OPERATION & MAINTENANCE MANUAL

DFI No. : D00194
Facility Type: Water Quality Biofiltration Swale

JUNE, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	**D00194**
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Number) 39V-010
Location:	District: 2B (Old 2A)
	Highway No.: 140
	Mile Post: 4.69; 4.81 (beg./end)
	Description: This facility is located along the northbound travel lane of Hillsboro-Silverton Highway (Hwy 140) near SW Unger Road, south of Hillsboro. Facility access is found along the roadway shoulder adjacent to the site.

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, Daniel C. Gunther, (503) 731- 8299

Facility construction: 2005
Contractor: N/A

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.

This water quality biofiltration swale is located along the shoulder of the northbound travel lane of Hillsboro-Silverton Highway (Hwy 140), near SW Unger Road, south of Hillsboro when approaching Farmington Road from the north.

Stormwater runoff from the nearby travel lanes is treated by the 580-foot long facility. The swale receives ditch flows through a 12-inch diameter culvert pipe from both ends of the swale (see point A of the Operational Plans; Appendix A). The separate flows simultaneously converge at an inlet/outlet structure (point C of the Operational Plans; Appendix A), serving as the swale outlet.

The treated water discharges through an 18-inch pipe and outfalls into a water quality swale (D00193), located southwest of this facility on the opposite side of the highway.

A. Maintenance equipment access:
   This swale can be accessed by maintenance crews from the shoulder along the northbound travel lane. The swale is lined with several rock check dams, noted as point B in Operational Plans; Appendix A, so heavy equipment access into this swale is limited.

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: This photo depicts swale and its relative position to Hillsboro-Silverton Highway.

Photo 2: This biofiltration swale conveys stormwater that outfalls into the swale shown above (D00193).

5. Facility Haz Mat Spill Feature(s)

The water quality biofiltration swale can be used to store a volume of liquid by blocking the 18-inch diameter outlet pipe located at the outlet of the water quality biofiltration swale. This pipe is noted as point C 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

☒ Other, as noted below
This facility does not contain an auxiliary outlet structure.

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

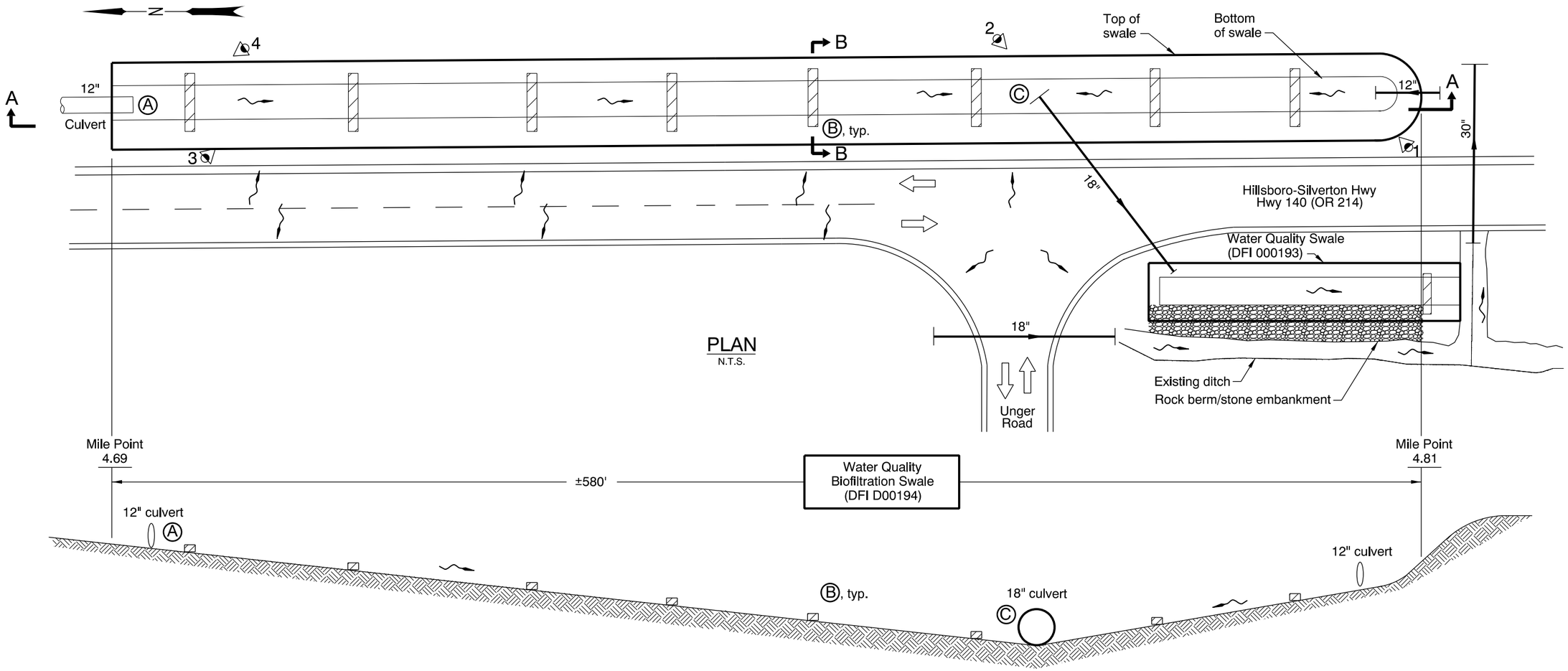
Contact any of the following for more detailed information about management of waste materials found on site:

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

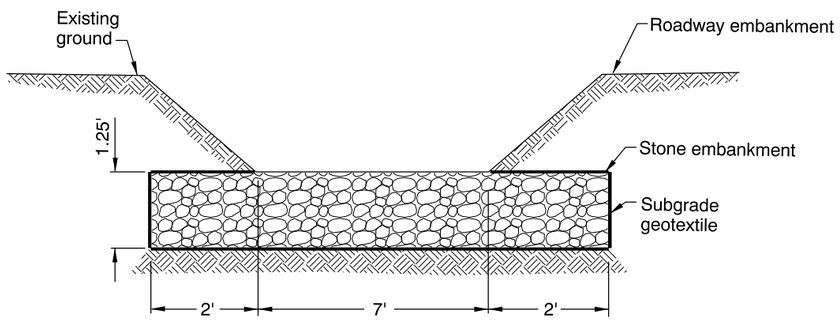
Content:

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



PLAN
N.T.S.

