OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: November 2017

DFI No. D00220

Figure 1: DFI No. D00220, looking north on S 6th Street

1. Identification

Drainage Facility ID (DFI):	D00220
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Numbers) 40V-9
Location:	District: 05
	Highway No.: 001
	Mile Post: 172.15 to 172.11, NB [right]

2. Manual Purpose

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

3. 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

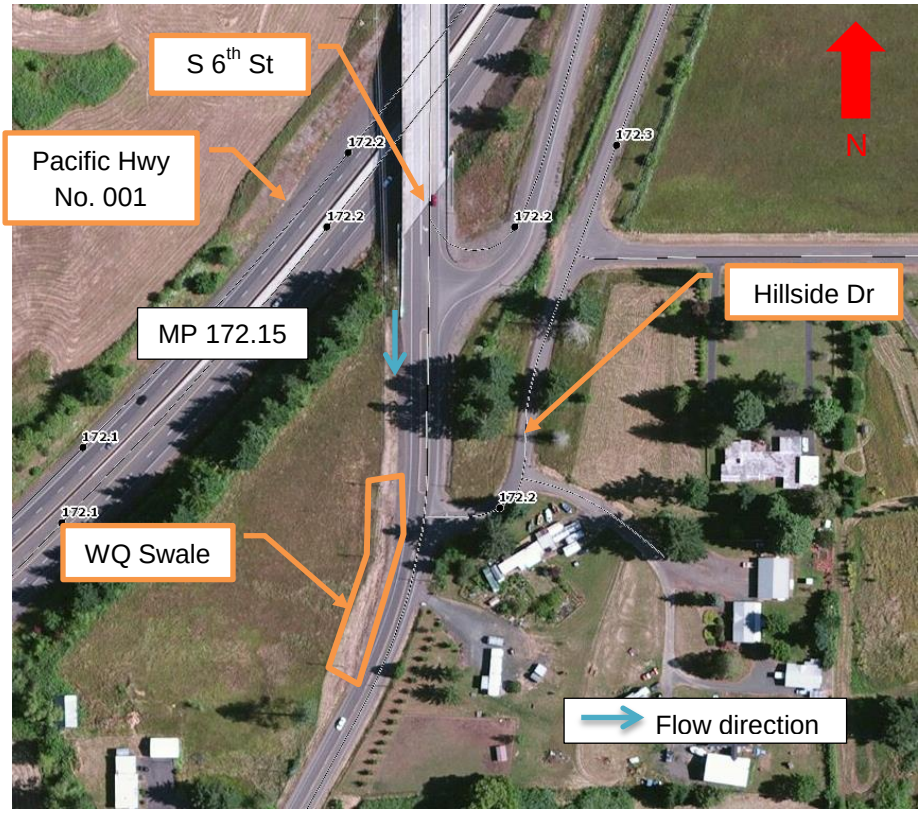


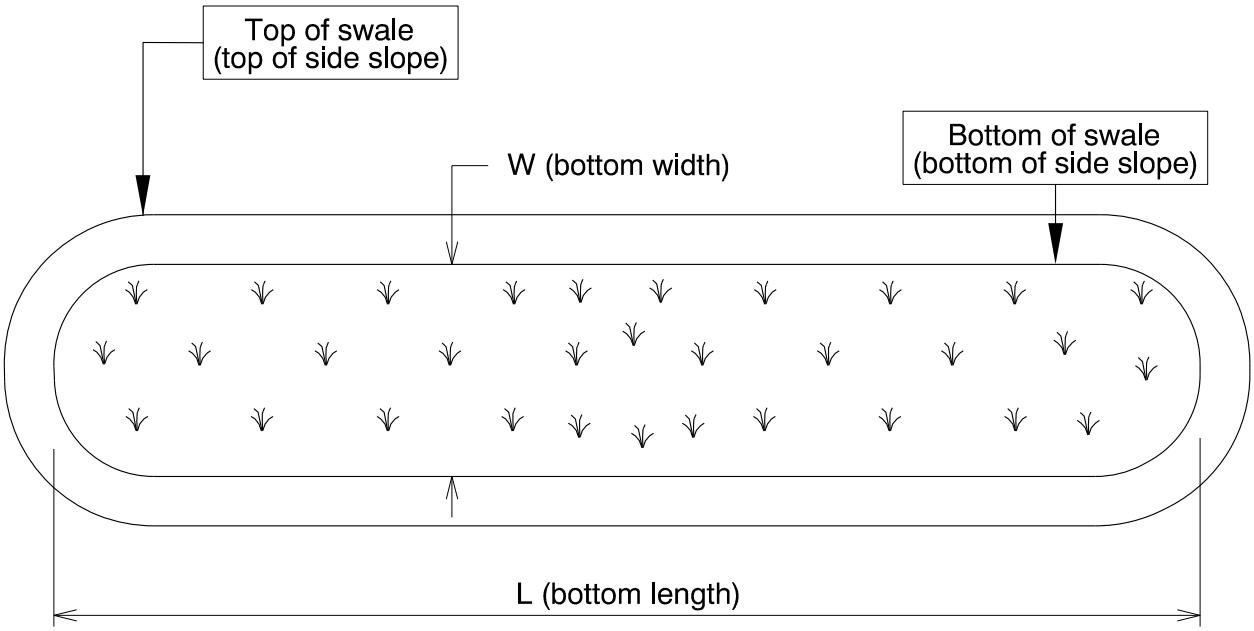
Figure 2: Facility location map

4. 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:

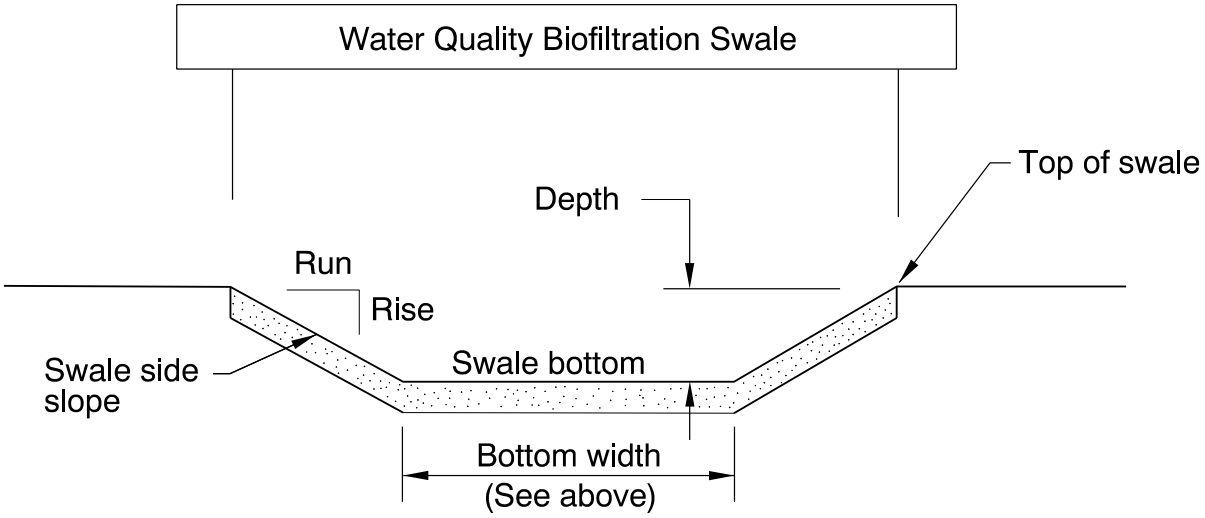
Bottom Length (feet)	Bottom Width (feet)
±203	±6



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

Depth and side slopes:

Depth (feet)	Rise (feet)	Run (feet)
1	1	4



Site Specific Information: The biofiltration swale is treating runoff from bridge number 20039.

