OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: November 2018

DFI No. D00773

Figure 1: DFI No. D00773, looking northwest (photo taken Feb 2016)

Identification

Drainage Facility ID (DFI):	D00773
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 46V-060
Location:	District: 2B
	Highway No.: 047
	Mile Post: 60.87-60.84 (Right Side)

1. Manual Purpose

The purpose of this manual is to outline inspection needs and summarize maintenance actions.

2. Facility Location

The location map below details the facility location. The highway, mile posts, side streets, access location, and stormwater flow directions are noted on the map.

Facility location type: On ramp

Flow direction: Northwest

Figure 2: Facility location map

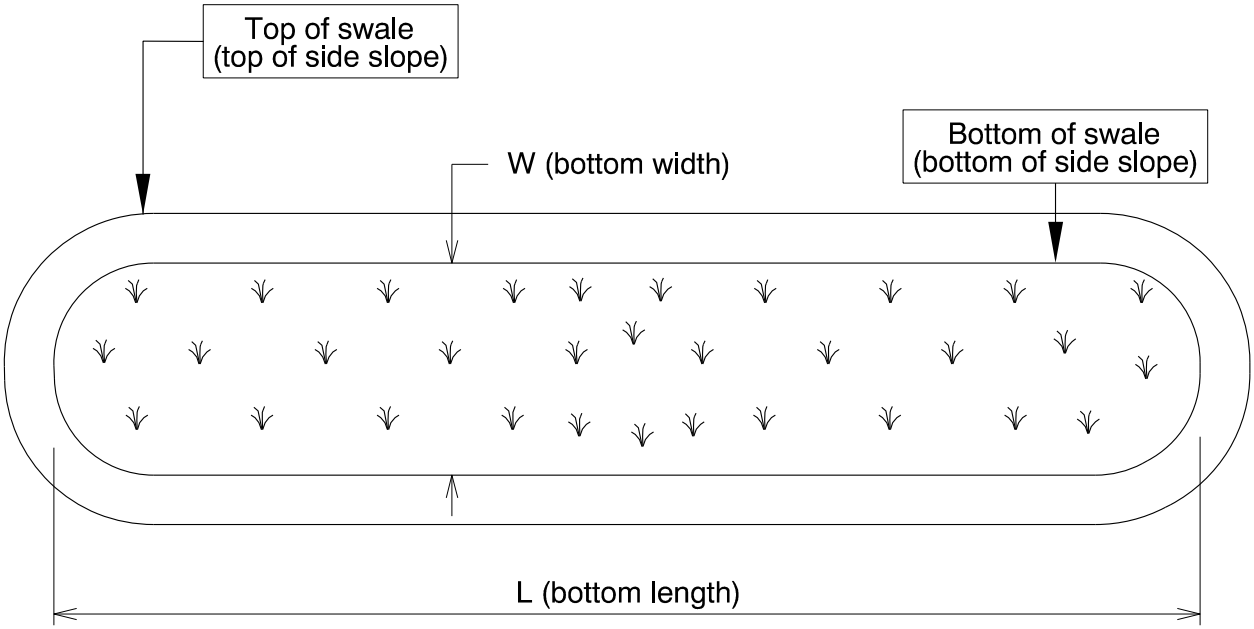
.

3. Facility Summary

The length and width of a swale are based on the bottom dimensions.

The bottom length and bottom width of the swale is:

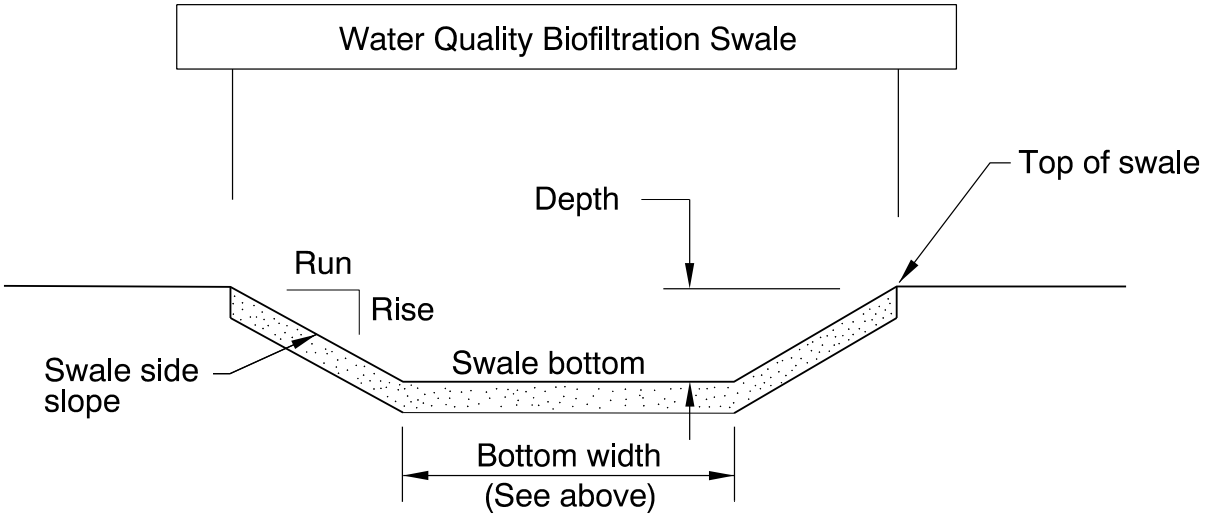
Bottom Length (feet)	Bottom Width (feet)
160	4 (min)



The depth of the swale is the vertical distance measured from the bottom of the swale to the top. The slope of the swale sides is presented by a vertical distance (rise) followed by the horizontal distance (run).

Depth and side slopes:

Depth (feet)	Rise (feet)	Run (feet)
1	1	3



Site Specific Information: There is no access to the swale off of US 26. Maintenance access is provided by NW Groveland Dr, which has a turnabout. This provides a direct access road to the swale. The access road is not gated.

4. Facility Access

Maintenance access to the facility:

☐Roadside pad	☐Roadside shoulder
☐Access road with Gate	☒Access road without Gate

Figure 3: Maintenance Access

5. Operational Components / Maintenance Items

Classification

This facility is classified as an:

☒ On-line Swale	☐ Off-line Swale
A swale that does not include a high flow bypass component; flow drains into and through the facility	**A swale that treats low/small flows and diverts high flows using a bypass component**

Bypass Component

This facility includes a high flow bypass component:

☒ No	☐ Yes
There is no bypass component. High flows drains into and through the facility	**There is a bypass component. Only low/small flows drain into the swale. High flows are diverted around the swale using a bypass component**

Operational Components

A swale has many components that assist with treatment, conveyance, and reducing flow velocity to minimize erosion. The components in use can vary depending if the facility was designed to operate on-line or off-line. The facility components table (**Table 1**) has been provided to highlight the applicable components for this facility. The component is in use when the box contains an "x" (e.g. ☒).

The Standard Operation Manual for Water Quality Biofiltration Swales (implemented March 2017) outlines facility operation, typical footprint configuration, and component definitions and details. A link to the manual is attached to the feature marker in TransGIS.
https://gis.odot.state.or.us/TransGIS/

Operational Plan

The applicable standard operational plan for this facility is:

☐ Operational Plan A	☒ Operational Plan B	☐ Operational Plan C
An on-line swale with roadside ditches	**An on-line swale with piped inlets and outlets**	**An off-line swale with a piped high flow bypass**
A standard operational plan illustrates the general facility footprint configuration and explains the purpose of each facility component. Operational plans (A, B, C) are provided in the Standard Operation Manual.		

