

OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: October 2020

DFI No. D01257

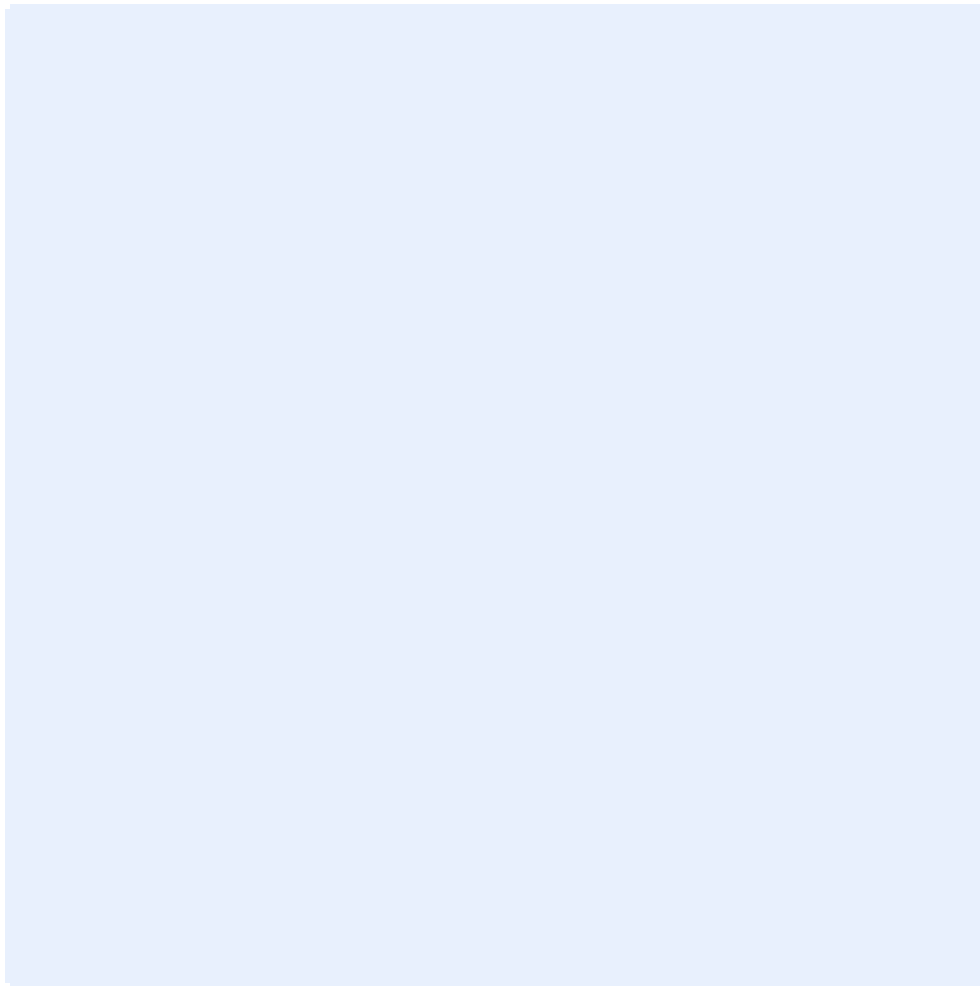


Figure 1: DFI No. D01257, looking [note cardinal direction]

Identification

Drainage Facility ID (DFI): D01257
Facility Type: Water Quality Biofiltration Swale
Construction Drawings: (V-File Numbers) 54V-022
Location: District: 3
Highway No.: 051
Mile Post: 3.78 to 3.80, Right

