

# OPERATION & MAINTENANCE MANUAL

## Infiltration Slope

Manual prepared: April 2019

DFI No. D00541



Figure 1: DFI No. D00541, Looking East

# 1. Identification

Drainage Facility ID (DFI): D00541  
Facility Type: Infiltration Slope  
Construction Drawings: (V-File Numbers) 44V-028  
Location: District: 2B  
Highway No.: 002  
Mile Post: 16.00 to 16.21,  
I-84 West, NW Frontage Rd.

# 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. **NOTE: Mile posts are based off of the V-File, and may vary from TransGIS mile posts.**

Facility location type: Roadway shoulder

Flow direction: East to West, Infiltration Slope

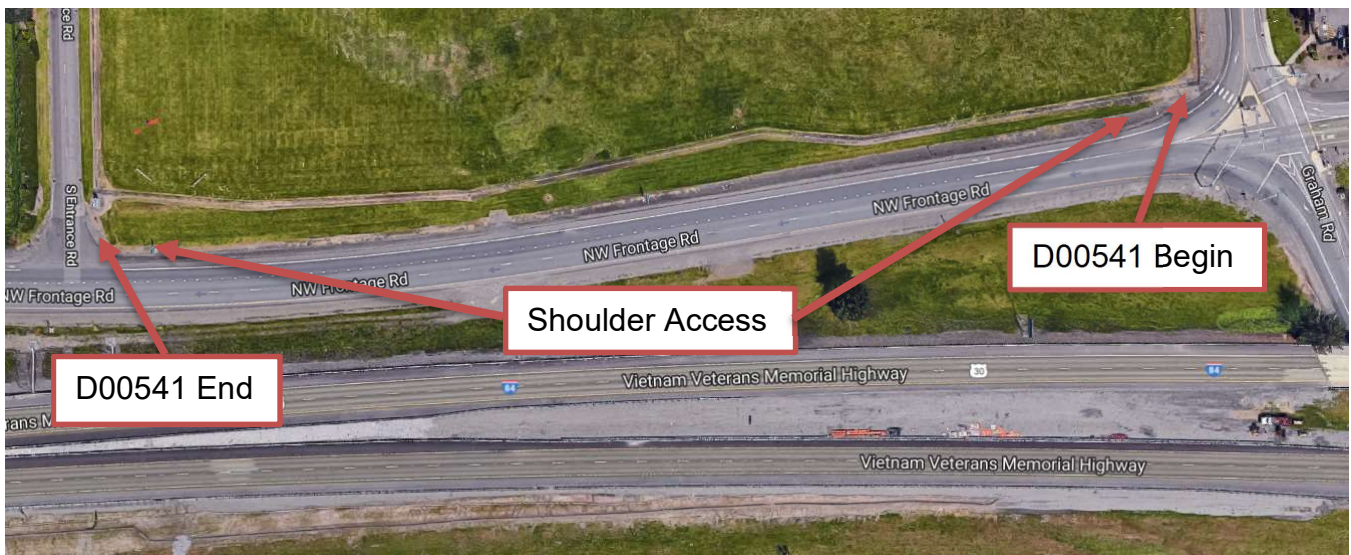


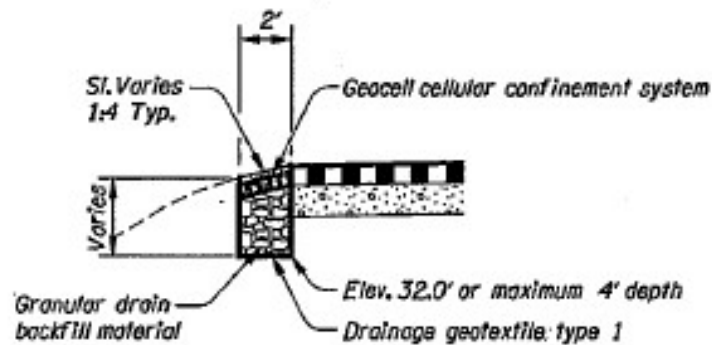
Figure 2: I-84 West, NW Frontage Rd. D00541

#### 4. Facility Summary

The width is measured perpendicular to the edge of pavement and is equivalent to the flow length. The length is measured parallel to the edge of pavement and is equivalent to the length of the contributing impervious area.

The length and width of the applicable facility components are:

Component	Length (feet)	Width (feet)
Infiltration Swale "XBS" 12+16 to 22+97	1081	2



#### INFILTRATION SLOPE TYPE B

Figure 3: Infiltration Slope Section

**Site Specific Information:** NW Frontage Rd. is a one way road, traveling east to west. The infiltration slope is similar to a Bioslope, but all stormwater infiltrates to the ground. It is long and linearly constructed into the existing slope. Infiltration testing was performed in the soil near this location and the infiltration rate was 100 inches/hour. The treatment is provided and pollutants are removed by infiltration processes. The water is stored in the voids in the trench gravels until it percolates into the surrounding soil. There are no subsurface drain pipes in this facility.

## 5. 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

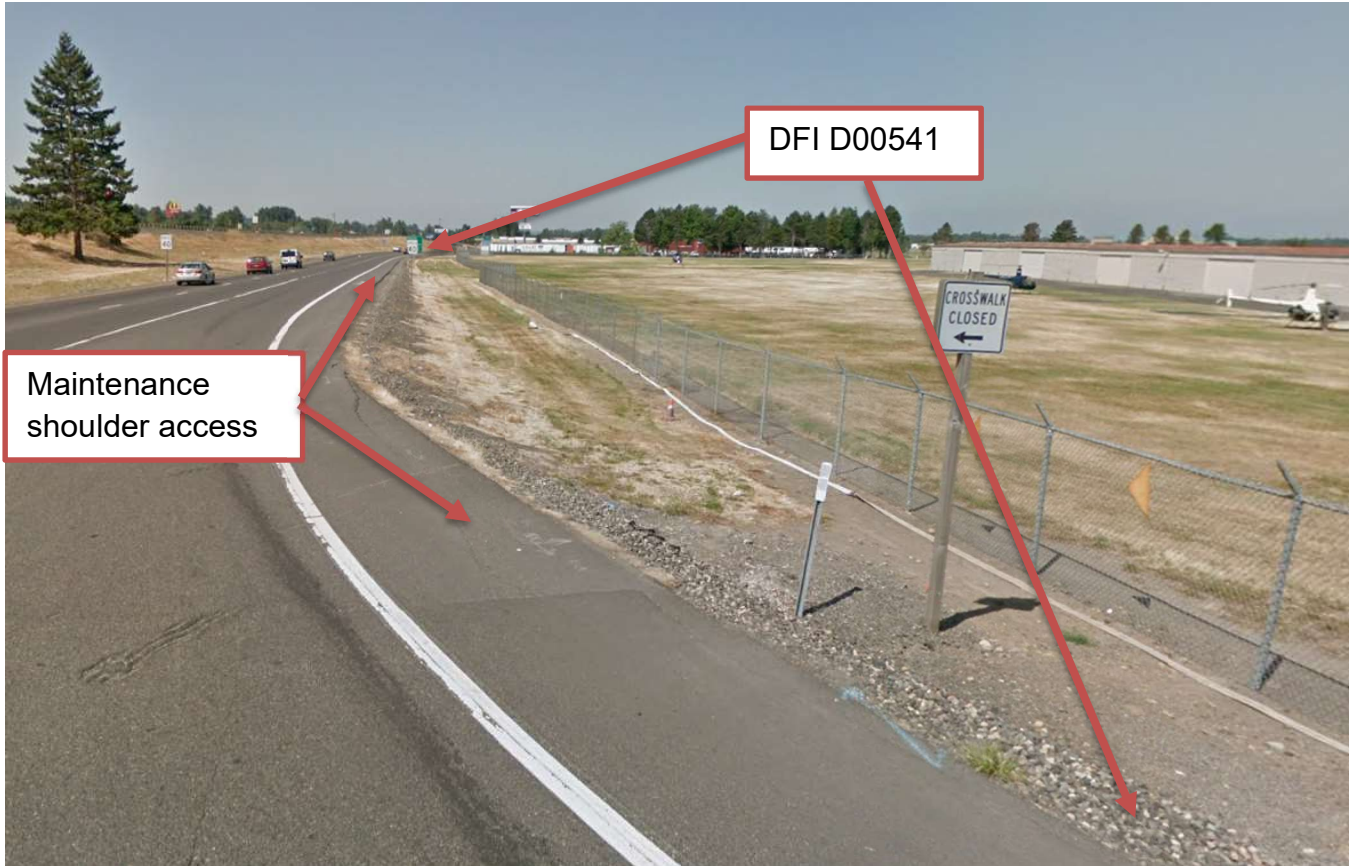


Figure 3: Looking west at Infiltration Swale

## 6. Operational Components / Maintenance Items

### Classification and Standard Operational (Op) Plan:

This facility is classified as a:

<p><input type="checkbox"/> <b>Filter Strip (Op Plan A)</b></p> <p>A filter strip consists of a vegetated or media slope located parallel to the edge of pavement. It maintains sheet flow of stormwater runoff over the width of the strip.</p>	<p><input checked="" type="checkbox"/> <b>Bioslope (Infiltration Slope) (Op Plan B)</b></p> <p>A bioslope consists of a filter strip and treatment zone. It is a flow-through stormwater treatment facility located along roadside embankments.</p>
<p><b>A standard operational plan illustrates the general facility footprint configuration and explains the purpose of each facility component. Operational plans (A, B) are provided in the Standard Operation Manual.</b></p>	

See Appendix A for the site specific operational plan.

### Operational Components

Filter strips and bioslopes have many components that assist with treatment, conveyance, and infiltration of stormwater runoff. The components in use can vary depending on the facility design. 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 Filter Strips and Bioslopes (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/>

## 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.

<b>Table 1: Bioslope/Infiltration Slope/Filter/Strip Components</b>		<b>ID #</b>
<b>Facility Inlet</b>		
Pavement Sheet Flow	<input checked="" type="checkbox"/>	<b>B1</b>
Flow Spreader	<input type="checkbox"/>	<b>B2</b>
<b>Ground Cover</b>		
Vegetated Slope	<input type="checkbox"/>	<b>B3</b>
Aggregate Media Slope	<input checked="" type="checkbox"/>	<b>B4</b>
<b>Underground Components</b>		
Water Quality Mix	<input type="checkbox"/>	<b>B5</b>
Ecology Mix	<input type="checkbox"/>	<b>B6</b>
Granular Drain Backfill Material	<input checked="" type="checkbox"/>	<b>B7</b>
Geotextile Fabric	<input checked="" type="checkbox"/>	<b>B8</b>
Geocell Grid	<input checked="" type="checkbox"/>	<b>B9</b>
<b>Structures</b>		
Curb/Berm	<input type="checkbox"/>	<b>B10</b>
Check Dam	<input type="checkbox"/>	<b>B11</b>
Cleanout	<input type="checkbox"/>	<b>B12</b>
<b>Facility Outlet</b>		
Perforated Drain Pipe	<input type="checkbox"/>	<b>B13</b>
Open Slope Outlet	<input type="checkbox"/>	<b>B14</b>
Open Channel Outlet	<input type="checkbox"/>	<b>B15</b>
Storm Drain Outlet Pipe	<input type="checkbox"/>	<b>B16</b>
Other: Infiltration Slope	<input checked="" type="checkbox"/>	<b>B17</b>
<b>Outfall Type</b>		
Waterbody (Creek/Lake/Ocean)	<input type="checkbox"/> <b>C</b>	<b>B18</b>
	<input type="checkbox"/> <b>L</b>	
	<input type="checkbox"/> <b>O</b>	
Outfall Channel	<input type="checkbox"/>	<b>B19</b>
Storm Drain System	<input type="checkbox"/>	<b>B20</b>
<b>Outfall Components</b>		
Pervious Berm	<input type="checkbox"/>	<b>B21</b>
Riprap Pad	<input type="checkbox"/>	<b>B22</b>

## 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 filter strips and bioslopes:

- Table 1 (General Maintenance): Contains general maintenance and inspection guidelines that are applicable to all ODOT water quality facilities
- Table 4 (Water Quality Filter Strips)
- Table 5 (Water Quality Bioslopes)

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

<http://www.oregon.gov/ODOT/HWY/OOM/pages/mguide.aspx>

The *Blue Book* can be viewed at the following website:

[http://www.oregon.gov/ODOT/Maintenance/Documents/blue\\_book.pdf](http://www.oregon.gov/ODOT/Maintenance/Documents/blue_book.pdf)

## 8. Limitations

Filter strips, bioslopes and infiltration swales are NOT designed to allow the use of heavy equipment. Vehicles entering the facility 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.

