

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
A01	Title Sheet
A02	Index Of Sheets Cont'd. & Std. Dwg. Nos.

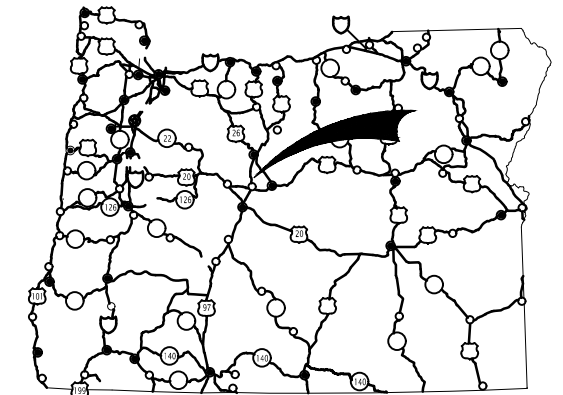
# Deschutes County Road Department

PLANS FOR PROPOSED PROJECT

Structures, Grading, Paving & Drainage

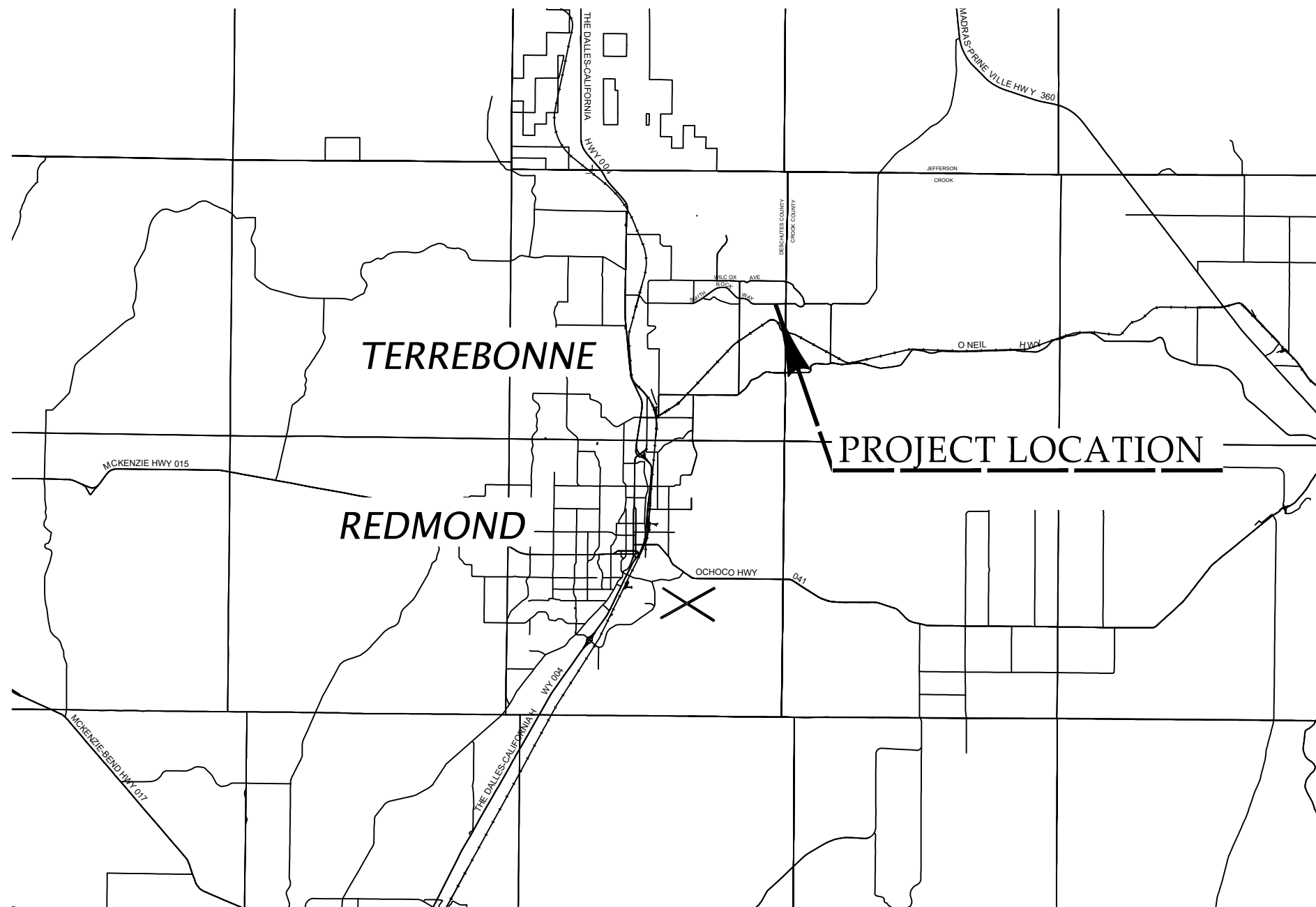
## Smith Rock Way Bridge #15452 Replacement Project

NE Smith Rock Way  
Deschutes County  
2023



Overall Length Of Project - 0.06 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.)



SEC. 13, T. 14 S., R. 13 E., W.M.

**COUNTY COMMISSION**

ANTHONY DEBONE	COMMISSIONER
PHIL CHANG	COMMISSIONER
PATTI ADAIR	COMMISSIONER
CHRIS DOTY	DIRECTOR, ROADS DEPARTMENT

PLANS PREPARED FOR  
Deschutes County Road Department



5121 Skyline Village Loop S., Suite 200  
Salem Oregon 97306 Ph: 503.361.8635

These plans were developed using AASHTO design standards. Exceptions to these standards, if any, have been submitted and approved by the Deschutes County Road Department Director or their delegated authority.

PLANS PREPARED FOR  
Deschutes County Road Department

Shon K. Heern 2023.09.19 14:29:49-0700'

Signature & date

Shon Heern, P.E. - Project Manager

Print name and title

**SMITH ROCK WAY BRIDGE  
#15452 REPLACEMENT PROJECT  
DESCHUTES COUNTY**

TITLE SHEET

SHEET NO.  
A01

## INDEX OF SHEETS, CONT.

### ROADWAY DETAILS

SHEET NO.	DESCRIPTION
BA01	Typical Section
BA02	Typical Section
BB01	Details
BB02	Details

### ROADWAY CONSTRUCTION

C01	General Construction
C01A	Profile

### TRAFFIC CONTROL

EA01	Traffic Control Details
EA02	Detour Plan

### BRIDGE

SHEET NO.	DESCRIPTION
Bridge Name – Structure No. 24285	
J01	Plan And Elevation
J02	General Notes And Typical Section
J03	Geotechnical Data
J04	Foundation Plan
J05	Prestressed Slab Details
J06	Bent Details
J07	Wingwall Details

## ABBREVIATIONS

ACP	Asphalt concrete pavement
Approx.	Approximate
Br.	Bridge
Bt.	Bent
Btm.	Bottom
Btwn.	Between
CL.	Centerline
Co.	County
Comp.	Compacted
Conc.	Concrete
Const.	Construct
Cont.	Continuous
Coord.	Coordinate
Ctr.	Center
Ctrs.	Centers
CY	Cubic yards
Dia.	Diameter
Dwg.	Drawing
Dwy.	Driveway
E	Exposure (curb)
Ea	Each
Ease	Easement
El.	Elevation
Elev.	Elevation
Emb.	Embankment fill
Exc.	Excavation
Exp.	Expanding
Extg.	Existing

## ABBREVIATIONS, Cont.

FDC	Full Depth Construction
FL	Flow line
Ft.	Feet, Foot
Hk.	Hook
Horiz.	Horizontal
In.	Inch, Inches
Inst.	Install
Jt.	Joint
Ksi.	Kilopounds per square inch
LF	Linear feet
Lt. / Rt.	Left / Right
Max.	Maximum
Min.	Minimum
No. / Nos.	Number(s)
Nom.	Nominal
OD	Outside diameter
Off	Offset
PC	Point from tangent to circular curve
PCC	Portland Cement Concrete
PCMS	Portable Changeable Message Sign
Perf.	Perforated
Perp.	Perpendicular
POC	Point on horizontal curve
POT	Point on tangent
Prop.	Proposed
PSST	Perforated Steel Square Tube
Pvmt.	Pavement
Rdwy.	Roadway
Reqd, Req'd	Required
Ref.	Reference
R/W	Right of Way
SIDL	Superimposed Dead Load
Sl.	Slope
Sch.	Schedule
SF	Square feet
Shldr.	Shoulder
Sht.	Sheet
SSC	Stainless steel clamp
Sta.	Station
Std.	Standard
Symm.	Symmetric
TCD	Traffic Control Devices
TCM	Traffic Control Measures
TCP	Traffic Control Plan
Thkn.	Thickness
TSS	Temporary sign support
Typ.	Typical
Var.	Varies
Vert.	Vertical

### Standard Drg. Nos.

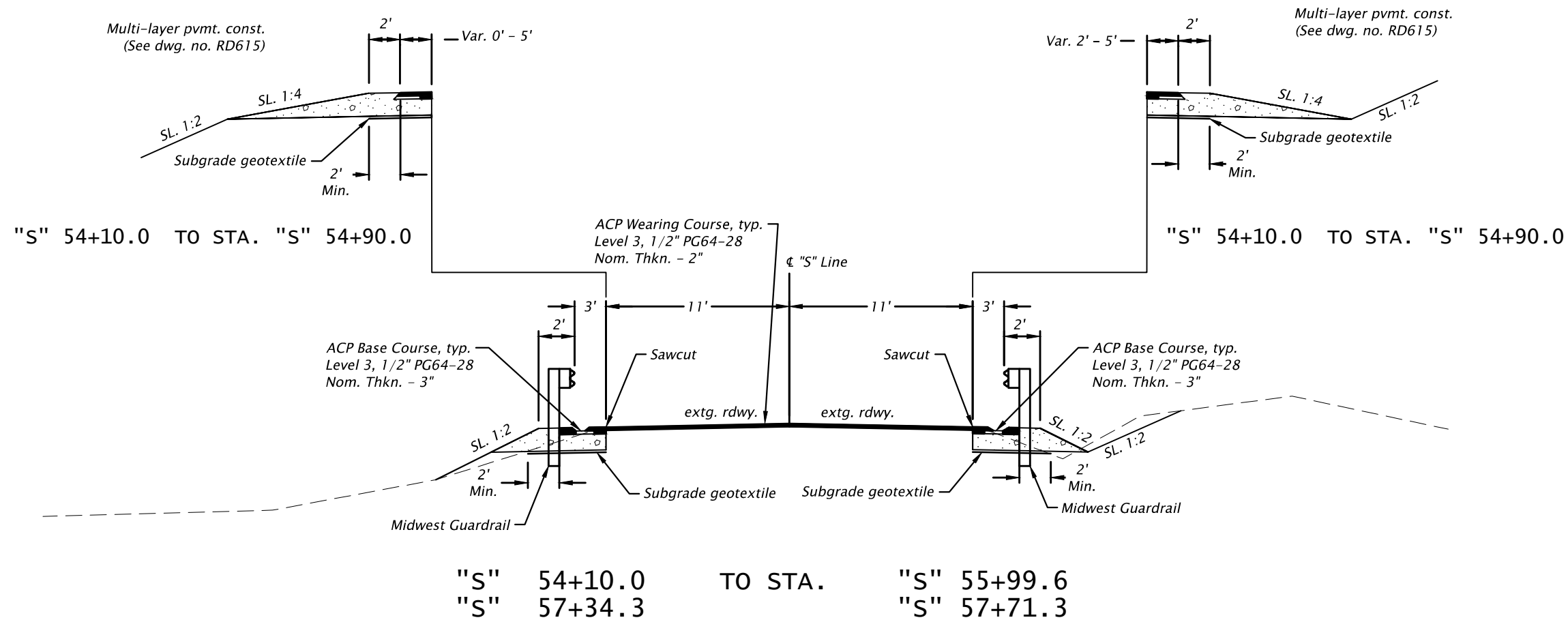
RD402	-Midwest Guardrail System Types
RD403	-Midwest Guardrail System Wood Post and Block
RD406	-Placement of Guardrails on Slopes
RD407	-Midwest Guardrail System (W-Beam)
RD409	-Thrie Beam Guardrail
RD410	-Thrie Beam Guardrail Transition
RD415	-Guardrail and Metal Median Barrier Parts (29" Rail Height)
RD416	-Midwest Guardrail System Standard Hardware (Nuts, Bolts, Washers and Misc.)
RD419	-Midwest Guardrail Systems Grading for Terminals
RD420	-Midwest Guardrail System Non-Flared Energy-Absorbing Terminal
RD442	-Midwest Guardrail System Typical Layouts at Bridge Ends
RD451	-Wood Breakaway Posts
RD610	-Asphalt Concrete Pavement (ACP) Details
RD615	-Surface Edge Details
RD701	-Drainage Curbs
RD715	-Approaches and Non-Sidewalk Driveways
RD810	-Barbed and Woven Wire Fences
RD820	-Fence Gates
RD1005	-Check Dams Type 1, 3 and 4
RD1030	-Sediment Barrier Type 2, 3, and 4
BR233	-Thrie-Beam Rail and Transition
BR165	-Bridge Approach Slab
BR208	-3-Tube Curb Mount Rail
BR209	-3-Tube Curb Mount Rail Transition
BR422	-30" Precast Prestressed Slab
BR445	-Precast Prestressed Box and Slab Details
TM222	-Installation Details Milepost Marker Posts
TM500	-Pavement Marking Standard Detail Blocks
TM670	-Wood Post Sign Supports
TM671	-3-Second Gust Wind Speed Map
TM800	-Tables, Abrupt Edge and PCMS Details
TM820	-Temporary Barricades
TM821	-Temporary Sign Supports
TM822	-Temporary Sign Supports
TM840	-Closure Details
TM841	-Intersection Work Zone Details
TM850	-2-Lane, 2-Way Roadways
TM855	-2-Lane, 2-Way Roadways

SMITH ROCK WAY BRIDGE  
#15452 REPLACEMENT PROJECT  
DESCHUTES COUNTY

INDEX, ABBREVIATIONS & STD. DRAWINGS

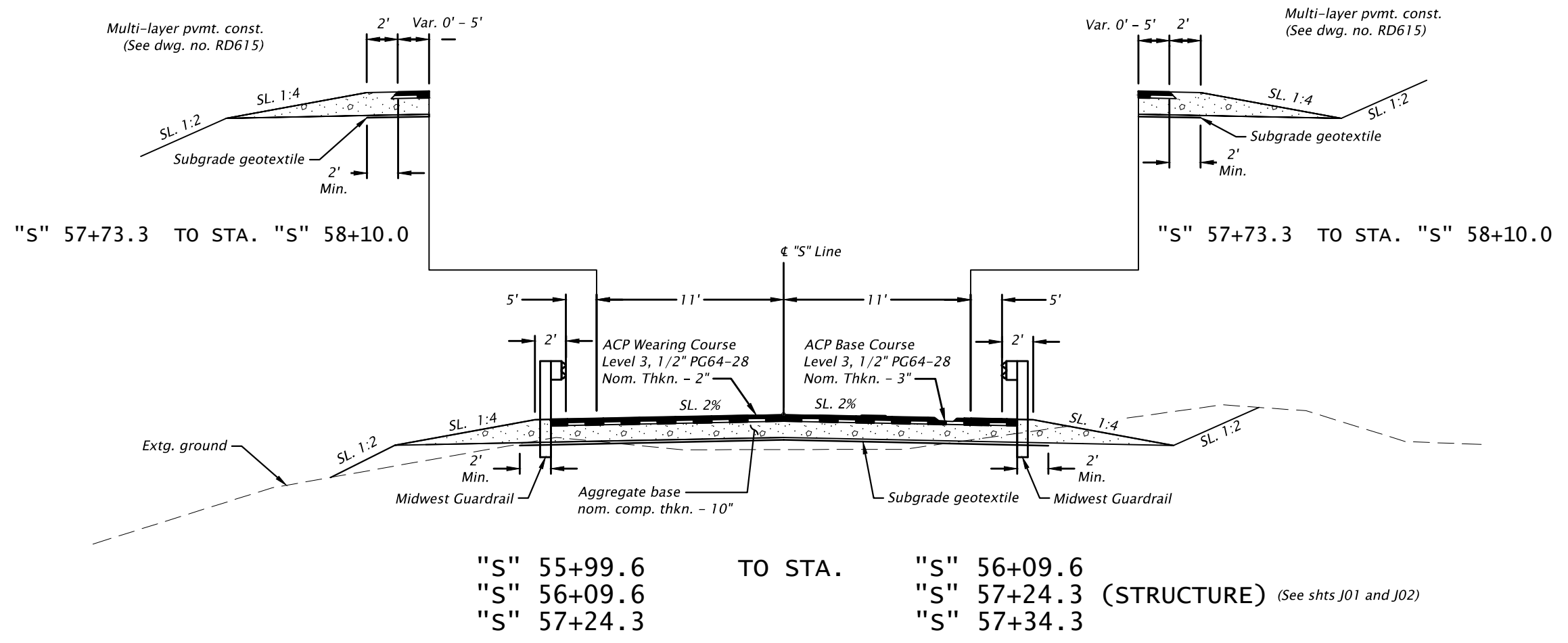
SHEET NO.

A02



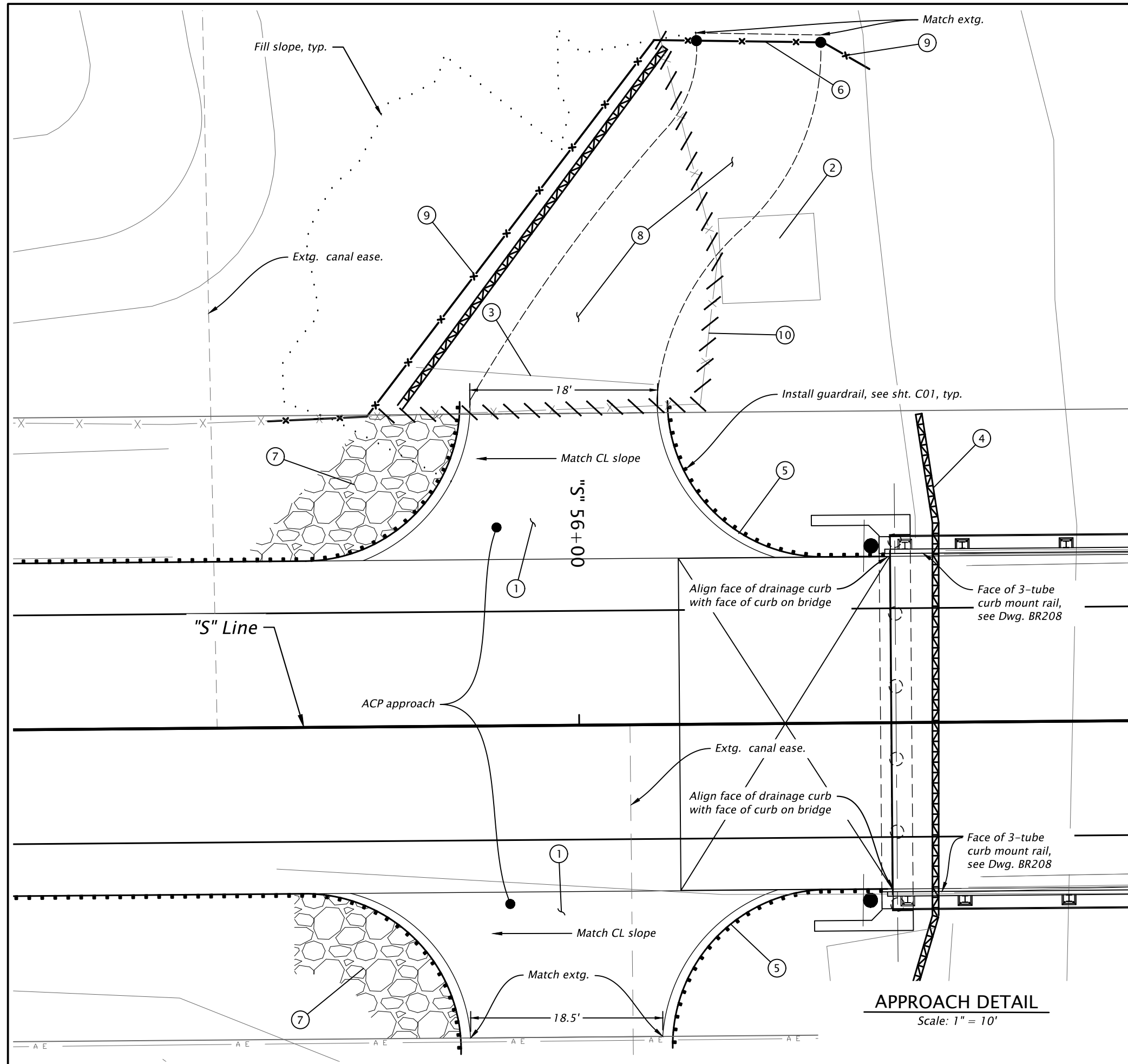
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DIGITALLY SIGNED 2023.09.12 21:07:32-07'00'  
OREGON  
JANUARY 10, 2017  
TAISEI IMAMURA  
RENEWS: 06-30-2025

<p><b>DAVID EVANS AND ASSOCIATES INC.</b> 5121 Skyline Village Loop S., Suite 200 Salem Oregon 97306 Phone: 503.361.8635</p>	<p>ROAD DEPARTMENT</p>
<p>Designer: T. Imamura  Drafter: C. Spielman</p>	<p>Reviewer: S. Heern  Checker: L. Hunt</p>
<p><b>TYPICAL SECTION</b></p>	
<p>SHEET NO. BA01</p>	



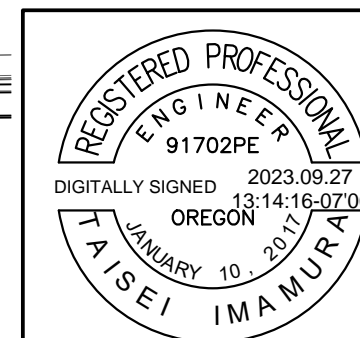
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	<p><b>SMITH ROCK WAY BRIDGE #15452 REPLACEMENT PROJECT</b> NE SMITH ROCK WAY DESCHUTES COUNTY</p> <p>Designer: T. Imamura      Reviewer: S. Heern Drafter: C. Spielman      Checker: L. Hunt</p>	
<p>TYPICAL SECTION</p>		<p>SHEET NO. BA02</p>





- ① Const. ACP approach - 2  
(See dwg. no. RD715 for details)
- ② Remove extg. cattle guard
- ③ Relocate extg. irrigation pipe. Coord. with property owner.
- ④ Inst. sediment barrier, Type 3  
(See dwg. no. RD1030 for details)
- ⑤ Const. PCC drainage curb  
(See dwg. no. RD701 for details)
- ⑥ Inst. 12' gate  
(See dwg. no. RD820 for details)
- ⑦ Inst. class 50 riprap slope armor - 18" thkn.
- ⑧ Const. gravel access using 6" thk. agg. base - 10cy
- ⑨ Sta. "S" 55+65 to Sta. "S" 56+35, Lt.  
Const. type 1 fence  
(See dwg. nos. RD810)
- ⑩ Remove extg. field fence

**APPROACH DETAIL**  
Scale: 1" = 10'



RENEWS: 06-30-2025



**SMITH ROCK WAY BRIDGE  
#15452 REPLACEMENT PROJECT**  
NE SMITH ROCK WAY  
DESCHUTES COUNTY

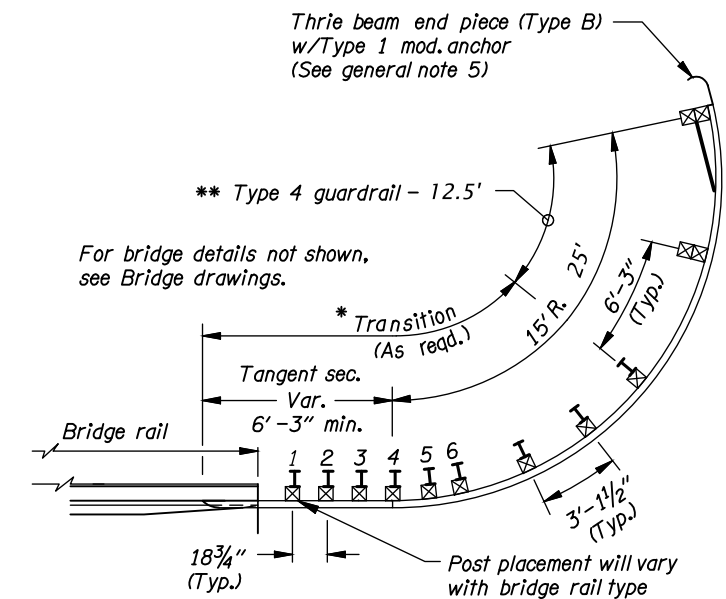
Designer: T. Imamura      Reviewer: S. Heern  
Drafter: C. Spielman      Checker: L. Hunt

**DETAILS**

SHEET NO.  
BB01

GENERAL NOTES FOR ALL DETAILS:

1. For transition details, see appropriate bridge standard drawings. Eliminate thrie beam to W-beam rail element when type 4 rail is used.
2. Place radius identification plate (For details, see drg. no. RD415).
3. Shop fabricate all radius rail to dimensions shown (14'-9" radius is min. allowable for thrie beam rail).
4. Rail elements:
  - \* Thrie beam rail:  
2 - 12 gauge rail elements
  - \*\* Thrie beam rail:  
1 - 12 gauge rail element
5. Anchor and end piece shown are to be used only for private driveways/approach roads. An approved end treatment is required on public roadways.

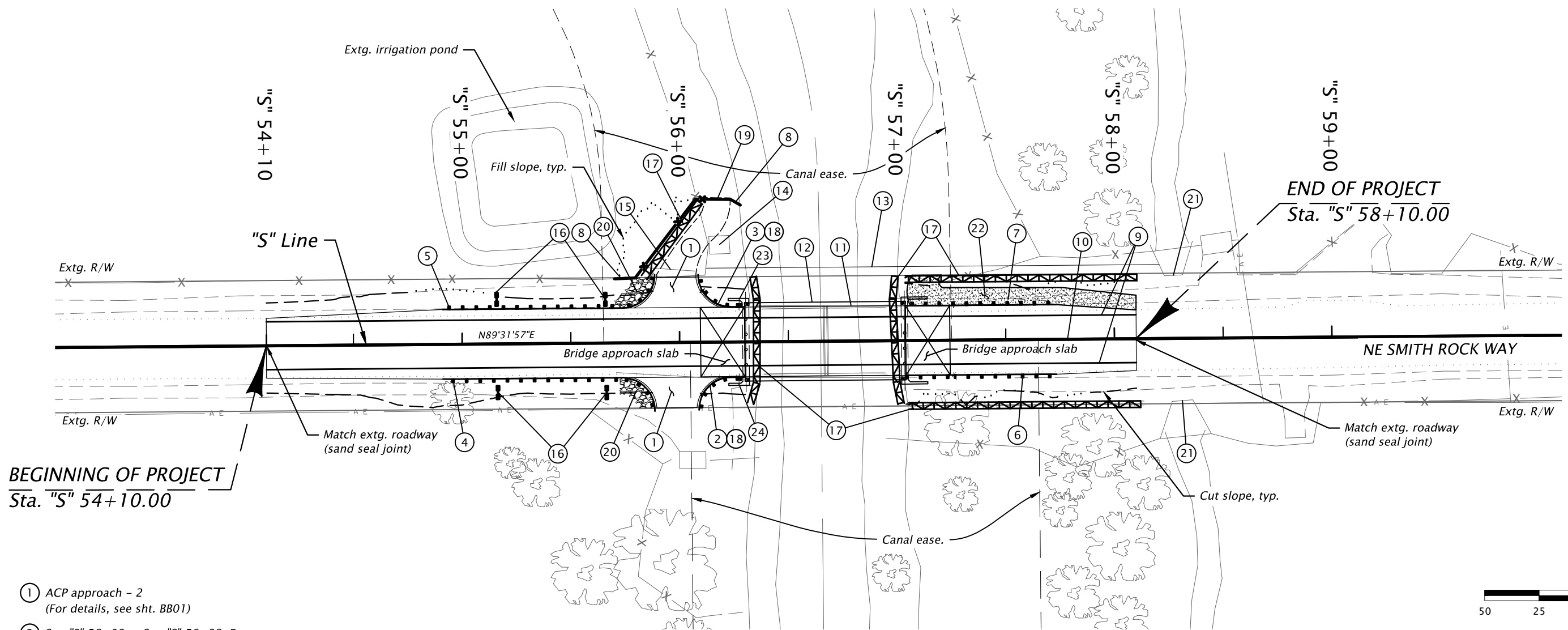


6'-3" OF TRANSITION IN TANGENT  
15' RADIUS

**Bridge Rail End Protection**

Scale: No Scale

	<p><b>DAVID EVANS AND ASSOCIATES INC.</b> 5121 Skyline Village Loop S., Suite 200 Salem Oregon 97306 Phone: 503.361.8635</p>	<p>ROAD DEPARTMENT</p>
<p><b>SMITH ROCK WAY BRIDGE #15452 REPLACEMENT PROJECT</b> NE SMITH ROCK WAY DESCHUTES COUNTY</p>		
<p>Designer: T. Imamura Drafter: C. Spielman</p>		<p>Reviewer: S. Heern Checker: L. Hunt</p>
<p>RENEWS: 06-30-2025</p>		<p><b>DETAILS</b></p>
		<p>SHEET NO. BB02</p>



**BEGINNING OF PROJECT**  
Sta. "S" 54+10.00

**END OF PROJECT**  
Sta. "S" 58+10.00

① ACP approach - 2  
(For details, see sht. BB01)

② Sta. "S" 56+09 to Sta. "S" 56+32, Rt.  
Const. guardrail to bridge rail transition  
Const. guardrail anchor, type 1 modified  
(For details, see BB02)

③ Sta. "S" 56+09 to Sta. "S" 56+32, Lt.  
Const. guardrail to bridge rail transition  
Const. guardrail anchor, type 1 modified  
(For details, see BB02)

④ Sta. "S" 54+91.1 to Sta. "S" 55+89.0, Rt.  
Const. guardrail - 12.5' (Type 3)  
W=0, E=0  
Const. guardrail terminal, non-flared  
Test level 3  
Const. guardrail anchor, type 1 modified  
(For details, see BB02)  
(See dwg. nos. BR209, RD402, RD403,  
RD406, RD407, RD409, RD410, RD416,  
RD419, RD420, RD442 & RD451)

⑤ Sta. "S" 54+91.1 to Sta. "S" 55+89.0, Lt.  
Const. guardrail - 12.5' (Type 3)  
W=0, E=0  
Const. guardrail terminal, non-flared  
Test level 3  
Const. guardrail anchor, type 1 modified  
(For details, see BB02)

⑥ Sta. "S" 57+04.0 to Sta. "S" 57+73.3, Rt.  
Const. guardrail to bridge rail transition  
Const. guardrail - 12.5' (Type 3)  
W=0, E=0  
Const. guardrail terminal, non-flared  
Test level 3

⑦ Sta. "S" 57+04.0 to Sta. "S" 57+73.3, Lt.  
Const. guardrail to bridge rail transition  
Const. guardrail - 12.5' (Type 3)  
W=0, E=0  
Const. guardrail terminal, non-flared  
Test level 3

⑧ Remove extg. field fence - 70'  
Const. Type 1 fence - 70'  
(For details, see sht. BB01)

⑨ Inst. 4" white line (W) - 400'  
(See dwg. no. TM500)

⑩ Inst. double yellow no-pass line (D) - 400'  
(See dwg. no. TM500)

⑪ Remove extg. Co. Br. No. 15452

⑫ Structure no. 24285  
Const. structure - 73'  
Rdwy width 32'  
(For sht. nos., see sht. A02, Bridge)

⑬ Maintain & protect extg. irrigation main  
crossing

⑭ Extg. cattle guard  
(For details, see sht. BB01)

⑮ Extg. irrigation pipe.  
(For details, see sht. BB01)

⑯ Inst. check dam, type 3 - 4  
(See dwg. no. RD1005 for details)

⑰ Inst. sediment barrier, Type 3 - 400'  
(See dwg. no. RD1030 for details)

⑱ PCC drainage curb - 60'  
(For details, see sht. BB01)

⑲ Inst. 12' gate  
(See dwg. no. RD820 for details)

⑳ Riprap slope armor - 18" thkn.  
(For details, see sht. BB01)

㉑ Maintain & protect extg. headwall

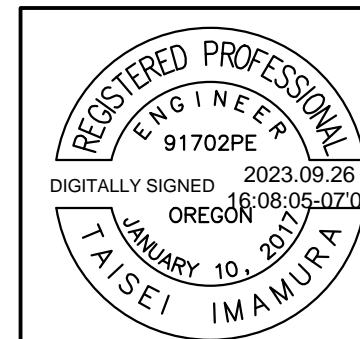
㉒ Const. gravel access

㉓ Remove and save extg. OM-3L object marker  
Remove extg. object marker post  
Reinstall OM-3L object marker on new milepost  
marker post in front of bridge end, behind guardrail  
(See dwg. no. TM222)

㉔ Remove and save extg. OM-3R object marker  
Remove extg. object marker post  
Reinstall OM-3R object marker on new milepost  
marker post in front of bridge end, behind guardrail

**GENERAL NOTES:**

1. Seed disturbed areas as directed by the engineer.
2. Maintain access to approaches at all times.
3. Align face of drainage curb with face of curb on bridge

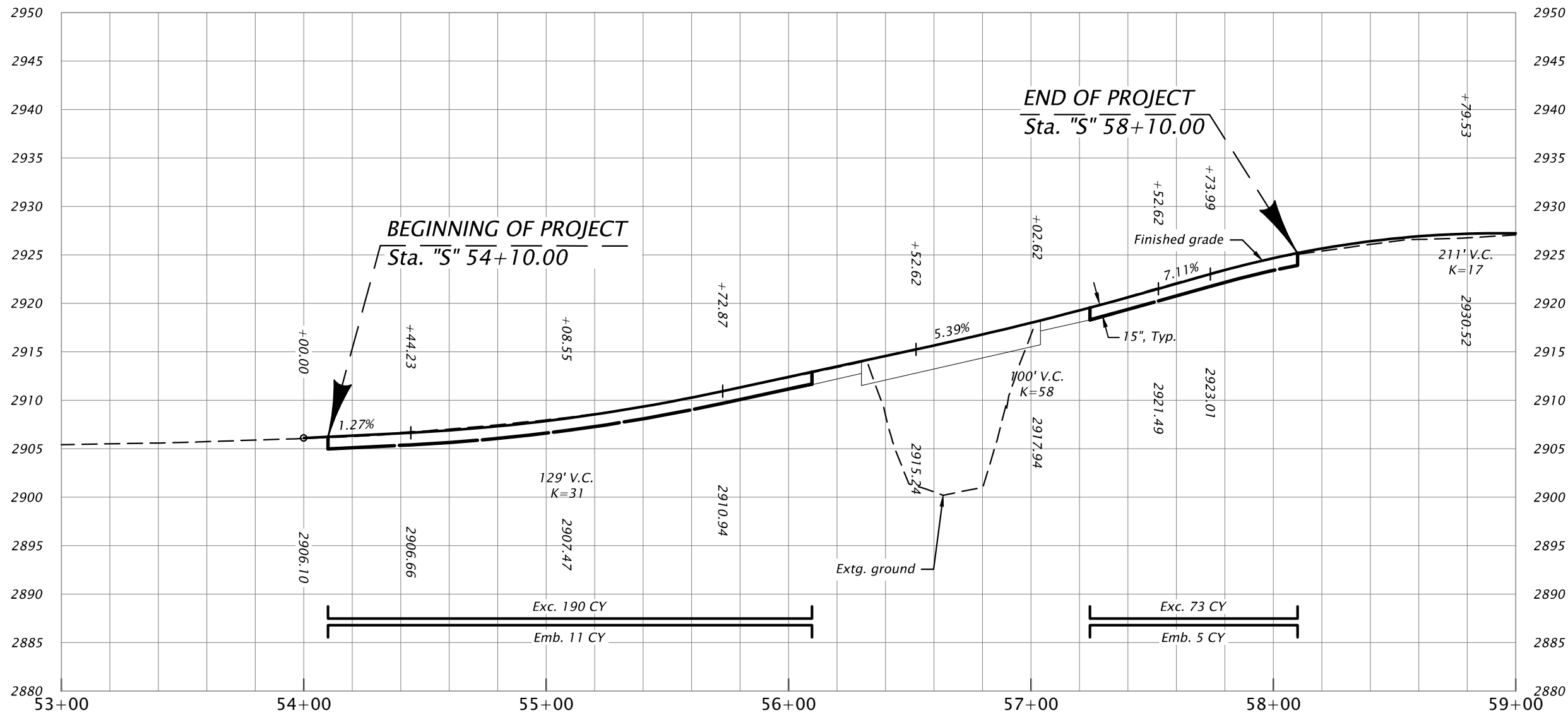


RENEWS: 06-30-2025

<p><b>DAVID EVANS AND ASSOCIATES INC.</b> 5121 Skyline Village Loop S., Suite 200 Salem Oregon 97306 Phone: 503.361.8635</p>	<p>DESCHUTES COUNTY</p>	ROAD DEPARTMENT
		<p><b>SMITH ROCK WAY BRIDGE #15452 REPLACEMENT PROJECT</b> NE SMITH ROCK WAY DESCHUTES COUNTY</p>

Designer: T. Imamura	Reviewer: S. Heern
Drafter: C. Spielman	Checker: L. Hunt

<b>GENERAL CONSTRUCTION</b>	SHEET NO. C01
-----------------------------	------------------



REGISTERED PROFESSIONAL ENGINEER  
91702PE  
DIGITALLY SIGNED 2023.09.12 21:06:11-07'00'  
OREGON  
Taisei Imamura  
RENEWS: 06-30-2025

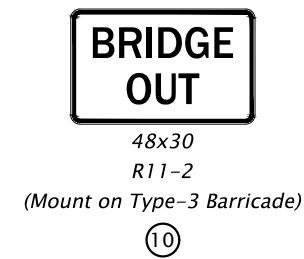
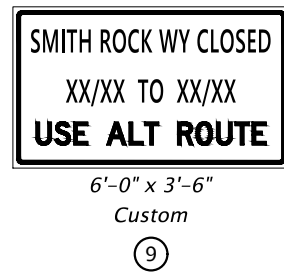
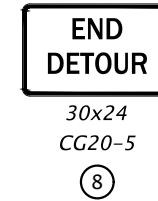
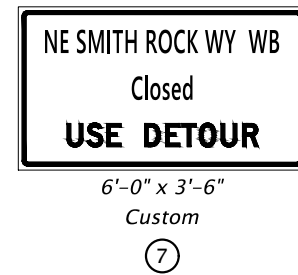
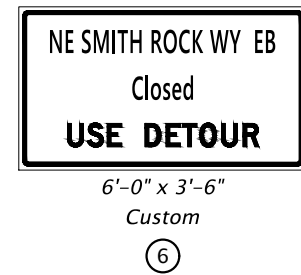
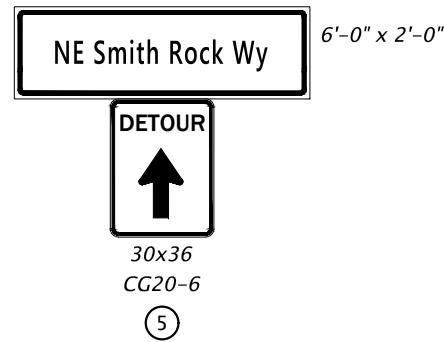
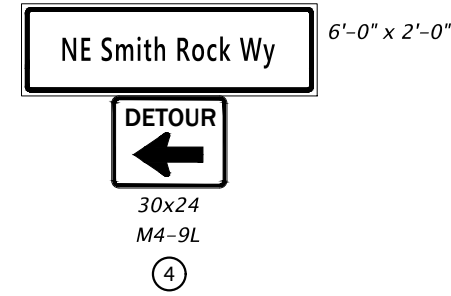
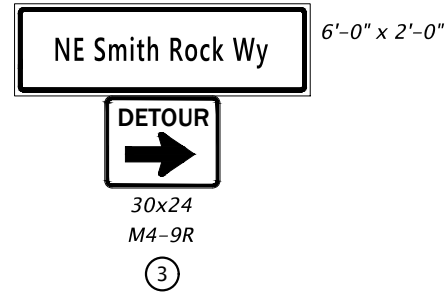
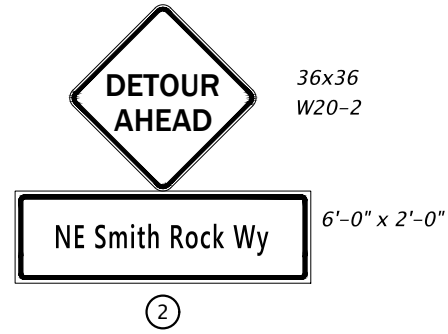
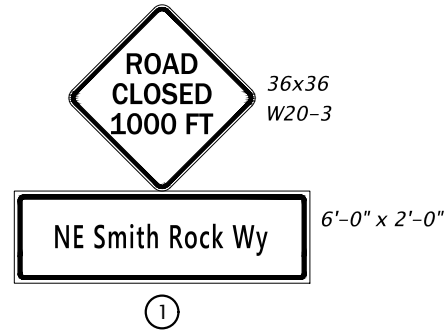
**DAVID EVANS AND ASSOCIATES INC.**  
5121 Skyline Village Loop S., Suite 200  
Salem Oregon 97306  
Phone: 503.361.8635

DESCHUTES COUNTY ROAD DEPARTMENT

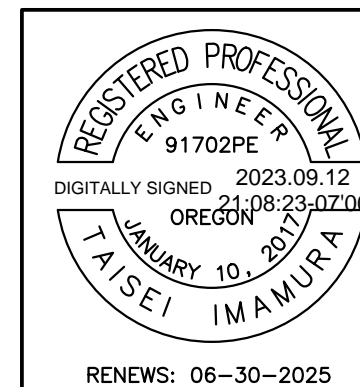
**SMITH ROCK WAY BRIDGE #15452 REPLACEMENT PROJECT**  
NE SMITH ROCK WAY  
DESCHUTES COUNTY

Designer: T. Imamura Reviewer: S. Heern  
Drafter: C. Spielman Checker: L. Hunt

**PROFILE** SHEET NO. C01A



To Be Accompanied by Standard Dwg. Nos.  
TM670, TM671, TM800, TM820, TM821, TM822,  
TM840, TM841, TM850 & TM855.



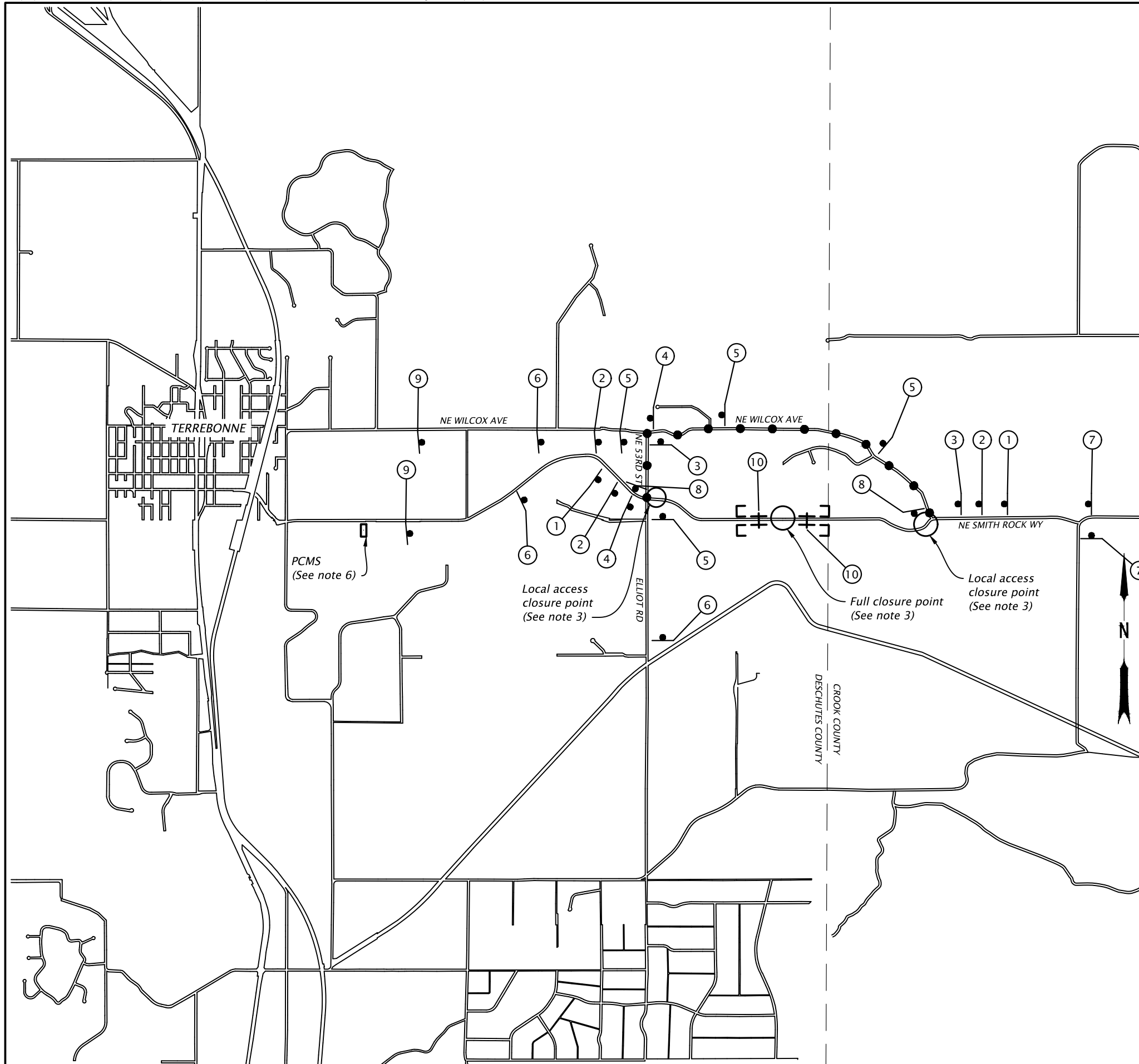
SMITH ROCK WAY BRIDGE  
#15452 REPLACEMENT PROJECT  
NE SMITH ROCK WAY  
DESCHUTES COUNTY

Designer: T. Imamura Reviewer: S. Heern  
Drafter: C. Spielman Checker: L. Hunt

TRAFFIC CONTROL DETAILS

SHEET NO.  
EA01





## DETOUR PLAN NOTES

1. Traffic control devices (TCD) spacing not shown on the detour plan shall follow the "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on std. dwg. TM800.
2. Signs and other TCD shown are min. reqd. Adjustment of temp TCD may be reqd. to accomodate extg. field conditions. Addl Traffic Control Measures (TCM) may be reqd. as directed by the engineer.
3. For closure TCD and signing, see dwg. no. TM840.
4. Inst. Sign No. 9 as advance warning sign a min. of 2 weeks prior to closure. Place as directed by the engineer.
5. Contractor to obtain appropriate permits from the Oregon Department Of Transportation for temporary traffic control devices in state highway right-of-way.
6. Place PCMS boards as directed by the engineer. (See TM800 for details)

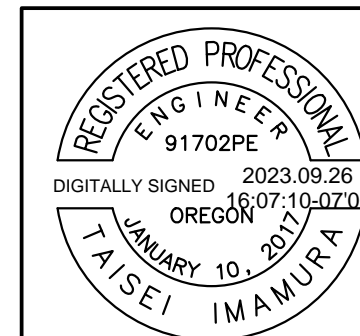
## LEGEND

- ● ● ● ● Detour Route
- ⊣ Detour Route Sign
- ⌈ ⊞ ⌋ 2-8' B(III) LR Barricades & TSS
- Portable changeable message sign

**SMITH ROCK WY CLOSED**      **USE DETOUR**

## PORTABLE CHANGEABLE MESSAGE SIGN

(Suggested Message)  
(Locate As Directed)

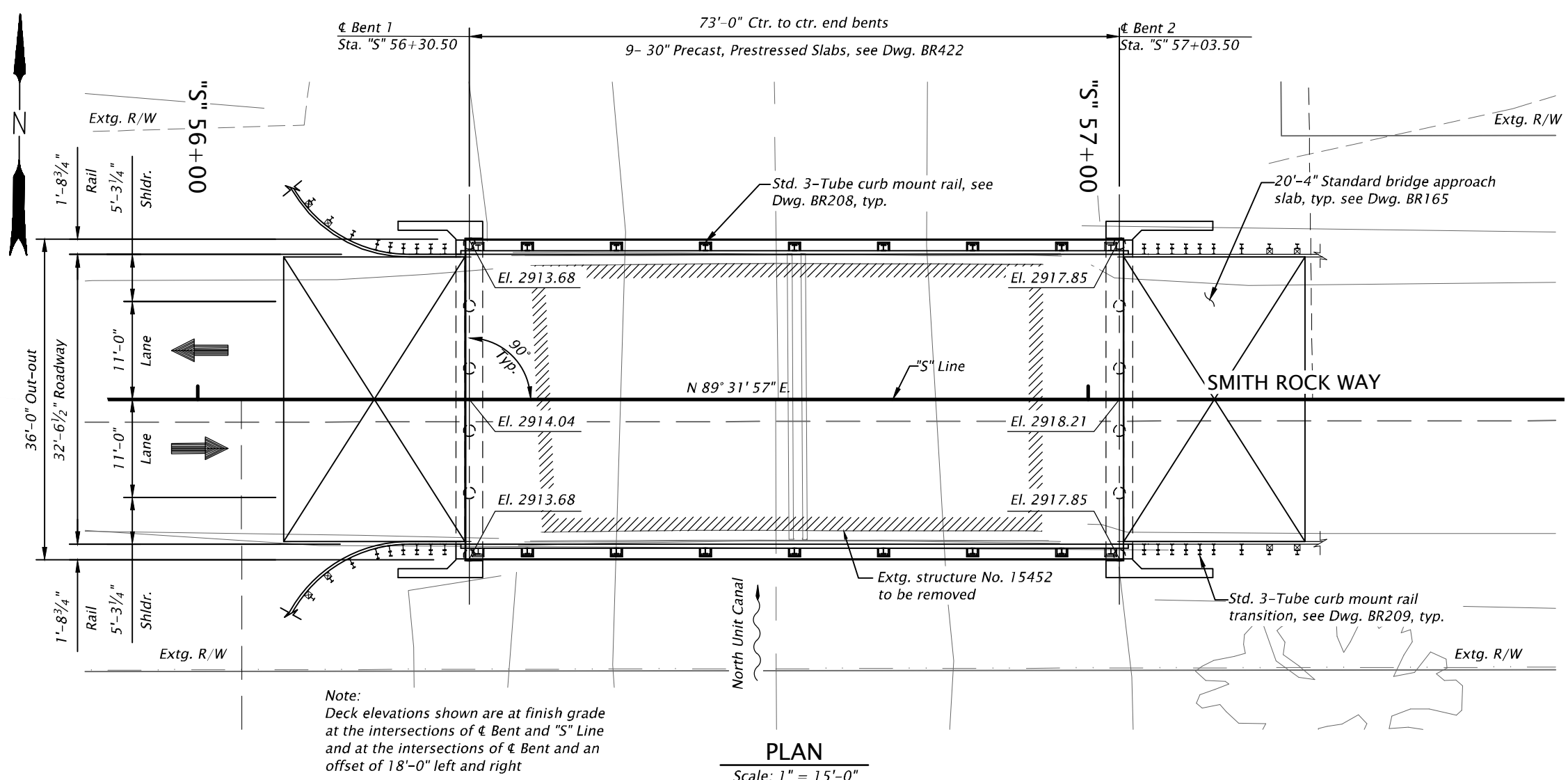


RENEWS: 06-30-2025

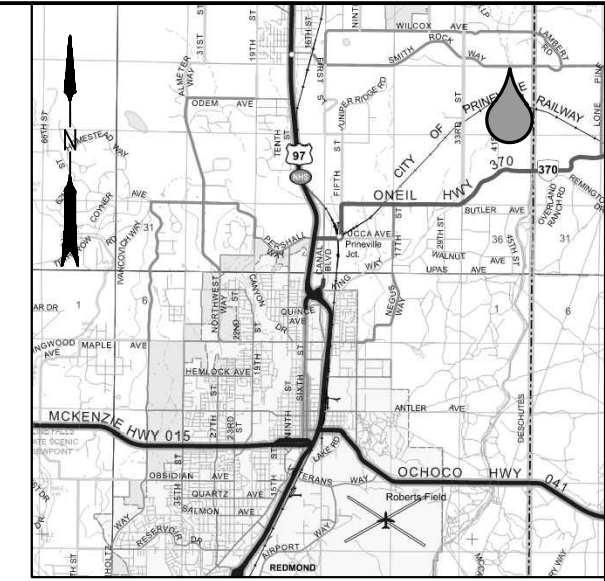
 <b>DAVID EVANS AND ASSOCIATES INC.</b> 5121 Skyline Village Loop S., Suite 200 Salem Oregon 97306 Phone: 503.361.8635	 <b>DESCHUTES COUNTY</b>	<b>ROAD DEPARTMENT</b>

Designer: T. Imamura	Reviewer: S. Heern
Drafter: C. Spielman	Checker: L. Hunt

<b>DETOUR PLAN</b>	SHEET NO. EA02
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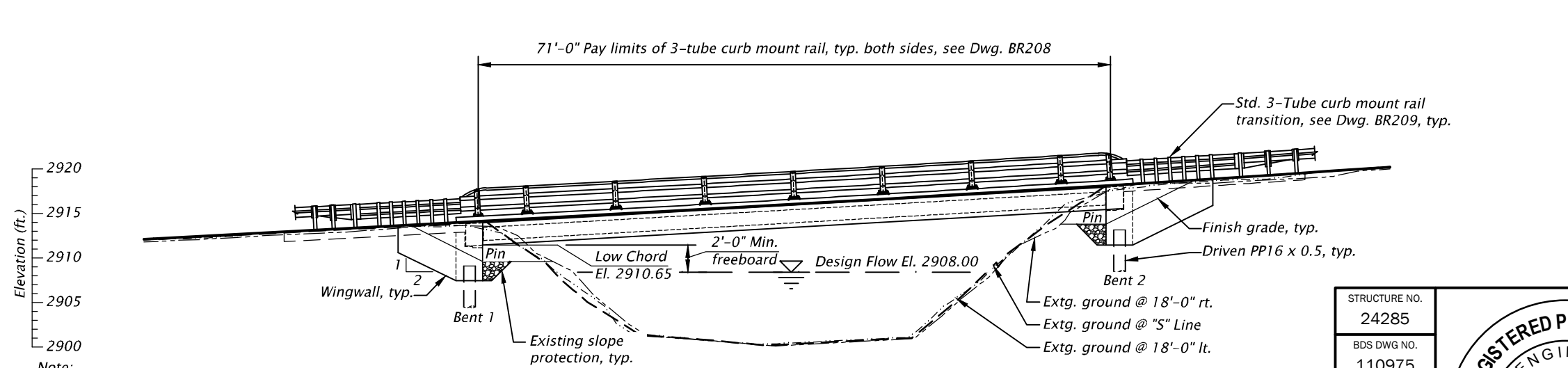


Note:  
Deck elevations shown are at finish grade at the intersections of  $\phi$  Bent and "S" Line and at the intersections of  $\phi$  Bent and an offset of 18'-0" left and right

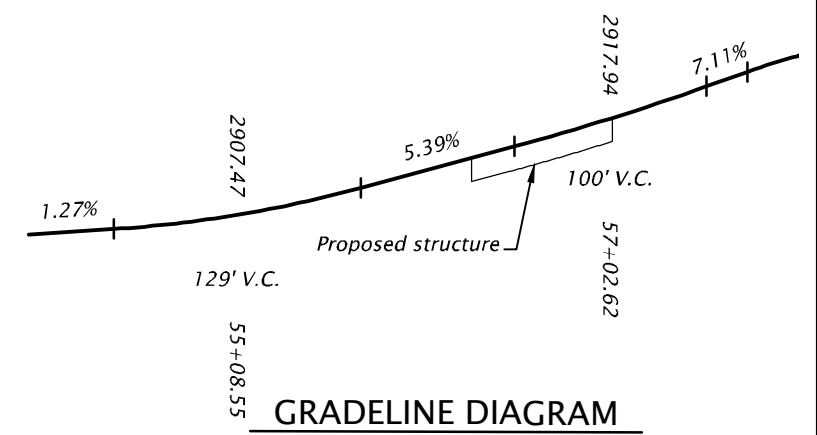


LAT. 44.34887°, LONG. 121.11504°  
SEC. 24, T. 14 S., R. 13 E., W.M.  
**LOCATION MAP**  
No Scale

HYDRAULIC DATA		
ITEMS	UNITS	DESIGN FLOW
DISCHARGE	ft. <sup>3</sup> /s	1100
HIGH WATER ELEVATION AT UPSTREAM FACE OF BRIDGE ALONG EMBANKMENT	feet	2908
BACKWATER	feet	0.0
SCOUR DEPTH	feet	0.0



Note:  
Elevations shown are based on North American Vertical Datum (NAVD88).  
Protect existing slope protection in place.



STRUCTURE NO.	24285
BDS DWG NO.	110975
CALC. BOOK	-
HWY:	2184-03
M.P.:	3.50
COUNTY	DESCHUTES
DATE	09/2023



<b>DAVID EVANS AND ASSOCIATES INC.</b> 5121 Skyline Village Loop S., Suite 200 Salem Oregon 97306 Phone: 503.361.8635	<b>DESCHUTES COUNTY ROAD DEPARTMENT</b>
North Unit Canal_Smith Rock Way_44.3488/121.1150	
<b>SMITH ROCK WAY BRIDGE #15452 REPLACEMENT PROJECT</b> NE SMITH ROCK WAY DESCHUTES COUNTY	
Designer: Makenzie Ellett	Reviewer: Amanda Blankenship
Drafter: Dustin Altenburg	Checker: Brett Karnes
<b>PLAN AND ELEVATION</b>	
SHEET NO. J01	

ACCOMPANIED BY DWGS.:  
J02-J07, BR165, BR208,  
BR209, BR422 and BR445

**SCALE WARNING**  
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

## GENERAL NOTES

Provide all materials and perform all work according to the "Oregon Standard Specifications for Construction 2021".  
 Bridge is designed in accordance with the 2020 edition of the "AASHTO LRFD Bridge Design Specifications (including interim revisions)" and the October 2022 edition of the "ODOT Bridge Design Manual", with an allowance of 40psf for present wearing surface and 40 psf for future wearing surface and all of the following Live Loads:

**Service and Strength-I Limit States:**

HL-93: Design truck (or trucks per LRFD 3.6.1.3) or the design tandems and the design lane load.

**Strength-II Limit State:**

ODOT Type STP-5BW Permit truck  
 ODOT Type STP-4E Permit truck

Seismic design is performed in accordance with the "AASHTO Guide Specifications for LRFD Seismic Bridge Design" ("AASHTO LRFD Bridge Design Specifications") as modified by the October 2022 edition of the "ODOT Bridge Design Manual". The Horizontal Peak Ground Acceleration Coefficients (PGA) for 1000-year return (Life Safety) is 0.11g, based on 2014 USGS Seismic Hazard Maps. The bridge site is defined as a Site Class B with Site Factor (Fpga) of 0.90.

Provide all reinforcing steel according to ASTM Specification A706, or AASHTO 31 (ASTM A615) Grade 60. Provide field bent bars according to ASTM Specification A706. Use the following splice lengths (unless shown otherwise).

Reinforcing Splice Lengths (Class B) Grade 60 $f_c = 4.0 \text{ ksi}$ , $\lambda_{rc} = 0.4$ , 2" min. cl. cover											
Bar Size	#3	#4	#5	#6	#7	#8	#9	#10	#11	#14	#18
Uncoated	1'-4"	1'-7"	2'-0"	2'-5"	2'-9"	3'-2"	3'-7"	4'-0"	4'-5"	Not Permitted	

Increase all splice lengths 30% for horizontal or nearly horizontal bars so placed that more than 12" of fresh concrete is cast below the bar.

Splice reinforcing steel at alternate bars, staggered at least one splice length or as far as possible, unless shown otherwise.

All reinforcing shall have 2" of concrete cover unless shown otherwise.

