OPERATION & MAINTENANCE MANUAL

Water Quality Planter

Manual prepared: November 2018

DFI No. D00580, D00581, D00582

Figure 1: DFI No D00581, looking South

1. Identification

Drainage Facility ID (DFI):	D00580
Facility Type:	Water Quality Planter
Construction Drawings:	45V-038
Locations:	District: 2B Highway No.: 123 Mile Post: 12.57-12.58

Drainage Facility ID (DFI):	D00581
Facility Type:	Water Quality Planter
Construction Drawings:	45V-038
Locations:	District: 2B Highway No.: 123 Mile Post: 12.60-12.61

Drainage Facility ID (DFI):	D00582
Facility Type:	Water Quality Planter
Construction Drawings:	45V-038
Locations:	District: 2B Highway No.: 123 Mile Post: 12.67-12.68

2. Manual Purpose

The purpose of this manual is to outline inspection needs and summarize maintenance actions for water quality planters.

3. Facility Location

The location map below details the facility location. The highway, mile posts, side streets, access location, and stormwater flow directions are noted on the map.

Facility location type: In Sidewalk

Flow direction: East

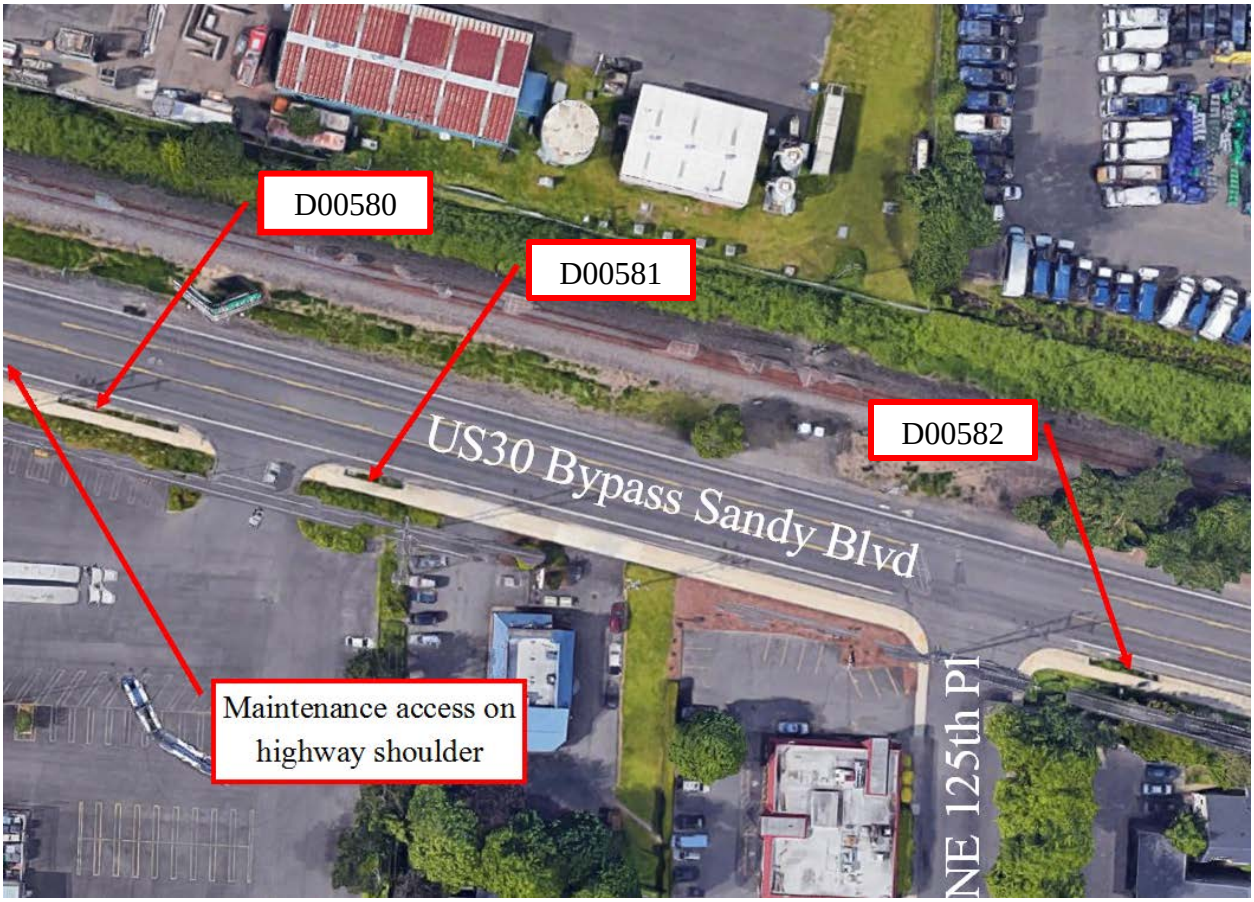


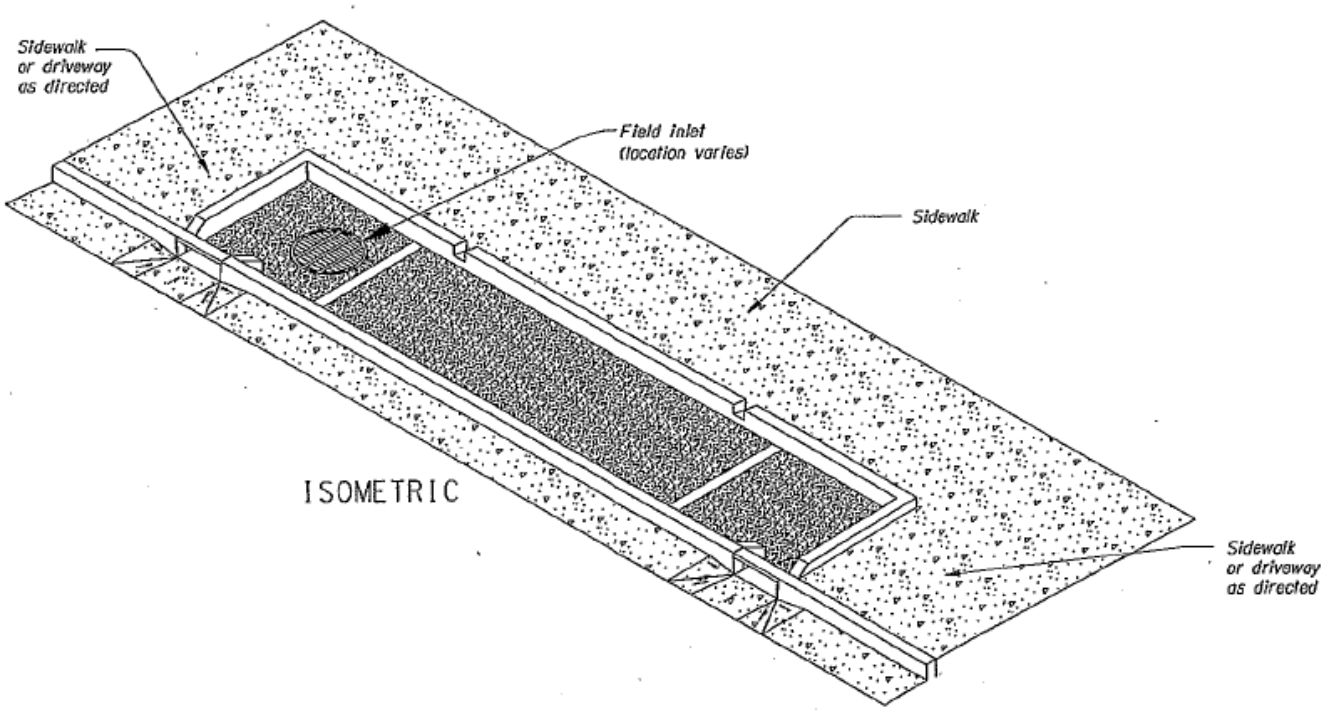
Figure 2: Facility Location Map

4. Facility Summary

The length and width of the WQ Planter is based on the dimensions of the inside of the treatment cell.

The length and width of the WQ Planters are:

Facility DFI	Length (Feet)	Width (Feet)
D00580	64	3.5
D00581	32	3.5
D00582	38	3.5



Site Specific Information: The planters have blended compost and topsoil mixture. There are also three types of grasses in the planters and two curb inlets. There are no bypass inlets on the planters.

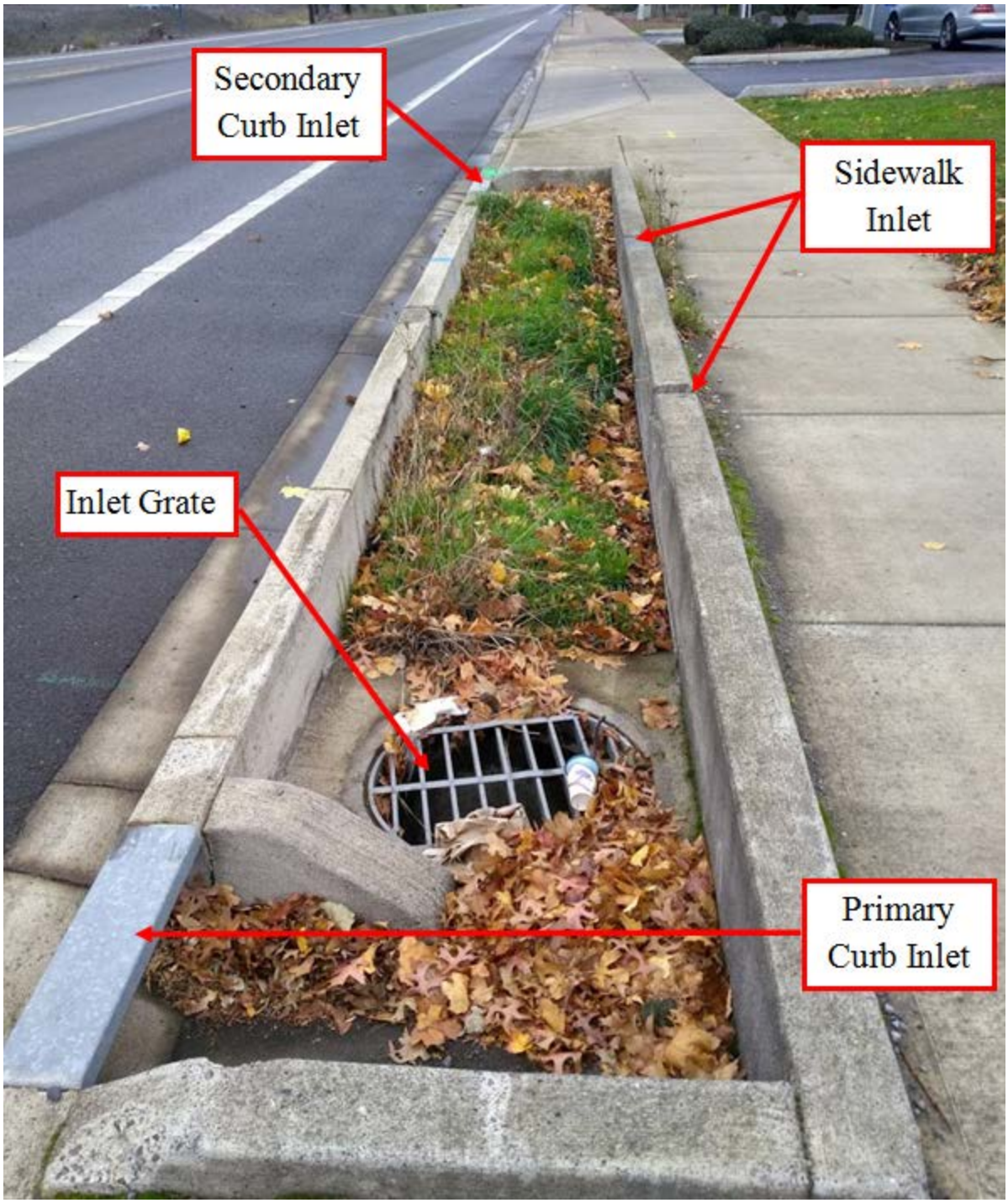


Figure 3: Facility Components

Figure 4: Facility Components

5. Facility Access

Maintenance access to the facility: Curb and gutter (travel lane)

☒ Lane Closure Needed

Water quality planters do not typically have access roads/access pads, nor are they gated, as they are located in urban areas alongside sidewalks and curbs. Use caution when accessing these facilities as there may be pedestrians or cyclists in the vicinity.