## 9. Waste Material Handling

Material removed from the facility is defined as waste by the Department of Environmental Quality (DEQ). Refer to the road waste section of the ODOT Maintenance Yard Environmental Management System (EMS) Policy and Procedures Manual for disposal options:

<http://www.oregon.gov/ODOT/HWY/OOM/pages/ems.aspx>

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

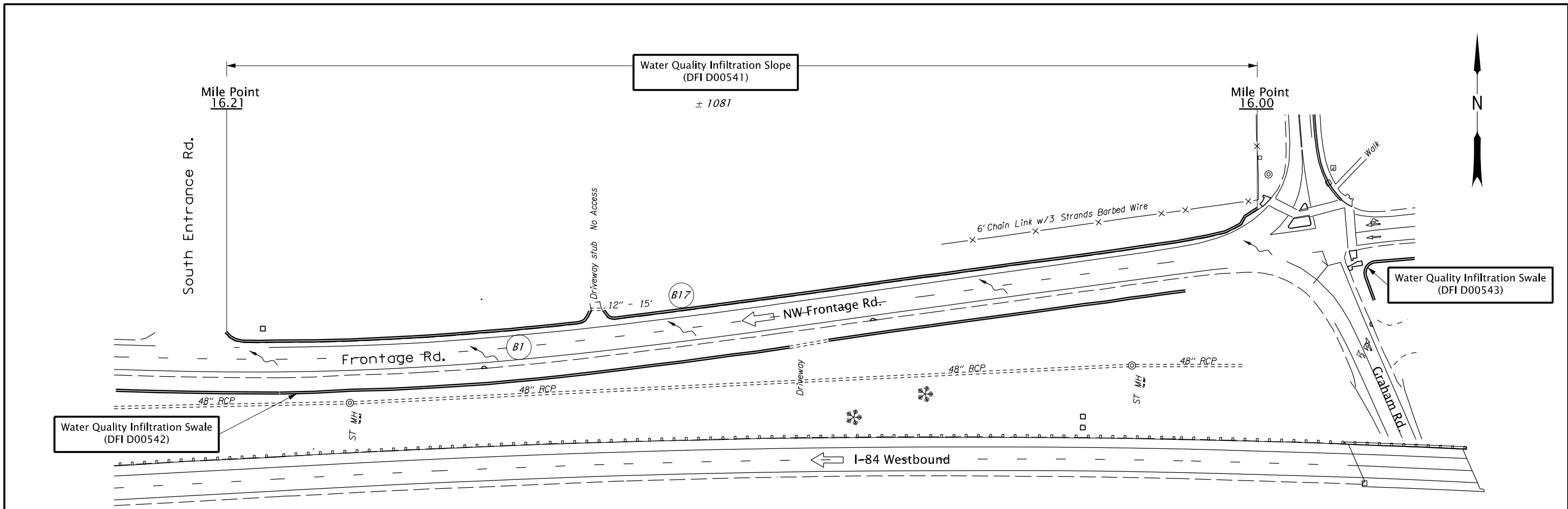
ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 667-7442
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODOT Region 2 Hazmat Coordinator	(503) 986-2647
ODOT Region 3 Hazmat Coordinator	(541) 957-3594
ODOT Region 4 Hazmat Coordinator	(541) 388-6186
ODOT Region 5 Hazmat Coordinator	(541) 963-1590
ODEQ Northwest Region Office	(503) 229-5263



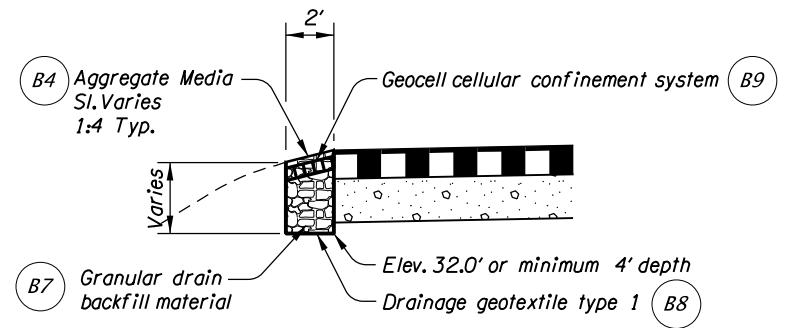
## **A Appendix A – Site Specific Operational Plan**

### **Contents:**

**Operational Plan: DFI D00541**



PLAN  
N.T.S.



INFILTRATION SLOPE TYPE B

TYPICAL SECTION  
N.T.S.

- LEGEND:**
- X# Facility Component (see table 1 in O&M Manual)
  - and/or ⊙ Manhole
  - and/or □ Inlet
  - Storm Pipe (Facility)
  - - - Storm Pipe
  - ← Conveyance Direction
  - ~ Pavement / Facility Flow Path
  - ⇐ Traffic Flow Direction

Sht. 1 of 1

Prepared By:  
Alan Babicky

Drafted By:  
Alan Babicky



**DFI D00541**  
**MAINTENANCE DISTRICT 2B HWY 002**  
**INFILTRATION SLOPE**  
 HIGHWAY MP 16.00 to 16.21  
 MULTNOMAH COUNTY

## **B Appendix B – Project Contract Plans**

### **Contents:**

**Site Specific Subset of Project Contract Plan 44V-028**

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

STATE OF OREGON  
 DEPARTMENT OF TRANSPORTATION  
 PLANS FOR PROPOSED PROJECT

GRADING, DRAINAGE, PAVING, PAVEMENT MARKERS, SIGNING,  
 ILLUMINATION, SIGNALS & ROADSIDE DEVELOPMENT

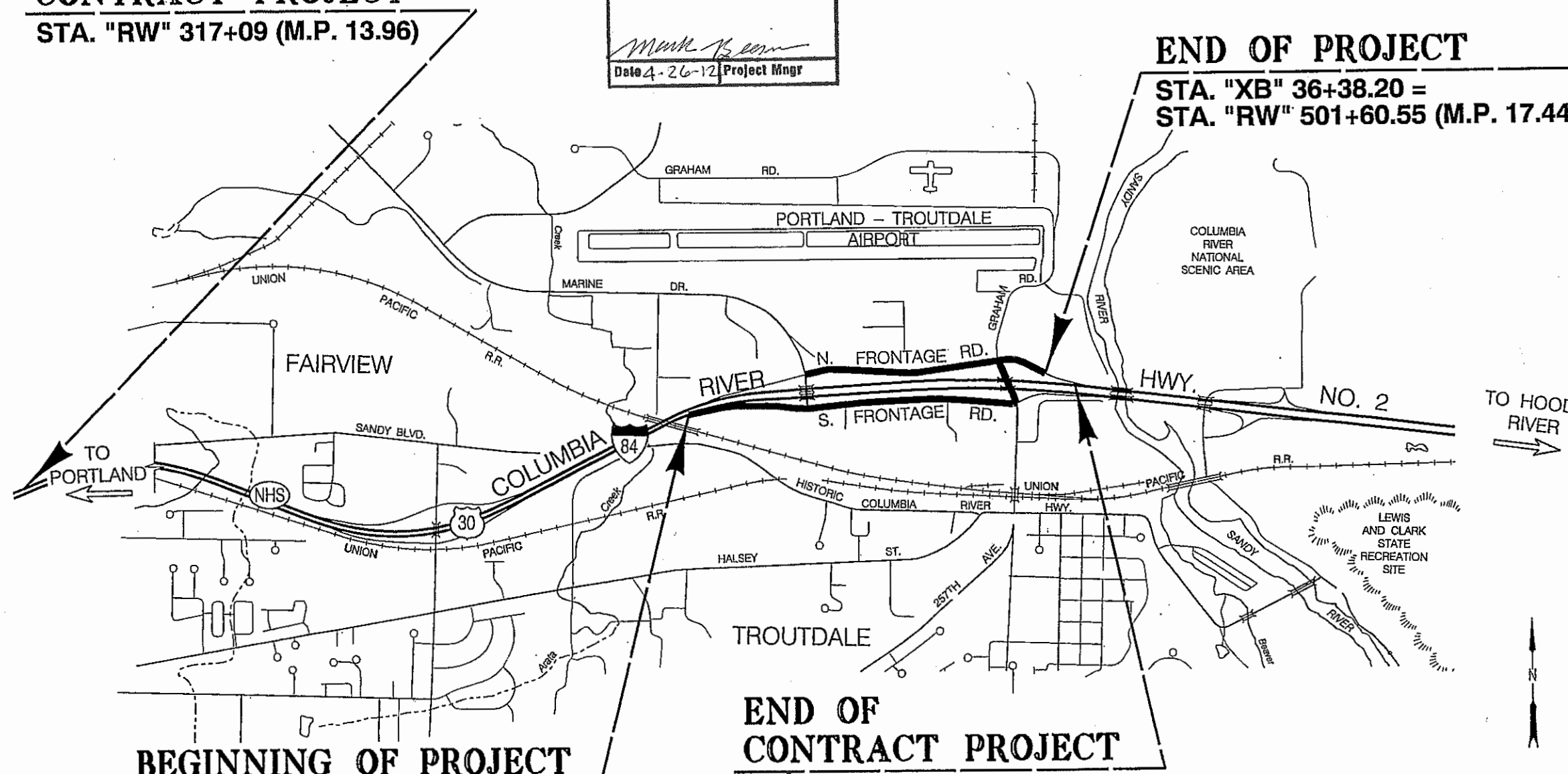
## I-84 AT 257TH AVE (TROUTDALE INTERCHANGE) SEC. COLUMBIA RIVER HIGHWAY

MULTNOMAH COUNTY  
 MARCH 2011

**BEGINNING OF  
 CONTRACT PROJECT**  
 STA. "RW" 317+09 (M.P. 13.96)

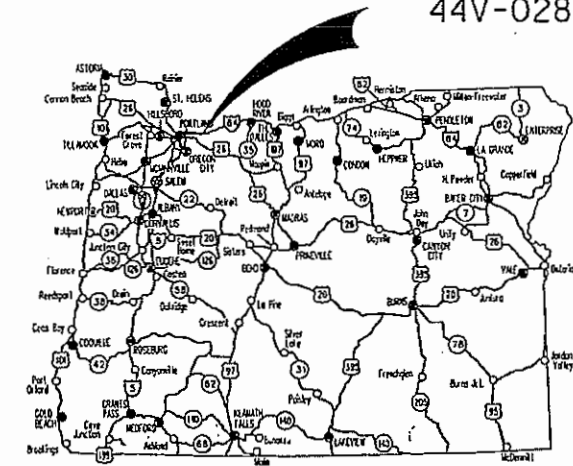
**"AS CONSTRUCTED"**  
*M. M. M. M.*  
 Date 4-26-12 Project Mngr

**END OF PROJECT**  
 STA. "XB" 36+38.20 =  
 STA. "RW" 501+60.55 (M.P. 17.44)



**BEGINNING OF PROJECT**  
 STA. "L4E" 455+91.00  
 STA. "RW" 455+94.16 (M.P. 16.59)

**END OF CONTRACT PROJECT**  
 STA. "XB" 42+00.30 (109.63 Lt.) =  
 STA. "RW" 507+19.70 (M.P. 17.54)



Overall Length Of Project - 0.85 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

**OREGON TRANSPORTATION COMMISSION**  
 Gail Achterman CHAIR  
 Michael Nelson VICE-CHAIR  
 Mary Olson COMMISSIONER  
 Alan Brown COMMISSIONER  
 David Lohman 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: *Naveen G. Chandra*  
 Naveen G. Chandra, P.E.  
 Project Delivery Manager, Region 1

*J. M. M.*  
 Concurrence by ODOT Chief Engineer

I-84 AT 257TH AVE (TROUTDALE INTERCHANGE) SEC.  
 COLUMBIA RIVER HIGHWAY  
 MULTNOMAH COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	<b>STATE</b>	1

