OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: 08/2020

DFI No. D01255

Figure 1: DFI No. D01255, looking [note cardinal direction]

Identification

Drainage Facility ID (DFI):	D01255
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 53V-031
Location:	District: 10
	Highway No.: 053
	Mile Post: 104.10 to 104.13, Left

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: East

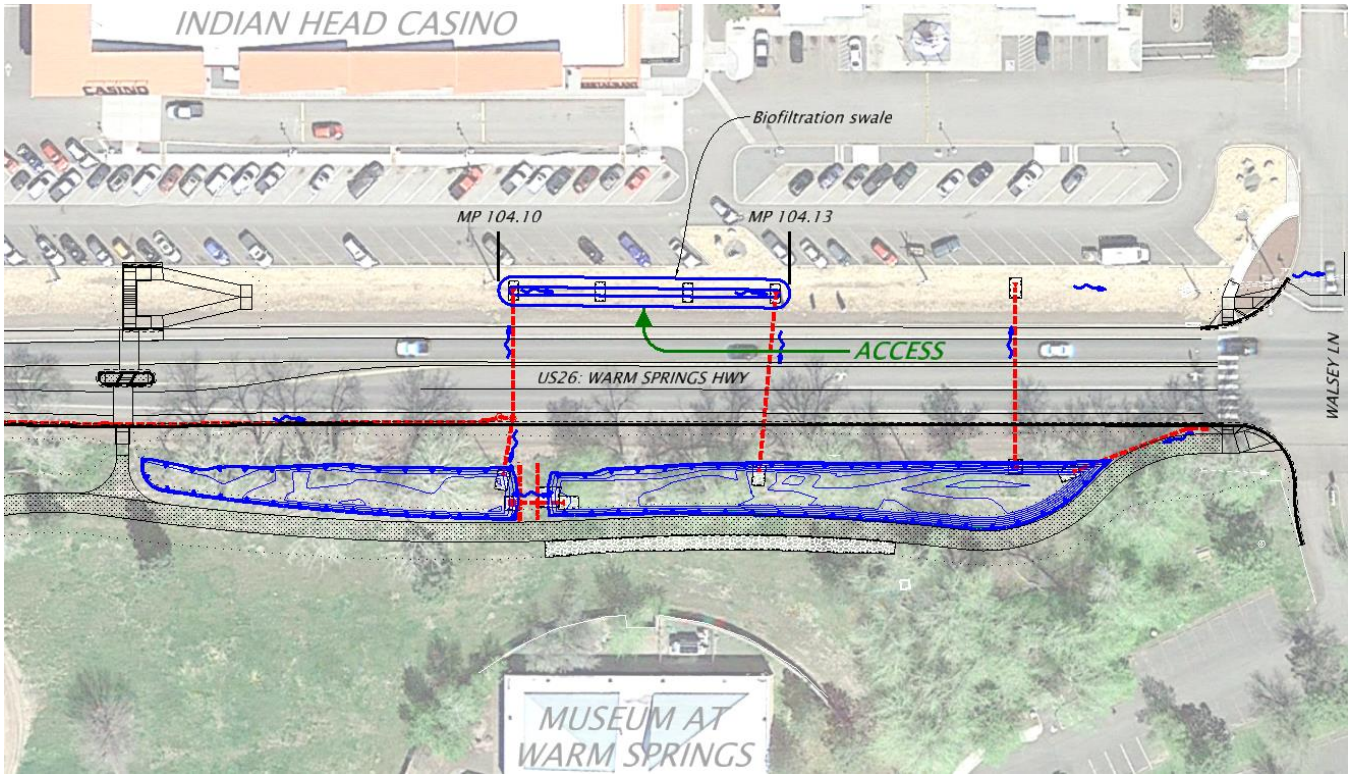


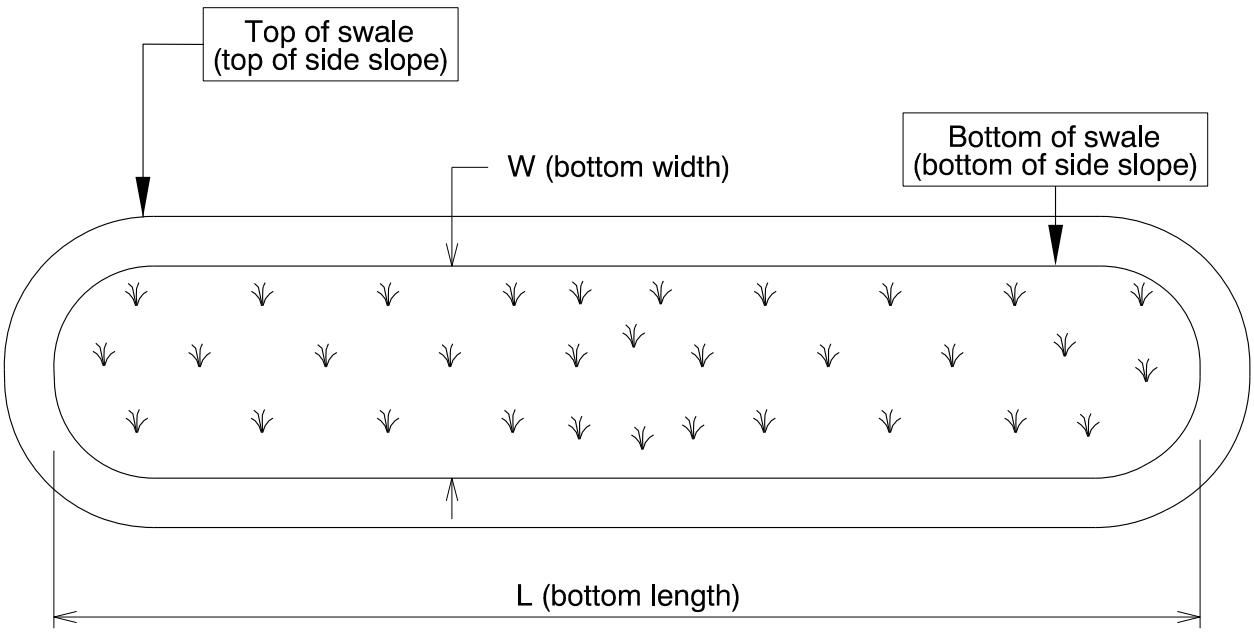
Figure 2: Facility location map

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:

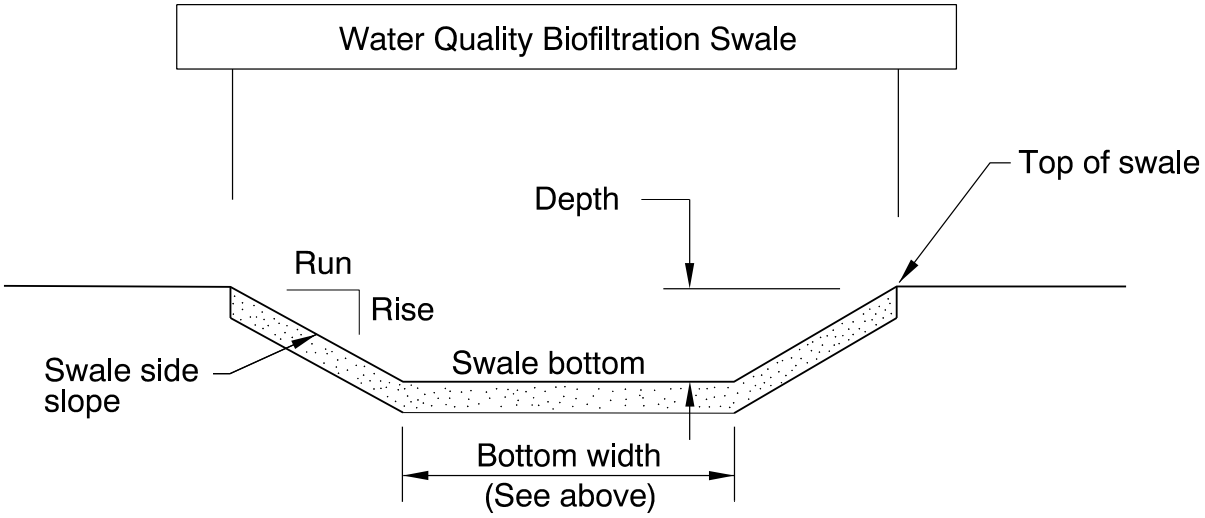
Bottom Length (feet)	Bottom Width (feet)
139	4



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)
1.33	**1**	**4**



Site Specific Information: The flow splitter manhole upstream only allows flow from the water quality storm to enter the swale. Any additional flow is diverted into the detention ponds (D01242) across the highway. Upon exiting the swale, treated stormwater is also piped to these ponds. See D01242 Operation & Maintenance Manual for specific details relating to the ponds.

4. Facility Access

Maintenance access to the facility:

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

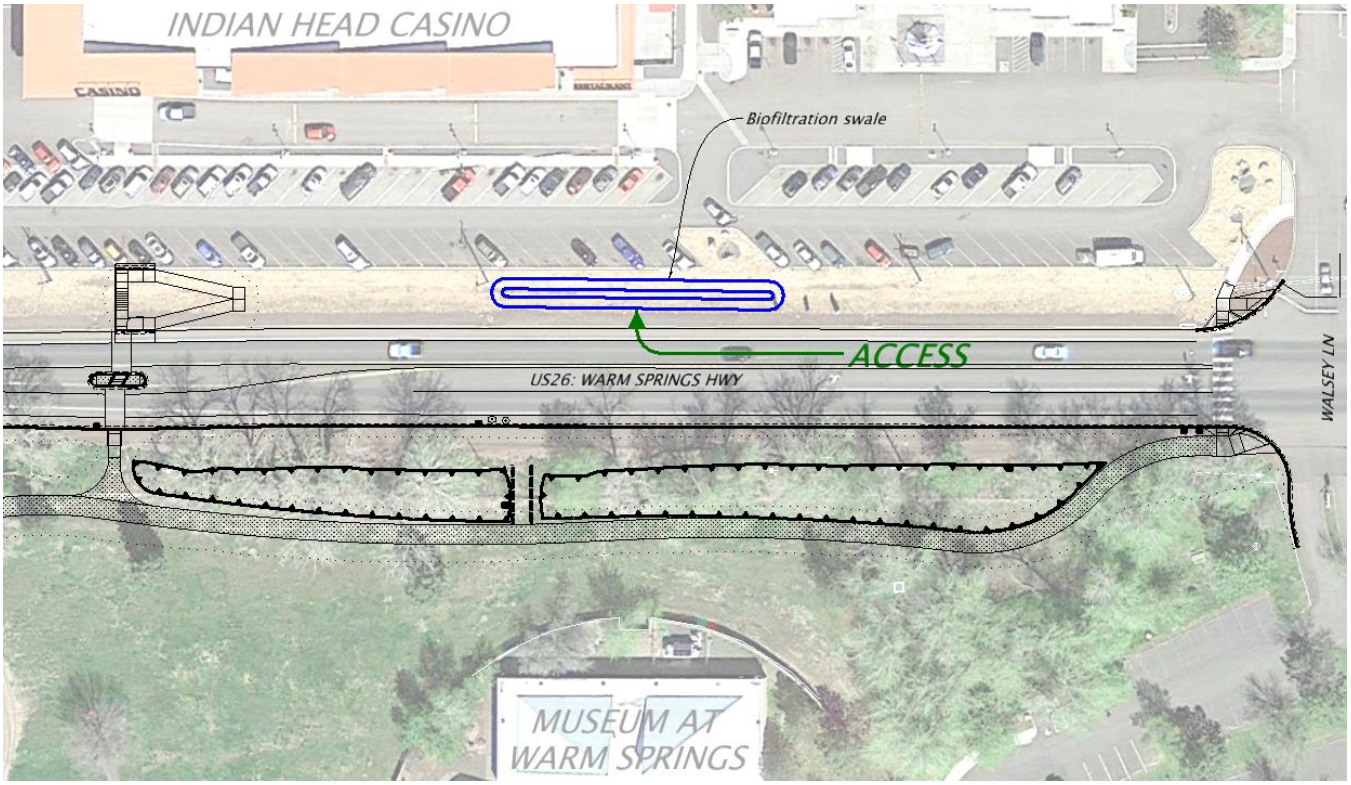


Figure 3: Facility access map

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	☒	**S17**
Anchored board (midpoint of swale or every 50 feet along swale bottom)	☐	**S18**
Other:	☐	**S19**
Swale Outlet		
Catch basin with grate	☐	**S20**
Outlet Pipe (s)	☒	**S21**
Open channel outlet	☐	**S22**
Auxiliary Outlet: Ditch	☒	**S23**
Outfall Type		
Waterbody (**C**reek/**L**ake/**O**cean)	☐ **C** ☐ **L** ☐**O**	**S24**
Ditch (Pond)	☒	**S25**
Storm drain system	☐	**S26**
Outfall Components		
Riprap pad	☒	**S27**
Riprap bank 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 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

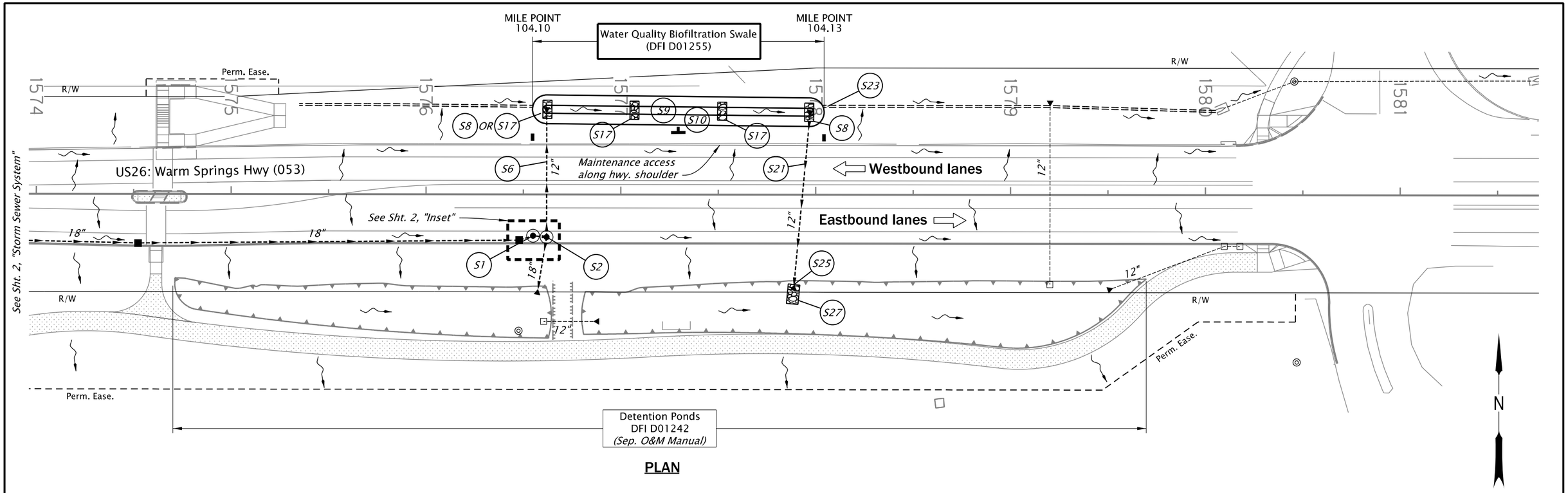
Contact any of the following for more detailed information about management of waste materials found on site:

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

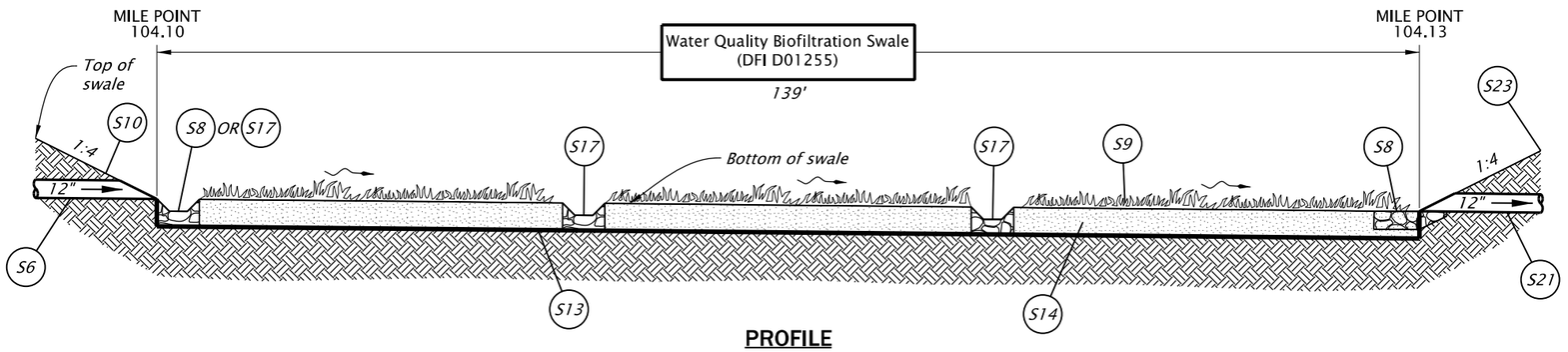
A Appendix A – Site Specific Operational Plan

Contents:

Operational Plan: DFI D01255

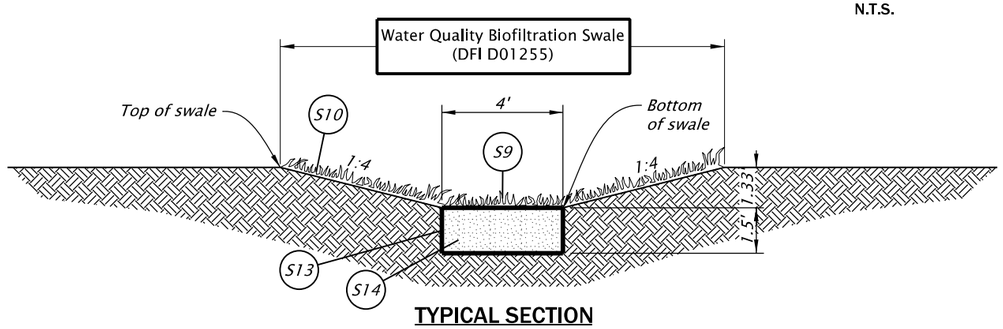


PLAN



PROFILE

N.T.S.



TYPICAL SECTION

N.T.S.

LEGEND:

- X# — Facility component (see table 1 in O&M Manual)
- ◉ and/or ◎ — Manhole
- ■ and/or □ — Inlet
- Storm pipe (facility)
- Storm pipe
- Conveyance direction
- Pavement / facility flow path
- Traffic flow direction
- Facility marker

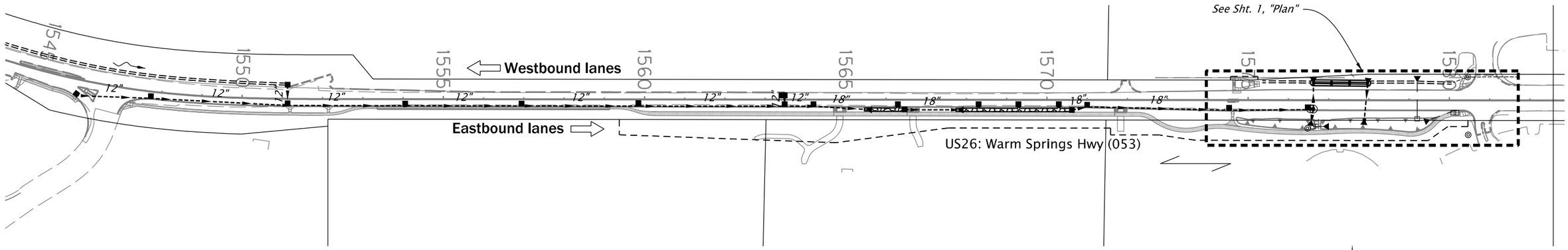
OREGON DEPARTMENT OF TRANSPORTATION

Sht. 1 of 2

Prepared By: Austin Kleinberg

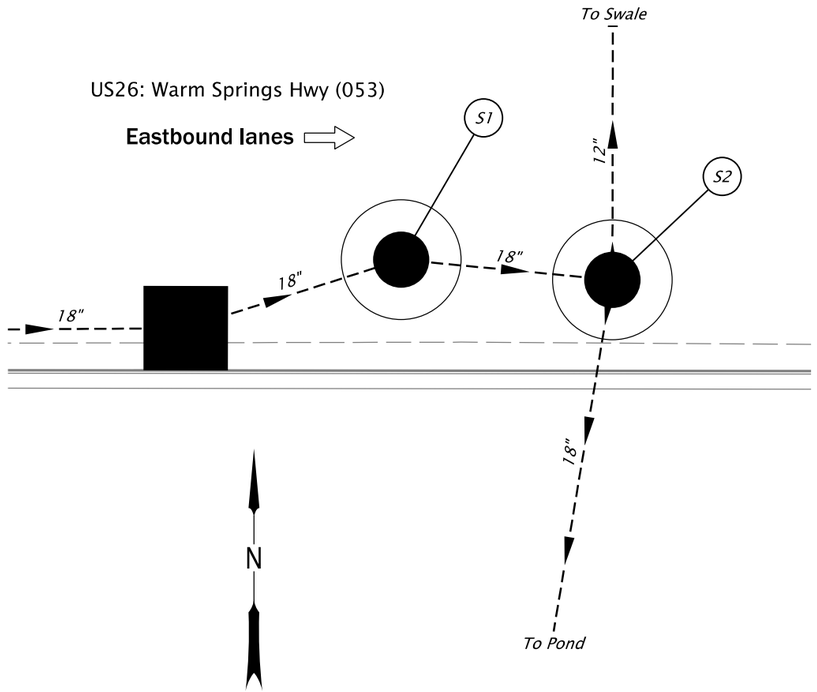
Drafted By: Austin Kleinberg

DFI D01255
MAINTENANCE DISTRICT 10 HWY 053
WATER QUALITY BIOFILTRATION SWALE
WARM SPRINGS HWY MP 104.10 - 104.13
CTWS RESERVATION & JEFFERSON COUNTY



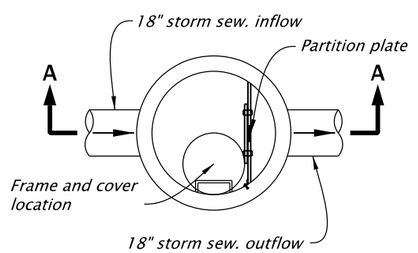
STORM SEWER SYSTEM

INSET
1"=5'

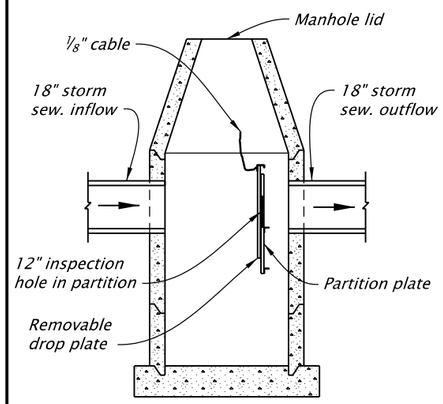


SEDIMENTATION MANHOLE DETAILS
N.T.S.