See Appendix A for the site specific operational plan.

Maintenance Items

Operational components marked in **Table 1** should be inspected and maintained according to Section 7. Each facility component is defined and detailed in the Standard Operation Manual using the associated ID number indicated below.

Table 1: Swale Components		ID #
Manholes/Structures		
Pre-treatment manhole	☐	**S1**
Weir type flow splitter/flow splitter manhole	☐	**S2**
Orifice type flow splitter/flow splitter manhole	☐	**S3**
Standard manhole	☐	**S4**
Swale Inlet		
Pavement sheet flow	☐	**S5**
Inlet Pipe (s)	☒	**S6**
Open channel inlet	☐	**S7**
Riprap pad	☐	**S8**
Ground Cover		
Grass bottom	☒	**S9**
Grass side slopes	☒	**S10**
Granular drain rock	☐	**S11**
Plantings	☐	**S12**
Underground Components		
Geotextile fabric	☐	**S13**
Water quality mix	☒	**S14**
Perforated pipe	☐	**S15**
Porous pavers (access grid)	☐	**S16**
Flow Spreader		
Rock basin (used at inlet)	☒	**S17**
Anchored board (midpoint of swale or every 50 feet along swale bottom)	☐	**S18**
Other: describe type	☐	**S19**
Swale Outlet		
Catch basin with grate	☐	**S20**
Outlet Pipe (s)	☐	**S21**
Open channel outlet	☒	**S22**
Auxiliary Outlet:	☐	**S23**
Outfall Type		
Waterbody (**C**reek/**L**ake/**O**cean)	☐ **C** ☐ **L** ☐**O**	**S24**
Ditch	☒	**S25**
Storm drain system	☐	**S26**
Outfall Components		
Riprap pad	☐	**S27**
Riprap channel protection	☒	**S28**

6. Maintenance

Maintenance Frequency/Maintain Records

a. Inspect annually. Preferably prior to the rainy season.
b. Clean and maintain as necessary. Refer to Activity 125 for conditions when maintenance is needed.
c. Keep a record of inspections, maintenance, and repairs.

Maintenance Guide/Maintenance Actions

The ODOT Routine Road Maintenance Water Quality and Habitat Guide (the *Blue Book*) outlines the standard maintenance actions for water quality facilities under Activity 125.

There are standard maintenance tables for standard ODOT designs. The maintenance tables describe the maintenance component, the defect or problem, the condition when maintenance is needed, and the recommended maintenance to correct the problem. Use the following tables to maintain ODOT swales:

- Table 1 (General Maintenance): Contains general maintenance and inspection guidelines that are applicable to all ODOT water quality facilities
- Table 3 (Maintenance of Water Quality or Biofiltration Swales): Contains maintenance information for swales

The *Blue Book* can be viewed at the following website:
http://www.oregon.gov/ODOT/Maintenance/Documents/blue_book.pdf

7. Limitations

Access grid installed:

☒ No	☐ Yes
There are (Choose applicable weight: no, light, med., heavy) duty porous pavers installed in this swale	

Swales are designed to allow equipment access along the bottom. If an access grid is **NOT** installed, vehicles entering the swale can create depressions (tire ruts), damage vegetation, and damage structural components (e.g. flow spreaders). These conditions may result in poor treatment and drainage performance.

Equipment wheels should be kept on the tops and side slopes. Mower arms may be run along the swale bottom.

8. Waste Material Handling

Material removed from the facility is defined as waste by the Department of Environmental Quality (DEQ). Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options:

http://www.oregon.gov/ODOT/Maintenance/Documents/ems_manual.pdf

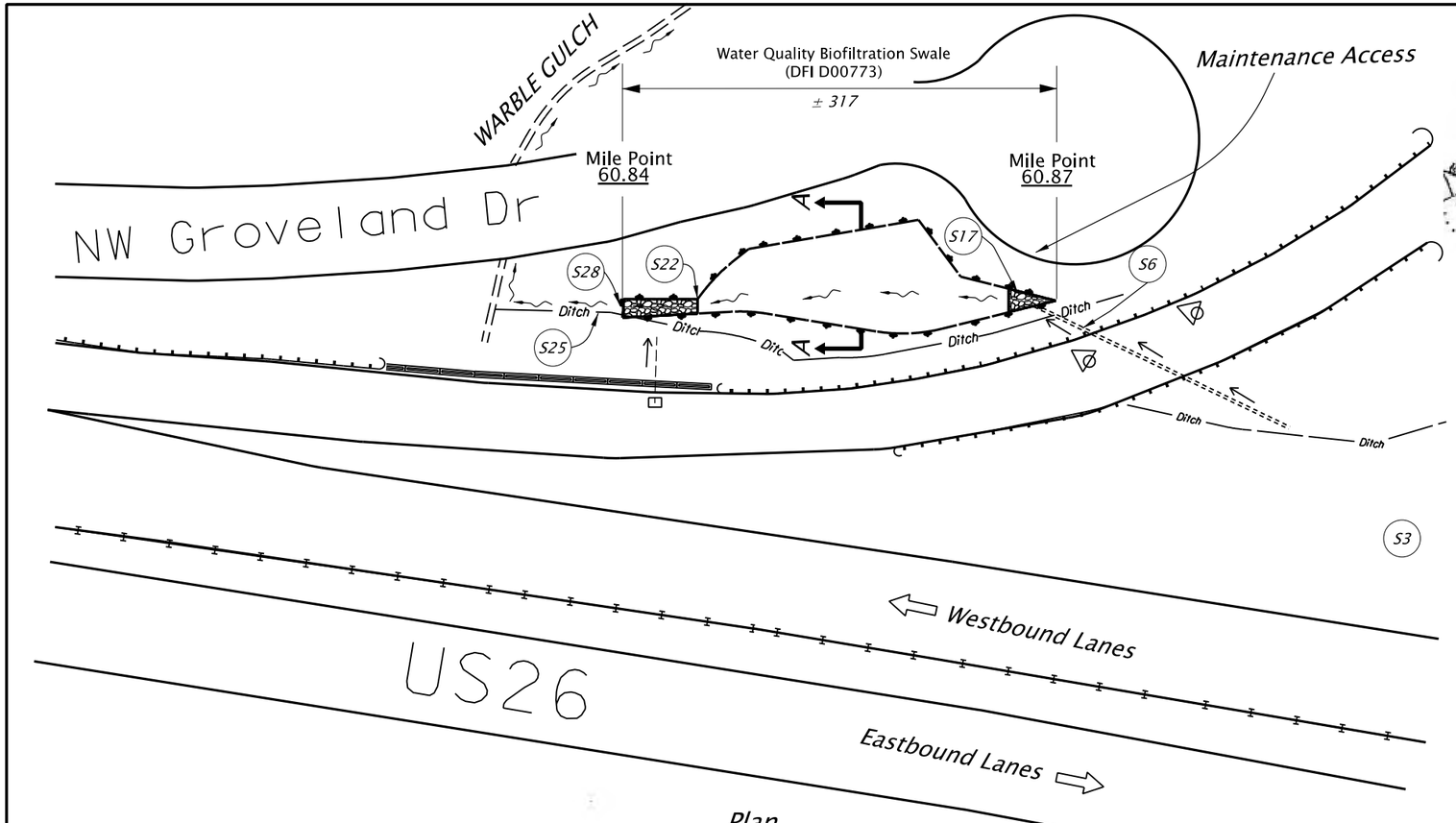
Contact any of the following for more detailed information about management of waste materials found on site:

ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 667-7442
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODOT Region 2 Hazmat Coordinator	(503) 986-2647
ODOT Region 3 Hazmat Coordinator	(541) 957-3594
ODOT Region 4 Hazmat Coordinator	(541) 388-6186
ODOT Region 5 Hazmat Coordinator	(541) 963-1590
ODEQ Northwest Region Office	(503) 229-5263

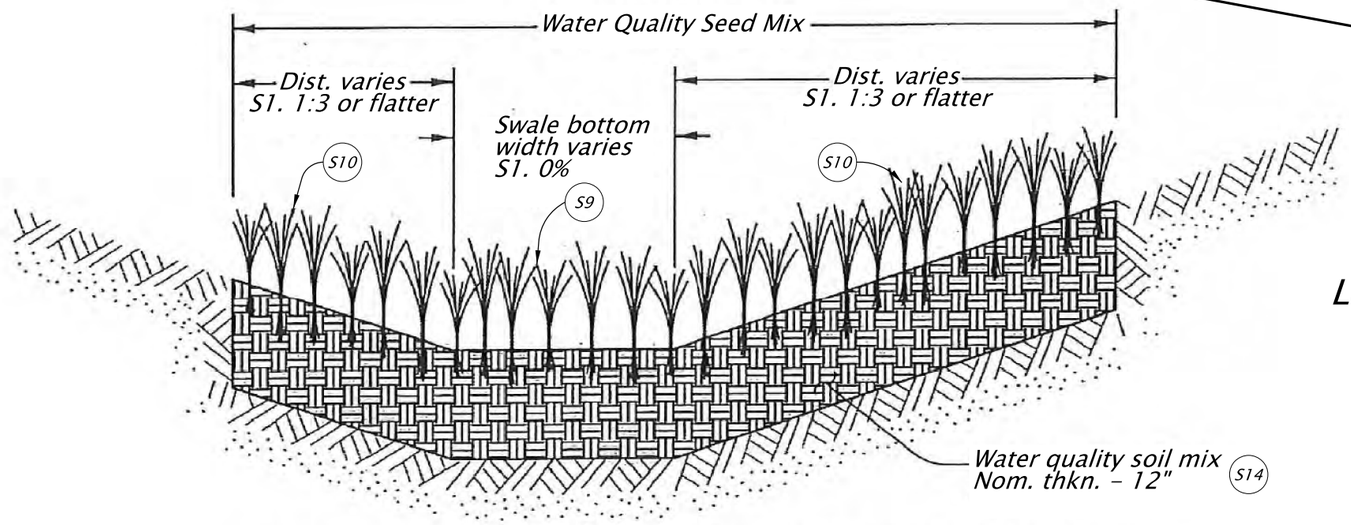
A Appendix A – Site Specific Operational Plan

Contents:

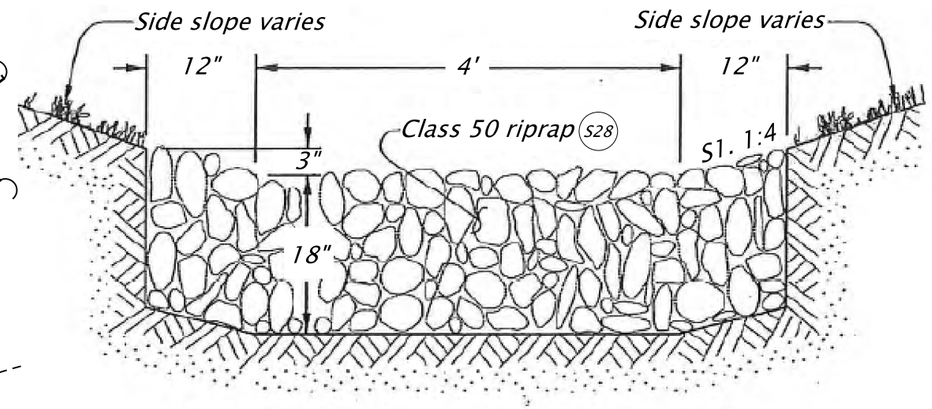
Operational Plan: DFI D00773



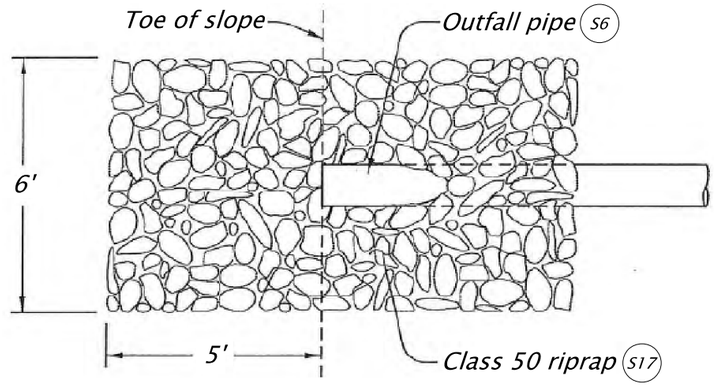
Plan
N.T.S.



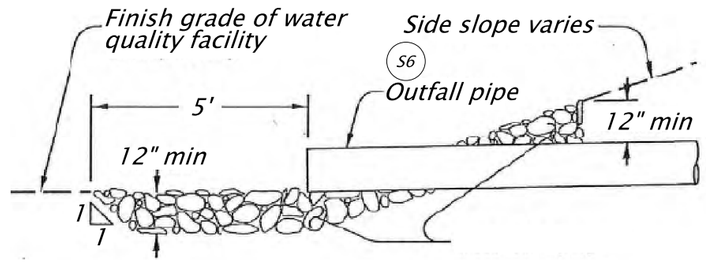
SECTION A-A
N.T.S.



CHANNEL PROTECTION



OUTFALL PIPE



OUTFALL PIPE PROFILE

Legend

- Photo Location/Direction
- Storm Pipe (Not Facility)
- Storm Pipe (Facility)
- Conveyence Direction
- Water Flow Direction
- Traffic Flow Direction
- Inlet

Sht. 01 of 01

Prepared By:
Katrina Sepulveda

Drafted By:
Katrina Sepulveda

OREGON DEPARTMENT
OF TRANSPORTATION

DFI D00773
MAINTENANCE DISTRICT 2B HWY 047
Water Quality Biofiltration Swale
SUNSET HIGHWAY MP 60.84-60.87
Washington County

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 46V-060

46V-060

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index of Sheets Cont'd.
1A-2	Std. Drg. Nos.
1B	Sheet Layout

