OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: March 2021

DFI No. D01239

Figure 1: DFI No. D01239, looking Southwest

Identification

Drainage Facility ID (DFI):	D01239
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 53V-013
Location:	District: 08
	Highway No.: OR140 (270)
	Mile Post: 1.483 to 1.503, 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: West

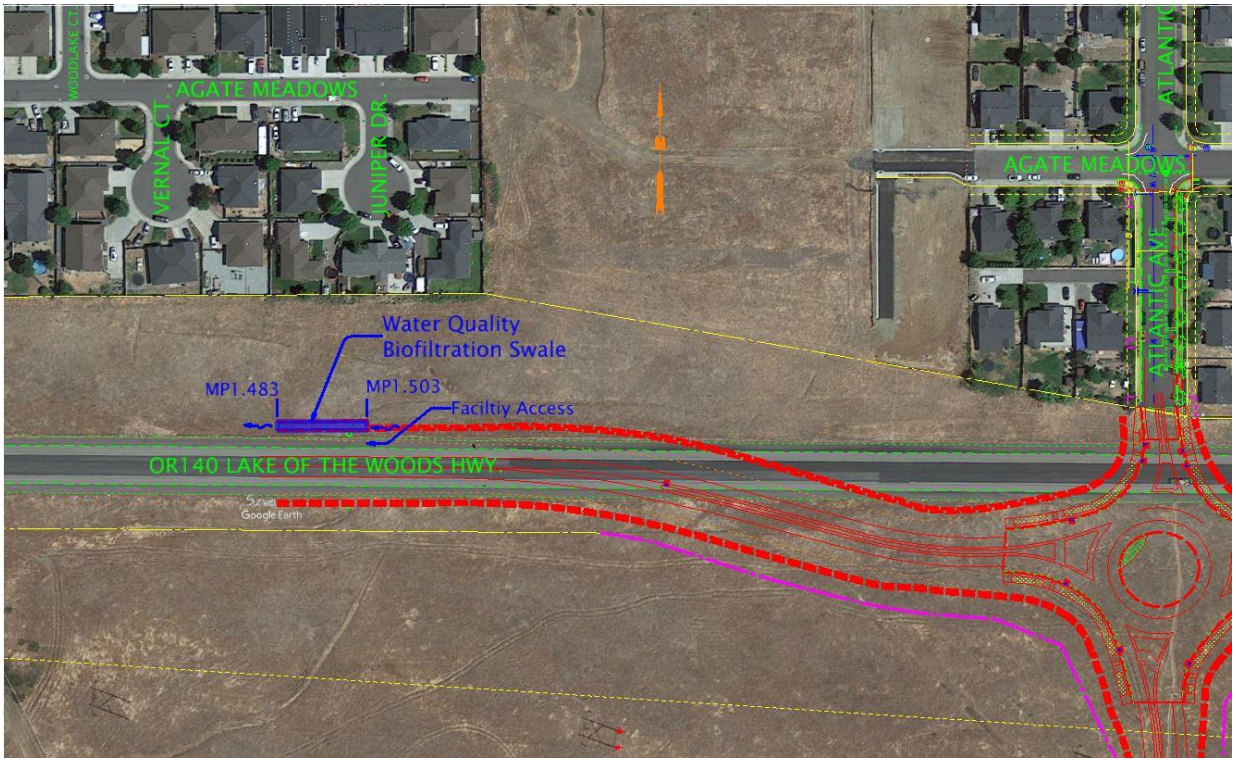


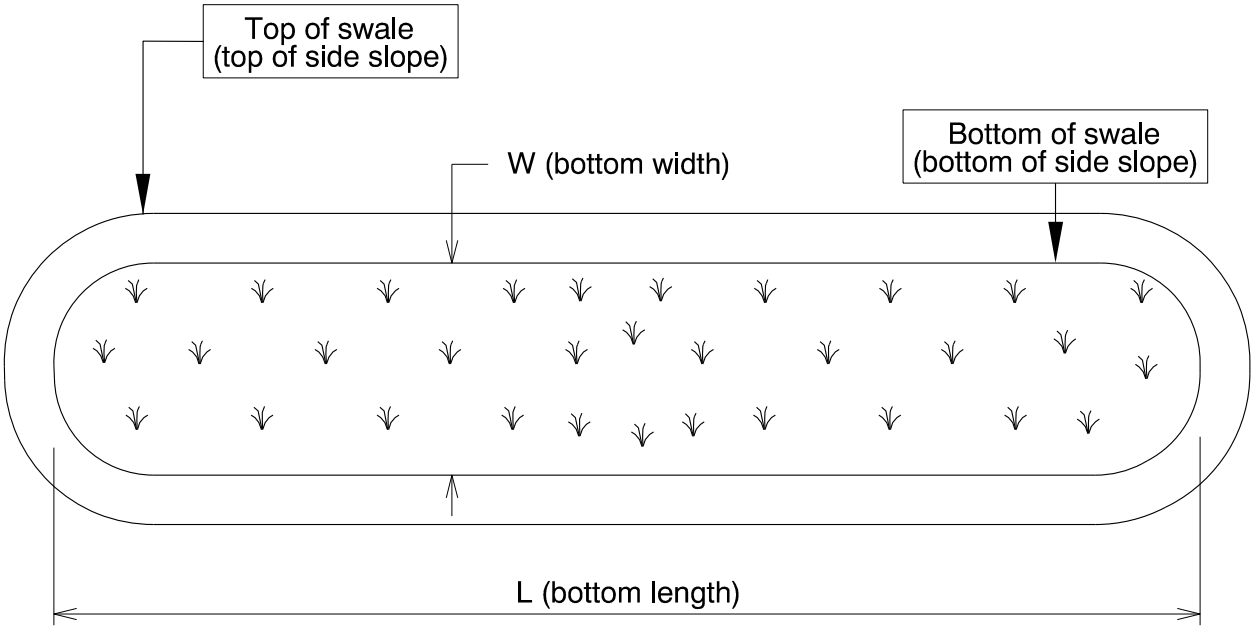
Figure 2: Facility Location Map

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:

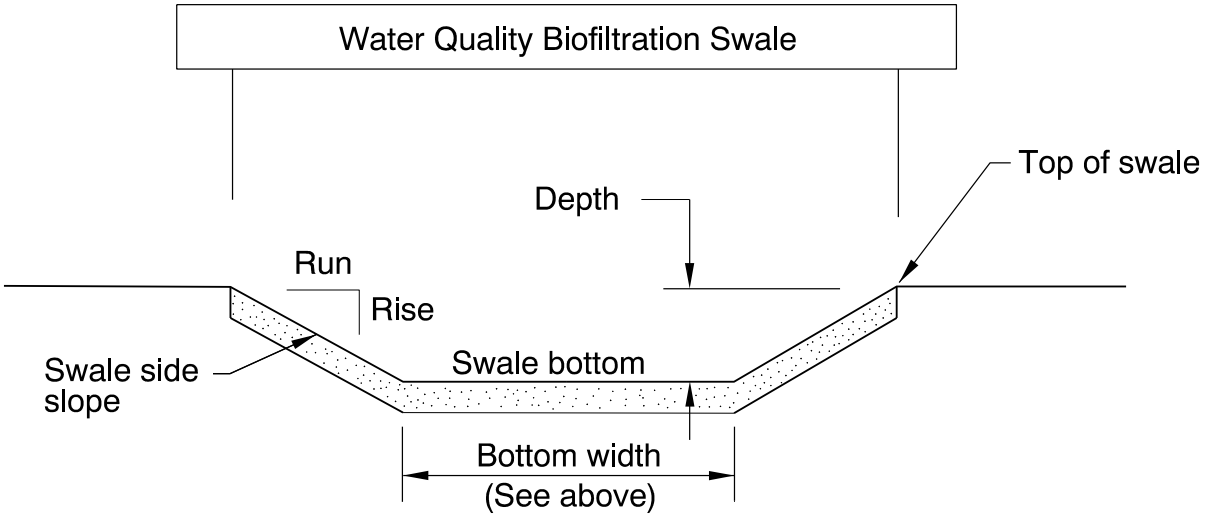
Bottom Length (feet)	Bottom Width (feet)
105	10



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)
2.6	**1**	**4**



Site Specific Information: This is an on-line biofiltration swale with an inlet pipe and inlet ditch, anchored board flow spreaders, and an outlet ditch.

4. Facility Access

Maintenance access to the facility:

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

Figure 3: Swale 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		
Matting, Type F	☒	**S13**
Water quality mix	☒	**S14**
Perforated pipe	☐	**S15**
Porous pavers (heavy duty 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:	☐	**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 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 heavy 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:

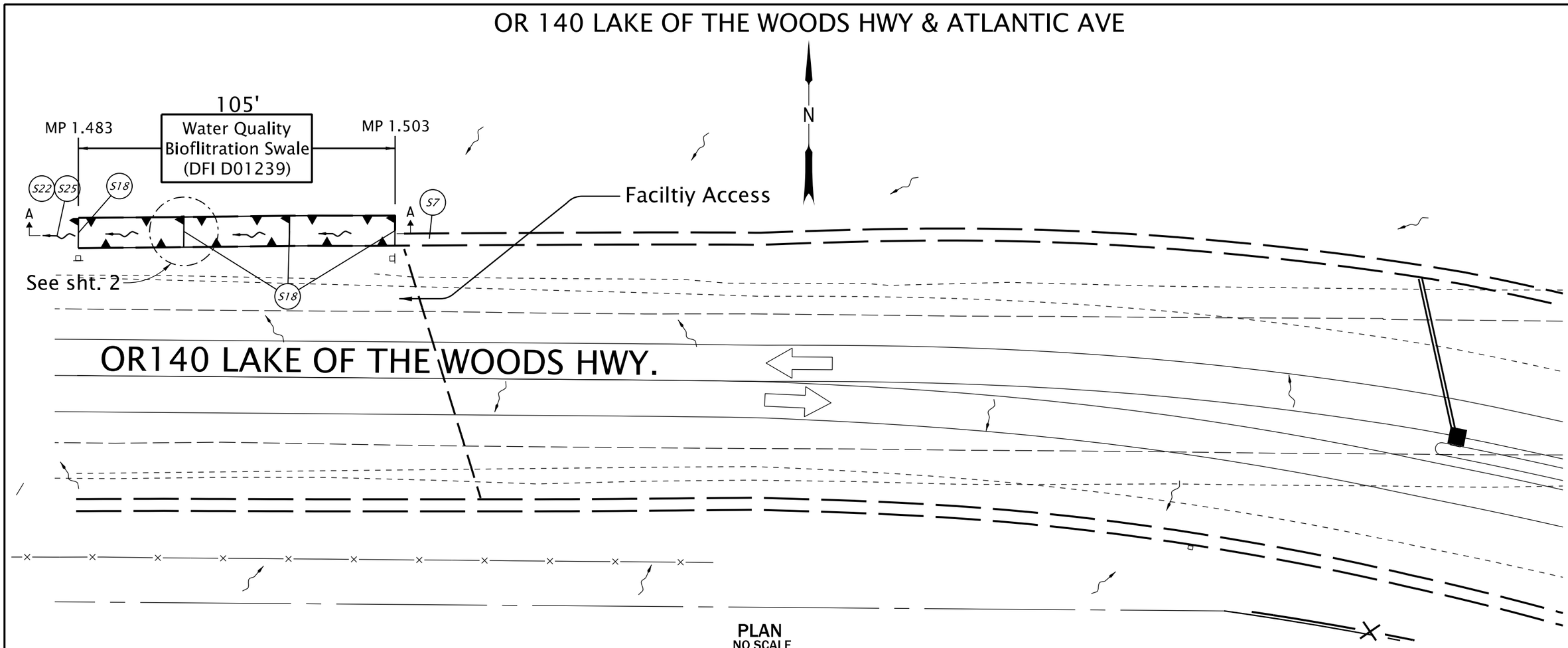
ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 667-7442
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODOT Region 2 Hazmat Coordinator	(503) 986-2647
ODOT Region 3 Hazmat Coordinator	(541) 957-3594
ODOT Region 4 Hazmat Coordinator	(541) 388-6186
ODOT Region 5 Hazmat Coordinator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

