

2024 OREGON STANDARD DRAWINGS

Standard Distribution
Date of Issue: July 2024

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This is the July 2024 release of the 2024 Oregon Standard Drawings.

For ODOT Projects, the details in the standard drawings will be effective on the **Dec 1, 2024** bid opening where these drawings are called for in the project plans.

These drawings are for use with projects using the **2024 Oregon Standard Specifications**.

The drawing “effective date” is located below the title block on each Standard Drawing. The bid opening date of a project should be in the effective date window of the drawings. This will ensure the correct drawings are being used on the projects.

Electronic PDF files with the effective date for each drawing are on the web at:

<http://www.oregon.gov/ODOT/Engineering/Pages/Standards.aspx>

Each standard drawing has a corresponding Standard Drawing Reports that contains useful information for the designer as well as updates that occur on the drawing. The link to the report is the title of the specific drawing on the webpage.

The following Standard Drawings were updated for the July 2024 release:

Drawing Number	Comment
RD438	
RD484A	New Drawing
RD484B	New Drawing
RD490A	New Drawing
RD490B	New Drawing
RD490C	New Drawing
RD490D	New Drawing
RD490E	New Drawing
RD490F	New Drawing
RD490G	New Drawing
RD490H	New Drawing
RD502	
RD545	

Drawing Number	Comment
RD546	
RD548A	New Drawing
RD548B	New Drawing
RD1005	
BR207	
BR209	
BR216	
BR220	
BR230	
BR270	
BR273	
BR291	
TM240	
TM450	
TM452	
TM460	
TM466	
TM467	
TM470	
TM471	
TM472	
TM485	
TM621	
TM630	
TM678	
TN800	
TM830	
TM841	

OREGON STANDARD DRAWINGS 2024 NUMBERS AND REVISION DATES

DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE
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RD100	1/2024
RD101	1/2024
RD110	
RD115	
RD120	
RD130	
RD140	
RD150	
RD160	
RD170	
RD250	
RD254	
RD255	
RD258	
RD262	
RD266	
RD270	
RD274	
RD278	
RD282	
RD286	
RD300	
RD302	
RD304	
RD306	
RD308	
RD310	
RD312	
RD316	
RD317	
RD318	
RD319	
RD320	
RD321	
RD322	1/2024
RD324	1/2024
RD325	
RD326	
RD327	
RD328	
RD330	
RD332	
RD334	
RD335	
RD336	
RD338	
RD339	
RD340	
RD342	
RD343	

RD344	
RD345	
RD346	
RD348	
RD350	
RD352	
RD354	
RD356	
RD358	
RD360	
RD362	
RD363	
RD364	
RD365	
RD366	
RD367	
RD368	
RD370	
RD371	
RD372	
RD373	
RD374	
RD376	
RD378	
RD380	
RD382	
RD384	
RD386	
RD388	
RD390	
RD391	
RD393	
RD398	
RD399	
RD400	
RD401	
RD402	
RD403	
RD404	
RD405	
RD406	
RD407	
RD408	
RD409	
RD410	
RD412	
RD415	
RD416	
RD417	
RD419	

RD420	1/2024
RD421	
RD435	
RD436	
RD437	
RD438	7/2024
RD440	
RD442	1/2024
RD443	1/2024
RD444	1/2024
RD445	
RD450	
RD451	1/2024
RD470	
RD471	1/2024
RD472	
RD473	
RD474	
RD481	
RD482	
RD484A	7/2024
RD484B	7/2024
RD490A	7/2024
RD490B	7/2024
RD490C	7/2024
RD490D	7/2024
RD490E	7/2024
RD490F	7/2024
RD490G	7/2024
RD490H	7/2024
RD500	
RD501	1/2024
RD502	7/2024
RD503	
RD505	
RD510	
RD515	
RD516	
RD520	
RD526	
RD530	
RD535	
RD536	
RD545	7/2024
RD546	7/2024
RD548A	7/2024
RD548B	7/2024
RD550	
RD560	
RD570	

OREGON STANDARD DRAWINGS 2024 NUMBERS AND REVISION DATES

DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE
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RD575	
RD576	
RD580	
RD581	
RD590	
RD595	
RD596	
RD602	
RD610	
RD615	
RD700	
RD701	
RD702	1/2024
RD705	
RD706	
RD707	
RD710	
RD711	
RD715	
RD720	
RD721	
RD722	
RD725	
RD730	
RD735	
RD740	
RD745	
RD750	
RD770	
RD771	
RD780	1/2024
RD781	1/2024
RD782	1/2024
RD810	
RD815	
RD820	
RD825	
RD830	
RD832	
RD835	
RD840	
RD845	
RD900	1/2024
RD901	1/2024
RD902	
RD904	
RD905	
RD906	
RD908	
RD909	

RD910	
RD912	
RD913	
RD916	
RD920	
RD922	
RD930	
RD932	
RD936	
RD938	
RD940	
RD950	
RD952	
RD960	
RD1000	
RD1005	7/2024
RD1006	
RD1010	
RD1015	
RD1030	
RD1031	
RD1032	
RD1033	
RD1040	
RD1045	
RD1050	
RD1055	
RD1060	
RD1065	
RD1070	
RD1140	
BR115	1/2024
BR133	
BR135	
BR136	
BR139	
BR140	
BR141	
BR145	
BR157	
BR165	1/2024
BR175	
BR182	
BR190	
BR191	
BR195	
BR200	1/2024
BR203	

BR206	
BR207	7/2024
BR208	1/2024
BR209	7/2024
BR212	
BR214	
BR216	7/2024
BR220	7/2024
BR221	
BR222	
BR223	
BR226	1/2024
BR230	7/2024
BR233	
BR236	
BR240	
BR241	
BR242	
BR245	
BR246	
BR250	
BR253	
BR256	
BR260	
BR263	
BR266	
BR270	7/2024
BR273	7/2024
BR275	1/2024
BR285	
BR286	
BR290	
BR291	7/2024
BR300	
BR310	
BR321	
BR325	
BR330	
BR335	
BR340	
BR350	
BR360	
BR365	
BR375	
BR400	
BR405	
BR410	
BR415	
BR420	
BR422	

OREGON STANDARD DRAWINGS 2024 NUMBERS AND REVISION DATES

DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE
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TM695	
TM696	
TM697	
TM698	
TM800	7/2024
TM810	
TM820	
TM821	
TM822	
TM830	7/2024
TM831	
TM832	
TM833	
TM840	
TM841	7/2024
TM842	1/2024
TM843	
TM844	
TM845	
TM850	
TM851	
TM852	
TM853	
TM854	
TM855	
TM860	
TM861	
TM862	
TM870	
TM871	
TM880	

- A -

Access and Ventilation

Hardware for Concrete Box Girders BR135, BR136

Air Release/Air Vacuum Assembly,

Water System RD266, RD270

Anchors, Pipe Slope RD330, RD332

Approaches RD715

- B -

Barricades (Types I, II, & III) TM820

Barrier, Concrete, Median

35" cast-in-place RD590

Barrier, Concrete, Standard (32" Height)

Around Median Obstacle RD535, RD536

At Bridge Expansion Joints BR263

Buried in Backslope RD526

Cast-In-Place RD505

Median Barrier Anchoring RD515

Precast RD500, RD501, RD502

Scuppers (Precast) RD595, RD596

Securing Barrier To Roadway RD516

Temporary Inst. and Maintenance RD503, RD515, RD516,

RD530

Terminals RD510

Transition To Bridge Rail RD520

Transition To Guardrail RD530, RD580

Barrier, Concrete, Tall (42" Height)

Around Median Obstacle RD575, RD576

Modified Reinforcing RD548A, RD548B

Precast RD545, RD546.

RD548A RD548B

Securing Barrier To Roadway RD516

Transition to Bridge Rail RD550

Transition To Standard Barrier RD560

Transition To Guardrail RD570, RD581

Barrier, Metal Median RD400, RD405, RD408

Bollards RD130, RD255

Bike Lane

Curb RD702

Crossing RD1140

Box Culvert, Concrete

Cast-in-place BR820, BR825,

BR830, BR835

Double Box Culverts BR840, BR841

Extensions BR805

Modified Type 2A Guardrail BR266

Wingwalls BR800

Boxes

Trapezoidal Box Reinforcement BR133

Bridge End Panel BR165

Bridge Concrete Parapet

32" Vertical BR221

42" Vertical BR222

With Steel Post BR214

Bridge Preservation

Concrete Repair	BR500
General Cathodic Protection	BR520
Reinforcement Continuity	BR525
Reinforcing Bar Repair	BR505
Rivet Replacement	BR550

Bridge Rail

2-Tube Curb Mount	BR206, BR207
2-Tube Side Mount	BR226, BR230
3-Tube Curb Mount	BR208, BR209
Combination	BR223
Concrete Post and Beam	BR212
Flush Mount Combination	BR220
Pedestrian	BR246
Pedestrian On Sidewalk Mount	
Parapet	BR250
Rail Buttress	
42 Inch	BR275
Sidewalk Mount Combination	BR216
Sidewalk Mount Parapet with	
Chain Link Fence	BR253
Thrie Beam	BR233
Thrie Beam Retrofit	BR273
Trailing End Connection	
To Guardrail	BR236
Transition From Guardrail	BR270, BR275
Transition To Guardrail	BR203
Transition To Guardrail,	
3'-6" Height	BR291
Type F	BR200
Type F 3'-6" Height	BR290
Type F with Chain Link	BR260
Type F with Pedestrian Rail	BR256
Type F with Rectangular Tube	BR285, BR286

- C -

Cathodic Protection, General	BR520
Cattle Guard	
Painted	RD110
Steel Tube	BR175
Cattle Pass	RD110
Check Dams	RD1005, RD1006
Concrete Pavement	
Plain Dowelled	RD600
Reinforced	RD600
Concrete Repair, Bridge	BR500
Concrete Truck Wash Out	RD1070
Construction Entrances	RD1000
Coupling Bands for Corrugated Metal Pipe	RD325, RD326, RD327
Cross Slopes, Roadway Superelevations	RD140
Crosswalk Closure	TM240
Curb Inlets	RD366
Curbs, Various Types	RD700, RD170
Drainage	RD701
Bike Lane	RD702
Curb Ramp	
Blended Transition	RD940
Combination	RD930, RD932, RD936, RD938
Components	RD900
Corner Identification	RD901
Detectable Warning Surface	RD902, RD904, RD905 RD906, RD908
Detectable Guide Strip	RD909
End of Walk	RD950, RD952

2024 OREGON STANDARD DRAWINGS INDEX

Parallel	RD920, RD922
Perpendicular	RD910, RD912, RD913, RD916
Unique	RD960
Cutbanks, Rounding	RD150

Crossing

Bike Lane	RD1140
-----------	--------

-D-

Delineators

Installation	
Freeways	TM575
Non-Freeway	TM576
Special Applications	TM577
Layout And Posts Types	TM570
Steel Post Details	TM571

Detectable Warning Devices	RD902, RD904, RD905, RD906, RD908, RD909
----------------------------	---

Drainage Details

Bore Casing	RD308
Concrete Encasement, Cradle, And Cap	RD306
Locator Post	RD334
Street Cut	RD302
Trench Backfill	RD300
Gutter Transition At Inlet	RD363

Driveways

Curb Line Sidewalk	RD730, RD735 RD745, RD750
Non-Sidewalk Separated Sidewalk	RD715 RD725, RD740

-E-

End Pieces, Guardrail	RD415, RD417
Energy Dissipater	RD1045, RD1050

Erosion Control

Check Dams	RD1005, RD1006
Concrete Truck Wash Out	RD1070
Construction Entrances	RD1000
Energy Dissipater	RD1045, RD1050
Inlet Protection	RD1010, RD1015
Matting	RD1055
Scour Basin, Temporary	RD1050
Sediment Barrier	RD1030, RD1031, RD1032, RD1033
Sediment Fence	RD1040
Sediment Trap	RD1065
Slope Drains, Temporary	RD1045
Tire Wash Facility	RD1060

Expansion Joints, Bridge	BR139, BR140, BR141, BR145
--------------------------	-------------------------------

-F-

Feathering A.C. Over Existing Pavement	RD610
Fences	
Barbed & Woven Wire (Types 1, 1-5W And 2)	RD810
Chain Link	RD815
Gates	RD820
Pedestrian	RD780, RD781, RD782
Protective	BR240, BR241, BR242, BR245
Snow, Metal	RD825
Wildlife	RD830, RD832, RD835, RD840, RD845
Field Marker, Storm Water Treatment And Storage Facilities	RD399
Flag Board Mounting Details	TM204
Flashing Beacon (RRFB) Assemblies	TM493

-G-

Gates, Fence	RD820, RD832
Gateway	RD810
Girders	
Precast Prestressed Boxes	BR425, BR430, BR435, BR440, BR445
Bulb-I	BR300

Bulb-T	BR310, BR360, BR365, BR375
BT90 And BT96	BR321
Temporary Diaphragm Beam	BR350
Type II	BR325
Type III	BR330
Type IV	BR335
Type V	BR340
Grade Crossing, Railroad	RD445
Grate	
Inlets	RD365, RD378
Manhole	RD356
Guardrail	
29" Rail Height	<i>See Guardrail - 29" Rail Height</i>
31" Rail Height	<i>See Midwest Guardrail system</i>
Short Radius	<i>See Short Radius Guardrail system</i>
Anchors, Steel (Types 1 And 1 Mod.)	RD450
Bridges/Rails	(See Rails)
Installation At Railroad Crossing	RD445
Placement of Guardrail on Slopes	RD406
Post, Stiffening Layouts	RD484A, RD484B
Posts, Wood Breakaway	RD451
Thrie Beam	RD409, RD410

Guardrail - 29" Rail Height

Adjustment	RD400
Assembly Details	RD400
Blocks	RD405
End Pieces, Types B And C	RD415
Guardrail and Transitions	RD400, RD481 RD530, RD570
Installation At Bridge Ends	RD440
Over Low-Fill Culverts	RD470
Parts	RD415
Posts	RD405
Terminals, Bridges	RD440
Terminals, Cut And False Cut	RD435
Types 1, 2A, 3 & 4	RD400

Guardrail - 31" Rail Height

See Midwest Guardrail system

Guide Posts	(See Delineators)
Gutter Transition at Inlet	RD363
Reduced Post Spacing Installation	RD484A, RD484B

Guardrail - Short Radius Guardrail System

Alternate Radii Layouts	RD490F
Eyebolt Spacing Details	RD490D, RD490E
Installation at Main Road	RD490B
Installation at Side Road	RD490C
Installation Overview	RD490A
Miscellaneous Details	RD490G, RD490H

-H-

Handrail	
Metal	RD770, RD771
Stairway	RD120
Hydrant Installation	RD254

-I-

ID Marker, Culvert	RD398
ID Marker, Bridge	BR195
Illumination	TM300, TM301 TM302, TM303

Inlets

Adjusting Existing	RD376
Concrete Cap	RD376
Concrete Type CG-3	RD371, RD372, RD373
Concrete Types G, & G-2M	RD364
Concrete Types CG	RD366
Curb Inlet Channel	RD367
Concrete Types M-E, M-O, And B	RD368
Ditch, Type D	RD370
Field or Area Drainage Basin	RD374
Frames and Grates	RD365
Pipe to Structure Connections	RD339
Slotted CMP Drain	RD328
Type 3	RD378

Inlet Protection	RD1010, RD1015
------------------	----------------

Islands

Accessible Route	RD710
Accessible Route Channelized	RD711
Traffic	RD705
Nose Treatments	RD707

-J-

Joint Seal, Asphaltic Plug Also see Expansion Joints, Bridge	BR157
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-L-

Locator Post	RD334
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Luminaire Poles

Breakaway Location Guidelines	TM635
Fixed and Slip Base Supports	TM629, TM630, TM631
Mounting On Structures	BR970, BR971, BR972

Lifeline, Fall Arrest	BR190, BR191
-----------------------	--------------

-M-

Mail Box Support	RD100
Mail Box Installation	RD101

Manhole, Concrete

24" Manhole	RD343
Base, Cast-In-Place And Precast	RD344
Carry Through, Storm Sewer	RD354
Cover and Frame	RD356
Grate	RD356
Frame Adjustment	RD360
Inside Drop, Sanitary	RD350
Outside Drop	RD352
Pipe to Manhole Connections	RD345
Precast, Large	RD346
Precast, Pollution Control	RD340
Precast, Sanitary Sewer	RD338
Precast, Storm Sewer	RD335
Shallow	RD342
Slope Protector	RD358
Steps	RD336
With Inlet	RD348

Matting	RD1055
---------	--------

Median Barrier, Metal

Barrier and Transitions	RD400, RD408, RD481, RD530, RD570 RD580, RD581
Assembly Details	RD400, RD408
Blocks	RD403, RD404, RD405
Bridge Deck Expansion Joint	RD400, RD412
Parts	RD415, RD416, RD417
Posts	RD403, RD404, RD405

Median and Shoulder Barriers, Concrete

Anchoring	RD515
Cast-In-Place	RD505
Precast	RD500
Securing Barrier To Roadway	RD516

Terminals	RD510
Meter Assembly, Water System	RD278
Milepost Signing Details	TM221, TM222
Moment Slab on MSE Wall	BR760
Monument Box	RD115
Multi-Use Path	RD602
Midwest Guardrail System	
Adjustment	RD401
Assembly Details	RD407, RD408
Blocks	RD403, RD404
Box Culvert	
Embedded Anchor Steel Post	RD472
Bolt-Thru Anchor Steel Post	RD473
Bridges/Rails	(See Rails)
Buried in Backslope	RD436, RD437
Curb And Omitted Post	RD474
End Pieces, Types B and C	RD417
Guardrail and Transitions	RD412, RD482 RD580, RD581
Height Conversion	RD481
Over Low-Fill Culverts	
Omitted Post	RD471
Parts	RD416, RD417
Posts	RD403, RD404
Reduced Post Spacing	RD484A, RD484B
Short Radius	RD490A, RD490B, RD490C, RD490D, RD490E, RD490F, RD490G, RD490H
Terminals, Bridges	RD442
Terminals, Buried in Backslope	RD436, RD437
Terminals, Downstream Anchor	RD438
Terminals, Energy Absorbing	RD420, RD421
Terminals, Grading	RD419

Transition to Bridge Rail	BR270
Types	RD402
Metal Median Barrier	RD408
Thrie beam	RD409, RD410
W-beam	RD407, RD482
Typical Layouts	
At Bridge Ends	RD442
For Embankments	RD443
For Fixed Objects	RD444

-P-

Pavement

Asphalt Pavement Details	RD610, RD615
Multi-Layer Construction	RD615
Surface Edge Details	RD615

Pavement Markings

Alignment Layout	TM560, TM561
Durable Markings	TM520, TM521
Freeway Ramp	TM547, TM551
Intersection	TM530
High Performance Markings	TM521
Left Turn and Median	TM539
Railroad Crossing	TM505
Raised Marking Details	TM515, TM516
Recessed Marking Details	TM517
Standard Details Blocks	TM500, TM501, TM502, TM503, TM504, TM510
Turn Arrow	TM531

Pedestrian

Aluminum Fence RD780, RR781, RD782
 Metal Handrail RD770, RD771

Pipe

Backfill/Compaction Details RD300, RD304
 Connection Details, Unlike Pipe RD325, RD326, RD327
 Corrugated Metal Coupling Bands RD325, RD326, RD327
 Culvert Embankment Protection RD317
 Culvert ID Marker RD398
 Miscellaneous Culvert Details RD319
 Multiple Installations RD300
 Paved End Slopes RD320
 Paved End Slopes
 With Removable Safety Bars RD321
 Safety End Sections, Concrete Pipe RD324
 Safety End Sections, Metal Pipe RD322
 Skew Diagram RD316
 Slope Anchors RD330, RD332
 Sloped Ends, Concrete Pipe RD318
 Sloped Ends, Metal Pipe RD316
 Slotted Drain, Metal Pipe (CMP) RD328

Pipe Fill Height Tables

Concrete RD386
 Corrugated HDPE RD390
 Metal, Arch RD382
 Metal, Round RD380
 Metal, Spiral Rib RD384
 Polypropylene RD393
 Poly Vinyl Chloride (PVC) RD388
 Reinforced HDPE RD391

Poles

Luminaire Fixed and Slip Base Supports TM629, TM630, TM631
 Traffic Signals TM650, TM651, TM652
 TM653, TM654
 Portable Barricade TM820

-R-

Railroad At Grade Crossing RD445
 Ramp, Sidewalk RD910, RD920, RD930,
 RD940, RD950, RD960
 Reinforcement Continuity BR525
 Reinforcing Bar Repair BR505
 Rivet Replacement BR550
 Roadway Cross Slopes
 Superelevated Sections RD140
 Rounding Of Cutbanks RD150
 Root Barrier, Water Pipe RD286
 Roundabout Curb Placement RD170

-S-

Safety Edge RD615

Sanitary Sewer

Clean Out RD362
 Manhole RD338
 Piped Inside Drop Connection RD350
 Sampling Station, Water System RD282
 Sanitary Sewer,

Service Connections	RD310
Scour Basin, Temporary	RD1050
Sediment Barrier	RD1030, RD1031, RD1032, RD1033
Sediment Fence	RD1040
Sediment Trap	RD1065
Sidewalk	RD720, RD721, RD722

Short Radius Guardrail System

See Guard Rail - *Short Radius Guardrail System*

Signs

Aluminum Panel	TM675
Attachment	TM676
Bracing Details	TM206
Directional Sign Layout	TM223, TM224, TM226
Exit	TM225
Flag Board Mounting Details	TM204
Installation Details	TM200, TM201
Mileposts	TM221, TM222
Mounts	TM677, TM678, TM679
Multi-Post Installations	TM220
Removable Legend	
Mounting Details	TM230, TM231, TM232, TM233

Signs Con't

Route Makers	
Interstate Route Shields	TM211
Oregon Highways	TM212
U.S. Route Shields	TM211

Sign Supports

Breakaway Location Guidelines	TM635
Cantilever	TM621, TM622, TM623, TM624, TM625, TM626, TM627, TM628, TM690, TM691
Multi-Post Breakaway	TM600, TM601
Sign Bridge	TM614, TM615, TM616, TM617, TM618, TM619, TM620, TM693, TM694, TM695, TM696, TM697
Square Tube	TM681, TM687, TM688, TM689
Temporary	TM822
Triangular Base Breakaway	TM602
Variable Message Sign	TM606, TM607, TM608, TM609, TM610, TM611, TM612, TM621, TM622, TM623, TM624, TM625, TM626, TM627, TM628, TM690, TM691, TM693, TM694, TM695, TM696, TM697
Wood Post	TM670
Service Connection, Water System	RD274
Siphon Box	RD376
Slabs, Precast Prestressed	BR400, BR405, BR410, BR415, BR420, BR422, BR445

Slope

Drains, Temporary	RD1045
Paving	BR115
Pipe Anchors	RD330, RD332

2024 OREGON STANDARD DRAWINGS INDEX

Protector, Concrete Manhole Rounding	RD358 RD150
Slotted Drains, Metal Pipe (CMP)	RD328
Snow Fence, Metal	RD825
Soundwalls	
Masonry (Pile Footing)	BR750, BR751
Masonry (Spread Footing)	BR730
Precast Concrete	BR740
Stairway, Concrete	RD120
Steps, Manhole Precast	RD336
Stop Lane, Truck And Bus At Railroad Crossing	RD445
Storm Water Treatment and Storage Facility Field Marker	RD399
Street Cut	RD302
Subsurface Drain	RD312

-T-

Temporary Traffic Control	
2-Lane, 2-Way Roadways	TM850, TM854
Abrupt Edge	TM800
Barricades	TM820
Blasting Zones	TM871
Bridge Construction	TM870
Closure Details	TM840
Concrete Barrier	TM830
Freeway Sections	TM860, TM861, TM862

Impact Attenuator	TM831, TM832, TM833
Intersection Work Zones	TM841, TM842, TM843
Message Sign	TM800
Non-Freeway Multi-Lane Sections	TM851, TM852, TM853
Pedestrian Accessible Routing	TM844
Reflective Pavement Makers	TM810
Rumble Strips	TM830
Sign Supports	TM689, TM821
Speed Reduction (Moving Operations)	TM880
Tables, Flare Rate, Taper, Spacing	TM800
Temporary Sidewalk Ramps	TM845
Temporary Sign Support	TM822
Thrust Blocking, Water Systems	RD250
Tire Wash Facility	RD1060
Traffic	
Island	RD705
Separator, Concrete	RD706

Traffic Signals	
Color Code Chart	TM470
Controller Cabinet and Foundation	TM482
Fire Preemption Details	TM456
Junction Boxes	TM472
Maintenance Pad Details	RD160
Mast Arm Pole Details	TM450
Mounting Details	
Adjustable Signal Head	TM462
Spanwire	TM456
Pedestrian Signal	TM457, TM467
Pole Footing Details	
Mast Arm Pole	TM450

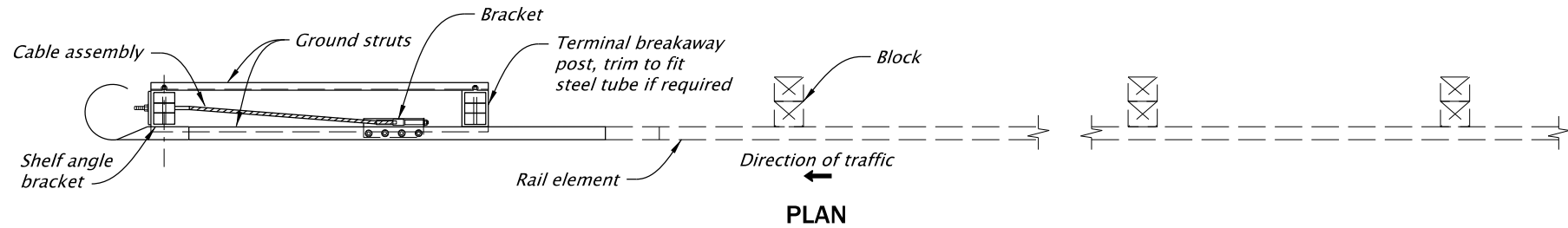
2024 OREGON STANDARD DRAWINGS INDEX

Strain Pole	TM452
Pole Mounts	TM680
Ramp Meter Details	TM492
Rectangular Rapid Flashing Beacon	TM493
Service Cabinet	TM485
Spanwire Design	TM456
Strain Pole Details	TM452
Supports	TM650, TM651, TM652, TM653, TM654, TM655, TM656, TM657, TM658
Temporary Trenching & Conduit Installation	TM453, TM454, TM456
Vehicle Signal Details	TM471
Vehicle Signal Pedestal	TM460
	TM457
Trench Backfill	RD300
Truck Aprons on Roundabouts	RD170
Trucks and Bus Stop Lanes At Railroad Crossing	RD445
Truck Scale Pit	BR182
Truncated Dome	RD902
-V-	
Valve Box And Operator Extension Assembly	RD258
VMS Walk-In Bridge	TM698