6. Operational Components / Maintenance Items

Classification and Standard Operational (Op) Plan:

This facility is classified as a:

☐ Filterra (Op Plan A)	☒ WQ Planter (Op Plan B)	☐ MWS (Op Plan C)
A Filterra is a single chamber treatment cell that utilizes filter media, a plant, and a perforated underdrain.	A WQ Planter is a single chamber treatment cell that utilizes plants, filter media, and a perforated underdrain. The auxiliary outlet is located inside of the treatment cell.	A Modular Wetland System is a three chamber treatment cell that utilizes plants, filter media, filter media cartridges, and a perforated underdrain network.
A standard operational plan illustrates the general facility footprint configuration and explains the purpose of each facility component. Operational plans (A and B) are provided in the Standard Operation Manual.		

See Appendix A for the site specific operational plan.

Operational Components

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 Planters (implemented April 2018) 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.

Table 1: Facility Components		ID #
Facility Inlet		
Inlet Grate	☐	P1
Curb Inlet	☒	P2
Sidewalk Chute	☐	P3
Bypass Inlet	☐	P4
Treatment		
Plants (Tree or Shrub)	☐	P5
Grass	☒	P6
Filter Media	☐	P7
Filter Media Cartridge	☐	P8
Planter Components		
Perforated Pipe	☒	P9
Outlet Grate	☒	P10
Outfall Type		
Waterbody (Creek/Lake/Ocean)	☐	P11
Ditch	☐	P12
Storm Drain System	☒	P13

7. Maintenance

Maintenance Frequency/Maintain Records

a. Full inspection 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 these water quality planters:

- Table 1 (General Maintenance): Contains general maintenance and inspection guidelines that are applicable to all ODOT water quality facilities. Maintenance of inlets, outlets, trash removal and noxious weeds is recommended seasonally.
- Table 3 (Maintenance of Water Quality or Biofiltration Swales): Contains maintenance information for swales. The planted area of these planters should be maintained as described for the bottom and sides of swales, by using equipment other than mowers to control plant height. Replant if needed with plants from the original plans, or as recommended by ODOT landscaping and stormwater staff.

The *Blue Book* can be viewed at the following website:
http://www.oregon.gov/ODOT/Maintenance/Documents/blue_book.pdf

8. Limitations

Vactors may be used at the inlet, outlet, and grated areas. No heavy equipment may be used in the planted areas.

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:

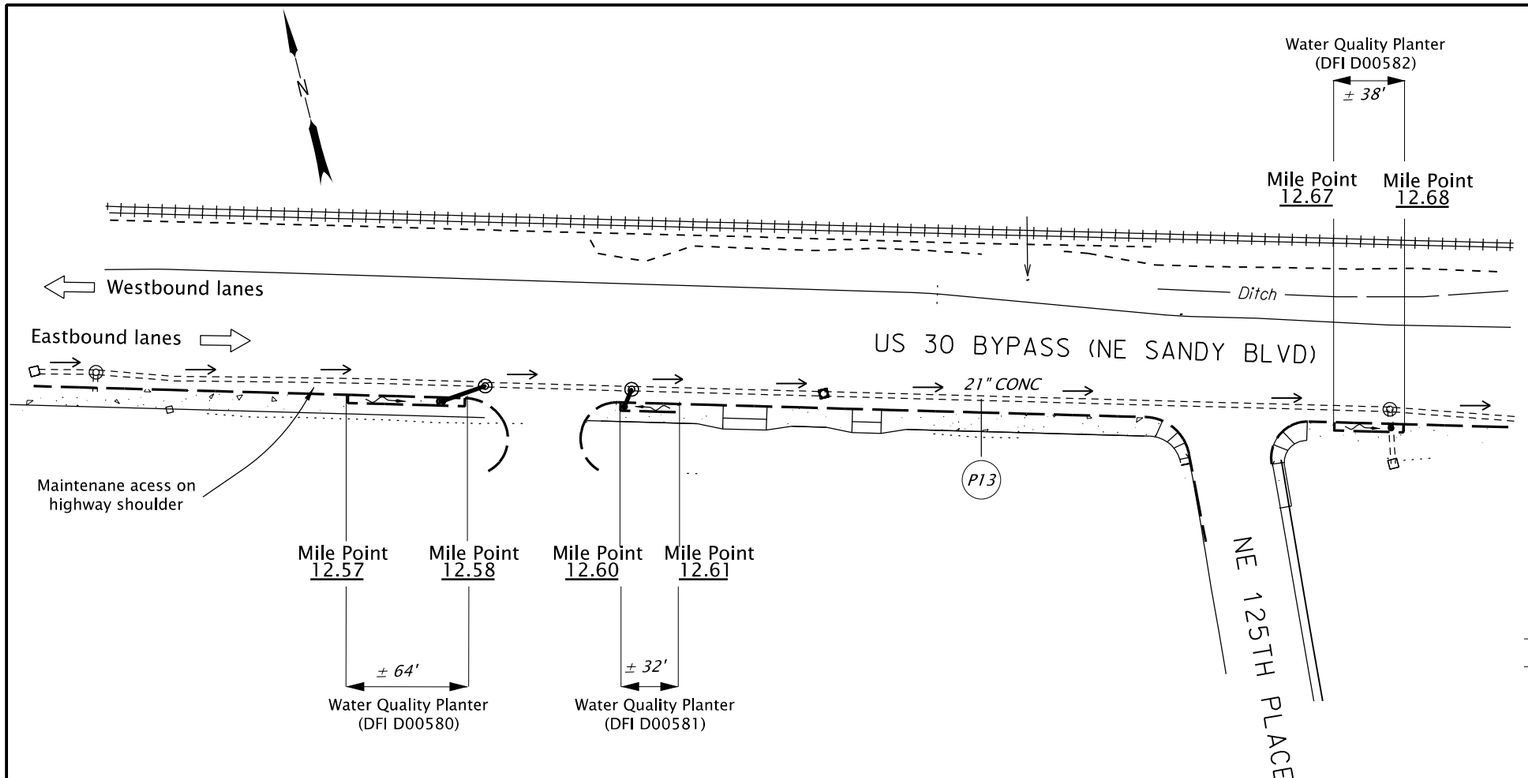
ODOT Clean Water Unit	(503) 986-3008
ODOT Statewide Hazmat Coordinator	(503) 667-7442
ODOT Region 1 Hazmat Coordinator	(503) 731-8290
ODOT Region 2 Hazmat Coordinator	(503) 986-2647
ODOT Region 3 Hazmat Coordinator	(541) 957-3594
ODOT Region 4 Hazmat Coordinator	(541) 388-6186
ODOT Region 5 Hazmat Coordinator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

ODEQ Northwest Region Office (503) 229-5263

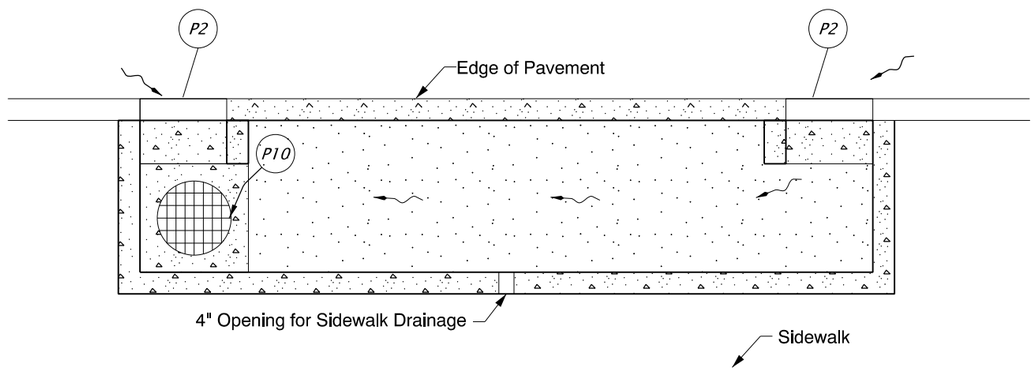
A Appendix A – Site Specific Operational Plan

Contents:

Operational Plan: DFI D00580, D00581, D00582



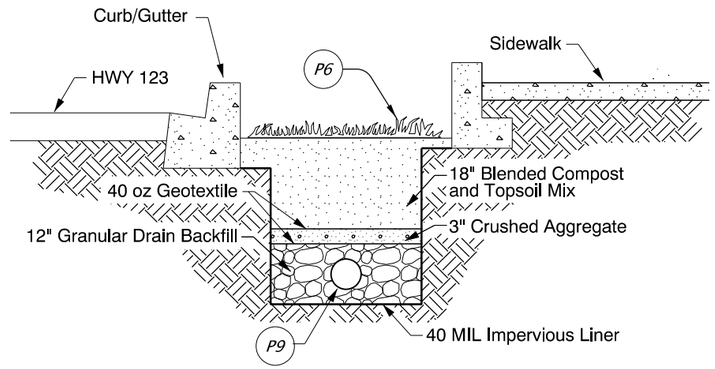
PLAN
N.T.S.



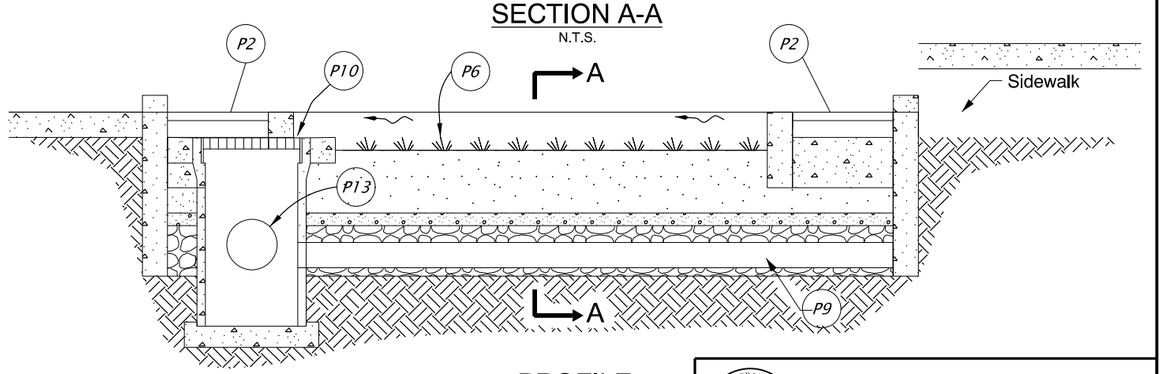
PLAN
N.T.S.

Legend

- Standard Manhole
- Inlet
- Storm Pipe (Facility)
- Conveyence Direction
- Water Flow Direction
- Traffic Flow Direction



SECTION A-A
N.T.S.



PROFILE
N.T.S.