"NOT REVISED AS CONSTRUCTED"
Tom Lawson
PROJECT MANAGER
8/22/17
DATE

STATE OF OREGON
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

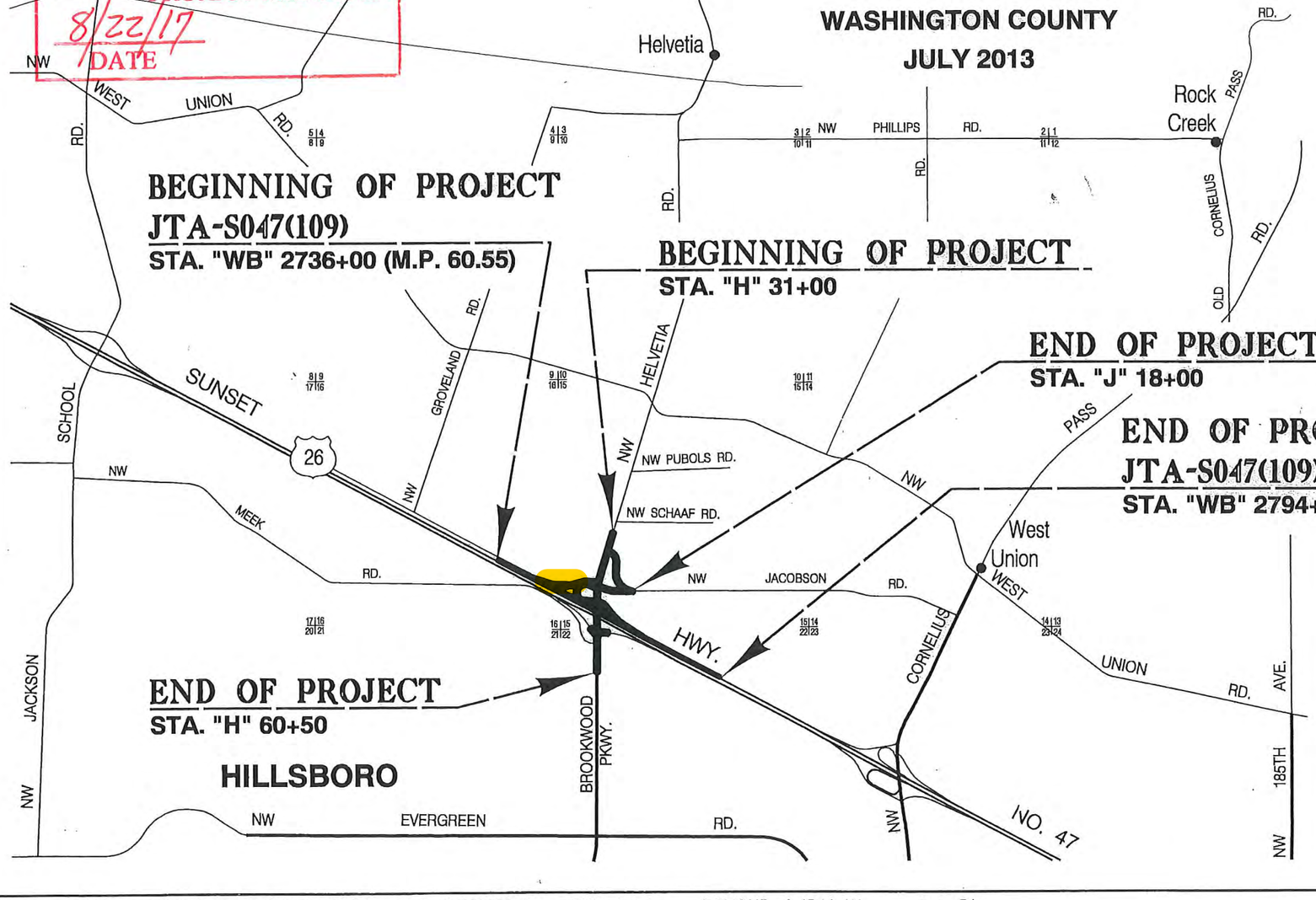
GRADING, DRAINAGE, STRUCTURES, PAVING, SIGNING, ILLUMINATION AND SIGNALS

US26 @ BROOKWOOD / HELVETIA (SHUTE RD) PROJECT

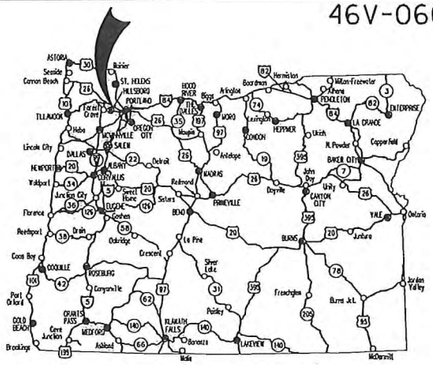
SUNSET HIGHWAY

WASHINGTON COUNTY

JULY 2013



Sections 15, 16 & 22
T. 1 N., R. 2 W., W.M.



Overall length of project: 1.1 miles

ATTENTION:
Oregon Law Requires You To Follow Rules Adapted 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

OREGON TRANSPORTATION COMMISSION

Pat Egan	CHAIR
David Lohman	COMMISSIONER
Mary F. Olson	COMMISSIONER
Mark Frohnmayer	COMMISSIONER
Tammy Baney	COMMISSIONER
Matthew L. Garrett	DIRECTOR OF TRANSPORTATION

These plans were developed using ODOT design standards. Exceptions to these standards, if any, have been submitted and approved by the ODOT Chief Engineer or their delegated authority.

Approving Authority: Naveen G. Chandra
Naveen G. Chandra, Reg. 1 Project Delivery Mgr.
6/11/13

Concurrence by ODOT Chief Engineer

US26 @ BROOKWOOD / HELVETIA (SHUTE RD) PROJECT
SUNSET HIGHWAY
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	STATE	1

PE001829

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INDEX OF SHEETS, CONT'D.

SHEET NO.	DESCRIPTION
	ROADWAY
~~2, 2A Thru 2A-12 Incl.~~	Typical Sections
2, 2A Thru 2A-14 Incl.	
~~2B Thru 2B-7 Incl.~~	Details
2B Thru 2B-8 Incl.	
2C Thru 2C-57 Incl.	Traffic Control Plans
2D & 2D-2	Pipe Data Sheet
3	General Construction
4	General Construction
5	Alignment & R/W
5A	General Construction
5B	Drainage & Utilities
5B-2	Drainage & Utilities Notes
5C	Profile
6	Alignment & R/W
6A	General Construction
6A-2	Construction Notes
6B	Drainage & Utilities
6B-2	Drainage & Utilities Notes
6C	Profile
7	General Construction
8	Alignment & R/W
8A	General Construction
8A-2	Construction Notes
9	Alignment & R/W
9A	General Construction
9A-2	Construction Notes
9B	Drainage & Utilities
9B-2	Drainage & Utilities Notes
9C	Profile
10	Alignment & R/W
10A	General Construction
10A-2	Construction Notes
10B	Drainage & Utilities
10B-2	Drainage & Utilities Notes
10C	Profile
11	Alignment & R/W
11A	General Construction
11A-2	Construction Notes
11B	Drainage & Utilities
11B-2	Drainage & Utilities Notes
11C	Profile
11D	Profile
11E	Pedestrian Pathway Details
12	Alignment & R/W
12A	General Construction
12B	Drainage & Utilities
12C	Profile
13	Alignment & R/W
13A	General Construction

INDEX OF SHEETS, CONT'D.