All reinforcing spacing is intended to be maximum unless shown otherwise.

Provide concrete and prestressing steel in precast prestressed units according to detail plans.

Provide a 3/4" chamfer on all exposed concrete edges unless noted otherwise.

Provide Class HPC 4500 - 1" or 1 1/2" concrete for approach slabs.

Provide Class 4000 - 1 1/2", 1", or 3/4" concrete for all other concrete.

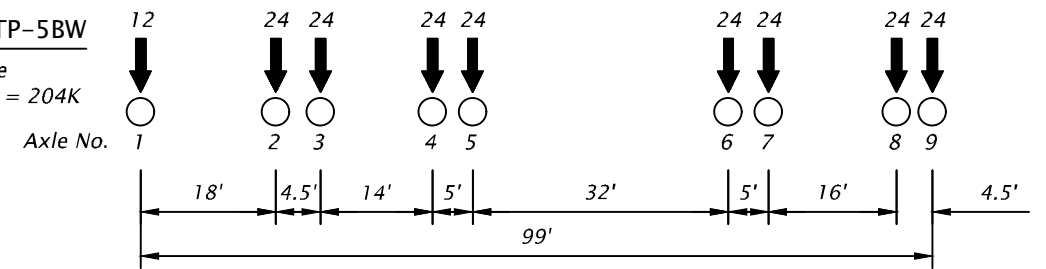
See Foundation Plan for Foundation Design Notes.

Field verify all dimensions and elevations prior to beginning work.

Remove all sections of the existing bridge from within the canal limits, and restore channel to existing condition.

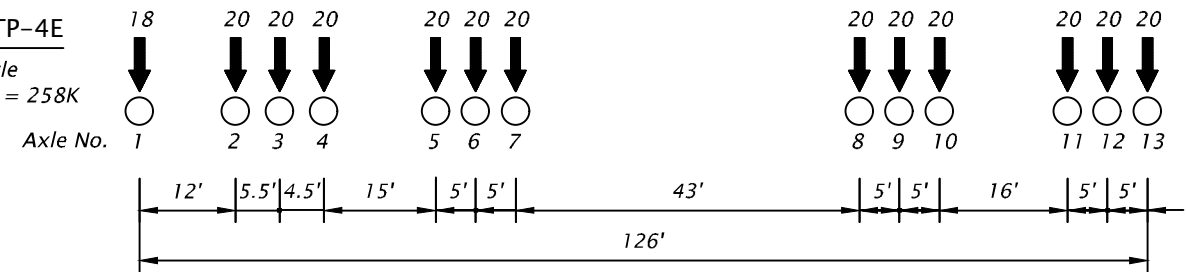
**TYPE OR-STP-5BW**

9 Axle Vehicle  
 Gross Weight = 204K



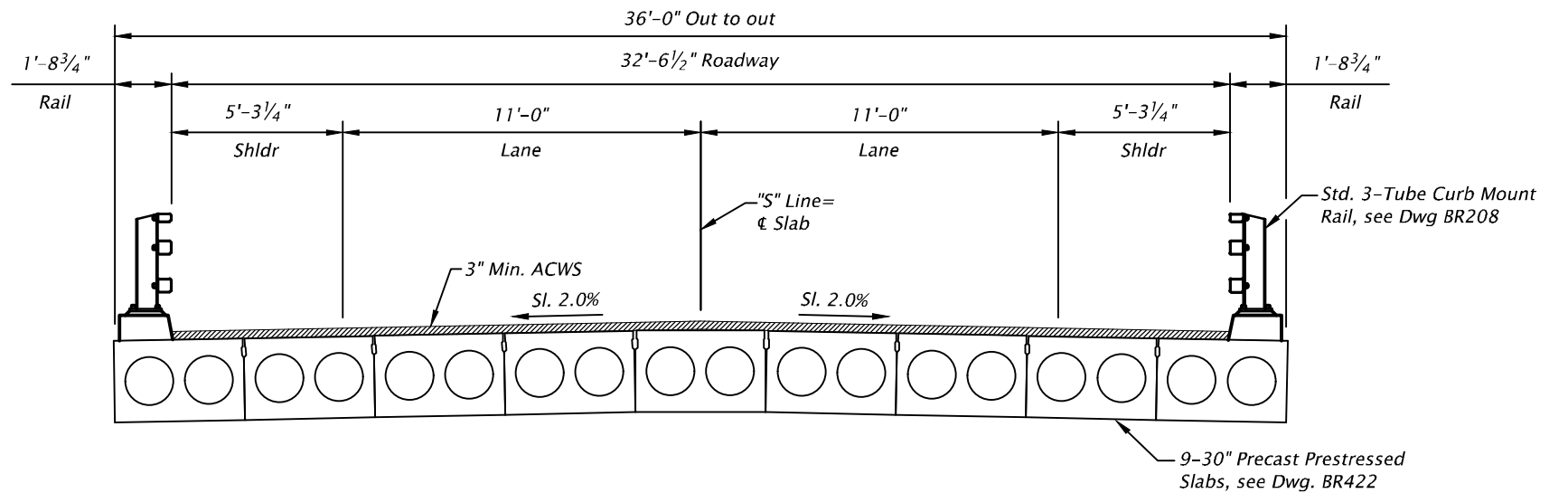
**TYPE OR-STP-4E**

13 Axle Vehicle  
 Gross Weight = 258K



**PERMIT TRUCK DIAGRAMS**

No Scale



**TYPICAL SECTION**

Scale: 3/16" = 1'-0"

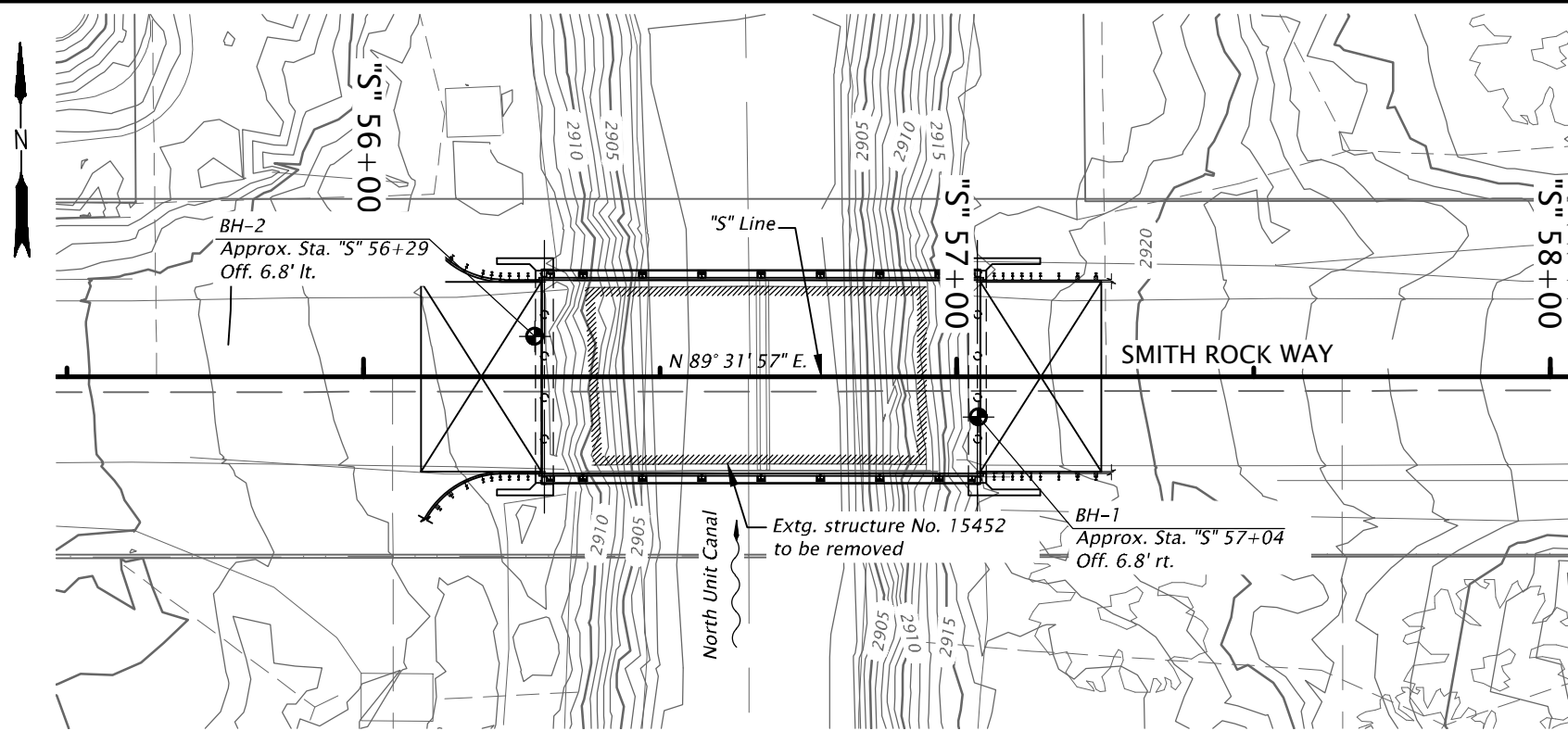
**SCALE WARNING**  
 IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	24285
BDS DWG NO.	110976
CALC. BOOK	-
HWY: 2184-03 M.P.: 3.50	
COUNTY	DESCHUTES
DATE	09/2023

**REGISTERED PROFESSIONAL ENGINEER**  
 90087PE  
 DIGITALLY SIGNED 2023.09.12 09:47:45-07'00"  
 OREGON  
 MARCH 12, 2019  
 MAKENZIE ANN ELLETT  
 RENEWS: 12-31-2023

<b>DAVID EVANS AND ASSOCIATES INC.</b> 5121 Skyline Village Loop S., Suite 200 Salem Oregon 97306 Phone: 503.361.8635	<b>DESCHUTES COUNTY ROAD DEPARTMENT</b>
North Unit Canal_Smith Rock Way_44.3488/121.1150 <b>SMITH ROCK WAY BRIDGE #15452 REPLACEMENT PROJECT</b> NE SMITH ROCK WAY DESCHUTES COUNTY	
Designer: Makenzie Ellett	Reviewer: Amanda Blankenship
Drafter: Dustin Altenburg	Checker: Brett Karnes
<b>GENERAL NOTES AND TYPICAL SECTION</b>	SHEET NO. J02





**PLAN**

Scale: 1" = 30'

**UNIT DESCRIPTIONS**

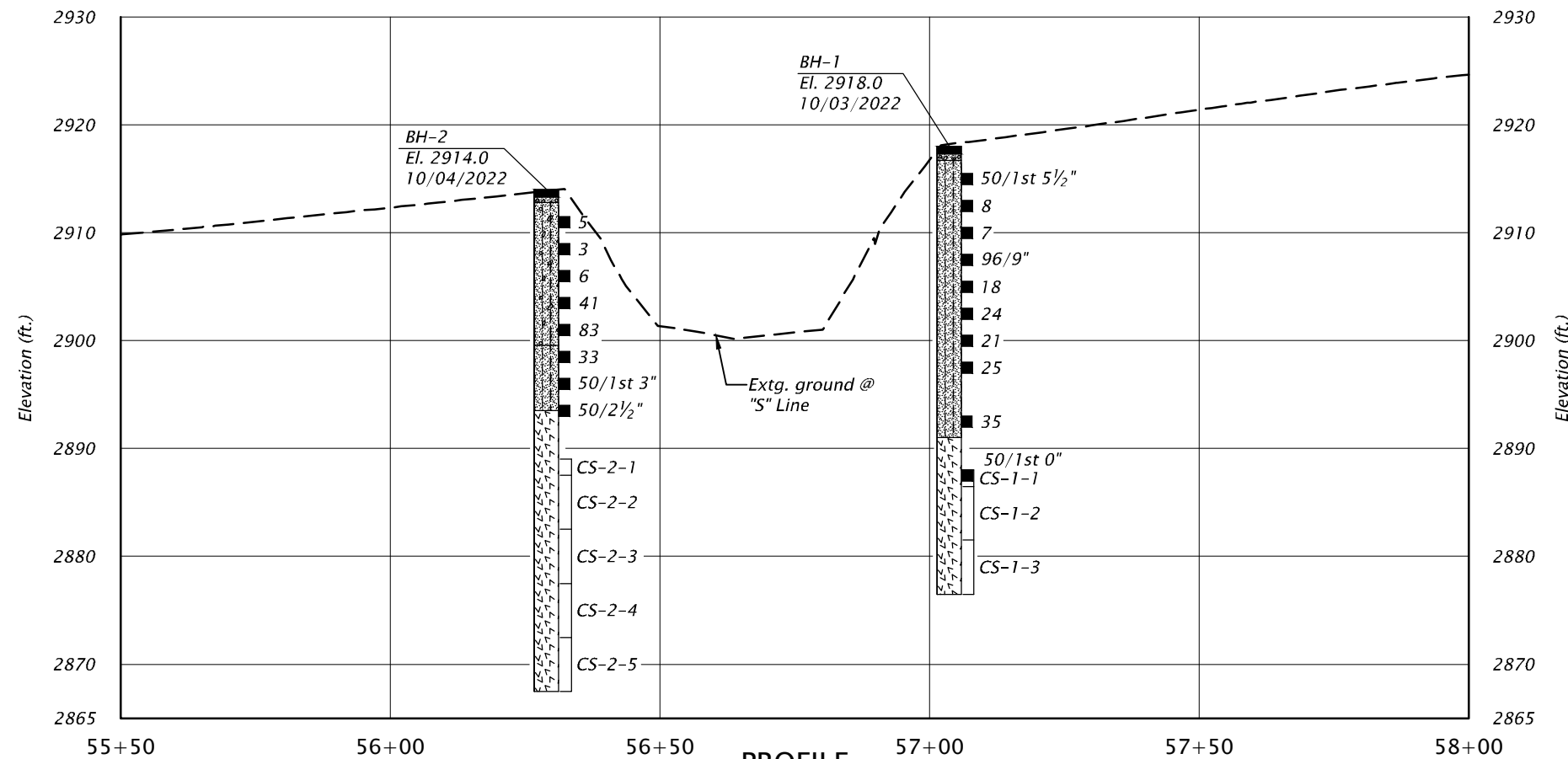
- ASPHALTIC CONCRETE
- CRUSHED ROCK (GP); grey, dry to damp, medium dense, ±¾-inch minus angular rock, (base rock).
- Silty SAND (SM) and Silty SAND, scattered to some gravel and cobbles (SM); brown, dark brown, and dark grey, non-plastic silt, damp to wet, loose to dense, fine to medium sand, fine subangular gravel, subangular basaltic cobbles, weak cementation, (fill, eolian deposits, and eolian deposits transitioning to bedrock).
- Silty SAND, some gravel (SM); light brown to brown, non-plastic silt, damp to moist, very loose to very dense, fine to medium sand, fine subangular gravel, (fill and eolian deposits).
- BASALT; dark grey, slightly weathered to fresh, soft to very hard (R2 to R5), close to moderately close joints are planar to irregular, very rough, and open to closed, some vesicles to highly vesicular, (Basalt of Newberry volcano).

**LEGEND**

- 24 = Standard Penetration Test (SPT) N-Value
- 50/1st # = SPT Test Refusal Length
- = Geotechnical Test Boring (BH)
- CS-1-1 = Core Sample Interval
- RQD = Rock Quality Designation
- % Rec = Percent Core Sample Recovery
- $q_u$  = Unconfined Compressive strength

**GENERAL NOTES**

1. Elevations are based on North American Vertical Datum 1988 (NAVD88).
2. 1' Contour Interval.
3. Geotechnical data shown on this drawing are a consolidation of information and/or revision in terminology from the drill logs. The drill logs used in compiling this drawing are available upon request Contractor shall refer to geotechnical reports and drill logs and information therein.
4. In accordance with ASTM D1586-84, N-values are reported for an interval of 1 ft. except as noted.
5. Refer to the ODOT Soil and Rock Classification Manual (1987) for a description of the terms used on this sheet.
6. Borings were sampled with a hammer efficiency of 85.5%.



**PROFILE**

Horiz. Scale: 1" = 30'  
Vert. Scale: 1" = 15'

TEST BORING	CORE RUN	% REC	HARDNESS	RQD	$q_u$ (psi)
BH-1	CS-1-1	93	R5	87	16,230
	CS-1-2	82	R5	54	
	CS-1-3	92	R3 to R4	78	4,950
BH-2	CS-2-1	93	R2 to R3	73	5,734
	CS-2-2	94	R1 to R3	77	
	CS-2-3	92	R2 to R3	74	2,934
	CS-2-4	100	R2 to R3	92	
	CS-2-5	98	R1 to R3	78	

STRUCTURE NO.	24285
BDS DWG NO.	110977
CALC. BOOK	-
HWY: 2184-03 M.P.: 3.50	
COUNTY	DESCHUTES
DATE	09/2023

**REGISTERED PROFESSIONAL ENGINEER**  
60776PE  
Digitally signed by William L Nickels Jr  
Date: 2023.09.12 14:09:06 -0700

**WILLIAM L. NICKELS JR.**  
MAY 17, 1999  
OREGON

RENEWS: 12-31-2024

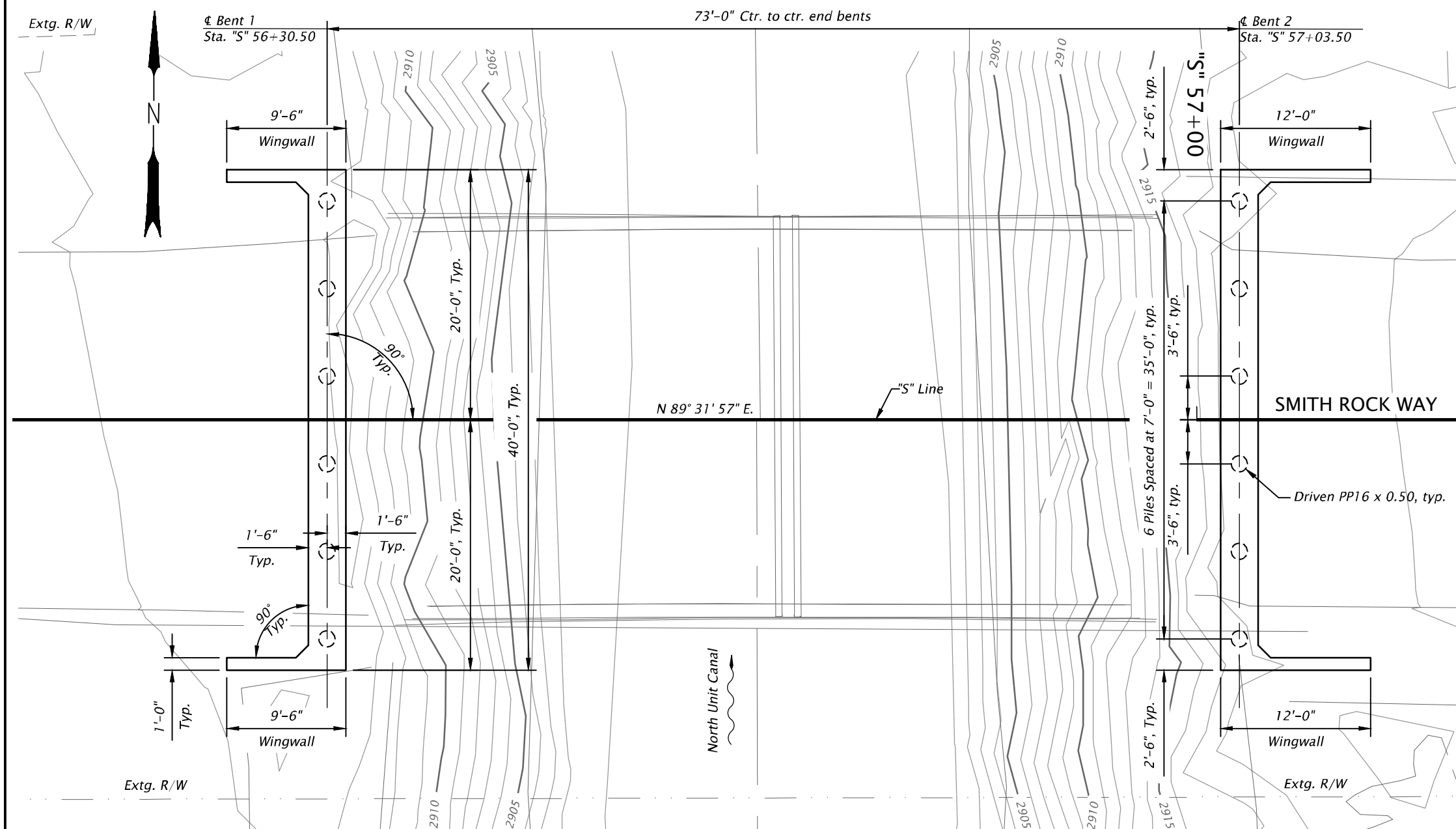
<b>FOUNDATION ENGINEERING, INC.</b> PROFESSIONAL GEOTECHNICAL SERVICES <small>800 N.W. CORNELL AVENUE CORVALLIS, OREGON 97339 TEL: (541) 757-7846 FAX: (541) 757-7850</small>	<b>DESCHUTES COUNTY ROAD DEPARTMENT</b>
North Unit Canal_Smith Rock Way_44.3488/121.1150 <b>SMITH ROCK WAY BRIDGE #15452 REPLACEMENT PROJECT</b> NE SMITH ROCK WAY DESCHUTES COUNTY	
Designer: William Nickels, Jr.	Reviewer: Mallory McAdams
Drafter: Dustin Altenburg	Checker: Brooke Running
<b>GEOTECHNICAL DATA</b>	
SHEET NO. J03	

**SCALE WARNING**  
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

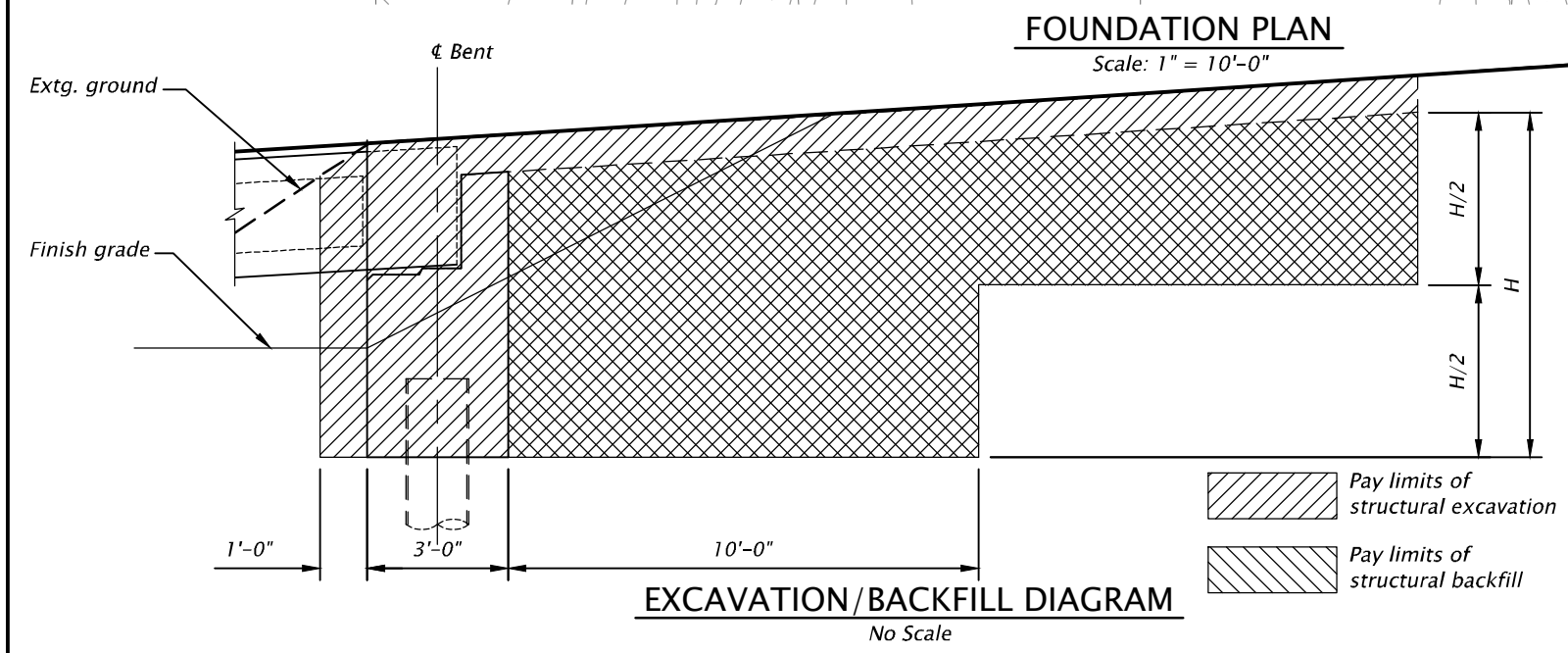
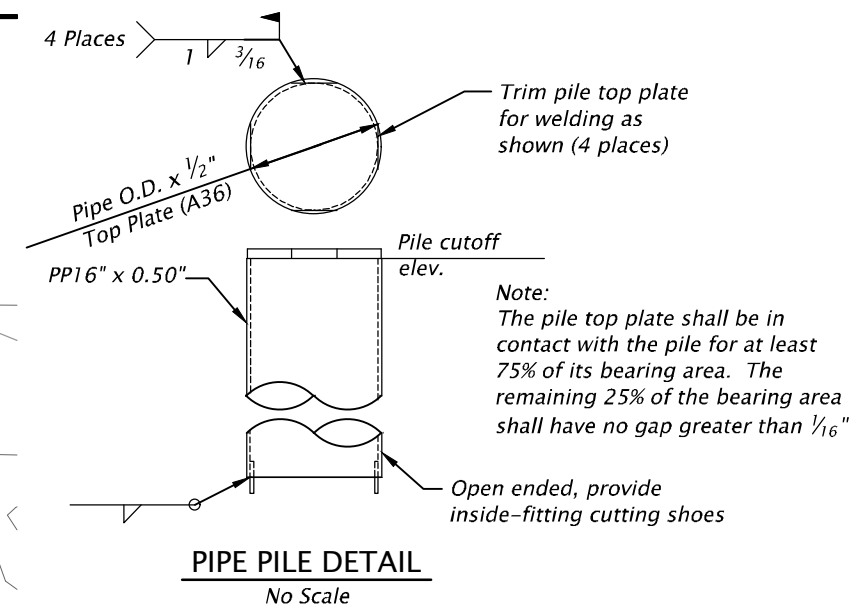
**GENERAL FOUNDATION NOTES:**

All bents, provide PP 16 x 0.50, ASTM A252, Grade 3 (Mod) piling driven open-ended with cutting shoes to a nominal resistance of 780 kips per pile.

Drive all piling to the specified nominal resistance using driving criteria developed from the Wave Equation Analysis Program (WEAP).



Bent	Estimated Tip Elevation (ft.)	Minimum Tip Elevation (ft.)	As-const. tip El. (ft.)	Average Cut-Off Elevation (ft.)
1	2892.5	2893.5	-	2909.3
2	2890.0	2891.0	-	2913.2



STRUCTURE NO.	24285
BDS DWG NO.	110978
CALC. BOOK	-
HWY: 2184-03 M.P.: 3.50	
COUNTY	DESCHUTES
DATE	09/2023

**REGISTERED PROFESSIONAL ENGINEER**  
 90087PE  
 DIGITALLY SIGNED 2023.09.12 09:48:08-07'00'  
 OREGON  
 MARCH 12, 2019  
 MAKENZIE ANN ELLETT  
 RENEWS: 12-31-2023

**DAVID EVANS AND ASSOCIATES INC.**  
 5121 Skyline Village Loop S., Suite 200  
 Salem Oregon 97306  
 Phone: 503.361.8635

**DESCHUTES COUNTY ROAD DEPARTMENT**

North Unit Canal\_Smith Rock Way\_44.3488/121.1150  
**SMITH ROCK WAY BRIDGE #15452 REPLACEMENT PROJECT**  
 NE SMITH ROCK WAY  
 DESCHUTES COUNTY

Designer: Makenzie Ellett  
 Drafter: Dustin Altenburg  
 Reviewer: Amanda Blankenship  
 Checker: Brett Karnes

**FOUNDATION PLAN** SHEET NO. J04

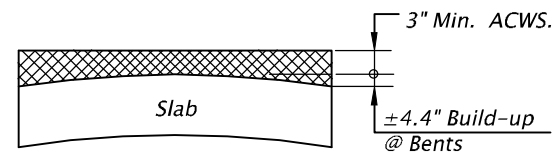
**SCALE WARNING**  
 IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

30" STANDARD PRECAST PRESTRESSED SLABS

No. Slabs Required	Span No.	Horizontal Length o-o at slab, ft. (after Shortening)	Skew Angle		Total Strand	Debonded Strands	Distance "Yc" to c.g. strand at midspan, in.	Distance "Yu" to c.g.s. at midspan subtracting top strand, in.	Min. Concrete Strength Req'd by Design Loading, ksi	Minimum Concrete Strength at Transfer of Prestress, ksi	Estimated Midspan Deflection		
			Back	Ahead							Upward at Transfer of Prestress, in.	Upward 4 months after transfer of Prestress (No SIDL), in.	Downward Due to SIDL, in
9	1	73.83	90	90	48	12	5.39	3.42	6.0	4.5	1.37	3.11	0.27

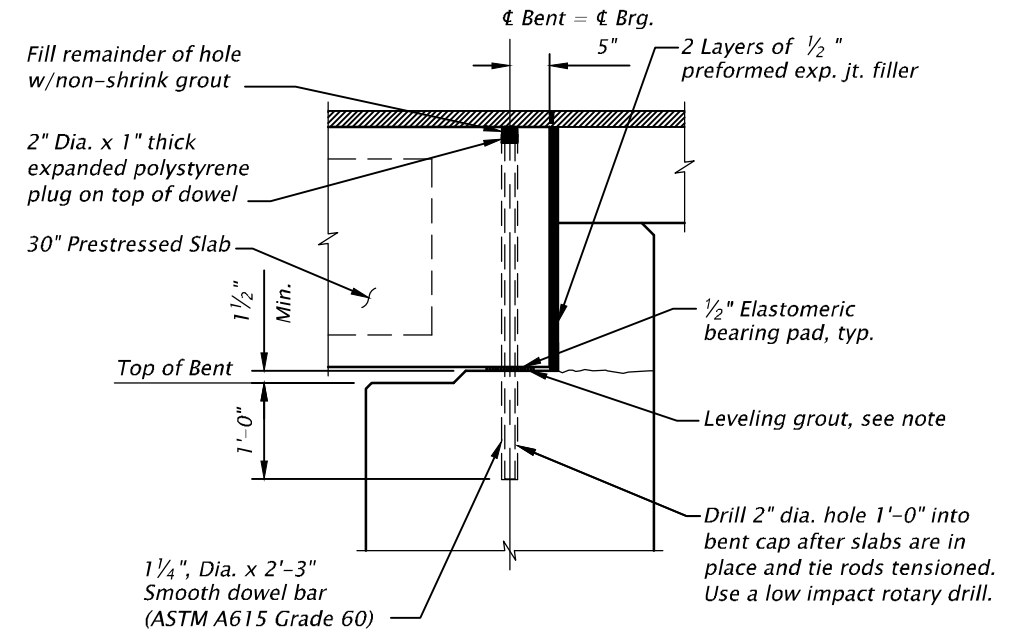
For General Notes and details not shown, see Dwgs. BR422 & BR445. The superimposed dead load (SIDL) is 85 lbs./ft<sup>2</sup>. which includes the present wearing surface and bridge rails.

Min. ACWS \_\_\_\_\_ 3"  
 Anticipated camber @ 4 mos \_\_\_\_\_ 3.11"  
 Downward due to SIDL \_\_\_\_\_ 0.27"  
 Vertical Curve Correction \_\_\_\_\_ 1.00"  
 Construction Tolerance \_\_\_\_\_ 0.5"  
 Wearing surface thickness @ Bents \_\_\_\_\_ 7.4"



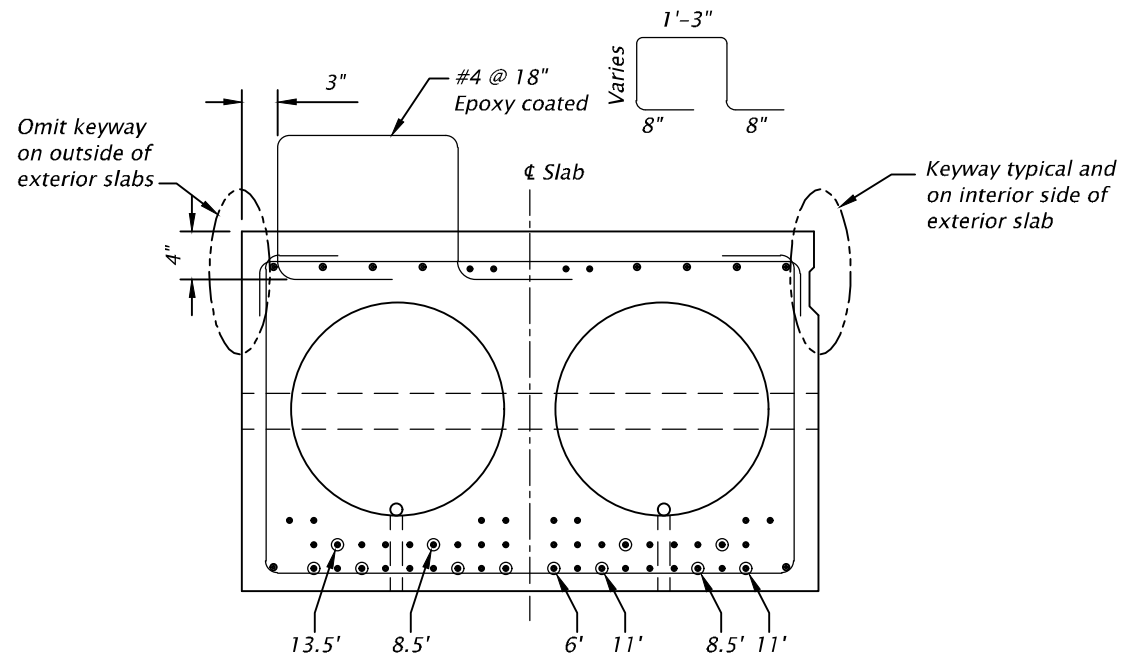
ACWS BUILD-UP DETAIL

No Scale



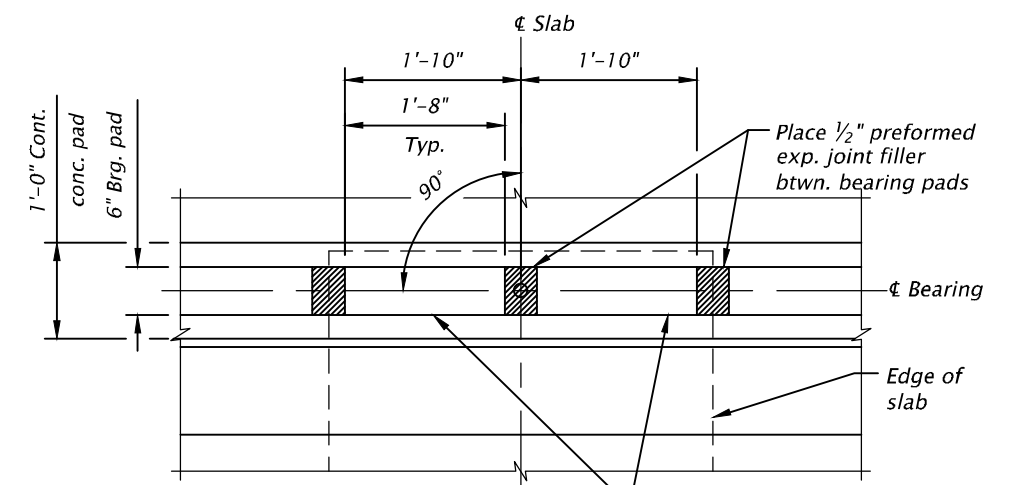
CONCRETE PAD DETAIL

Scale: 1/2" = 1'-0"



TYPICAL 30" SLAB SECTION

No Scale



PLAN BEARING DETAIL

Scale: 1/2" = 1'-0"

Note:  
 Form 1/2" concrete pad integrally with Bent. Allow concrete to cure 3 days or until concrete obtains design strength. Place 1/2" grout layer immediately before placing slabs. Place elastomeric bearing pads, preformed expansion joint filler and prestressed slabs before grout is set to ensure uniform bearing across full width of slab. If uniform bearing is not achieved, lift slab and repeat procedure. Any excess grout protruding above bottom of bearing pads shall be removed immediately after placing slabs.

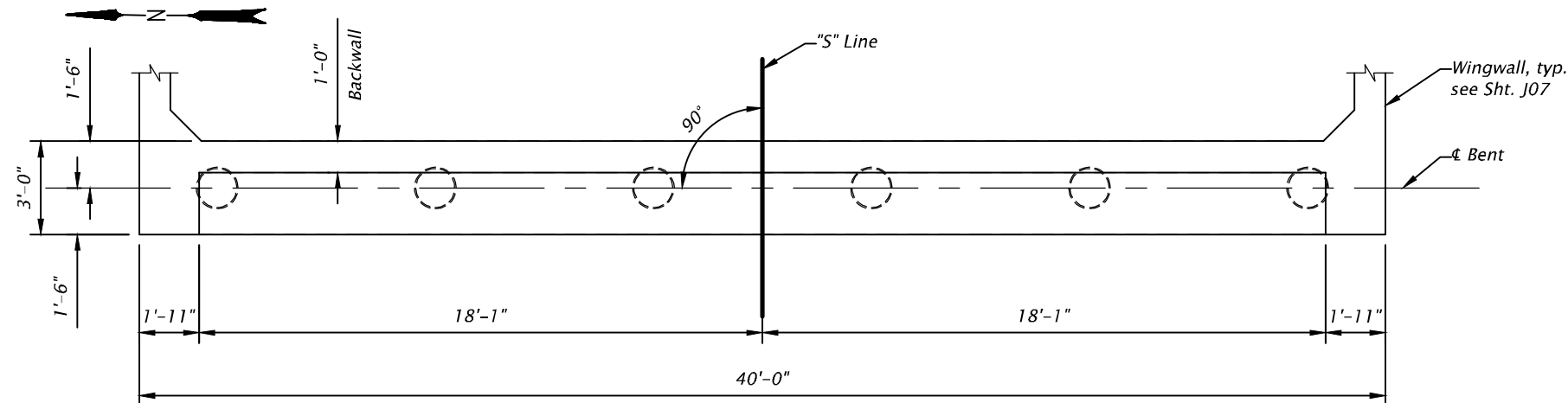
**SCALE WARNING**  
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STRUCTURE NO.	24285
BDS DWG NO.	110979
CALC. BOOK	-
HWY: 2184-03 M.P.: 3.50	
COUNTY	DESCHUTES
DATE	09/2023

**REGISTERED PROFESSIONAL ENGINEER**  
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 RENEWS: 12-31-2023

<b>DAVID EVANS AND ASSOCIATES INC.</b> 5121 Skyline Village Loop S., Suite 200 Salem Oregon 97306 Phone: 503.361.8635	<b>DESCHUTES COUNTY ROAD DEPARTMENT</b>
North Unit Canal_Smith Rock Way_44.3488/121.1150 <b>SMITH ROCK WAY BRIDGE #15452 REPLACEMENT PROJECT</b> NE SMITH ROCK WAY DESCHUTES COUNTY	
Designer: Makenzie Ellett	Reviewer: Amanda Blankenship
Drafter: Dustin Altenburg	Checker: Brett Karnes
<b>PRESTRESSED SLAB DETAILS</b>	SHEET NO. J05

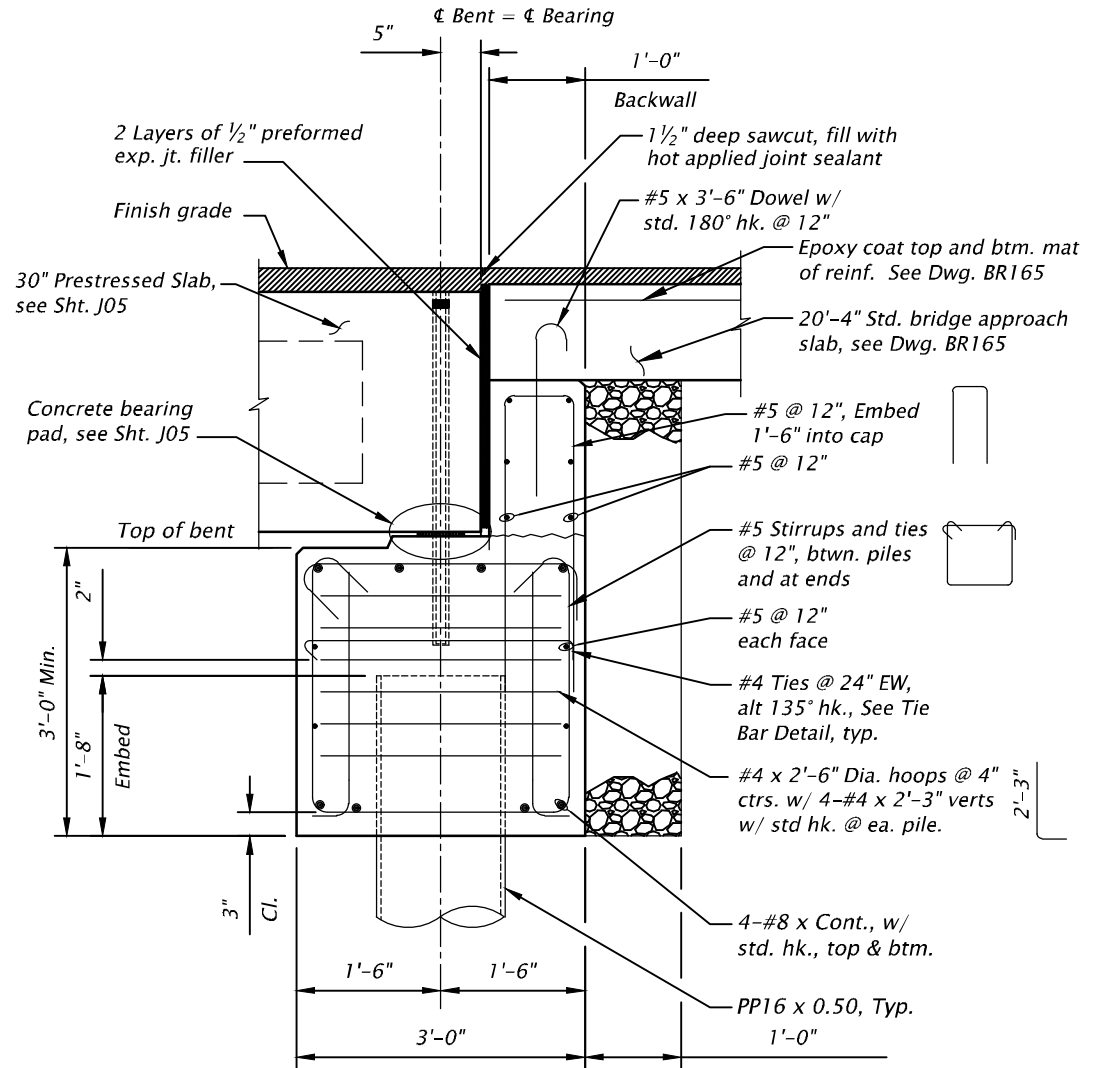




Note:  
Slabs and rail not shown for clarity.

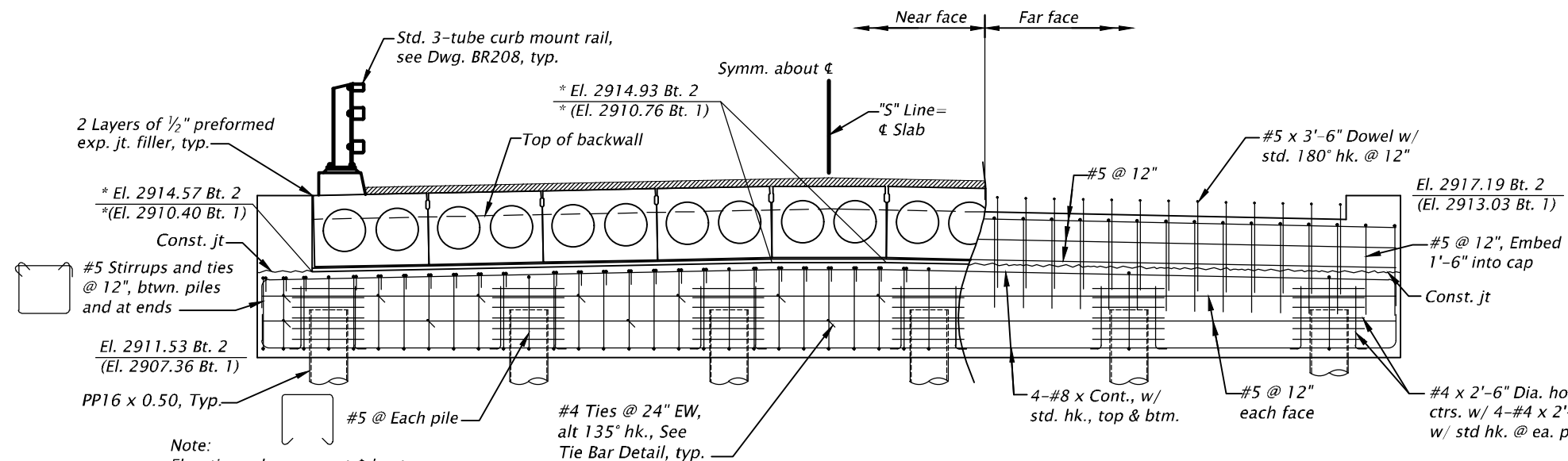
### BENT 2 PLAN

Scale: 3/16" = 1'-0"  
(Bent 1 similar, looking back on station)



### TYPICAL BENT SECTION

Scale: 1/2" = 1'-0"

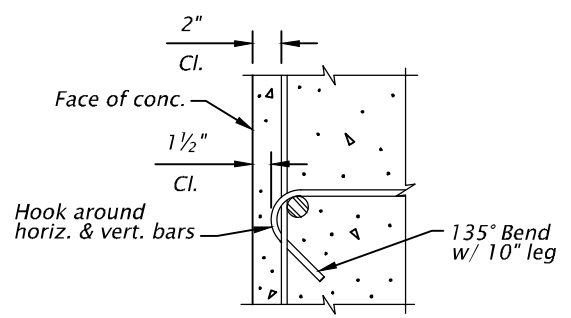


Note:  
Elevations shown are at  $\phi$  bent.

\* Elevations are at top of bent.

### BENT 2 ELEVATION

Scale: 3/16" = 1'-0"  
(Bent 1 similar, looking back on station)

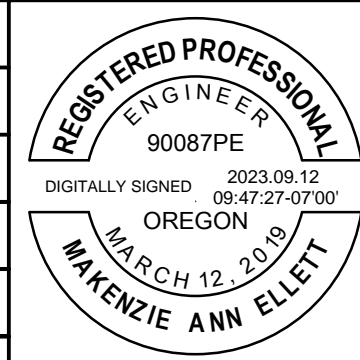


### TIE BAR DETAIL

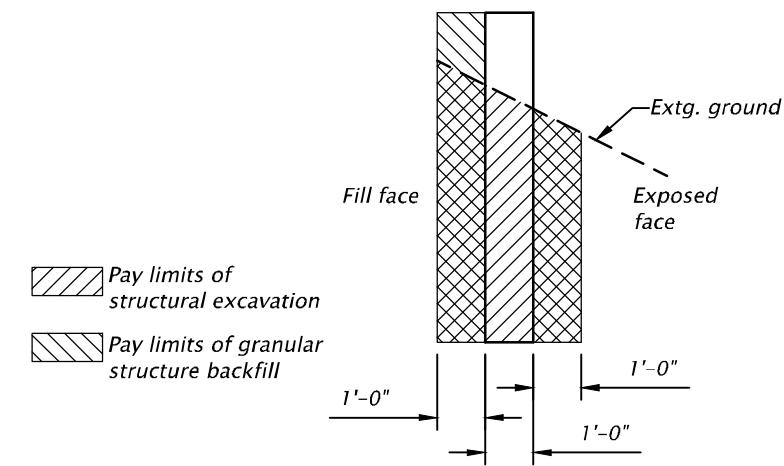
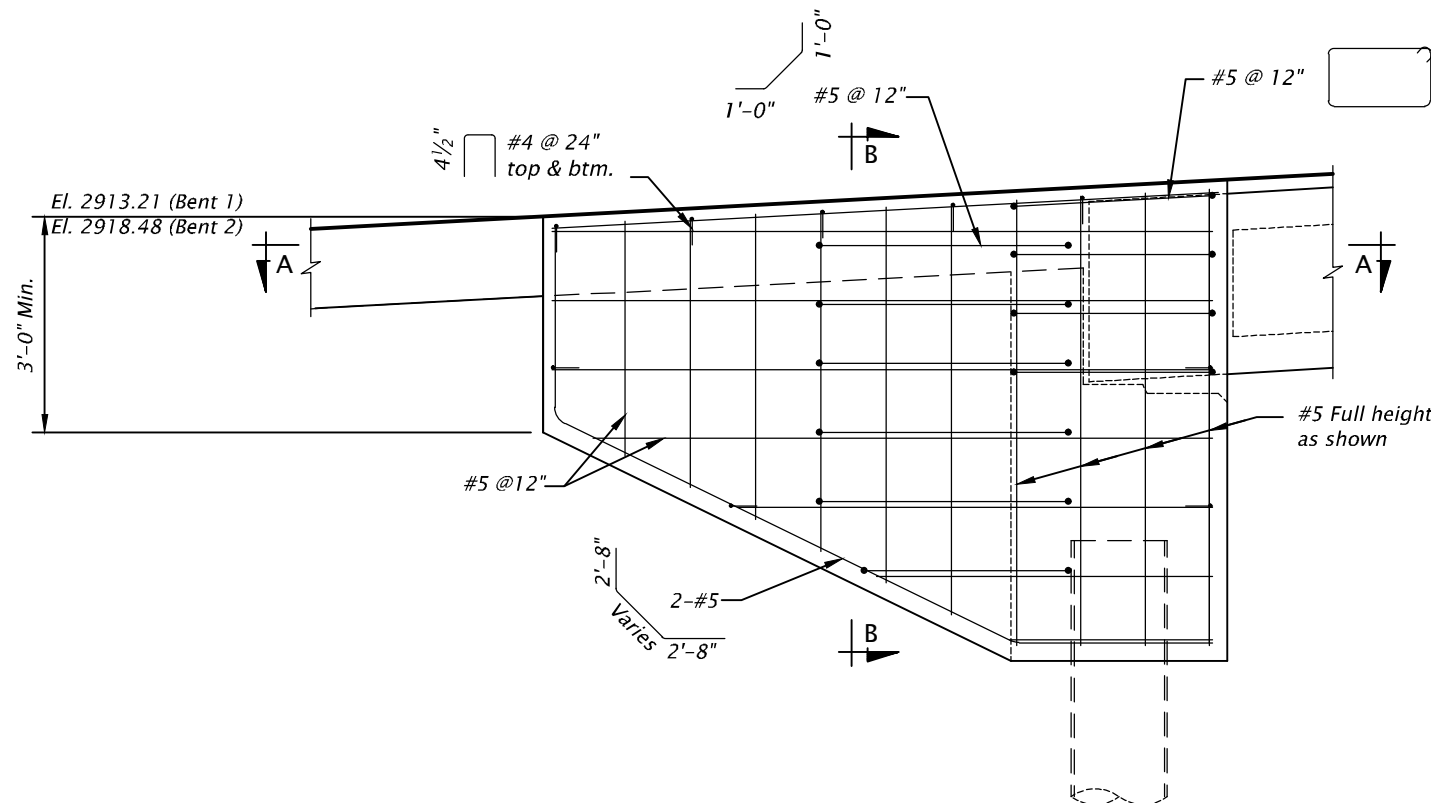
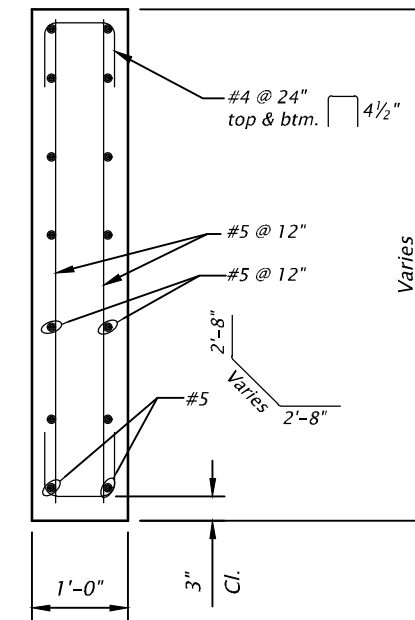
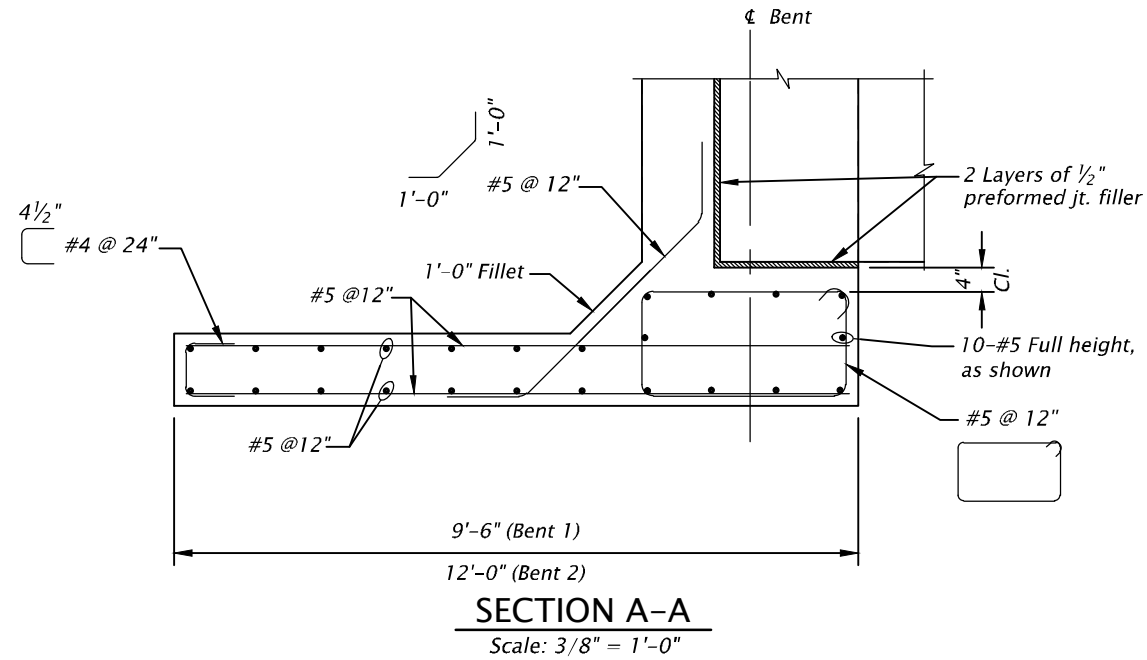
No Scale

**SCALE WARNING**  
IF THIS SCALE LINE DOES NOT MEASURE ONE INCH, THEN DRAWING IS NOT TO SCALE

STRUCTURE NO.	24285
BDS DWG NO.	110980
CALC. BOOK	-
HWY: 2184-03	M.P.: 3.50
COUNTY	DESCHUTES
DATE	09/2023



<p><b>DAVID EVANS AND ASSOCIATES INC.</b> 5121 Skyline Village Loop S., Suite 200 Salem Oregon 97306 Phone: 503.361.8635</p>	<p><b>ROAD DEPARTMENT</b></p>
Designer: Makenzie Ellett	Reviewer: Amanda Blankenship
Drafter: Dustin Altenburg	Checker: Brett Karnes
<b>BENT DETAILS</b>	
SHEET NO. J06	



**SCALE WARNING**  
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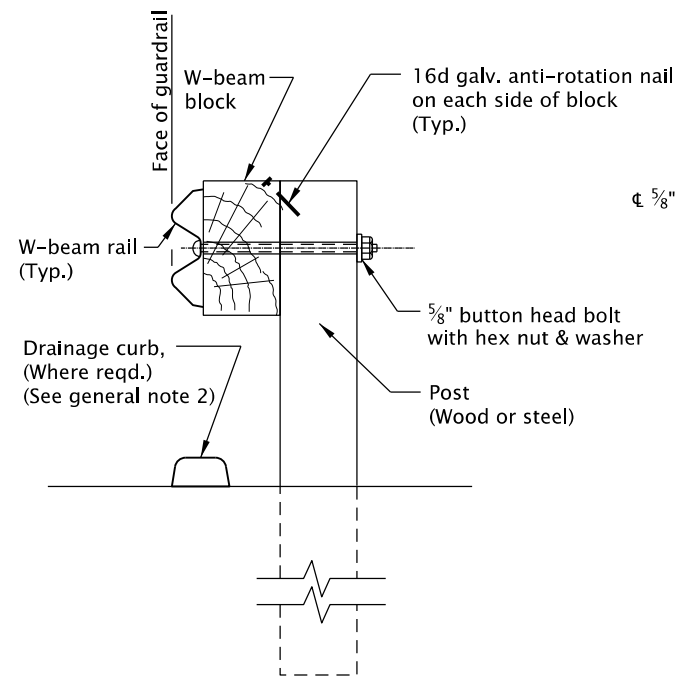
STRUCTURE NO.	24285
BDS DWG NO.	110981
CALC. BOOK	-
HWY: 2184-03 M.P.: 3.50	
COUNTY	DESCHUTES
DATE	09/2023

**REGISTERED PROFESSIONAL ENGINEER**  
90087PE  
DIGITALLY SIGNED 2023.09.12 09:48:45-07'00'  
OREGON  
MARCH 12, 2019  
MAKENZIE ANN ELLETT  
RENEWS: 12-31-2023

<b>DAVID EVANS AND ASSOCIATES INC.</b> 5121 Skyline Village Loop S., Suite 200 Salem Oregon 97306 Phone: 503.361.8635	<b>DESCHUTES COUNTY ROAD DEPARTMENT</b>
North Unit Cana_Smith Rock Way_44,3488/121.1150 <b>SMITH ROCK WAY BRIDGE #15452 REPLACEMENT PROJECT</b> NE SMITH ROCK WAY DESCHUTES COUNTY	
Designer: Makenzie Ellett Drafter: Dustin Altenburg	Reviewer: Amanda Blankenship Checker: Brett Karnes
<b>WINGWALL DETAILS</b>	SHEET NO. J07

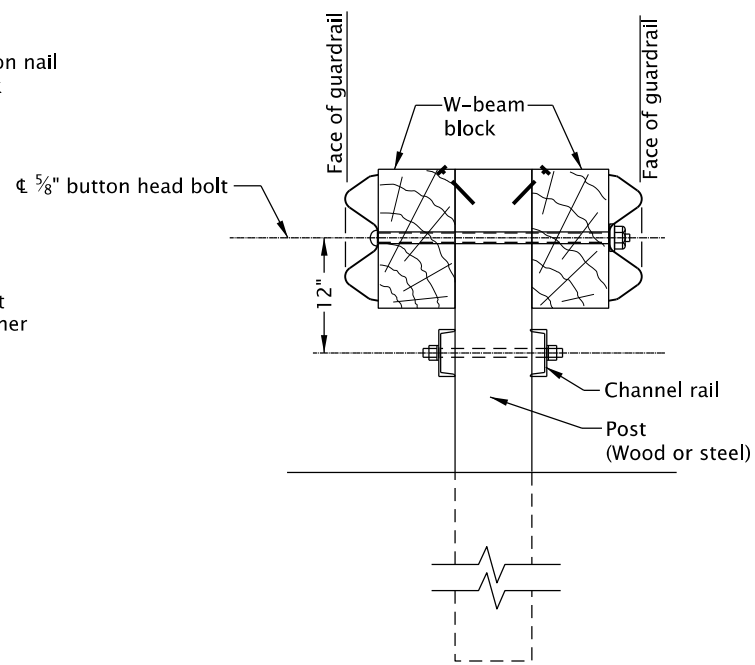
19-JUL-2021

RD402.dgn

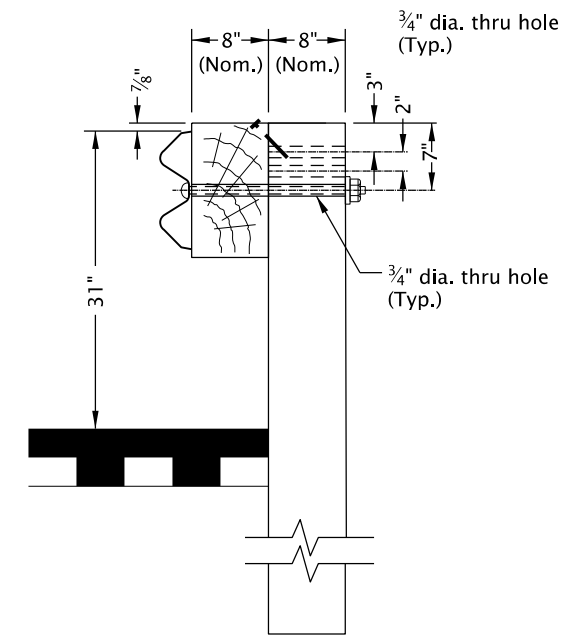


**TYPES 2A & 3**  
(For Type 3 use double thickness (2) rail elements)

**W-BEAM GUARDRAIL**



**METAL MEDIAN BARRIER**  
**(DOUBLE SIDED W/ CHANNEL RAIL)**  
(See general note 3)



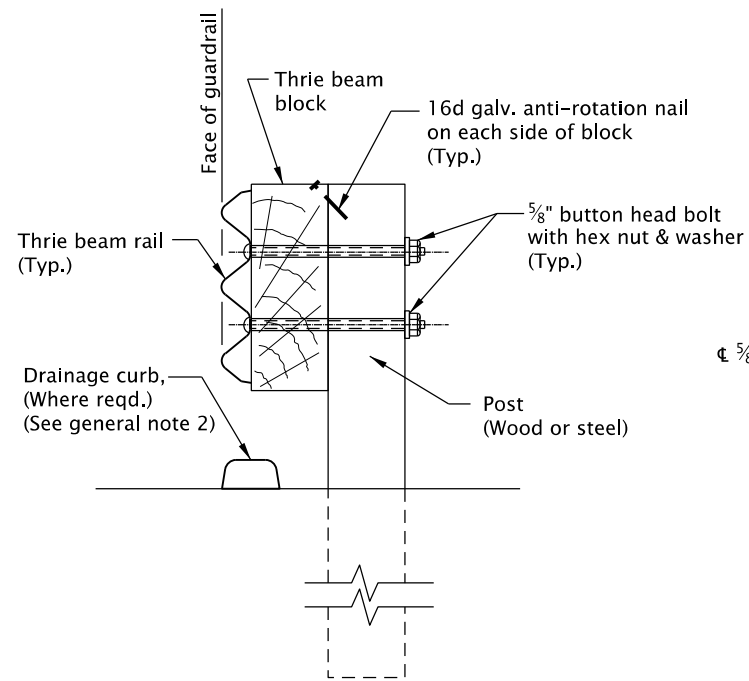
**TYPICAL INSTALLATION**

**W-BEAM GUARDRAIL ASSEMBLY**

NORMAL RAIL ELEMENT DATA			
TYPE	RAIL	EFFECTIVE LENGTHS	GAUGE
2A	W-beam	6.25', 12.5', 25'	10 & 12
3	W-beam	6.25', 12.5', 25'	10 & 12
4	Thrie beam	6.25', 12.5', 25'	10 & 12
4 TRANSITION	Thrie beam	6.25'	10 & 12

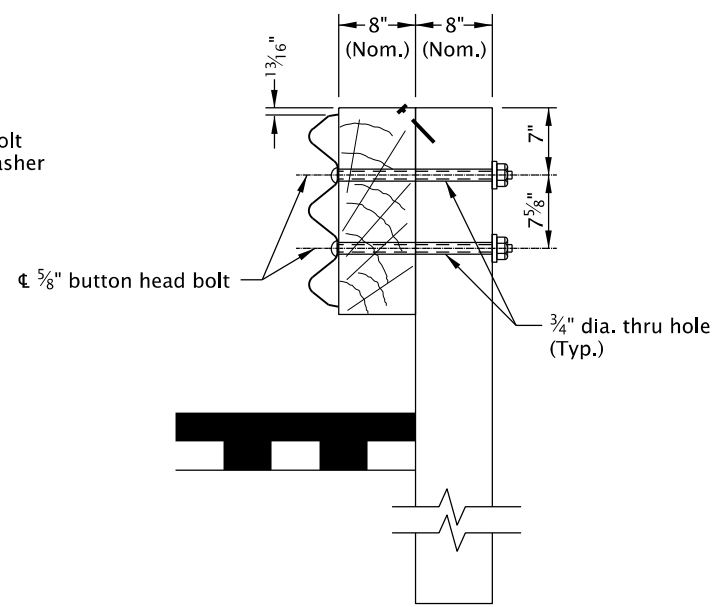
GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

- See appropriate guardrail standard drawing(s) for details not shown.
- When required by the plans, Drainage curb alignment same as face of guardrail.
- Orient post bolts with the button head located on the side nearest the traffic lane. The bolt's threaded portion is not permitted to extend beyond limits of 1/4" to 1/2" from the face of the tightened nut; trim the treated portion as needed.
- Lap guardrail in direction of adjacent traffic.
- Final paved surfacing to extend to face of post. Rail height measured from final paved surface at face of rail (Typical all types). 1"± tolerance.
- Wood block shall be toe-nailed to the post with 2 - 16d galvanized nails in top of block to prevent block rotation.
- Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.
- Existing posts shall not be raised. Replace posts as necessary to achieve required guardrail height.



