OPERATION & MAINTENANCE MANUAL

DFI No. : D00358
Facility Type: Water Quality Manhole

JULY, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	**D00358**
Facility Type:	Water Quality Manhole
Construction Drawings:	37V-041
Location:	District: 2B (Old 2A)
	Highway No.: 047
	Mile Post: 66.50
	Description: This facility is located along the right shoulder and travel lanes of eastbound US 26 (Hwy047). Access to the facility can be obtained from US 26 (Hwy 047) just east of exit 65.

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:	Mowatt Construction Company

4. Storm Drain System and Facility Overview

This water quality manhole is an underground flow-through structure with a settling or separation unit designed to treat stormwater runoff by removing sediment and other pollutants. The system is an ODOT internally designed facility, providing pollution control and treatment through sedimentation by separating contaminants from the stormwater runoff. It is designed to treat stormwater runoff by separating contaminants, such as floatables (trash, debris and oil) and settleable particles, like sediment, from stormwater.

Inflows enter the manhole from the inlet pipe and subsequently go into an open weir channel. From the open weir channel, the treatment flow drops down into the manhole sump (its treatment zone) via a vertical pipe with an L-shaped lower portion. In the treatment zone, the treatment flow volume accumulates up to the elevation of the bottom of the open weir channel.

Contaminants separate from the treatment flow volume due to density differences. Contaminants less dense than water float to the top of the volume, and contaminants denser than water sink. As new flow enters the treatment zone, the input displaces old treatment flow and pushes it up another vertical pipe (which has an L-shaped lower portion.) This pipe leads to the open weir channel, which conveys the outflow to the manhole's outlet pipe.

This water quality facility and the adjoining swale treats both sheet flow and ditch flow runoff from the east bound travel lane of US 26 (Hwy 047). After treatment through the manhole, the water is conveyed south through a 12-inch diameter pipe to a water quality biofiltration swale (DFI D00169).

A. Maintenance equipment access:
Located beneath a set of nearby power transmission lines, this facility is situated behind a metal guardrail which runs parallel to the right shoulder along the eastbound travel lane of US 26 (Hwy 047). There is a maintenance access pad located just west of the facility that can be utilized for access to this facility.

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: Exterior view of Water Quality Manhole structure.

Photo 2: Interior view of Water Quality Manhole structure.

5. Facility Haz Mat Spill Feature(s)

The water quality manhole 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 manhole. This pipe is noted as point B in the Operational Plan; Appendix A.

6. Auxiliary Outlet (High Flow Bypass)

Auxiliary Outlets are provided if the primary outlet control structure can not safely pass the projected high flows. Broad-crested spillway weirs and over flow risers are the two most common auxiliary outlets used in stormwater treatment facility design. The auxiliary outlet feature is either a part of the facility or an additional storm drain feature/structure.

The auxiliary outlet feature for this facility is:

☒ Designed into facility
The water quality manhole is equipped with a high flow weir which serves the facility as the high flow bypass when water flows reach certain levels. The high flow weir used within this facility is a metal angle. Refer to Section A-A in the Operational Plan; Appendix A for further details.

☐ 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 biofiltration swales)
- ☐ Table 4 (water quality filter strips)
- ☐ Table 5 (water quality bioslopes)
- ☐ Table 6 (detention tank)
- ☐ Table 7 (detention vault)
- ☐ Appendix C (proprietary structure)
- ☐ Special Maintenance requirements:

Note: Special maintenance Requirements Require Concurrence from ODOT SR Hydraulics Engineer.

8. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options: http://egov.oregon.gov/ODOT/HWY/OOM/EMS.shtml

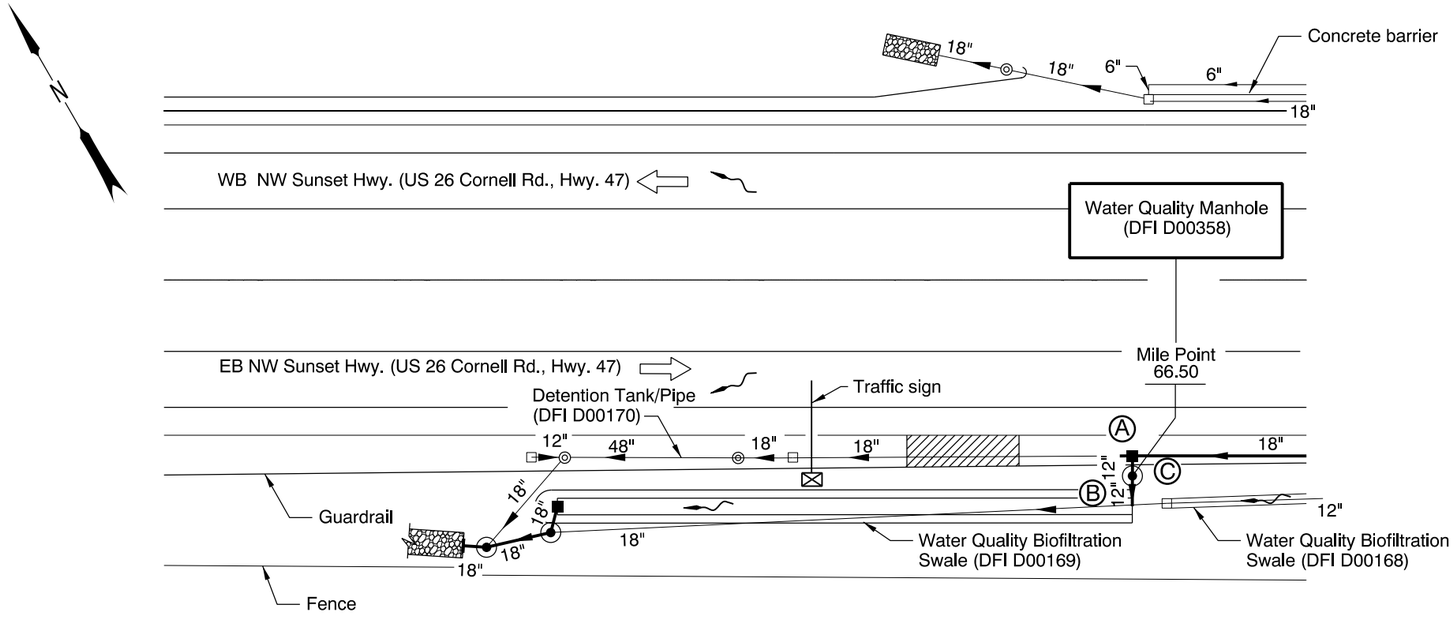
Contact any of the following for more detailed information about management of waste materials found on site:

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

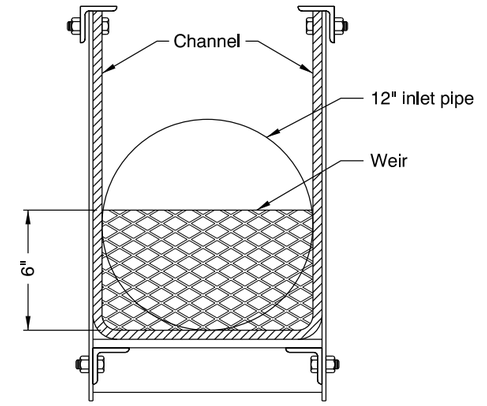
Appendix A

Content:

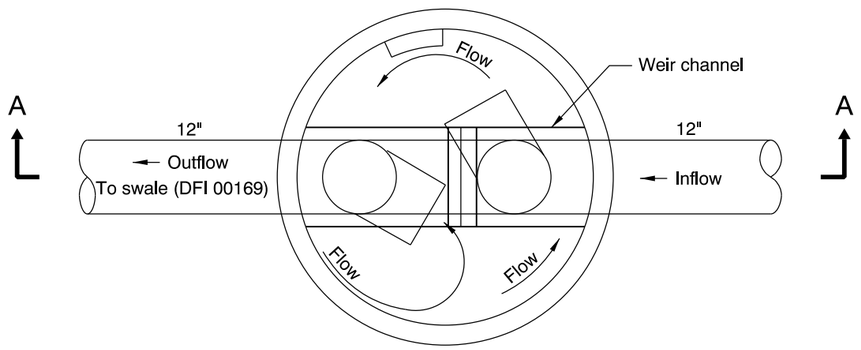
- **Operational Plan and Profile Drawing(s)**



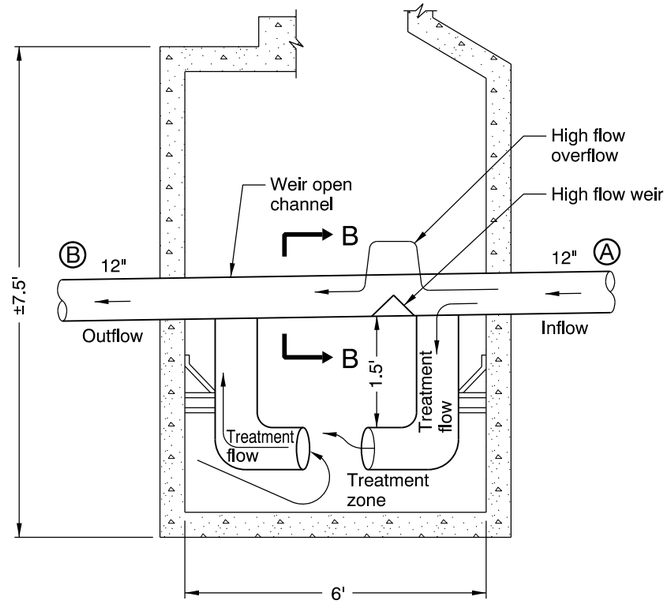
PLAN
N.T.S.



SECTION B-B
N.T.S.



WATER QUALITY MANHOLE DETAIL AT POINT Ⓒ
N.T.S.



SECTION A-A
N.T.S.

LEGEND:

- Photograph location / direction
- Ⓐ Inlet
- Ⓑ Outlet
- Ⓒ Water Quailty / Flow Control Weir
- ◉ and/or ◎ Manhole
- ■ and/or □ Inlet
- Storm Pipe (Facility)
- Storm Pipe
- Conveyance Direction
- Pavement / Facility Flow Path
- Maintenance Access

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Craig Fox

Drafted By: M. Bunde/D.Claycomb

DFI D00358
MAINTENANCE DISTRICT 2B HWY 47
WATER QUALITY MANHOLE
SUNSET HWY MP 66.50
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