A Appendix A – Site Specific Operational Plan

Contents:

Operational Plan: DFI D01239

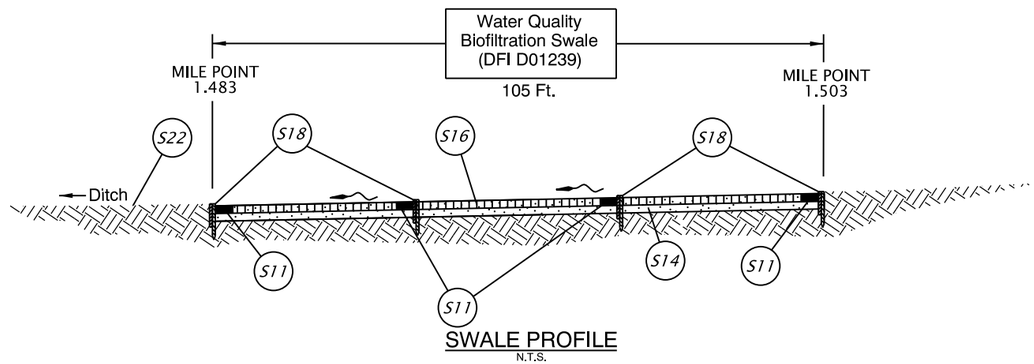
OR 140 LAKE OF THE WOODS HWY & ATLANTIC AVE



PLAN
NO SCALE

LEGEND:

- *Facility component (see table 1 in O&M Manual)*
- *Manhole*
- *Inlet*
- *Storm pipe (facility)*
- *Storm pipe*
- *Conveyance direction*
- *Pavement / facility flow path*
- *Traffic flow direction*
- *Ditch*
- *Fence*
- *Swale Bottom*



SWALE PROFILE
N.T.S.

SECTION A-A

OREGON DEPARTMENT OF TRANSPORTATION

Sht. 1 of 2

Prepared By: Richard Carson

Drafted By: Richard Carson

DFI D01239
MAINTENANCE DISTRICT 8 HWY 270
WATER QUALITY BIOFILTRATION SWALE
HIGHWAY MP 1.483-1.503
JACKSON COUNTY

pw:\\WPDOTAPPL233.partners.odot.or.gov:PW_ODOT_PROD\Documents\STIP_Projects\K20192_ODOT\1_Design\Hydraulics\H__st_wrk_01.dgn :: aerial view 2/24/2020 1:36:02 PM hwye29g

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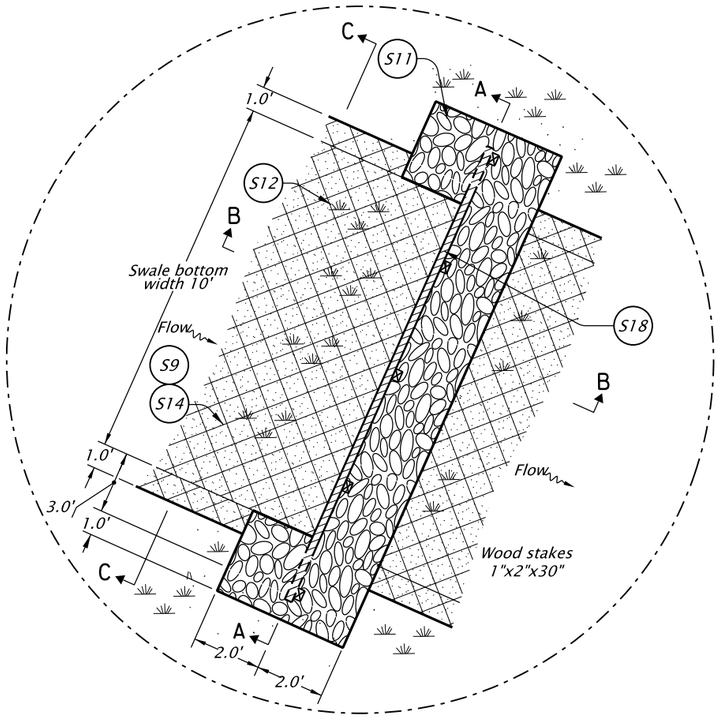
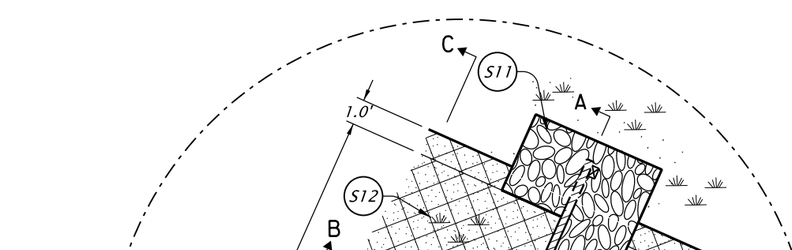


SWALE PLAN VIEW



SECTION A-A

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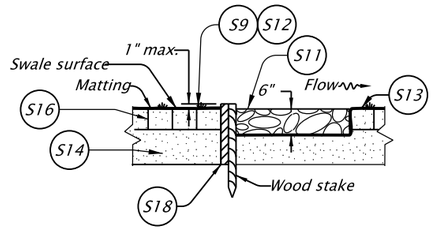

SECTION B-B

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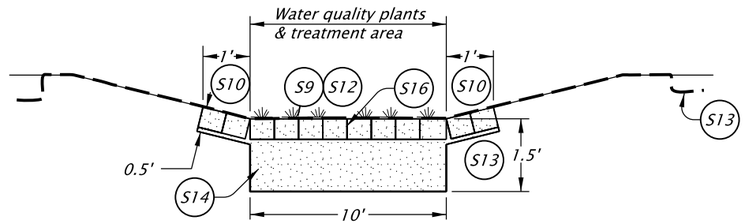


SECTION C-C

(not to scale)

OREGON DEPARTMENT OF TRANSPORTATION

Sht. 2 of 2

Prepared By: Richard Carson

Drafted By: Richard Carson

DFI D01239
MAINTENANCE DISTRICT 8 HWY 270
WATER QUALITY BIOFILTRATION SWALE
HIGHWAY MP 1.483-1.503
JACKSON COUNTY

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 53V-013

53V-013

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

NOT REVISED AS CONSTRUCTED

Tony Simpson 11-18-2020
PROJECT INSPECTOR DATE

12-4-2020
DATE

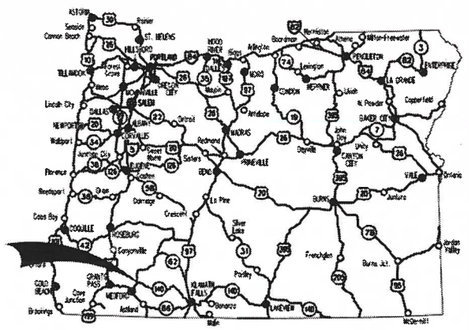
STATE OF OREGON
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED PROJECT

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

OR140: ATLANTIC AVE. INTERSECTION IMPROVEMENTS PROJECT

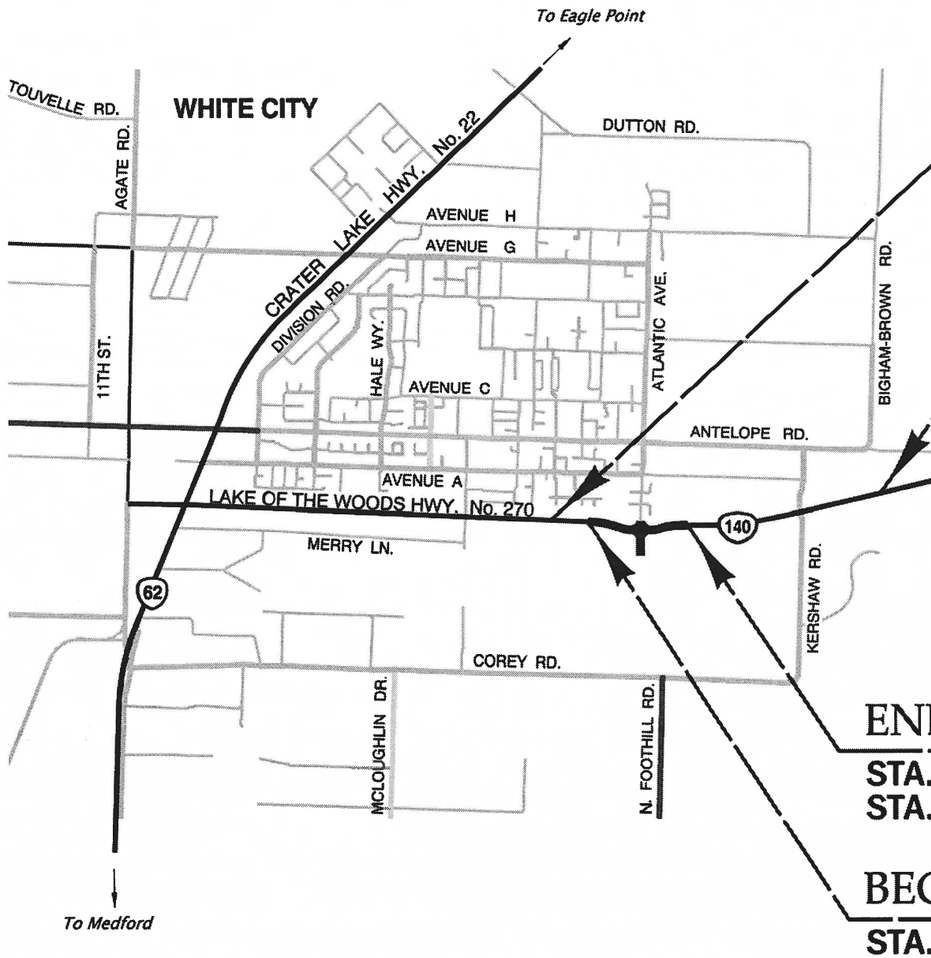
LAKE OF THE WOODS HIGHWAY

JACKSON COUNTY
MARCH 2020



Overall Length Of Project - 0.38 Miles

ATTENTION:
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0001 Through OAR 952-001-0090. You May Obtain Copies Of The Rules By Calling The Center (Note: The Telephone Number For The Oregon Utility Notification Center Is (503) 232-1987).



BEGINNING OF CONTRACT LIMITS
STA. "RW" 168+00.00 (MP 1.34)

END OF CONTRACT LIMITS
STA. "RW" 232+59.00 (MP 2.53)

END OF PROJECT
STA. "RW" 194+79.22
STA. "L" 40+00.00

BEGINNING OF PROJECT
STA. "RW" 174+96.04
STA. "L" 19+96.00

N

T. 36 S., R. 1 W., W.M.

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

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.

