OPERATION & MAINTENANCE MANUAL

DFI No. : D00683

Facility Type: Water Quality Biofiltration Swale

December, 2014

INDEX

1. Identification

Drainage Facility ID (DFI):	**D00683**
Facility Type:	Water Quality Biofiltration Swale
Construction Drawings:	46V-015
Location:	District: 9
	Highway No.: 002
	Mile Post: 104.41; 104.47 LT
	Description: This facility is located on the north side of the westbound on-ramp from US97 connecting to I-84. The swale resides between Barge Lane and the westbound on-ramp.

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 Senior Hydraulics Engineer (503) 986-3365.

3. Construction

Engineer of Record:	ODOT Designer – Region 4 Tech. Center, Mike Ogden, (541) 388-6288
Facility construction:	2014
Contractor:	Kerr Contractors Inc.

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 vegetation. Treatment by trapping sedimentation occurs when stormwater runoff flows through the grass and flow spreaders.

There are three separate storm drain systems that convey stormwater to this swale. One storm drain system collects runoff from US97 from the eastbound on/off-ramps to the northern edge of the westbound on/off-ramps and the westbound on-ramp. Another collects runoff from the westbound off-ramp and the north side of I-84 through the interchange. The last collects runoff from the southwest corner of the interchange. The full contributing drainage area for this swale can be seen in Appendix A.

There is a single outlet from the swale into the Columbia River. At the end of the swale, a set of three inlets collects stormwater and conveys it to the Columbia River via a 24 inch pipe under Barge Lane.

A. Maintenance equipment access:
Maintenance equipment can access the biofiltration swale via the westbound on-ramp or via Bargeway Lane. The sideslopes of either road and the swale are adequate for most maintenance quipment.

B. Heavy equipment access into facility:

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

C. Special Features:

☒ Amended Soils
☐ Porous Pavers
☐ Liners
☐ Underdrains

5. Facility Haz Mat Spill Feature(s)

The Biofiltration Swale can be used to store a volume of liquid by blocking the 24-inch diameter outlet pipe located at the downstream end of the Biofiltration Swale. This pipe is noted as point A in Figure 1.

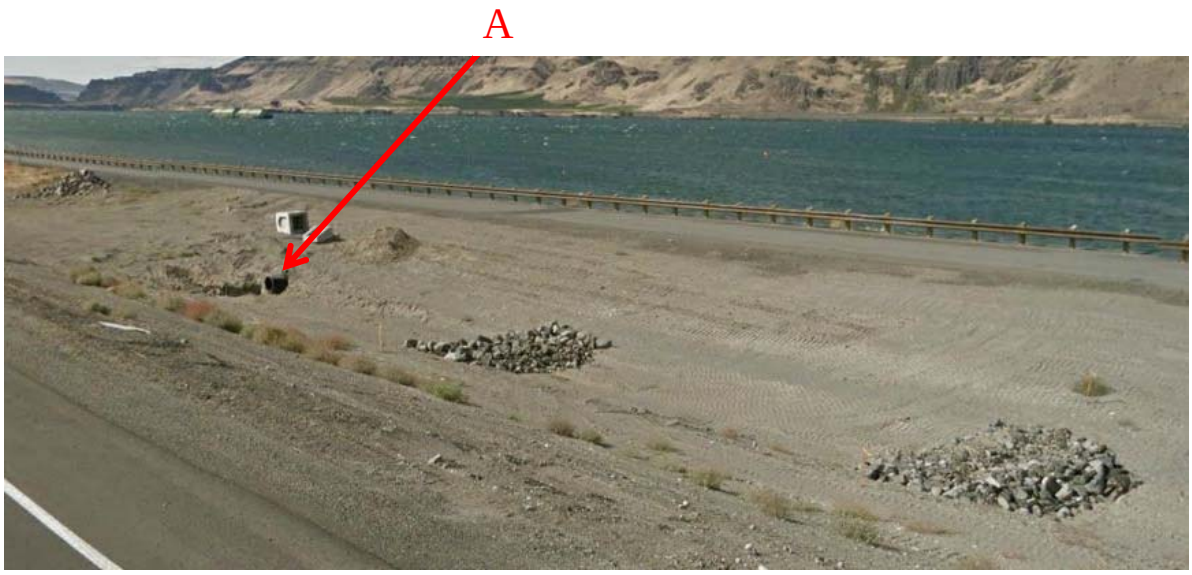


Figure 1 – Biofiltration Swale Outlet

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
The outlet pipe for the swale is considered the auxiliary outlet for the swale. The pipe is sized as a 24 inch pipe, when a 12 inch pipe is all that is required. If the pipe becomes blocked, there is enough capacity and a high enough infiltration rate that the swale will function adequately as a retention pond as well.

☐ Other, as noted below

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:
  Riprap flow spreader repair. During the normally scheduled inspections it should be determined whether or not the riprap check flow spreaders are functioning properly (this should be done when water is flowing in the swale). If not they should be rebuilt/re-shaped in a way the slows down and spreads out the flow. Check dams are required to slow down and spread out the flow. Normally boards or bricks are used to spread the flow, but in this case it was chosen to use riprap for the ease of maintenance.

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	(541) 388-6088
ODEQ Northwest Region Office	(503) 229-5263

Appendix A

Content:

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

COLUMBIA RIVER

Ⓑ

Access point

BARGE LANE

WQ Swale
(DFI D00683)

N

Ⓒ Ⓐ Ⓒ Ⓐ Ⓒ Ⓐ

Access point

Westbound I-84 On-Ramp

I-84

Westbound lanes

Conc. barrier

Eastbound lanes

I-84

LEGEND:

- Ⓐ Storm drain system outfalls to swale
- Ⓑ Swale outlet pipe outfalls into Columbia River
- Ⓒ Riprap flow spreader
- ■ Inlet
- ◉ Manhole
- Storm Pipe with flow direction
- Pavement / Facility Flow Path
- Conveyance Direction

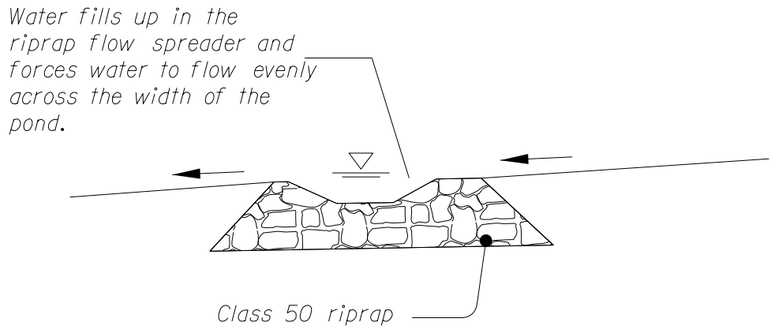
OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Wade Coatney

