

OPERATION & MAINTENANCE MANUAL

Water Quality Biofiltration Swale

Manual prepared: December 2017

DFI No. D00473



Figure 1: DFI No. D00473, looking southeast

Identification

Drainage Facility ID (DFI): D00473
Facility Type: Water Quality Biofiltration Swale
Construction Drawings: (V-File Numbers) 40V-24
Location: District: 10
Highway No.: 041
Mile Post: 65.62 to 65.64, SB [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: Roadside shoulder

Flow direction: Southeast

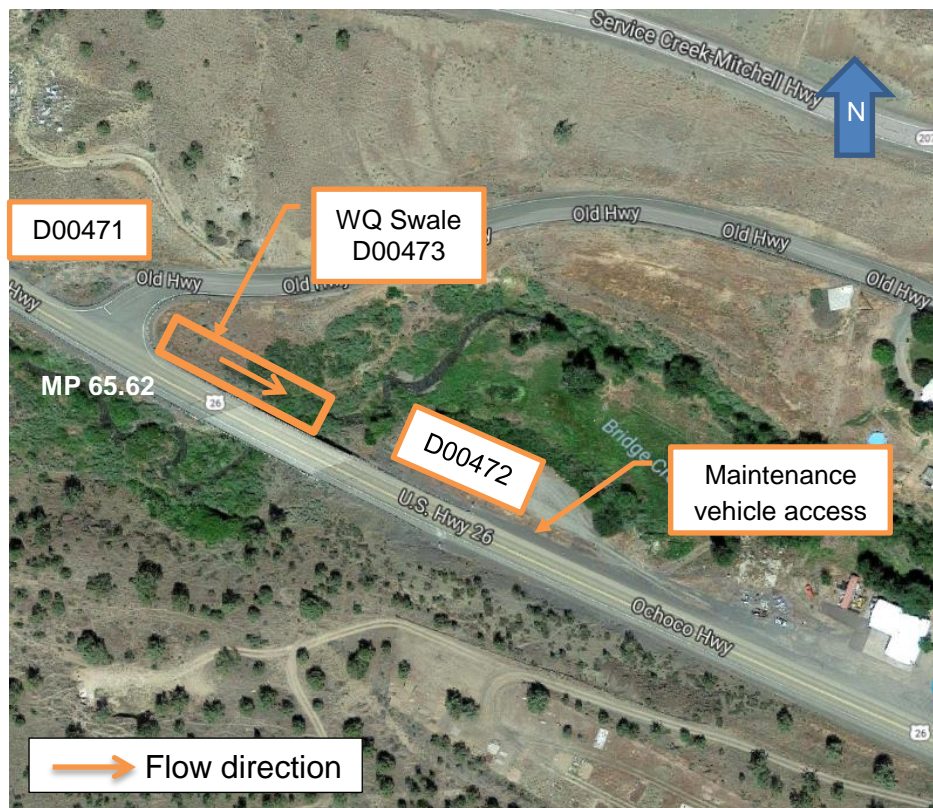


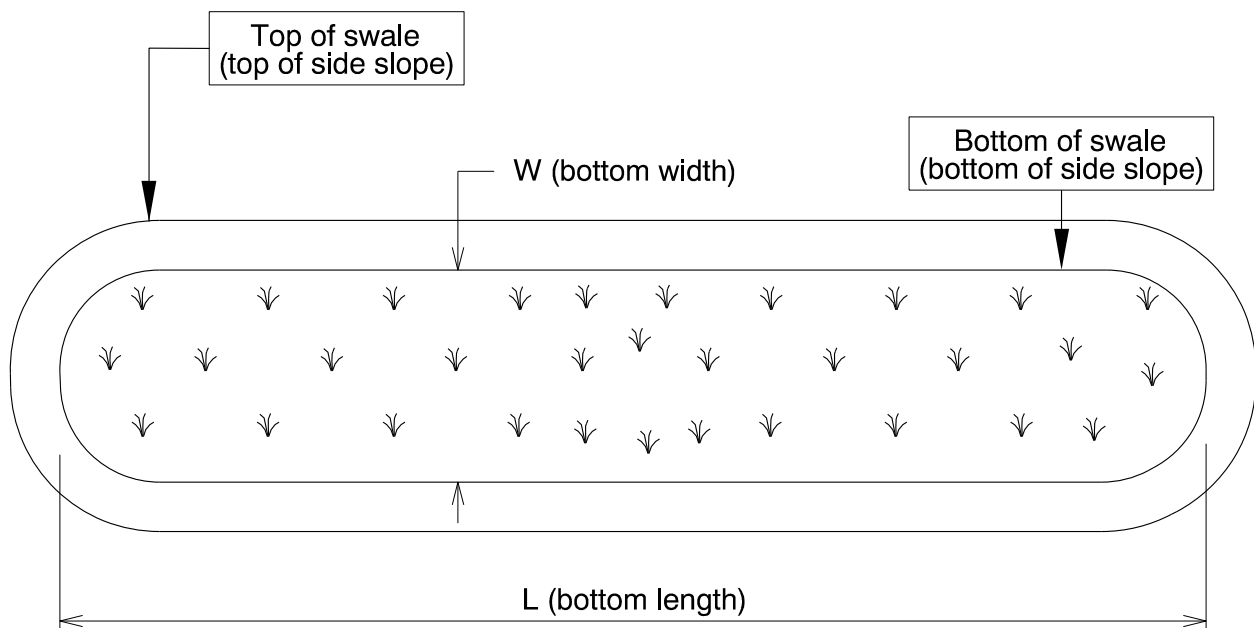
Figure 2: Facility location map

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:

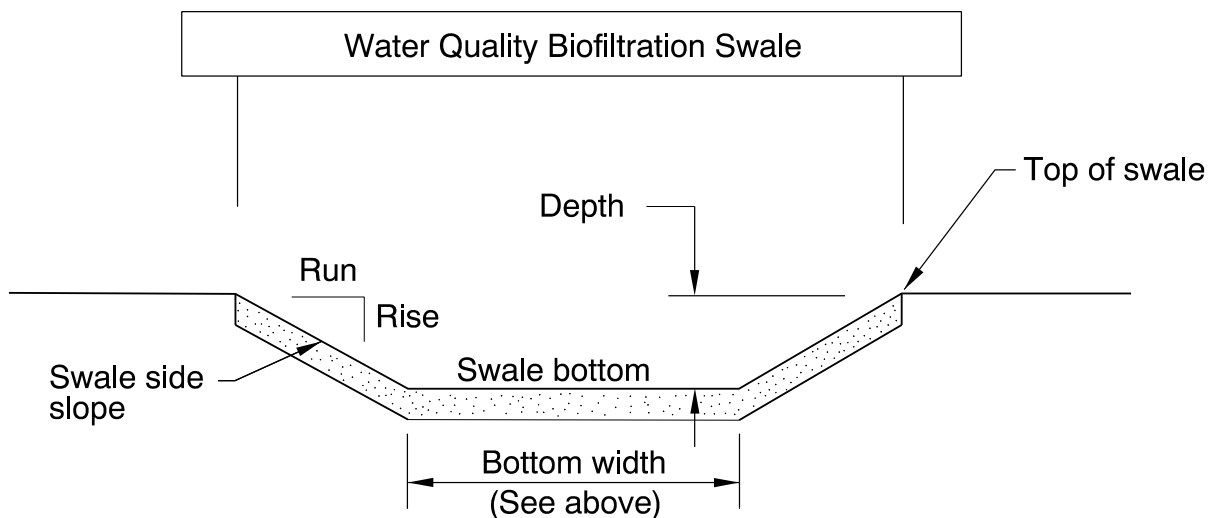
Bottom Length (feet)	Bottom Width (feet)
± 120	± 4



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)
Varies ± 1.2	1	4



Site Specific Information: The facility location provides limited access to maintenance equipment. The swale is surrounded by guardrail on the west side and by Bridge Creek on the east side. Maintenance vehicles may be parked on the roadway shoulder near DFI D00472 (see Appendix A).

4. Facility Access

Maintenance access to the facility:

<input type="checkbox"/> Roadside pad	<input checked="" type="checkbox"/> Roadside shoulder
<input type="checkbox"/> Access road with Gate	<input type="checkbox"/> Access road without Gate



Figure 3: Surrounding guardrail limits maintenance access to the facility location.

5. Operational Components / Maintenance Items

Classification

This facility is classified as an:

<input checked="" type="checkbox"/> On-line Swale	<input type="checkbox"/> 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:

<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes
There is no bypass component. High flows drain 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:

<input checked="" type="checkbox"/> Operational Plan A <input type="checkbox"/> Operational Plan B <input type="checkbox"/> 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 in table 1.

Table 1: Swale Components		ID #
Manholes/Structures		
Pre-treatment manhole	<input type="checkbox"/>	S1
Weir type flow splitter/flow splitter	<input type="checkbox"/>	S2
Orifice type flow splitter/flow splitter	<input type="checkbox"/>	S3
Standard manhole	<input type="checkbox"/>	S4
Swale Inlet		
Pavement sheet flow	<input checked="" type="checkbox"/>	S5
Inlet Pipe (s)	<input type="checkbox"/>	S6
Open channel inlet	<input type="checkbox"/>	S7
Riprap pad	<input checked="" type="checkbox"/>	S8
Ground Cover		
Grass bottom	<input checked="" type="checkbox"/>	S9
Grass side slopes	<input checked="" type="checkbox"/>	S10
Granular drain rock	<input type="checkbox"/>	S11
Plantings	<input type="checkbox"/>	S12
Underground Components		
Geotextile fabric	<input type="checkbox"/>	S13
Water quality mix (12" top soil)	<input checked="" type="checkbox"/>	S14
Perforated pipe	<input type="checkbox"/>	S15
Porous pavers (access grid)	<input type="checkbox"/>	S16
Flow Spreader		
Rock basin (used as outlet)	<input type="checkbox"/>	S17
Anchored board (midpoint of swale or every 50 feet along swale bottom)	<input type="checkbox"/>	S18
Other: Type 1 Check dams, approx. every 20 ft.	<input checked="" type="checkbox"/>	S19
Swale Outlet		
Catch basin with grate	<input type="checkbox"/>	S20
Outlet Pipe (s)	<input type="checkbox"/>	S21
Open channel outlet	<input type="checkbox"/>	S22
Auxiliary Outlet:	<input type="checkbox"/>	S23
Outfall Type		
Waterbody (Creek/Lake/Ocean)	<input checked="" type="checkbox"/> C	S24
	<input type="checkbox"/> L	
	<input type="checkbox"/> O	
Ditch	<input type="checkbox"/>	S25
Storm drain system	<input type="checkbox"/>	S26
Outfall Components		
Riprap pad	<input checked="" type="checkbox"/>	S27
Riprap bank protection	<input type="checkbox"/>	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:

<input checked="" type="checkbox"/> No	<input type="checkbox"/> 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.

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

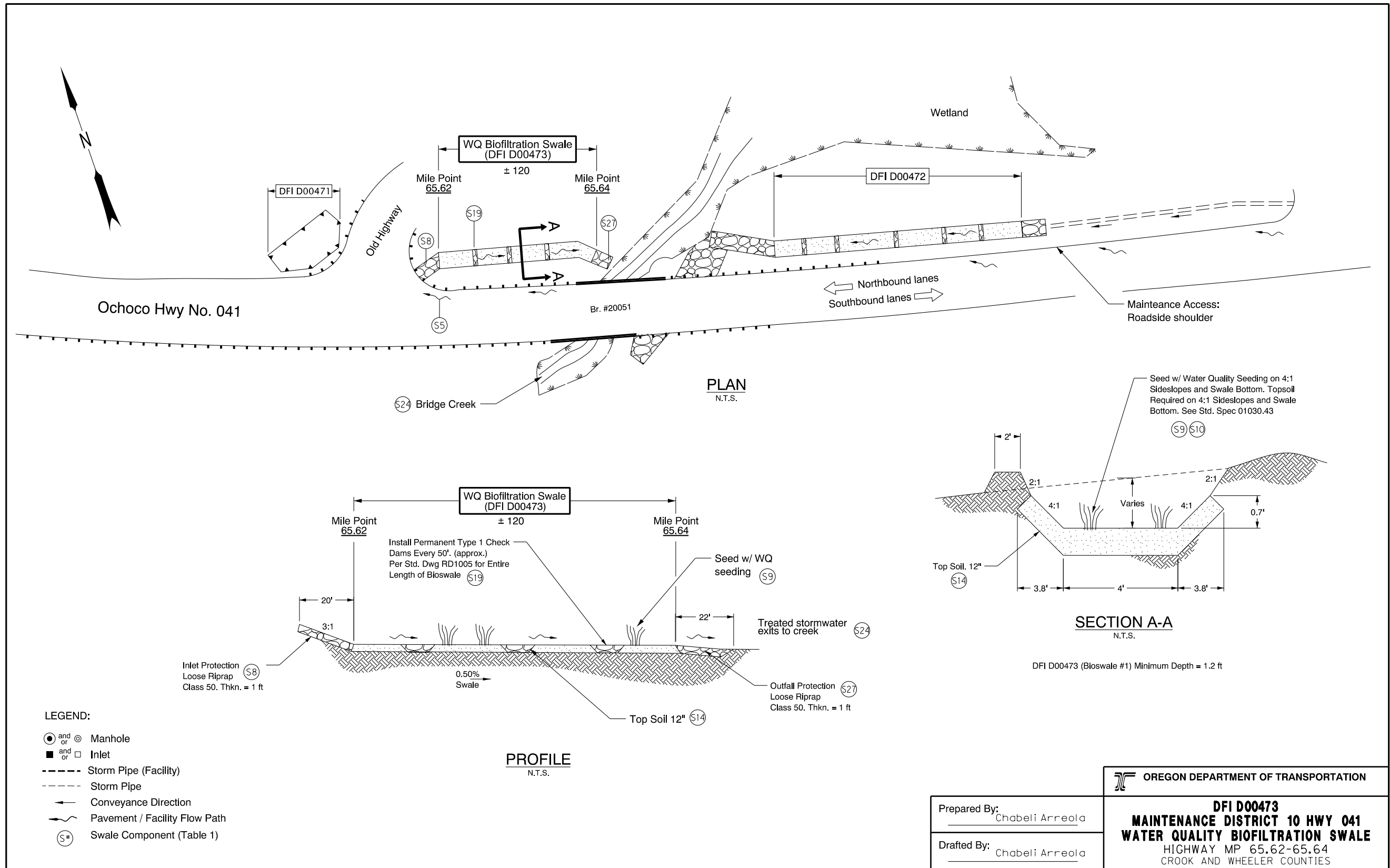
Contact any of the following for more detailed information about management of waste materials found on site:

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 D00473



DFI_D00473.dgn

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B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 40V-24

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STATE OF OREGON
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT
PAVING AND STRUCTURES