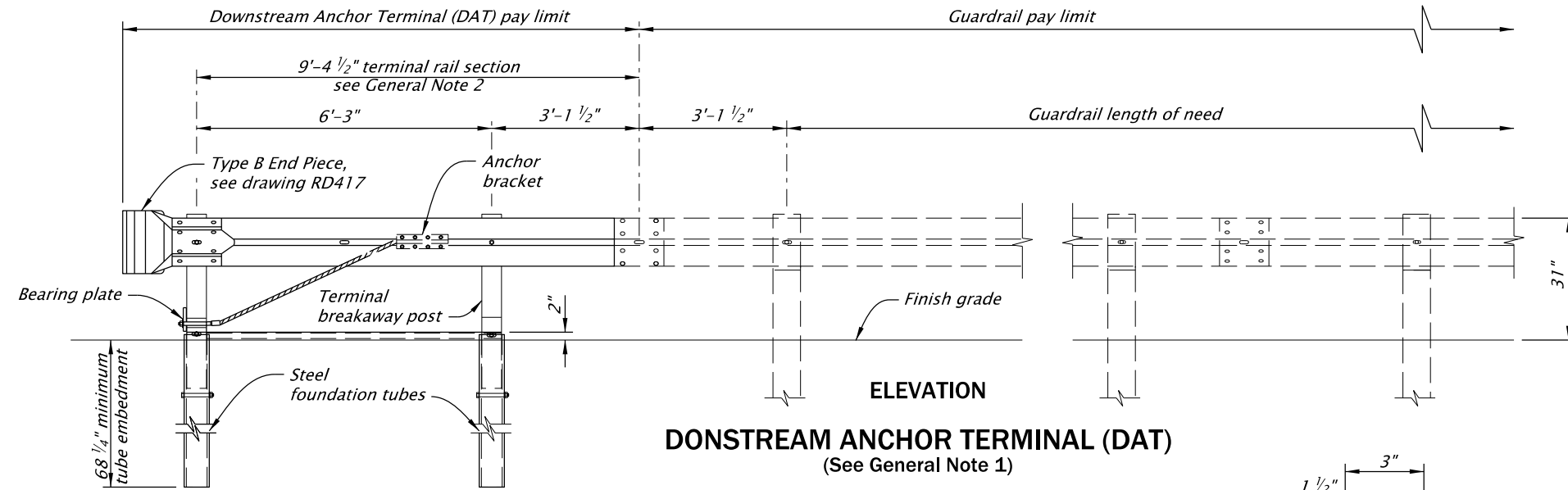
-W-	
Walls	
Retaining, Concrete	BR705, BR706, BR707, BR708, BR709
Soundwall, Masonry Pile Footing	BR750, BR751
Spread Footing	BR730
Soundwall, Precast	BR740
Water Systems	
Air Release Assembly, Manual	RD266
Air Release/Air Vacuum Valve Assembly	RD270
Hydrant Installation	RD254
Main Dead-End Blowoff Assembly	RD262
Root Barrier	RD286
Thrust Blocking	RD250
Valve Box And Operator Extension Assembly	RD258
Water Meter Assembly	RD278
Water Sampling Station	RD282
Water Service Connection	RD274
Wingwalls, Concrete Box Culverts	BR800
Wind Pressure Map	TM671
Wind Speed Map	TM672

12-JUL-2024

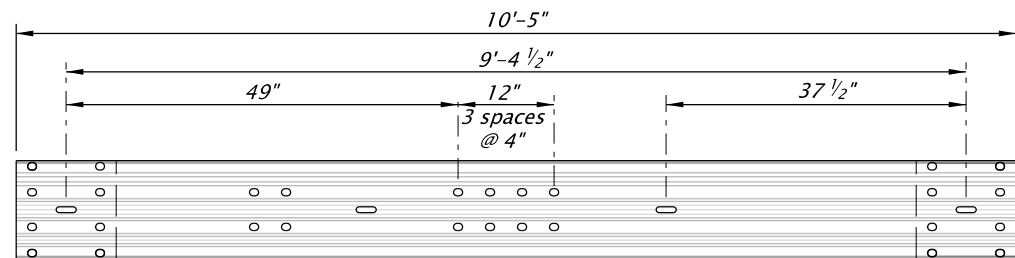
RD438.dgn



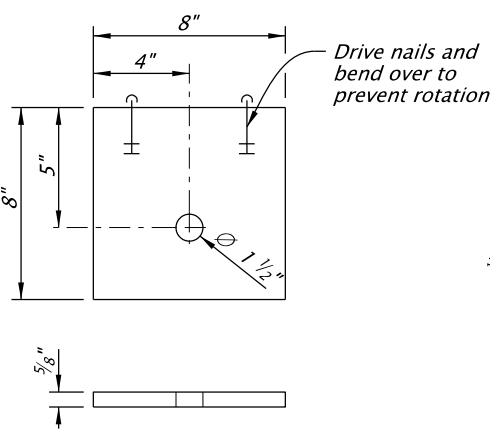
PLAN



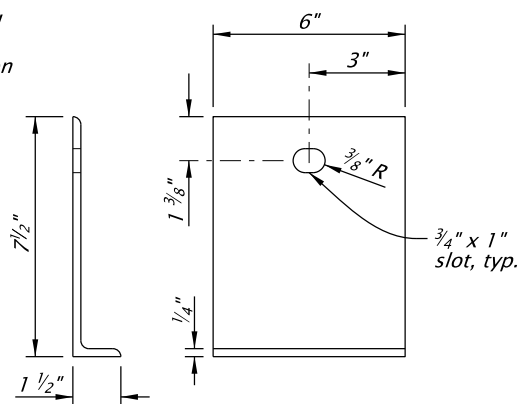
DONSTREAM ANCHOR TERMINAL (DAT)
(See General Note 1)



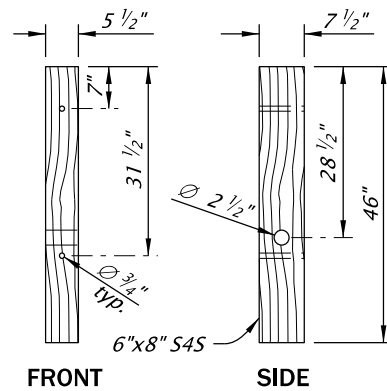
TERMINAL RAIL ELEMENT



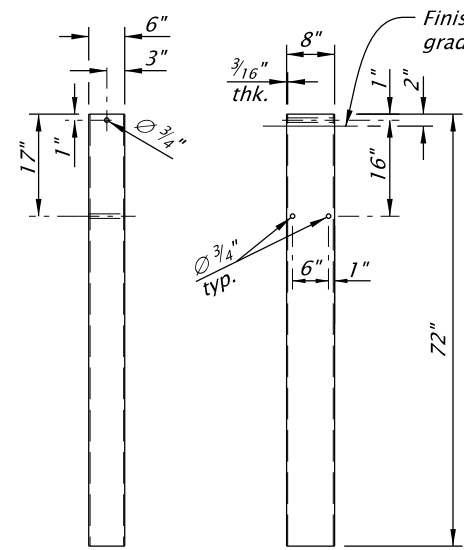
BEARING PLATE



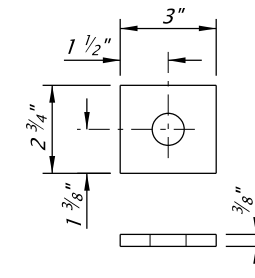
SHELF ANGLE BRACKET



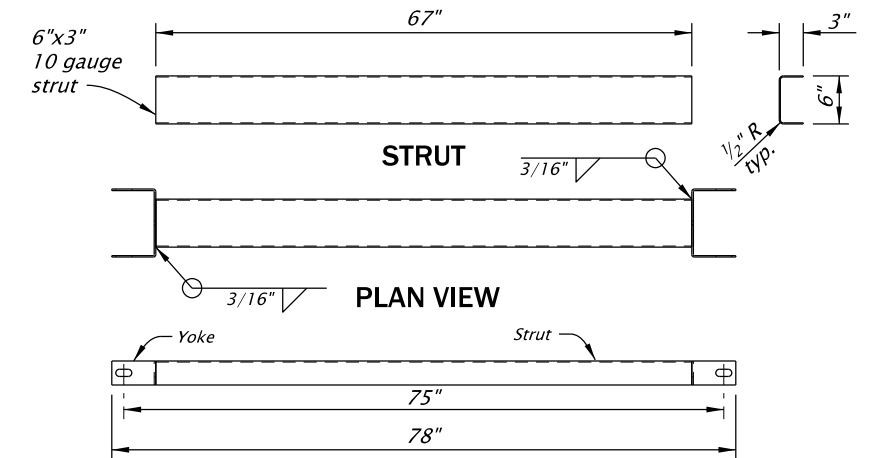
TERMINAL BREAKAWAY POST



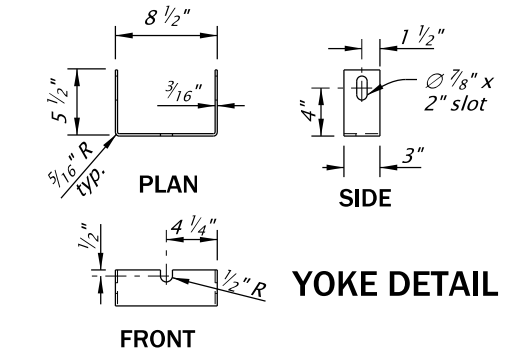
STEEL FOUNDATION TUBE



END PLATE



STRUT AND YOKE ASSEMBLY



YOKE DETAIL

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Downstream Anchor Terminal (DAT) shall be used on the end of guardrail run, when located outside the horizontal clearance area of opposing traffic or when crashworthy terminal is not required.
2. See appropriate guardrail standard drawing(s) for additional details not shown.
3. The rail section at the end post is supported by the Shelf Angle Bracket. The rail element is not attached to the end post.
4. The foundation tubes shall not project more than 3-3/4-inch above the finished grade.
5. All hardware for Downstream Anchor Terminal (DAT) shall be ASTM A307 unless otherwise shown.
6. If a mow strip is required with the Downstream Anchor Terminal (DAT) installation the leave-out area around the steel foundation tubes and the two channel struts may be omitted. This will require a full pour at the foundation tubes.
7. See drawing RD417 for Type B End Piece.

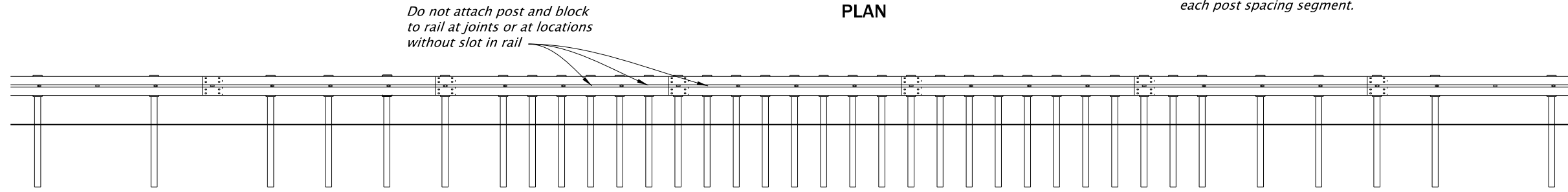
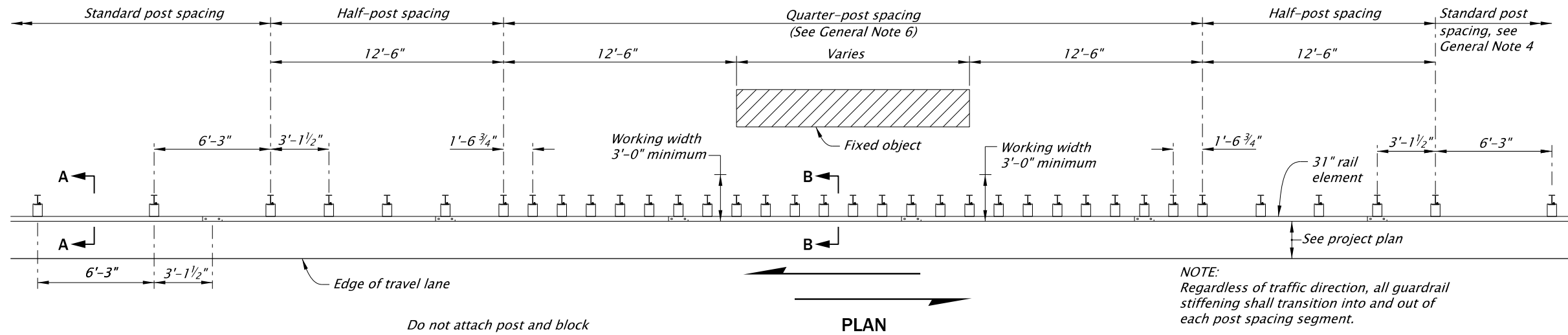
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.			
OREGON STANDARD DRAWINGS			
MIDWEST GUARDRAIL SYSTEM			
DOWNSTREAM ANCHOR TERMINAL (DAT)			
2024			
DATE	REVISION	DESCRIPTION	
09-2023			
07-2024	ADDED STRUT DETAIL, UPDATED CAD STANDARDS		
CALC. BOOK NO.	N/A	SDR DATE	12-JUL-2024
			RD438

Effective Date: December 1, 2024 – May 31, 2025

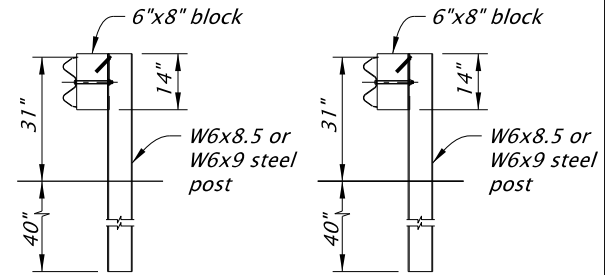
12-JUL-2024

RD484.dgn

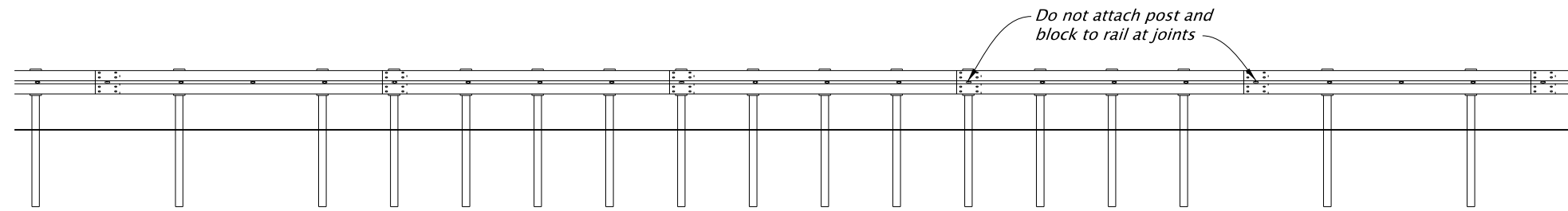
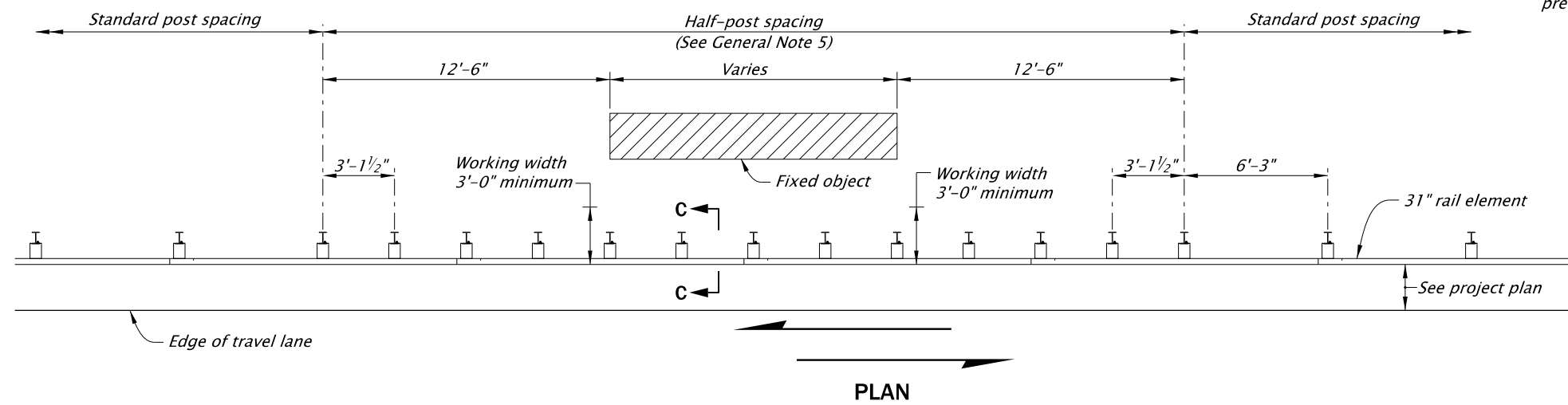


GUARDRAIL STIFFENING GENERAL QUARTER-POST SPACING
(Longer transition from full to quarter-post spacing shown)

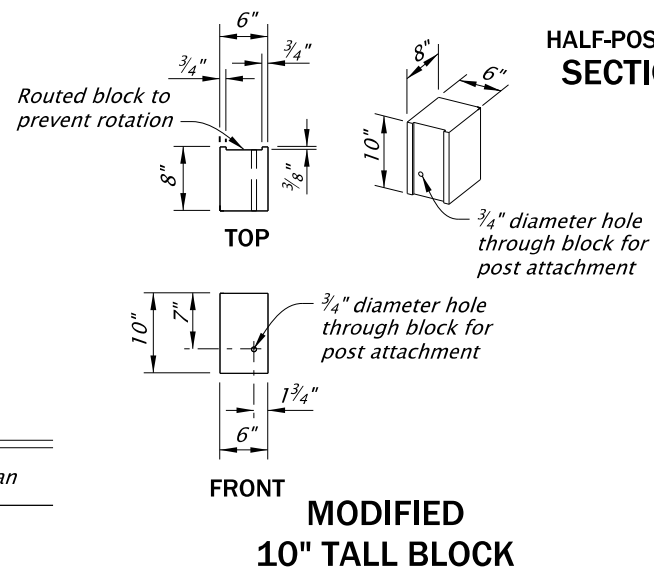
- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**
1. See appropriate guardrail standard drawing(s) for details not shown.
 2. Lap guardrail in direction of adjacent traffic.
 3. Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.
 4. In the standard post spacing sections, the guardrail bolt is secured at each blockout to a post, and the W-beam rails are spliced at midspan between the posts.
 5. In the half-post spacing sections, the guardrail bolt is secured at each blockout to a post except where a post was located at a rail splice.
 6. In the quarter-post spacing sections, the guardrail bolt is secured at the rail only at half-post spacing locations. Do not attach post and block to rail at a rail splices or at locations without slot in rail.



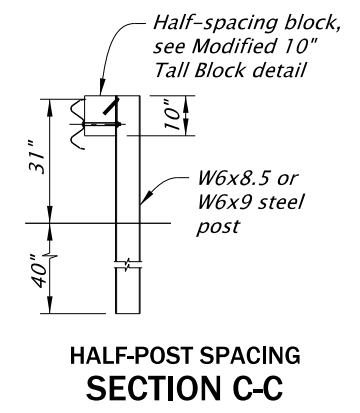
HALF-POST SPACING SECTION A-A **QUARTER-POST SPACING SECTION B-B**



GUARDRAIL STIFFENING GENERAL HALF-POST SPACING
(Transition from full to half-post spacing shown)



MODIFIED 10" TALL BLOCK



HALF-POST SPACING SECTION C-C

ACCOMPANIED BY DWGS.:
RD484B

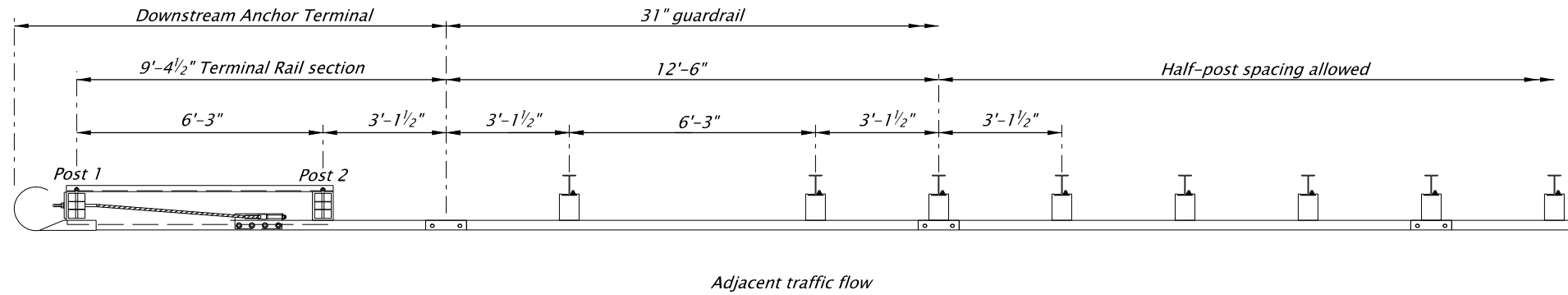
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

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

OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
WITH REDUCED POST SPACING
INSTALLATION DETAILS
SHEET 1 OF 2
2024

DATE	REVISION	DESCRIPTION
04-2024	CREATED NEW DRAWING	

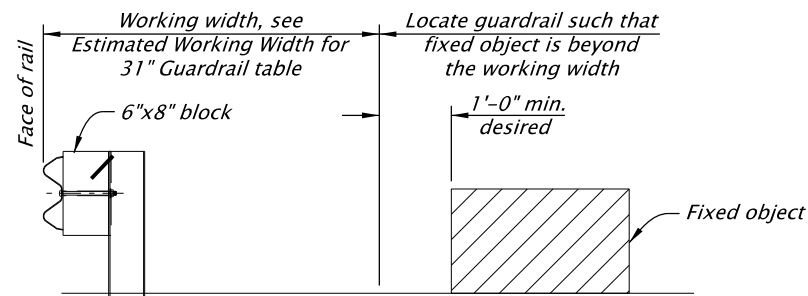
CALC. BOOK NO. - - -	N/A - - -	SDR DATE - 12-JUL-2024	RD484A
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GUARDRAIL STIFFENING AT 31" END ANCHORAGE

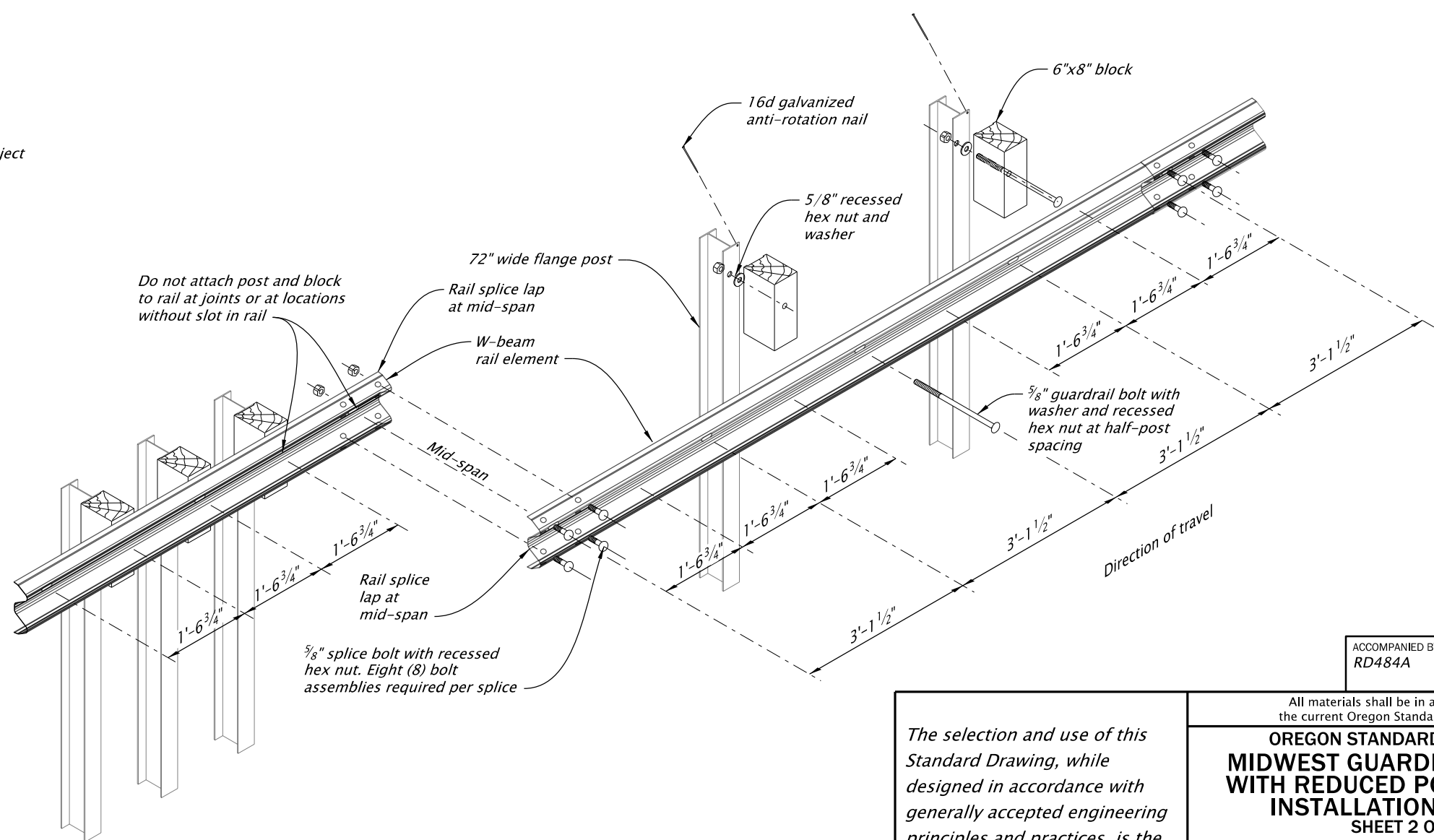
GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail standard drawing(s) for details not shown.
2. Lap guardrail in direction of adjacent traffic.
3. Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.
4. In the standard post spacing sections, the guardrail bolt is secured at each blockout to a post, and the W-beam rails are spliced at midspan between the posts.
5. In the half-post spacing sections, the guardrail bolt is secured at each blockout to a post, except where a post was located at rail splices.
6. In the quarter-post spacing sections, the guardrail bolt is secured at the rail only at half-post spacing locations. Do not attach post and block rail at a rail splice or at locations without a slot in the rail.



