OPERATION & MAINTENANCE MANUAL

DFI No. : D00046
Facility Type: Water Quality Biofiltration Swale

MARCH, 2011

INDEX

1. Identification

Drainage Facility ID (DFI):	D00046
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	(V-File Number) 38V-117
Location:	District: 3
	Highway Number: 001
	Mile Post: 252.41 / 252.49 (Beg./end)
	Description: This facility is located alongside the northbound lanes of I-5 (Hwy 001). Access can be obtained from a gated entrance off of 37th Avenue SE adjacent to the swale.

2. Facility Contact Information

Contact the Engineer of Record, Region Technical Center or Geo Environmental's Senior Hydraulics Engineer for:

- Operational clarification
- Maintenance clarification
- Repair or restoration assistance

Engineering Contacts:

Region Technical Center Hydro Unit Manager

Or

Geo-Environmental's Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record: ODOT Designer - Region 2 Tech. Center, Chris Carman, P.E., (503) 986-2691

Construction Year: 2005
Contractor: Hamilton Construction Company

4. Storm Drain System and Facility Overview

A water quality swale is a flat-bottomed open channel designed to treat stormwater runoff from highway pavement areas. This type of facility is lined with grass. Treatment by trapping sedimentation occurs when stormwater runoff flows through the grass.

This swale facility is 430-feet long (Photo 1) and receives stormwater from inlets located south of the facility. The facility's drainage area also includes sheet flow runoff from the northbound lane adjacent to and also from portions extending 330-feet south of this swale (DFI D00046).

Water is conveyed from inlets and pipes located in the north and southbound lanes to a manhole located just west of the swale. This manhole directs the water through an 18-inch pipe to the swale's inlet (Point A in the Operational Plans in Appendix A, Photo 1). The water first encounters a flow spreader (Point C, Photo 1) and is then treated as it travels to the swale's outlet (Point B, Photo 2). The swale's outlet is a 36-inch pipe that travels west and diagonally crosses Interstate-5 (Hwy 001). The 36-inch pipe intersects a large manhole in the median of I-5 (Hwy 001) and then outlets into mill creek. The manhole located in the median of the highway also collects stormwater from three inlets on I-5 (Hwy 001) as indicated in the Operational Plans in Appendix A.

At the end of the outlet pipe there are two pipes (Photo 4). The pipe on the right in Photo 4 is the pipe that receives outfall from the swale. See Photo 3 for a close up of this pipe.

A. Maintenance equipment access:
   The swale can be accessed through a gate (Photo 6) at the end of 37th Avenue SE, adjacent to the western side of the swale. This access road branches off of Turner Road SE.

B. Heavy equipment access into facility:

   ☒ Allowed(no limitations)
   ☐ Allowed (with limitations)
   ☐ Not allowed

C. Special Features:

   ☐ Amended Soils
   ☐ Porous Pavers
   ☐ Liners
   ☐ Underdrains

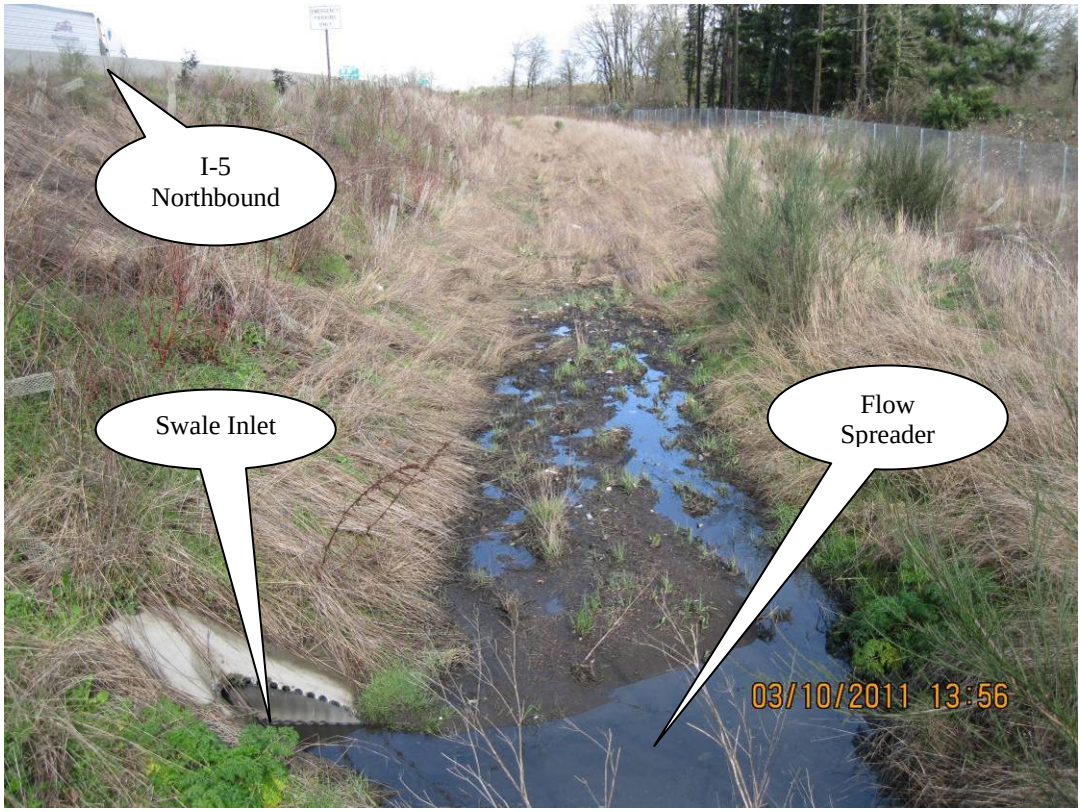


Photo 1: Swale (Looking North)