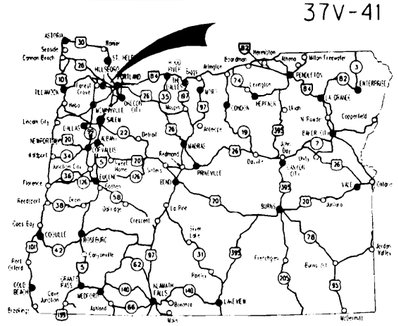
PLANS FOR PROPOSED PROJECT

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

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

SUNSET HIGHWAY

WASHINGTON COUNTY
MARCH 2004

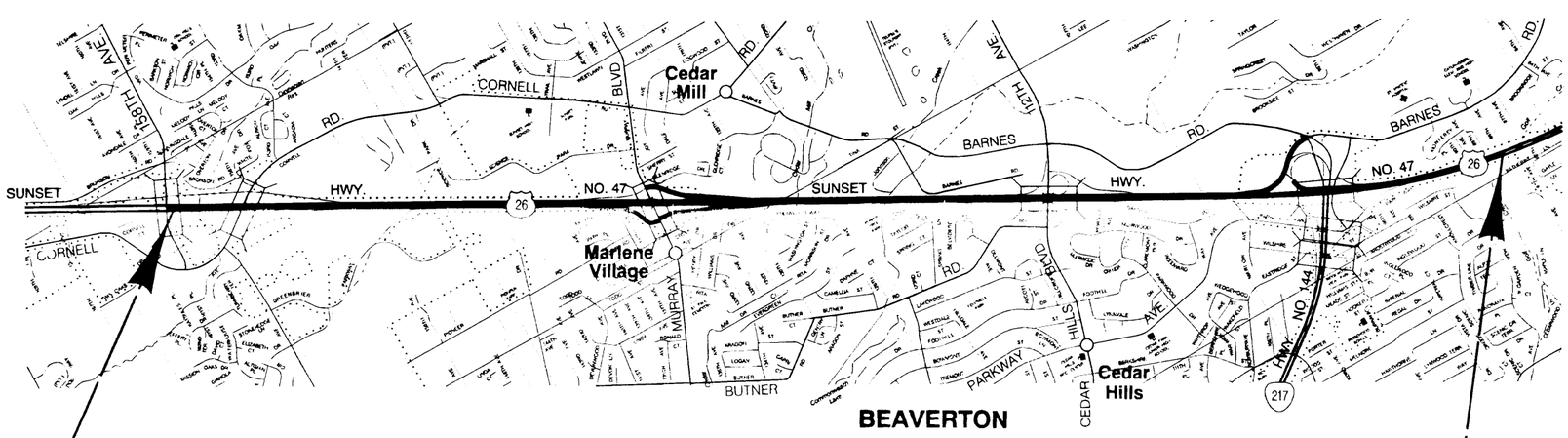


Overall Length Of Project - 6.51 km (4.05 Miles)

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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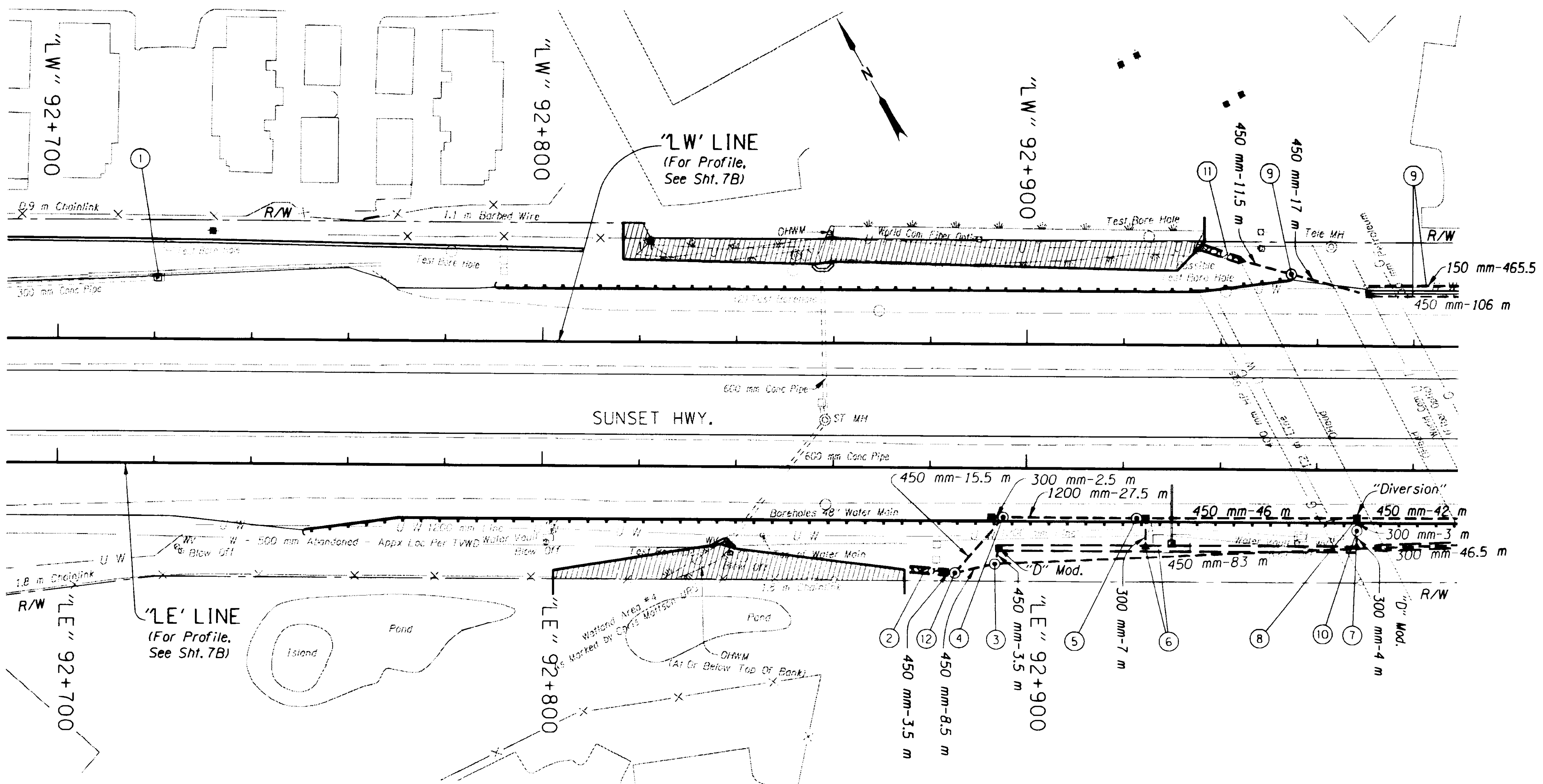
Sec. 32, T. 1N, R. 1W, W.M.



