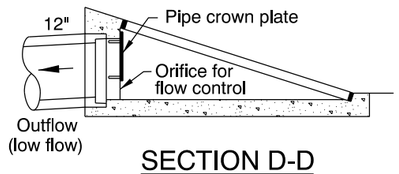
DIVERSION MANHOLE "HIGH FLOW"
"LOW FLOW" TO SIDE DETAIL
SEE POINT Ⓐ



SECTION A-A
N.T.S.



SECTION E-E
N.T.S.



SECTION D-D
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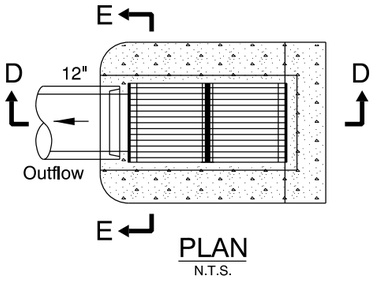


PLAN
N.T.S.

TYPE M-E INLET/OUTLET DETAIL
SEE POINT Ⓔ

LEGEND:

- Photo Location / Direction
- Ⓐ High-Low Split Flow Manhole
- Ⓑ Water Quality Manhole (DFI D00232)
- Ⓒ Manhole Modified
- Ⓓ Facility Inlet/Riprap Basin
- Ⓔ Type M-E/Type D Inlets/Facility Outlet
- Ⓕ Inlet-catch basin tie-in
- Manhole
- Inlet
- 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 D00084
MAINTENANCE DISTRICT 2B HWY 047
DETENTION POND
SUNSET HWY MP 68.36
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

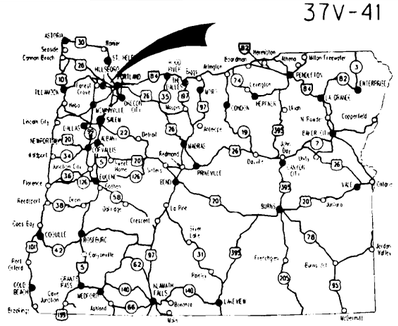
GRADING, DRAINAGE, STRUCTURES, PAVING, SIGNING, ILLUMINATION, SIGNALS, & ROADSIDE DEVELOPMENT

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

SUNSET HIGHWAY

WASHINGTON COUNTY

MARCH 2004

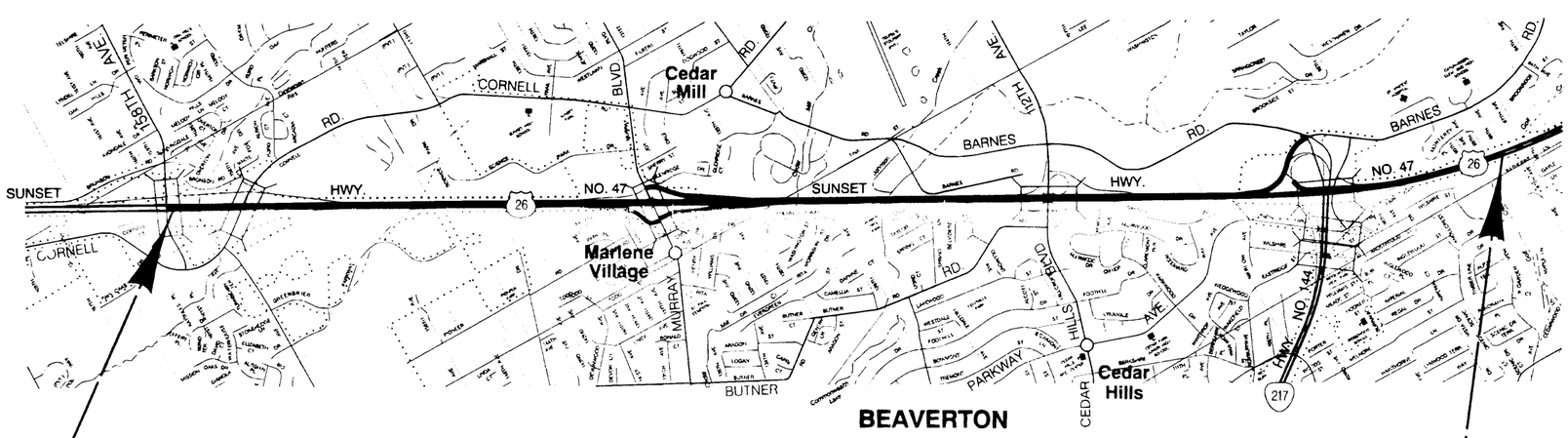


Overall Length Of Project - 6.51 km (4.05 Miles)

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)

METRIC

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

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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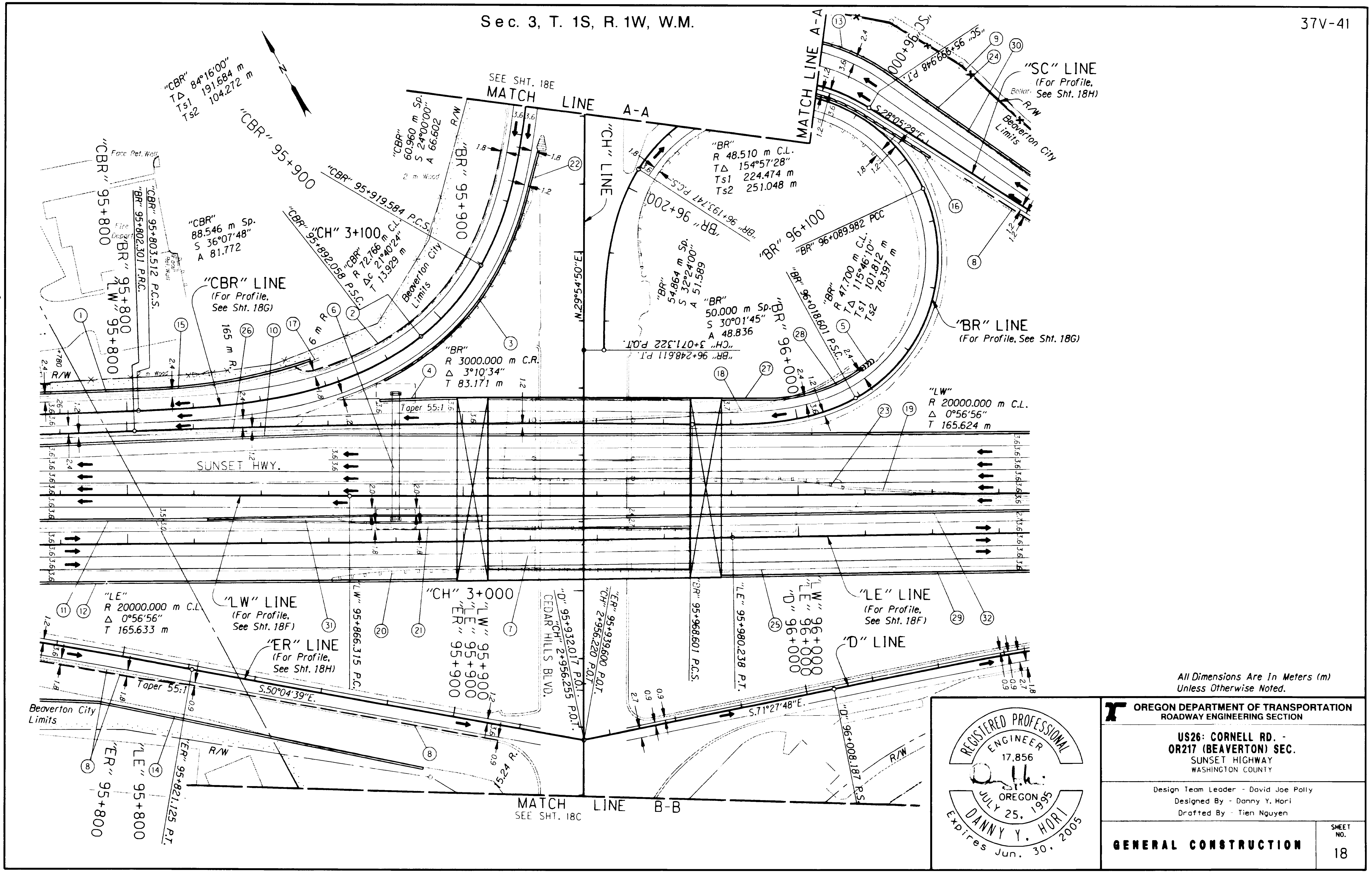


REGISTERED PROFESSIONAL ENGINEER 17,856
OREGON JULY 25, 1995
DANNY Y. HORI
Expires Jun. 30, 2005

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

GENERAL CONSTRUCTION

SHEET NO. 18

STRUCTURAL DETAILS CHECKED

STRUCTURAL DETAILS CHECKED

(1) Sta. "CBR" 95+770.98 To Sta. "CBR" 95+809.47, Lt.
Const. Conc. Shldr. Barrier (Reflectorized) - 38.4 m
Grout Barrier (Plug Scuppers)
Flare Rate=0, W=0, E=0.6 m

(2) Remove Extg. Curb
Const. Mountable Curb & Gutter
(For Details, See Sht. 2B-3)
(See Drg. No. RD700)

(3) Sta. "CBR" 95+876.38 To Sta. "CBR" 95+956.00, Rt.
Const. Cast-In-Place Conc. Shldr. Barrier (Reflectorized) - 84.4 m
Flare Rate=20:1, W=0.61 m, E=0
Protect Leading End W/Extg. Impact Attenuator
(See Drg. No. RD505)

(4) Sta. "BR" 95+875.55 To Sta. "BR" 95+898.83, Lt.
Const. Conc. Shldr. Barrier (Reflectorized) -23.3 m
Pin Barrier To Rdwy.
Grout Barrier (Plug Scuppers)
Flare Rate=0, W=0, E=0.6 m
Const. Conc. Barrier Transition To Bridge Rail

(5) Inst. Impact Attenuator
Obstacle Width - 0.6 m
Number Of Bays - 3
(For Details, See Sht. 2B-8)

(6) Bridge No. 19808
Sta. "LW" 95+880.00
Const. Sign Truss And Footings
(For Drg. Nos., See Sht. 1A-2)

(7) Bridge No. 9345
Sta. "LW" 95+907.73 To Sta. "LW" 95+967.47
Remove Extg. Bridge Rail
Remove Extg. Asph. Conc. Surfacing
Const. Bridge Rail
Const. Structure
Const. Structural Overlay
Const. Reinf. Panel At Bridge End W/Bridge Rail - 2
(For Drg. Nos., See Sht. 1A)

(8) Remove Extg. Curb
Const. Low Profile Mountable Curb

(9) Const. Type CL-6 Fence

(10) See Sht. 16, Note 2
Const. Conc. Median Barrier

(11) See Sht. 17, Note 19
Const. Single Slope Conc. Barrier

(12) See Sht. 17, Note 5
Const. Conc. Shldr. Barrier

(13) See Sht. 18E, Note 1
Const. Conc. Shldr. Barrier

(14) See Sht. 14, Note 5
Const. Soundwall No. 515

(15) Sta. "CBR" 95+809.47 To Sta. "CBR" 95+857.71, Lt.
Const. Cast-In-Place Conc. Shldr. Barrier (Reflectorized) - 46.5 m
Flare Rate=20:1, W=2.3 m, E=0.6 m
Const. Conc. Barrier Buried Terminal
(For Details, See Sht. 2B-11)
(See Drg. Nos. RD505 & RD510)

(16) Remove Extg. Conc. Traffic Separator
Const. Type "C" Traffic Separator (600 mm Width)
With 300 mm Drain
(See Drg. No. RD705)

(17) See Sht. 16, Note 9
Remove Extg. Conc. Barrier

(18) Sta. "BR" 95+850.03, Rt. To Sta. "BR" 96+022.12, Lt.
Remove Extg. Conc. Barrier - 169 m

(19) Sta. "LW" 96+012.92, Lt. To Sta. "LW" 96+197.56, Rt.
Remove Extg. Conc. Barrier - 185 m

(20) Sta. "LE" 95+861.18 To Sta. "LE" 95+907.42, Rt.
Remove Extg. Guardrail - 47 m

(21) Sta. "LE" 95+861.48 To Sta. "LE" 95+907.50, Lt.
Remove Extg. Guardrail - 47 m

(22) Sta. "CBR" 95+896.40 To Sta. "CBR" 95+954.31, Rt.
Remove Extg. Guardrail - 62 m

(23) Sta. "LW" 95+967.85 To Sta. "LW" 95+013.73, Lt.
Remove Extg. Guardrail - 47 m

(24) Sta. "SC" 95+984.57 To Sta. "SC" 96+161.83, Lt.
Remove Extg. Guardrail - 180 m

(25) Remove Extg. Curb

(26) Remove Extg. Conc. Traffic Separator

(27) Sta. "BR" 95+976.91 To Sta. "BR" 95+989.29, Lt.
Const. Conc. Shldr. Barrier (Reflectorized) - 11.8 m
Pin Barrier To Rdwy.
Grout Barrier (Plug Scuppers)
Flare Rate=0, W=0, E=0.6 m
Const. Conc. Barrier Transition To Bridge Rail

(28) Sta. "BR" 95+989.29 To Sta. "BR" 96+024.96, Lt.
Const. Cast-In-Place Conc. Shldr. Barrier (Reflectorized) - 32.0 m
Flare Rate=0, W=0, E=0.6 m

(29) Sta. "LE" 95+976.37 To Sta. "LE" 96+195.29, Rt.
Const. Conc. Shldr. Barrier (Reflectorized) - 218.9 m
Grout Barrier (Plug Scuppers)
Flare Rate=0, W=0, E=0
Const. Conc. Barrier Transition To Bridge Rail

(30) Sta. "SC" 96+000.06 To Sta. "SC" 96+099.79, Lt.
Const. Conc. Shldr. Barrier (Reflectorized) - 99.7 m
Pin Barrier To Rdwy.
Grout Barrier (Plug Scuppers)
Flare Rate=0, W=0, E=0.6 m

(31) Sta. "LW" 95+811.13 To Sta. "LW" 95+905.69, Rt.
Const. Single Slope Conc. Barrier Mod. - 94.6 m
Connect To Mod. Median Barrier On Bridge Deck
(For Details, See Shts. 2B-4, 2B-5, 2B-7, 2B-12 & Bridge Drgs.)