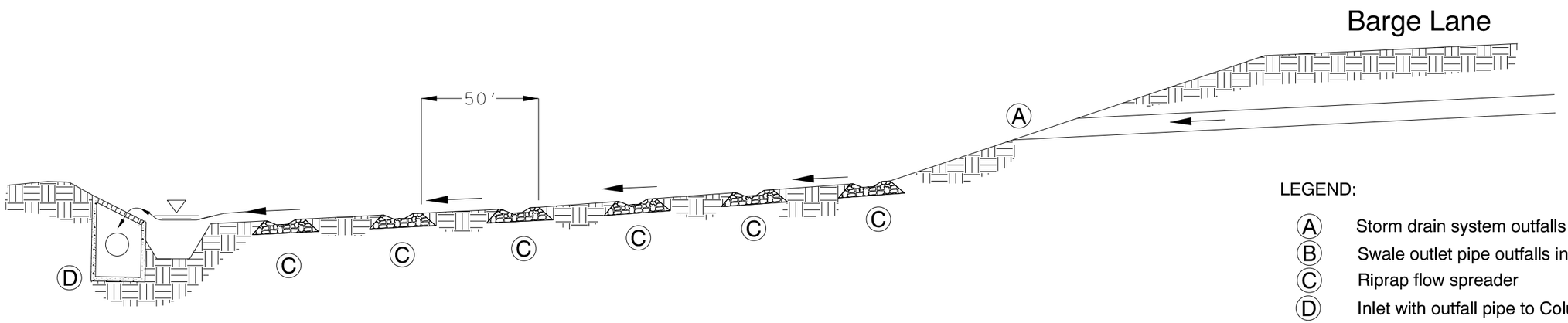
Drafted By: Wade Coatney

DFI D00683
MAINTENANCE DISTRICT 9 HWY 002
WATER QUALITY BIOFILTRATION SWALE
COLUMBIA RIVER HWY MP 104.41 TO 104.47
SHERMAN COUNTY

DFI_D00000.dgn



RIPRAP FLOW SPREADER



SWALE PROFILE

LEGEND:

- (A) Storm drain system outfalls to swale
- (B) Swale outlet pipe outfalls into Columbia River
- (C) Riprap flow spreader
- (D) Inlet with outfall pipe to Columbia River
- (●) Manhole
- Storm Pipe with flow direction
- Pavement / Facility Flow Path
- Conveyance Direction

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Wade Coatney

Drafted By: Wade Coatney

DFI D00683
MAINTENANCE DISTRICT 9 HWY 002
WATER QUALITY BIOFILTRATION SWALE
COLUMBIA RIVER HWY MP 104.41 TO 104.47
SHERMAN COUNTY

DFI_D00000.dgn

N

All pipes within this zone
flow to Water Quality Swale
DFI D00683

COLUMBIA RIVER

BARGE LANE

INTERSTATE
84

97

UNION PACIFIC RAILROAD

LEGEND:

- Ⓐ Storm drain system outfalls to swale
- Ⓑ Swale outlet pipe outfalls into Columbia River
- Ⓒ Riprap flow spreader
- Ⓓ Inlet with outfall pipe to Columbia River
- Manhole
- Storm Pipe with flow direction
- Pavement / Facility Flow Path
- Conveyance Direction

Sht. 3 of 3

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Wade Coatney

Drafted By: Wade Coatney

DFI D00683
MAINTENANCE DISTRICT 9 HWY 002
WATER QUALITY BIOFILTRATION SWALE
COLUMBIA RIVER HWY MP 104.41 TO 104.47
SHERMAN COUNTY

DFI_D00000.dgn

Appendix B

Content:

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

46V-015

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

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

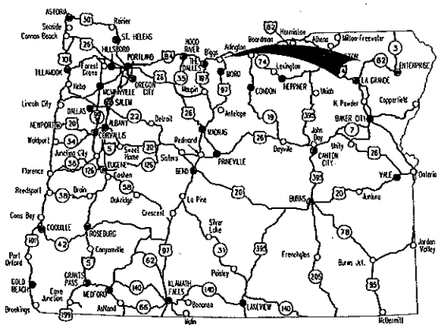
PLANS FOR PROPOSED PROJECT

STRUCTURE, PAVING, SIGNING, ILLUMINATION
SIGNALS & ROADSIDE DEVELOPMENT

FFO - I-84 @ US97 INTERCHANGE (BIGGS JUNCTION) PROJECT

COLUMBIA RIVER HIGHWAY

SHERMAN COUNTY
MARCH 2013



Overall Length Of Project - 6.50 Miles

ATTENTION:
Oregon Law Requires You To Follow Rules Adopted By The Oregon Utility Notification Center. Those Rules Are Set Forth In OAR 952-001-0010 Through OAR 952-001-0090. You May Obtain Copies Of The Rules By Calling The Center. (Note: The Telephone Number For The Oregon Utility Center Is (503) 232-1987.)