US26: RUSH CREEK-ANTONE-BUNDLE A51

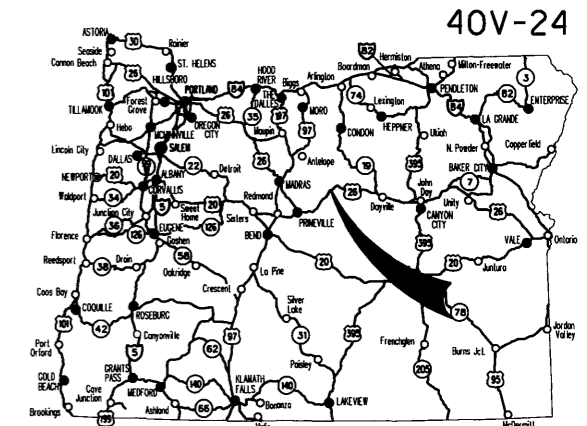
OCHOCO HIGHWAY

CROOK AND WHEELER COUNTIES

March 2007

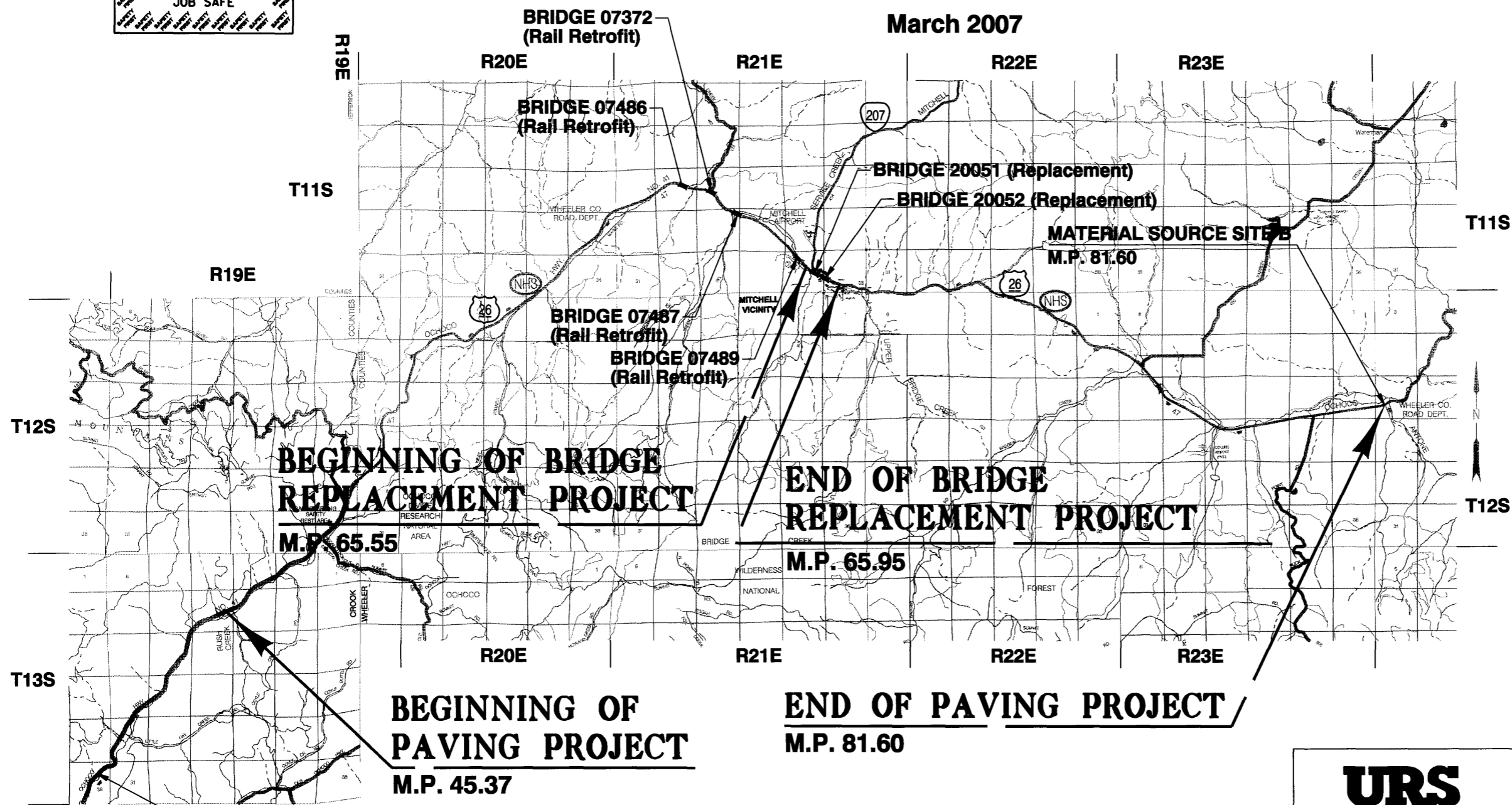
INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
1	Title Sheet
1A	Index Of Sheets Cont'd. & Std. Drg. Nos.

Revised Plan
Sheets Incorporated



Overall Length Of Project - 36.23 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.)



OREGON TRANSPORTATION COMMISSION

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

PLANS PREPARED FOR
OREGON DEPT. OF TRANSPORTATION
BY:
URS



OREGON DEPARTMENT OF TRANSPORTATION
CONCURRENCE
[Signature] 2-07
Technical Services Managing Engineer DATE

US26: RUSH CREEK-ANTONE-BUNDLE A51
OCHOCO HIGHWAY
CROOK AND WHEELER COUNTIES

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	NH-0T1A-S041 (021)	1

URS
ENGLISH
111 S.W. Columbia, Suite 1500
Portland, Oregon 97201
(tel) 503-222-7200
(fax) 503-222-4292

INDEX OF SHEETS CONT'D.	
SHEET NO.	DESCRIPTION
2A Thru 2A-5	Typical Sections
2B Thru 2B-13	Details
2C Thru 2C-13	Traffic Control Plans
2D	Pipe Data Sheet
3, 3A, 3B - 4, 4A, 4B	Detour R/W Alignment, Const. & Profile
5, 5A - 6, 6A	Mainline Const. & Profile

PERMANENT PAVEMENT MARKINGS	
ST Thru ST-2	Striping Plan

GEO/HYDRO	
GA Thru GA-2	Erosion Control Plans
GM Thru GM-5	Prospective Material Source and Cross Sections

DRAWING NO.	DESCRIPTION
BRIDGE NO. 20051	
75135	Plan & Elevation
75136	General Notes
75137	Foundation Data
75138	Foundation Plan
75139	End Bent 1 Plan and Elevation
75140	End Bent 2 Plan and Elevation
75141	End Bent Detail and Bearing Details
75142	Wingwall Details
75143	Standard Bulb-T Beam Details
75144	Bulb-T beam Schedule and Misc. Details
75145	Deck Section and Details
75146	Deck Elevations

DRAWING NO.	DESCRIPTION
BRIDGE NO. 20052	
75147	Plan & Elevation
75148	General Notes
75149	Foundation Data
75150	Foundation Plan
75151	End Bent 1 Plan and Elevation
75152	End Bent 2 Plan and Elevation
75153	End Bent Detail and Bearing Details
75154	Wingwall Details
75155	Girder Details 1
75156	Girder Details 2
75157	Standard Precast Prestressed Box Schedule
75158	Deck Section and Details
75159	Deck Elevations

DRAWING NO.	DESCRIPTION
STRUCTURE NO. 20492	
75160	Retaining Wall Design

DRAWING NO.	DESCRIPTION
BRIDGE NO. 07486	
75161	Plan

INDEX OF SHEETS CONT'D.

DRAWING NO.	DESCRIPTION
BRIDGE NO. 07372	
75162	Plan

DRAWING NO.	DESCRIPTION
BRIDGE NO. 07487	
75163	Plan

DRAWING NO.	DESCRIPTION
BRIDGE NO. 07489	
75164	Plan

DRAWING NO.	DESCRIPTION
PERMANENT SIGNING	
S-09261 Thru S-09271	Signing Plan

Standard Drg. Nos.

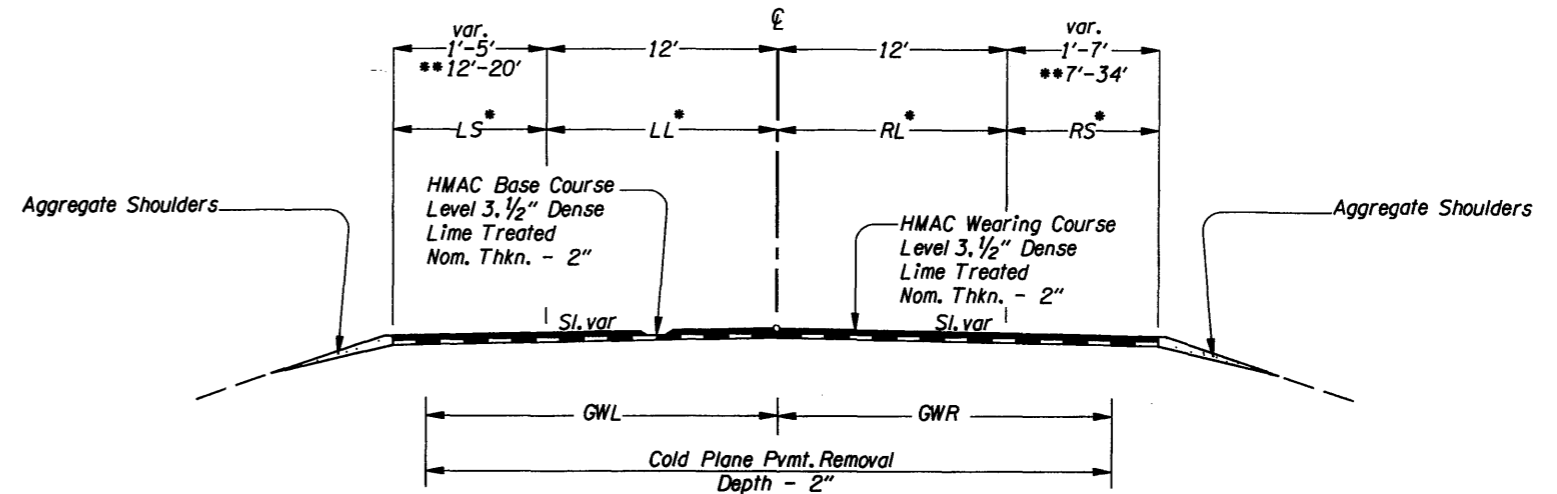
- RD100, RD101 - Mailbox Installation
- RD200 - Superelevated Sections
- RD230 - Slope Rounding
- RD300, RD304 - Pipe Backfill and Compaction
- RD316, RD318 - Slope End Section
- RD326 - Coupling Bands
- RD364 - Concrete Inlets
- RD380, RD382, RD384, RD386 - Fill Height Tables
- RD400, RD405 - Guardrail Parts
- RD410 - Thriebeam
- RD415 - Guardrail
- RD420 - Terminals
- RD440 - Guardrail at Bridge Ends
- RD450 - Guardrail Anchors
- RD610 - Asphalt Pavement
- RD700 - Curbs
- RD715 - Approaches
- RD810, RD820 - Fences
- RD900, RD905, RD908, RD910, RD911, RD935, RD945, RD950 - Traffic Control
- RD1000, RD1005, RD1010, RD1030, RD1040, RD1055 - Erosion Control
- BR140 - Expansion Joint w/ Compression Seal or Poured Sealant
- BR165 - Bridge End Panel
- BR200 - Type "F" Rail
- BR203 - Bridge Rail/Guardrail Transition
- BR233 - Thrie Beam Rail
- BR273 - Thrie Beam Rail Retrofit
- BR350 - Temporary Diaphragms
- BR445 - Prestressed Boxes & Slabs
- TM100, TM105 - Temporary Wood Posts
- TM200, TM201, TM205, TM206, TM207, TM211, TM212, TM217, TM221, TM222, TM223, TM235, TM239, TM240 - Permanent Signing
- TM500, TM501, TM502, TM525, TM545 - Pavement Markings Details
- TM570, TM575 - Delineators
- TM600, TM601, TM602, TM603, TM604 - Breakaway Sign Supports
- TM670 - Permanent Signing Wood Post Sizing Chart

REVISIONS	
1	Revised 03-12-2007 Revised Sheet Number
2	Revised 03-12-2007 Added Std. Drg. BR445
3	Revised 03-12-2007 Deleted Std. Drg. BR800

US26: RUSH CREEK-ANTONE-BUNDLE A51 OCHOCO HIGHWAY CROOK AND WHEELER COUNTIES		
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	NH-OTIA-S041 (021)	1A

MP	GWL	LS	LL	RL	RS	GWR
45.370	14	3	11	11	2	13
45.490	13	3	12	11	3	14
45.785	14	2	12	11	4	13
45.951	13	2	11	12	3	13
46.188	14	3	11	11	3	14
46.366	14	3	11	11	4	13
46.549	14	2	12	10	3	13
46.879	13	2	11	11	3	14
47.023	13	2	11	11	2	13
47.279	12	2	10	11	3	14
47.500	14	2	12	10	3	13
47.663	13	2	11	11	3	14
48.074	13	2	11	11	3	14
48.177	12	2	10	11	4	13
48.342	14	3	11	11	3	14
48.718	14	3	11	10	3	13
49.137	14	3	11	11	3	14
49.489	14	3	11	11	2	13
49.564	13	3	12	11	2	13
49.668	13	3	12	11	3	14
49.881	13	4	11	11	9	13
49.909	13	15	11	11	16	13
49.926	13	15	11	11	16	13
49.947	13	21	11	11	35	13
49.974	13	21	11	11	35	13
49.990	13	20	11	12	10	13
50.027	13	12	12	11	7	13
50.100	14	15	11	12	2	14
50.1 - 60.3	NO WORK AREA					
60.300	13	2.5	12.5	12	4	13
60.500	13	3	12	12	2	14
60.736	14	3	11	12	3	13
61.012	13	3	12	12	3	13
61.243	13	3	12	12	2	14
61.377	13	3	12	11	2	13
61.588	13	3	12	12	2	14
61.802	13	3	12	11	2	13
62.000	14	2	12	12	3	13
62.190	13	2	13	11	3	14
62.290	13	3	12	11	2	13
62.532	13	2	11	12	3	13
62.619	13	3	12	12	3	13
62.925	13	3	12	12	3	13
63.192	13	3	12	12	4	13
63.460	13	3	12	12	2	14
63.652	13	3	12	12	3	13
63.909	14	3	11	12	2	14
64.080	14	2	12	12	3	13
64.449	13	3	13	11	3	14
64.651	13	3	12	12	3	13
65.022	13	3	12	11	3	14
65.260	13	3	12	12	3	13
65.368	13	3	12	11	2	13
65.55	SEE TYPICAL SHEET 2A-2, 2A-3					
65.95	SEE TYPICAL SHEET 2A-2, 2A-3					
66.057	13	3	12	12	3	13
66.175	14	2	12	12	3	13
66.225	13	3	12	11	3	14
66.378	13	3	12	12	2	14
66.461	14	3	11	11	3	14
66.569	13	3	12	12	3	13
66.785	13	6	12	12	4	13
67.1 - 72.3	13	4-5	12	12	4-5	13

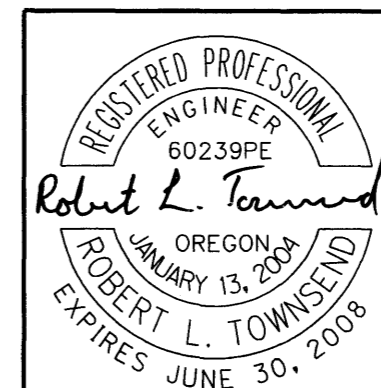
* Existing Widths Shown in Table
 *** See Detail Sheet 2B-4 for Structure Surfacing Details



- M.P. 45.37 To M.P. 49.90
- **49.90 To 50.10
- 50.10 To 60.30 NO WORK AREA
- 60.30 To 65.55 (STA. 695+00)
- 65.95 (STA. 708+75) To 72.33
- ***61.70 To 61.72 STRUCTURE NO. 07486
- ***62.53 To 62.55 STRUCTURE NO. 07372
- ***63.21 To 63.23 STRUCTURE NO. 07487
- ***65.02 To 65.04 STRUCTURE NO. 07489

LEGEND:

MP	Milepoint
GWL	Grinding Width Left
LS	Left Shoulder
LL	Left Lane
RL	Right Lane
RS	Right Shoulder
GWR	Grinding Width Right