(32) Sta. "LW" 95+967.74 To Sta. "LW" 96+200.44, Rt.
Const. Single Slope Conc. Barrier (Reflectorized) - 232.8 m
Flare Rate=0, W=0, E=0
Connect To Extg. Conc. Barrier
(For Details, See Shts. 2B-4 & 2B-5)

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

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

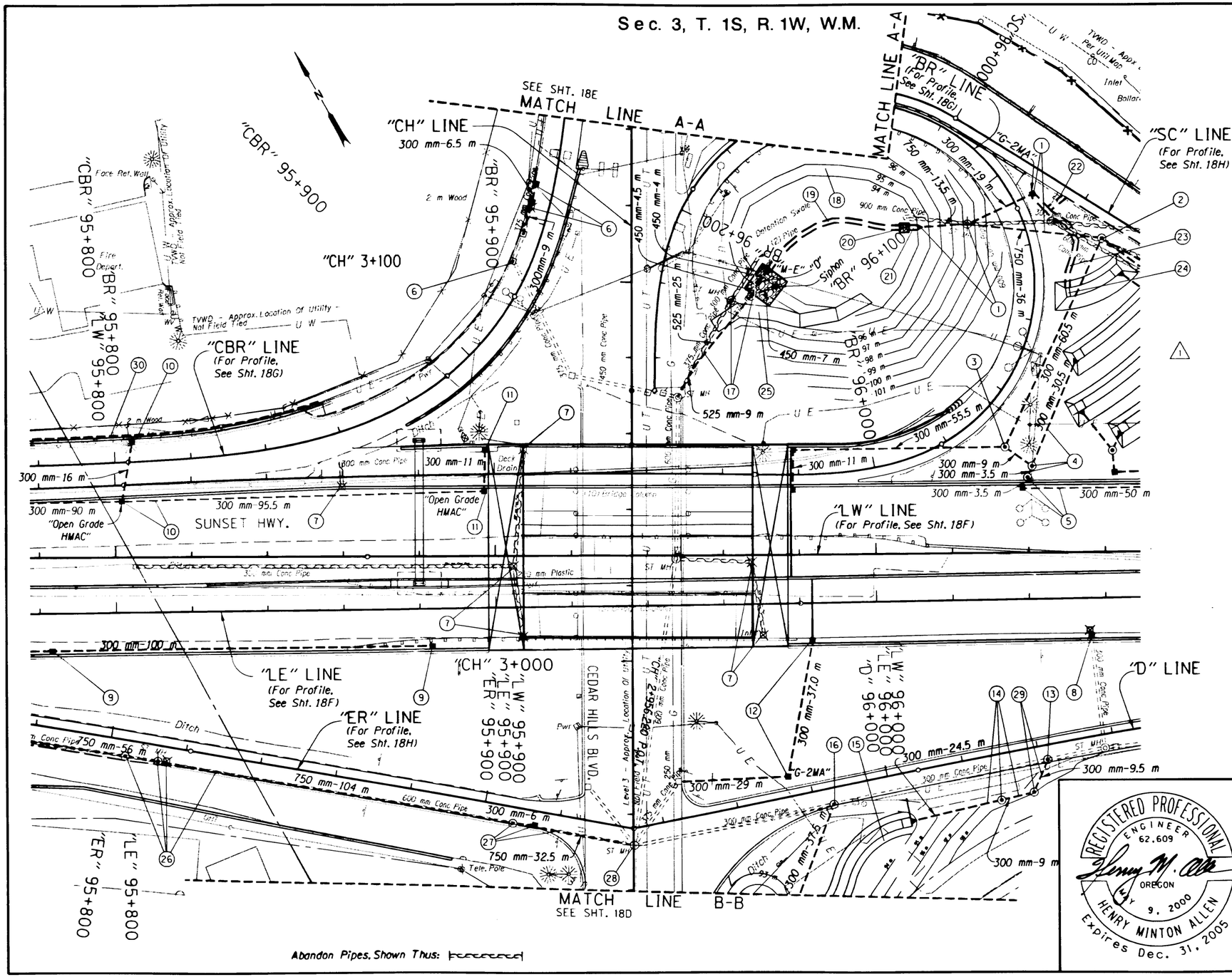
US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

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

GENERAL CONSTRUCTION NOTES

SHEET NO. 18A

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



Revised 2/18/2004

1 Removed Bubble & Leader Line

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 - Henry M. Allen
Drafted By - Tien Nguyen

DRAINAGE & UTILITIES

SHEET NO. 18B

① Sta. "BR" 96+092.55, Lt.
Remove Manhole
Const. Manhole, Large, 1500 mm Dia.
Const. Type "G-2MA" Inlet
Inst. 300 mm Storm Sew. Pipe - 19.0 m
3 m Depth
Inst. 750 mm Storm Sew. Pipe - 49.5 m
6 m Depth
Const. Paved End Slope - 4.6 m^2

② Sta. "SC" 96+049.10, Rt.
Const. Manhole, Large, 1500 mm Dia.
Const. Type "G-1" Inlet - 4
Inst. 300 mm Storm Sew. Pipe - 136 m
3 m Depth
Inst. 750 mm Storm Sew. Pipe - 69.0 m
6 m Depth
Const. Paved End Slope - 4
9.6 m^2 (Total)

③ Sta. "BR" 96+030.25, Rt.
Const. Manhole
Const. Type "G-2" Open Graded HMAC Inlet - 2
Inst. 300 mm Storm Sew. Pipe - 11.0 m
1.5 m Depth
Inst. 300 mm Storm Sew. Pipe - 64.5 m
3 m Depth
Const. Wearing Surface Drain - 32.0 m
Const. Wearing Surface Drain Outlet - 2
(See Drg. No. RD314)

④ Sta. "LW" 96+041.03, Lt.
Const. Manhole, Type Diversion, "High-Low"
Inst. 300 mm Storm Sew. Pipe - 34.0 m
1.5 m Depth
Const. Paved End Slope - 2.4 m^2
(For Details, See Sht. GHJ-19)

⑤ Sta. "LW" 96+039.85, Lt.
Const. Manhole, Type Pollution Control
Const. Type "G-2" Open Graded HMAC Inlet - 2
Inst. 300 mm Storm Sew. Pipe - 53.5 m
1.5 m Depth
(For Details, See Sht. GHJ-30)

⑥ Sta. "CBR" 95+936.03, Lt.
Remove Inlet
Adjust Inlet - 2
Const. Type "G-2" Inlet - 2
Inst. 300 mm Storm Sew. Pipe - 6.5 m
1.5 m Depth
Inst. 300 mm Storm Sew. Pipe - 9.0 m
3 m Depth

⑦ Remove Inlet - 6

⑧ Sta. "LE" 96+056.07, Rt.
Remove Inlet
Const. Type "G-2" Open Graded HMAC Inlet
Remove Extg. Pipe - 1.5 m

⑨ Sta. "LE" 95+783.23, Rt.
Const. Type "G-2" Open Graded HMAC Inlet - 2
Inst. 300 mm Storm Sew. Pipe - 100.0 m
1.5 m Depth

⑩ Sta. "LW" 95+801.64, Lt.
Const. Type "G-2" Inlet
Const. Type "G-2" Open Graded HMAC Inlet
Inst. 300 mm Storm Sew. Pipe - 111.5 m
3 m Depth
Rock Exc. - 12 m^3

⑪ Sta. "LW" 95+897.15, Lt.
Const. Type "G-2" Inlet
Const. Type "G-2" Open Graded HMAC Inlet
Inst. 300 mm Storm Sew. Pipe - 11.0 m
3 m Depth

⑫ Sta. "D" 95+946.09, Rt.
Const. Type "G-2" Open Graded HMAC Inlet
Const. Type "G-2MA" Inlet
Inlet F.L. 92.800
Inst. 300 mm Storm Sew. Pipe - 66.0 m
1.5 m Depth
Inst. 3 Piece Elbow - 2
Inst. Slip Joint
Inst. Slope Anchor - 6
Connect To Extg.
Const. Wearing Surface Drain - 16.5 m
Const. Wearing Surface Drain Outlet
(For Details, See Sht. GHJ-4)

⑬ Sta. "D" 96+042.07, Rt.
Const. Manhole, Type Diversion, "High-Low"
Manhole Flow Line, See Sht. GHJ-18
(For Details, See Sht. GHJ-18)

⑭ Sta. "D" 96+028.13, Rt.
Const. Manhole, Type Pollution Control
Inst. 300 mm Storm Sew. Pipe - 33.5 m
6 m Depth
Manhole Flow Line 93.968
Outfall Flow Line 93.600
Const. Paved End Slope - 2.4 m^2
(For Details, See Sht. GHJ-29)

⑮ Const. Water-Quality Swale "S1"
(For Details, See Sht. GHJ-47)

⑯ Sta. "D" 95+984.89, Rt.
Const. Manhole, Mod.
Inst. 300 mm Storm Sew. Pipe - 37.5 m
1.5 m Depth
Manhole Flow Line Match Extg. (93.194±)
Outfall Flow Line 90.950
Const. Paved End Slope - 2.4 m^2
(For Details, See Sht. GHJ-6)

⑰ Sta. "BR" 96+250.48, Lt.
Remove Manhole
Reconst. Manhole
Const. Manhole, Large, 1800 mm Dia.
Remove Inlet
Const. Type "M-E" Inlet
Const. Type "D" Detention Modified Inlet
Const. Siphon Box
Reconst. Inlet
Remove Pipe - 15 m
Inst. 450 mm Storm Sew. Pipe - 15.5 m
3 m Depth
Inst. 525 mm Storm Sew. Pipe - 34.0 m
3 m Depth
Connect To Extg.
Const. Loose Riprap Blanket (Class 50) - 60 MG
8 m Wide x 8 m Long x 0.45 m Thick Around Inlets
Riprap Geotextile, Type 2 - 80 m^2
Tr. Resurf. - 18 m^2
(For Details, See Shts. GHJ-5 & GHJ-6)

⑱ Regrade Detention Basin
Clearing And Grubbing - 0.8 ha
Gen. Exc. - 4500 m^3
(For Details, See Sht. GHJ-44)

⑲ Sta. "BR" 96+115.61, Lt.
Const. Loose Riprap Channel (Class 25) - 240 MG
Riprap Geotextile, Type 2 - 270 m^2
(For Details, See Sht. GHJ-8)

⑳ Sta. "BR" 96+110.69, Lt.
Const. Loose Riprap Basin (Class 100) - 44 MG
Riprap Geotextile, Type 2 - 60 m^2
(For Details, See Sht. GHJ-9)

㉑ Sta. "BR" 96+103.82, Lt.
Const. Loose Riprap Channel (Class 350) - 26 MG
Riprap Geotextile, Type 2 - 25 m^2
(For Details, See Sht. GHJ-8)

㉒ Sta. "SC" 96+034.54, Rt.
Const. Loose Riprap Channel (Class 25) - 22 MG
Riprap Geotextile, Type 2 - 34 m^2
Dt. Exc. - 14 m^3
(For Details, See Sht. GHJ-8)

㉓ Sta. "BR" 96+068.63, Rt.
Const. Loose Riprap Channel (Class 25) - 130 MG
Riprap Geotextile, Type 2 - 204 m^2
Dt. Exc. - 81 m^3
(For Details, See Sht. GHJ-8)

㉔ Sta. "BR" 96+067.66, Rt.
Const. Loose Riprap Basin (Class 25) - 2.5 MG
Riprap Geotextile, Type 2 - 6.5 m^2
(For Details, See Sht. GHJ-9)

㉕ Const. Access Road
Aggregate Base (75mm - 0) - 110 MG
Subgrade Geotextile - 191 m^2
(For Details, See Sht. GHJ-7)

㉖ Sta. "ER" 95+804.38, Rt.
Remove Manhole
Const. Manhole, Large, 1500 mm Dia.
Remove Inlet
Remove Pipe - 104.0 m
Inst. 750 mm Storm Sew. Pipe - 104.0 m
6 m Depth

㉗ Sta. "ER" 95+908.02, Rt.
Const. Manhole, Large, 1500 mm Dia.
Const. Type "G-2" Inlet
Remove Pipe - 32.5 m
Inst. 300 mm Storm Sew. Pipe - 6.0 m
3 m Depth
Inst. 750 mm Storm Sew. Pipe - 32.5 m
6 m Depth
Tr. Resurf. - 32 m^2

㉘ Sta. "ER" 95+940.44, Rt.
Remove Manhole
Const. Manhole, Large, 2400 mm Dia.
Connect To Extg. - 6

㉙ Sta. "D" 96+036.93, Rt.
Const. Manhole
Inst. 300 mm Storm Sew. Pipe - 9.5 m,
3 m Depth
Manhole Flow Line 94.100 W., 95.542 E.