LET'S ALL WORK TOGETHER TO MAKE THIS JOB SAFE

END BARRIER REPLACEMENT
M.P. 109.17

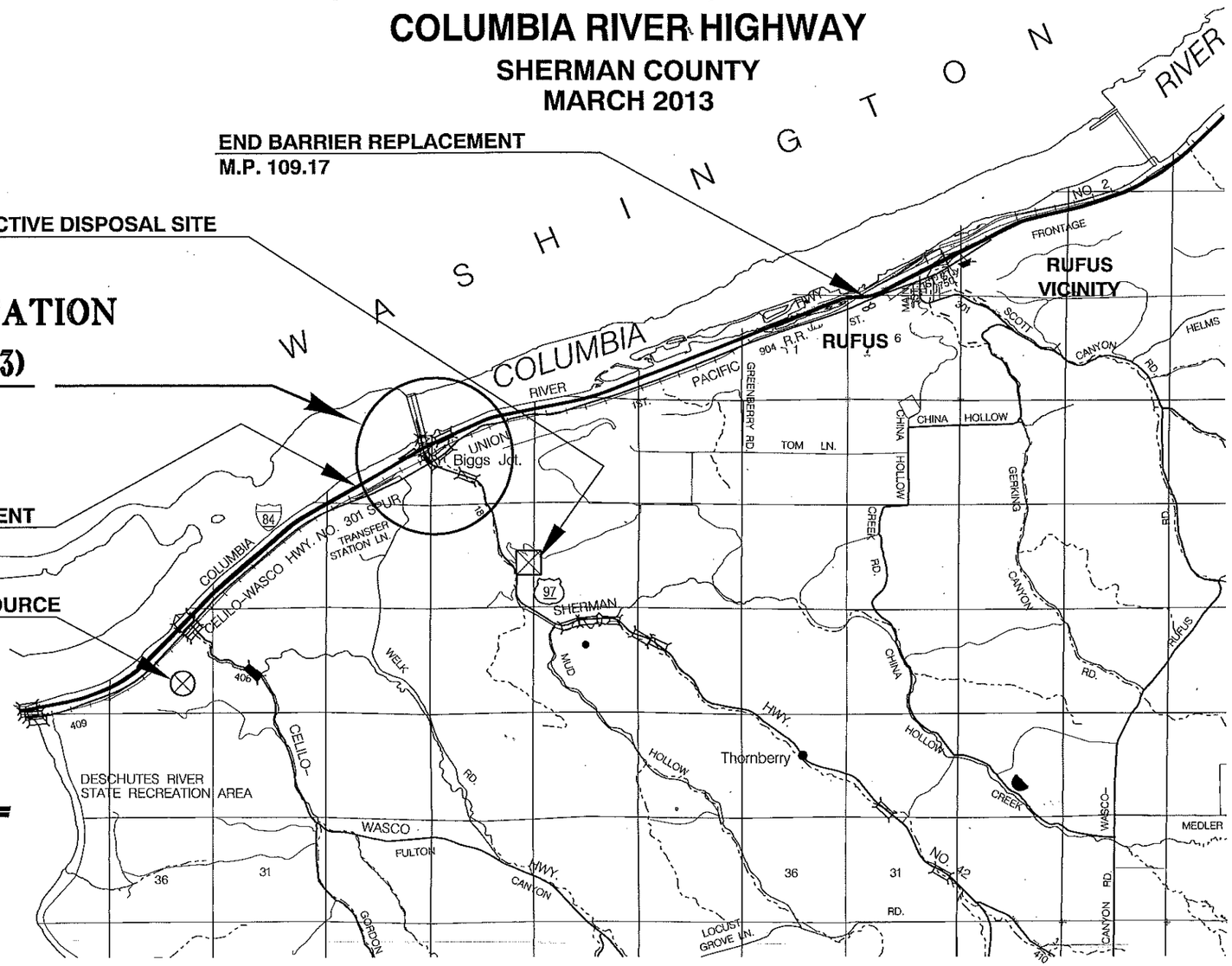
PROSPECTIVE DISPOSAL SITE
M.P. 1.5

PROJECT LOCATION

HSIP-SO-S002(133)
M.P. 104.50

BEGIN BARRIER REPLACEMENT
M.P. 103.77

PROSPECTIVE MATERIAL SOURCE
M.P. 101.68



T. 2 N., R. 16 E., W.M.

OREGON TRANSPORTATION COMMISSION

Pat Egan	CHAIR
David Lohman	COMMISSIONER
Mary F. Olson	COMMISSIONER
Mark Frohnmayer	COMMISSIONER
Tammy Baney	COMMISSIONER
Matthew L. Garrett	DIRECTOR OF TRANSPORTATION

These plans were developed using ODOT design standards. Exceptions to these standards, if any, have been submitted and approved by the ODOT Chief Engineer or their delegated authority.

Approving Authority: Jon W. Heacock 12/21/12
Signature & date

Jon Heacock, Region 4 TCM
Print name and title

Concurrence by ODOT Chief Engineer

FFO - I-84 @ US97 INTERCHANGE (BIGGS JUNCTION) PROJECT
COLUMBIA RIVER HIGHWAY
SHERMAN COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	HSIP-SO-S002(133)	1

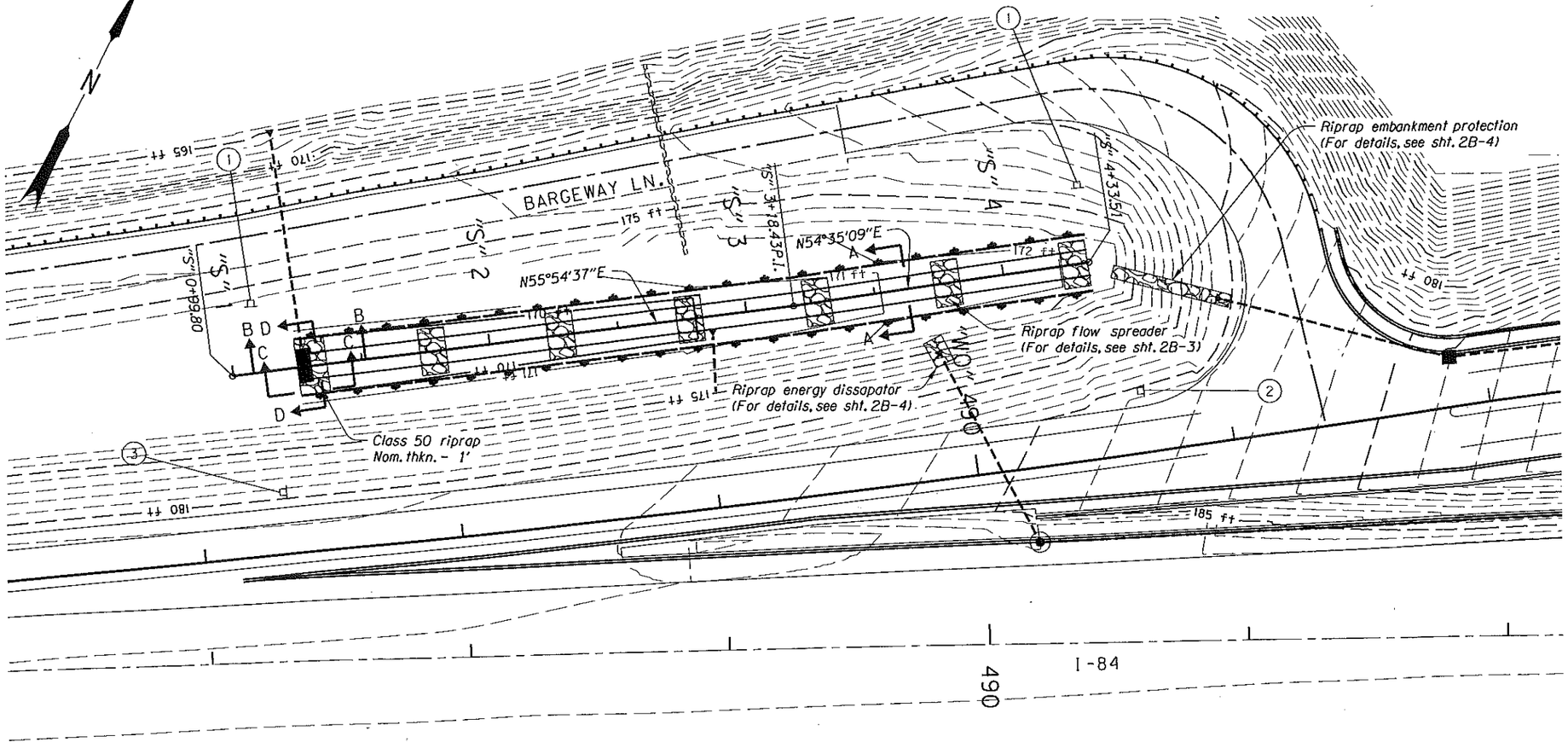
F:\ODOT_DATA\Projects\16940_Biggs_Junction\16940ts.dgn :: Default 12/20/2012 1:52:49 PM hwye431