**TYPE 4 & 4 TRANSITION**

**THRIE BEAM GUARDRAIL**



**INITIAL INSTALLATION**

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

All materials shall be in accordance with the current Oregon Standard Specifications.

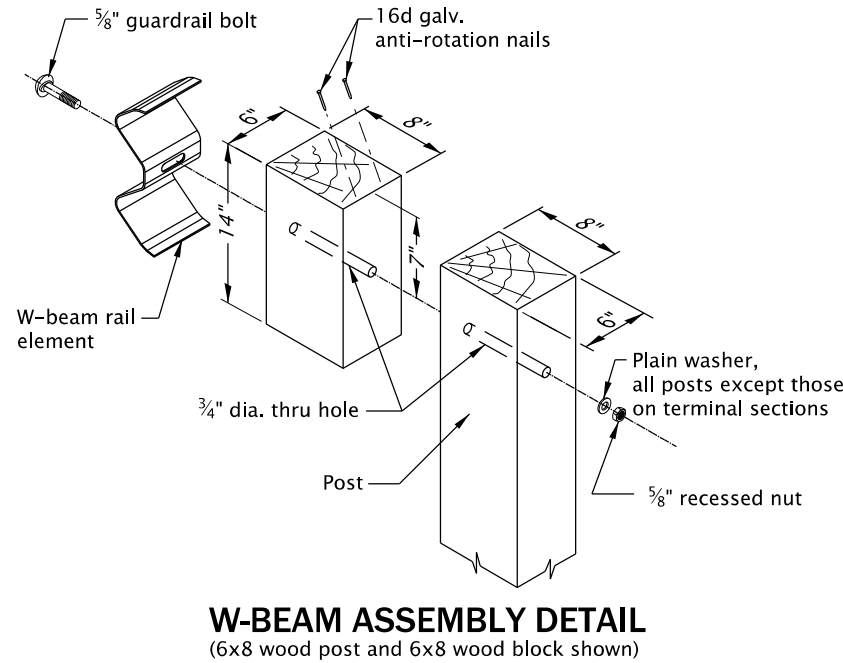
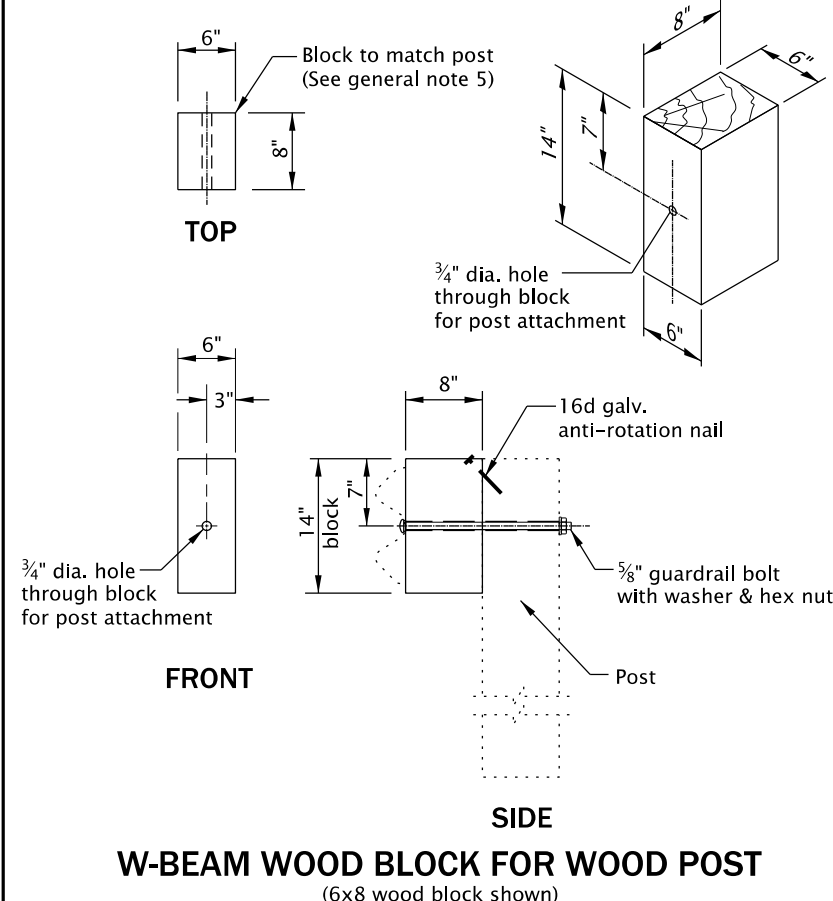
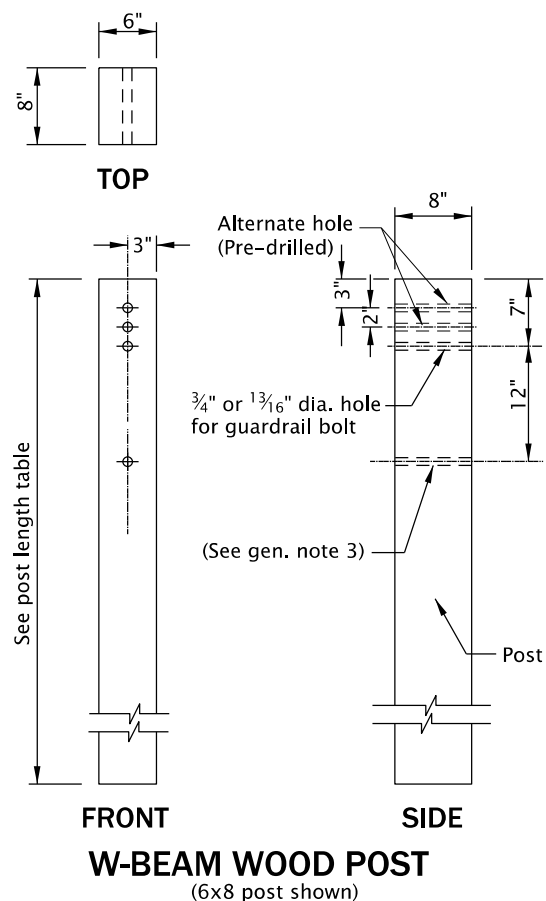
**OREGON STANDARD DRAWINGS**  
**MIDWEST GUARDRAIL**  
**SYSTEM TYPES**

2021

DATE	REVISION	DESCRIPTION
07-2021	REVISED DETAILS AND NOTES	

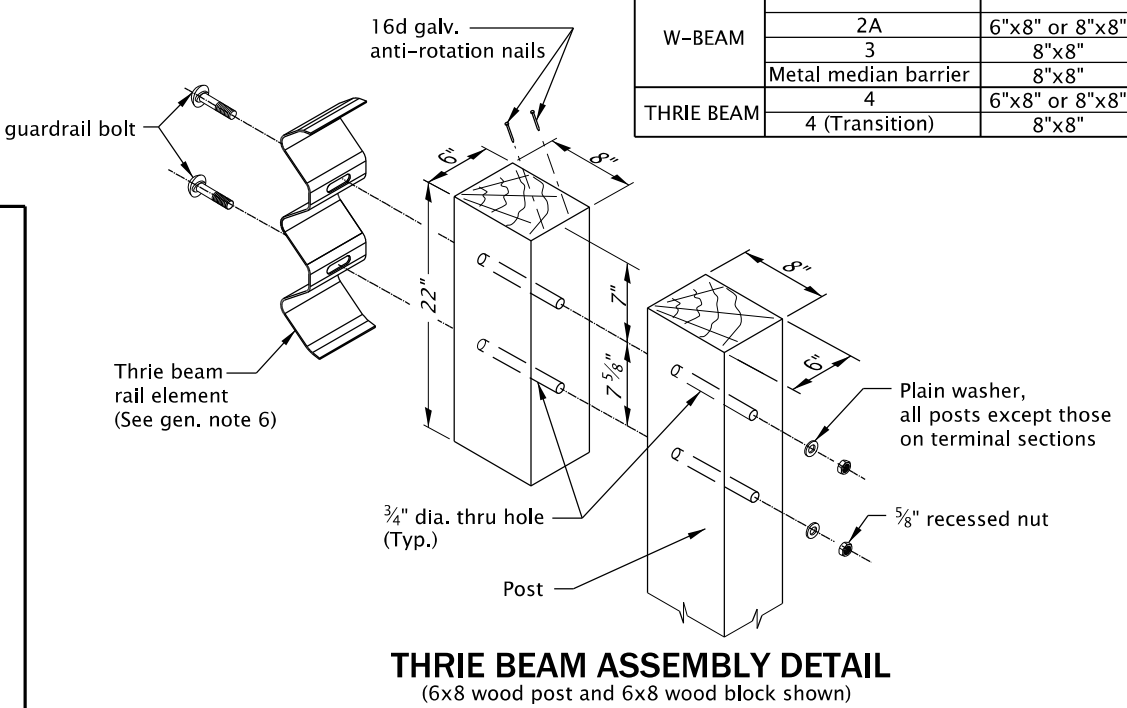
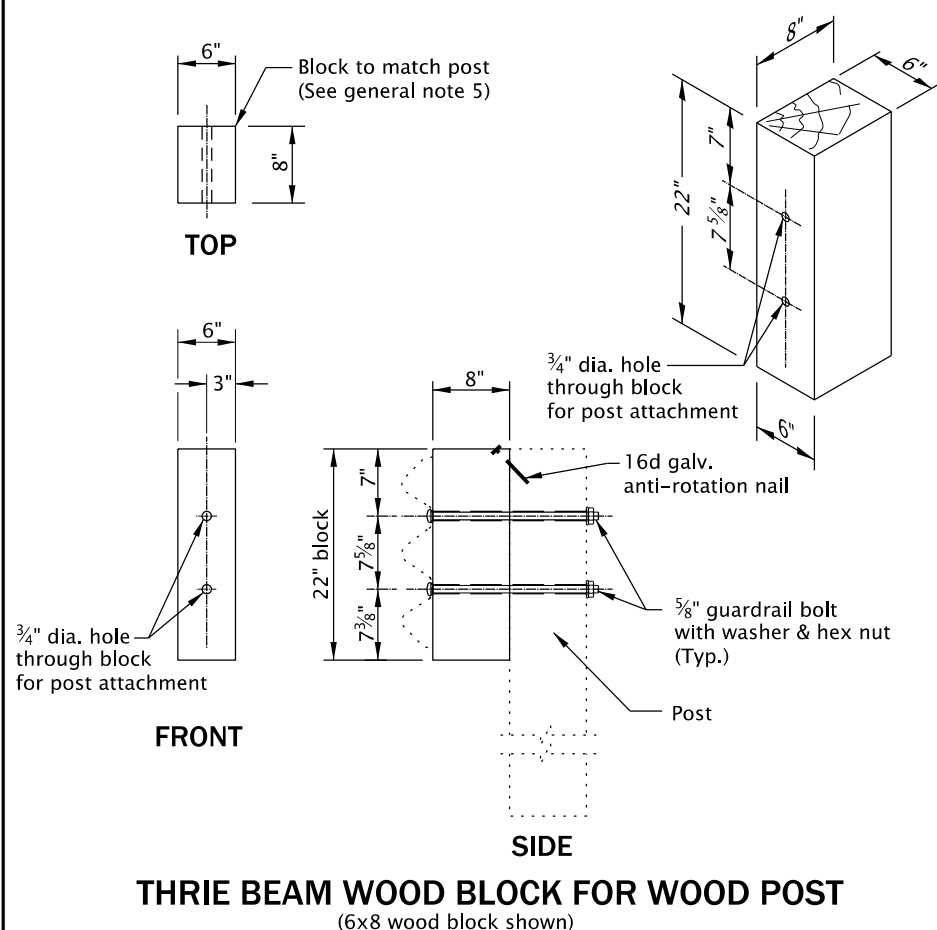
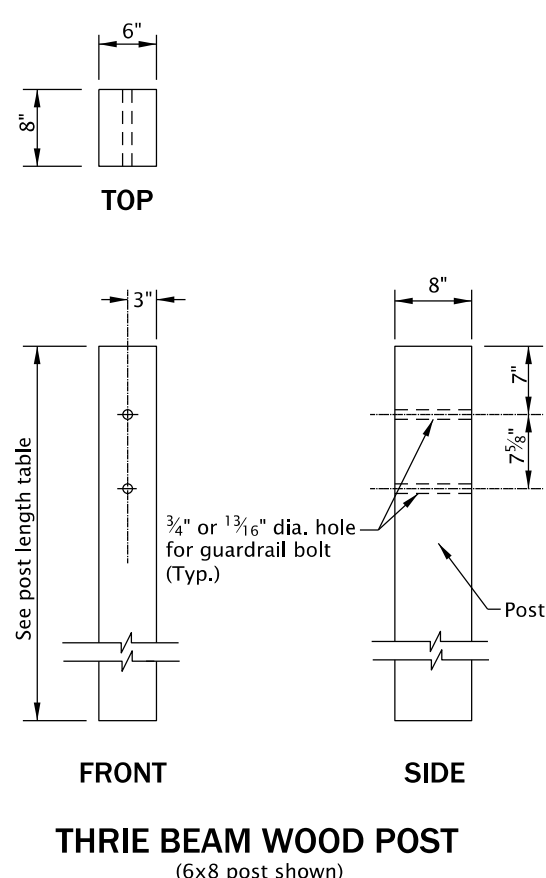
CALC. BOOK NO. --- N/A --- SDR DATE- 19-JUL-2021 --- **RD402**

RD403.dgn 19-JUL-2021



- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:
1. See appropriate guardrail standard drawing(s) for details not shown.
  2. See Bridge Dwgs. for bridge transition guardrail post and block requirements.
  3. Lowest hole(s) required only when channel rail is to be installed. Drill 12" below top 3/4" or 1 3/16" hole(s) used.
  4. Dimensions shown are for nominal posts and blocks.
  5. Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.
  6. When required by the plans, nested thrie beam wood post shall be 8"x8".
  7. Wood block shall be toe-nail to the post with 2 - 16d galvanized nails in top of block to prevent block rotation.

GUARDRAIL WOOD POST TABLE				
	GUARDRAIL TYPE	POST SIZE	POST LENGTH	POST SPACING
W-BEAM	2A	6"x8" or 8"x8"	6'-0"	6'-3"
	3	8"x8"	6'-0"	3'-1 1/2"
	Metal median barrier	8"x8"	6' 6"	6'-3"
THRIE BEAM	4	6"x8" or 8"x8"	7'-0"	6'-3"
	4 (Transition)	8"x8"	6'-0"	3'-1 1/2"



*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

All materials shall be in accordance with the current Oregon Standard Specifications.

**OREGON STANDARD DRAWINGS**

**MIDWEST GUARDRAIL SYSTEM WOOD POST AND BLOCK**

2021

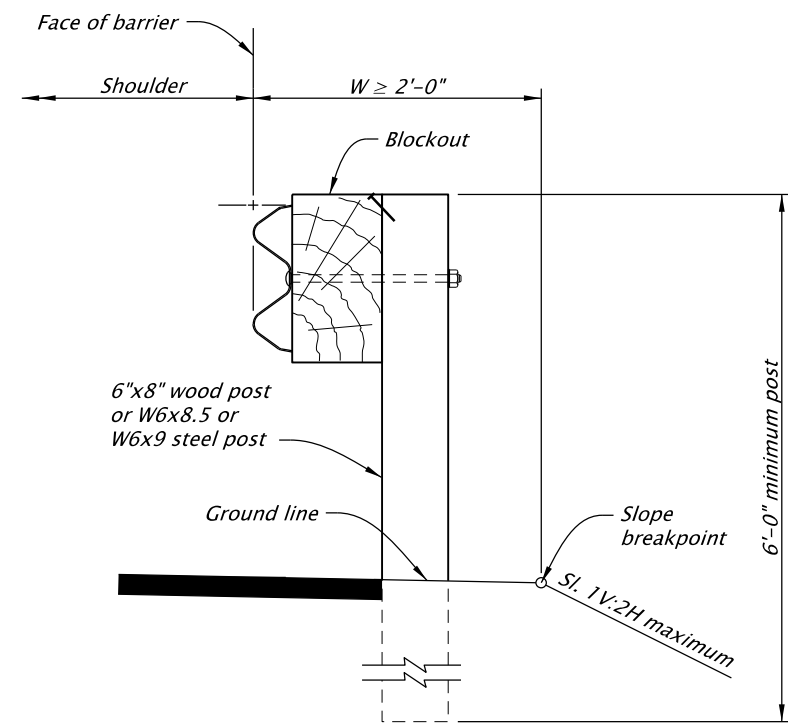
DATE	REVISION	DESCRIPTION
07-2021	REVISED DETAILS AND NOTES	

CALC. BOOK NO. --- N/A --- SDR DATE: 19-JUL-2021 **RD403**

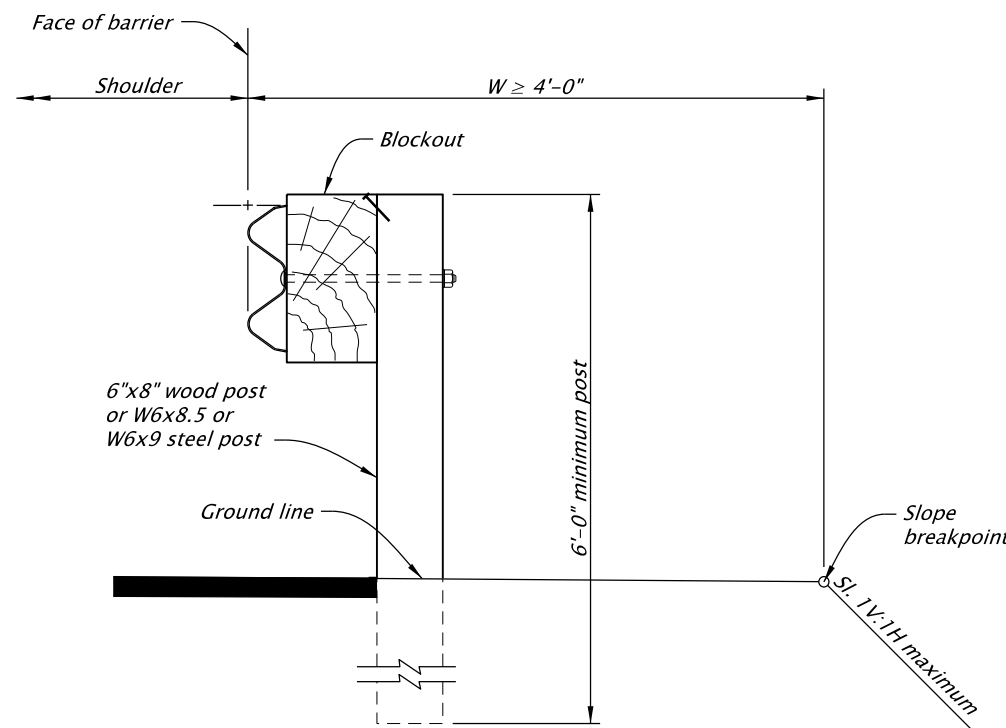
20-JAN-2023  
RD406.dgn

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

1. See appropriate guardrail standard drawing(s) for details not shown.
2. Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.
3. All posts for guardrail run shall be of the same type: wood or steel.

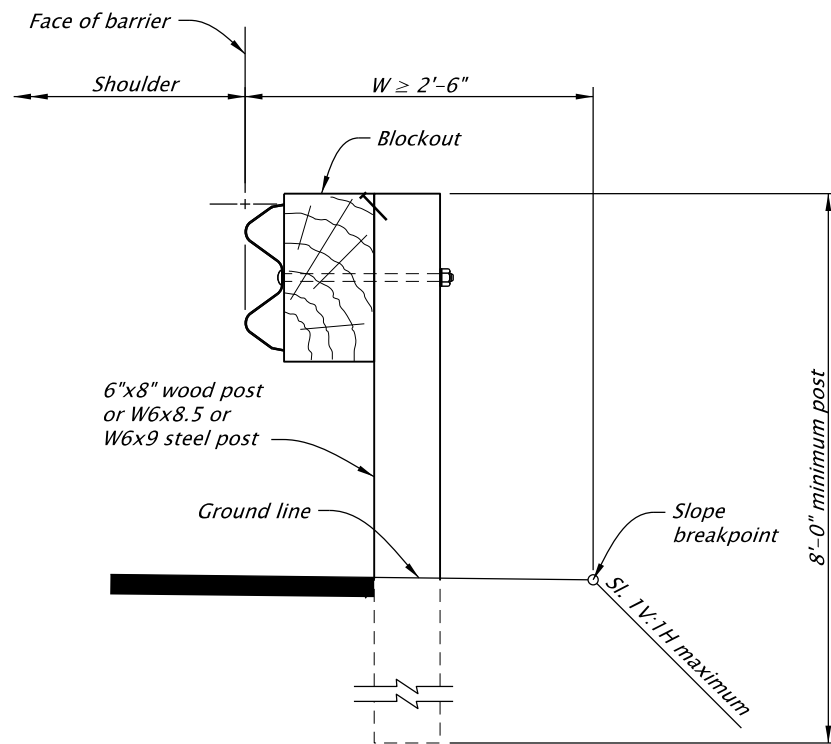


**CASE 1**  
(Wood post shown)

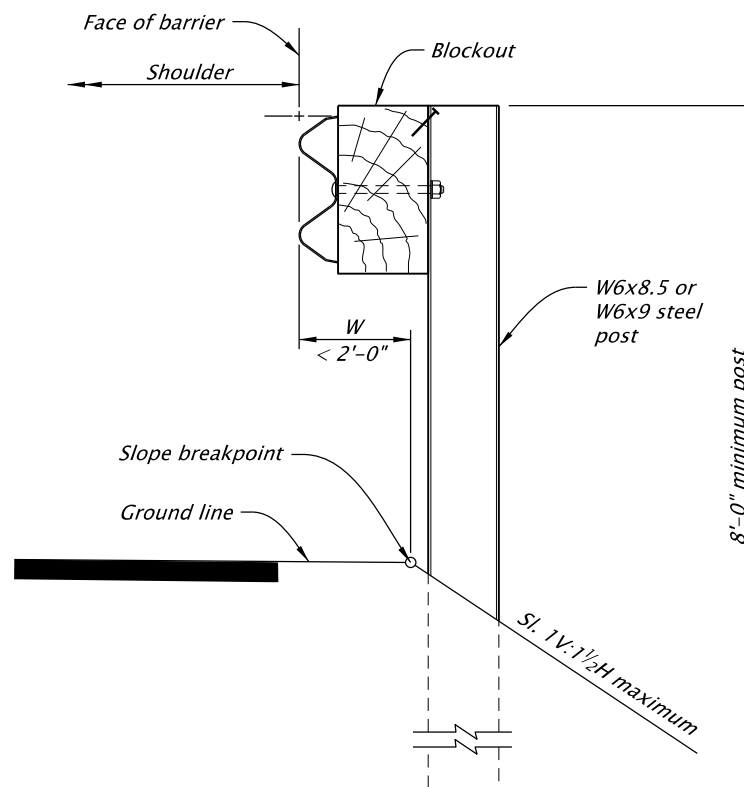


**CASE 2**  
(Wood post shown)  
Use when there is a 4'-0" or greater shoulder widening from face of guardrail to the slope breakpoint

SLOPE / EMBANKMENT TABLE			
POST LENGTH (ft)	POST TYPE	SLOPE (V:H)	W (ft) (Face of barrier to slope of breakpoint)
6	Wood/Steel	1:2 or flatter	2'-0" minimum
6	Wood/Steel	1:1 or flatter	4'-0" minimum
8	Wood/Steel	1:1 or flatter	2'-6" minimum
8	Steel	1:1½ or flatter	Less than 2'-0"



**CASE 3**  
(Wood post shown)  
Use when there is a 2'-6" or greater shoulder widening from face of guardrail to the slope breakpoint



**CASE 4**  
(Steel post shown)  
Do not use in weak soil conditions.  
Use when there is less than a 2'-0" shoulder widening from face of guardrail to the slope breakpoint

**PLACEMENT OF GUARDRAIL ON SLOPES**

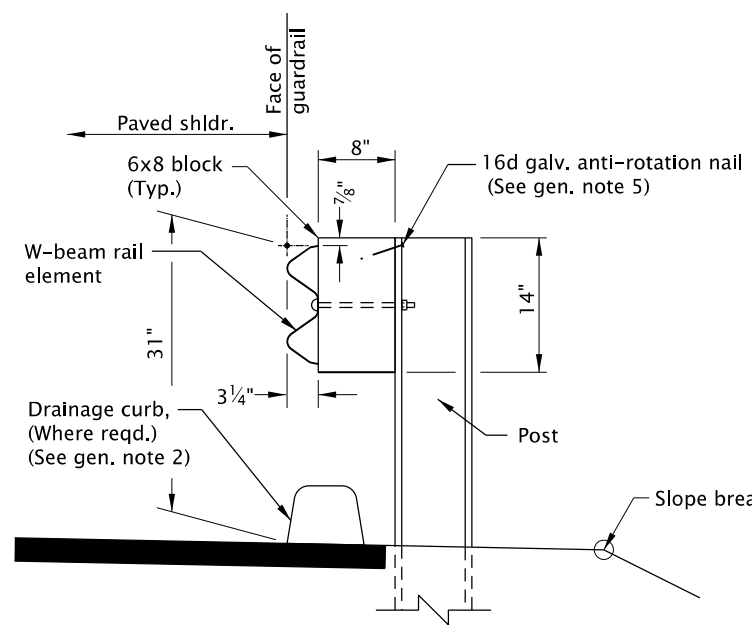
NOTE: Cases shown do not apply to terminals, transition sections or anchors.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.			
<b>OREGON STANDARD DRAWINGS</b>			
<b>PLACEMENT OF GUARDRAILS ON SLOPES</b>			
2021			
DATE	REVISION	DESCRIPTION	
07-2021	NEW DRAWING CREATED		
12-2021	REVISED DETAILS AND NOTES		
12-2022	REVISED NOTE		
CALC. BOOK NO.	N/A	SDR DATE	20-JAN-2023
			<b>RD406</b>



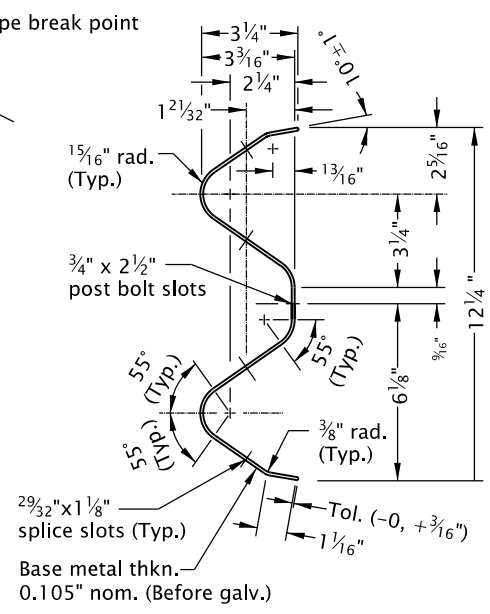
RD407.dgn 19-JUL-2021



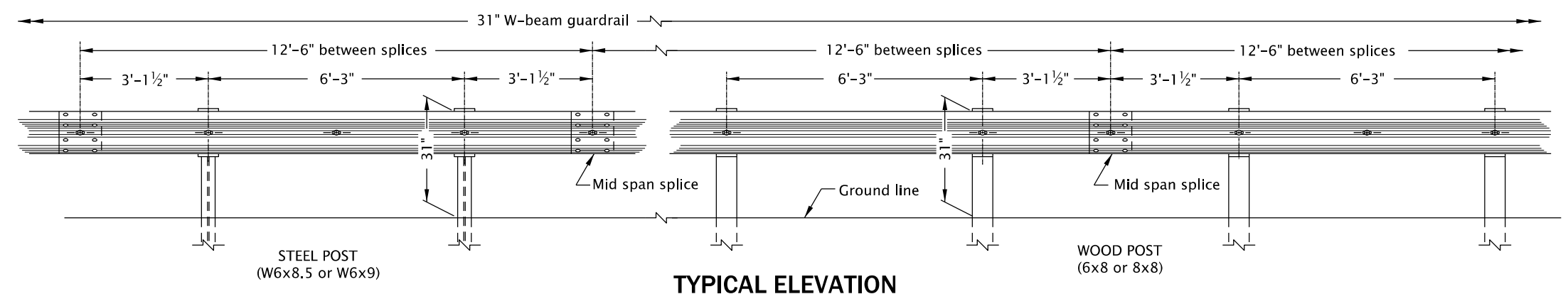
**TYPICAL SECTION**  
(Steel post shown)

**NORMAL RAIL ELEMENT DATA**

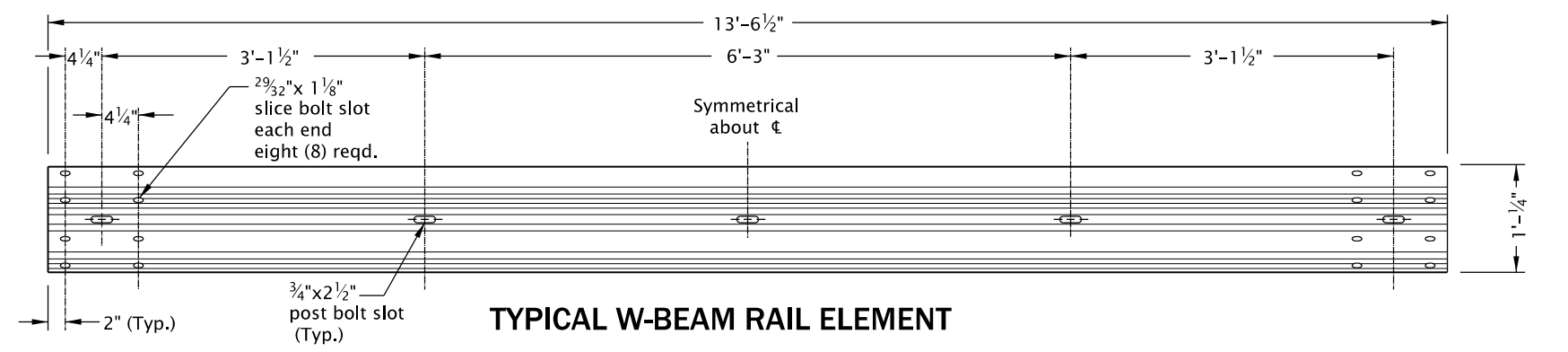
Type	Effective Lengths	Thkn. (Galv.)
2A, 3	6.25', 12.5', 25'	10 ga. & 12 ga.



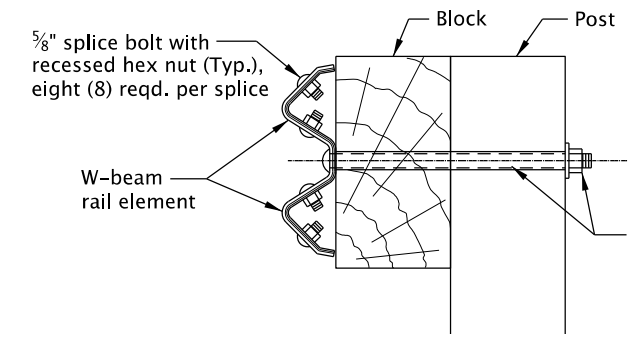
**SECTION THRU RAIL ELEMENT**



**TYPICAL ELEVATION**

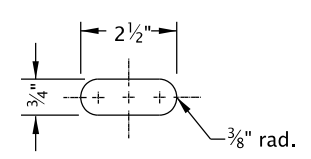


**TYPICAL W-BEAM RAIL ELEMENT**

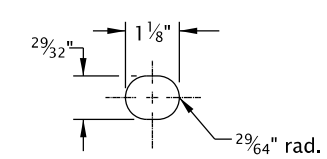


**FITTINGS**

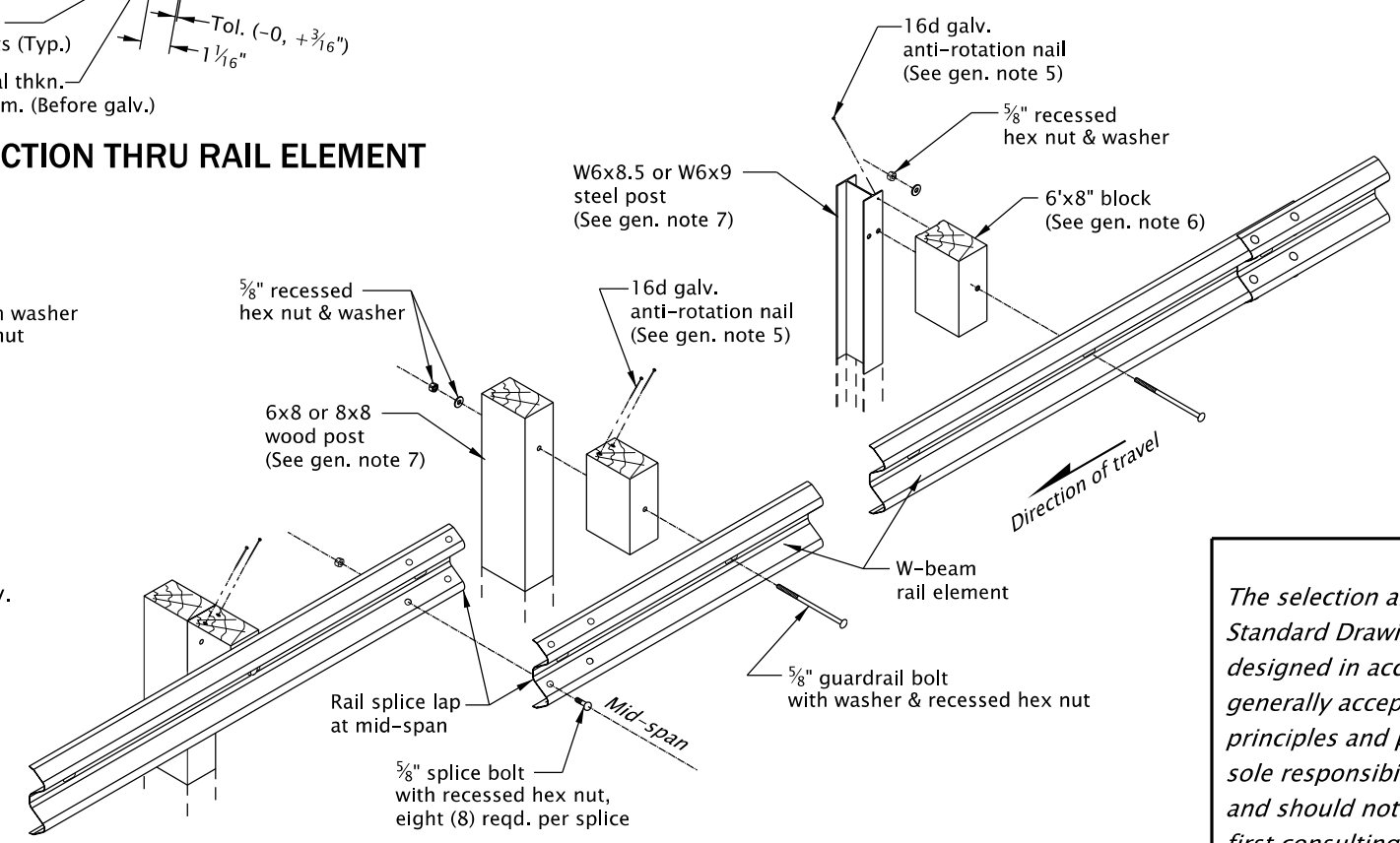
- NOTES:**
- When required by the plans, post bolts to extend beyond the tightened nuts within limits of 1/4" to 1/2".
  - All post bolt threads to be set after assembly for wrench removal only.



**POST BOLT SLOT**



**SPlice BOLT SLOT**



**W-BEAM ASSEMBLY DETAILS**

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

- See appropriate guardrail standard drawing(s) for details not shown.
- When required by the plans, drainage curb alignment same as face of guardrail.
- Lap guardrail in direction of adjacent traffic.
- Final paved surfacing to extend to face of post. Rail height measured from final paved surface at face of rail to top of rail (typ. all types). 1" ± tolerance.
- Blocks shall be toe-nailed to prevent rotation when wood posts are used (see Std. Dwg. RD403). Blocks shall be rounded or toe-nailed when steel posts are used to prevent rotation (see Std. Dwg. RD404).
- Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.
- All posts for guardrail run shall be of the same type: wood or steel.
- For guardrail installed on radii of 150' or less (5' min. radius) use rail elements pre-curved to industry standard. Install "Radius Identification Plate".

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

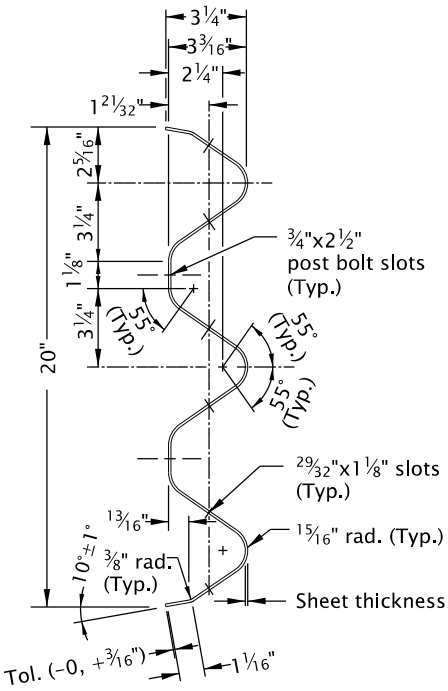
All materials shall be in accordance with the current Oregon Standard Specifications.			
<b>OREGON STANDARD DRAWINGS</b>			
<b>MIDWEST GUARDRAIL SYSTEM</b>			
<b>W-BEAM</b>			
2021			
DATE	REVISION	DESCRIPTION	
07-2021	REVISED DETAILS AND NOTES		
CALC. BOOK NO.	N/A	SDR DATE	19-JUL-2021
			<b>RD407</b>

20-JUL-2020

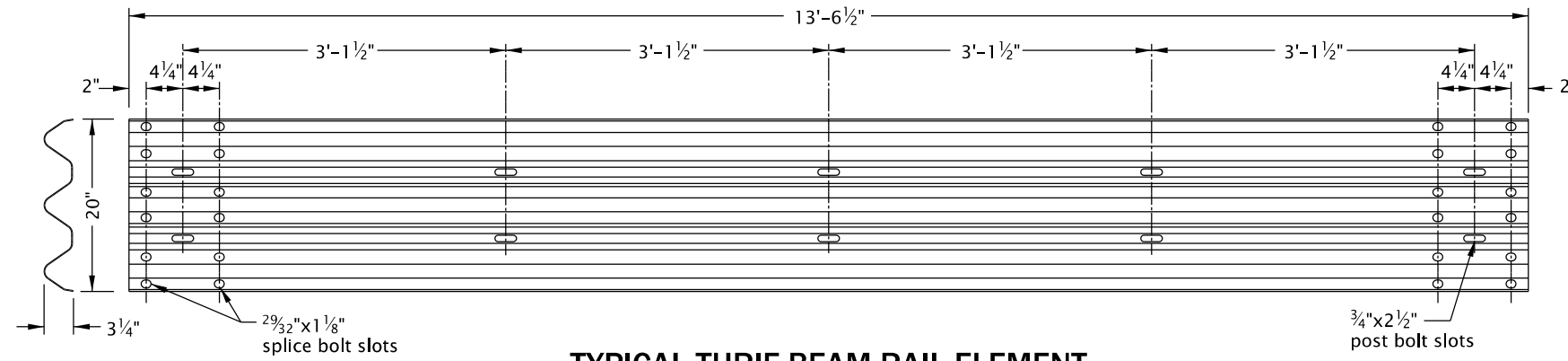
RD409.dgn

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

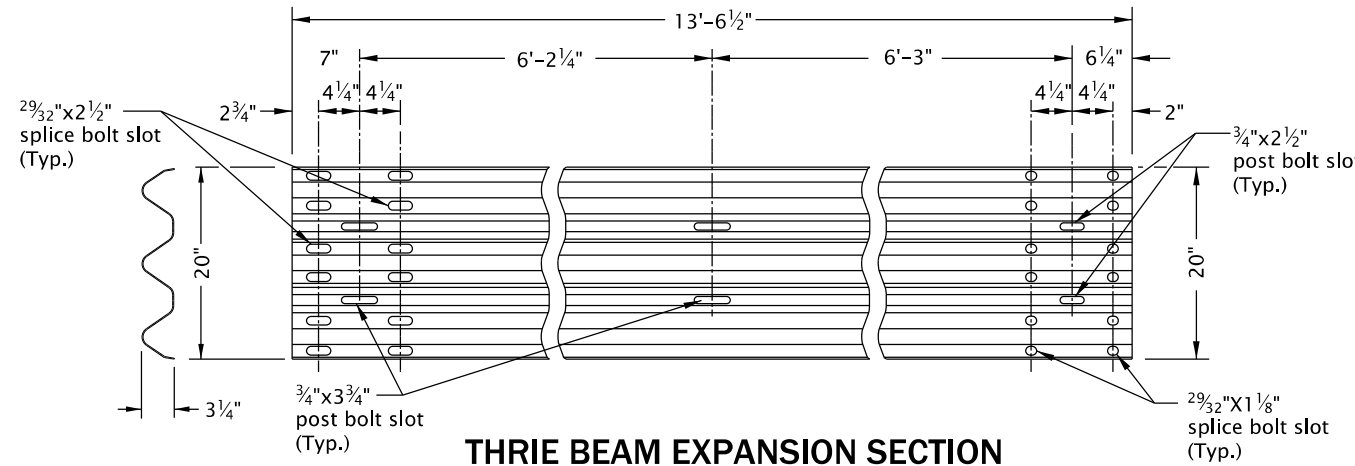
1. See appropriate guardrail standard drawing(s) for details not shown.
2. Lap guardrail in direction of adjacent traffic.
3. Hole layout per manufacturer with appropriate post and block.
4. Final paved surfacing to extend to face of post. Rail height measured from final paved surface at face of rail to top of rail (Typ. all types). 1" ± tolerance.
5. Wood block shall be toe-nailed to the post with 2 - 16d galvanized nails in top of block to prevent block rotation.
6. Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.
7. All posts for guardrail run shall be of the same type: wood or steel.
8. When required by the plans, nested thrie beam post shall be 8x8 wood or W6x9 steel.



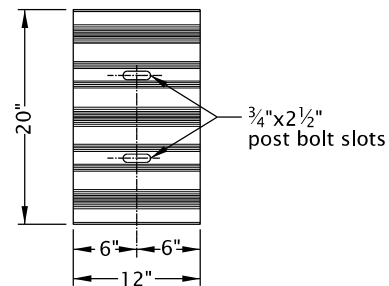
**SECTION THRU RAIL ELEMENT**



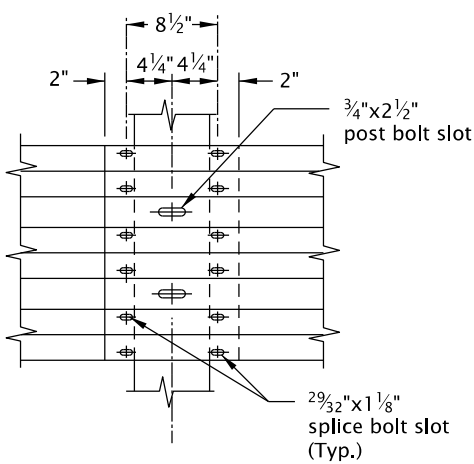
**TYPICAL THRIE-BEAM RAIL ELEMENT**  
(12'-6" length shown)



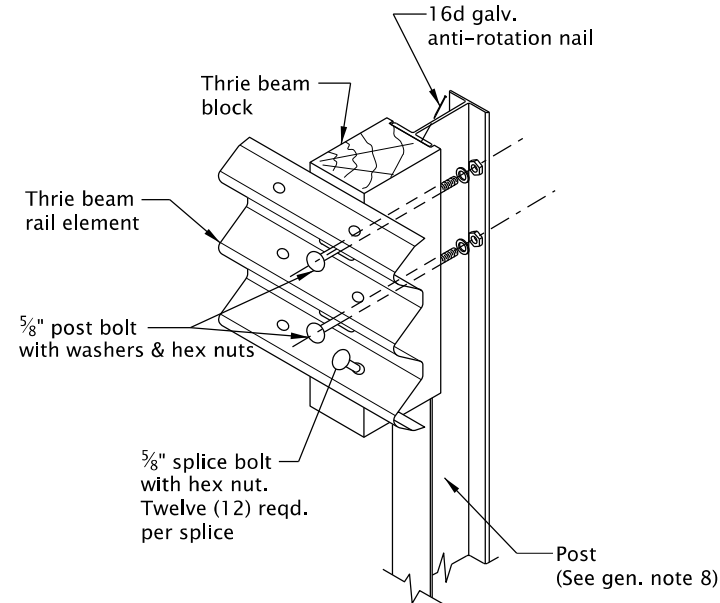
**THRIE BEAM EXPANSION SECTION**



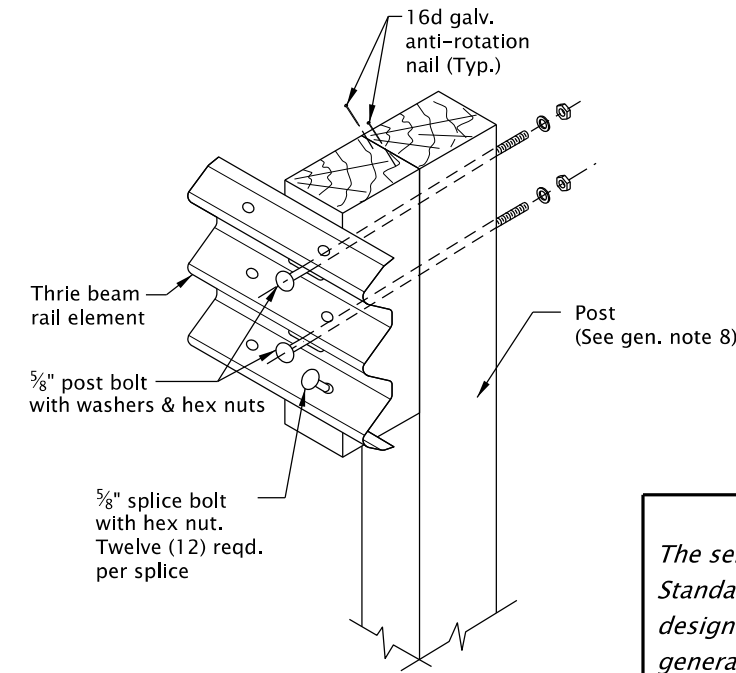
**THRIE BEAM BACK-UP PLATE**  
(For detail not shown, see "Section Thru Rail Element")



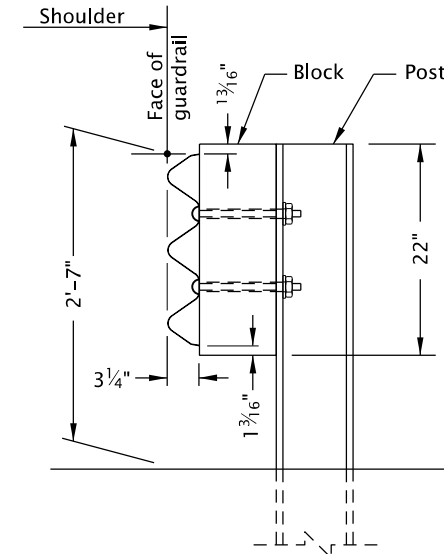
**THRIE BEAM SPLICE**



**STEEL POST ASSEMBLY**



**WOOD POST ASSEMBLY**



**TYPICAL SECTION**  
(Steel post shown)

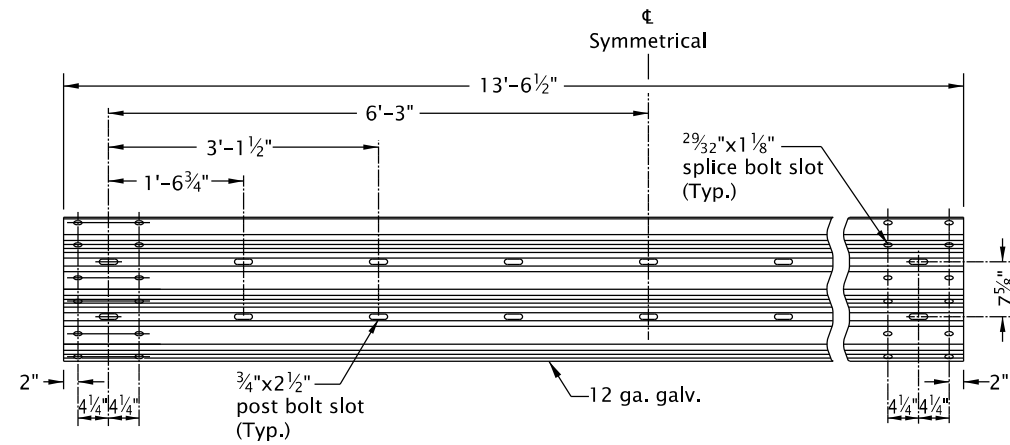
All materials shall be in accordance with the current Oregon Standard Specifications.			
<b>OREGON STANDARD DRAWINGS</b>			
<b>THRIE BEAM GUARDRAIL</b>			
2021			
DATE	REVISION DESCRIPTION		
CALC. BOOK NO.	N/A	SDR DATE	13-JAN-2020
			<b>RD409</b>

Effective Date: June 1, 2023 - November 30, 2023

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

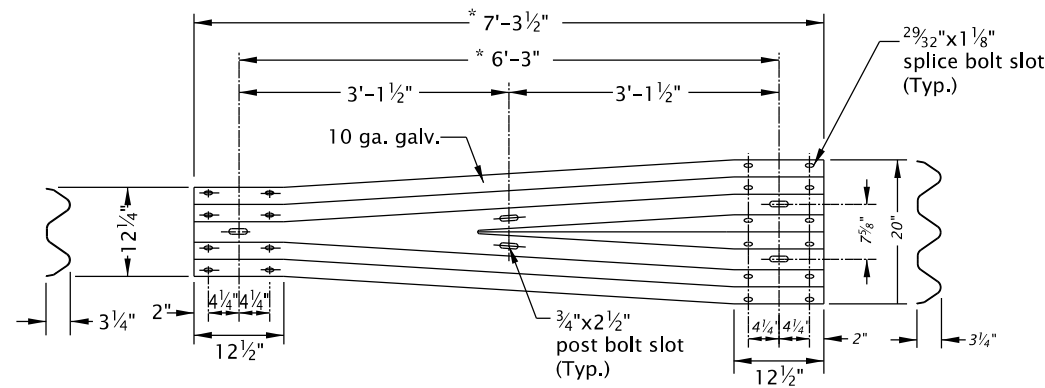
20-JUL-2020

RD410.dgn

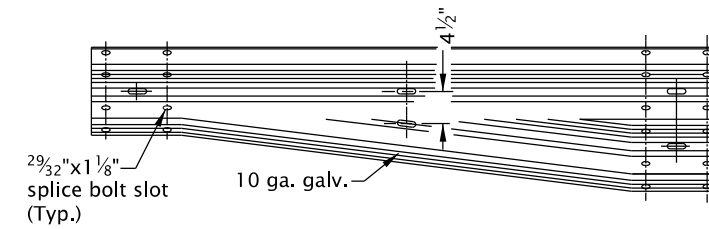


**THRIE BEAM RAIL ELEMENT**  
**1/4 POST SPACING**  
 (12'-6" section shown)

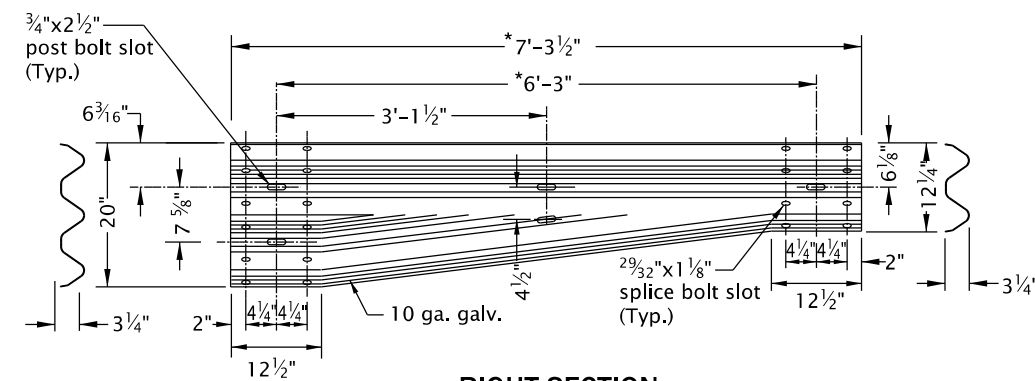
\* See general note 4



**SYMMETRICAL THRIE BEAM TRANSITION ELEMENT**  
 (Left section shown, right section reversed)



**LEFT SECTION**  
 (Reverse of right section)



**RIGHT SECTION**  
**TYPICAL THRIE BEAM TRANSITION ELEMENT**

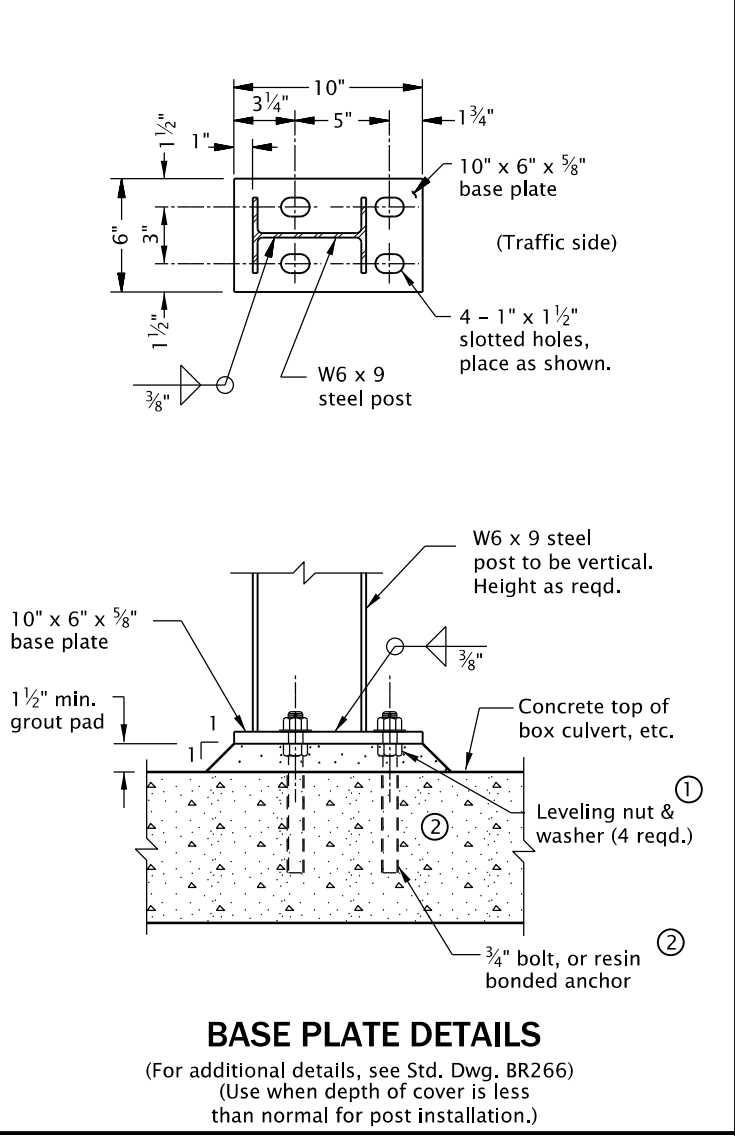
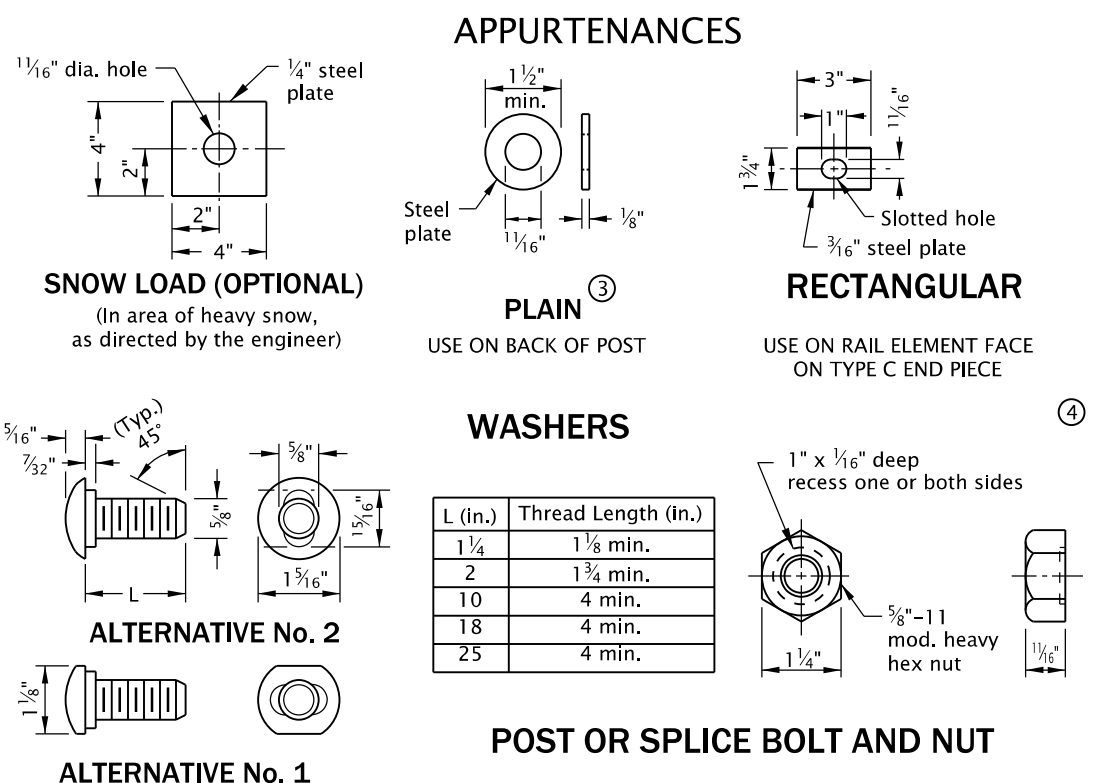
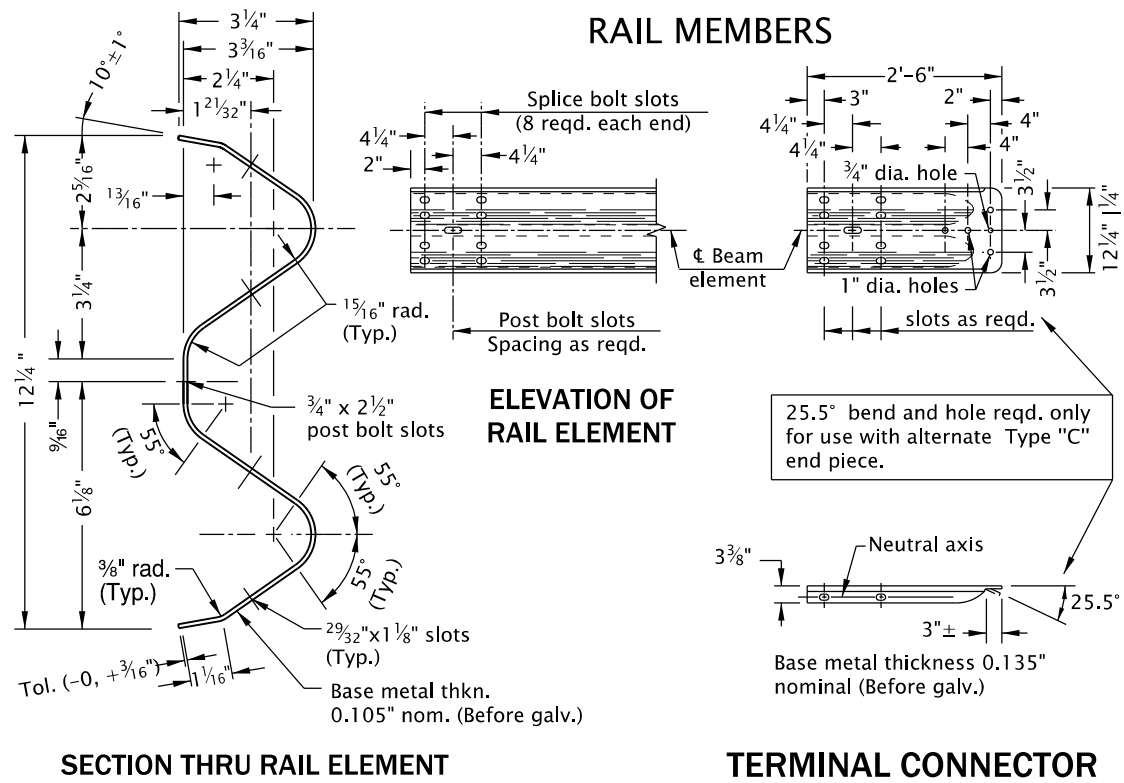
GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail standard drawing(s) for details not shown.
2. See appropriate bridge standard drawing(s) for transition guardrail detail and installation limits at bridge ends.
3. All rail sections shall be lapped in the direction of adjacent traffic.
4. Slot layout per manufacturer with appropriate post and block.