SHEET NO.	DESCRIPTION
	GEO/HYDRO
GA	Erosion & Sediment Notes
GA-2 Thru GA-43 Incl.	Erosion & Sediment Control Plan
GA-44	Erosion & Sediment Control Details
GB Thru GB-3 Incl.	Drill Hole Locations
GB-4	Wall 1 Subsurface Data
GB-5	Wall 2 Subsurface Data
GB-6 Thru GB-9 Incl.	Subsurface Data
GC	Wall 1 (Structure No. 22103)
GC-2 & GC-3	Wall 2 (Structure No. 22104)
GC-4	Wall 2 Sections (Structure No. 22104)
GC-5	Wall 2 Stages (Structure No. 22104)
GC-6	General Notes & Design Requirements (Structure No. 22103 & 22104)
GE	Culvert & Temporary Water Management Plan
GJ Thru GJ-3 Incl.	Water Quality Facility Details
GJ-4	Water Quality Facility No. 1
GJ-5 Thru GJ-7 Incl.	Water Quality Facility No. 2
GJ-8	Water Quality Facility No. 3
GL Thru GL-2 Incl.	Prospective Disposal Site
GN Thru GN-2 Incl.	Contour Grading Plan
GR	Weed Control Work Plan

"REVISED AS CONSTRUCTED"
Ken Larson
PROJECT MANAGER
8/28/17
DATE

INDEX OF SHEETS, CONT'D.

DRAWING NO.	DESCRIPTION
91879	General Layout & Index
	BRIDGE NO. 09722 NW HELVETIA RD CONN OVER HWY 47
91880	Plan & Elevation
91881	General Notes
91882	Foundation Data
91883	Staging
91884	Footing Plan
91885	Construction & Concrete Pour Sequence
91886	Deck Plan Span 1
91887	Deck Plan Span 2
91888	Deck Section
91889	Partial Framing Layout
91890	Steel Girder Details - Span 1
91891	Steel Girder Details - Span 2
91892	Girder Camber Details
91893	Field Splice Details
91894	Cross Beam (Bent 2) Details
91895	Cross Beam (Bent 2) Connection
91896	Misc. Welding Details
91897	Intermediate Cross Frame Details
91898	Cross Frames (Bents 1 & 3) Details
91899	Bent 3 (Bent 1 similar)
91900	Misc. (Bents 1 & 3) Details
91901	Bearing Details (Bents 1 & 3)
91902	Wingwalls
91903	Bent 2
91904	Bent 2 - Details
91905	Bearing Details (Bent 2)
91906	Ornamental Protective Fencing 1
91907	Ornamental Protective Fencing 2
91908	Ornamental Protective Fencing 3
91909	Temporary Barrier-Plan & Elevation
91910	Temporary Barrier Details

PERMANENT PAVEMENT MARKINGS	
ST Thru ST-11 Incl.	Striping Plan

DRAWING NO.	DESCRIPTION
	PERMANENT SIGNING
S-14052 Thru S-14075 Incl.	Permanent Signing
S-14076	Rice Museum Signing Plan
	STRUCTURE No. 22039
S-14076	Cantilever Sign Support
S-14077	Subsurface Data

INDEX OF SHEETS, CONT'D.

SHEET NO.	DESCRIPTION
	STRUCTURE No. 22068 (SIGN BRIDGE)
S-14078	Plan & Elevation
S-14079	Subsurface Data

	STRUCTURE No. 22038
S-14080	Cantilever Sign Support
S-14081	Subsurface Data

	ILLUMINATION
I-02155	Illumination Legend
I-02156 Thru I-02163 Incl.	Illumination Plan
I-02164	Temporary Illumination Legend & Pole Table
I-02165 Thru I-02168 Incl.	Temporary Illumination Plan
I-02169	Temporary Illumination Details

	TRAFFIC SIGNALS
17329	Signal Legend
17330	Signal Plan
17331	Detector Plan
17332	Existing Utility Plan
17333	Signal Removal Plan
17334	Signal Plan
17335	Detector Plan
17336	Existing Utility Plan
17337	Signal Removal Plan
17338	Interconnect Plan
17339	Details
17340	Pamp Meter Legend
17341	Pamp Meter Plan
17342	Temporary Signal Legend
17343 Thru 17347 Incl.	Temporary Signal & Detector Plan
17348	Existing Utilities
17349 Thru 17351 Incl.	Temporary Signal & Detector Plan
17352	Existing Utilities
17353 Thru 17355 Incl.	Details
17360	Signal Pole Footing - Detail 1 Bridge Dwg. No. 91717
17361	Signal Pole Footing - Detail 2 Bridge Dwg. No. 91718

ITS	
ITS-1521	ITS Legend
~~ITS-1522 Thru ITS-1525 Incl.~~ ITS-1522 Thru ITS-1524 Incl.	ITS Plan
~~ITS-1526 Thru ITS-1527 Incl.~~ ITS-1525 Thru ITS-1528 Incl.	Details

R/W Map No. 11B-05-35

Added new Plan Sheets 2A-13, 2A-14, 2B-8 and 11E - Pedestrian Pathway Details, S-14076 - Rice Museum Signing Plan, ITS-1528 - Details

Standard Drawings located on the web at: http://www.oregon.gov/ODOT/HWY/ENGSERVICES/standard_drawings_home.shtml

US26 @ BROOKWOOD / HELVETIA (SHUTE RD) PROJECT
SUNSET HIGHWAY
WASHINGTON COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	STATE	1A

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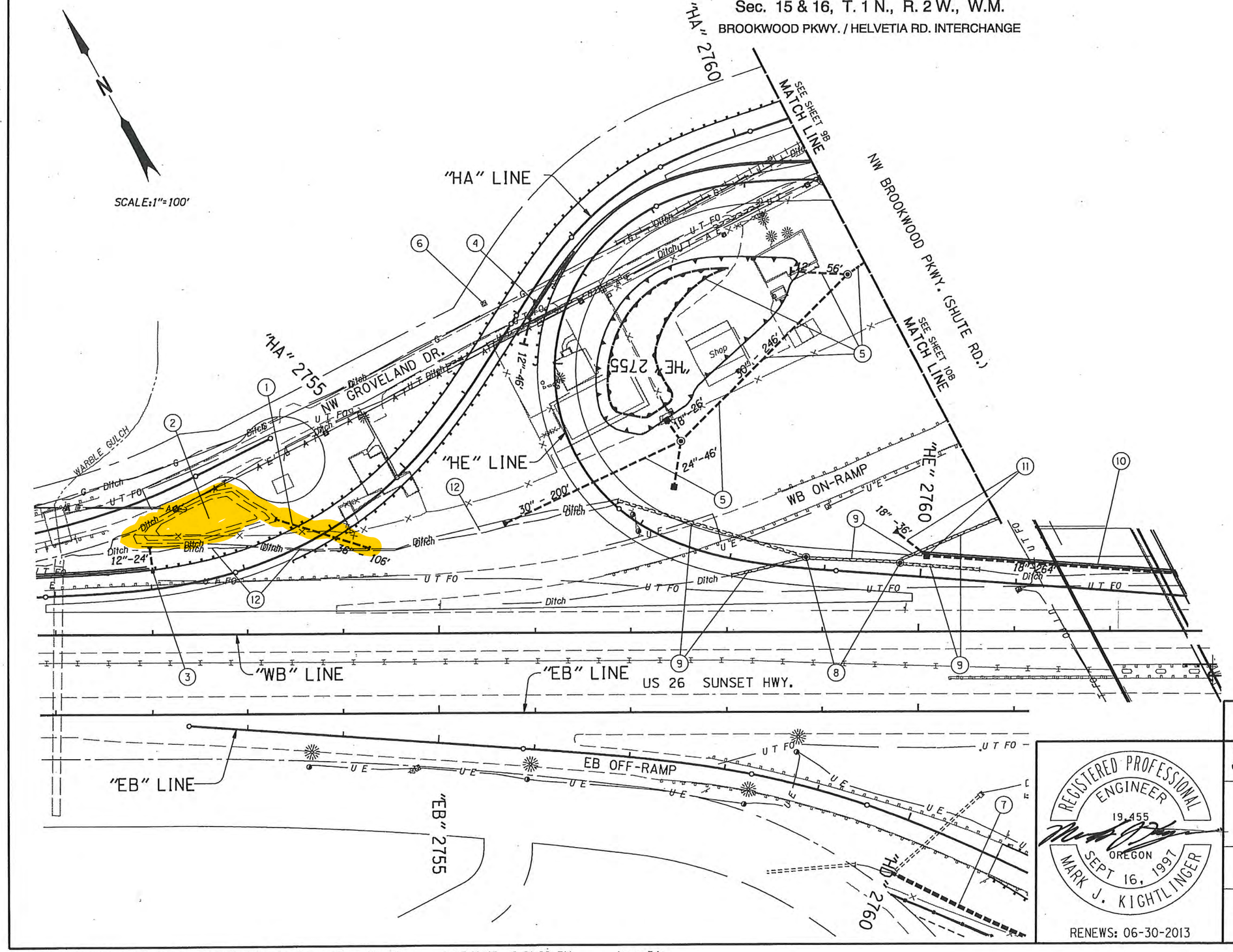
46V-060