Photo 2: Swale Outlet

Photo 3: Swale Outflow Pipe Outfall

Photo 4: Swale Outlet

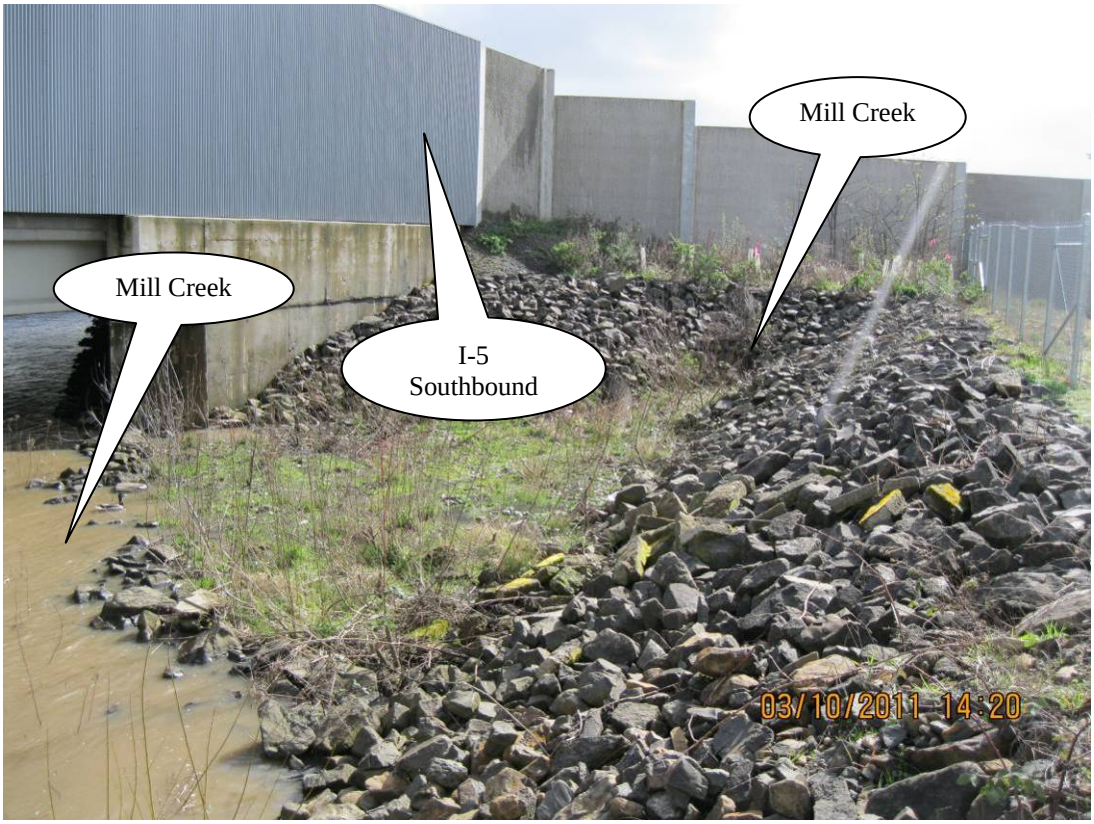


Photo 5: Swale Outfall (Looking south)

Photo 6: Swale Access

5. Facility Haz Mat Spill Feature(s)

The swale can be used to store a volume of liquid by blocking the 36-inch diameter outlet pipe located at the downstream end of the swale. This pipe in noted at point B on the Operational Plan. A barrier at this pipe would prevent contaminants from draining into Mill Creek.

6. Auxiliary Outlet (High Flow Bypass)

Auxiliary Outlets are provided if the primary outlet control structure can not safely pass the projected high flows. Broad-crested spillway weirs and over flow risers are the two most common auxiliary outlets used in stormwater treatment facility design. The auxiliary outlet feature is either a part of the facility or an additional storm drain feature/structure.

The auxiliary outlet feature for this facility is:

☐ Designed into facility:

☒ Other, as noted below:

There is no auxiliary outlet feature constructed into this facility because the swale and 36-inch outlet pipe is designed for water quality and high flow conveyance.

7. Maintenance Requirements

Routine maintenance table for non-proprietary stormwater treatment and storage/detention facilities have been incorporated into ODOT's Maintenance Guide. These tables summarize the maintenance requirements for ponds, swales, filter strips, bioslopes, and detention tanks and vaults. Special maintenance requirements in addition to the routine requirements are noted below when applicable.

The ODOT Maintenance Guide can be viewed at the following website:

http://www.oregon.gov/ODOT/HWY/OOM/MGuide.shtml

Maintenance requirements for proprietary structures, such as underground water quality manholes and/or vaults with filter media are noted in Appendix C when applicable.

The following stormwater facility maintenance table (See ODOT Maintenance Guide) should be used to maintain the facility outlined in this Operation and Maintenance Manual or follow the Maintenance requirements outlined in Appendix C when proprietary structure is selected below:

- ☒ Table 1 (general maintenance)
- ☐ Table 2 (stormwater ponds)
- ☒ Table 3 (water quality biofiltration swales)
- ☐ Table 4 (water quality filter strips)
- ☐ Table 5 (water quality bioslopes)
- ☐ Table 6 (detention tank)
- ☐ Table 7 (detention vault)
- ☐ Appendix C (proprietary structure)
- ☐ Special Maintenance requirements:

Note: Special maintenance Requirements Require Concurrence from ODOT SR Hydraulics Engineer.

8. Waste Material Handling

Material removed from the facility is defined as waste by DEQ. Refer to the roadwaste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options: http://egov.oregon.gov/ODOT/HWY/OOM/EMS.shtml