T. 1 N., R. 3 E., W.M.



PE001770 000 J13

INDEX OF SHEETS, CONT'D.	
SHEET NO.	DESCRIPTION
2, 2A, 2A-2 thru 2A-13, Incl.	Typical Sections
2B, 2B-2 thru 2B-4, Incl.	Details <i>Added Sht 2B-3A</i>
2C, 2C-2 & 2C-3	Detour
2C-4 thru 2C-16, Incl.	Traffic Control Plans
2D	Pipe Data Sheet
3	Alignment
3A	General Construction
3B	Drainage & Utilities
3C	Profiles
4	Alignment
4A	General Construction
4B	Drainage & Utilities
4B-2	Drainage & Utilities
4C	Profiles
4D	Drainage Profiles
5	Alignment
5A	General Construction
5B	Drainage & Utilities
5B-2	Drainage & Utilities
5C	Profiles
5D	Drainage Profiles
6	Alignment
6A	General Construction
6B	Drainage & Utilities
6B-2	Drainage & Utilities
6C	Profiles
6D	Drainage Profiles
7	Alignment
7A	General Construction
7C	Profiles
B	Alignment
8A	General Construction
<b>GEO/HYDRO</b>	
GA	Erosion Control Details
GA-2 thru GA-8	Erosion Control Plans
GB, GB-2 & GB-3	Geotechnical Data
GJ	Drainage Details
GJ-2, GJ-3, GJ-4	Stormwater Treatment and Storage Facility Field Markers
<b>BRIDGE STRUCTURE 17365</b>	
85233	Bridge General Layout
85235	Structural Mount
85236	Structure Mount Details
<b>PERMANENT PAVEMENT MARKINGS</b>	
ST, ST-2 thru ST-7, Incl.	Pavement Marking Plan
<b>PERMANENT SIGNING</b>	
S-12500 thru S-12517, Incl.	Permanent Signing
<b>BRIDGE STRUCTURE 21529</b>	
S-12518	Cantilever Sign Support, Sta. "EB" 458+80

INDEX OF SHEETS, CONT'D.	
DRAWING NO.	DESCRIPTION
<b>ILLUMINATION</b>	
I-1827	Illumination Legend
I-1828 & I-1829	Illumination Removal Plan
I-1830 & I-1831	Illumination Plan
I-1832	Illumination Details
<b>TRAFFIC SIGNALS</b>	
15969	Signal and Detector Plan Legend
15970	Detector Plan
15971	Signal Removal Plan
15972	Temporary Signal Plan
15973	Signal Plan
15974	Detector Plan
15975	Existing Utility Plan
15976	Signal Removal Plan
15977	Temporary Signal Plan
15978	Signal Plan
15979	Detector Plan
15980	Existing Utility Plan
15981	Temporary Pole Entrance Chart
15982	Pole Entrance Chart
<b>ITS</b>	
ITS-1044	ITS Legend & Symbols
ITS-1045 thru ITS-1049, Incl.	ITS Plan
ITS-1050 thru ITS-1055, Incl.	ITS Details

*ADDED 15978A GRADING For Signal Pole # 18*

Standard Drg. Nos.

- RD140 - Roadway Cross Slopes Superelevated Sections
- RD150 - Slope Rounding
- RD300 - Trench Backfill, Bedding, Pipe Zone And Mult. Installations
- RD302 - Street Cut
- RD316 - Sloped Ends For Metal Pipe
- RD318 - Sloped Ends For Concrete Pipe
- RD320 - Paved End Slope For Culverts 60" Maximum Pipe Size
- RD326 - Coupling Bands For Corrugated Metal Pipe
- RD336, RD342, RD344, RD346 - Manholes
- RD356 - Manhole Cover & Frames
- RD358 - Manhole Slope Protectors
- RD364, RD370, RD376 - Concrete Inlets
- RD380, RD384, RD386 - Pipe Fill Height Tables
- RD400, RD405, RD415, RD420, RD450 - Guardrail

- RD500 - Precast Concrete Barrier Pin And Loop Assembly
- RD510 - Concrete Barrier Terminal
- RD700 - Curbs
- RD705 - Islands
- RD710 - Accessible Route Islands
- RD715 - Approaches And Non-Sidewalk Driveways
- RD720 - Sidewalks
- RD755 - Sidewalk Ramp Details
- RD759 - Truncated Dome Detectable Warning Surface Details And Locations
- RD1000 - Construction Entrances
- RD1005 - Check Dams
- RD1010, RD1015 - Inlet Protection
- RD1040 - Sediment Fence
- TM200 - Sign Installation Details
- TM201 - Miscellaneous Sign Placement Details
- TM204 - Flag Board Mounting Details
- TM211 - Signage Details
- TM223, TM224 - Directional Sign Layout
- TM225 - Exit Number & Gore Signage Details
- TM230, TM231, TM232, TM233 - Mounting Details For Removable Legend
- TM300, TM301 - Illumination Control Cabinets
- TM450 - Mast Arm Pole Details
- TM452 - Strain Pole Details
- TM455 - Temporary Signal Details
- TM457 - Vehicle, Ped. Signal & Push Button Mounting Details
- TM458 - Pedestrian Ramp Placement Details
- TM460 - Vehicle Signal Details
- TM462 - Adjustable Signal Head Mounting Details
- TM463 - Spanwire Mounting Details
- TM465 - Overhead Sign, Fire Preemption & Photoelectronic Details
- TM467 - Ped. Signal And Ped. Push Button Details
- TM470 - Color Code Charts
- TM472 - Traffic Signal Junction Boxes
- TM475 - Loop Details
- TM480 - Loop Entrance Details
- TM482 - Controller Cabinet And Foundation Details
- TM485 - Service Cabinets And Service Cabinet Wiring Details
- TM488 - Terminal Cabinet Detail
- TM490 - Crosswalk Closure Detail

**"AS CONSTRUCTED"**  
*Mark Beem*  
 Date 4-26-12 Project Mgr

**I-84 AT 257TH AVE (TROUTDALE INTERCHANGE) SEC.**  
 COLUMBIA RIVER HIGHWAY  
 MUTNOMAH COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	STATE	1A

Standard Drawings located on the web at:  
[http://www.oregon.gov/ODOT/HWY/ENGSERVICES/standard\\_drawings\\_home.shtml](http://www.oregon.gov/ODOT/HWY/ENGSERVICES/standard_drawings_home.shtml)

Standard Drg. Nos. (contd.)

- TM500, TM501, TM503 - Pavement Marking Standard Details
- TM525 - Turn Arrow Marking Details
- TM530 - Intersection Pavement Markings
- TM551 - Freeway Exit Ramp Pavement Markings
- TM560, TM561 - Alignment Layout
- TM570 - Traffic Delineators
- TM571 - Traffic Delineators Steel Post Details
- TM575 - Traffic Delineator Installation
  
- TM600, TM601 - Multi-Post Breakaway Sign Supports
- TM602 - Triangular Base Breakaway Multi-Direction Slip Base
- TM618 - Truss Type Sign Bridge
- TM622, TM623, TM624, TM625, TM626, TM627 - Monotube Cantilever Sign Support
  
- TM629, TM630 - Slip Base & Fixed Base Luminaire Supports
  
- TM635 - Breakaway Sign & Luminaire Supports
- TM650, TM651, TM652, TM653 - Traffic Signal Supports
- TM670 - Wood Post Sign Supports
- TM671 - 3 Second Gust Wind Speed Isotach
- TM675 - Extruded Aluminum Panels
- TM676 - Sign Attachments
- TM677 - Sign Mounts
- TM678 - Secondary Sign Mounting Details
- TM679 - Signal Mast Arm Street Name Sign Mounts
- TM680 - Signal Pole Mounts
- TM681, TM687, TM688 - Square Tube Sign Supports
  
- TM800 - Tables, Abrupt Edge And PCMS Details
- TM810 - Temporary Reflective Pavement Markers
- TM820 - Temporary Barricades
- TM821 - Temporary Sign Supports
- TM830 - Temporary Concrete Barrier And Rumble Strips
- TM831, TM832 - Temporary Impact Attenuators
- TM840 - Closure Details
- TM841 - Intersection Work Zone Details
- TM842 - Signalized Intersection Details
- TM843 - Intersection Details
- TM851 - 2-Lane, 2-Way Roadways
- TM860 - Freeway Sections

R/W Map Nos. 6B-15-13, 1A-22-7,  
1R-3-1477 and 1R-3-1477

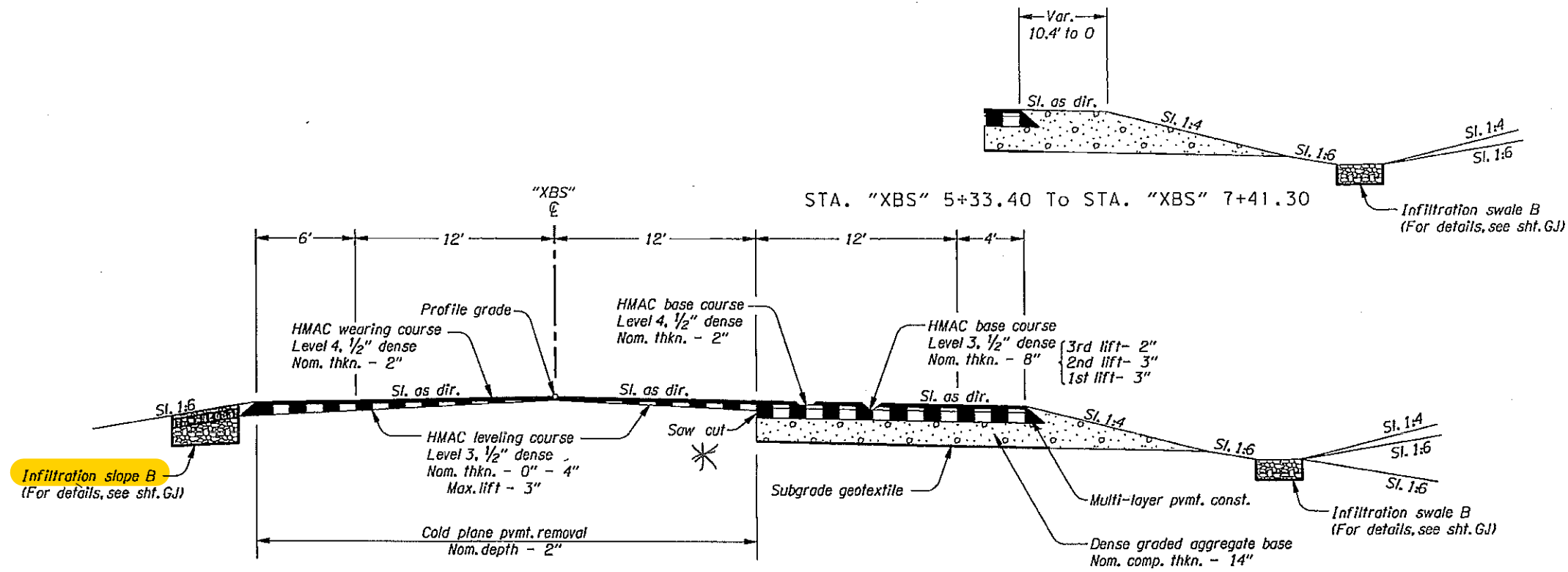
**"AS CONSTRUCTED"**

*Mark Beer*

Date 4-26-12 Project Mngr

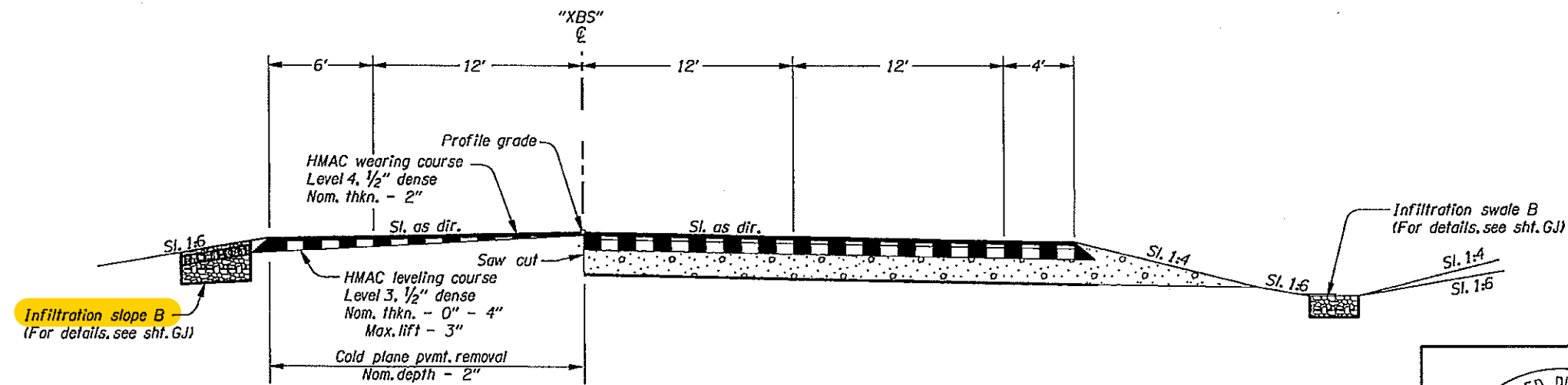
<b>1-84 AT 257TH AVE (TROUTDALE INTERCHANGE) SEC.</b> COLUMBIA RIVER HIGHWAY MULTNOMAH COUNTY		
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	<b>STATE</b>	<b>1B</b>

Standard Drawings located on the web at:  
[http://www.oregon.gov/ODOT/HWY/ENGSERVICES/standard\\_drawings\\_home.shtml](http://www.oregon.gov/ODOT/HWY/ENGSERVICES/standard_drawings_home.shtml)



\* As-Built  
 \* Saw cut was 1.5 ft.  
 from the original  
 right edge of pavement.