① Adjust Inlet
Const. Open Grade HMAC Mod. Inlet

② Sta. "LE" 92+882.236, 21.425 m Rt.
Const. Ditch
0.6 m Flat Bottom, 1:2 Slopes
Inst. 450 mm Storm Sew. Pipe - 3.5 m
1.5 m Depth
Const. Paved End Slope - 4.3 m^2
Const. Loose Riprap (Class 25) - 31 MG
Riprap Geotextile Matl., Type "1" - 49 m^2
Dt. Exc. - 23 m^3
(For Details, See Sht. GHJ-8)

③ Sta. "LE" 92+893.492, 19.724 m Rt.
Const. Manhole
Const. Type "D" Mod. Inlet - 2
Const. Water Quality Swale "WC2A"
0.6 m Flat Bottom
Inst. 450 mm Storm Sew. Pipe - 86.5 m
1.5 m Depth
(For Details, See Sht. GHJ-35)

④ Sta. "LE" 92+895.233, Rt.
Const. Detention Manhole, Large, 2400 mm Dia.
Const. Type "G-2" Open Grade HMAC Inlet
Inst. 300 mm Storm Sew. Pipe - 2.5 m
1.5 m Depth
Inst. 1200 mm Storm Sew. Pipe - 27.5 m
3 m Depth
(For Details, See Sht. GHJ-11)

⑤ Sta. "LE" 92+922.789, Rt.
Const. Manhole, Large, 2400 mm Dia.
Const. Type "G-2" Open Grade HMAC
Diversion Mod. Inlet
Inst. 450 mm Storm Sew. Pipe - 46.0 m
1.5 m Depth
(For Details, See Sht. GHJ-14)

⑥ Sta. "LE" 92+922.787, 16.504 m Rt.
Const. Paved End Slope - 3.1 m^2
Const. Water Quality Swale "WC2B"
Inst. 300 mm Storm Sew. Pipe - 7.0 m
1.5 m Depth
(For Details, See Shts. R-28 & GHJ-36)

⑦ Sta. "LE" 92+968.367, 16.341 m Rt.
Inst. 300 mm Storm Sew. Pipe - 4.0 m
1.5 m Depth
Const. Paved End Slope - 3.1 m^2

⑫ Sta. "LE" 92+885.229, 21.626 m Rt.
Const. Manhole
Inst. 450 mm Storm Sew. Pipe - 8.5 m
1.5 m Depth
Inst. 450 mm Storm Sew. Pipe - 15.5 m
3 m Depth

⑪ Sta. "LW" 92+964.843, 15.383 m Lt.
Const. Ditch
0.6 m Flat Bottom, 1:2 Slopes
Inst. 450 mm Storm Sew. Pipe - 11.5 m
1.5 m Depth
Const. Paved End Slope - 4.3 m^2
Const. Loose Riprap (Class 25) - 33 MG
Riprap Geotextile Matl., Type "1" - 51 m^2
Dt. Exc. - 24 m^3
(For Details, See Sht. GHJ-8)

⑧ Sta. "LE" 92+968.400, Rt.
Const. Type "G-2" Open Grade HMAC Diversion Mod. Inlet
Inst. 450 mm Storm Sew. Pipe - 42.0 m
3 m Depth
(For Details, See Sht. GHJ-14)

⑨ Sta. "LW" 92+967.593, 14.937 m Lt.
Const. Pollution Control Manhole
Const. Type "G-2" Open Grade HMAC Inlet - 5
Inst. 300 mm Storm Sew. Pipe - 256.5 m
1.5 m Depth
Inst. 450 mm Storm Sew. Pipe - 123.0 m
1.5 m Depth
Const. Conc. Barrier Drain - 465.5 m
(For Details, See Sht. GHJ-1)

⑩ Sta. "LE" 92+968.387, 12.435 m Rt.
Const. Pollution Control Manhole
Inst. 300 mm Storm Sew. Pipe - 3.0 m
1.5 m Depth
(For Details, See Sht. GHJ-31)

Wetland Area No Work Zone, Shown Thus:

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

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

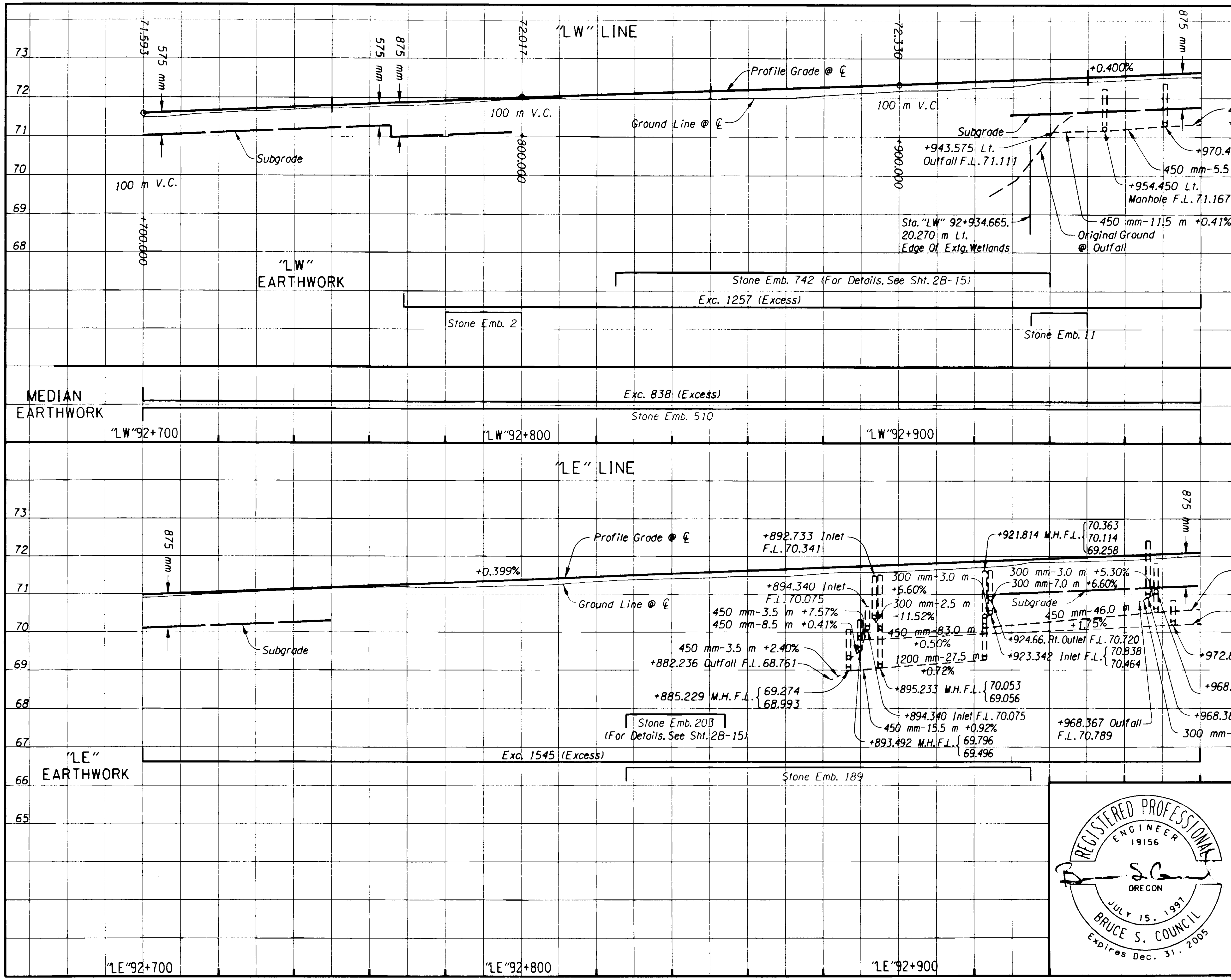
US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