Sht. 01 of 01

OREGON DEPARTMENT OF TRANSPORTATION

Prepared By: Katrina Sepulveda

Drafted By: Katrina Sepulveda

DFI D00580, D00581, D00582
MAINTENANCE DISTRICT 2B HWY 123
Water Quality Planters
HIGHWAY MP 12.57-12.68
Multnomah County

B Appendix B – Project Contract Plans

Contents:

Site Specific Subset of Project Contract Plan 45V-038

45V-038

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

STATE OF OREGON

DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED PROJECT

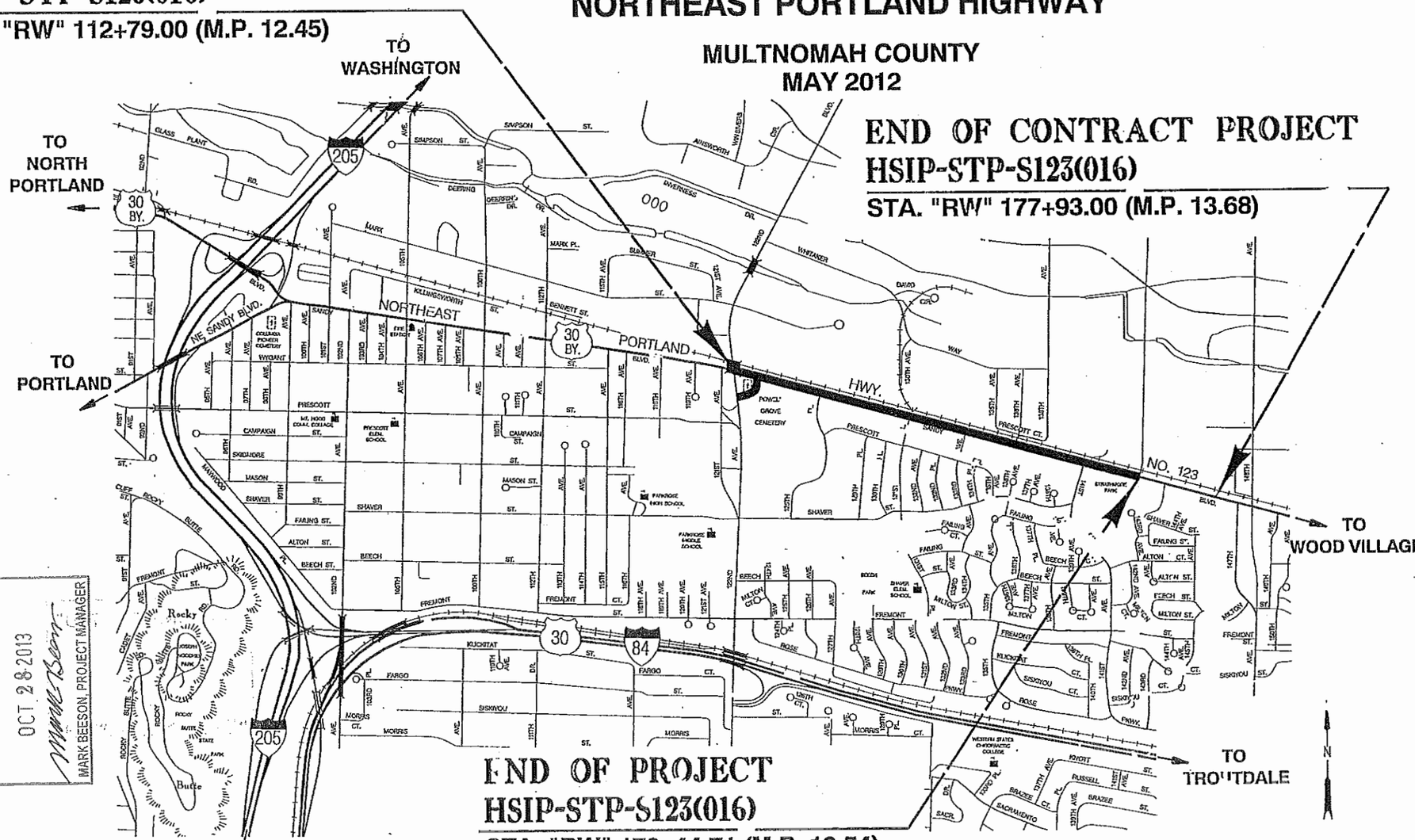
GRADING, DRAINAGE, PAVING, PAVEMENT MARKERS, SIGNING, SIGNALS & ROADSIDE DEVELOPMENT

US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.

NORTHEAST PORTLAND HIGHWAY

MULTNOMAH COUNTY
MAY 2012

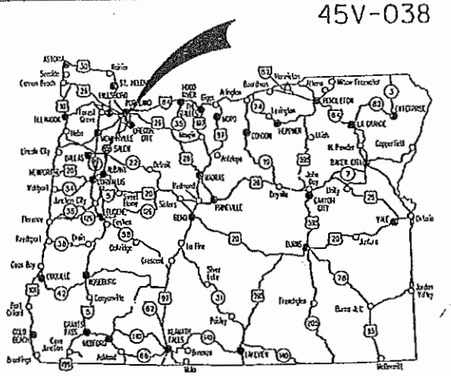
BEGINNING OF PROJECT & CONTRACT PROJECT
HSIP-STP-S123(016)
STA. "RW" 112+79.00 (M.P. 12.45)



END OF CONTRACT PROJECT
HSIP-STP-S123(016)
STA. "RW" 177+93.00 (M.P. 13.68)

END OF PROJECT
HSIP-STP-S123(016)
STA. "RW" 170+44.71 (M.P. 13.54)

T. 1 N., R. 2 E., W.M.



Overall Length Of Project - 1.09 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.)

"AS CONSTRUCTED"
OCT 28 2013
MARK BEESON, PROJECT MANAGER

OREGON TRANSPORTATION COMMISSION

Pat Egan	CHAIR
Mary F. Olson	COMMISSIONER
David Lohman	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: Naveen G. Chandra
Naveen G. Chandra, P.E.
Project Delivery Manager, Region 1

Concurrence by ODOT Chief Engineer

US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	HSIP-STP-S123(016)	1

PE001435 000

\\Sc-reglhq-1\drafting_projects\15068_US30 BYPS NE 122ND - NE 141ST\4_Final\15068F.TS :: Default 4/4/2012 8:09:36 AM hwye66e

INDEX OF SHEETS, CONT'D.

SHEET NO.	DESCRIPTION
2, 2A, 2A-2 thru 2A-5	Typical Sections
2B, 2B-2 thru 2B-8	Details
2C, 2C-2 Thru 2C-5	Traffic Control Plans
2D	Pipe Data Sheet
3	General Construction
3A & 3A-2	Drainage & Utilities
3B	Profile
4	General Construction
4A & 4A-2	Drainage & Utilities
4B	Profile
5	General Construction
5A & 5A-2	Drainage & Utilities
5B	Profile
6	General Construction
6A & 6A-2	Drainage & Utilities
7	General Construction
7A & 7A-2	Drainage & Utilities
7B	Profile
8	General Construction
8A	Drainage & Utilities
GEO/HYDRO	
GA, GA-2 Thru GA-10	Erosion Control
GB & GB-2	Geotechnical Data
GM	Mandatory Disposal Site
ROADSIDE DEVELOPMENT	
GN, GN-2 & GN-3	Details
GN-4 Thru GN-8	Roadside Development Plans
PERMANENT PAVEMENT MARKINGS	
ST, ST-2 Thru ST-5 Incl.	Striping Plans
PERMANENT SIGNING	
S-13094 Thru S-13104	Permanent Signing

INDEX OF SHEETS, CONT'D.

SHEET NO.	DESCRIPTION
	TRAFFIC SIGNALS
16463	Legend
16464	Removal Plan
16465	Signal Plan
16466	Detector Plan
16467	Existing Utilities
16468	Removal Plan
16469	Signal Plan
16470	Detector Plan
16471	Existing Utilities
16472	Interconnect Plan
16473	Flashing Beacon Plan
16474	Existing Utilities
16475	Details
16476	Details
16494	Details
16495	Details

Standard Drg. Nos.

RD140 – Roadway Cross Slopes Superelevated Sections
RD150 – Slope Rounding

RD300 – Trench Backfill, Bedding, Pipe Zone And Mult. Installations
RD302 – Street Cut
RD312 – Subsurface Drain
RD336, RD338, RD342 – Manholes
RD344, RD346
RD356 – Manhole Cover & Frames
RD360 – Manhole Frame Adjustment
RD362 – Sanitary Cleanout
RD370 – Concrete Inlets
RD380, RD386, RD388 – Pipe Fill Height Tables
RD390
RD399 – Stormwater Treatment and Storage Facility Field Markers

RD400, RD405, RD410, RD415, RD420, RD425, RD430, RD435, RD440, RD445, RD450, RD470 – Guardrail

RD610 – Asphalt Pavement Details

RD700, RD701 – Curbs
RD705 – Islands
RD710 – Accessible Route Islands
RD715 – Approaches And Non-Sidewalk Driveways
RD720 – Sidewalks
RD725 – Separated Sidewalk Driveways or Alleys
RD735 – Curb Line Sidewalk Driveways or Alleys
RD755 – Sidewalk Ramp Details
RD759 – Truncated Dome Detectable Warning Surface Details And Locations

RD1000 – Construction Entrances
RD1015 – Inlet Protection
RD1040 – Sediment Fence

BR270 – Rail Transition From Flex Beam Rail To Curb & Parapet Rail

TM204 – Details
TM211 – Sign Bracing Detail

TM457 – Vehicle, Ped. Signal & Push Button Mounting Details
TM458 – Pedestrian Ramp Placement Details
TM462 – Adjustable Signal Head Mounting Details
TM465 – Overhead Sign, Fire Preemption & Photoelectronic Details

TM500, TM501, TM503 – Pavement Marking Standard Details
TM505 – Rail Crossing Pavement Markings
TM520, TM521 – Durable Pavement Markings
TM525 – Turn Arrow Marking Details
TM530 – Intersection Pavement Markings
TM539 – Median And Left Turn Channelization Details
TM560, TM561 – Alignment Layout
TM570 – Traffic Delineators
TM571 – Traffic Delineators Steel Post Details
TM576 – Traffic Delineator Installation

TM670 – Wood Post Sign Supports
TM671 – 3 Second Gust Wind Speed Isotach
TM677 – Sign 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
TM840, TM841, TM842 – Closure Details
TM844 – Temporary Pedestrian Access Routing
TM850 – 2-Lane, 2 Way Roadways
TM851 – Non-Freeway Multi-Lane Sections

R/W Map No. 11B-05-0025

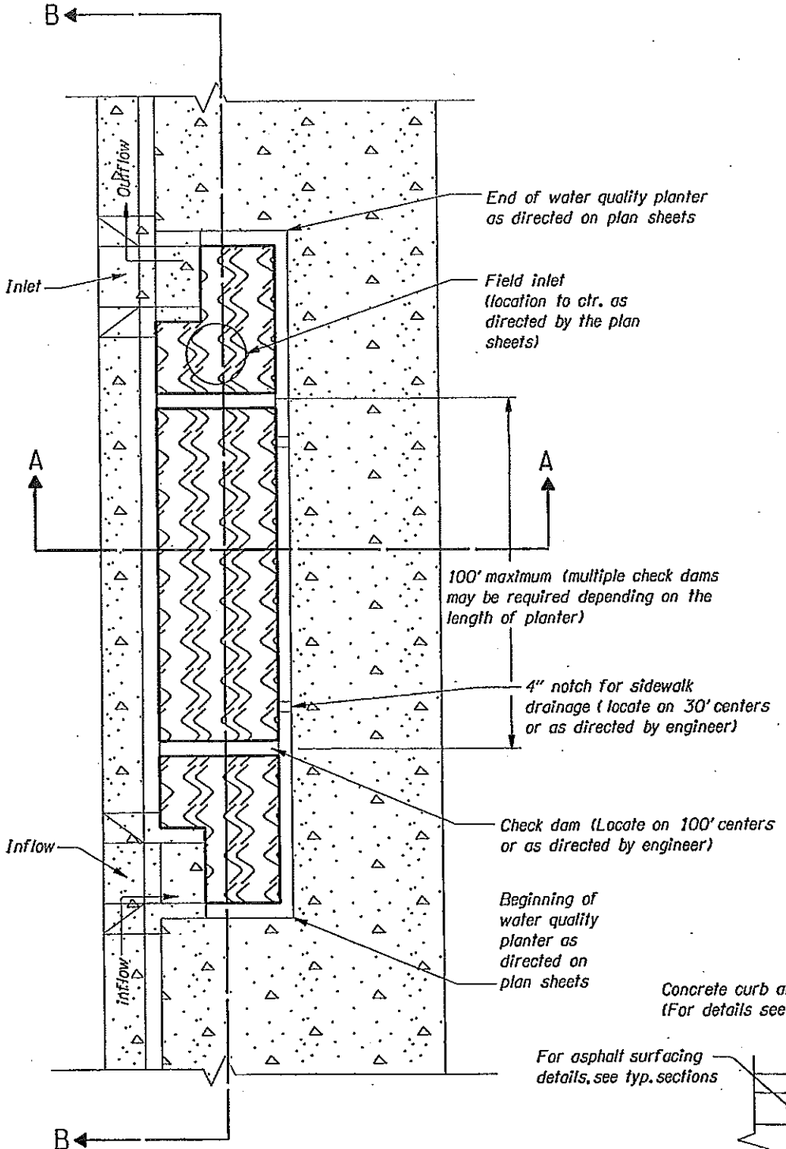
"AS CONSTRUCTED"
OCT 28 2013
MARK BEESON, PROJECT MANAGER

US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

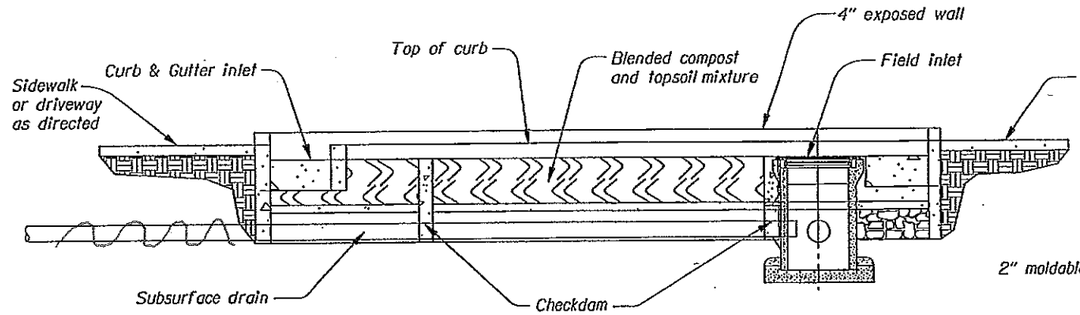
FEDERAL HIGHWAY ADMINISTRATION	PROJECT NUMBER	SHEET NO.
OREGON DIVISION	HSIP-STP-S123(016)	1A