㉚ Sta. "CBR" 95+773.05 To Sta. "CBR" 95+857.74, Lt.
Const. Conc. Barrier Drain - 83.0 m
Drain To Gutter
Emb. In Place - 40 m^3
(For Details, See Sht. GHJ-1)

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

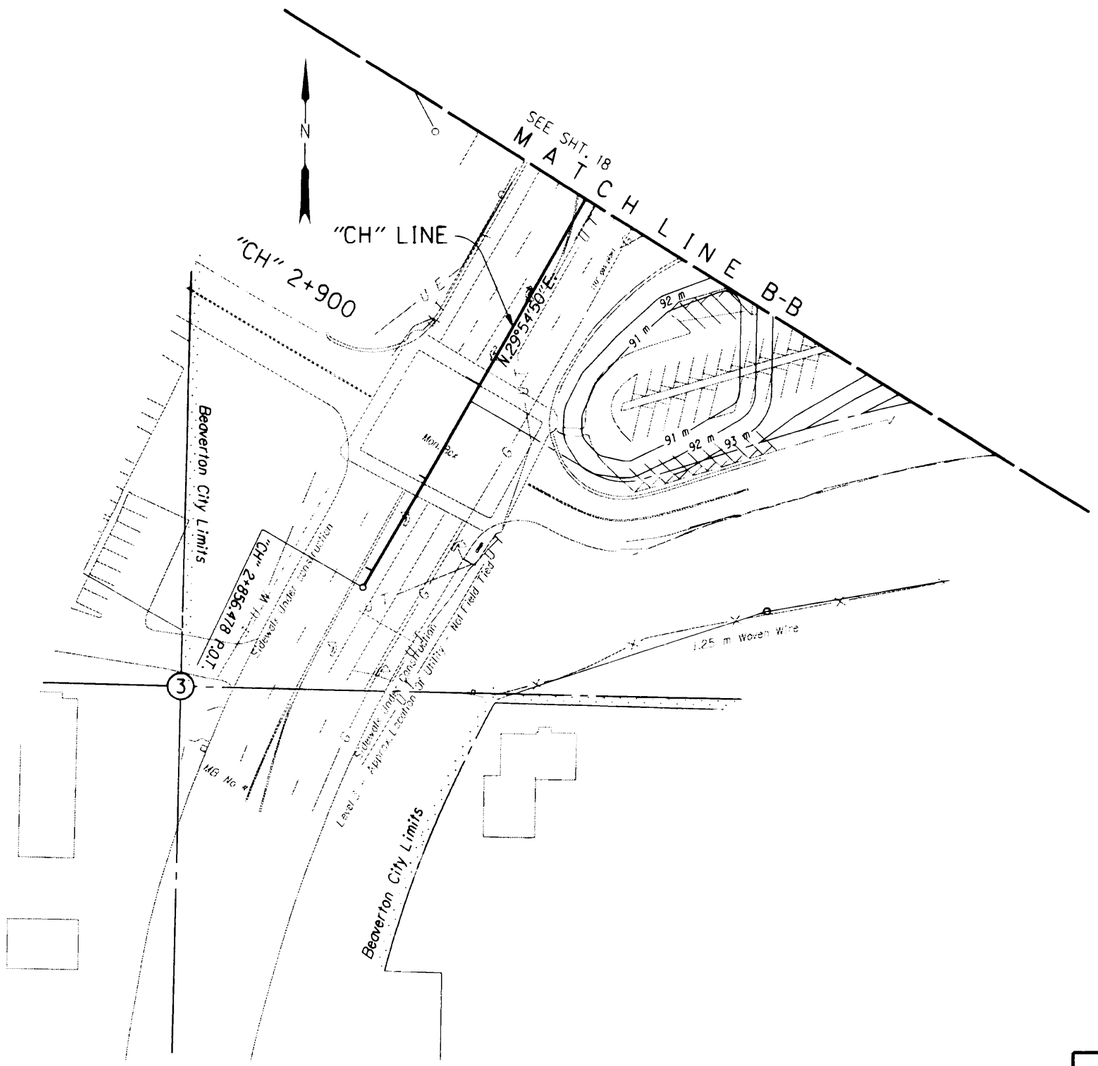
Design Team Leader - Eileen J. Phelan
Designed By - Henry M. Allen
Drafted By - Tien Nguyen

DRAINAGE & UTILITIES NOTES

SHEET NO. 18B-2

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

37V-41



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

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

GENERAL CONSTRUCTION

SHEET NO. 18C

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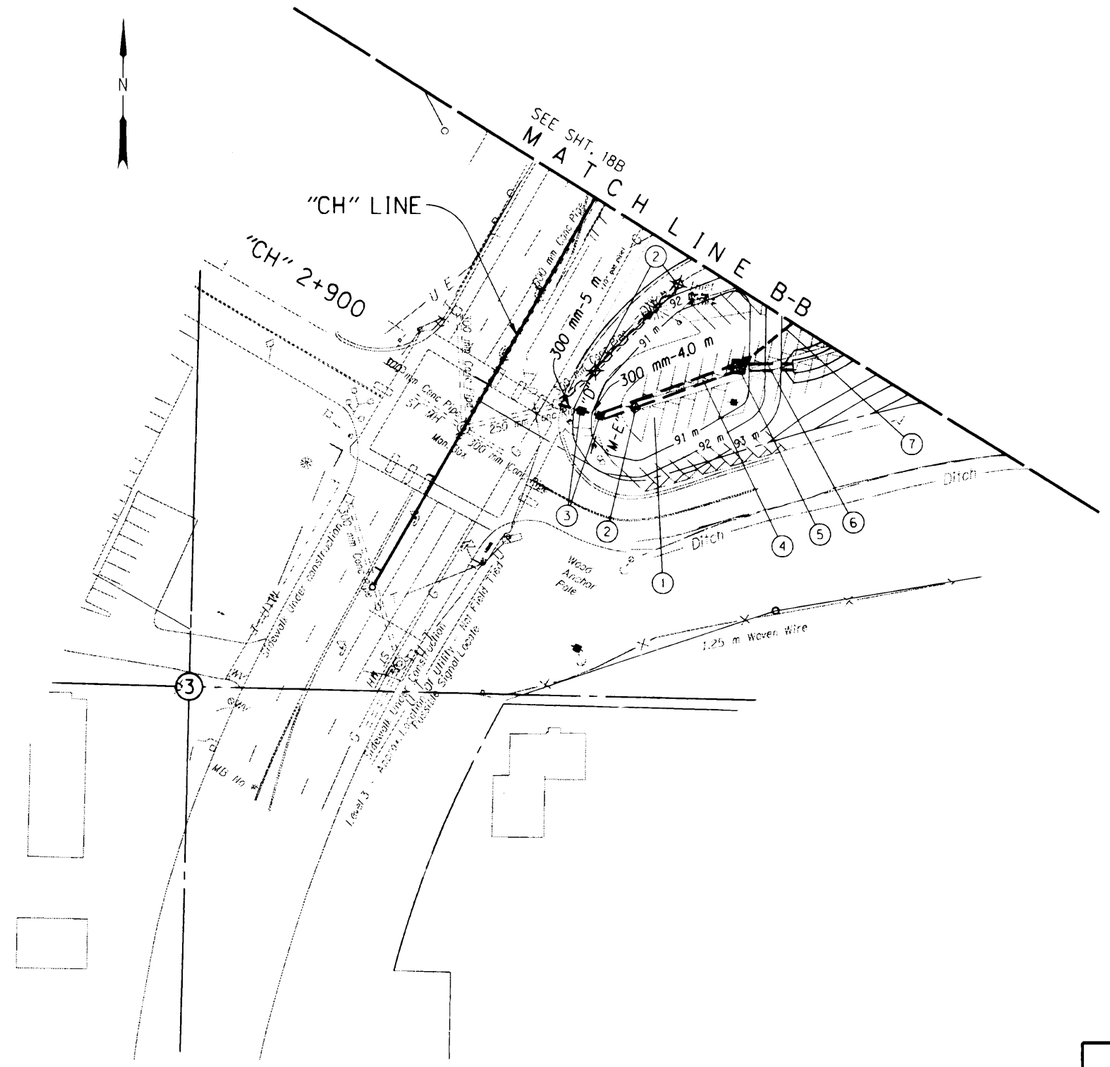
Sec. 3, T. 1S, R. 1W, W.M.

37V-41



(1) *Const. Detention Basin*
Removal Of Pvmt. - 1880 m²
Clearing And Grubbing - 0.2 ha
Gen. Exc. - 3600 m³
(For Details, See Sht. GHJ-46)

(2) *Remove Inlet - 3*
Remove Pipe - 32 m

(3) *Sta. "D" 95+933.98, Rt.*
Const. Type "M-E" Detention Modified Inlet
Const. Type "D" Inlet
Lip Elev. 91.550
Inst. 300 mm Storm Sew. Pipe - 9 m
1.5 m Depth
Connect To Existing
Trench Resurfacing - 2 m²
(For Details, See Sht. GHJ-5)

(4) *Sta. "D" 95+963.17, Rt.*
Const. Loose Riprap Channel (Class 25) - 162 MG
Riprap Geotextile, Type 2 - 165 m²
(For Details, See Sht. GHJ-8)

(5) *Sta. "D" 95+964.14, Rt.*
Const. Loose Riprap Basin (Class 25) - 18 MG
Riprap Geotextile, Type 2 - 16 m²
(For Details, See Sht. GHJ-9)

(6) *Sta. "D" 95+973.85, Rt.*
Const. Loose Riprap Channel (Class 25) - 41 MG
Riprap Geotextile, Type 2 - 58 m²
(For Details, See Sht. GHJ-8)

(7) *See Sht. 18B-2, Note 16*

REGISTERED PROFESSIONAL ENGINEER
62,609
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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 - Henry M. Allen
Drafted By - Tien Nguyen

DRAINAGE & UTILITIES

SHEET NO. 18D

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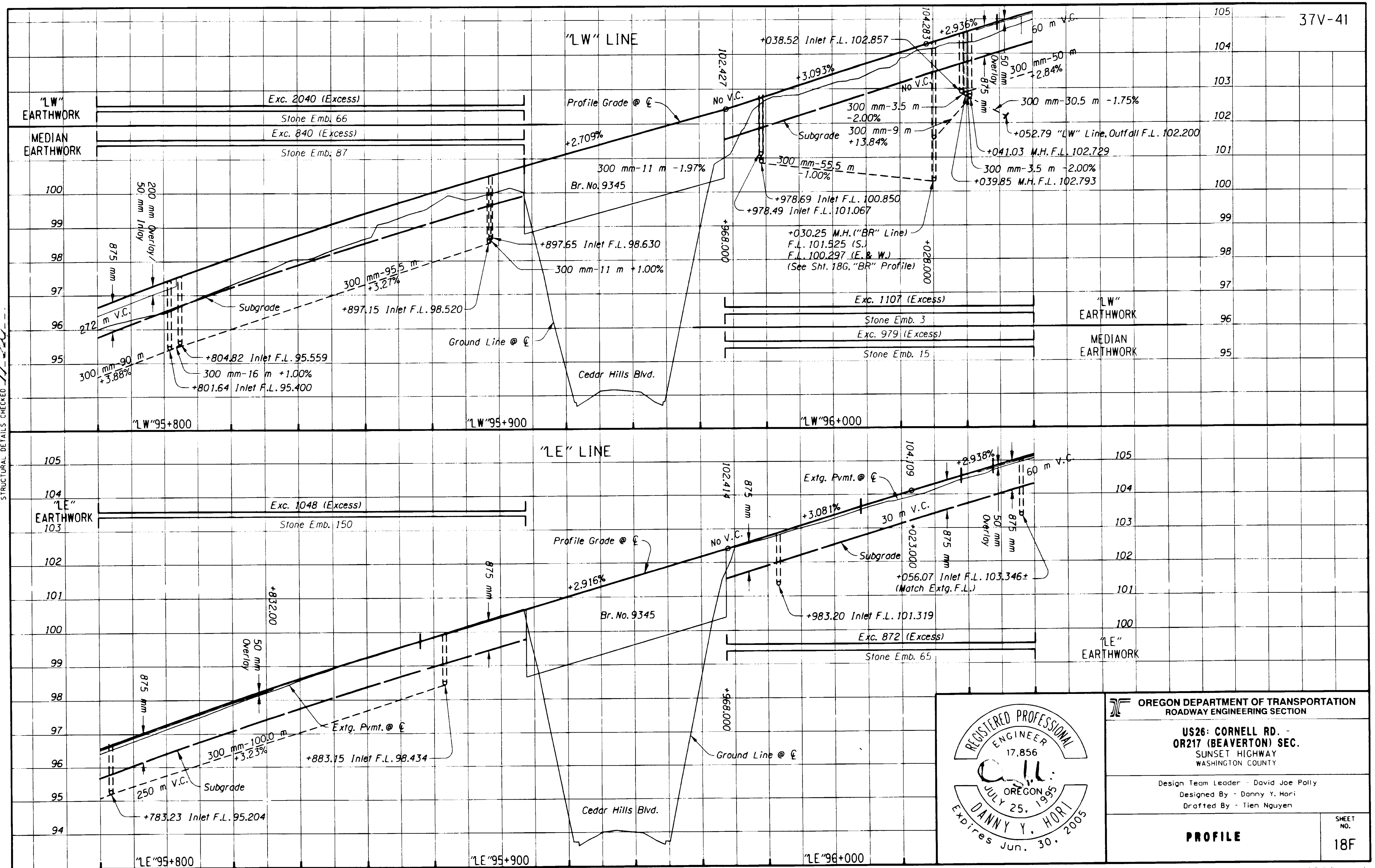
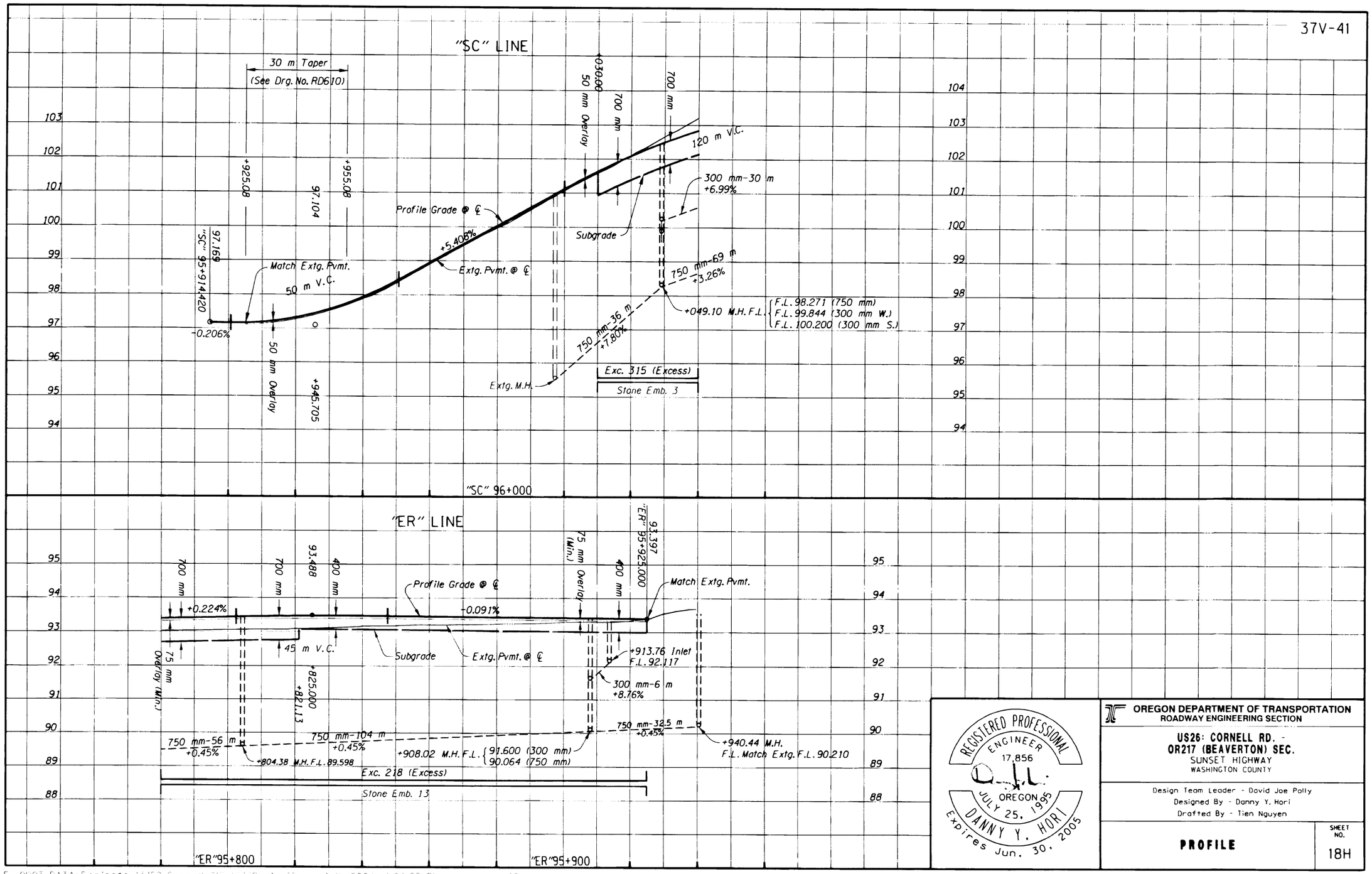