M. Thompson, PE Jan 29 2020 9:46 AM
Approving Authority: _____
Signature & date

Mark Thompson, Reg. 3 Tech. Ctr. Mgr.
Print name and title
Steven B Cooley Feb 5 2020 4:54 PM
Concurrence by ODOT Chief Engineer

OR140: ATLANTIC AVE. INTERSECTION IMPROVEMENTS PROJECT
LAKE OF THE WOODS HIGHWAY
JACKSON COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	STATE	A01

PE002846-000

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FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

Rotation: 0° Scale: 1"=100'

INDEX OF SHEETS, CONT.	
SHEET NO.	DESCRIPTION
A03, A04	Survey Control Data

ROADWAY DETAILS	
SHEET NO.	DESCRIPTION
BA01 thru BA07	Typical Sections
BB01 thru BB12	Details
BC01 thru BC17	Curb Ramp Details
BD01	Pipe Data

ROADWAY CONSTRUCTION	
SHEET NO.	DESCRIPTION
C01	Alignment
C01A	General Construction
C01B	General Construction Notes
C01C	Drainage and Utilities
C01D	Drainage and Utilities Notes
C01E, C01F	Profile
C02	Alignment
C02A	General Construction
C02B	Drainage and Utilities
C02C	Profile

TRAFFIC CONTROL	
SHEET NO.	DESCRIPTION
EA01	Traffic Control Plan (TPAR)
EB01 thru EB03	Traffic Control Plan (Stage I)
EC01 thru EC06	Traffic Control Plan (Stage II)
ED01 thru ED03	Traffic Control Plan (Stage III)
EE01, EE02	Traffic Control Plan (Stage IV)
EF01, EF02	Traffic Control Plan (Stage V)

ROADSIDE DEVELOPMENT / EROSION CONTROL	
SHEET NO.	DESCRIPTION
FA01	Roundabout Details
FA02	Roundabout Planting Plan
FB01, FB02	Erosion Control & Sediment Control

HYDRAULIC	
SHEET NO.	DESCRIPTION
HA01	Drainage And Utilities
HA02	Stormwater Detail

SIGNS	
SHEET NO.	DESCRIPTION
LA01 thru LA05	Signing Plan
LB01 thru LB03	Signing Details
LC01 thru LC04	Sign and Post Data Table

SIGNALS	
SHEET NO.	DESCRIPTION
M01 thru M05	Flashing Beacon Plan
M06	Details

ILLUMINATION	
SHEET NO.	DESCRIPTION
P01	Illumination Plan
P02 thru P04	Illumination Details

PERMANENT PAVEMENT MARKINGS	
SHEET NO.	DESCRIPTION
QA01 thru QA05	Pavement Marking Details
QB01 thru QB05	Pavement Marking Plan

Standard Dwg. Nos.

RD140 - Roadway Cross Slopes Superelevated Sections
RD150 - Slope Rounding
RD170 - Roundabout And Truck Apron Curb Placement

RD300 - Trench Backfill, Bedding, Pipe Zone And Multiple Installations
RD316 - Sloped Ends For Metal Pipe
RD318 - Sloped Ends For Concrete Pipe
RD319 - Miscellaneous Culvert Details
RD325 - Coupling Bands For Corrugated Metal Pipe
RD326 - Coupling Bands For Corrugated Metal Pipe
RD327 - Coupling Bands For Corrugated Metal Pipe
RD335 - Standard Storm Sewer Manhole
RD336 - Standard Manhole Details
RD339 - Pipe To Structure Connections
RD344 - Standard Manhole Base Section
RD345 - Pipe To Manhole Connections
RD348 - Manhole With Inlet
RD363 - Gutter Transition At Inlet
RD364 - Concrete Inlets Type G-1, G-2, G-2M & G-2MA
RD365 - Frames & Grates For Concrete Inlets
RD380 - Fill Height Tables For Aluminum & Steel Corrugated Pipe
RD382 - Fill Height Tables For Aluminum & Steel Arch Pipe
RD384 - Fill Height Tables For Aluminum & Steel Spiral Rib Pipe
RD386 - Fill Height Tables For Circular Concrete Pipe
RD388 - Fill Height Tables For PVC Pipe
RD390 - Fill Height Table For Corrugated HDPE Pipe
RD393 - Fill Height Tables For Polypropylene Pipe
RD398 - Culvert ID Marker

RD610 - Asphalt Concrete Pavement (ACP) Details
RD615 - Asphalt Concrete Pavement (ACP) Details

RD700 - Curbs
RD705 - Islands
RD706 - Traffic Separators And Transitions
RD707 - Island Nose Treatments
RD710 - Accessible Route Islands
RD720 - Curb Line Sidewalks
RD721 - Separated Sidewalks
RD722 - Sidewalk Joints
RD755 - Curb Ramp Details
RD758 - Detectable Warning Surface Details & Placement Locations
RD759 - Detectable Warning Surface Details & Placement Locations

RD810 - Barbed And Woven Wire Fences

RD1000 - Construction Entrances
RD1005 - Check Dams Type 1, 3, And 4
RD1010 - Inlet Protection Type 2, 3, 6, 7, 10 And 11
RD1055 - Slope and Channel Matting

TM200 - Sign Installation Details
TM201 - Miscellaneous Sign Placement Details
TM212 - Signing Details Oregon Route Signs
TM221 - Signing Details Milepost Markers
TM222 - Installation Details Milepost Marker Posts
TM223 - Conventional Roads Directional Sign Layout Street Name Signs
TM230 - Mounting Details For Removable Legend 4" Through 8" Letters & Numbers
TM233 - Mounting Details For Removable Legend Various Arrow Sizes

TM467 - Pedestrian Signal And Pedestrian Push Button Details
TM471 - Trenching & Conduit Installation
TM472 - Traffic Signal Junction Boxes/Hand Holes
TM482 - Controller Cabinet & Service Cabinet Foundation Details
TM485 - Service Cabinet Wiring Details

TM500 - Pavement Marking Standard Detail Blocks
TM501 - Pavement Marking Standard Detail Blocks
TM502 - Pavement Marking Standard Detail Blocks
TM503 - Pavement Marking Standard Detail Blocks
TM515 - Pavement Markers
TM521 - Durable & High Performance Pavement Markings Surface & Groove Installed Non-Profiled
TM530 - Intersection Pavement Markings (Crosswalk, Stop Bar & Bike Lane Stencil)
TM531 - Turn Arrow Marking Details
TM539 - Median and Left Turn Channelization Details
TM560 - Alignment Layout: General
TM561 - Alignment Layout: Left Turn Lane, Centerline & Medians
TM570 - Traffic Delineators
TM571 - Traffic Delineators Steel Post Details
TM576 - Traffic Delineator Installation For Non-Freeways

TM602 - Triangular Base Breakaway Multi-Directional Slip Base Design
TM629 - Slip Base And Fixed Base Luminaire Supports General Details And Design Criteria
TM630 - Slip Base And Fixed Base Luminaire Supports Base Plate & Footing Details
TM670 - Wood Post Sign Supports
TM671 - 3 Second Gust Wind Speed Map
TM675 - Extruded Aluminum Panels
TM676 - Sign Attachments
TM677 - Sign Mounts
TM678 - Secondary Sign Mounting Details
TM681 - Perforated Steel Square Tube (PSST) Sign Support Installation
TM687 - Perforated Steel Square Tube (PSST) Anchor Foundation
TM688 - Perforated Steel Square Tube (PSST) Slip Base Foundation

TM800 - Tables, Abrupt Edge And PCMS Details
TM810 - Temporary Pavement Markings
TM820 - Temporary Barricades
TM821 - Temporary Sign Supports
TM822 - Temporary Sign Supports
TM830 - Temporary Concrete Barrier And Rumble Strip Details
TM831 - Temporary Impact Attenuators
TM833 - Temporary Impact Attenuators
TM841 - Intersection Work Zone Details
TM844 - Temporary Pedestrian Access Routing
TM850 - 2-Lane, 2-Way Roadways

NOT REVISED AS CONSTRUCTED

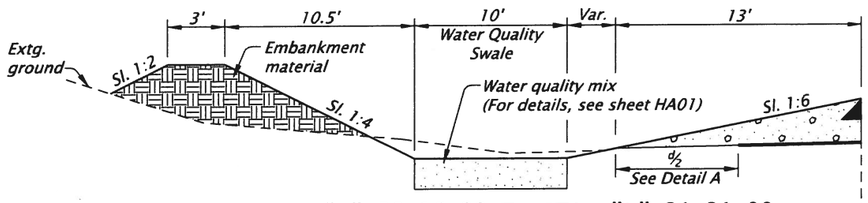
Tony Simpson — PROJECT INSPECTOR
11-18-2020 — DATE

OREGON DEPARTMENT OF TRANSPORTATION

Standard Drawings located on the web at:
http://www.oregon.gov/ODOT/Engineering/Pages/Standards.aspx

OR140: ATLANTIC AVE.
INTERSECTION IMPROVEMENTS PROJECT
LAKE OF THE WOODS HIGHWAY
JACKSON COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	SEE SHEET A01	A02



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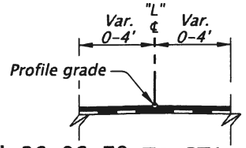

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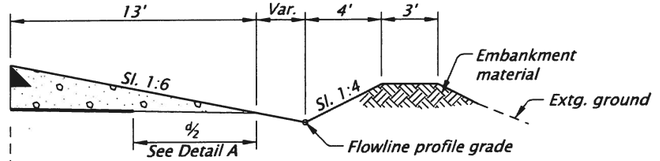

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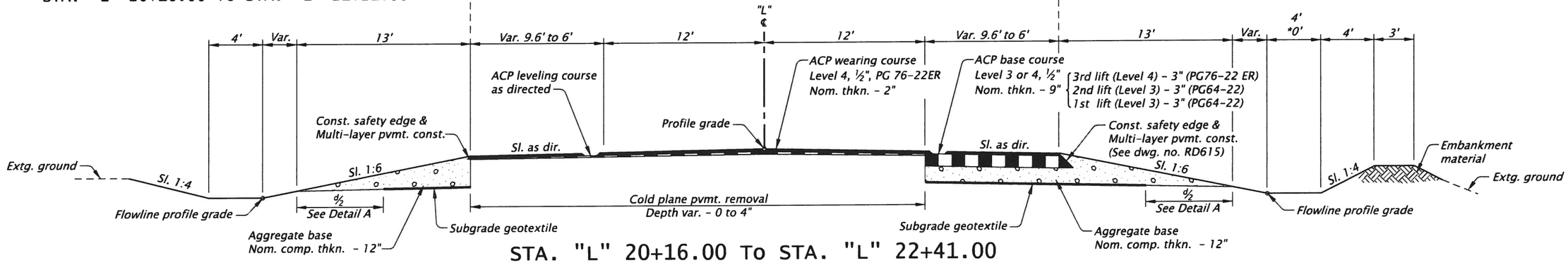
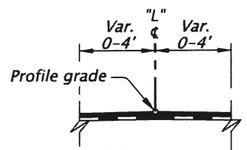


STA. "L" 20+16.00 To STA. "L" 22+41.00
* "L" 36+06.70 To "L" 39+15.00

REVISED AS CONSTRUCTED

Tony Simpson 11-18-2020
PROJECT INSPECTOR DATE



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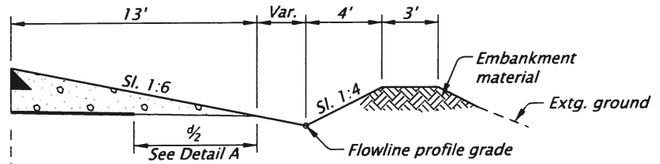