1:1200 - 001

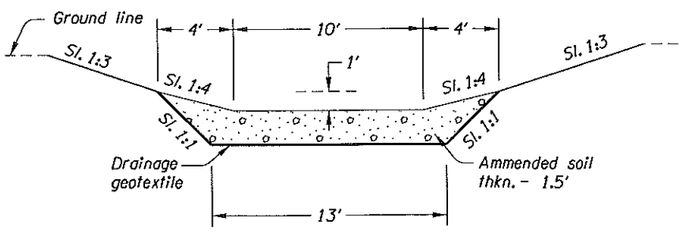
(1) Inst. Type "S2" marker
DFI no. D00683
(See drg. no RD399)

(2) Inst. Type "S1" marker - green
(See drg. no RD399)

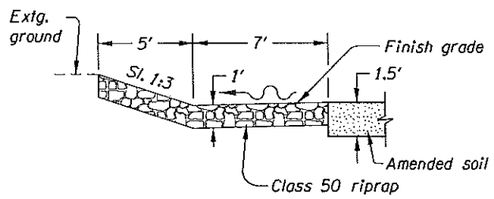
(3) Inst. Type "S1" marker - red



SWALE PLAN



SECTION A-A



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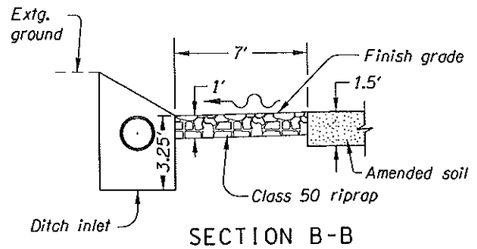
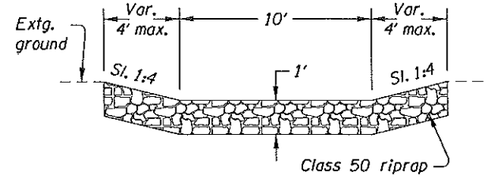


SECTION B-B

(For details not shown, see drg. no. RD370)



SECTION D-D

OREGON DEPARTMENT OF TRANSPORTATION

REGION 4 TECHNICAL CENTER

FFO - I-84 @ US97 INTERCHANGE
(BIGGS JUNCTION) PROJECT
COLUMBIA RIVER HIGHWAY
SHERMAN COUNTY

Reviewed By - Michael W. Ogden
Designed By - Wade J. Coatney
Drafted By - Joseph J. Rodriguez