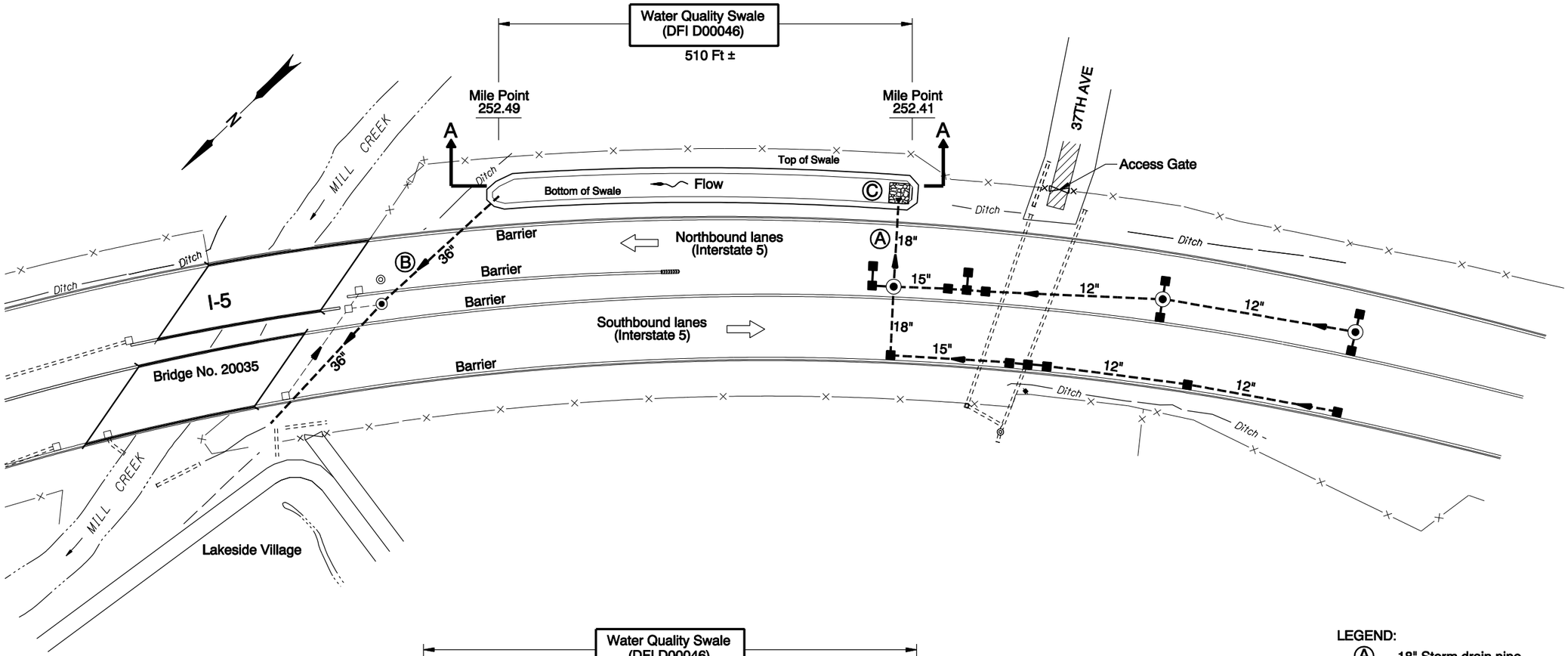
Contact any of the following for more detailed information about management of waste materials found on site:

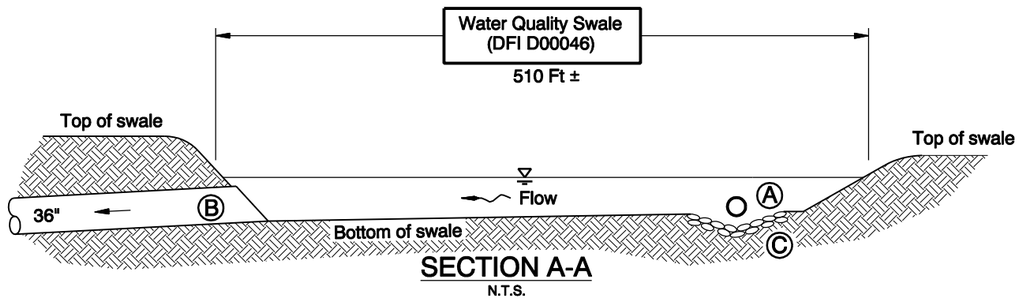
ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 229-5129
ODOT Region Hazmat Coordinator	(503) 986-2647
ODEQ Northwest Region Office	(503) 229-5263

Appendix A

Content:

- **Operational Plan and Profile Drawing(s)**





SECTION A-A
N.T.S.

LEGEND:

- Ⓐ 18" Storm drain pipe
- Ⓑ 36" Storm drain pipe outfalls into Mill Creek
- Ⓒ Flow spreader
- ◉ and/or ◎ Manhole
- ■ and/or □ Inlet
- Storm Pipe (Facility)
- Access Road
- Access Gate
- Conveyance Direction
- Pavement / Facility flow path

Sht. 1 of 1

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: M. Wittenbrink

Drafted By: Jim Holeman

DFI D00046
MAINTENANCE DISTRICT 3 HWY 1
WATER QUALITY SWALE
PACIFIC HIGHWAY MP 252.41-252.49
MARION COUNTY

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DFI_D00046.dgn

Appendix B

Content:

- **ODOT Project Plan Sheets**
    - ***Cover/Title Sheet***
    - ***Water Quality/Detention Plan Sheets***
    - ***Details***

38V-117

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd.
1A-2	Index Of Sheets Cont'd.
1A-3	Index Of Sheets Cont'd.
1A-4	Standard Drawing Nos.
1B	Layout Sheet

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

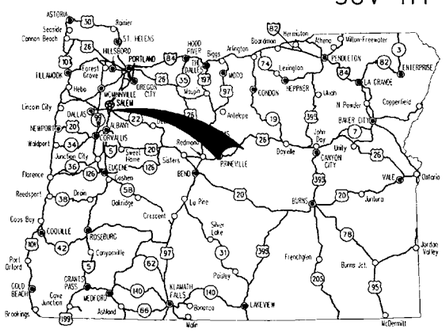
GRADING, DRAINAGE, STRUCTURES, PAVING, SIGNING, ILLUMINATION, SIGNALS & ROADSIDE DEVELOPMENT

I-5: N. SANTIAM HWY. - KUEBLER BLVD. (SALEM) SEC.