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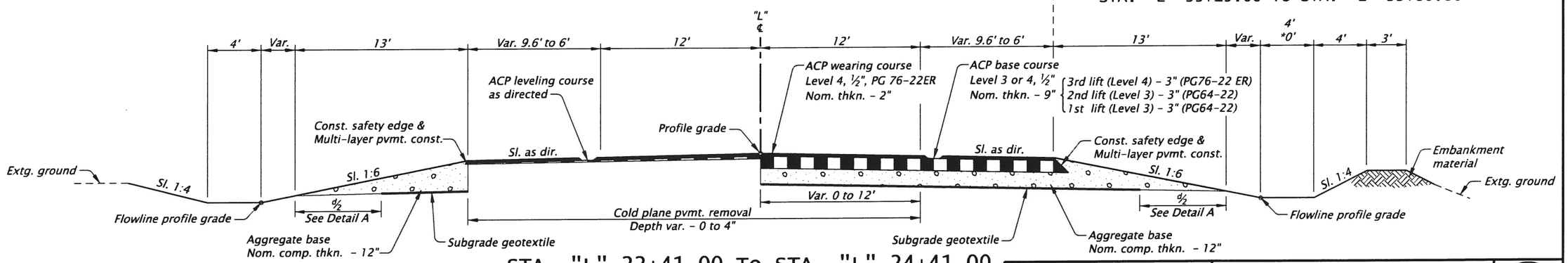

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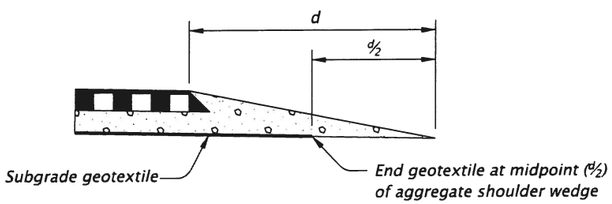
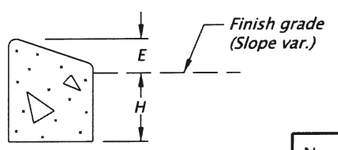
* "L" 39+15.00 To "L" 39+80.00



DETAIL A



DETAIL B

NOTE:
1. Side-slopes are shown as vert. to horiz.
2. For standard superelevation, see dwg. no. RD140.
3. For slope rounding, see dwg. no. RD150.
4. Lane dimensions are shown perpendicular to median gutter line alignments.

No.	DATE	REVISIONS	BY
1	05-26-20	Revised	C.Z.

REGISTERED PROFESSIONAL ENGINEER
63243PE
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OREGON
JULY 9, 2001
CHRIS ROSS ZELMER
RENEWS: 06-30-2020

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OREGON DEPARTMENT OF TRANSPORTATION

OR140: ATLANTIC AVE. INTERSECTION IMPROVEMENTS PROJECT
LAKE OF THE WOODS HIGHWAY
JACKSON COUNTY

Designer: Brian Sheadel | Reviewer: Chris Zelmer
Drafter: David Knox | Checker: Rich Coffel

TYPICAL SECTIONS

SHEET NO. BA02

PIPE 2008 - File Update: Dec. 2017

53V-013

SHEET NUMBER	NOTE No. ON PLANS	DESIGN HEIGHT OF COVER (FEET) ①	PIPE: CIRCULAR OR ELLIPTICAL: SIZE IN (Inches)	PIPE: CIRCULAR OR ELLIPTICAL: LENGTH IN FEET	PIPE – ARCH: HELICAL: Riveted Welded or Lock Seam: EQUIV. RND SIZE (Inches)	PIPE – ARCH: HELICAL: LENGTH (Feet)	PIPE – ARCH: CROSS-SECTIONAL DIMENSIONS ②: SPAN (Feet-Inches)	PIPE – ARCH: CROSS-SECTIONAL DIMENSIONS ②: RISE (Feet-Inches)	PIPE – ARCH: CROSS-SECTIONAL DIMENSIONS ②: CORNER RADII (Inches)	USE / INSTALLATION CRITERIA: DRAIN (PERFORATED)	CULVERT (ROAD APPROACH)	CULVERT (CONDUIT)	CULVERT	IRRIGATION	SIPHON	STORM SEWER	SANITARY SEWER	OTHERS (SEE REMARKS)	WATERTIGHT JOINTS	SLOPE ANCHORS	IMPERFECT TRENCH	PH	RESISTIVITY (HUNDREDS)	TERMINAL TREATMENT: LT./RT. SLOPED ENDS	TERMINAL TREATMENT: SKEW NUMBER	TERMINAL TREATMENT: PAVED END SLOPES: Not For Conc. Pipe Over 60" Dia.	TERMINAL TREATMENT: PAVED END SLOPES: No.
C01D	1	1.0		86												✓						6.2	26.7	1:6			2
	2	1.0		41												✓						6.2	26.7	1:6			1
	3	1.0		206												✓						6.2	26.7				
	4																										
	5	1.0	19													✓						6.2	26.7				
	6	1.0	29													✓						6.2	26.7	1:6			1
	7																										
	8	1.0	18													✓						6.2	26.7				
	9	1.0	28													✓						6.2	26.7	1:3			1
	10	1.0		25												✓						6.2	26.7	1:6			1
	11	1.0	26													✓						6.2	26.7	1:3			1
	12	1.0		26												✓						6.2	26.7	1:3			1
	13	1.0		84												✓						6.2	26.7				
	14	1.0		34												✓						6.2	26.7	1:3			1
	15	1.0	30													✓						6.2	26.7	1:3			1
	16	1.0	53													✓						6.2	26.7	1:6			1
	17	1.0	55													✓						6.2	26.7	1:6			1

ALTERNATE MATERIALS

HELICAL CORRUGATED METAL

ALUMINUM — SIZE OF CORRUGATIONS

SHEET NUMBER	RIVETED, WELDED OR LOCK SEAM: 1½" x ¼": PLATE THKN. (Inches)	1½" x ¼": ③ CROSS SECTION	2⅔" x ½": PLATE THKN. (Inches)	2⅔" x ½": ③ CROSS SECTION	3" x 1": PLATE THKN. (Inches)	3" x 1": ③ CROSS SECTION	3" x 1": ⑤ COATING	LOCK SEAM: SMOOTH WALL SPIRAL RIB: PLATE THKN. (Inches)	LOCK SEAM: ③ CROSS SECTION	LOCK SEAM: ⑤ COATING
C01D										

ALUMINIZED OR GALVANIZED IRON AND STEEL — SIZE OF CORRUGATIONS

SHEET NUMBER	RIVETED, WELDED OR LOCK SEAM: 1½" x ¼": PLATE THKN. (Inches)	1½" x ¼": ③ CROSS SECTION	2⅔" x ½": PLATE THKN. (Inches)	2⅔" x ½": ③ CROSS SECTION	3" x 1": PLATE THKN. (Inches)	3" x 1": ③ CROSS SECTION	3" x 1": ⑤ COATING	LOCK SEAM: SMOOTH WALL SPIRAL RIB: PLATE THKN. (Inches)	LOCK SEAM: ③ CROSS SECTION	LOCK SEAM: ⑤ COATING	LOCK SEAM: ⑤ ALUMINIZED
C01D											

RIGID

SHEET NUMBER	PRE-CAST CONCRETE: ④ PLAIN: I	PLAIN: II	PLAIN: III	REINF.: IV	REINF.: V
C01D				✓	

PLASTIC & IRON

SHEET NUMBER	CORRUGATED HDPE	SOLID WALL HDPE	REINFORCED HDPE	PVC - PSI STIFFNESS (115 PSI)	POLYPROPYLENE, DOUBLE WALL	POLYPROPYLENE, TRIPLE WALL	DUCTILE IRON - PIPE CLASS
C01D				✓	✓		

APPURTENANCES — MANHOLES

SHEET NUMBER	DEPTH, TOP OF COVER TO INVERT (Feet)	DIAMETER OF LARGEST PIPE IN BASE (In.)	CONC.: PRECAST	CONC.: CAST-IN-PLACE	DROP MANHOLE	SPECIAL
C01D						
	4.8	18	✓			
	4.1	18	✓			

APPURTENANCES — INLETS

SHEET NUMBER	TYPE: G-1	TYPE: Number Required
C01D		
	✓	✓
	✓	✓
	✓	✓
	✓	✓
	✓	✓
	✓	✓
	✓	✓
	✓	✓
	✓	✓
	✓	✓
	✓	✓
	✓	✓
	✓	✓
	✓	✓
	✓	✓
	✓	✓

EXTENSION

SHEET NUMBER	LEFT (Feet)	RIGHT (Feet)	EXTG. PIPE MATERIAL ⑥
C01D			

SHEET NUMBER	REMARKS
C01D	
	Manhole, w/ G-1 inlet
	Manhole, w/ G-1 inlet

NOT REVISED AS CONSTRUCTED

Tony Simpson 11-18-2020

PROJECT INSPECTOR DATE

GENERAL NOTES:

1. A check (✓) indicates column heading applies.
2. A new pipe culvert installation shall be of like material throughout.
3. Extension of existing metal culverts may be of unlike metal or corrugations. For connecting details, see Std Drg. No. RD326.
4. Dimensions shown are nominal.
5. All pipes shall conform to the AASHTO specification applicable for the type of material and the diameter of the pipe involved.

FOOTNOTES:

① Design height of cover is the critical design height used to select pipe materials. The height of cover for any given run of pipe may vary. Design height of cover shall be measured to subgrade.

② Cross-sectional dimensions may vary with different materials. When galvanized iron or steel and aluminum are acceptable alternates use a separate line for each type of material.

③ Cross-sectional shape of pipe normal to longitudinal axis, prior to loading
A = Pipe – Arch
R = Round
E = Elliptical (5% nominal elongation)

④ Minimum allowable diameter for Class 1 nonreinforced concrete pipe is 15".

⑤ Abbreviations for protective coatings for metal pipe
PM = Polymeric, 10 Mil. thkn. coated both sides
PO = Polyethylene inside lining, polymeric outside
U = Uncoated
CIM = Chevron Industrial membrane
Ep = Epoxy coated

⑥ Abbreviations for existing pipe materials
AB = Asbestos cement
Al = Corrugated aluminum
Co = Concrete
Pl = Plastic
St = Corrugated steel
X = Other material, see remarks column

■	RD300	Trench Backfill, Bedding, Pipe Zone And Multiple Installations
□	RD302	Street Cut
□	RD304	Arch Pipe Backfill/Compaction
□	RD306	Concrete Encasement, Cradle, and Cap Details
□	RD308	Bore Casing Detail
□	RD310	Shallow/Deep Trench Service Connection, Blocking and Markers
□	RD312	Subsurface Drain
■	RD316	Sloped Ends For Metal Pipe
□	RD317	Culvert Embankment Protection And Riprap Pads
■	RD318	Sloped Ends For Concrete Pipe
■	RD319	Miscellaneous Culvert Details
□	RD320	Paved End Slope For Culverts 60" Maximum Pipe Size
□	RD321	Paved End Slope With Removable Safety Bar(s)
□	RD322	Safety End Section For Metal Pipe
□	RD324	Safety End Section For Concrete, PVC, HDPE & Polypropylene Pipe
■	RD325	Coupling Bands For Corrugated Metal Pipe
■	RD326	Coupling Bands For Corrugated Metal Pipe
■	RD327	Coupling Bands For Corrugated Metal Pipe
□	RD328	Slotted C.M.P. Drain Details
□	RD330	Pipe Slope Anchors – Metal
□	RD332	Pipe Slope Anchors – Concrete
□	RD334	Locator Post
■	RD335	Standard Storm Sewer Manhole
■	RD336	Standard Manhole Details
□	RD338	Standard Sanitary Sewer Manhole
■	RD339	Pipe To Structure Connections
□	RD340	Storm Sewer Pollution Control Manhole
□	RD342	Shallow Manholes
□	RD343	24" Manholes
■	RD344	Standard Manhole Base Section
■	RD345	Pipe To Manhole Connections
□	RD346	Large Precast Manhole
■	RD348	Manhole With Inlet
□	RD350	Sanitary Sewer Piped Inside Drop Connection for Manholes
□	RD352	Outside Drop Manholes
□	RD354	Carry Through Manhole – Storm
□	RD356	Manhole Covers And Frames
□	RD358	Manhole Slope Protectors
□	RD360	Manhole Frame Adjustment
□	RD362	Sanitary Cleanout
■	RD363	Gutter Transition At Inlet
■	RD364	Concrete Inlets Type G-1, G-2, G-2M, & G-2MA
■	RD365	Frames & Grates For Concrete Inlets
□	RD366	Concrete Inlets Type CG-1, CG-2
□	RD367	Curb Inlet Channel
□	RD368	Concrete Inlets Type M-E, M-O, B And B-SL
□	RD370	Ditch Inlet Type D
□	RD371	Concrete Inlet Base Type CG-3
□	RD372	Concrete Inlet Top, Option 1 Type CG-3
□	RD373	Concrete Inlet Top, Option 2 Type CG-3
□	RD374	Area Drainage Basin Or Field Inlet
□	RD376	Miscellaneous Drainage Structures Siphon Box, Inlet Cap & Inlet Adjustment
□	RD378	Type "3" Catch Basin, Frame and Grate
■	RD380	Fill Height Tables For Aluminum & Steel Corrugated Pipe
■	RD382	Fill Height Tables For Aluminum & Steel Arch Pipe
■	RD384	Fill Height Tables For Aluminum & Steel Spiral Rib Pipe
■	RD386	Fill Height Table For Circular Concrete Pipe
■	RD388	Fill Height Tables For PVC Pipe
■	RD390	Fill Height Table For Corrugated HDPE Pipe
□	RD391	Fill Height Table For Steel Reinforced HDPE Pipe
■	RD393	Fill Height Tables For Polypropylene Pipe
■	RD398	Culvert ID Marker
□	RD399	Stormwater Treatment and Storage Facility Field Markers