OREGON DEPARTMENT OF TRANSPORTATION
 ROADWAY ENGINEERING SECTION

US26: RUSH CREEK-ANTONE-BUNDLE A51

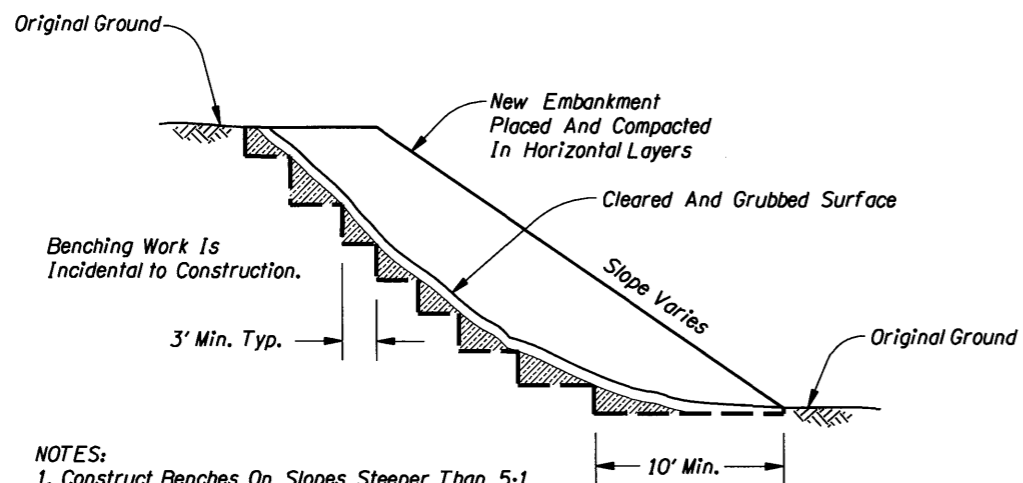
OCHOCO HIGHWAY
 CROOK AND WHEELER COUNTIES

Designed By - Robert Townsend
 Drafted By - Greg Saurbier

TYPICAL SECTION

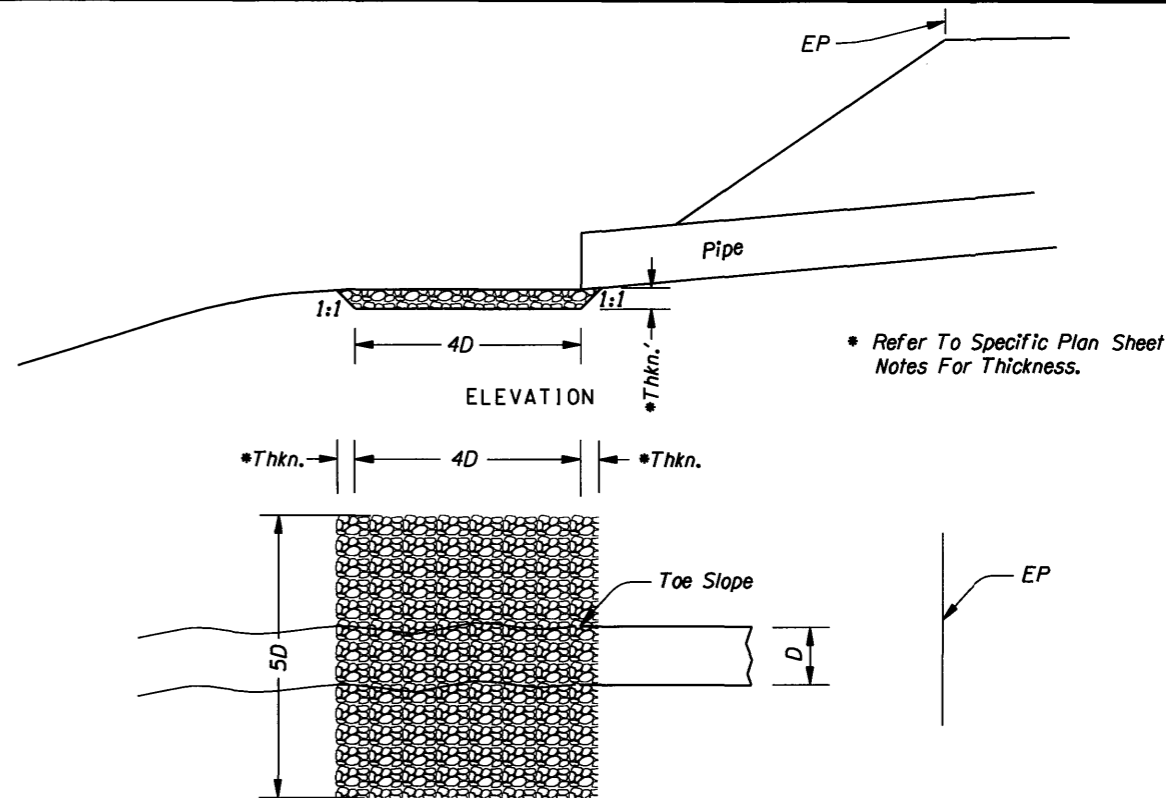
SHEET NO.

2A



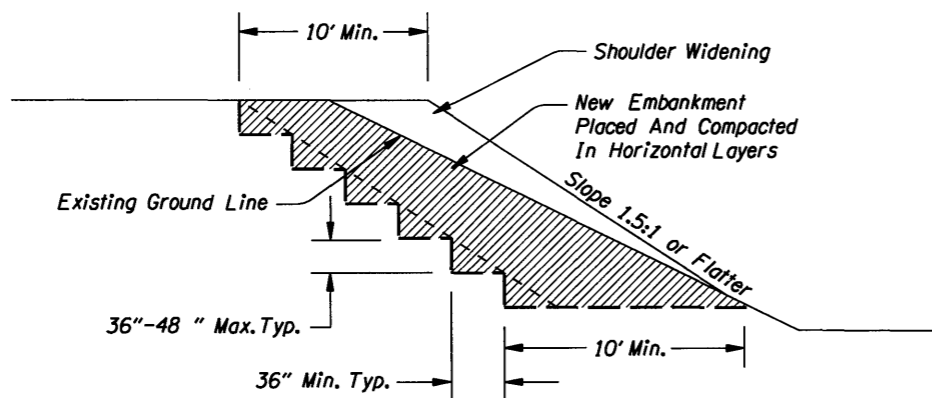
NOTES:
1. Construct Benches On Slopes Steeper Than 5:1 To Provide Positive Bond With Existing Ground.

STANDARD EMBANKMENT CONSTRUCTION



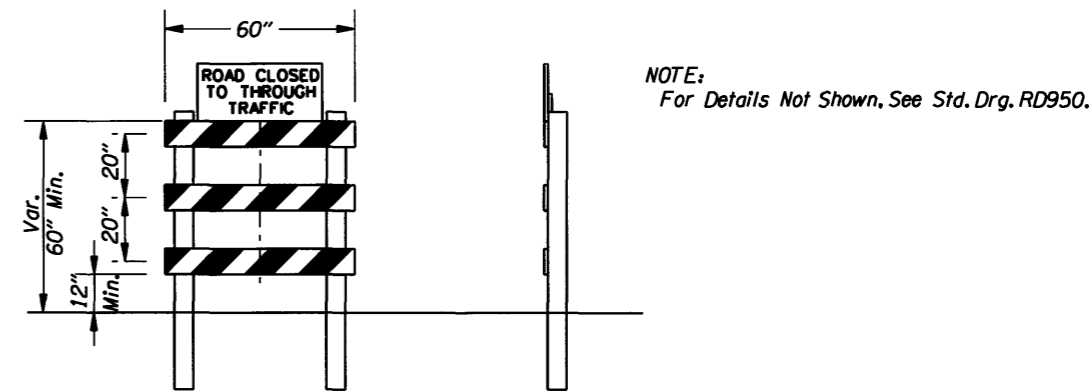
PLAN

RIPRAP CONSTRUCTION AT PIPE OUTFALLS



SLIVER FILL BENCHING DETAIL

NOTES:
1. Detail Is For All Fill Widening Which Toe Out On The Existing Embankment Slope Or Within 5' Of The Existing Embankment Toe. Use Standard Embankment Construction Detail For Widening Toeing Out 5' Or More Beyond The Existing Embankment Toe.
2. This Detail May Require Removal Of Part Of Existing Paved Roadway.



TYPE III BARRICADE AND SIGN



OREGON DEPARTMENT OF TRANSPORTATION

URS CORPORATION
HIGHWAYS AND BRIDGES SECTION

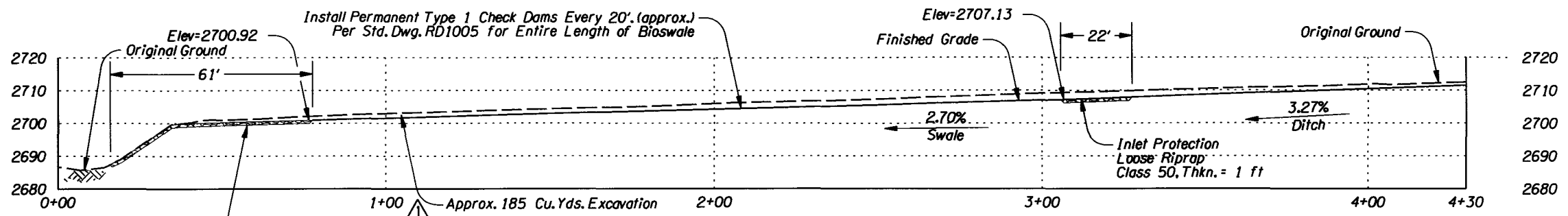
US26: RUSH CREEK-ANTONE-BUNDLE A51

OCHOCO HIGHWAY
CROOK AND WHEELER COUNTIES

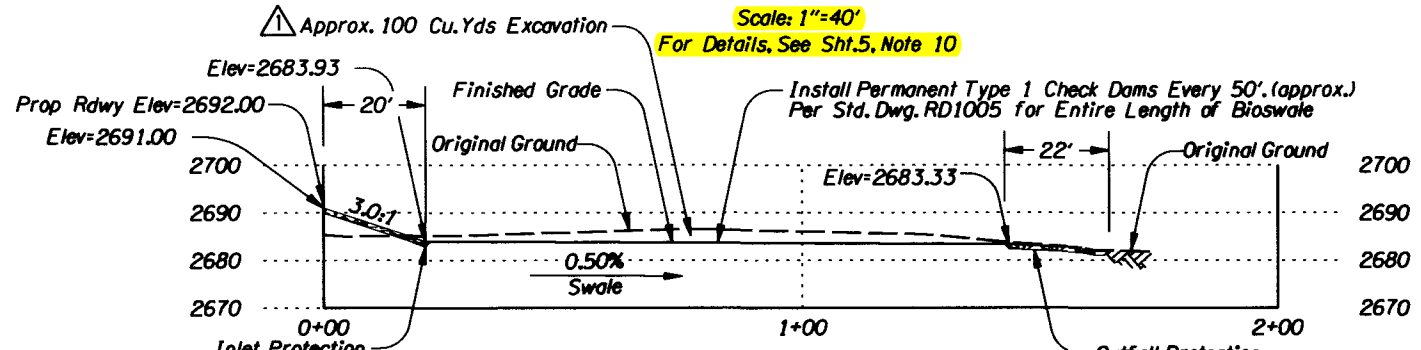
Project Leader - Brian Willman
Designed By - Dale Cerney
Drafted By - Serge Valverde

DETAILS

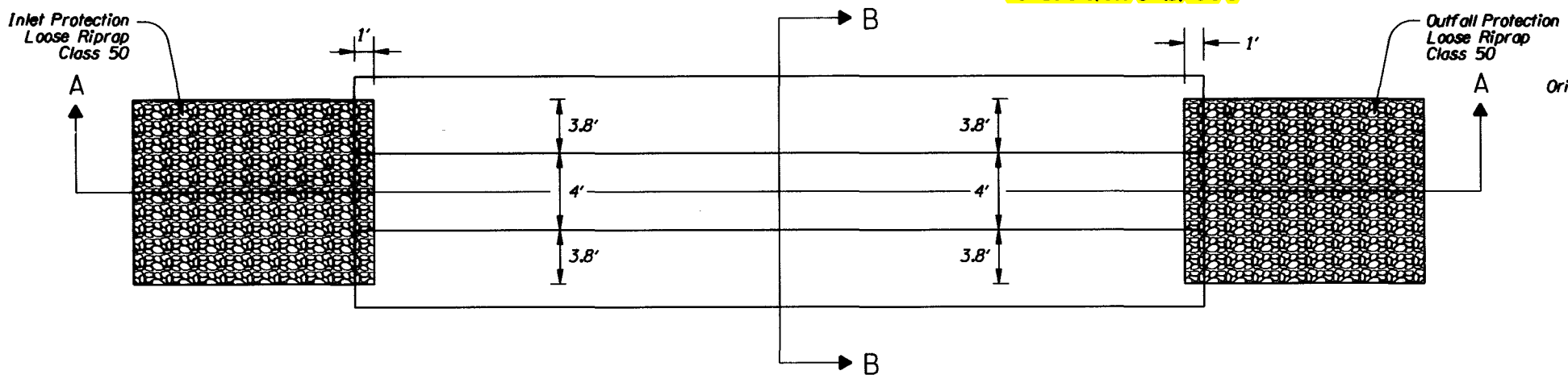
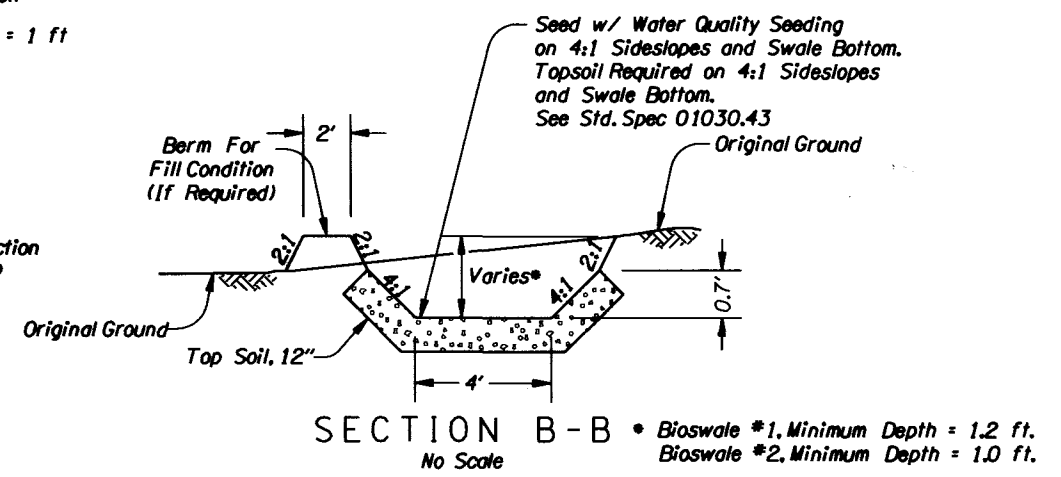
SHEET NO.
2B-7