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

DRAINAGE & UTILITIES

SHEET NO. 7A

37V-41



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

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

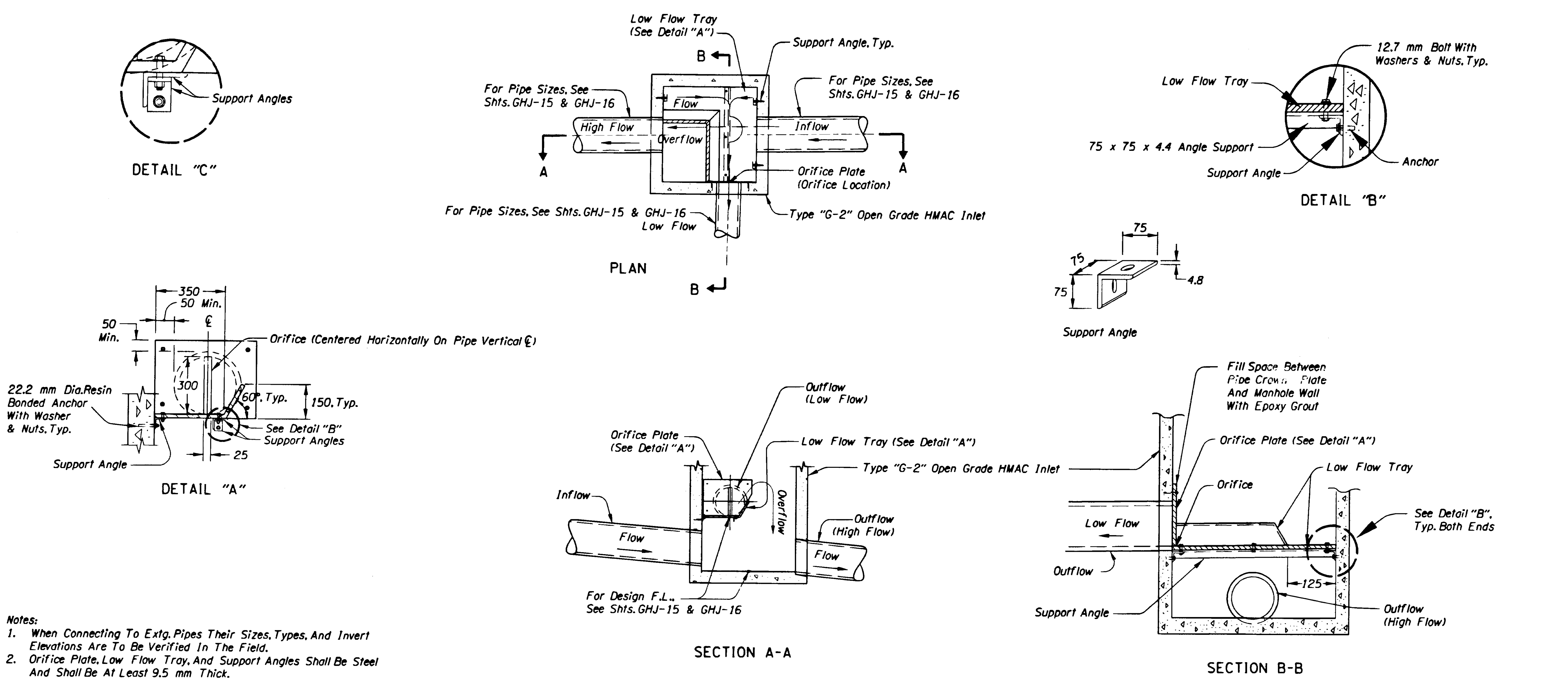
US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - Eileen J. Phelan
Designed By - Jason L. Donnelly & Bruce S. Council
Drafted By - Tien Nguyen

PROFILE

SHEET NO. 7B

DIVERSION TYPE "G-2" INLET HIGH-LOW, ORIFICE PLATE, AND LOW FLOW GENERAL DETAILS



Notes:

1. When Connecting To Extg. Pipes Their Sizes, Types, And Invert Elevations Are To Be Verified In The Field.
2. Orifice Plate, Low Flow Tray, And Support Angles Shall Be Steel And Shall Be At Least 9.5 mm Thick.
3. 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.
4. For Resin-Bonded Anchors, Use Steel Threaded Rods.
5. Anchors Shall Be 25 mm, Min., Inside Orifice Plate, And Support Angle Edges.
6. Hole Diameters In The Plates And Angles For The Anchors And Bolts Shall Be 3.2 mm Larger Than The Anchor Or Bolt Diameters.
7. Metal Plates And All Hardware Shall Be Stainless Steel Or Hot-Dipped Galvanized.
8. Permanent Waterproof Seal All Edges Of, And All Bolt Holes Through Low Flow Tray.
9. For Other Bolt, Anchor, And Support Details Not Shown, See Sht. GHJ-20, Details "A" & "B".
10. All Dimensions Are In Millimeters (mm) Unless Otherwise Noted.
11. For Inlet Details Not Shown, See RD364.