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: Roadway shoulder

Flow direction: South

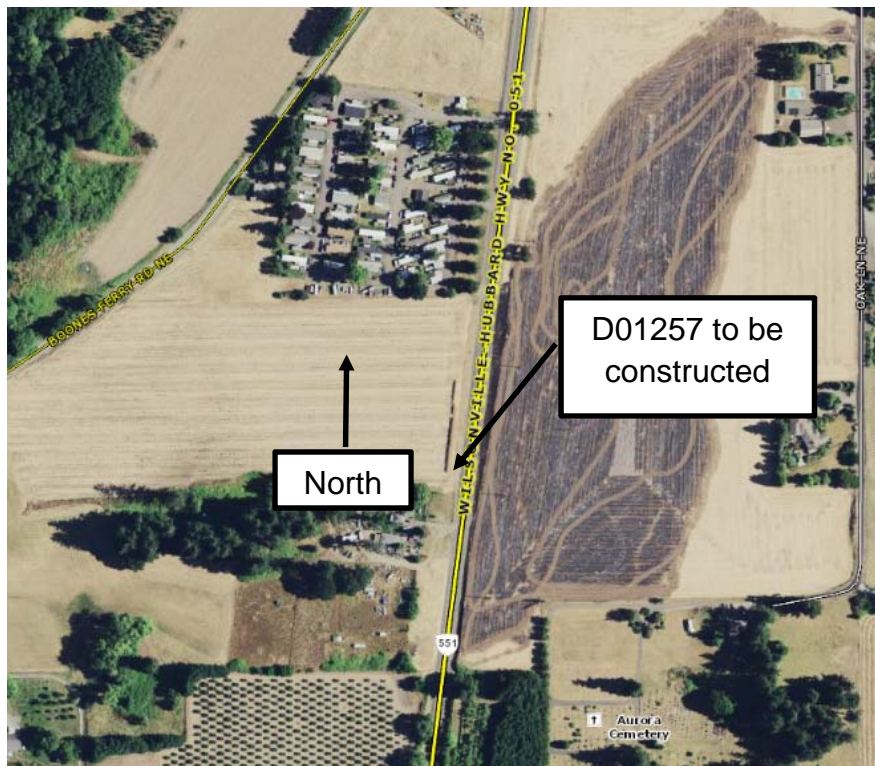


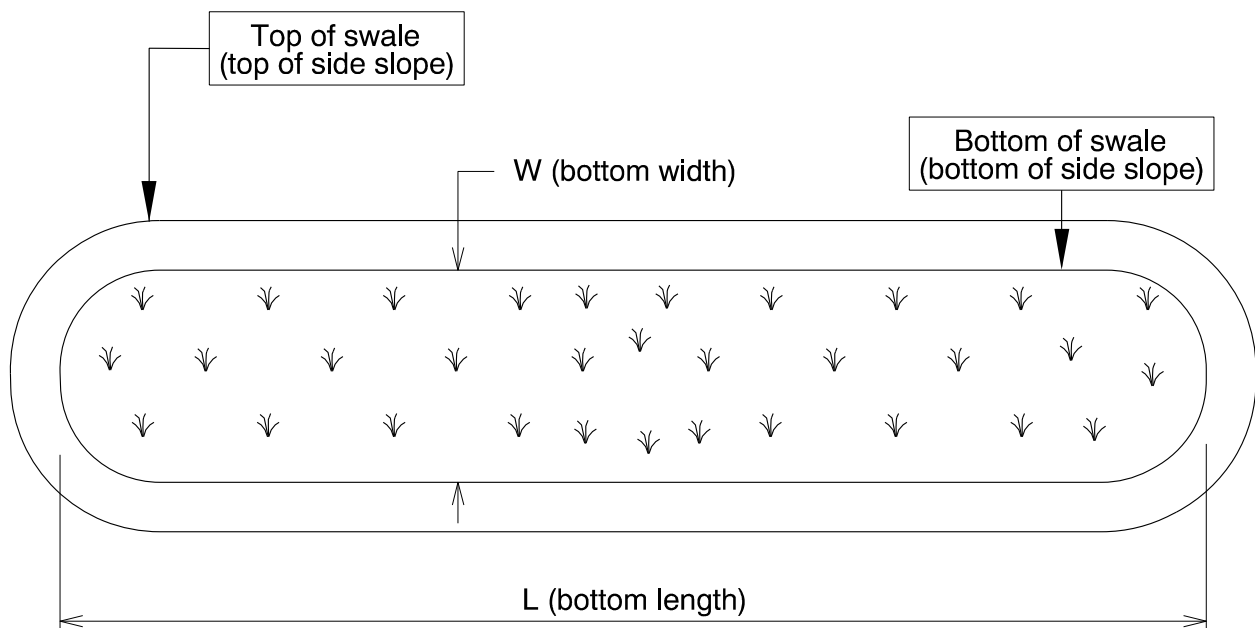
Figure 2: Facility location map

3. Facility Summary

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

The bottom length and bottom width of the swale is:

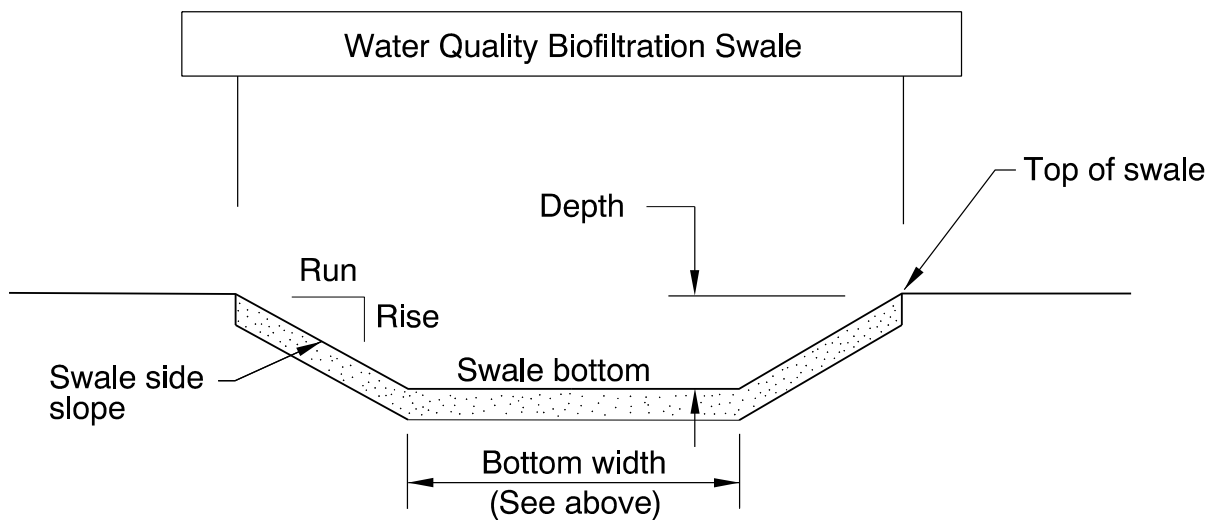
| Bottom Length (feet) | Bottom Width (feet) |
|----------------------|---------------------|
| 100 | 4 |



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) |
|--------------|-------------|------------|
| varies | 1 | varies |



Site Specific Information:

4. Facility Access

Maintenance access to the facility:

| | |
|--|---|
| <input type="checkbox"/> Roadside pad | <input checked="" type="checkbox"/> Roadside shoulder |
| <input type="checkbox"/> Access road with Gate | <input type="checkbox"/> Access road without Gate |



Figure 3: Access to swale along shoulder

5. Operational Components / Maintenance Items

Classification

This facility is classified as an:

| | |
|---|---|
| <input checked="" type="checkbox"/> On-line Swale | <input type="checkbox"/> 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:

| <input checked="" type="checkbox"/> No | <input type="checkbox"/> 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:

| <input checked="" type="checkbox"/> Operational Plan A | <input type="checkbox"/> Operational Plan B | <input type="checkbox"/> 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 | <input type="checkbox"/> | S1 |
| Weir type flow splitter/flow splitter manhole | <input type="checkbox"/> | S2 |
| Orifice type flow splitter/flow splitter manhole | <input type="checkbox"/> | S3 |
| Standard manhole | <input type="checkbox"/> | S4 |
| Swale Inlet | | |
| Pavement sheet flow | <input checked="" type="checkbox"/> | S5 |
| Inlet Pipe (s) | <input type="checkbox"/> | S6 |
| Open channel inlet | <input checked="" type="checkbox"/> | S7 |
| Riprap pad | <input type="checkbox"/> | S8 |
| Ground Cover | | |
| Grass bottom | <input checked="" type="checkbox"/> | S9 |
| Grass side slopes | <input checked="" type="checkbox"/> | S10 |
| Granular drain rock | <input type="checkbox"/> | S11 |
| Plantings | <input type="checkbox"/> | S12 |
| Underground Components | | |
| Geotextile fabric | <input type="checkbox"/> | S13 |
| Water quality mix | <input checked="" type="checkbox"/> | S14 |
| Perforated pipe | <input type="checkbox"/> | S15 |
| Porous pavers (access grid) | <input type="checkbox"/> | S16 |
| Flow Spreader | | |
| Rock basin (used at inlet) | <input type="checkbox"/> | S17 |
| Anchored board (midpoint of swale or every 50 feet along swale bottom) | <input type="checkbox"/> | S18 |
| Other: Riprap flow spreaders every 25 feet | <input checked="" type="checkbox"/> | S19 |
| Swale Outlet | | |
| Catch basin with grate | <input type="checkbox"/> | S20 |
| Outlet Pipe (s) | <input type="checkbox"/> | S21 |
| Open channel outlet | <input checked="" type="checkbox"/> | S22 |
| Auxiliary Outlet: | <input type="checkbox"/> | S23 |
| Outfall Type | | |
| Waterbody (Creek/Lake/Ocean) | <input type="checkbox"/> C | S24 |
| | <input type="checkbox"/> L | |
| | <input type="checkbox"/> O | |
| Ditch | <input checked="" type="checkbox"/> | S25 |
| Storm drain system | <input type="checkbox"/> | S26 |

| Outfall Components | | |
|------------------------|--------------------------|------------|
| Riprap pad | <input type="checkbox"/> | S27 |
| Riprap bank protection | <input type="checkbox"/> | S28 |