STORMWATER BIOSWALE #2
SECTION A-A
Sta. 701+55 To Sta. 703+85
LENGTH - 230.0 ft

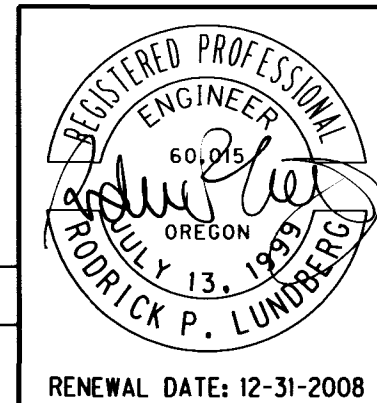


STORMWATER BIOSWALE #1
SECTION A-A
Sta. 698+49 To Sta. 699+71
LENGTH - 120.0 ft

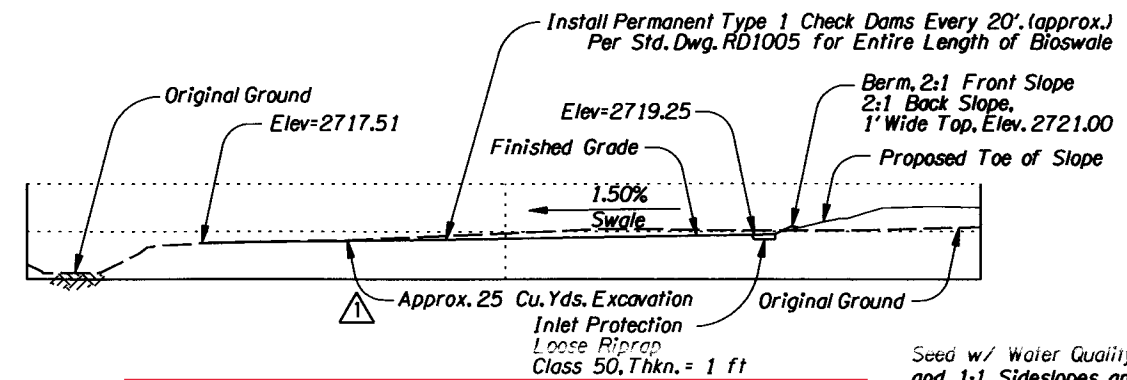
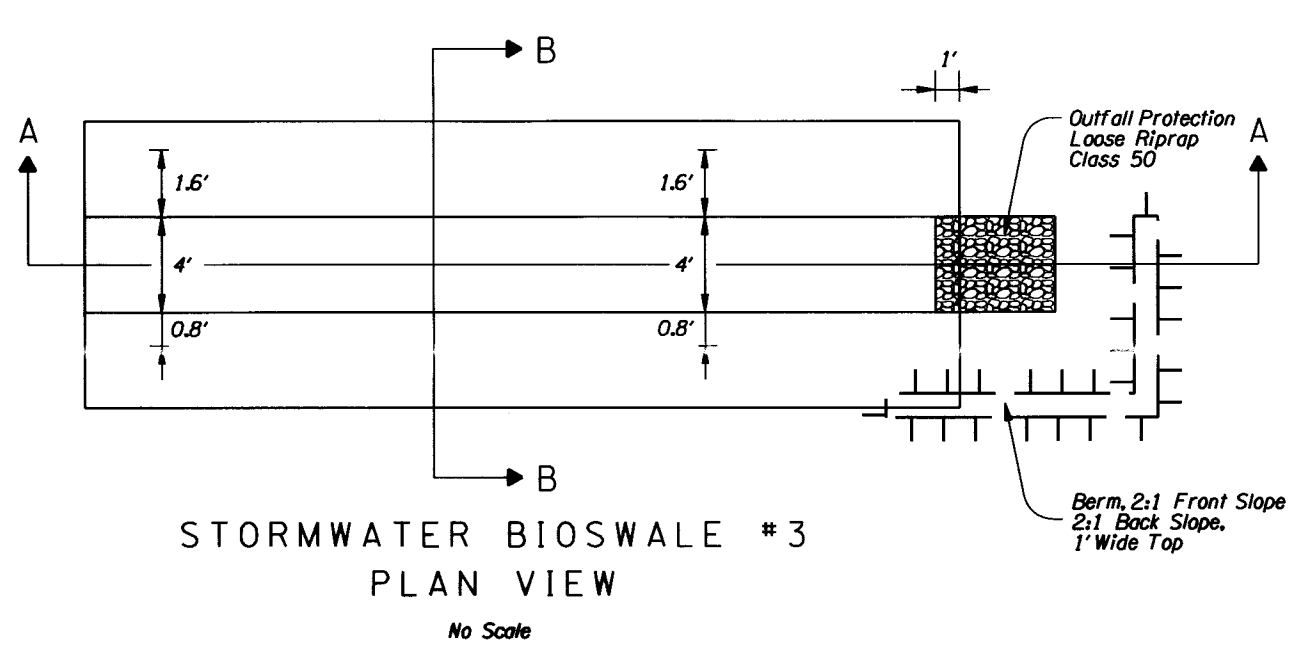


STORMWATER BIOSWALES #1 AND #2
PLAN VIEW, TYPICAL
No Scale

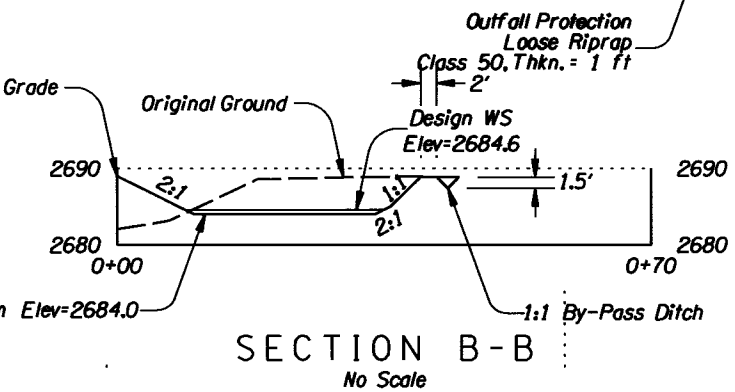
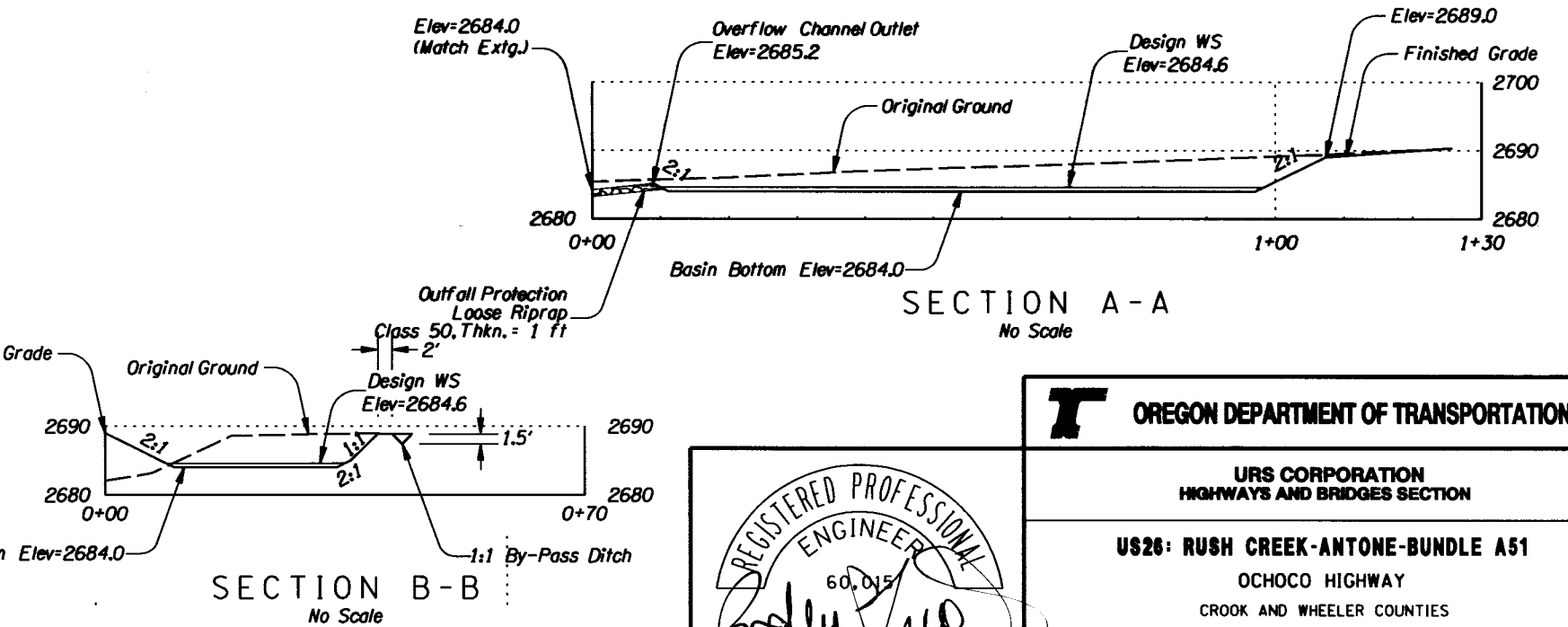
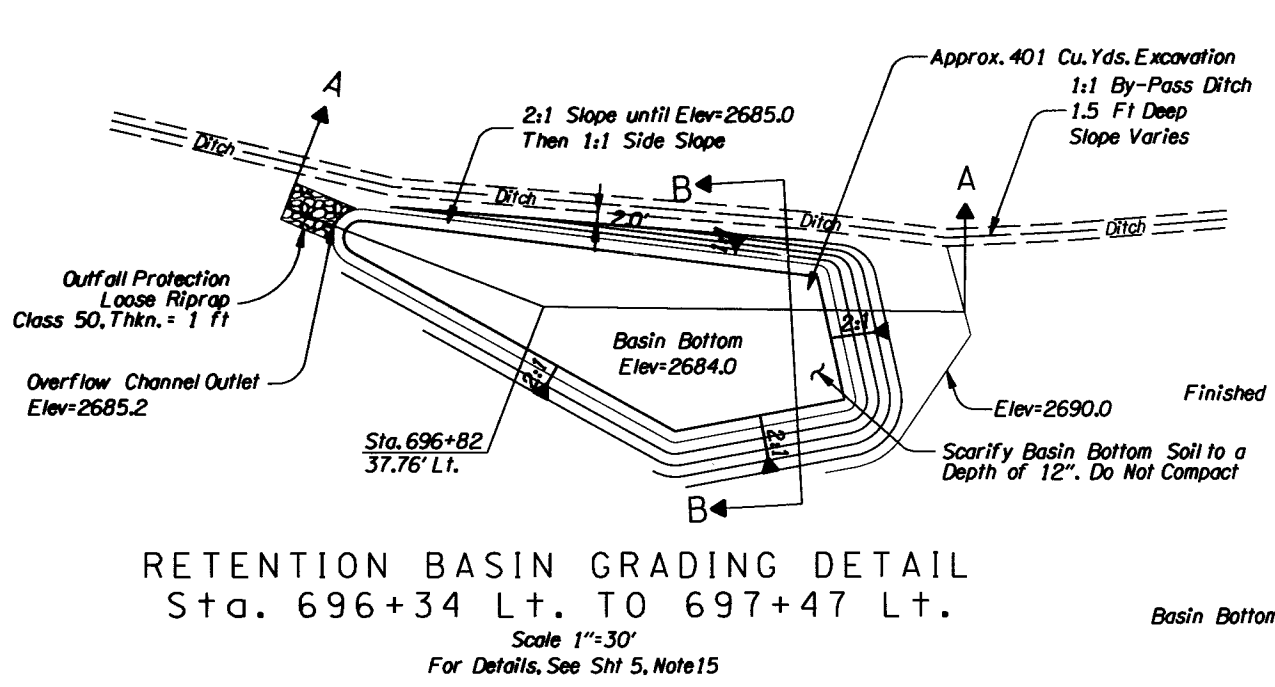
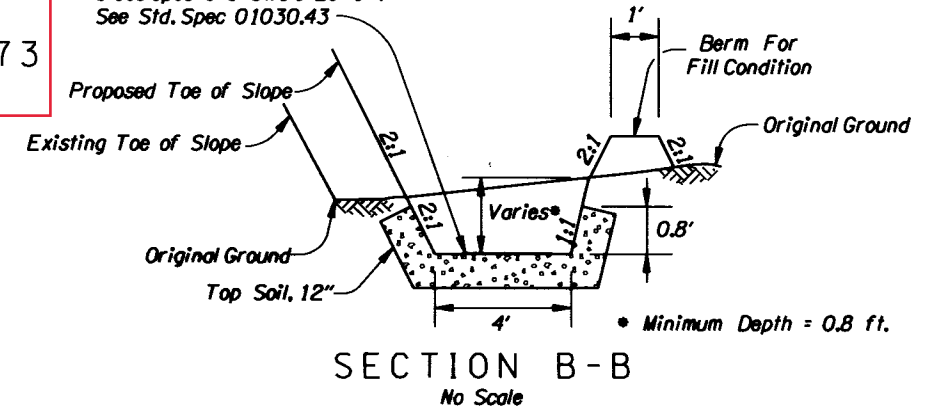
REVISIONS	
▲	Revised 03-29-2007 Added Note



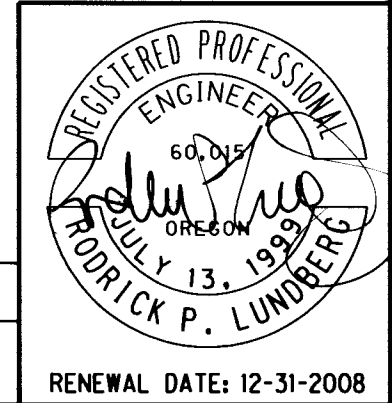
OREGON DEPARTMENT OF TRANSPORTATION	
URS CORPORATION HIGHWAYS AND BRIDGES SECTION	
US26: RUSH CREEK-ANTONE-BUNDLE A51 OCHOCO HIGHWAY CROOK AND WHEELER COUNTIES	
Project Leader - Brian Willman Designed By - Dale Cerney Drafted By - Serge Valverde	
DETAILS	SHEET NO. 2B-8



Seed w/ Water Quality Seeding on 2:1 and 1:1 Sideslopes and Swale Bottom. Topsoil Required on 2:1 and 1:1 Sideslopes and Swale Bottom. See Std. Spec 01030.43



REVISIONS	
⚠	Revised 03-29-2007 Added Note



OREGON DEPARTMENT OF TRANSPORTATION

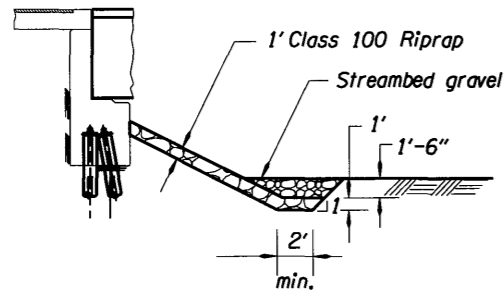
URS CORPORATION
 HIGHWAYS AND BRIDGES SECTION

US26: RUSH CREEK-ANTONE-BUNDLE A51
 OCHOCO HIGHWAY
 CROOK AND WHEELER COUNTIES

Project Leader - Brian Willman
 Designed By - Dale Cerney
 Drafted By - Serge Valverde

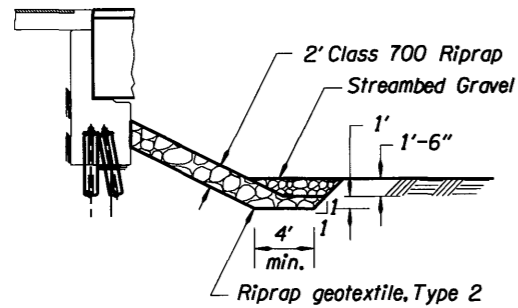
DETAILS

SHEET NO. **2B-9**



RIPRAP DETAIL: Br. 20051

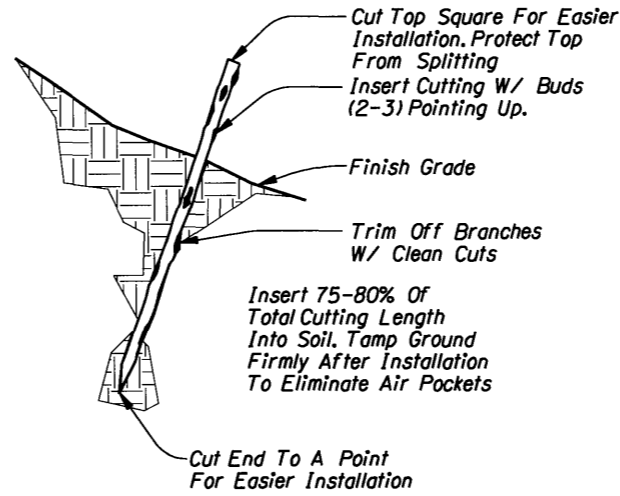
No Scale
For Details, See Sht 5, Notes 16 and 17