(For Details Not Shown, See Sht. GHJ-20)

DIVERSION "G-2" INLET "HIGH-LOW", LOW FLOW TO SIDE

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

OREGON DEPARTMENT OF TRANSPORTATION

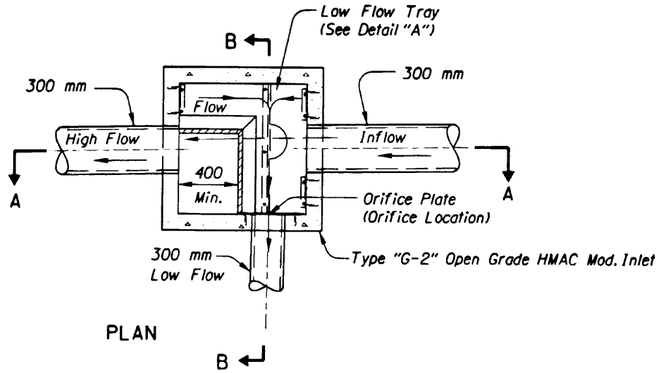
US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

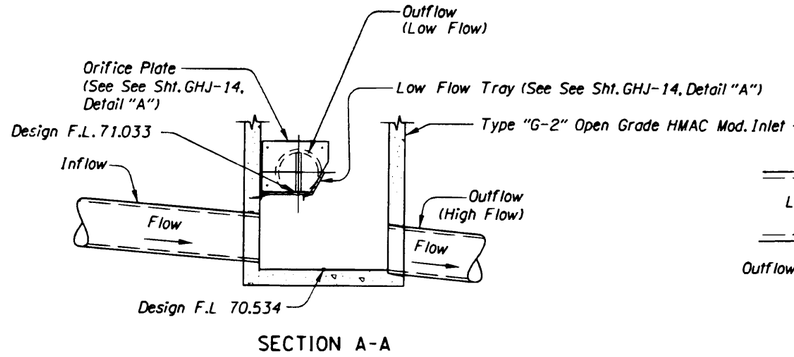
Project Leader - Naveen Chandra
Designed By - Bruce S. Council
Drafted By - Martin G. Casillas

WATER QUALITY DETAILS

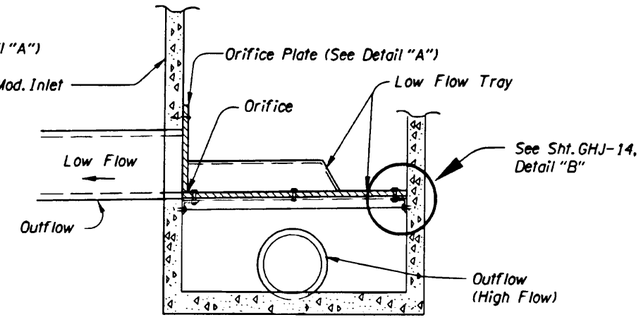
SHEET NO. GHJ-14

1:1000 - 2





SECTION A-A

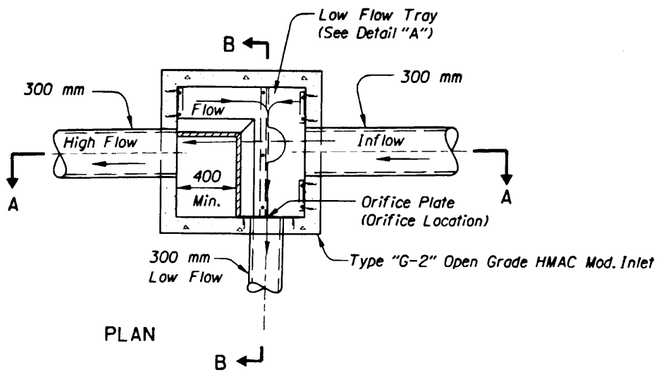


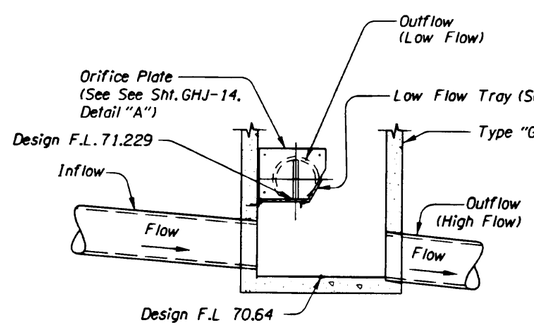
SECTION B-B

(For Details Not Shown, See Shts. GHJ-14 & GHJ-20)

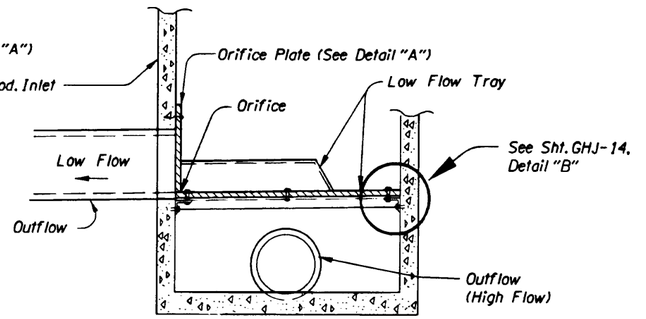
DIVERSION "G-2" INLET "HIGH-LOW", LOW FLOW TO SIDE

Sta. "LE" 92+968.40, Rt.





SECTION A-A



SECTION B-B

(For Details Not Shown, See Shts. GHJ-14 & GHJ-20)

DIVERSION "G-2" INLET "HIGH-LOW", LOW FLOW TO SIDE

Sta. "LE" 92+923.34, Rt.