ESTIMATED WORKING WIDTH FOR 31" GUARDRAIL	
Standard post (6'-3") spacing	5'-0"
Standard post (6'-3") spacing 9' post at 1:2 breakline	5'-3"
Half post (3'-1 1/2") spacing	3'-7"
Quarter post (1'-6 3/4") spacing	3'-0"

GUARDRAIL LOCATION - WORKING WIDTH



Do not attach post and block to rail at joints or at locations without slot in rail

**W-BEAM ASSEMBLY
QUARTER AND HALF POST SPACING DETAILS**

ACCOMPANIED BY DWGS.:
RD484A

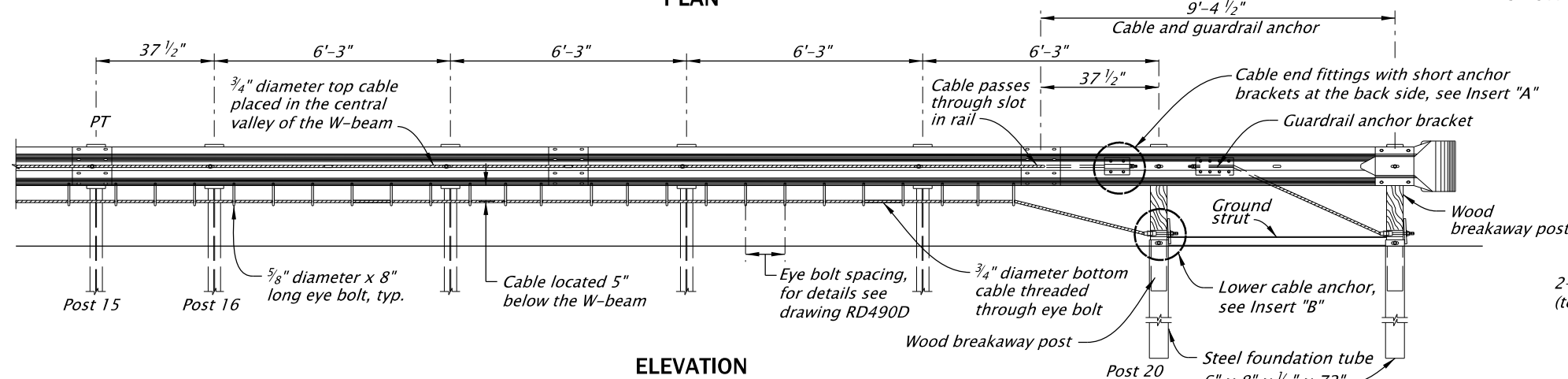
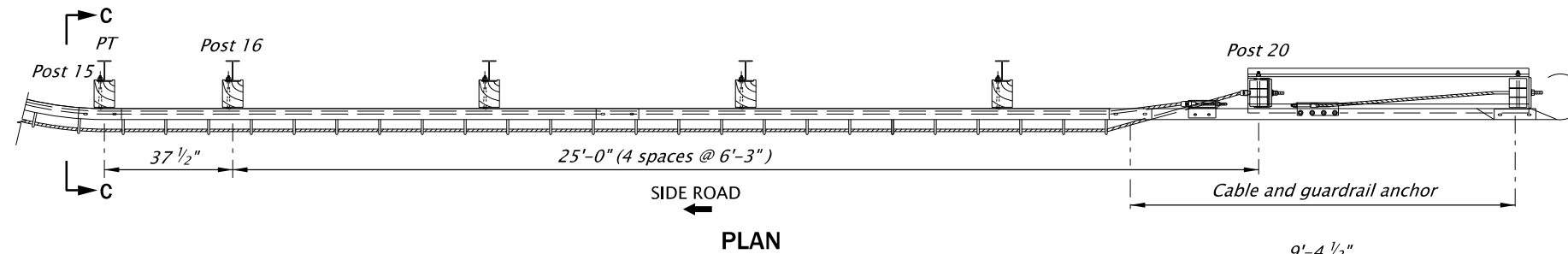
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

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

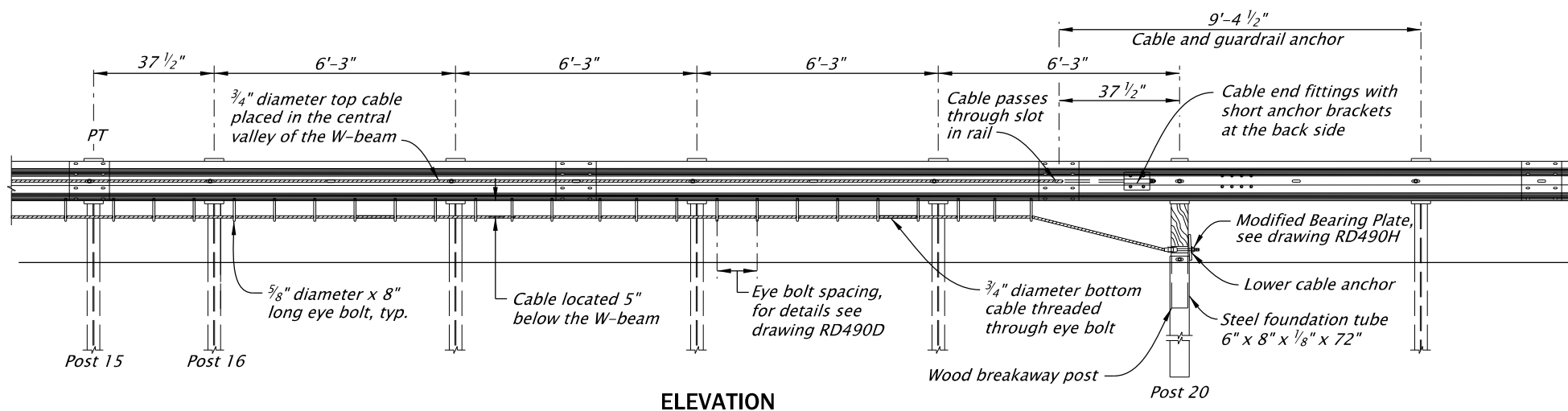
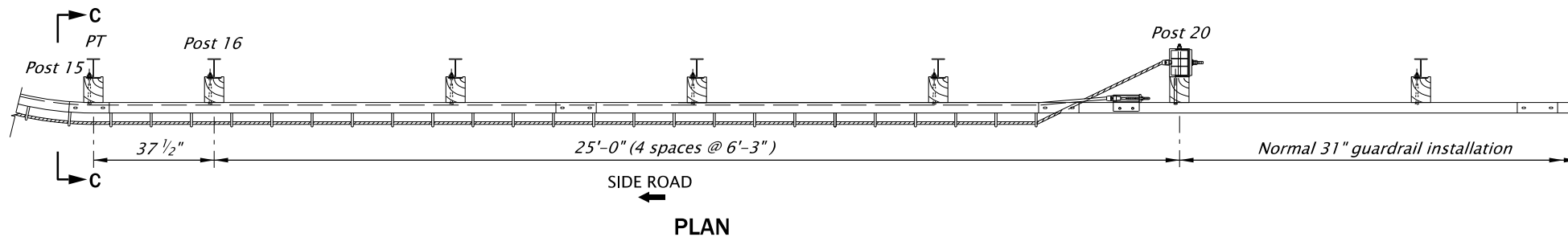
**OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
WITH REDUCED POST SPACING
INSTALLATION DETAILS
SHEET 2 OF 2
2024**

DATE	REVISION	DESCRIPTION
04-2024	CREATED	NEW DRAWING

CALC. BOOK NO. ---	N/A ---	SDR DATE- 12-JUL-2024	RD484B
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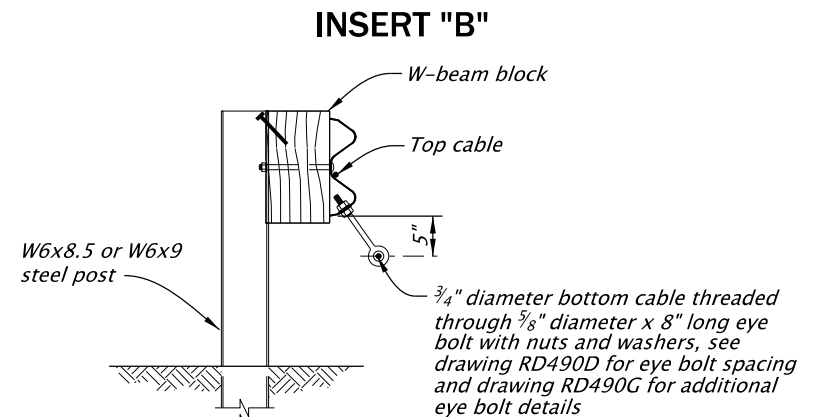
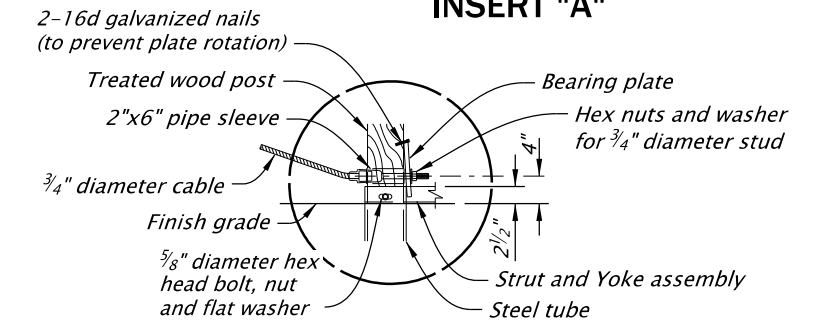
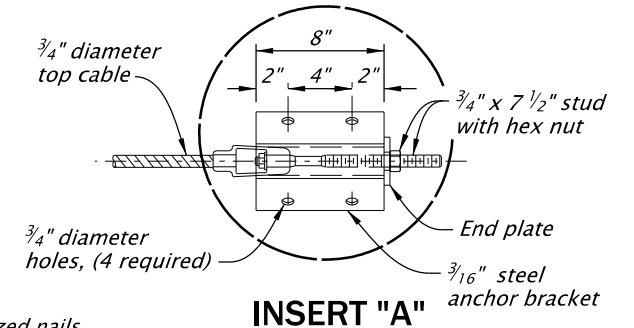
FOR CABLE AND GUARDRAIL ANCHOR



FOR GUARDRAIL TERMINAL OR 31" W-BEAM GUARDRAIL

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail standard drawing(s) for posts, rail, and other hardware details not shown.
2. See drawing RD490A for SRGS overview details.
3. See drawing RD490B for SRGS along the main road and connection to bridge end or other concrete barrier details.
4. See drawings RD490D and RD490E for SRGS eye bolt spacing and anchor bracket slot details.
5. See drawings RD490G and RD490H for details not shown.



ACCOMPANIED BY DWGS.:
RD490A, RD490B, RD490D, RD490E,
RD490F, RD490G, RD490H

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

**OREGON STANDARD DRAWINGS
SHORT RADIUS GUARDRAIL
SYSTEM (SRGS)
ALONG SIDE ROAD
SHEET 3 OF 8
2024**

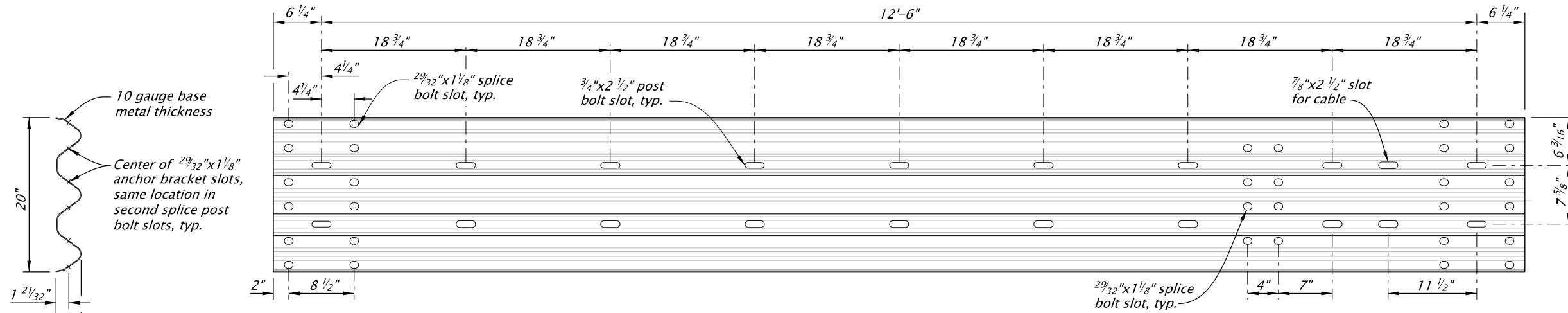
DATE	REVISION	DESCRIPTION
05-2024	CREATED NEW DRAWING	
CALC. BOOK NO.	N/A	SDR DATE: 12-JUL-2024

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.

RD490C

12-JUL-2024

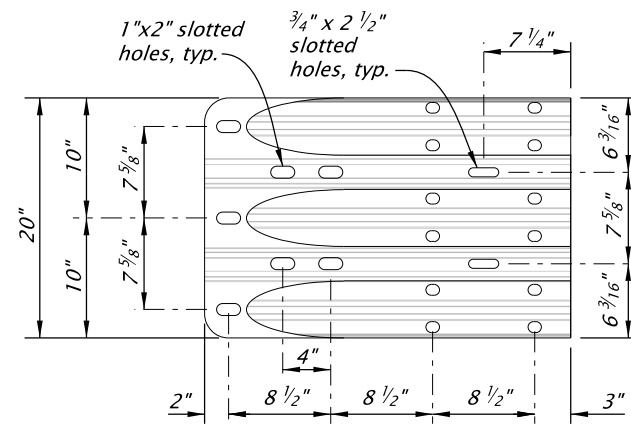
RD490D.dgn



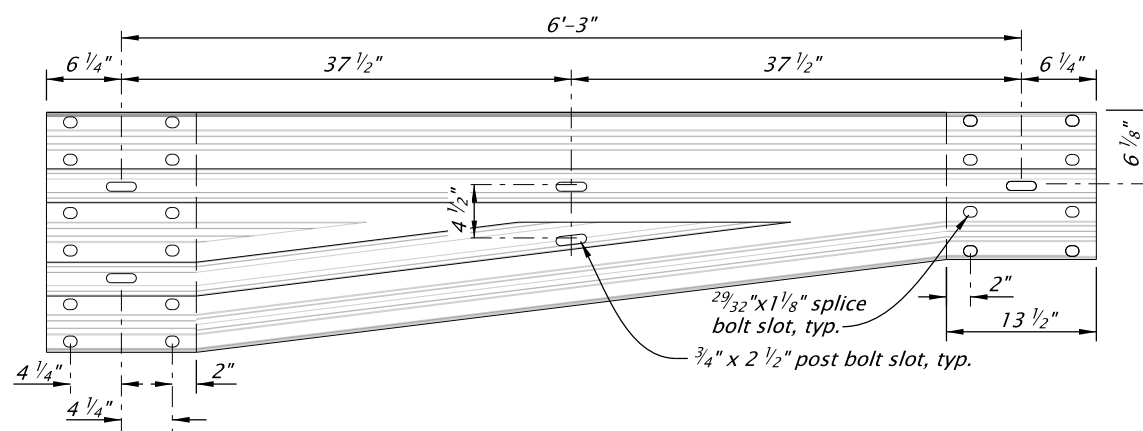
SRGS 8-SPACE THRIE BEAM GUARDRAIL WITH HOLES AND SLOTS

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

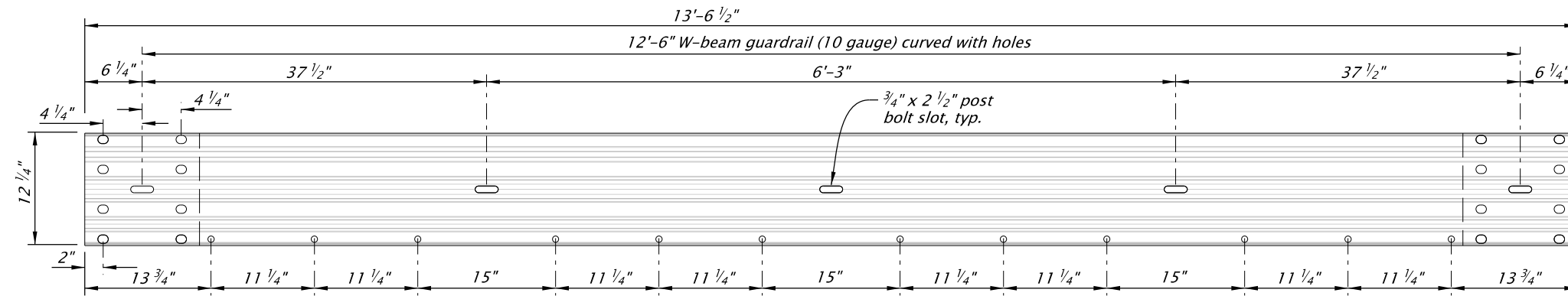
1. See appropriate guardrail standard drawing(s) for posts, rail, and other hardware details not shown.
2. See drawing RD490A for overview details.
3. See drawing RD490B for SRSG along the main road and connection to bridge end or other concrete barrier details.
4. See drawing RD490C for SRSG along the side road.
5. See drawing RD490F for SRGS alternate radii layout.
6. See drawings RD490G and RD490H for details not shown.



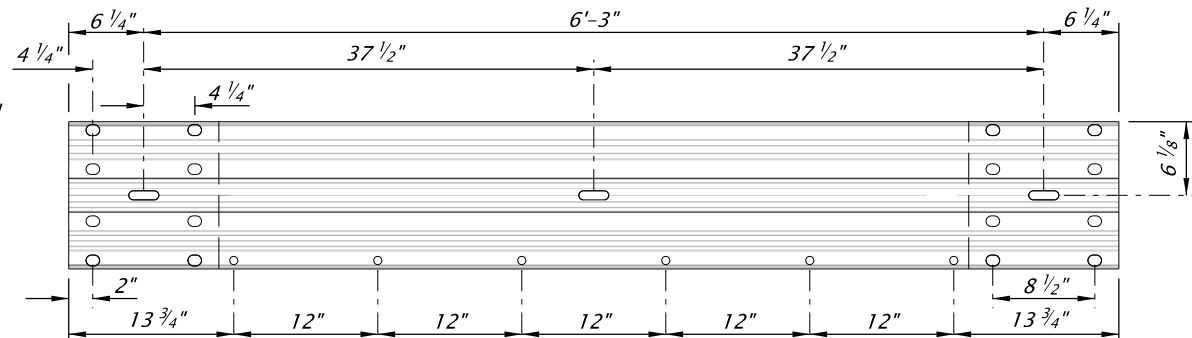
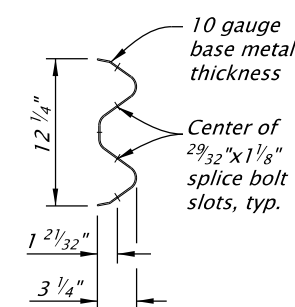
THRIE BEAM TERMINAL CONNECTOR



ASYMMETRICAL THRIE BEAM TRANSITION SECTION



SRGS CURVED 4-SPACE W-BEAM GUARDRAIL WITH HOLES



SRGS W-BEAM SPACER GUARDRAIL WITH HOLES

ACCOMPANIED BY DWGS.: RD490A, RD490B, RD490C, RD490E, RD490F, RD490G, RD490H

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

OREGON STANDARD DRAWINGS
SHORT RADIUS GUARDRAIL SYSTEM (SRGS) EYE BOLT SPACING AND SLOT DETAILS
 SHEET 4 OF 8
 2024

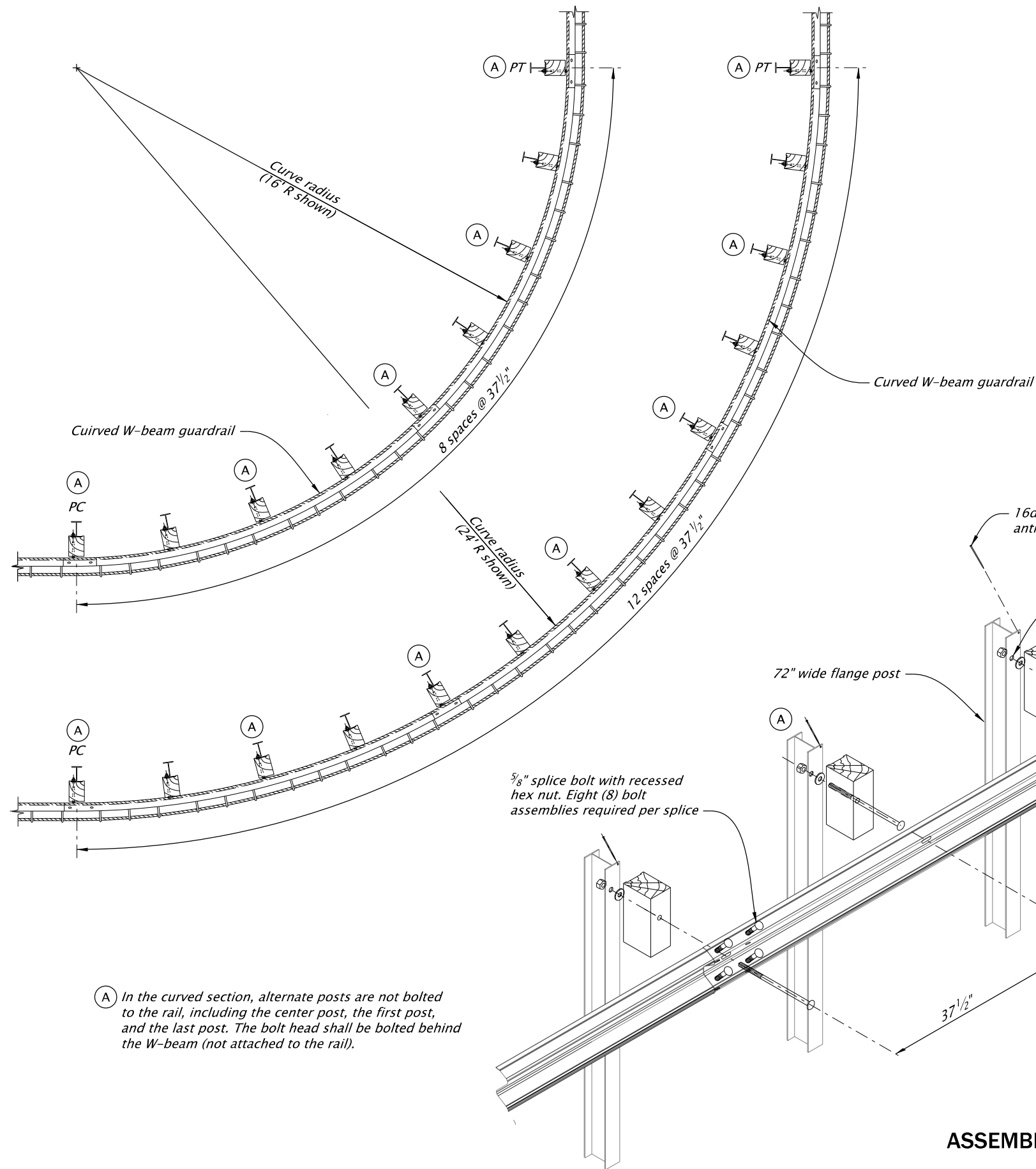
DATE	REVISION	DESCRIPTION
05-2024	CREATED	NEW DRAWING

CALC. BOOK NO. ---	N/A ---	SDR DATE: 12-JUL-2024	RD490D
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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.

12-JUL-2024

RD490F.dgn



GUARDRAIL RADIUS	NUMBER OF POSTS	CABLE LENGTH	
		TOP	BOTTOM
8'	5	59'	62'
16'	9	72'	75'
24'	13	85'	88'
32'	17	98'	101'
40'	21	111'	114'
48'	25	124'	127'

NOTE: Cable length should be checked prior to installation.

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail standard drawing(s) for posts, rail, and other hardware details not shown.
2. See drawing RD490A for SRGS overview details.
3. See drawing RD490B for SRGS along the main road and connection to bridge end or other concrete barrier details.
4. See drawing RD490C for SRGS along the side road.
5. See drawings RD490D and RD490E for SRGS eye bolt spacing and anchor bracket slot details.
6. See drawings RD490G and RD490H for other details not shown.

ASSEMBLY DETAILS

(A) In the curved section, alternate posts are not bolted to the rail, including the center post, the first post, and the last post. The bolt head shall be bolted behind the W-beam (not attached to the rail).

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.

ACCOMPANIED BY DWGS.: RD490A, RD490B, RD490C, RD490D, RD490E, RD490G, RD490H

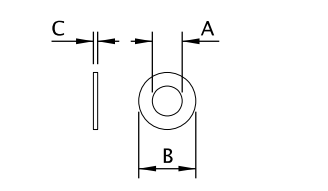
All materials shall be in accordance with the current Oregon Standard Specifications.