5. Facility Access

Maintenance access to the facility:

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

Figure 3: Shoulder access on

6. 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 (Selected Topsoil)	☒	**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**

7. 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

8. 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.

9. 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

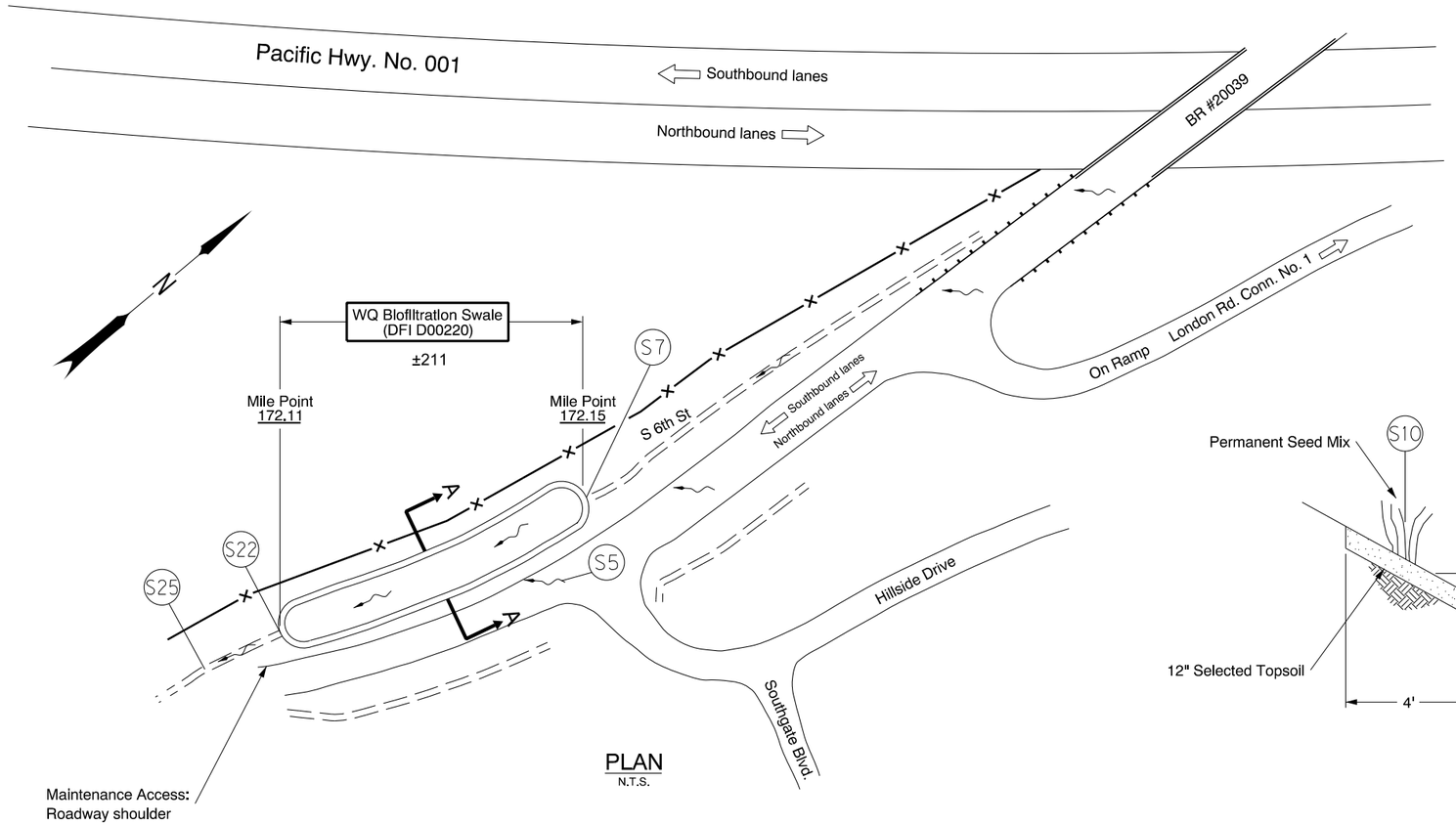
Contact any of the following for more detailed information about management of waste materials found on site:

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

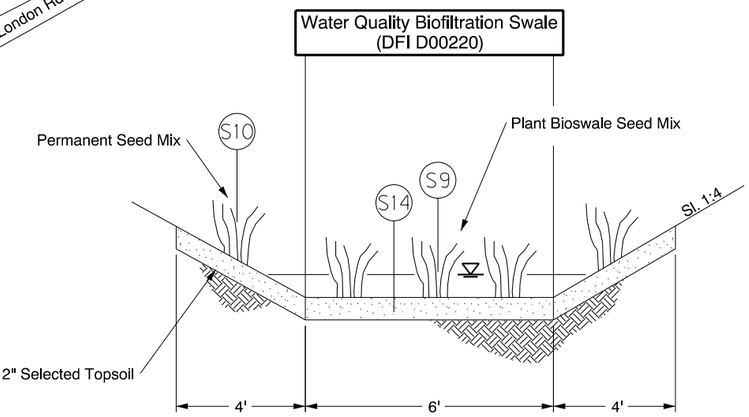
A Appendix A – Site Specific Operational Plan

Contents:

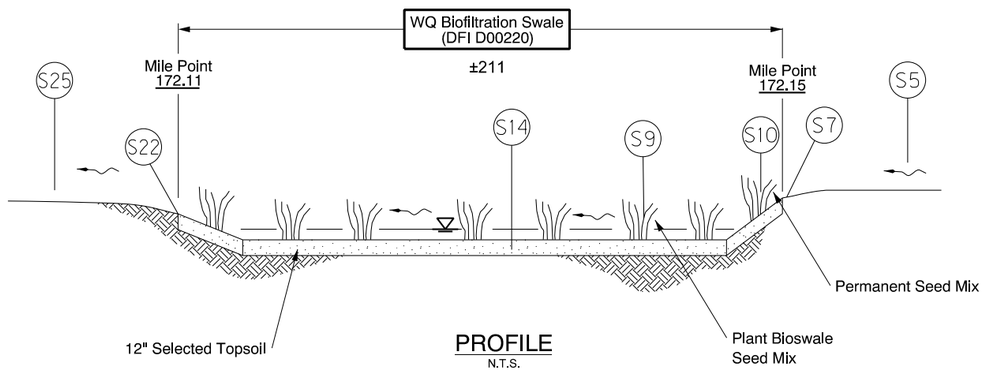
Operational Plan: DFI D00220



PLAN
N.T.S.