SECTION A-A
N.T.S.



SECTION B-B
N.T.S.

LEGEND:
- Photo Location / Direction
- Ⓐ Swale Inlet is drainage ditch
- Ⓑ Rock check dam flow spreader
- Ⓒ Swale outlet is 18" culvert
- Storm Pipe (Facility)
- Conveyance Direction
- Pavement / Facility Flow Path
- Traffic Flow/Direction

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: J.D. Koziol

Drafted By: Rodney Schultz

DFI D00194
MAINTENANCE DISTRICT 2B HWY 140
WATER QUALITY BIOFILTRATION SWALE
HILLSBORO-SILVERTON HWY MP 4.69-4.81
WASHINGTON COUNTY

Appendix B

Content:

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

39V-010

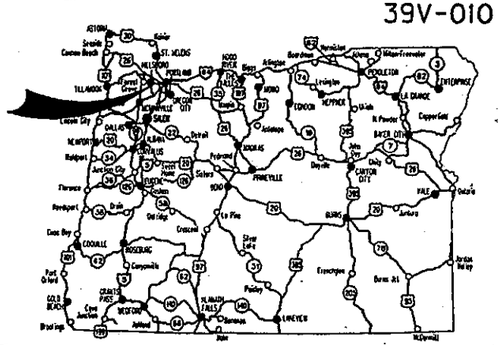
INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Title Sheet Continued
2, 2A	Typical Sections
2B	Details
2C Thru 2C-3 Incl.	Traffic Control Plans
2D	Pipe Data Sheet
3	Alignment & General Construction
3A	Drainage & Utilities
4	Alignment & General Construction
4A	Drainage & Utilities
4B	Profile
5	Alignment & General Construction
5A	Drainage & Utilities
5A-2	Notes
6	Alignment & General Construction
6A	Drainage & Utilities
PERMANENT PAVEMENT MARKINGS	
ST, ST-2	Striping Plan
GEO/HYDRO	
GA Thru GA-4 Incl.	Erosion Control Plans
GJ, GJ-2	Water Quality Details
PERMANENT SIGNING	
S-08492 Thru S-08496 Incl.	Signing Plan

STATE OF OREGON
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED PROJECT

GRADING, DRAINAGE, PAVING, STRIPING, & SIGNING

OR219: HILLSBORO - SILVERTON HWY. AT UNGER RD. SEC.

HILLSBORO - SILVERTON HIGHWAY
WASHINGTON COUNTY
NOVEMBER 2005

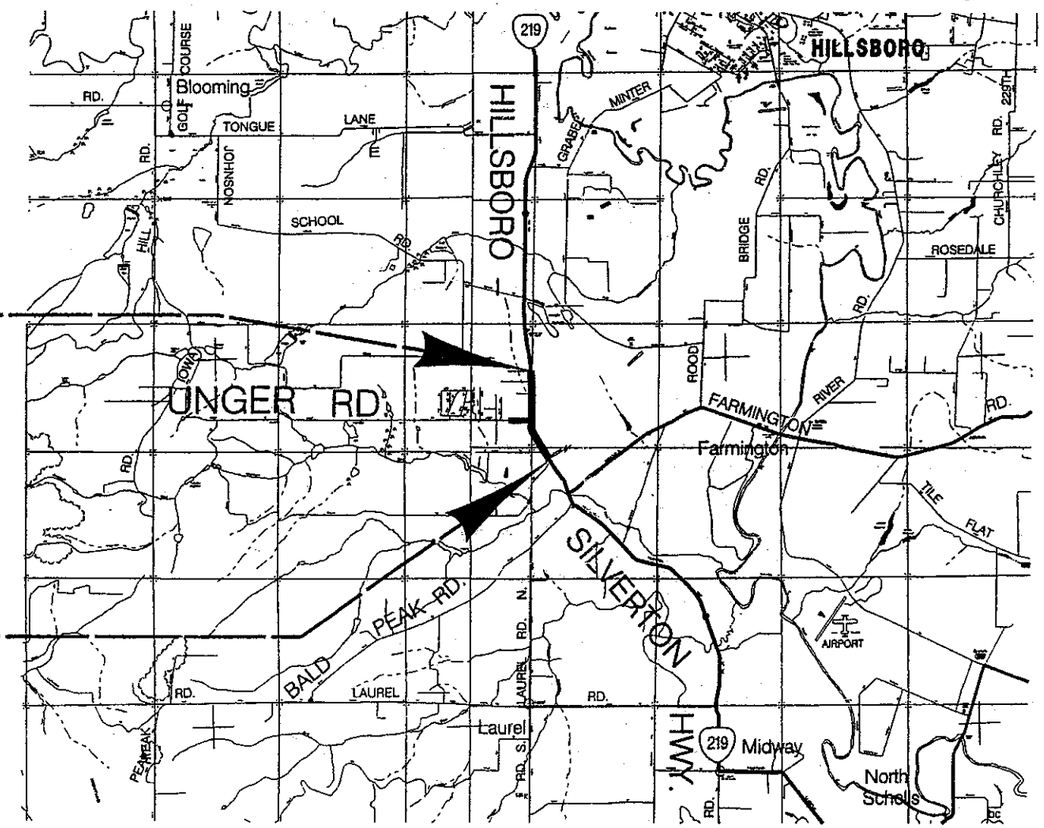


Overall Length Of Project - 0.96 km (0.59 Miles)

AS CONSTRUCTED
Wayne A. Statler
PROJECT MANAGER
2 MAR 2007
DATE

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.)