6. Maintenance

Maintenance Frequency/Maintain Records

- Inspect annually. Preferably prior to the rainy season.
- Clean and maintain as necessary. Refer to Activity 125 for conditions when maintenance is needed.
- 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:

| | |
|---|-------------------------------------|
| <input checked="" type="checkbox"/> No | <input type="checkbox"/> Yes |
| There are no 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

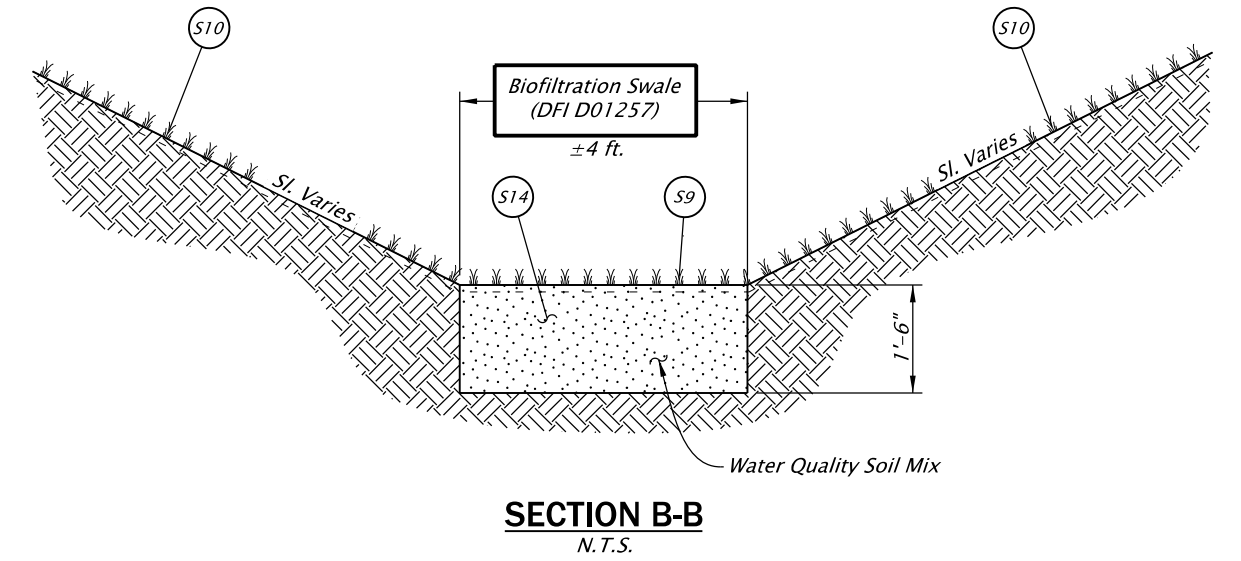
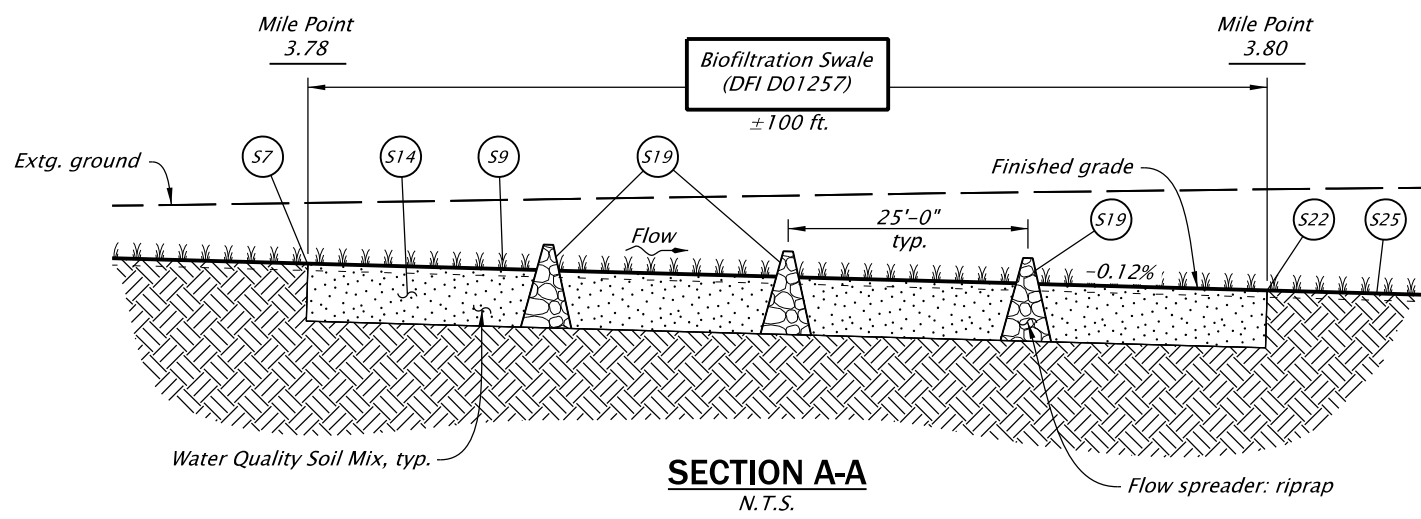
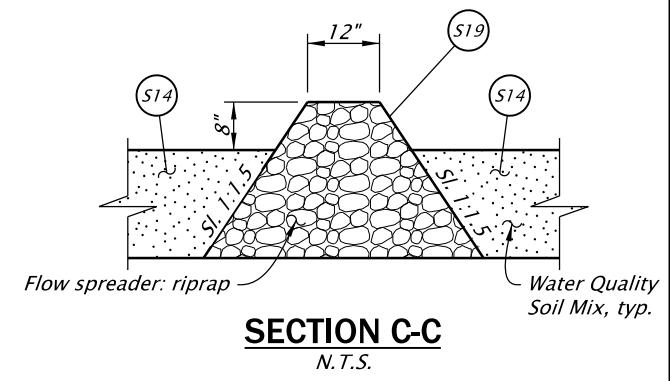
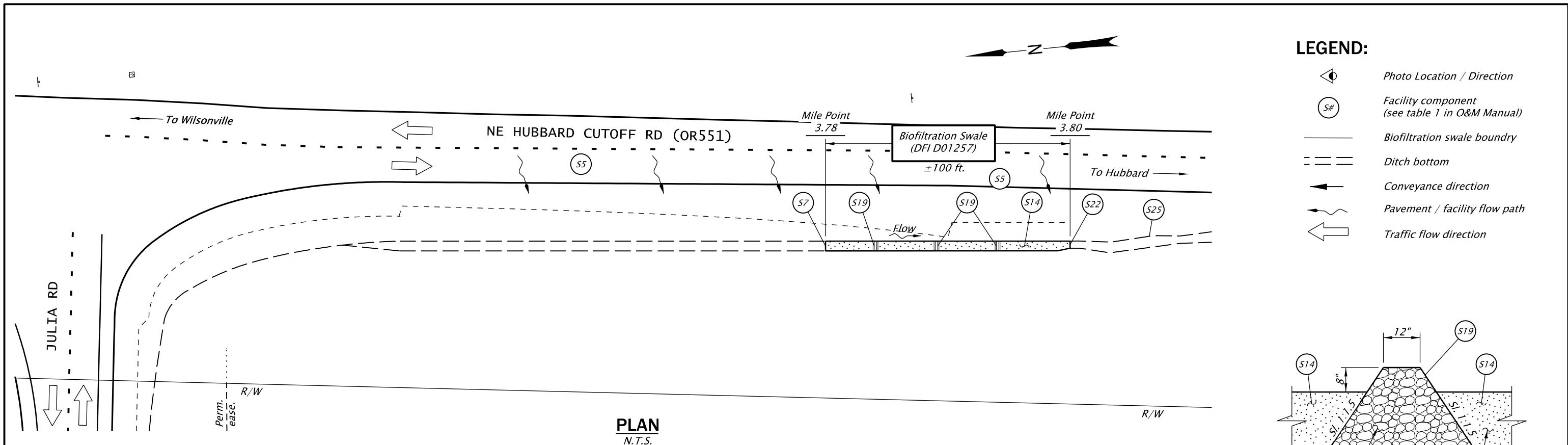
Contact any of the following for more detailed information about management of waste materials found on site:

| | |
|-----------------------------------|----------------|
| 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 D01257



| | |
|--------------------------------|---|
| Prepared By: Ramiro Perez | DFI D01257 MAINTENANCE DISTRICT 3 HWY 51 BIOFILTRATION SWALE HIGHWAY MP 3.78 MARION COUNTY |
| Drafted By: Michael Skelton | |

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 54V-022

| INDEX OF SHEETS | |
|-----------------|-------------------------|
| SHEET NO. | DESCRIPTION |
| A01 | Title Sheet |
| A02 | Index Of Sheets Cont'd. |
| A03 | Std. Dwg. Nos. |

STATE OF OREGON
 DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT
 GRADING, DRAINAGE, PAVING, CURB RAMPS, SIGNING,
 SIGNAL & ROADSIDE DEVELOPMENT

OR551 @ EHLEN ROAD SEC.
WILSONVILLE - HUBBARD HIGHWAY

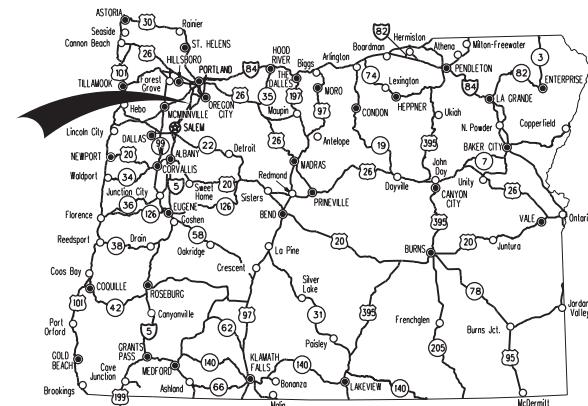
MARION COUNTY
 FEBRUARY 2021

BEGINNING OF WORK

STA. "L" 795+96 (M.P. 3.40)

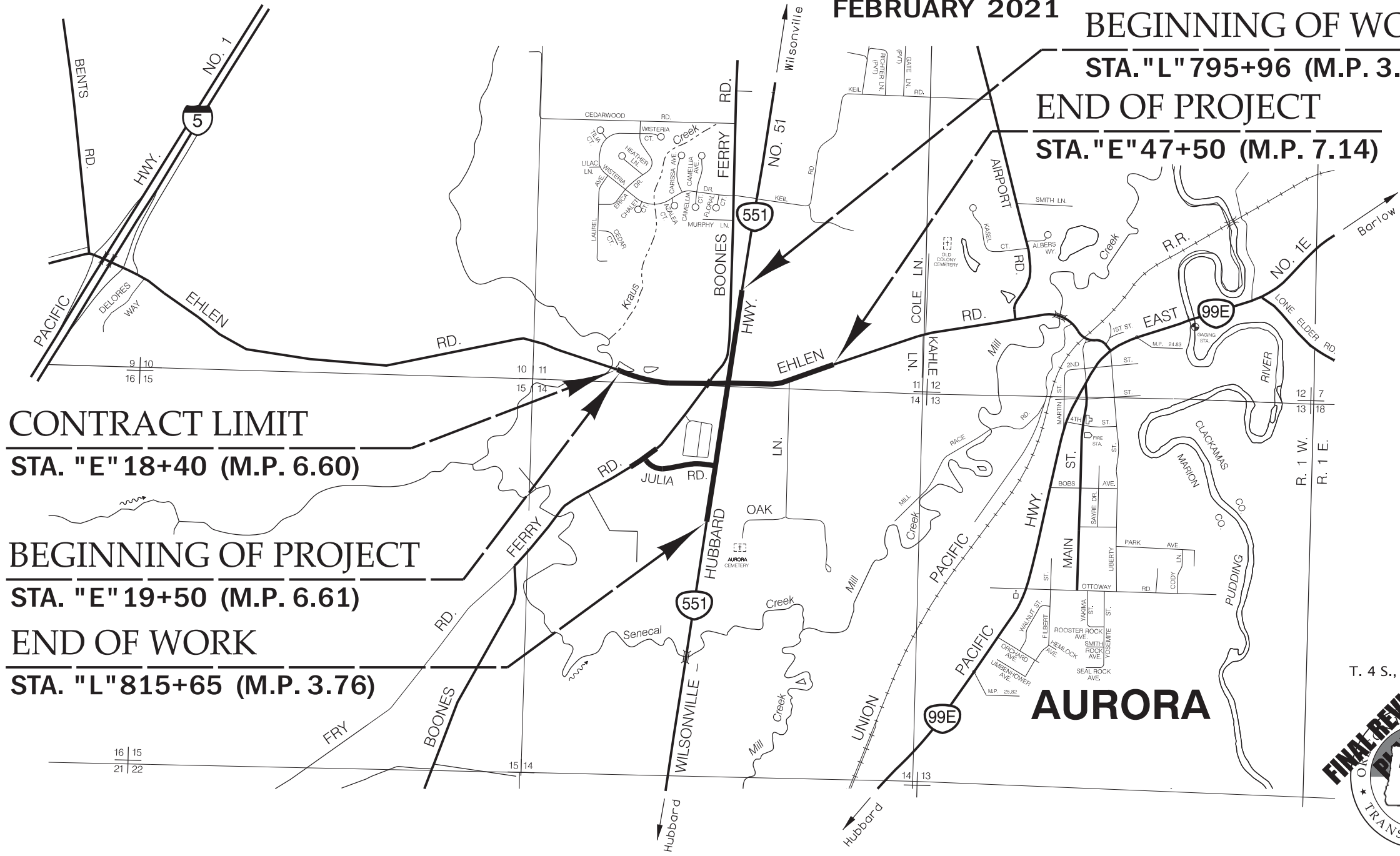
END OF PROJECT

STA. "E" 47+50 (M.P. 7.14)



Overall Length Of Project - 1.02 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.)