SECTION A-A
N.T.S.



PROFILE
N.T.S.

LEGEND

- Stormwater Flow Path
- Traffic Flow Direction
- Flow Depth
- (S#) Swale Component (Table 1)

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Chabeli Arreola

Drafted By: Chabeli Arreola

DFI D0220
MAINTENANCE DISTRICT 05 HWY 001
WATER QUALITY BIOFILTRATION SWALE
HIGHWAY MP 172.11-172.15
LANE COUNTY

DFI_D00220.dgn

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 40V-9

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

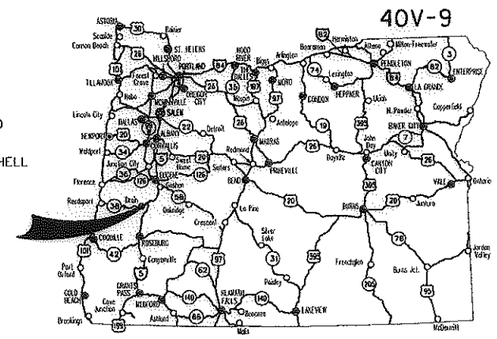
STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

GRADING, DRAINAGE, STRUCTURES, PAVING, AND SIGNING

REVISED AS CONSTRUCTED
1-10-09 CONTRACT 13384
PROJ. MGR. TIMOTHY C. SHELL



Overall Length Of Project - 2.36 Miles

I-5: WHITEAKER AVE - LONDON RD - BUNDLE A04

PACIFIC HIGHWAY

LANE COUNTY
JUNE 2007

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.)

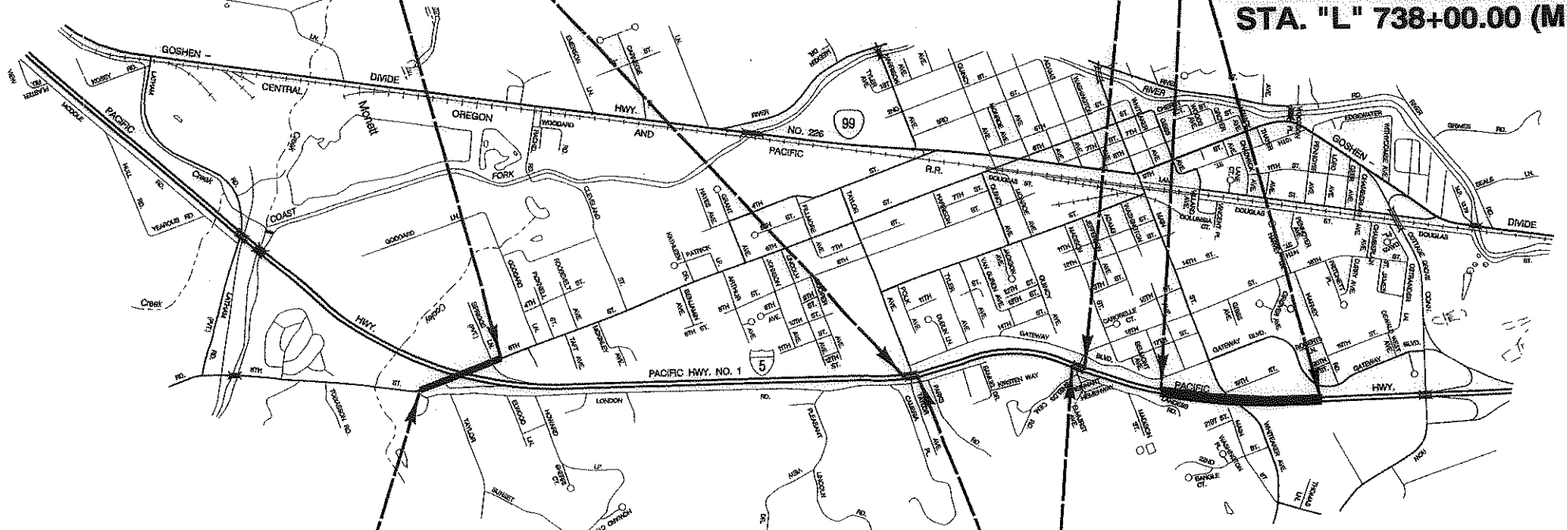
END OF PROJECT
STA. "LS" 794+11.20 (M.P. 173.40)

END OF PROJECT
STA. "LR" 57+75.00

END OF PROJECT
STA. "LS" 759+16.09 (M.P. 174.04)

BEGINNING OF PROJECT
STA. "LS" 769+68.00 (M.P. 173.84)

BEGINNING OF PROJECT
STA. "L" 738+00.00 (M.P. 174.44)



BEGINNING OF PROJECT
STA. "LR" 43+65.00

BEGINNING OF PROJECT
STA. "LS" 792+91.20 (M.P. 173.40)

END OF PROJECT
STA. "LS" 770+78.00 (M.P. 173.84)

OREGON TRANSPORTATION INVESTMENT ACT

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

T. 21 S., R. 3 W., W.M.

OREGON TRANSPORTATION COMMISSION

Stuart Foster	CHAIRMAN
Gail L. Achterman	COMMISSIONER
Mike Nelson	COMMISSIONER
Randall Pape	COMMISSIONER
John Russell	COMMISSIONER
Matthew L. Garrett	DIRECTOR OF TRANSPORTATION

PLANS PREPARED FOR
OREGON DEPARTMENT OF TRANSPORTATION
BY:
KPFF CONSULTING ENGINEERS

OREGON DEPARTMENT OF TRANSPORTATION
CONCURRENCE

TECHNICAL SERVICES MANAGING ENGINEER _____ DATE _____

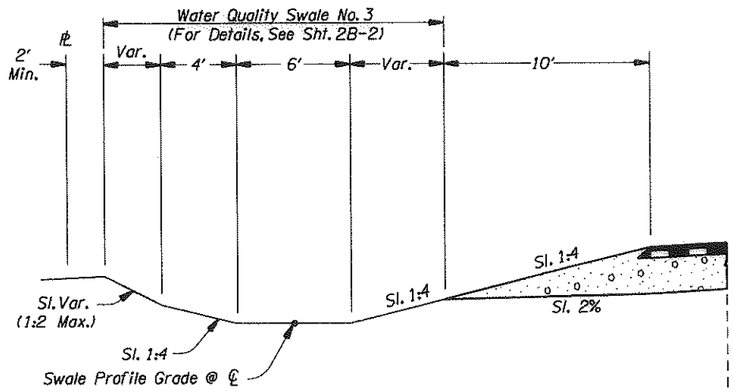
I-5: WHITEAKER AVE - LONDON RD - BUNDLE A04
PACIFIC HIGHWAY
LANE COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	X-IM-S001(226)	1

