OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: May 2018

DFI No. D00215

Figure 1: DFI No. D00215, looking West.

Identification

Drainage Facility ID (DFI):	D00215
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 41V-002
Location:	District: 2B
	Highway No.: 001
	Mile Post: 306.23 to 306.27, RT

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: Southeast

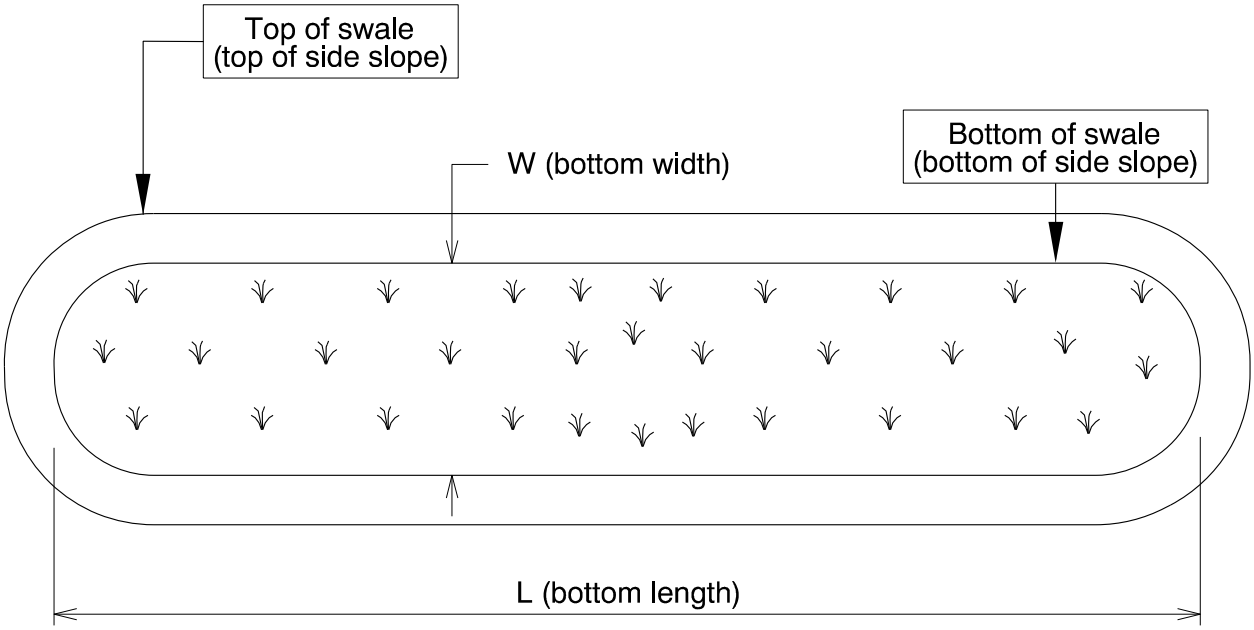
Figure 2: Facility location map

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:

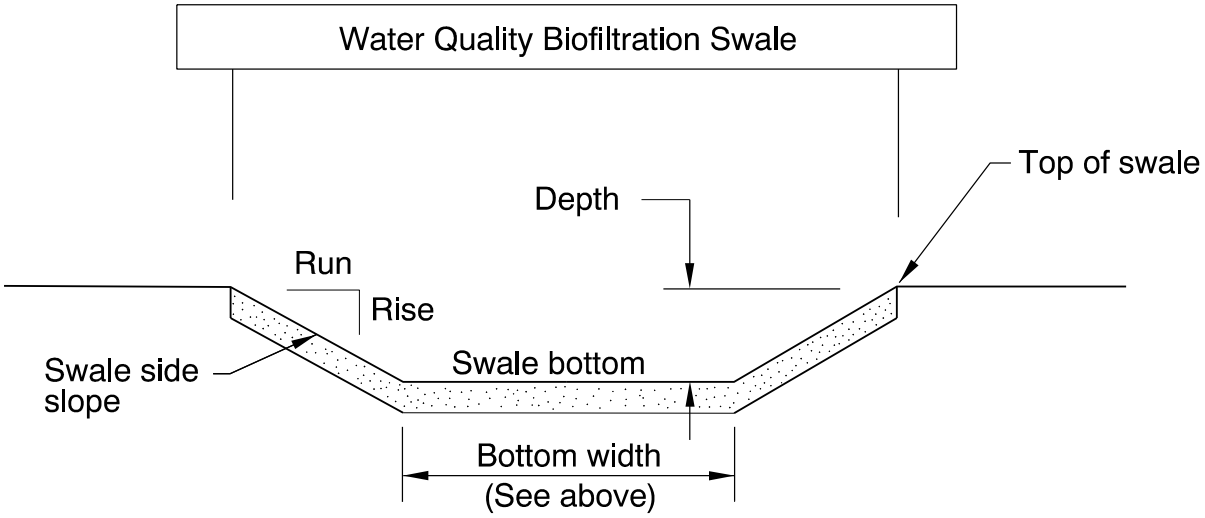
Bottom Length (feet)	Bottom Width (feet)
275	24



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)
3	1	4



Site Specific Information: Facility is located on the right shoulder of the I-5 (Hwy 001) Columbia Blvd. southbound on-ramp.

4. Facility Access

Maintenance access to the facility:

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

Figure 3: Maintenance Access Road entrance, facing Columbia Blvd. Southbound on-ramp.