Standard Drawings located on the web at:
http://www.oregon.gov/ODOT/HWY/ENGSERVICES/standard_drawings_home.shtml

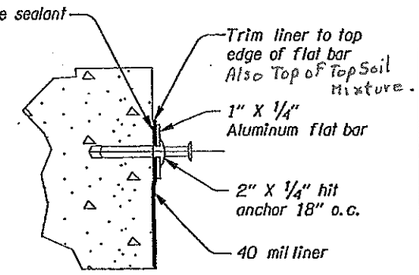
45V-038



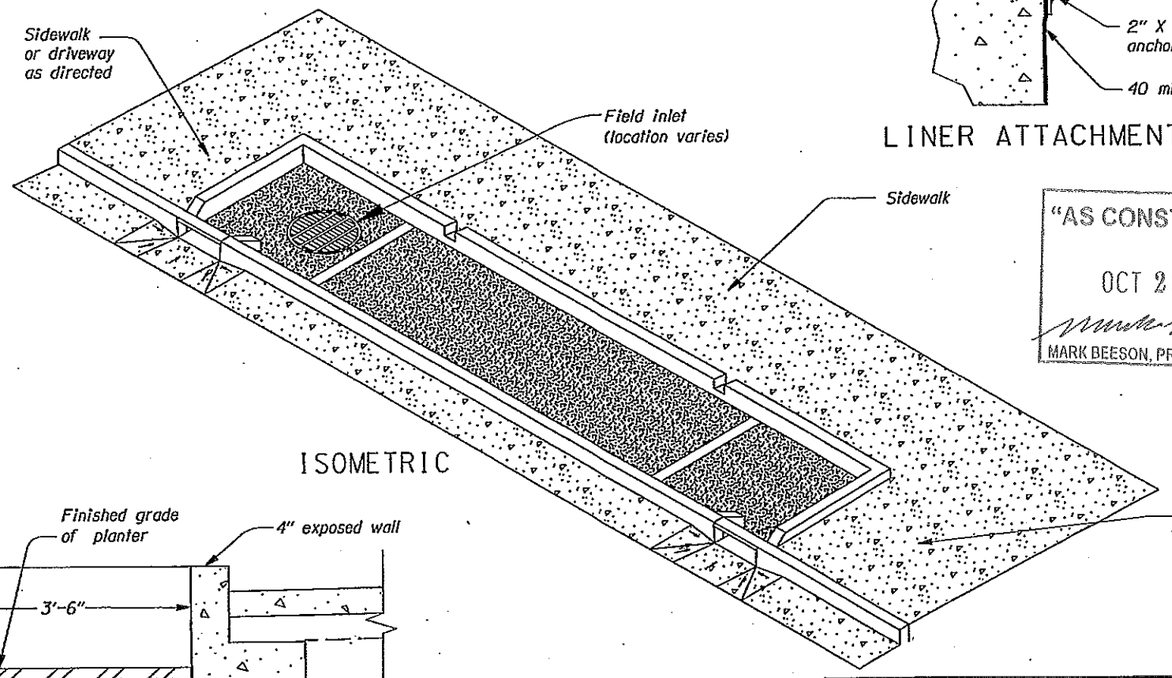
STORM WATER PLANTER DETAIL



SECTION B-B
STORM WATER PLANTER



LINER ATTACHMENT



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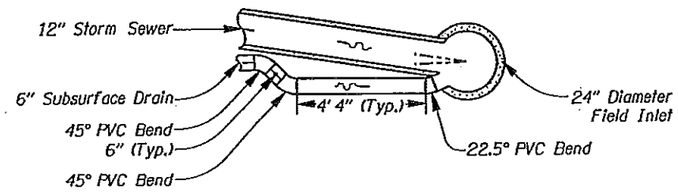
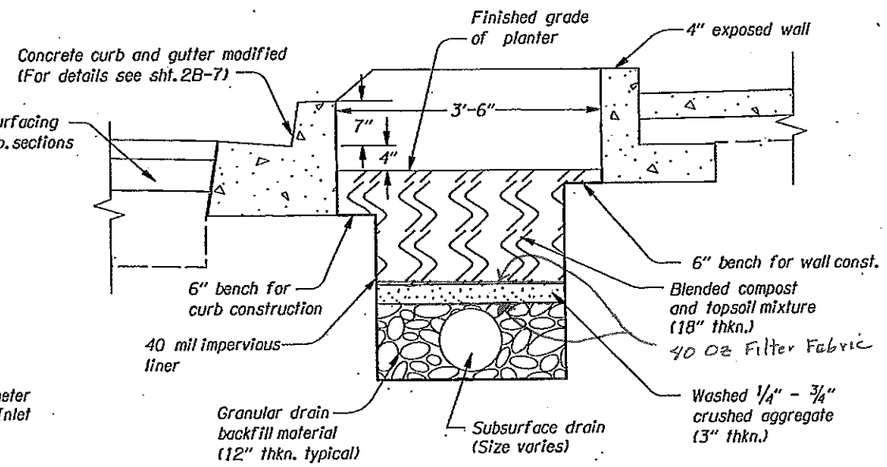


ACUTE ANGLE PIPE CONNECTION DETAIL
(As Required)



SECTION A-A
STORM WATER PLANTER

"AS CONSTRUCTED"
OCT 28 2013
MARK BEESON, PROJECT MANAGER

REGISTERED PROFESSIONAL ENGINEER
74492PE
OREGON
JAN. 13, 2009
JERED W. CARPENTER
EXPIRES: 12-31-2013

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - GEO/HYDRO/HAZMAT UNIT

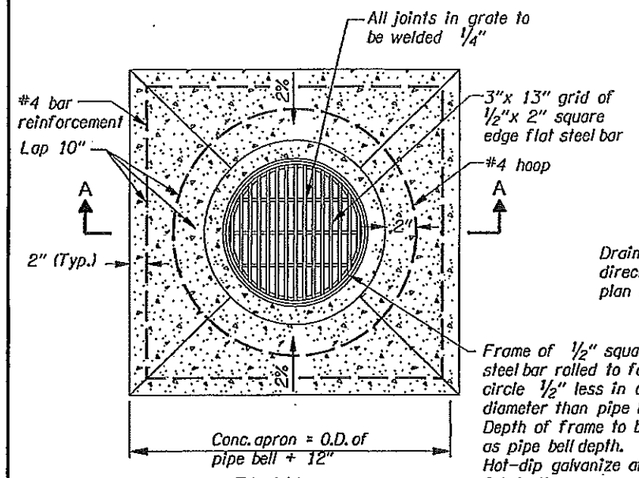
US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

Reviewed By - Ed Foltyn
Designed By - Jered Carpenter
Drafted By - Billy Shafer

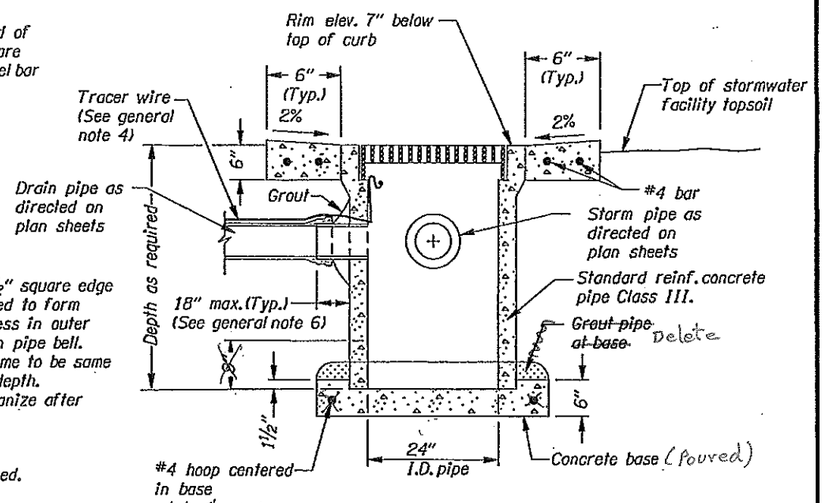
DETAILS

SHEET NO. 2B

45V-038



PLAN



SECTION A-A

FIELD INLET

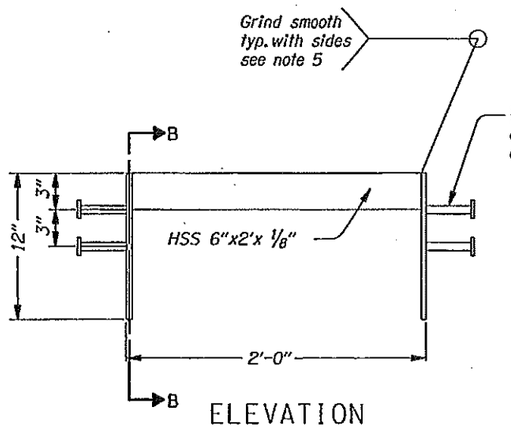
NOTES

1. Grates shall be constructed for bicycle safety.
2. Precast concrete catch basins may be used when specified or approved.
3. Anchor vertical leg of inlet pipe if not a glued joint.
4. See Std. Drg. RD336 for tracer wire details.
5. All reinforcement shall be 2" clear of nearest face of conc., unless otherwise shown.
6. All connecting pipes shall have a flexible, gasketted, and unrestrained joint within 18" of vertical 24" I.D. pipe.

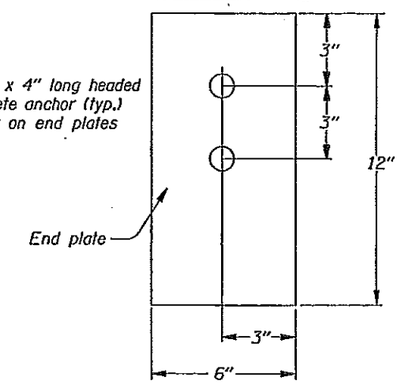
"AS CONSTRUCTED"