37V-41
"LW" LINE
"LW" EARTHWORK
Exc. 2040 (Excess)
Stone Emb. 66
MEDIAN EARTHWORK
Exc. 840 (Excess)
Stone Emb. 87
Profile Grade @ ℄
+2.709%
No V.C.
102.427
+038.52 Inlet F.L. 102.857
104.283
+2.936%
60 m V.C.
+3.093%
300 mm-50 m +2.84%
50 mm Overlay
875 mm
No V.C.
300 mm-3.5 m -2.00%
300 mm-30.5 m -1.75%
Subgrade
300 mm-9 m +13.84%
+052.79 "LW" Line, Outfall F.L. 102.200
+041.03 M.H. F.L. 102.729
300 mm-55.5 m -1.00%
300 mm-3.5 m -2.00%
+039.85 M.H. F.L. 102.793
300 mm-11 m -1.97%
Br. No. 9345
+978.69 Inlet F.L. 100.850
+978.49 Inlet F.L. 101.067
+968.000
+030.25 M.H. ("BR" Line)
F.L. 101.525 (S.)
F.L. 100.297 (E. & W.)
(See Sht. 18G, "BR" Profile)
+028.000
200 mm Overlay/ 50 mm Inlay
875 mm
+897.65 Inlet F.L. 98.630
300 mm-11 m +1.00%
300 mm-95.5 m +3.27%
272 m V.C.
Subgrade
+897.15 Inlet F.L. 98.520
Ground Line @ ℄
300 mm-90 m +3.88%
+804.82 Inlet F.L. 95.559
300 mm-16 m +1.00%
+801.64 Inlet F.L. 95.400
Cedar Hills Blvd.
Exc. 1107 (Excess)
Stone Emb. 3
Exc. 979 (Excess)
Stone Emb. 15
"LW" EARTHWORK
MEDIAN EARTHWORK
"LW"95+800
"LW"95+900
"LW"96+000
"LE" LINE
"LE" EARTHWORK
Exc. 1048 (Excess)
Stone Emb. 150
102.414
875 mm
104.109
Extg. Pvmt. @ ℄
+2.938%
60 m V.C.
+3.081%
30 m V.C.
+023.000
875 mm
50 mm Overlay
875 mm
Profile Grade @ ℄
No V.C.
Subgrade
+056.07 Inlet F.L. 103.346±
(Match Extg. F.L.)
+2.916%
875 mm
+832.00
Br. No. 9345
+983.20 Inlet F.L. 101.319
Exc. 872 (Excess)
Stone Emb. 65
"LE" EARTHWORK
50 mm Overlay
875 mm
Extg. Pvmt. @ ℄
300 mm-100.0 m +3.23%
+883.15 Inlet F.L. 98.434
+968.000
Ground Line @ ℄
250 m V.C.
Subgrade
+783.23 Inlet F.L. 95.204
Cedar Hills Blvd.
"LE"95+800
"LE"95+900
"LE"96+000
105 104 103 102 101 100 99 98 97 96 95 94
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.
18F
STRUCTURAL DETAILS CHECKED



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ROADWAY ENGINEERING SECTION

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SUNSET HIGHWAY
WASHINGTON COUNTY

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

PROFILE

SHEET NO. 18H

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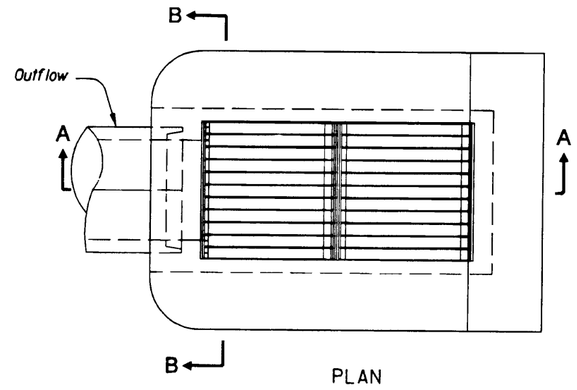
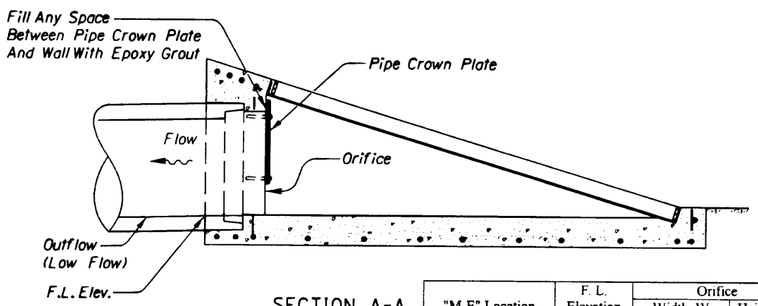
TYPE "M-E" DETENTION MODIFIED INLET



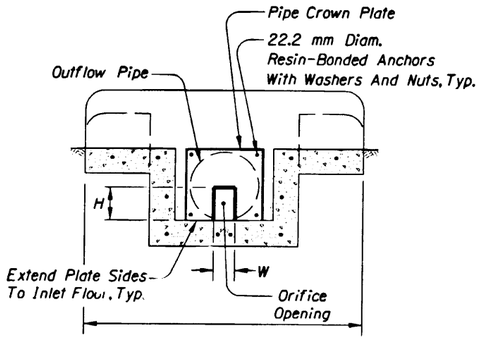
PLAN

Note:
1. For Details Not Shown, See RD368 And Sht. GHJ-20
2. Curved Edge Not Required On M-E Inlet.



SECTION A-A

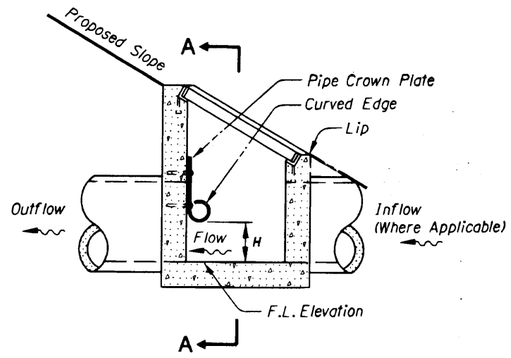
"M-E" Location	F. L. Elevation (m)	Orifice Width, W (mm)	Orifice Height, H (mm)
Sta. "CB" 92+305	66.540	25	150
Sta. "LE" 93+452	69.961	25	150
Sta. "MC" 93+920	74.158	25	150
Sta. "LW"94+062	72.000	62	75
Sta. "D"95+942	90.800	100	100



SECTION B-B

Notes:
1. Extg. Pipe 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 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.
10. All Dimensions Are In Millimeters (mm) Unless Otherwise Noted.

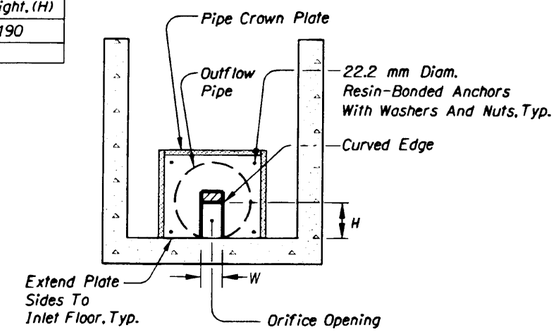
TYPE "D" DETENTION MODIFIED INLET



ELEVATION

Note:
1. For Details Not Shown, See RD370 And GHJ-20

"D" Location	F.L. Elevation	Orifice Width, (W)	Orifice Height, (H)
Sta. "BR"96+214.25	93.079	190	190



SECTION A-A

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

OREGON DEPARTMENT OF TRANSPORTATION
GEO / HYDRO SECTION

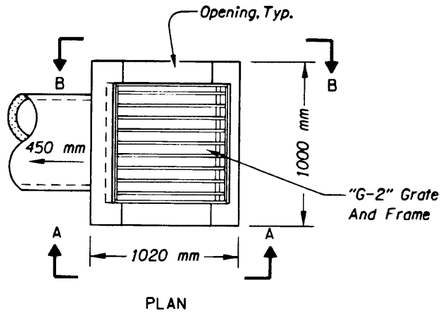
US26: CORNELL RD. -
OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

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

WATER QUALITY DETAILS

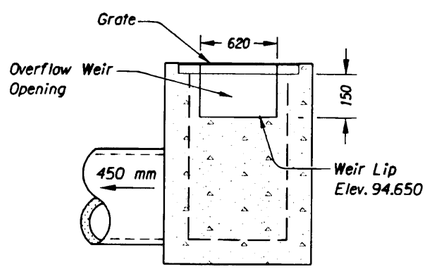
SHEET NO. GHJ-5

SIPHON BOX WITH "G-2" GRATE

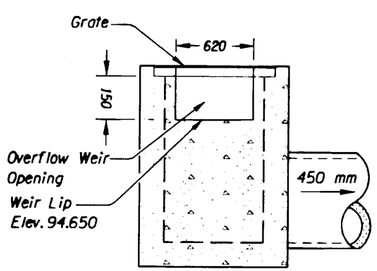


PLAN

Note:
For Details Not Shown, See RD364 & RD376

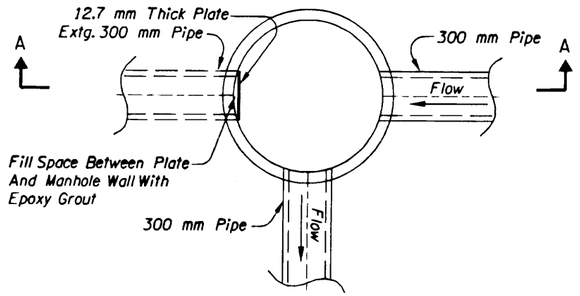


SECTION A-A

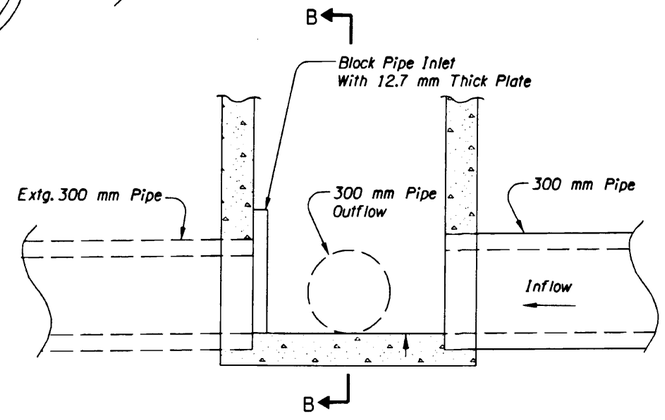


SECTION B-B

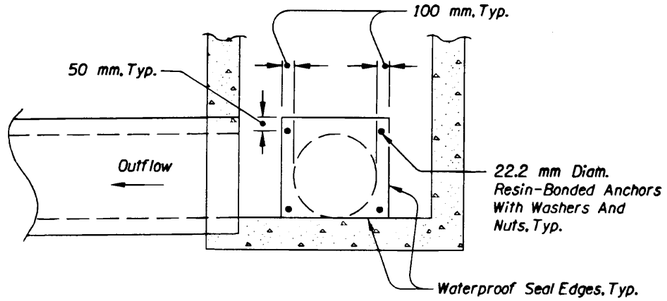
MANHOLE MODIFIED



PLAN



SECTION A-A



SECTION B-B

Note:
For Details Not Shown, See Sht. GHJ-20

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

REGISTERED PROFESSIONAL ENGINEER
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OREGON
9, 2000
HENRY MINTON ALLEN
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OREGON DEPARTMENT OF TRANSPORTATION
GEO / HYDRO SECTION