DETAILS

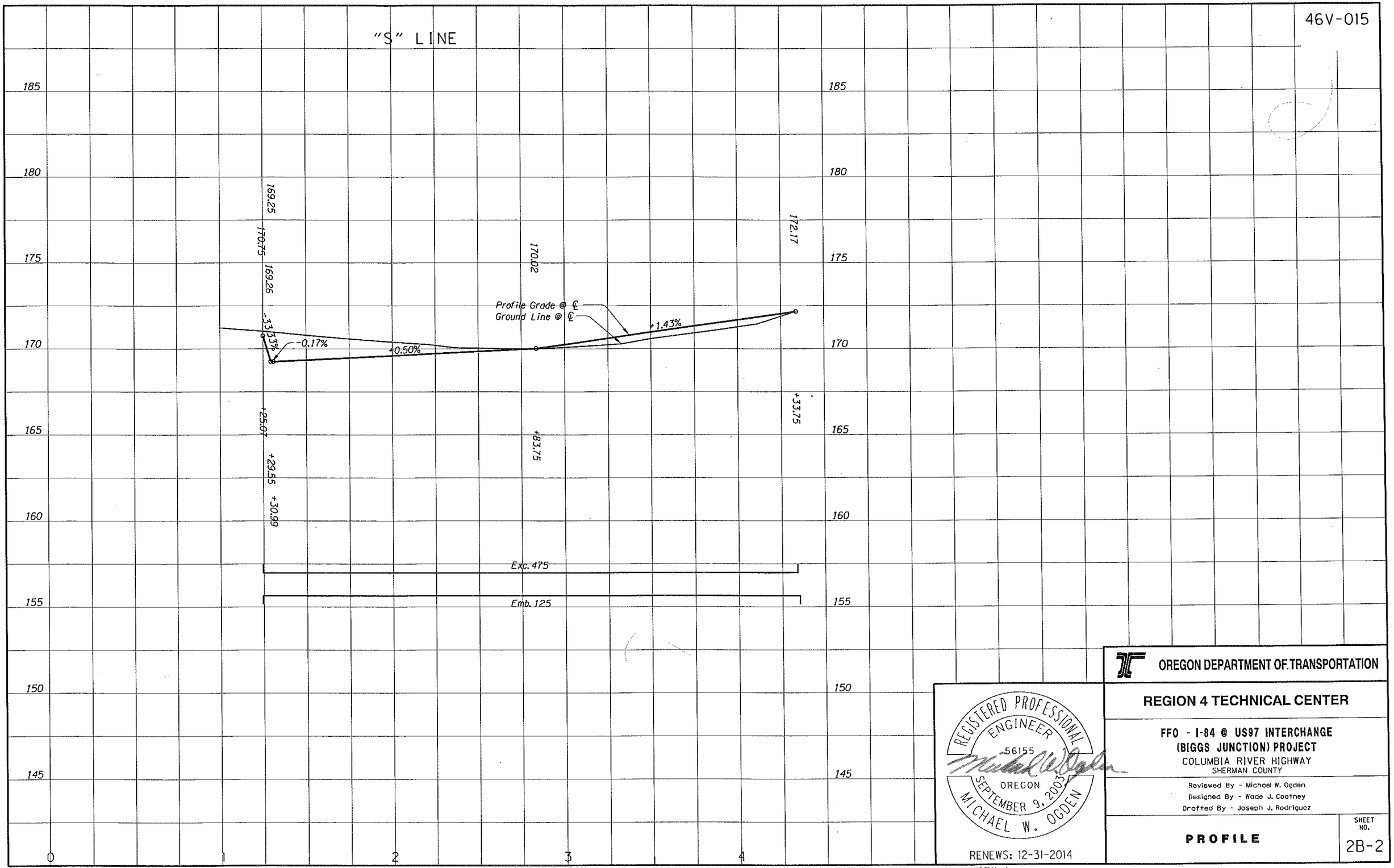
SHEET NO. 2B

REGISTERED PROFESSIONAL ENGINEER
56155
OREGON
SEPTEMBER 9, 2003
MICHAEL W. OGDEN
RENEWS: 12-31-2014

VIEW 1

46V-015

"S" LINE



OREGON DEPARTMENT OF TRANSPORTATION

REGION 4 TECHNICAL CENTER

REGISTERED PROFESSIONAL ENGINEER
56155
OREGON
SEPTEMBER 9, 2003
MICHAEL W. OGDEN
RENEWS: 12-31-2014

FFO - I-84 @ US97 INTERCHANGE
(BIGGS JUNCTION) PROJECT
COLUMBIA RIVER HIGHWAY
SHERMAN COUNTY

Reviewed By - Michael W. Ogden
Designed By - Wade J. Coatney
Drafted By - Joseph J. Rodriguez

PROFILE

SHEET NO. 2B-2

F:\ODOT_DATA\Projects\16940_Biggs_Junction\16940dt02.dgn :: Default 12/19/2012 4:28:29 PM hwye431

VIEW 1

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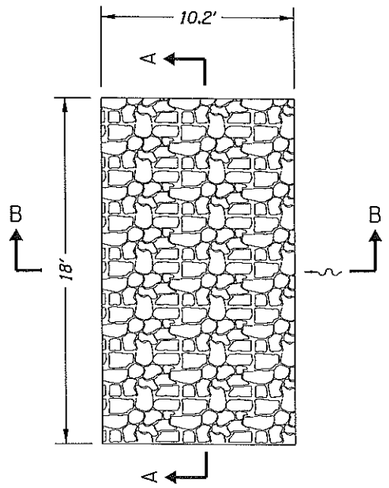
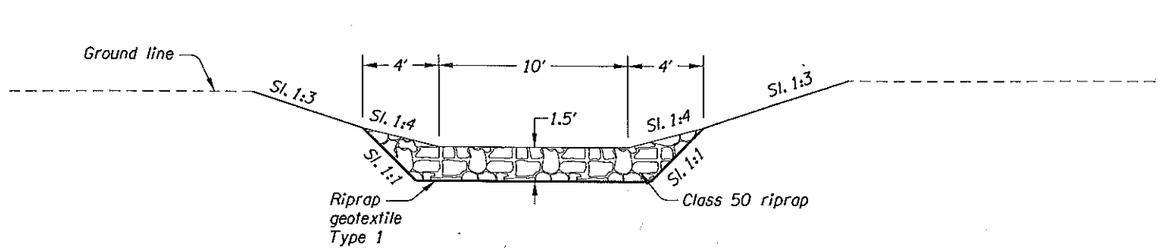
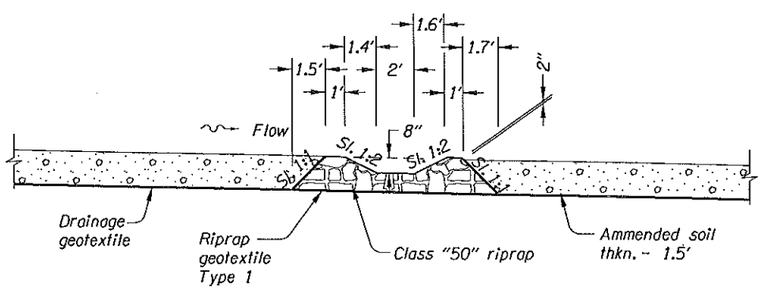


PLAN

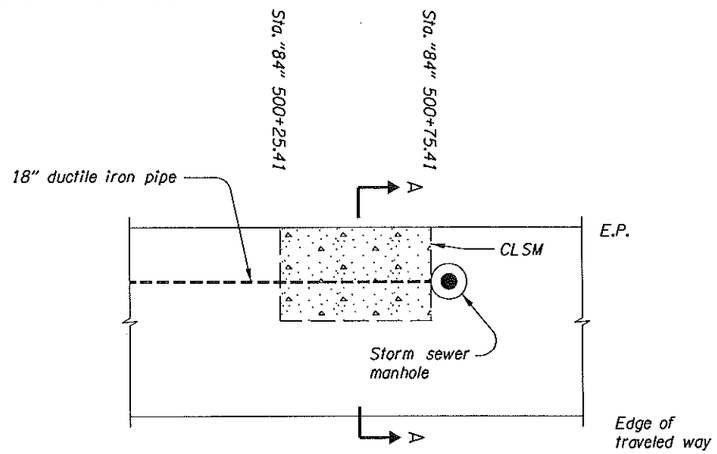


SECTION A-A



SECTION B-B

RIPRAP FLOW SPREADER



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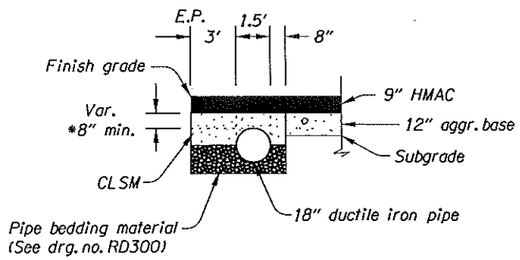


SECTION A-A

CONCRETE CAP

*Thickness varies to match top of aggr. base elevation

NOTE:
1. Side-slopes are shown as vert. to horiz.