STA. "XBS" 5+33.45 To STA. "XBS" 19+35.00  
 "XBS" 20+40.00 To "XBS" 23+52.50



STA. "XBS" 19+35.00 To STA. "XBS" 20+40.00  
 (For surfacing details not shown, see section above)

- NOTE:
1. Side-slopes are shown as vert. to horiz.
  2. For standard superelevation, see drg. no. RD140.
  3. For slope rounding, see drg. no. RD150.

**OREGON DEPARTMENT OF TRANSPORTATION**

REGION 1 - ROADWAY ENGINEERING SECTION

I-84 AT 257TH AVE (TROUTDALE INTERCHANGE) SEC.  
 COLUMBIA RIVER HIGHWAY  
 MULTNOMAH COUNTY

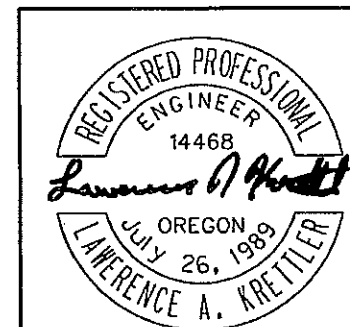
Design Team Leader - Lawrence Krettlter  
 Designed By - Marco Singer & Dave Hoase  
 Drafted By - Carolyn Allen

**TYPICAL SECTIONS**

SHEET NO.  
**2A-7**

**"AS CONSTRUCTED"**

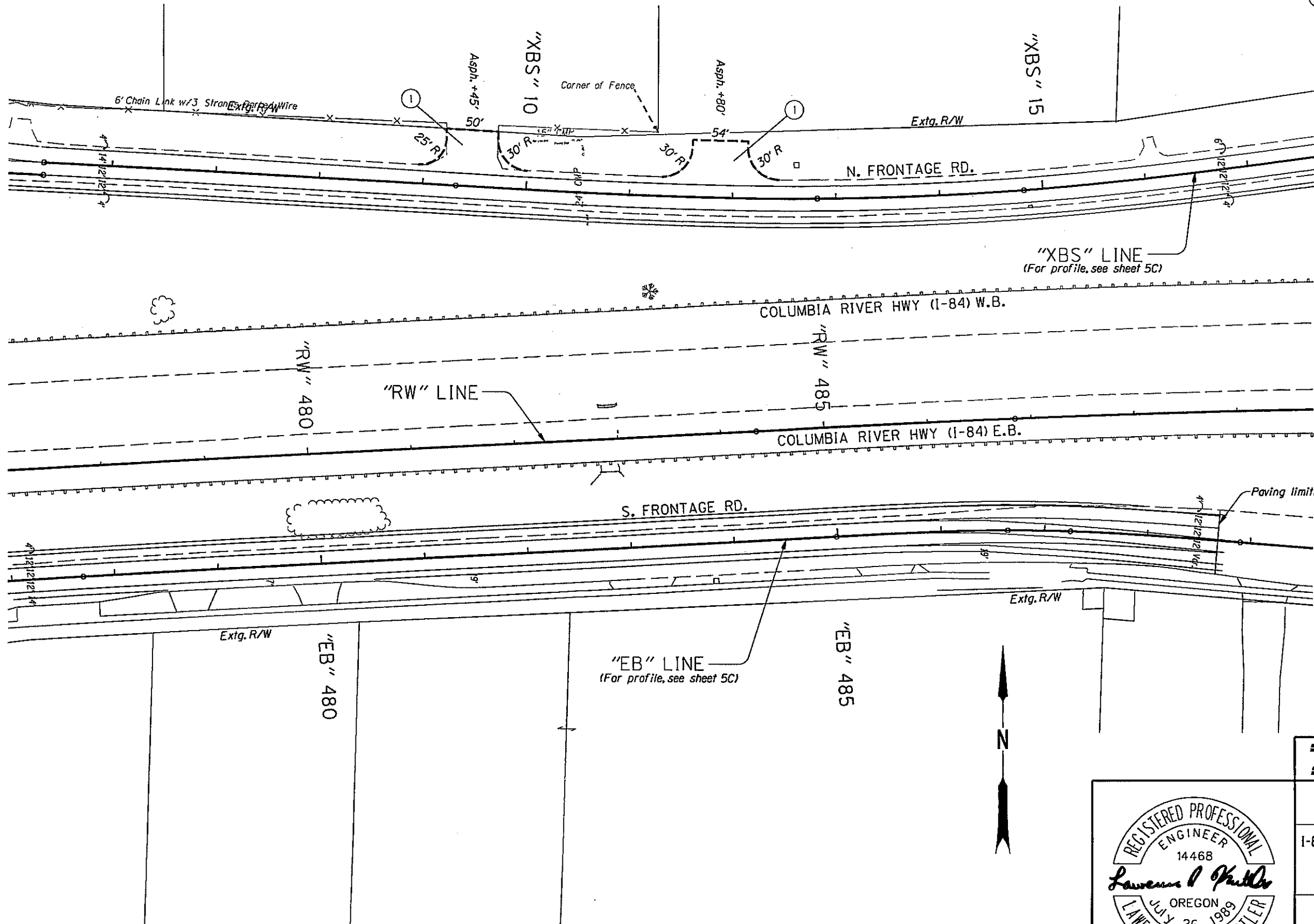
*Mark Bean*  
 Date 4-26-12 Project Mngr



EXPIRATION DATE: 6-30-2011

Sec. 26, T. 1 N, R. 3 E, W.M.

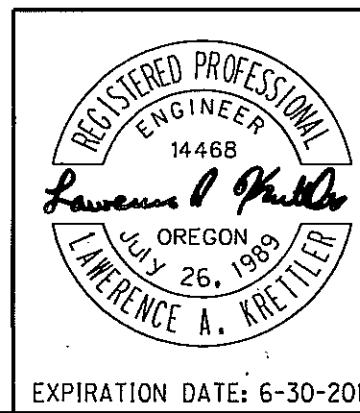
① Const. appr. - 2  
(See drg. no. RD715)



**"AS CONSTRUCTED"**

*Mark Brown*

Date 4-26-12 | Project Mngr



<b>OREGON DEPARTMENT OF TRANSPORTATION</b>	
REGION 1 - ROADWAY ENGINEERING SECTION	
I-84 AT 257TH AVE (TROUTDALE INTERCHANGE) SEC. COLUMBIA RIVER HIGHWAY MULTNOMAH COUNTY	
Design Team Leader - Lawrence Krettlar Designed By - Marco Singer & Dave Hoase Drafted By - Carolyn Allen	
<b>GENERAL CONSTRUCTION</b>	SHEET NO. <b>5A</b>



20 As per cco #15

EXISTING PIPE & Type D Inlet (ADDED)

Out of paving limits

- Infiltration swale shown thus:
- Infiltration slope shown thus:
- Cut line shown thus:
- Adjust manhole shown thus:
- Adjust inlet shown thus:

**OREGON DEPARTMENT OF TRANSPORTATION**

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

**I-84 AT 257TH AVE (TROUTDALE INTERCHANGE) SEC.**  
 COLUMBIA RIVER HIGHWAY  
 MULTNOMAH COUNTY

Reviewed By - Craig Sheahan  
 Designed By - Karina Nordahl  
 Drafted By - Edita Bogustawski

**DRAINAGE & UTILITIES**

SHEET NO. **5B**

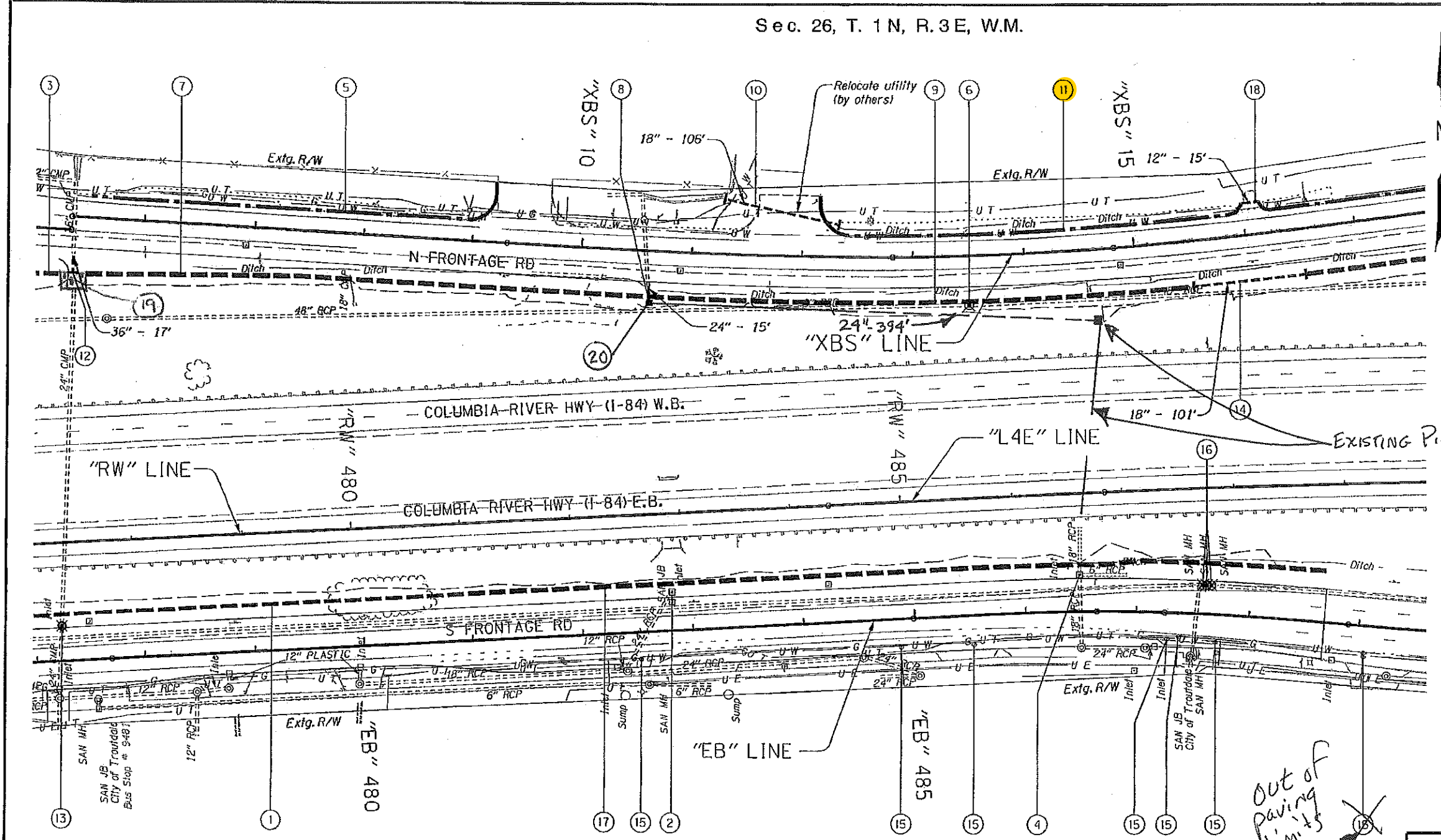
**REGISTERED PROFESSIONAL ENGINEER**  
 58552