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
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:	☐	**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 light 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

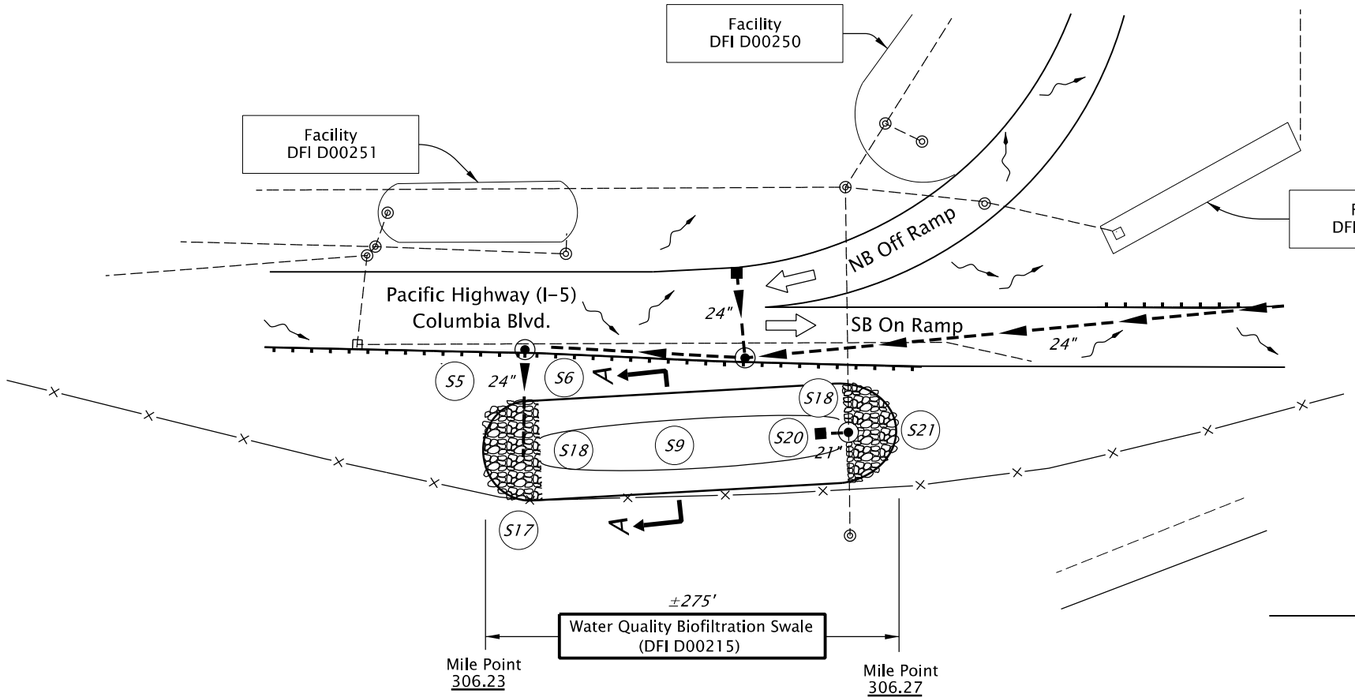
Contact any of the following for more detailed information about management of waste materials found on site:

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

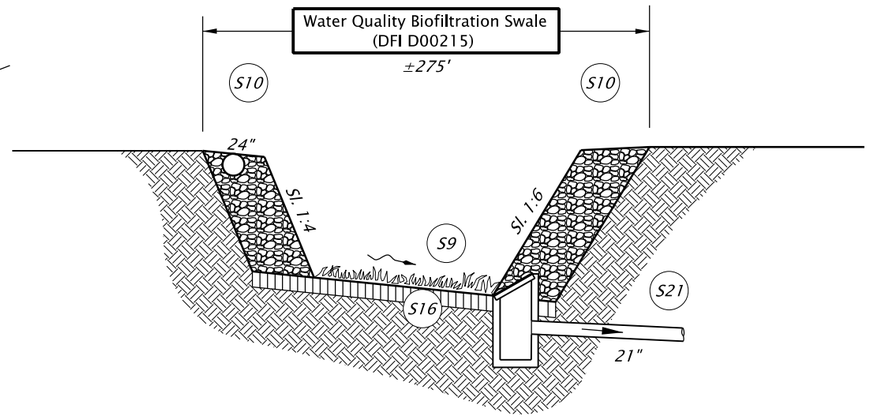
A Appendix A – Site Specific Operational Plan

Contents:

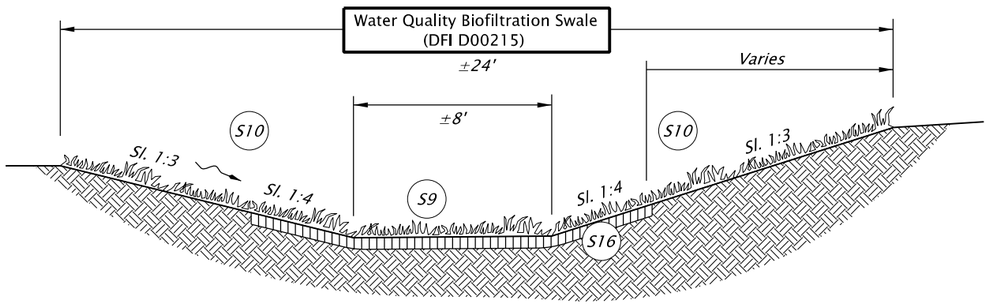
Operational Plan: DFI D00215



PLAN
N.T.S.



PROFILE
N.T.S.



SECTION A–A
N.T.S.