Sec. 15 & 16, T. 1 N., R. 2 W., W.M.

BROOKWOOD PKWY. / HELVETIA RD. INTERCHANGE



"NOT REVISED AS CONSTRUCTED"
Ron Lauson
PROJECT MANAGER
8/22/17
DATE

Removal of pipes, shown thus: ==========

REGISTERED PROFESSIONAL ENGINEER
19,455
OREGON
SEPT 16, 1997
MARK J. KIGHTLINGER
RENEWS: 06-30-2013

OREGON DEPARTMENT OF TRANSPORTATION

Region 5 Tech Center
3012 Island Ave
La Grande, OR 97850
(541) 963-3177

US26 @ BROOKWOOD / HELVETIA (SHUTE RD) PROJECT
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - Thomas Glen Wallace
Designed By - Mark J. Kightlinger
Drafted By - Mark J. Kightlinger

DRAINAGE & UTILITIES

SHEET NO. 5B

S:\Projects\16842_US26_Brookwood\16842plans.dgn :: Plan Sheets 5/13/2013 6:01:29 PM hwye54e

* 18" storm sewer pipe must be ductile iron due to shallow depth as directed by EOR on 8/5/15 via e-mail.

(1) Sta. "HA" 2753+90
Inst 36" Culvert Pipe - 106'
5' depth
(Subject to in-water work period)
(See drg. no. RD300)

(2) Const. water quality facility no. 3
(Subject to in-water work period)
(For sht. nos., see sht. 1A)

(3) Sta. "HA" 2752+03, Lt. Offset 18.42' Left
Const. Type "G-2" Inlet with 18" sump
Inst. 12" storm sewer pipe - 24'
5' depth
Inst. slope anchors
(See Drg. nos. RD330 & RD364)

(4) Sta. "HA" 2757+20, Rt. Offset 8.42' Right
Const. Type "G-2" Inlet with 18" sump
Inst. 12" storm sewer pipe - 46'
5' depth

(5) Const. water quality facility no. 2
(For sht. nos., see sht. 1A)

(6) Monitoring well
Decommissioned by others

(7) Const. ditch
4' flat bottom, 1:4 sides
Dit excavation - 73 cu.yd.

(8) Remove manholes - 2

(9) Remove extg. storm sewer pipes

(10) Sta. "HE" 2760+05 to Sta "HE" 2762+69, Lt
~~Inst. 18" storm sewer pipe - 264'~~ * Install 18" Ductile Iron Pipe - 264'
5' depth

(11) Sta. "HE" 2760+05 Offset 22.17' Left
Const. Type "G-2" Inlet
~~Inst. 18" storm sew. pipe - 36'~~ * Install 18" Ductile Iron Pipe - 36'
5' depth
Const. paved end slope

(12) Exist. ditch
(Subject to in-water work period)

"REVISED AS CONSTRUCTED"
Ron Larson
PROJECT MANAGER
8/22/17
DATE

REGISTERED PROFESSIONAL ENGINEER
19,455
OREGON
SEPT 16, 1997
MARK J. KIGHTLINGER
RENEWS: 06-30-2013

OREGON DEPARTMENT OF TRANSPORTATION

Region 5 Tech Center
3012 Island Ave
La Grande, OR 97850
(541) 963-3177

US26 @ BROOKWOOD / HELVETIA
(SHUTE RD) PROJECT
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - Thomas Glen Wallace
Designed By - Mark J. Kightlinger
Drafted By - Mark J. Kightlinger

DRAINAGE & UTILITIES NOTES

SHEET NO. 5B-2

"HE" LINE

Match "H" line surfacing
-0.41%
200' V.C.
+40.00
2.3"
-3.00%
Profile Grade @ ℄
Subgrade
+33.93
196.00
400' V.C.
+70.00
Extg. ground @ ℄
+33, 30" Storm Sewer
-0.31%
300' V.C.
194.24
+44.59
18"-36' @ 0.50%
+75, 43' Lt.
Outlet El. 189.65
+05, Inlet Lt.
F.L. in 189.83
18"-264' @ 0.50%
23"
0.42%
+69, Inlet Lt.
F.L. in 191.15
(WB Ll. side) General excavation - 570 cu. yd.
Foundation exc. - (quantities covered under "HA" Line)
Stone emb. in place - (quantities covered under "HA" Line)
Embankment in place 2,000 cu. yd.
Foundation exc. - 3,000 cu.yd.
General excavation - 4,205 cu.yd.
Stone emb. in place - 6,936 cu. yd.
Embankment in place - 940 cu. yd.
2755+00
2760+00

"REVISED AS CONSTRUCTED"
Steve Larson
PROJECT MANAGER
8/22/17
DATE

"HA" LINE

* Flowline elevation changed to match the elevation shown on Sheet GJ-8 by the EOR via e-mail on 11/25/13

Match "H" line surfacing
206.50
+78.68
+20, Inlet Rt.
F.L. 197.99
Profile Grade @ 12' Lt.
3.57%
300' V.C.
-1.07%
202.52
23"
+49.56
+76, 22' Rt.
Outlet El. 197.53
12"-46' @ -1.00%
190.40
+23"
+03, Inlet Lt.
F.L. in 186.77
12"-24' @ -23.4%
+03.
Outlet El. 181.1
+28.00
36"-106' @ 0.50%
+52, 37' Lt.
~~Outlet El. 183.20~~ * Outlet El. 182.00'
+20, 39' Rt.
Inlet El. 183.72
Subgrade
Extg. ground @ ℄
Foundation excavation - 8,494 cu.yd.
General excavation - 693 cu.yd.
Stone emb. in place - 43,669 cu.yd.
MSE Wall #1
2755+00
2760+00

"FR" LINE
Profile Grade @ ℄
184.70
185.51
Feather HMAC
1.11%
+72.00
+45.00
18"
Subgrade
General excavation - 120 cu. yd.
Stone emb. in place - 30 cu. yd.
7+00
8+00
9+00