OREGON  
 JULY 21, 1998  
**CHRISTINE J. HIGGINS**

EXPIRES

**"AS CONSTRUCTED"**

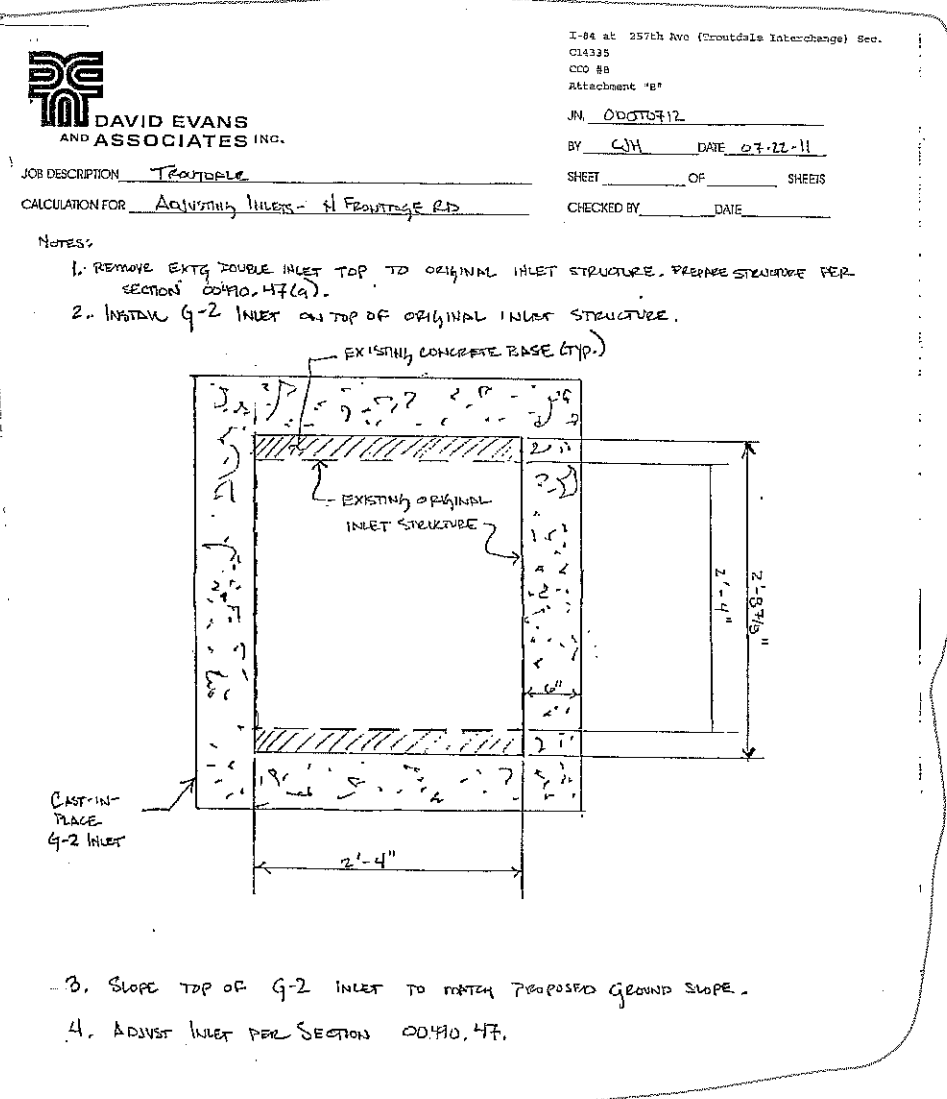
*Mark Bear*  
 Date 4-26-12 Project Mgr



\* CHANGE ORDER FOR NOTES ② & ④

- ① Sta. "EB" 475+50.00, 41.93' Lt. to Sta. "EB" 480+75.00, 41.93' Lt. Const. infiltration swale type D - 49.3 cu. yd. (For detail, see sht. GJ)
- ② Sta. "EB" 482+82.16, 34.62' Lt. ~~Adjust inlet~~ Rim 36.34
- ③ See note 6, sht. 4B-2
- ④ Sta. "EB" 486+49.32, 32.97' Lt. ~~Adjust inlet~~ Rim 38.36
- ⑤ Sta. "XBS" 5+50.09, Lt. to Sta. "XBS" 9+19.31, Lt. Const. infiltration swale type B - 88.2 cu. yd. Inst. delineators, type S1 (For details, see shts. GJ & GJ-2)
- ⑥ Sta. "XBS" 13+49.46, 44.75' Rt. Const. granular drain backfill diversion Major adjust manhole (For details, see sht. GJ-3)
- ⑦ Sta. "XBS" 5+48.50, 51.06' Rt. to Sta. "XBS" 10+60.00, 41.42' Rt. Const. infiltration swale type B - 75.9 cu. yd. (For details, see sht. GJ)
- ⑧ Sta. "XBS" 10+63.01, 46.91' Rt. Const. ditch inlet type "D" Extend 24" culvert pipe - 15' 5' depth (See drg. no. RD370)
- ⑨ Sta. "XBS" 10+62.13, 41.42' Rt. to Sta. "XBS" 15+50.03, 41.42' Rt. Const. infiltration swale type B - 72.7 cu. yd. (For details, see sht. GJ)
- ⑩ Sta. "XBS" 11+28.87, 49.67' Lt. to Sta. "XBS" 12+33.30, 28.98' Lt. Inst. 18" culvert pipe - 106' 5' depth Trench resurf. - 34 sq. yd. (See drg. no. RD302)
- ⑪ Sta. "XBS" 12+15.60 Lt. to Sta. "XBS" 16+00.00 Lt. Const. infiltration slope type B - 113.9 cu. yd. (For details, see sht. GJ)
- ⑫ Sta. "XBS" 5+36.35, 33.50' Rt. Extend 36" culvert pipe - 17' 5' depth
- ⑬ Sta. "EB" 477+25.60, 31.52' Lt. Remove extg. inlet Const. shallow manhole Connect extg. 24" storm sew. pipes Rim 35.90 F.L. 31.80 (Extg. 24" N) F.L. 31.70 (Extg. 24" S)

- ⑭ Sta. "XBS" 15+50.03, 41.42' Rt. to Sta. "XBS" 16+50.00, 41.42' Rt. Inst. 18" culvert pipe - 101' 5' depth
- ⑮ Adjust water valve - \* 6
- ⑯ Minor adjust sanitary manhole - 3
- ⑰ Sta. "EB" 480+75.00, 41.93' Lt. to Sta. "EB" 488+68.12, 46.52' Lt. Const. infiltration swale type A - 276.6 cu. yd. Inst. delineators, type S1 (For details, see shts. GJ & GJ-2)
- ⑱ Sta. "XBS" 16+00.00, 28.97' Lt. to Sta. "XBS" 16+14.91, 29.00' Lt. Inst. 12" storm sew. pipe - 15' 5' depth
- ⑲) REPAIR CURB AND RAMP BENCH (25' X 20' X 1') WITH REPAIR GRANULAR, TAP 1
- ⑳ Install 24" storm sew. pipe - 394' 5' DEPTH Connect to ~~Extg~~ Type D Inlet NEW



"AS CONSTRUCTED"

*Mark Ben*

Date 4-26-12 Project Mngt

REGISTERED PROFESSIONAL ENGINEER 58552

OREGON JULY 21, 1998

CHRISTINE J. HIGGINS

EXPIRES

**OREGON DEPARTMENT OF TRANSPORTATION**

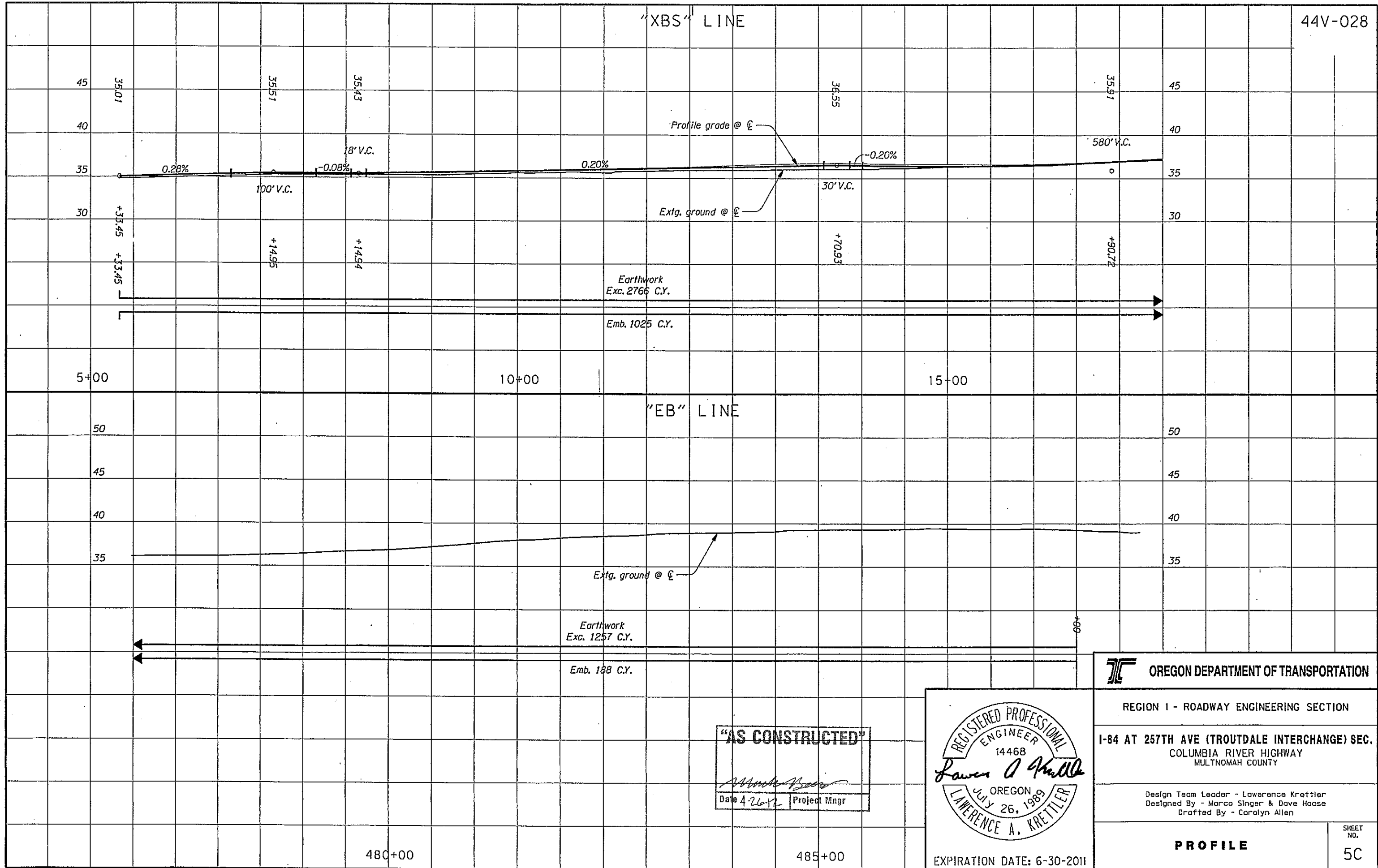
**DAVID EVANS AND ASSOCIATES INC.**  
2100 Southwest River Parkway  
Portland Oregon 97201 Ph: 503.223.6663

**I-84 AT 257TH AVE (TROUTDALE INTERCHANGE) SEC.**  
COLUMBIA RIVER HIGHWAY  
MULTNOMAH COUNTY

Reviewed By - Craig Sheehan  
Designed By - Karina Nordahl  
Drafted By - Edita Boguslawski

**DRAINAGE & UTILITIES**

SHEET NO. **5B-2**



44V-028

"XBS" LINE

"EB" LINE

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - ROADWAY ENGINEERING SECTION

I-84 AT 257TH AVE (TROUTDALE INTERCHANGE) SEC.  
COLUMBIA RIVER HIGHWAY  
MULTNOMAH COUNTY

Design Team Leader - Lawrence Kretler  
Designed By - Marco Singer & Dave Hoase  
Drafted By - Carolyn Allen