REGISTERED PROFESSIONAL ENGINEER
63243PE
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OREGON
JULY 9, 2001
CHRIS ROSS ZELMER
RENEWS: 06-30-2020

OREGON DEPARTMENT OF TRANSPORTATION

OR140: ATLANTIC AVE. INTERSECTION IMPROVEMENTS PROJECT
LAKE OF THE WOODS HIGHWAY
JACKSON COUNTY

Designer: Brian Sheadel Reviewer: Chris Zelmer
Drafter: Judy Hardin Checker: Rich Coffel

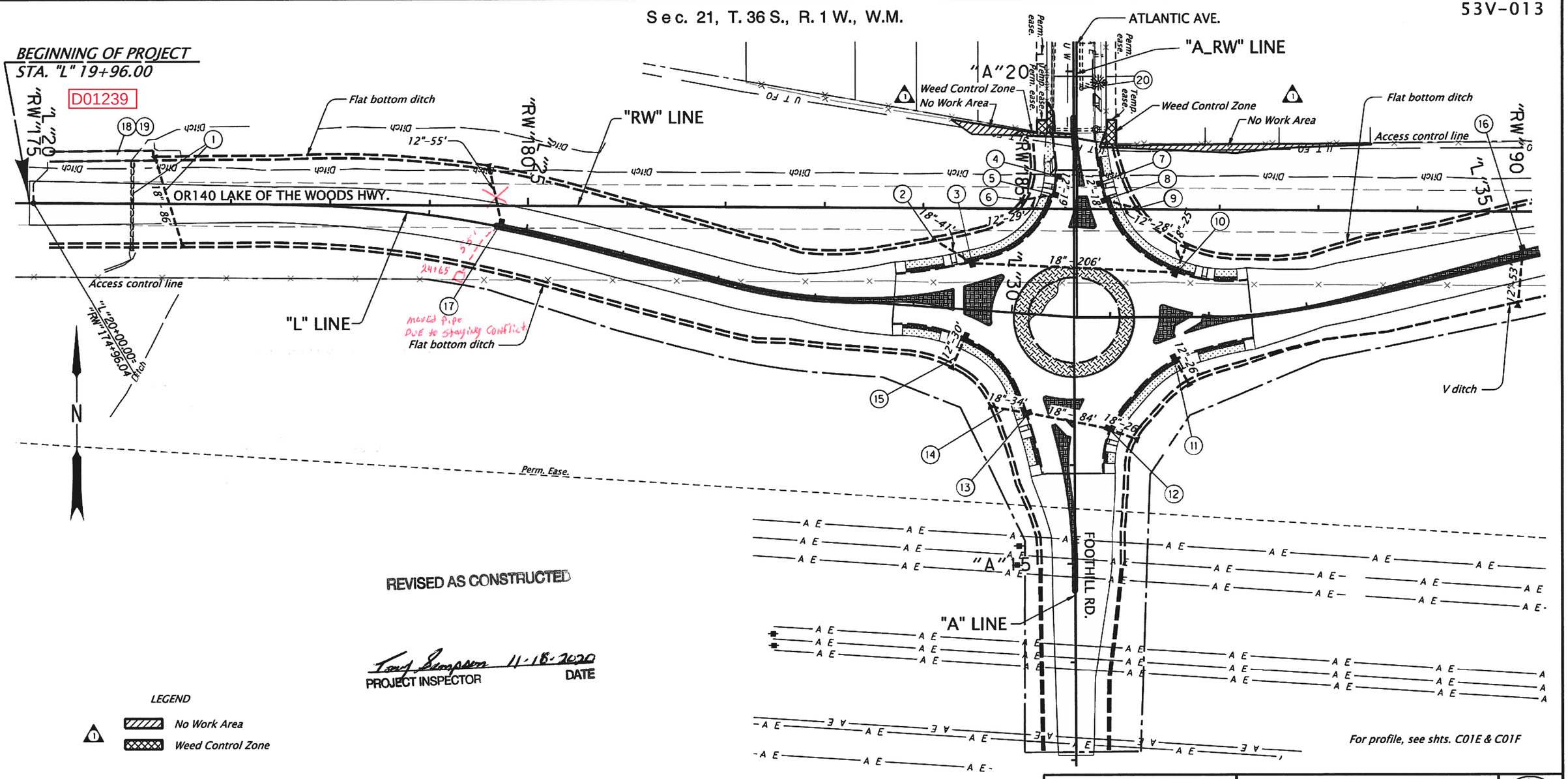
PIPE DATA

SHEET NO. BD01

R_K20192_pd_01.dgn :: Default 12/10/2019 2:13:26 PM hwye33g

53V-013

Sec. 21, T. 36 S., R. 1 W., W.M.



REVISED AS CONSTRUCTED

Tony Simpson 11-18-2020
PROJECT INSPECTOR DATE

LEGEND

⚠1 *No Work Area*

Weed Control Zone

CULVERT ID MARKER TABLE

Culvert Location Station	Structure Number	DFI Number	Type 1 Marker Inlet	Type 1 Marker Outlet	Type 2 Marker Inlet	Type 2 Marker Outlet
"L" 21+50 Lt. & "L" 21+24 Rt.	N/A	N/A	✓	✓		
"L" 35+09 Rt.	N/A	N/A		✓		
"L" 24+53 Lt.	N/A	N/A		✓		

See Std. Dwg. RD398

No.	DATE	REVISIONS	BY
⚠1	03-03-20	Added: No Work Area and Weed Control Zone	C.Z.

REGISTERED PROFESSIONAL ENGINEER
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OREGON
JULY 9, 2001
CHRIS ROSS ZELMER
RENEWS: 06-30-2020

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OREGON DEPARTMENT OF TRANSPORTATION

OR140: ATLANTIC AVE. INTERSECTION IMPROVEMENTS PROJECT
LAKE OF THE WOODS HIGHWAY
JACKSON COUNTY

Designer: Brian Sheadel Reviewer: Chris Zelmer
Drafter: Judy Hardin Checker: Rich Coffel

DRAINAGE & UTILITIES

SHEET NO. C01C

R_K20192_dr_01.dgn :: Default 3/3/2020 10:03:25 AM hwye33g

Rotation: 0° Scale: 1"=100'

L 24165 Rt

(1) *Sta. "L" 21+50.0, 39.5' Rt. to Sta. "L" 21+24.0, 43.3' Lt.*
Remove extg. pipe - 90'
Inst. 18" culv. pipe - 86'
5' depth
Const. sloped end - 2
Const. paved end slope, Lt. & Rt.
Inst. culvert ID marker, Type 1 - 2
(See dwg. nos. RD300, RD316, RD318, RD319, RD325, RD326, RD327, RD380, RD382, RD384, RD386, RD388, RD390, RD393, & RD398)

(2) *Sta. "L" 29+56.0, 48.7' Lt. to Sta. "L" 29+19.5. 66.6' Lt.*
Inst. 18" storm sew. pipe - 41'
5' depth
Const. sloped end
Const. paved end slope, Lt.

(3) *Sta. "L" 29+56.0, 48.7' Lt.*
Const. manhole with type G-1 inlet
Inst. 18" storm sew. pipe - 206'
5' depth
(See dwg. nos. RD335, RD336, RD339, RD344, RD345, RD348, RD363, RD364 & RD365)

(4) *Sta. "A" 18+94.0, 17.9' Lt.*
Const. type G-1 inlet

(5) *Sta. "A" 18+75.0, 20.9' Lt.*
Const. type G-1 inlet
Inst. 12" storm sew. pipe - 19'
5' depth

(6) *Sta. "A" 18+75.0, 20.9' Lt. to Sta. "A" 18+70.4, 48.5' Lt.*
Inst. 12" storm sew. pipe - 29'
5' depth
Const. sloped end
Const. paved end slope, Lt.

(7) *Sta. "A" 18+87.0, 28.5' Rt.*
Const. type G-1 inlet

(8) *Sta. "A" 18+69.0, 33.1' Rt.*
Const. type G-1 inlet
Inst. 12" storm sew. pipe - 18'
5' depth

(9) *Sta. "A" 18+69.0, 30.1' Rt. to Sta. "A" 18+62.0, 59.4' Rt.*
Inst. 12" storm sew. pipe - 28'
5' depth
Const. sloped end
Const. paved end slope, Rt.

(10) *Sta. "L" 31+75.3, 68.4' Lt. to Sta. "L" 31+66.0, 46.2' Lt.*
Const. manhole with type G-1 inlet
Inst. 18" storm sew. pipe - 25'
5' depth
Const. sloped end
Const. paved end slope, Lt.

(11) *Sta. "A" 17+08.0, 101.6' Rt. to Sta. "A" 16+85.3, 113.8' Rt.*
Const. type G-1 inlet
Inst. 12" storm sew. pipe - 26'
5' depth
Const. sloped end
Const. paved end slope, Rt.

(12) *Sta. "A" 16+27.5, 59.2' Rt. to Sta. "A" 16+37.0, 34.1' Rt.*
Const. type G-1 inlet
Inst. 18" storm sew. pipe - 26'
5' depth
Const. sloped end
Const. paved end slope, Rt.

(13) *Sta. "A" 16+53.0, 46.5' Lt.*
Const. type G-1 inlet
Inst. 18" storm sew. pipe - 84'
5' depth

(14) *Sta. "A" 16+53.0, 46.5' Lt. to Sta. "A" 16+59.1, 81.3' Lt.*
Inst. 18" storm sew. pipe - 34'
5' depth
Const. sloped end
Const. paved end slope, Lt.

(15) *Sta. "A" 17+31.0, 110.5' Lt. to Sta. "A" 17+03.5, 122.3' Lt.*
Const. type G-1 inlet
Inst. 12" storm sew. pipe - 30'
5' depth
Const. sloped end
Const. paved end slope, Lt.