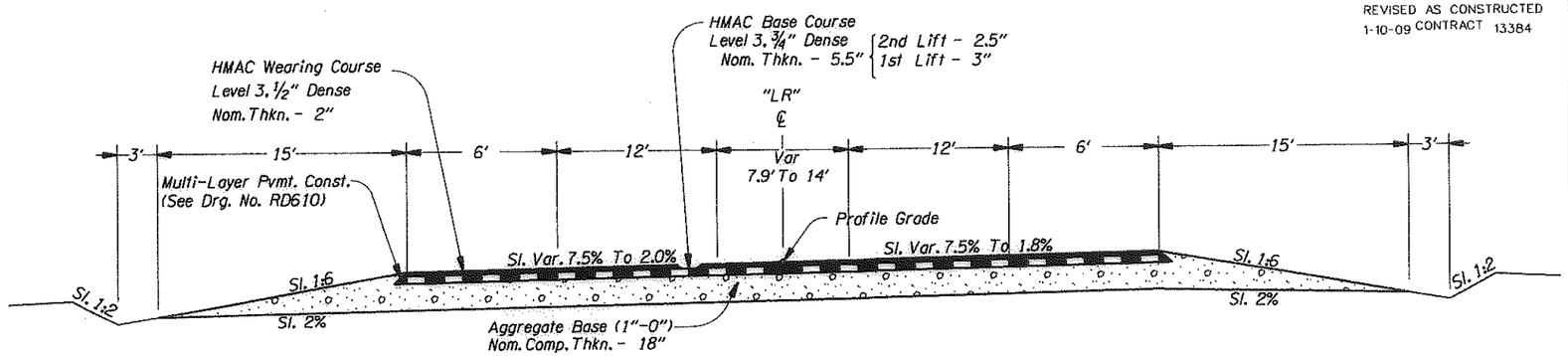
I:\c\p\2005\305085\DGN\AS-CONSTRUCTED\Plot\London Road\L135390T2.tsl :: Default 11/16/2009 2:03:14 PM jcadua

1:2400 - 1

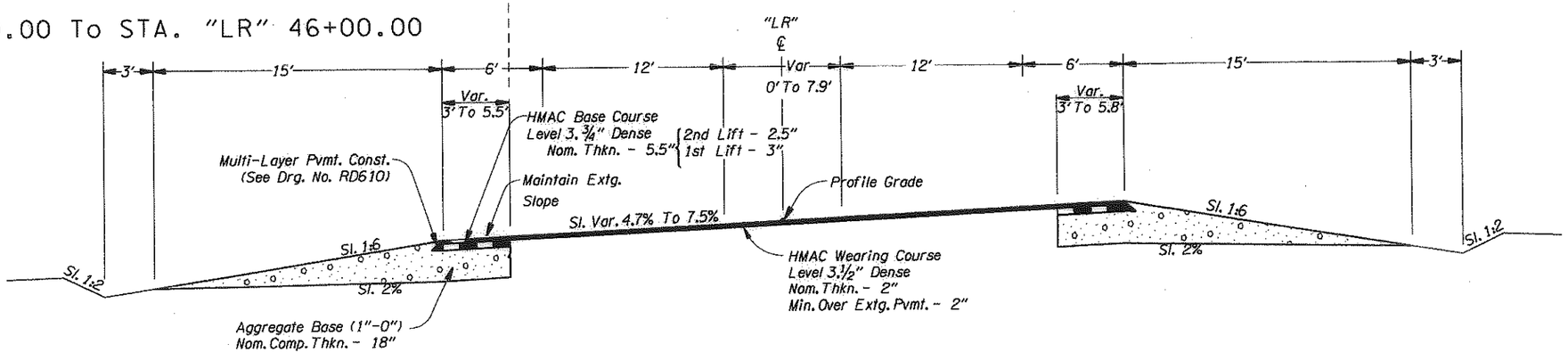
REVISED AS CONSTRUCTED
1-10-09 CONTRACT 13384



STA. "LR" 43+90.00 To STA. "LR" 46+00.00



STA. "LR" 46+10.00 To STA. 47+65.00



STA. "LR" 43+65.00 To STA. "LR" 46+10.00
*"LR" 45+75.00 To "LR" 46+10.00

NOTE:
1. Side-Slopes Are Shown As Vert. To Horiz.
2. For Superelevation Diagram, See Sht. 2B-6.

kpff
Consulting Engineers
111 S.W. Fifth Avenue
Suite 2500
Portland, OR 97204
FAX 503-227-7980

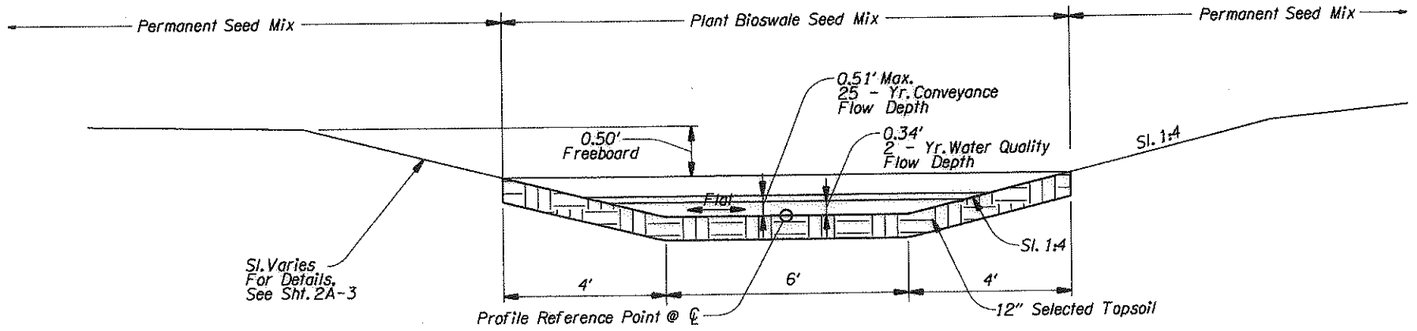
OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: WHITEAKER AVE - LONDON RD - BUNDLE A04
PACIFIC HIGHWAY
LANE COUNTY

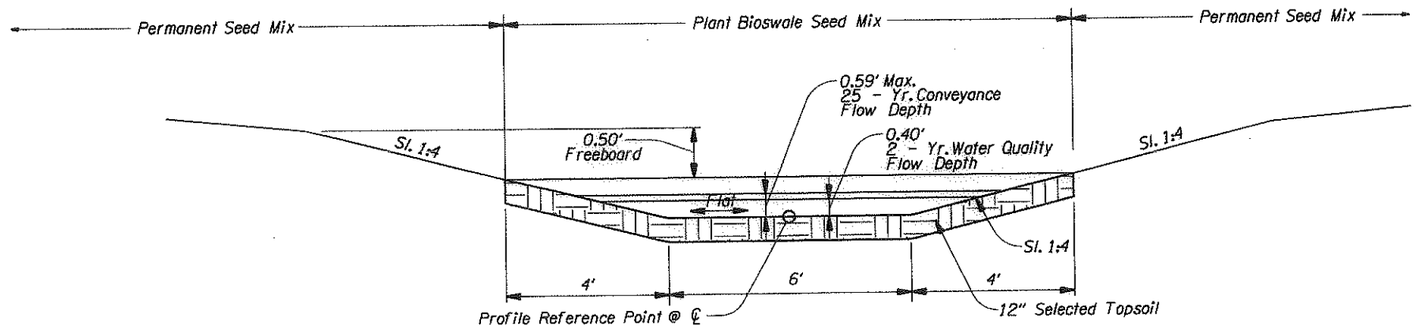
Design Team Leader - Tim Shell
Designed By - Fred Maddox / Brad Cooper
Drafted By - Ben Eneas / Ricco Cadua