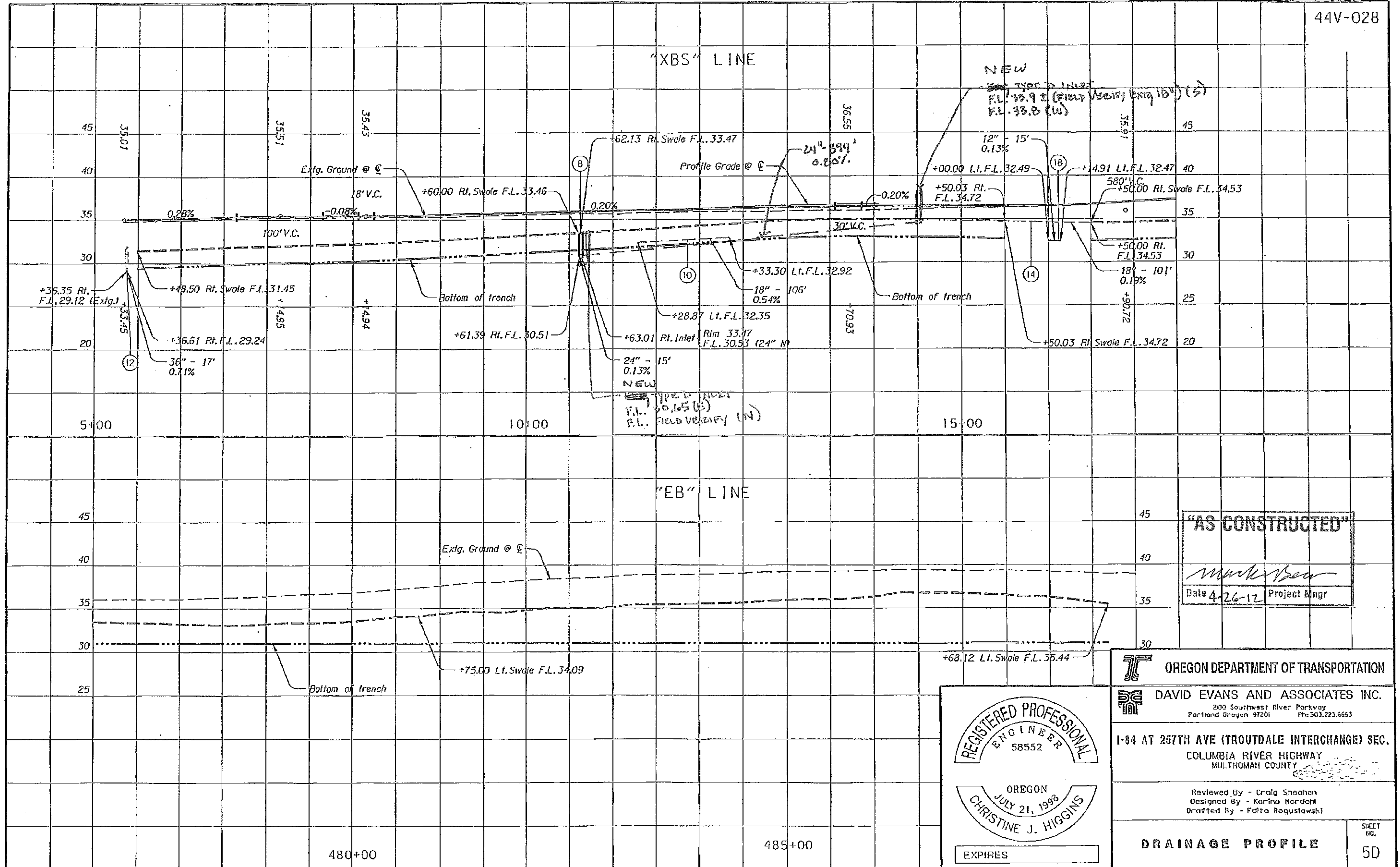
PROFILE

SHEET NO.  
5C

"AS CONSTRUCTED"  
Date 4-26-92 Project Mngr

REGISTERED PROFESSIONAL ENGINEER 14468  
Lawrence A. Kretler  
OREGON JULY 26, 1989  
LAWRENCE A. KRETLER

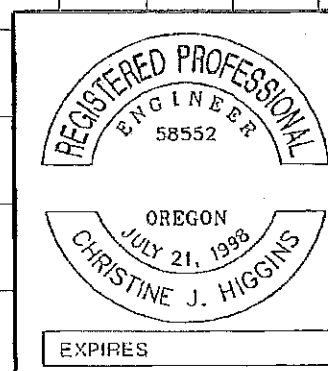
EXPIRATION DATE: 6-30-2011



**"AS CONSTRUCTED"**

*Mark Van*

Date 4-26-12 Project Mgr



**OREGON DEPARTMENT OF TRANSPORTATION**

**DAVID EVANS AND ASSOCIATES INC.**  
200 Southwest River Parkway  
Portland Oregon 97201 Ph: 503.223.6663

1-84 AT 257TH AVE (TROUTDALE INTERCHANGE) SEC.  
COLUMBIA RIVER HIGHWAY  
MULTNOMAH COUNTY

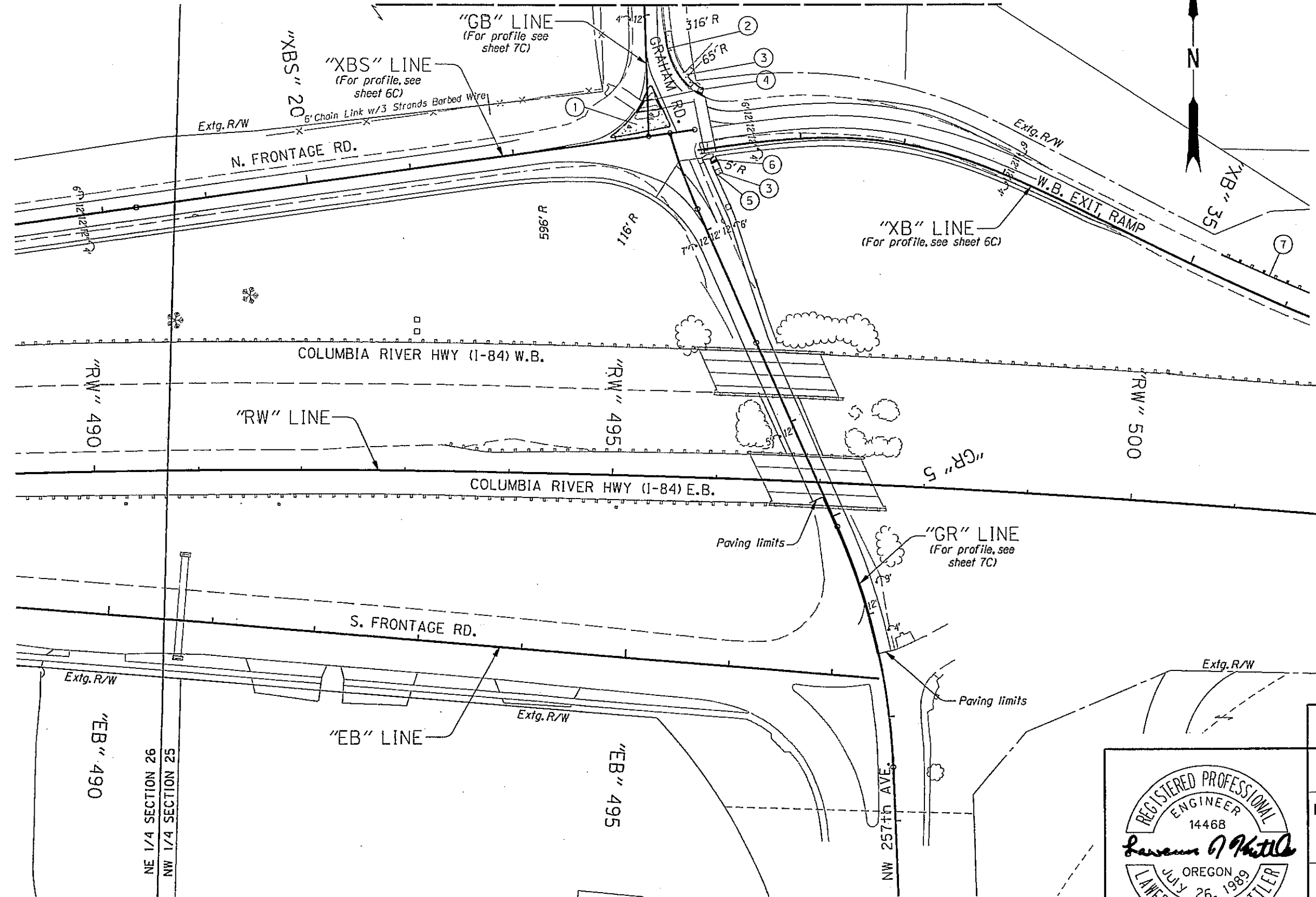
Reviewed By - Craig Sheahan  
Designed By - Karina Nordoh  
Drafted By - Edito Boguslawski

**DRAINAGE PROFILE**

SHEET NO. 5D

Sec. 25, 26 T. 1 N, R. 3 E, W.M.

MATCH LINE A  
See sht. 8A



- ① Remove extg. island  
Const. raised rt turn channelization island  
(Cut through design)  
(See drg. no. RD710)  
(For details, see sht. 2B-3)
- ② Const. curb & gutter  
(See drg. no. RD700)
- ③ Const. P.C. conc. sidewalk
- ④ Const. parallel sidewalk ramp - (Modified)  
(For details, see sht. 2B)
- ⑤ Const. standard curb  
(See drg. no. RD700)
- ⑥ Const. sidewalk ramp  
(For details, see sht. 2B)
- ⑦ Adjust extg. guardrail - 125'  
(As directed)

**"AS CONSTRUCTED"**

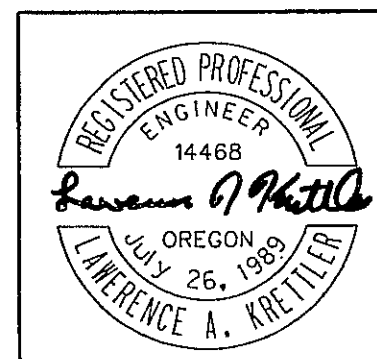
*Mark New*  
Date 4-26-12 Project Mngr

**OREGON DEPARTMENT OF TRANSPORTATION**

REGION 1 - ROADWAY ENGINEERING SECTION

I-84 AT 257TH AVE (TROUTDALE INTERCHANGE) SEC.  
COLUMBIA RIVER HIGHWAY  
MULTNOMAH COUNTY

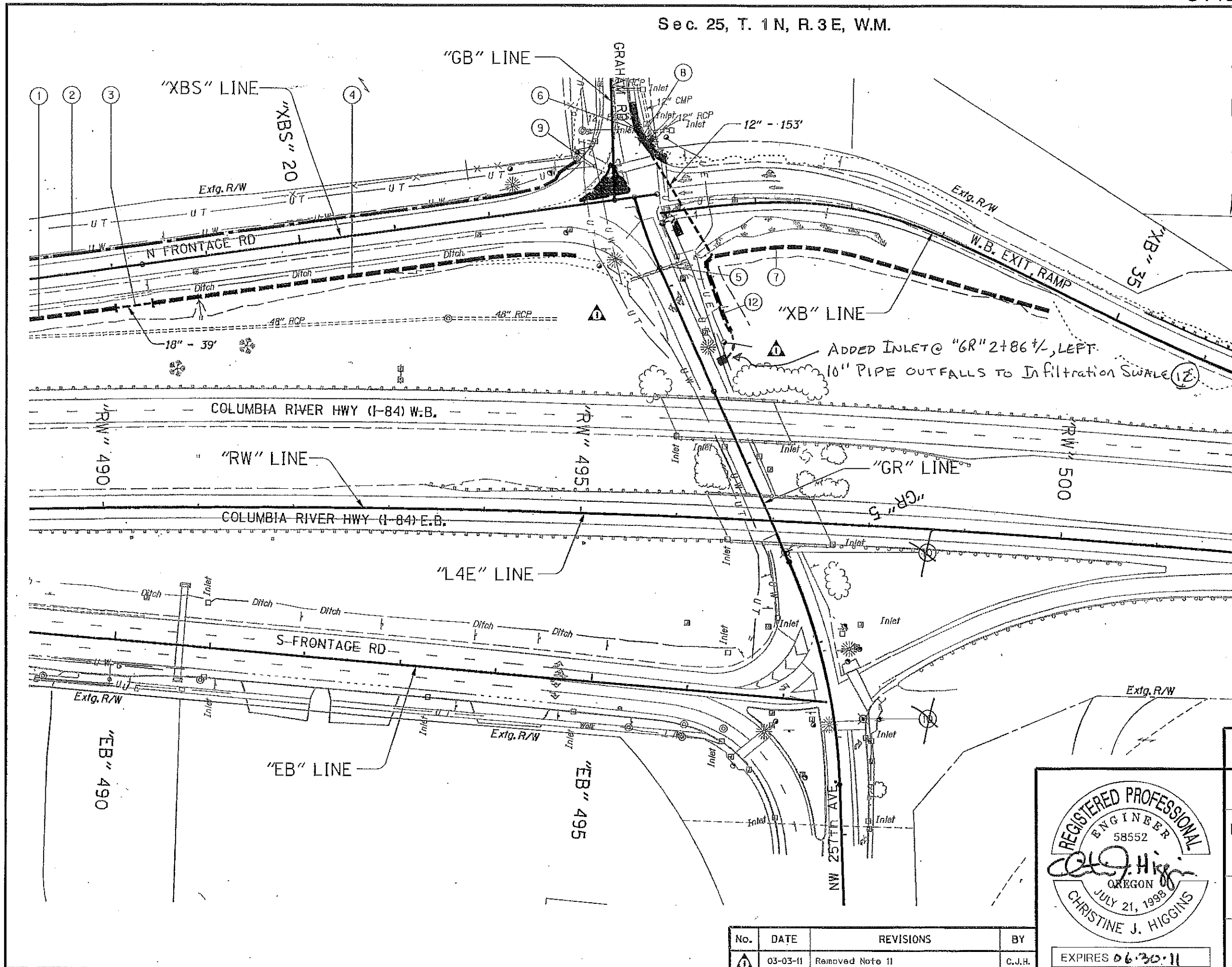
Design Team Leader - Lawrence Krettlor  
Designed By - Marco Singer & Dave Hoase  
Drafted By - Carolyn Allen



EXPIRATION DATE: 6-30-2011

**GENERAL CONSTRUCTION** SHEET NO. 6A

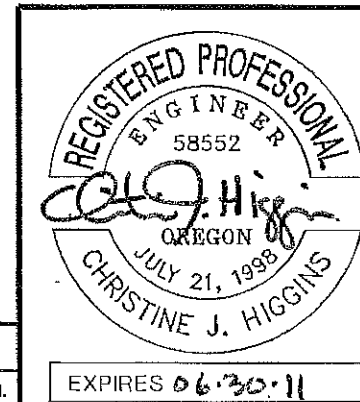
Sec. 25, T. 1N, R. 3E, W.M.