PLAN

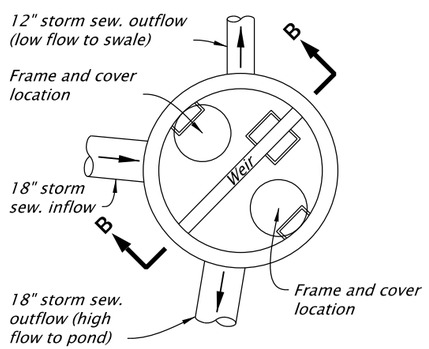


SECTION A-A

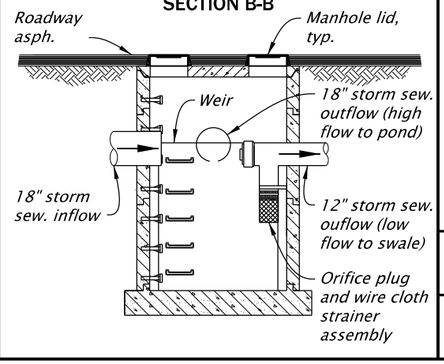


FLOW SPLITTER MANHOLE DETAILS
N.T.S.

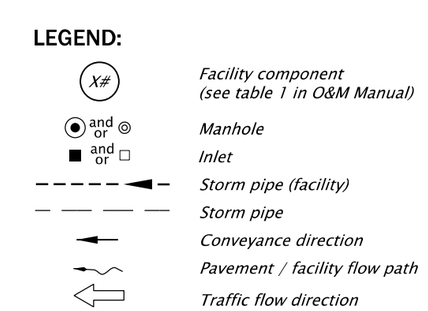
PLAN



SECTION B-B



LEGEND:



OREGON DEPARTMENT OF TRANSPORTATION

Sht. 2 of 2

Prepared By: Austin Kleinberg

Drafted By: Austin Kleinberg

DFI D01255
MAINTENANCE DISTRICT 10 HWY 053
WATER QUALITY BIOFILTRATION SWALE
WARM SPRINGS HWY MP 104.10 - 104.13
CTWS RESERVATION & JEFFERSON COUNTY

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 53V-031

53V-031

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
A01	Title Sheet
A02 & A03	Index Of Sheets Cont'd. & Std. Dwg. Nos.
A04 & A05	Control Data Sheet

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

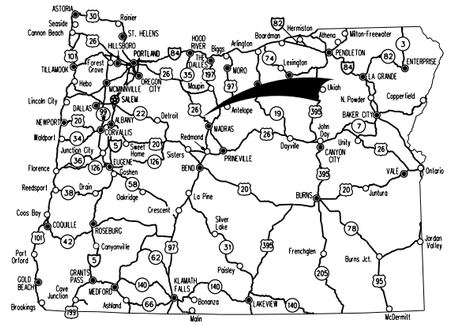
PLANS FOR PROPOSED PROJECT

GRADING, DRAINAGE, STRUCTURES, PAVING, CURB RAMPS, SIGNING, ILLUMINATION & SIGNALS

US26: WARM SPRINGS SAFETY CORRIDOR SEC.

WARM SPRINGS HWY.