REGISTERED PROFESSIONAL ENGINEER
19,455
OREGON
SEPT 16, 1997
MARK J. KIGHTLINGER
RENEWS: 06-30-2013

OREGON DEPARTMENT OF TRANSPORTATION

Region 5 Tech Center
3012 Island Ave
La Grande, OR 97850
(541) 963-3177

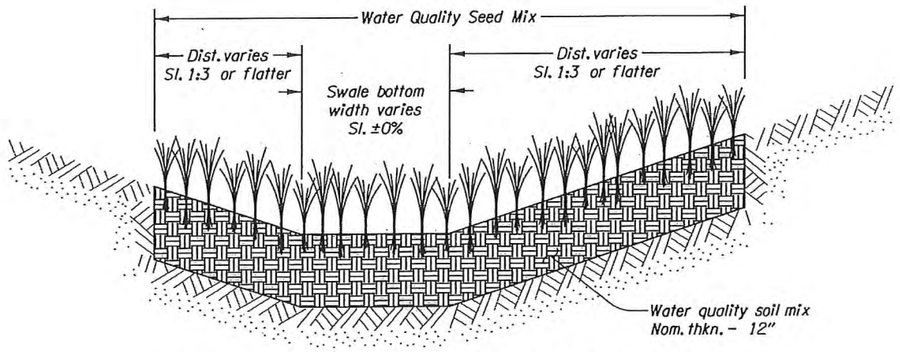
US26 @ BROOKWOOD / HELVETIA
(SHUTE RD) PROJECT
SUNSET HIGHWAY
WASHINGTON COUNTY

Design Team Leader - Thomas Glen Wallace
Designed By - Mark J. Kightlinger
Drafted By - Mark J. Kightlinger

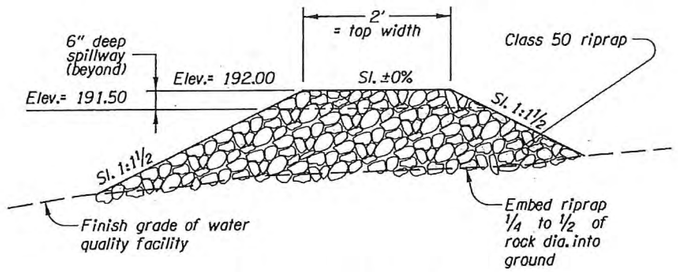
PROFILE

SHEET NO. 5C

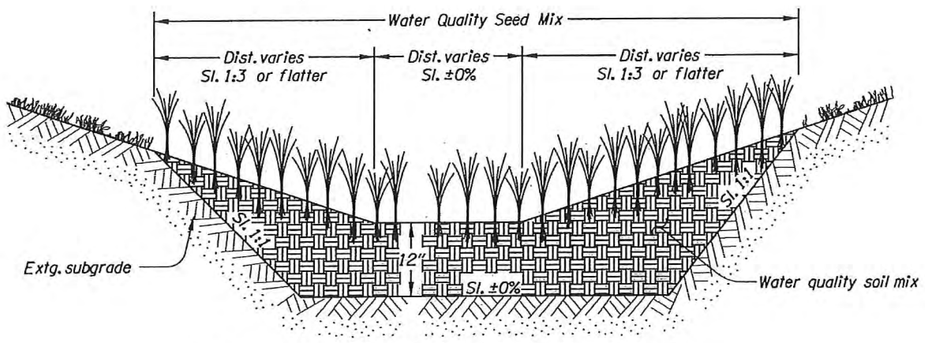
S:\Projects\16842_US26_Brookwood\16842plans.dgn :: Plan Sheets 5/13/2013 8:22:47 PM hwye54e



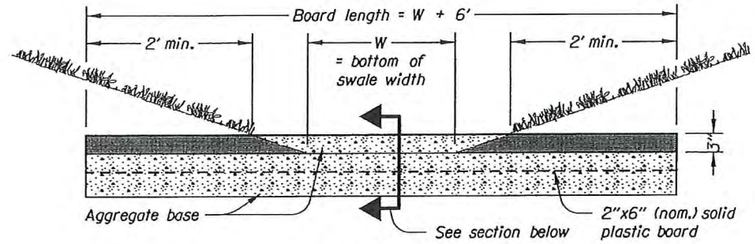
WATER QUALITY SWALE SECTION



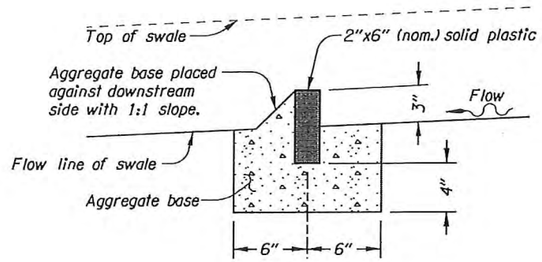
FOREBAY BERM



TYPICAL DRY POND SECTION



ELEVATION



SECTION

FLOW SPREADING CHECK DAM

Space approx. every 50' or as directed.

"NOT REVISED AS CONSTRUCTED"
Ron Larson
PROJECT MANAGER
8/22/17
DATE

NOTES FOR ALL DETAILS:
1. Side-slopes are shown as vert. to horiz.

REGISTERED PROFESSIONAL ENGINEER
60,795
OREGON
05, 1999
CAROLINE L. BARNES
RENEWS: 12-31-2013

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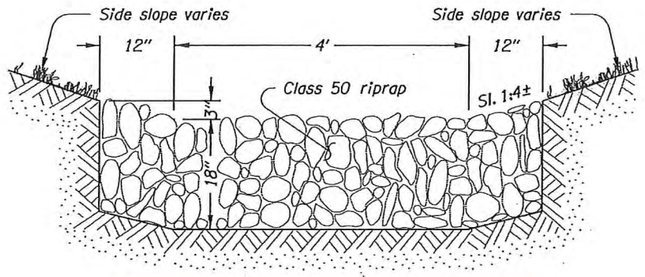
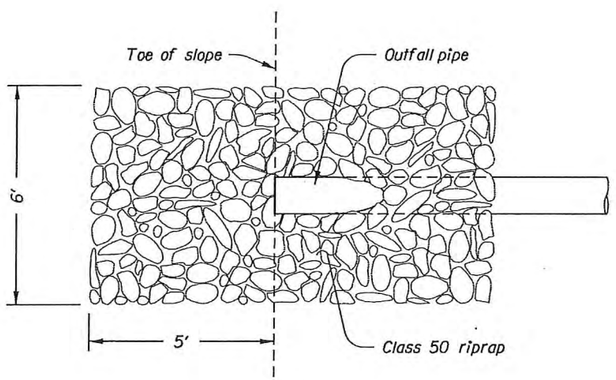
Design Team Leader - Thomas Glen Wallace
Designed By - Caroline L. Barnes
Drafted By - F. Jeremy Schad