**"AS CONSTRUCTED"**

*Mark Berry*  
Date 4-16-12 Project Mng'r

- Infiltration swale shown thus:
- Infiltration slope shown thus:
- Fill line shown thus:
- Cut line shown thus:
- Adjust manhole shown thus:
- Remove extg. inlet shown thus:
- Plug and abandon pipe shown thus:



**OREGON DEPARTMENT OF TRANSPORTATION**

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**I-84 AT 25TH AVE (TROUTDALE INTERCHANGE) SEC.**  
COLUMBIA RIVER HIGHWAY  
MULTNOMAH COUNTY

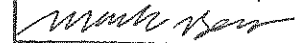
Reviewed By - Craig Sheahan *CSH*  
Designed By - Karina Nordahl  
Drafted By - Edita Bogustawski

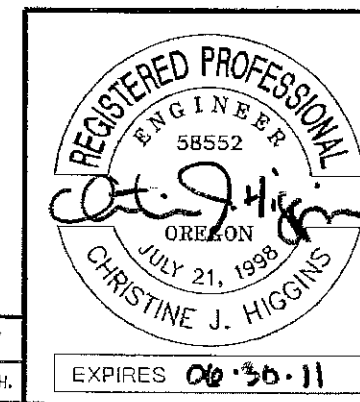
**DRAINAGE & UTILITIES**


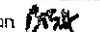
SHEET NO. **6B**

No.	DATE	REVISIONS	BY
1	03-03-11	Removed Note 11	C.J.H.

- ① Sta. "XBS" 16+50.00, 41.42' Rt. to  
Sta. "XBS" 17+98.66, 41.42' Rt.  
Const. infiltration swale type B - 22.1 cu. yd.  
(For details, see shf. GJ)
- ② Sta. "XBS" 16+14.91 Lt. to  
Sta. "XBS" 22+97.33 Lt.  
Const. infiltration slope type B - 202.9 cu. yd.  
Inst. delineators, type S1  
Inst. delineators, type S2  
(For details, see shfs. GJ & GJ-2)
- ③ Sta. "XBS" 17+98.66, 41.42' Rt. to  
Sta. "XBS" 18+37.63, 41.42' Rt.  
Inst. 18" culvert pipe - 39'  
5' depth
- ④ Sta. "XBS" 18+37.63, 41.42' Rt. to  
Sta. "XBS" 22+84.67, 52.53' Rt.  
Const. infiltration swale type B - 100.3 cu. yd.  
Inst. delineators, type S1  
Inst. delineators, type S2  
(For details, see shfs. GJ & GJ-2)
- ⑤ Plug and abandon extg. 18" storm sew. pipe - 62'
- ⑥ Sta. "GB" 13+44.21 Lt. + 24.9 Lt.  
Const. type "G-2" inlet  
Inst. 12" storm sew. pipe - 155' 180'  
5' depth  
Trench resurf. - 29 sq. yd.  
(See drg. no. RD364)
- ⑦ Sta. "XB" 30+48.87, 52.01' Rt. to  
Sta. "XB" 34+33.10, 22.48' Rt.  
Const. infiltration swale type B - 97.0 cu. yd.  
Inst. delineators, type S1  
Inst. delineators, type S2  
(For details, see shfs. GJ & GJ-2)
- ⑧ Remove extg. inlet  
Plug and abandon extg. 12" storm sew. pipe - 13'
- ⑨ Adjust water valve
- ⑩ Minor adjust manhole - 2
- ⑪ Note not used 
- ⑫ Sta. "GR" 1+89.46, 54.84' Lt. = Sta. "XB" 30+48.87, 52.01' Rt. to  
Sta. "GR" 2+67.50, 40.75' Lt.  
Const. infiltration swale type B - 11.6 cu. yd.  
Inst. delineators, type S1  
(For details, see shfs. GJ & GJ-2)

**"AS CONSTRUCTED"**  
  
 Date 4-26-12 Project Mngr



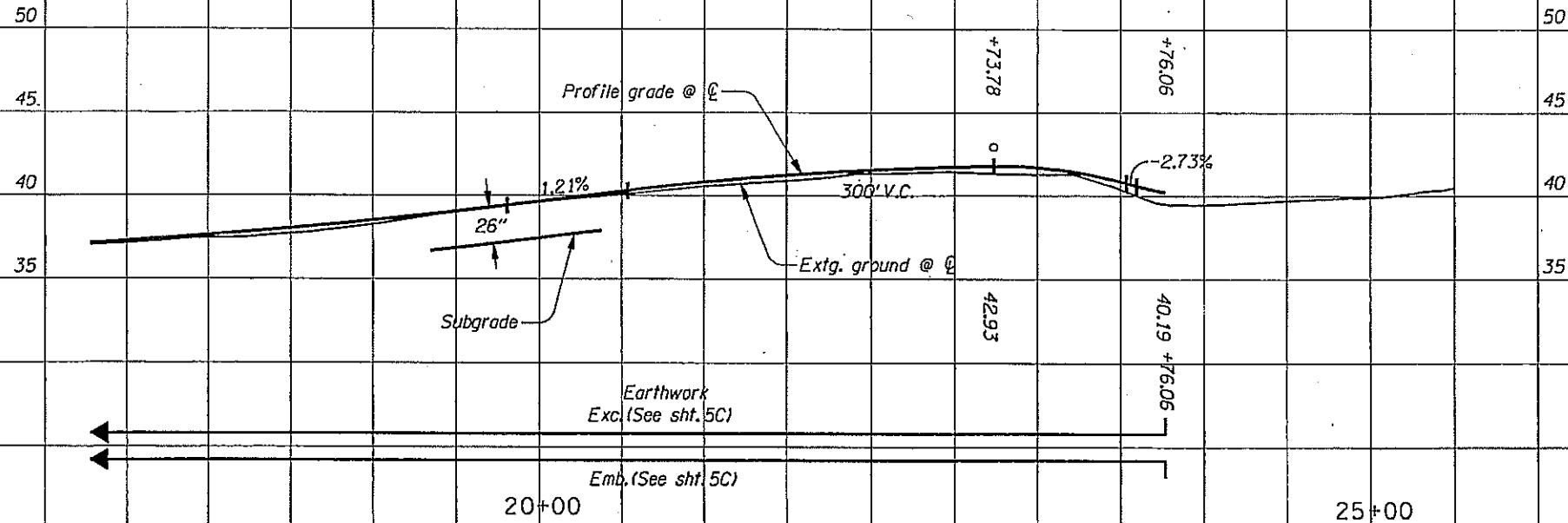
 OREGON DEPARTMENT OF TRANSPORTATION	
<b>DAVID EVANS AND ASSOCIATES INC.</b> <small>200 Southwest River Parkway Portland Oregon 97201 Ph: 503.223.6663</small>	
<b>I-84 AT 257TH AVE (TROUTDALE INTERCHANGE) SEC.</b> COLUMBIA RIVER HIGHWAY MULTNOMAH COUNTY	
Reviewed By - Craig Sheahan  Designed By - Karina Nordahl Drafted By - Edita Boguslawski	
<b>DRAINAGE &amp; UTILITIES</b>	SHEET NO. <b>6B-2</b>

No.	DATE	REVISIONS	BY
①	03-03-11	Removed Note II	C.J.H.

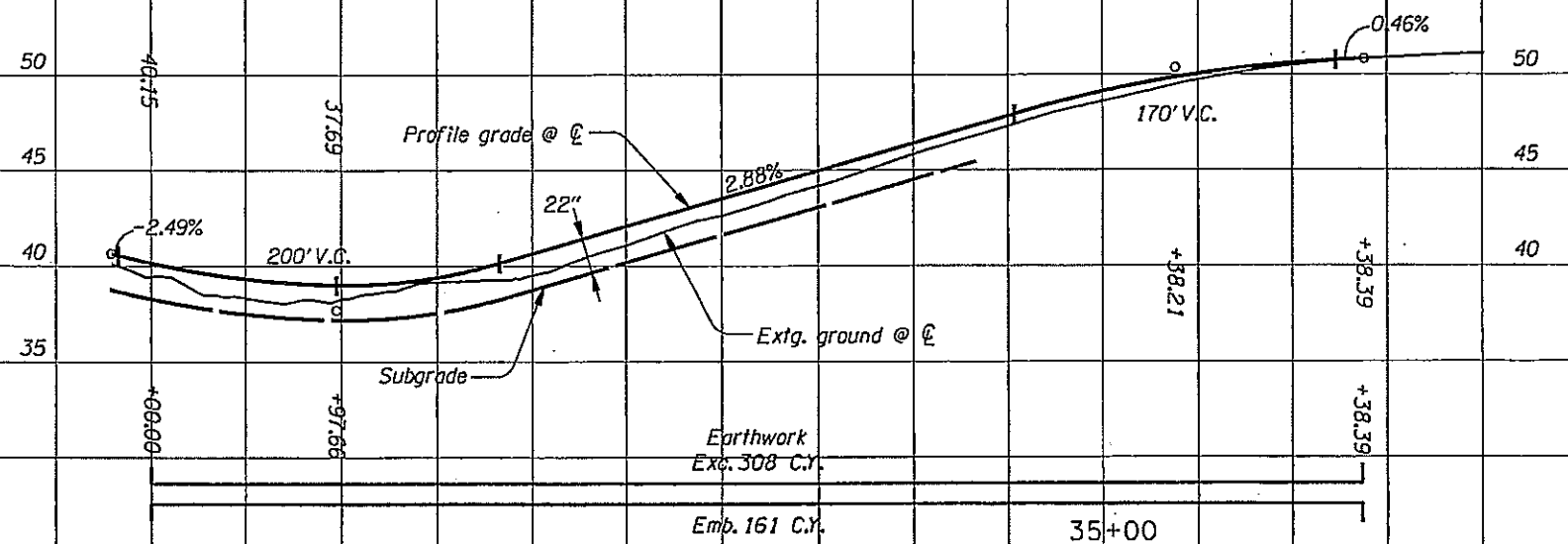
EXPIRES 06-30-11

44V-028

"XBS" LINE



"XB" LINE



**"AS CONSTRUCTED"**

*Mark Hart*

Date 4-26-12 Project Mngr

REGISTERED PROFESSIONAL  
ENGINEER  
14468  
*Lawrence A. Krettl*  
OREGON  
JULY 26, 1989  
LAWRENCE A. KRETTLER  
EXPIRATION DATE: 6-30-2011