OCT 28 2013

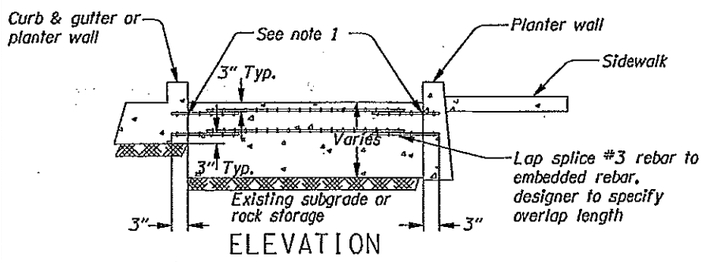
MARK BEESON, PROJECT MANAGER



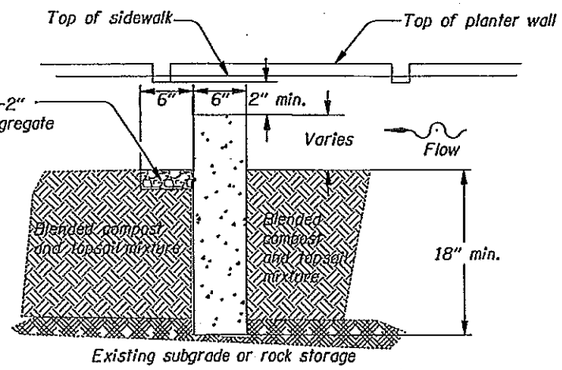
ELEVATION



SECTION B-B



ELEVATION

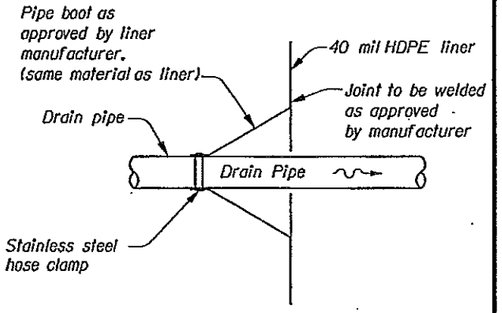


SECTION

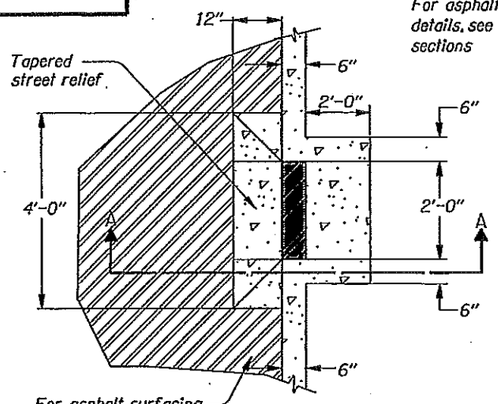
CONCRETE CHECK DAM

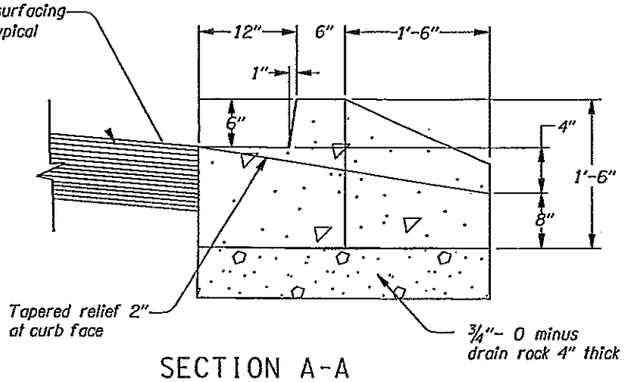
NOTES:

1. Embed #3 rebar 3" into curb and planter wall.



STORM FACILITY LINER BOOT FOR STORMWATER PIPE

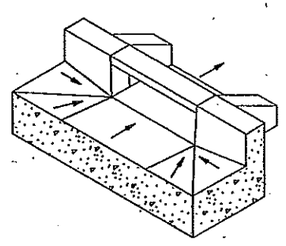




SECTION A-A

CURB AND GUTTER INLET (METAL)

PLAN



ISOMETRIC

Notes:

1 Headed concrete anchors shall meet the requirements of ASTM A-10B.

2 HSS 6"X2'X1/8" shall meet the requirements of ASTM A-500 Grade B.

3 End plates shall meet the requirements of ASTM A-36.

4 Entire assembly shall be hot dip galvanized in accordance with ASTM A-123.

5 Single Bevel groove weld.

REGISTERED PROFESSIONAL ENGINEER
74492PE
OREGON
JAN. 13, 2009
JERED W. CARPENTER

EXPIRES: 12-31-2013

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 - GEO/HYDRO/HAZMAT UNIT

US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

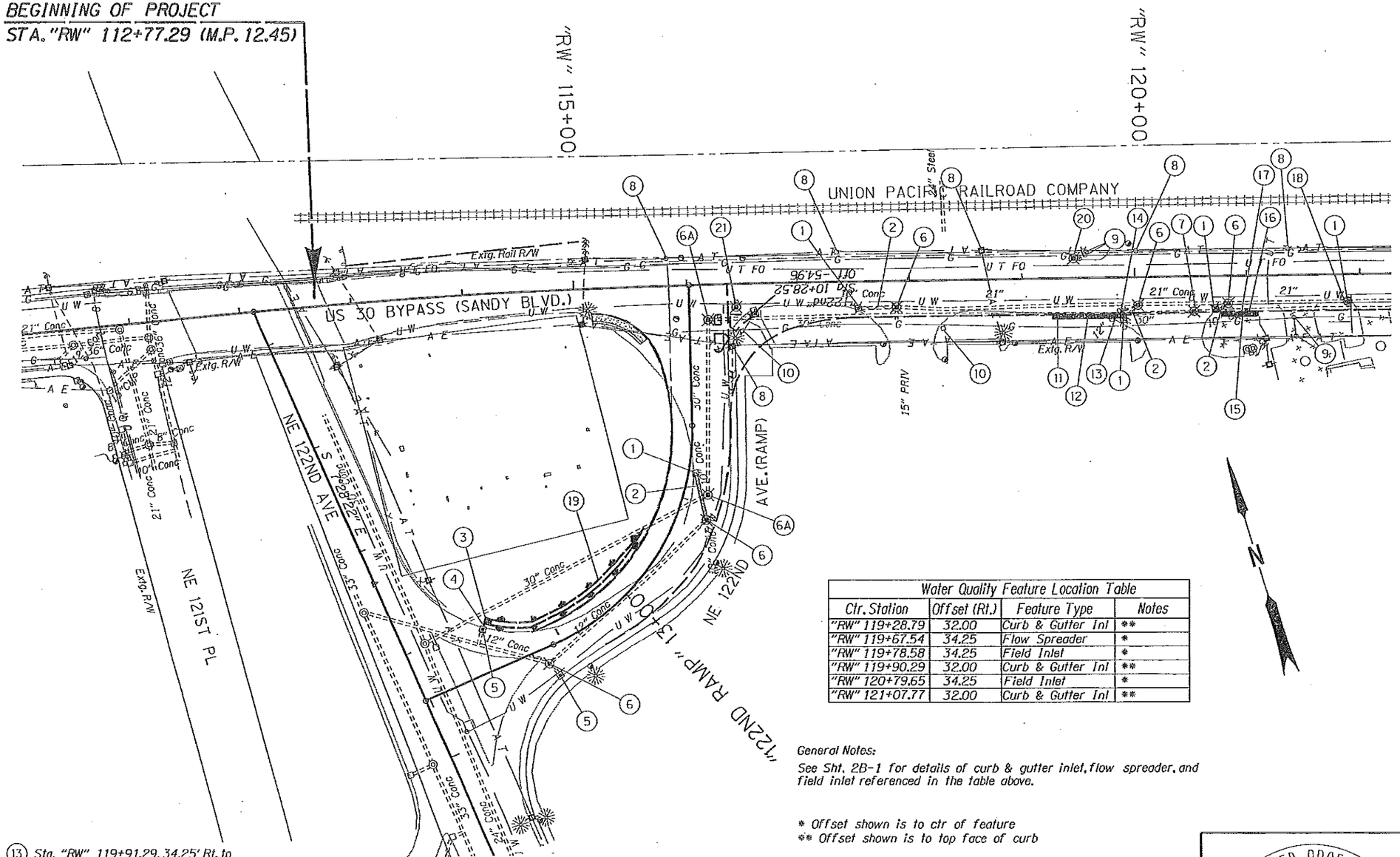
Reviewed By - Ed Foltyn
Designed By - Jared Carpenter
Drafted By - Billy Shafer

DETAILS

SHEET NO. 2B-2

T. 1 N., R. 2 E., W.M.

45V-038



(1) Remove Inlet - 5

(2) Abandon pipe - 108'

(3) Sta. "122nd" 14+26.48, 43.86' Rt.
Const. Type "D" inlet
(See dwg. no. RD370)

(4) Sta. "122nd Ramp" 14+26.48, 43.86' Rt. to
Sta. "122nd Ramp" 14+31.57, 37.68' Rt.
Inst. 12" sewer pipe - 8" 8.9'
10' depth
Connect to extg. inlet

(5) Adjust inlet - 2

(6) Minor adjust manhole - 5
(See dwg. no. RD360)

(6A) Minor adjust manhole - 2
(By others)

(7) Relocate sanitary manhole
(By others)

(8) Relocate utility poles - 6
(By others)

(9) Adjust gas valve box - 5

(10) Relocate riser - 2
(By others)

(11) Sta. "RW" 119+27.29 to Sta. "RW" 119+91.79
Const. water quality planter strip - 28.7 sq. yds.
(Drainage facility ID# D00580)
(For details. see shts. 2B & 2B-2)

(12) Sta. "RW" 119+27.80, 34.00' Rt. to
Sta. "RW" 119+78.58, 34.25' Rt.
Inst. 6" drain pipe - 51'
5' depth
(For details see shts. 2B & 2B-2)

Water Quality Feature Location Table			
Ctr. Station	Offset (Rt.)	Feature Type	Notes
"RW" 119+28.79	32.00	Curb & Gutter Inl	**
"RW" 119+67.54	34.25	Flow Spreader	*
"RW" 119+78.58	34.25	Field Inlet	*
"RW" 119+90.29	32.00	Curb & Gutter Inl	**
"RW" 120+79.65	34.25	Field Inlet	*
"RW" 121+07.77	32.00	Curb & Gutter Inl	**

General Notes:
See Sht. 2B-1 for details of curb & gutter inlet, flow spreader, and field inlet referenced in the table above.

* Offset shown is to ctr of feature
** Offset shown is to top face of curb

Abandoned pipe shown thus

(13) Sta. "RW" 119+91.29, 34.25' Rt. to
Sta. "RW" 119+78.58, 34.25' Rt
Inst. 6" drain pipe - 13'
5' depth
(For details see shts. 2B & 2B-2)

(14) Sta. "RW" 119+78.58, 34.25' Rt. to
Sta. "RW" 120+02.68, 25.08' Rt
Inst. 12" sew pipe - 26'
5' depth
connect to extg. manhole

(15) Sta. "RW" 120+77.40 to Sta. "RW" 121+09.27
Const. water quality planter strip - 14.2 sq. yds.
(Drainage facility ID# D00581)
(For details, see shts. 2B & 2B-2))

(16) Sta. "RW" 120+79.65, 34.25' Rt. to
Sta. "RW" 121+08.77, 34.25' Rt
Inst. 6" drain pipe - 29'
(For details see shts. 2B & 2B-2)

(17) Sta. "RW" 120+79.65, 34.25' Rt. to
Sta. "RW" 120+83.28, 24.63' Rt
Inst. 12" sew pipe - 10'
10' depth
Connect to extg. manhole

(18) Sta. "RW" 121+89.02, 24.07' Rt.
Const. manhole over extg. storm sewer
(See dwg. no. RD336)

(19) Const. bio-swale - 173 ft.
Install stormwater treatment markers
(Drainage facility ID# D00579)
(For details see sht. 2B-8 and RD399)

(20) Minor adjust communication manhole

(21) Relocate waterline access vault
(By others)