CONTRACT LIMIT

STA. "E" 18+40 (M.P. 6.60)

BEGINNING OF PROJECT

STA. "E" 19+50 (M.P. 6.61)

END OF WORK

STA. "L" 815+65 (M.P. 3.76)

T. 4 S., R. 1 W., W.M.



OREGON TRANSPORTATION COMMISSION
 Robert Van Brocklin CHAIR
 Alando Simpson COMMISSIONER
 Martin Callery COMMISSIONER
 Julie Brown COMMISSIONER
 Sharon Smith COMMISSIONER
 Kristopher W. Strickler 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: _____
 Signature & date
 Vidal T. Francis-R2 Tech Center Manager
 Print name and title

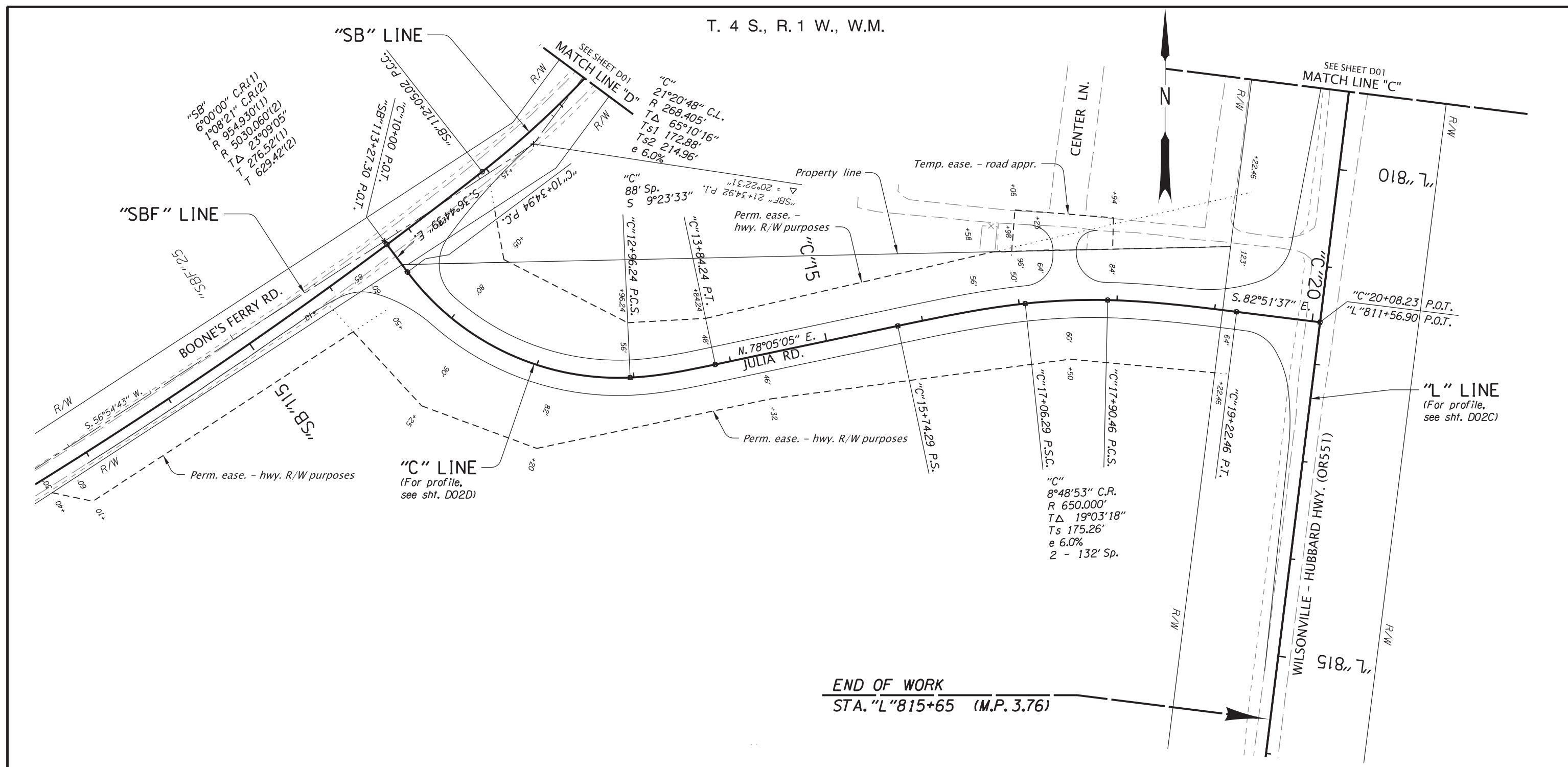
 Concurrence by ODOT Chief Engineer

OR551 @ EHLEN ROAD SEC.
WILSONVILLE - HUBBARD HIGHWAY
 MARION COUNTY

| | | |
|--------------------------------|----------------|-----------|
| FEDERAL HIGHWAY ADMINISTRATION | PROJECT NUMBER | SHEET NO. |
| OREGON DIVISION | S051(003) | A01 |