(16) *Sta. "L" 35+25.3, 7.5' Lt. to Sta. "L" 35+08.9, 42.2' Rt.*
Const. type G-1 inlet
Inst. 12" storm sew. pipe - 53'
5' depth
Const. sloped end
Const. paved end slope, Rt.
Inst. culvet ID marker, Type 1

(17) *Sta. "L" 24+74.0, 2.8' Lt. to Sta. "L" ~~24+52.6~~, 54.6' Lt.*
Const. type G-1 inlet
Inst. 12" storm sew. pipe - 55'
5' depth
Const. sloped end
Const. paved end slope, Lt.
Inst. culvet ID marker, Type 1

(18) *Sta. "L" 21+20.7 to Sta. "L" 20+16.0, Lt.*
Const. water quality swale, D01239
Const. wetland plugs - 2100 ea.
(For details, see shts. HA01 & HA02)

(19) *Inst. field facility markers, Type S2 - 2*
(For details, see sht. HA02)

(20) *Adjust box*

REVISED AS CONSTRUCTED

Tony Simpson 11-18-2020
PROJECT INSPECTOR DATE

REGISTERED PROFESSIONAL ENGINEER
63243PE
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OREGON
JULY 9, 2001
CHRIS ROSS ZELMER
RENEWS: 06-30-2020

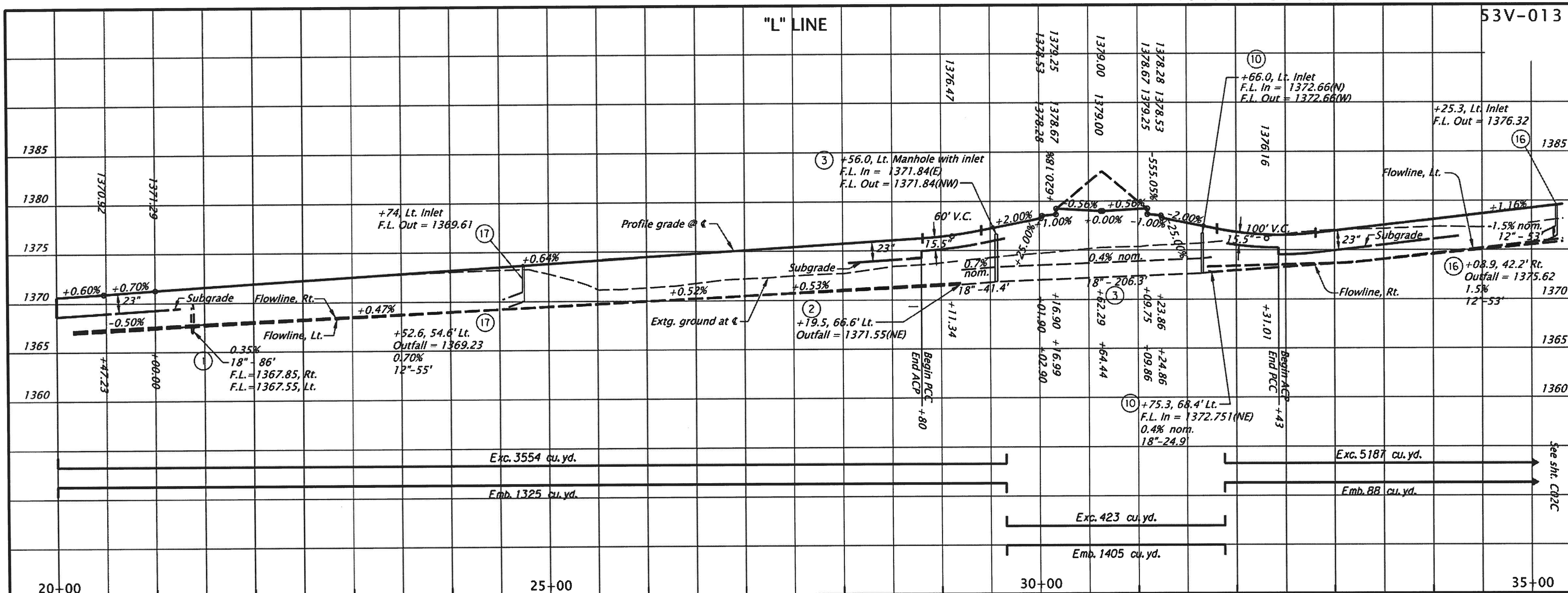
OREGON DEPARTMENT OF TRANSPORTATION

OR140: ATLANTIC AVE. INTERSECTION IMPROVEMENTS PROJECT
LAKE OF THE WOODS HIGHWAY
JACKSON COUNTY

Designer: Brian Sheadel Reviewer: Chris Zelmer
Drafter: Judy Hardin Checker: Rich Coffel

DRAINAGE & UTILITY NOTES SHEET NO. C01D

53V-013


"L" LINE
1385
1380
1375
1370
1365
1360
+74, Lt. Inlet
F.L. Out = 1369.61
Profile grade @ ℄
+0.64%
+0.60%
+0.70%
23"
Subgrade
-0.50%
Flowline, Rt.
Flowline, Lt.
+0.47%
0.35%
18" - 86'
F.L.=1367.85, Rt.
F.L.=1367.55, Lt.
+52.6, 54.6' Lt.
Outfall = 1369.23
0.70%
12"-55'
+0.52%
Extg. ground at ℄
+0.53%
+19.5, 66.6' Lt.
Outfall = 1371.55(NE)
+56.0, Lt. Manhole with inlet
F.L. In = 1371.84(E)
F.L. Out = 1371.84(NW)
60' V.C.
15.5"
0.7% nom.
18" -41.4'
Begin PCC End ACP +80
+2.00%
+1.00%
+0.56%
+0.56%
+0.00%
-1.00%
-2.00%
+25.00%
-25.00%
0.4% nom.
18" - 206.3'
+66.0, Lt. Inlet
F.L. In = 1372.66(N)
F.L. Out = 1372.66(W)
100' V.C.
+75.3, 68.4' Lt.
F.L. In = 1372.751(NE)
0.4% nom.
18"-24.9'
Begin ACP End PCC +43
+25.3, Lt. Inlet
F.L. Out = 1376.32
Flowline, Lt.
+1.16%
-1.5% nom.
12" - 53'
Flowline, Rt.
+03.9, 42.2' Rt.
Outfall = 1375.62
1.5%
12"-53'
Exc. 3554 cu. yd.
Emb. 1325 cu. yd.
Exc. 423 cu. yd.
Emb. 1405 cu. yd.
Exc. 5187 cu. yd.
Emb. 88 cu. yd.
See sht. C02C
20+00
25+00
30+00
35+00

REVISED AS CONSTRUCTED

Tony Simpson 11-18-2020
PROJECT INSPECTOR DATE

Notes:
1. All pipe slopes provided are nominal.
2. See Drainage and Utility Note Sheet C01D for corresponding note number.

REGISTERED PROFESSIONAL ENGINEER
63243PE
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OREGON
JULY 9, 2001
CHRIS ROSS ZELMER
RENEWS: 06-30-2020

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OREGON DEPARTMENT OF TRANSPORTATION

OR140: ATLANTIC AVE. INTERSECTION IMPROVEMENTS PROJECT
LAKE OF THE WOODS HIGHWAY
JACKSON COUNTY

Designer: Brian Sheadel
Reviewer: Chris Zelmer
Drafter: Judy Hardin
Checker: Rich Coffel

PROFILE

SHEET NO. C01E

R_K20192_pf_01.dgn :: Default 2/5/2020 8:17:37 AM hwye32o

Rotation: 0° Scale: 1"=100'

Sec. 21 & 22, T. 36 S., R. 1 W., W.M.

53V-013

REVISED AS CONSTRUCTED

Tony Simpson 11-18-2020
PROJECT INSPECTOR DATE

N

"RW" LINE

"L" LINE

"RW" 190

"L" 35

"RW" 195

"L" 40

"RW" 215

"RW" 220

KERSHAW RD.

R/W

R/W

Access control line

Perm. ease.

Access control line

Access control line

S 89°33'09" E

OR140 LAKE OF THE WOODS HWY.

Access control line

Access control line

R/W

R/W

60.00'

60.00'

+71.66

"L" 35+15.25 P.S.

"L" 36+55.25 P.S.C.

"L" 37+87.75 P.C.S.

"L" 39+27.75 P.T.

"L" 40+00.00 = "RW" 194+79.22 EQUA.

"L"
5°00'00" C.R.
TΔ 13°37'31"
Ts 206.97'
e = 4.5%
2 - 140' Sp.

END OF PROJECT
STA. "L" 40+00.00

N

"RW" 220

"RW" LINE

"RW" 230

END OF CONTRACT PROJECT
STA. "RW" 232+59

Access control line

OR140 LAKE OF THE WOODS HWY.

Access control line

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JULY 9, 2001
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OR140: ATLANTIC AVE. INTERSECTION IMPROVEMENTS PROJECT
LAKE OF THE WOODS HIGHWAY
JACKSON COUNTY

Designer: Brian Sheadel Reviewer: Chris Zelmer
Drafter: Judy Hardin Checker: Rich Coffel

ALIGNMENT

SHEET NO. C02

R_K20192_al_01.dgn :: Default 2/5/2020 8:17:39 AM hwye32o

Rotation: 0° Scale: 1"=100'

Sec. 21 & 22, T. 36 S., R. 1 W., W.M.