LEGEND:

S#	*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

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Jenn Mora

Drafted By: Jenn Mora

DFI D00215
MAINTENANCE DISTRICT 2B HWY 001
WATER QUALITY BIOFILTRATION SWALE
HIGHWAY MP 306.23 - 306.27
MULTNOMAH COUNTY

DFI_D00215.dgn

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 41v-002

41V-002

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A, 1A-2	Index Of Sheets Cont'd.
1B	Std. Drg. Nos.
1C	Sheet Layout
1D	Survey Control Network
1E	Survey Control Chart

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

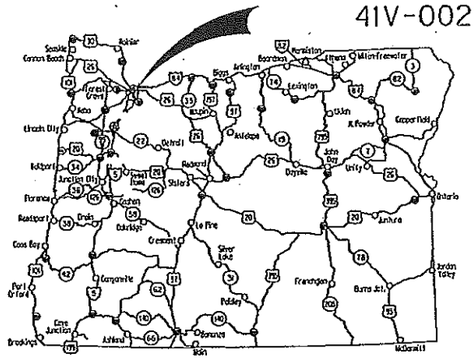
GRADING, DRAINAGE, STRUCTURES, PAVING, SIGNING, ILLUMINATION, SIGNALS & ROADSIDE DEVELOPMENT

I-5: VICTORY BLVD. TO LOMBARD ST. SECTION

PACIFIC HIGHWAY

MULTNOMAH COUNTY

JANUARY 2008



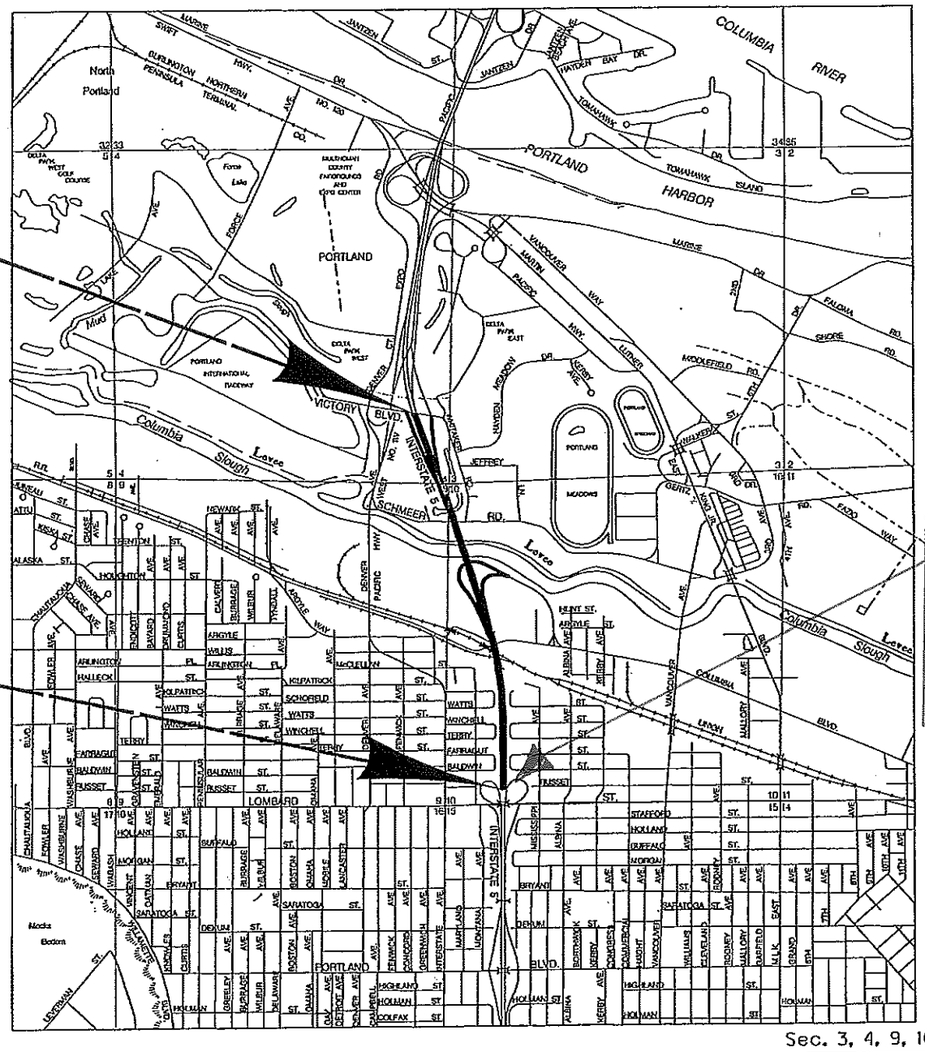
Overall Length Of Project - 1.22 Miles

"AS CONSTRUCTED"

Date 11/26/14 Project Mngr

BEGINNING OF PROJECT
IM-STP-S001(258)
STA. "L2" 129+93.4 (M.P. 306.70)

END OF PROJECT
IM-STP-S001(258)
STA. "L2" 193+92.8 (M.P. 305.48)



Additional Work was done in each of the Lombard loops. This included burial of soil that was contaminated.

OTIA
OREGON TRANSPORTATION INVESTMENT ACT

Sec. 3, 4, 9, 10, T. 1 N., R. 1 E., W.M.

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.)

SAFETY FIRST
LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

OREGON TRANSPORTATION COMMISSION

Stuart Foster	CHAIRMAN
Gail L. Achterman	COMMISSIONER
Mike Nelson	COMMISSIONER
Randall Pape'	COMMISSIONER
Janice J. Wilson	COMMISSIONER
Matthew L. Garrett	DIRECTOR OF TRANSPORTATION

PLANS PREPARED FOR
OREGON DEPARTMENT OF TRANSPORTATION
BY:
DAVID EVANS AND ASSOCIATES INC.