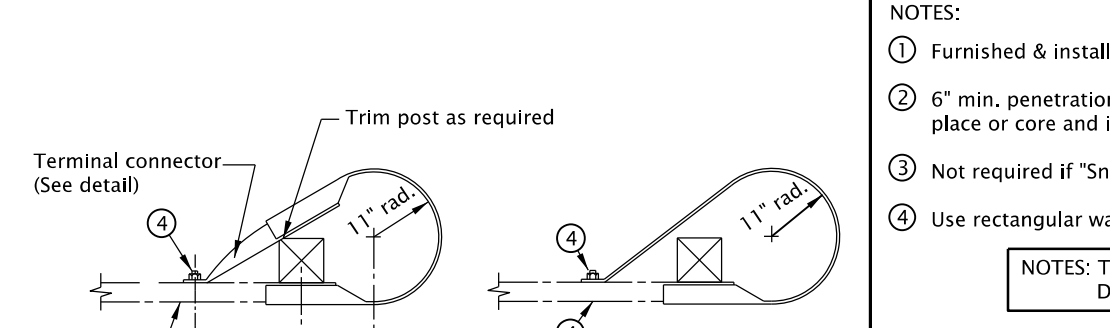
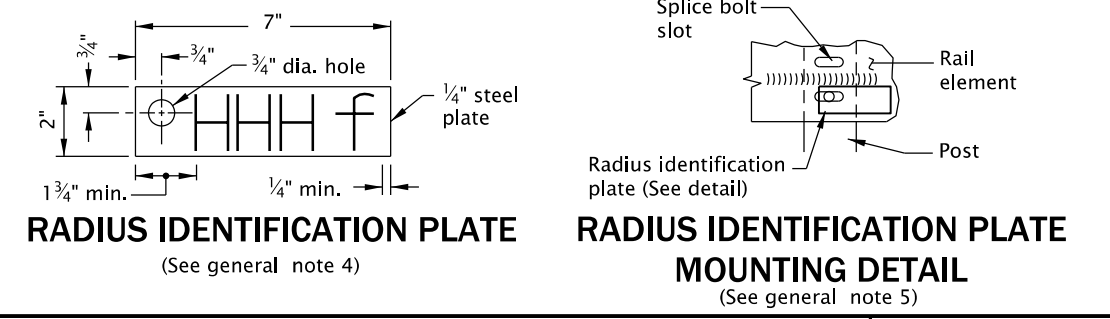
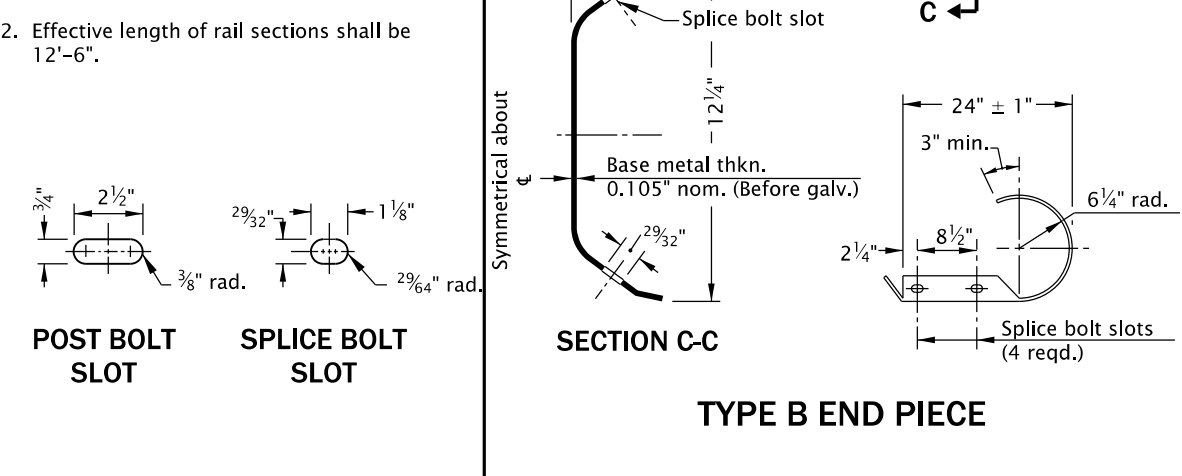
<p><i>The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.</i></p>		<p>All materials shall be in accordance with the current Oregon Standard Specifications.</p>	
		<p><b>OREGON STANDARD DRAWINGS</b></p> <p><b>THRIE BEAM GUARDRAIL TRANSITION</b></p> <p>2021</p>	
DATE		REVISION	DESCRIPTION
CALC. BOOK NO.	N/A	SDR DATE	13-JAN-2020
			<b>RD410</b>

20-JUL-2020

RD415.dgn



- NOTES:**
- For guardrail installed on radii of 150' or less (5' min. radius) use rail elements pre-curved to industry standard. Install "Radius Identification Plate" (See detail right).
  - Effective length of rail sections shall be 12'-6".



- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**
- See appropriate guardrail standard drawing(s) for details not shown.
  - For details of guardrail connections to structural handrails, see special details or Standard Drawings as called for on plans.
  - All indicated welds shall attain the full strength of the section welded.
  - Radius dimensions, in feet to the nearest 0.5 foot, shall be placed on the plate with a raised weld bead replacing the letters "HHH", shown on the Radius Identification Plate detail. Digits shall be 1 1/2" min. height and 3/4" max. width. Plate shall be galvanized after placement of digits.
  - The guardrail radius identification plate is to be mounted on the back side of the rail element with the lowest splice bolt nearest the P.C. of the guardrail radius.

- NOTES:**
- Furnished & installed by structure contractor when shown on structure plans.
  - 6" min. penetration into concrete slabs other than bridge decks. Cast in place or core and install using approved resin bonding system.
  - Not required if "Snow Load" washer option is used.
  - Use rectangular washer under bolt head and nut on Type C End Piece as shown.
- NOTES: THIS DRAWING IS RETAINED FOR MAINTENANCE PURPOSES. DO NOT USE FOR NEW CONSTRUCTION.**

All materials shall be in accordance with the current Oregon Standard Specifications.

**OREGON STANDARD DRAWINGS**

**GUARDRAIL AND METAL MEDIAN BARRIER PARTS (29" RAIL HEIGHT)**

2021

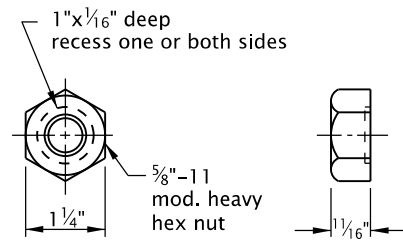
DATE	REVISION	DESCRIPTION

Calc. BOOK No. --- N/A --- SDR DATE-- 13-JAN-2020 -- **RD415**

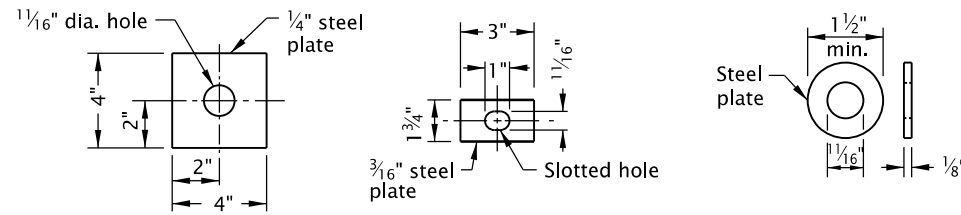
*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

20-JUL-2020

RD416.dgn



**5/8" DIA. RECESSED HEX NUT**

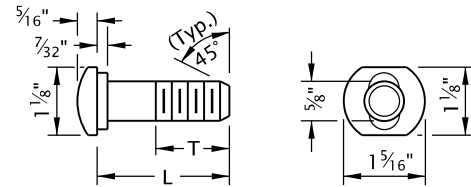


**SNOW LOAD POST WASHER**

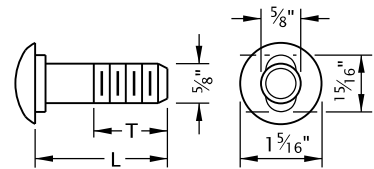
**SNOW LOAD RAIL WASHER**

**PLAIN WASHER**  
Use on back of post.

Use in area of heavy snow, as directed by the engineer (See general note 6)



**ALTERNATIVE No. 1**

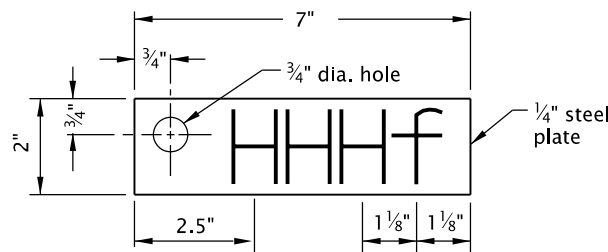


**ALTERNATIVE No. 2**

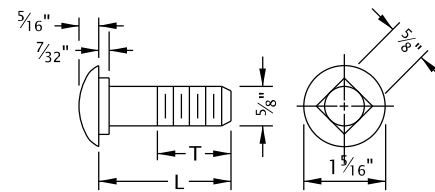
**BOLT DIMENSION TABLE**

Length (L) (in.)	Thread Length (T) (in.)
1 1/4	1 1/8 min.
2	1 3/4 min.
10	4 min.
18	4 min.
25	4 min.

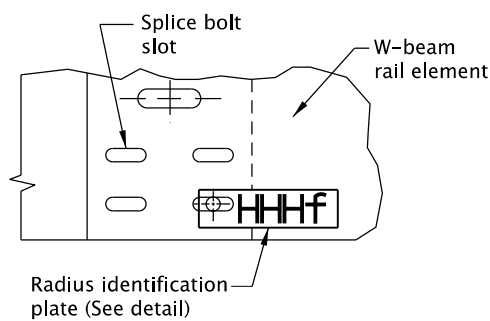
**5/8" GUARDRAIL POST/SPICE BOLT (BUTTON HEADED)**



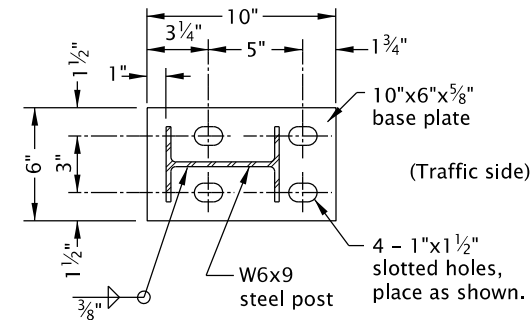
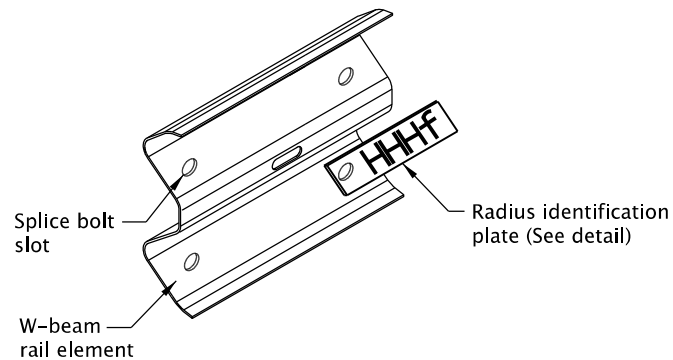
**RADIUS IDENTIFICATION PLATE**  
(See general note 4)



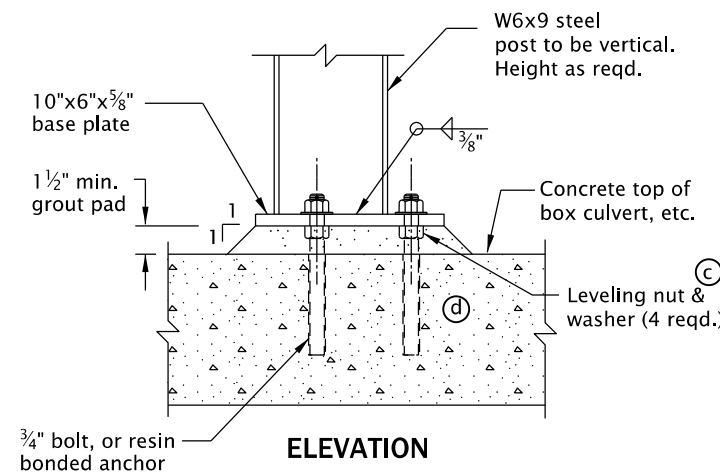
**5/8" DIA. CARRIAGE BOLT**



**RADIUS IDENTIFICATION PLATE MOUNTING DETAIL**  
(See general note 5)



**PLAN**



**ELEVATION**

**BASE PLATE DETAILS**

(For additional details, see Std. Dwg. BR266)  
(Use when depth of cover is less than normal for post installation.)

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

- See appropriate guardrail standard drawing(s) for details not shown.
- For details of guardrail connections to structural handrails, see special details or Standard Drawings as called for on plans.
- All indicated welds shall attain the full strength of the section welded.
- Radius dimensions, in feet to the nearest 0.5 foot, shall be placed on the plate with a raised weld bead replacing the letters "HHH", shown on the Radius Identification Plate detail. Digits shall be 1 1/2" min. height and 3/4" max. width. Plate shall be galvanized after placement of digits.
- The guardrail radius identification plate is to be mounted on the back side of the rail element with the lowest splice bolt nearest the P.C. of the guardrail radius.
- When required by the plans, a Snow Load Post Washer shall be used on the backside of the post and a Snow Load Rail Washer shall be placed on rail element face. Snow Load Rail Washers shall not be installed on terminals.

**SUPPLEMENTARY NOTES:**

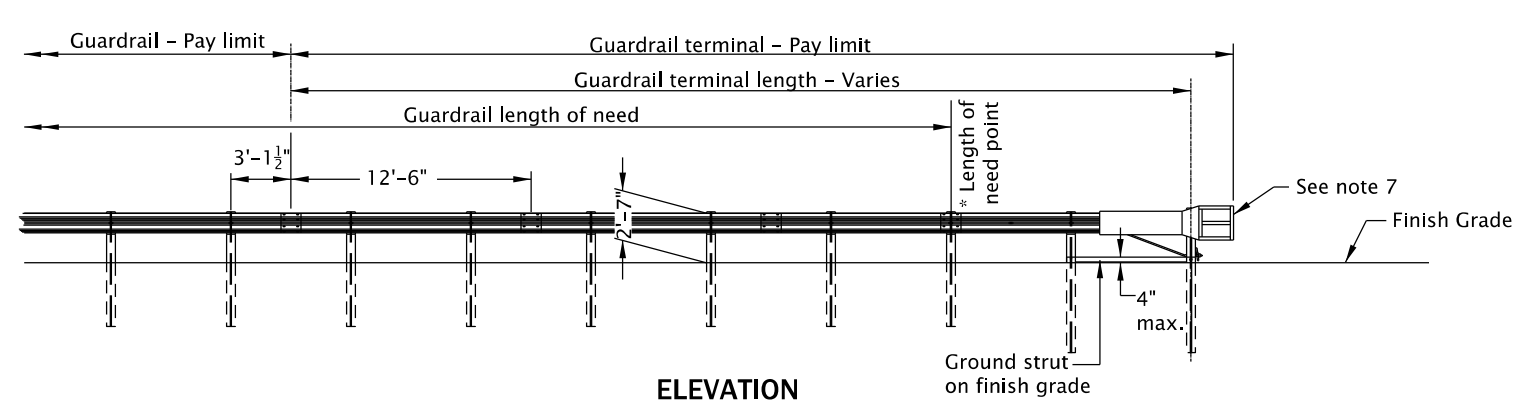
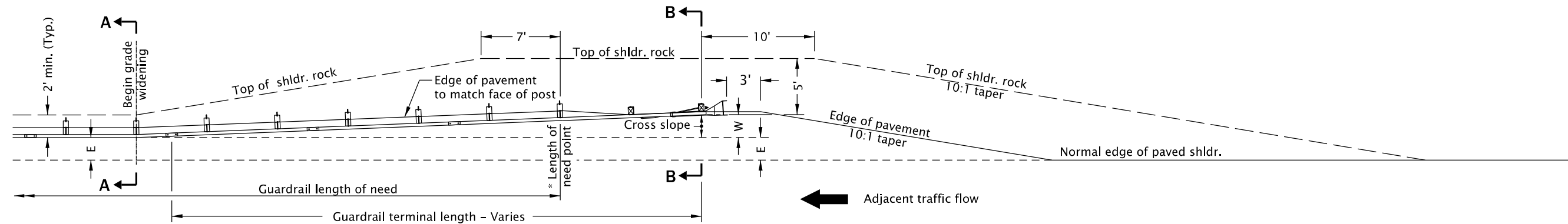
- (a) Not required if Snow Load Post washer option is used.
- (b) Use rectangular Snow Load Rail washer under bolt head and nut on Type C End Piece as shown.
- (c) Furnished & installed by structure contractor when shown on structure plans.
- (d) 6" min. penetration into concrete slabs other than bridge decks. Cast in place or core and install using approved resin bonding system.

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

All materials shall be in accordance with the current Oregon Standard Specifications.		
<b>OREGON STANDARD DRAWINGS</b>		
<b>MIDWEST GUARDRAIL SYSTEM</b>		
<b>STANDARD HARDWARE</b>		
<b>(NUTS, BOLTS, WASHERS AND MISC.)</b>		
2021		
DATE	REVISION DESCRIPTION	
CALC. BOOK NO. ---	N/A ---	SDR DATE-- 13-JAN-2020
		<b>RD416</b>

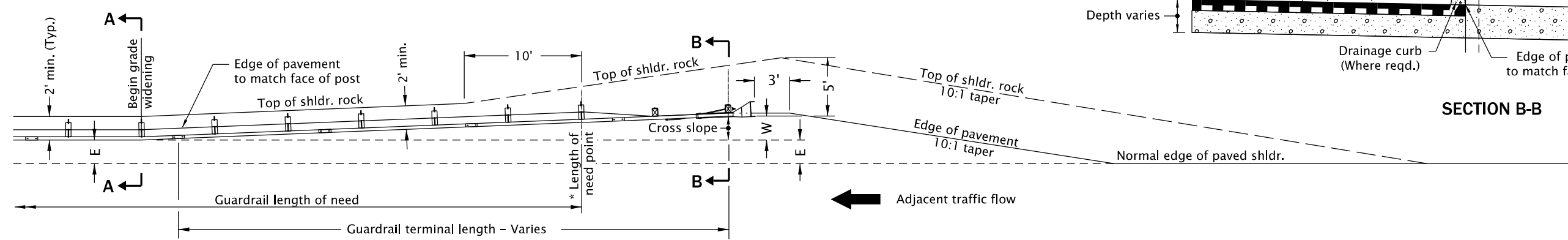
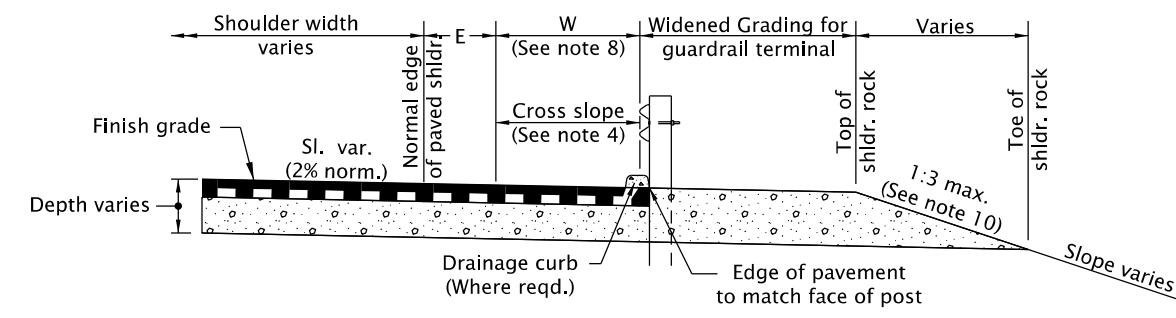
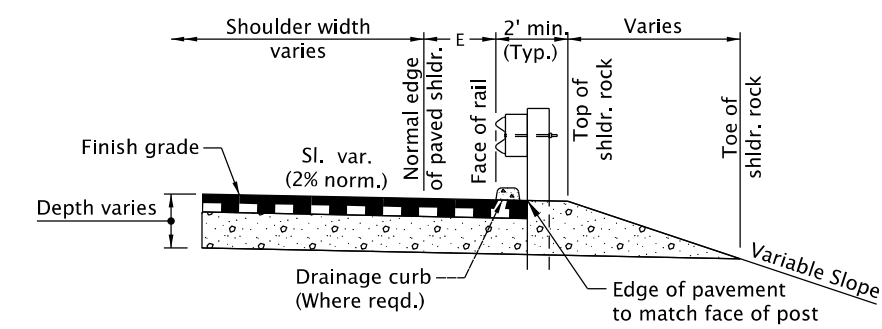
19-JUL-2021

RD419.dgn



\* See note 6 and 9

**PREFERRED GRADING**



**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

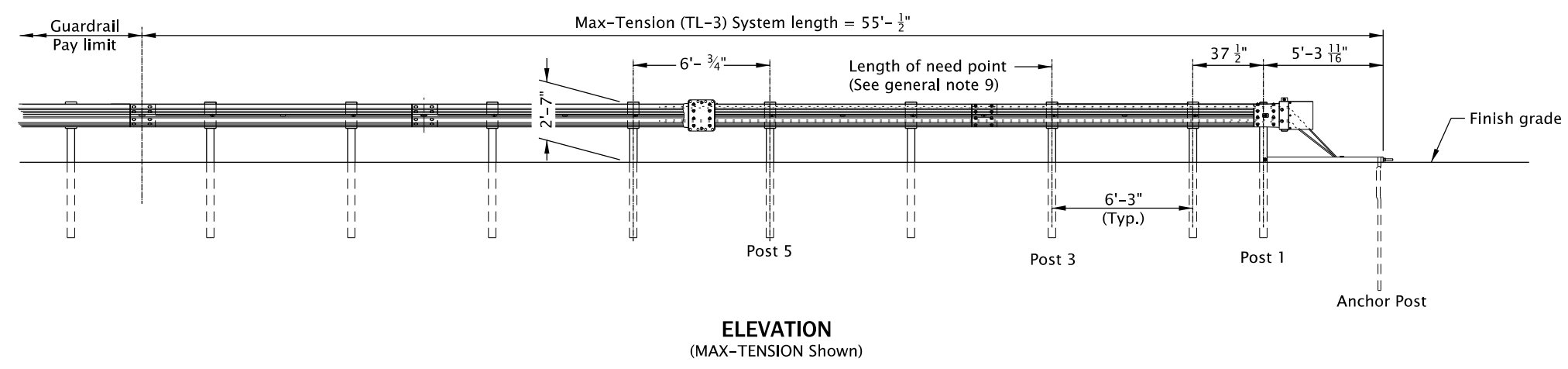
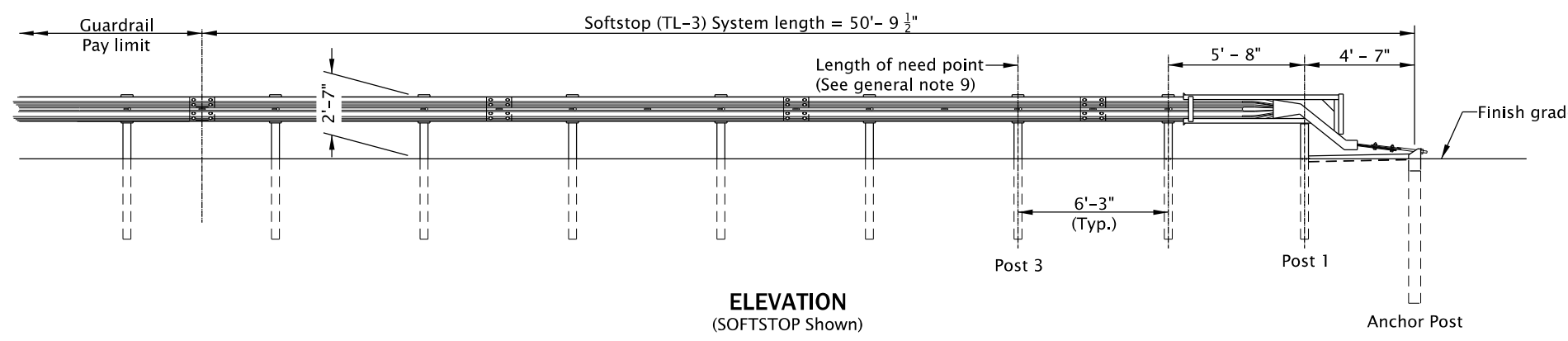
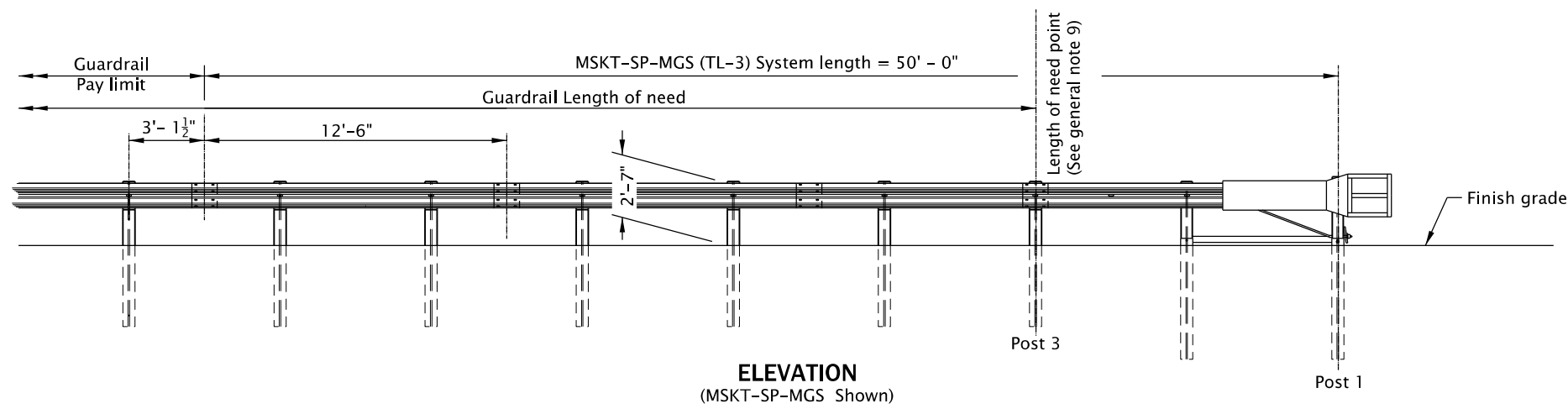
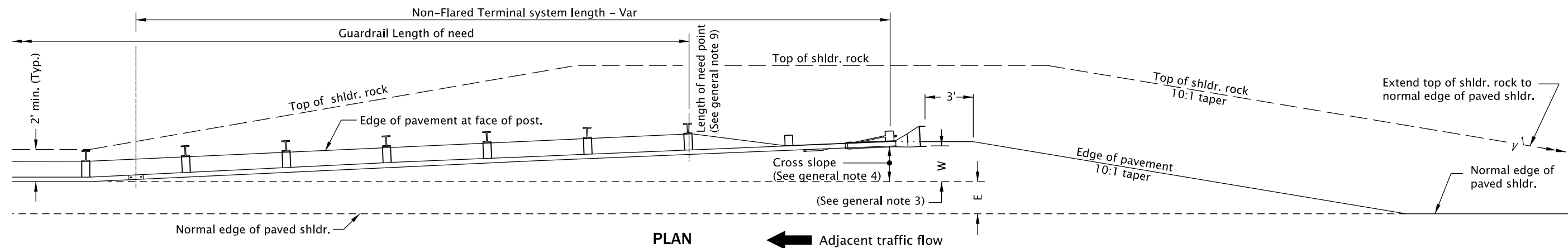
- Use details shown as a general guide since manufacturer's details may vary. Install a guardrail terminal system that meets MASH requirements per manufacturer's recommendations. Ensure that guardrail terminal meets appropriate test level for the project.
- See appropriate guardrail standard drawing(s) for details not shown. See project plans for details not shown. See Std. Dwg. RD701 for drainage curbs, where required. E=2' or as shown on project plans.
- Guardrail Non-flared terminal shall be installed with a minimum 1 foot offset ensuring that the end piece is entirely off normal shoulder.
- Cross slope to match adjacent roadway cross slope (preferred). If required, maximum shoulder slope 10% for guardrail widening. If required, maximum grade break at normal edge of shoulder 8%.
- On two way two lane highways, both ends of guardrail runs shall be provided with a terminal flared or non-flared. Paving of widened shoulder to the face of posts on both ends of guardrail runs is required.
- Provide guardrail terminal from ODOT's QPL. Install according to manufacturer's recommendations (post count varies). Provide shop drawings to Engineer.
- Install a reflectorized object marker on head of every guard rail terminal with "W" 4 feet or less according to manufacturer's recommendations.
- "W" distance is measured to face of guardrail at end post, exclusive of end piece.
- Length of need post location varies by manufacturer.
- 1:4 slope or flatter preferable, 1:3 maximum.

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

All materials shall be in accordance with the current Oregon Standard Specifications.	
<b>OREGON STANDARD DRAWINGS</b>	
<b>MIDWEST GUARDRAIL SYSTEM GRADING FOR TERMINALS</b>	
2021	
DATE	REVISION DESCRIPTION
CALC. BOOK NO. --- N/A ---	SDR DATE- 19-JUL-2021
<b>RD419</b>	

19-JUL-2021

RD420.dgn



- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**
- Use details shown as a general guide since manufacturer's details may vary. Install a guardrail terminal system that meets MASH requirements per manufacturer's recommendations. Ensure that guardrail terminal meets appropriate test level for the project.
  - See appropriate guardrail standard drawing(s) for details not shown. See project plans for details not shown. See Std. Dwg. RD701 for drainage curbs, where required. E=2' or as shown on project plans.
  - Guardrail Non-flared terminal shall be installed with a min. 1 foot offset ensuring that the end piece is entirely off normal shldr.
  - Cross slope to match adjacent roadway cross slope (preferred). If required, maximum shoulder slope 10% for guardrail widening. If required, maximum grade break at normal edge of shoulder 8%.
  - On two way two lane highways, both ends of guardrail runs shall be provided with a terminal flared or non-flared. Paving of widened shldr. to the face of posts on both ends of guardrail runs is required.
  - Provide guardrail terminal from ODOT's QPL. Install according to manufacturer's recommendations (post count varies). Provide shop drawings to Engineer.
  - Install a reflectorized object marker on head of every guard rail terminal with "W" 4 feet or less according to manufacturer's recommendations.
  - "W" distance is measured to face of guardrail at end post, exclusive of end piece.
  - Length of need post location varies by manufacturer.

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

All materials shall be in accordance with the current Oregon Standard Specifications.

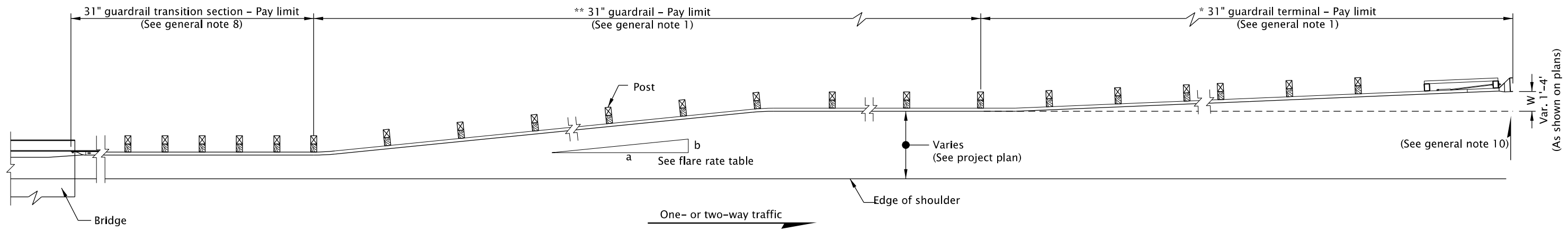
**OREGON STANDARD DRAWINGS**  
**MIDWEST GUARDRAIL SYSTEM**  
**NON-FLARED ENERGY-ABSORBING TERMINAL**  
2021

DATE	REVISION	DESCRIPTION

CALC. BOOK NO. - - - -	N/A - - - -	SDR DATE - 19-JUL-2021	<b>RD420</b>
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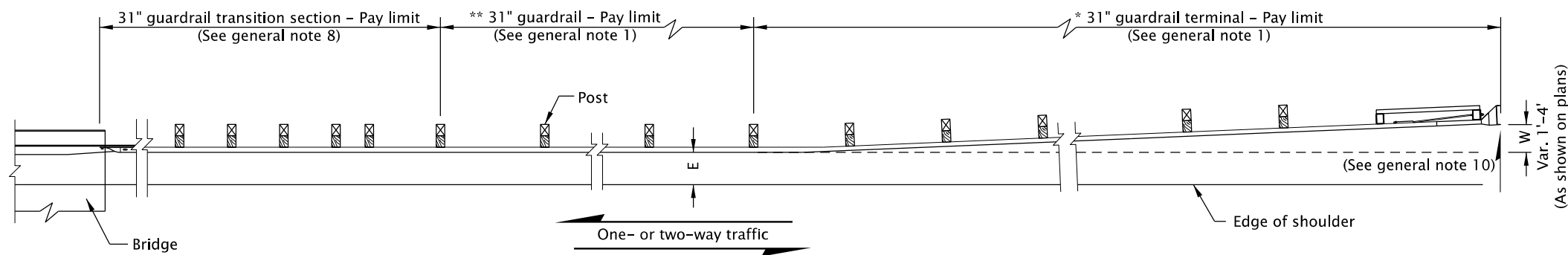
14-JAN-2022

RD442.dgn



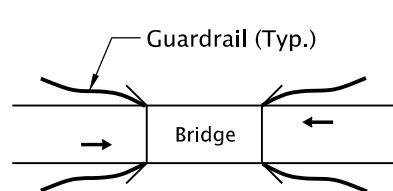
### NARROW BRIDGE ON ONE OR TWO-WAY TRAFFIC

- \* Provide from ODOT's QPL. Install according to manufacturer's instruction.
- \*\* Length of need calculation will determine quantity of Type 2A required.

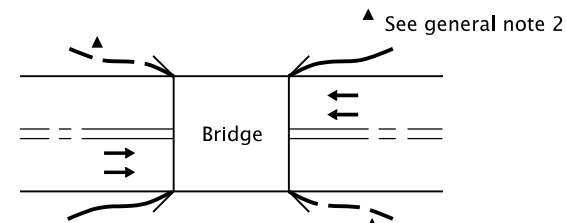


### ONE OR TWO-WAY TRAFFIC

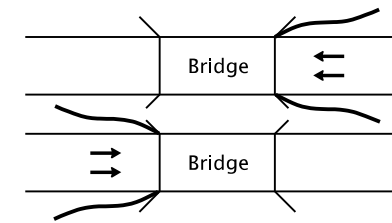
FLARE RATE TABLE	
POSTED SPEED (MPH)	FLARE RATE a:b
70	15 : 1
60	14 : 1
55	12 : 1
50	11 : 1
45	10 : 1
40 or less	9 : 1



TWO LANE



MULTILANE



MULTILANE

### LOCATIONS AT BRIDGE ENDS (MINIMUM SHOWN)

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

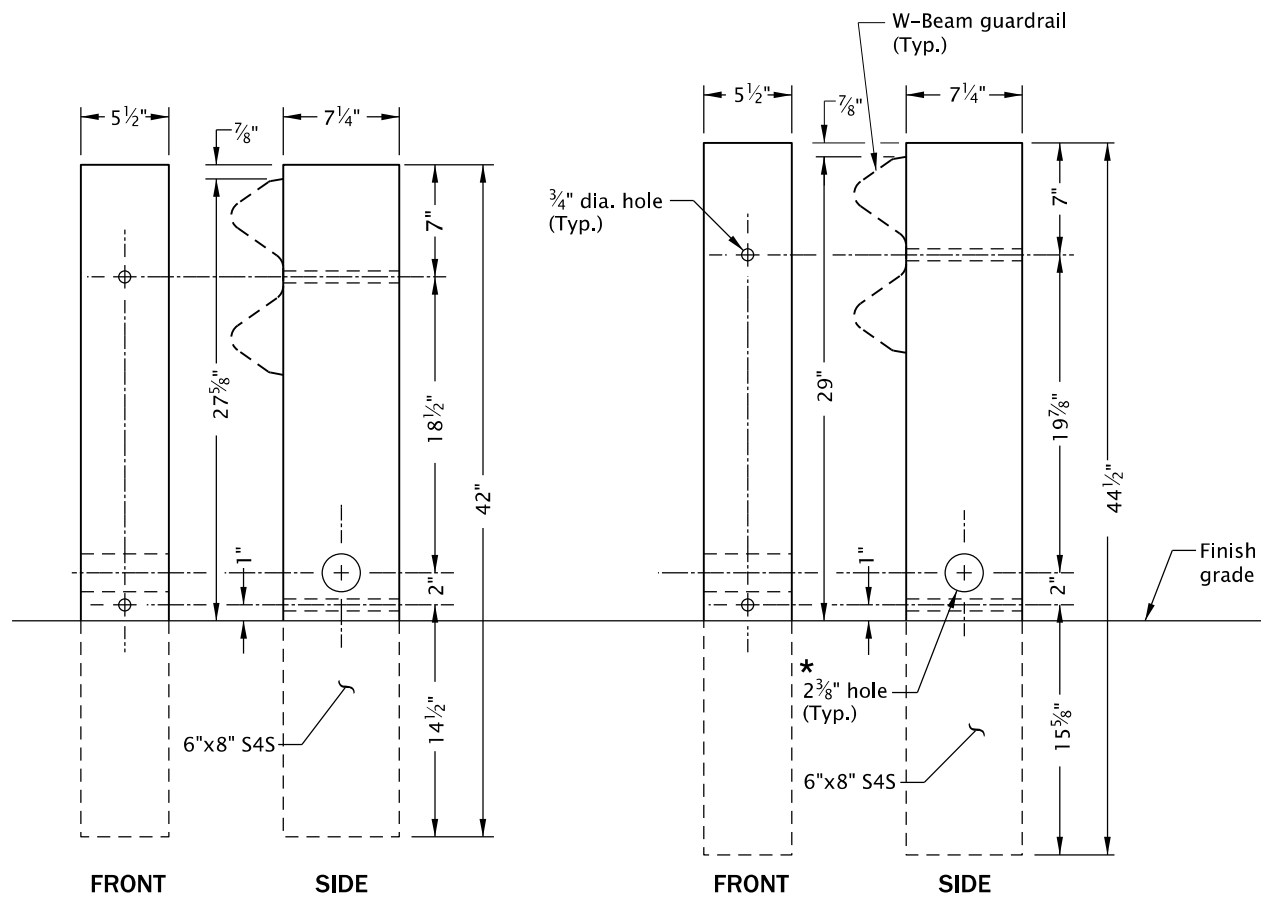
1. See appropriate standard drawing(s) for details not shown.
2. Guardrail at indicated positions is required for protection at bridge ends. Additional guardrail is to be installed as required by guardrail warrant and fastened to bridge.
3. Face of guardrail at locations shown above must match face of bridge curb or bridge rail on structure without curb.
4. Trailing ends (Freeway, multilane and similar one-way facilities) not exposed to opposing traffic:
  - (a) Guardrail terminals, use a Downstream Anchor Terminal (DAT) (RD438), Type B end piece and do not flare.
  - (b) At bridge ends, omit transition guardrail & Type 3 guardrail. Use bridge connection (Bridge drawing BR236) and guardrail as required in plans.
5. Rail expansion slots to be provided at bridge end connections. See dwg. no. RD412 "MIDWEST GUARDRAIL SYSTEM INSTALLATION AT BRIDGE DECK EXPANSION JOINT" details and notes.
6. Where bridges employ guardrail in lieu of handrail or vehicular barriers, adjacent connecting guardrail runs shall be the same type.
7. (a) All bolts except adjustment bolts shall be drawn tight on rails and components on initial installation. (b) Final tightness check on rail and component bolts and re-tightening as required to be done 30 days after initial installation.
8. See project plans for details not shown. See dwg. no. RD482 for Type 3, Nested W-Beam details. For transition guardrail detail and installation limits at bridge ends, see applicable bridge drawings.
9. "W" distance is measured from face of guardrail at end post, exclusive of end piece.
10. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 1V : 10H when the guardrail is within 12'-0" from the edge of the shoulder. Paving of widened shoulder to face of posts in both ends of guardrail runs is required.
11. Wood or steel post. Wood post shown.

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

All materials shall be in accordance with the current Oregon Standard Specifications.	
<b>OREGON STANDARD DRAWINGS</b>	
<b>MIDWEST GUARDRAIL SYSTEM</b>	
<b>TYPICAL LAYOUTS</b>	
<b>AT BRIDGE ENDS</b>	
2021	
DATE	REVISION DESCRIPTION
CALC. BOOK NO. --- N/A ---	SDR DATE- 14-JAN-2022 - <b>RD442</b>



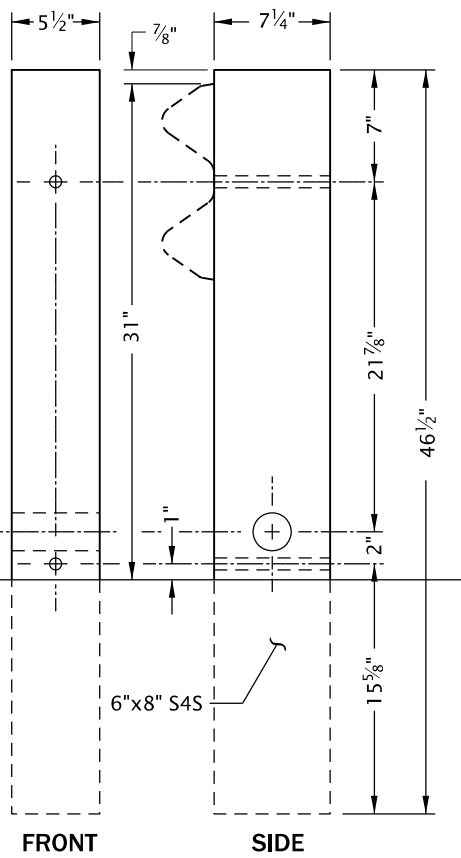
RD451.dgn 20-JUL-2020



**TOP OF RAIL  
HEIGHT 27<sup>5</sup>/<sub>8</sub>"**

(This detail is retained for maintenance purposes.  
Do not use for new construction.)

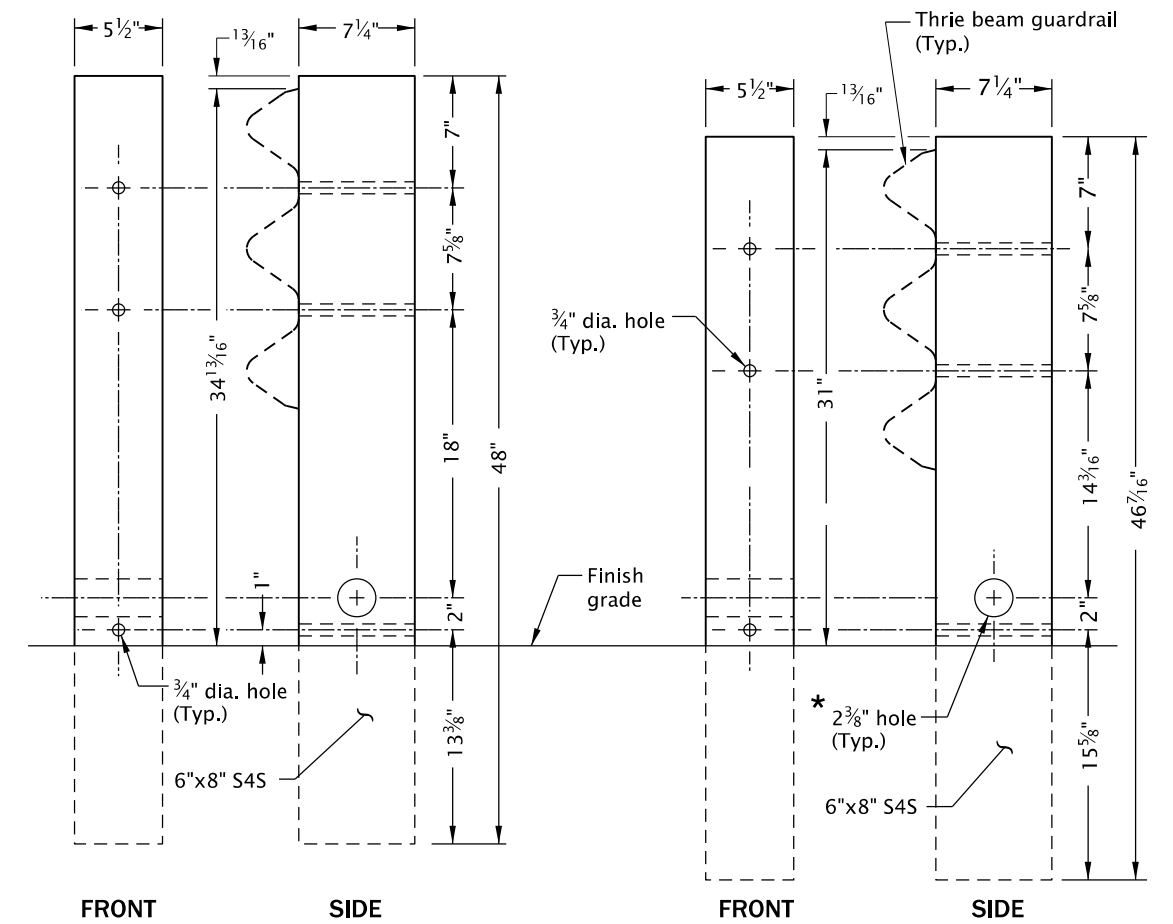
**TOP OF RAIL  
HEIGHT 29"**



**TOP OF RAIL  
HEIGHT 31"**

\* 2" std. pipe in end post only, 2<sup>3</sup>/<sub>8</sub>" dia.hole

**W-BEAM WOOD BREAKAWAY POST**



**TOP OF RAIL  
HEIGHT 35" (Nom.)**

**TOP OF RAIL  
HEIGHT 31"**

**THRIE BEAM WOOD BREAKAWAY POST**

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

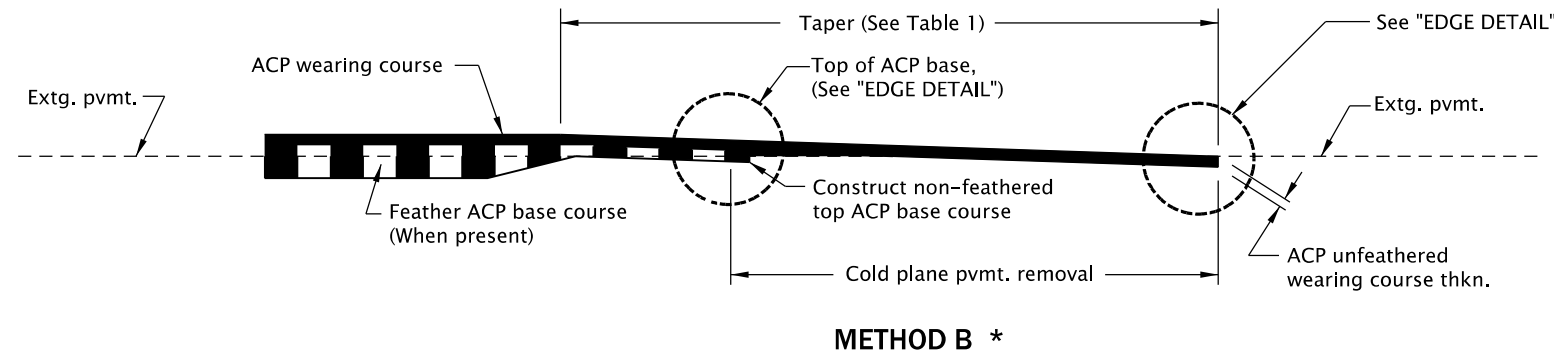
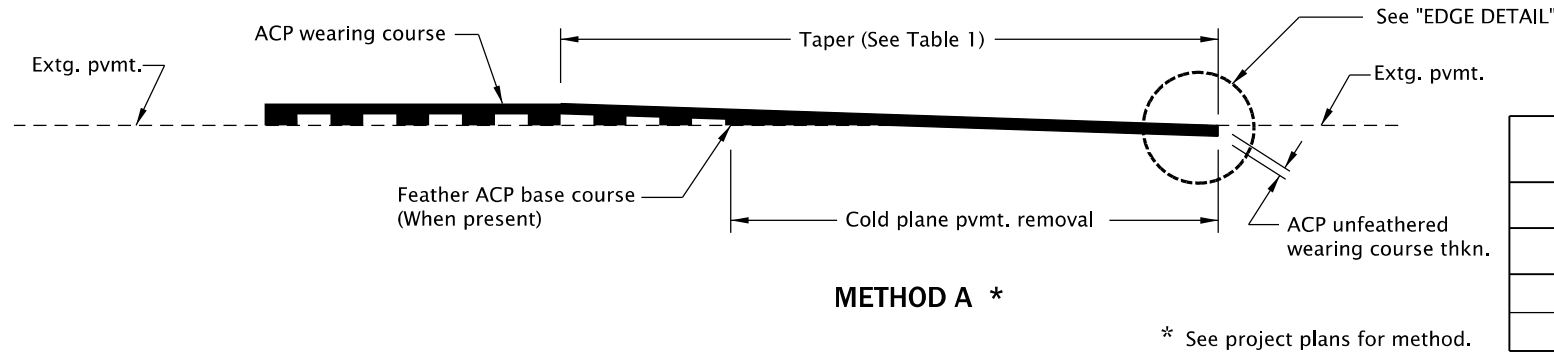
1. See appropriate guardrail standard drawing(s) for details not shown.
2. Use only 6"x8" S4S wood posts, trim to fit steel tube if reqd.

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

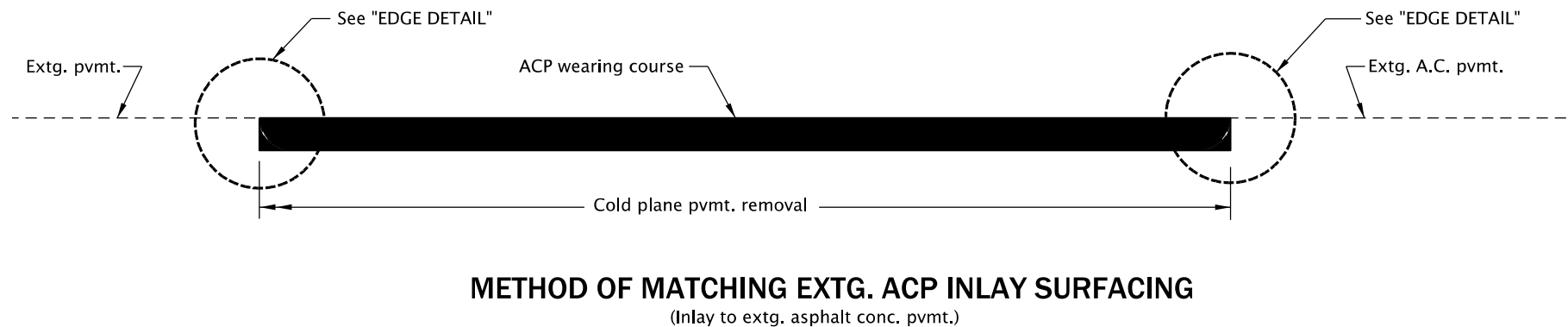
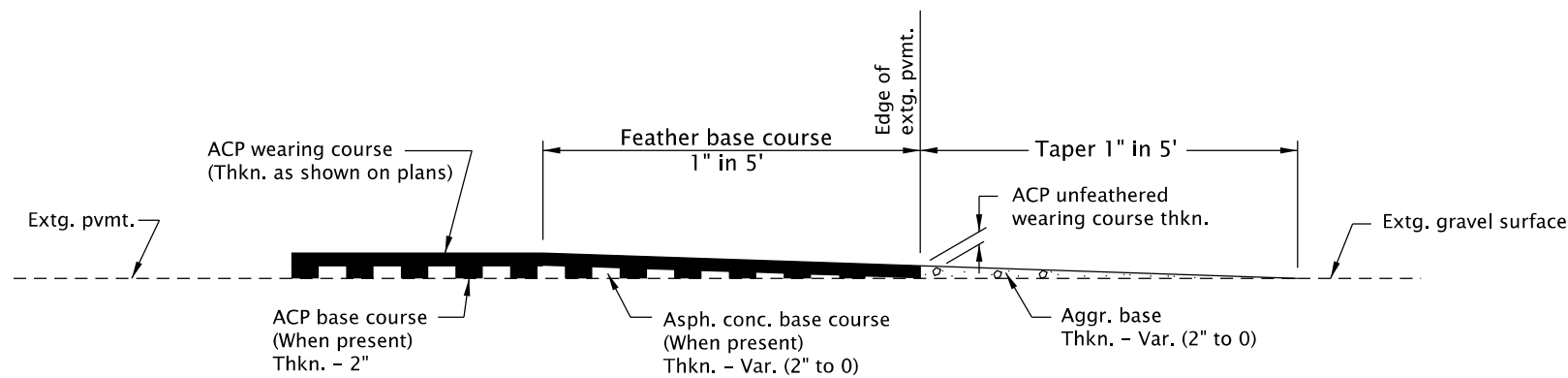
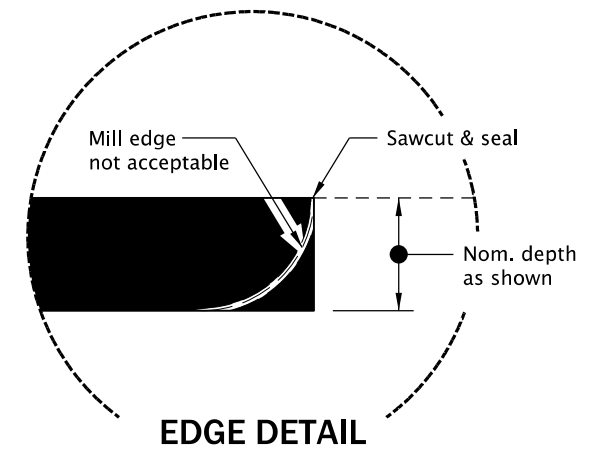
All materials shall be in accordance with the current Oregon Standard Specifications.			
<b>OREGON STANDARD DRAWINGS</b>			
<b>WOOD BREAKAWAY POSTS</b>			
2021			
DATE	REVISION DESCRIPTION		
CALC. BOOK NO.	N/A	SDR DATE	13-JAN-2020
			<b>RD451</b>

Effective Date: June 1, 2023 – November 30, 2023

20-JUL-2020  
RD610.dgn



**ACP PAVEMENT MATCH AT PROJECT ENDS  
OR BRIDGE ENDS WHEN NOT OVERLAYING THE BRIDGE**



*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

All materials shall be in accordance with the current Oregon Standard Specifications.