**OREGON DEPARTMENT OF TRANSPORTATION**

REGION 1 - ROADWAY ENGINEERING SECTION

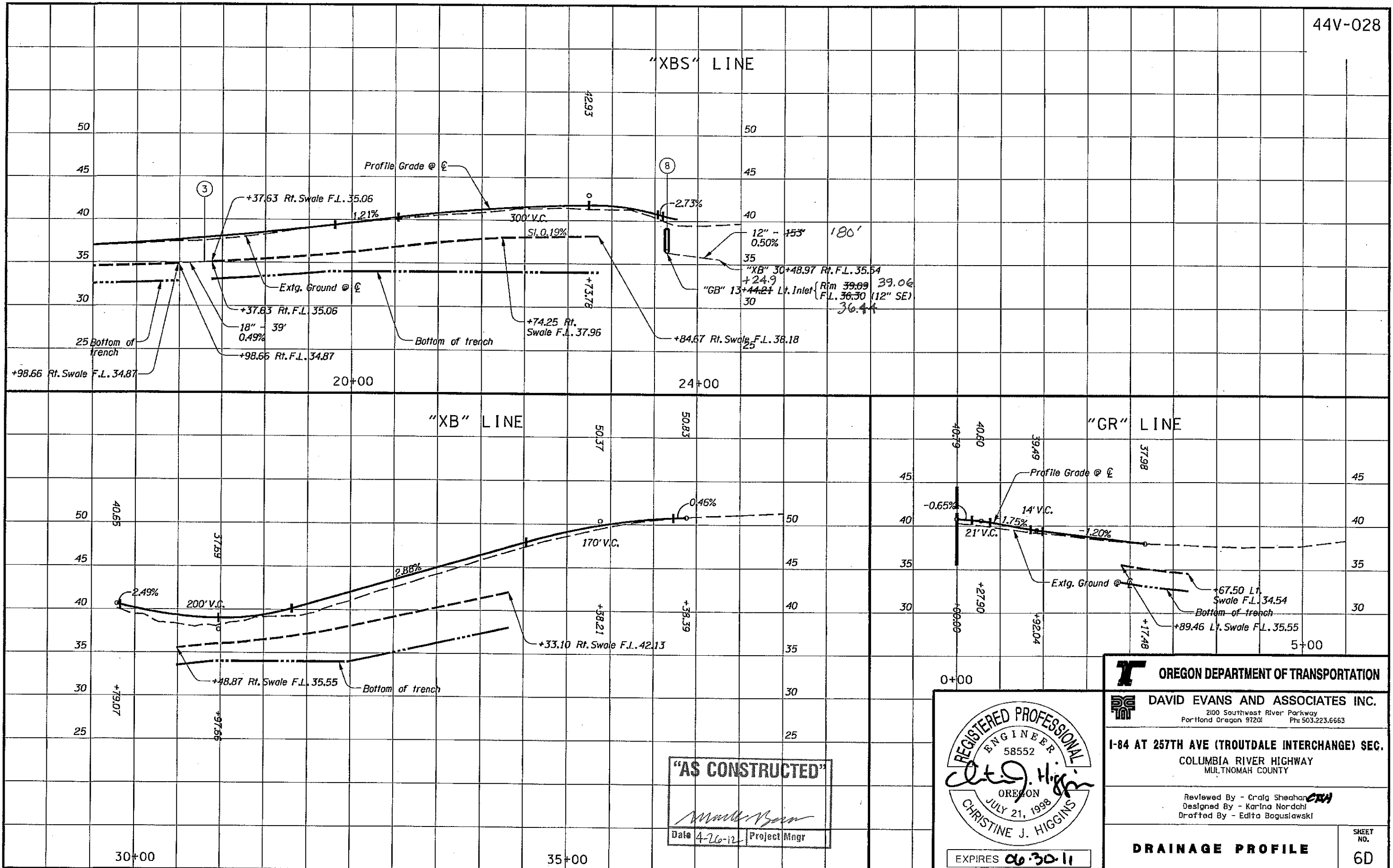
I-84 AT 257TH AVE (TROUTDALE INTERCHANGE) SEC.  
COLUMBIA RIVER HIGHWAY  
MULTNOMAH COUNTY

Design Team Leader - Lawrence Krettl  
Designed By - Marco Singer & Dave Haase  
Drafted By - Carolyn Allen

**PROFILE**

SHEET NO. 6C

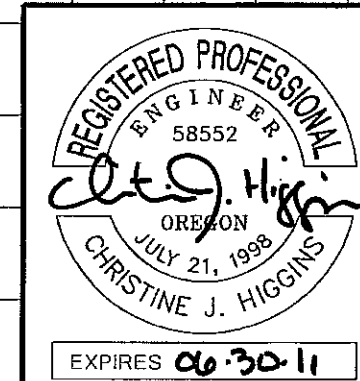




**"AS CONSTRUCTED"**

*Mark Bain*

Date 4-26-12 Project Mngr



**OREGON DEPARTMENT OF TRANSPORTATION**

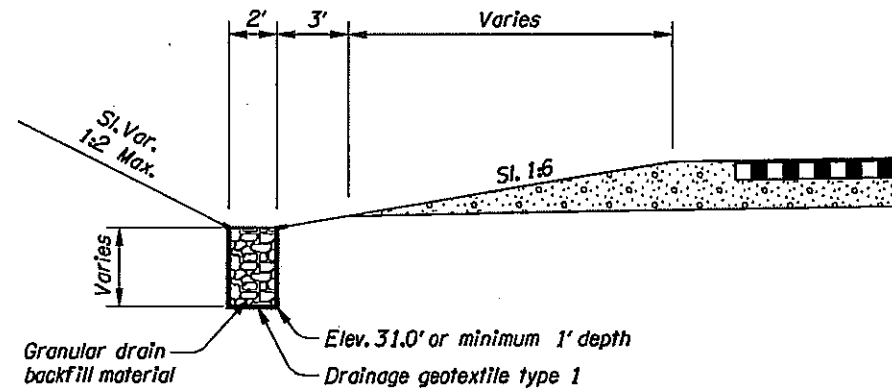
**DAVID EVANS AND ASSOCIATES INC.**  
2100 Southwest River Parkway  
Portland Oregon 97201 Ph: 503.223.6663

**I-84 AT 257TH AVE (TROUTDALE INTERCHANGE) SEC.**  
COLUMBIA RIVER HIGHWAY  
MULTNOMAH COUNTY

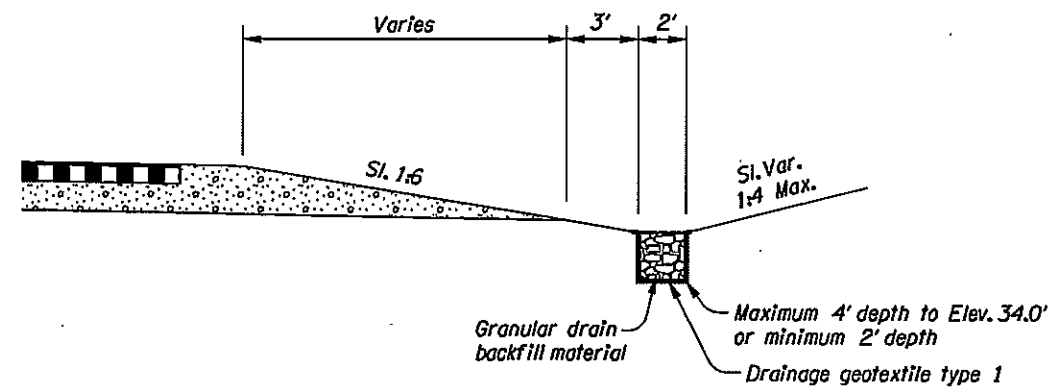
Reviewed By - Craig Sheahan *CWS*  
Designed By - Karina Nordahl  
Drafted By - Edita Boguslawski

**DRAINAGE PROFILE**

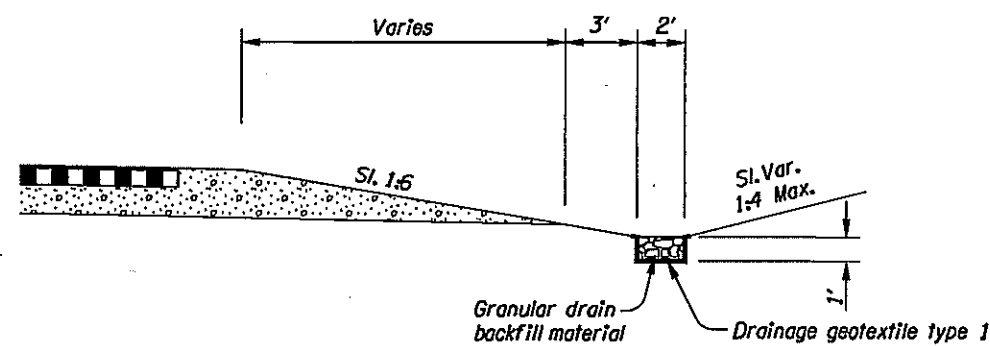
SHEET NO. **6D**



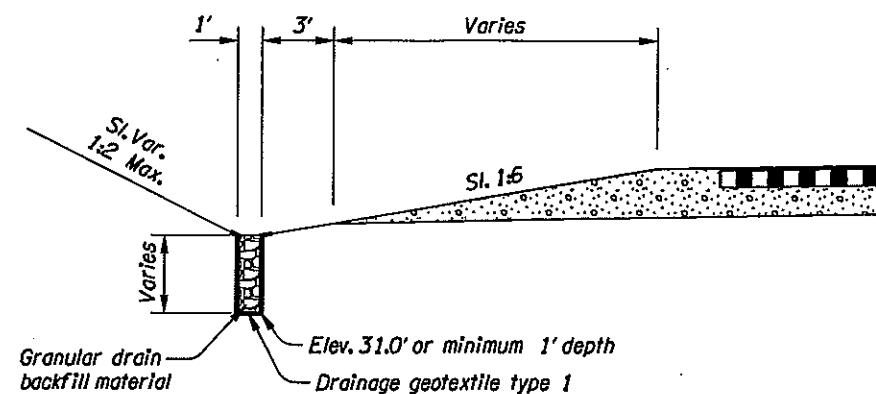
INFILTRATION SWALE TYPE A



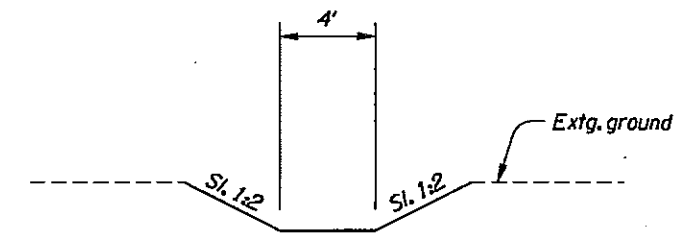
INFILTRATION SWALE TYPE B



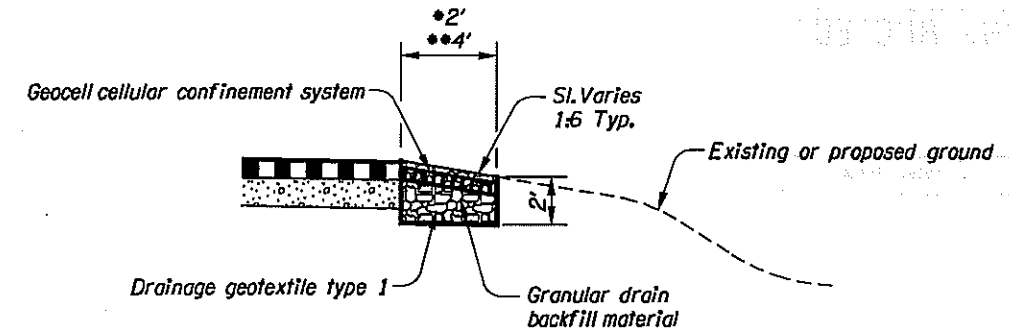
INFILTRATION SWALE TYPE C



INFILTRATION SWALE TYPE D

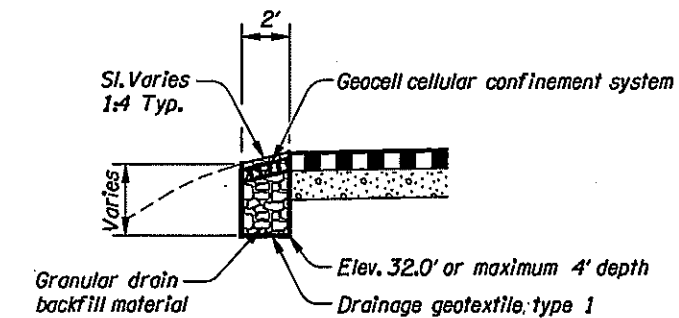


DITCH



- Sta. "L4E" 455+91.80 to Sta. "L4E" 459+70.00
- Sta. "EB" 459+71.35 to Sta. "EB" 470+03.60

INFILTRATION SLOPE TYPE A



INFILTRATION SLOPE TYPE B

"AS CONSTRUCTED"  
 Mark Van  
 Date 4-26-12 Project Mngr

REGISTERED PROFESSIONAL  
 ENGINEER  
 58552  
 OREGON  
 JULY 21, 1998  
 CHRISTINE J. HIGGINS  
 EXPIRES 06-30-11

<p>OREGON DEPARTMENT OF TRANSPORTATION</p>	
<p>DAVID EVANS AND ASSOCIATES INC.                  2100 Southwest River Parkway                  Portland Oregon 97201 Ph: 503.223.6663</p>	
<p>I-84 AT 257TH AVE (TROUTDALE INTERCHANGE) SEC.                  COLUMBIA RIVER HIGHWAY                  MULTNOMAH COUNTY</p>	
<p>Reviewed By - Craig Sheahan                  Designed By - Karina Nordahl                  Drafted By - Edita Bogustawski</p>	
<p><b>DRAINAGE DETAILS</b></p>	<p>SHEET NO.                  GJ</p>