TYPICAL SECTIONS

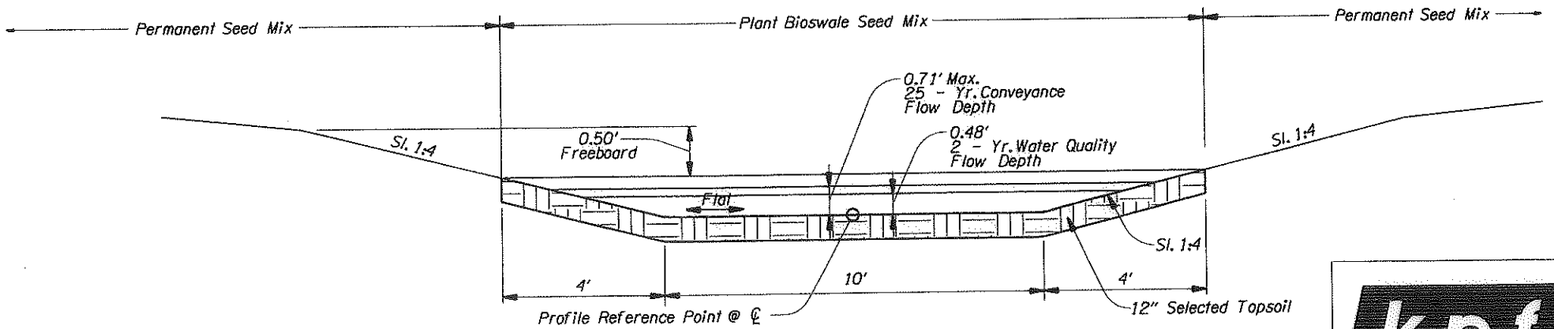
SHEET NO. 2A-3



WATER QUALITY SWALE NO.3



WATER QUALITY SWALE NO.4



WATER QUALITY SWALE NO.5

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FAX 503-227-7980

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: WHITEAKER AVE - LONDON RD -
BUNDLE A04
PACIFIC HIGHWAY
LANE COUNTY

Design Team Leader - Tim Shell
Designed By - Fred Maddox / Brad Cooper
Drafted By - Ben Eneas / Ricco Caduo

DETAILS

SHEET NO. 2B-2

Sec. 4, T. 21 S, R. 3 W, W.M.

40V-9

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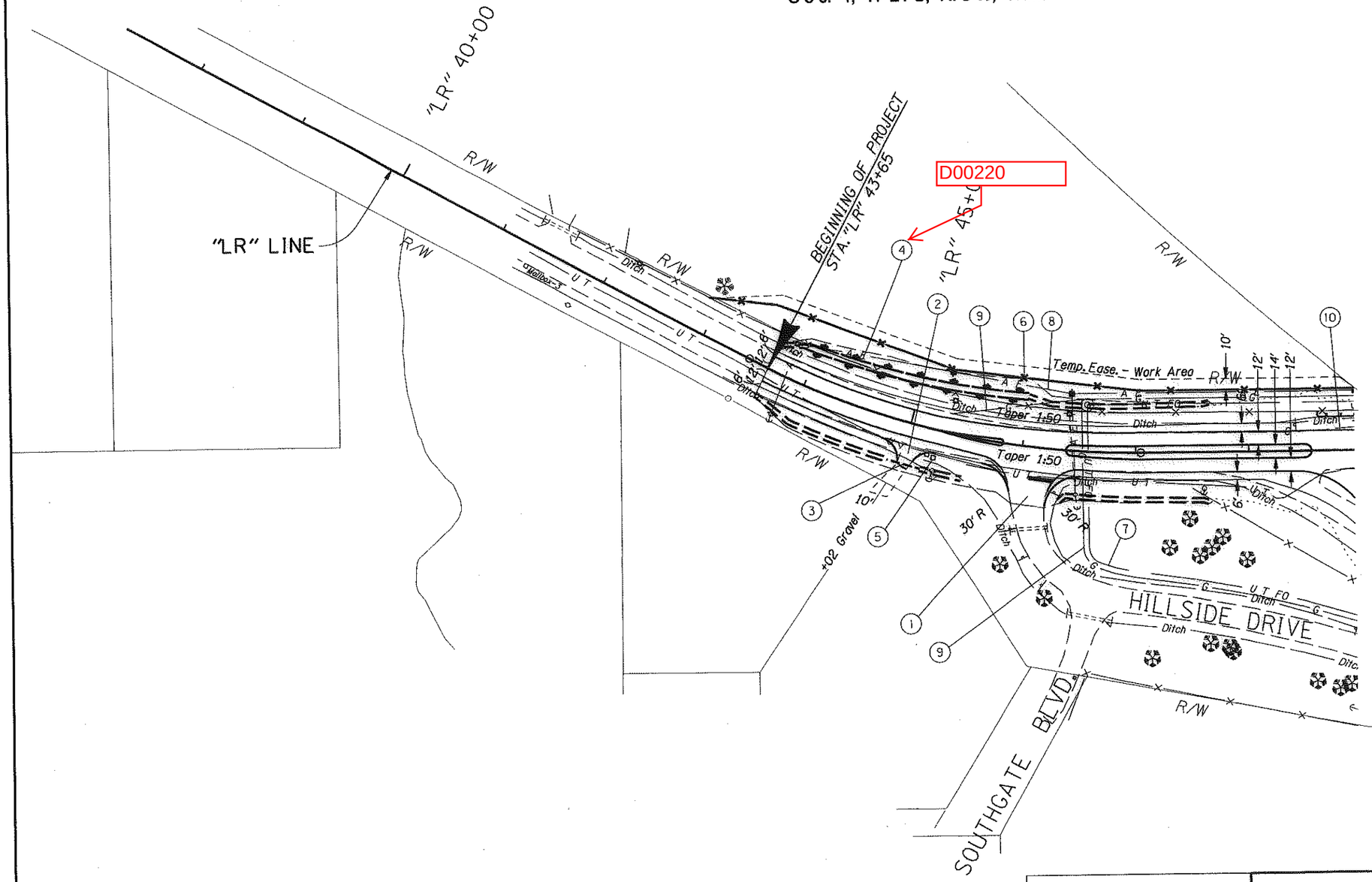
1-10-09 CONTRACT 13384



1. Const. Road Conn. (See Std. Drg. No. RD715)
2. Const. Apron (See Std. Drg. No. RD715)
3. Sta. "LR" 44+89, 37.00' Rt. To Sta. "LR" 45+18, 37.57' Rt. Inst. 12" Culvert Pipe - 30' Match Ditch Invert
4. Sta. "LR" 43+89, 33.00' Lt. To Sta. "LR" 46+00, 44.00' Lt. Const. Water Quality Swale No.3 D00220
5. Inst. Single Mailbox Support Const. Conc. Collar Const. Mailbox Service Turnout (Locate as Dir.) (See Drg. No. RD100, RD101)
6. Const. Type 2 Fence - 577' Along R.O.W. Line (See Std. Drg. No. RD810)
7. Approximate Location of Relocated Qwest Fiber Optic Line (By Others).
8. Approximate Location of Relocated Emerald PUD Overhead Power Line. And Charter Communications Line (By Others).
9. Approximate Location of Relocated NW Natural Gas Line (By Others).
10. Extg. NW Natural Gas Line To Be Abandoned. Confirm With NW Natural Prior To Construction.