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE



N

T. 1 S., R. 2 W., W.M.
R 3 W., W.M.

BEGINNING OF PROJECT
STA. "HS" 7+159 (M.P. 4.54)

END OF PROJECT
STA. "HS" 8+115 (M.P. 5.14)

OREGON TRANSPORTATION COMMISSION

Stuart Foster	CHAIRMAN
Gail L. Achterman	COMMISSIONER
Mike Nelson	COMMISSIONER
Randall Papé	COMMISSIONER
Janice J. Wilson	COMMISSIONER
Bruce A. Warner	DIRECTOR OF TRANSPORTATION

REGISTERED PROFESSIONAL ENGINEER
13,704
OREGON
JULY 16, 1987
CATHERINE M. NELSON
Expires Dec. 31, 2006

Catherine M. Nelson
STATE HIGHWAY ENGINEER

METRIC

OR219: HILLSBORO - SILVERTON HWY.
AT UNGER RD. SEC.
HILLSBORO - SILVERTON HIGHWAY
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	X-STP-S140(030)	1

PE000529 000

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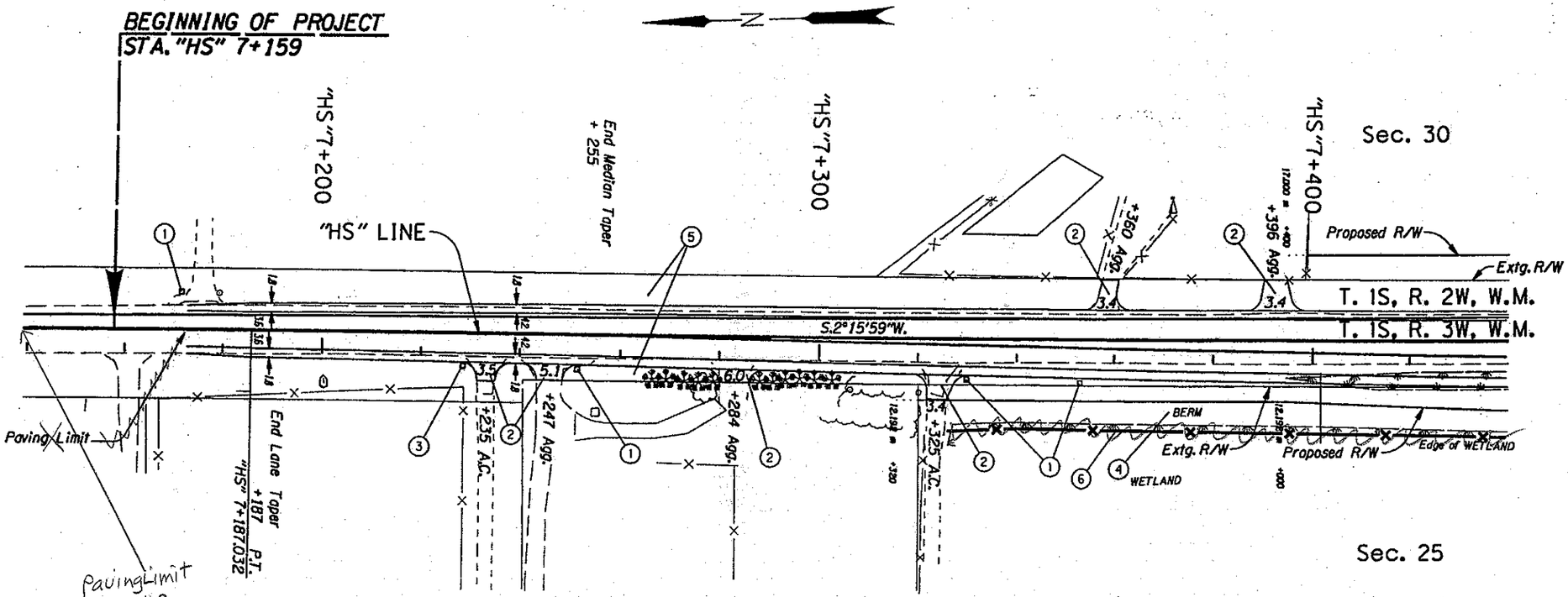


1. Inst. Single Mailbox Support - 4 Const. Conc. Collar (See Drg. No. RD100)
2. Const. Asph. Conc. Approach - 6
3. Inst. Multiple Mailbox Support Const. Conc. Collar
4. Removed Berm (By Contractor)
5. Sta. "HS" 7+159 To "HS" 8+115 Lt. & Rt. Inst. Type 1 Delineators (See Drg. Nos. RD800 & RD805)
6. Inst. Temp. Orange Plastic Mesh Delineation Fence. (As Directed)

AS CONSTRUCTED
Wayne L. Statler
PROJECT MANAGER
2 MAR 2007
DATE

NOTE:
1. All Dimensions Shown Are In Meters (m) Unless Otherwise Noted.
2. Temp. Type Orange Plastic Mesh Delineation Fence Shown As Thus: ——×——×-