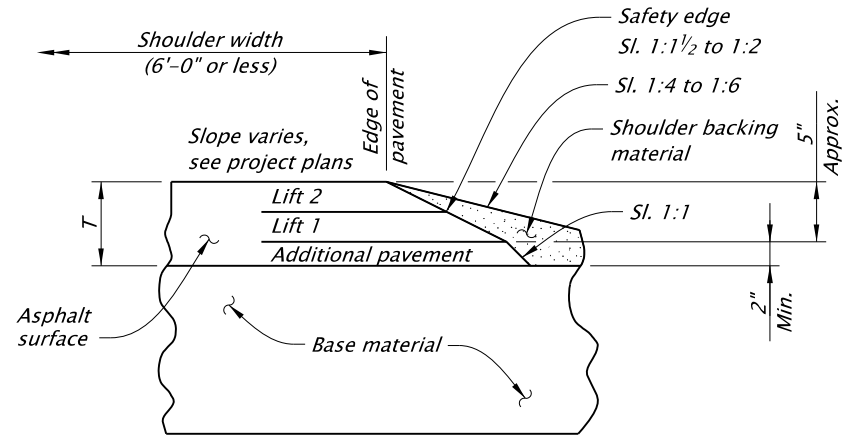
**OREGON STANDARD DRAWINGS**  
**ASPHALT CONCRETE PAVEMENT (ACP) DETAILS**  
2021

DATE	REVISION	DESCRIPTION

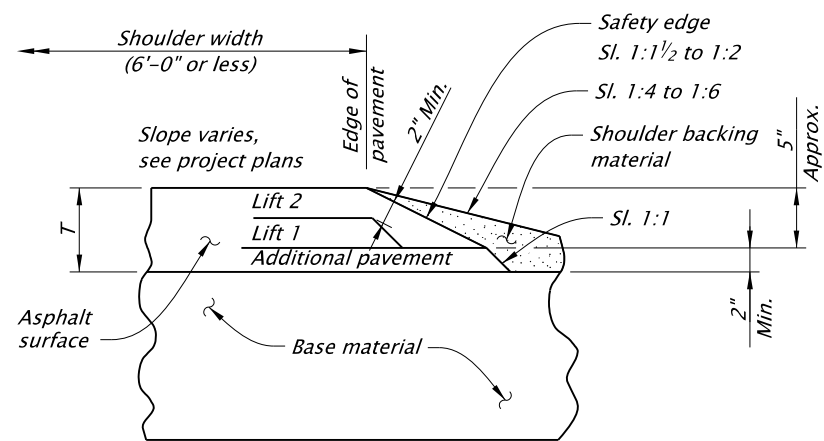
CALC. BOOK NO. --- N/A --- SDR DATE- 25-JUL-2017 --- **RD610**

19-JUL-2021

RD615.dgn

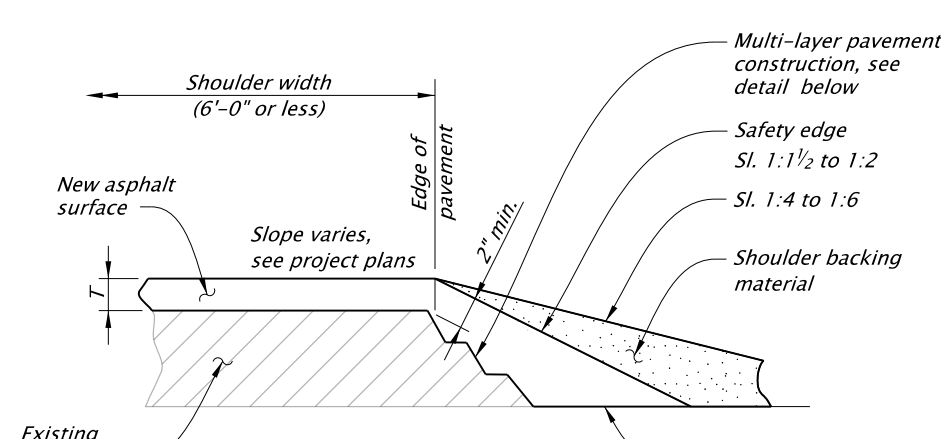


**SAFETY EDGE PLACED WITH LIFTS**

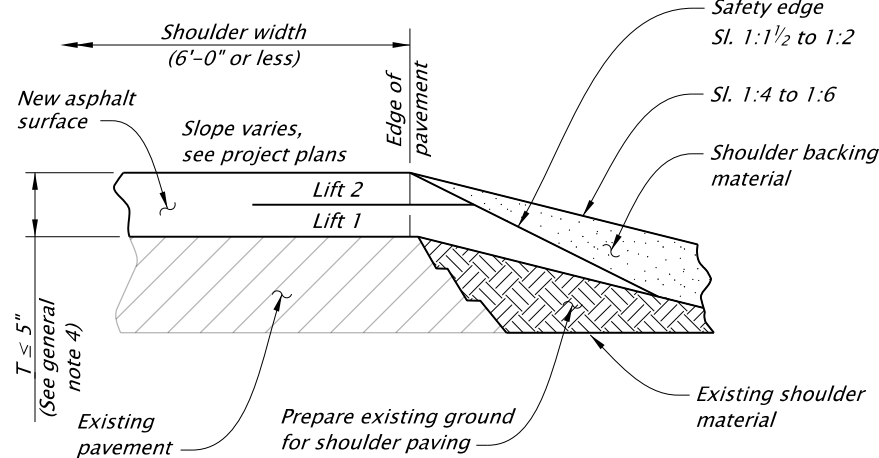


**SAFETY EDGE PLACED ONLY WITH FINAL LIFT**

**SAFETY EDGE FOR ASPHALT CONCRETE (NEW CONSTRUCTION)**

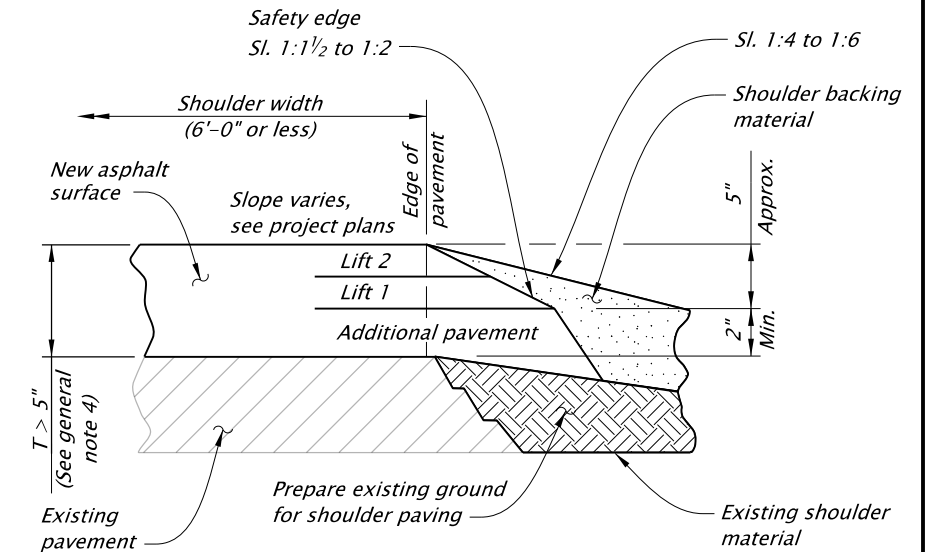


**SINGLE COURSE OVERLAY**



**PAVEMENT THICKNESS (T) 5" OR LESS**

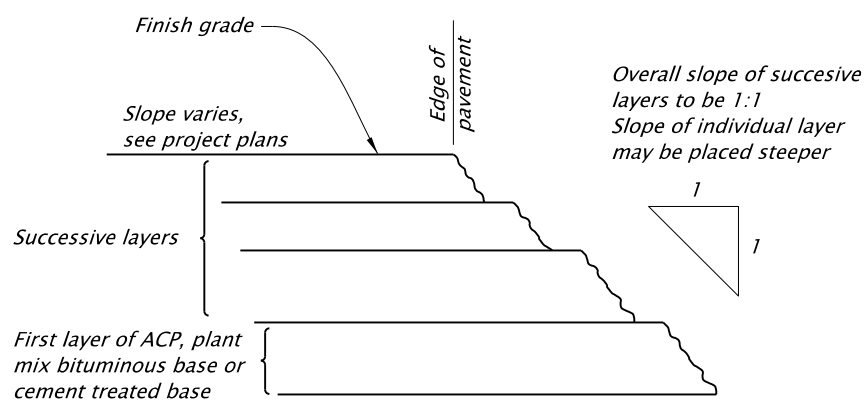
**SAFETY EDGE FOR ASPHALT CONCRETE RECONSTRUCTION (INCLUDING MILL, INLAY AND OVERLAY)**



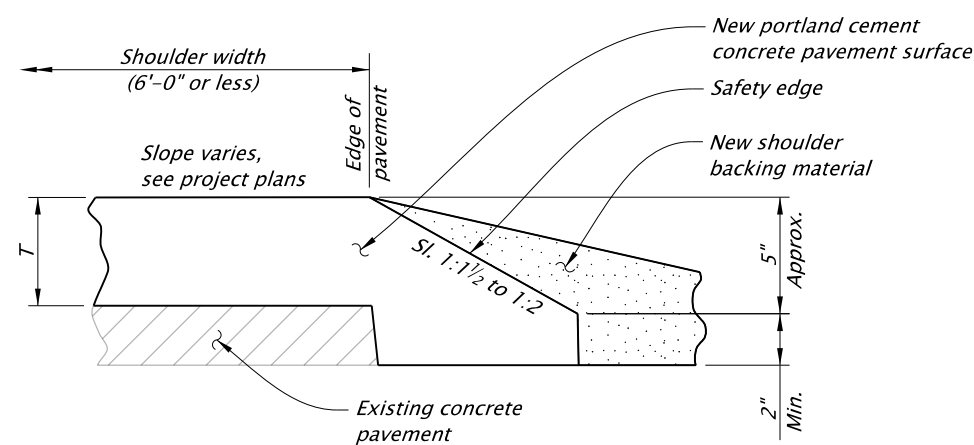
**PAVEMENT THICKNESS (T) GREATER THAN 5"**

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

1. Safety edges are required at the outside edges of the paved roadway (edge of travel lane or edge of paved shoulders), where the wearing surface thickness is 2" or greater, except where indicated in the plans.
2. Construct the safety edge at a slope of 1:1 1/2 to 1:2 measured from the pavement surface.
3. Do not construct safety edge at intersections, paved drives, or other obstructions.
4. For total new asphalt depth of "T" ≤ 5", construct the safety edge to the full thickness of the surface and intermediate courses. For total new asphalt depth of "T" > 5", construct the safety edge to a depth of 5" approximately with a 1:1 sloped face below the safety edge.



**MULTI-LAYER PAVEMENT CONSTRUCTION**



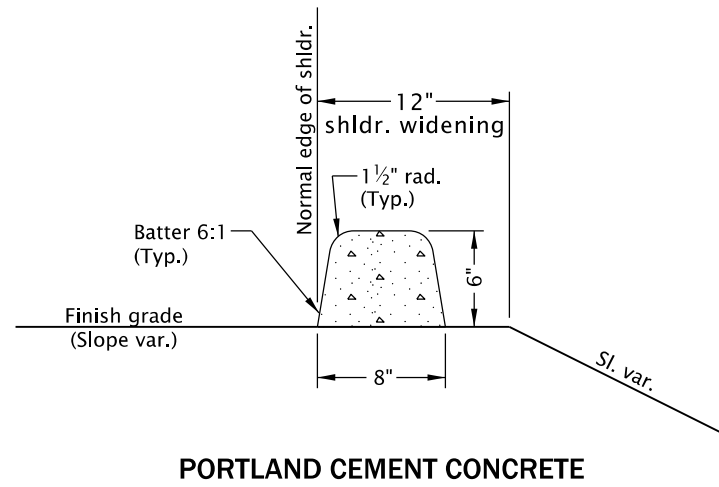
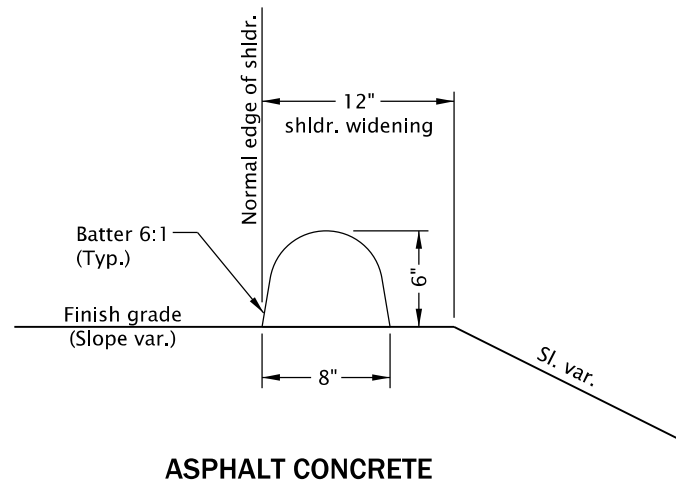
**SAFETY EDGE FOR PORTLAND CEMENT CONCRETE PAVEMENT OVERLAY**

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.			
<b>OREGON STANDARD DRAWINGS</b>			
<b>SURFACE EDGE DETAILS</b>			
2021			
DATE	REVISION	DESCRIPTION	
07-2021	TITLE CHANGED,	REVISED DETAILS AND NOTES	
CALC. BOOK NO.	N/A	SDR DATE	19-JUL-2021
			<b>RD615</b>

20-JUL-2020

RD701.dgn

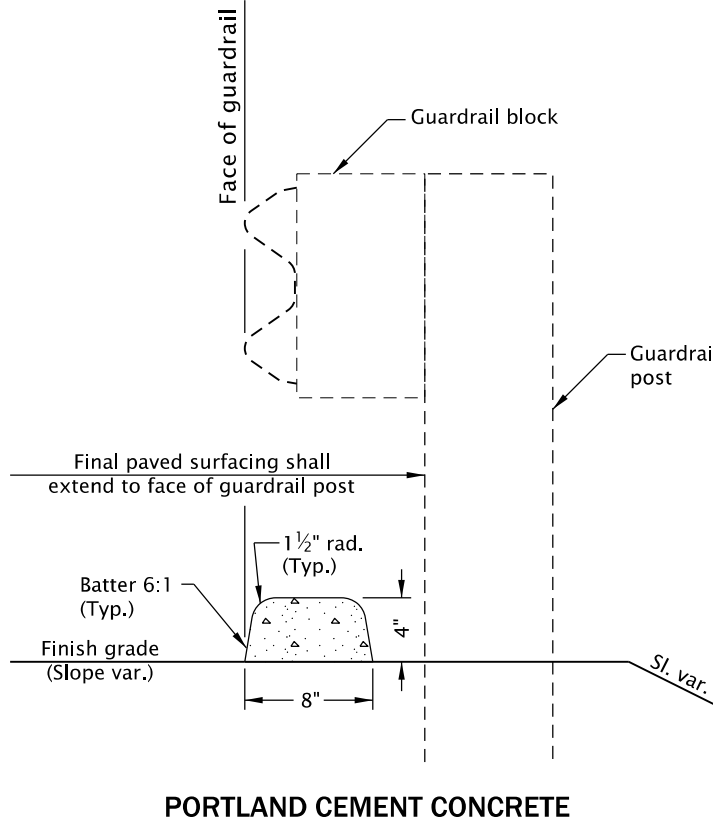
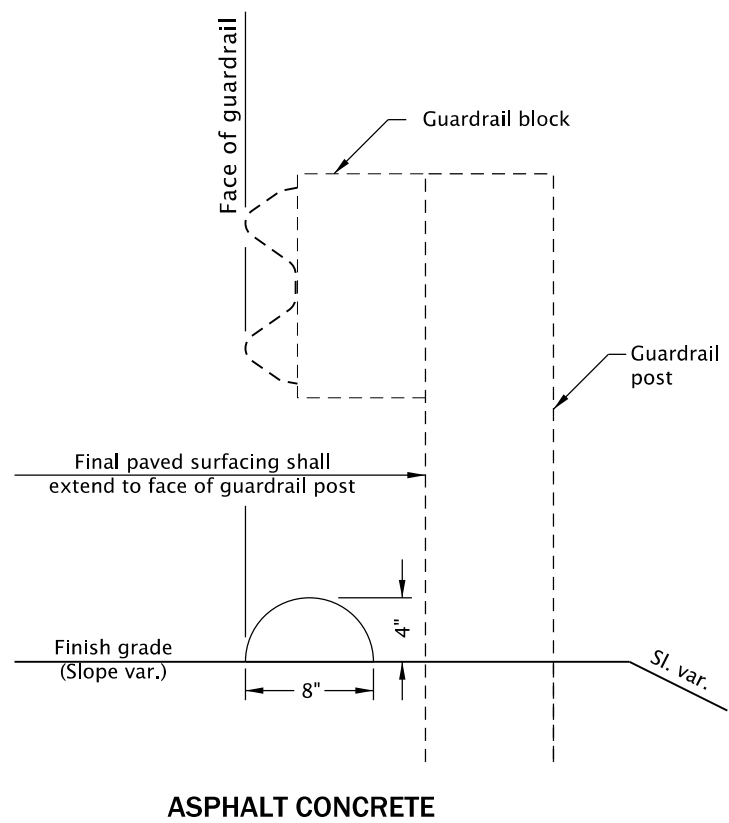


### DRAINAGE CURBS

(See general note 4)

**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

1. For PCC drainage curbs, construct curb expansion joints at 200' maximum spacing, and at points of tangency.
2. For PCC drainage curbs, construct curb contraction joints at 15' maximum spacing.
3. Dimensions are nominal, vary to conform with curb machine approved by the engineer.
4. When bonding to dense graded ACP, apply epoxy cement between surfaces.
5. When drainage curb is required, curb alignment shall be the same as face of guardrail, as shown above. When a run of drainage curb, or any part thereof, is placed under guardrail, curb height shall be 4".
6. For other curb types, see Std. Dwg. RD700.
7. For guardrail details not shown, see Std. Dwg. RD400.



### DRAINAGE CURBS UNDER GUARDRAIL

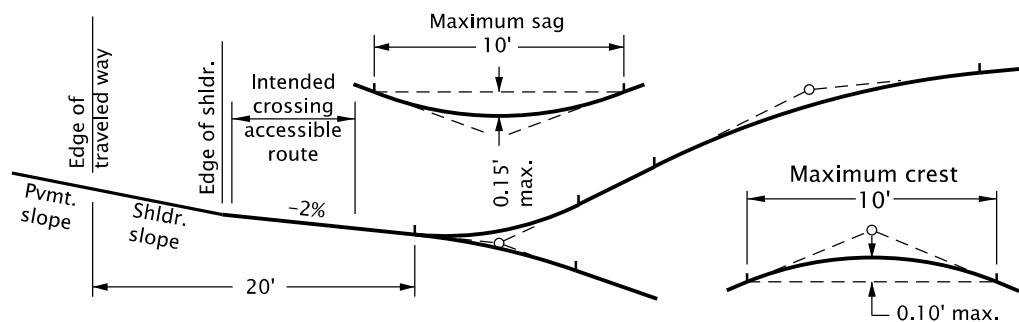
(See general note 4)

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

All materials shall be in accordance with the current Oregon Standard Specifications.	
<b>OREGON STANDARD DRAWINGS</b>	
<b>DRAINAGE CURBS</b>	
2021	
DATE	REVISION DESCRIPTION
CALC. BOOK NO. --- N/A ---	SDR DATE-- 20-JUL-2020 -- <b>RD701</b>

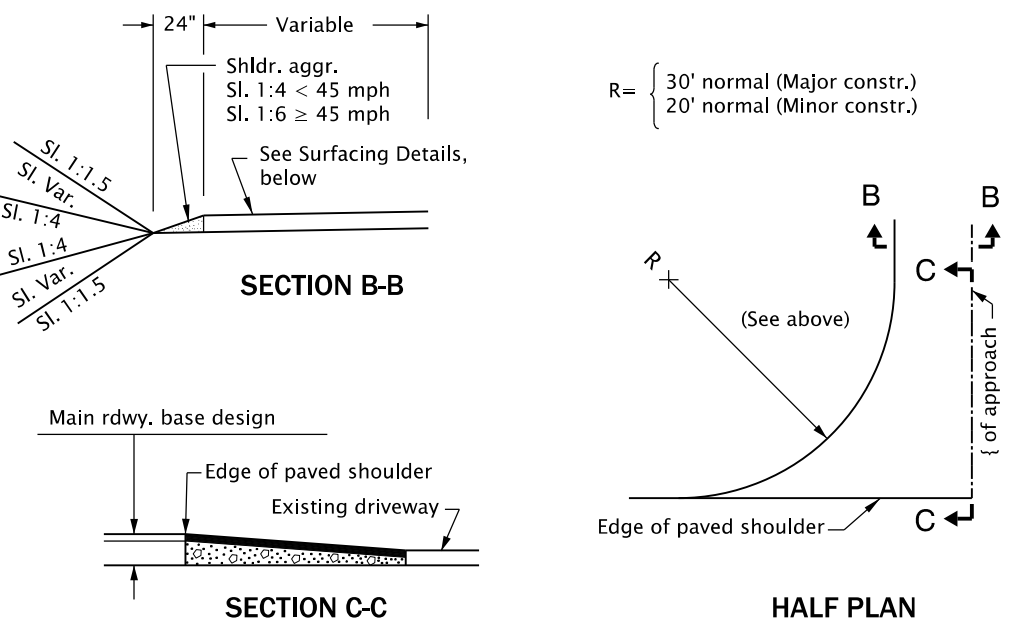
20-JUL-2020

RD715.dgn



**APPROACH PROFILE**

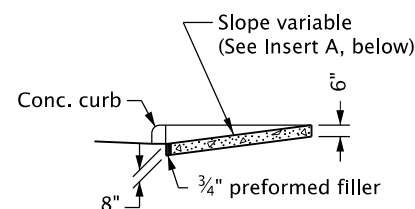
**NOTE:**  
When grades on approaches meet without vertical curves the maximum algebraic difference on crests should be 8% and on sags 12%. Grades steeper than 15% should not be used without prior approval of the engineer of record. Any driveways with slopes exceeding 12% shall be paved.



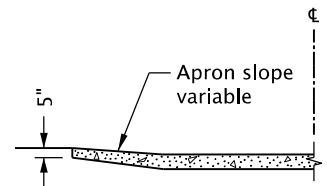
**APPROACH**

**NOTE:**  
Normal paving limits to extend 20' (30' for public road connections) from the edge of pavement or to the right of way line, whichever is less. Approach surfacing and width to then match existing approach.

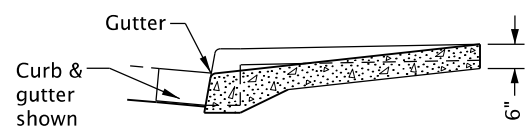
**TYPE A  
PORTLAND CEMENT CONCRETE**



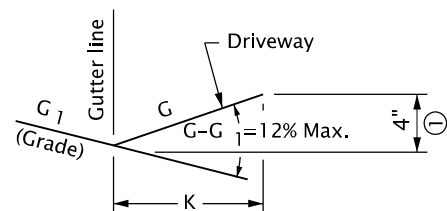
**SECTION D-D**



**SECTION E-E**



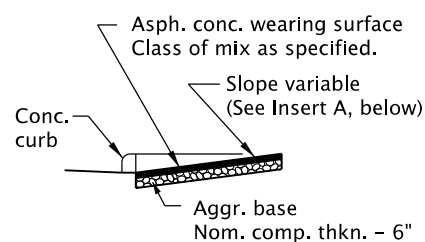
**SECTION A-A  
FOR MONOLITHIC DRIVEWAYS**



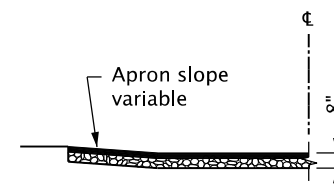
**INSERT A**

① Minimum allowable for drainage control on negatively sloped driveways.

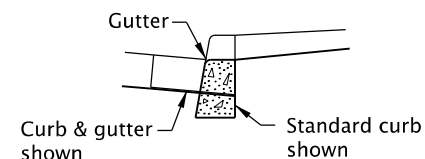
**TYPE A-1  
ASPHALT CONCRETE**



**SECTION D-D**



**SECTION E-E**



**SECTION A-A  
FOR DRIVEWAYS**

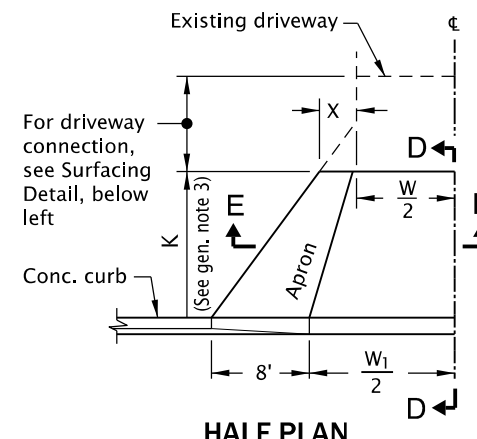
**NON-SIDEWALK DRIVEWAYS**

**NOTE:** This driveway type shall not be used along a pedestrian route. See "Table A" for dimensions not shown.

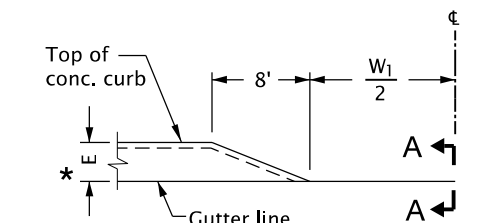
**GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**

1. Driveway details shown on this drawing are to be used on roadways where there are no existing or planned sidewalks in driveway vicinity. For driveways located in a sidewalk see Std. Dwgs. RD720, RD721, RD725 and/or RD730, RD735, RD740, RD745, RD750.
2. Width of driveway (W) as shown on plans or as directed.
3. K is the distance from back of curb to back of driveway (10' max.).
4. Where existing driveway is in good condition, construct only as much as required for satisfactory connection with new work.
5. "Alternate Apron Slope" used only where plans designate. Alternate Apron Slope may also be used at local jurisdiction's request when approved by the Project Manager.
6. Increase thickness of asphalt concrete and stone base where shown on plans.
7. For curb details, see Std. Dwgs. RD700 & RD701.
8. For expansion and contraction joint requirements, see applicable curb and sidewalk standard drawings.

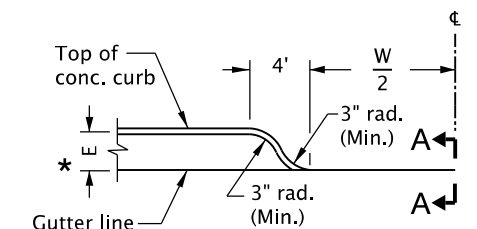
*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*



**HALF PLAN**



**HALF ELEVATION**



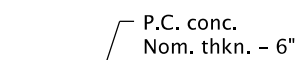
**HALF ELEVATION  
(ALTERNATE APRON SLOPE)**  
(See General Note 5)

\* Curb exposure E = 7" normal. Vary as shown on plans or as directed.

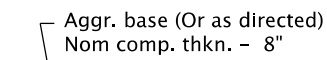
**TABLE A**

W (ft)	X (ft)	K (ft)			
		5	6	8	10
12	3	15	15	15	15
14		17	17	17	17
16		19	19	19	19
18		21	21	21	21
20		23	23	23	23
22	4	27	28	29	30
24		29	30	31	32
26		31	32	33	34
28		33	34	35	36
30		35	36	37	38
32		5	41	42	44
34	43		44	46	48
36	45		46	48	50

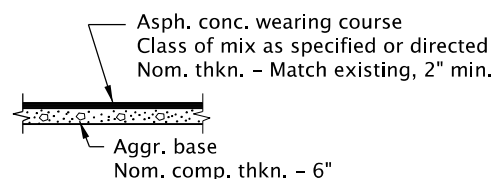
Where a travel lane is constructed adjacent to the curb line, use 16' W min. for residence and 30' W min. for light commercial, add 5' to W<sub>1</sub> for both. Do not add the 5' to W<sub>1</sub> when 4' min. shldr. or bikeway is included in the typical.



**P.C. CONCRETE SURFACING**



**GRAVEL SURFACING**



**ASPHALT CONCRETE SURFACING**

**APPROACH AND DRIVEWAY CONNECTION SURFACING DETAILS**

All materials shall be in accordance with the current Oregon Standard Specifications.

**OREGON STANDARD DRAWINGS  
APPROACHES AND  
NON-SIDEWALK DRIVEWAYS**

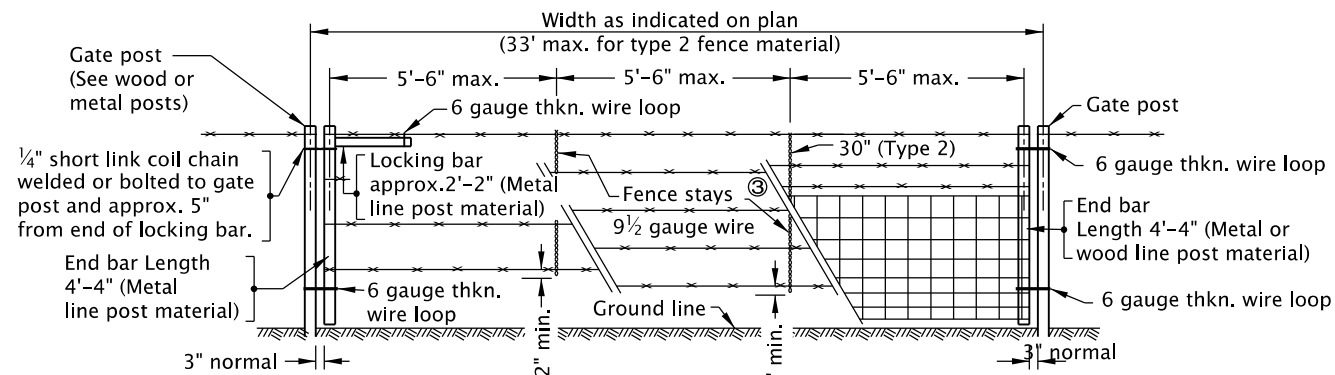
2021

DATE	REVISION DESCRIPTION

CALC. BOOK NO. --- N/A --- SDR DATE: 14-JAN-2022 **RD715**

20-JUL-2020

RD810.dgn



- NOTES:
- Match adjoining fence type.
  - For details not shown see fence type.
  - For wooden stays, see Type 1 fence details.

## GATEWAY

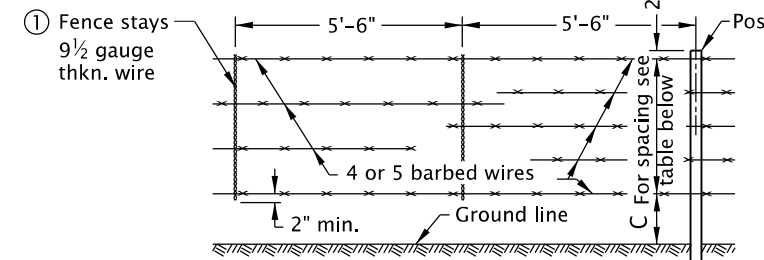
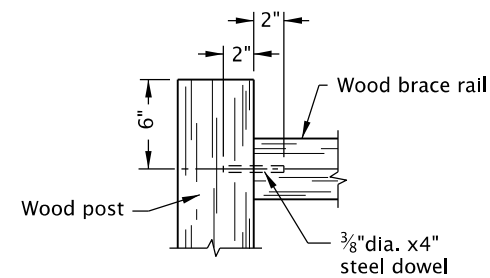


TABLE OF DIMENSIONS

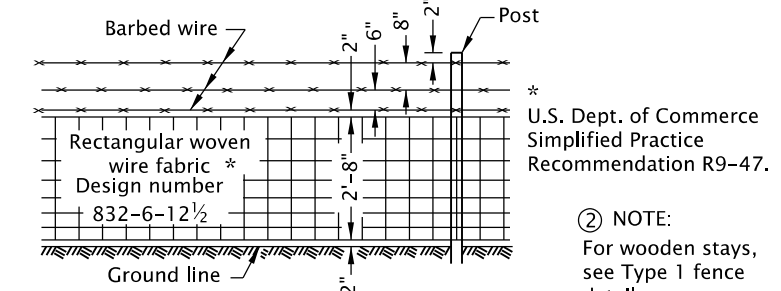
FENCE	C	SPACING	NO. OF WIRES
Type 1	14"	12"	4
Type 1-5W	10"	10"	5

- NOTE:
- Wooden Stays to be used in areas of heavy snowfall or snow drifts over 36". Stays to be 2"x2"x52" min. length, sound, untreated Douglas Fir, Western Hemlock or Western Pine, spaced as shown for wire stays and to rest firmly on the ground. Horizontal wires to be stapled are: single wires and a minimum of 4 wires for woven wire fabric.

## TYPES 1, & 1-5W



## BRACE RAIL CONNECTION



## TYPE 2

TABLE 1 (For wood posts)

FENCE	R (ft)	UNITS REQUIRED
Types { 1, 1-5W & 2	20 or Less	* None
	20-330	A
	Over 330	A & B

\* Unit A required at gate post.

Either Unit A or Units A & B are required in existing fence line at intersection with new fence line.

TABLE 2

FENCE	R max.	P	L min.	L1 min.	H	D min.	D1 min.	B min.	X min.-max.
All Types	660'	16'-6"	7'-6"	6'-6"	4'-4"	3'-2"	2'-2"	7'-8"	9"-22"

TABLE 3

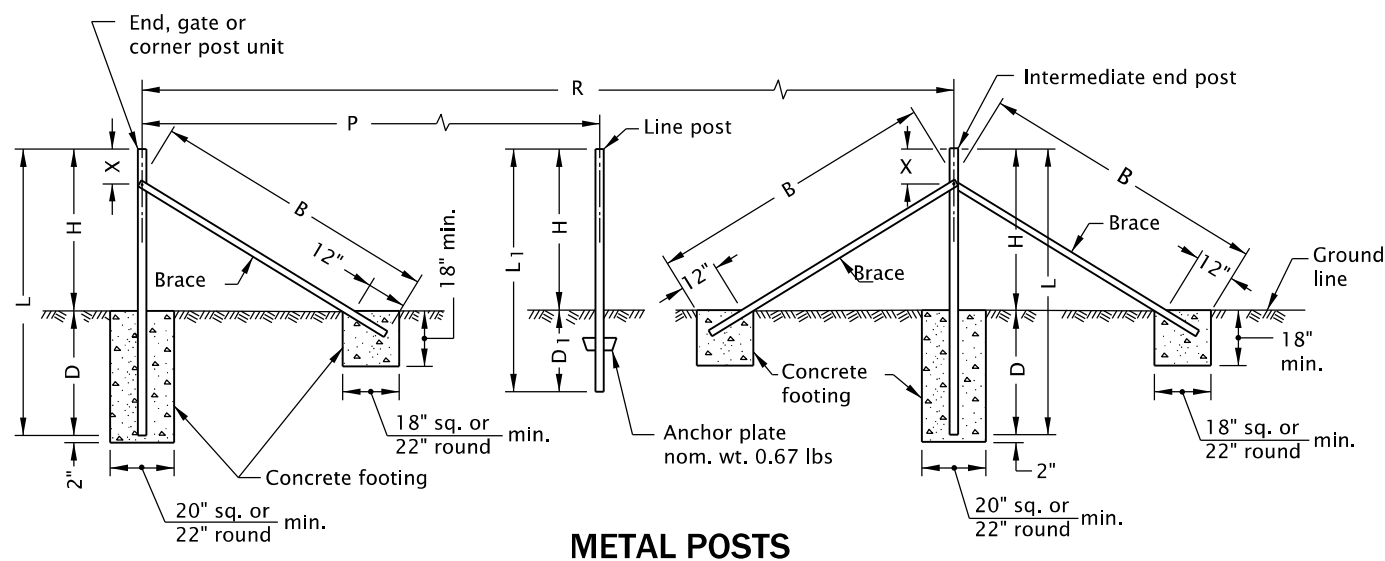
MEMBER	WOOD		SHAPE	WEIGHT PER (ft) nominal	SIZE nominal
	* ROUND	SQUARE			
	DIAMETER OF SMALL END (in) min.-max.	SIZE nominal (in) min. avg.			
Line Post	3" to 4"	3"	tee 3"x3" or U-bar	1.33 lb	ASTM A-702
Brace or Brace Rail	3 1/2" to 5 1/2"	4"	Tubular	(b)	1 1/2" +/- O.D.
			(a) Angle	3.19 lb	2"x2"x1/4"
Other Post	4" to 7"	5"	Tubular	b	2 3/8" O.D.
			(a) Angle	4.1 lb	2 1/2"x2 1/2"x1/4"

\* Max. taper 1":48".

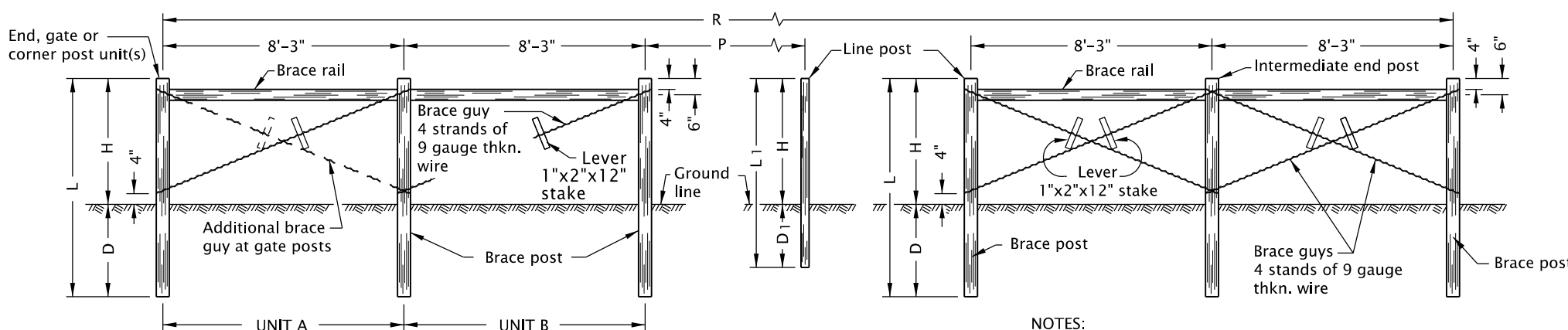
† Max. allowable size 1" additional in each dimension.

(a) In accordance with ASTM A 702.

(b) In accordance with AASHTO M 181.



## METAL POSTS



## WOOD POSTS

- NOTES:
- For dimensions indicated by letter see Table 2.
  - Line post spacing same as dimension P.
  - For cross sectional dimensions of members see Table 3.

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

- For dimensions indicated by letter see Table 2.
- Line post spacing same as dimension P.
- For shapes, weights and dimensions of members see Table 3.

- All concrete shall be commercial grade concrete.
- See Std. Dwg. RD820 for fence gates.
- See project plans for details not shown.
- Add fence grounding as required.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

## OREGON STANDARD DRAWINGS BARBED AND WOVEN WIRE FENCES

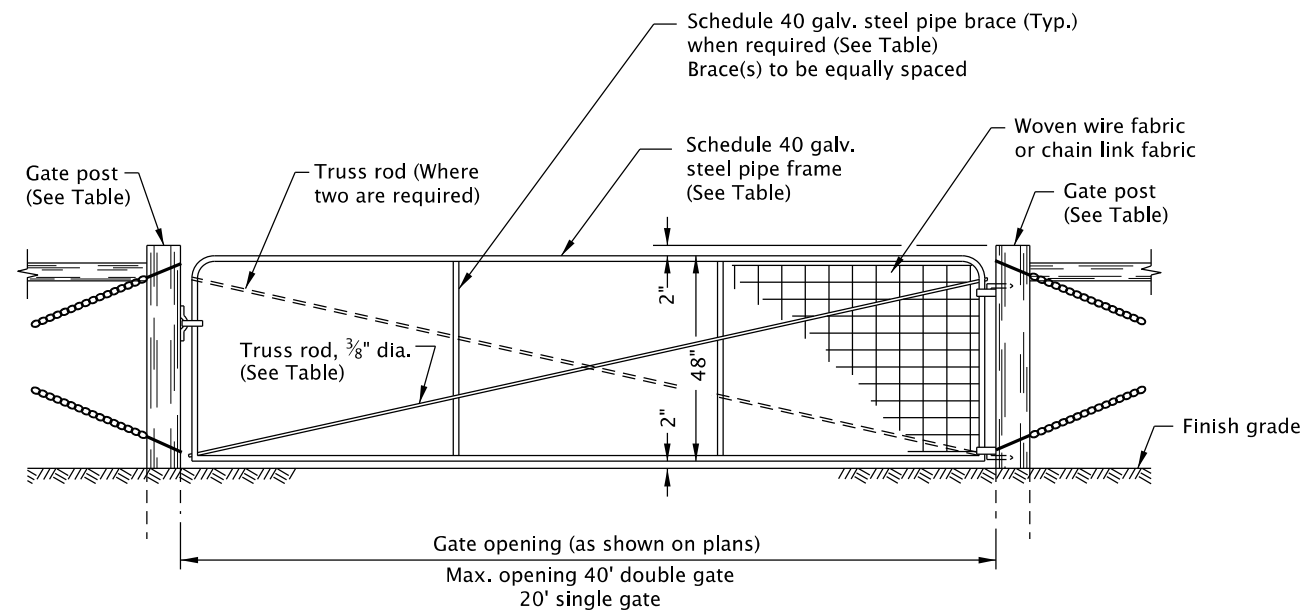
2021

DATE	REVISION	DESCRIPTION

CALC. BOOK NO. --- N/A --- SDR DATE: 13-JAN-2020 RD810

20-JUL-2020

RD820.dgn



GATE COMPONENTS								GATE POSTS ① ②					
GATE OPENING (ft)		SCHEDULE 40 GALV. STEEL PIPE FRAME		SCHEDULE 40 GALV. STEEL PIPE BRACE			TRUSS RODS	WOOD * ROUND			SQUARE	STEEL SCHEDULE 40 GALV. STEEL PIPE	
SINGLE GATE	DOUBLE GATE	NOM. DIA. (in)	MIN. WT. (lb/ft)	NUMBER	NOM. DIA. (in)	MIN. WT. (lb/ft)		DIA. OF SMALL END (in)			NOM. SIZE (in)	NOM. DIA. (in)	MIN. WT. (lb/ft)
								Min.	Max.	Min. Avg.			
UP thru 6	UP thru 12	1	1.68	-	-	-	-	5	7	6	6x6	2 1/2	5.79
7 thru 11	13 thru 22	1 1/4	2.27	1	1	1.68	1	5	7	6	6x6	3 1/2	9.11
12 thru 16	23 thru 32	1 1/2	2.72	2	1 1/4	2.27	2	7	9	8	8x8	6	18.97
17 thru 20	33 thru 40	2	3.65	2	1 1/4	2.27	2	9	11	10	10x10	6	18.97

- ① Gate posts on each side of a gate opening to be the same size. At a double gate installation with unequal width gates, size of both posts to be as indicated for single gate installation of the wider gate width.
- ② For length, setting and bracing details see end posts, Std. Dwg. RD810.

\* Max. taper 1" in 4'

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Gates shown are for use with Fence Types 1, 1-5W and 2.
2. See Std. Dwg. RD810 for details not shown.
3. See project plans for details not shown.
4. Add fence grounding as required.

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

FENCE GATES

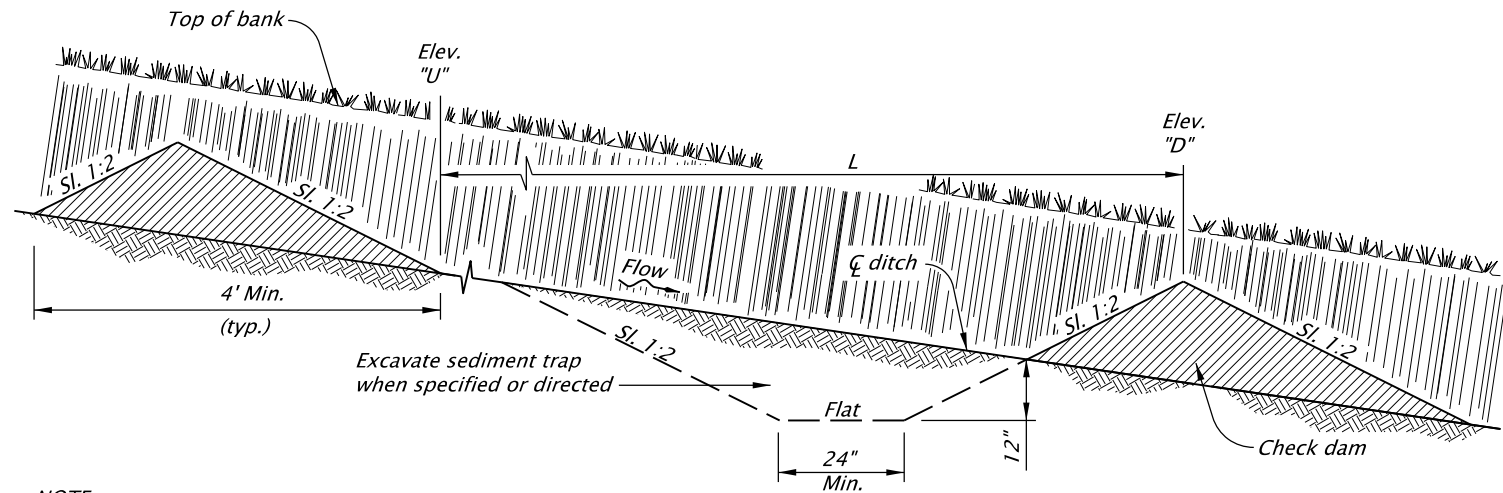
2021

DATE	REVISION	DESCRIPTION

CALC. BOOK NO. --- N/A --- SDR DATE 13-JAN-2020 RD820

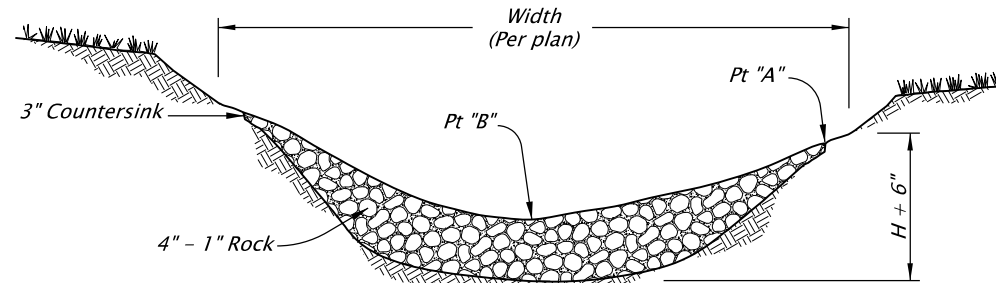
20-JAN-2021

RD1005.dgn



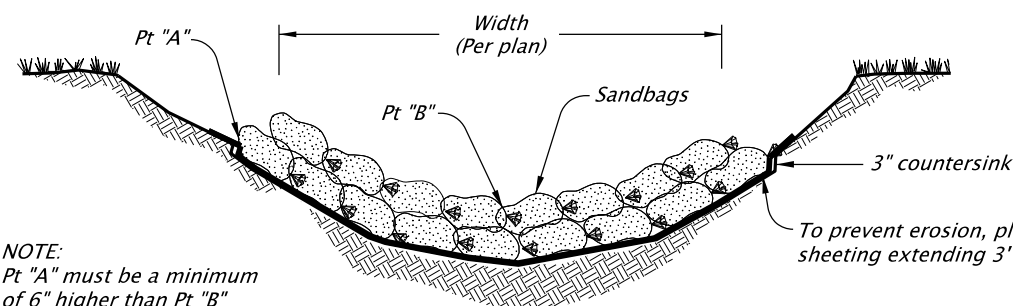
NOTE:  
L = Spacing along swale or ditch so that Elevation "U" equals Elevation "D".

**TYPICAL PROFILE SECTION CHECK DAMS (SHOWN WITH AGGREGATE)**  
NOT TO SCALE



NOTE:  
Pt "A" must be a minimum of 6" higher than Pt "B"

**AGGREGATE CHECK DAM - TYPE 1**  
NOT TO SCALE



NOTE:  
Pt "A" must be a minimum of 6" higher than Pt "B"

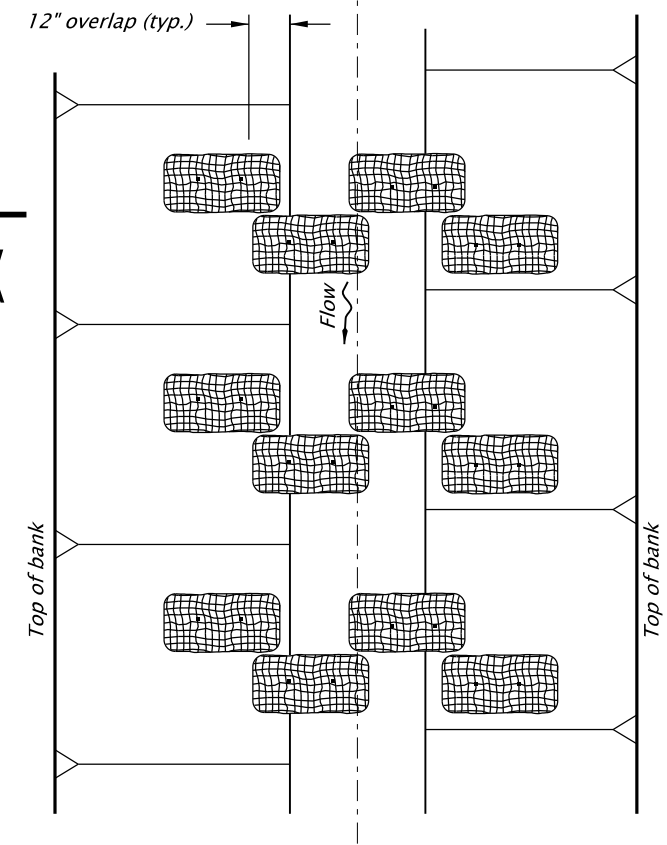
**SANDBAG CHECK DAM - TYPE 4**  
NOT TO SCALE

MAXIMUM CHECK DAM SPACING "L"				
Ditch Grade	H=8"	H=12"	H=18"	H=24"
10%	**	**	15'	20'
9%	**	**	16'	22'
8%	**	**	18'	25'
7%	**	**	21'	28'
6%	**	16'	25'	33'
5%	**	20'	30'	40'
4%	16'	25'	37'	50'
3%	22'	33'	50'	66'
2%	33'	50'	75'	100'

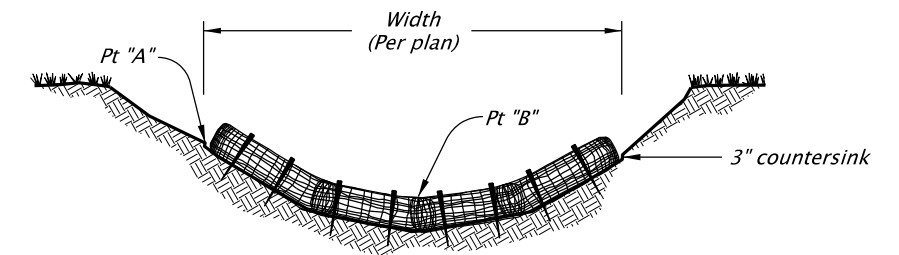
\*\* Not allowed H = Min. dam height

NOTES:

1. Type 3 - stake biofilter bags with two 2"x2"x18" (minimum) wood stakes per bag. Drive stakes a minimum of 6" into the ground and flush with the top of the bags. Omit stakes if placed over paved surfaces. Overlap bags 12" minimum at each joint.
2. Type 4 - Tightly abut or overlap ends of sandbags at each joint.
3. Spacing between check dams for all check dam types shall comply with the typical profile section shown above.



PLAN



SECTION A-A

**BIOFILTER BAG CHECK DAM - TYPE 3**  
NOT TO SCALE

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS

**CHECK DAMS TYPE 1, 3 AND 4**

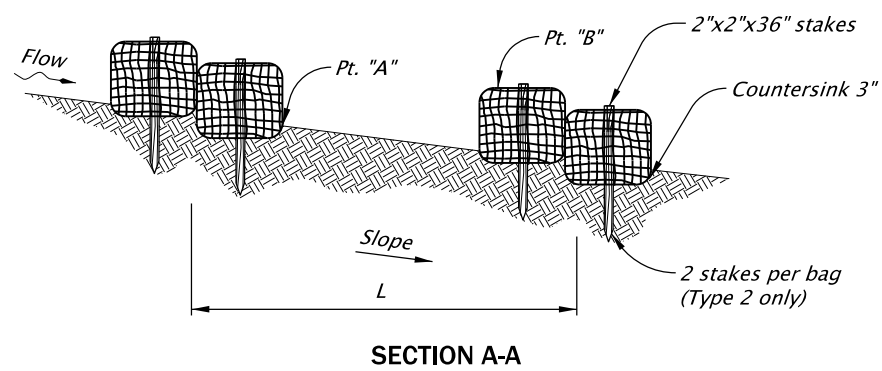
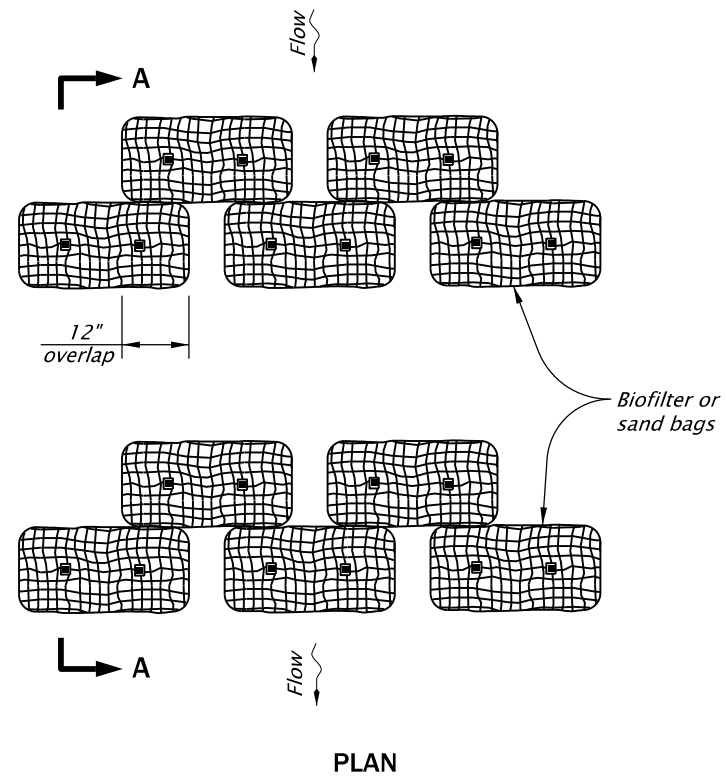
2021

DATE	REVISION	DESCRIPTION
01-2021	REMOVED	CALC BOOK NUMBERS
CALC. BOOK NO. ---	N/A ---	SDR DATE: 20-JAN-2021

RD1005



RD1030.dgn 20-JAN-2021

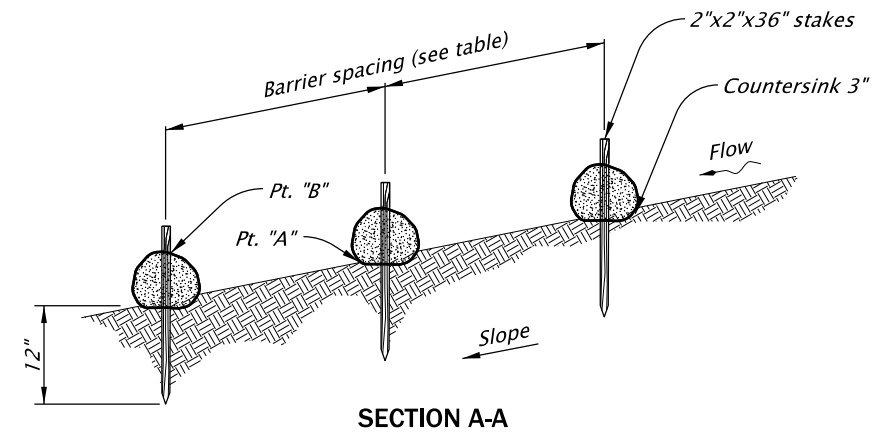
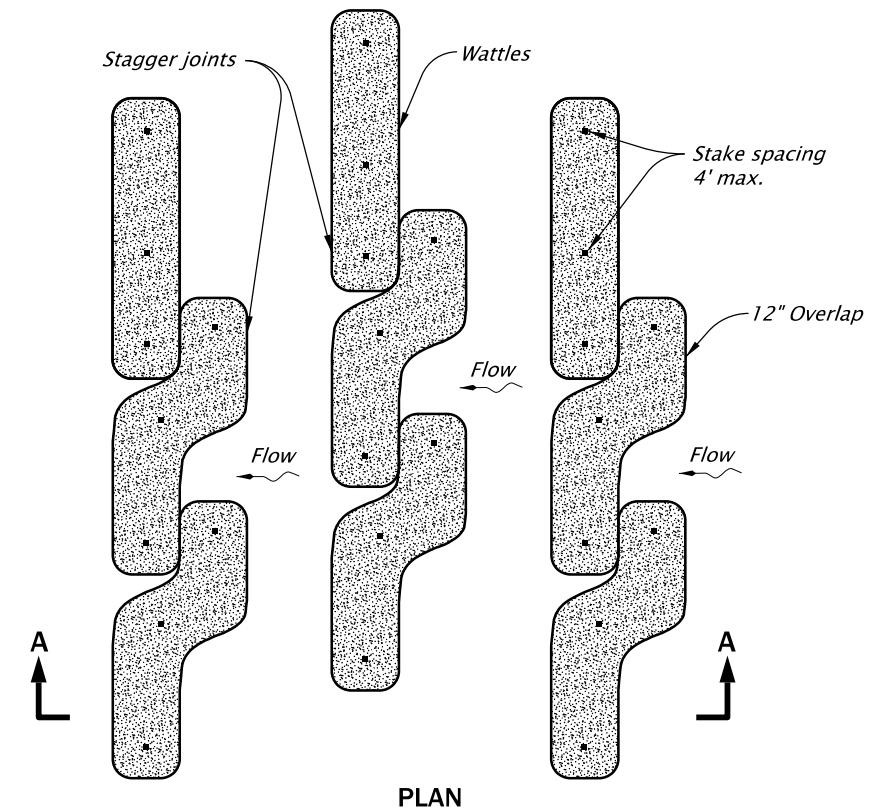


**BIOFILTER BAG / SAND BAG BARRIER - TYPE 2 AND 4**  
NOT TO SCALE

**NOTES:**

1. For Type 2 barrier, drive stakes flush with top of bag and into undisturbed ground a min. of 12". Omit stakes if bags are placed on paved surface.
2. For Type 2 and Type 4 barriers, space bags (L) so that the elevation of point "A" is less than or equal to the elevation of point "B".