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OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: WHITEAKER AVE - LONDON RD -
BUNDLE A04
PACIFIC HIGHWAY
LANE COUNTY

Design Team Leader - Tim Shell
Designed By - Fred Maddox / Brad Cooper
Drafted By - Ben Eneas / Ricco Caduo

GENERAL CONSTRUCTION

SHEET NO. 6A

Sec. 4, T. 21 S, R. 3 W, W.M.

40V-9

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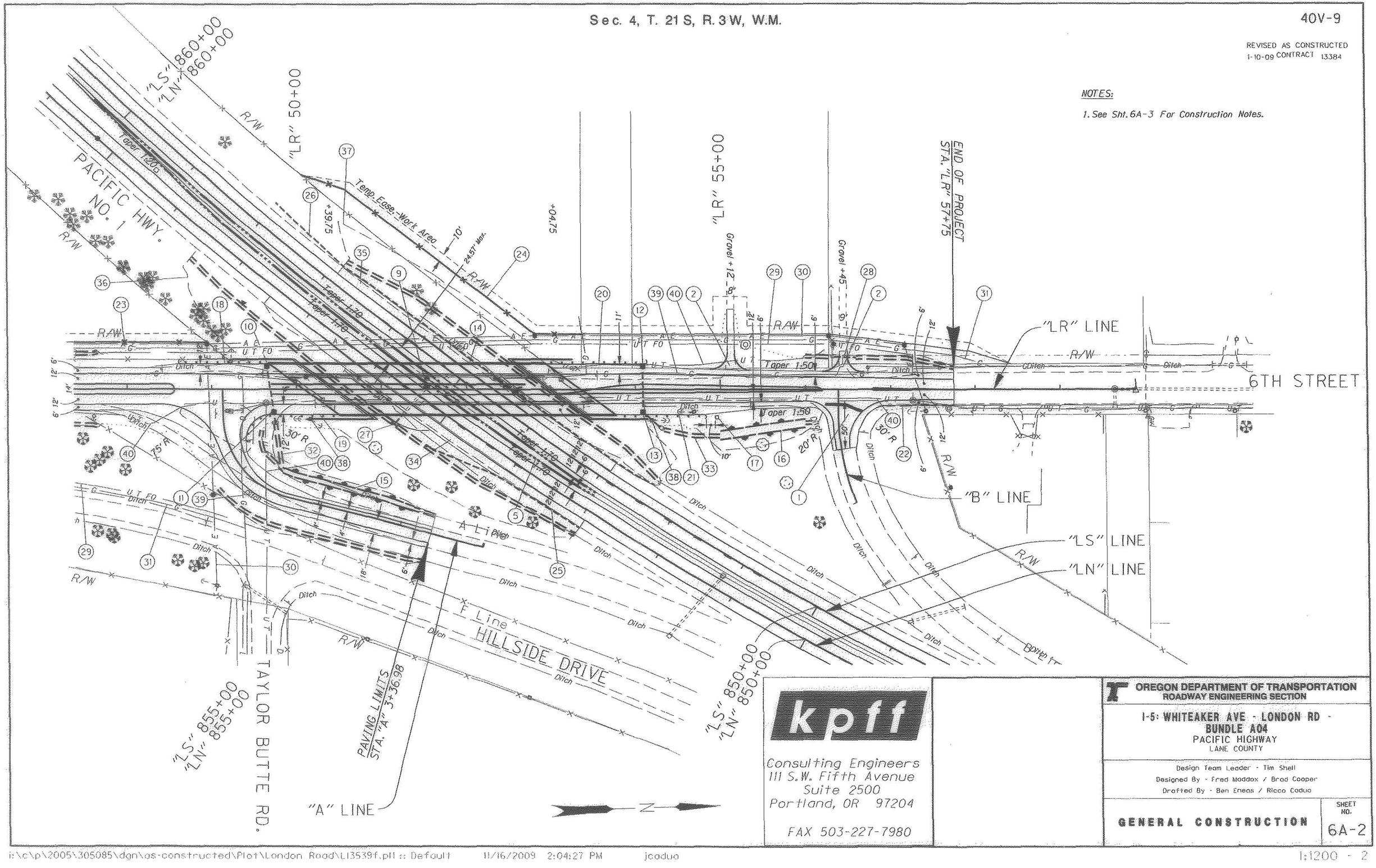
1-10-09 CONTRACT 13384

NOTES:

1. See Sht. 6A-3 For Construction Notes.



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OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: WHITEAKER AVE - LONDON RD -
BUNDLE A04
PACIFIC HIGHWAY
LANE COUNTY

Design Team Leader - Tim Shell
Designed By - Fred Maddox / Brad Cooper
Drafted By - Ben Eneas / Ricco Caduo

GENERAL CONSTRUCTION

SHEET NO. 6A-2

REVISED AS CONSTRUCTED
1-10-09 CONTRACT 13384

(1) Const. Road Conn.
(See Std. Drg. No. RD715)

(2) Const. Apron - 2
(See Std. Drg. No. RD715)

(remove note and number)

(remove note and number)

(5) Sta. "LN" 853+01, 18.32' Rt. To Sta. "LN" 860+94, 32.29' Rt.
Sta. "LS" 852+91, 18.82' Lt. To Sta. "LS" 860+76, 17.70' Lt.
Exc. - 236 Cu.Yds.
Const. Tall Conc. Median
Barrier - 1578'
Pin and Grout Barrier
Const. Transition to Existing Barrier - 3
Const. 4" P.C.C. Slab - 5500 Sq.Ft.
(See Std. Drg. No. RD500, RD516, RD545, RD560, RD575)
(For Details, See Sht. 2B-3)

(remove note and number)

(remove note and number)

(remove note and number)

(9) Sta. "LN" 855+37.95, 16.47' Rt.
Const. Type "CG-2" Inlet
Connect to Extg.
(See Std. Drg. No. RD366)

(10) Sta. "LR" 49+65, 30' Lt.
Const. Type "G1" Conc. Inlet
I.E. (12" Out) = 717.75
Inst. 12" Storm Sew. Pipe - 60'
5' Depth
S = 0.0200'/Ft.
(See Std. Drg. Nos. RD300 and RD364)

(11) Sta. "LR" 49+73, 30' Rt.
Const. Type "G1" Conc. Inlet
I.E. (12" In) = 716.55
I.E. (12" Out) = 716.42
Inst. 12" Storm Sew. Pipe - 10'
5' Depth
S = 0.0200'/Ft.
I.E. (12" Outfall) = 716.22
Inst. Riprap (Cl. 50) - 5 cu.Yds.