REGISTERED PROFESSIONAL ENGINEER
7233
OREGON
Nov. 28, 1987
GREG K. GIFFORD
Expires 06-30-2007

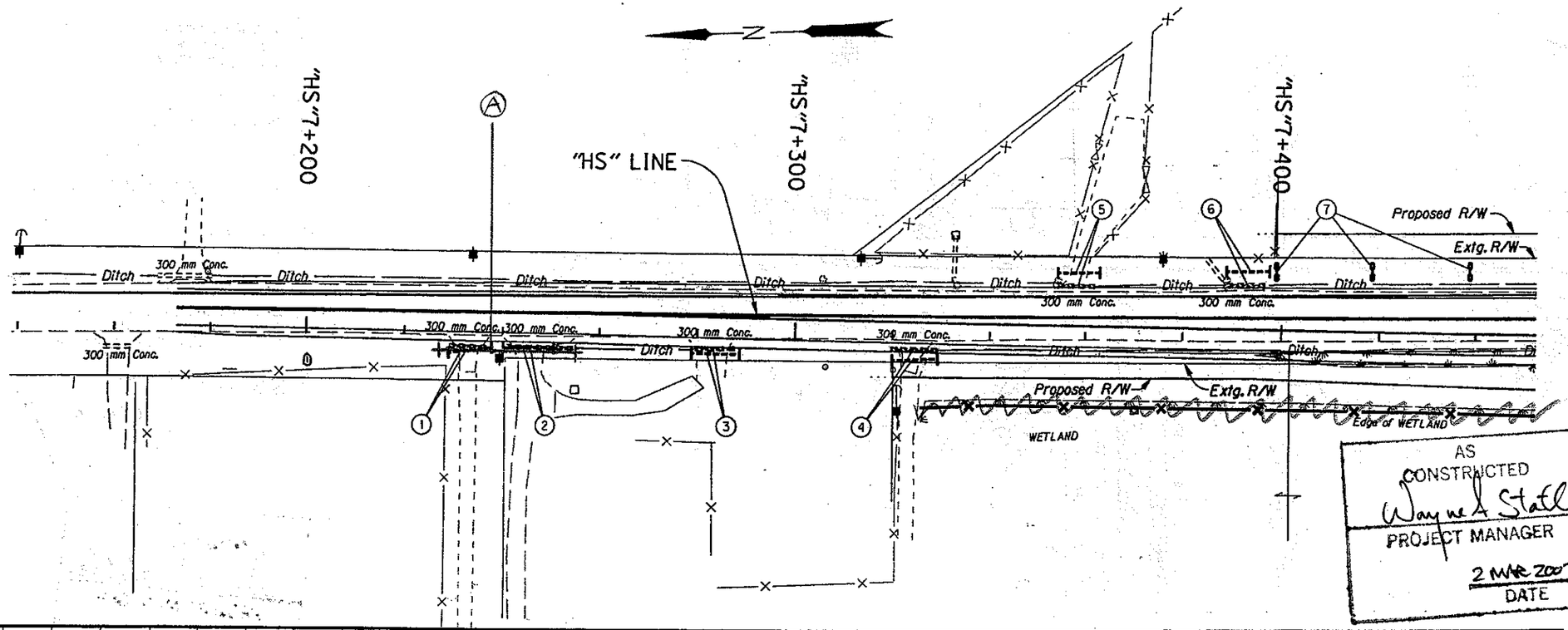
OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

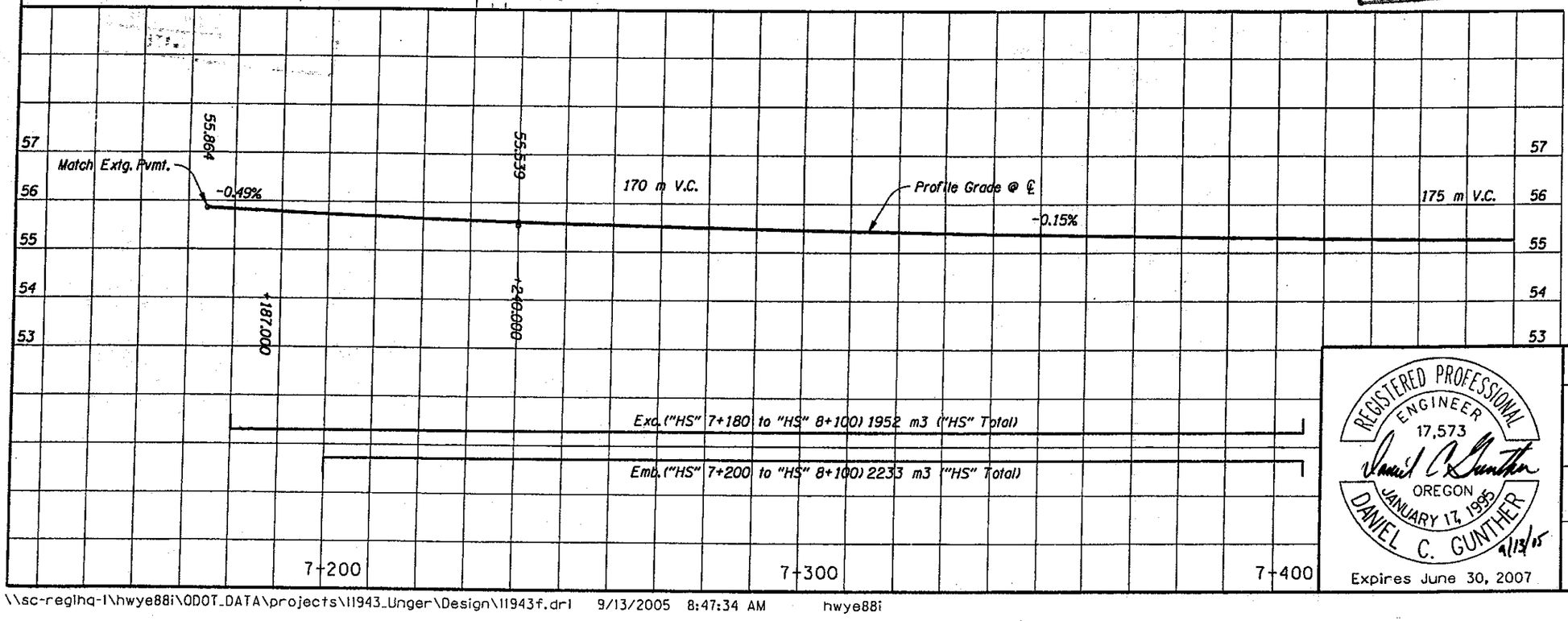
OR219: HILLSBORO-SILVERTON HWY AT UNGER ROAD
HILLSBORO-SILVERTON HIGHWAY
WASHINGTON COUNTY

Project Leader - Sandy Van Bemmel
Designed By - Brian A. Davis
Drafted By - David Haase

ALIGNMENT & GENERAL CONSTRUCTION

SHEET NO. 3





Exc. ("HS" 7+180 to "HS" 8+100) 1952 m3 ("HS" Total)

Emb. ("HS" 7+200 to "HS" 8+100) 2233 m3 ("HS" Total)

AS CONSTRUCTED
Wayne A Statler
PROJECT MANAGER
2 MAR 2007
DATE

(1) Sta. "HS" 7+230, Rt.
Remove Exist. Culv. Pipe - 8.0 m
Inst. 300 mm Culv. Pipe - 10.2 m
1.5 m Depth
Inst. Sloped End Section - 2
(See Drg Nos. RD300, RD316 and RD318)

(2) Sta. "HS" 7+243, Rt.
Remove Exist. Culv. Pipe - 14.0 m
Inst. 300 mm Culv. Pipe - 12.2 m
1.5 m Depth
Inst. Sloped End Section - 2