REGISTERED PROFESSIONAL ENGINEER
14947PE
OREGON
July 25, 1990
WILLIAM J. EVANS

EXPIRES 12-31-07

OREGON DEPARTMENT OF TRANSPORTATION CONCURRENCE

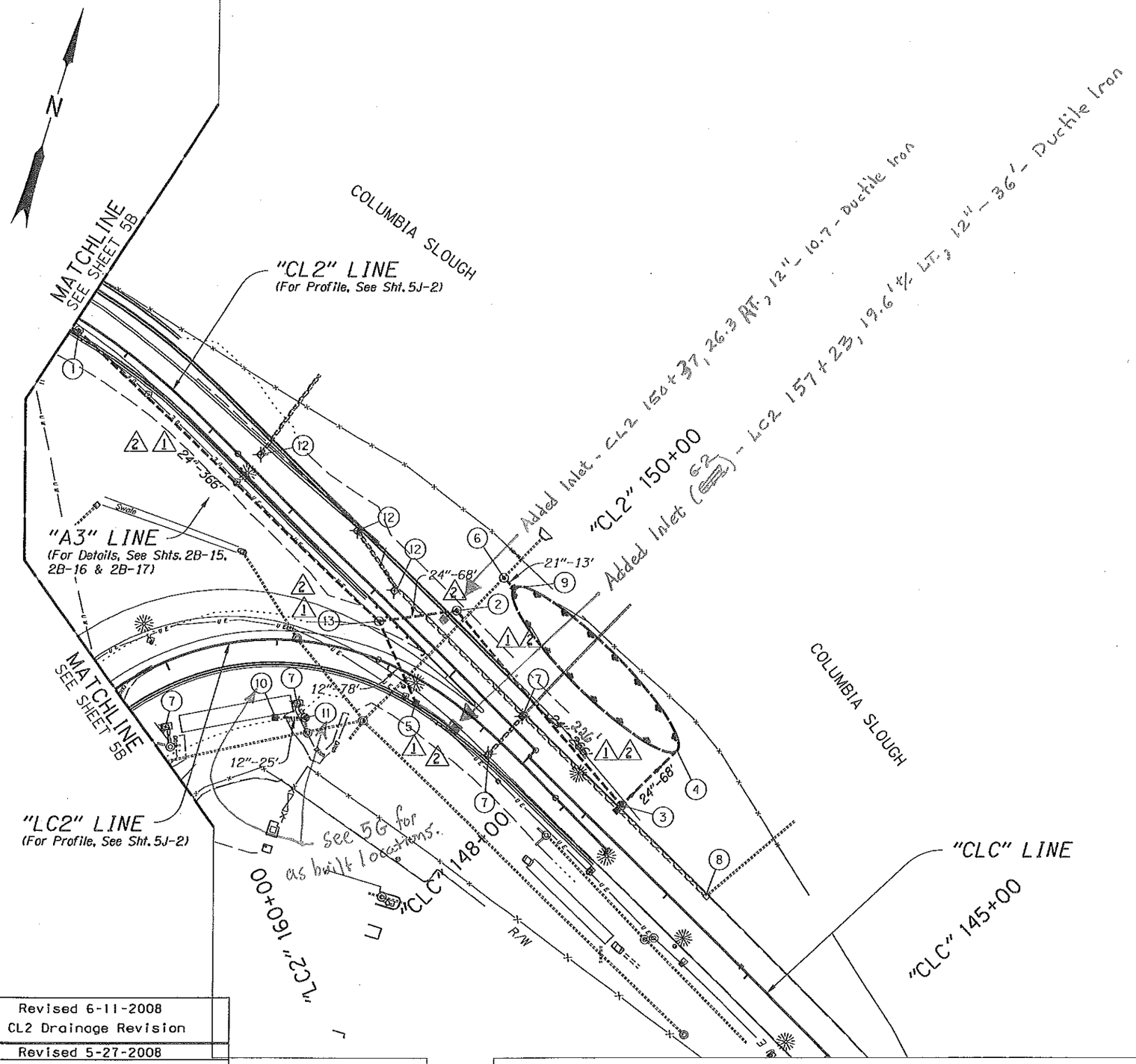
TECHNICAL SERVICES MANAGING ENGINEER — DATE 12-07

I-5: VICTORY BLVD. TO LOMBARD ST. SECTION
PACIFIC HIGHWAY
MULTNOMAH COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	IM-STP-S001(258)	1

P:\O\ODOT00000557\0400CAD\RH\DGN\Sheet\12076.TSI 11/8/2007 8:50:27 AM mjy

Sec. 10, T. 1 N, R. 1 E, W.M.



"AS CONSTRUCTED"

Date 11/26/14 Project Mngr

Remove or Abandon Pipe Shown Thus: ~~~~~

2	Revised 6-11-2008 CL2 Drainage Revision
1	Revised 5-27-2008 CL2 Drainage Revision

REVISED DRAINAGE PLAN
DRAINAGE AND UTILITIES

5F

THIS IS THE FILENAME LOCATION ********** PP MM YYYY HH MM USERNAME

(1) Sta. "CL2" 154+45, Lt.
Const. Manhole with Type "G-2" Inlet
Inst. 24" Storm Sew. Pipe - 145'
10' Depth
Const. Subsurface Drain Pipe - 477'
Const. Subsurface Drain Outlet

A 60" M.H. was constructed here

2 1 (2) Sta. "CL2" 150+37.37'
Const. Manhole
Inst. 24" Storm Sew. Pipe - 68'
20' Depth

Inlet at CL2 150+37, 26.3 LT.
12" Ductile Iron - 10.7'

3 2 1 (3) Sta. "CL2" 148+12. = LC2 155+64, 32.7 Rt.
Const. (60" Dia.) Manhole with Type "G-2" Inlet
Inst. 24" Storm Sew. Pipe - 226'
20' Depth
(See Drg. No. RD346)

(4) Sta. "LC2" 155+63, 102' Rt.
Const. Water Quality Swale #1
Inst. 24" Storm Sew. Pipe - 68'
20' Depth
(See Drg. No. RD1055)
(For Details, See Sht. GJ-2 and GJ-3)