Type 2 - Biofilter bags  
Type 3 - Wattles  
Type 4 - Sand bags



**FIBER ROLL BARRIER - TYPE 3**  
NOT TO SCALE

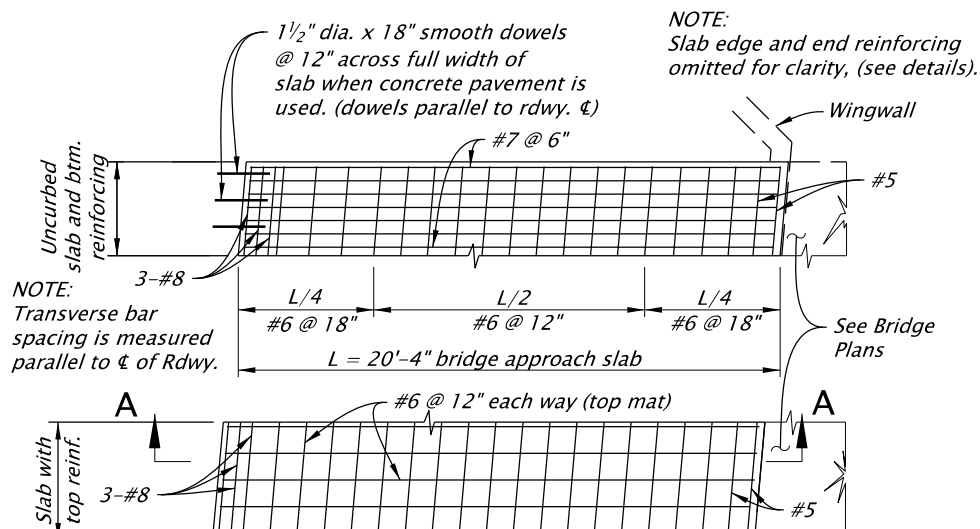
BARRIER SPACING		
INSTALL PARALLEL ALONG CONTOURS AS FOLLOWS		
% SLOPE	% SLOPE	MAXIMUM SPACING ON SLOPE
10% Flatter	1:10 or Flatter	300'
10 > % ≥ 15	10 > X ≥ 7.5	150'
15 > % ≥ 20	7.5 > X ≥ 5	100'
20 > % ≥ 30	5 > X ≥ 3	50'
Steeper than 30%	Steeper than 1:3	25'

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

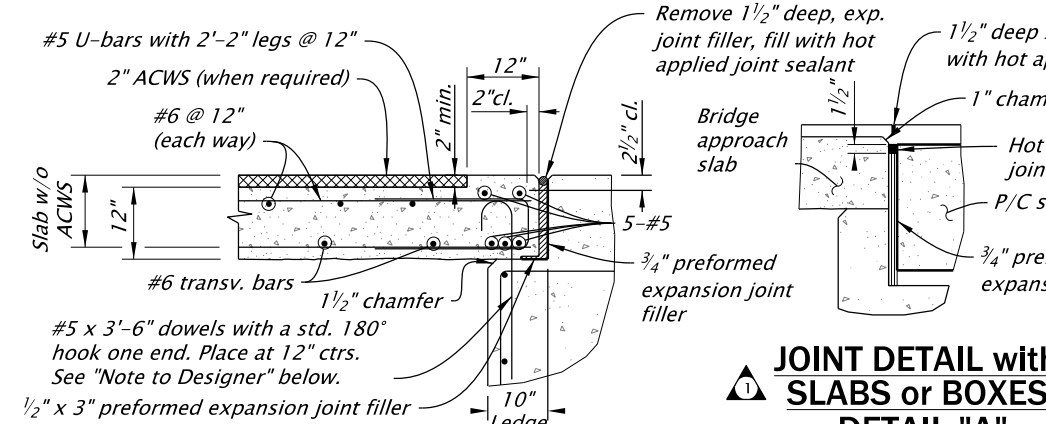
All materials shall be in accordance with the current Oregon Standard Specifications.		
<b>OREGON STANDARD DRAWINGS</b>		
<b>SEDIMENT BARRIER TYPE 2, 3 AND 4</b>		
2021		
DATE	REVISION DESCRIPTION	
01-2021	REMOVED CALC BOOK NUMBERS	
CALC. BOOK NO.	N/A	SDR DATE
		20-JAN-2021
		<b>RD1030</b>

01-JULY-2020

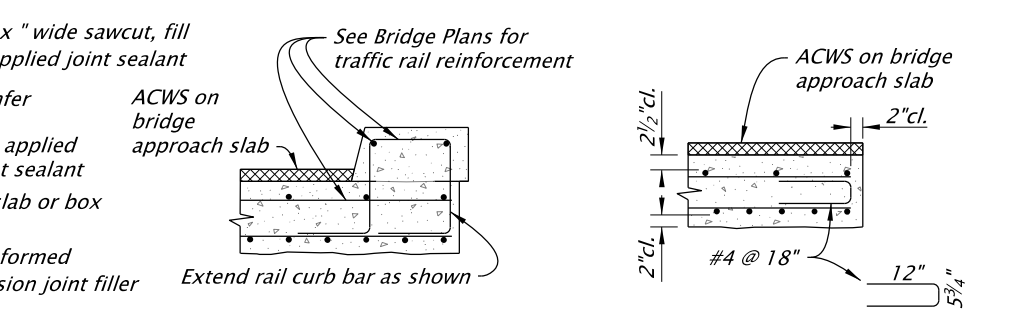
BR165.dgn



**PLAN - TYPICAL APPROACH SLAB**

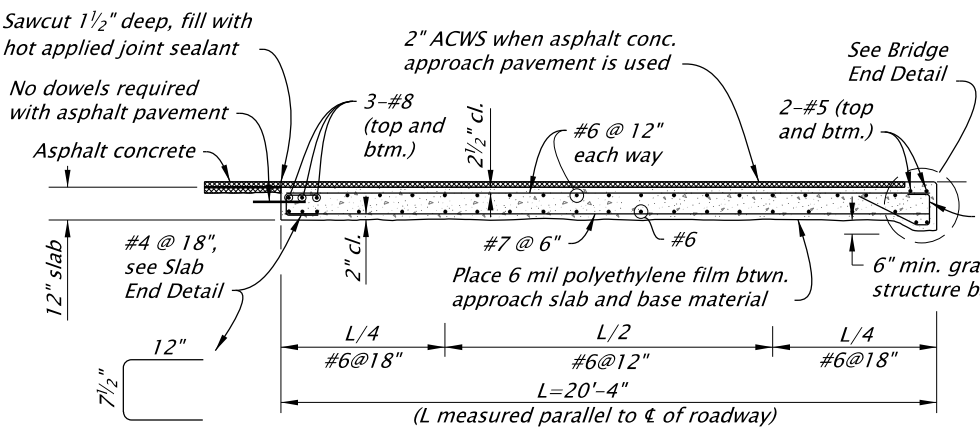


**TYPICAL BRIDGE END DETAIL WITHOUT EXPANSION JOINT BLOCKOUT**

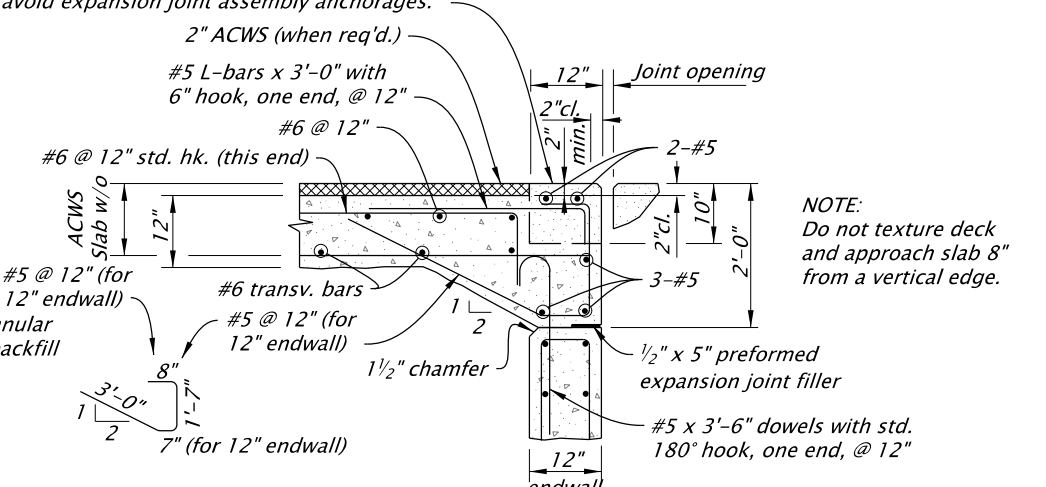


**CURB EDGE DETAIL**

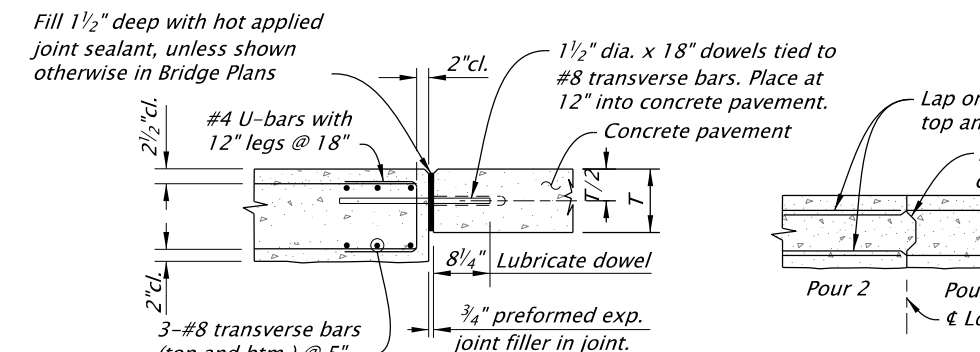
**UNCURBED EDGE DETAIL**



**SECTION A-A**

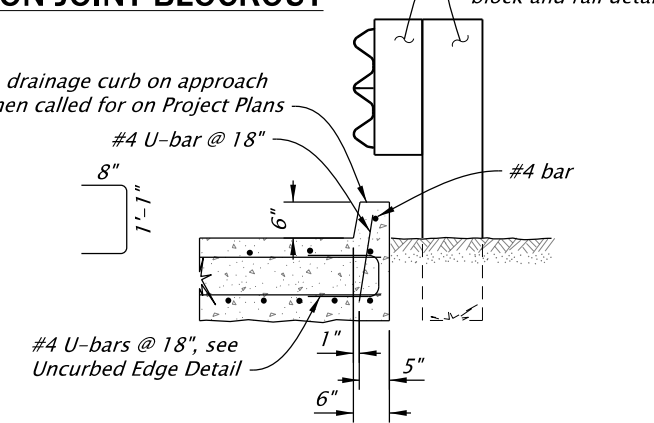


**BRIDGE END DETAIL WITH EXPANSION JOINT BLOCKOUT**

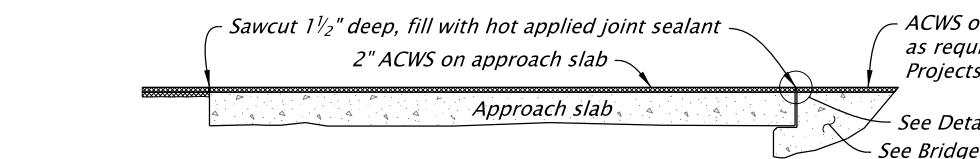


**SLAB END DETAIL**

**LONGITUDINAL JOINT DETAIL**



**DRAINAGE CURB EDGE DETAIL**



**APPROACH SLAB WITH ASPHALT PAVEMENT ON BRIDGE**

**GENERAL NOTES:**

1. See Project Plans for bridge rail, median barrier, and/or guardrail transition details.
2. Bridge approach slab designed for HL-93 loading according to AASHTO LRFD Bridge Design Specifications with an allowance of 25 psf for present wearing surface and 25 psf for future wearing surface (Span = 17'-4").
3. Provide Class HPC 4500 - 1 or 1 1/2 concrete.
4. Provide reinforcing steel conforming to AASHTO Specification M31 (ASTM A615) Gr. 60 or A706. Place steel 2" clear of nearest face of concrete unless shown otherwise. Use the following splice lengths unless shown otherwise:
 

Bar Size	3	4	5	6	7	8	9	10	11
Splice Length	1'-4"	1'-6"	1'-11"	2'-3"	2'-7"	3'-0"	3'-4"	3'-9"	4'-2"
Uncoated	1'-4"	1'-6"	1'-11"	2'-3"	2'-7"	3'-0"	3'-4"	3'-9"	4'-2"
Epoxy Coated	1'-8"	2'-3"	2'-10"	3'-4"	3'-11"	4'-5"	5'-0"	5'-8"	6'-3"
5. Provide 3/4" chamfer at all top transverse concrete edges (each end of approach slab and each end of bridge).
6. Longitudinal construction joints are allowed only when permitted by the Engineer or when shown on the Project Plans.
7. When a longitudinal construction joint is permitted, locate joint on a lane line.
8. Provide dowels conforming to AASHTO Specification M31 (ASTM A615).
9. Use the details on this sheet unless shown otherwise on the Project Plans.
10. Flare approach slab as required. Maintain bottom longitudinal bars spacing requirements at midspan.
11. Support top and bottom mat reinforcing steel at 3'-0" max. centers each way. Use #4 C-bars with 8" legs, or approved bar support chairs for top mat.
12. For additional reinforcing bars needed in the approach slab, see bridge rail and transition drawings in project plans.

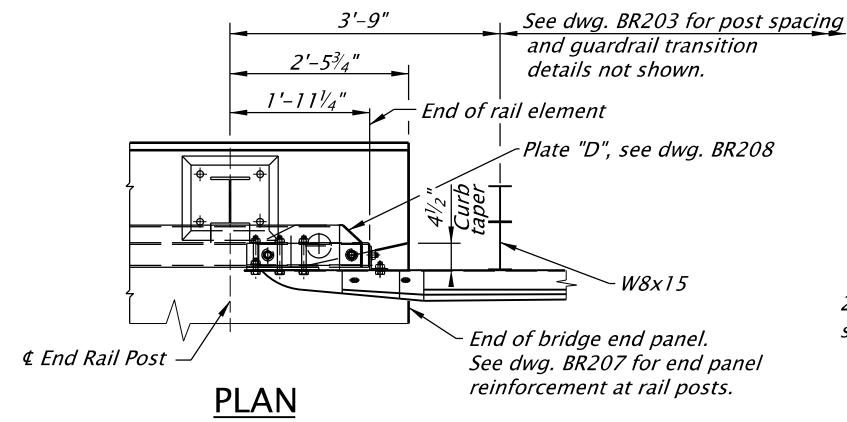
**NOTE TO DESIGNER:**  
For Integral and Semi-Integral end bents where the approach slab movement is used to accommodate thermal expansion, design and provide additional confinement and dowel reinforcement at bearing seat connection, as required.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.		All materials shall be in accordance with the current Oregon Standard Specifications.	
		<b>OREGON STANDARD DRAWINGS</b>	
		<b>BRIDGE APPROACH SLAB</b>	
		2021	
DATE	REVISION	DESCRIPTION	
07-2020		Changed end panel to approach slab, Removed 30'-4" length; CAD updates	
CALC. BOOK NO.	N/A	SDR DATE	20-APR-2018
		<b>BR165</b>	

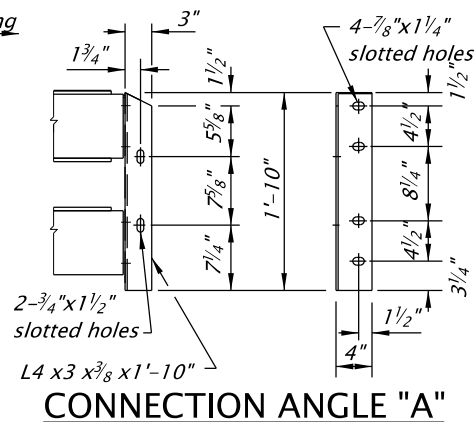


MAR-2017

BR209.dgn

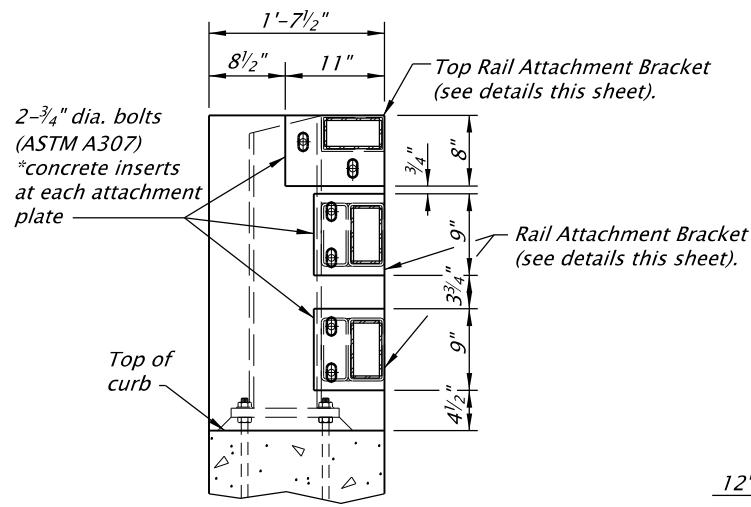


PLAN

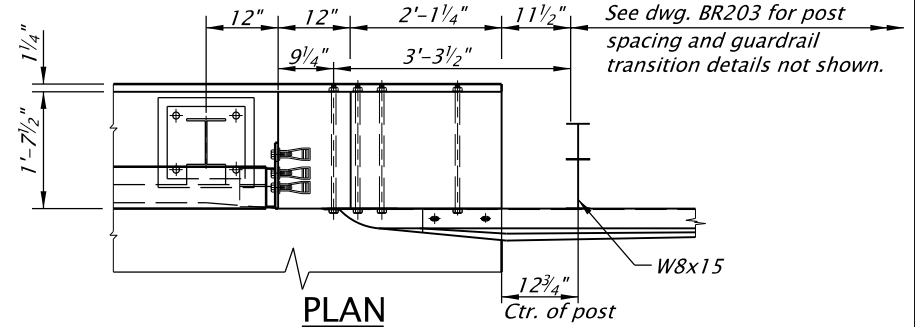


CONNECTION ANGLE "A"

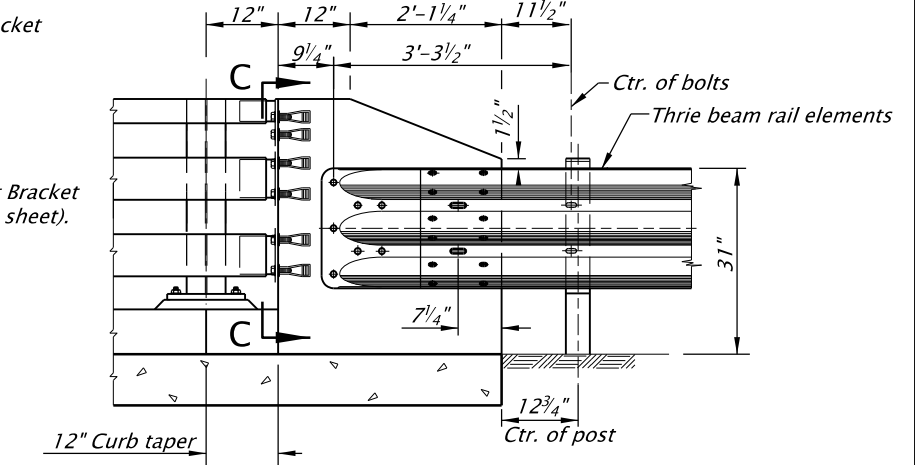
**\*CONCRETE INSERTS**  
 Hot-dip galvanized expanded coil concrete inserts with closed-back ferrule threaded to receive 3/4" dia. bolts, Gr36 (ASTM A307)  
 Minimum insert length= 4 1/2"  
 Minimum safe working load in tension= 4000 lbs.



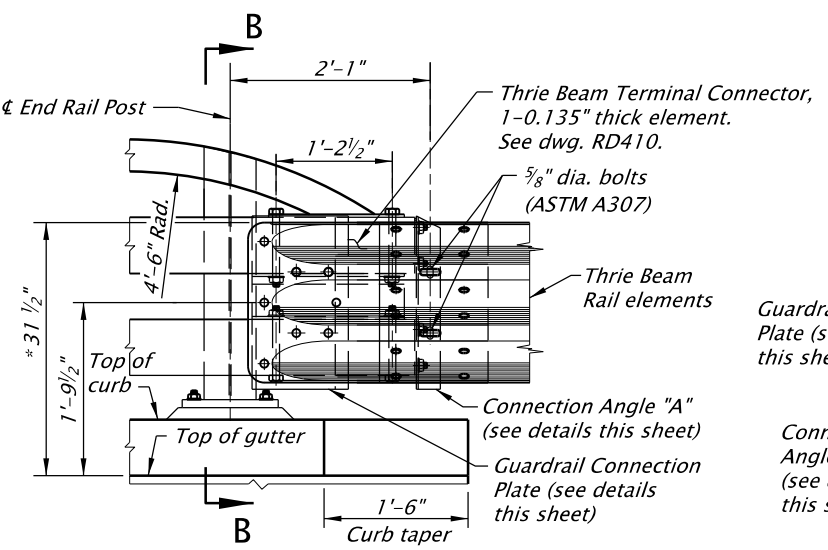
SECTION C-C



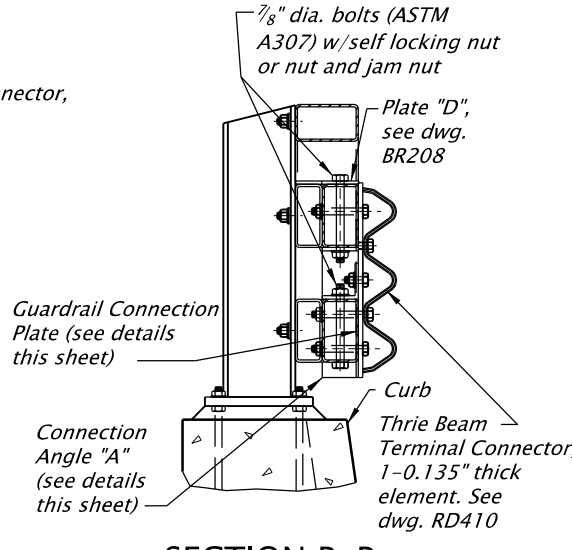
PLAN



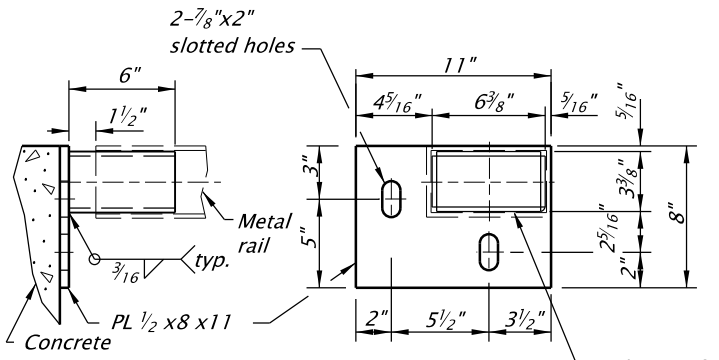
ELEVATION: TRANSITION CONNECTION TYPE II



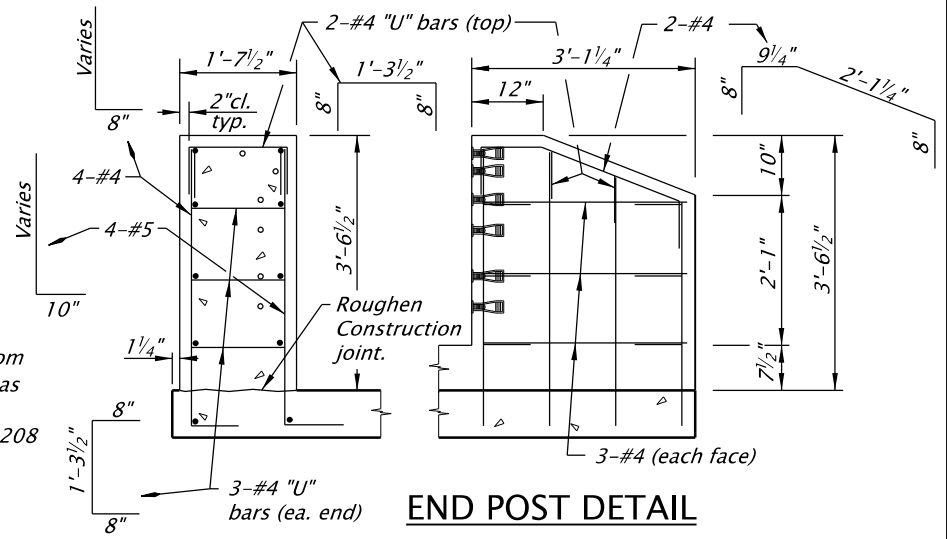
ELEVATION: TRANSITION CONNECTION TYPE I



SECTION B-B

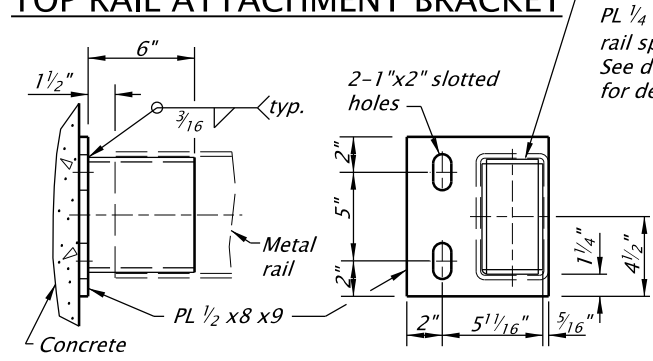


TOP RAIL ATTACHMENT BRACKET



END POST DETAIL

Fabricate from PL 1/4 (same as rail splices). See dwg. BR208 for details.

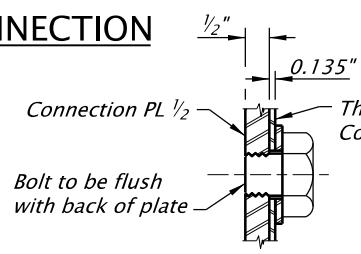


RAIL ATTACHMENT BRACKET

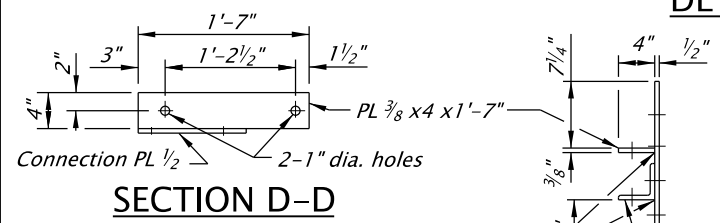
**GENERAL NOTES**  
 Rail designed and crash tested to meet NCHRP 350 TL-4 requirements.  
 Provide concrete Class 3300- 1/2 or 3/4.  
 Provide steel plates conforming to AASHTO M183 (ASTM A36).

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

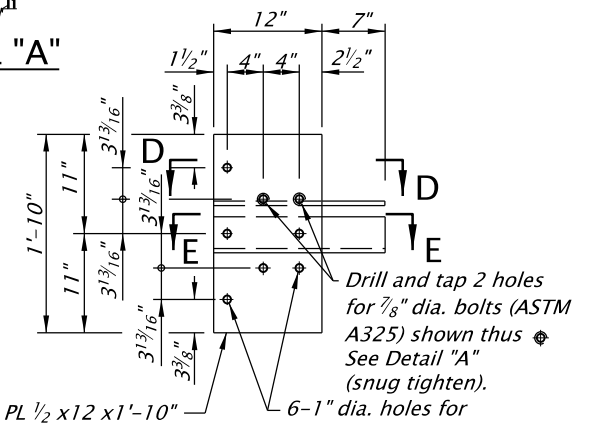
Effective Date: June 1, 2023 - November 30, 2023



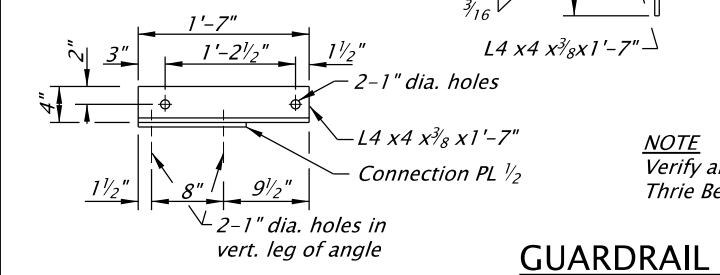
DETAIL "A"



SECTION D-D



GUARDRAIL CONNECTION PLATE DETAIL



SECTION E-E

**NOTE**  
 Verify all bolt hole locations to match Thrie Beam Terminal Connector.

Accompanied by dwgs. BR203, BR207, BR208, RD405, RD410

All materials shall be in accordance with the current Oregon Standard Specifications.

**OREGON STANDARD DRAWINGS**

**3-TUBE CURB MOUNT RAIL TRANSITION**

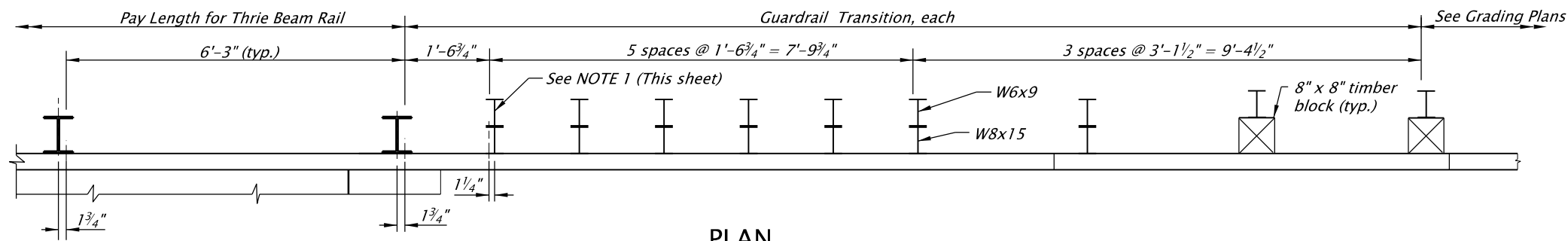
2021

DATE	REVISION	DESCRIPTION
-	-	-
-	-	-
-	-	-
-	-	-

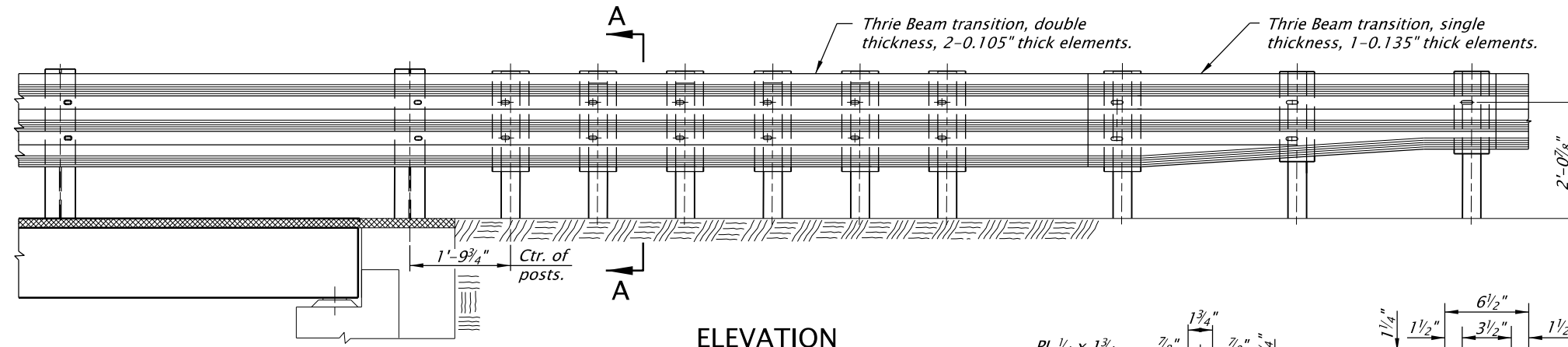
CALC. BOOK NO. - - - N/A - - - SDR DATE: 20-APR-2018 BR209

MAR-2017

BR233.dgn



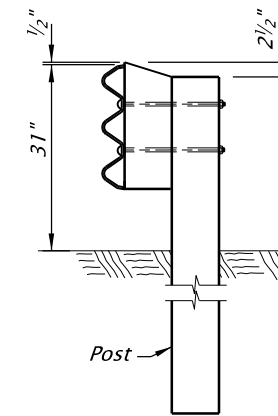
**PLAN**



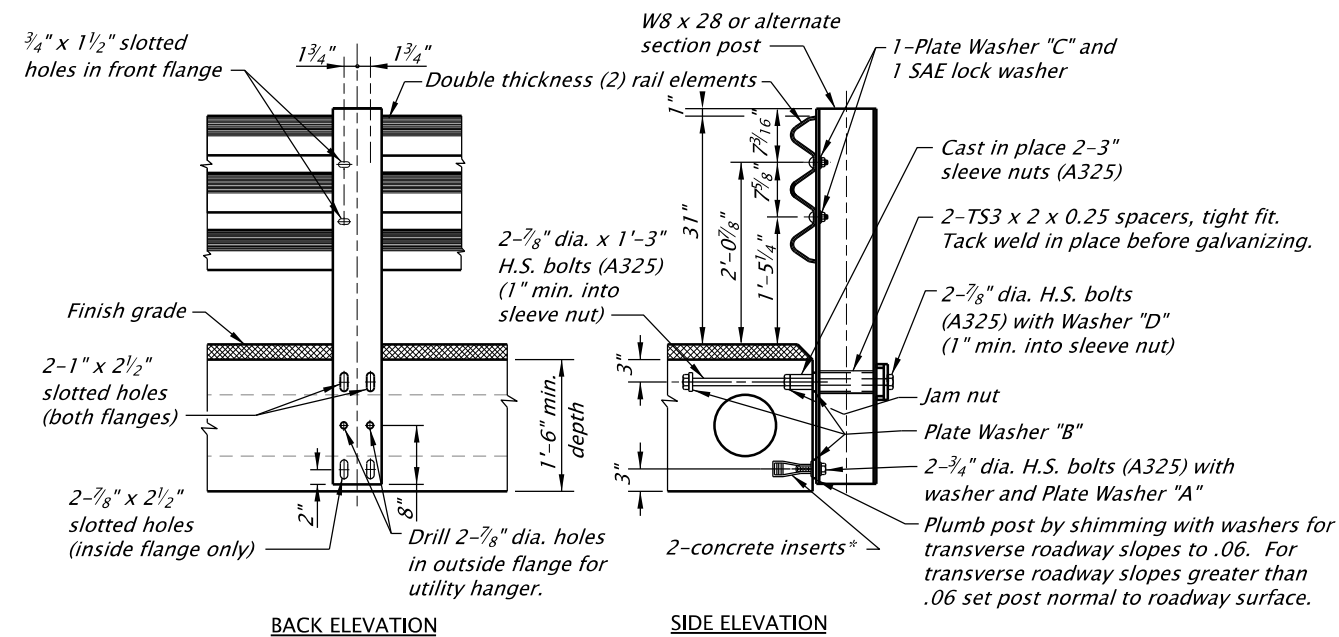
**ELEVATION**

**NOTE 1**  
Transition posts may be steel W6x9 or timber 8"x 8". All posts to be of same material. See dwg. BR203 for Thrie Beam blockouts.

**\*CONCRETE INSERTS**  
Hot-dip galvanized expanded coil concrete inserts with closed-back ferrule threaded to receive 3/4" dia., Gr36 (ASTM A307)  
Minimum insert length= 4 1/2"  
Minimum safe working load in tension= 4000 lbs.

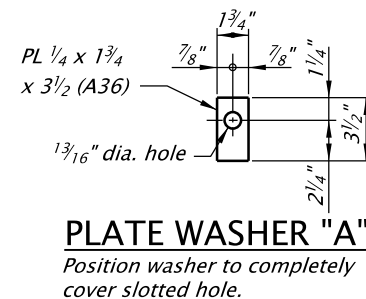


**SECTION A-A**

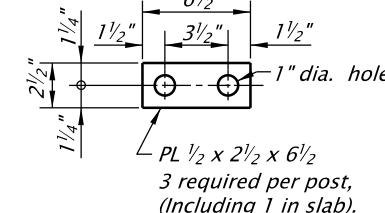


**POST DETAILS: SIDE MOUNT**

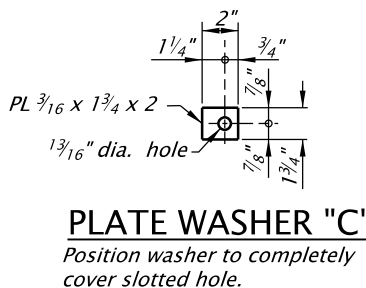
**NOTE**  
Field ream bolt holes in double thickness rail at splice locations. Repair damaged coating according to Specifications.



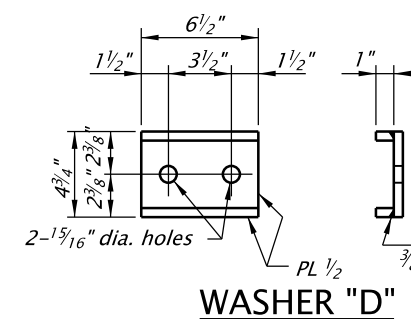
**PLATE WASHER "A"**  
Position washer to completely cover slotted hole.



**PLATE WASHER "B"**  
3 required per post, (Including 1 in slab).



**PLATE WASHER "C"**  
Position washer to completely cover slotted hole.



**WASHER "D"**

**GENERAL NOTES**  
Provide steel posts and plates conforming to AASHTO Specification M183 (ASTM A36), unless noted otherwise. Provide anchor bolts conforming to ASTM A325. (AASHTO M164). Provide guardrail hardware as shown on Std. Dwgs. RD405 and RD410. Hot dip galvanize all structural steel and hardware after fabrication. Fabricate railing to the horizontal and vertical alignment of the structure. Install posts normal to grade. When wearing surface thickness varies due to beam camber and/or superelevation, vary rail post lengths to provide uniform rail height. Tap nuts and inserts 0.0021 +0.001 -0.0001 oversize after galvanizing in accordance with ASTM A563. Tighten upper high strength post bolts 1/6 turn past snug tight condition. Tighten lower high strength post bolts 1/3 turn past snug tight condition. Do not use this rail for 12" thick slab.

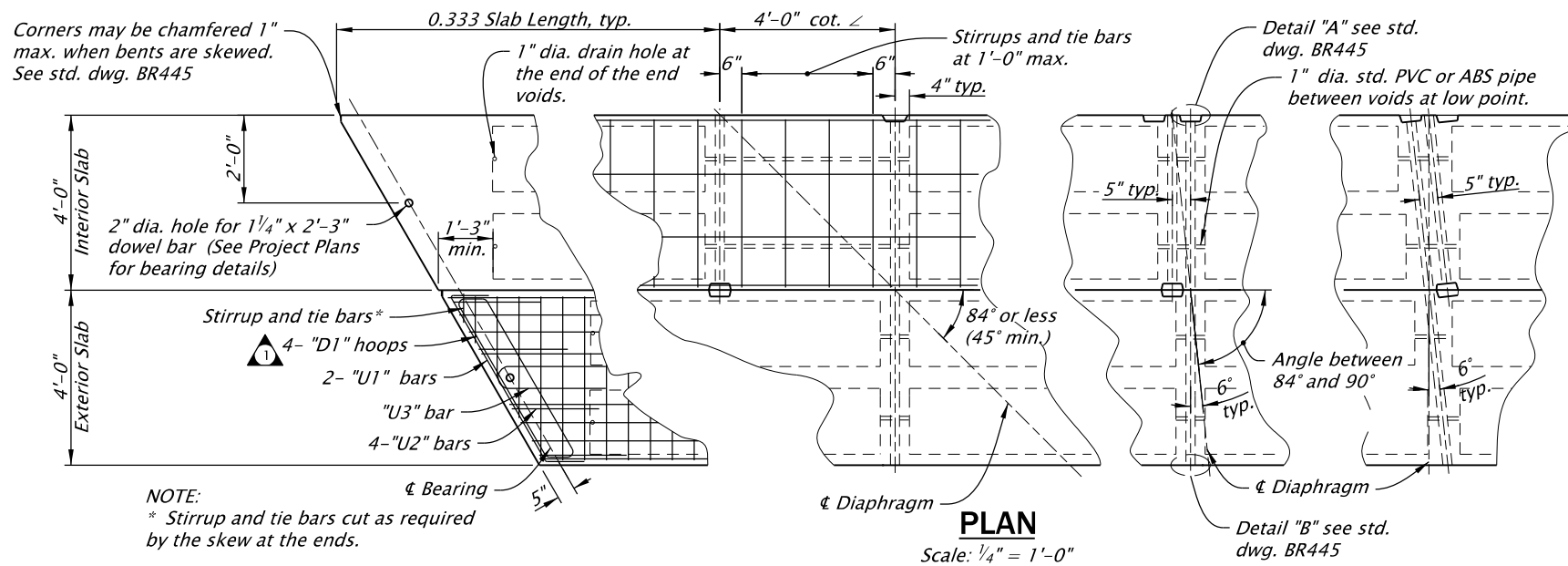
Accompanied by dwgs. BR203, RD405, RD410, RD480

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.	
<b>OREGON STANDARD DRAWINGS</b>	
<b>THRIE-BEAM RAIL AND TRANSITION</b>	
2021	
DATE	REVISION DESCRIPTION
-	-
CALC. BOOK NO.	SDR DATE
N/A	20-APR-2018
<b>BR233</b>	

JUL-2022

BR422.dgn



NOTE:  
\* Stirrup and tie bars cut as required by the skew at the ends.

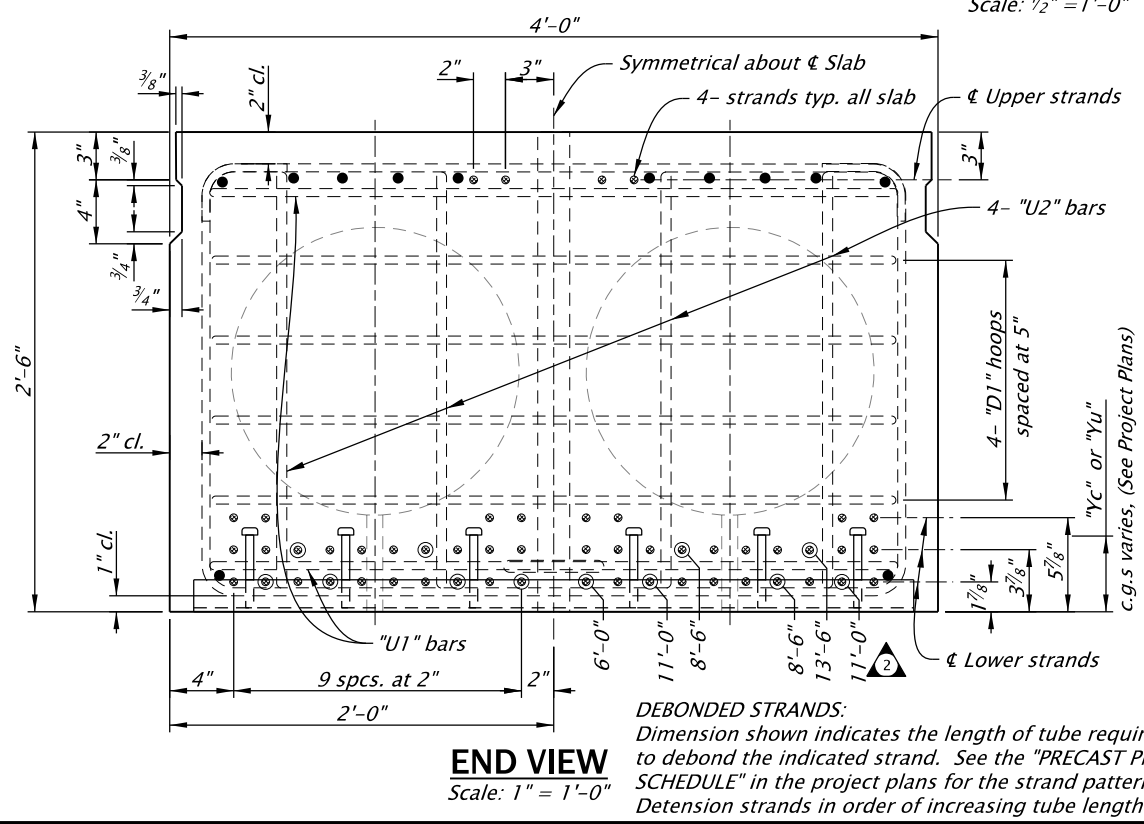
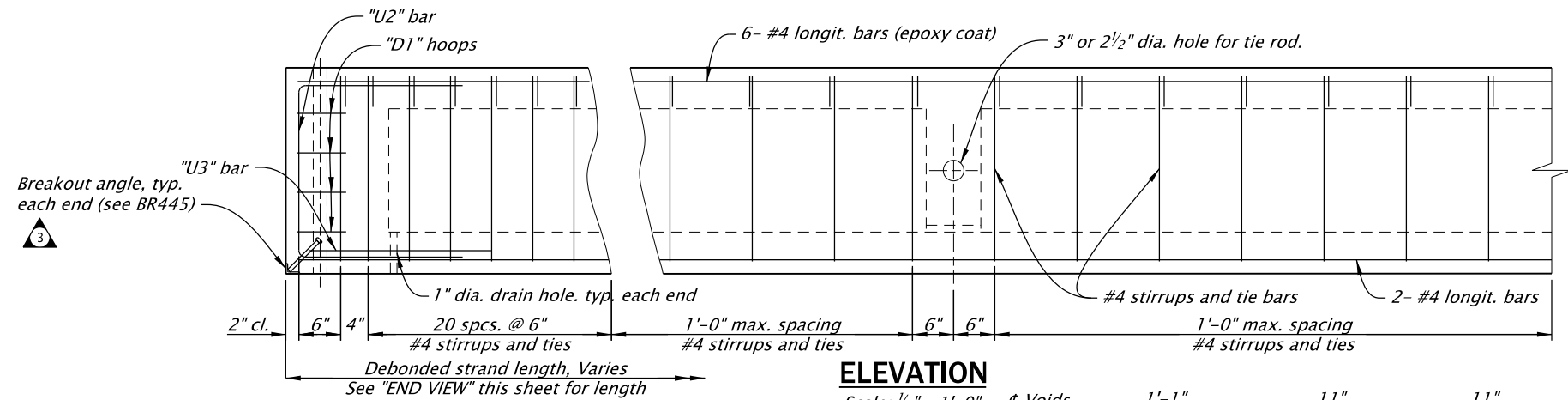
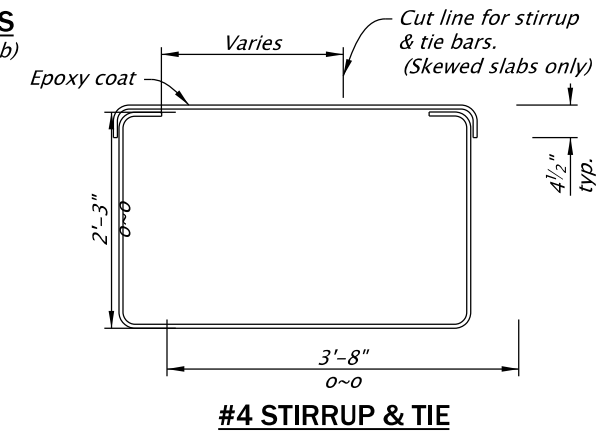
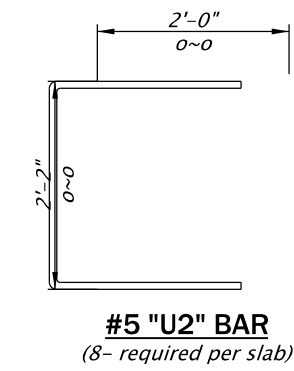
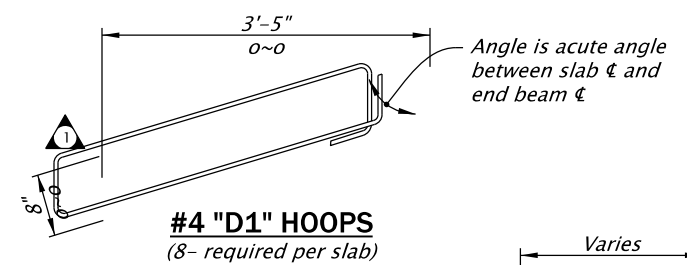
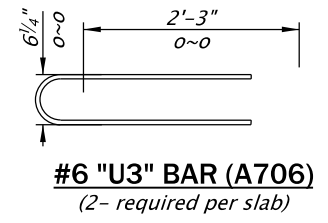
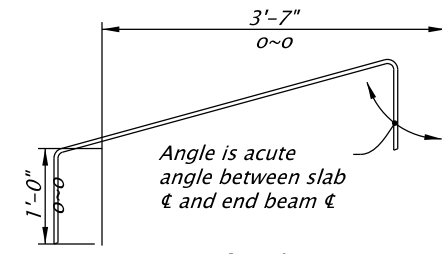
**NOTE "A" (Slab End Bars)**  
2- #5 x 10'-0", slabs 2 and 3  
4- #5 x 10'-0", slabs 4, 5 and 6  
4- #5 x 12'-6", slabs 7, 8 and 9  
4- #5 x 15'-0", slabs 10, 11, 12 and 13  
Place bars each end of each slab (Epoxy coat).

**NOTE:**  
Grout keyway as specified in General Notes.  
Omit keyway on exterior side of exterior slabs.  
Keyway is continuous.

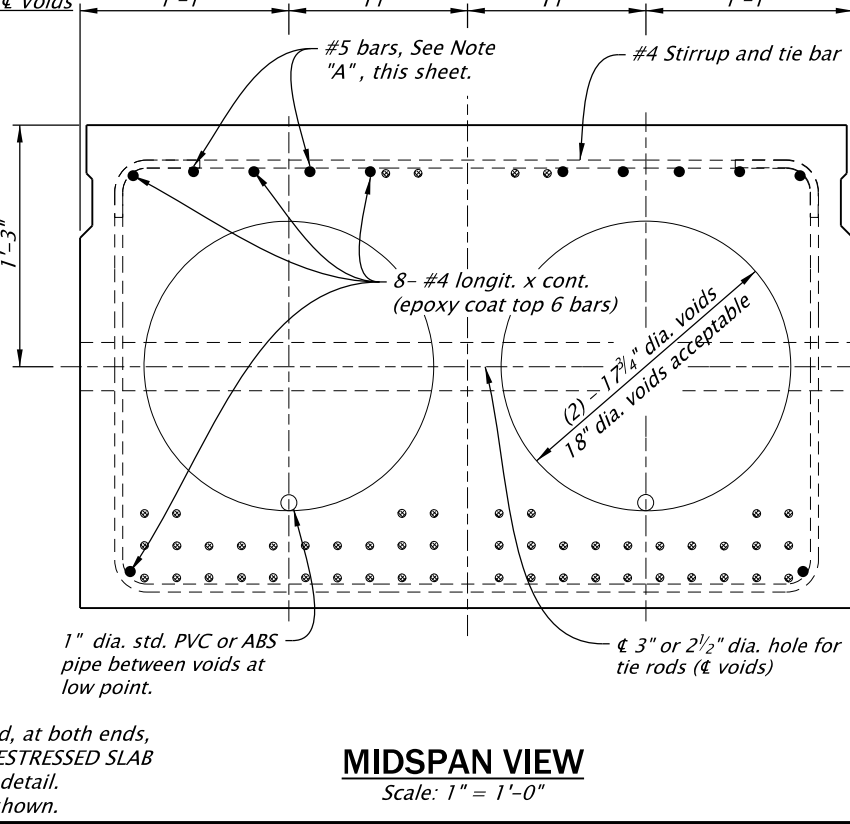
**SECTION PROPERTIES**

Area =	938 in <sup>2</sup>
c.g. =	14.91 in
I =	97,278 in <sup>4</sup>
St =	6447 in <sup>3</sup>
Sb =	6524 in <sup>3</sup>
Weight =	1009 lbs/ft
J =	180,800 in <sup>4</sup>
K =	0.80
V/S =	6.01
Form wt =	27 lbs/ft (tubes)
Total wt w/forms =	1036 lbs/ft

**Diaphragm Weight**  
No Skew 550 lb  
15° Skew 900 lb  
30° Skew 1560 lb  
45° Skew 2380 lb



**DEBONDED STRANDS:**  
Dimension shown indicates the length of tube required, at both ends, to debond the indicated strand. See the "PRECAST PRESTRESSED SLAB SCHEDULE" in the project plans for the strand pattern detail. Detension strands in order of increasing tube length shown.



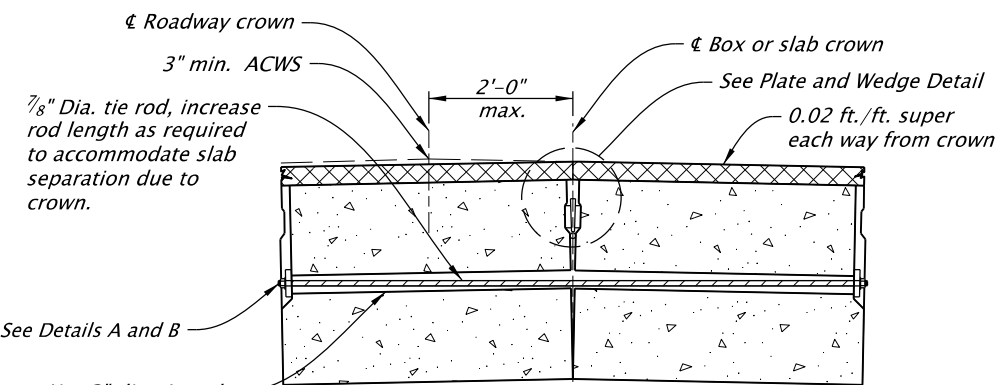
Accompanied by dwg. BR445

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.		
<b>OREGON STANDARD DRAWINGS</b>		
<b>30" PRECAST PRESTRESSED SLAB</b>		
2021		
DATE	REVISION	DESCRIPTION
07-2020	Added end zone reinf.	
07-2020	Revised debonded lengths and locations	
07-2020	Updated drawing to current stds.	
07-2022	Added breakout angle.	
CALC. BOOK NO.	N/A	SDR DATE: 08-JUL-2022
		<b>BR422</b>

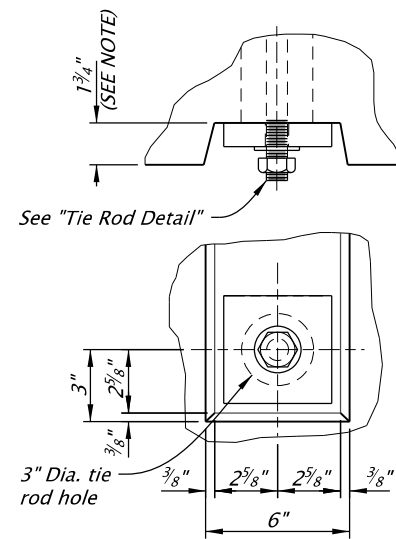
JUN-2022

BR445.dgn



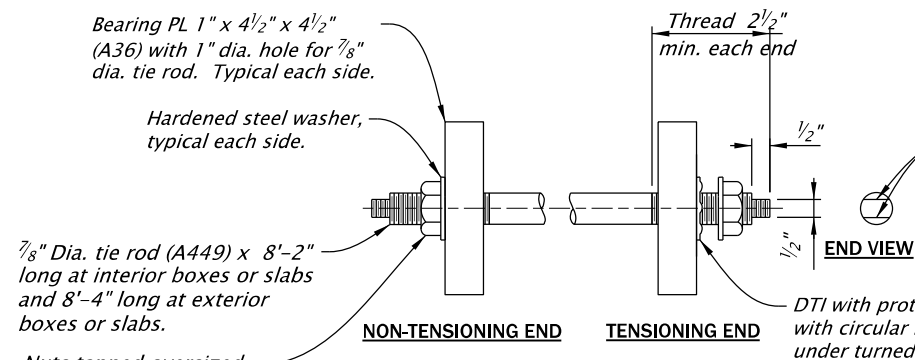
### TYPICAL DETAIL FOR INSTALLING BOXES OR SLABS ON CROWN

**NOTE:**  
Tighten tie rods until the bottom corners of the boxes or slabs are in contact. Loosen the tie rod and install the plates and wedges per detail. Shift wedge location as required to avoid conflict with the tie rod.  
Tension the tie rods. Install boxes or slabs level and build up roadway crown with AC wearing surface when roadway width is 28' or less (for bridges with ACWS).



### DETAIL "A" Non-Tensioning End

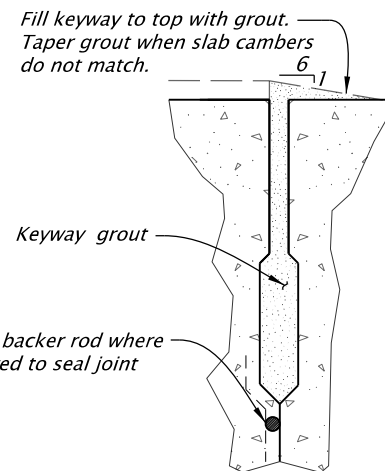
**NOTE:**  
1 3/4" @ tie rod  $\phi$  (2 1/2" depth may be used for slabs with an appropriate reduction in tie rod length)



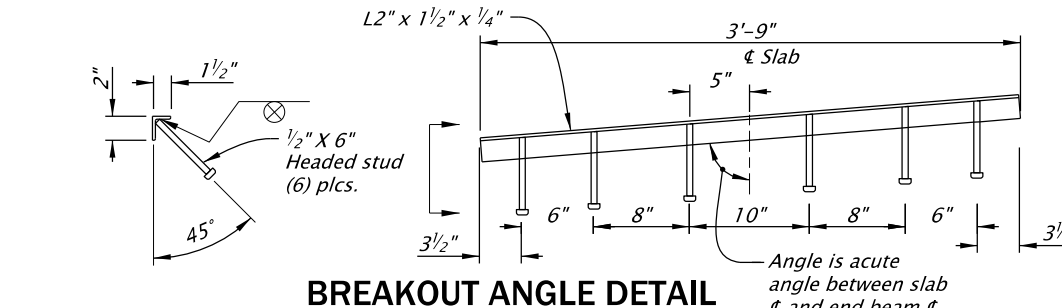
### TIE ROD DETAIL

Nuts tapped oversized (to fit tie rod threads) and lubricated.

Mill both ends of tie rod. Use wrench to prevent tie rod from turning when tensioning.

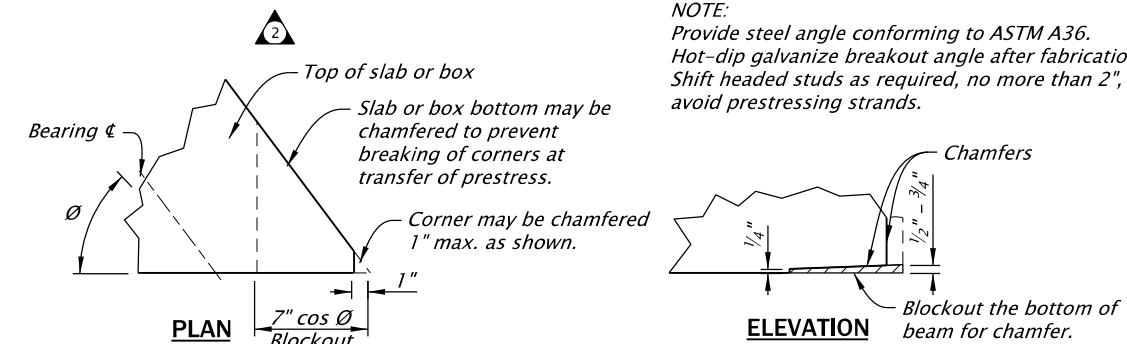


### KEYWAY GROUT DETAIL

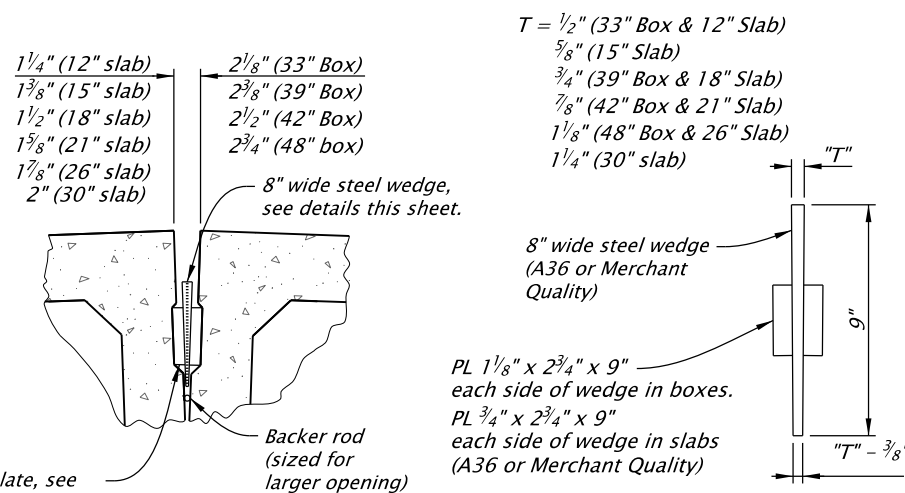


### BREAKOUT ANGLE DETAIL

**NOTE:**  
Provide steel angle conforming to ASTM A36. Hot-dip galvanize breakout angle after fabrication. Shift headed studs as required, no more than 2", to avoid prestressing strands.