PE002661-000

T. 4 S., R. 1 W., W.M.

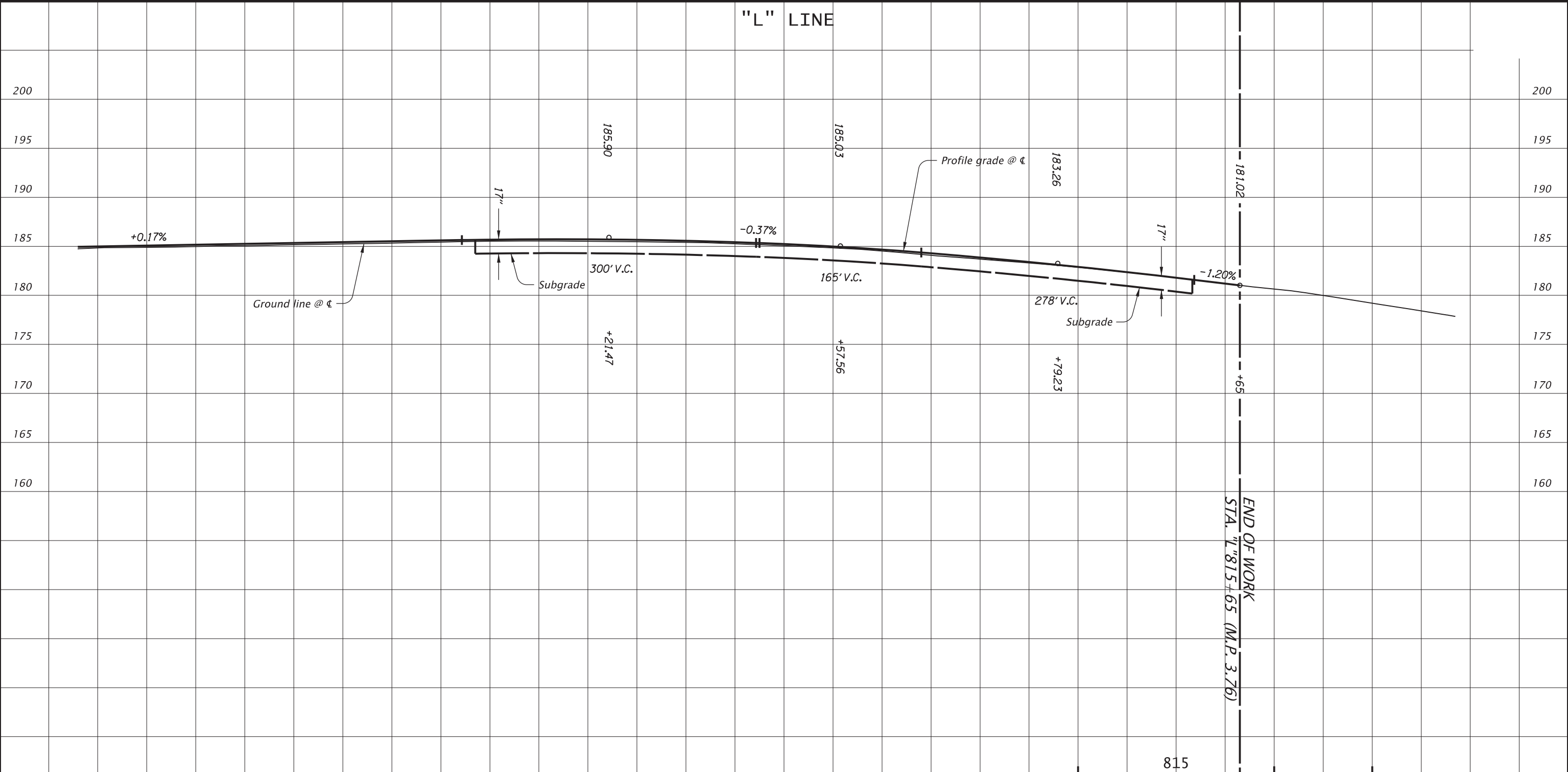


| | |
|---|------------------------|
| OREGON DEPARTMENT OF TRANSPORTATION | |
| OR551 @ EHLEN ROAD SEC. WILSONVILLE - HUBBARD HIGHWAY MARION COUNTY | |
| Designer: Troy Johnson | Reviewer: Derryl James |
| Drafter: Jeff Larson | Checker: N/A |
| ALIGNMENT | SHEET NO. D02 |


- ① *Inst. culv. pipe*
(For sht. nos., see sht. A02, Hydraulic)
- ② *Inst. 18" culv. pipe - 86'*
5' depth
Const. paved end slope - 2
- ③ *Inst. 18" culv. pipe - 71'*
5' depth
Const. paved end slope - 2
- ④ *Const. water quality swale*
(For sht. nos., see sht. A02, Hydraulic)
- ⑤ *Const. settlement plate - 4*
(For sht. nos., see sht. A02, Geotechnical)

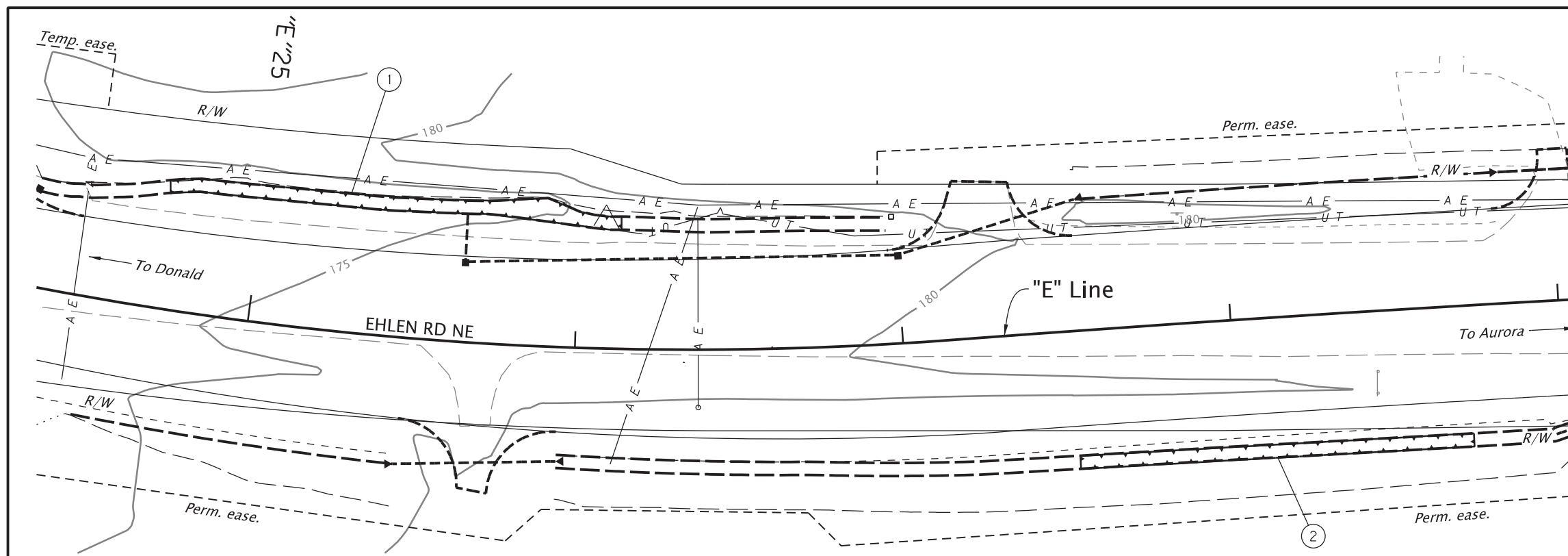
| | | |
|--|---|--------------------------|
|  <p>REGISTERED PROFESSIONAL ENGINEER 77 OREGON DEC. 12, 2012 TROY MICHAEL JOHNSON</p> |  OREGON DEPARTMENT OF TRANSPORTATION | |
| | OR551 @ EHLEN ROAD SEC. WILSONVILLE - HUBBARD HIGHWAY MARION COUNTY | |
| | Designer: Troy Johnson Reviewer: Derryl James Drafter: Jeff Larson Checker: N/A | |
| RENEWS: 06-30-2021 | GENERAL CONSTRUCTION NOTES | SHEET NO. D02B |