**OREGON STANDARD DRAWINGS
SHORT RADIUS GUARDRAIL
SYSTEM (SRGS)
ALTERNATE RADII
SHEET 6 OF 8
2024**

DATE	REVISION	DESCRIPTION
05-2024	CREATED	NEW DRAWING
CALC. BOOK NO.	N/A	SDR DATE
		12-JUL-2024

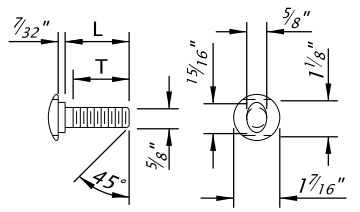
RD490F

Effective Date: December 1, 2024 – May 31, 2025



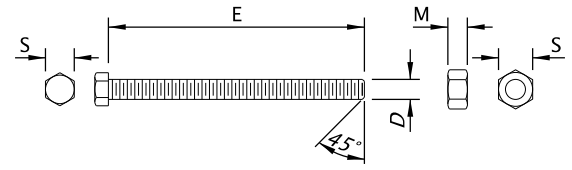
WASHER DIMENSION			
ANSI	A	B	C
5/8"	2 1/32"	1 5/16"	3/32"
3/4"	1 1/16"	1 3/4"	1/8"
7/8"	1 5/16"	1 25/32"	9/64"

ROUND WASHER



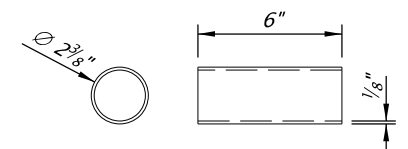
BOLT DIMENSIONS	
LENGTH (L)	THREAD (T)
1 1/4"	1 1/8"
2"	1 3/4"
10"	4"

GUARDRAIL BOLT
Use with recessed nut and plain round washer

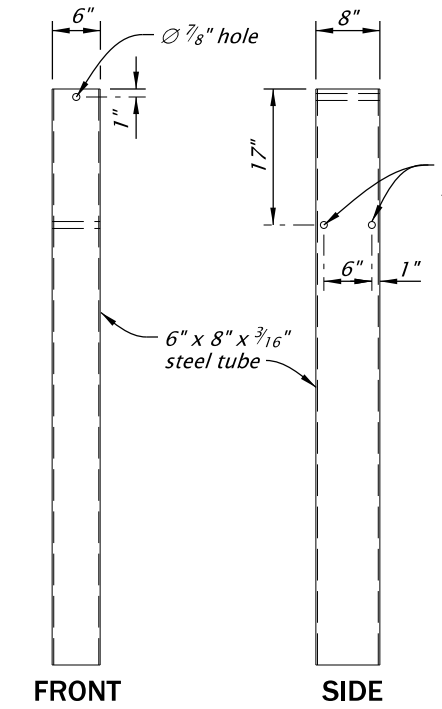


HEX BOLT DIMENSIONS			
D	E	M	S
5/8"	1 1/2"	37/64"	1 5/16"
	8" & 10"	37/64"	1 5/16"
7/8"	1 5/8"	1 5/16"	1 7/16"

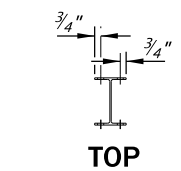
HEX BOLT AND NUT



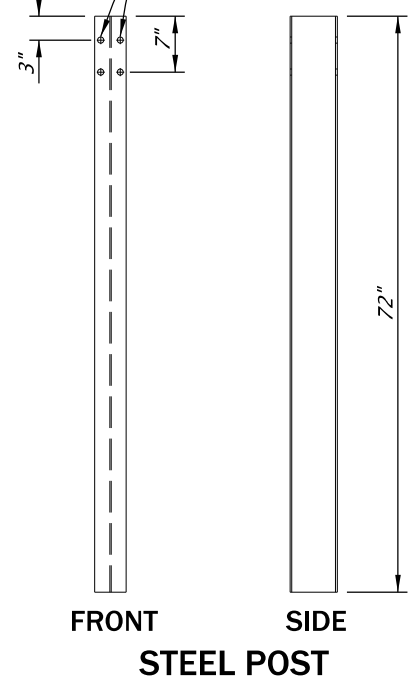
BREAKAWAY CABLE TERMINAL POST SLEEVE



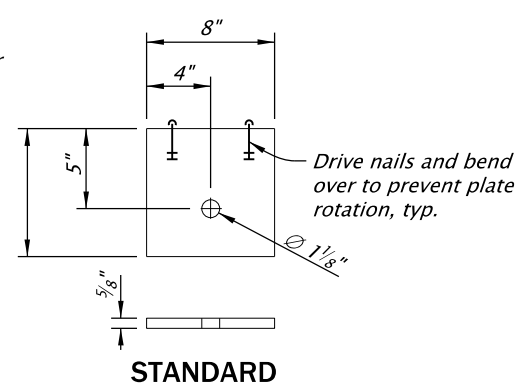
STEEL FOUNDATION TUBE



TOP

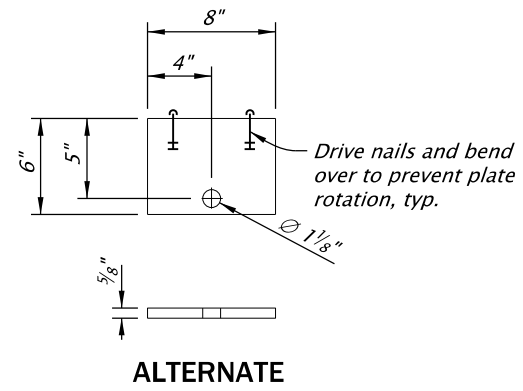


STEEL POST

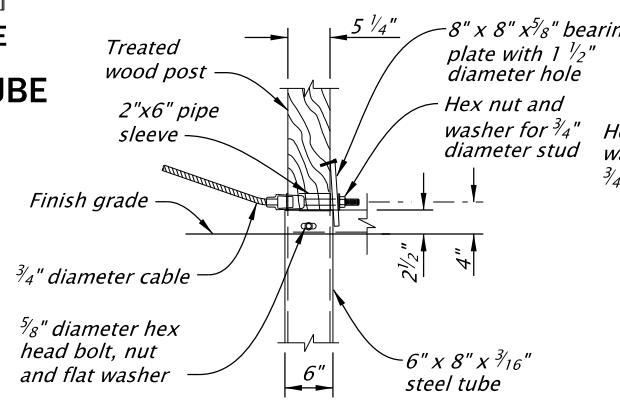


STANDARD

BREAKAWAY CABLE TERMINAL BEARING PLATE

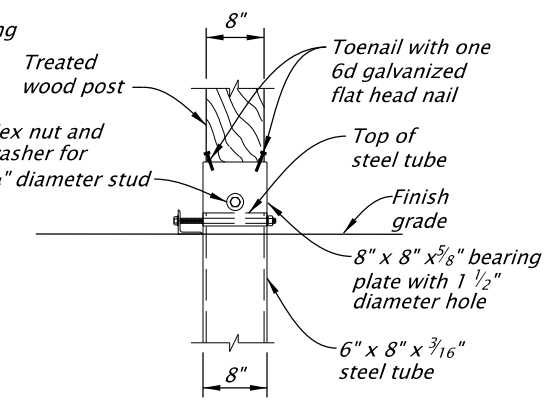


ALTERNATE

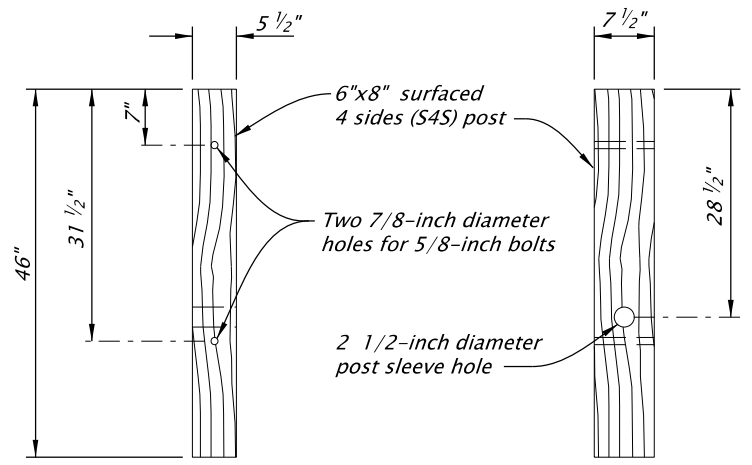


FRONT

BEARING PLATE ASSEMBLY



SIDE



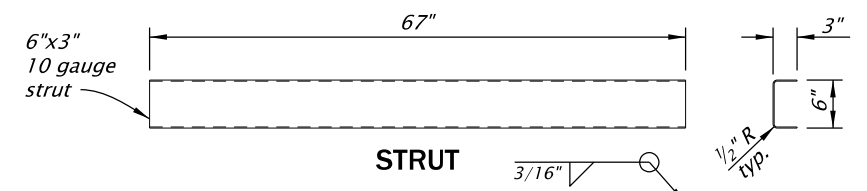
FRONT

TERMINAL BREAKAWAY POST

SIDE

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

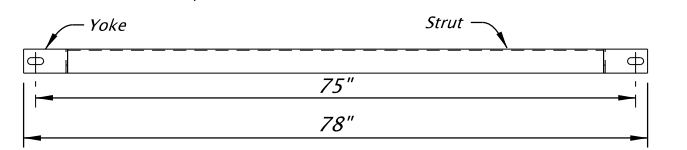
1. See appropriate guardrail standard drawing(s) for posts, rail, and other hardware details not shown.
2. See drawing RD490A for SRGS overview details.
3. See drawing RD490B for SRGS along the main road and connection to bridge end or other concrete barrier details.
4. See drawing RD490C for SRGS along the side road.
5. See drawings RD490D and RD490E for SRGS eye bolt spacing and anchor bracket slot details.
6. See drawing RD490F for SRGS alternate radii layout.
7. See drawing RD490G for other details not shown.



STRUT

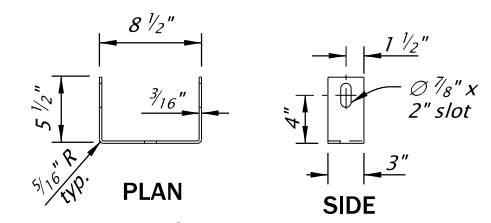


PLAN VIEW



FRONT VIEW

STRUT AND YOKE ASSEMBLY



PLAN

SIDE

FRONT

YOKE DETAIL

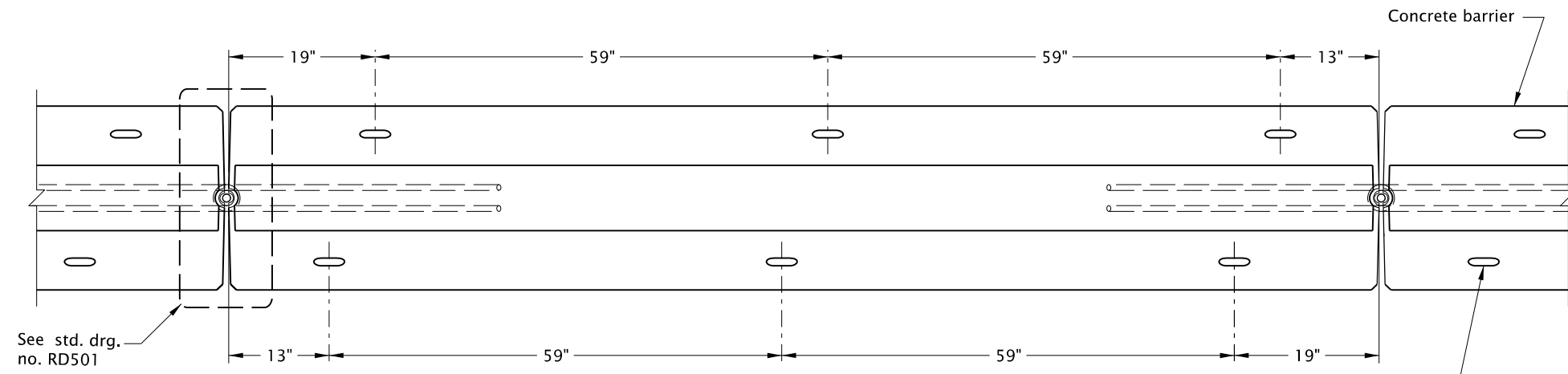
ACCOMPANIED BY DWGS.: RD490A, RD490B, RD490C, RD490D, RD490E, RD490F, RD490G

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			
SHORT RADIUS GUARDRAIL SYSTEM (SRGS)			
MISCELLANEOUS DETAILS			
SHEET 8 OF 8			
2024			
DATE	REVISION	DESCRIPTION	
05-2024	CREATED	NEW DRAWING	
CALC. BOOK NO.	N/A	SDR DATE	12-JUL-2024
			RD490H

12-JUL-2024

RD502.dgn

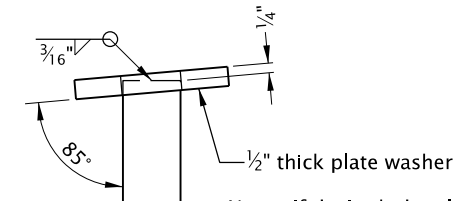


**PLAN
CONCRETE BARRIER ANCHORING PIN LOCATIONS**

1 7#8" x 4" Slot (typ.) - only required on traffic side(s) of barrier

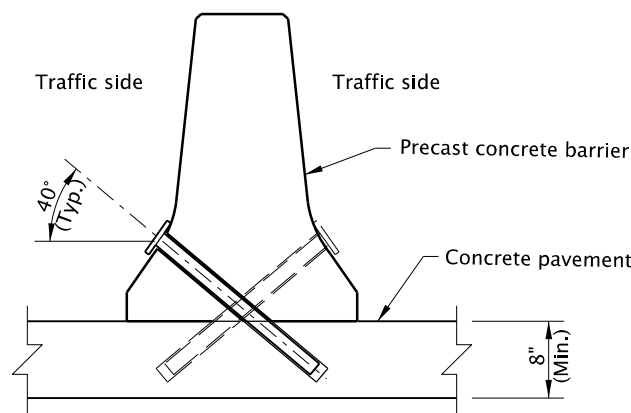
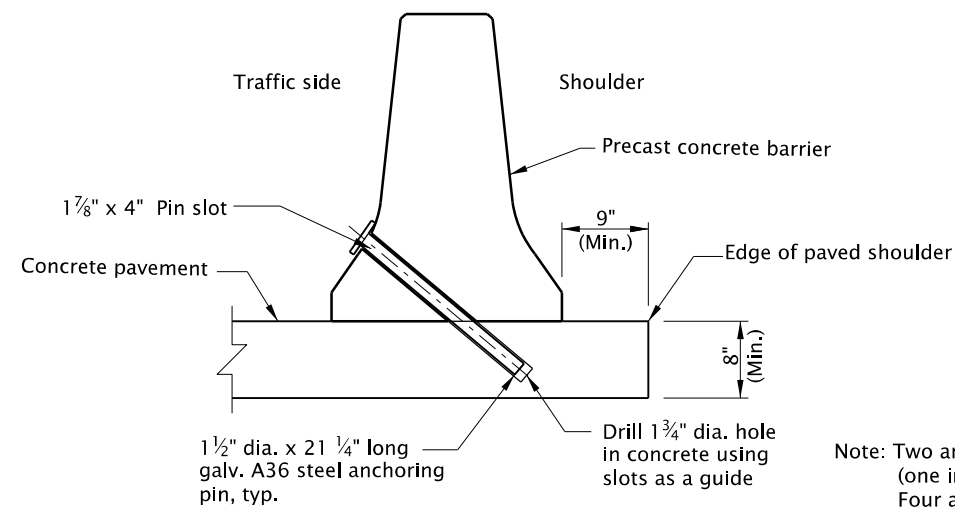
GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. This drawing applies to new permanent installations of concrete barrier (when being anchored) to the roadway. See Std. Dwgs. RD515 and RD516 for concrete barrier that is maintained for use in temporary installations. See Std. Dwgs. RD500 and RD501 for details not shown.
2. Concrete grout for grouting over pins, pinning holes or grouting of scuppers shall be portland cement grout, weak in strength and of thick consistency, as directed.
3. All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.



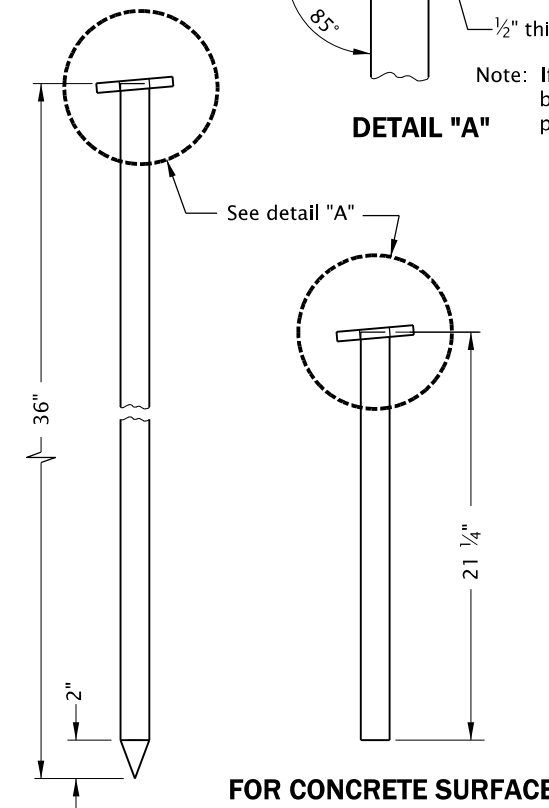
DETAIL "A"

Note: If desired, the plate may be welded top and bottom for applications where the pin will be pulled out later, such as in temporary installations.



Note: Two anchoring pins required on traffic side (one in each end slot)
Four anchoring pins total per barrier section

CONCRETE ANCHORING PIN DETAILS



FOR CONCRETE SURFACE

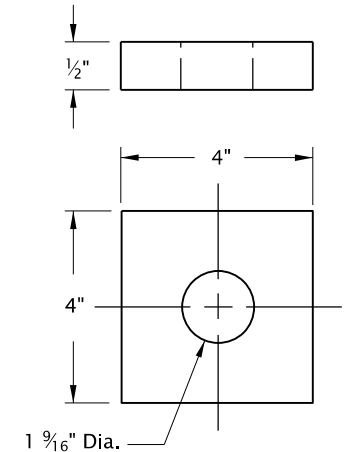
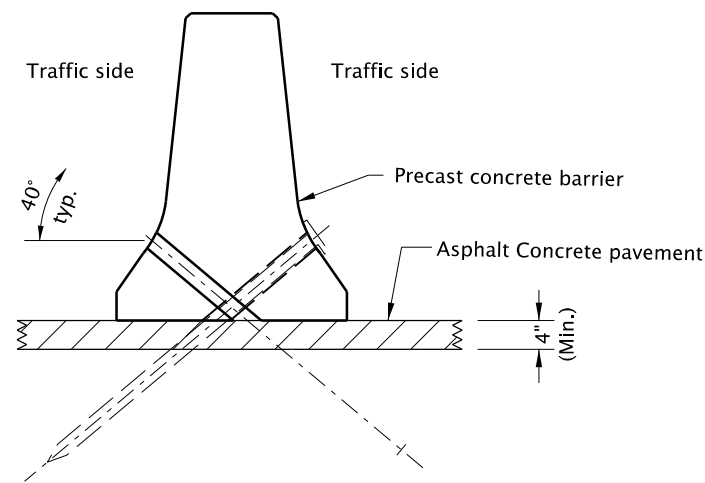
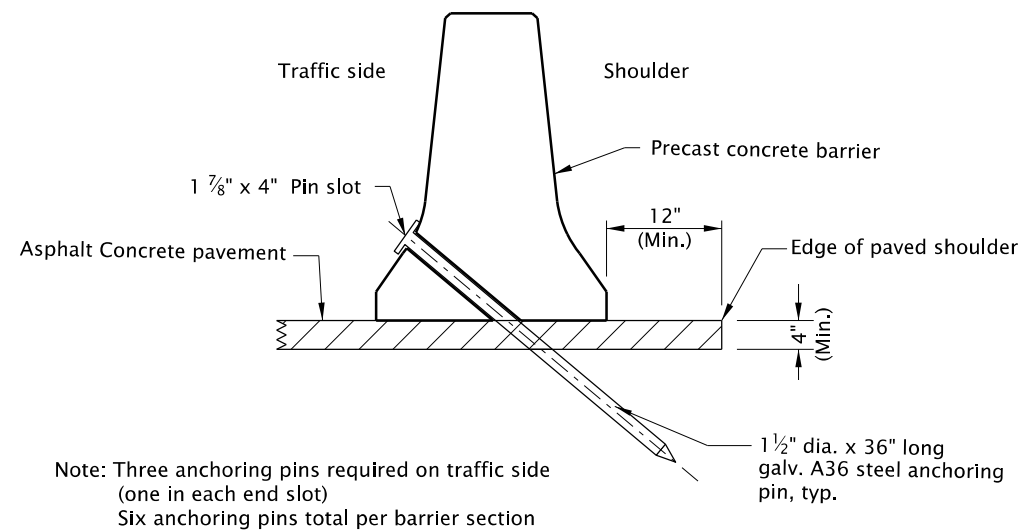


PLATE WASHER DETAIL



Note: Three anchoring pins required on traffic side (one in each end slot)
Six anchoring pins total per barrier section

ASPHALT ANCHORING PIN DETAILS

METHODS OF SECURING CONCRETE BARRIER TO ROADWAY

FOR ASPHALT SURFACE

ANCHORING PIN ASSEMBLY DETAIL

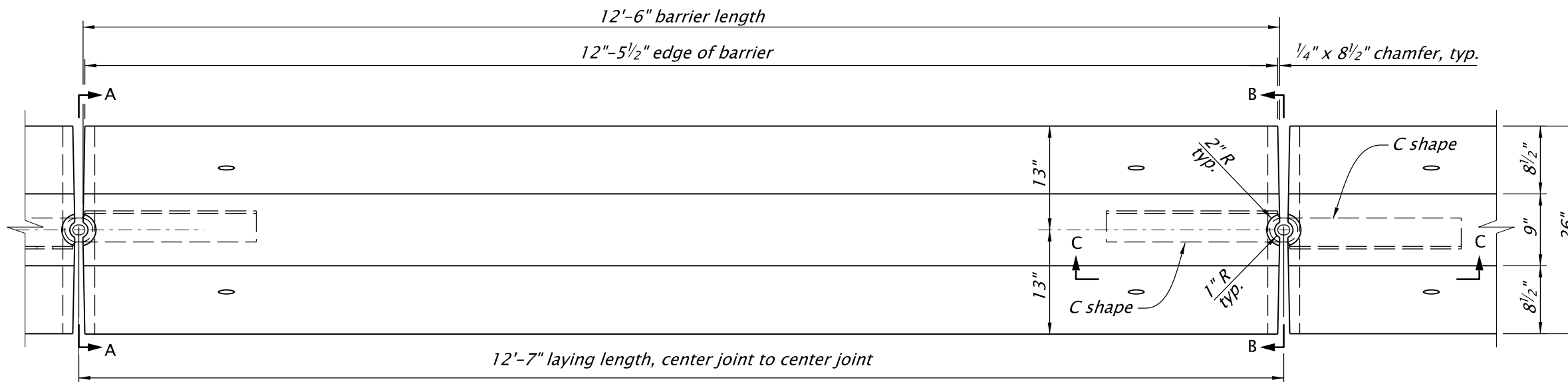
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.		
OREGON STANDARD DRAWINGS		
SECURING 32" TYPE "F" AND TALL 42" PRECAST CONCRETE BARRIER TO THE ROADWAY		
2024		
DATE	REVISION	DESCRIPTION
12-2023	REVISED NOTES AND DETAILS	
06-2024	REVISED NOTES AND DETAILS	
CALC. BOOK NO.	N/A	SDR DATE: 12-JUL-2024
		RD502

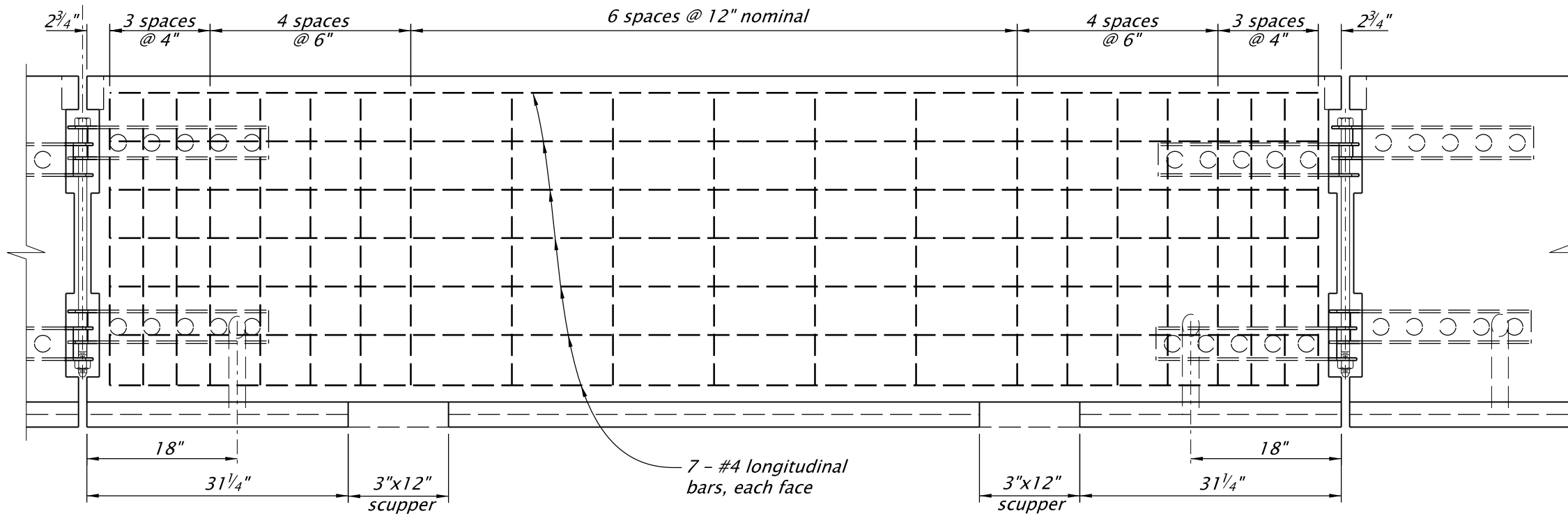
Effective Date: December 1, 2024 – May 31, 2025

12-JUL-2024

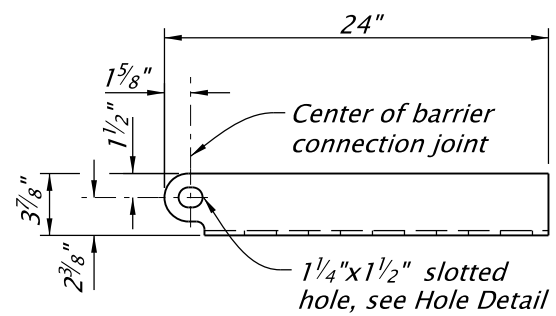
RD545.dgn



PLAN

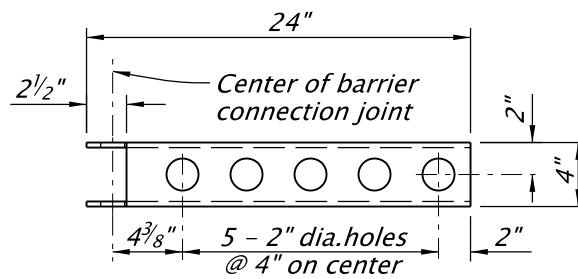


ELEVATION



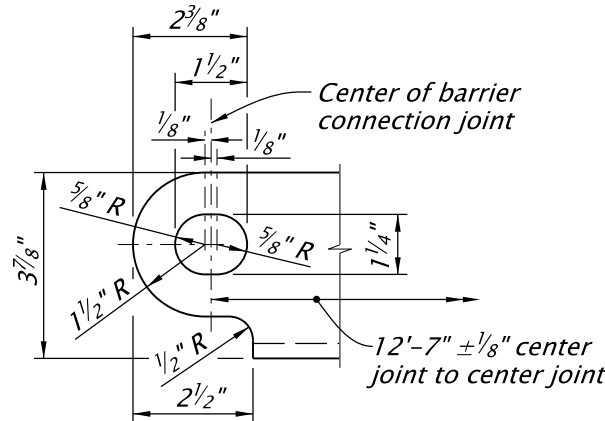
PLAN

Cut from 5/16" thick steel plate
(See note 5 for casting instructions)



ELEVATION

Perforated C-shape



HOLE DETAIL

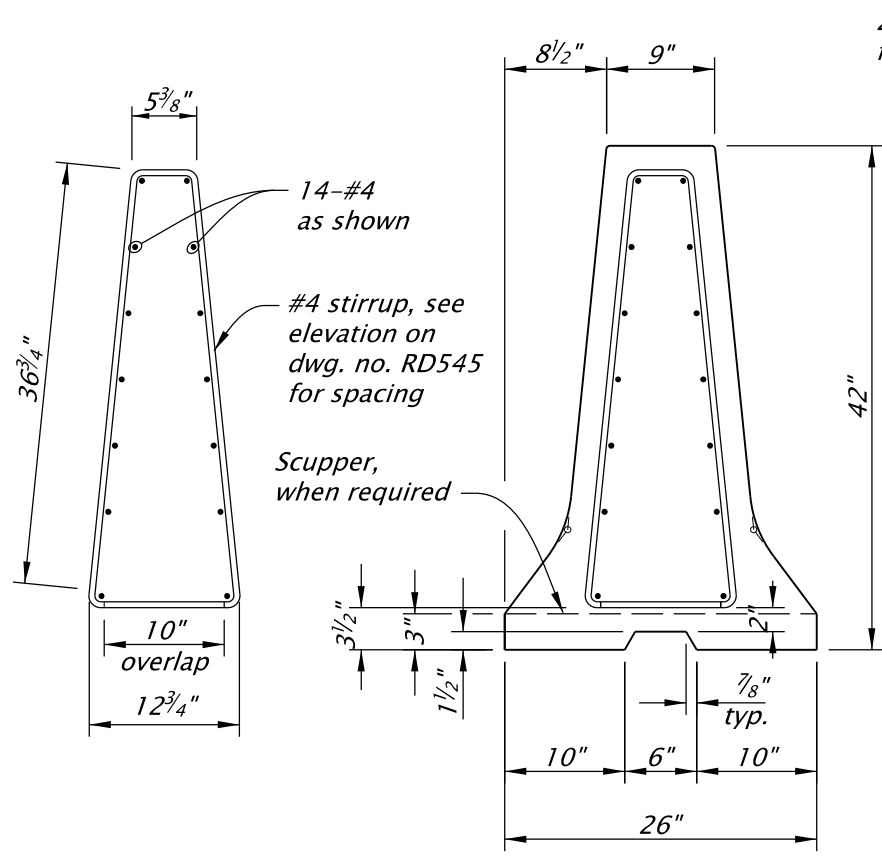
GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

- All reinforcing bars shall be full length as shown and shall be 2 inches clear of the nearest face of concrete unless shown otherwise.
- All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.
- Normal use of precast tall median barrier is restricted to curves with radii greater than 770'.
- Chamfer all edges 3/4 inch, typical.
- Perforated C-shape shall be placed in location shown to a tolerance of 3/32 inch.
- Estimated barrier weight is 8070 pounds per 12.5 foot unit length, estimated narrow base barrier weight is 6550 pounds.
- To anchor median barrier see Std. Dwg. RD502.
- Narrow base shoulder barrier to be used only at locations with backfill behind barrier as shown on plans.
- For barrier location details, see Std. Dwg. RD500.
- When scuppers are not required, plug them with a minimum 2" of grout, as directed.
- ALL EXISTING 42" BARRIER IN GOOD CONDITION IS ASSUMED TO BE MASH TL-3 COMPLIANT AND IS APPROVED FOR USE ON ODOT PROJECTS.