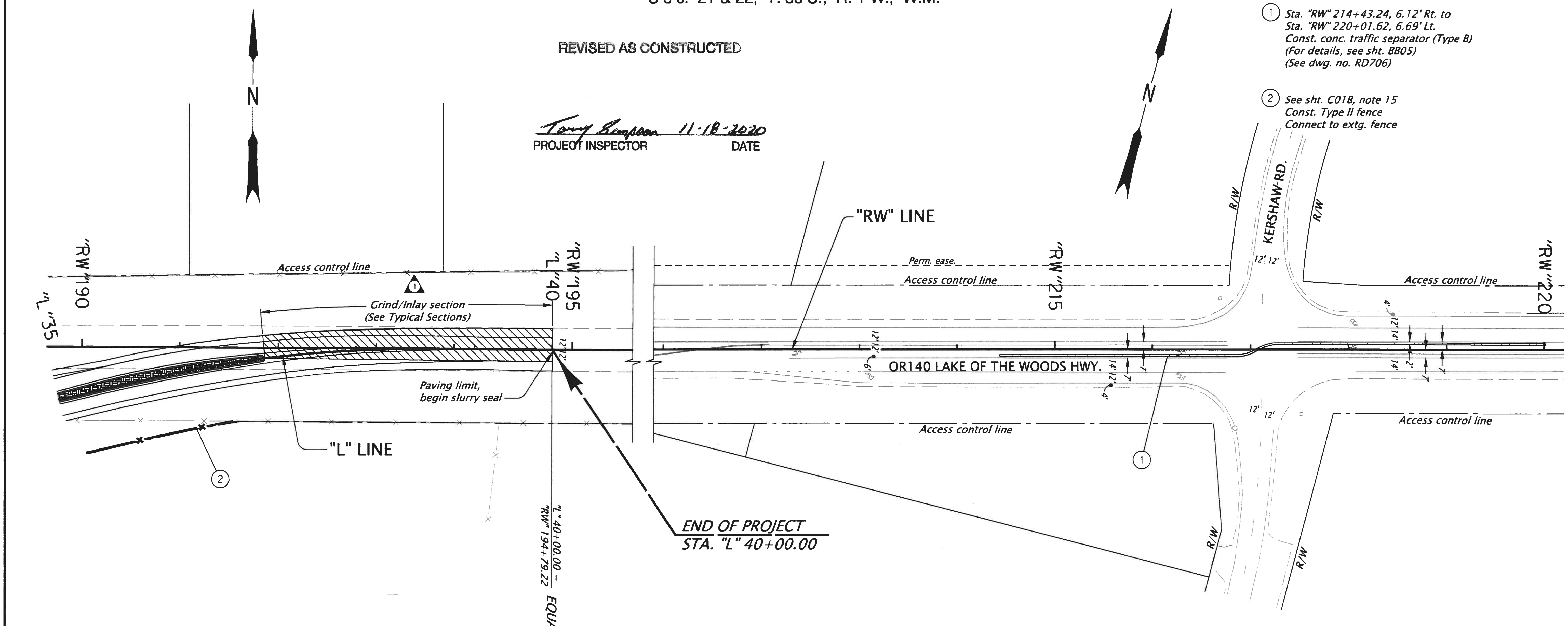
53V-013

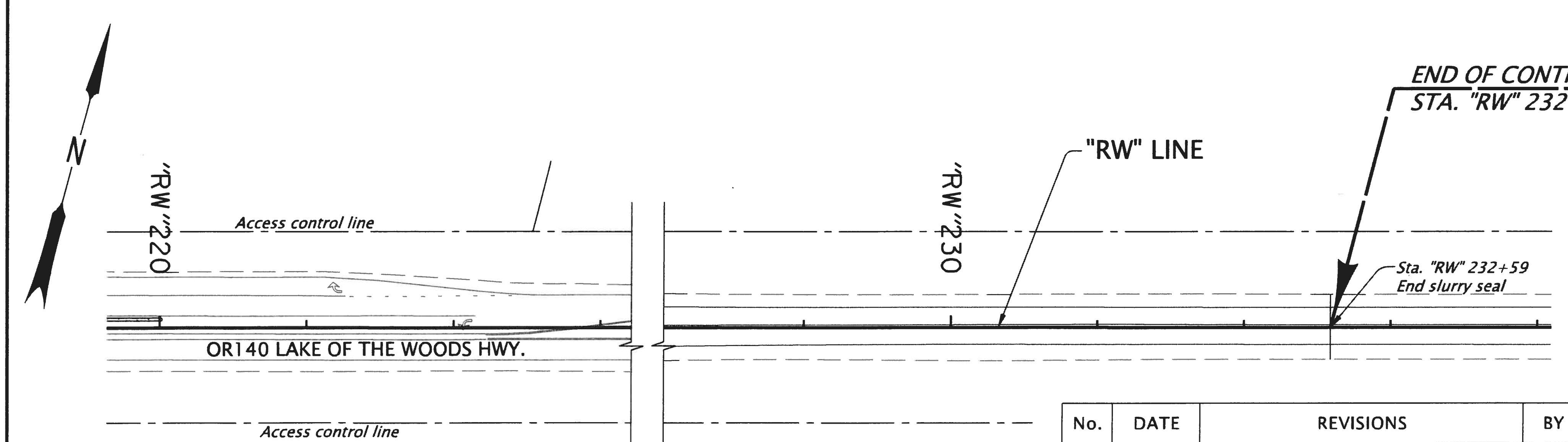
REVISED AS CONSTRUCTED

Tony Simpson 11-18-2020
PROJECT INSPECTOR DATE

(1) Sta. "RW" 214+43.24, 6.12' Rt. to
Sta. "RW" 220+01.62, 6.69' Lt.
Const. conc. traffic separator (Type B)
(For details, see sht. BB05)
(See dwg. no. RD706)

(2) See sht. C01B, note 15
Const. Type II fence
Connect to extg. fence





Grind/Inlay section

No.	DATE	REVISIONS	BY
1	05-26-20	Added Grind/Inlay section	C.Z.

REGISTERED PROFESSIONAL ENGINEER
63243PE
Digitally Signed Jun 30 2020 11:21 AM
OREGON
JULY 9, 2001
CHRIS ROSS ZELMER
RENEWS: 06-30-2020

FINAL ELECTRONIC DOCUMENT AVAILABLE UPON REQUEST

OREGON DEPARTMENT OF TRANSPORTATION

OR140: ATLANTIC AVE. INTERSECTION IMPROVEMENTS PROJECT
LAKE OF THE WOODS HIGHWAY
JACKSON COUNTY

Designer: Brian Sheadel
Reviewer: Chris Zelmer
Drafter: Judy Hardin
Checker: Rich Coffel

GENERAL CONSTRUCTION

SHEET NO. C02A

R_K20192_pl_01.dgn :: Default 5/22/2020 8:56:27 AM hwye33g

Rotation: 0° Scale: 1"=100'

Sec. 21 & 22, T. 36 S., R. 1 W., W.M.

53V-013

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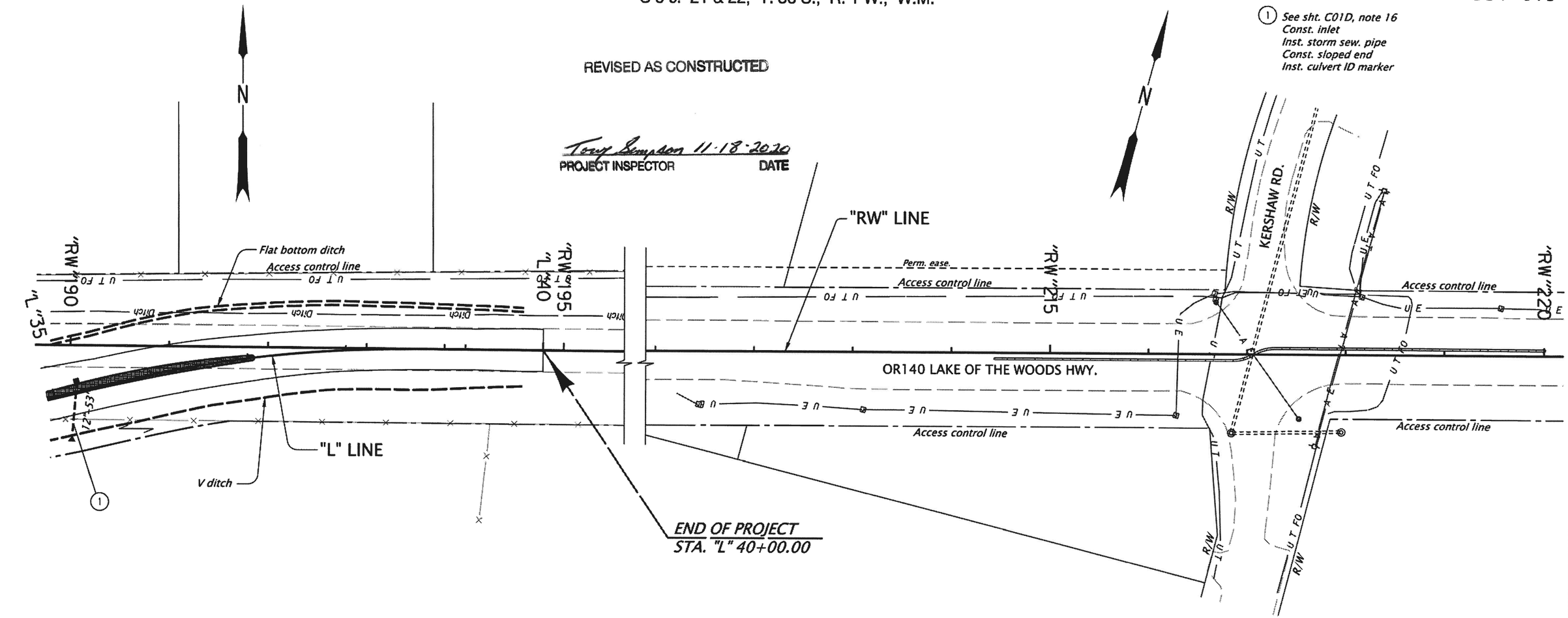
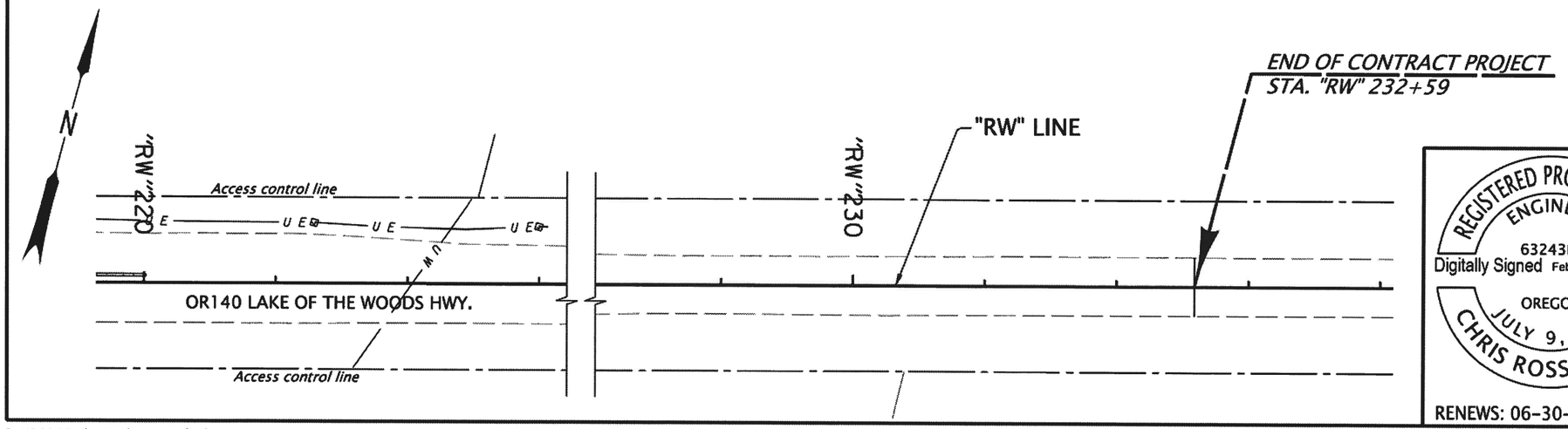
Tony Simpson 11-18-2020
PROJECT INSPECTOR DATE





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DRAINAGE & UTILITIES SHEET NO. C02B

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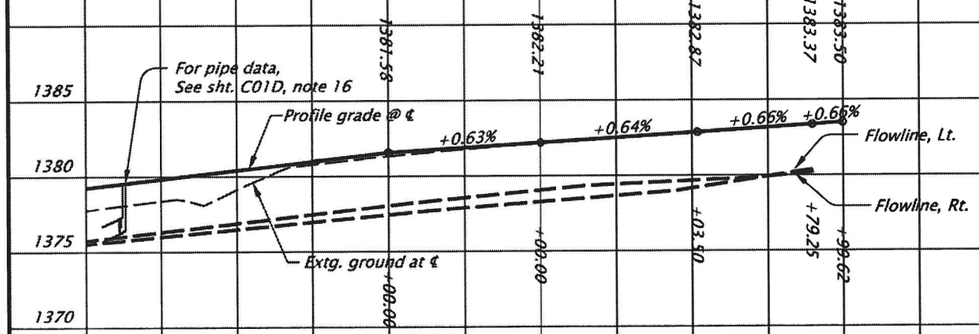
Rotation: 0° Scale: 1"=100'

53V-013

"L" LINE



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Tony Simpson 11-18-2020
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63243PE
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OREGON
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LAKE OF THE WOODS HIGHWAY
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PROFILE SHEET NO. C02C