"AS CONSTRUCTED"
OCT 28 2013
MARK BEESON, PROJECT MANAGER

REGISTERED PROFESSIONAL ENGINEER
74492PE
OREGON
JAN. 13, 2009
JERED W. CARPENTER
EXPIRES: 12-31-2013

OREGON DEPARTMENT OF TRANSPORTATION

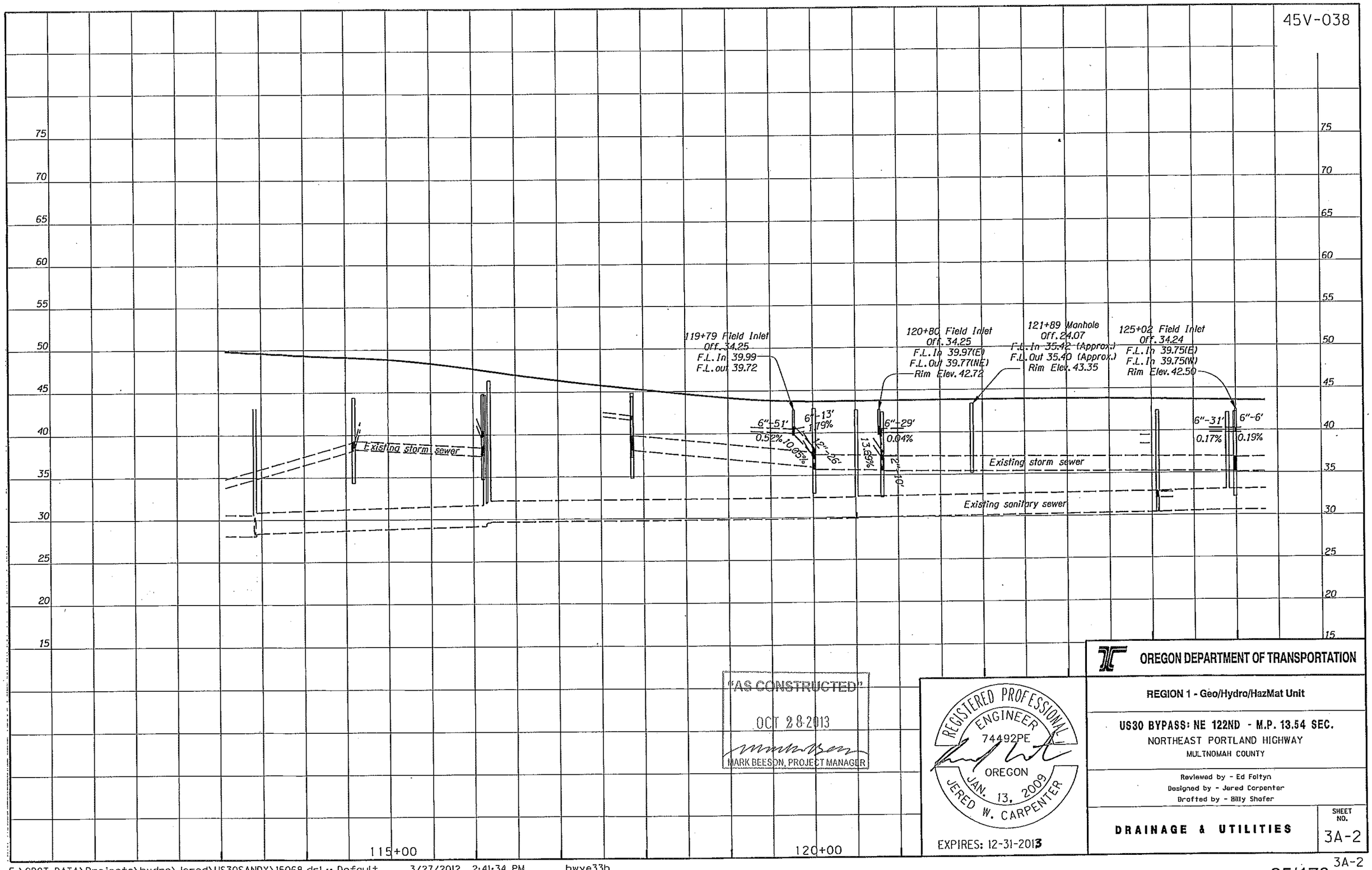
REGION 1 - Geo/Hydro/HazMat Unit

US30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

Reviewed by - Ed Foltyn
Designed by - Jered Carpenter
Drafted by - Billy Shafer

DRAINAGE & UTILITIES

SHEET NO. 3A



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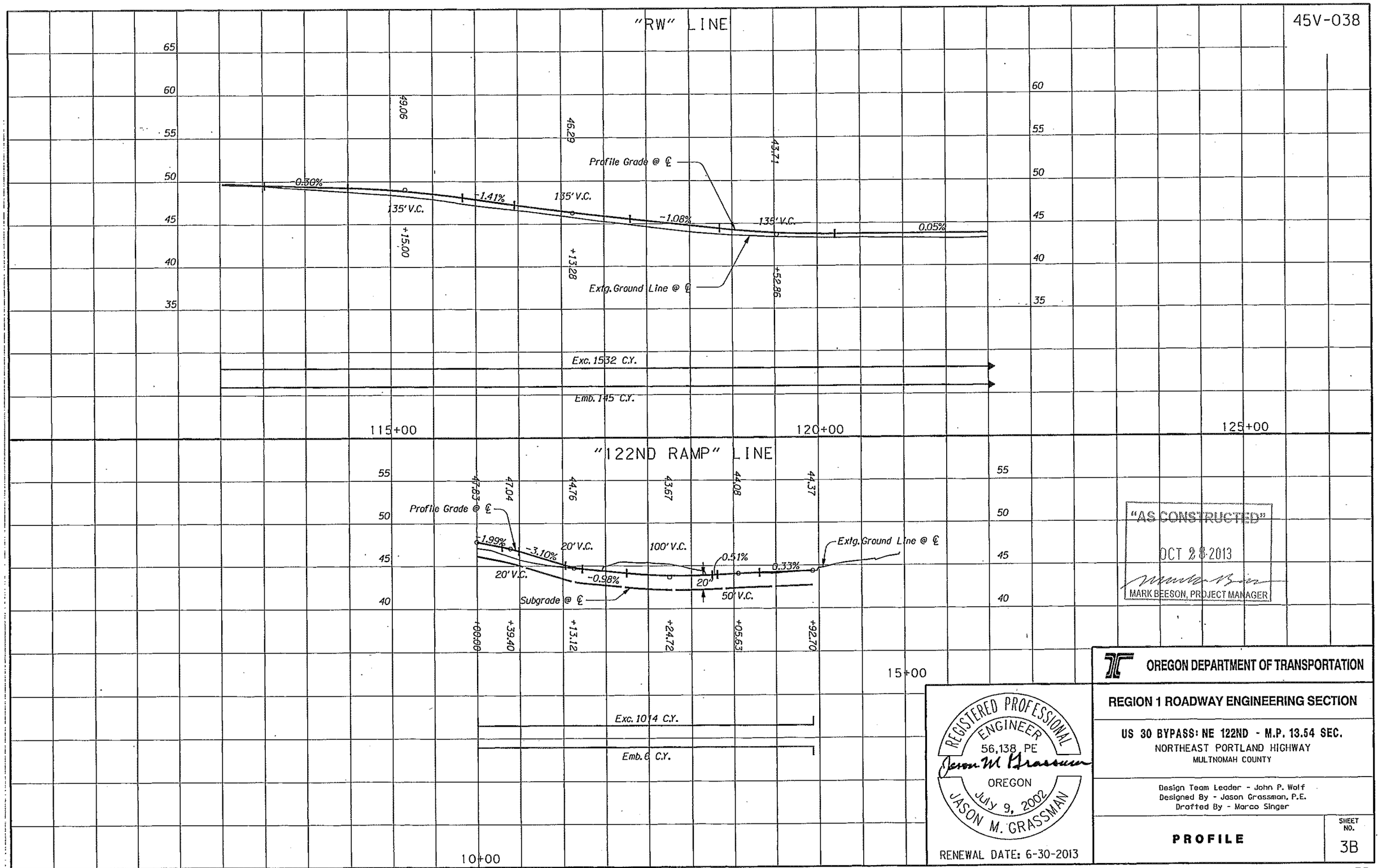
Drafted by - Billy Shafer

DRAINAGE & UTILITIES

SHEET NO. 3A-2



"AS CONSTRUCTED"
OCT 28 2013
MARK BEESON, PROJECT MANAGER

REGISTERED PROFESSIONAL ENGINEER
56,138 PE
OREGON
July 9, 2002
JASON M. GRASSMAN
RENEWAL DATE: 6-30-2013

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 ROADWAY ENGINEERING SECTION

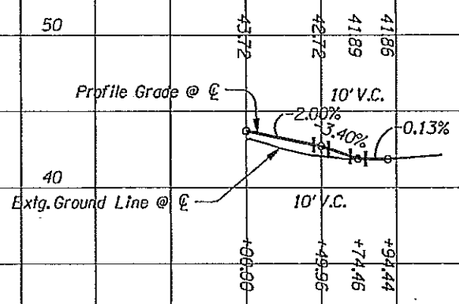
US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

Design Team Leader - John P. Wolf
Designed By - Jason Grassman, P.E.
Drafted By - Marco Singer

PROFILE

SHEET NO. 3B

"125TH" LINE



"AS CONSTRUCTED"
OCT 28 2013
MARK BEESON, PROJECT MANAGER

REGISTERED PROFESSIONAL ENGINEER
56,138 PE
OREGON
July 9, 2002
JASON M. GRASSMAN
RENEWAL DATE: 6-30-2013

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 ROADWAY ENGINEERING SECTION

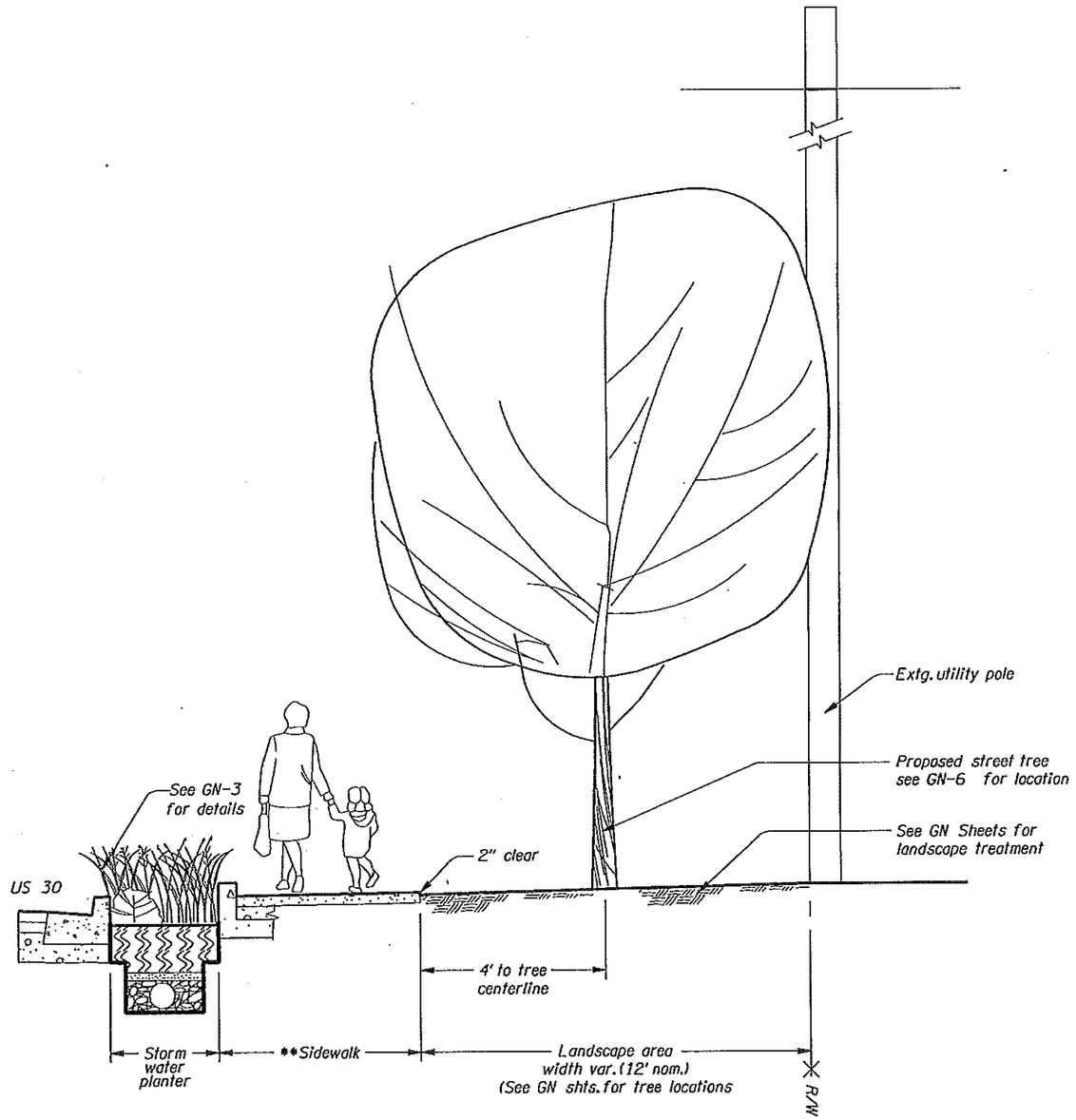
US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

Design Team Leader - John P. Wolf
Designed By - Jason Grassman, P.E.
Drafted By - Marco Singer