PACIFIC HIGHWAY

MARION COUNTY

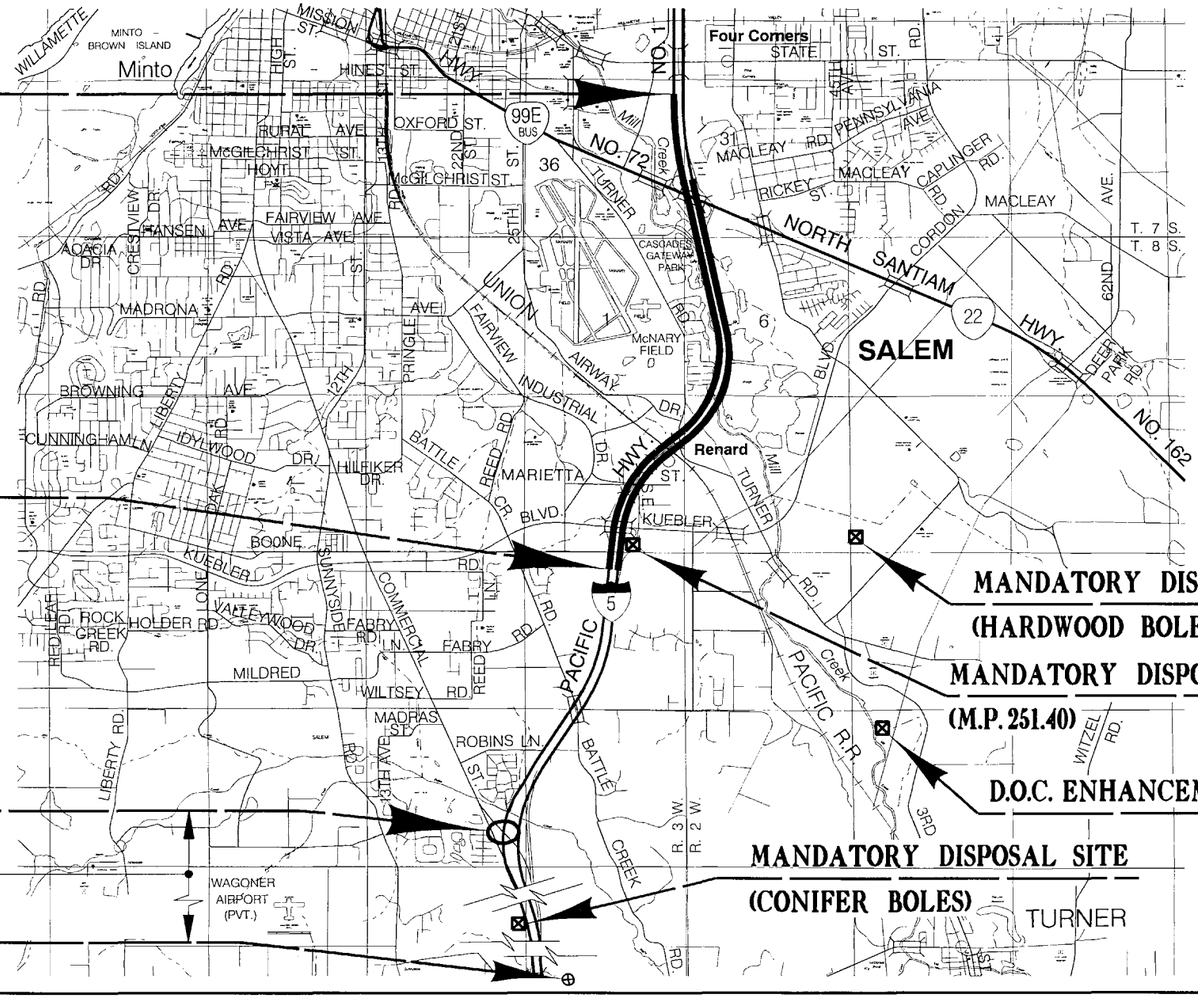
OCTOBER 2005



Overall Length Of Project - 4.02 km (2.49 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.)

OTIA-NH-IM-S001(196)
BEGINNING OF PROJECT
STA. "L" 10+280 (M.P. 254.58)



END OF WORK AREA
STA. "L" 15+682.3 (M.P. 251.22)

NO WORK AREA

OTIA-NH-IM-S001(196)
END OF PROJECT
STA. "LS" 18+664.61 (M.P. 249.38)

Approx. 28 Mi. South

PROSPECTIVE MATERIAL SOURCE
(M.P. 221.13)

MANDATORY DISPOSAL SITE
(HARDWOOD BOLES)

MANDATORY DISPOSAL SITE
(M.P. 251.40)

D.O.C. ENHANCEMENT SITE

MANDATORY DISPOSAL SITE
(CONIFER BOLES)
TURNER

OREGON TRANSPORTATION INVESTMENT ACT

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

OREGON TRANSPORTATION COMMISSION

Stuart Foster	CHAIRMAN
Gail L. Achterman	COMMISSIONER
Mike Nelson	COMMISSIONER
Randall Papé	COMMISSIONER
Janice J. Wilson	COMMISSIONER
Bruce A. Warner	DIRECTOR OF TRANSPORTATION

REGISTERED PROFESSIONAL ENGINEER
13,704
OREGON
JULY 16, 1987
CATHERINE M. NELSON
Expires Dec. 31, 2006

Catherine M. Nelson
TECHNICAL SERVICES MANAGING ENGINEER

I-5: N. SANTIAM HWY. - KUEBLER BLVD. (SALEM) SEC.
PACIFIC HIGHWAY
MARION COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	OTIA-NH-IM-S001(196)	1