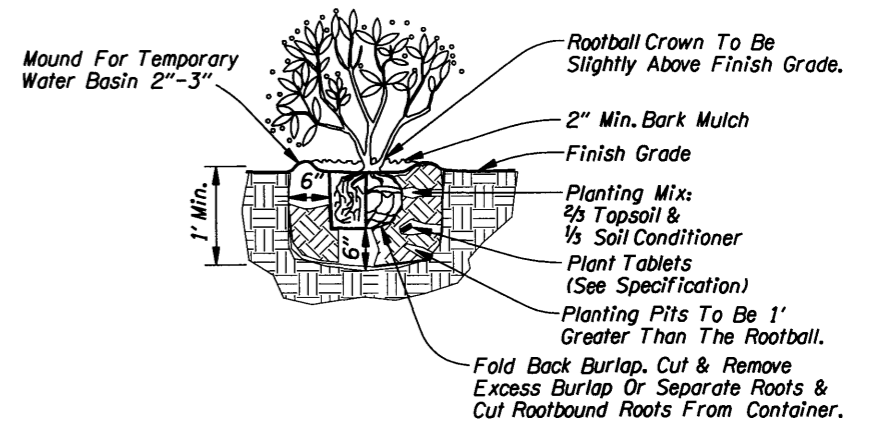
RIPRAP DETAIL: Br. 20052

No Scale
For Details See Sht 6, Notes 18 and 19

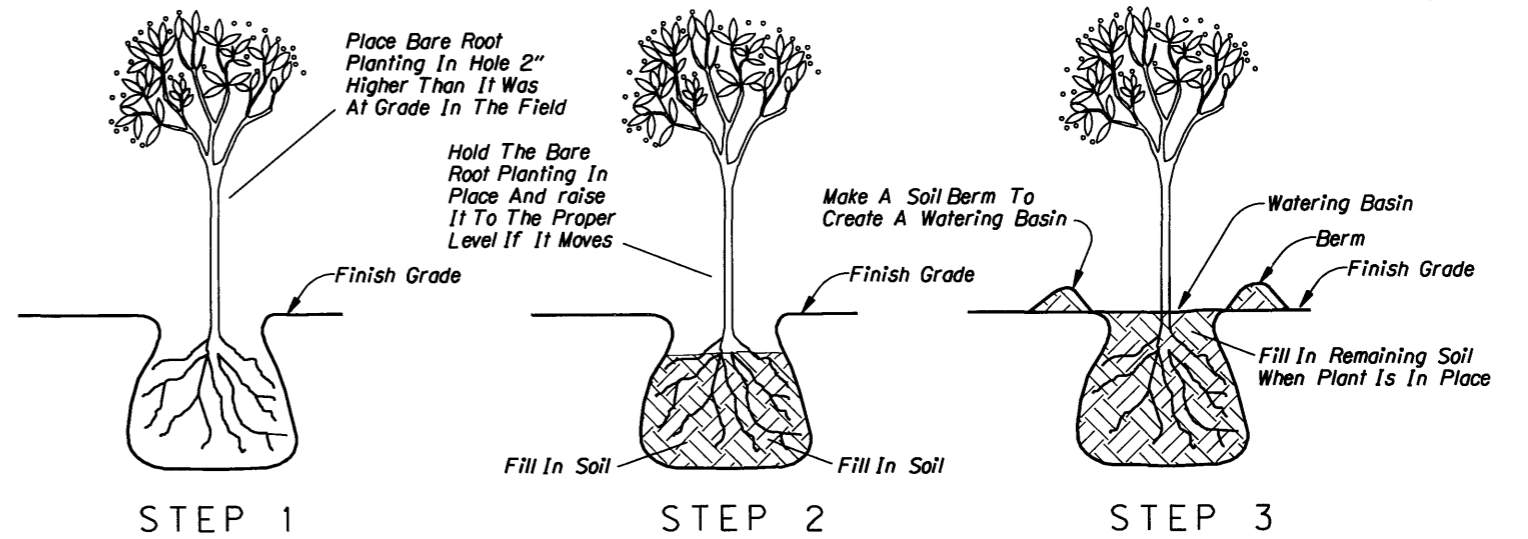
Note:
Live Cuttings Must Be Cut In 1 1/2'-3'
Lengths, From 3/4"-2" Dia. Stock Within
20 mi Of Site. Cutting And Installation Must
Be Performed Within 24 Hours and Cuttings
Must Be Kept Cool And Moist Prior To Installation.



PLANT CUTTING
INSTALLATION



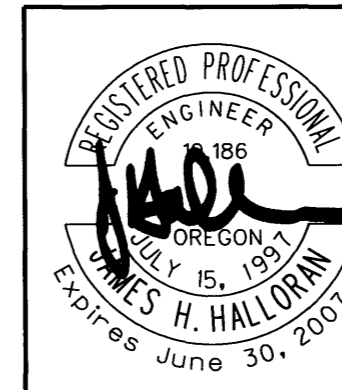
1 GAL POTTED PLANTING



BARE ROOT PLANTING

BARE ROOT PLANTING NOTES:

1. Gently Unwrap The Packaging Around The Plant Roots, Being Careful Not To Damage The Roots. Consult With The Nursery On How To Care For The Roots. Soak roots Overnight In Water, Or Use A Hose To Moisten Them.
2. Spread Roots Out And Place In The Planting Hole. Refill The Hole With Soil, Burying Roots Just To The Crown. A Crown Refers To The Point At Which A Plant's Roots And Top Structure Join. (Usually At Or Near The Soil Line)
3. Fill In The Hole With Soil Nearly To The Top, Firming It With Your Fingers As You Fill, And Then Gently Water. After The Plant Is Placed Correctly, Fill In Any Remaining Soil. Make A Berm (Narrow Pile) Of Soil Around The Hole To Form A Watering Basin.



OREGON DEPARTMENT OF TRANSPORTATION

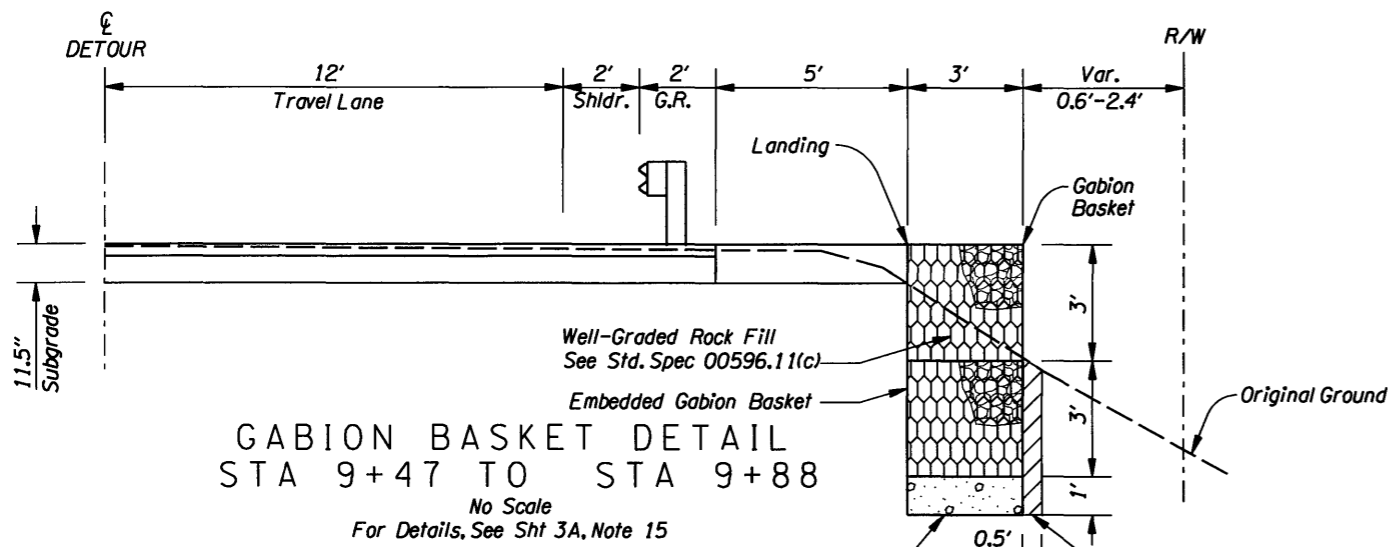
**URS CORPORATION
HIGHWAYS AND BRIDGES SECTION**

**US26: RUSH CREEK-ANTONE-BUNDLE A51
OCHOCO HIGHWAY
CROOK AND WHEELER COUNTIES**

Project Leader - Brian Willman
Designed By - Dale Cerney
Drafted By - Serge Valverde

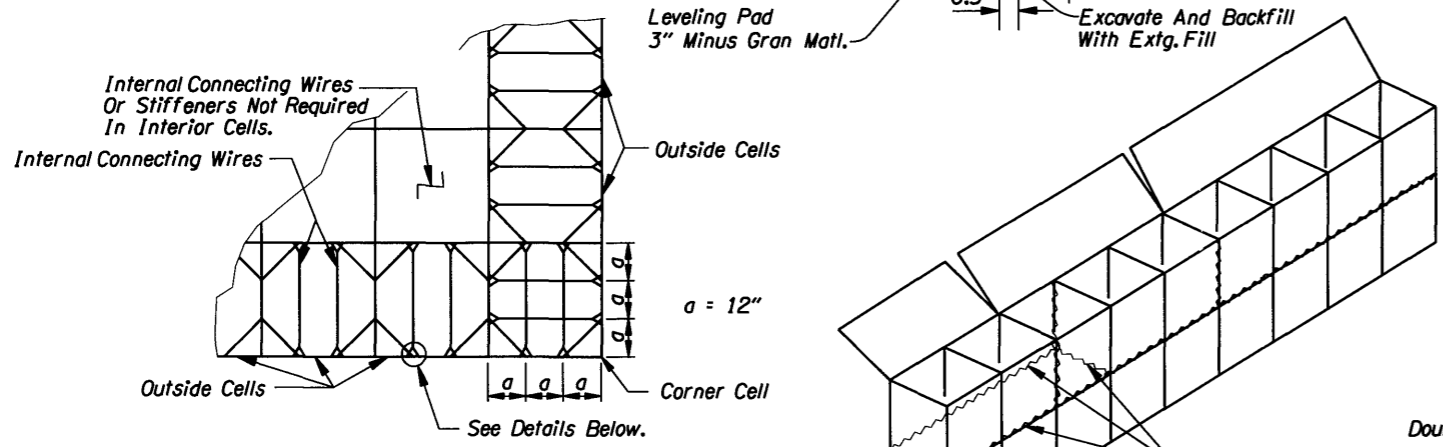
DETAILS

SHEET NO.
2B-10

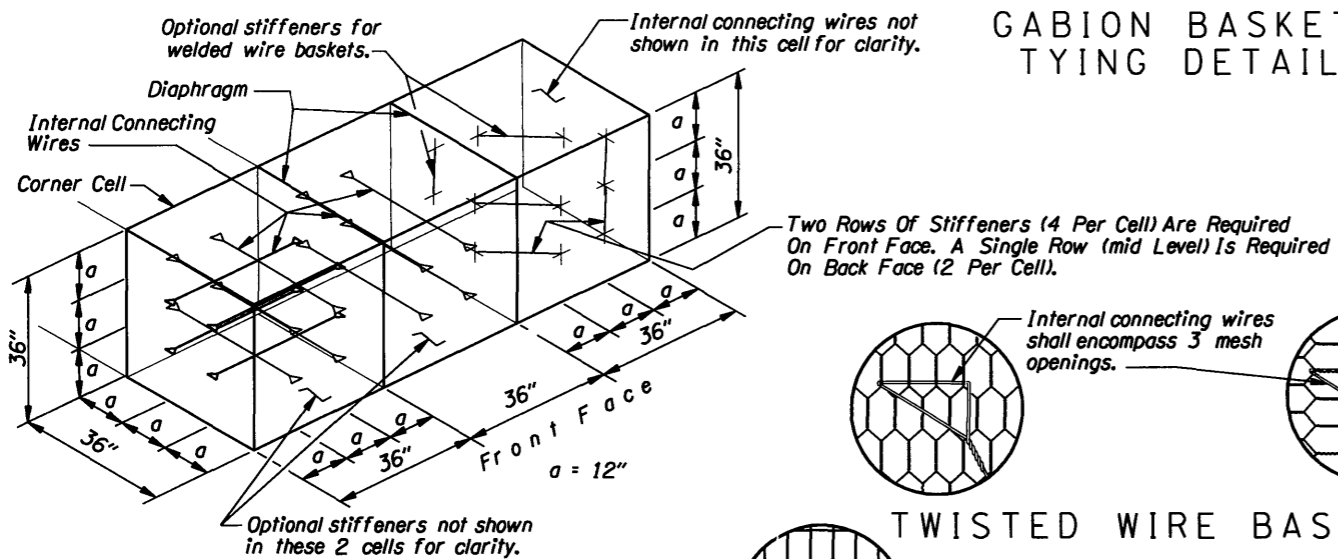


**GABION BASKET DETAIL
STA 9+47 TO STA 9+88**

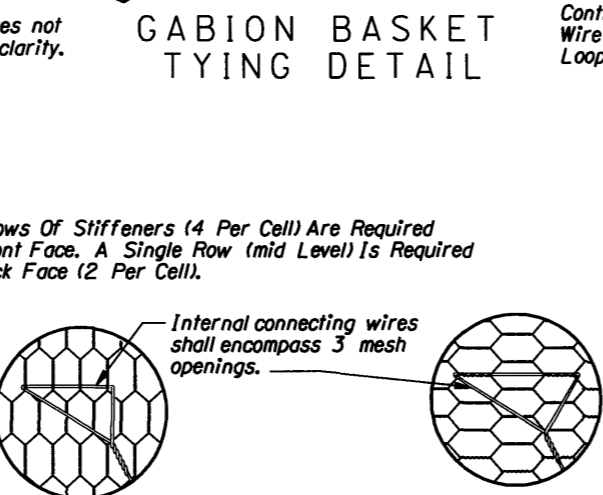
No Scale
For Details, See Sht 3A, Note 15