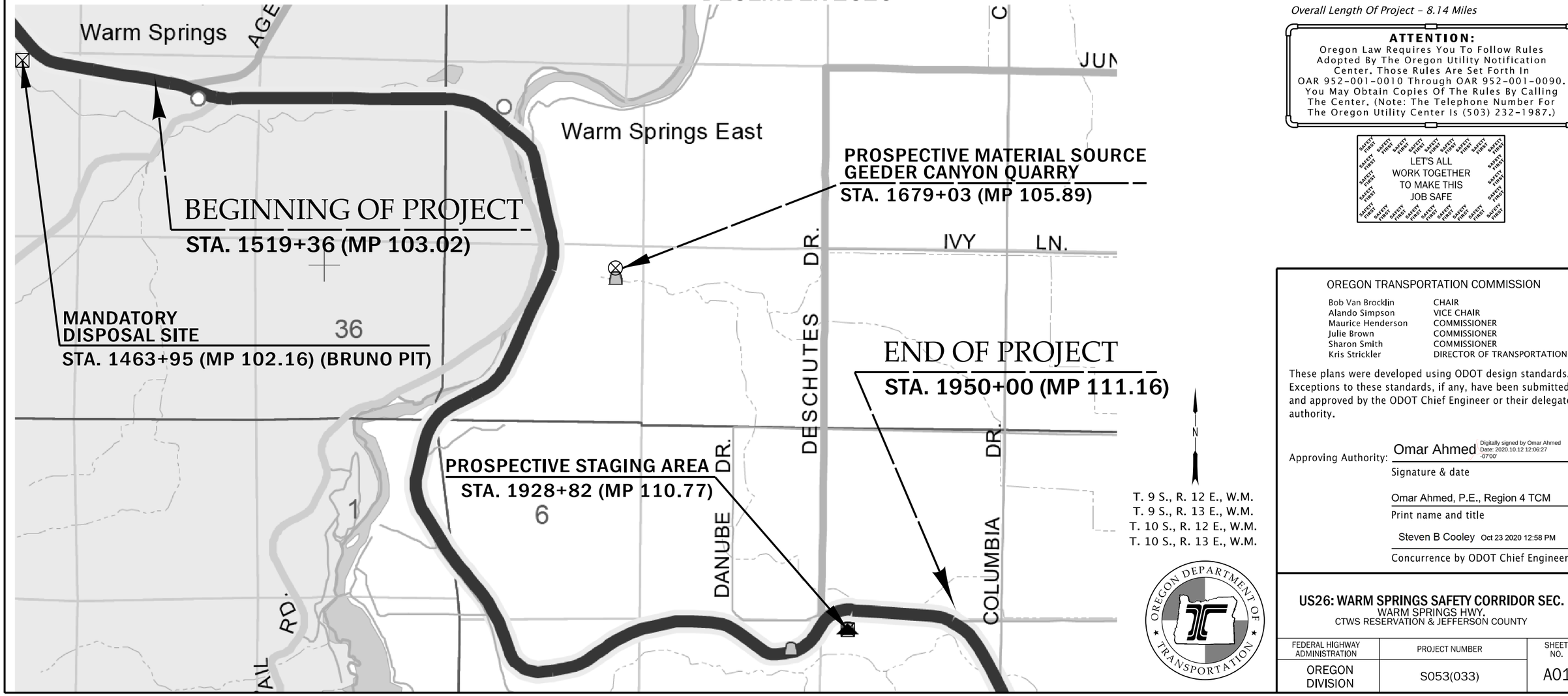
CTWS RESERVATION & JEFFERSON COUNTY
DECEMBER 2020



Overall Length Of Project - 8.14 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.)

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE



T. 9 S., R. 12 E., W.M.
T. 9 S., R. 13 E., W.M.
T. 10 S., R. 12 E., W.M.
T. 10 S., R. 13 E., W.M.

OREGON TRANSPORTATION COMMISSION

Bob Van Brocklin	CHAIR
Alando Simpson	VICE CHAIR
Maurice Henderson	COMMISSIONER
Julie Brown	COMMISSIONER
Sharon Smith	COMMISSIONER
Kris 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: Omar Ahmed Digitally signed by Omar Ahmed Date: 2020.10.12 12:06:27 -07'00'
Signature & date

Omar Ahmed, P.E., Region 4 TCM
Print name and title

Steven B Cooley Oct 23 2020 12:58 PM
Concurrence by ODOT Chief Engineer

US26: WARM SPRINGS SAFETY CORRIDOR SEC.
WARM SPRINGS HWY.
CTWS RESERVATION & JEFFERSON COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	S053(033)	A01

PE002561 000

R_K19640_ts_01.dgn :: A01 10/6/2020 5:10:58 PM hwym73f

Sec. 25, T. 9 S., R. 12 E., W.M.

(13) *Sta. 1576+61.6, 21.9' Rt.*
Const. diversion manhole 72" dia. w/ 3' sump
I.E. (W/N) = 1428.49'
I.E. (S) = 1428.63'
Weir elev. = 1429.49'
Inst. 18" storm sew. pipe - 8'
Sl. = 0.005 ft/ft
5' depth
Const. temp. pipe protection
(For details, see shts. HA05 & HA08)

(14) *Inst. 18" storm sew. pipe - 28'*
I.E. (out) = 1428.50'
Sl. = 0.005 ft/ft
5' depth
Const. temp. pipe protection
Const. sloped end
Const. riprap outfall channel (Class 50) - 5 cu. yd.
Length = 10'
(For details, see shts. HA04 & HA08)

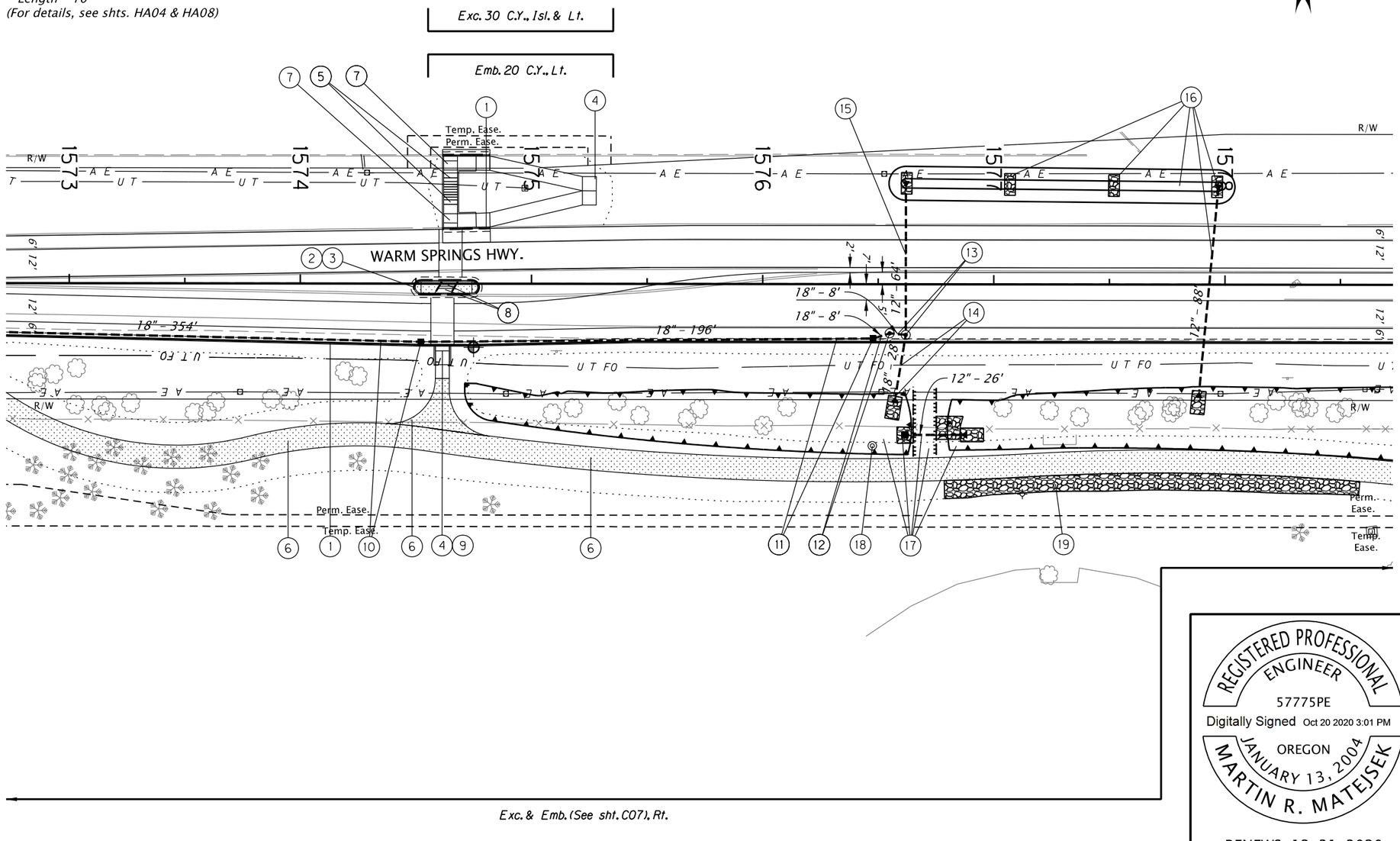
(15) *Inst. 12" storm sew. pipe - 64'*
I.E. (out) = 1428.18'
Sl. = 0.005 ft/ft
5' depth
Trench resurfacing - 22 sq. yd.
Const. sloped end