METRIC

PE000950

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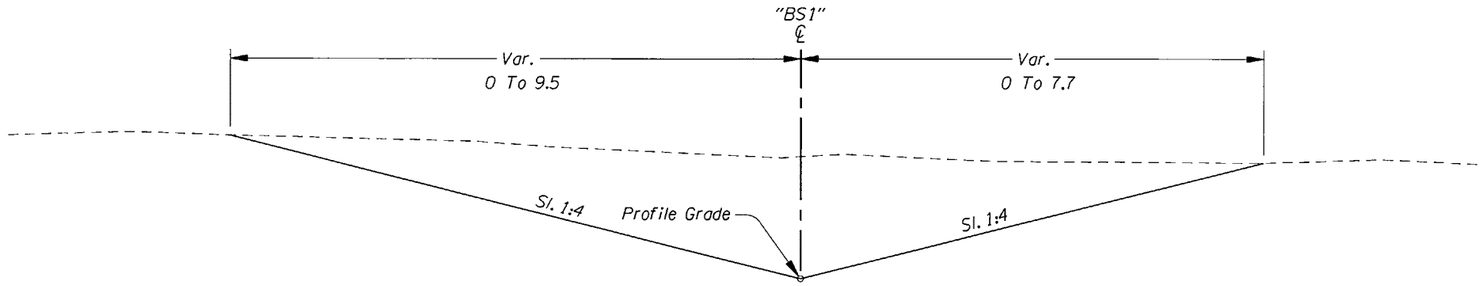
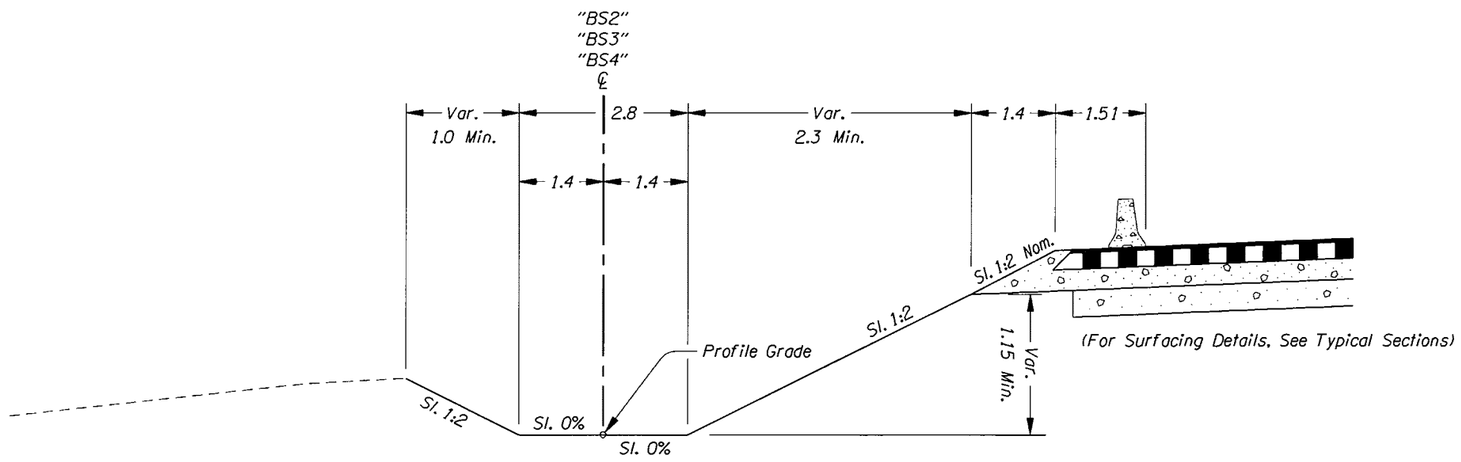


(For Planting Details, See Roadside Development Plans)

WATER QUALITY SWALE
STA. "L"11+654.4 To STA. "L"11+690.1, Lt.



(For Surfacing Details, See Typical Sections)

(For Planting Details, See Roadside Development Plans)

WATER QUALITY SWALES

STA.	"L"12+000.9	To STA.	"L"12+004.3	(Taper Section)
	"L"12+004.3	To	"L"12+176.5	
	"L"12+176.5	To	"L"12+207.2	(Taper Section)
	"L"12+240.2	To	"L"12+258.5	(Taper Section)
	"L"12+258.5	To	"NB"12+770.0	
	"NB"12+770.0	To	"NB"12+774.0	(Taper Section)
	"NB"13+116.1	To	"NB"13+120.0	(Taper Section)
	"NB"13+120.0	To	"NB"13+400.0	
	"NB"13+400.0	To	"NB"13+403.9	(Taper Section)
	"NB"13+648.0	To	"NB"13+656.0	(Taper Section)
	"NB"13+656.0	To	"NB"13+787.0	
	"NB"13+787.0	To	"NB"13+790.9	(Taper Section)

All Dimensions Are Shown In Meters (m) Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER
14,931
Carol A. Cartwright
OREGON
JULY 25, 1990
CAROL A. CARTWRIGHT
Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: N. SANTIAM HWY. - KUEBLER BLVD. (SALEM) SEC.
PACIFIC HIGHWAY
MARION COUNTY

Design Team Leader - Carol Cartwright
Designed By - John Lucas
Drafted By - Jeff Larson

DETAILS

SHEET NO. 2B-9

T. 8 S., R. 2 W., W.M.
SALEM

All Dimensions Are Shown In Meters (m)
Unless Otherwise Noted.