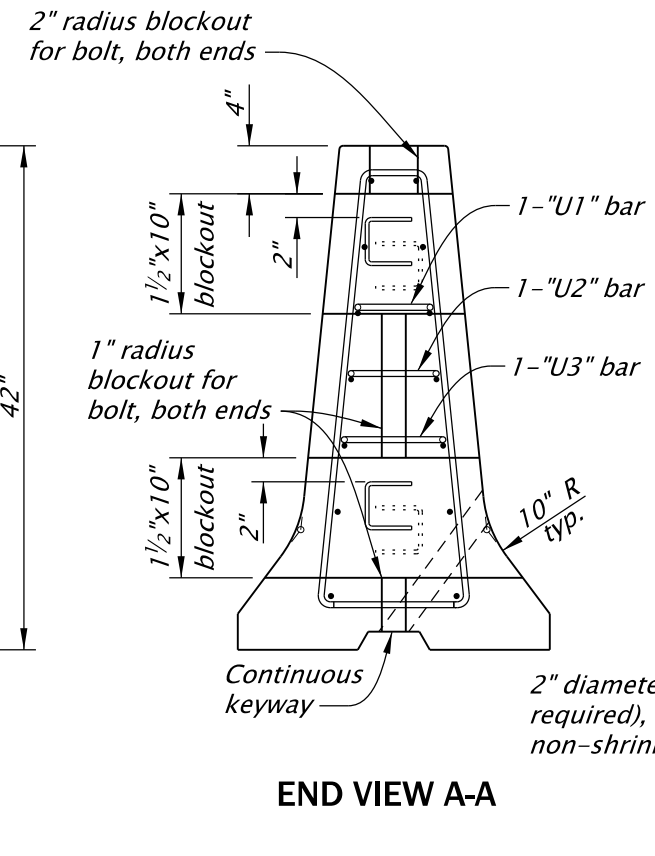
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.			
OREGON STANDARD DRAWINGS			
PRECAST TALL (42") CONCRETE BARRIER			
2024			
DATE	REVISION	DESCRIPTION	
07-2022	UPDATED DRAWING	TO CONNECT	
01-2023	REVISED	NOTES	
06-2024	REVISED	NOTES	
CALC. BOOK NO.	N/A	SDR DATE	12-JUL-2024
			RD545

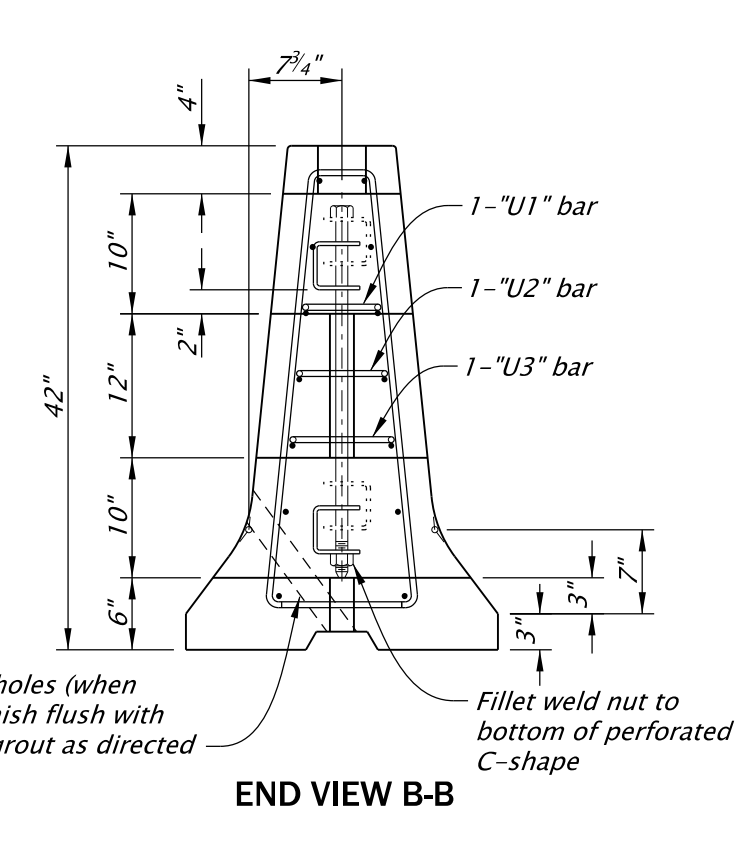
Effective Date: December 1, 2024 – May 31, 2025



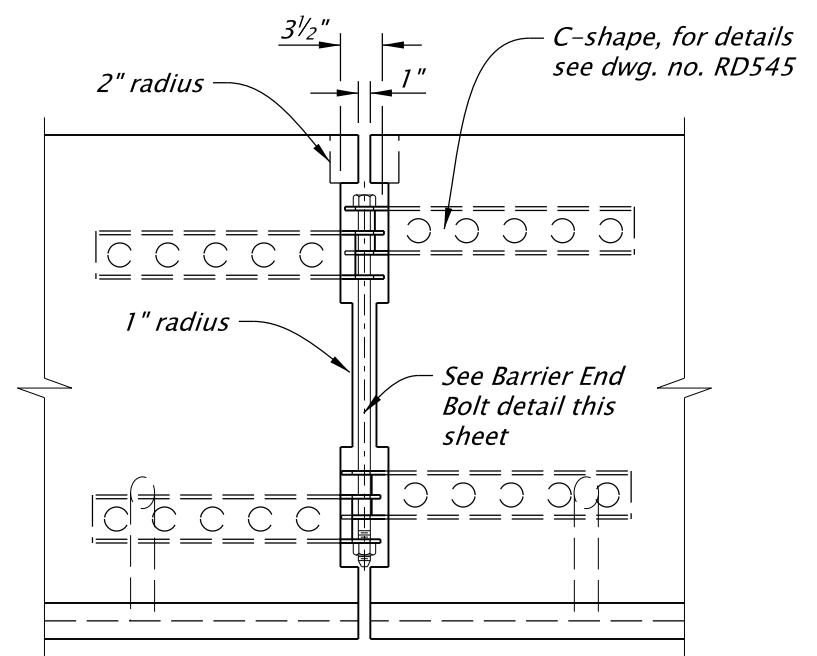
TYPICAL SECTION



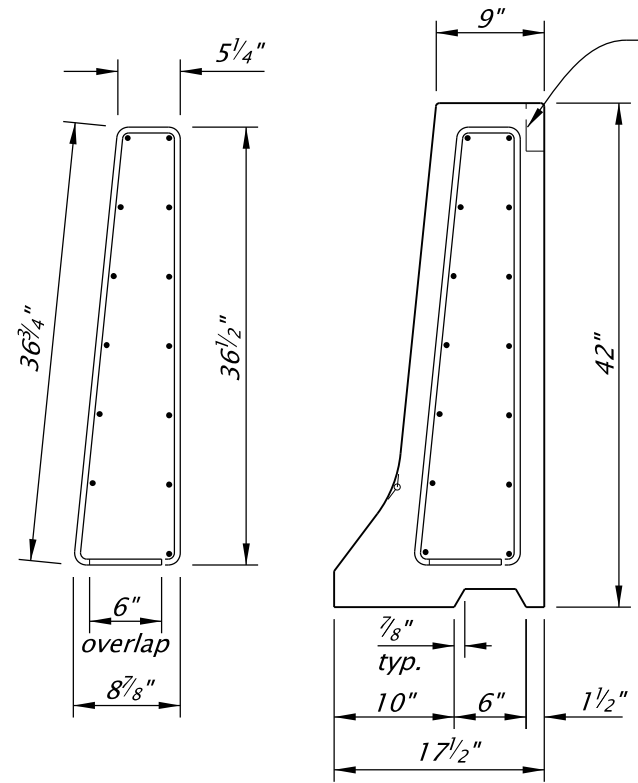
END VIEW A-A



END VIEW B-B

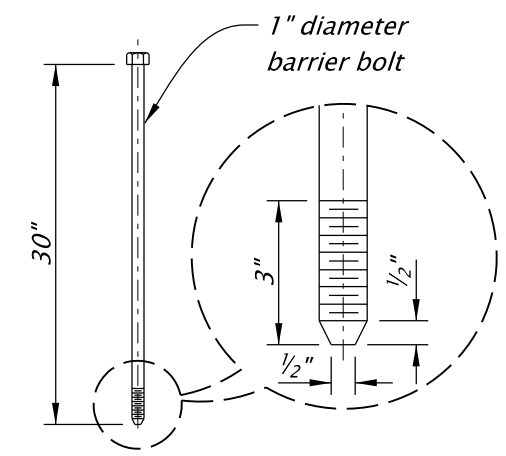


SECTION C-C



TALL NARROW BASE SHOULDER BARRIER

Only use against retaining walls or as directed. For details not shown, see other barrier details on this drawing and on dwg. no. RD545.

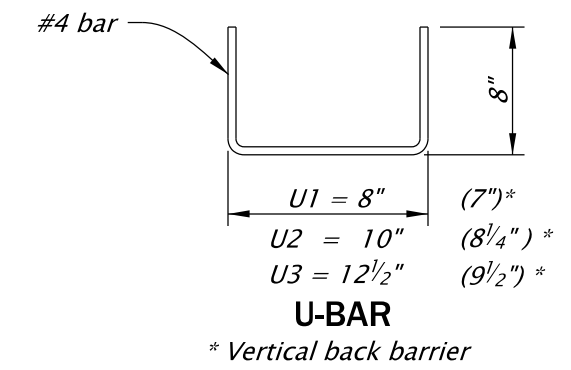


BARRIER END BOLT

11. ALL EXISTING 42" BARRIER IN GOOD CONDITION IS ASSUMED TO BE MASH TL-3 COMPLIANT AND IS APPROVED FOR USE ON ODOT PROJECTS.

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. All reinforcing bars shall be full length as shown and shall be 2" clear of the nearest face of concrete unless shown otherwise.
2. All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.
3. Normal use of precast tall median barrier is restricted to curves with radii greater than 770'.
4. Chamfer all edges 3/4 inch, typical.
5. Perforated C-shape shall be placed in location shown to a tolerance of 3/32 inch.
6. Estimated barrier weight is 8070 pounds per 12.5 foot unit length, estimated narrow base barrier weight is 6,550 pounds.
7. To anchor median barrier see Std. Dwg. RD502.
8. Narrow base shoulder barrier to be used only at locations with backfill behind barrier as shown on plans.
9. For barrier location details, see Std. Dwg. RD500.
10. When scuppers are not required, plug them with a minimum 2" of grout, as directed.



U-BAR

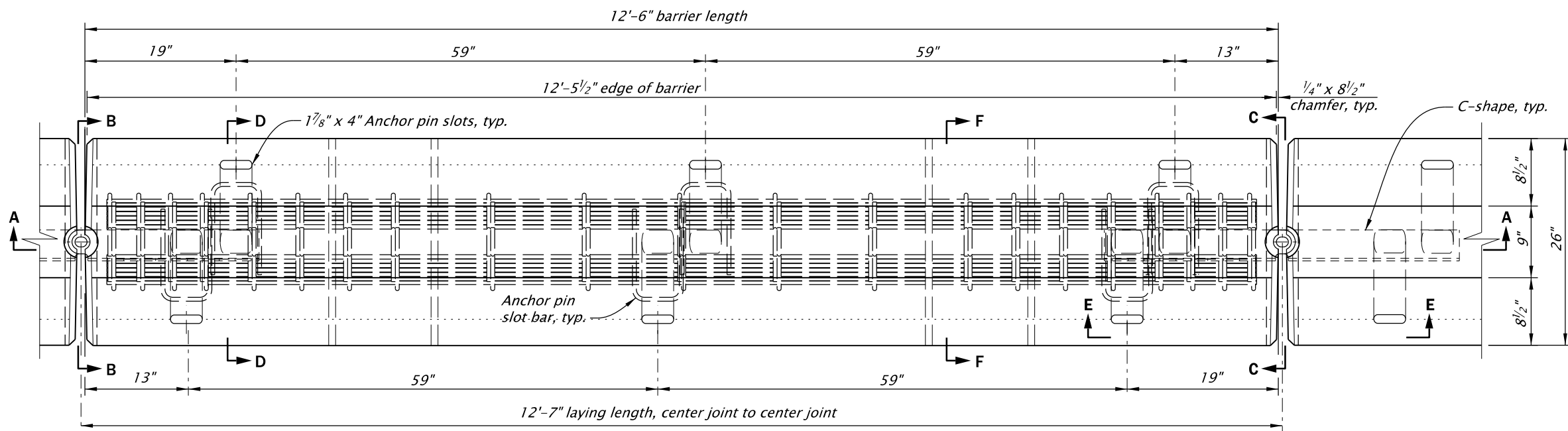
* Vertical back barrier

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.

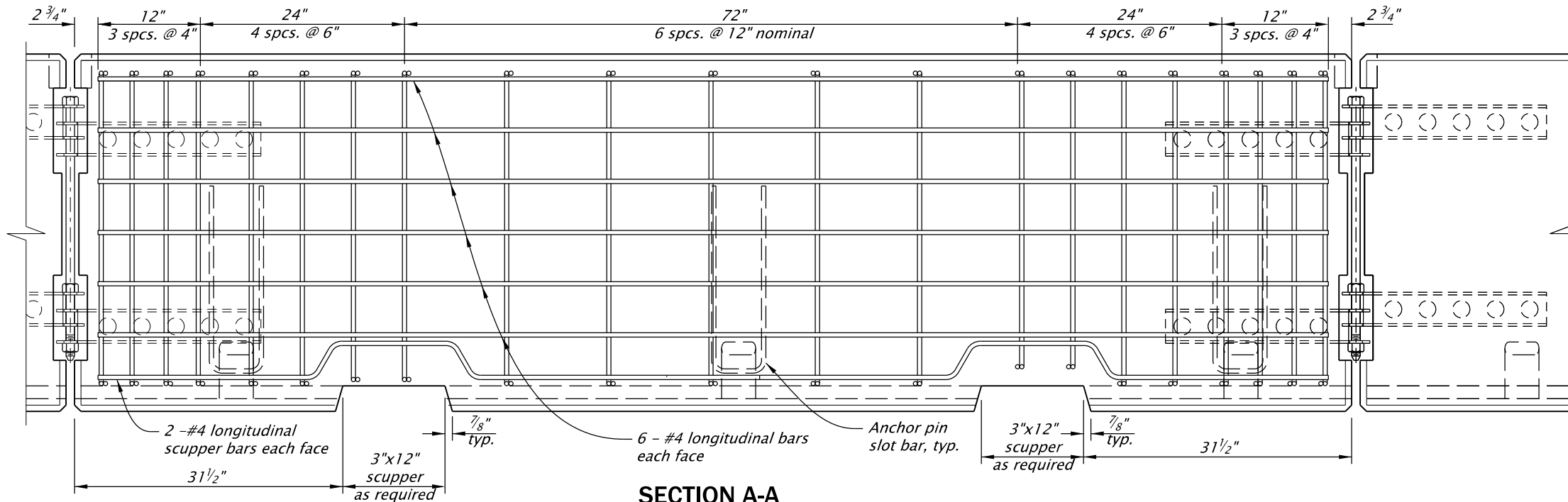
All materials shall be in accordance with the current Oregon Standard Specifications.	
OREGON STANDARD DRAWINGS	
PRECAST TALL (42") CONCRETE BARRIER	
2024	
DATE	REVISION DESCRIPTION
07-2022	CREATED NEW DRAWING
01-2023	REVISED NOTES
06-2024	REVISED NOTES
07-2024	REVISED NOTES AND DETAILS
CALC. BOOK NO. - - -	SDR DATE - 12-JUL-2024 -
N/A	RD546

12-JUL-2024

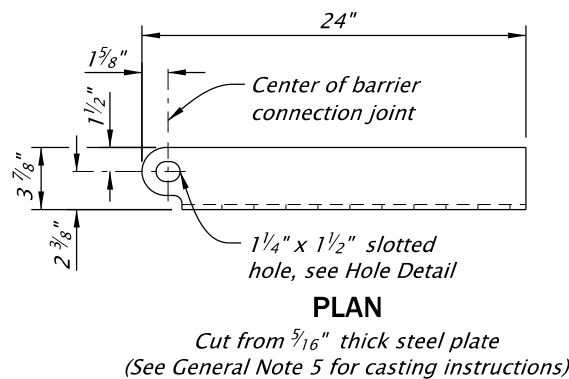
RD548A.dgn



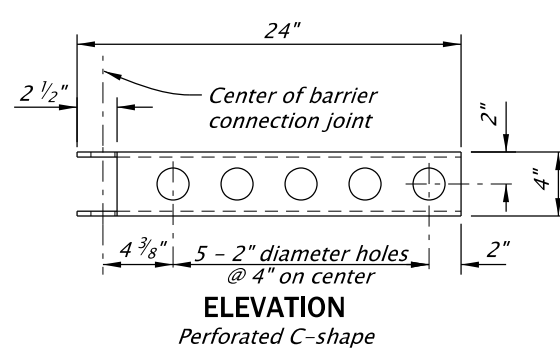
PLAN



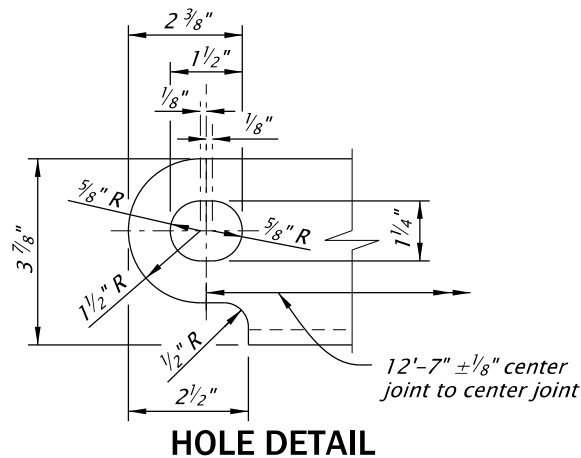
SECTION A-A



C-SHAPE DETAIL



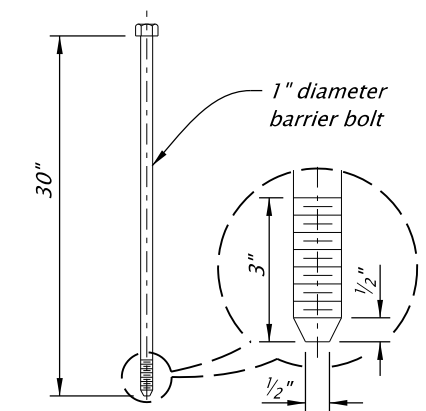
ELEVATION
Perforated C-shape



HOLE DETAIL

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. All reinforcing steel shall conform to ASTM A706 or AASHTO M31 (ASTM A615) Grade 420. All bars shall be full length as shown and shall be placed 2 inches clear of the nearest face of concrete unless shown otherwise.
2. All structural steel including fasteners shall be hot-dip galvanized after fabrication.
3. Normal use of precast tall median barrier is restricted to curves with radii greater than 770 feet.
4. Chamfer all edges 3/4-inch, typical.
5. Perforated C-shape shall be placed in location shown to a tolerance of 3/32-inch.
6. Estimated barrier weight is 8,070 pounds per 12-foot 6-inch unit length, estimated vertical backed barrier weight is 6,550 pounds.
7. Narrow base shoulder barrier to be used only at locations with backfill behind barrier as shown on plans.
8. See drawing RD548B for additional reinforcing details.



BARRIER END BOLT

ACCOMPANIED BY DWGS.:
RD548B

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

OREGON STANDARD DRAWINGS
PRECAST TALL (42") CONCRETE
BARRIER WITH MODIFIED
REINFORCING
 SHEET 1 OF 2
 2024

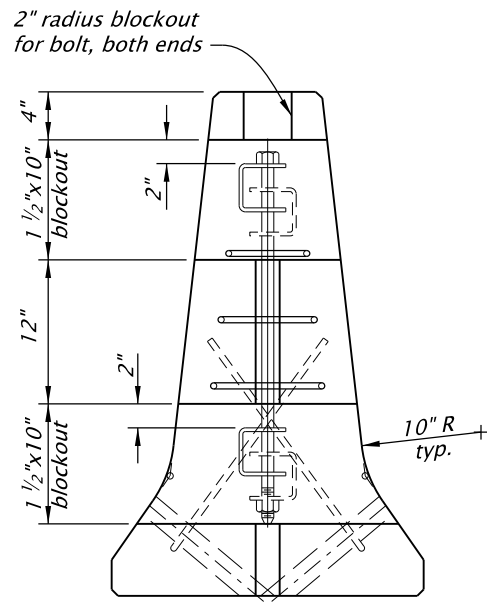
DATE	REVISION	DESCRIPTION
06-2024	CREATED NEW DRAWING	
CALC. BOOK NO. - - -	N/A - - -	SDR DATE - 12-JUL-2024 - RD548A

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.

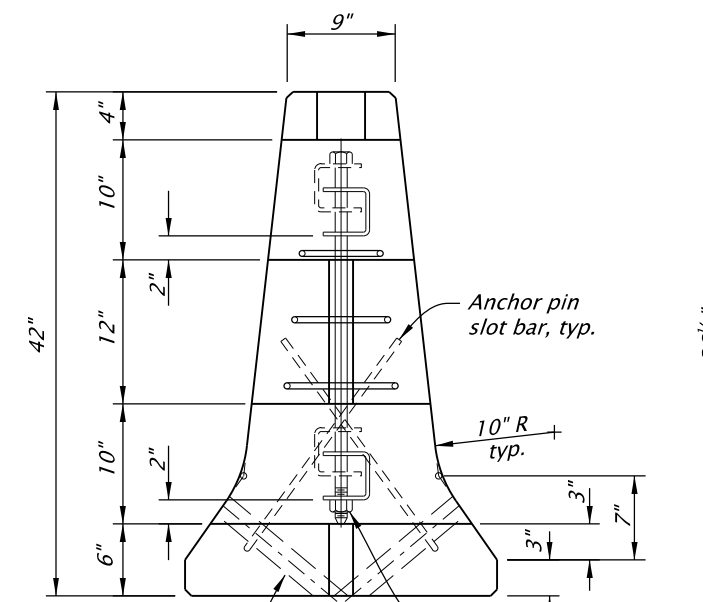
Effective Date: December 1, 2024 – May 31, 2025

12-JUL-2024

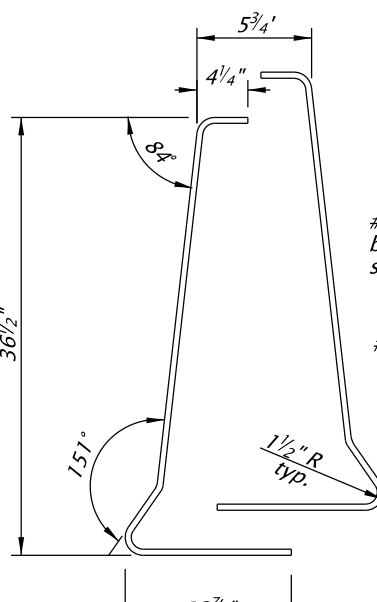
RD548B.dgn



END VIEW B-B

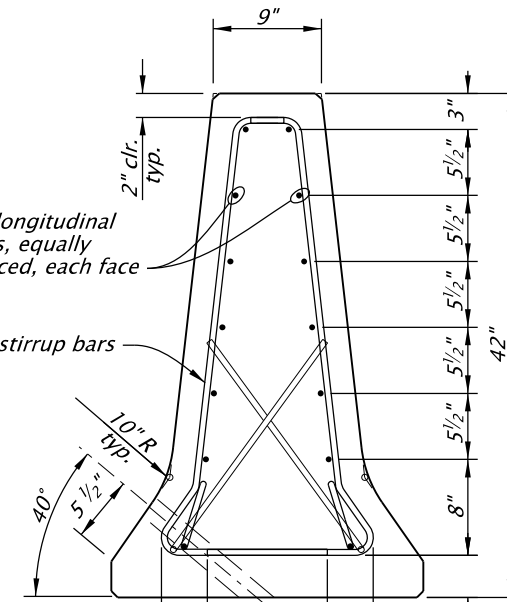


END VIEW C-C



SECTION D-D

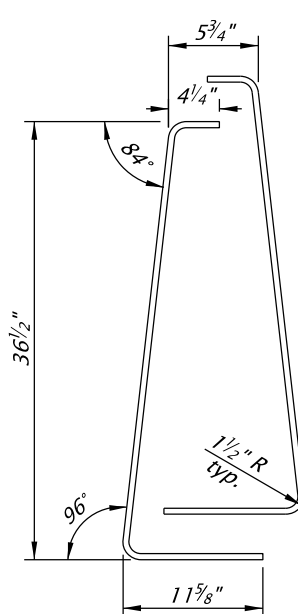
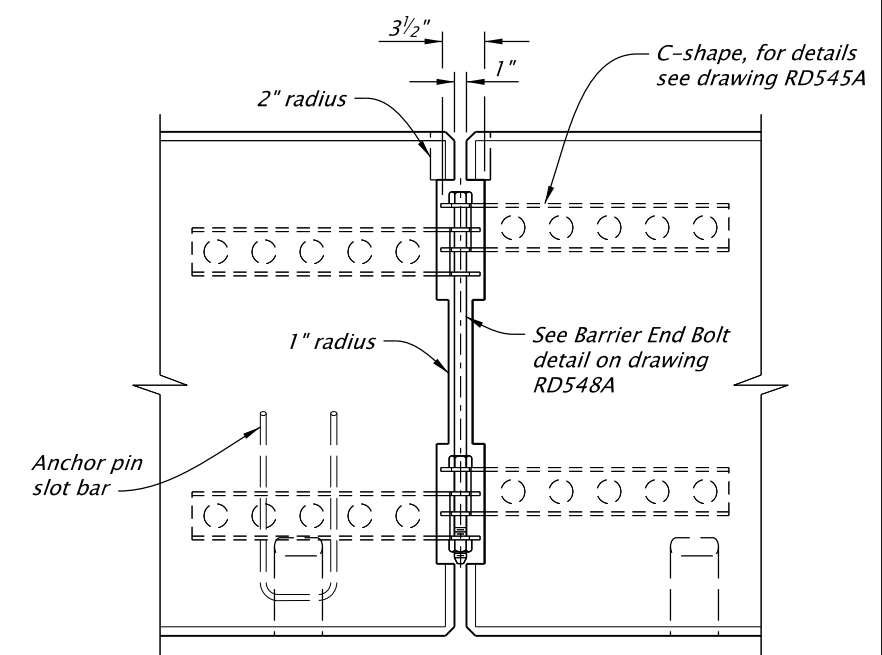
Quantity = 17 stirrup pairs



SECTION E-E

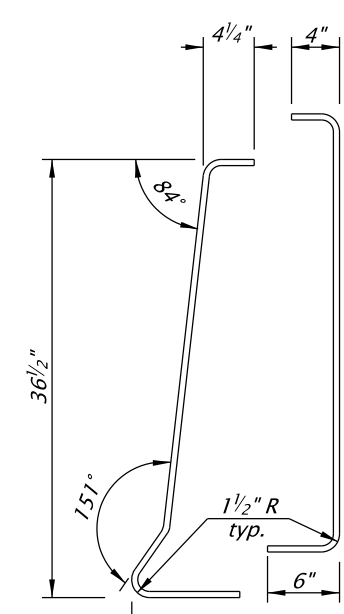
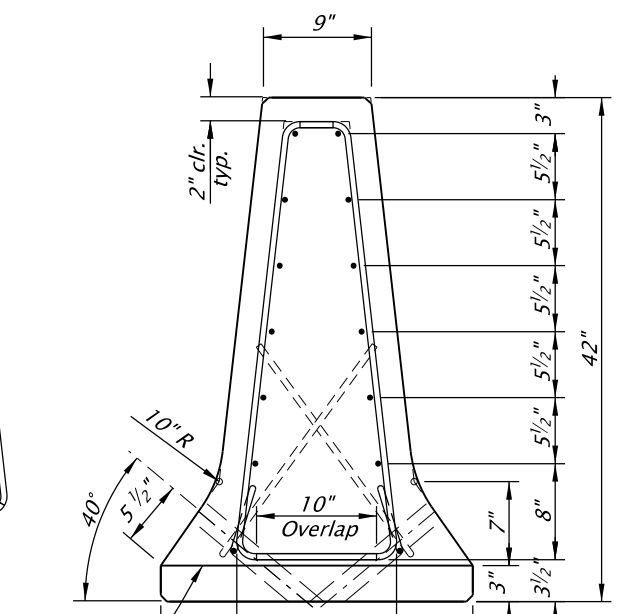
GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. For General Notes for all details on this sheet, see drawing RD548A.