(12) Sta. "LR" 54+09, 30' Lt.
Const. Type "G1" Conc. Inlet
I.E. (12" Out) = 714.25
Inst. 12" Storm Sew. Pipe - 60'
5' Depth
S = 0.0200'/Ft.

(13) Sta. "LR" 54+09, 30' Rt.
Const. Type "G1" Conc. Inlet
I.E. (12" In) = 713.05
I.E. (12" Out) = 712.92
Inst. 12" Storm Sew. Pipe - 30'
5' Depth
S = 0.0200'/Ft.
I.E. (12" Outfall) = 712.62
Inst. Riprap (Cl. 50) - 5 cu.Yds.

(14) Bridge No. 20039
Const. Structure - 265'
Rdwy. Width 60'
And Wingwalls
And MSE Walls
And Reinf. Panel at Bridge Ends
(For Drg. Nos., See Sht. 1A)

(15) Sta. "A" 1+50, 28.50' Lt. To Sta. "A" 3+10.23, 17' Lt.
Const. Water Quality Swale No. 4

(16) Sta. "LR" 54+99, 54.50' Rt. To Sta. "LR" 56+00, 39.78' Rt.
Const. Water Quality Swale No. 5

(17) Inst. Single Mailbox Support
Const. Conc. Collar

(18) Sta. "LR" 48+63, 30.00' Lt. To Sta. "LR" 49+68, 30.00' Lt.
Const. Guardrail - 37.5' (Type 2A)
- 12.5' (Type 3)
Const. Guardrail Transition
Flare Rate=0, W=0, E=5.0'
Const. Guardrail Terminal,
Non-Flared (Test Level 3)
(See Std. Drg. No. RD400, RD405,
RD415, RD420, RD440, RD450, RD700, BR203)

(19) Sta. "LR" 49+40, 60.00' Rt. To Sta. "LR" 50+50, 30.00' Rt.
Const. Asphalt Concrete Drainage Curb - 76'
Const. Guardrail - 50.0' (Type 2A)
- 12.5' (Type 3)
Const. Guardrail Transition
Const. Guardrail Anchor (Steel) - 2
Flare Rate=0, W=0, E=5.0', R=30'
Const. Guardrail End

(20) Sta. "LR" 52+95, 30.00' Lt. To Sta. "LR" 54+12, 30.00' Lt.
Const. Asphalt Concrete Drainage Curb - 117'
Const. Guardrail - 50.0' (Type 2A)
- 12.5' (Type 3)
Const. Guardrail Transition
Flare Rate=0, W=0, E=5.0'
Const. Guardrail Terminal,
Non-Flared (Test Level 3)

(21) Sta. "LR" 53+77, 30.00' Rt. To Sta. "LR" 54+81, 30.00' Rt.
Const. Asphalt Concrete Drainage Curb - 32'
Const. Guardrail - 37.5 (Type 2A)
- 12.5' (Type 3)
Const. Guardrail Transition
Flare Rate=0, W=0, E=5.0'
Const. Guardrail Terminal,
Non-Flared (Test Level 3)

(22) Sta. "LR" 56+95, 19.61' Rt. To Sta. "LR" 57+75, 19.61' Rt.
Const. Curb and Gutter - 80'
(See Std. Drg. No. RD700)

(23) See Sht. 6A, Note 6.

(24) Const. Type 2 Fence - 393'

(25) Sta. "LN" 852+95.00 To Sta. "LN" 855+00.00
Const. 6" Subsurface Drain Pipe - 208'
Const. Subsurface Drain Outlet
(See Std. Drg. No. RD312)

(26) Sta. "LS" 852+39.00 To Sta. "LS" 858+00.00
Const. 6" Subsurface Drain Pipe - 561'
Connect to Extg. Subsurface Drain Pipe

(27) Sta. "LN" 855+41.38, 28.71' Lt. To Sta "LN" 855+42.64, 44.53' Lt
Extend Extg. 18" Storm Sew. Pipe - 13'
5' Depth
Connect to Extg.
S = 0.0200'/Ft.
Inst. Safety End Section
(See Std. Drg. No. RD324)

(28) Sta. "LR" 56+30, 38.34' Lt. To Sta. "LR" 56+60, 37.75' Lt.
Inst. 12" Culvert Pipe - 30'
Match Ditch Invert

(29) See Sht. 6A, Note 7.

(30) See Sht. 6A, Note 8.

(31) See Sht. 6A, Note 9.

(32) Const. Ditch - 55'
Ditch Exc. - 10 Cu.Yds.

(33) Const. Ditch - 70'
Ditch Exc. - 12 Cu.Yds.

(34) Sta. "LN" 852+95 To Sta. "LN" 857+49
Inst. Continuous Rumble Strips - 454'
(For Details, See Sht. 2B-4)

(35) Sta. "LS" 852+91 To Sta. "LS" 856+90
Inst. Continuous Rumble Strips - 399'

(36) Const. NB Excavation
Exc. 3,648 Cu.Yds. (For Details, See Sht. 2A-6)

(37) Const. SB Excavation
Exc. 4,340 Cu.Yds. (For Details, See Sht. 2A-6)

(38) Emerald PUD Overhead Power Line
And Charter Communications Line,
To Be Relocated By Others.
Confirm Relocation With Emerald PUD Prior To Construction.

(39) See Sht. 6A, Note 10.

(40) Extg. Qwest Line To Be Abandoned.
Confirm With Qwest Prior To Construction.

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OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: WHITEAKER AVE - LONDON RD -
BUNDLE A04
PACIFIC HIGHWAY
LANE COUNTY

Design Team Leader - Tim Sheil
Designed By - Fred Maddox / Brad Cooper
Drafted By - Ben Eneas / Ricco Codua