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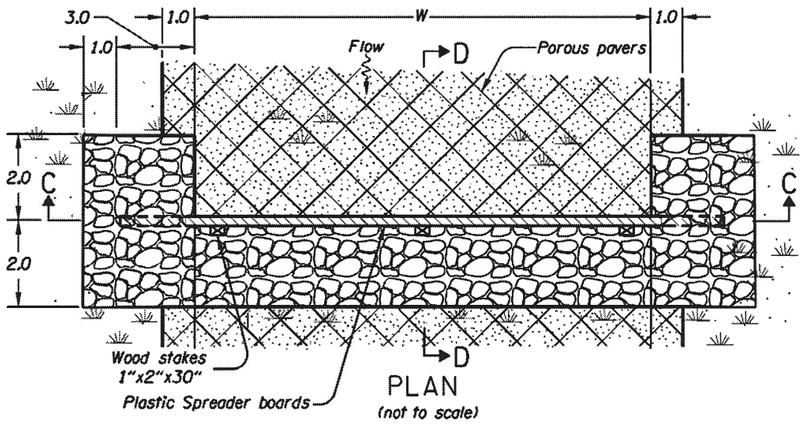
WATER QUALITY SWALE DETAILS

53V-013



PLAN
(not to scale)

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Terry Simpson 11-18-2020
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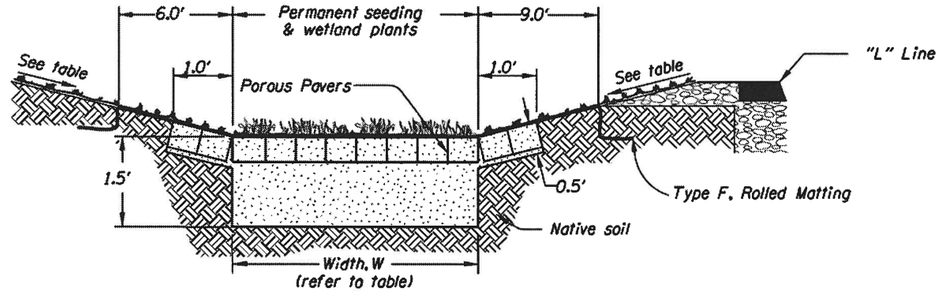

TYPICAL SECTION
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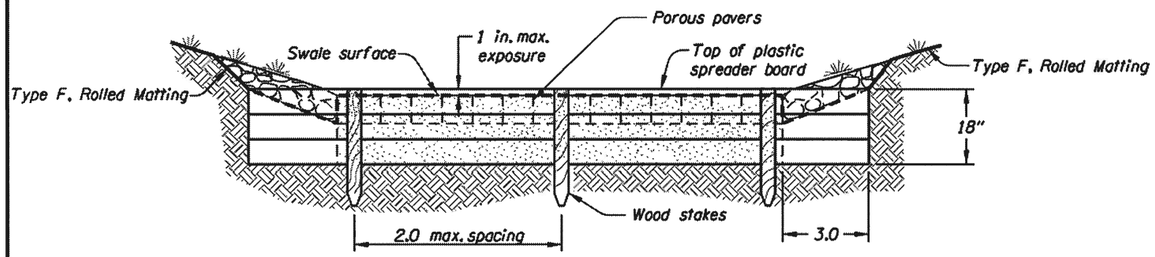
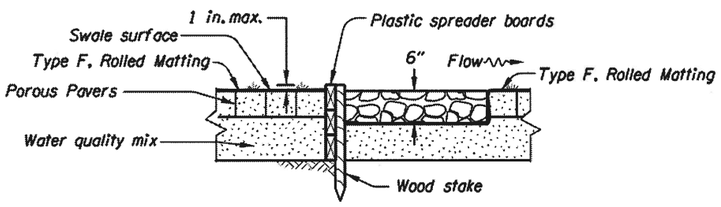


SECTION C-C
(not to scale)

BIOFILTRATION SWALE DATA							
Facility Name	Plan Sheet & Note #	STA. To STA.	W (ft.)	Longitudinal Slope (ft./ft.)	Side Slope Left (V:H)	Side Slope Right (V:H)	DFI
Water Quality Swale	C01D	"L" STA 20+16.0 TO "L" STA 21+21.0	10	.005	1:4	1:6	D01239



SECTION D-D
(not to scale)

PLASTIC BOARD FLOW SPREADER DETAIL

WETLAND PLANT PLUGS				
Scientific Name	Common Name	Type	Spacing	Quantity (Swale A)
Carex Densa	Dense Sedge	Plugs	1 per 2 sq. ft.	525
Eleocharis Palustris	Common Spikerush	Plugs	1 per 2 sq. ft.	525
Juncus Tenuis	Poverty Rush	Plugs	1 per 2 sq. ft.	525
Mimulus Guttatus	Seep Monkeyflower	Plugs	1 per 2 sq. ft.	525

NOTES:
1. Construct spreader boards level.
2. Extend spreader boards a minimum of 3 feet into side slopes.
3. Reinforce side slopes at flow spreader locally with 1½"-¾" granular drain backfill material..
4. Fasten wood stakes to spreader boards with 2½" galvanized wood screws every 2" (minimum).
5. Place plastic board flow spreader at beginning and end of swale and every 50 feet throughout length of biofiltration swale.
6. Install matting according to RD1055 channel application. Omit check slots.
7. Install Type S2 markers at beginning and end of biofiltration swale. See sheet HA02 for details.

1½"-¾" Granular Drain Backfill Material

Water quality mix (and swale excavation pay limit)

Note: All dimensions are in feet unless otherwise noted.

REGISTERED PROFESSIONAL ENGINEER
60211PE
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RICHARD C. CARSON
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OREGON DEPARTMENT OF TRANSPORTATION

OR 140: ATLANTIC AVE. INTERSECTION IMPROVEMENTS PROJECT

LAKE OF THE WOODS HIGHWAY
JACKSON COUNTY

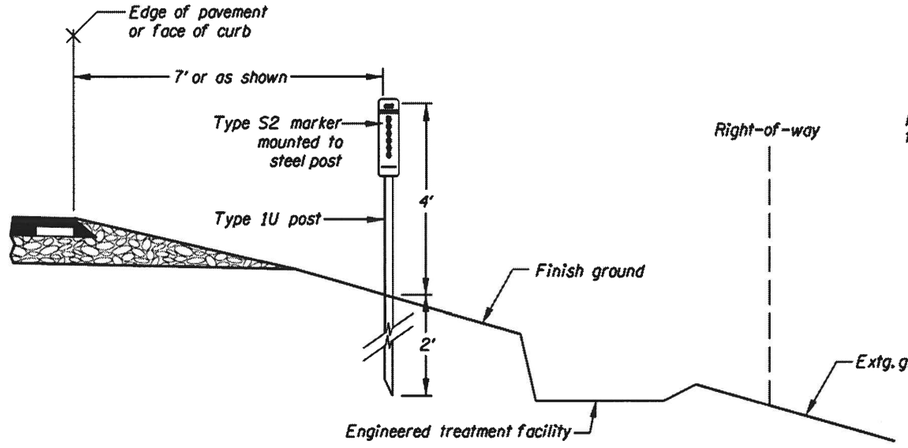
Designer: Richard Carson | Reviewer: DeLanie Cutsforth
Drafter: Richard Carson | Checker: DeLanie Cutsforth

STORMWATER DETAIL

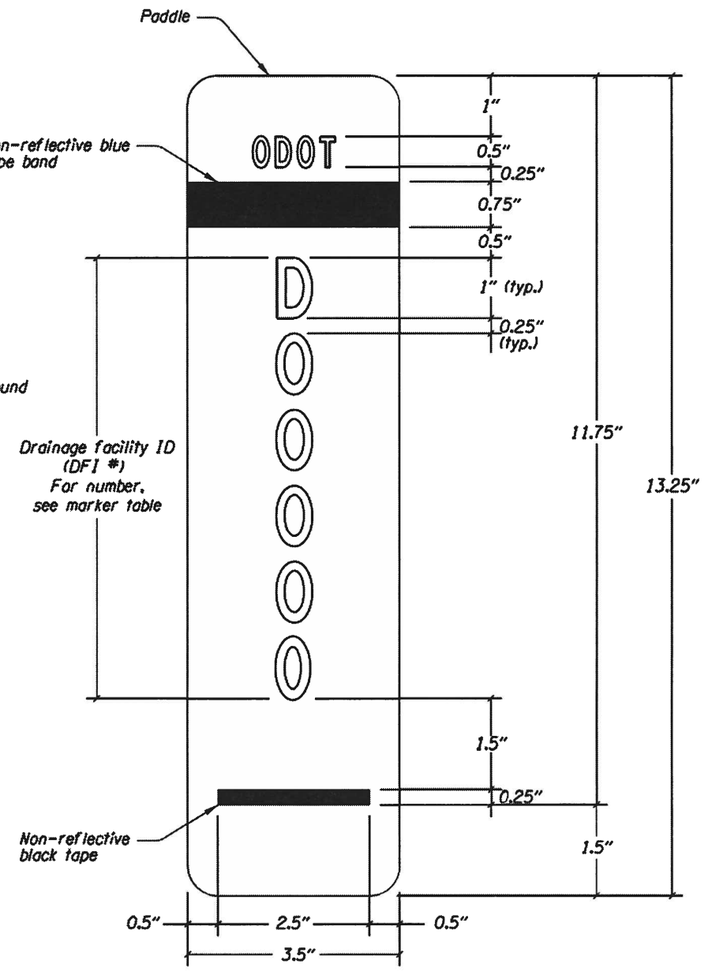
SHEET NO. HA01

53V-013

STORMWATER DRAINAGE FACILITY IDENTIFICATION



SECTION A-A



TYPE S2 MARKER

MARKER TABLE

FACILITY LOCATION	DF1 #	TYPE S2 MARKER	
STATION		START	END
Sta. "L" 20+16.0	D01239		✓
Sta. "L" 21+21.0	D01239	✓	

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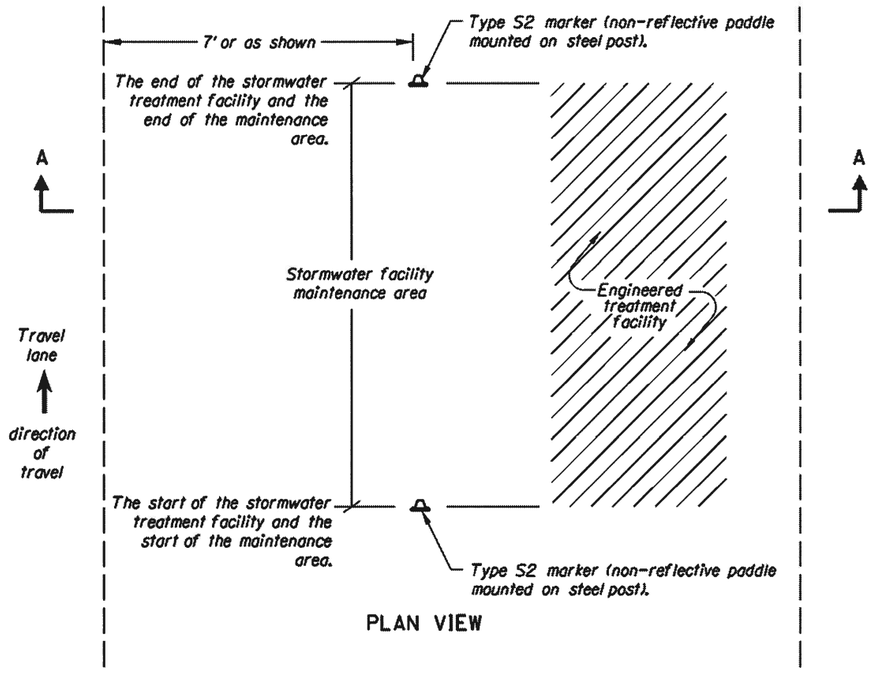
PROJECT INSPECTOR DATE



PLAN VIEW

INSTALLATION DETAIL

REGISTERED PROFESSIONAL ENGINEER
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OREGON
JAN. 04, 2010
RICHARD C. CARSON
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JACKSON COUNTY

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STORMWATER DETAIL — SHEET NO. HA02