WATER QUALITY FACILITY DETAILS

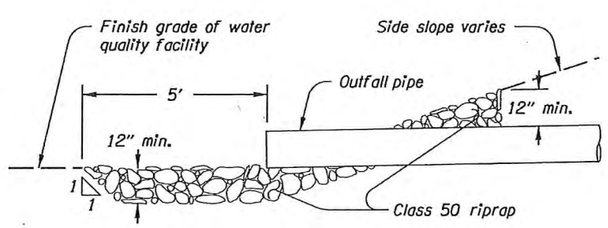
SHEET NO. GJ-2



CHANNEL PROTECTION



PLAN



ELEVATION

INLET ENERGY DISSIPATOR

"NOT REVISED AS CONSTRUCTED"
Ron Larson
PROJECT MANAGER
8/22/17
DATE

NOTES FOR ALL DETAILS:
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REGISTERED PROFESSIONAL ENGINEER
60,795
OREGON
MAY 05, 1999
CAROLINE L. BARNES
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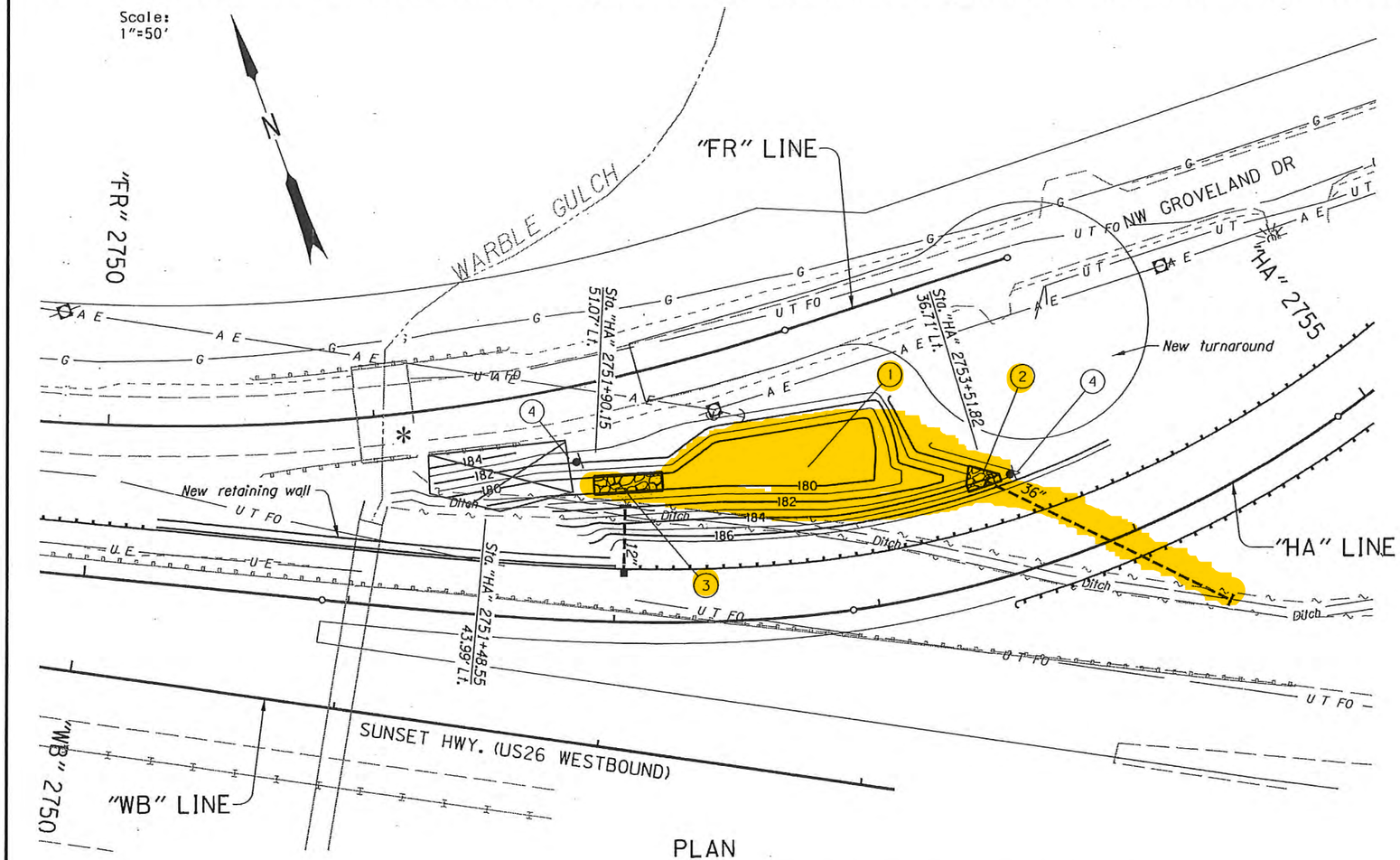
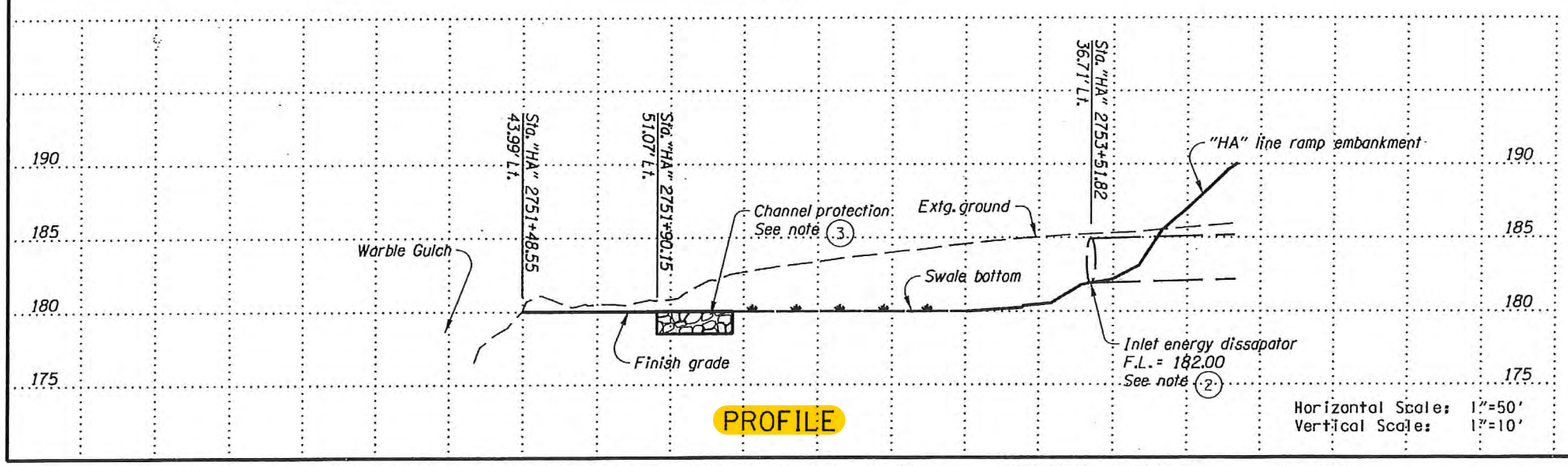
WATER QUALITY FACILITY DETAILS

SHEET NO. GJ-3

*Grading work at this location eliminated by ODOT R1 Hydraulic Engineer due to conflict with "No Work Zone" as shown on Sheet 4

46V-060





(1) Sta. "HA" 2753+51.82, 36.71' Lt. to Sta. "HA" 2751+90.15, 51.07' Lt. Const. 4' wide water quality swale (For details see sht. GJ-2)

(2) Const. inlet energy dissipator (For details see sht. GJ-3)

(3) Const. riprap channel protection - 26' (For details see sht. GJ-3)

(4) Install stormwater treatment field marker

"REVISED AS CONSTRUCTED"
Ron Larson
PROJECT MANAGER
8/22/17
DATE

Storm Facility No. D00773

REGISTERED PROFESSIONAL ENGINEER
60,795
OREGON
MAY 05, 1999
CAROLINE L. BARNES
RENEWS: 12-31-2013

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WASHINGTON COUNTY

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Designed By - Caroline L. Barnes
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WATER QUALITY FACILITY NO.3

SHEET NO. GJ-8