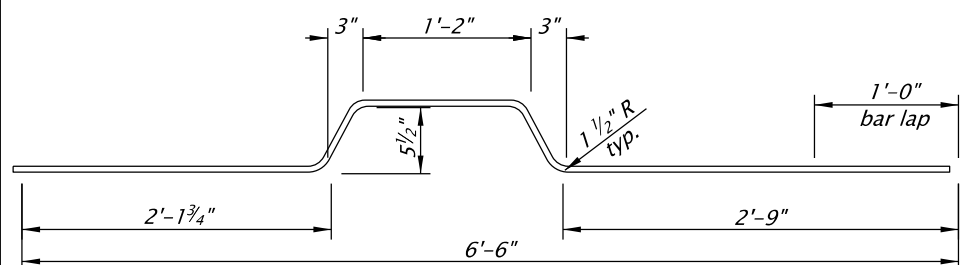
SECTION F-F

Quantity = 4 stirrup pairs



TALL NARROW BASE SHOULDER BARRIER

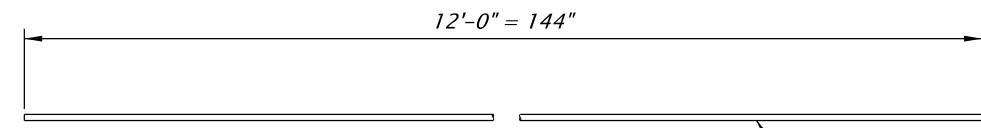
(NO PIN SLOTS REQUIRED)



LONGITUDINAL SCUPPER BAR

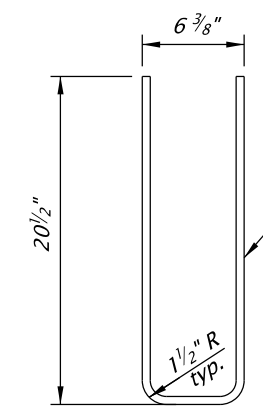
PROJECTED VIEW

Quantity = 4 bars



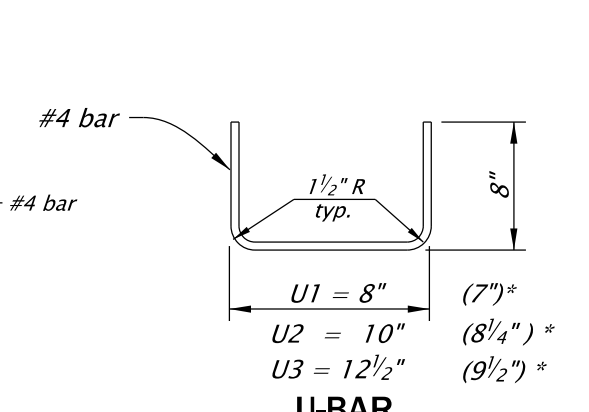
LONGITUDINAL BAR

Quantity = 12 bars



PIN SLOT BAR

Quantity = 6 bars



U-BAR

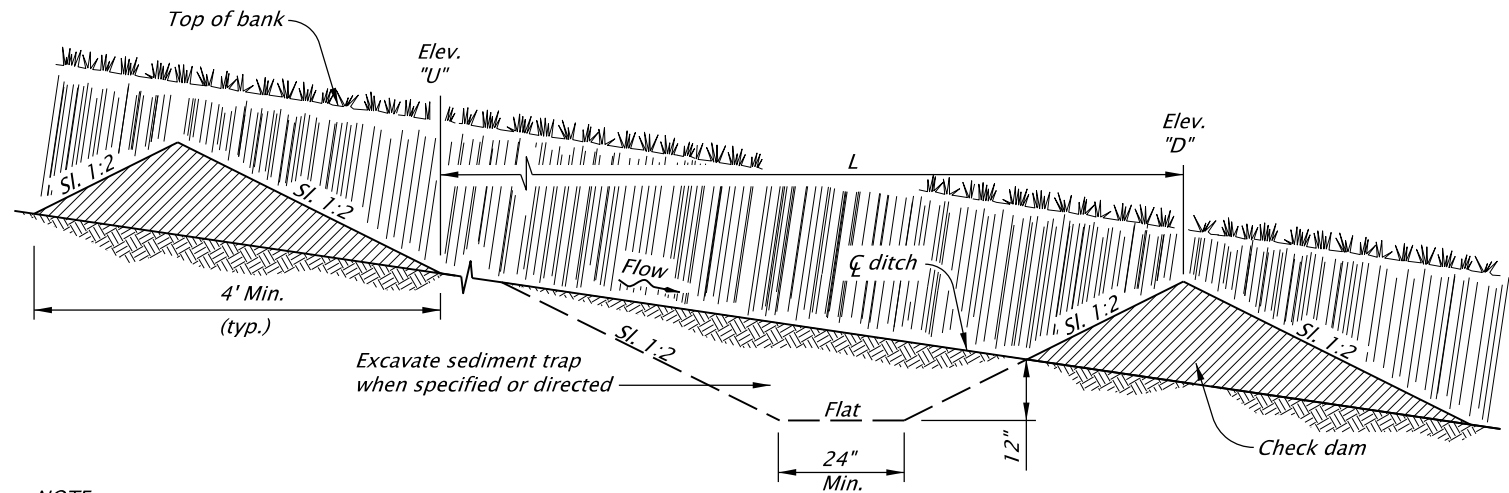
* Vertical back barrier
Quantity = 2 each bar size

ACCOMPANIED BY DWGS.:
RD548A

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.

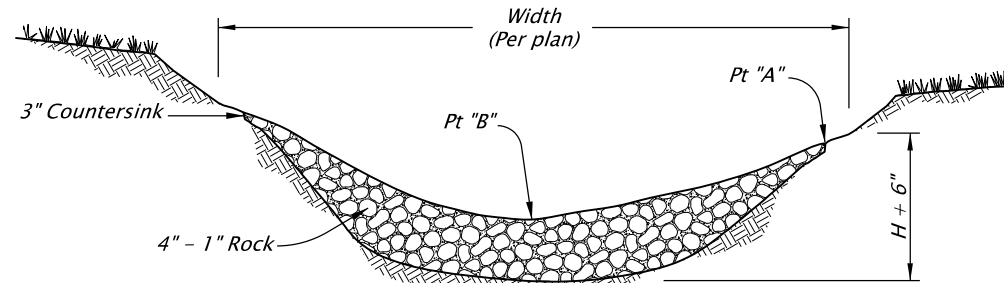
All materials shall be in accordance with the current Oregon Standard Specifications.			
OREGON STANDARD DRAWINGS			
PRECAST TALL (42") CONCRETE BARRIER WITH MODIFIED REINFORCING			
SHEET 2 OF 2			
2024			
DATE	REVISION	DESCRIPTION	
06-2024	CREATED	NEW DRAWING	
CALC. BOOK NO.	N/A	SDR DATE	12-JUL-2024
			RD548B

Effective Date: December 1, 2024 – May 31, 2025



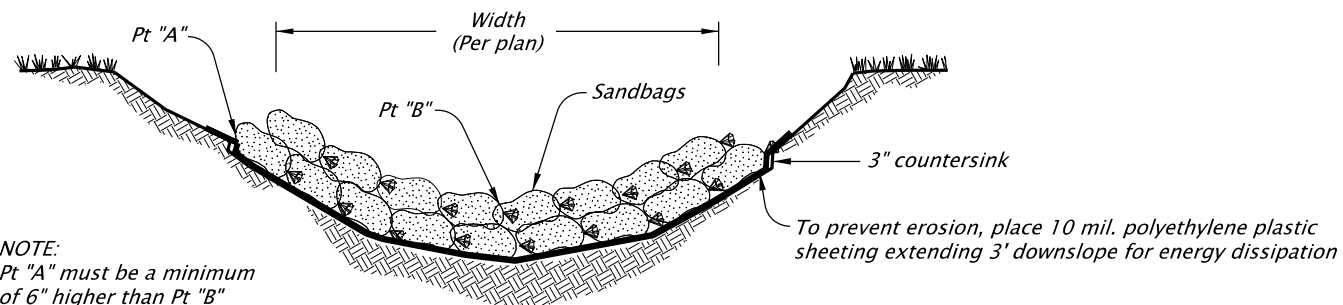
NOTE:
L = Spacing along swale or ditch so that Elevation "U" equals Elevation "D".

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"

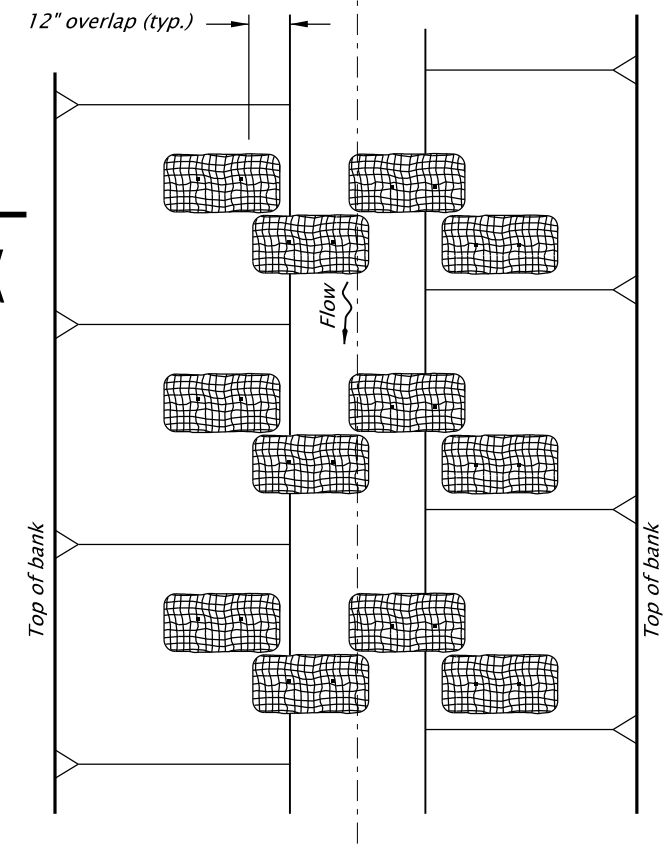
SANDBAG CHECK DAM - TYPE 4
NOT TO SCALE

NOTES:

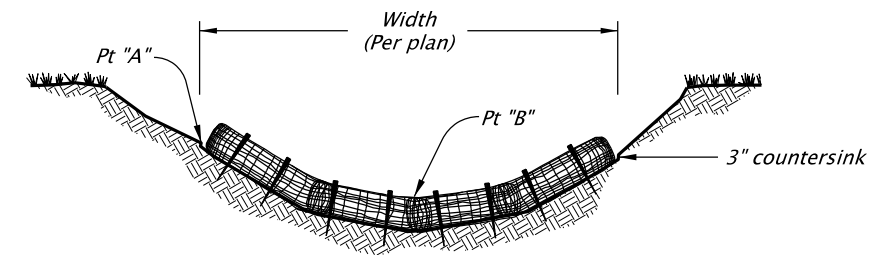
1. Type 3 - stake biofilter bags with two 2"x2"x18" (minimum) wood stakes per bag. Drive stakes a minimum of 6" into the ground and flush with the top of the bags. Omit stakes if placed over paved surfaces. Overlap bags 12" minimum at each joint.
2. Type 4 - Tightly abut or overlap ends of sandbags at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

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



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

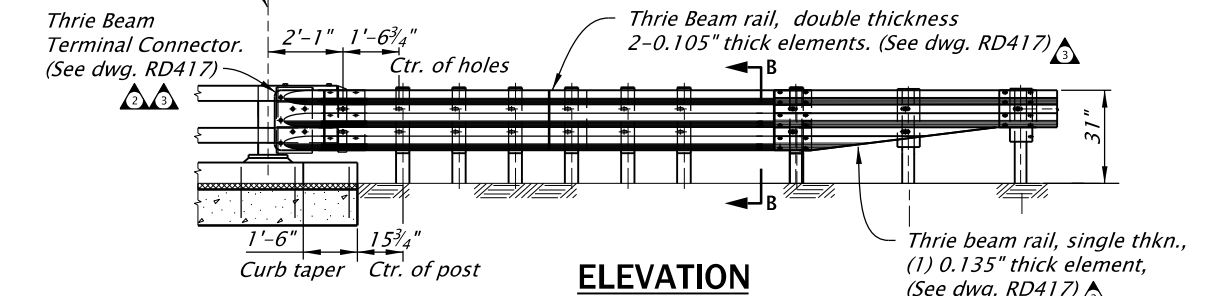
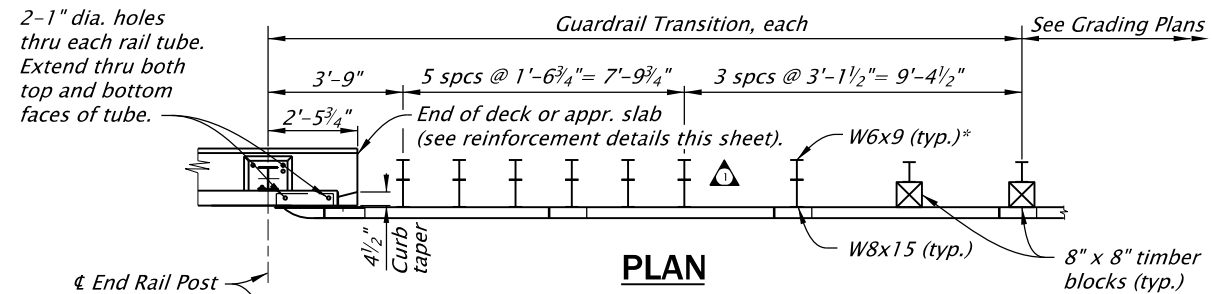
2024

DATE	REVISION	DESCRIPTION
01-2021	REMOVED CALC BOOK NUMBERS	
07-2024	ADDED NOTE 4	

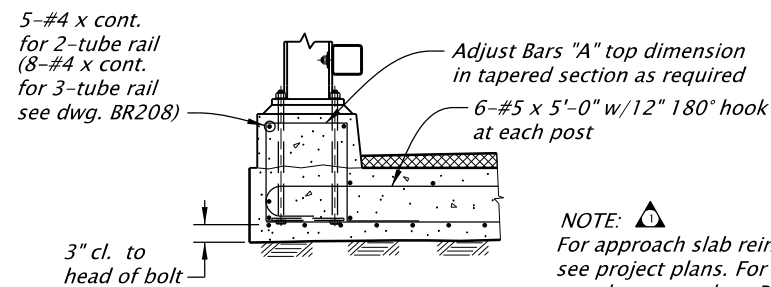
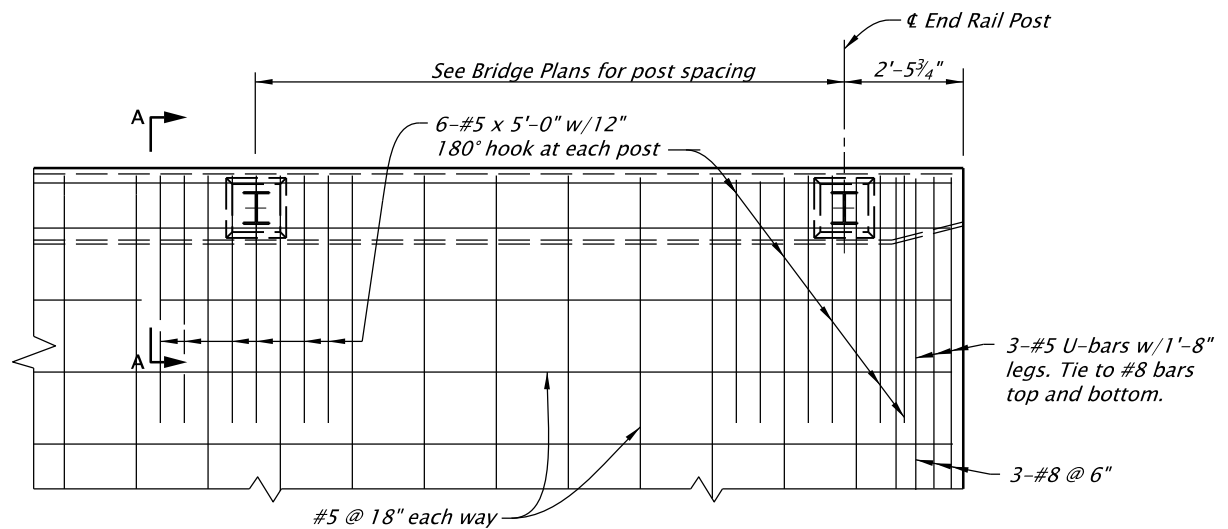
CALC. BOOK NO. --- N/A --- SDR DATE- 12-JUL-2024 - **RD1005**

01-JULY-2024

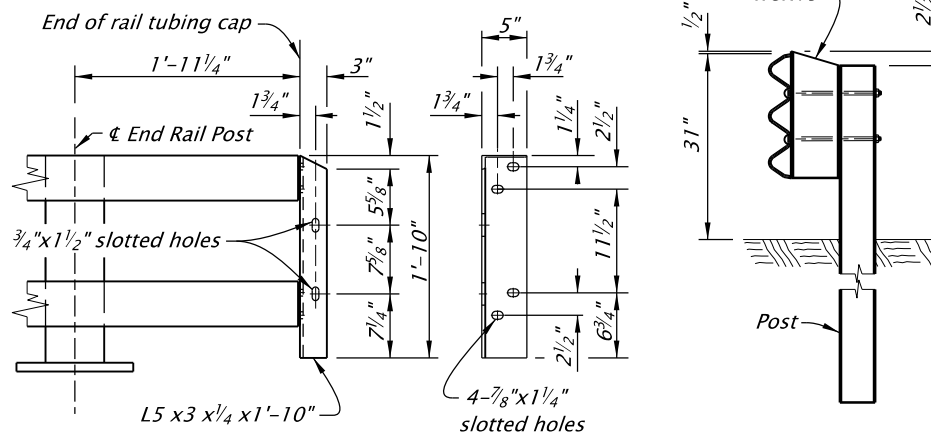
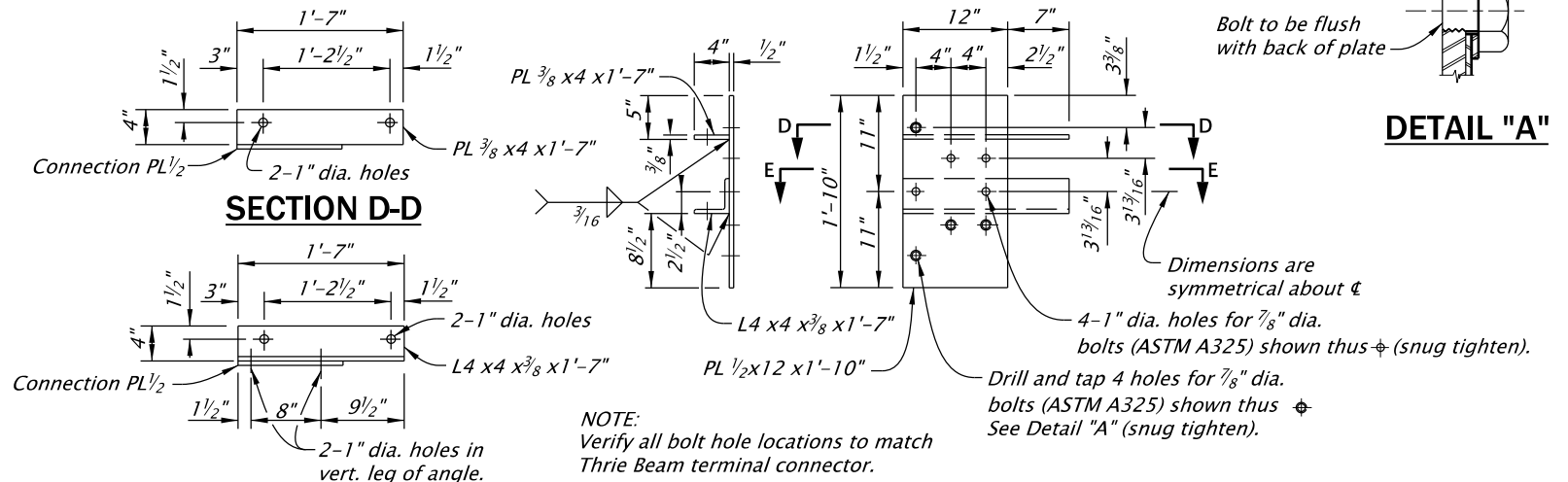
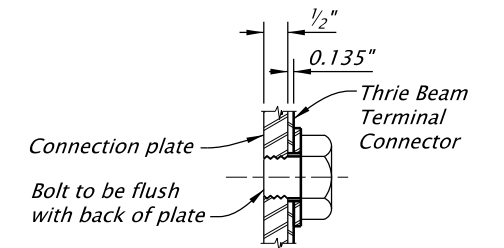
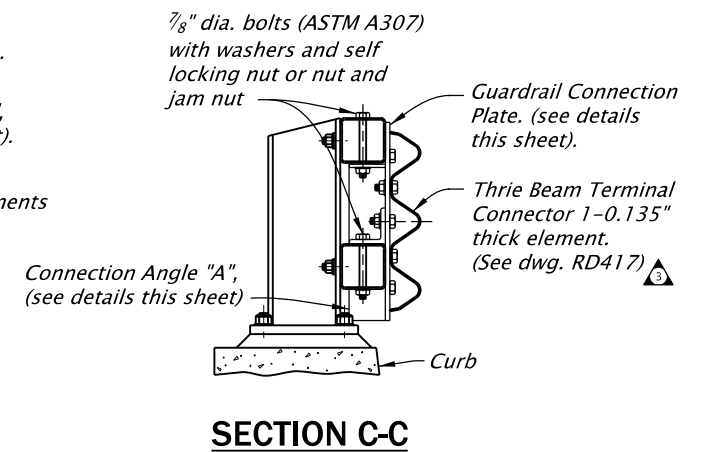
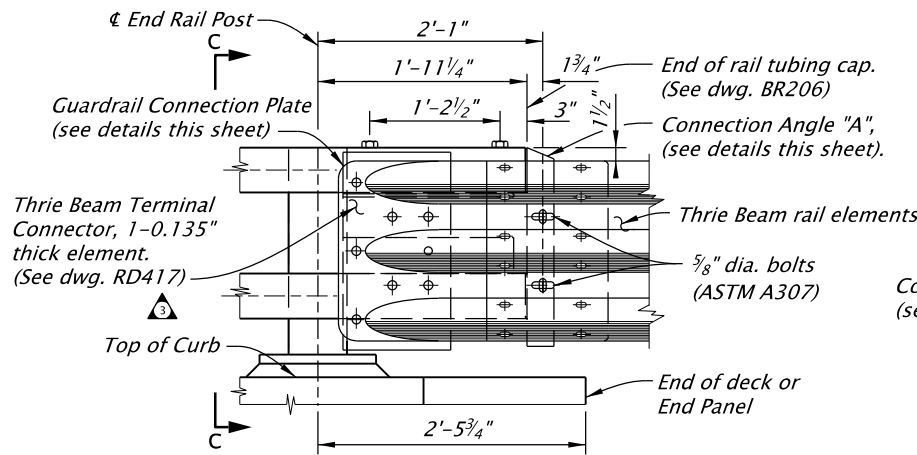
BR207.dgn



*Transition posts may be steel W6x9 or timber 8" x 8". All posts to be of same material. For details see dwg. BR203 "Thrie Beam Block"



NOTE: For approach slab reinforcement not shown see project plans. For rail and curb details not shown see dwg. BR206 or BR208.



GENERAL NOTES
 Rail designed and crash tested to meet NCHRP 350 TL-4 requirements.
 Provide steel plates and wide-flange posts conforming to AASHTO M183 (ASTM A36).

ACCOMPANIED BY DWGS.:
 BR203, BR206, RD401, RD402, RD407, RD408, RD417, RD412

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

OREGON STANDARD DRAWINGS
2-TUBE CURB MOUNT RAIL TRANSITION

2024

DATE	REVISION DESCRIPTION
01-2023	Revised accompanied by dwg references, General text revisions.
01-2024	General text revisions.
07-2024	General text revisions.