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

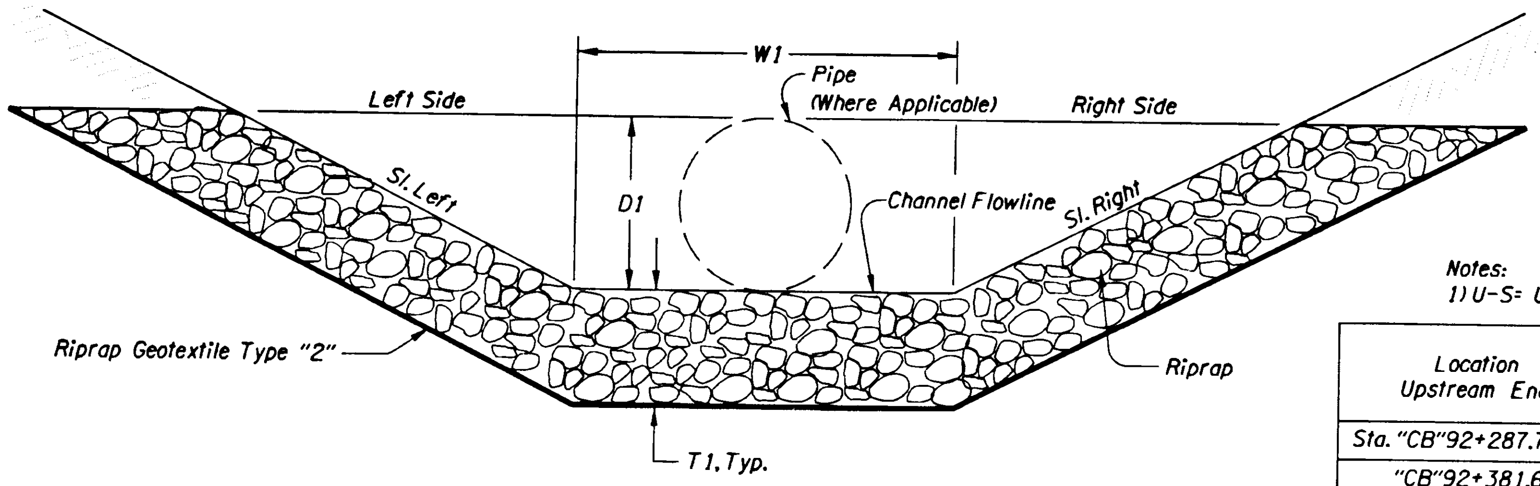
Project Leader - Naveen Chandra
Designed By - Henry M. Allen
Drafted By - Martin G. Casillas

WATER QUALITY DETAILS

SHEET NO. GHJ-6

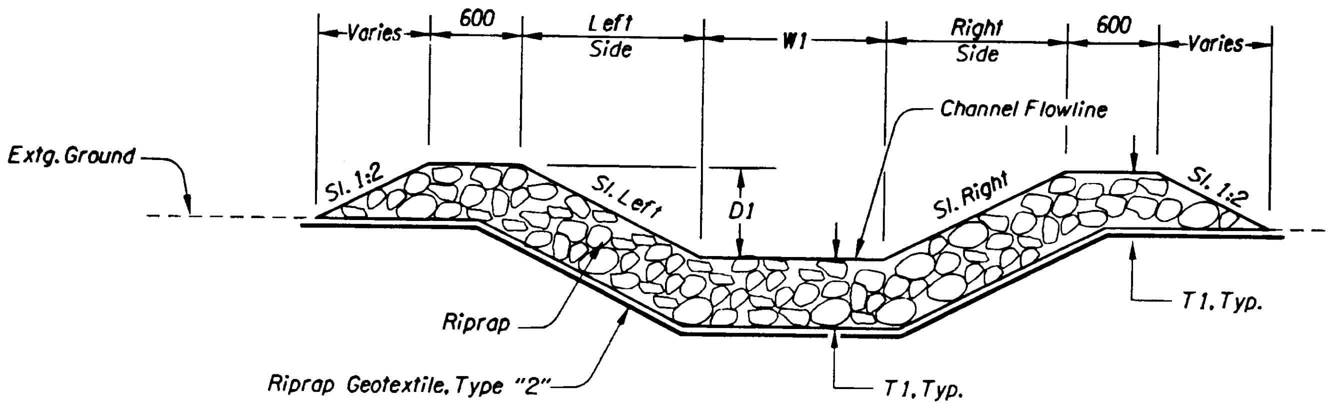
VIEW 3

RIPRAP CHANNEL



LOOKING DOWNSTREAM

RIPRAP CHANNEL, TYPE 1



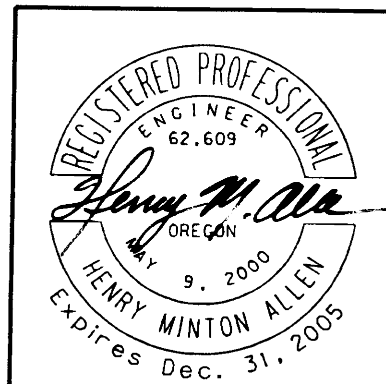
LOOKING DOWNSTREAM

RIPRAP CHANNEL, TYPE 2

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

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



OREGON DEPARTMENT OF TRANSPORTATION
GEO / HYDRO SECTION

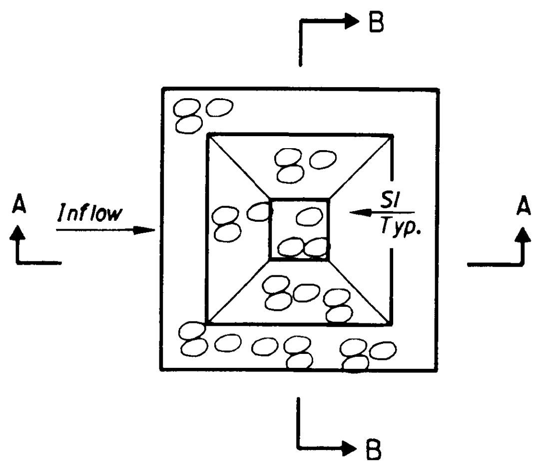
US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

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

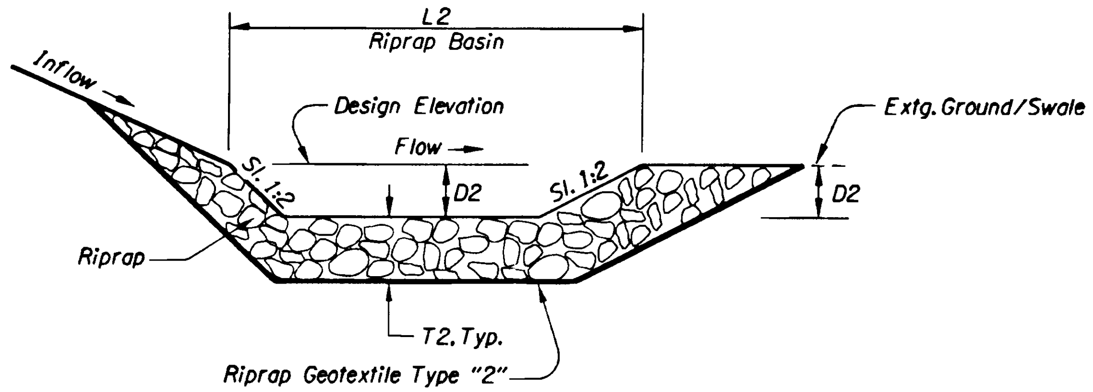
WATER QUALITY DETAILS

SHEET NO. GHJ-8

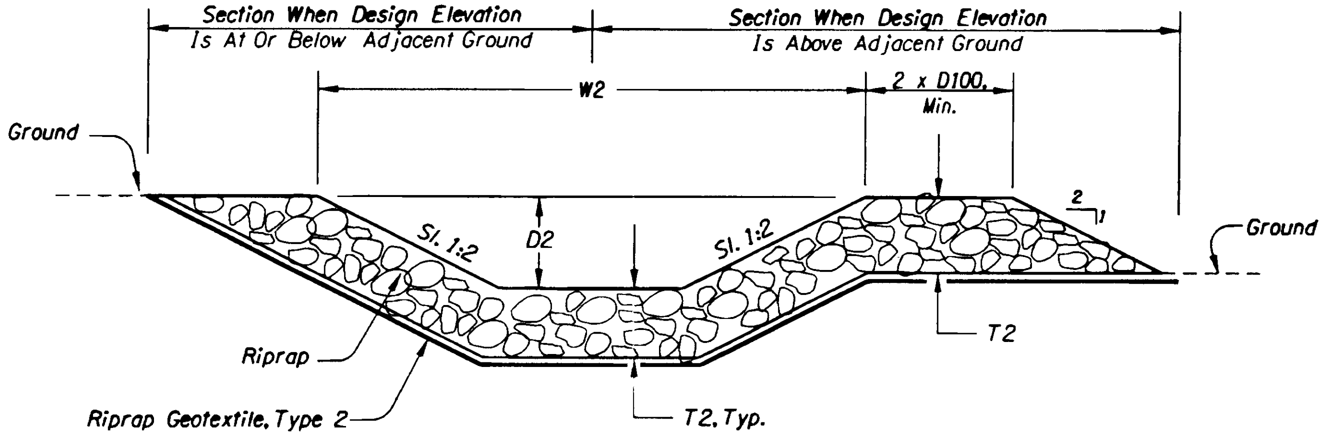
RIPRAP BASIN



PLAN



SECTION A - A



SECTION B - B

Location Center Of Basin	L2, (m)	W2, (m)	D2, (mm)	T2, (mm)	Design Elevation (m)	Riprap Class
Sta. "LE"95+107.49, Rt.	5	5	450	450	59.750	25
"LE"95+268.02, Rt	5.8	3.8	750	600	71.800	100
"LW"95+309.62, Lt.	3.6	3.6	600	600	70.100	50
"D"95+964.14, Rt	2.4	2.4	300	450	90.950	25
"SC"96+067.55, Rt	1	2.4	0	450	101.935	25
"BR"96+067.66, Rt	1	2.4	0	450	101.650	25
"BR"96+110.69, Rt.	4.8	4.8	1200	600	93.900	100

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

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WASHINGTON COUNTY

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WATER QUALITY DETAILS

SHEET NO. GHJ-9

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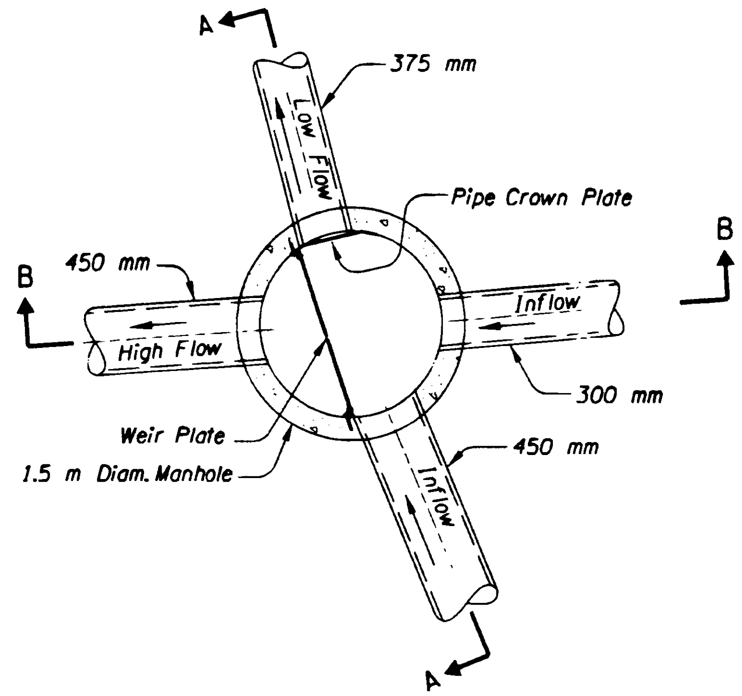
VIEW 3