CAROL A. CARTWRIGHT
14,931
JULY 25, 1990
Expires Dec. 31, 2005

Carol A. Cartwright

OREGON DEPARTMENT OF TRANSPORTATION
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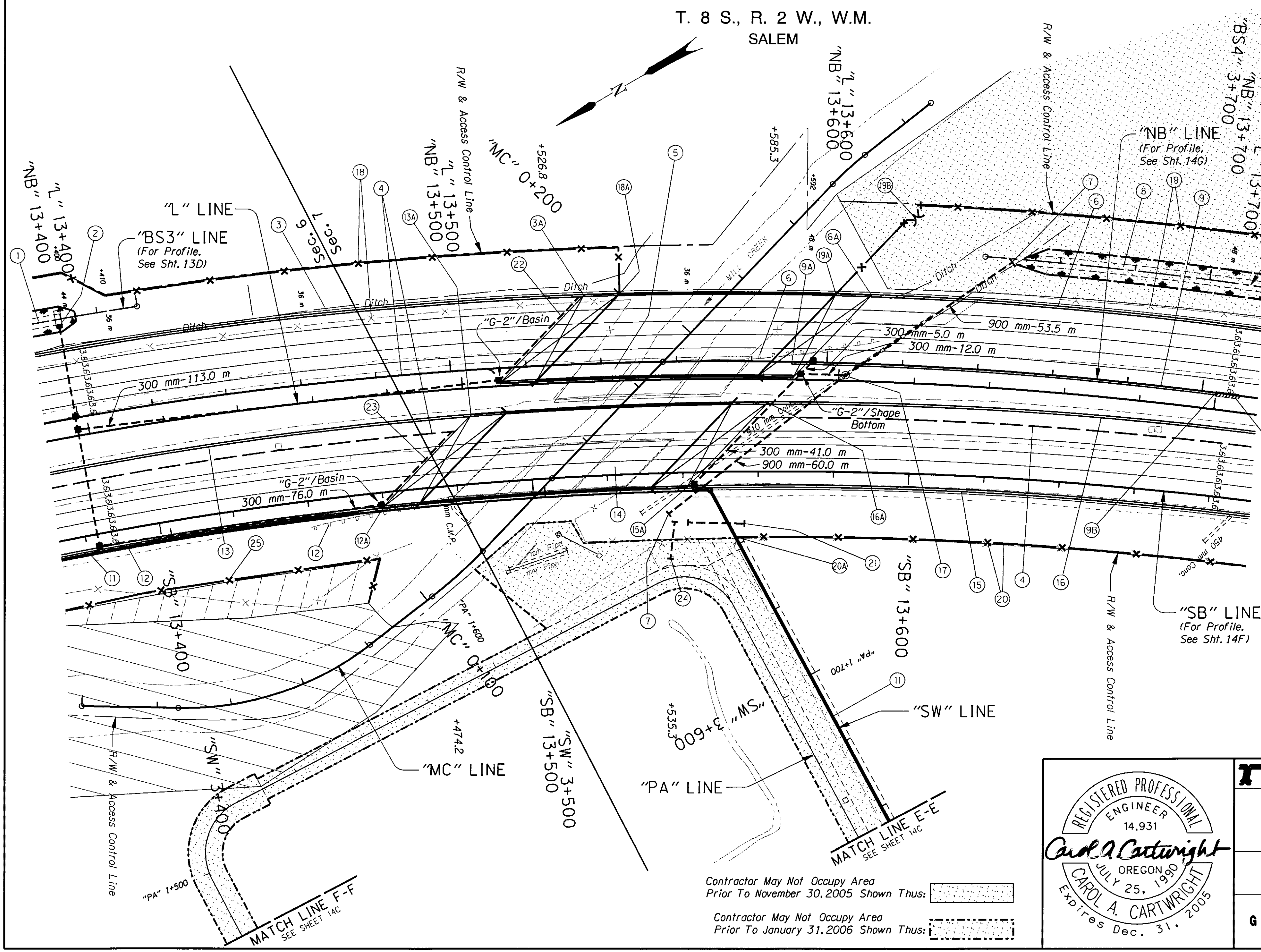
MARION COUNTY

Design Team Leader - Carol Cartwright
Designed By - John Lucas
Drafted By - Jeff Larson

ALIGNMENT

SHEET NO.
14

T. 8 S., R. 2 W., W.M.
SALEM



Restricted Work Area Shown Thus:

No Work Area Shown Thus:

All Dimensions Are Shown In Meters (m) Unless Otherwise Noted.

Contractor May Not Occupy Area Prior To November 30, 2005 Shown Thus:

Contractor May Not Occupy Area Prior To January 31, 2006 Shown Thus:

REGISTERED PROFESSIONAL ENGINEER
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Carol A Cartwright
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Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: N. SANTIAM HWY. - KUEBLER BLVD. (SALEM) SEC.
PACIFIC HIGHWAY
MARION COUNTY

Design Team Leader - Carol Cartwright
Designed By - John Lucas
Drafted By - Jeff Larson

GENERAL CONSTRUCTION

SHEET NO. 14A

STRUCTURAL DETAILS CHECKED

STRUCTURAL DETAILS CHECKED _____

(1) See Sht. 13A, Note 4
Const. Water Quality Swale

(2) See Sht. 13A, Note 7

(3) See Sht. 12, Note 1
Const. Precast Conc. Shldr. Barrier
(3A) Const. Conc. Barrier Transition To Bridge Rail - 3.8 m

(4) Const. Low Profile Mountable Curb

(5) Sta. "NB" 13+526.8 To Sta. "NB" 13+585.3
Structure No. 20034
Remove Extg. Structure
Const. Structure - 58.4 m
Rdwy. Width - 21.6 m
(For Drg. Nos., See Sht. 1A-2)

(6) Sta. "NB" 13+611.3 To Sta. "L" 14+070.9
Remove Extg. Guardrail - 102.9 m
Const. Precast Conc. Shldr. Barrier - 452.5 m
(Reflectorized)
Plug Scuppers
(6A) Const. Conc. Barrier Transition To Bridge Rail - 3.8 m
Flare Rate=0, W=0, E=0

(7) Sta. "NB" 13+625.7
Remove 900 mm Culv. Pipe - 93.5 m
Inst. 900 mm Sew. Pipe - 113.5 m
1.5 m Depth

(8) Const. Water Quality Swale
(For Details, See Shts. 2B-9 & GJ-8)

(9) Sta. "NB" 13+590.6 To Sta. "NB" 13+703.7
Remove Extg. Guardrail - 64.8 m
Const. Precast Conc. Shldr. Barrier - 111.2 m
(Reflectorized)
Plug Scuppers
(9A) Const. Conc. Barrier Trailing End Terminal
(9B) Connect To Impact Attenuator
Flare Rate=20:1, W=0.61 m, E=0
(For Details, See Sht. 2B-5)

(10) Sta. "NB" 13+703.7
Inst. Impact Attenuator
(For Details, See Sht. 2B-5 & 2B-6)

(11) See Sht. 8A, Note 12
Const. Soundwall

(12) See Sht. 9A, Note 9
Remove Extg. Guardrail
Const. Precast Conc. Shldr. Barrier
(12A) Const. Conc. Barrier Transition To Bridge Rail - 3.8 m

(13) See Sht. 7, Note 3
Const. Precast Tall Conc. Median Barrier
(13A) Const. Conc. Barrier Transition To Bridge Rail - 3.8 m
(See Drg. No. RD550)

(14) Sta. "SB" 13+474.2 To Sta. "SB" 13+535.3
Structure No. 20035
Remove Extg. Structure
Const. Structure - 61.1 m
Rdwy. Width - 21.6 m
(For Drg. Nos., See Sht. 1A)

(15) Sta. "SB" 13+541.0 To Sta. "L" 14+044.9
Remove Extg. Guardrail - 83.8 m
Const. Precast Conc. Shldr. Barrier - 494.7 m
(Reflectorized)
Plug Scuppers
(15A) Const. Conc. Barrier Transition To Bridge Rail - 3.8 m
Flare Rate=0, W=0, E=0

(16) Sta. "SB" 13+562.8 To Sta. "L" 15+228.7
Remove Extg. Metal Median Barrier - 1291.6 m
Const. Precast Tall Conc. Median Barrier - 1645.2 m
(Reflectorized)
(16A) Const. Conc. Barrier Transition To Bridge Rail - 3.8 m