3 2 1 (5) Sta. "CL2" 150+04.45' Lt. = "LC2" 157+61.20' Lt.
Const. Type "G-2" Inlet
Const. Subsurface Drain Pipe - 92'
Const. Subsurface Drain Outlet

ADDED G-2 Inlet @ LC2 157+23 (see SF)

(6) Sta. "CL2" 150+25.87' Rt.
Const. Large Precast Manhole (84" Dia.) Over Extg. 54" CMP
Inst. 21" Storm Sew. Pipe - 13'
10' Depth

(7) Abandon Inlet - 4

(8) Protect Extg. Inlet

(9) Sta. "CL2" 150+12.87' Rt.
Const. Type "M-E" Inlet

(10) Sta. "LC2" ~~159+00.70'~~ Lt. 158+98.41, 75.24' LT
Const. Type ~~"B" Inlet~~ G2 - MA
(See Drg. No. RD370)

(11) Sta. "LC2" ~~158+80.70' Lt.~~ 158+64.24, 68.35' LT
Connect to Extg. Manhole
Inst. 12" Storm Sew. Pipe - 25'
5' Depth

(12) Remove Inlet - 3

2 (13) Sta. "CL2" 150+78, 17.3' Lt.
Const. Manhole
Inst. 12" Storm Sew. Pipe - 78'
5' Depth
Inst. 24" Storm Sew. Pipe - 366'
20' Depth

"AS CONSTRUCTED"
Date 11/26/14 Project Mngr

TROUTDALE CONSTRUCTION OFFICE Revised 6-20-2008 3 LC2 Station correction
TROUTDALE CONSTRUCTION OFFICE Revised 6-11-2008 2 CL2 Drainage Revision
Revised 5-27-2008 1 CL2 Drainage Revision

REVISED DRAINAGE NOTES

DRAINAGE AND UTILITIES NOTES

5G

THIS IS THE FILENAME LOCATION ********** DD-MMM-YYYY HH:MM USERNAME

Revised 5-27-2008
1 CL2 Drainage Revision

Revised 6-11-2008
2 CL2 Drainage Revision

Revised 6-20-2008
3 CL2 Drainage Revision

"CL2" Line

See also Sheet 5F
added pipe 31.36 (12" in S.)

+37 M.H.F.L. { 25.50 (24" In N.W.) / 25.46 (24" Out S.E.) } 60" M.H.

12'-78' 2.6%

Inlet F.L. 32.00 +04.00

78.00 M.H.F.L. { 30.00 (12" In S.E.) / 25.71 (24" In W.) / 25.67 (24" Out N.E.) }

Note: See Sht. 5G (5)

22"

Subgrade

Note: See Sht. 5G (13)

Inlet F.L. 22.50 +12.00

Note: See Sht. 5G (2)

24"-366' 0.25%

Note: See Sht. 5G (9)

24"-68' 0.25%

21"-13' 2.00%

Note: See Sht. 5G (6)

+25 M.H.F.L. { 14.3 (54" In S.W.) / 22.24 (21" In S.E.) / 14.3 (54" Out N.E.) }

150+00

Note: See Sht. 5G (1)

27.08 (24" In W.) / 27.03 (24" Out E.) +00.00

26.67 (24" In W.) / 26.62 (24" Out S.E.) +47.00 M.H.F.L.

Profile Grade @ ℄

24"-145' 0.25%

24"-25' 0.31%

155+00

27.21 (24" In W.) / 27.16 (24" Out E.) +25.00

Ground Line @ ℄

+50.00 { 27.34 (24" In S.W.) / 27.29 (24" Out E.) / 27.30 (6" In N.W.) }

Inlet Rim Elev. 45.01

24"-80' .25%

5"-63' 5.6%

28.29 (15" In S.) / 27.54 (24" Out N.E.) / 29.90 (12" In S.E.) +40.00 MH.FL.

Rim 49.00 ± / 41.40 (15" In E.) / 45.00 (12" In S.W.) / 41.10 (15" Out N.) / 41.50 (12" In N.W.) +18.00 MH.FL.

Subgrade

12"-130' 3.00%

Ground Line @ ℄

15"-52' 32.88%

12"-72' 1.00%

+50.00 { Inlet F.L. 42.22

15"-240' 5.34%

233.9
5.48%

160+00

"LC2" Line

F.L. 51.0
Inlet F.L. 52.40 +60.00

Profile Grade @ ℄

12"-100' 1.00%

+64.00 M.H. F.L. { 25.00 (24" In N.W.) / 24.95 (24" Out N.E.) }
25.00

+61.0 { Inlet F.L. 32.0

Note: See Sht. 5G (3)

Subgrade

2' Water Pipe at 160+50.00 Depth 40.12'

Ground Line @ ℄

For Structure Information See Sheet 5H-2

pipe lowered by 1.4', 50.0 In

22"

22"

+23.0 Added G2 inlet F.L. 32.35

Note: See Sht. 5G (4)

Note: See Sht. 5G (2)

See ⑤ (CL2 150+04) in above profile

"LC2" 155+64 = "CL2" 148+12.00
Beginning of Swale F.L. 24.78

24"-68' 0.25%

24"-226' 0.25%

155+00

160+00

Note:
See Sht. 5C & 5G For Drainage And Utilities Notes.

+64.00 { 17.00 (18" In W.) Extg. / 17.00 (18" Out S.) Extg. / 17.20 (12" In W.)
+80.00 Extg. M.H.F.L.