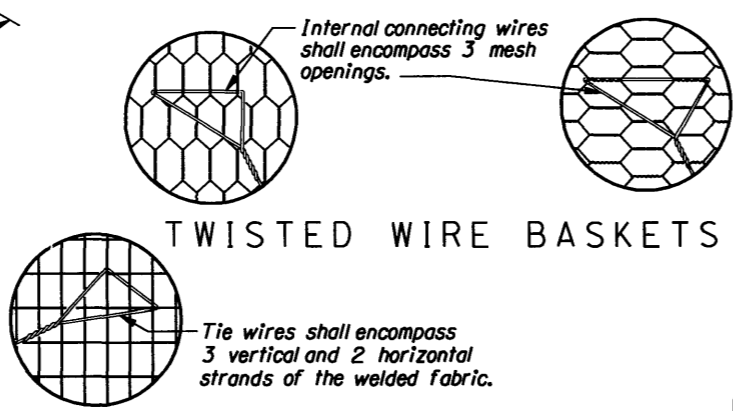
**TYPICAL PLAN FOR INTERNAL
CONNECTING WIRES**



INTERNAL CONNECTING WIRES

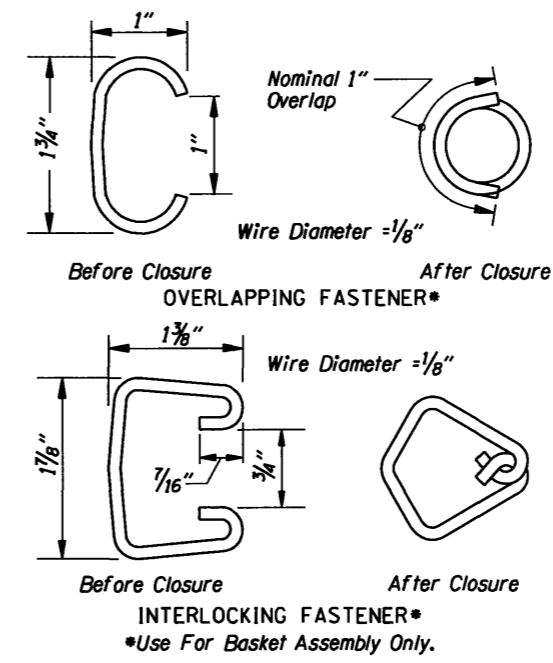


**GABION BASKET
TYING DETAIL**

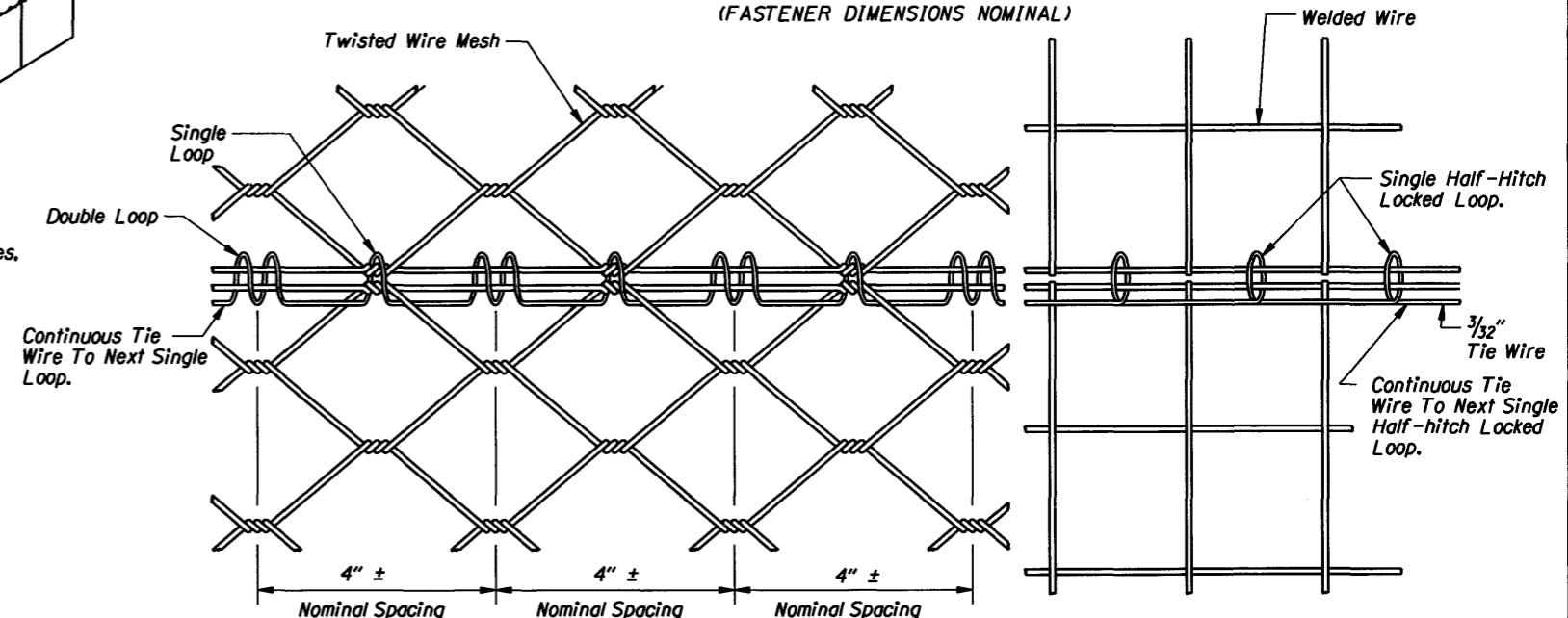


TWISTED WIRE BASKETS

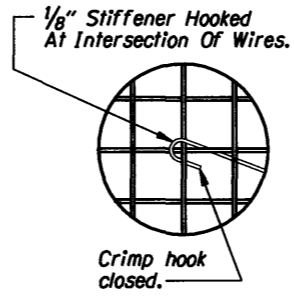
WELDED WIRE BASKETS



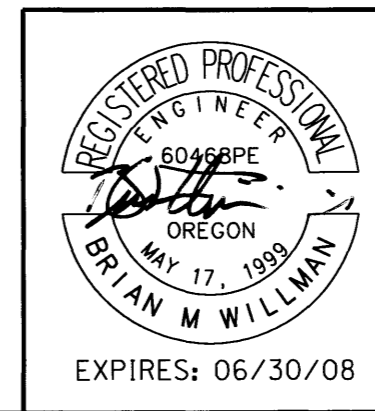
**ALTERNATE GABION JOINT FASTENERS
(FASTENER DIMENSIONS NOMINAL)**



STANDARD 3/32" TIE WIRE DETAIL



**OPTIONAL STIFFENER
CONNECTION FOR WELDED
WIRE GABION BASKET**



OREGON DEPARTMENT OF TRANSPORTATION

**URS CORPORATION
HIGHWAYS AND BRIDGES SECTION**

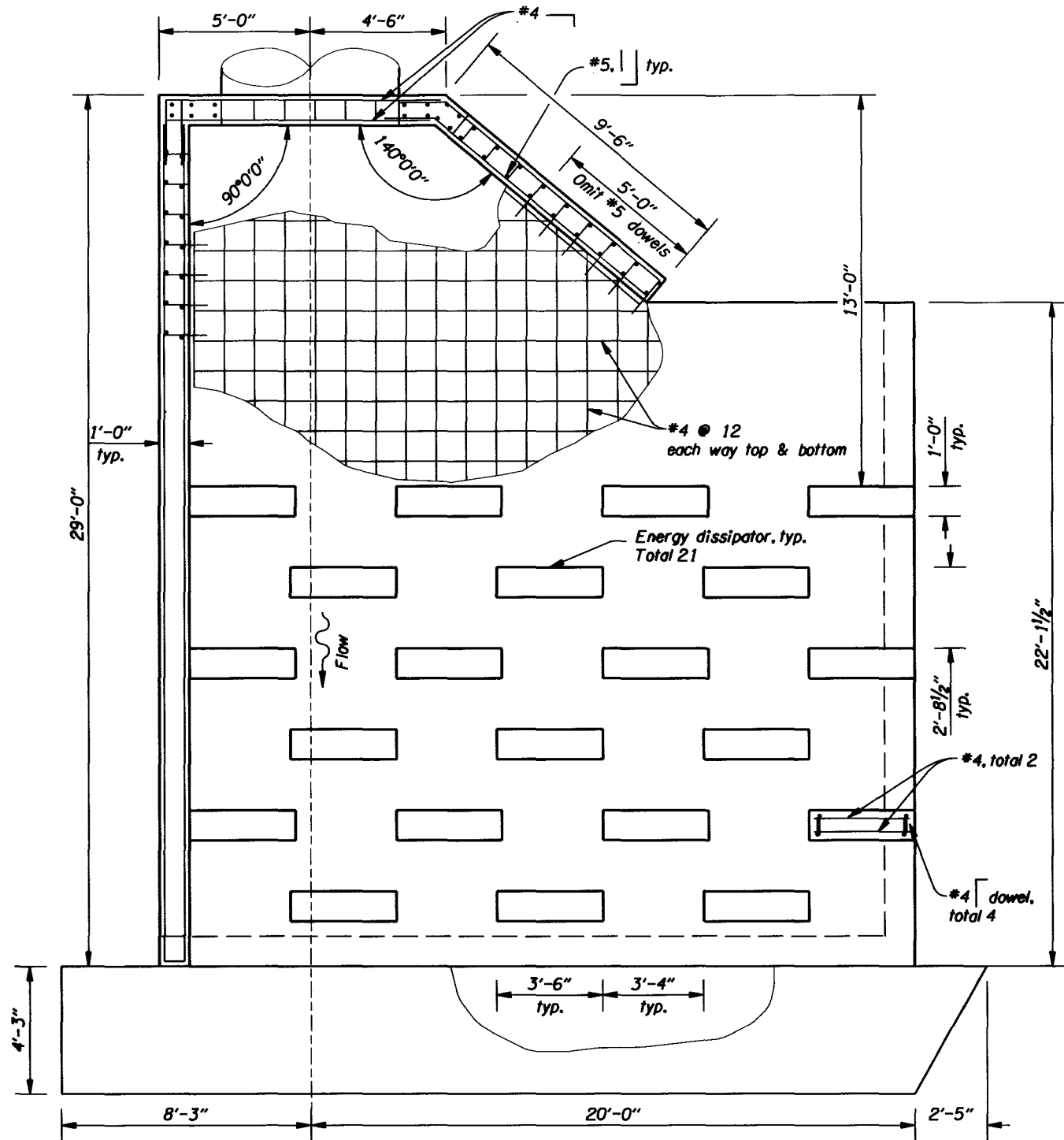
US26: RUSH CREEK-ANTONE-BUNDLE A51

OCHOCO HIGHWAY
CROOK AND WHEELER COUNTIES

Project Leader - Brian Willman
Designed By - Dale Cerney
Drafted By - Serge Valverde

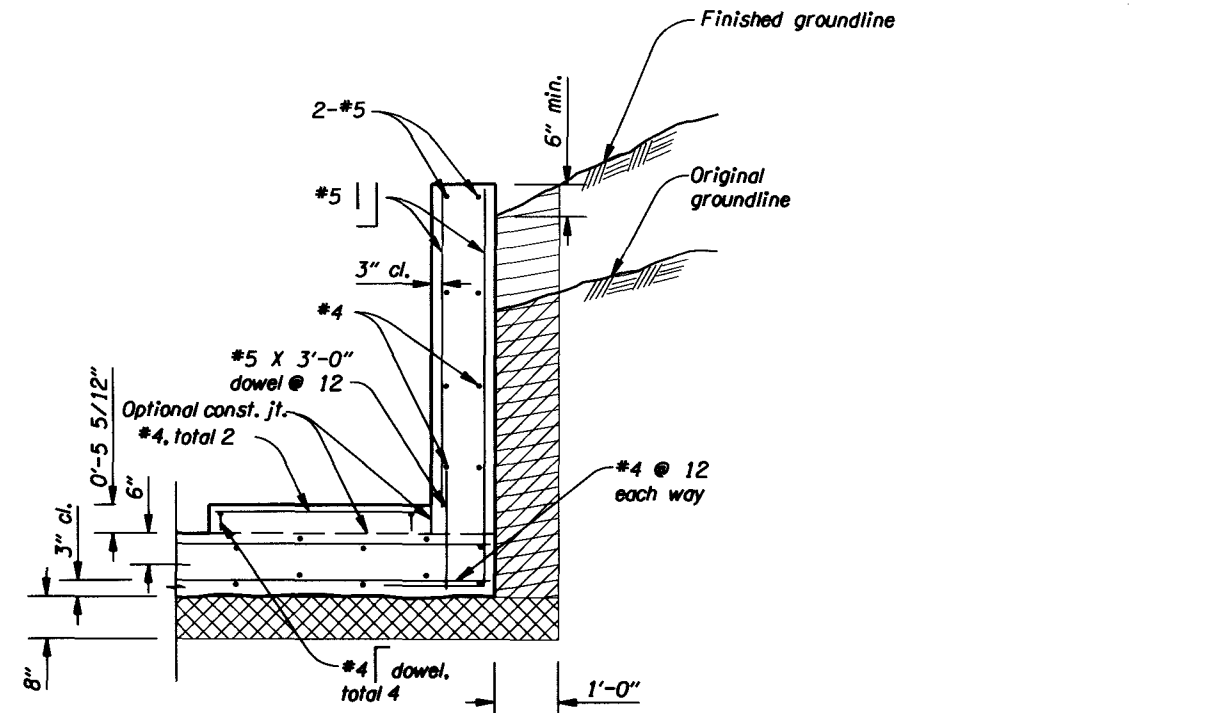
DETAILS

SHEET NO.
2B-11



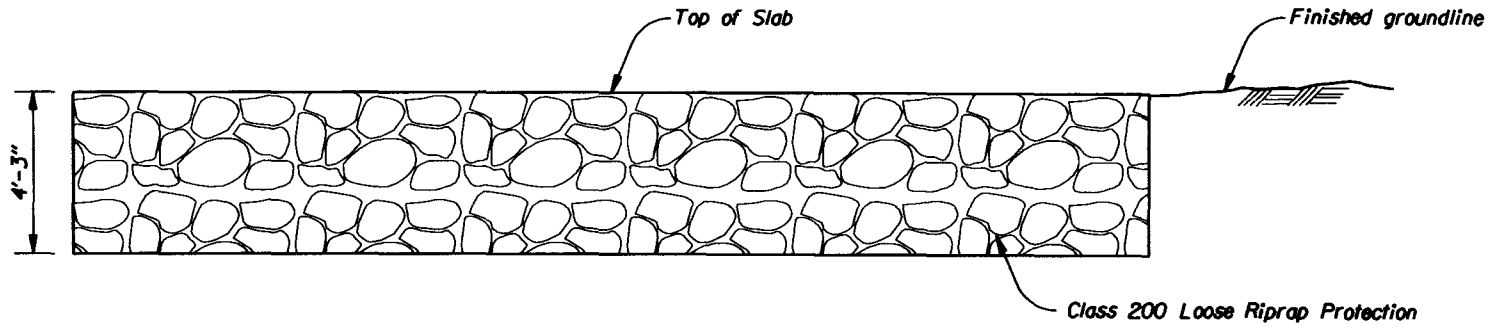
PLAN
Scale: 1"=50'-0"

Note: For details not shown, See Sht. 2B-13

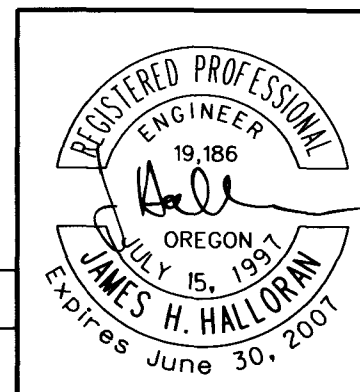


PART WALL SECTION
Scale: 1"=30'-0"

- Limit of structure excavation
- Limits of granular backfill
- Limits of granular wall backfill