OREGON DEPARTMENT OF TRANSPORTATION

REGION 4 TECHNICAL CENTER

FFO - I-84 @ US97 INTERCHANGE
(BIGGS JUNCTION) PROJECT
COLUMBIA RIVER HIGHWAY
SHERMAN COUNTY

Reviewed By - Michael W. Ogden
Designed By - Wade J. Cootney
Drafted By - Joseph J. Rodriguez

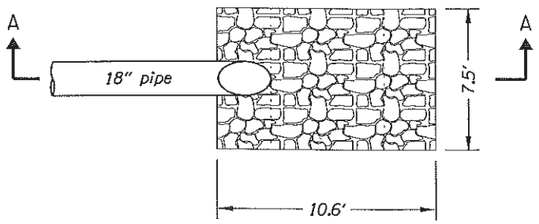
DETAILS

SHEET NO. 2B-3

REGISTERED PROFESSIONAL ENGINEER
56155
OREGON
SEPTEMBER 9, 2003
MICHAEL W. OGDEN

RENEWS: 12-31-2014

VIEW 3



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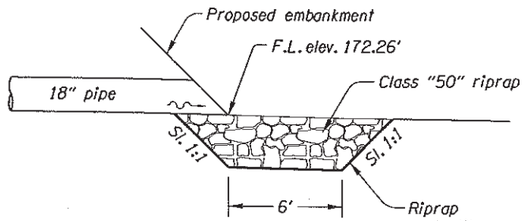
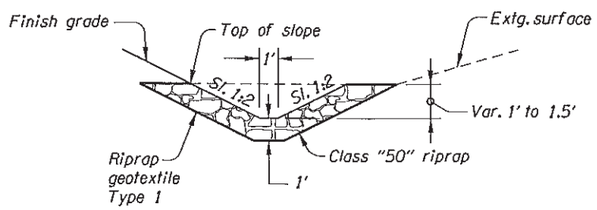
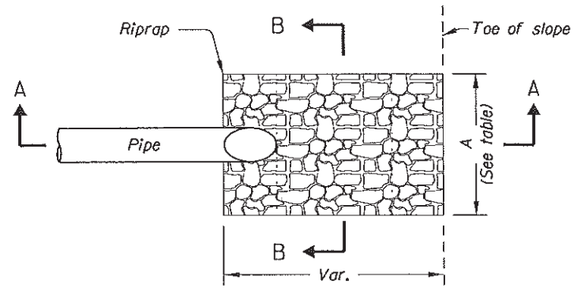


SECTION A-A

RIPRAP ENERGY DISSAPATOR



RIPRAP DITCH



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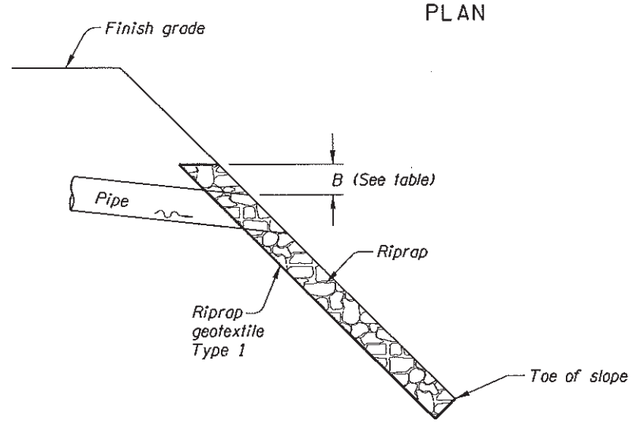

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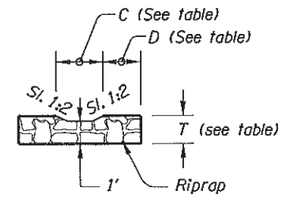


SECTION B-B

EMBANKMENT PROTECTION

TABLE A						
PIPE DIA.	Riprap Class	A	B	C	D	t
12"	50	5'	0.5'	1.5'	1.25'	1.25'
18"	200	7.5'	1'	2.5'	1'	2.25'

REGISTERED PROFESSIONAL ENGINEER
56155
OREGON
SEPTEMBER 9, 2003
MICHAEL W. OGDEN

RENEWS: 12-31-2014

OREGON DEPARTMENT OF TRANSPORTATION

REGION 4 TECHNICAL CENTER

FFO - I-84 @ US97 INTERCHANGE (BIGGS JUNCTION) PROJECT
COLUMBIA RIVER HIGHWAY
SHERMAN COUNTY

Reviewed By - Michael W. Ogden
Designed By - Wade J. Coatney
Drafted By - Joseph J. Rodriguez

DETAILS

SHEET NO. 2B-4

Sec. 8 & 9, T. 2 N., R. 16 E., W.M.

46V-015

Water Quality swale
DFI no:
D00683

BEGINNING OF PROJECT
"97" STA. 0+05.09 (M.P. -0.19)

"B" LINE
"WO" LINE
"97" LINE
"EX" LINE
"EO" LINE
"WX" LINE
BARGEWAY LN.
Columbia River Shoreline
U.S. 97
184: COLUMBIA RIVER HWY.
Paving Limit
Maint. access via WB On-Ramp
BRIDGE OVER RAILROAD
UPRR Easement
MATCH LINE "A" SEE SHEET 5H
RENEWS: 12-31-2012

OREGON DEPARTMENT OF TRANSPORTATION

REGION 4 TECHNICAL CENTER

FFO - I-84 @ US97 INTERCHANGE
(BIGGS JUNCTION) PROJECT
COLUMBIA RIVER HIGHWAY
SHERMAN COUNTY

Reviewed By - Michael W. Ogden
Designed By - Wade J. Coatney
Drafted By - Joseph J. Rodriguez

DRAINAGE & UTILITIES

SHEET NO. 5B

(1) See Sht. 4A, Note 2

(2) Plug and abandon culvert
Remove culvert ends - 38'
Saw cut to match extg. slopes