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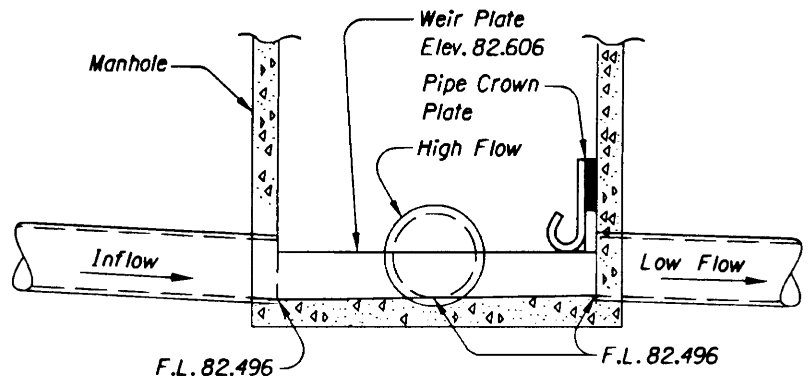
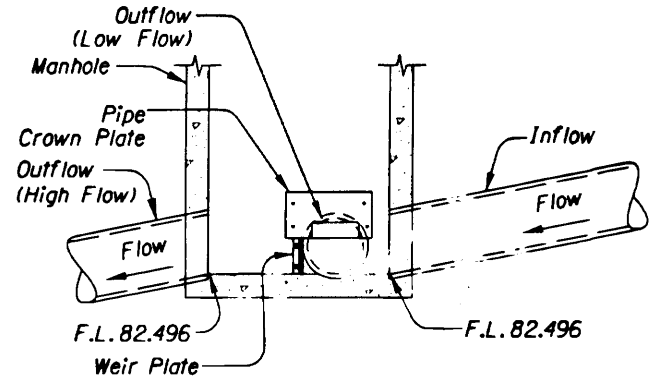


SECTION A-A

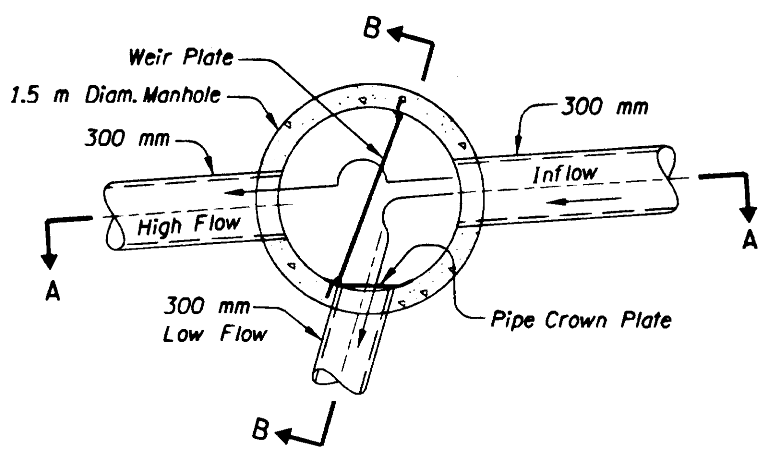


SECTION B-B

For Details Not Shown, See Sht. GHJ-20

DIVERSION MANHOLE "HIGH-LOW" LOW FLOW STRAIGHT THROUGH

Sta. "CBR"95+523, Lt.



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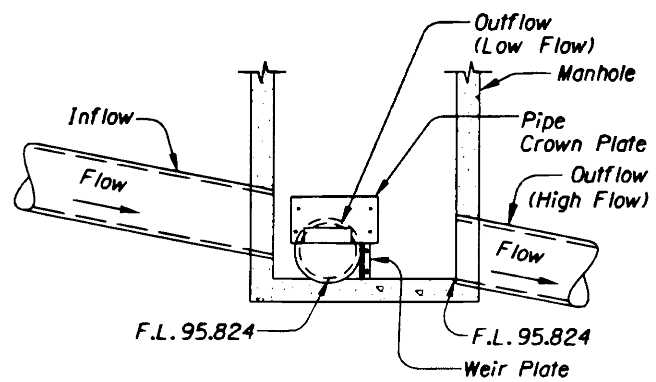

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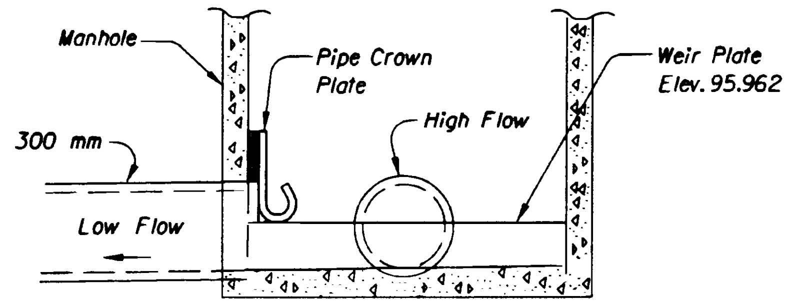

SECTION B-B

For Details Not Shown, See Sht. GHJ-20

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

Sta. "D"96+042, Rt.

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WASHINGTON COUNTY

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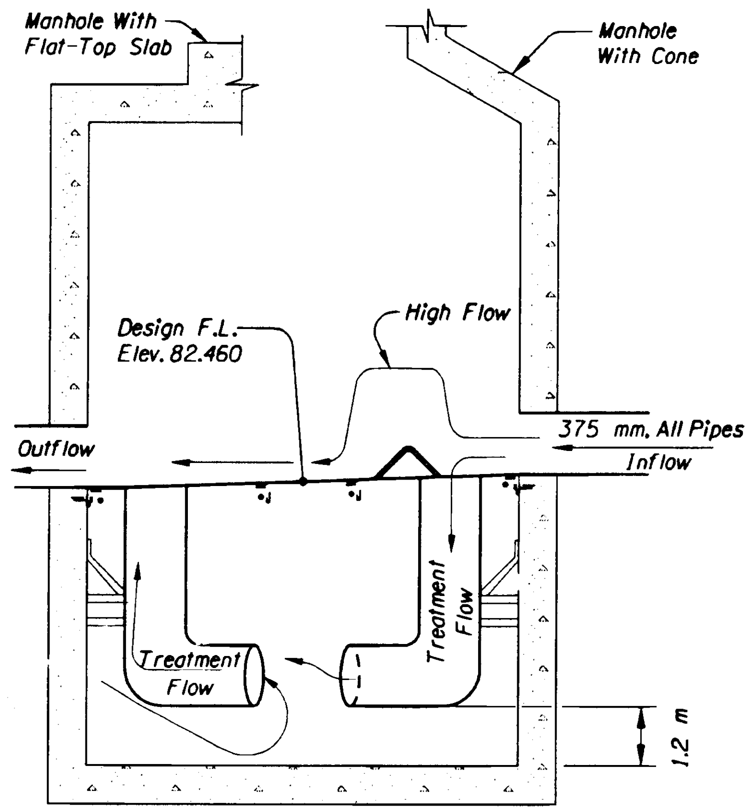
Drafted By - Martin G. Casillas

WATER QUALITY DETAILS

SHEET NO. GHJ-18



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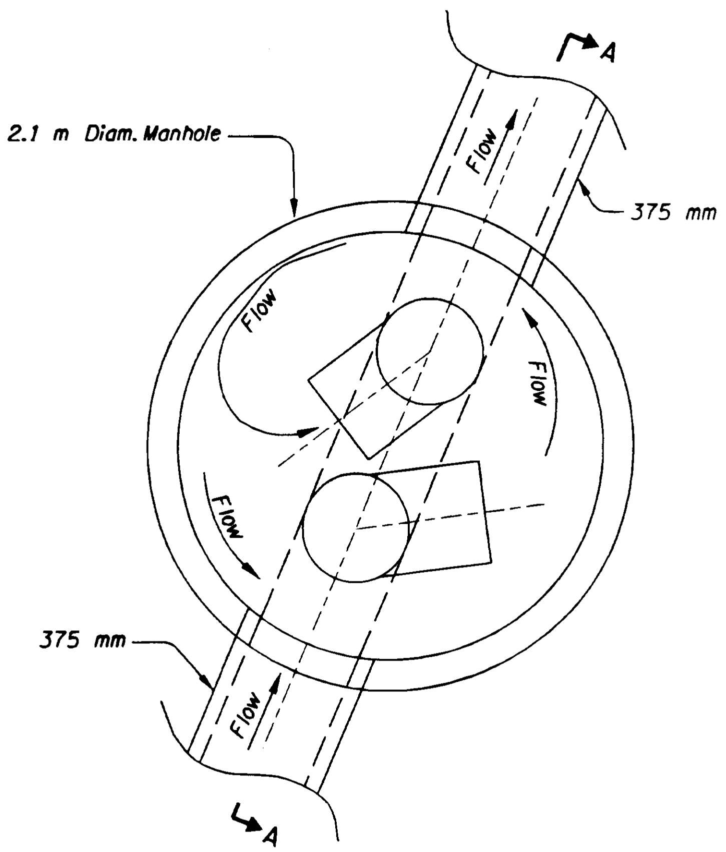
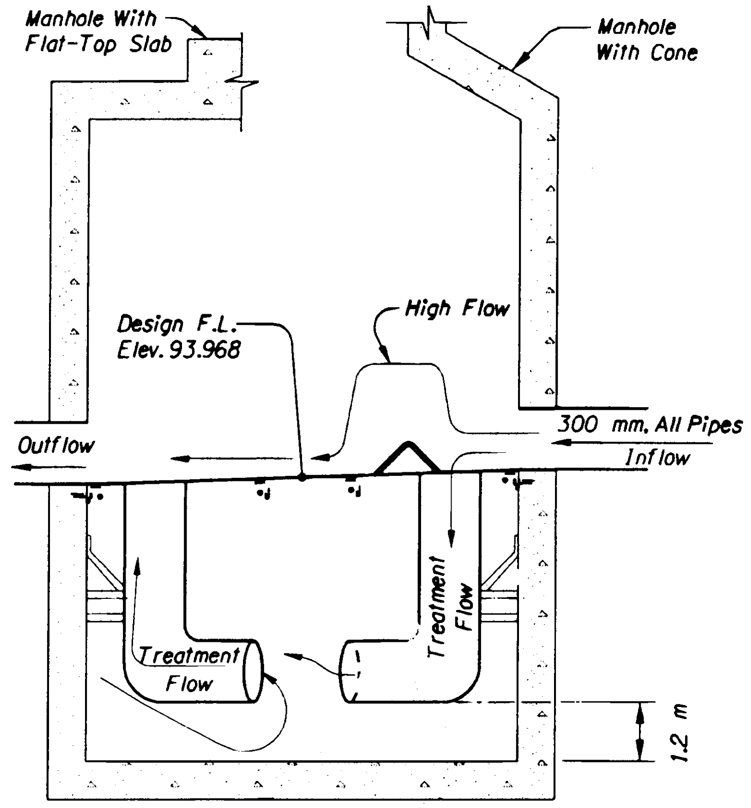


PLAN

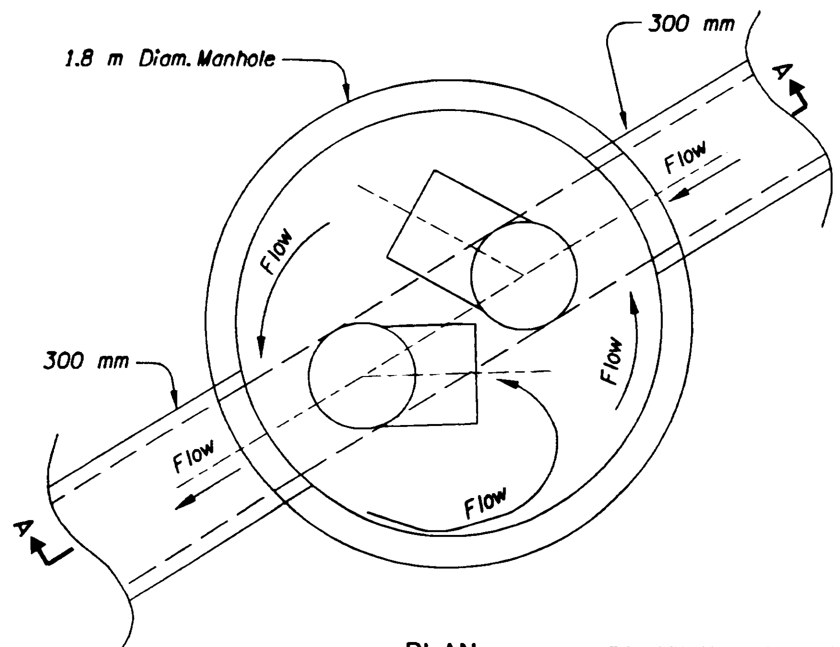
For Details Not Shown, See Sht. GHJ-31

POLLUTION CONTROL MANHOLE

Sta. "CBR"95+522, Lt.



SECTION A-A



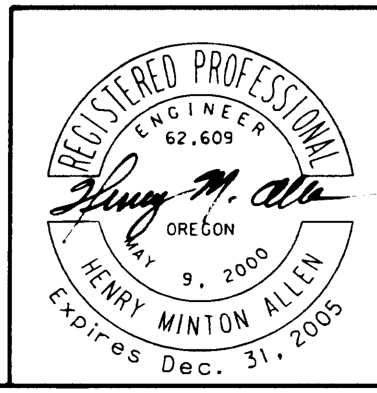
PLAN

For Details Not Shown, See Sht. GHJ-31

POLLUTION CONTROL MANHOLE

Sta. "D"96+028, Rt.