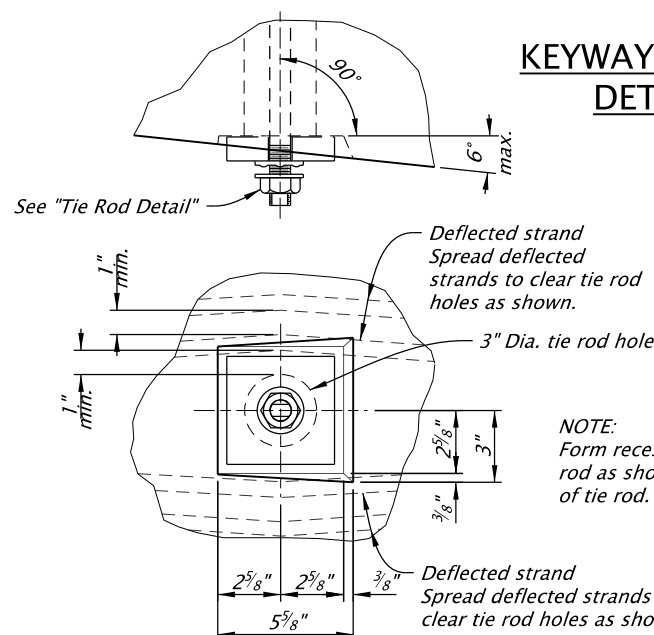


### PARTIAL ELEVATION CHAMFER DETAIL



### PLATE AND WEDGE DETAIL

**NOTE:**  
Add steel plates and wedge at each tie rod crossing before tensioning tie rods. Hot-dip galvanize wedges and plates.



### DETAIL "B" Tensioning End

**NOTE:**  
Form recess bearing area perpendicular to tie rod as shown. Use Detail "B" at tensioning end of tie rod.

### GENERAL NOTES FOR PRESTRESSED BOXES AND SLABS

Boxes and slabs are designed for live and superimposed dead loading as shown in the General Notes for the Project. Provide the class of concrete shown in the Slab or Box Schedule with nominal maximum size aggregate of 1 or 3/4. Transfer prestress after the concrete reaches the minimum concrete strength at transfer shown in the Slab or Box Schedule.

Select a keyway grout from the QPL for filling keyways, lifting blockouts and tie rod blockouts.

Allow traffic on the bridge only after keyway grout has reached design strength.

Provide reinforcing steel as specified in the General Notes for the Project.

Provide smooth dowels conforming to AASHTO M31, Grade 60 (ASTM A615, Grade 60), ASTM F1554, Grade 55 or ASTM A529, Grade 55.

Provide 1/2" diameter 7 wire low relaxation prestressing steel strand conforming to AASHTO Specification M203 (ASTM A416), Grade 270 Supplement 1.

Tension strand initially to 31.0 kips per strand (after harping deflected strand). Debond strands where specified using either split or solid plastic sheathing with a minimum wall thickness of 0.025".

Provide high strength tie rods conforming to ASTM A449. Provide heavy hexagon nuts conforming to ASTM A563. Provide hardened steel washers conforming to ASTM F436. Hot-dip galvanize tie rods, plates, nuts and washers (except DTIs) after fabrication.

Tighten tie rods to 39 kips (minimum) using mechanically galvanized direct tension indicators (DTIs) conforming to ASTM F959 and ASTM F3125, Grade A325. Tighten all tie rods (per box or slab) to about one half the specified tension before proceeding with final tensioning.

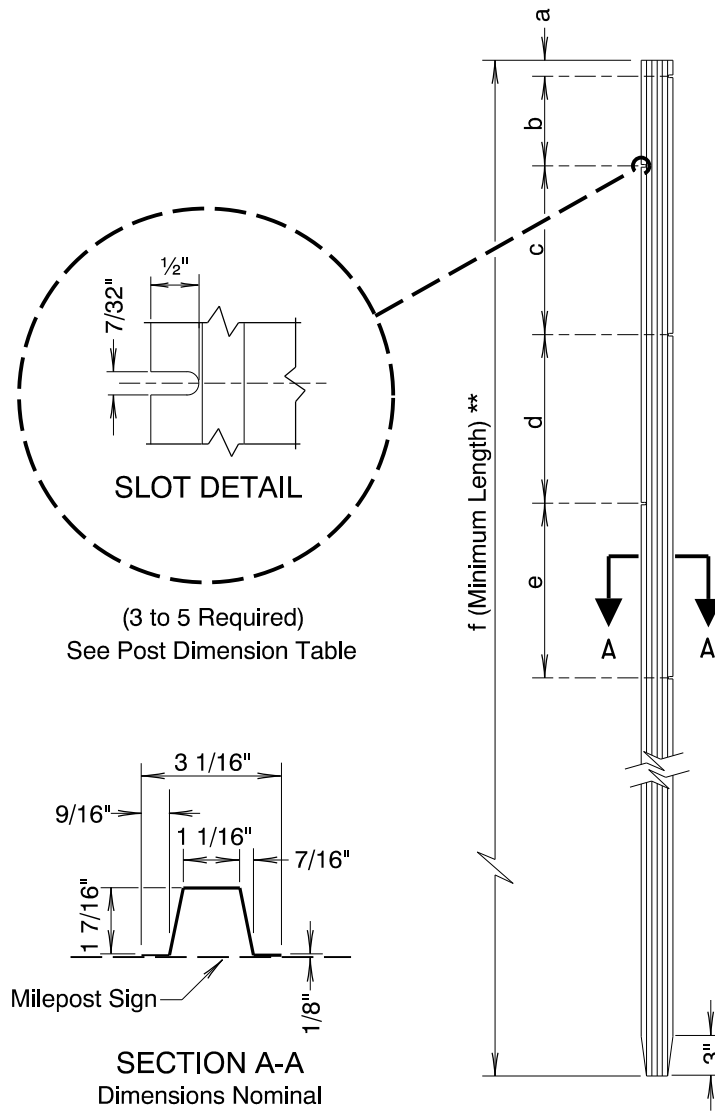
Keep boxes and slabs upright at all times. Support them within 2'-0" of the ends during storage (to prevent excessive camber, overstress or failure). Locate transport supports and lifting devices within 2'-0" of the ends of boxes and slabs. Transport boxes and slabs after the concrete has reached the 28 day design strength and a minimum of 7 days after casting.

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.		All materials shall be in accordance with the current Oregon Standard Specifications.	
		<b>OREGON STANDARD DRAWINGS</b>	
		<b>PRECAST PRESTRESSED BOX AND SLAB DETAILS</b>	
		2021	
DATE	REVISION	DESCRIPTION	
07-2020	1	Revised steel grade for dowels and tie rods.	
07-2020	2	Updated drawing to current stds.	
07-2020	3	Moved rail anchorage detail to det3465.	
06-2022	4	Revised General Notes. Added breakout Angle Detail.	
CALC. BOOK NO.	N/A	SDR DATE	08-JUL-2022
		<b>BR445</b>	



10-DEC-2009

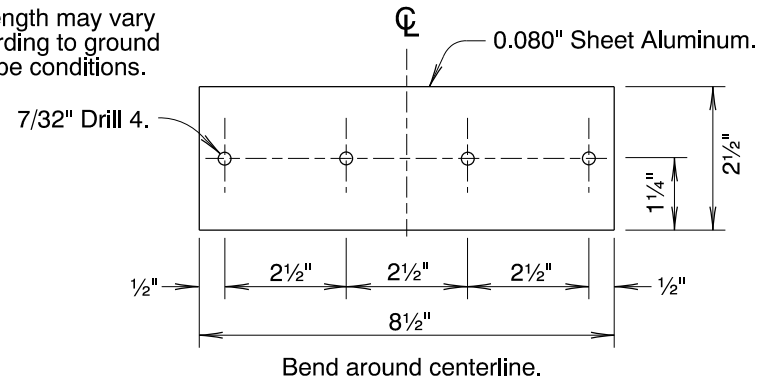
TM222.dgn



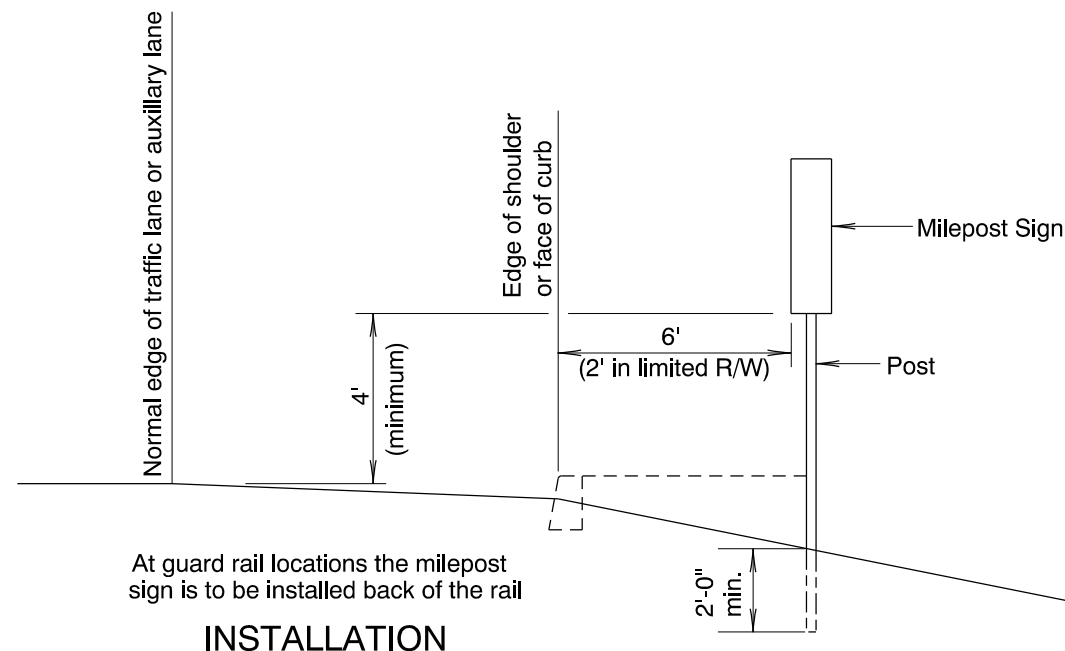
**POST DETAILS**

POST DIMENSION TABLE						
SIGN *	a	b	c	d	e	f **
A	1"	7"	8 1/2"	—	—	8'-6"
B	1"	7"	8 1/2"	9"	—	9'-3"
C	1"	7"	8 1/2"	9"	9"	10'-0"
D	1"	7"	12 1/2"	—	—	9'-0"
E	1"	7"	12 1/2"	13"	—	10'-6"
F	1"	7"	12 1/2"	13"	13"	12'-0"

\* See TM221  
 \*\* Length may vary according to ground slope conditions.

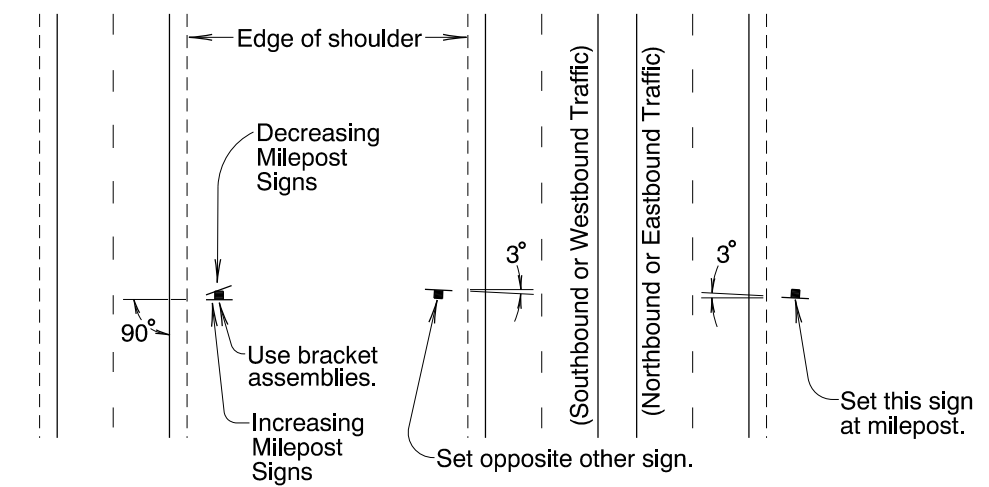


**BRACKET ASSEMBLY**  
 (Use only on 2 lane roads)



**INSTALLATION**

- GENERAL NOTES:**
- POST AND BRACKET ASSEMBLIES**
    - The nominal weight of the post shall be 2 pounds per lineal foot.
    - Bracket assemblies shall conform to subsection 2910.10 of the current Oregon Standard Specifications for Construction.
  - INSTALLATION**
    - If roadway conditions prohibit locating the milepost sign at the milepoint, it may be moved up to 50 feet in either direction. If it cannot be located within this variation, it should be omitted.
    - Signs shall be mounted to posts with 3/16" diameter aluminum blind rivets that conform to subsection 2910.40 of the current Oregon Standard Specifications for Construction.
    - If the milepost sign is located within 25 feet of a delineator, the delineator should be moved or deleted.
    - Installation of the post and sign panel shall conform to subsection 840.41 of the current "Oregon Standard Specifications".



**CONVENTIONAL ROADS      EXPRESSWAYS & FREEWAYS**

**INSTALLATION**

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

All materials shall be in accordance with the current Oregon Standard Specifications.

**OREGON STANDARD DRAWINGS**

**INSTALLATION DETAILS**  
**MILEPOST MARKER POSTS**

2021

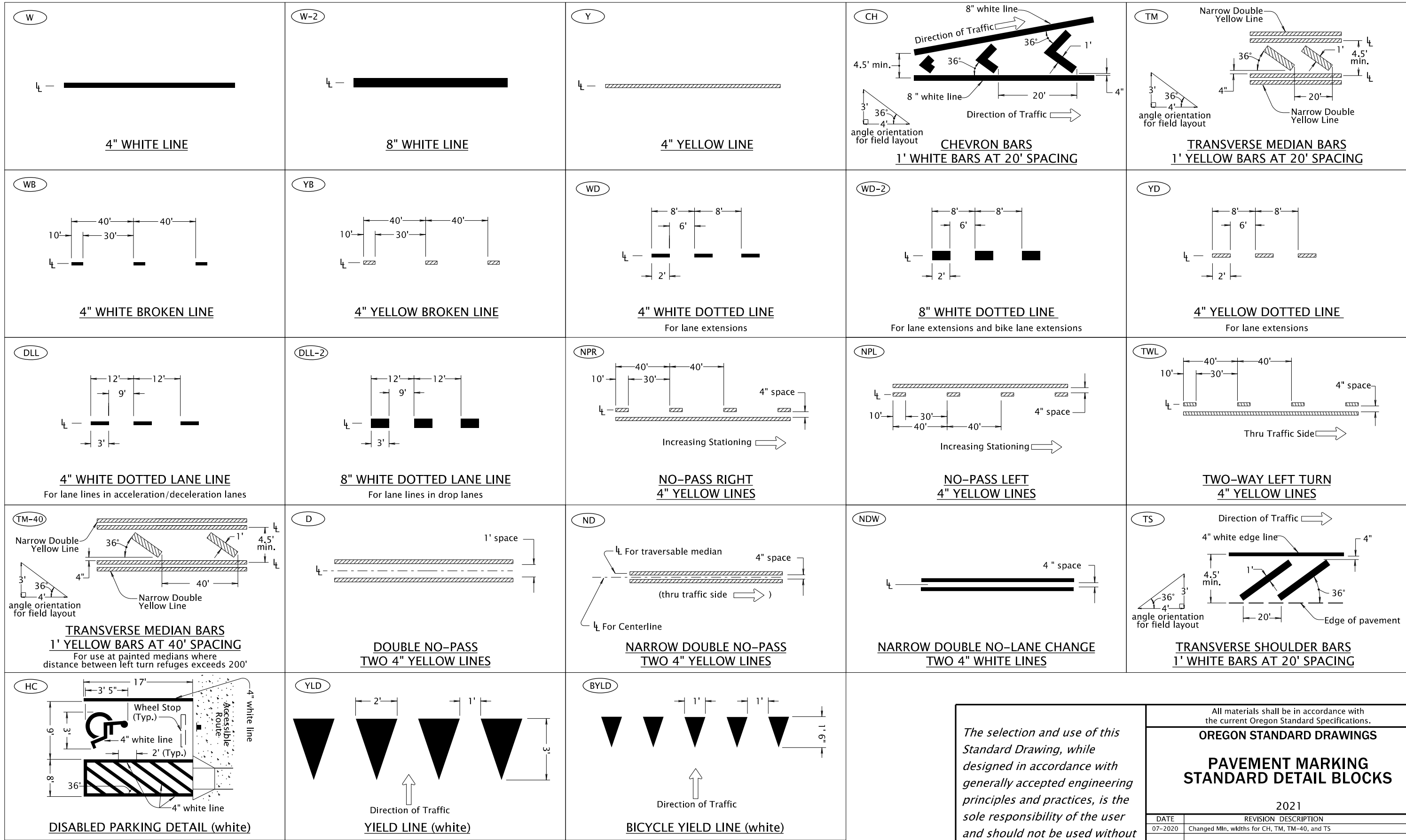
DATE	REVISION	DESCRIPTION

CALC. BOOK NO. ---	N/A ---	SDR DATE- 10-DEC-2009	<b>TM222</b>
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07-01-2020

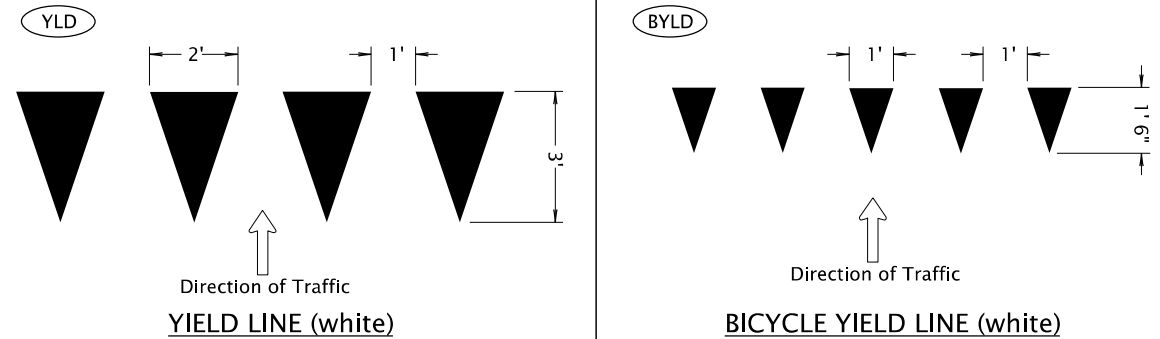
TM500.dgn



← Direction Of Traffic, Increasing Stationing Or Thru Traffic Side

⊥ Lane line dimensions are shown on the striping plans

**LEGEND**

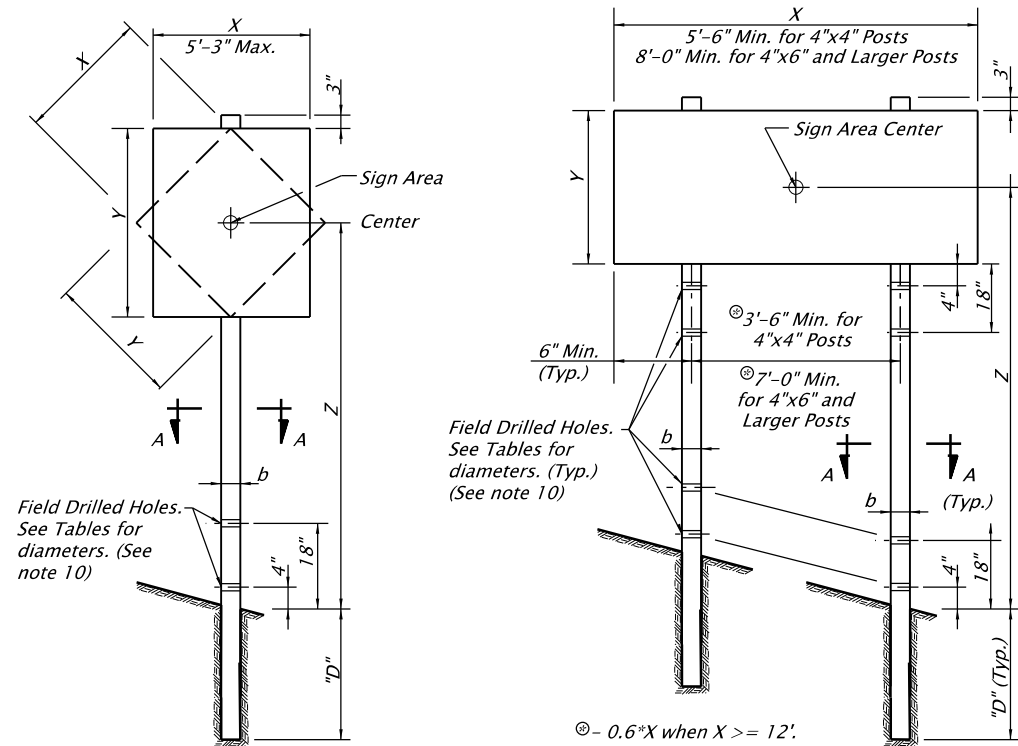


*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

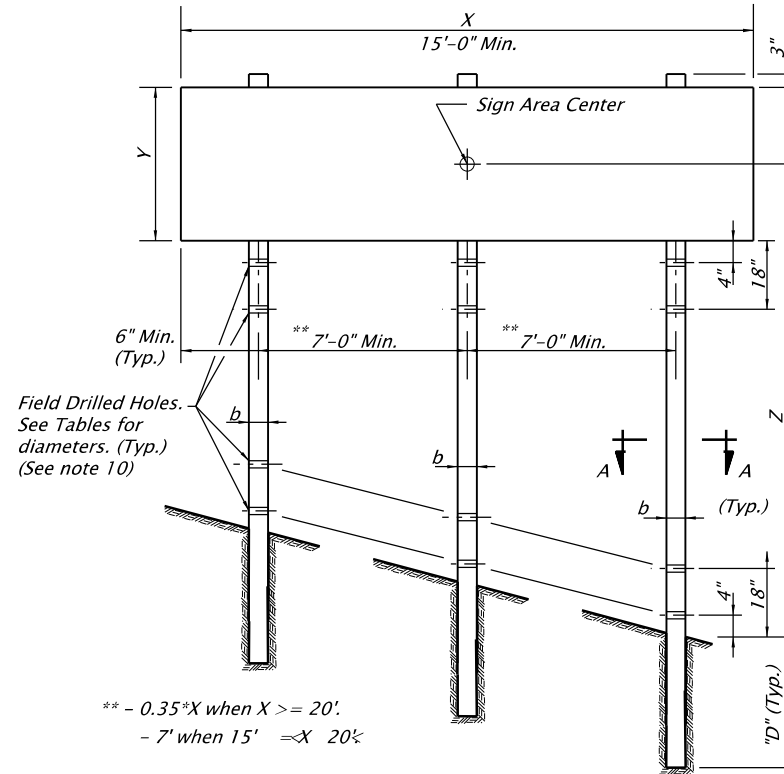
All materials shall be in accordance with the current Oregon Standard Specifications.		
<b>OREGON STANDARD DRAWINGS</b>		
<b>PAVEMENT MARKING STANDARD DETAIL BLOCKS</b>		
2021		
DATE	REVISION DESCRIPTION	
07-2020	Changed Min. widths for CH, TM, TM-40, and TS	
CALC. BOOK NO.	N/A	SDR DATE: 07-01-2020
		<b>TM500</b>

07-JAN-2022

TM670.dgn



**ELEVATION**  
No scale



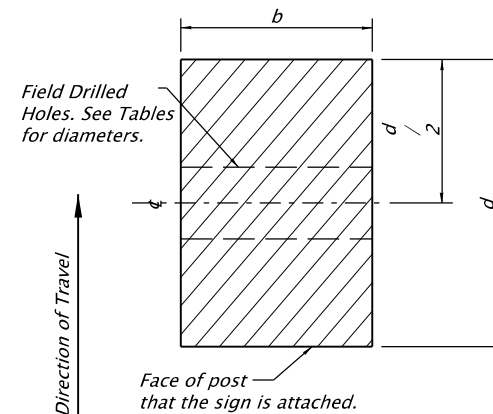
\*\* - 0.35\*X when X >= 20';  
- 7' when 15' < X < 20'

**General Notes:**

1. Wood posts are available in the following commercial lengths: 12', 14', 16', 18', 20', 22', 24', 26'.
2. Material shall be Douglas Fir No. 1 and according to Section 02110.40.
3. For horizontal and vertical clearances of permanent signs refer to TM200 and of temporary signs refer to TM822.
4. Wood post design in accordance with the 5th Edition 2009 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.
5. Use the 3 second gust wind speeds shown on TM671 for the site specific sign location.
6. General design parameters are  $K_z = 0.87$ , SIF (duration factor) = 1.6, Cd (sign) = 1.20, and  $G = 1.14$ .
7. The sign width to sign height or sign height to sign width ratio shall not exceed 5.0.
8. Permanent signing uses an  $I_r = 0.71$  for a recurrence interval of 10 years.
9. Temporary signing uses an  $I_r = 0.45$  for a recurrence interval of 1.5 years.
10. Posts protected by barrier or guardrail do not require field drilled holes.
11. 4" x 4" posts should not be used in snow plow areas.

**Post Embedment Installation:**

1. Excavate the hole at least 12" larger in diameter than the diagonal dimension of the post. Maintain at least 6" of space around the edges of the post to accommodate compaction equipment.
2. Align the post in the hole to a vertical position.
3. The space around the wood post shall be backfilled to finished ground surface.
4. Backfill with selected general backfill meeting the requirements of 00330.13.
5. Place in layers not greater than 6 inches.
6. Solidly ram and tamp the layers into the excavation area around the post.
7. Dampen during placement if too dry to compact properly.
8. Replace and finish the surface around the post to match the surrounding surface.



**SECTION A-A**  
No scale

(X * Y * Z) in ft <sup>3</sup> - Maximum														Field Drilled Hole Diameters	Post Embedment Depth "D"
3 Second Gust Wind Speed (TM671)															
85 MPH				95 MPH				105 and 110 MPH							
Number of Posts				Number of Posts				Number of Posts							
POST SIZE b x d	1	2	3*	3*	1	2	3*	3*	1	2	3*	3*	Not Req'd	4' - 0"	
	4" x 4"	4" x 6"	6" x 6"	6" x 8"	X=15'	X ≥ 20'	X=15'	X ≥ 20'	X=15'	X ≥ 20'	X=15'	X ≥ 20'			
4" x 4"	77	154	165	231	62	124	132	186	56	112	120	168	Not Req'd	4' - 0"	
4" x 6"	162	324	347	486	130	260	278	390	117	234	250	351	1 1/2"	5' - 0"	
6" x 6"	270	540	578	810	216	432	462	648	195	390	417	585	2"	5' - 0"	
6" x 8"	494	988	1058	1482	395	790	846	1185	356	712	762	1068	3"	7' - 0"	

**PERMANENT WOOD POST TABLE**

\* - Linear Interpolate X\*Y\*Z 3 post values for signs greater than 15' and less than 20'.  
\*\* - See note 8

(X * Y * Z) in ft <sup>3</sup> - Maximum														Field Drilled Hole Diameters	Post Embedment Depth "D"
3 Second Gust Wind Speed (TM671)															
85 MPH				95 MPH				105 and 110 MPH							
Number of Posts				Number of Posts				Number of Posts							
POST SIZE b x d	1	2	3*	3*	1	2	3*	3*	1	2	3*	3*	Not Req'd	4' - 0"	
	4" x 4"	4" x 6"	6" x 6"	6" x 8"	X=15'	X ≥ 20'	X=15'	X ≥ 20'	X=15'	X ≥ 20'	X=15'	X ≥ 20'			
4" x 4"	122	244	261	366	98	196	210	294	88	176	188	264	Not Req'd	4' - 0"	
4" x 6"	257	514	550	771	205	410	439	615	185	370	396	555	1 1/2"	5' - 0"	
6" x 6"	426	852	912	1278	341	682	730	1023	308	616	660	924	2"	5' - 0"	
6" x 8"	779	1558	1669	2337	624	1248	1337	1872	563	1126	1206	1689	3"	7' - 0"	

**TEMPORARY WOOD POST TABLE**

\* - Linear Interpolate X\*Y\*Z 3 post values for signs greater than 15' and less than 20'.  
\*\* - See note 9

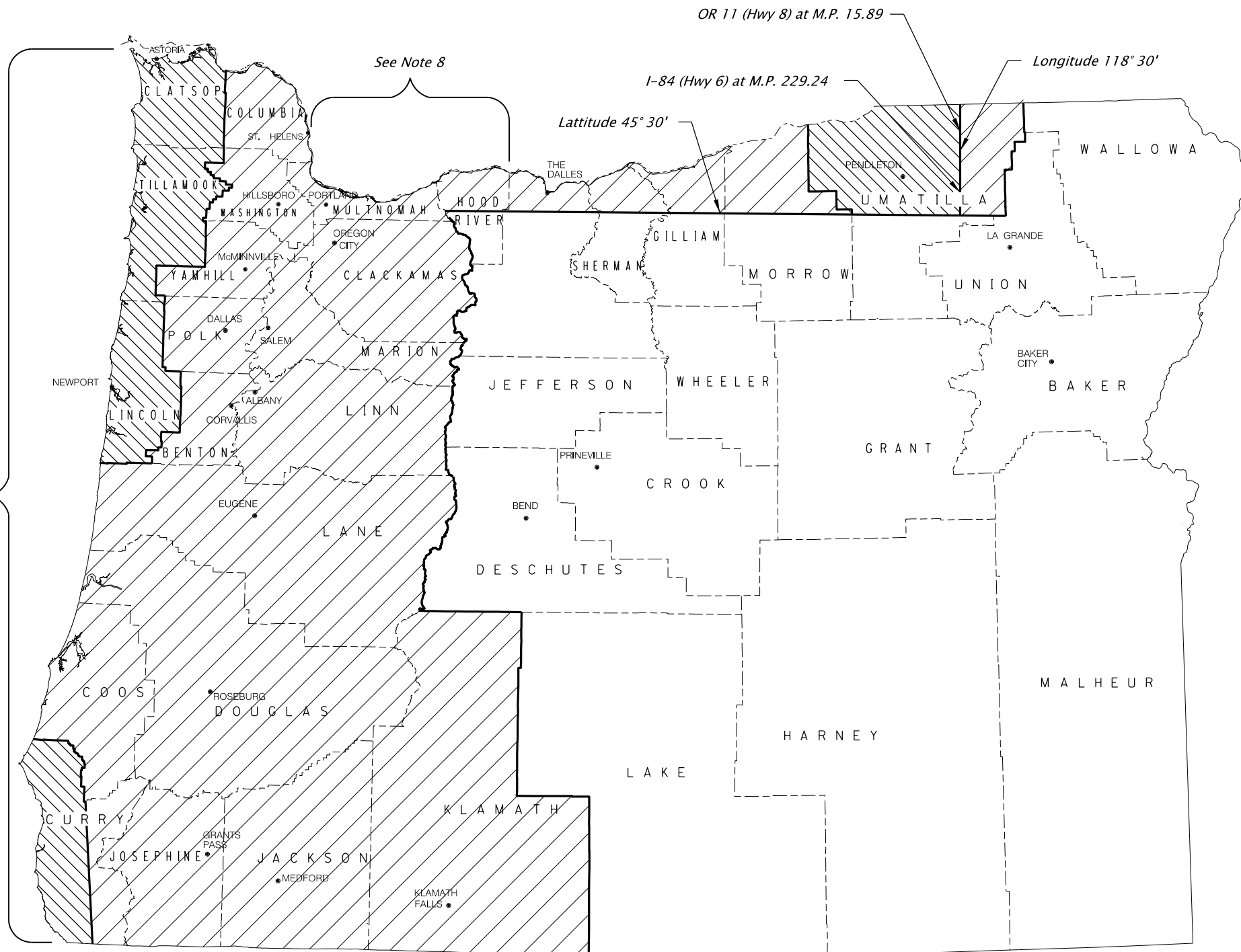
Accompanied by dwgs. TM200, TM671, TM822

The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.			
<b>OREGON STANDARD DRAWINGS</b>			
<b>WOOD POST SIGN SUPPORTS</b>			
2021			
DATE	REVISION DESCRIPTION		
01-2022	ADDED 3'-6" MINIMUM SPACING FOR 4"x4" POSTS AND 8'-0" MINIMUM SIGN WIDTHS FOR 4"x6" AND LARGER POSTS		
CALC. BOOK NO.	5850	SDR DATE	07-JAN-2022
			<b>TM670</b>

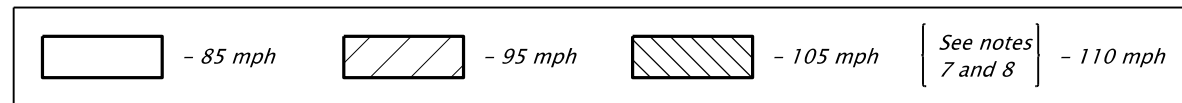
10-JUL-2020

TM671.dgn



1. The wind velocity map as shown is adapted from AASHTO 2001 4th Edition - "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals", Appendix C, Figure C-3 and Section 3, Figure 3-2. It uses the wind speed map shown in Figure 1609 of the 2007 Oregon Structural Code to account for locations in the State with special wind regions.
2. The wind velocities shown above are 3-Second Gust wind velocities.
3. The Exposure Category is C.
4. The mean recurrence interval is 50-Years.
5. Mountainous terrain, gorges, and ocean promontories are classified as special wind regions and shall be examined for unusual wind conditions.
6. The Interval Height (Kz) is 30 ft.
7. All areas with full exposure to ocean winds shall be designated 110 mph areas.
8. Areas in Multnomah and Hood River counties with full exposure to Columbia River Gorge winds shall be designated 110 mph areas.
9. Localities may have adopted wind speed higher than shown on this map. Those higher wind speed shall be used.

See Note 7



All materials shall be in accordance with the current Oregon Standard Specifications.			
<b>OREGON STANDARD DRAWINGS</b>			
<b>3 SECOND GUST WIND SPEED MAP</b>			
2021			
DATE	REVISION DESCRIPTION		
CALC. BOOK NO.	N/A	SDR DATE	06-JAN-2012
			<b>TM671</b>

01-JUL-2022

TM800.dgn

TAPER TYPES & FORMULAS	
TAPER	FORMULA
Merging (Lane Closure)	"L"
Shifting	"L"/2 or 1/2"L"
Shoulder Closure	"L"/3 or 1/3"L"
Flagging (See Drg. TM850)	50' - 100'
Downstream (Termination)	Varies (See Drawings)

★ Use Pre-Construction Posted Speed to select the Speed from the Tables below:

TEMPORARY BARRIER FLARE RATE TABLE	
★ SPEED (mph)	MINIMUM FLARE RATE
≤ 30	8:1
35	9:1
40	10:1
45	12:1
50	14:1
55	16:1
60	18:1
65	19:1
70	20:1

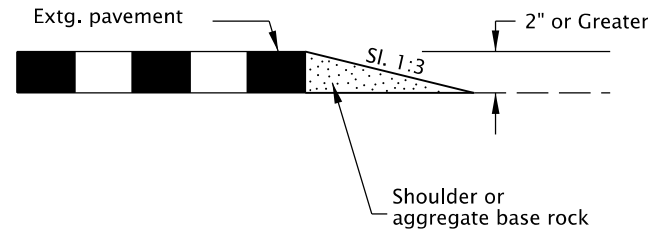
MINIMUM LENGTHS TABLE					
★ SPEED (mph)	"L" VALUE FOR TAPERS (ft)				BUFFER "B" (ft)
	W ≤ 10	W = 12	W = 14	W = 16	
25	105	125	145	165	75
30	150	180	210	240	100
35	205	245	285	325	125
40	265	320	375	430	150
45	450	540	630	720	180
50	500	600	700	800	210
55	550	660	770	880	250
60	600	720	840	960	285
65	650	780	910	1000	325
70	700	840	980	1000	365
FREEWAYS					
55	1000	1000	1000	1000	250
60	1000	1000	1000	1000	285
65	1000	1000	1000	1000	325
70	1000	1000	1000	1000	365

NOTES:  
 • For Lane closures where W < 10', use "L" value for W = 10'.  
 • For Shoulder closures where W < 10', use "L" value for W = 10' or calculate "L" using formula, for Speeds ≥ 45: L = WS, Speeds < 45: L = S<sup>2</sup>W/60, S = Speed, W=Width

TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE				
★ SPEED (mph)	Sign Spacing (ft)			Max. Channelizing Device Spacing (ft)
	A	B	C	
20 - 30	100	100	100	20
35 - 40	350	350	350	20
45 - 55	500	500	500	40
60 - 70	700	700	700	40
Freeway	1000	1500	2640	40

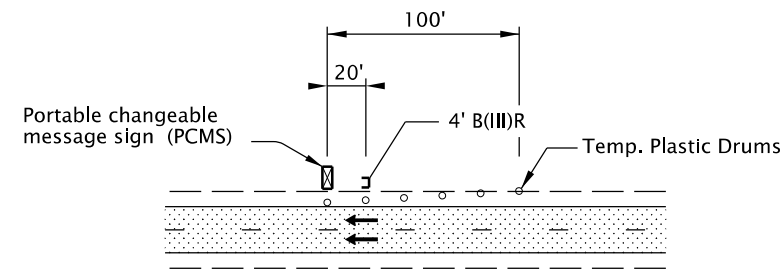
NOTES:  
 • Place traffic control devices on 10 ft. spacing for intersection and access radii.  
 • When necessary, sign spacing may be adjusted to fit site conditions. Limit spacing adjustments to 30% of the "A" dimension for all speeds.

NOTES:  
 • When paved shoulders adjacent to excavations are less than four feet wide protect longitudinal abrupt edge as shown.  
 • Use aggregate wedge when abrupt edge is 2 inches or greater.



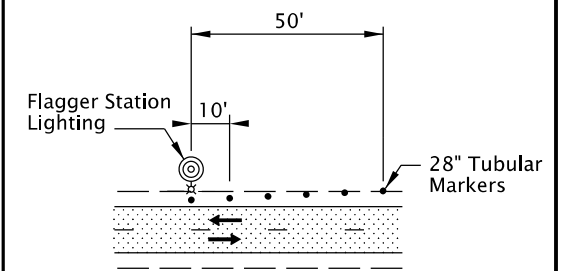
EXCAVATION ABRUPT EDGE

NOTES:  
 • Install PCMS beyond the outside shoulder, when possible.  
 • Use the appropriate type of barricade panels for PCMS location. Right shoulder, use Type B(III)R. Left shoulder, use Type B(III)L.  
 • Use six drums in shoulder taper on 20' spacing. The drums and barricade may be omitted when PCMS is placed behind a roadside barrier.  
 • Detail as shown is used for trailered and non-crashworthy components of:  
 • Portable Traffic Signals  
 • Smart Work Zone Systems



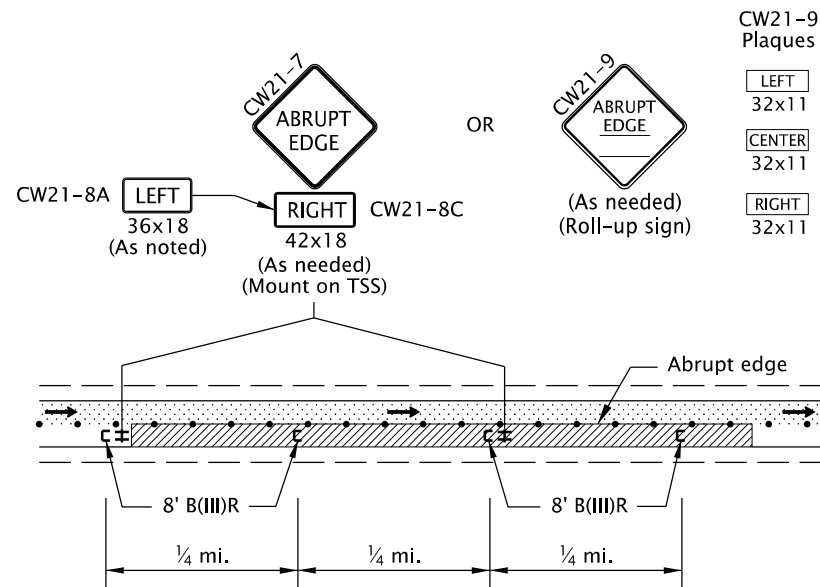
PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) INSTALLATION

NOTES:  
 • Install Flagger Station Lighting beyond the outside shoulder, where practical.  
 • Use six tubular markers in shoulder taper on 10' spacing.  
 • Place cart / generator / power supply off of the shoulder, as far as practical.



FLAGGER STATION LIGHTING DELINEATION

NOTES:  
 • Abrupt edges may be created by paving, operations, excavations or other roadway work. Use abrupt edge signing for longitudinal abrupt edges of 1 inch or greater.  
 • If the excavation is located on left side of traffic, replace the 8' B(III)R barricades with 8' B(III)L barricades and replace the "RIGHT" (CW21-8C) riders with "LEFT" (CW21-8A) riders.  
 • Continue signing and other traffic control devices throughout excavation area at spacings shown.  
 • If roll-up signs are used, attach the correct (CW21-9) plaques to the sign face using hook and loop fasteners. Place roll-up signs in advance of barricades.



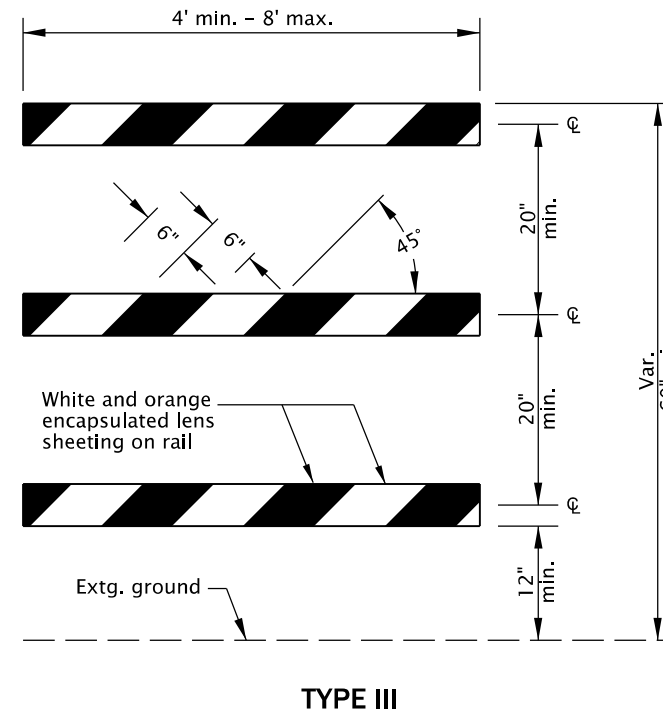
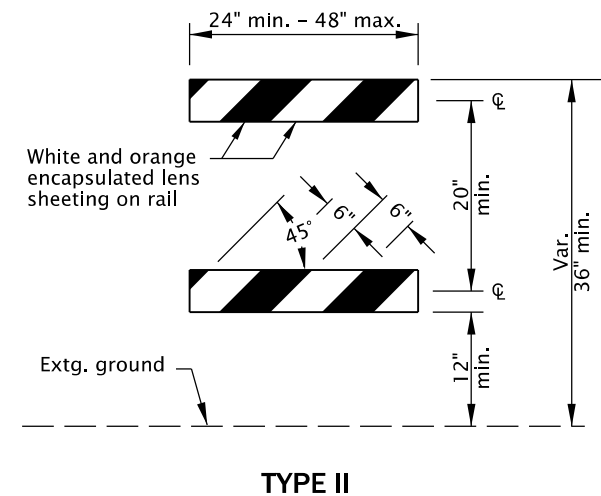
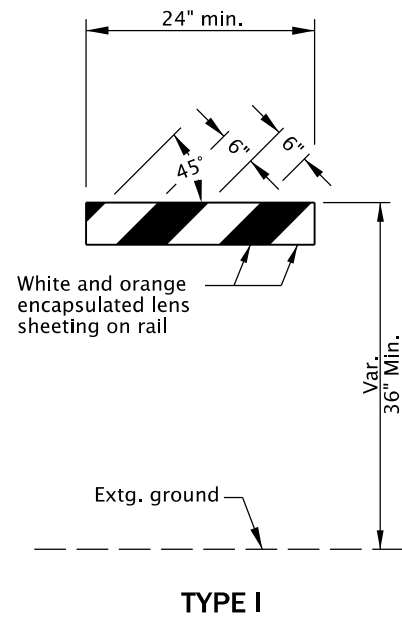
TYPICAL ABRUPT EDGE DELINEATION

GENERAL NOTES FOR ALL TCP DRAWINGS:  
 • Signs and other Traffic Control Devices (TCD) shown are the minimum required.  
 • Place a barricade approx. 20' ahead of all sequential arrow boards.  
 • Arrows shown in roadway are directional arrows to indicate traffic movements.  
 • All signs are 48" x 48" unless otherwise shown. Use fluorescent orange sheeting for the background of all temporary warning signs.  
 • All diamond shaped warning signs mounted on barrier sign supports shall be 36" by 36". All other signs mounted on barrier sign supports shall not exceed 12 sq. ft. in total sign area.  
 • Low speed highways have a pre-construction posted speed of 40 mph or less. High speed highways have a pre-construction posted speed of 45 mph or higher.  
 • Do not locate sign supports in locations designated for bicycle or pedestrian traffic.  
 • Combine drawing details to complete temporary traffic control for each work activity.  
 • Coordinate and control pedestrian movements through a Temporary Accessible Route using Flaggers, Traffic Control Measures, or as directed.  
 • To be accompanied by Dwg. Nos. TM820 & TM821.

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All materials shall be in accordance with the current Oregon Standard Specifications.			
<b>OREGON STANDARD DRAWINGS</b>			
<b>TABLES, ABRUPT EDGE AND PCMS DETAILS</b>			
2021			
DATE	REVISION DESCRIPTION		
07-2022	Added a note for TPARs		
CALC. BOOK NO.	N/A	SDR DATE	01-JUL-2022
			<b>TM800</b>

01-JUL-2020  
TM820.dgn



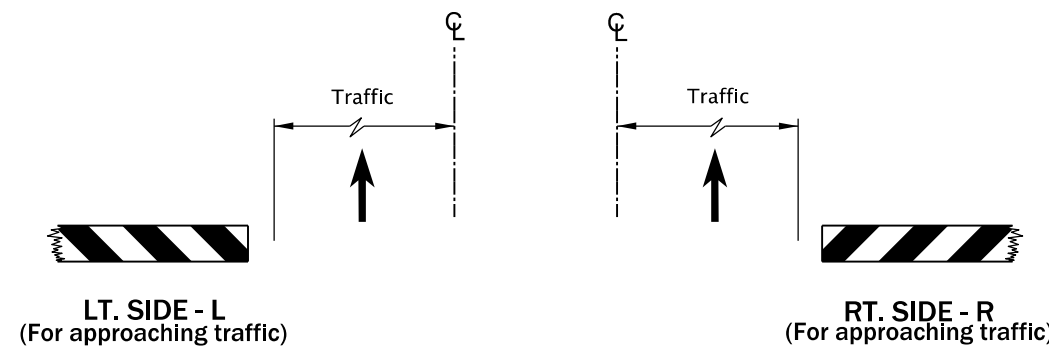
## BARRICADE RAIL LAYOUT

### GENERAL NOTES FOR ALL DETAILS:

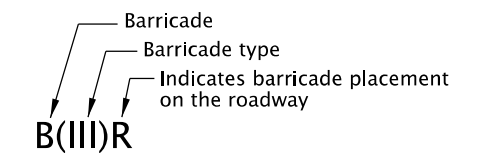
- Sandbags (approximately 25 lb sack filled with sand) may be placed on lower frame to provide additional ballast.
- Ballast shall not extend above bottom rail or be suspended from barricade.
- For rails less than 36" long, 4" wide stripes shall be used.
- Rails must be 8" min. to 12" max. in height.
- Use barricades from ODOT Qualified Products List (QPL).
- Use 4' Type III barricades where horizontal space is limited.
- Do not block bike lanes or shoulders unless the facility is properly closed and signed.
- Do not place barricades in sidewalks unless sidewalk is closed and a temporary pedestrian accessible route (TPAR) is signed according to the TCP. See Dwg. No. TM844.

### NOTES:

- Markings for barricade rails shall slope downward at an angle of 45° in the direction traffic is to pass.
- Where a barricade extends entirely across a roadway, it is desirable that the stripes slope downward in the direction toward which traffic must turn in detouring.
- Where both right and left turns are provided for, slope the chevron striping downward in both directions from the center of the barricade.
- For full roadway closures, the C or LR barricade may be used. Extend barricades completely across roadway unless access is required for local road users.



## DIAGRAM FOR BARRICADE PLACEMENT AND SLOPE MARKING



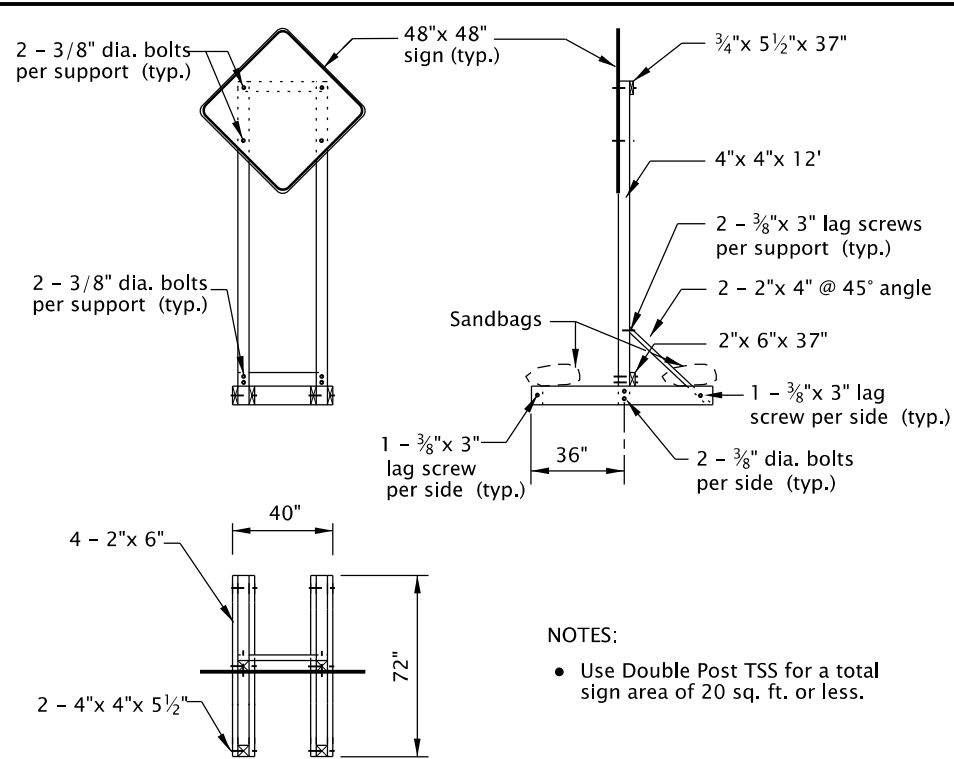
## BARRICADE NOTATION

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All materials shall be in accordance with the current Oregon Standard Specifications.			
<b>OREGON STANDARD DRAWINGS</b>			
<b>TEMPORARY BARRICADES</b>			
2021			
DATE	REVISION DESCRIPTION		
CALC. BOOK NO.	N/A	SDR DATE	01-JUL-2020
			<b>TM820</b>

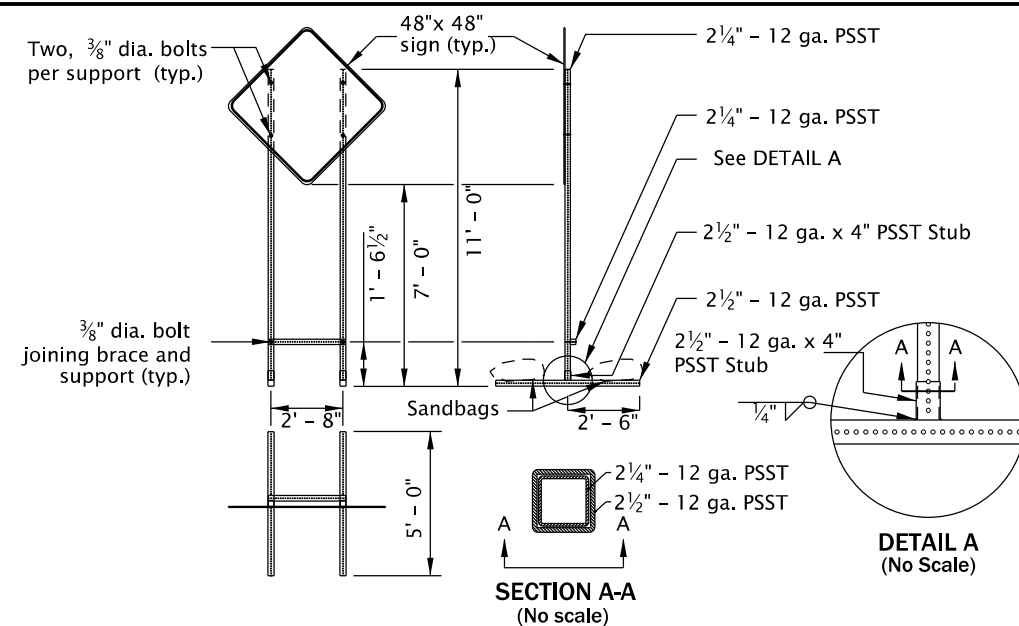
01-JUL-2020

TM821.dgn



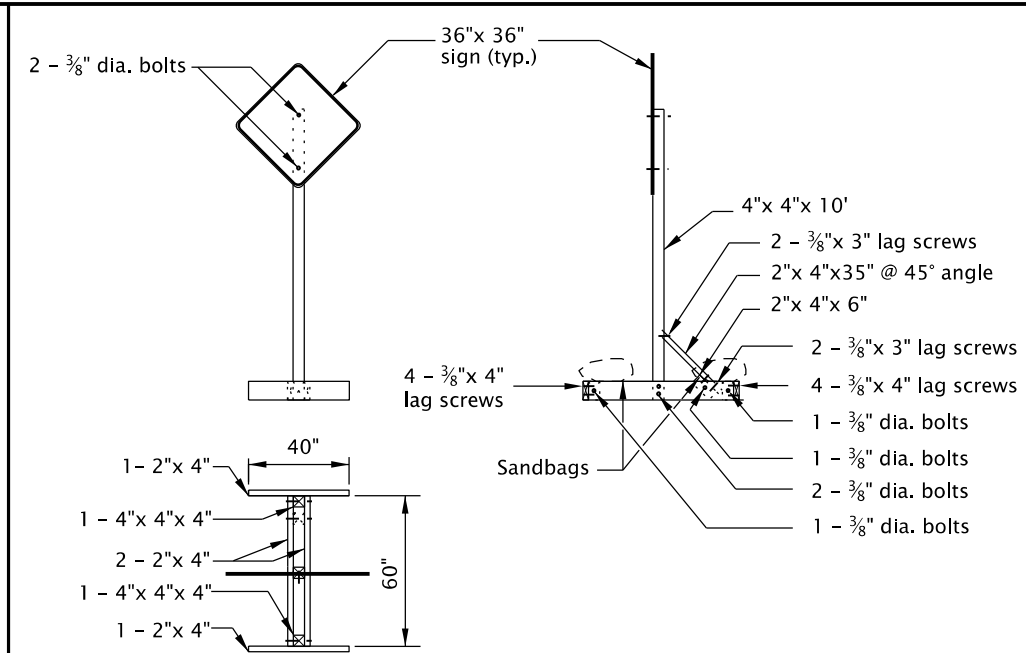
- NOTES:
- Use Double Post TSS for a total sign area of 20 sq. ft. or less.

**DOUBLE POST DETAIL**



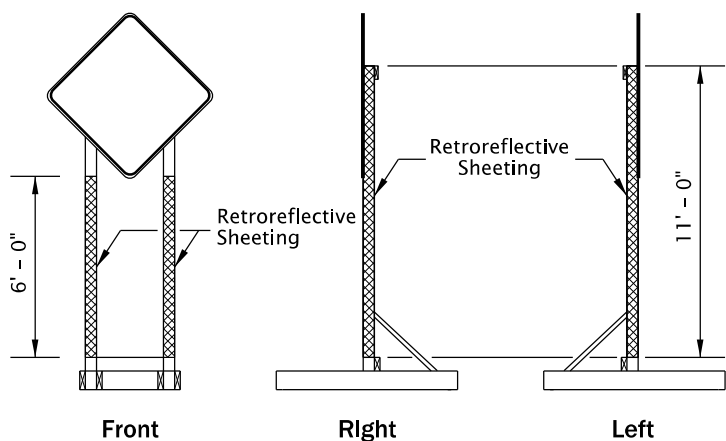
- NOTES:
- Use PSST TSS's for a total sign area of 16 sq. ft. or less.
  - All members shall have a minimum yield stress of 50 ksi.
  - Galvanize steel according to ASTM A653 with coating designation G90. Remove Galvanizing from steel before welding. Repair Galvanizing according to ASTM A780.
  - Use A325 Bolts or equivalent.
  - 2 1/4" - 12 ga. PSST to extend entire length inside of the 2 1/2" - 12 ga. x 4" PSST Stub.
  - Do not use bolt to secure 2 1/4" PSST inside of the 2 1/2" - 12 ga. x 4" PSST Stub.
  - Weld steel according to American Welding Society (AWS) D.1.1.

**PERFORATED STEEL SQUARE TUBE (PSST) DETAIL**

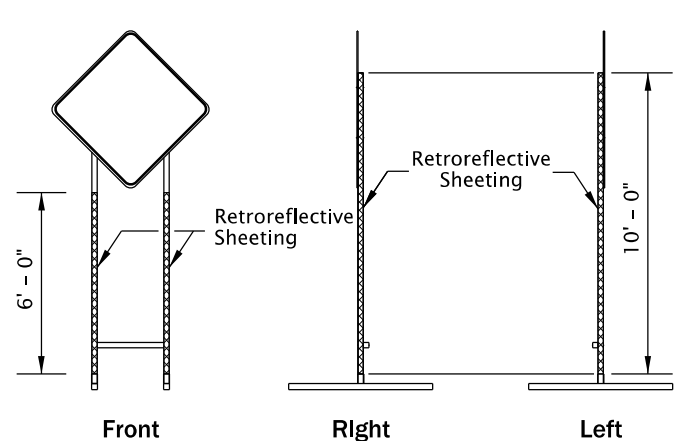


- NOTES:
- Use Single Post TSS for a total sign area of 12 sq. ft. or less.
  - Use Single Post TSS for mounting "Business Access" (CG20-11) signs. Do not mount signs on Type II or III Barricades.