(3) Sta. "HS" 7+280, Rt.
Remove Exist. Culv. Pipe - 9.0 m
Inst. 300 mm Culv. Pipe - 11.2 m
1.5 m Depth
Inst. Sloped End Section - 2

(4) Sta. "HS" 7+320, Rt.
Remove Exist. Culv. Pipe - 10.0 m
Inst. 300 mm Culv. Pipe - 11.2 m
1.5 m Depth
Inst. Sloped End Section - 2

(5) Sta. "HS" 7+356, Lt.
Remove Exist. Culv. Pipe - 7.0 m
Inst. 300 mm Culv. Pipe - 10.2 m
1.5 m Depth
Inst. Sloped End Section - 2

(6) Sta. "HS" 7+390, Lt.
Remove Exist. Culv. Pipe - 8.0 m
Inst. 300 mm Culv. Pipe - 14.2 m
1.5 m Depth
Inst. Sloped End Section - 2

(7) Sta. "HS" 7+400 to 7+560 Lt. & 7+600 Lt.
Const. Check Slot Structure - 10
Dt. Exc. - 4 m3
Stone Embankment - 4 m3
Subgrade Geotextile - 60 m2
(For Details, See Sheet GJ)
(See Drg. No. RD1055)

(A) Installed 300mm culv. pipe 26.21m 2300mm sloped end's installed. "HS" 7+228 - 7+254 RT

NOTE:
1. All Dimensions Shown Are In Meters (m) Unless Otherwise Noted.
2. Remove Extg. Pipe Shown Thus: ~~~~
3. Temp. Type Orange Plastic Mesh Delineation Fence Shown as Thus: ——×——×——

REGISTERED PROFESSIONAL ENGINEER
17,573
OREGON
JANUARY 17, 1995
DANIEL C. GUNTHER
9/13/05
Expires June 30, 2007

OREGON DEPARTMENT OF TRANSPORTATION
REGION 1 GEO/HYDRO UNIT

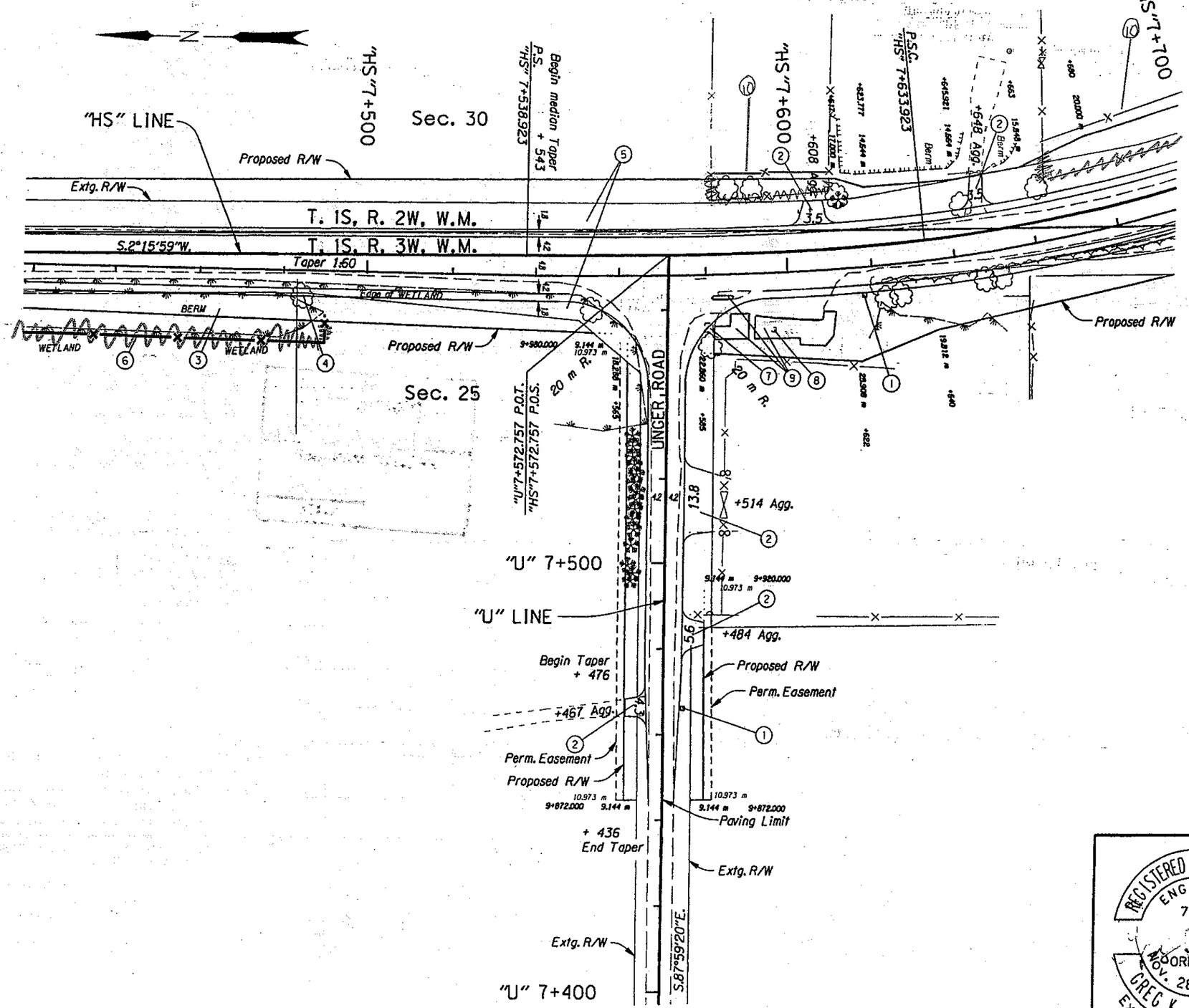
OR219: HILLSBORO-SILVERTON HWY AT UNGER ROAD
HILLSBORO-SILVERTON HIGHWAY
WASHINGTON COUNTY

Project Leader - Sandy Van Bemmel
Designed By - Stephen Hay
Drafted By - David Haase

DRAINAGE & UTILITIES

SHEET NO. 3A

39V-010



(1) Inst. Single Mailbox Support - 2 Const. Conc. Collar (See Drg. No. RD100)

(2) Const. Asph. Conc. Approach - 5

(3) See Note 4 On Sheet 3.