(17) Sta. "SB" 13+538.1 To Sta. "NB" 13+605.0
Const. Large Manhole 1800 mm Dia.
Const. Type "G-2" Open Grade HMAC Inlet With Basin - 2
0.45 m Deep
Const. Type "G-2" Open Grade HMAC Inlet Shape Bottom
Adjust Inlet For Wearing Course - 2
Inst. 300 mm Sew. Pipe - 58.0 m
1.5 m Depth

(18) See Sheet 10A, Note 9
Remove Extg. Fence
Const. Type CL-6 Fence
(18A) End At Bridge

(19) Sta. "NB" 13+601.8 To Sta. "NB" 14+098.3
Remove Extg. Fence
Const. Type CL-6 Fence
(19A) End At Bridge
(19B) Inst. Double Type CL-6 Locked Gate - 4.2 m

(20) Sta. "SB" 13+553.8 To Sta. "SB" 14+057.0
Remove Extg. Fence
Const. Type CL-6 Fence
(20A) End At Soundwall

(21) Sta. "SB" 13+541.2 To Sta. "SB" 13+557.4
Inst. 600 mm Culv. Pipe - 15.0 m
1.5 m Depth

(22) Sta. "NB" 13+516.3
Const. Open Grade Wearing Surface Drain Outlet To Inlet

(23) Sta. "SB" 13+463.5
Const. Open Grade Wearing Surface Drain Outlet To Inlet

(24) Sta. "SB" 13+537.5
Inst. 600 mm Culv. Pipe - 10.0 m
1.5 m Depth

(25) Const. Temp. Type Orange Plastic Fence

REGISTERED PROFESSIONAL ENGINEER
14,931
Carol A. Cartwright
OREGON
JULY 25, 1990
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Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

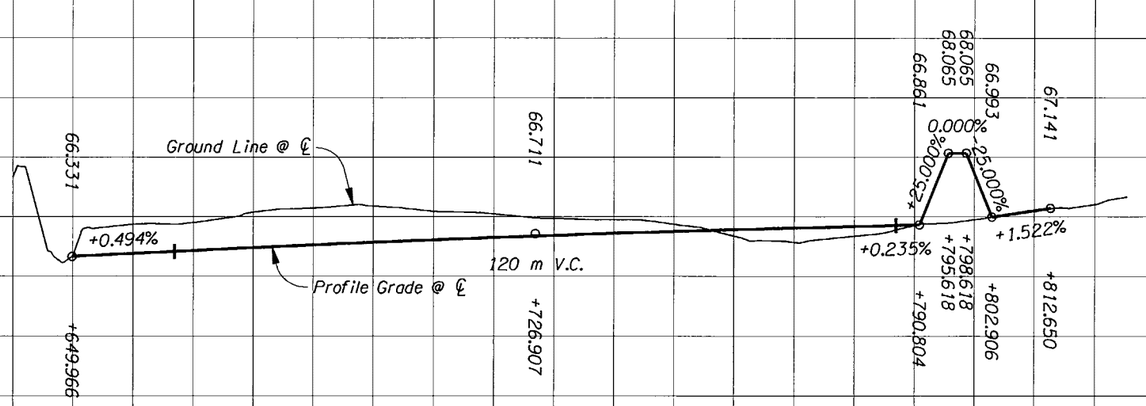
I-5: N. SANTIAM HWY. - KUEBLER BLVD. (SALEM) SEC.
PACIFIC HIGHWAY
MARION COUNTY

Design Team Leader - Carol Cartwright
Designed By - John Lucas
Drafted By - Jeff Larson

NOTES

SHEET NO. 14B

"BS4" LINE



REGISTERED PROFESSIONAL ENGINEER
14,931
Carol A. Cartwright
OREGON
JULY 25, 1990
CAROL A. CARTWRIGHT
Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: N. SANTIAM HWY. - KUEBLER BLVD. (SALEM) SEC.
PACIFIC HIGHWAY
MARION COUNTY

Design Team Leader - Carol Cartwright P.E.
Designed By - John Lucas
Drafted By - Steve Donaldson

PROFILE

SHEET NO. 14H

SALEM

"BS4" LINE
(For Profile, See Sht. 14H)

"L" LINE

"BS4"
R 1022.466 m
Δ 10°23'14"
T 92.938 m

R/W & Access Control Line

"BS4" 3+800

"NB" 13+800

"L" 13+800

"BS4" 3+825.366 P.T.

37TH AVE

"NB" LINE
(For Profile, See Sht. 15C)

"NB" 13+900

"NB" 13+909.095 P.C.S.

"L" 13+900

"L" 13+938.872 P.C.S.

"NB"
180.000 m Sp.
S 5°11'54"
A 422.564

"NB" 14+000

"L" 14+000

"L" 13+700

"SB" LINE
(For Profile, See Sht.15B)

"SB" 13+700

"SB" 13+800

"SB" 13+895.837 P.C.S.

"SB" 13+900

"SB"
180.000 m Sp.
S 5°15'43"
A 420.000

Ditch

450 mm-31.0 m
375 mm-22.5 m
300 mm-4.0 m
"G-2"/Basin
300 mm-1.5 m
375 mm-4.5 m
450 mm-26.5 m
375 mm-44.0 m
300 mm-64.5 m
300 mm-2.5 m
300 mm-54.0 m
300 mm-69.0 m
300 mm-3.5 m

Contractor May Not Occupy Area
Prior To November 30, 2005 Shown Thus:

T. 8 S., R. 2 W., W.M.
T. 8 S., R. 3 W., W.M.
Sec. 7
Sec. 12

All Dimensions Are Shown In Meters (m)
Unless Otherwise Noted.