"L" LINE



RENEWS: 06-30-2021

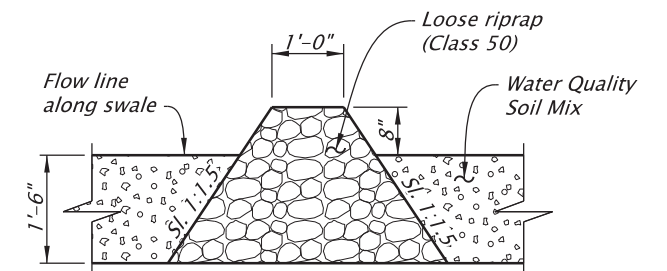
| | |
|--|--|
|  OREGON DEPARTMENT OF TRANSPORTATION | |
| OR551 @ EHLEN ROAD SEC. WILSONVILLE - HUBBARD HIGHWAY MARION COUNTY | |
| Designer: Troy Johnson Drafter: Jeff Larson | Reviewer: Derryl James Checker: N/A |
| PROFILE | SHEET NO. D02C |



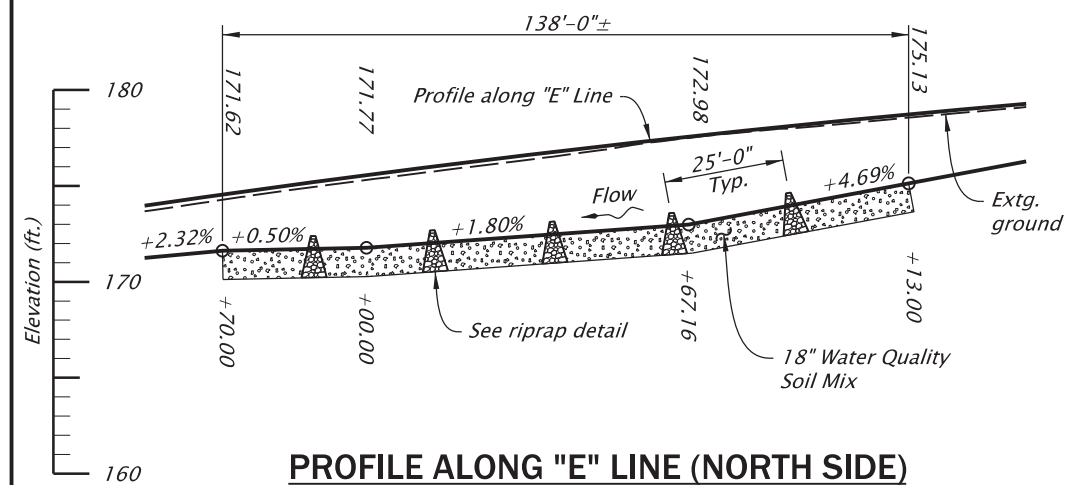
PLAN
Scale: 1"=40'

- ① Sta. "E" 24+70, 37.27' Lt. to Sta. "E" 26+13, 38.28' Lt.
Const. Water Quality Biofiltration Swale
Inlet F.L. = 175.13'
Outlet F.L. = 171.62'
Gen. exc. - 31 cu. yd.
Water Quality Soil Mix - 31 cu. yd.
Const. loose riprap (Class 50) - 7 cu. yd.
- ② Sta. "E" 27+51, 40.05' Rt. to Sta. "E" 28+72, 40.97' Rt.
Const. Water Quality Biofiltration Swale
Inlet F.L. = 180.28'
Outlet F.L. = 179.75'
Gen. exc. - 27 cu. yd.
Water Quality Soil Mix - 27 cu. yd.
Const. loose riprap (Class 50) - 6 cu. yd.

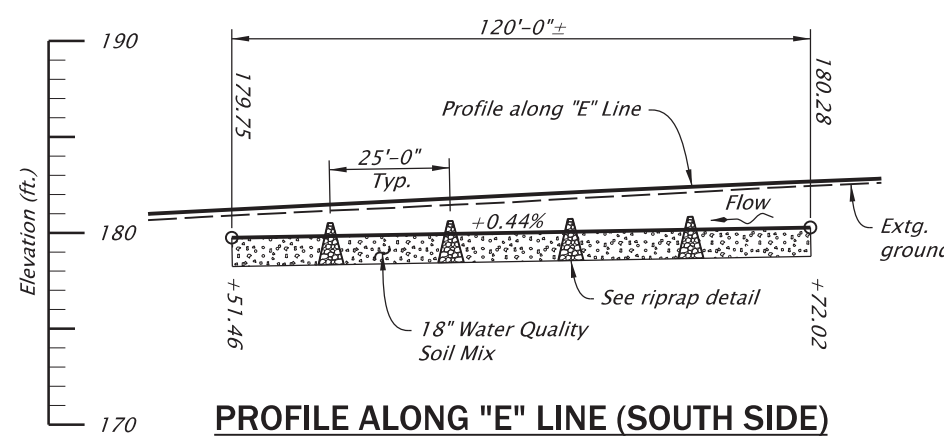
Note: Station offsets are at the center of the Water Quality Biofiltration Swale bottom



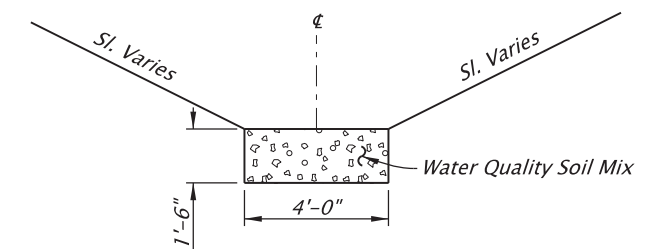
RIPRAP DETAIL
Scale: 3/8"=1'-0"



PROFILE ALONG "E" LINE (NORTH SIDE)
Horz. Scale: 1"=40'
Vert. Scale: 1"= 10'



PROFILE ALONG "E" LINE (SOUTH SIDE)
Horz. Scale: 1"=40'
Vert. Scale: 1"= 10'



TYPICAL SECTION
Scale: 3/16"=1'-0"

Note: All slopes shown as horiz. to vert. unless otherwise shown.