(3) Plug and abandon culvert
Remove culvert ends - 30'
Saw cut to match extg. slopes

(4) Plug and abandon culvert
Remove culvert ends - 20'
Saw cut to match extg. slopes

(5) Const. riprap energy dissipator
(For details, see sht. 2B-4)

(6) Sta. "84" 490+20.35, Lt.
Const. manhole w/ 1.5' sump
See drg. nos. RD344 & RD384
I.E. (18" In) - 175.18'
I.E. (18" Out) - 175.08
Inst. 18" storm sew. pipe - 81'
10' depth
S = .0050'/ft
I.E. (12" outfall) = 174.68'
See drg. nos. RD300, RD302, RD336, RD386, & RD388

(7) Sta. "84" 493+59.60, Lt.
Remove extg. culv. pipe - 21'
Connect to extg. storm sew. pipe
Const. manhole w/ 1.5' sump
I.E. (12" Extg.) - 180.56'
I.E. (18" In) - 176.99'
I.E. (18" Out) - 176.89'
Inst. 18" ductile iron pipe - 341'
10' depth
S = 0.0050'/ft

(8) Sta. "84" 496+44.14, Lt.
Remove extg. culv. pipe - 24'
Connect to extg. storm sew. pipe
Const. manhole w/ 1.5' sump
I.E. (12" Extg.) - 180.46'
I.E. (18" In) - 178.18'
I.E. (18" Out) - 178.08'
Inst. 18" ductile iron pipe - 286'
10' depth
S = 0.0038'/ft

(9) Sta. "84", 498+47.22, Lt.
Const. manhole w/ 1.5' sump
I.E. (18" In) - 179.05'
I.E. (18" Out) - 178.95'
Inst. 18" ductile iron pipe - 204'
10' depth
S = 0.0038'/ft

(10) Sta. "WX" 499+93.86 Rt.
Const. type "G-2" inlet w/ 1.5' sump
See drg. no. RD364
I.E. (12" In) - 181.39'
I.E. (12" Out) - 181.29'
Inst. 12" storm sew. pipe - 80'
5' depth
S = 0.0100'/ft

(11) Sta. "WX" 497+80.92 Rt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" Out) - 191.20'
Inst. 12" storm sew. pipe - 213'
5' depth
S = 0.0462'/ft

(12) Const. riprap embankment protection
(For details, see sht. 2B-4)

(13) Sta. "WO" 491+86.90, Lt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" In) - 185.36'
I.E. (12" Out) - 185.26'
Inst. 12" storm sew. pipe - 93'
5' depth
S = 0.0400'/ft
I.E. (12" outfall) = 181.57'

(14) Sta. "WO" 494+43.39 Lt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" In) - 197.59'
I.E. (12" In) - 197.59'
I.E. (12" Out) - 197.49'
Inst. 12" storm sew. pipe - 258'
5' depth
S = 0.0471'/ft

(15) Sta. "97" 2+19.85 Rt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" In) - 199.35'
I.E. (12" Out) - 199.25'
Inst. 12" storm sew. pipe - 58'
5' depth
S = 0.0288'/ft

(16) Sta. "97" 2+22.53 Rt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" In) - 199.47'
I.E. (12" Out) - 199.37'
Inst. 12" storm sew. pipe - 5'
5' depth
S = 0.005'/ft

(17) Sta. "97" 1+95.34 Lt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" In) - 200.04'
I.E. (12" Out) - 199.94'
Inst. 12" storm sew. pipe - 95'
5' depth
S = 0.005'/ft

(18) Sta. "97" 1+89.57 Lt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" Out) - 200.08'
Inst. 12" storm sew. pipe - 8'
5' depth
S = 0.005'/ft

(19) Sta. "97" 1+45.19, Rt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" Out) - 199.92'
Inst. 12" storm sew. pipe - 51'
5' depth
S = 0.0463'/ft

(20) Sta "EO" 494+82.81, Lt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" Out) - 205.39'
Inst. 12" storm sew. pipe - 57'
5' depth
S = 0.0100'/ft

(21) Sta "EO" 494+83.49, Rt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" In) - 204.82'
I.E. (18" In) - 206.64'
I.E. (18" Out) - 204.72'
Inst. 18" storm sew. pipe - 253'
10' depth
S = 0.0449'/ft

(22) Sta "EO" 496+98.89 Lt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" Out) - 194.57'
Inst. 12" storm sew. pipe - 42'
5' depth
S = 0.0288'/ft

(23) Sta "EO" 497+31.70, Rt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" In) - 193.38'
I.E. (18" In) - 193.34'
I.E. (18" Out) - 193.28'
Inst. 18" storm sew. pipe - 26'
5' depth
S = 0.1000'/ft

(24) Const. riprap embankment protection
(For details, see sht. 2B-4)

(25) Sta. "WO" 497+48.50 Rt to Sta "WO" 497+87.30 Rt
Const. riprap lined ditch
(For details see sht. 2B-4)

(26) Inst. 12" HDPE culvert pipe - 136'
Slipline extg. pipe - 100'
I.E. (In) - 177.67'
I.E. (Out) - 174.78'
10' depth
S = 0.0213'/ft
(For details, see shts. 2B-5 & 2B-6)

(27) Sta. "97" 5+45.96, Lt.
Const. manhole w/ 1.5' sump
I.E. (12" In) - 208.42'
I.E. (18" In) - 209.99'
I.E. (18" Out) - 208.31'
Inst. 18" storm sew. pipe - 42'
5' depth
S = 0.0401'/ft

(28) Sta. "97" 5+52.00 Lt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" In) - 208.61'
I.E. (12" Out) - 208.51'
Inst. 12" storm sew. pipe - 9'
5' depth
S = 0.0100'/ft

(29) Sta. "97" 5+55.40 Lt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" Out) - 208.65'
Inst. 12" storm sew. pipe - 5'
5' depth
S = 0.0100'/ft

(30) Sta. "97" 5+78.30, Lt.
Inst. 15 degree pipe bend

(31) Sta. "97" 7+70.11, Lt.
Inst. 15 degree pipe bend

(32) Sta. "97" 7+92.78, Lt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" In) - 216.80'
I.E. (18" In) - 216.80'
I.E. (18" Out) - 216.70'
Inst. 18" storm sew. pipe - 243'
5' depth
S = 0.0253'/ft