PROFILE

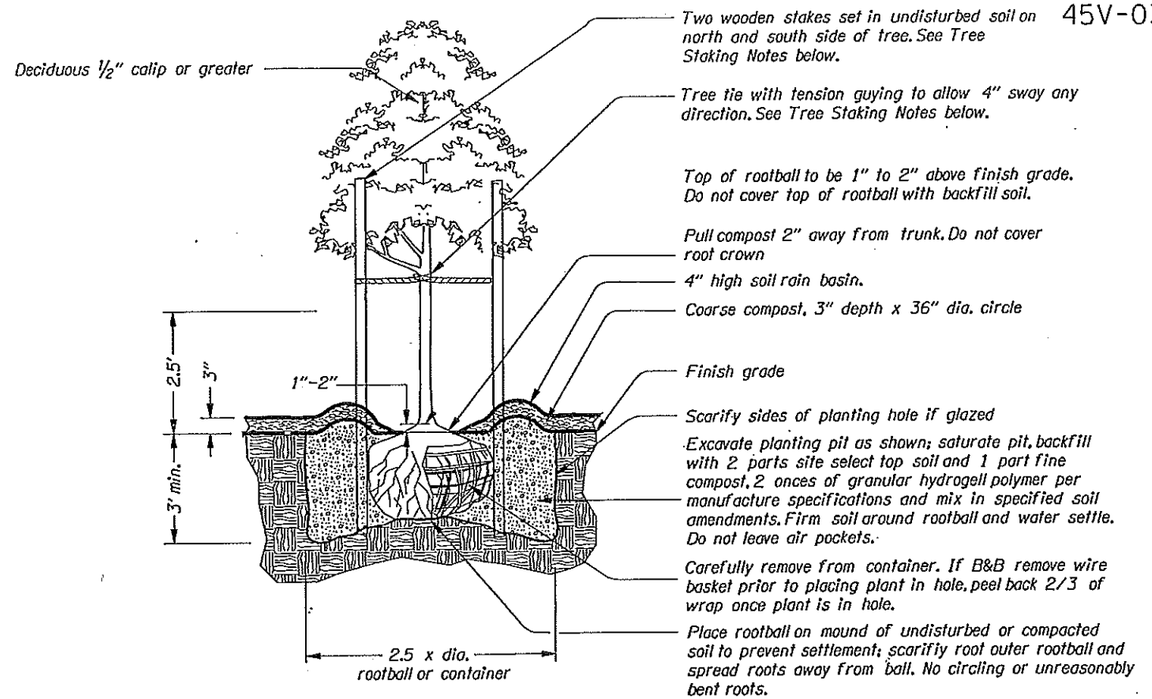
SHEET NO. 4B

45V-038



1 STORM WATER PLANTER AND TREE PLANTING SECTION

Not to scale



TREE STAKING NOTES:

1) Tree ties to be either:

Rigid guy system as manufactured by Alpine Nursery, Boring Oregon. Galvanized wire to be approx. ⅛" thickness and 24" length. There is a plastic sleeve over portion that goes around tree. The wire tie is to go thru the wood stake and be securely fastened.

Plastic chain type, approx. 1" width by ⅛" depth where two stakes are required. Cross ties between stakes and wrap tie around tree. Fasten securely to stake.

2) Furnish tree stakes on all tree plantings. Stakes to be construction grade, rough sawn or finished Douglas Fir or Pine. Stain with approved green penetrating oil. Stake Size is to be 1½"x1½" by following lengths:

Trees 36" and shorter - Use one - 6' (approx.) stake
Trees taller than 36" - Use one - 8' (approx.) stake

Drive stakes vertically and at least 24" into undisturbed soil. Do not drive stakes thru root ball. Locate stakes to best resist prevailing winds.

2 STREET TREE PLANTING AND STAKING

Not to scale

"AS CONSTRUCTED"
OCT 28 2013
MARK BEESON, PROJECT MANAGER

REGISTERED LANDSCAPE ARCHITECT
424
Magnus U. Bernhardt
OREGON
04/14/99

OREGON DEPARTMENT OF TRANSPORTATION

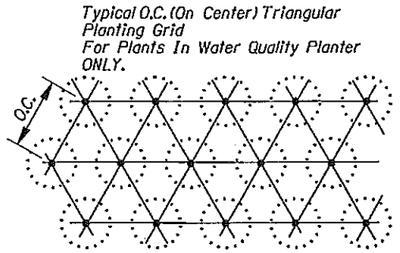
REGION 1 ROADWAY ENGINEERING SECTION

US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

Design Team Leader - Magnus Bernhardt
Designed By - Magnus Bernhardt
Drafted By - Marco Singer

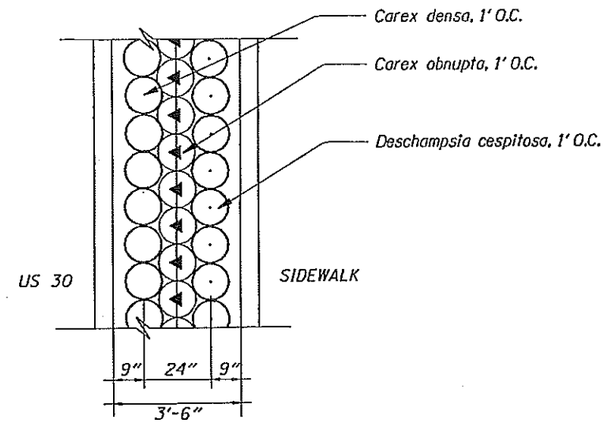
DETAILS

SHEET NO. GN-2



3 STORM WATER PLANT SPACING

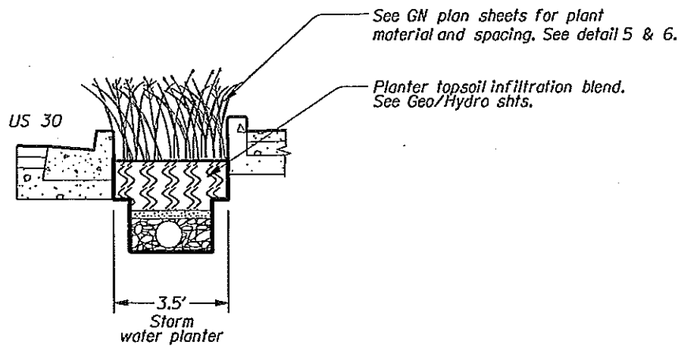
Not to scale



5 STORM WATER PLANTER PLANTING LAYOUT DETAIL

Plan layout

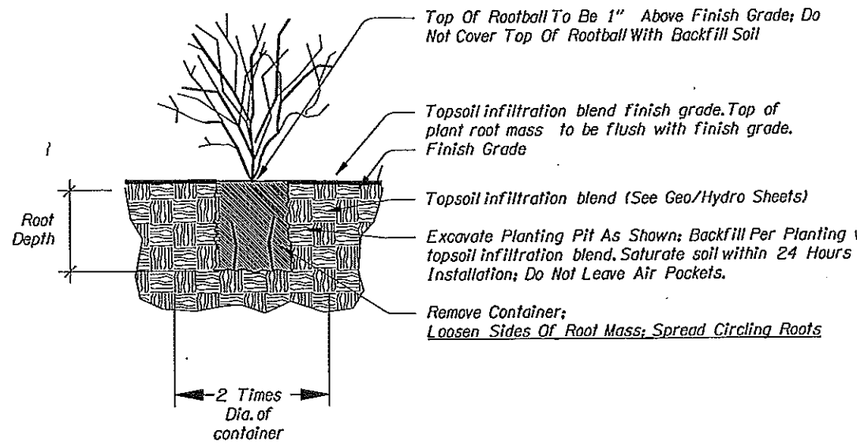
Not to scale



4 STORM WATER PLANTER PLANTING DETAIL

SECTION

Not to scale



6 CONTAINER SHRUB PLANTING

Water Quality Planter Planting

Not To Scale

"AS CONSTRUCTED"