RENEWS: 12-31-2020

OREGON DEPARTMENT OF TRANSPORTATION

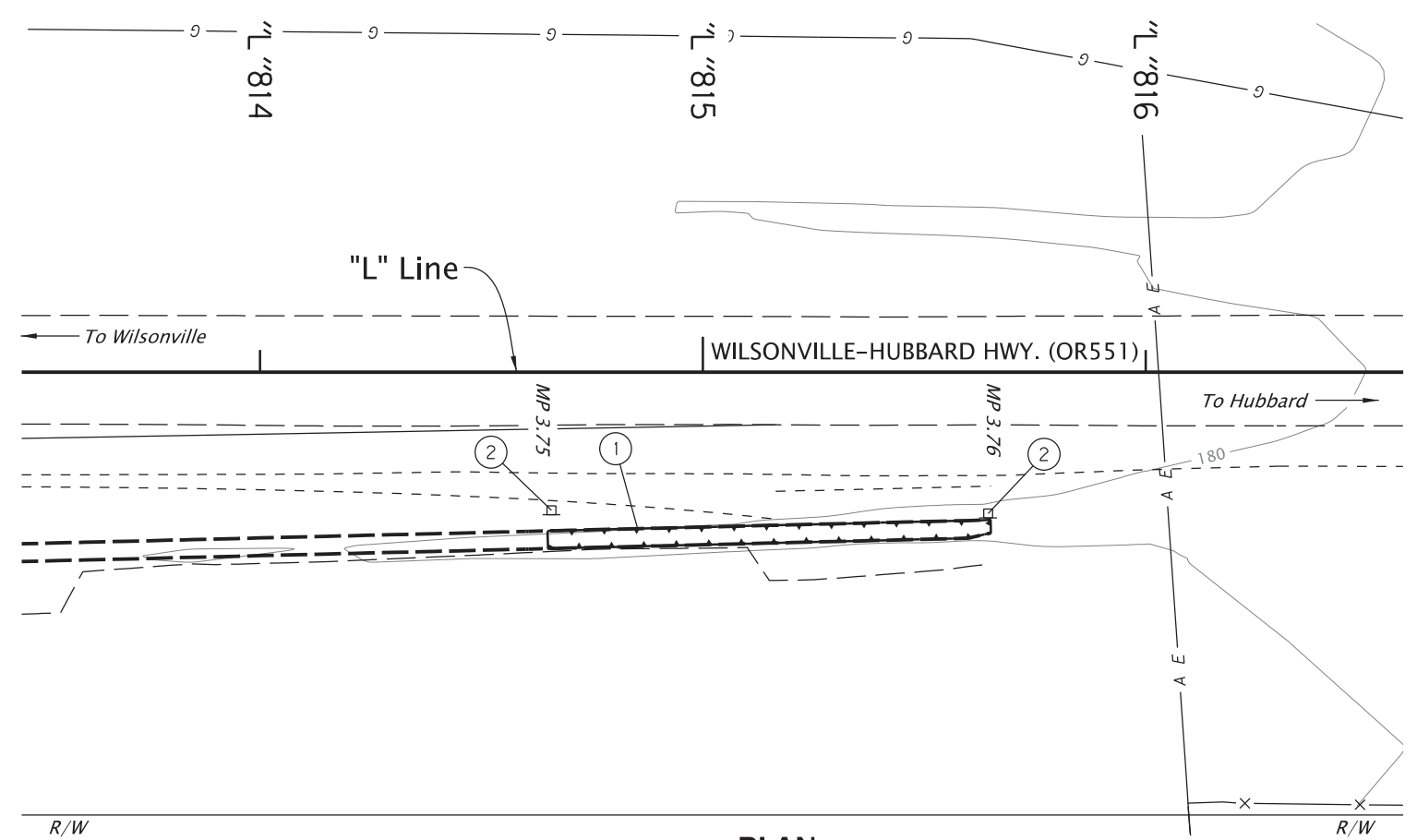


OR551 @ EHLEN ROAD SEC.
WILSONVILLE - HUBBARD HIGHWAY
MARION COUNTY

Designer: Ramiro Perez Reviewer: Chris Carman
Drafter: Jeff Coon Checker: N/A

STORMWATER

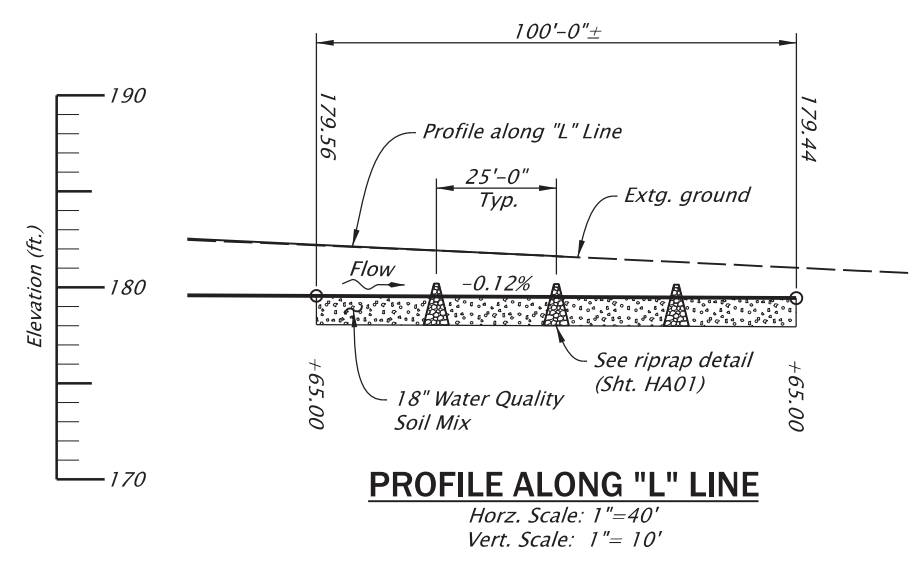
SHEET NO.
HA01



PLAN
Scale: 1"=40'

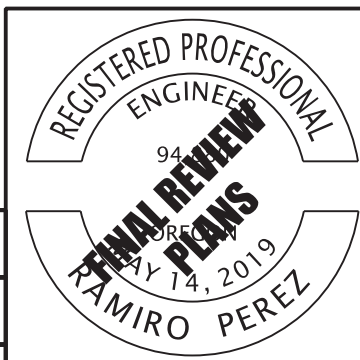
- ① Sta. "L" 814+65, 37.84' Rt. to Sta. "L" 815+65, 34.84' Rt.
Const. Water Quality Biofiltration Swale No. 01257
Inlet F.L. = 179.56'
Outlet F.L. = 179.44'
Gen. exc. - 22 cu. yd.
Water Quality Soil Mix - 22 cu. yd.
Const. loose riprap (Class 50) - 4 cu. yd.
- ② Inst. Type S2 markers - 2
(For details see dwg, RD399)

- Notes:**
1. Station offsets are at the center of the Water Quality Biofiltration Swale bottom.
 2. See typical section Sht. HA01.



PROFILE ALONG "L" LINE
Horz. Scale: 1"=40'
Vert. Scale: 1"= 10'

| |
|-------------------|
| HWY: 051 |
| M.P.: 3.75 - 3.76 |
| COUNTY |
| Marion |
| DFI/TSSU NO. |
| 01257 |



RENEWS: 12-31-2020

| | |
|--|------------------------|
| OREGON DEPARTMENT OF TRANSPORTATION | |
| OR551 @ EHLEN ROAD SEC. WILSONVILLE - HUBBARD HIGHWAY MARION COUNTY | |
| Designer: Ramiro Perez | Reviewer: Chris Carman |
| Drafter: Jeff Coon | Checker: N/A |
| STORMWATER | SHEET NO. HA03 |