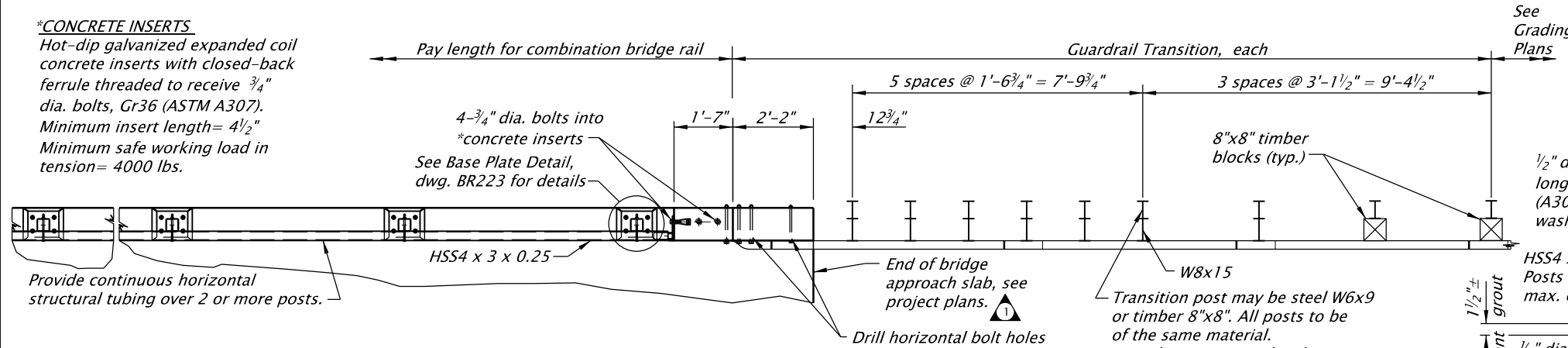
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

CALC. BOOK NO. 4057 & 4058 SDR DATE 12-JULY-2024 **BR207**

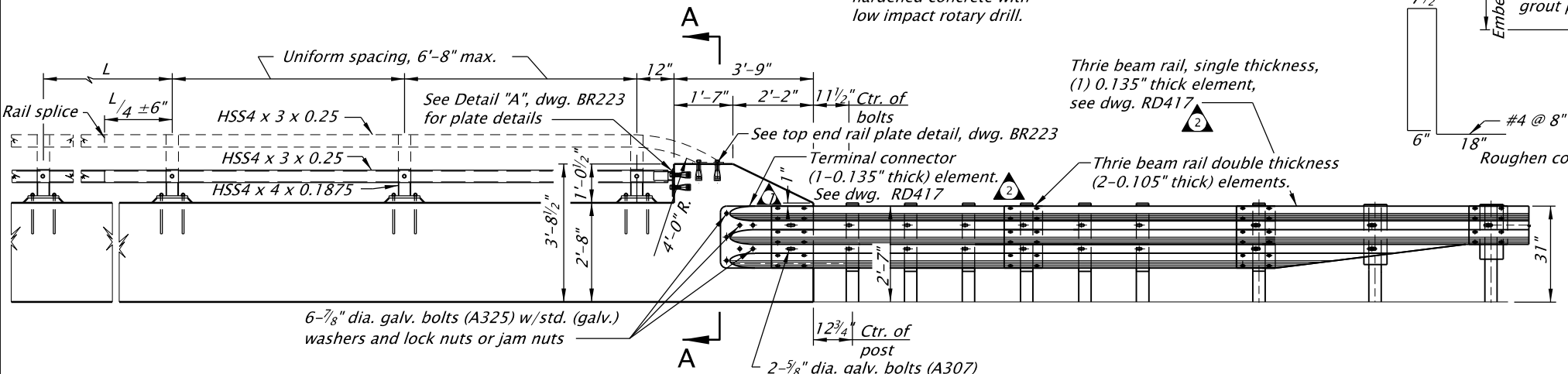
Effective Date: December 1, 2024 - May 31, 2025

BR216.dgn 01-JULY-2024

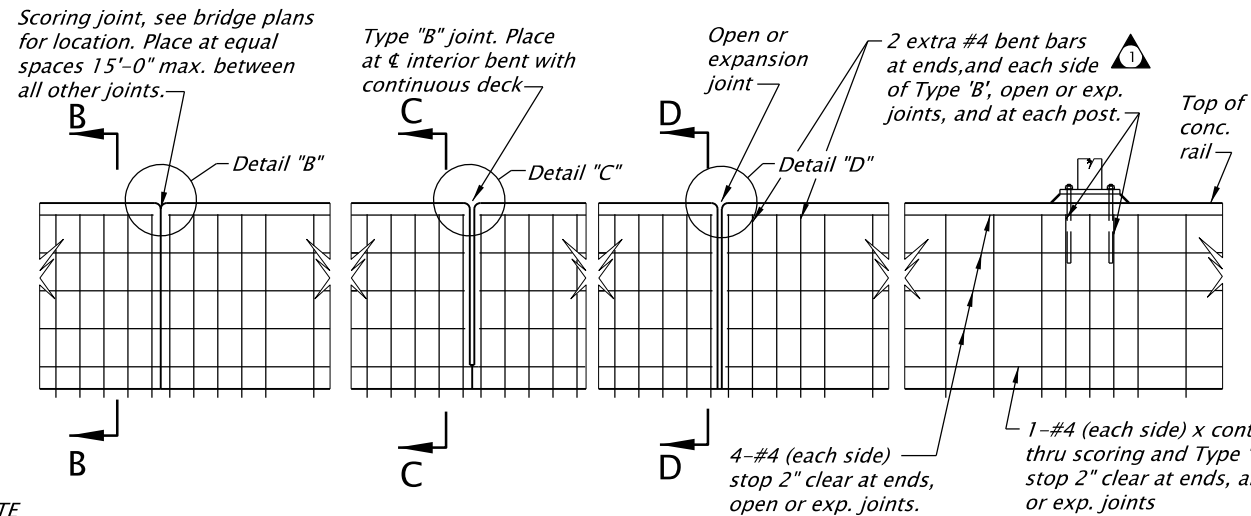
***CONCRETE INSERTS**
 Hot-dip galvanized expanded coil concrete inserts with closed-back ferrule threaded to receive 3/4" dia. bolts, Gr36 (ASTM A307). Minimum insert length= 4 1/2" Minimum safe working load in tension= 4000 lbs.



PLAN: TRANSITION RAIL DETAIL



ELEVATION: TRANSITION RAIL DETAIL

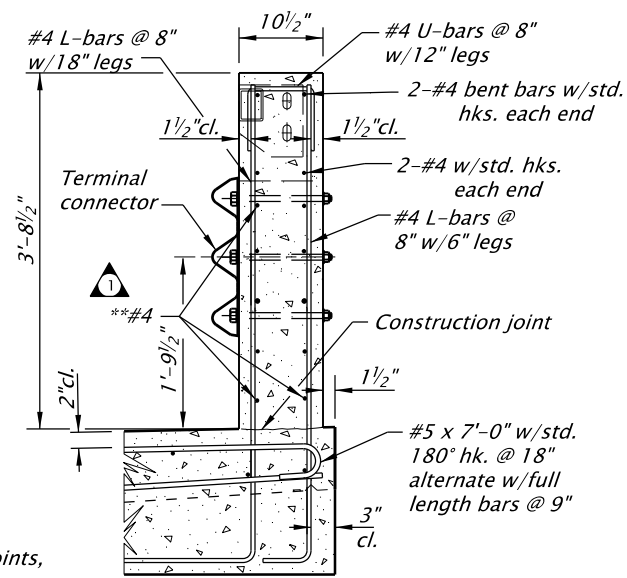


ELEVATION: CONCRETE BRIDGE RAIL

NOTE
 For Sections B-B, C-C, and D-D and Details A, B, C, and D see dwg. BR223

ESTIMATED QUANTITIES

	3'-6 1/2" Rail	4'-6" Rail
Concrete Volume (ft ³ /ft)	2.26	2.26
Reinforcement Weight (lbs/ft)	23.39	23.39
Structural Steel Weight (lbs/ft)	18.0	30.0
Total Rail Weight (lbs/ft)	357	369
Center of Gravity (cg, ft)	0.572	0.581



SECTION A-A

**Continuous thru scoring joints, stop 2" clear at ends and open or exp. joints.

GENERAL NOTES

- Provide steel tubing conforming to ASTM A500, Grade B, A501 or A618.
- Provide reinforcing steel conforming to ASTM A706, or AASHTO M31 (ASTM A615) Grade 60. Splice #4 bars 1'-4" min.
- Provide concrete Class 3300 - 1 1/2 or 3/4.
- Provide steel posts and plates conforming to AASHTO M183 (ASTM A36) unless otherwise noted.
- Provide High Strength anchor bolts (Grade 105) according to Oregon Standard Specification 02560.30 (b).
- Construct rail (posts and parapet) normal to grade in the longitudinal direction and vertical in the transverse direction.
- Hot-dip galvanize structural steel including fasteners after fabrication. Provide Galvanize-Control Silicon posts and horizontal rail steel tubing according to Oregon Standard Specification 02530.70. Tap nuts and inserts 0.021" oversize after galvanizing in accordance with ASTM A563.
- Use 4'-6" height for bikeways when called for on project plans.

Accompanied by dwgs. BR203, BR223, RD401, RD402, RD407, RD408, RD417, RD412

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
SIDEWALK MOUNTED COMBINATION BRIDGE RAIL

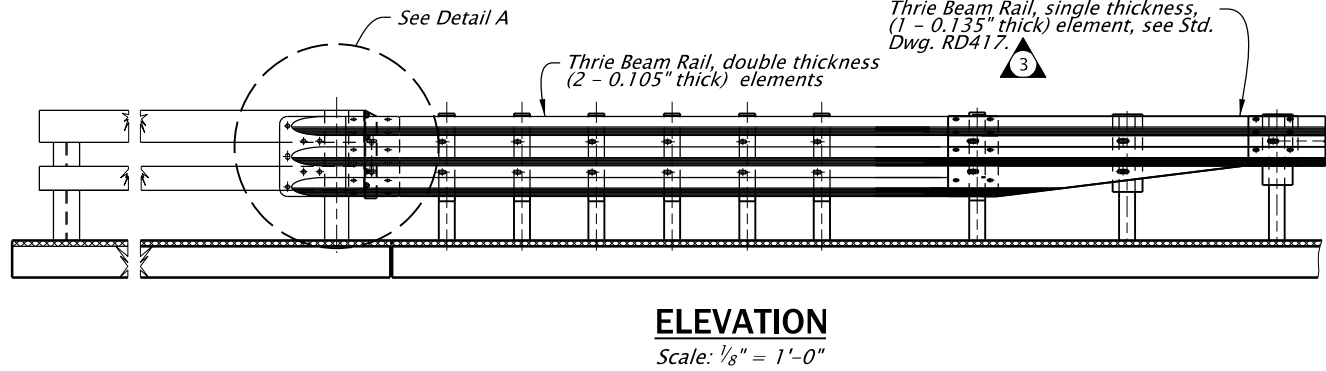
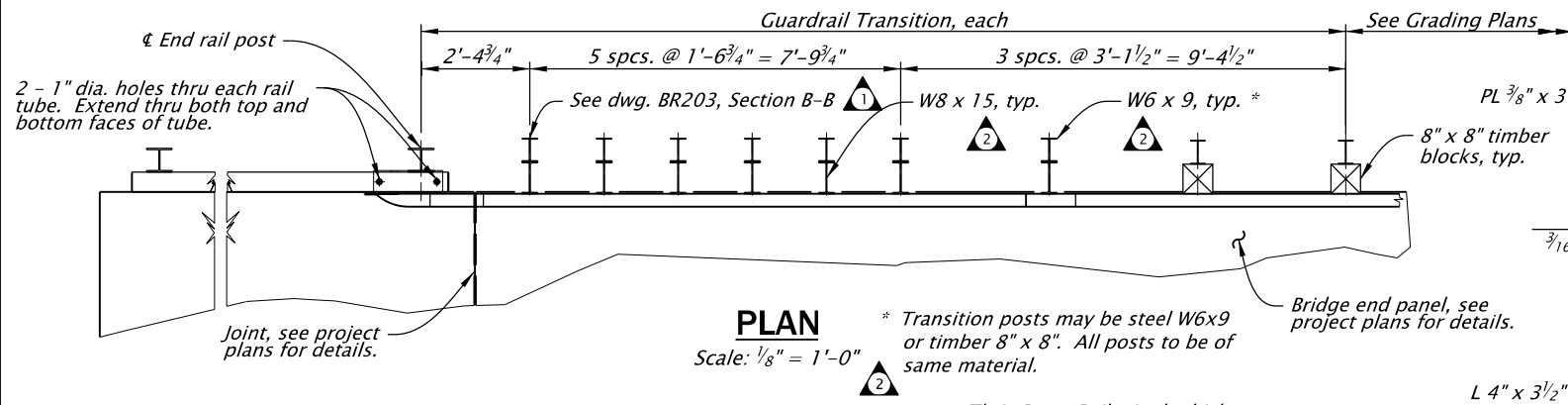
2024

DATE	REVISION	DESCRIPTION
01-2023		Revised accompanied by dwg references, General text revisions.
07-2024		General text revisions.
CALC. BOOK NO.	N/A	SDR DATE: 12-JULY-2024

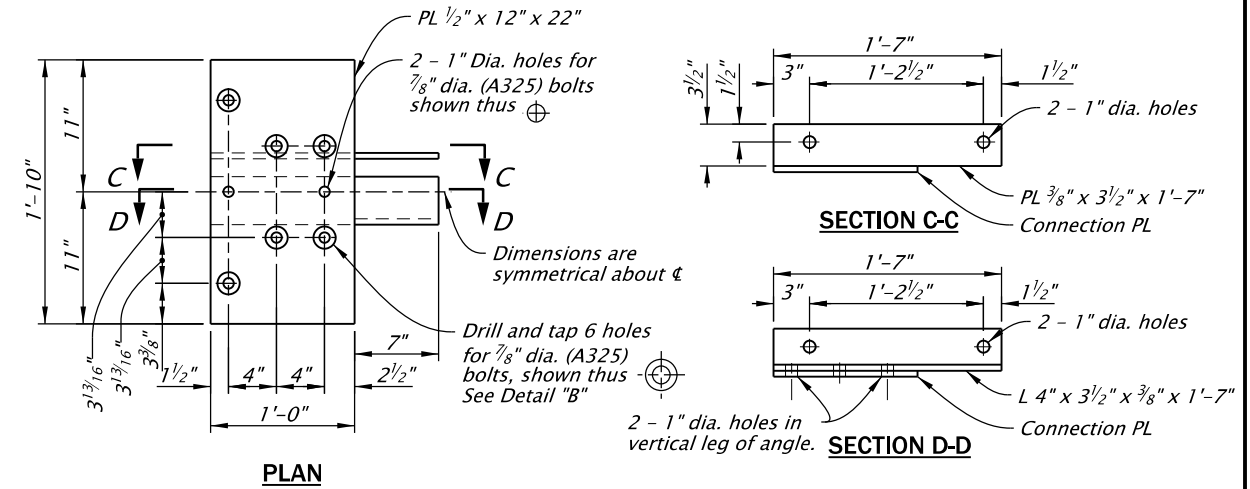
BR216

01-JULY-2024

BR230.dgn

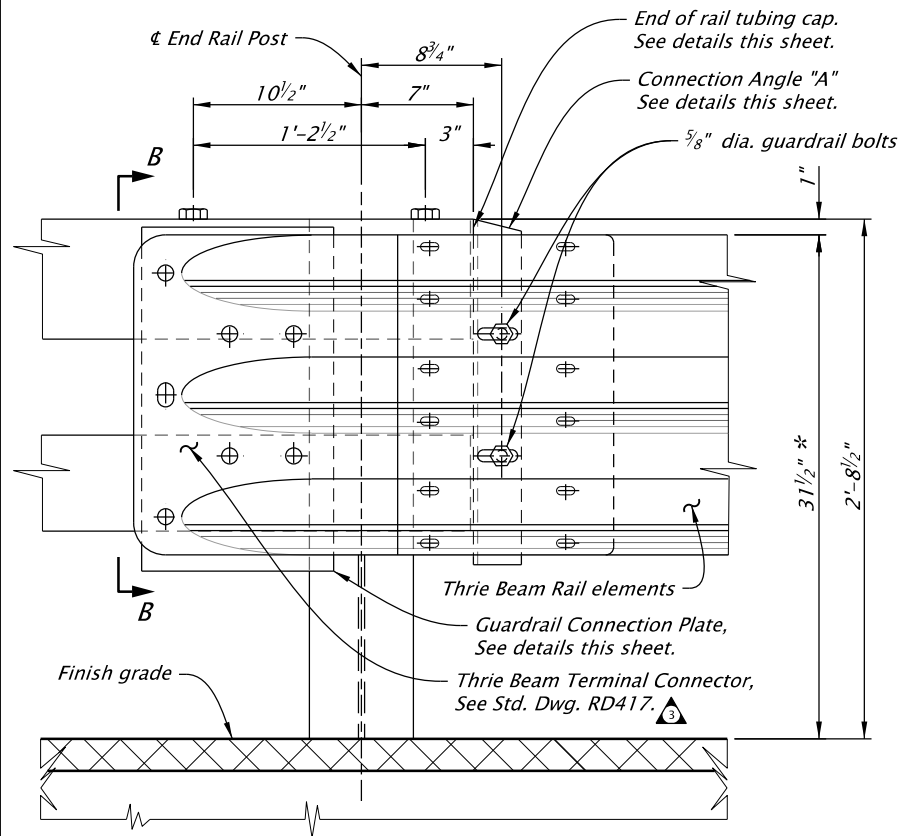


ELEVATION



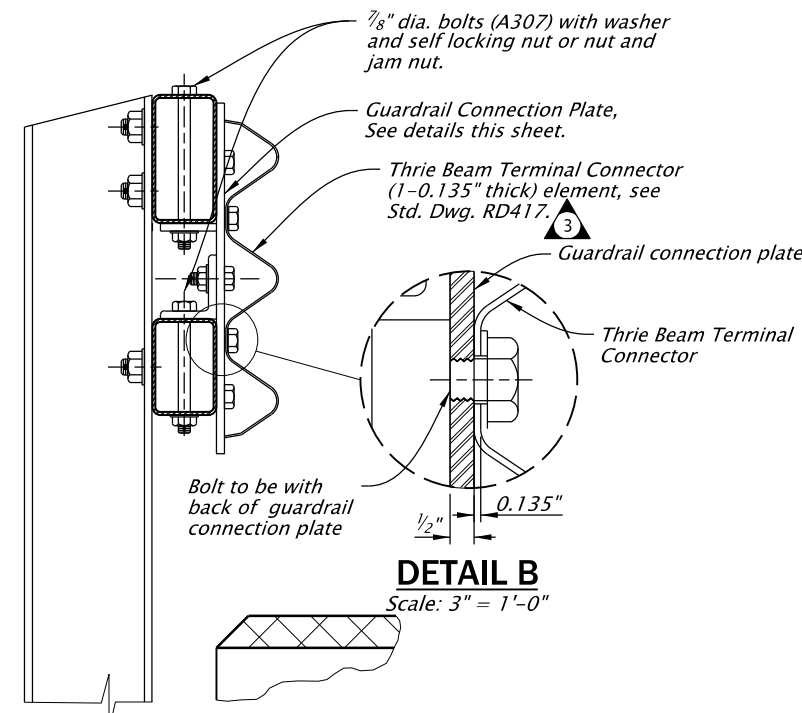
GUARDRAIL CONNECTION PLATE DETAILS

Scale: 1" = 1'-0"



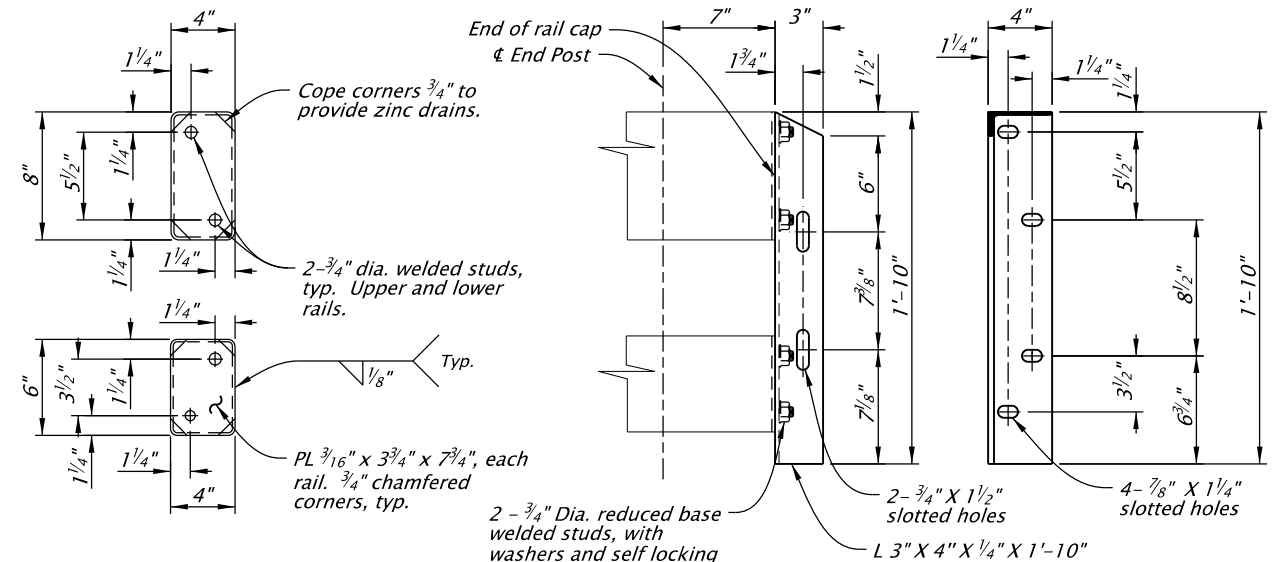
DETAIL A-A

Scale: 1/8" = 1'-0"



SECTION B-B

Scale: 1/8" = 1'-0"



UPPER AND LOWER RAILS

Scale: 1" = 1'-0"

CONNECTION ANGLE "A"

Scale: 1" = 1'-0"

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

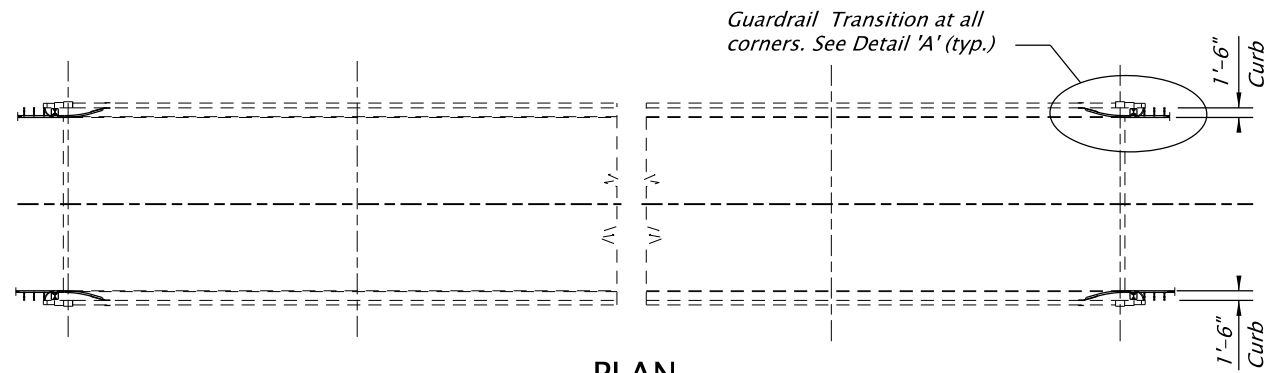
OREGON STANDARD DRAWINGS
2-TUBE SIDE MOUNT RAIL TRANSITION

2024

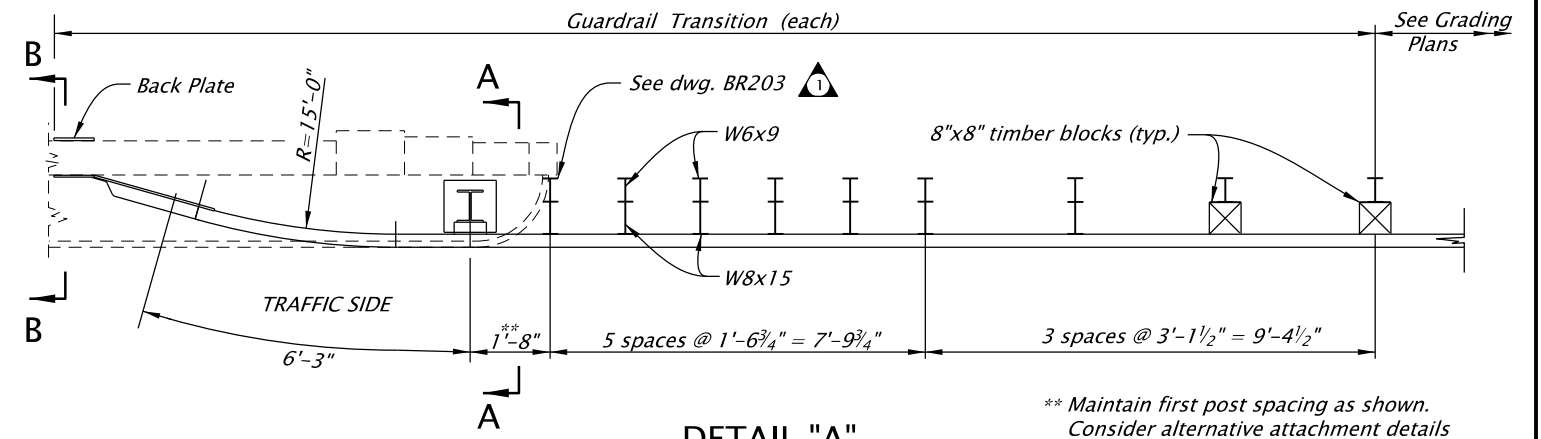
DATE	REVISION	DESCRIPTION
09-2020	1	Updated section note and removed note 3.
09-2020	2	Updated to current drafting standards
01-2022	3	Replaced timber block with W8x15 to be consistent to BR203.
07-2024	4	General text revisions.