(4) Remove Tree

(5) Sta. "HS" 7+159 To "HS" 8+115 Lt. & Rt. Inst. Type 1 Delineators

(6) Inst. Temp. Orange Plastic Mesh Delineation Fence. (As Directed)

(7) Remove Underground Fuel Tank (By Others)

(8) Remove 64 mm Steel Pipe (0.1 m Exposed, Possible Fuel Pipe For Underground Tank) (By Others)

(9) Remove Conc. Pads - 42 m² (By Others)

(10) Installed field fence

AS CONSTRUCTED
Wayne A. Statler
PROJECT MANAGER
2 MAR 2007
DATE

NOTE:
1. All Dimensions Shown Are In Meters (m) Unless Otherwise Noted.
2. Temp. Type Orange Plastic Mesh Delineation Fence Shown As Thus: ——×——×—

REGISTERED PROFESSIONAL ENGINEER
7233
OREGON
NOV. 28, 1987
GREG K. GIFFORD
Expires 06-30-2007

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

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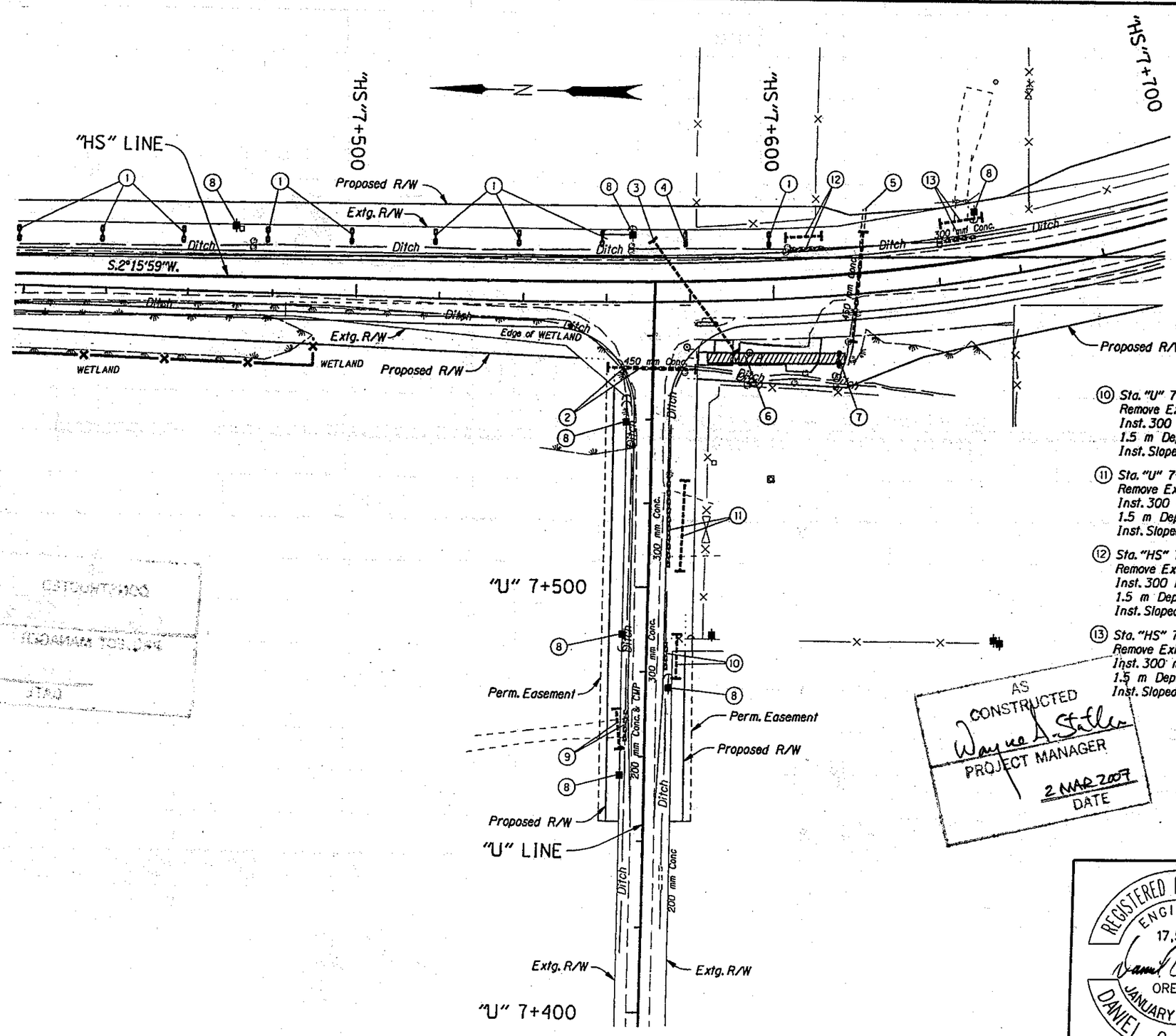
WASHINGTON COUNTY

Project Leader - Sandy Van Bemmel
Designed By - Brian A. Davis
Drafted By - David Haase

ALIGNMENT & GENERAL CONSTRUCTION

SHEET NO. 4



(1) See Sht. 3A, Note 7

(2) Sta. "U" 7+552, Lt.
Remove Exist. Culv. Pipe - 18.0 m
Inst. 600 mm Culv. Pipe - 22.2 m
1.5 m Depth
Inst. Sloped End Section - 2

(3) Sta. "HS" 7+572, Lt.
Inst. 450 mm Culv. Pipe - 35.2 m
1.5 m Depth
Inst. Sloped End Section - 2

(4) Sta. "HS" 7+573, Lt.
Const. Check Dam Type 1
Dt. Exc. - 0.5 m3
Stone Embankment - 0.5 m3
Subgrade Geotextile - 6 m2
(For Details, See Sheet GJ)
(See Drg No. RD1005)

(5) Sta. "HS" 7+622 Lt.
Remove Exist. Culv. Pipe - 24 m
Inst. 750 mm Culv. Pipe - 27.2 m
1.5 m Depth
Inst. Sloped End Section - 2