REGISTERED PROFESSIONAL ENGINEER
14,931
OREGON
JULY 25, 1990
CAROL A. CARTWRIGHT
Expires Dec. 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

I-5: N. SANTIAM HWY. - KUEBLER BLVD. (SALEM) SEC.
PACIFIC HIGHWAY
MARION COUNTY

Design Team Leader - Carol Cartwright
Designed By - John Lucas
Drafted By - Jeff Larson

GENERAL CONSTRUCTION

SHEET NO. 15

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1:1000 - 5

(1) *See Sht. 14B, Note 10*
Inst. Impact Attenuator

(2) *See Sht. 14B, Note 8*
Const. Water Quality Swale

(3) *Sta. "NB" 13+786.4 To Sta. "NB" 13+951.4*
Const. Manhole - 3
Const. Type "G-2" Open Grade HMAC Inlet With Basin - 6
0.45 m Deep
Const. Type "G-2" Open Grade HMAC Inlet - 4
Shape Bottom
Adjust Inlet For Wearing Course - 4
Inst. 300 mm Sew. Pipe - 152.0 m
1.5 m Depth
Inst. 375 mm Sew. Pipe - 31.5 m
1.5m Depth
Inst. 450 mm Sew. Pipe - 57.5 m
1.5 m Depth
Const. Paved End Slope
Const. Flow Spreader
(For Details, See Sht. GJ-7)
(See Drg. No. RD342)

(4) *See Sht. 14B, Note 6*
Const. Precast Conc. Shldr. Barrier

(5) *Const. Low Profile Mountable Curb*

(6) *See Sht. 14B, Note 15*
Remove Extg. Guardrail
Const. Precast Conc. Shldr. Barrier

(7) *Sta. "SB" 13+759.1 To Sta. "SB" 13+919.9*
Const. Type "G-2" Open Grade HMAC Inlet With Basin
0.45 m Deep
Const. Type "G-2" Open Grade HMAC Inlet - 5
Shape Bottom
Adjust Inlet For Wearing Course - 6
Inst. 300 mm Sew. Pipe - 112.5 m
1.5 m Depth
Inst. 375 mm Sew. Pipe - 48.5 m
1.5 m Depth

(8) *See Sht. 14B, Note 16*
Const. Precast Tall Conc. Median Barrier

(9) *See Sht. 14B, Note 19*
Remove Extg. Fence
Const. Type CL-6 Fence
(9A) *Inst. Double Type "CL-6" Locked Gate - 4.2 m*

(10) *See Sht. 14B, Note 20*
Remove Extg. Fence
Const. Type CL-6 Fence
(10A) *Connect To Extg. Fence*

(11) *Sta. "L" 13+825.6*
450 mm Culv. Pipe - 58.3 m (In Pl.)
Remove - 2.0 m Lt.
Extend - 17.0 m Lt.
1.5 m Depth

(12) *Sta. "L" 13+843.2*
900 mm Culv. Pipe - 69.7 m (In Pl.)
Remove - 2.0 m Lt.
Extend - 17.0 m Lt.
1.5 m Depth

REGISTERED PROFESSIONAL ENGINEER
14,931
Carol A. Cartwright
OREGON
JULY 25, 1990
CAROL A. CARTWRIGHT
Expires Dec. 31, 2005

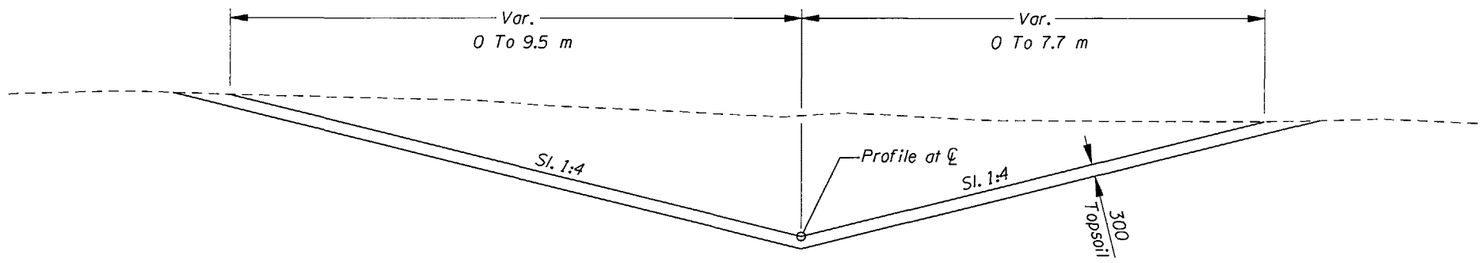
OREGON DEPARTMENT OF TRANSPORTATION
ROADWAY ENGINEERING SECTION

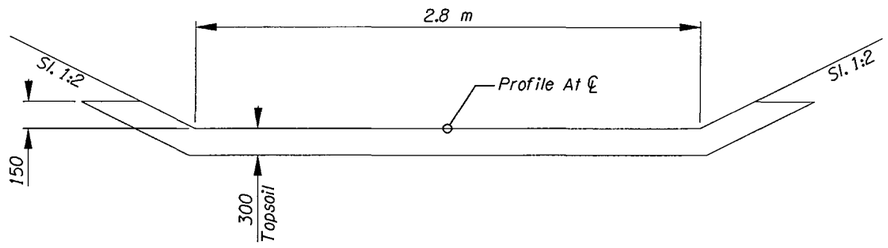
I-5: N. SANTIAM HWY. - KUEBLER BLVD. (SALEM) SEC.
PACIFIC HIGHWAY
MARION COUNTY

Design Team Leader - Carol Cartwright
Designed By - John Lucas
Drafted By - Jeff Larson

NOTES

SHEET NO. 15A





(For Planting Details, See Roadside Development Plans)
(For Locations, See Sht. 2B-9)

WATER QUALITY SWALE - CROSS SECTION

Not To Scale

NOTES:
1. *Side Slopes Are Shown As Vert. To Horiz.*
2. *All Dimensions Shown Are In Millimeters (mm) Unless Otherwise Noted*

REGISTERED PROFESSIONAL ENGINEER
17807
OREGON
JULY 25, 1995
CHRIS CARMAN

EXPIRES: December 31, 2005

OREGON DEPARTMENT OF TRANSPORTATION
REGION 2 TECH CENTER

I-5: NORTH SANTIAM HWY. - KUEBLER BLVD. (SALEM) SEC.
PACIFIC HIGHWAY
MARION COUNTY

Reviewed By - Alvin Shoblom
Designed By - Chris Carman
Drafted By - Chris Shearer

WATER QUALITY SWALE DETAILS

SHEET NO. GJ-8