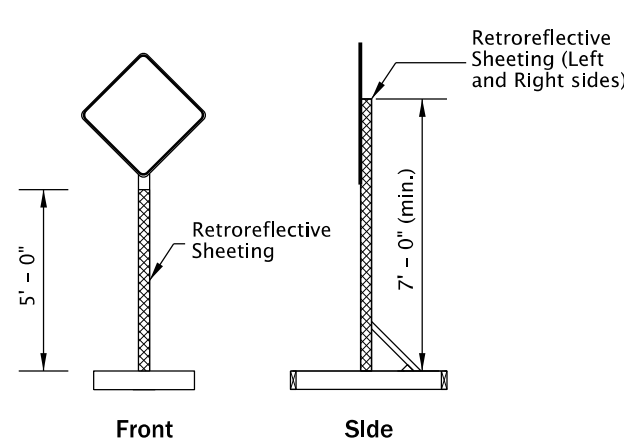
**SINGLE POST DETAIL**



**Double Post**



**Perforated Steel Square Tube (PSST)**



**Single Post**

Retroreflective Sheeting (Left and Right sides)

**TEMPORARY SIGN SUPPORT GENERAL NOTES:**

- Do not tip over TSS at any time.
- Do not locate TSS's in locations that block pedestrian or bicycle traffic.
- For wooden TSS's, use either Douglas Fir or Hem Fir, which is surfaced four sides (S4S) and free of heart center (FOHC).
- See "Temporary Sign Placement" detail on TM822 for sign installation heights.
- Do not place or stack ballast more than 24" above the ground.
- When sign is inconsistent with current work zone conditions, cover sign; or turn sign 90 degrees away from approaching traffic. Remove TSS from roadway when signing is not needed for more than 3 days.
- Place a minimum of 50 lbs of sandbags on each of the four TSS supports legs. (25 lb. max per bag) (min. 100 lbs per side of each TSS).
- See Dwg. No. TM204 for flag board mounting detail.

- NOTES:
- Apply fluorescent orange, ANSI Type VIII or IX retroreflective sheeting to TSS posts, as shown, for all temporary signs, except "STOP" and "DO NOT ENTER". For "STOP" and "DO NOT ENTER" signs, used red ANSI Type III or IV retroreflective sheeting on the TSS posts.
  - Apply sign post retroreflectivity to each TSS post facing front; and to the left and right sides of the TSS, as shown. Use 3" wide sheeting for wood post TSS's. Use 2" wide sheeting for PSST TSS's.
  - Sheeting may be applied directly to post material; or applied to a rigid, lightweight substrate, then securely attached to the posts.

**SIGN POST REFLECTIVE SHEETING PLACEMENT**

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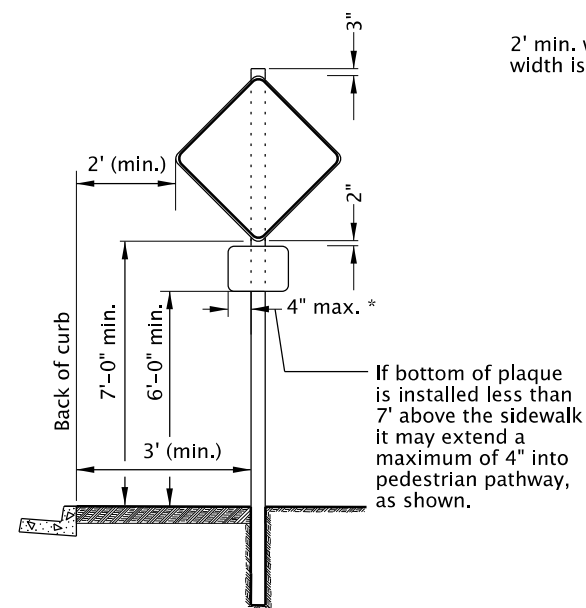
All materials shall be in accordance with the current Oregon Standard Specifications.			
<b>OREGON STANDARD DRAWINGS</b>			
<b>TEMPORARY SIGN SUPPORTS</b>			
2021			
DATE	REVISION DESCRIPTION		
CALC. BOOK NO.	N/A	SDR DATE	01-JUL-2020
			<b>TM821</b>

01-JUL-2020

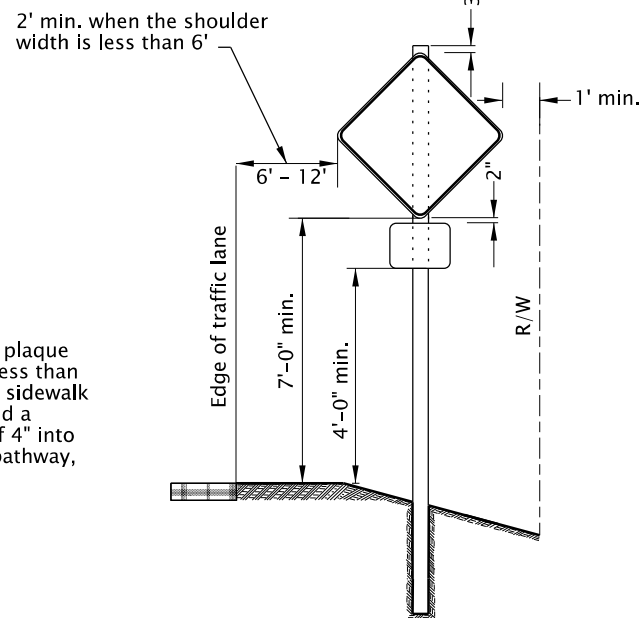
TM822.dgn

NOTES:

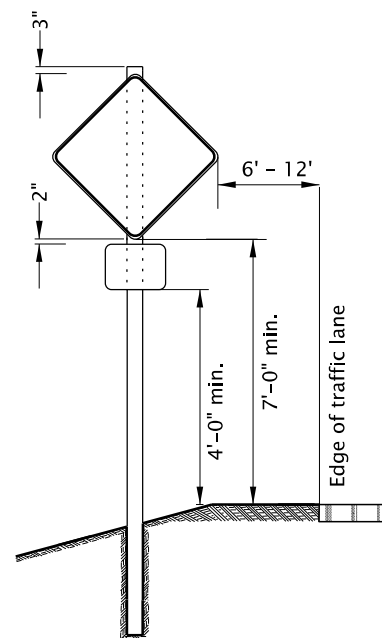
- Do not block bicycle lanes, sidewalks, or TPAR's with sign supports. Maintain minimum widths for these facilities according to TCP Design Manual, MUTCD, ADA, or as directed.
- To be accompanied by Dwg. Nos. TM670, TM671, TM687, TM688 & TM689.



Urban Areas With Curb/Sidewalk

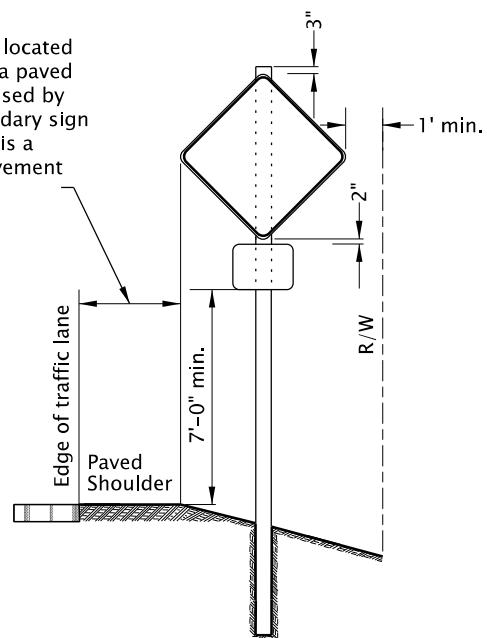


Rural Areas



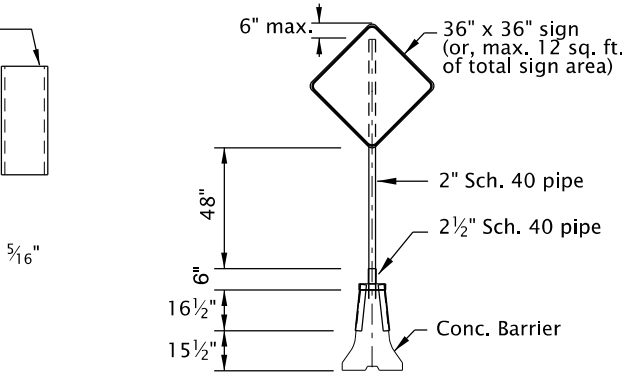
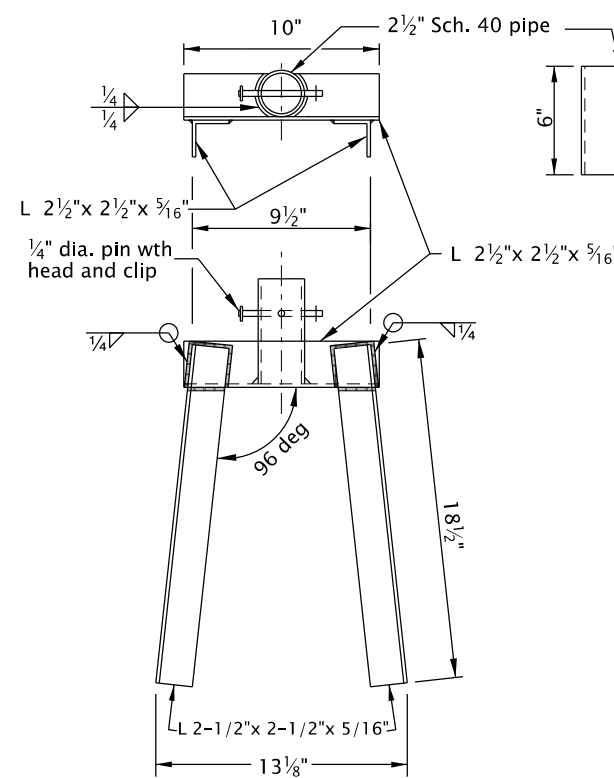
Divided Highway/Freeway Medians  
No Curb/Sidewalk

Where temporary signs are located adjacent to or intrude into a paved shoulder or other surface used by bicycle traffic, install secondary sign (plaque) so bottom of sign is a minimum of 7'0" above pavement surface, as shown.



Rural or Urban Areas - Curb or No Curb  
Bicycles On Shoulder

TEMPORARY SIGN PLACEMENT



NOTES:

- Drill additional holes so sign can be rotated 90 degrees and pinned when not in use.
- All structural steel shall conform to ASTM A36.
- Support fits both 32" and 42" tall "F" barrier.
- Use for supporting a maximum 12 sq. ft. of total sign area.
- Place support at connection between two concrete barrier sections.
- Weld steel according to American Welding Society (AWS) D.1.1.
- Do not use clipped signs.
- Follow manufacturer recommendation when installing signs on barrier other than concrete.

CONCRETE BARRIER SIGN SUPPORT

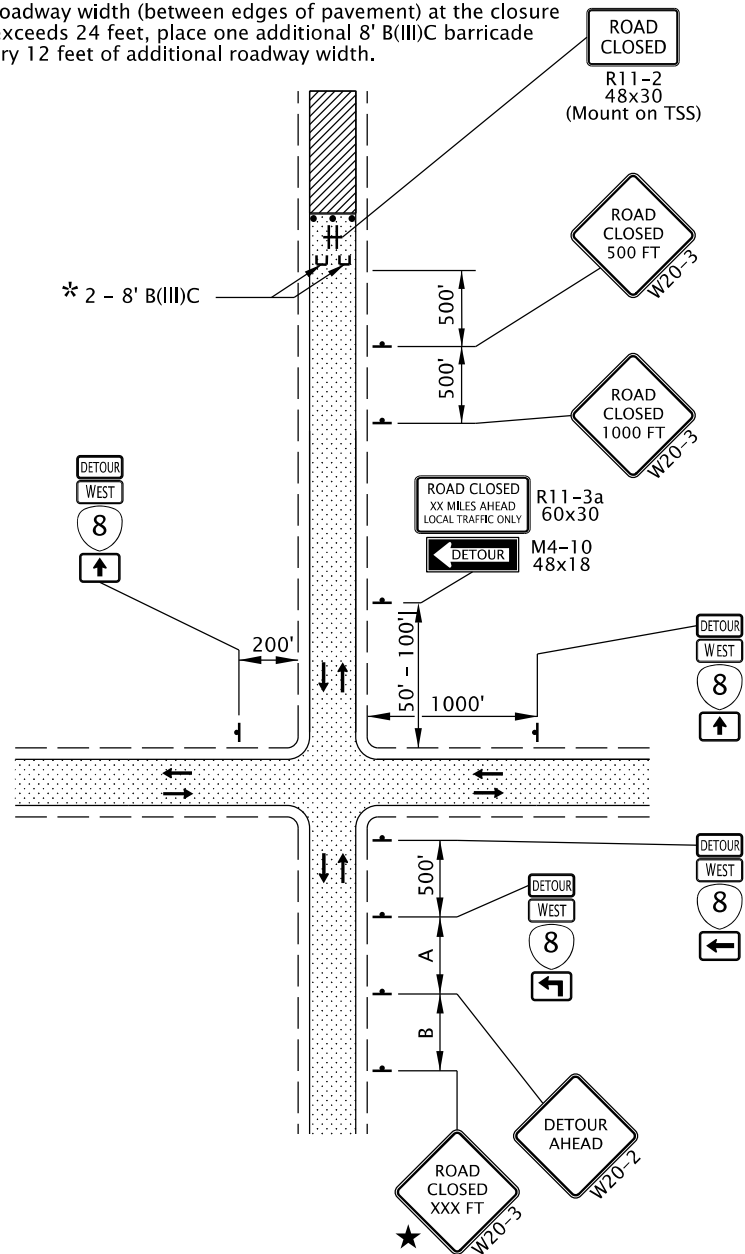
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All materials shall be in accordance with the current Oregon Standard Specifications.			
<b>OREGON STANDARD DRAWINGS</b>			
<b>TEMPORARY SIGN SUPPORTS</b>			
2021			
DATE	REVISION DESCRIPTION		
CALC. BOOK NO.	N/A	SDR DATE	01-JUL-2020
			<b>TM822</b>

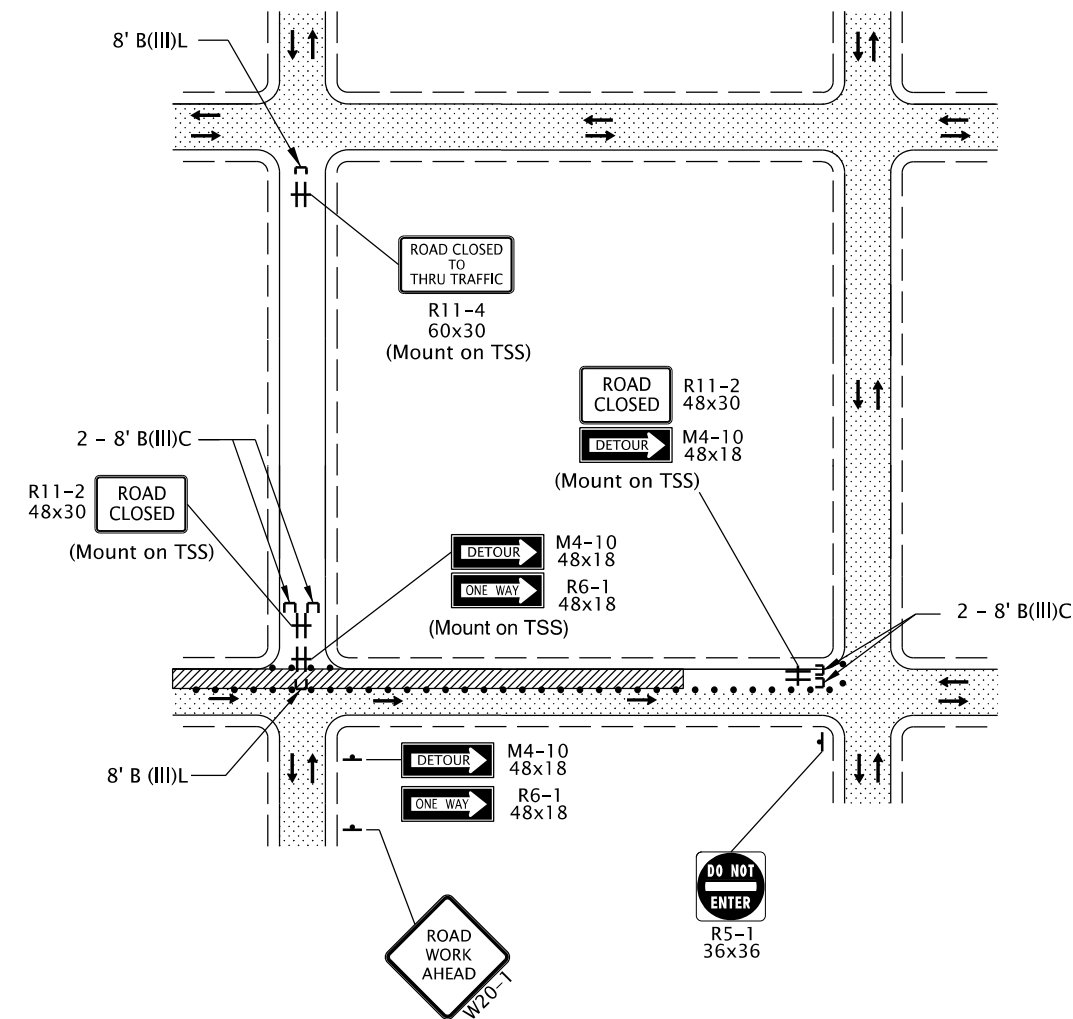
01-JUL-2020  
TM840.dgn

**NOTES:**  
If closure point is less than 1500 ft. from nearest intersection, use a "ROAD CLOSED TO THRU TRAFFIC" (R11-4) sign in place of the "ROAD CLOSED XX MILES AHEAD" sign.

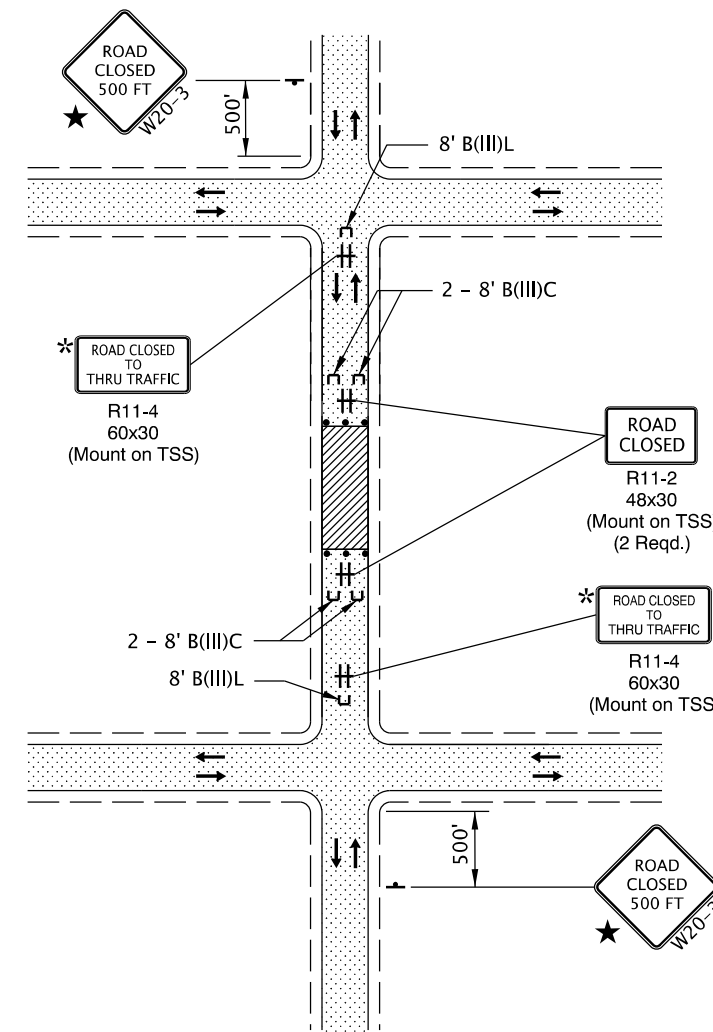
\* If the roadway width (between edges of pavement) at the closure point exceeds 24 feet, place one additional 8' B(III)C barricade for every 12 feet of additional roadway width.



**TYPICAL ROAD CLOSURE WITH DETOUR**



**TYPICAL PARTIAL ROAD CLOSURE**

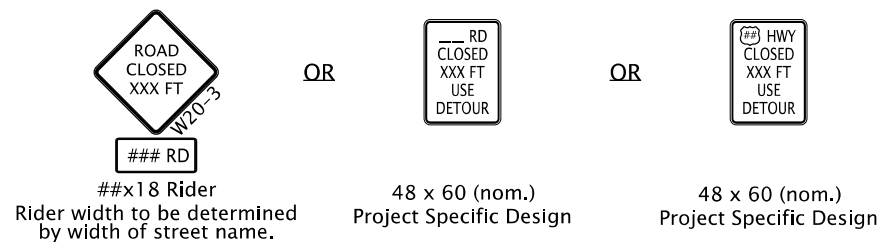


**NOTE:**  
\* If accesses exist between intersection and point of closure, install "ROAD CLOSED TO THRU TRAFFIC" sign as shown.

**TYPICAL ROAD CLOSURE**

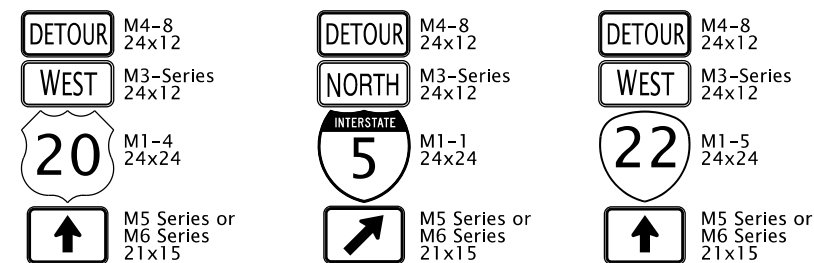
**GENERAL NOTES FOR ALL DETAILS:**

★ A "Street Name" rider may be used to enhance Road Closure signing; or provide a project specific design; or, as shown in the traffic control plan.



- Use a minimum of two Type III barricades for a road closure. For roads  $\geq 36'$  wide between curbs or edge of pavement, use a minimum of three Type III barricades for the closure point.
- For full road closures, the C or LR barricade may be used.
- Place additional signing as directed.
- To determine sign spacing A, B, & C, use the "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Dwg. TM800.
- To be accompanied by Dwg. Nos. TM820 & TM821.

- •••• 28" Tubular Markers See TCD Spacing Table on TM800 for max. spacing.
- [Dotted pattern] UNDER TRAFFIC
- [Hatched pattern] UNDER CONSTRUCTION



**NOTE:**  
• When detour routes overlap, each Route Shield will include a separate cardinal direction, detour, and directional arrow auxiliary sign assembly.

**TYPICAL TRAILBLAZER ASSEMBLY**

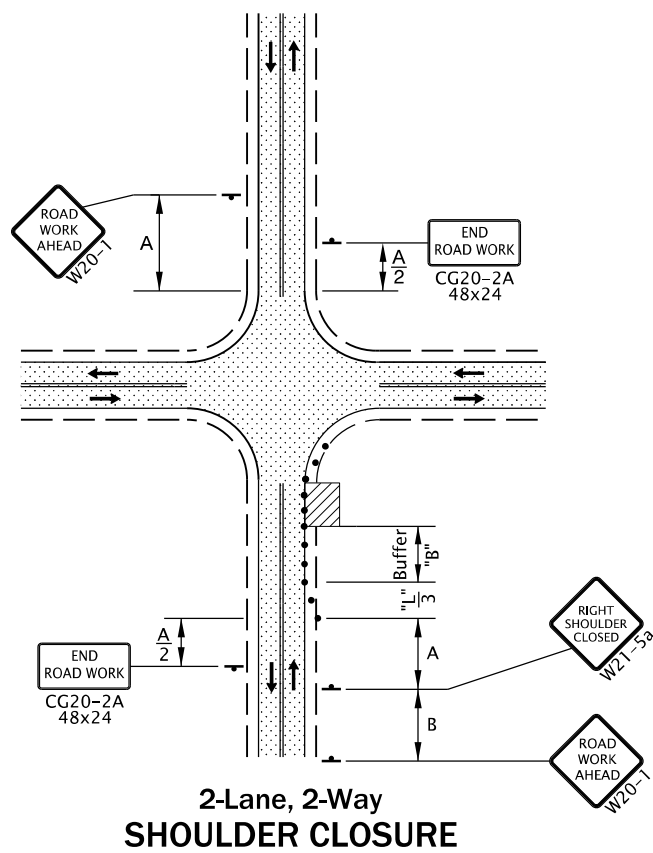
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All materials shall be in accordance with the current Oregon Standard Specifications.			
<b>OREGON STANDARD DRAWINGS</b>			
<b>CLOSURE DETAILS</b>			
2021			
DATE	REVISION DESCRIPTION		
CALC. BOOK NO.	N/A	SDR DATE	01-JUL-2020
			<b>TM840</b>

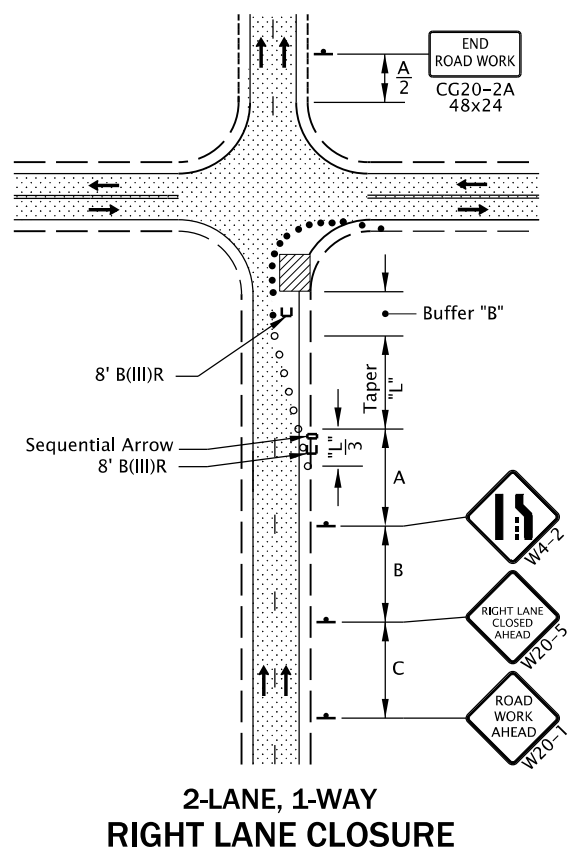


01-JUL-2022

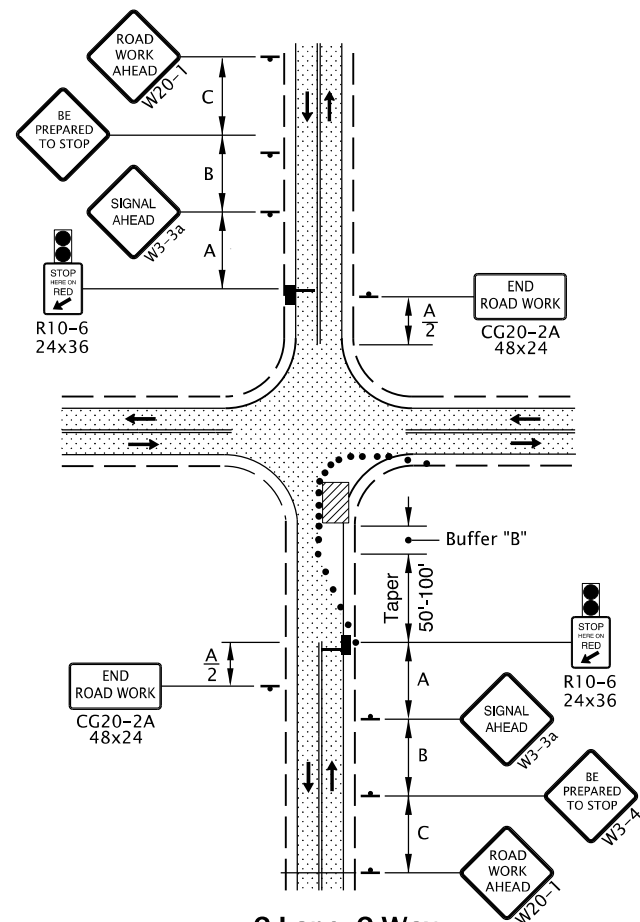
TM841.dgn



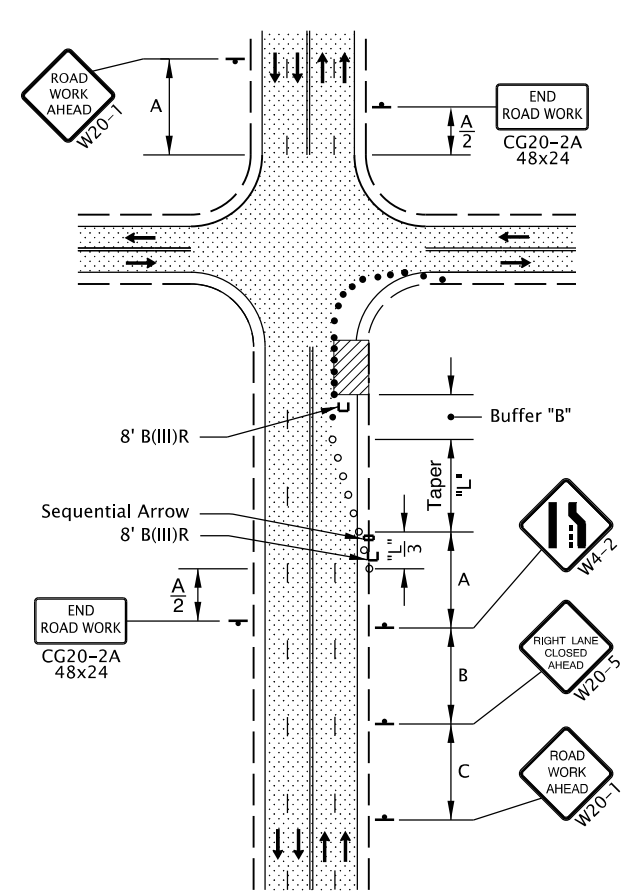
**2-Lane, 2-Way SHOULDER CLOSURE**



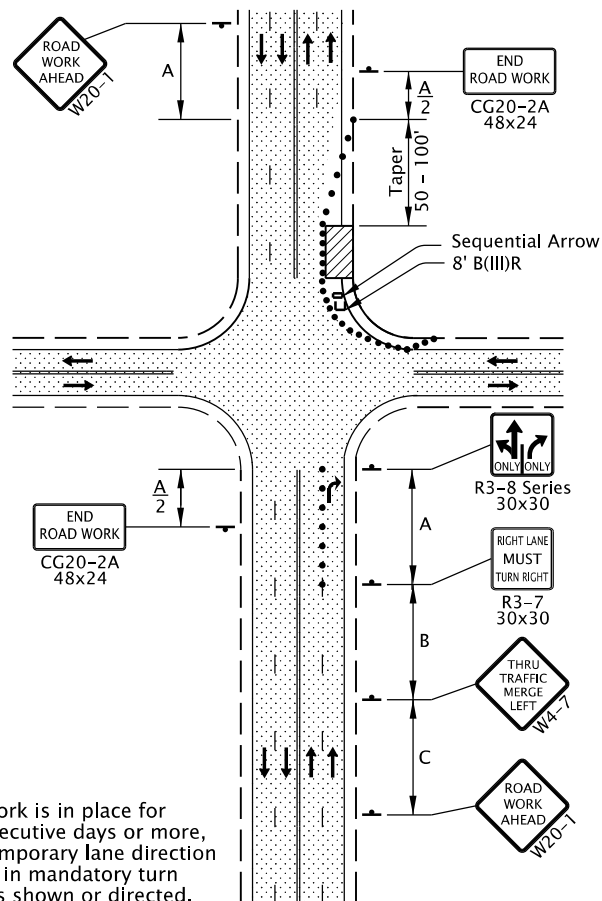
**2-LANE, 1-WAY RIGHT LANE CLOSURE**



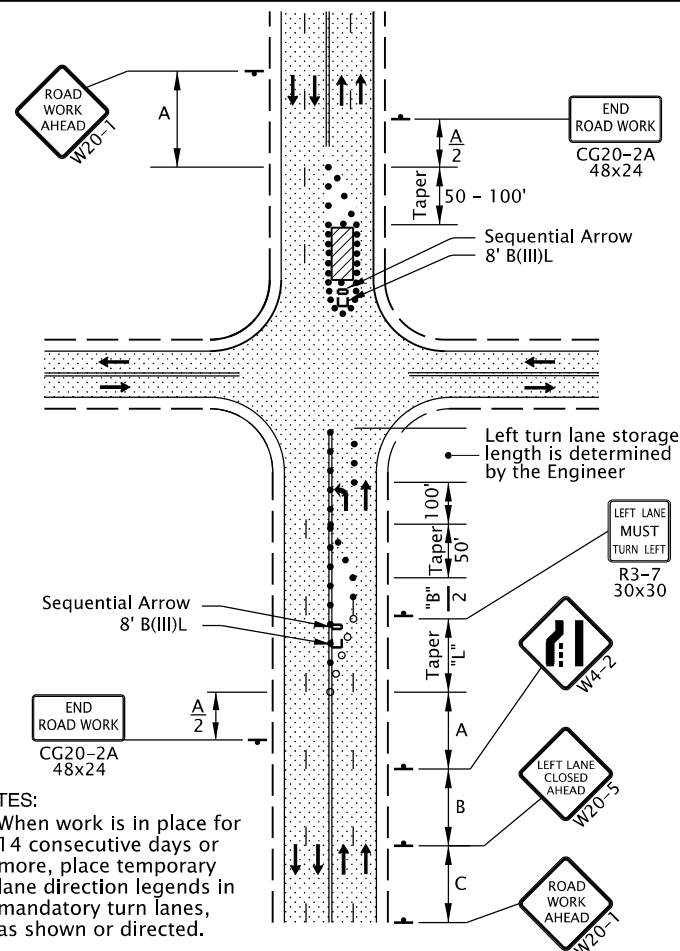
**2-Lane, 2-Way ONE LANE CLOSURE**



**4-Lane, 2-Way RIGHT LANE CLOSURE, NEAR SIDE**



**4-Lane, 2-Way RIGHT LANE CLOSURE, FAR SIDE**



**4-Lane, 2-Way LEFT LANE CLOSURE, FAR SIDE**

**NOTES:**

- When work is in place for 14 consecutive days or more, place temporary lane direction legends in mandatory turn lanes, as shown or directed.

**NOTES:**

- When work is in place for 14 consecutive days or more, place temporary lane direction legends in mandatory turn lanes, as shown or directed.

**GENERAL NOTES FOR ALL DETAILS:**

- Additional Traffic Control Measures (TCM) may be required for all legs of the intersection.
- The "SIGNAL AHEAD" (W3-3a) sign may be substituted with the signal ahead symbol (W3-3) sign.
- To determine Taper Length ("L") and Buffer Length ("B"), use the "MINIMUM LENGTHS TABLE" on Dwg. TM800.
- For left lane or shoulder work, place TCD to close left lane or shoulder. Use "LEFT LANE CLOSED AHEAD" (W20-5) sign, "LEFT LANE ENDS" (W4-2L) symbol sign, or "LEFT SHOULDER CLOSED" (W21-5a) sign, where applicable.
- To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Dwg. TM800.
- When a through road intersects within the work zone, place a "ROAD WORK AHEAD" (W20-1) sign in advance of the intersection at sign spacing A.
- Tubular markers may be used in lane closure tapers where posted speed is 40 mph or less.
- Where shoulder width is limited, Sequential Arrow may be placed within the lane closure taper.
- Place channelizing devices around intersection radii, business accesses and driveways at 10' spacing.
- Install a "BICYCLES ON ROADWAY" (CW11-1) sign in advance of the closure when a bike lane is closed, or when the shoulder is closed and bikes are expected.
- To be accompanied by Dwg. Nos. TM820, TM82, TM840 & TM854.

- Automated Flagging Assistance Device (AFAD)
- 28" Tubular Markers See TCD Spacing Table on TM800 for max. spacing.
- Temp. Plastic Drums See TCD Spacing Table on TM800 for max. spacing.
- UNDER TRAFFIC
- UNDER CONSTRUCTION

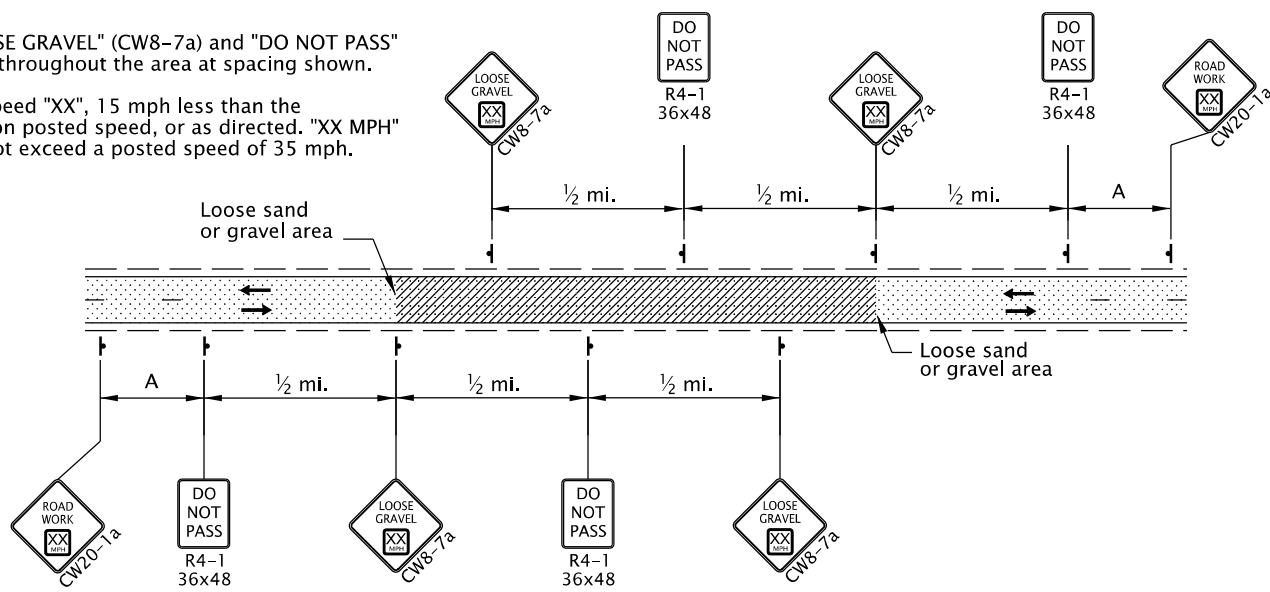
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All materials shall be in accordance with the current Oregon Standard Specifications.			
<b>OREGON STANDARD DRAWINGS</b>			
<b>INTERSECTION WORK ZONE DETAILS</b>			
2021			
DATE	REVISION DESCRIPTION		
CALC. BOOK NO.	N/A	SDR DATE	01-JUL-2022
			<b>TM841</b>

01-JUL-2022

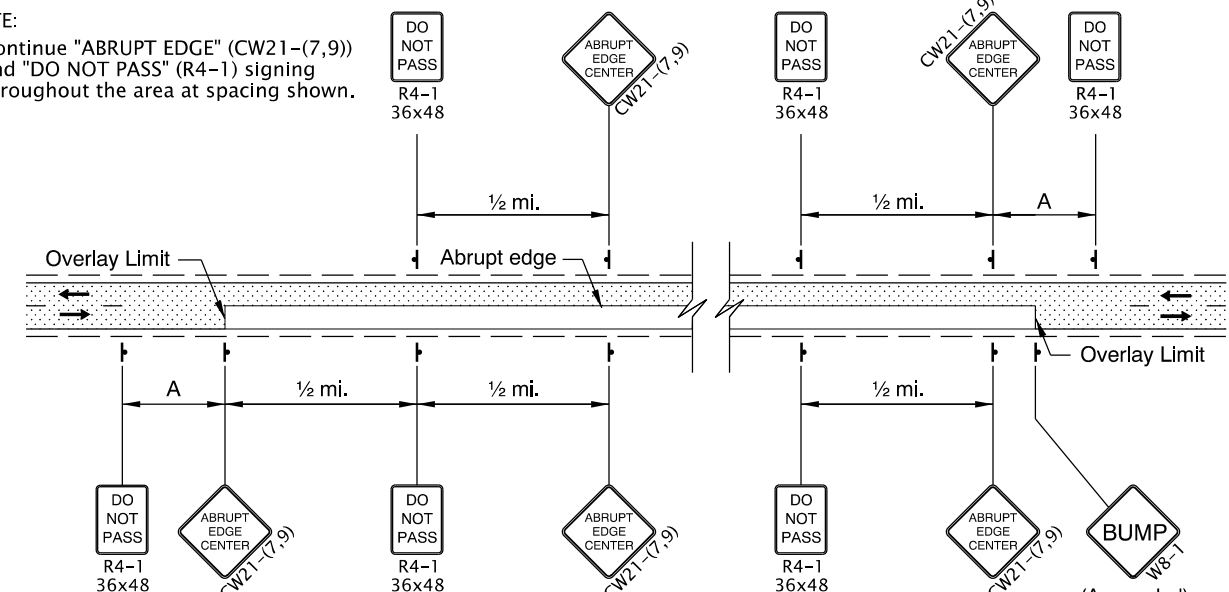
TM850.dgn

- NOTE:
- Continue "LOOSE GRAVEL" (CW8-7a) and "DO NOT PASS" (R4-1) signing throughout the area at spacing shown.
  - Use advisory speed "XX", 15 mph less than the pre-construction posted speed, or as directed. "XX MPH" placard shall not exceed a posted speed of 35 mph.



2-Lane, 2-Way Roadway  
LOOSE GRAVEL IN ROADWAY SIGNING

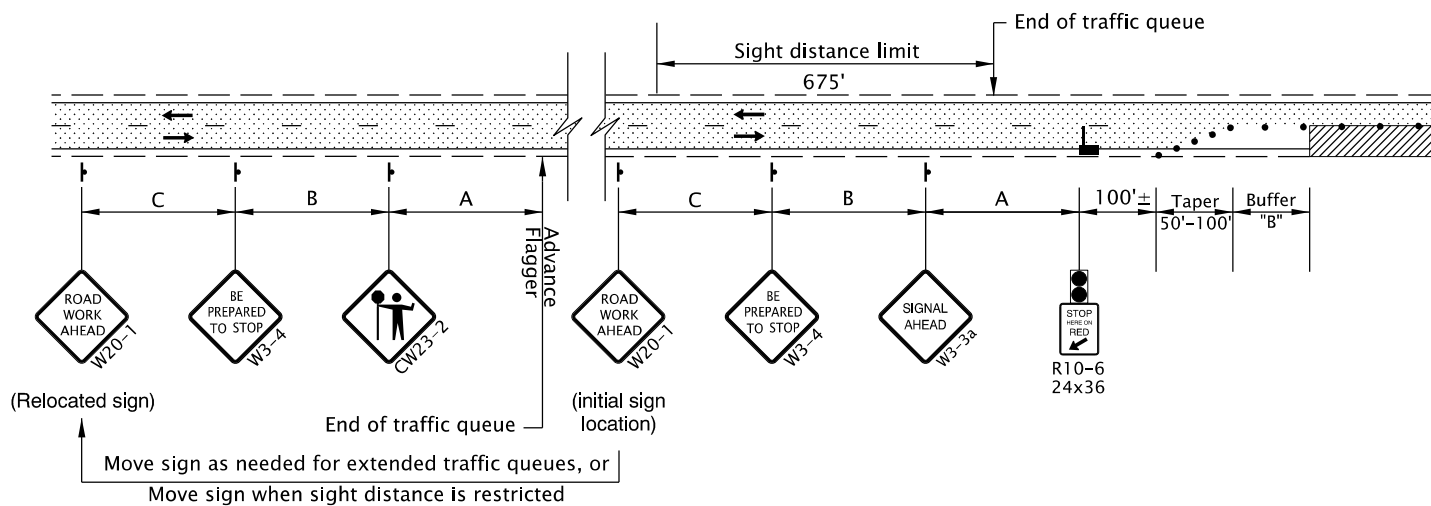
- NOTE:
- Continue "ABRUPT EDGE" (CW21-(7,9)) and "DO NOT PASS" (R4-1) signing throughout the area at spacing shown.



2-Lane, 2-Way Roadway  
OVERLAY AREA SIGNING

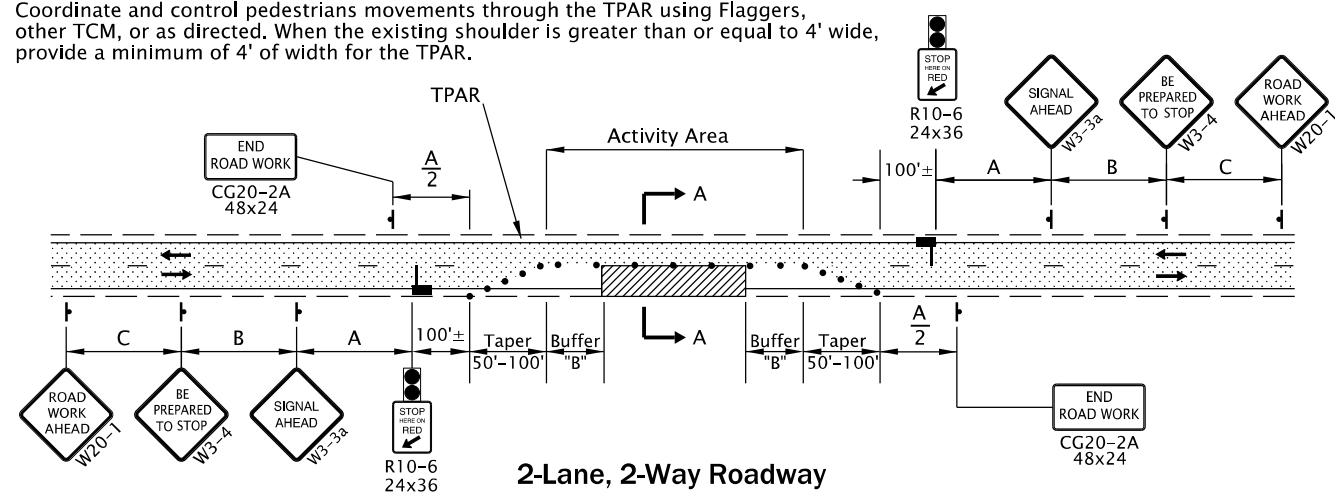
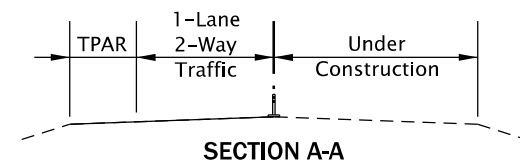
- NOTES:
- Place Advance Flagger and additional signing when traffic queues extend beyond initial warning signing OR when sight distance is restricted.
  - Relocate initial "ROAD WORK AHEAD" (W20-1) sign in advance of additional "BE PREPARED TO STOP" (W3-4) and Flagger Ahead (CW23-2) signs, as shown.

- Place additional Tubular Markers for Flagger and Advance Flagger Stations according to FLAGGER STATION DELINEATION detail.



ADVANCE FLAGGER FOR EXTENDED TRAFFIC QUEUES

- NOTE:
- When using pilot cars with flaggers to control traffic during paving operations, the Tubular Marker spacing along centerline may be increased to 200' within the Activity Area, as shown or as directed.
  - Include "WAIT FOR FLAGGER" (CR4-23) signs mounted on Type II Barricade located approx. 50' before each Flagger.
  - Coordinate and control pedestrians movements through the TPAR using Flaggers, other TCM, or as directed. When the existing shoulder is greater than or equal to 4' wide, provide a minimum of 4' of width for the TPAR.



2-Lane, 2-Way Roadway  
ONE LANE CLOSURE

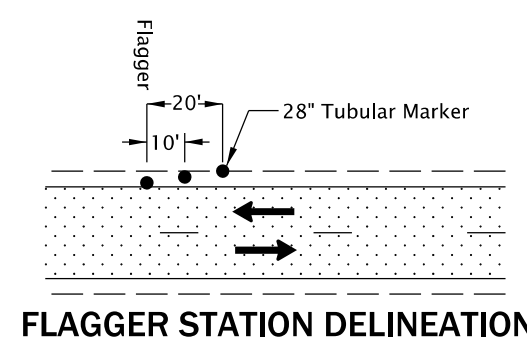
GENERAL NOTES FOR ALL DETAILS:

- The "SIGNAL AHEAD" (W3-3a) sign may be substituted with the Signal Ahead (W3-3) symbol sign.
- Cover existing passing zone signing, as directed.
- Install temporary striping as required.
- To determine Taper Length ("L") and Buffer Length ("B"), use the "MINIMUM LENGTHS TABLE" shown on Dwg. No. TM800.
- To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Dwg. No. TM800.
- Install a "BICYCLES ON ROADWAY" (CW11-1) sign in advance of the closure when a bike lane is closed, or when the shoulder is closed and bikes are expected.
- At night, flagger stations shall be illuminated according to the FLAGGER STATION LIGHTING DELINEATION detail on Dwg No. TM800.

- To be accompanied by Dwg. Nos. TM820, TM821 & TM854.

- Automated Flagging Assistance Device (AFAD)
  - 28" Tubular Markers on 20' max. spacing for flagger tapers and stations
  - 28" Tubular Markers See TCD Spacing Table on TM800 for max. spacing.
- 

- NOTE:
- Use a minimum of 3 tubular markers in shoulder taper on 10' spacing for flagger station delineation.



FLAGGER STATION DELINEATION

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All materials shall be in accordance with the current Oregon Standard Specifications.

**OREGON STANDARD DRAWINGS**

**2-LANE, 2-WAY ROADWAYS**

2021

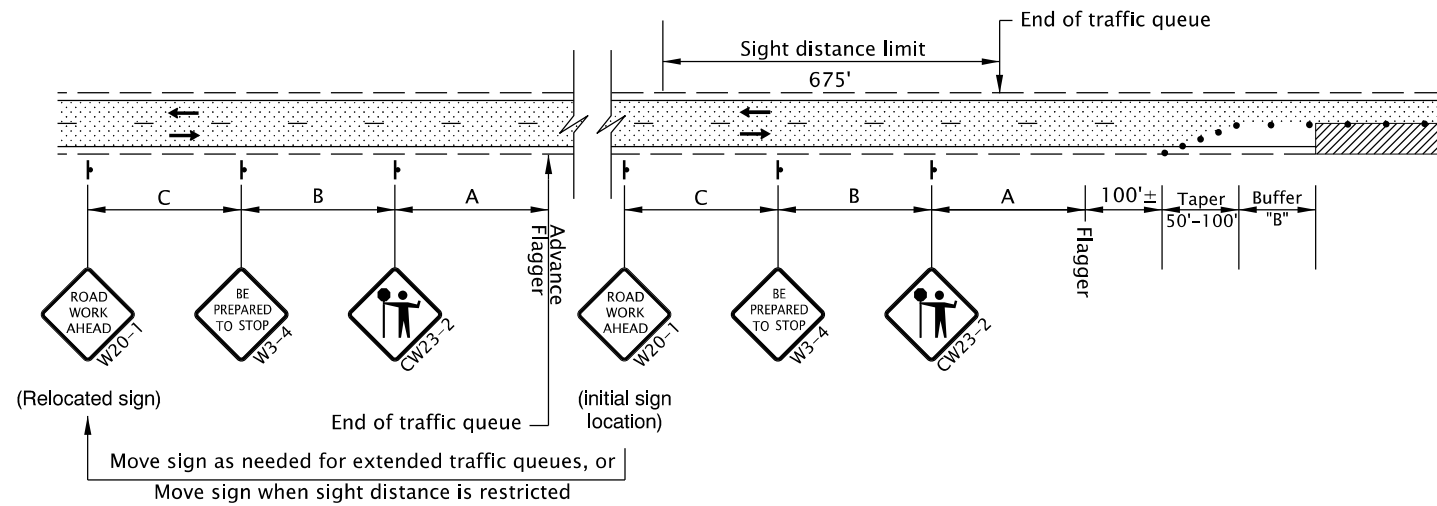
DATE	REVISION	DESCRIPTION
01-2022	Added AFADs to drawing.	

CALC. BOOK NO. --- N/A --- SDR DATE: 01-JUL-2022 **TM850**

13-JAN-2023  
TM855.dgn

**NOTES:**

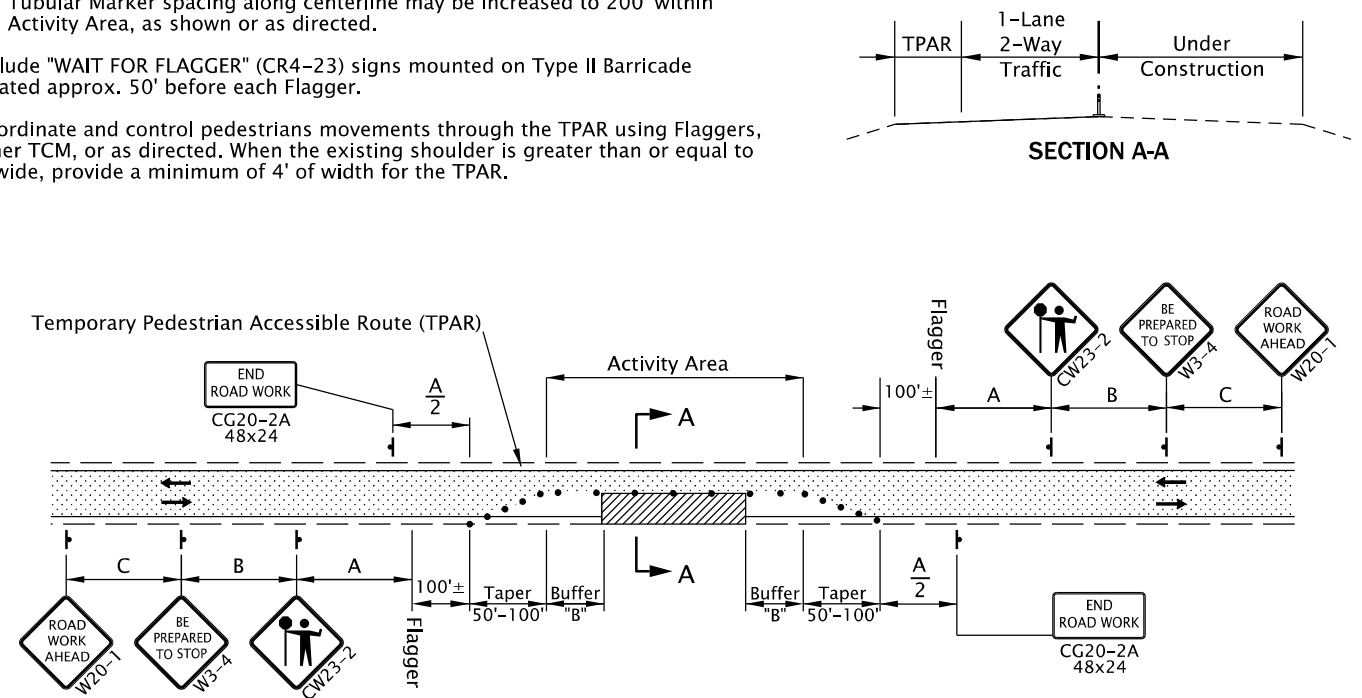
- Place Advance Flagger and additional signing when traffic queues extend beyond initial warning signing OR when sight distance is restricted.
- Relocate initial "ROAD WORK AHEAD" (W20-1) sign in advance of additional "BE PREPARED TO STOP" (W3-4) and Flagger Ahead (CW23-2) signs, as shown.
- Place additional Tubular Markers for Flagger and Advance Flagger Stations according to FLAGGER STATION DELINEATION detail.



**ADVANCE FLAGGER FOR EXTENDED TRAFFIC QUEUES**

**NOTE:**

- When using pilot cars with flaggers to control traffic during paving operations, the Tubular Marker spacing along centerline may be increased to 200' within the Activity Area, as shown or as directed.
- Include "WAIT FOR FLAGGER" (CR4-23) signs mounted on Type II Barricade located approx. 50' before each Flagger.
- Coordinate and control pedestrians movements through the TPAR using Flaggers, other TCM, or as directed. When the existing shoulder is greater than or equal to 4' wide, provide a minimum of 4' of width for the TPAR.



**2-Lane, 2-Way Roadway  
ONE LANE CLOSURE**

**GENERAL NOTES FOR ALL DETAILS:**

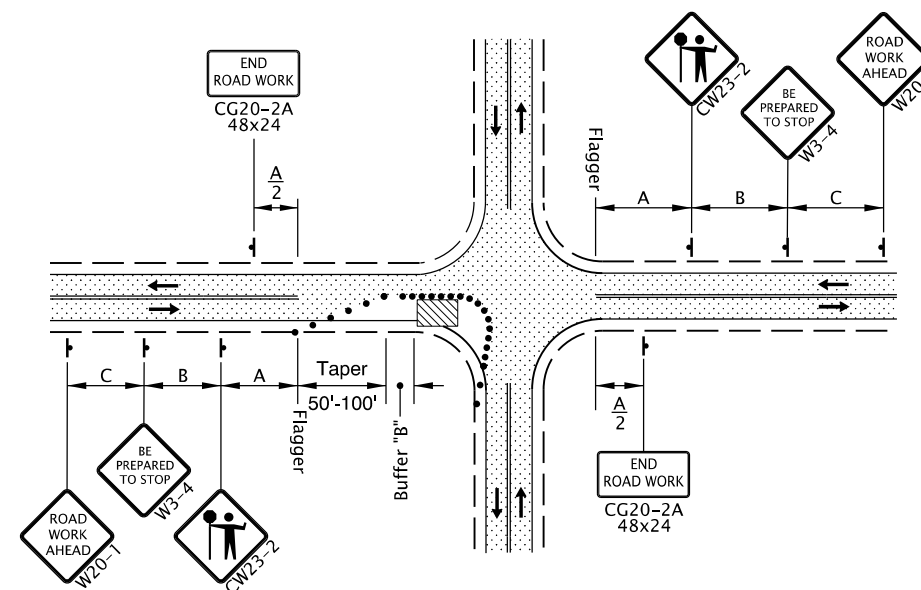
- This drawing is only intended to be used where an Automated Flagger Assistance Device (AFAD) cannot be utilized.
- The "FLAGGER" (CW23-2) symbol sign shall be used only in conjunction with the "BE PREPARED TO STOP" (W3-4) sign.
- Cover existing passing zone signing, as directed.
- Install temporary striping as required.
- To determine Taper Length ("L") and Buffer Length ("B"), use the "MINIMUM LENGTHS TABLE" shown on Dwg. No. TM800.
- To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Dwg. No. TM800.
- Install a "BICYCLES ON ROADWAY" (CW11-1) sign in advance of the closure when a bike lane is closed, or when the shoulder is closed and bikes are expected.
- At night, flagger stations shall be illuminated according to the FLAGGER STATION LIGHTING DELINEATION detail on Dwg No. TM800.
- To be accompanied by Dwg. Nos. TM820 & TM821.

- ..... 28" Tubular Markers on 10' max. spacing around intersection radii.
- ..... 28" Tubular Markers on 20' max. spacing for flagger tapers and stations
- ..... 28" Tubular Markers See TCD Spacing Table on TM800 for max. spacing.

..... UNDER TRAFFIC  
 / / / / UNDER CONSTRUCTION

**NOTE:**

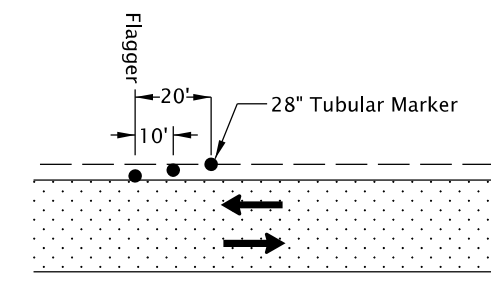
- Additional Traffic Control Measures (TCM) may be required for all legs of the intersection



**2-Lane, 2-Way Roadway  
ONE LANE CLOSURE, INTERSECTION**

**NOTE:**

- Use a minimum of 3 tubular markers in shoulder taper on 10' spacing for flagger station delineation.



**FLAGGER STATION DELINEATION**

*The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.*

All materials shall be in accordance with the current Oregon Standard Specifications.			
<b>OREGON STANDARD DRAWINGS</b>			
<b>2-LANE, 2-WAY ROADWAYS</b>			
2021			
DATE	REVISION DESCRIPTION		
CALC. BOOK NO.	N/A	SDR DATE	13-JAN-2023
			<b>TM855</b>