(6) Sta. "FB" 0+013 to 0+046
Const. Ditch
Dt. Exc. - 64 m3
Stone Embankment - 36 m3
Subgrade Geotextile - 195 m2
Ditch Liner (40 mm HDPE) - 195 m2
(For Details, See Sheet GJ-2)

(7) Sta. "FB" 0+044
Const. Check Slot Structure - 1
Dt. Exc. - 0.5 m3
Stone Embankment - 0.5 m3
Subgrade Geotextile - 6 m2

(8) Relocate Utility Pole - 7
(By others)

(9) Sta. "U" 7+464, Lt.
Remove Exist. Culv. Pipe - 7.0 m
Inst. 300 mm Culv. Pipe - 11.2 m
1.5 m Depth
Inst. Sloped End Section - 2

(10) Sta. "U" 7+481, Rt.
Remove Exist. Culv. Pipe - 7.0 m
Inst. 300 mm Culv. Pipe - 12.2 m
1.5 m Depth
Inst. Sloped End Section - 2

(11) Sta. "U" 7+505, Rt.
Remove Exist. Culv. Pipe - 22 m
Inst. 300 mm Culv. Pipe - 23.2 m
1.5 m Depth
Inst. Sloped End Section - 2

(12) Sta. "HS" 7+605 Lt.
Remove Exist. Culv. Pipe - 8 m
Inst. 300 mm Culv. Pipe - 17.2 m
1.5 m Depth
Inst. Sloped End Section - 2

(13) Sta. "HS" 7+642 Lt.
Remove Exist. Culv. Pipe - 8 m
Inst. 300 mm Culv. Pipe - 12.2 m
1.5 m Depth
Inst. Sloped End Section - 2

AS CONSTRUCTED
Wayne A. Stalter
PROJECT MANAGER
2 MAR 2007
DATE

NOTE:
1. All Dimensions Shown Are In Meters (m) Unless Otherwise Noted.
2. Remove Extg. Pipe Shown Thus: ~~~~~
3. Temp. Type Orange Plastic Mesh Delineation Fence Shown as Thus: —×—×—

REGISTERED PROFESSIONAL ENGINEER
17,573
OREGON
JANUARY 17, 1995
DANIEL C. GUNTHER
9/13/05
Expires June 30, 2007

OREGON DEPARTMENT OF TRANSPORTATION
REGION 1 GEO/HYDRO UNIT

OR219: HILLSBORO-SILVERTON HWY AT UNGER ROAD
HILLSBORO-SILVERTON HIGHWAY
WASHINGTON COUNTY

Project Leader - Sandy Van Bemmel
Designed By - Stephen Hay
Drafted By - David Haase

DRAINAGE & UTILITIES

SHEET NO. 4A

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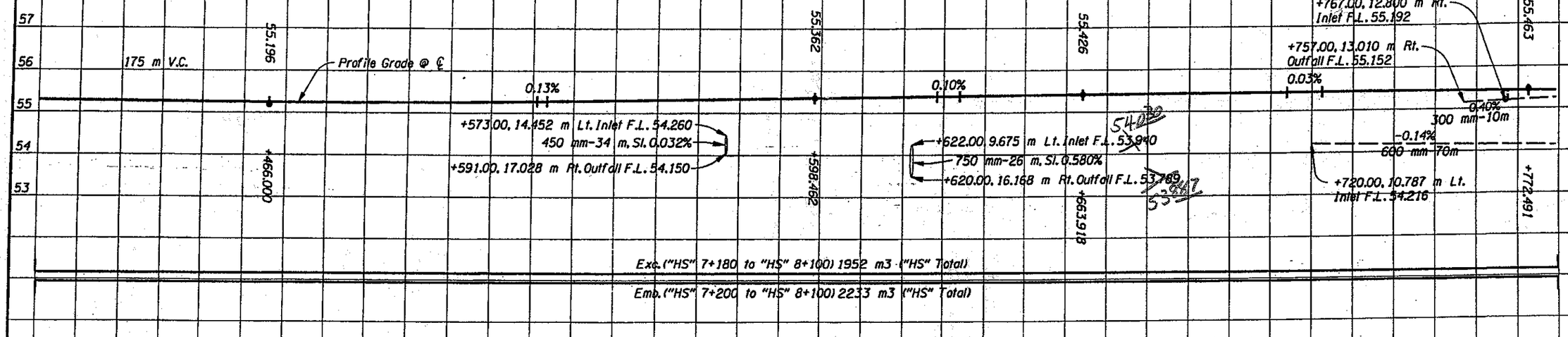
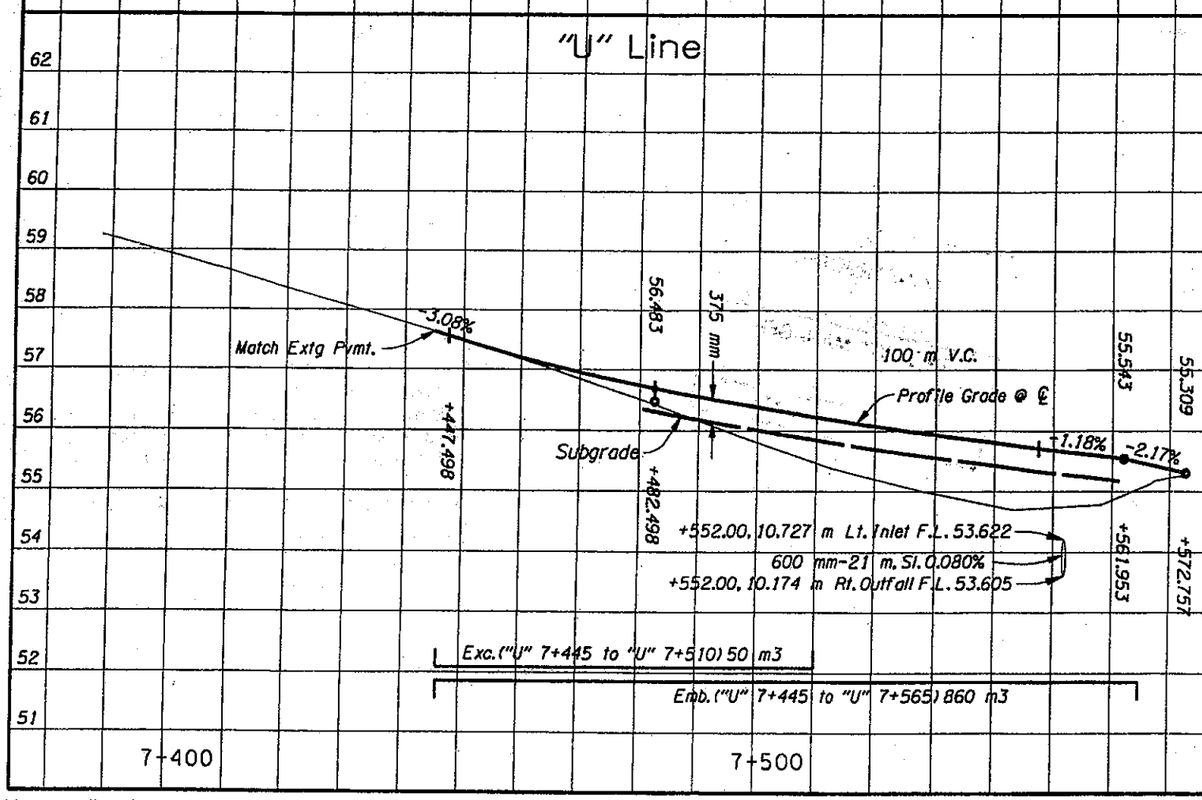
39V-010