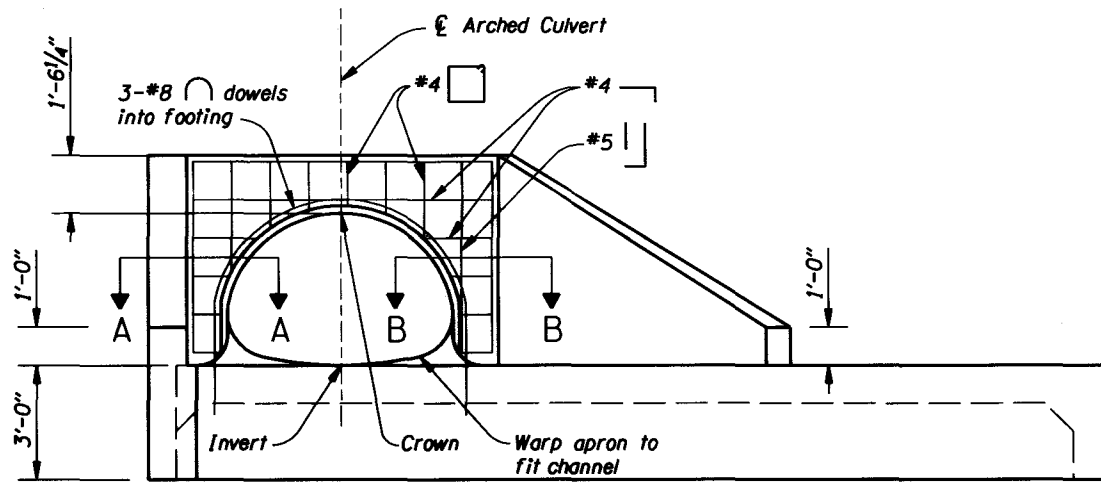


RIPRAP ELEVATION
Scale: 1"=50'-0"



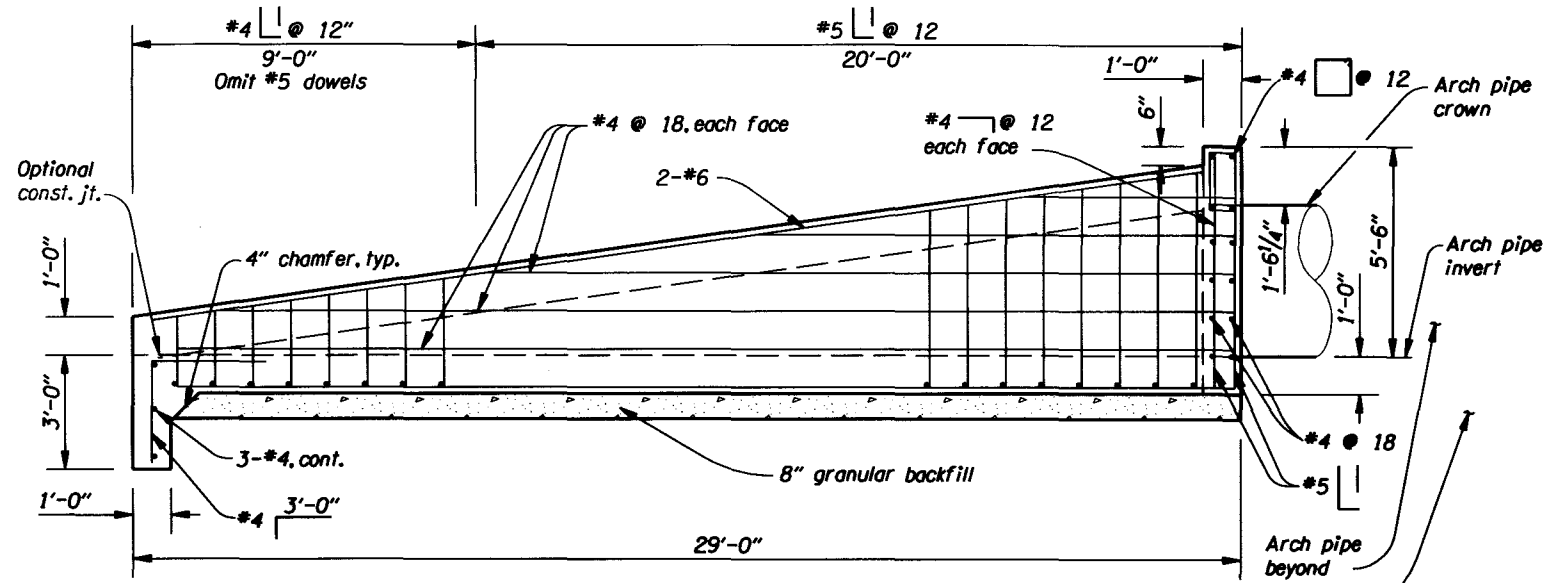
OREGON DEPARTMENT OF TRANSPORTATION	
URS CORPORATION HIGHWAYS AND BRIDGES SECTION	
US26: RUSH CREEK-ANTONE-BUNDLE A51 OCHOCHO HIGHWAY CROOK AND WHEELER COUNTIES	
Project Leader - Brian Willman Designed By - John England Drafted By - Serge Valverde	
DETAILS	SHEET NO. 2B-12

REVISIONS	
	Revised 03-12-2007 New Sheet Created



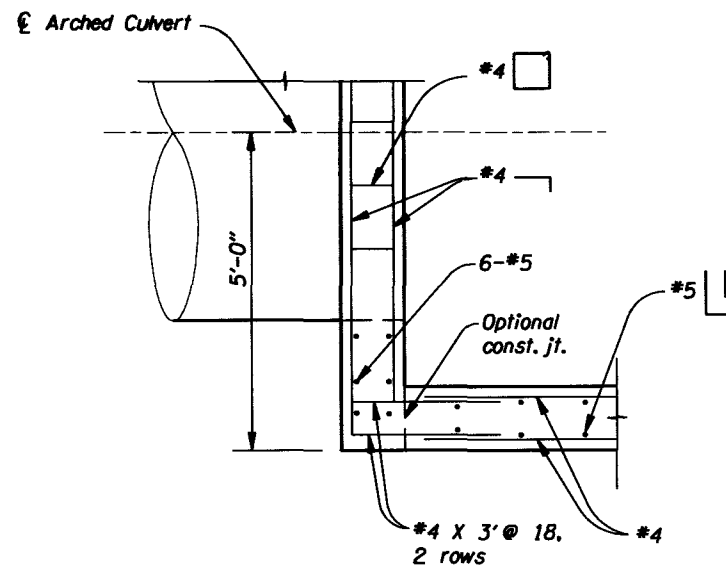
END ELEVATION
Scale: 1"=50'-0"

Note:
Energy dissipators not shown

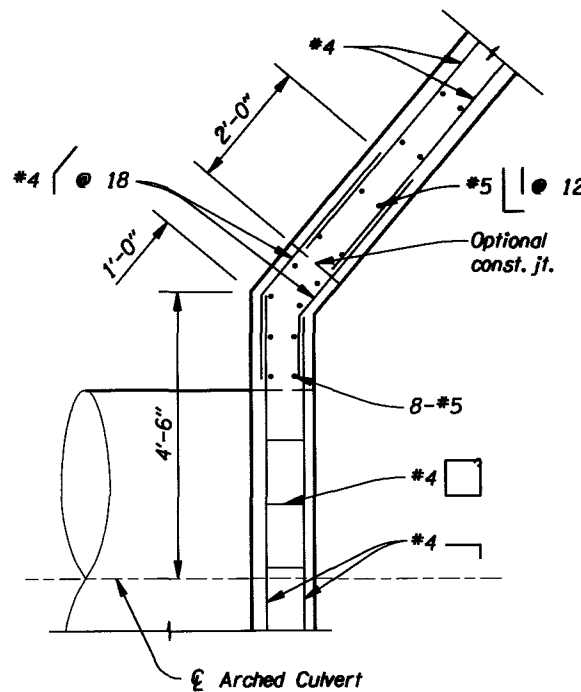


INLET WALL REINFORCEMENT
Scale: 1"=50'-0"

Note:
Wingwall are similar except as noted
Energy dissipators not shown



SECTION A-A
Scale: 1"=30'-0"



SECTION B-B
Scale: 1"=30'-0"

GENERAL NOTES:

Provide all material and perform all work according to the 2002 Standard Specification For Highway Construction of the Oregon Department of Transportation.

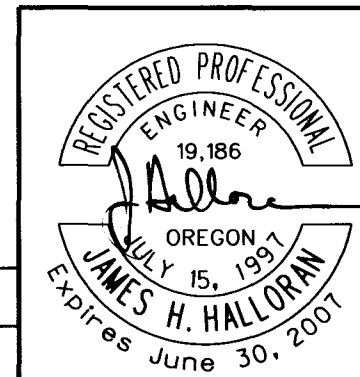
Bar Size	#3	#4	#5	#6	#7	#8	#9	#10	#11	#14	#18
Splice Uncoated	1'-0"	1'-4"	1'-8"	2'-0"	2'-8"	3'-6"	4'-4"	5'-7"	6'-9"	Not Permitted	
Length Epoxy Coated	1'-5"	1'-10"	2'-4"	2'-10"	3'-9"	4'-11"	6'-1"	7'-10"	9'-6"	Not Permitted	

Earth Load = 135 lb/cu.ft.
Equivalent fluid pressure = 58 lb/cu.ft.
Use epoxy coated reinforcing steel, all locations.
Concrete should be class 3600 - 1 1/2, 1 or 3/4.
Concrete members designed by load factor design methods.

NOTES TO CONTRACTOR:

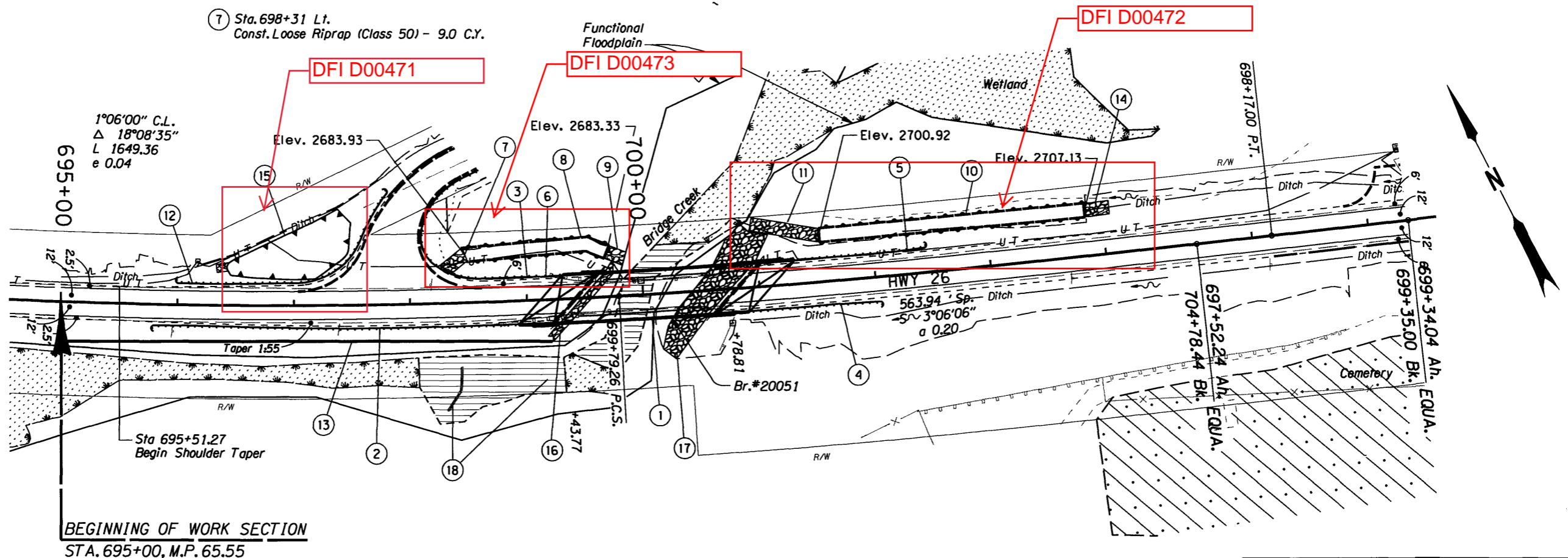
- All corners to have 1" chamfer.
- Concrete forms may be removed at 75% f'c or 28 days.
- For details not show see Sht. No. 3A.
- Field verify height and alignment of wingwalls before ordering or fabricating any material.
- All reinforcing steel shall be 2" clear unless otherwise shown.

REVISIONS	
▲	Revised 03-12-2007 New Sheet Created



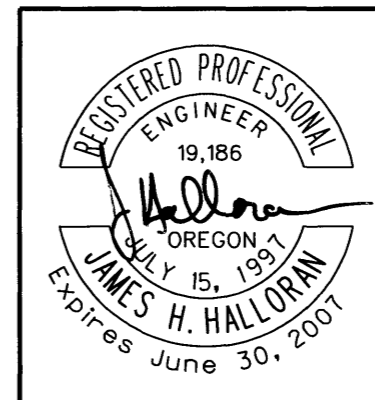
OREGON DEPARTMENT OF TRANSPORTATION	
URS CORPORATION HIGHWAYS AND BRIDGES SECTION	
US26: RUSH CREEK-ANTONE-BUNDLE A51 OCHOCO HIGHWAY CROOK AND WHEELER COUNTIES	
Project Leader - Brian Willman Designed By - John England Drafted By - Serge Valverde	
▲ DETAILS	SHEET NO. 2B-13

- ① Const. Bridge (Str # 20051) (For Bridge Details, See Index of Sheets)
Remove Extg. Bridge (Str#07490)
- ② Sta. 695+80 To Sta. 698+96 Rt.
Remove Extg. G.R. - 81'
Const. G.R. - 250' (Type 2A)
- 12.5' (Type 3)
Const. G.R. Transition
Const. G.R. Terminal (Level 3), Non-Flared
Flare Rate=0', W=1', E=2'
(See Std. Drg. BR203, RD410 & RD440)
- ③ Sta. 698+62 To Sta. 699+34 Lt.
Remove Temporary G.R. Terminal
Remove Extg. G.R. - 56'
Const. G.R. - 37.5' (Type 2A)
- 12.5' (Type 3)
Const. G.R. Transition
Connect To Extg. G.R.
- ④ Sta. 700+90 To Sta. 702+05 Rt.
Remove Extg. G.R. - 56'
Const. G.R. - 50' (Type 2A)
- 12.5' (Type 3)
Const. G.R. Transition
Const. G.R. Terminal (Level 3), Non-Flared
Flare Rate=0', W=1', E=2'
- ⑤ Sta. 701+31 To Sta. 702+47 Lt.
Remove Extg. G.R. - 81'
Const. G.R. - 50' (Type 2A)
- 12.5' (Type 3)
Const. G.R. Transition
Const. G.R. Terminal (Level 3), Non-Flared
Flare Rate=0', W=1', E=2'
- ⑥ Sta. 698+35 To Sta. 699+32 Lt.
Const. Asph. Drainage Curb - 97 Ft
- ⑦ Sta. 698+31 Lt.
Const. Loose Riprap (Class 50) - 9.0 C.Y.
- ⑧ Sta. 698+49, 41' Lt. To Sta. 699+71, 38' Lt.
Const. Stormwater Detention Bioswale #1
4:1 Side Slope, 4' Wide, 120' Long
(For Details, See Sheet 2B-8)
- ⑨ Sta. 699+71 Lt.
Const. Loose Riprap (Class 50) - 9.5 C.Y.
- ⑩ Sta. 701+55, 40' Lt. To Sta. 703+85 40' Lt.
Const. Stormwater Detention Bioswale #2
4:1 Side Slope, 4' Wide, 230' Long
(For Details, See Sheet 2B-8)
- ⑪ Sta. 701+55 Lt.
Const. Loose Riprap (Class 50) - 26.6 C.Y.
- ⑫ Sta. 696+00 To Sta. 697+10 Lt.
Remove Temporary G.R. Terminal
Connect To Exst. G. R.
Const. G.R. 75' (Type 2A)
Const. G.R. Terminal (Level 3), Non-Flared
Flare Rate = 0', W=1', E=2'
- ⑬ Sta. 695+03 To Sta. 699+21
Const. Retaining Wall - 4275 SF
(For Details, See Sht 75160)
- ⑭ Sta. 704+06 Lt.
Const. Loose Riprap (Class 50) - 9.5 C.Y.
- ⑮ Construct Retention Basin
Const. Loose Riprap (Class 50) - 9.0 C.Y.
(For Details, See Sht 2B-9)
- ⑯ Sta. 699+22, 35.5' Rt. To Sta. 699+74, 29.7' Lt.
Const. Loose Riprap (Class 100) - 13.0 C.Y.
(For Details, See Sht 2B-10)
- ⑰ Sta. 700+14, 47.3' Rt. To Sta. 701+10, 43.7' Lt.
Const. Loose Riprap (Class 100) - 114.6 C.Y.
(For Details, See Sht 2B-10)
- ⑱ Remove Extg. Concrete and Corrugated Metal
(Location is Approximate)