OCT 28 2013

MARK BEESON, PROJECT MANAGER

REGISTERED
424
Magnus U. Bernhardt
OREGON
04/14/99
LANDSCAPE ARCHITECT

OREGON DEPARTMENT OF TRANSPORTATION

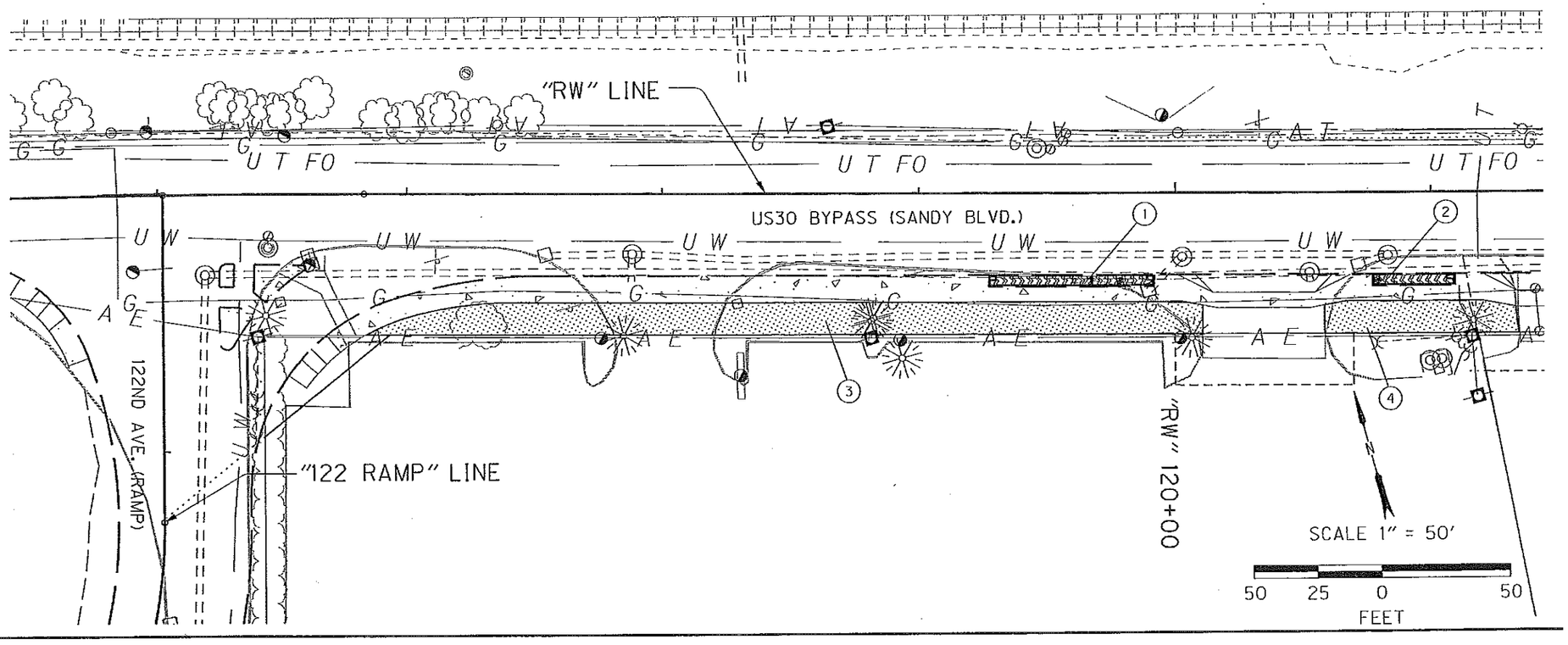
REGION 1 ROADWAY ENGINEERING SECTION

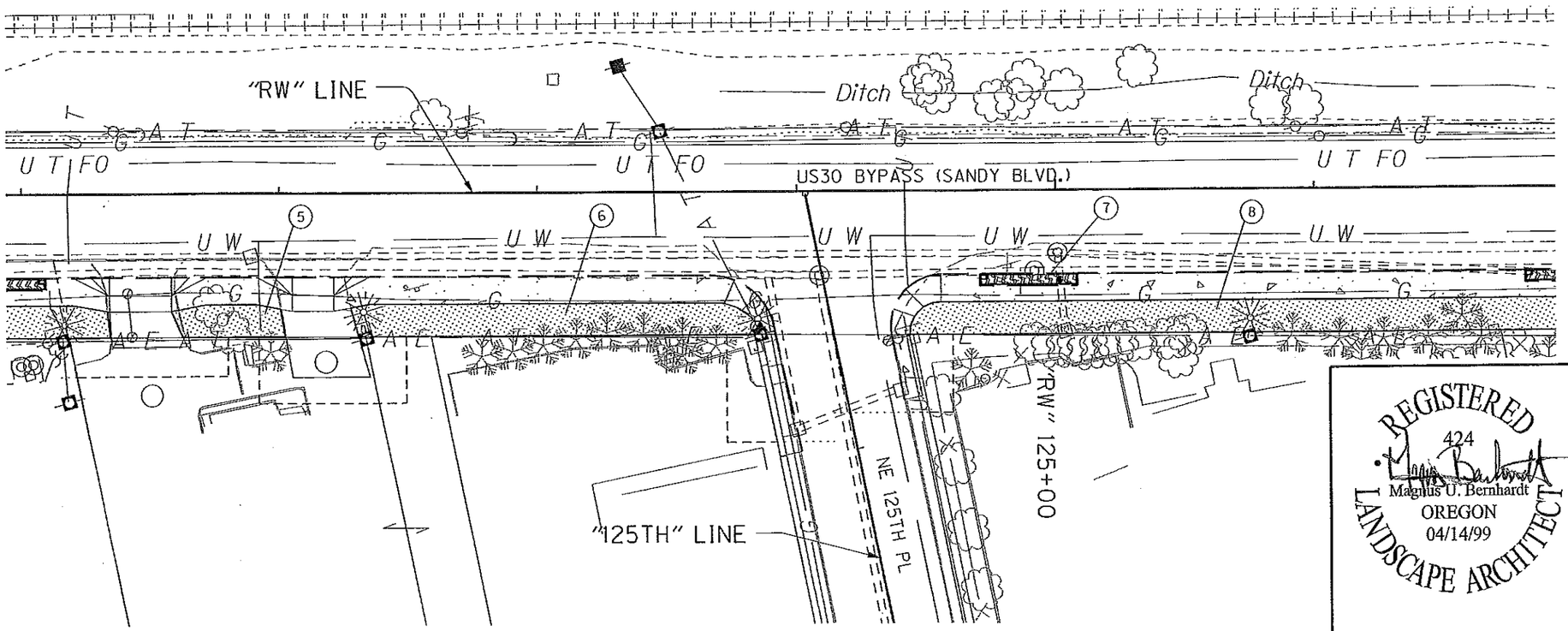
US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

Design Team Leader - Magnus Bernhardt
Designed By - Magnus Bernhardt
Drafted By - Marco Singer

DETAILS

SHEET NO. GN-3





1. 209 SF Storm water planter. Intall the following plants:
   60-Carex obnupta
   60-Carex densa
   60-Deschampsia cespitosa
2. 99 SF Storm water planter. Intall the following plants:
   28-Carex obnupta
   28-Carex densa
   28-Deschampsia cespitosa
3. Apply 24 CUYD of 2" thick coarse compost over 3870 SF.
4. Apply 5.7 CUYD of 2" thick coarse compost over 915 SF.
5. Apply 3.0 CUYD of 2" thick coarse compost over 490 SF.
6. Apply 11.6 CUYD of 2" thick coarse compost over 1880 SF.
7. 120 SF Storm water planter. Intall the following plants:
   34-Carex obnupta
   34-Carex densa
   34-Deschampsia cespitosa
8. Apply 37.5 CUYD of 2" thick coarse compost over 6090 SF.

"AS CONSTRUCTED"

OCT 28 2013

MARK BEESON, PROJECT MANAGER

NOTES:
1. See Plant and Material Schedule
2. See General Notes, and GN-2 & GN-3 details.
3. Remove weeds per 01030.42. Weeds requiring special attention include English Ivy (Hedera Helix) and Himalayan Blackberry (Rubus armeniacus).
4. See Special Provisions 03020 for compost types: fine, medium & coarse

REGISTERED 424 Magnus U. Bernhardt OREGON 04/14/99 LANDSCAPE ARCHITECT

OREGON DEPARTMENT OF TRANSPORTATION

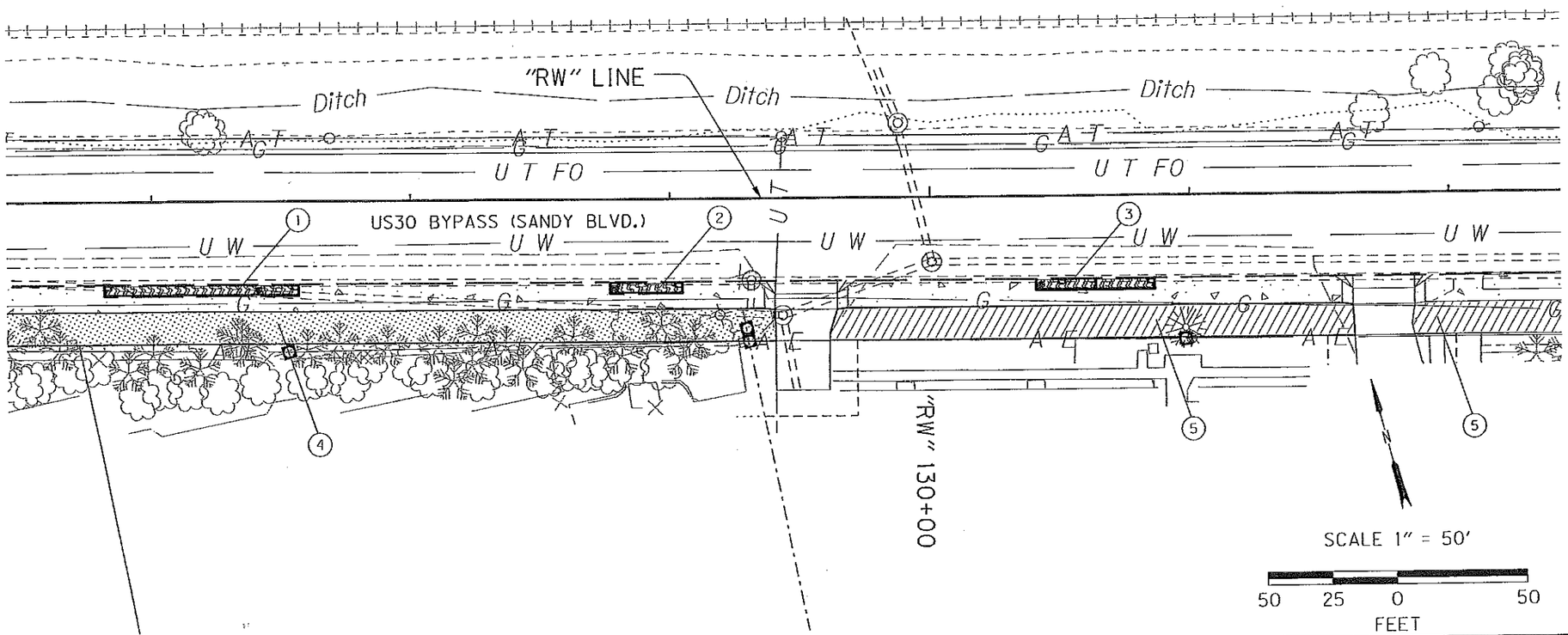
REGION 1 ROADWAY ENGINEERING SECTION

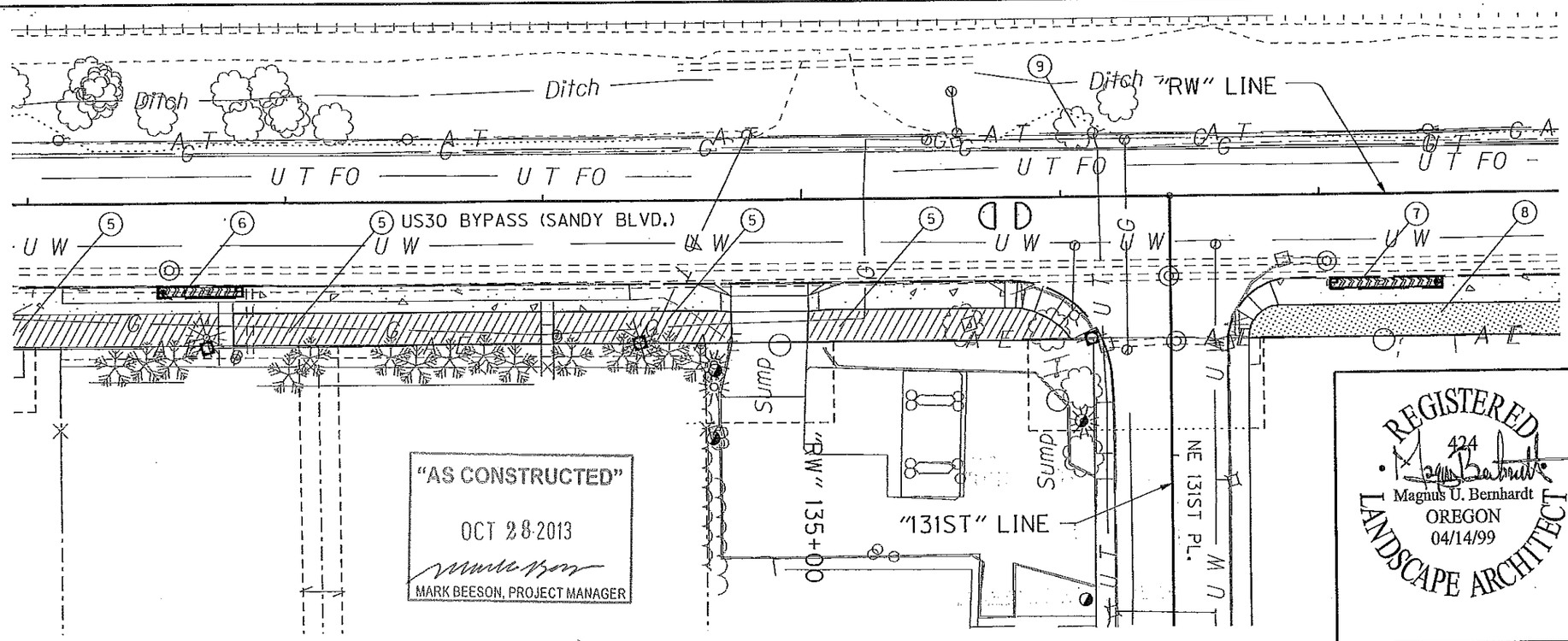
US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

Design Team Leader - Magnus Bernhardt
Designed By - Magnus Bernhardt
Drafted By - Marco Singer

ROADSIDE DEVELOPMENT PLAN

SHEET NO. GN-4





(1) *248 SF Storm water planter. Intall the following plants: 70-Carex obnupta 70-Carex densa 70-Deschampsia cespitosa*

(2) *85 SF Storm water planter. Intall the following plants: 24-Carex obnupta 24-Carex densa 24-Deschampsia cespitosa*

(3) *144 SF Storm water planter. Intall the following plants: 41-Carex obnupta 41-Carex densa 41-Deschampsia cespitosa*

(4) *Apply 2" thick coarse compost per note 8, sheet GN-4*

(5) *Existing lawn to remain to edge of new sidewalk. Coordinate with land owner to move existing irrigation where present. Areas left bare between new sidewalk and existing lawn shall be re-seeded with similar seed to match existing lawn.*

(6) *104 SF Storm water planter. Intall the following plants: 30-Carex obnupta 30-Carex densa 30-Deschampsia cespitosa*

(7) *140 SF Storm water planter. Intall the following plants: 40-Carex obnupta 40-Carex densa 40-Deschampsia cespitosa*

(8) *Apply 11.2 CUYD of 2" thick coarse compost over 1820 SF.*

(9) *Tree cluster to be removed cleared and grubbed*

NOTES:
1. See Plant and Material Schedule
2. See General Notes, and GN-2 & GN-3 details.
3. Remove weeds per 01030.42. Weeds requiring special attention include English Ivy (Hedera Helix) and Himalayan Blackberry (Rubus armeniacus).
4. See Special Provisions 03020 for compost types: fine, medium & coarse

REGISTERED
424
Magnus U. Bernhardt
OREGON
04/14/99
LANDSCAPE ARCHITECT

OREGON DEPARTMENT OF TRANSPORTATION

REGION 1 ROADWAY ENGINEERING SECTION

US 30 BYPASS: NE 122ND - M.P. 13.54 SEC.
NORTHEAST PORTLAND HIGHWAY
MULTNOMAH COUNTY

Design Team Leader - Magnus Bernhardt
Designed By - Magnus Bernhardt
Drafted By - Marco Singer

ROADSIDE DEVELOPMENT PLAN

SHEET NO. GN-5