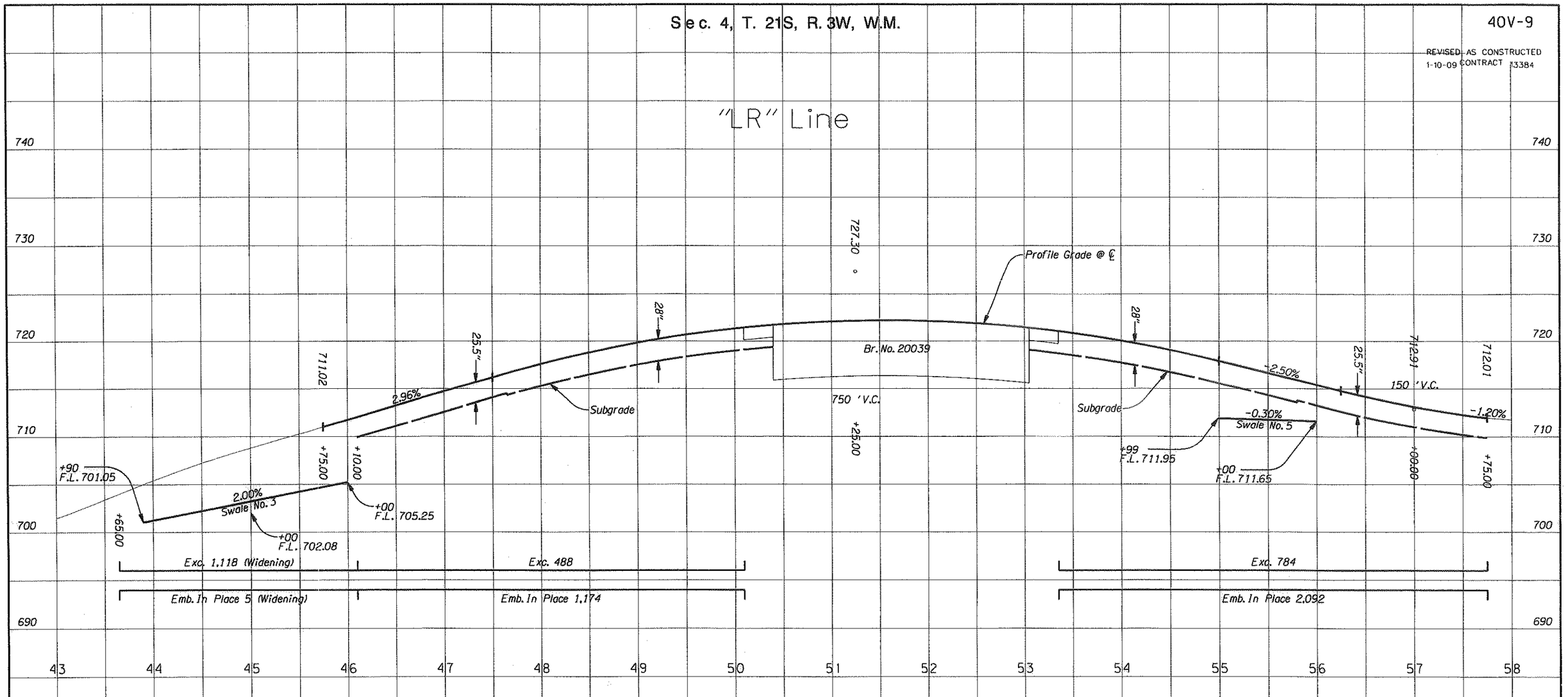
CONSTRUCTION NOTES

SHEET NO. 6A-3

Sec. 4, T. 21S, R. 3W, W.M.

40V-9

REVISED AS CONSTRUCTED
1-10-09 CONTRACT 13384



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OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: WHITEAKER AVE - LONDON RD - BUNDLE A04
PACIFIC HIGHWAY
LANE COUNTY

Design Team Leader - Tim Shell
Designed By - Fred Maddox / Brad Cooper
Drafted By - Ben Eneas / Ricco Codua

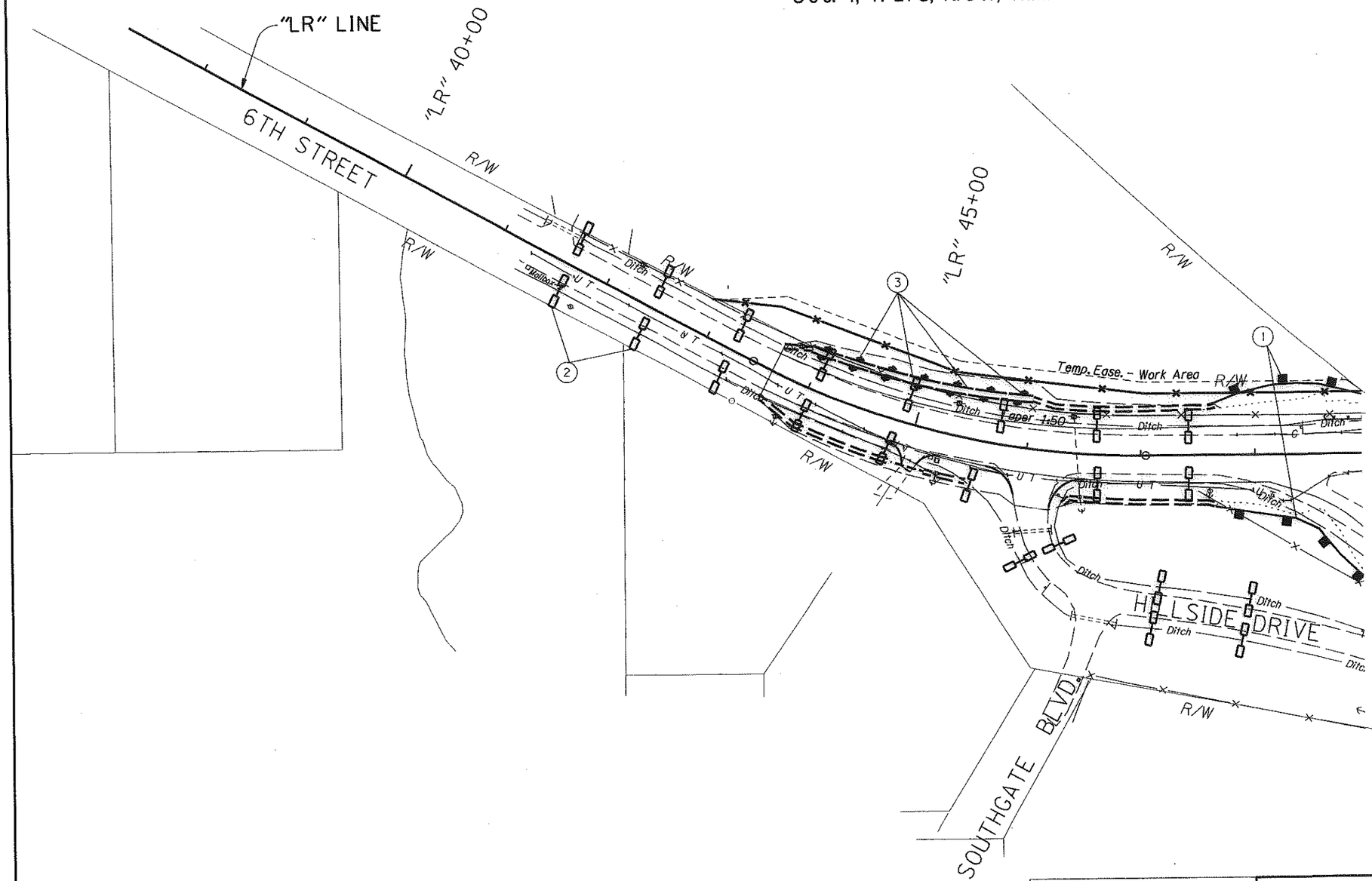
PROFILE

SHEET NO. 6B

Sec. 4, T. 21 S, R. 3 W, W.M.

40V-9

REVISED AS CONSTRUCTED
1-10-09 CONTRACT 13384



1. Install Unsupported Sediment Fence (See Drg. No. RD1040)
2. Install Check Dam (Typ.) (See Drg. No. RD1005)
3. Install Flow Spreader - 50' O.C.

LEGEND

Sediment Fence, Unsupported

18" Check Dam, 80' O.C.

N

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LANE COUNTY

Design Team Leader - Tim Shell
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EROSION CONTROL PLAN

SHEET NO. GA-4

1:1200 - 1

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