Note: See Sht. 5G (10)

+00.00 { Inlet F.L. 17.40

G2MA @ 158+98

12"-25' 1.00%

"LC2" Line

158+00 159+00 160+00

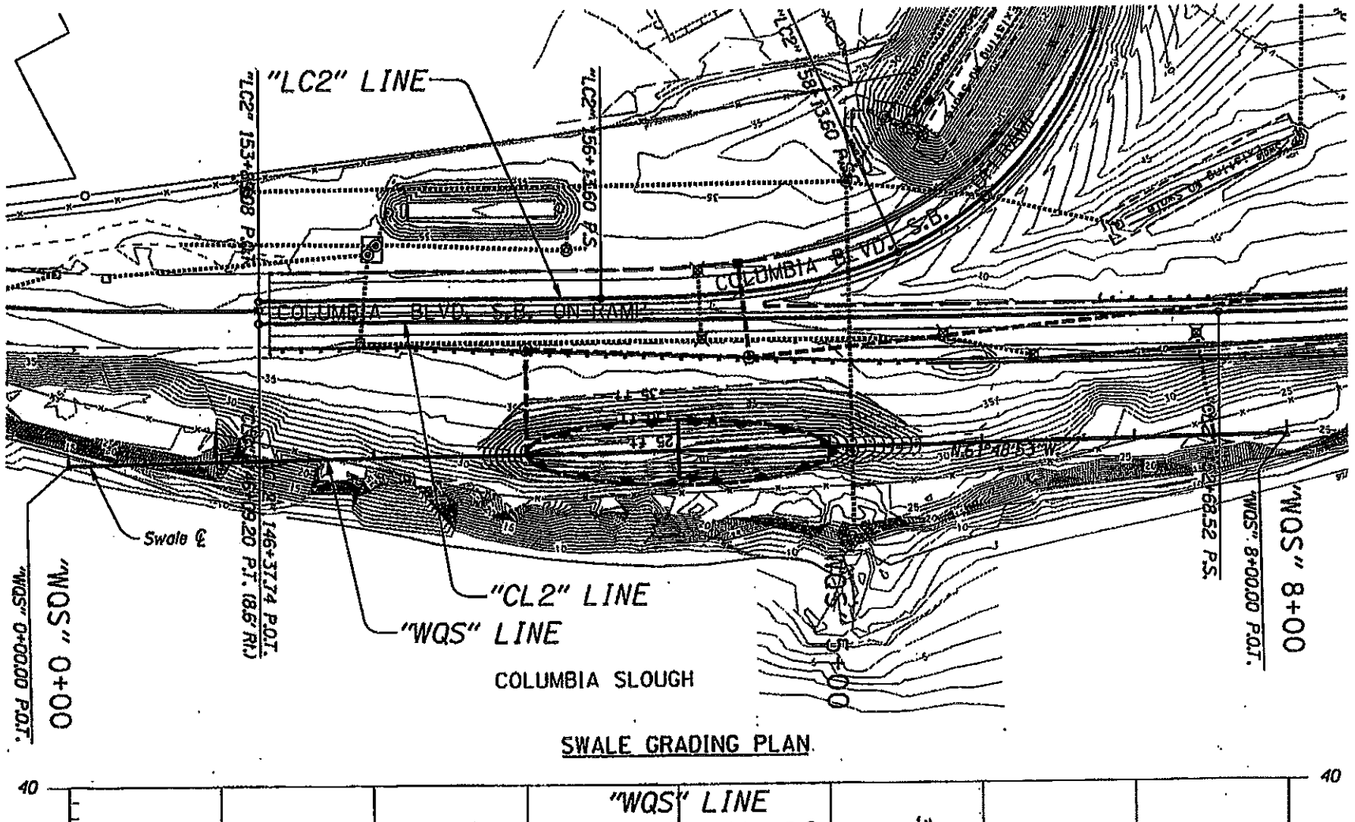
165+00

"AS CONSTRUCTED"
NOV 26 2014
MARK BEESON, PROJECT MANAGER

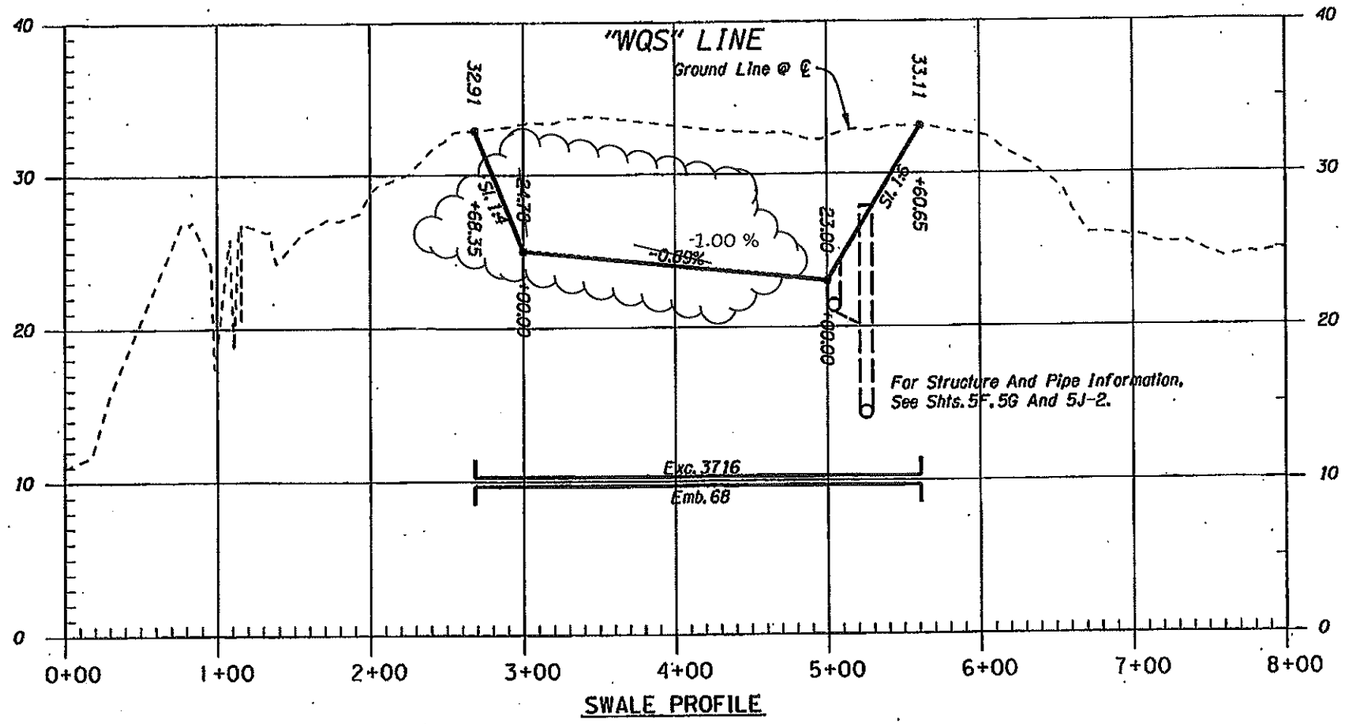
6/11/08 REVISED DRAINAGE PROFILE

5J-2

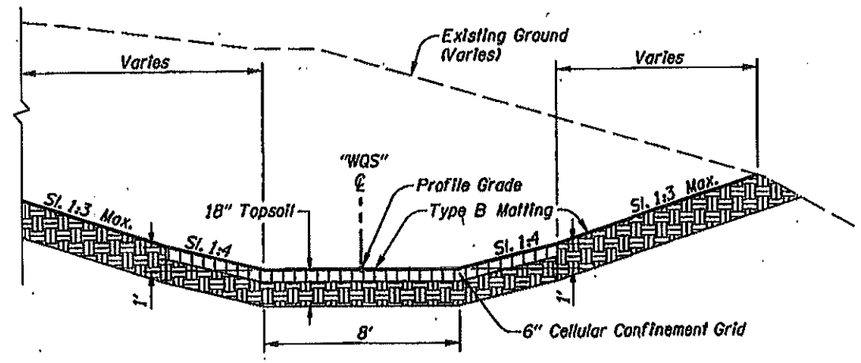
THIS IS THE FILENAME LOCATION ********** DD-MMM-YYYY HH:MM USERNAME



SWALE GRADING PLAN



SWALE PROFILE



Water Quality Swale
SECTION A-A (TYPICAL)

"AS CONSTRUCTED"