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

OREGON DEPARTMENT OF TRANSPORTATION

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

Project Leader - Naveen Chandra
Designed By - Bruce S. Council
Drafted By - Martin G. Casillas

WATER QUALITY DETAILS

SHEET NO. GHJ-15

1:1000 - 3

1/16/2004 8:14:00 AM

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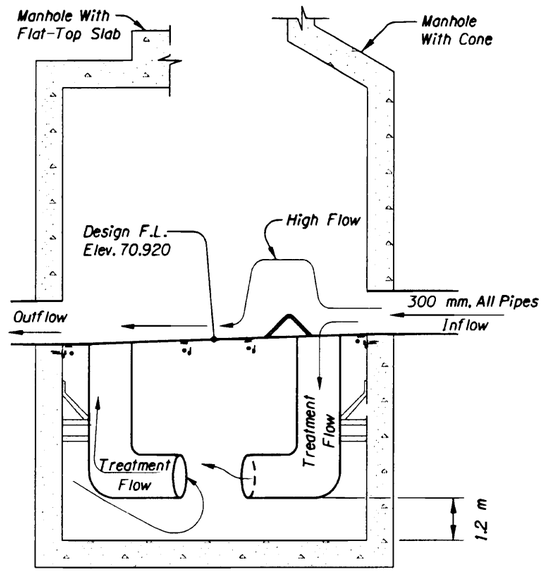
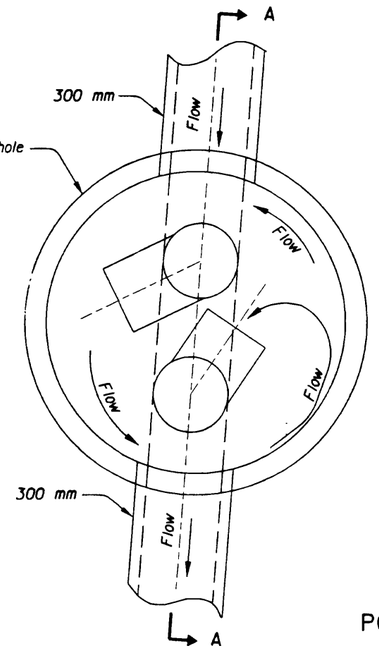


SECTION A-A

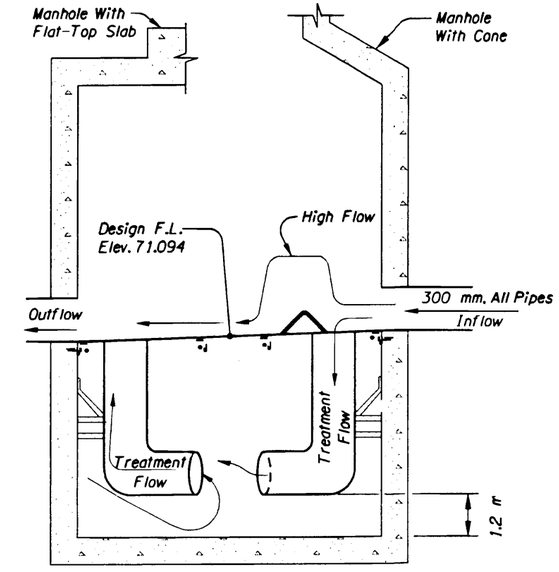


PLAN

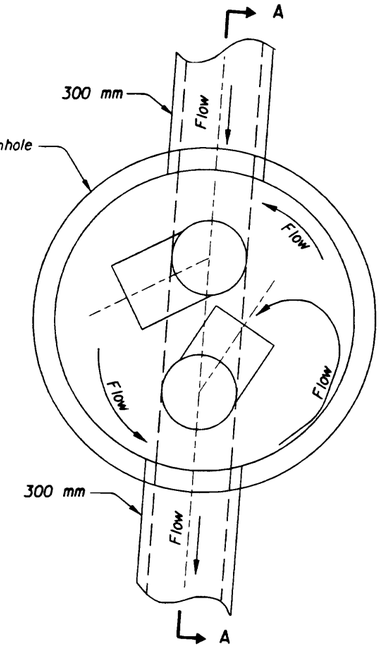
For Details Not Shown, See Sht. GHJ-31

POLLUTION CONTROL MANHOLE

Sta. "LE"92+968.00, Rt.



SECTION A-A



PLAN

For Details Not Shown, See Sht. GHJ-31

POLLUTION CONTROL MANHOLE

Sta. "LE"93+009.96, Rt.

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

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

OREGON DEPARTMENT OF TRANSPORTATION
GEO / HYDRO SECTION

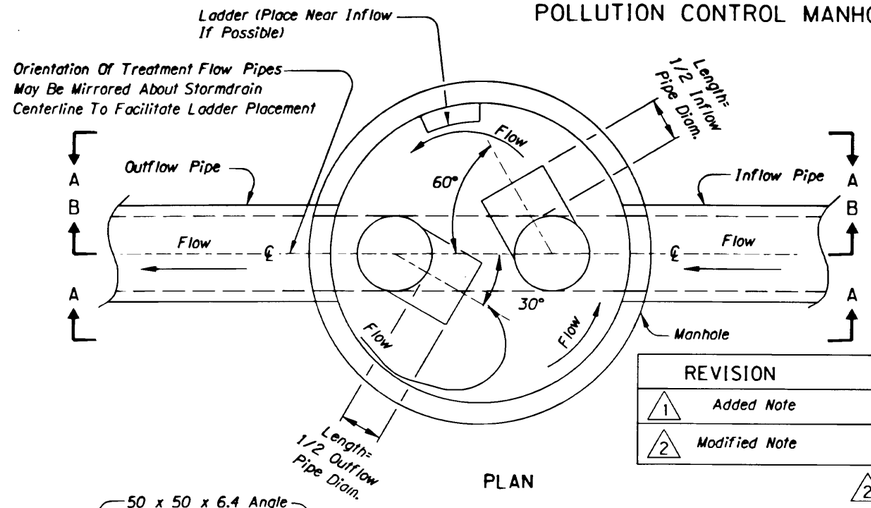
US26: CORNELL RD. - OR217 (BEAVERTON) SEC.
SUNSET HIGHWAY
WASHINGTON COUNTY

Project Leader - Naveen Chandra
Designed By - Bruce S. Council
Drafted By - Martin G. Casillas