(33) Sta. "97" 7+87.89, Lt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" Out) - 216.86'
Inst. 12" ductile iron pipe - 7'
5' depth
S = 0.0100'/ft

(34) Sta. "WO" 489+03.87
Inst. 18" culv. pipe - 22'
Connect to extg. culv. pipe
Match extg. material
S = 0.005'/ft
I.E. (Out) = 170.44'

(35) Inst. Type "S1" marker - green
(See drg. no RD399)

(36) Inst. Type "S2" marker
DFI no. D00684
(See drg. no RD399)

(37) Sta. "97" 7+66.85 to Sta. "97" 7+92.78, Lt.
Const. conc. cap
(See drg. no. RD306)

(38) Extg. bio-retention pond
Preserve and protect

(39) Relocate utility
(By others)

REGISTERED PROFESSIONAL ENGINEER
56155
OREGON
SEPTEMBER 9, 2003
MICHAEL W. OGDEN
RENEWS: 12-31-2012

OREGON DEPARTMENT OF TRANSPORTATION

REGION 4 TECHNICAL CENTER

FFO - I-84 @ US97 INTERCHANGE
(BIGGS JUNCTION) PROJECT
COLUMBIA RIVER HIGHWAY
SHERMAN COUNTY

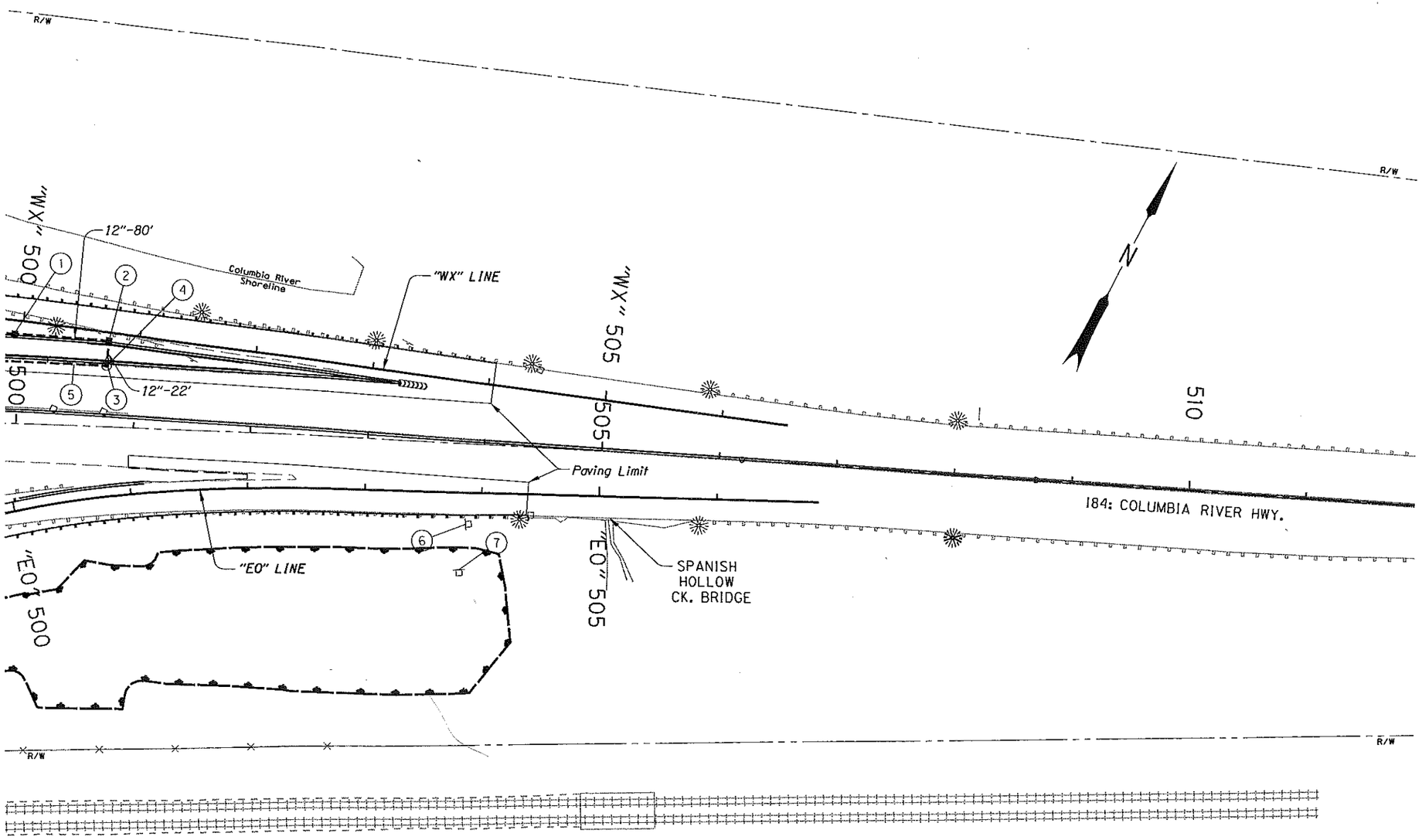
Reviewed By - Michael W. Ogden
Designed By - Wade J. Coatney
Drafted By - Joseph J. Rodriguez

DRAINAGE NOTES

SHEET NO. 5C

Sec. 9, T. 2 N., R. 16 E., W.M.

46V-015



(1) See shts. 5B & 5C Note 10

(2) Sta. "WX" 500+73.81 Rt.
Const. type "G-2" inlet w/ 1.5' sump
I.E. (12" In) - 180.49'
I.E. (12" Out) - 180.39'
Inst. 12" storm sew. pipe - 22'
5' depth
S = 0.0232'/ft

(3) Sta. "84" 500+75.41, Lt.
Connect to extg. storm sew. pipe
Const. manhole
I.E. (12" Extg.) - 180.45'
I.E. (12" In) - 179.88'
I.E. (18" Out) - 179.78'
Inst. 18" ductile iron pipe - 229'
5' depth
S = 0.0032'/ft

(4) Remove culv. pipe - 7'

(5) Sta. "84" 500+25.41 to Sta. "84" 500+75.41, Lt.
Const. conc. cap
(For details, see sht. 2B-5)

(6) Inst. type "S1" marker - red

(7) Inst. type "S2" marker
DFI no. D00684

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56155
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DRAINAGE & UTILITIES

SHEET NO. 6A

VIEW 5