(16) *Stormwater facility - D01255*
(For details, see sht. HA02)

(17) *Stormwater facility - D01242*
(For details, see sht. HA01)

(18) *Major adjust manhole - By others*
(See dwg. no. RD360)

(19) *Const. loose riprap (Class 50) - 50 cu. yd.*
(For details, see sht. HA01 "Section C-C")



(1) *Const. curb and gutter*

(2) *Const. mountable curb and gutter*

(3) *Sta. 1574+49 to Sta. 1574+77*
Remove pvmt.
Const. 6" P.C. conc. surfacing - 136 sq. ft.

(4) *Const. P.C. conc. sidewalk*
(For details, see sht. BC14)

(5) *Const. P.C. conc. stairs*
Const. pedestrian handrail
(For details, see sht. BC11 & BC14)
(See dwg. nos. RD120, RD770 &RD771)

(6) *Const. asph. conc. sidewalk*

(7) *Const. curb ramp - 2 (parallel)*
Inst. safety yellow truncated domes on new surface - 24 sq. ft.
(For details, see sht. BC11 & BC14)

(8) *Const. curb ramp (accessible route island) - 2*
Median cut-through crossing
(For details, see sht. BC10)
(See dwg. no. RD710)

(9) *Const. curb ramp (perpendicular)*
Inst. safety yellow truncated domes on new surface - 12 sq. ft.
(For details, see sht. BC09)

(10) *Sta. 1574+51.9, Rt.*
Const. type "CG-2" inlet w/ 1.5' sump
I.E. = 1429.55'
Inst. 18" storm sew. pipe - 354'
Sl. = 0.006 ft/ft
5' depth
Const. temp. pipe protection
(For details, see sht. HA08)

(11) *Sta. 1576+47.6, Rt.*
Const. type "CG-2" inlet w/ 1.5' sump
I.E. = 1428.57'
Inst. 18" storm sew. pipe - 196'
Sl. = 0.005 ft/ft
5' depth
Const. temp. pipe protection
(For details, see sht. HA08)

(12) *Sta. 1576+54.7, 21.2' Rt.*
Const. sedimentation manhole 48" dia. w/ 3' sump
I.E. = 1428.52'
Inst. 18" storm sew. pipe - 8'
Sl. = 0.006 ft/ft
5' depth
Const. temp. pipe protection
(For details, see sht. HA06 & HA08)

REGISTERED PROFESSIONAL ENGINEER
57775PE
Digitally Signed Oct 20 2020 3:01 PM
OREGON
JANUARY 13, 2004
MARTIN R. MATEJSEK
RENEWS: 12-31-2020

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

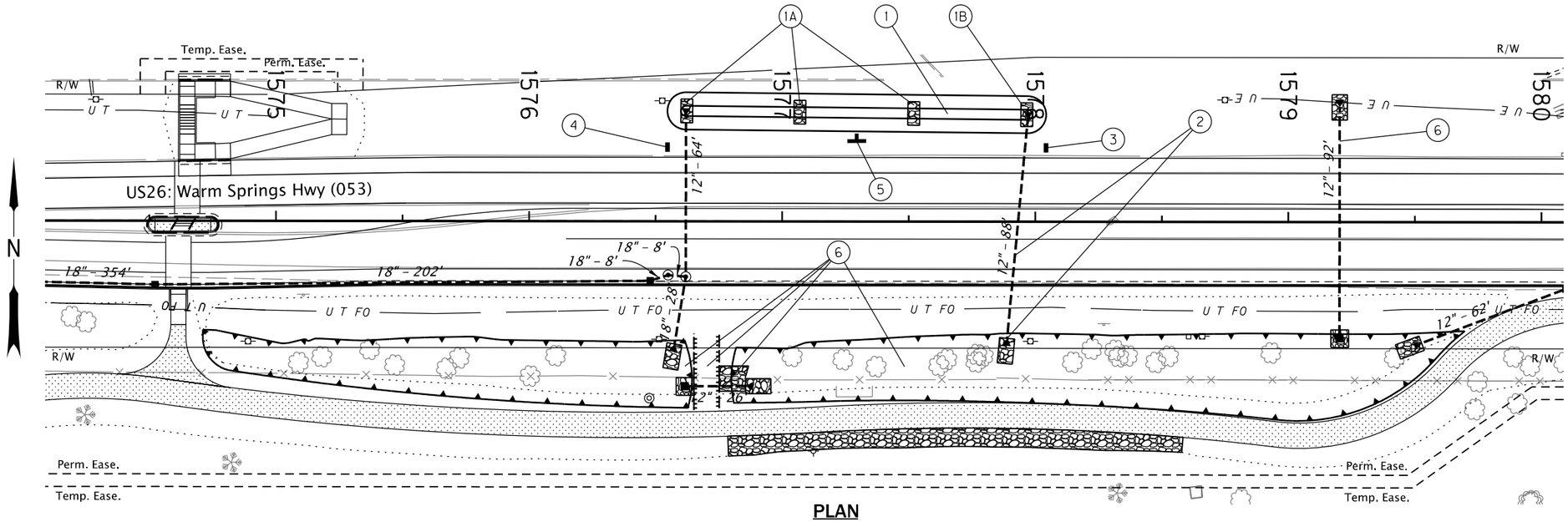
OREGON DEPARTMENT OF TRANSPORTATION

US26: WARM SPRINGS SAFETY CORRIDOR SEC.
WARM SPRINGS HWY.
CTWS RESERVATION & JEFFERSON COUNTY

Designer: Martin Matejsek | Reviewer: Brian Paslay
Drafter: Adam Temple | Checker: Chris Penka