WATER QUALITY DETAILS

SHEET NO. GHJ-23

POLLUTION CONTROL MANHOLE GENERAL DETAILS



PLAN

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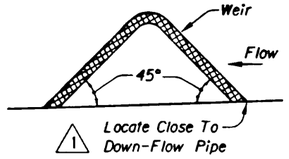
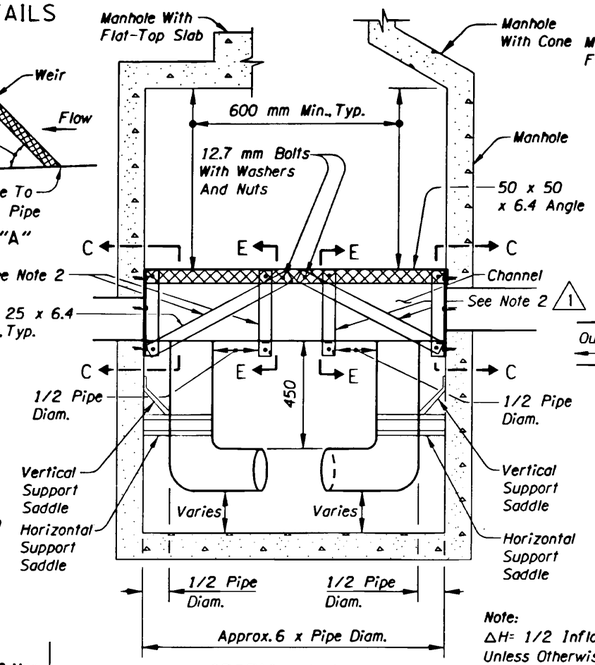
2 Modified Note	2-19-04	HMA

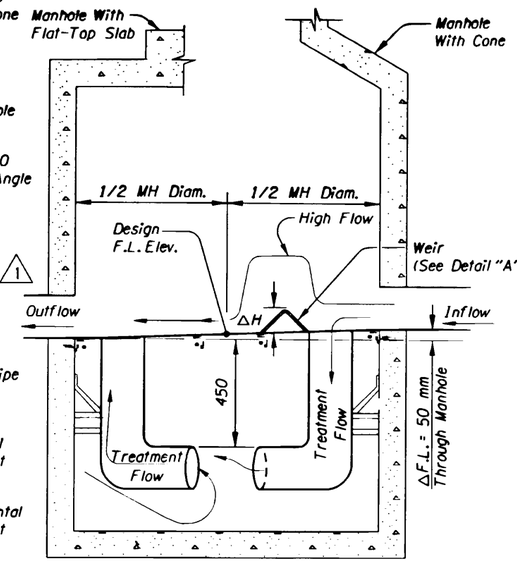


1 Locate Close To Down-Flow Pipe

DETAIL "A"

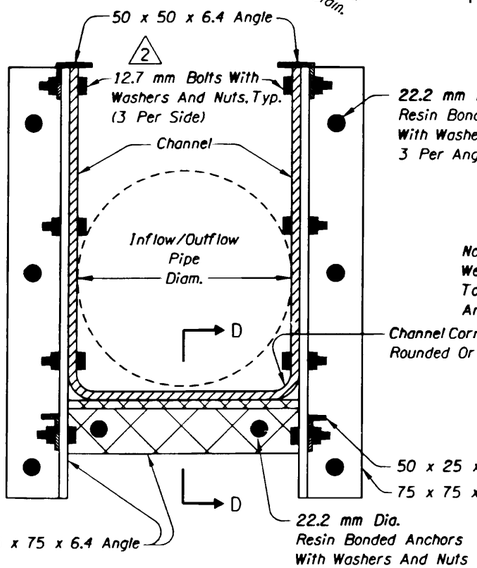


SECTION A-A

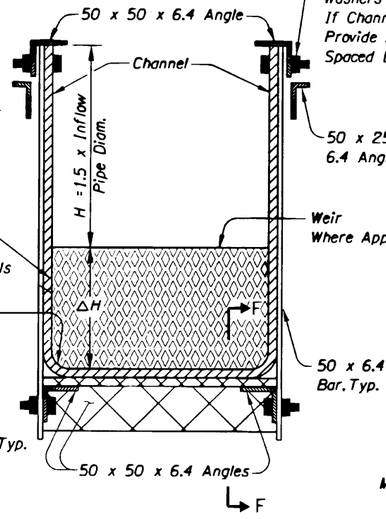


Note:
ΔH = 1/2 Inflow Pipe Diam. Unless Otherwise Specified

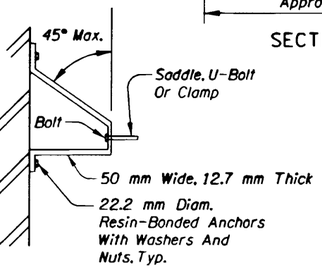
INSIDE SECTION B-B



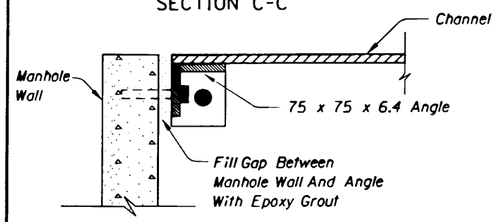
SECTION C-C



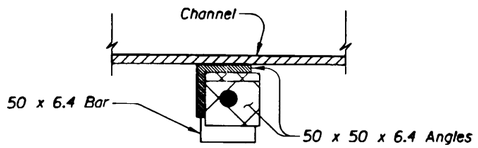
SECTION E-E



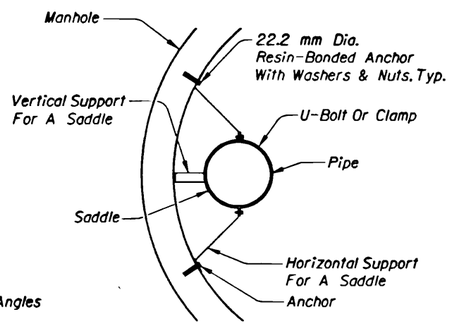
ELEVATION
VERTICAL PIPE SUPPORT



SECTION D-D
(Typ. Both Sides)



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
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-31

VIEW