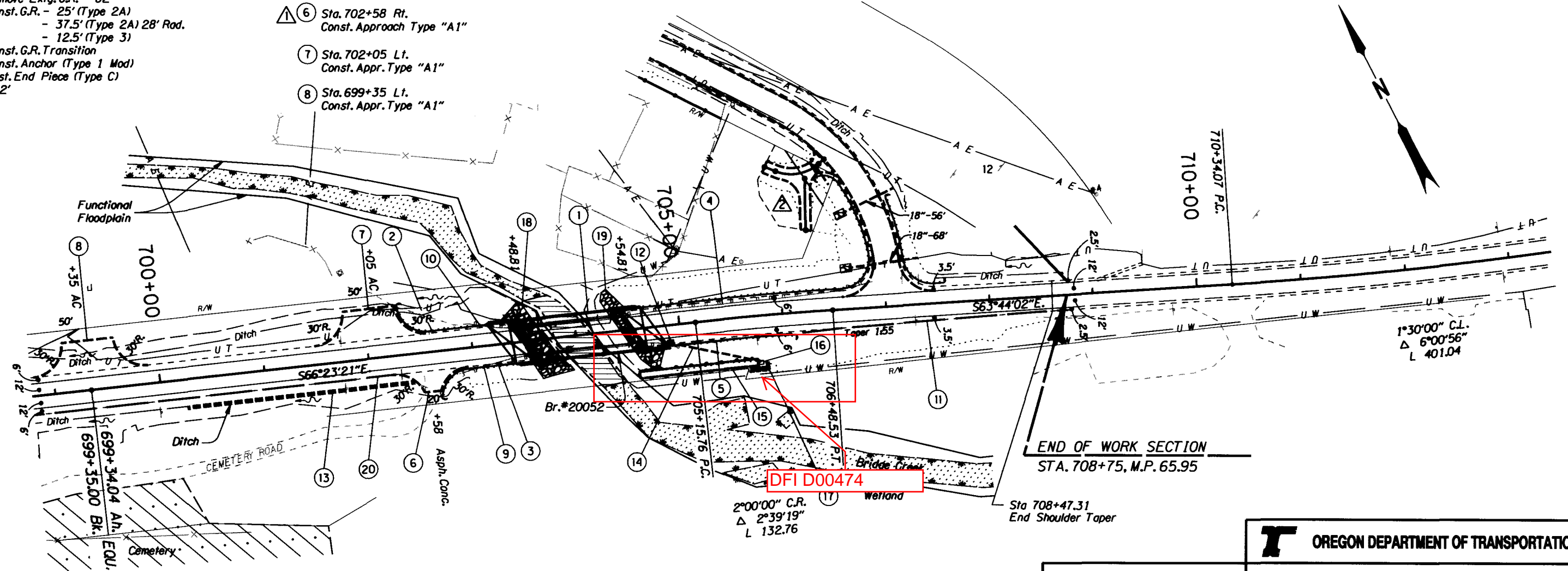
BEGINNING OF WORK SECTION
STA. 695+00, M.P. 65.55

- Regulated In-Water Work Area shown Thus: Period of July 15 - August 31.
- No Work Area, Off-Limits To Contractor
- No Work Area, Cemetery



OREGON DEPARTMENT OF TRANSPORTATION	
URS CORPORATION HIGHWAYS AND BRIDGES SECTION	
US26: RUSH CREEK-ANTONE-BUNDLE A51 OCHOCO HIGHWAY CROOK AND WHEELER COUNTIES	
Project Leader - Brian Willman Designed By - Dale Cerney Drafted By - Serge Valverde	
GENERAL CONSTRUCTION	SHEET NO. 5

- ① Const. Bridge (Str # 20052) (For Bridge Details, See Index of Sheets)
Remove Extg. Bridge (Str#07491)
- ② Sta. 702+32 To Sta. 703+89 Lt.
Remove Extg. G.R. - 57'
Const. G.R. - 43.75' (Type 2A) 28' Rad.
- 31.25' (Type 2A)
- 12.5' (Type 3)
Const. G.R. Transition
Const. Anchor (Type 1 Mod.)
Inst. End Piece (Type C)
E=2'
- ③ Sta. 702+66 To Sta. 703+32 Rt.
Remove Extg. G.R. - 82'
Const. G.R. - 25' (Type 2A)
- 37.5' (Type 2A) 28' Rad.
- 12.5' (Type 3)
Const. G.R. Transition
Const. Anchor (Type 1 Mod.)
Inst. End Piece (Type C)
E=2'
- ④ Sta. 704+72 To Sta. 706+57 Lt.
Remove Extg. G.R. - 82'
Const. G.R. - 167.75' (Type 2A)
- 12.5' (Type 3)
Const. G.R. Transition
Connect To Extg. G.R.
E=2'
- ⑤ Sta. 704+95 To Sta. 706+11 Rt.
Remove Extg. G.R. - 56'
Const. G.R. - 62.5' (Type 2A)
- 12.5' (Type 3)
Const. G.R. Transition
Const. G.R. Terminal (Level 3), Non-Flared
Flare Rate=0', W=1', E=2'
- ⑥ Sta. 702+58 Rt.
Const. Approach Type "A1"
- ⑦ Sta. 702+05 Lt.
Const. Appr. Type "A1"
- ⑧ Sta. 699+35 Lt.
Const. Appr. Type "A1"
- ⑨ Sta. 702+99 To Sta. 703+40 Rt.
Const. Asp. Drainage Curb - 46 Ft.
- ⑩ Sta. 703+01 To Sta. 703+16 Lt.
Const. Asp. Drainage Curb - 15 Ft.
- ⑪ Sta. 704+87 To Sta. 708+75 Rt.
Const. Asp. Drainage Curb - 387 Ft.
- ⑫ Sta. 704+90 20' Rt.
Const. Type "G-1" Inlet
Grate E1=2730.03, F.L. E1=2722.71
(See Std. Drg. RD364)
- ⑬ Sta. 700+30 To Sta. 702+30
Const. 3' Flat Bottom Ditch
- ⑭ Sta. 704+90 To Sta. 705+72 Rt.
Install 12" Storm Pipe - 86'
- ⑮ Sta. 704+57 To Sta. 705+73 Rt.
Const. Stormwater Detention Bioswale #3
2:1 Sideslope, 4' Wide, 1:1 Sideslope, 116' Long
(For Details, See Sht 2B-9)
- ⑯ Sta. 705+78
Const. Loose Riprap (Class 50) - 4.0 C.Y.
- ⑰ Sta. 705+65 To Sta. 705+82
Const. 2:1 Slope, 1' Wide Berm - 20'
(For Details, See Sht 2B-9)
- ⑱ Sta. 703+30, 22.3' Lt. To Sta. 703+95, 32.7' Rt.
Const. Loose Riprap (Class 700) - 59.7 C.Y.
(For Details, See Sht 2B-10)
- ⑳ Sta. 698+17 To Sta. 702+21 Rt.
Const. Asp. Drainage Curb - 405 Ft.



END OF WORK SECTION
STA. 708+75, M.P. 65.95

Sta 708+47.31
End Shoulder Taper

- Regulated In-Water Work Area shown Thus:
Period of July 15 - August 31.
- No Work Area, Off-Limits To Contractor
- No Work Area, Cemetery

REVISIONS	
⚠	Revised 03-12-2007 Revised Note
⚠	Revised 03-12-2007 Redisplayed Dwy.



OREGON DEPARTMENT OF TRANSPORTATION

URS CORPORATION
HIGHWAYS AND BRIDGES SECTION

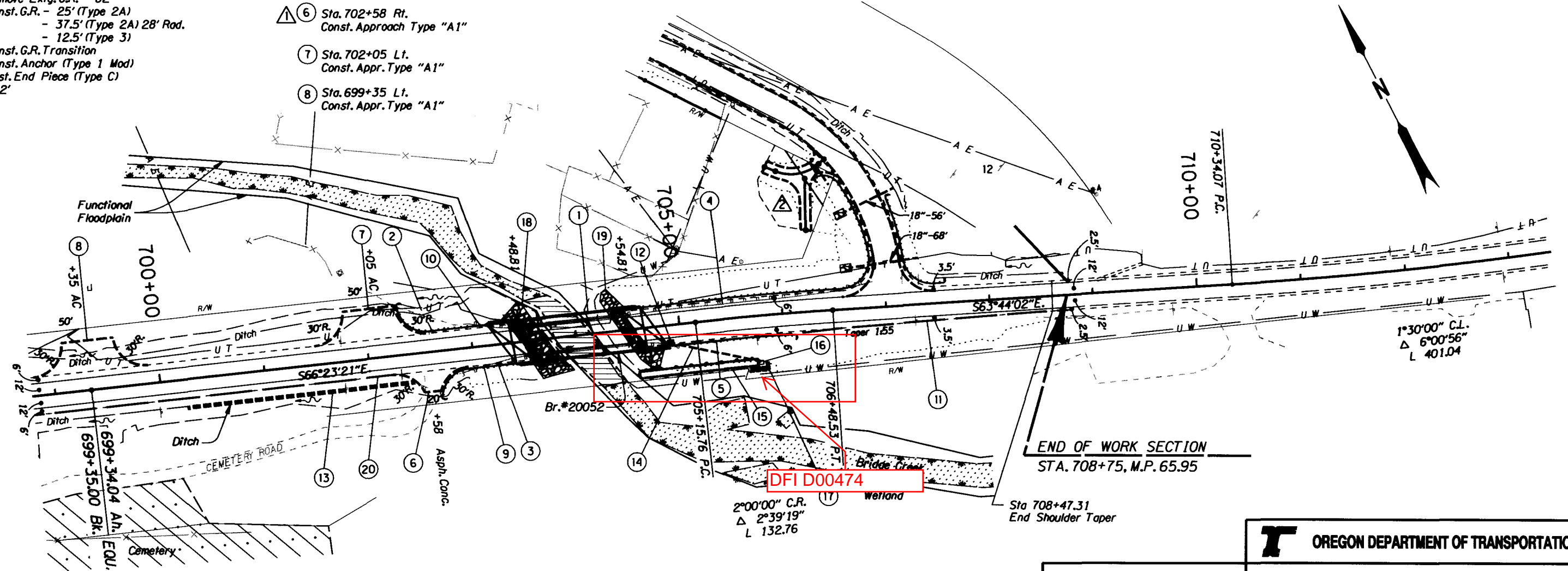
US26: RUSH CREEK-ANTONE-BUNDLE A51
OCHOCO HIGHWAY
CROOK AND WHEELER COUNTIES

Project Leader - Brian Willman
Designed By - Dale Cerney
Drafted By - Serge Valverde

GENERAL CONSTRUCTION

SHEET NO.
6

- ① Const. Bridge (Str # 20052) (For Bridge Details, See Index of Sheets)
Remove Extg. Bridge (Str#07491)
- ② Sta. 702+32 To Sta. 703+89 Lt.
Remove Extg. G.R. - 57'
Const. G.R. - 43.75' (Type 2A) 28' Rad.
- 31.25' (Type 2A)
- 12.5' (Type 3)
Const. G.R. Transition
Const. Anchor (Type 1 Mod.)
Inst. End Piece (Type C)
E=2'
- ③ Sta. 702+66 To Sta. 703+32 Rt.
Remove Extg. G.R. - 82'
Const. G.R. - 25' (Type 2A)
- 37.5' (Type 2A) 28' Rad.
- 12.5' (Type 3)
Const. G.R. Transition
Const. Anchor (Type 1 Mod.)
Inst. End Piece (Type C)
E=2'
- ④ Sta. 704+72 To Sta. 706+57 Lt.
Remove Extg. G.R. - 82'
Const. G.R. - 167.75' (Type 2A)
- 12.5' (Type 3)
Const. G.R. Transition
Connect To Extg. G.R.
E=2'
- ⑤ Sta. 704+95 To Sta. 706+11 Rt.
Remove Extg. G.R. - 56'
Const. G.R. - 62.5' (Type 2A)
- 12.5' (Type 3)
Const. G.R. Transition
Const. G.R. Terminal (Level 3), Non-Flared
Flare Rate=0', W=1', E=2'
- ⑥ Sta. 702+58 Rt.
Const. Approach Type "A1"
- ⑦ Sta. 702+05 Lt.
Const. Appr. Type "A1"
- ⑧ Sta. 699+35 Lt.
Const. Appr. Type "A1"
- ⑨ Sta. 702+99 To Sta. 703+40 Rt.
Const. Asp. Drainage Curb - 46 Ft.
- ⑩ Sta. 703+01 To Sta. 703+16 Lt.
Const. Asp. Drainage Curb - 15 Ft.
- ⑪ Sta. 704+87 To Sta. 708+75 Rt.
Const. Asp. Drainage Curb - 387 Ft.
- ⑫ Sta. 704+90 20' Rt.
Const. Type "G-1" Inlet
Grate E1=2730.03, F.L. E1=2722.71
(See Std. Drg. RD364)
- ⑬ Sta. 700+30 To Sta. 702+30
Const. 3' Flat Bottom Ditch
- ⑭ Sta. 704+90 To Sta. 705+72 Rt.
Install 12" Storm Pipe - 86'
- ⑮ Sta. 704+57 To Sta. 705+73 Rt.
Const. Stormwater Detention Bioswale #3
2:1 Sideslope, 4' Wide, 1:1 Sideslope, 116' Long
(For Details, See Sht 2B-9)
- ⑯ Sta. 705+78
Const. Loose Riprap (Class 50) - 4.0 C.Y.
- ⑰ Sta. 705+65 To Sta. 705+82
Const. 2:1 Slope, 1' Wide Berm - 20'
(For Details, See Sht 2B-9)
- ⑱ Sta. 703+30, 22.3' Lt. To Sta. 703+95, 32.7' Rt.
Const. Loose Riprap (Class 700) - 59.7 C.Y.
(For Details, See Sht 2B-10)
- ⑳ Sta. 698+17 To Sta. 702+21 Rt.
Const. Asp. Drainage Curb - 405 Ft.



Regulated In-Water Work Area shown Thus:
Period of July 15 - August 31.

No Work Area, Off-Limits To Contractor

No Work Area, Cemetery

REVISIONS	
⚠	Revised 03-12-2007 Revised Note
⚠	Revised 03-12-2007 Redisplayed Dwy.



OREGON DEPARTMENT OF TRANSPORTATION

URS CORPORATION
HIGHWAYS AND BRIDGES SECTION

US26: RUSH CREEK-ANTONE-BUNDLE A51
OCHOCO HIGHWAY
CROOK AND WHEELER COUNTIES

Project Leader - Brian Willman
Designed By - Dale Cerney
Drafted By - Serge Valverde

GENERAL CONSTRUCTION

SHEET NO. **6**