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



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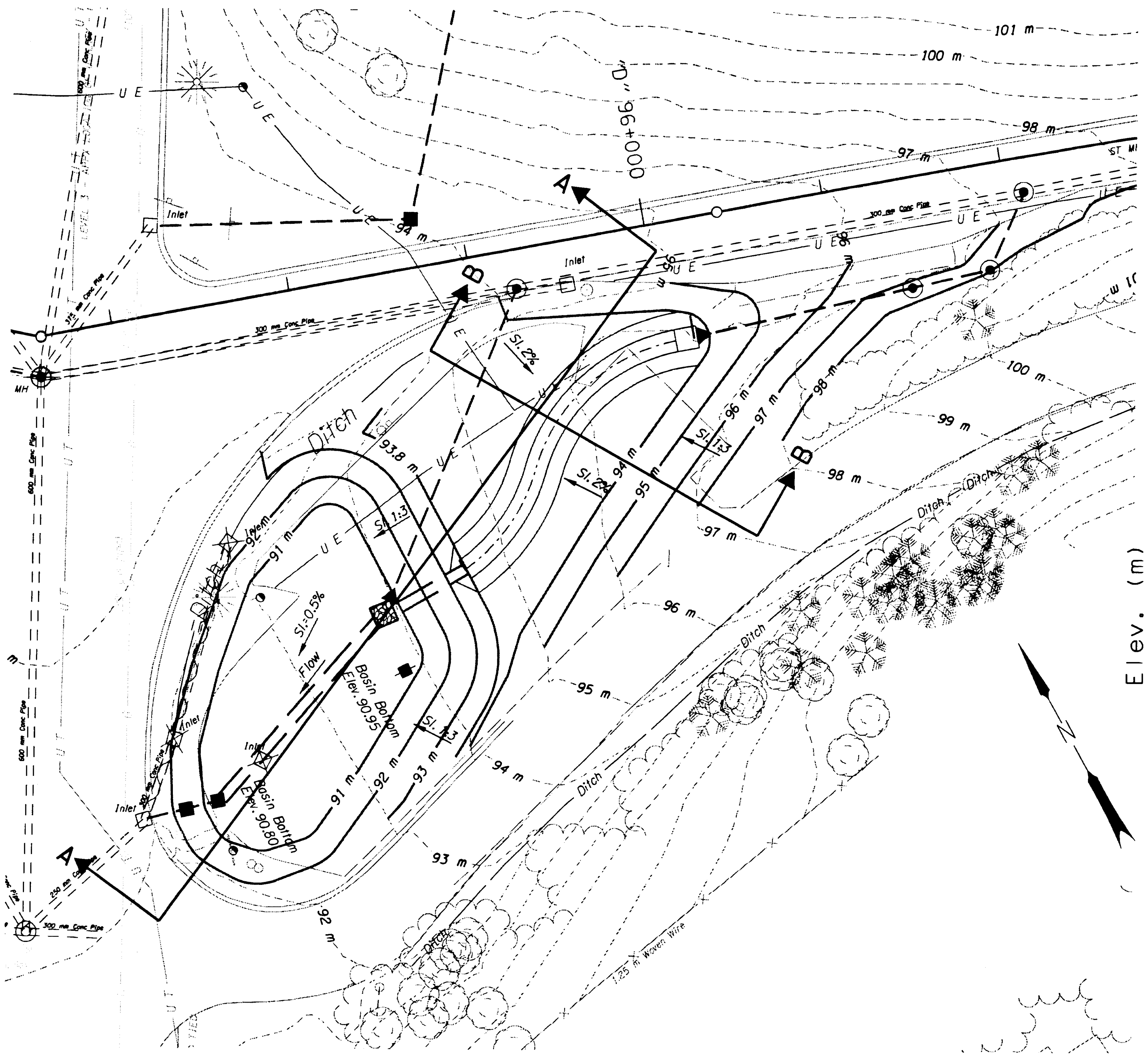
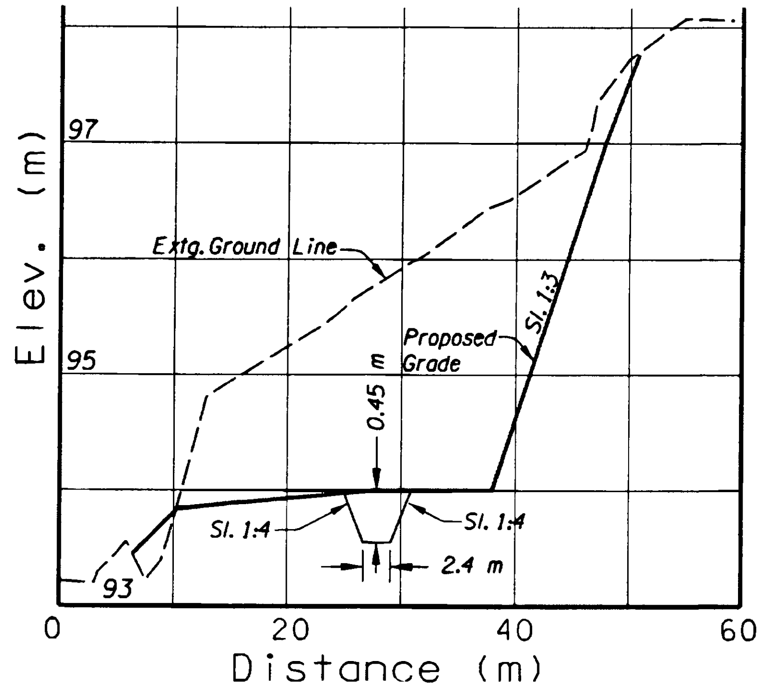
WATER QUALITY DETAILS

SHEET NO. GHJ-29

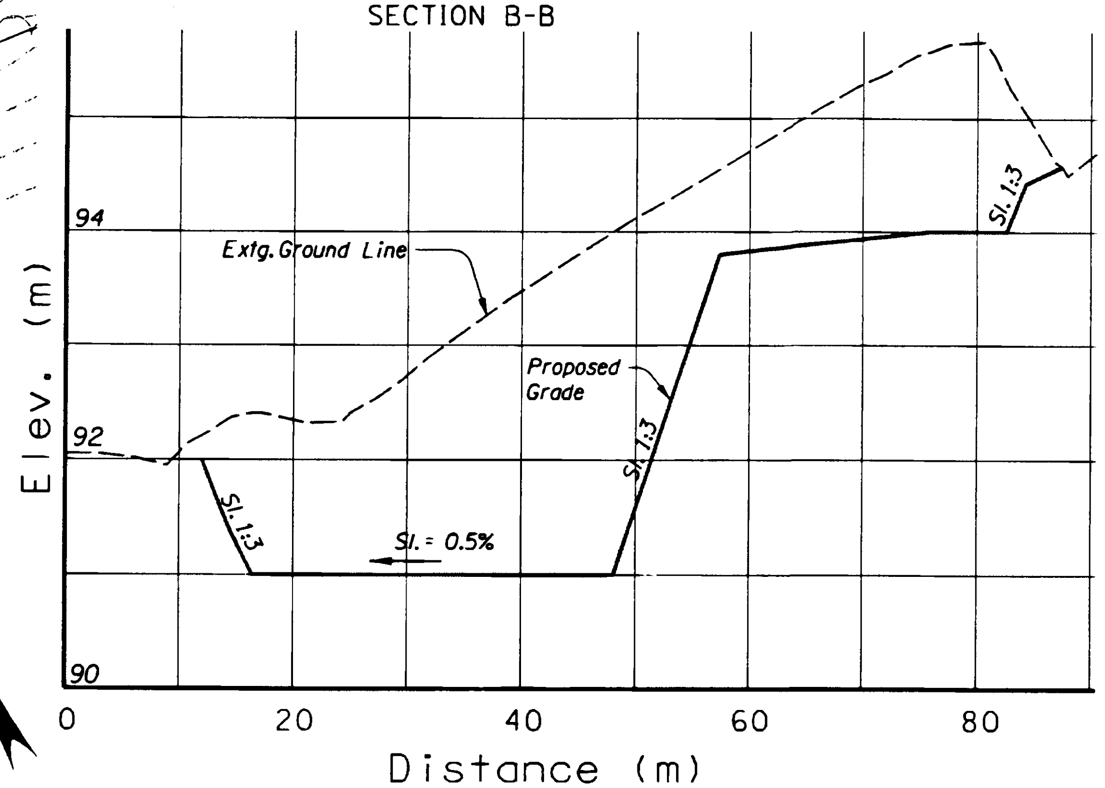
CEDAR HILLS BLVD. SE.

DETENTION BASIN GRADING





SECTION B-B



SECTION A-A

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

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

OREGON DEPARTMENT OF TRANSPORTATION
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SUNSET HIGHWAY
WASHINGTON COUNTY

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

WATER QUALITY PLAN

SHEET NO. GHJ-46

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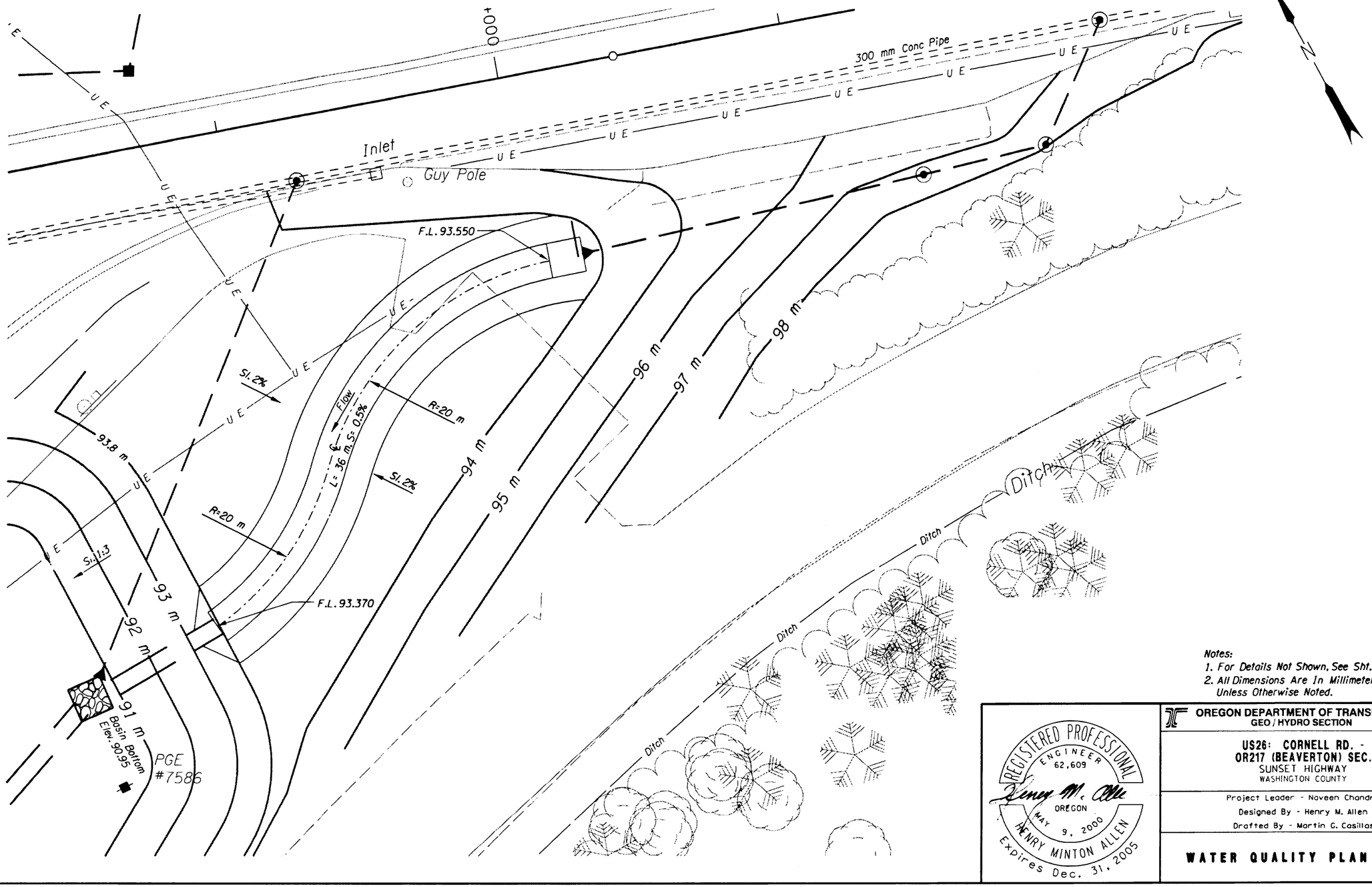
VIEW 3

VIEW 3

WATER QUALITY SWALE "S1"



Notes:

1. *For Details Not Shown, See Sht. GHJ-48.*
2. *All Dimensions Are In Millimeters (mm) Unless Otherwise Noted.*

REGISTERED PROFESSIONAL ENGINEER
62,609
OREGON
MAY 9, 2000
HENRY MINTON ALLEN
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WASHINGTON COUNTY

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Drafted By - Martin G. Casillas