GENERAL CONSTRUCTION

SHEET NO. C10



PLAN

1. *Const. biofiltration swale*
   (For details, see this sht.)

1A. *Const. riprap flow spreaders (Class 50) – 6 cu. yd.*
   (For details, see this sht.)

1B. *Const. loose riprap (Class 50) – 2 cu. yd.*
   9.33' x 4.67', 1' depth

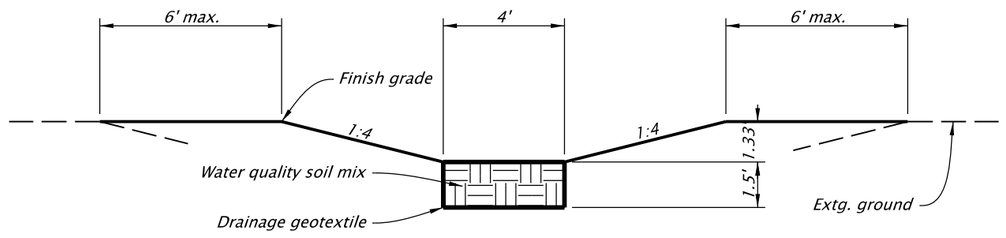
2. *Sta. 1577+96.7, 40.3' Lt. To*
   Sta. 1577+88.6, 46.1' Rt.
   Inst. 12" storm sew. pipe – 88'
   I.E. (Lt.) – 1427.50'
   I.E. (Rt.) – 1427.00'
   Sl. = 0.006 ft/ft
   5' depth
   Trench resurfacing – 30 sq. yd.
   Const. sloped end – 2
   Const. riprap outfall channel (Class 50) – 5 cu. yd.
   Length – 10'
   (For details, see sht. HA04)

3. *Inst. type "S1" field facility marker – red*
   (See dwg. no. RD399)

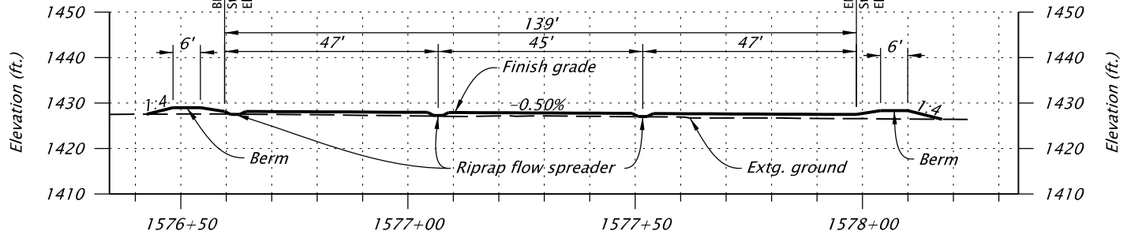
4. *Inst. type "S1" field facility marker – green*

5. *Inst. type "S2" field facility marker*
   DFI no. D01255

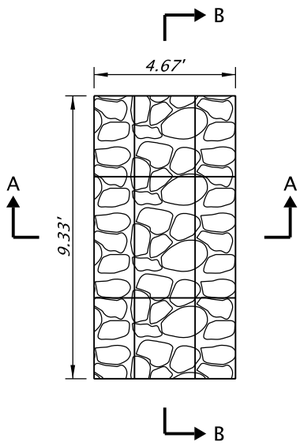
6. *Stormwater facility – D01242*
   (For details, see sht. HA01)



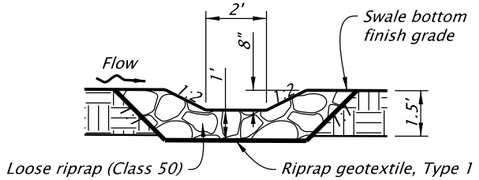
SWALE TYPICAL SECTION



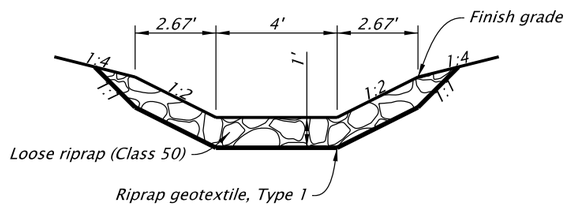
SWALE PROFILE



PLAN



SECTION A-A



SECTION B-B

FLOW SPREADER DETAILS

REGISTERED PROFESSIONAL ENGINEER
87978
DIGITALLY SIGNED Sep 1 2020 10:38 AM
OREGON
MARCH 12, 2013
WADE JOSH COATNEY
RENEWS: 12-31-2021

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OREGON DEPARTMENT OF TRANSPORTATION

US26: WARM SPRINGS SAFETY CORRIDOR SEC.
WARM SPRINGS HWY.
CTWS RESERVATION & JEFFERSON COUNTY

HWY: 053	
M.P.: 104.10-104.13	
UNIT FILE CODE	N/A
DFI/TSSU NO.	D01255
Designer: Austin Kleinberg	Reviewer: Wade Coatney
Drafter: Austin Kleinberg	Checker: Chad Howard

STORMWATER FACILITY PLAN

SHEET NO. HA02