NOV 26 2014
MARK BEESON, PROJECT MANAGER

REGISTERED PROFESSIONAL ENGINEER
7740
OREGON
July 13, 1973
DANIEL T. MILLER
EXPIRES 12-31-08

OREGON DEPARTMENT OF TRANSPORTATION

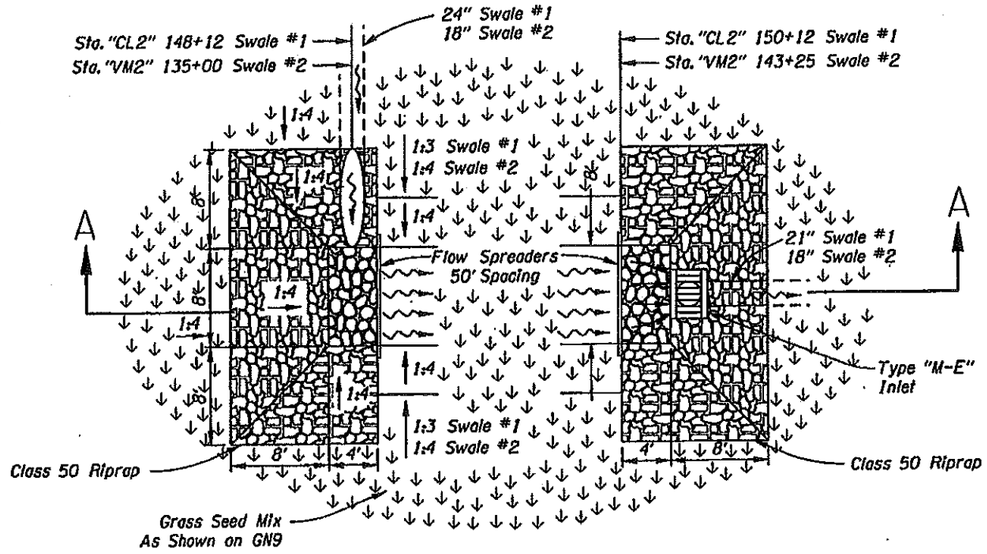
DAVID EVANS AND ASSOCIATES, INC.
2100 Southwest River Parkway
Portland Oregon 97201 Ph: 503.223.6663

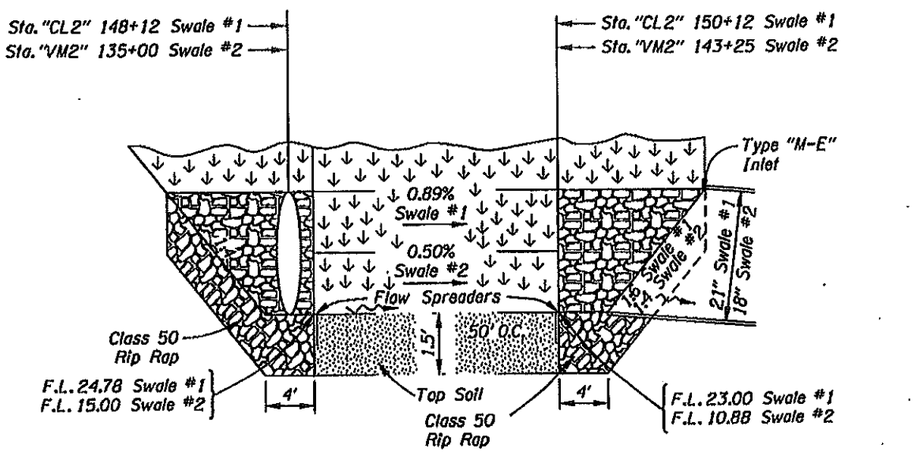
I-5: VICTORY BLVD. TO LOMBARD ST. SECTION
PACIFIC HIGHWAY
MULTNOMAH COUNTY

Reviewed By - Chris Higgins CPH
Designed By - Dan Miller
Drafted By - Mike Youngs