"HS" Line



"U" Line



AS CONSTRUCTED
Wayne A. Stalter
PROJECT MANAGER
2 MAR 2007
DATE

REGISTERED PROFESSIONAL ENGINEER
17,573
OREGON
JANUARY 17, 1995
DANIEL C. GUNTHER
9/13/05
Expires June 30, 2007

OREGON DEPARTMENT OF TRANSPORTATION
REGION 1 GEO/HYDRO UNIT

OR219: HILLSBORO-SILVERTON HWY
AT UNGER ROAD
HILLSBORO-SILVERTON HIGHWAY
WASHINGTON COUNTY

Project Leader - Sandy Van Bemmel
Designed By - Stephen Hay
Drafted By - David Haase

PROFILE

SHEET NO. 4B

\\sc-regthq-1\hwye88i\ODOT_DATA\projects\11943_Unger\Design\11943f.dr1 9/13/2005 8:47:40 AM hwye88i

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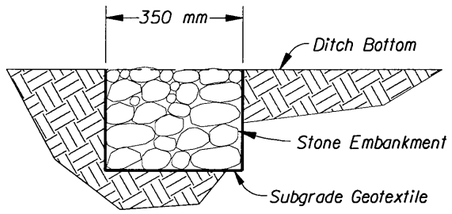
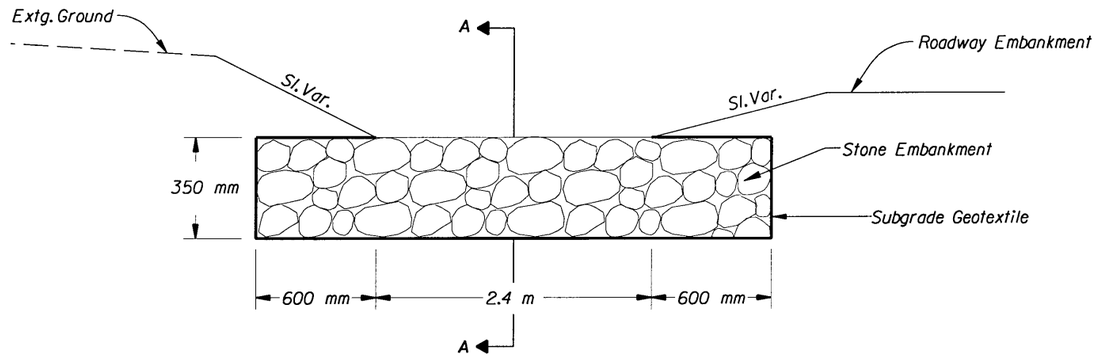
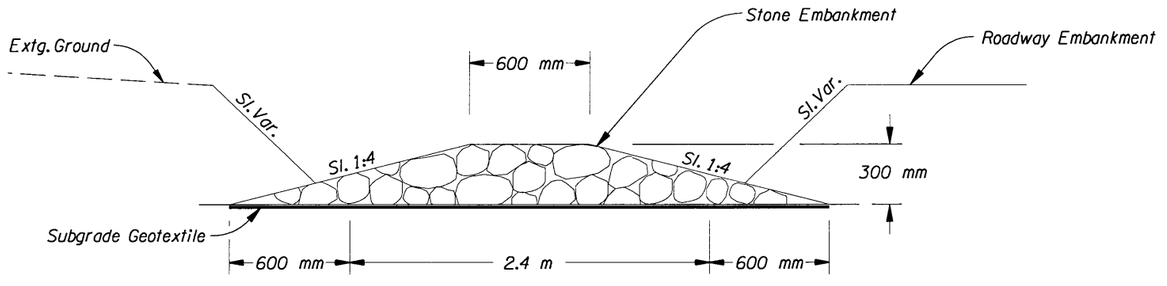


SECTION A-A



PERMANENT CHECK SLOT
FLAT BOTTOM DITCH
STA. "HB" 7+400 To STA. "HS" 7+560 Lt.
"HS" 7+600 Lt.
"HS" 7+880 To "HS" 8+050 Lt.
"FB" 0+044



PERMANENT CHECK DAM
FLAT BOTTOM DITCH
STA. "HS" 7+573 Lt.

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

REGISTERED PROFESSIONAL ENGINEER
17,573
OREGON
JANUARY 17, 1995
DANIEL C. GUNTHER
9/13/05
EXPIRES: 06/30/2007

OREGON DEPARTMENT OF TRANSPORTATION
REGION 1 GEO/HYDRO UNIT

OR219: HILLSBORO-SILVERTON HWY
AT UNGER ROAD
HILLSBORO-SILVERTON HIGHWAY
WASHINGTON COUNTY

Reviewed By - Dan Gunther
Designed By - Stephen Hay
Drafted By - Charlotte Gerken

WATER QUALITY DETAILS

SHEET NO. GJ