WATER QUALITY PLAN

SHEET NO. GHJ-47

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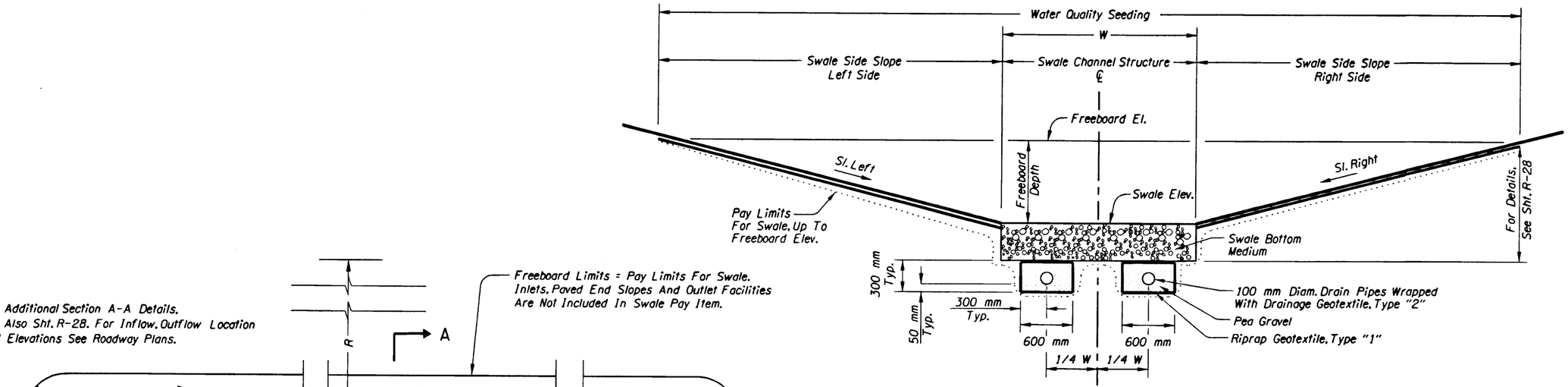
VIEW 4

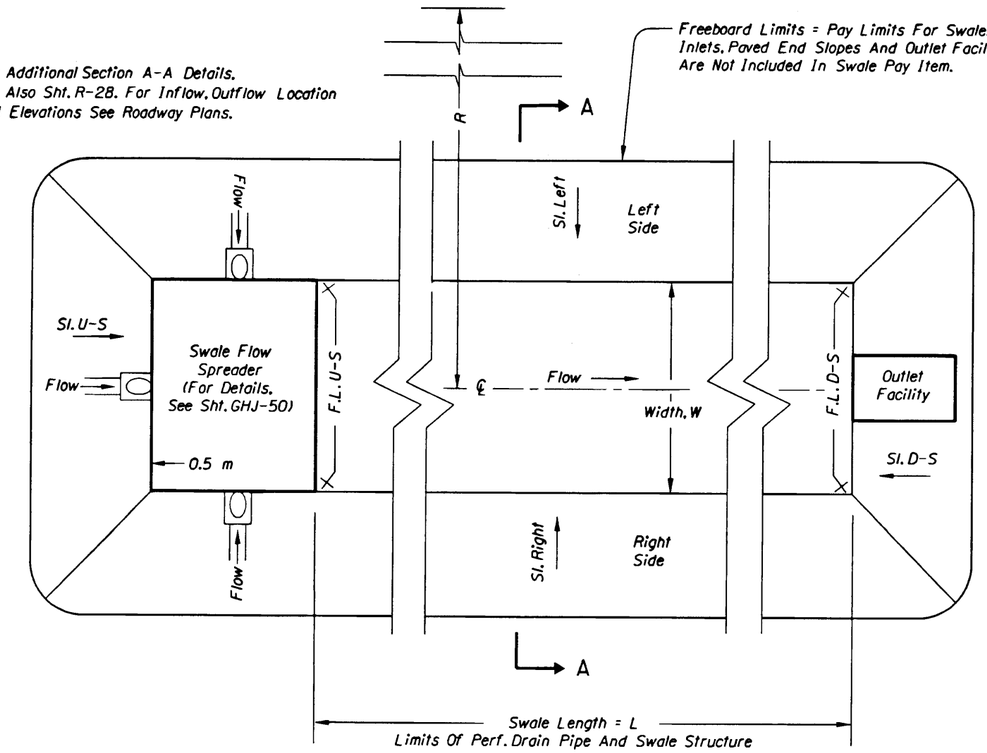
VIEW 4

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



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

PLAN

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 G. Casillas

WATER QUALITY DETAILS

SHEET NO. GHJ-48

VIEW 5

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	Left	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

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WASHINGTON COUNTY

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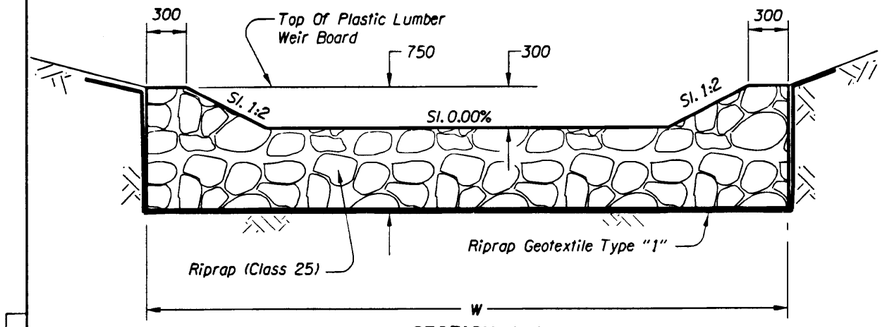
Drafted By - Martin G. Casillas

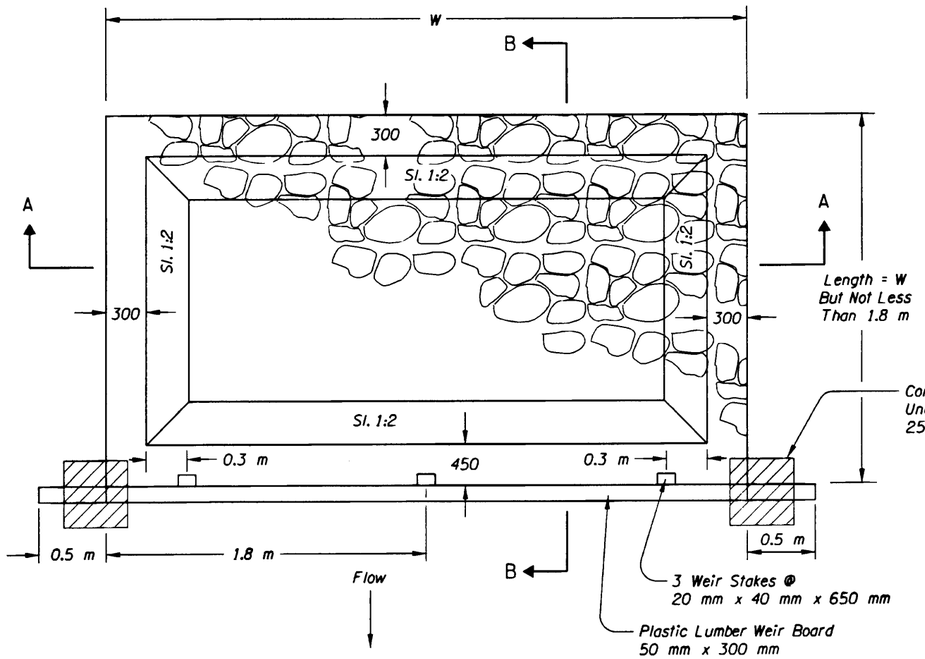
WATER QUALITY DETAILS

SHEET NO. GHJ-49

WATER QUALITY SWALE FLOW SPREADER



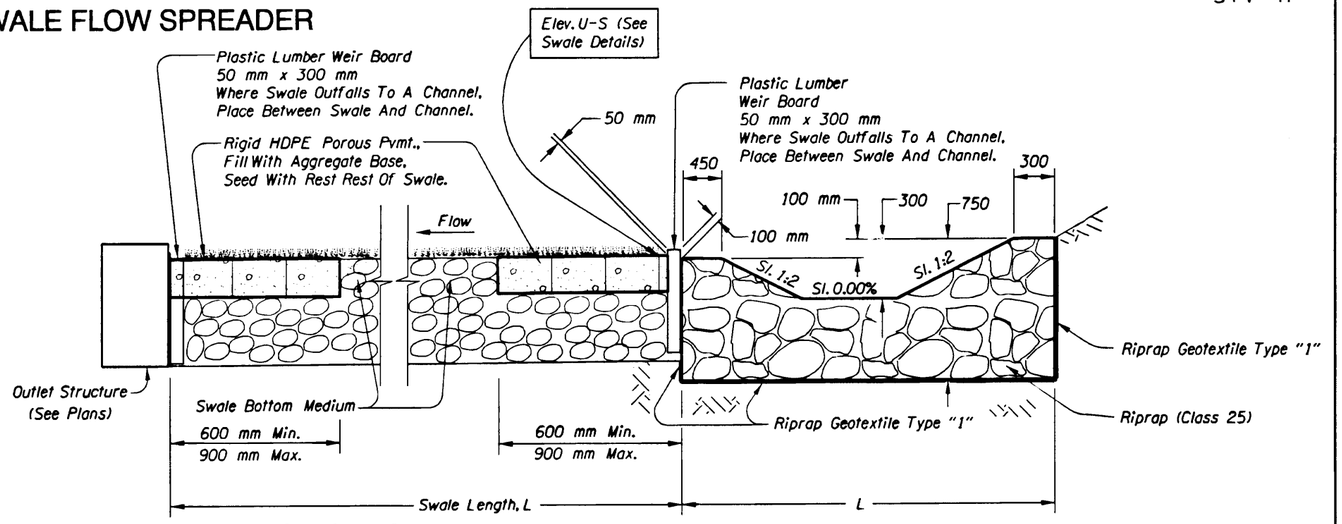
SECTION A-A



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

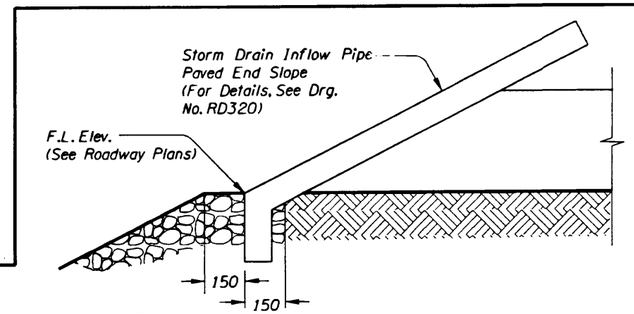
PLAN

SWALE FLOW SPREADER



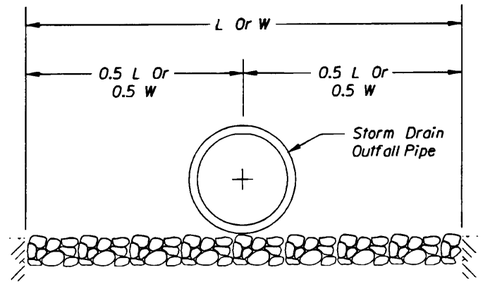
SECTION B-B

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
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WASHINGTON COUNTY

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Drafted By - Martin G. Casillas

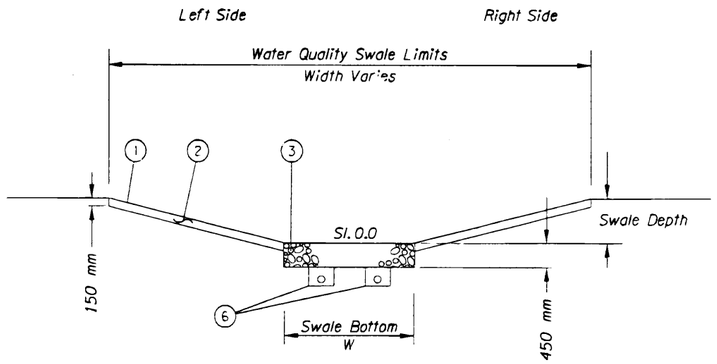
WATER QUALITY DETAILS

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

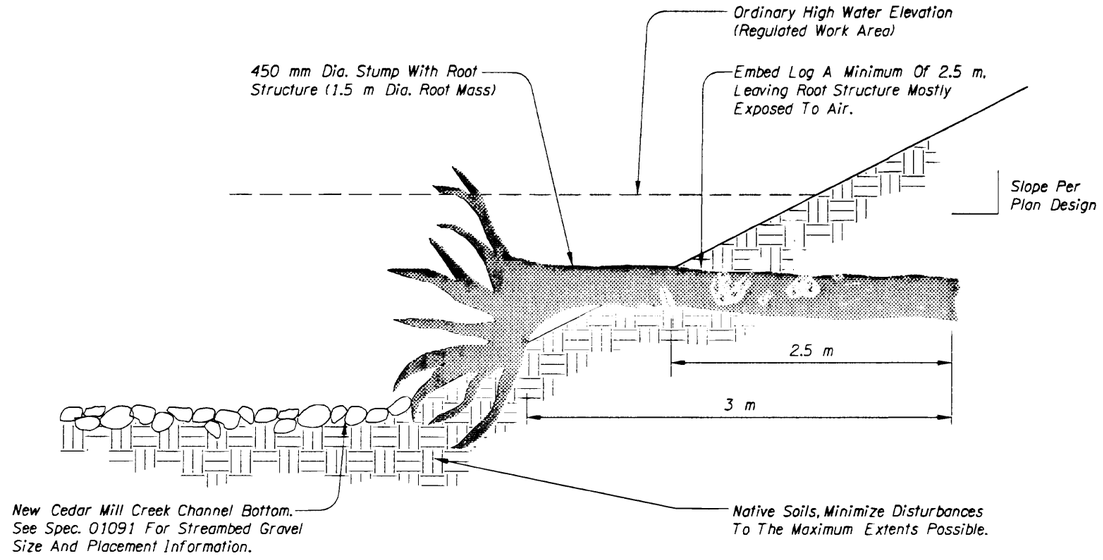
12/02/03



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).



STREAM BANK LOG WITH ROOT WAD

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.*

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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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
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BIO-STABILIZATION DETAILS

SHEET NO.
R28

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VIEW 2

VIEW 2