WATER QUALITY SWALE #1

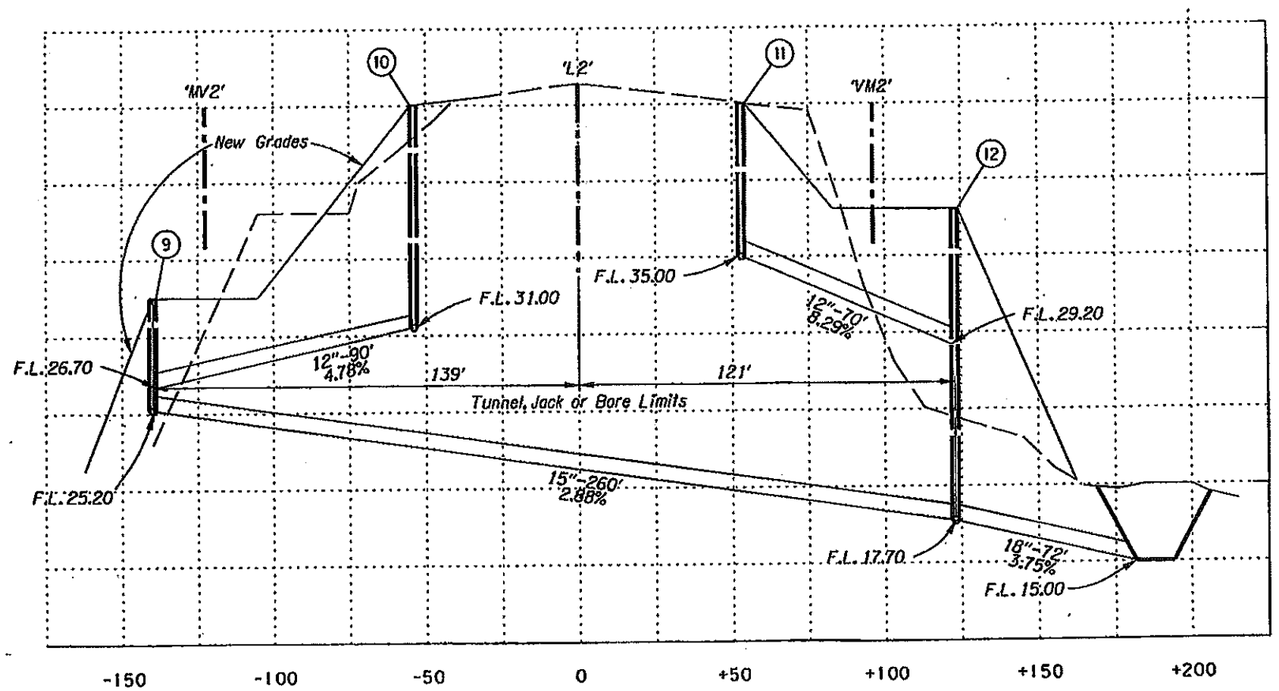
SHEET NO. GJ-2



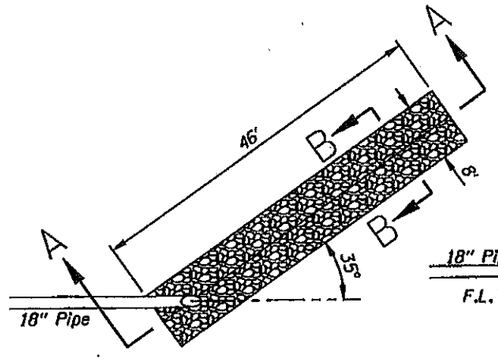


SECTION A-A

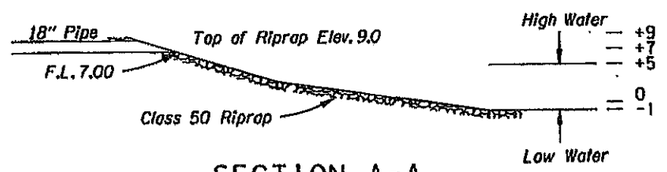
RIPRAP BASINS FOR UPSTREAM AND DOWNSTREAM END FOR SWALES 1 & 2



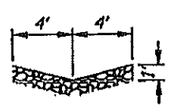
TUNNEL, JACK OR BORE AT STA. L2 135+00 (SHT. 3B)



LOOSE RIPRAP
SCALE: 1"=20'



SECTION A-A



SECTION B-B
SCALE: 1"=10'

"AS CONSTRUCTED"
NOV 26 2014
MARK BEESON, PROJECT MANAGER

REGISTERED PROFESSIONAL ENGINEER
7740
OREGON
July 13, 1973
DANIEL T. MILLER

EXPIRES 12-31-08

OREGON DEPARTMENT OF TRANSPORTATION

Ukiah Engineering, Inc.

I-5: VICTORY BLVD. TO LOMBARD ST. SECTION
PACIFIC HIGHWAY
MULTNOMAH COUNTY

Reviewed By - CHRIS STEINBRECHER
Designed By - DAN MILLER
Drafted By - STERLIN DRIGGS

DRAINAGE DETAILS

SHEET NO. GJ-3

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