CALC. BOOK NO.	N/A	SDR DATE	12-JULY-2024	BR230
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Effective Date: December 1, 2024 - May 31, 2025

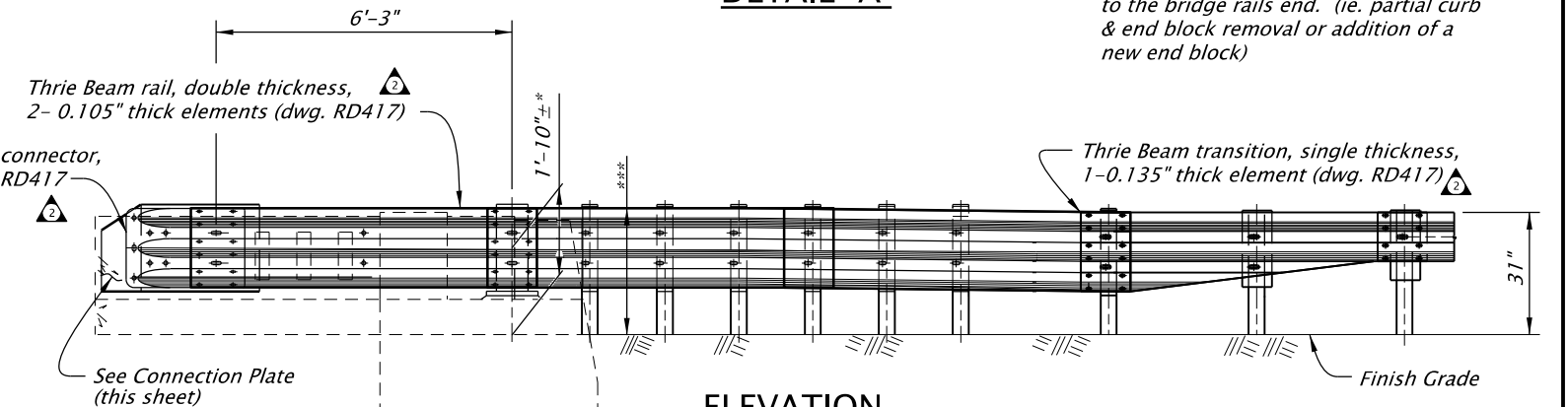


PLAN



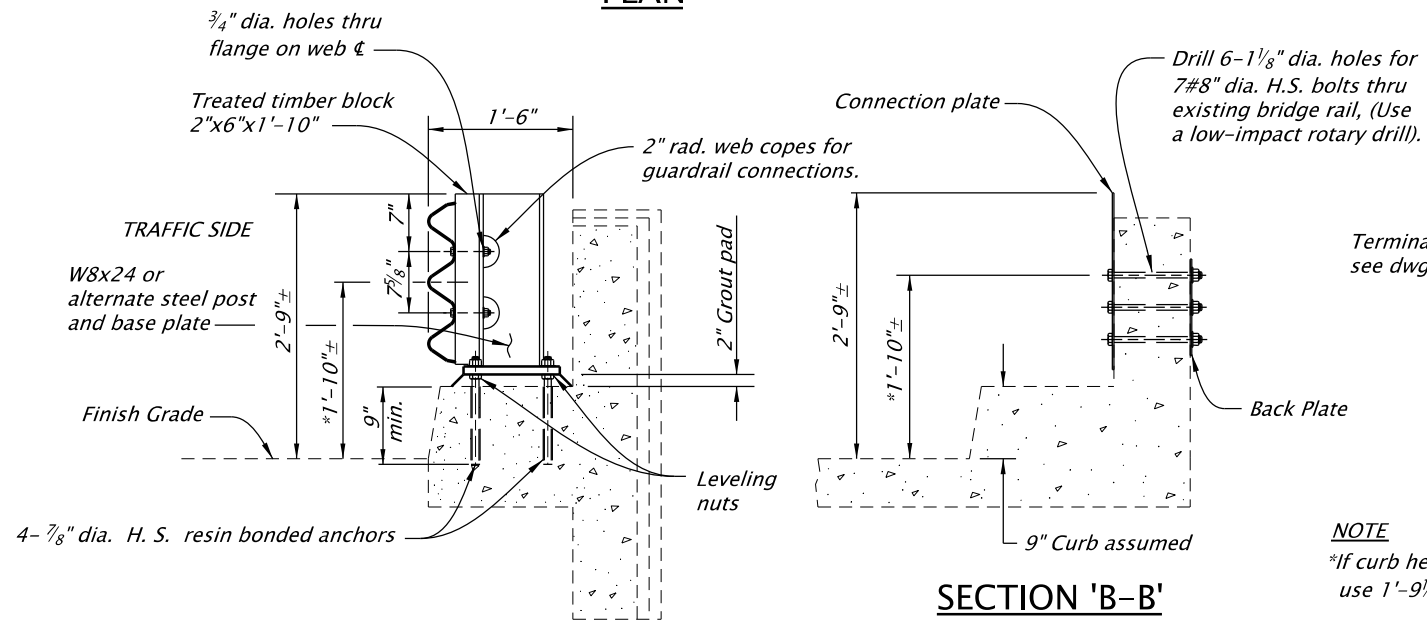
DETAIL "A"

** Maintain first post spacing as shown. Consider alternative attachment details to the bridge rails end. (ie. partial curb & end block removal or addition of a new end block)



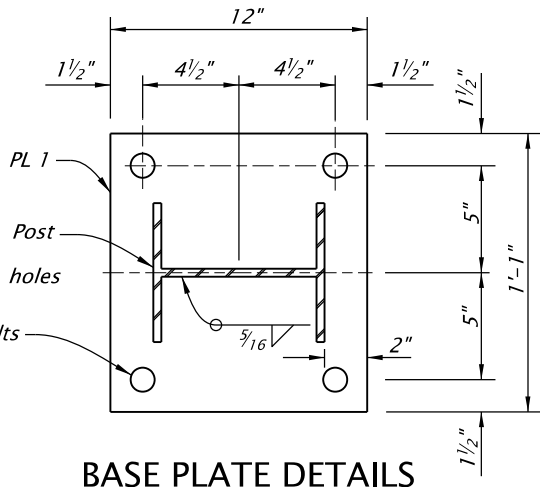
ELEVATION

NOTE
*If curb height is less than 8", use 1'-9¹/₂" for this dimension.



SECTION 'A-A'

SECTION 'B-B'



BASE PLATE DETAILS

GENERAL NOTES

Provide non-epoxy grout for the 2" nominal grout pads as noted in Section 02080.

Provide structural steel conforming to AASHTO Specification M183 (ASTM A36).

Provide all H.S. bolts conforming to AASHTO M164 (ASTM A325).

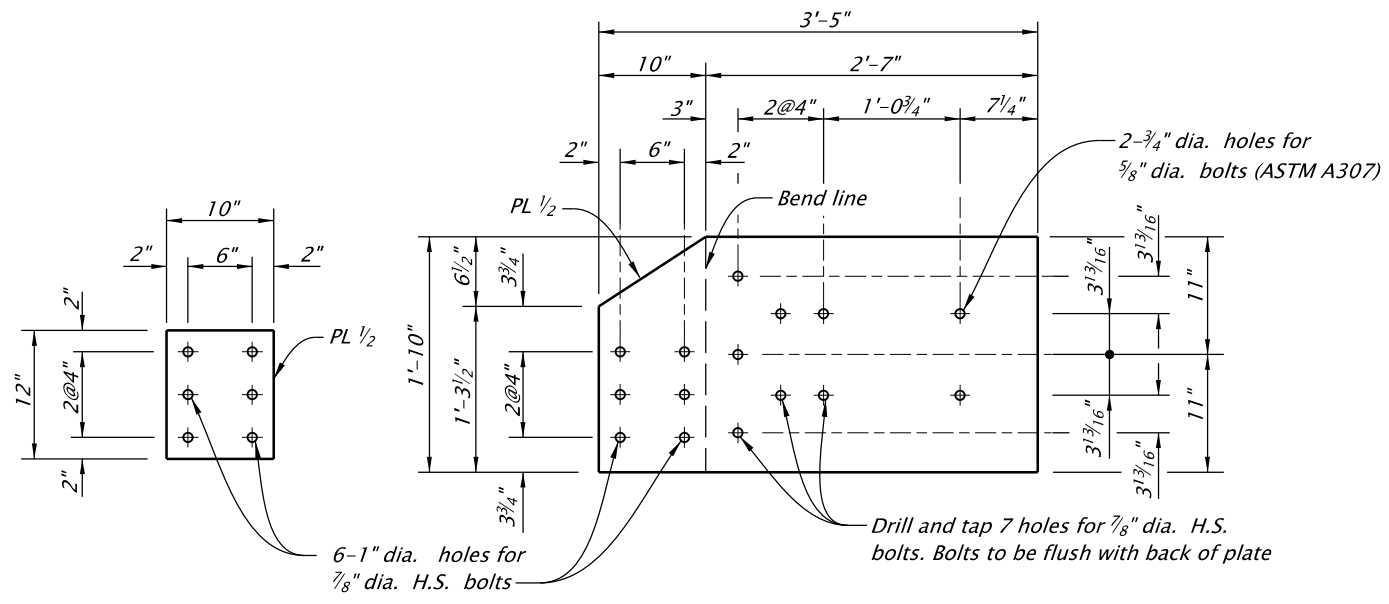
Provide and install High Strength resin bonded anchors (Grade 105) according to ODOT Specification 00535.

Hot-dip galvanize all anchor rods, washers, and nuts after fabrication.

Hot-dip galvanize all connection plate bolts, plates, and washers after fabrication of plates.

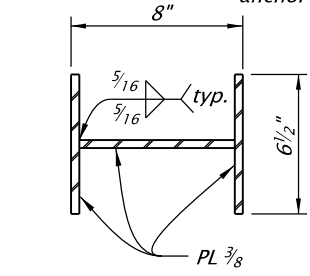
Field verify before fabrication.

***Transition top of rail height to match 31" approach rail.

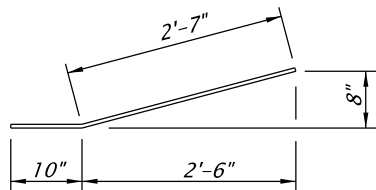


BACK PLATE

DEVELOPED VIEW: CONNECTION PLATE



ALTERNATE POST



CONNECTION PLATE BEND DETAILS

Accompanied by dwgs. BR203, RD405, RD417

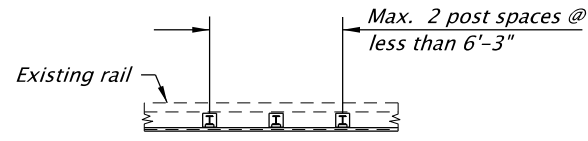
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.	
OREGON STANDARD DRAWINGS	
RAIL TRANSITION FROM FLEX BEAM RAIL TO CURB AND PARAPET RAIL	
2024	
DATE	REVISION DESCRIPTION
01-2022	Modified detail note text; removed (NOTE 3 and Section D-D) notation.
07-2024	General text revisions.
CALC. BOOK NO.	SDR DATE
N/A	12-JULY-2024
BR270	

01-JULY-2024

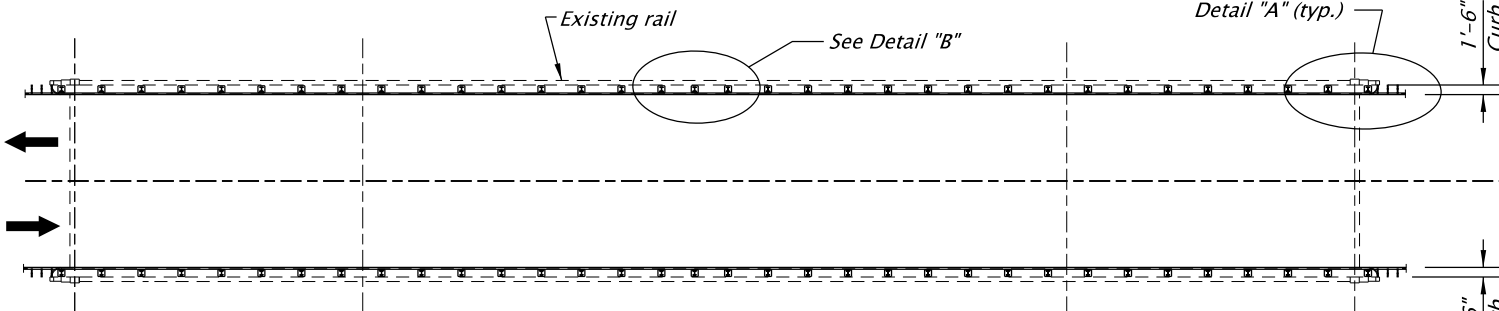
BR273.dgn

NOTE
 Maintain post spacing at 6'-3" full length of structure.
 A maximum of 2 non-standard post spaces may be used to adjust the rail installation to match structure length.



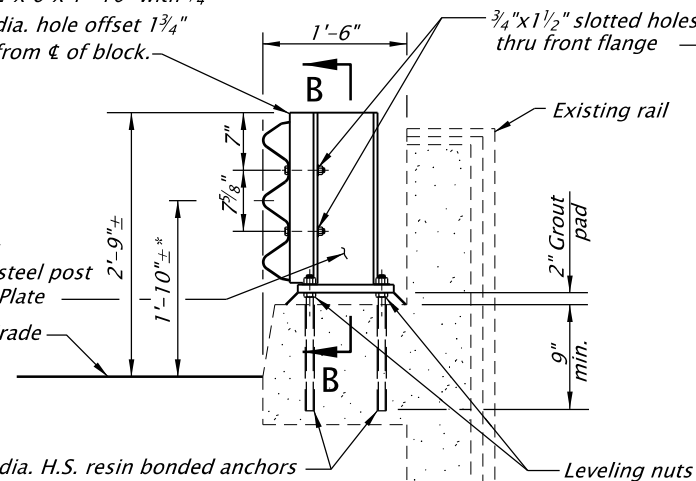
DETAIL "B"

Guardrail Transition at all corners. See Detail "A" (typ.)



Treated timber block (select structural grade)
 2"x 6"x 1'-10" with 3/4" dia. hole offset 1 3/4" from center of block.

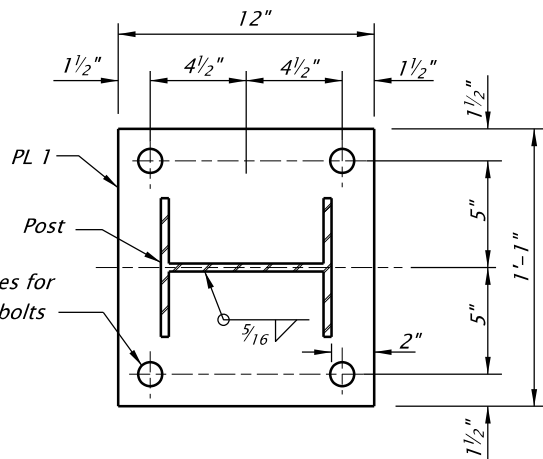
PLAN



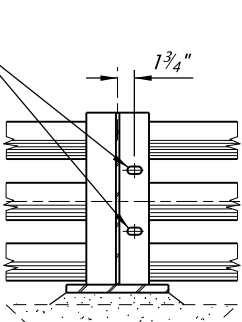
SECTION A-A

NOTE
 *If curb height is less than 8", use 1'-9 1/2" for this dimension.

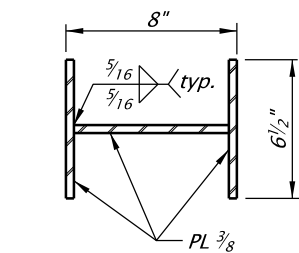
Note to Designer:
 1. Check Structural Capacity of the existing curb/deck for anchorage.
 2. Check Structural Capacity of the existing bridge deck overhang.



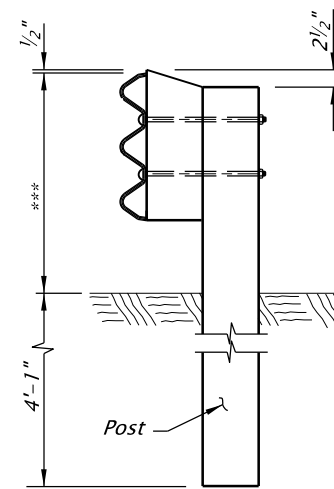
BASE PLATE DETAILS



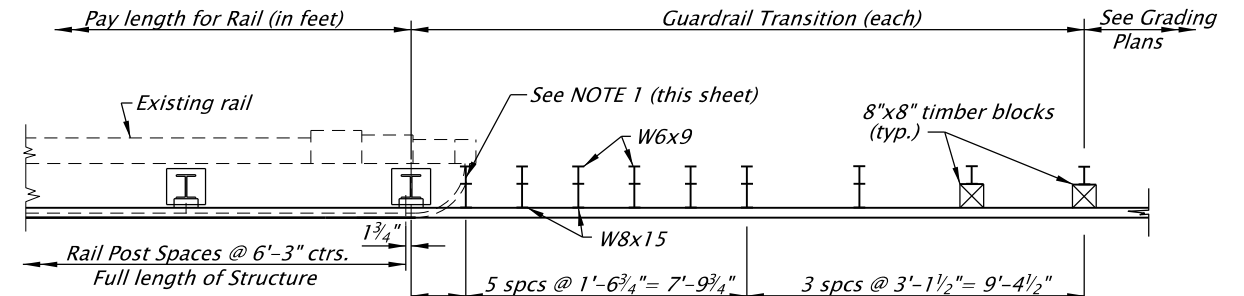
SECTION B-B



ALTERNATE POST



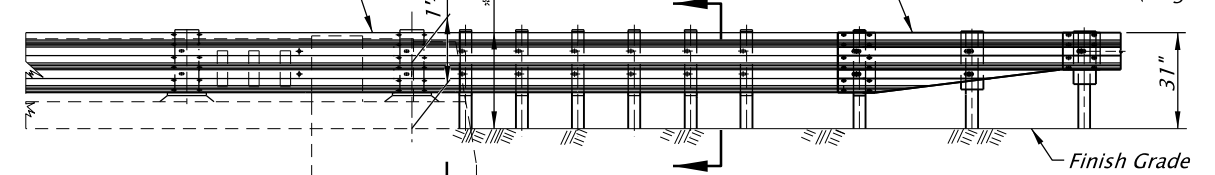
SECTION C-C



DETAIL "A"

** Maintain first post-spacing as shown. Consider alternative attachment details to the bridge rail's end. (i.e. partial curb and end block removal or addition of a new end block)

Thrie Beam rail, double thickness, 2-0.105" thick elements (dwg. RD417)



NOTE 1
 Transition posts may be steel W6x9 or timber 8"x 8". All posts to be of same material.

***Transition top of rail height to match 31" approach rail.

ELEVATION

GENERAL NOTES

Provide non-epoxy grout for the 2" nominal grout pads in Section 02080.
 Provide and install High Strength resin bonded anchors (Grade 105) according to ODOT Specification 00535.
 Provide all structural steel conforming to AASHTO Specification M183 (ASTM A36).
 Hot-dip galvanize all posts, anchor rods, washers, and nuts be after fabrication.
 Field verify dimensions before fabrication.

Accompanied by dwgs. RD405, RD417

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

OREGON STANDARD DRAWINGS
THRIE-BEAM RAIL RETROFIT FOR CURB AND PARAPET RAIL CONNECTION DETAILS

2024

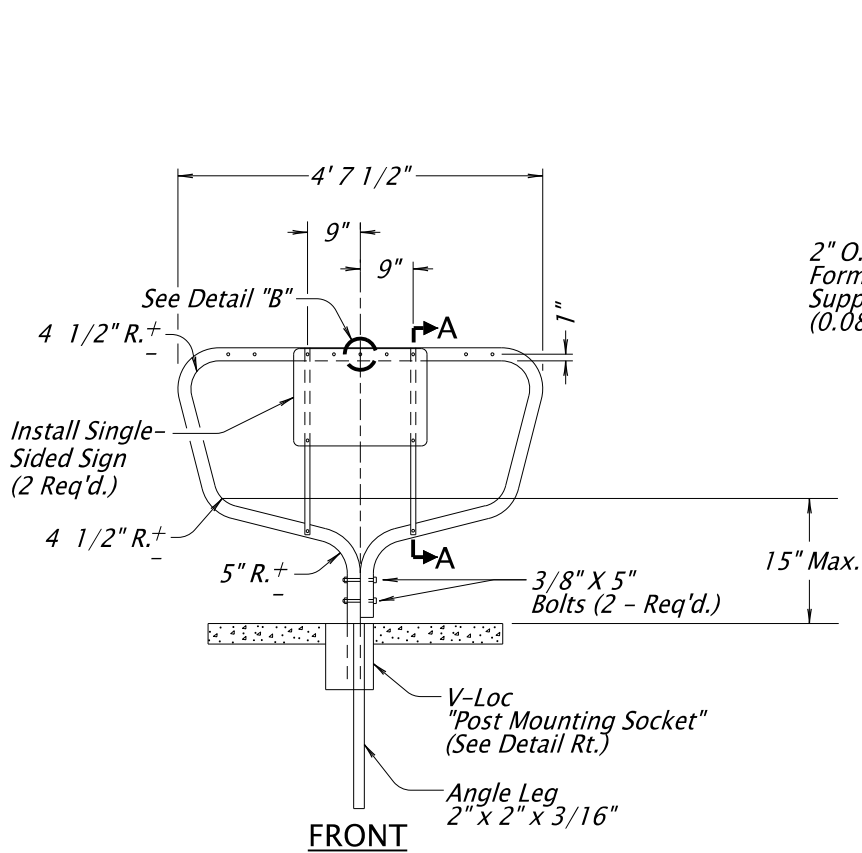
DATE	REVISION	DESCRIPTION
07-2024	General text revisions.	
CALC. BOOK NO.	N/A	SDR DATE: 20-APR-2018

BR273

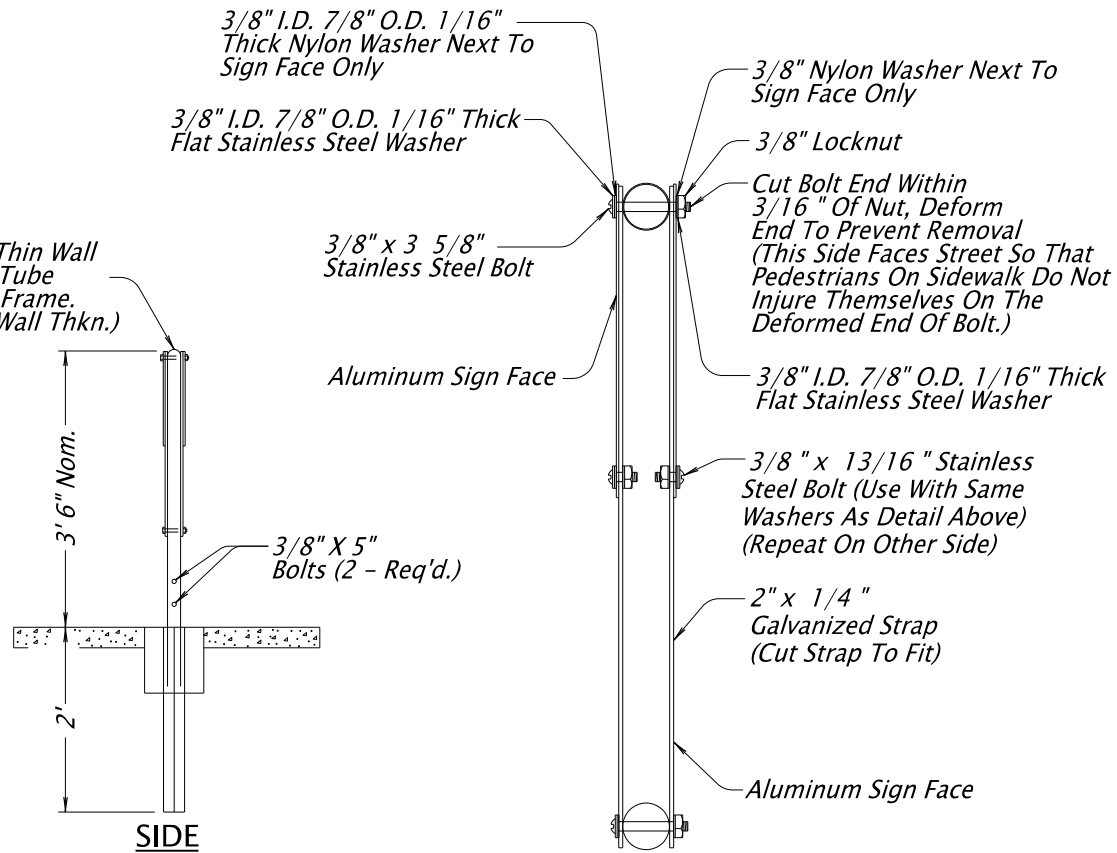
Effective Date: December 1, 2024 – May 31, 2025

9-JUL-2024

TM240.dgn



CROSSWALK CLOSURE SUPPORT DETAIL

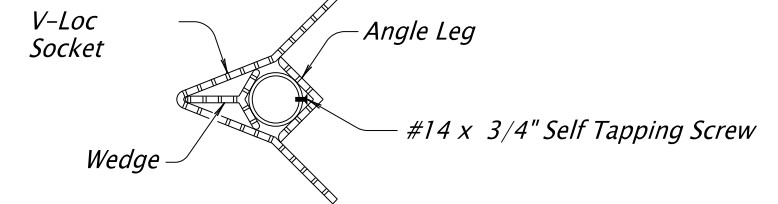


SECTION A-A



SIGN DETAIL
OR22-7
24" x 18"

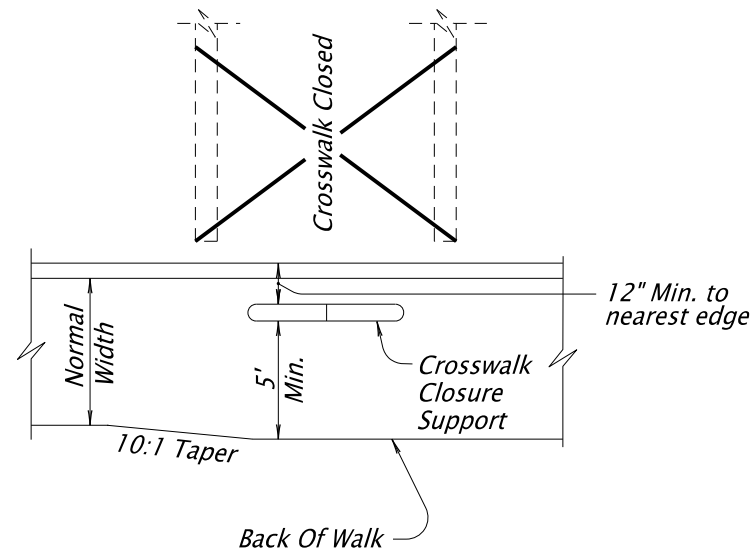
Drill 3/8" Dia. Bolt Hole At Each Corner Where Needed.



POST MOUNTING SOCKET

For Additional Details See Standard Drg. No. RD100

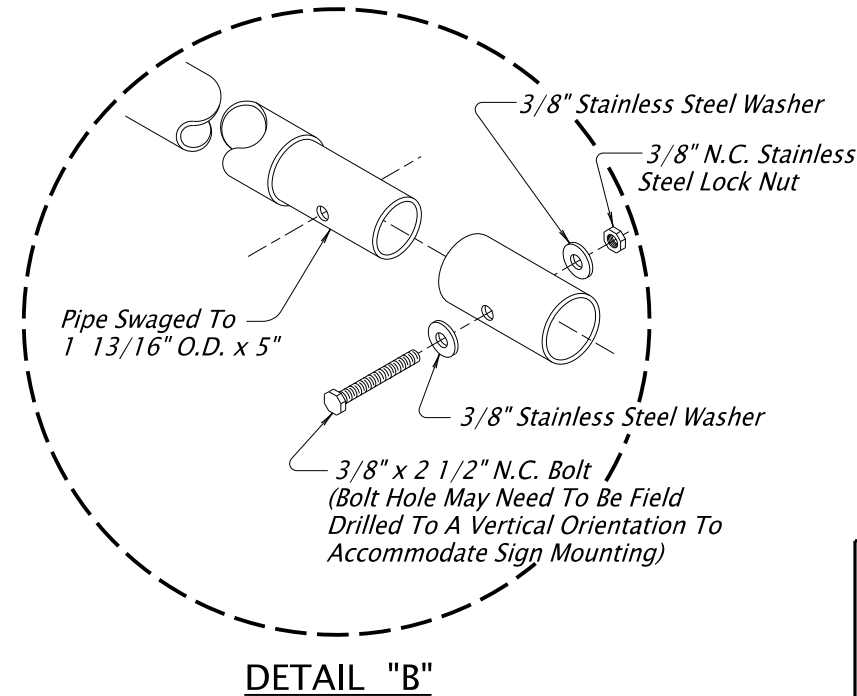
NOTE:
Care Shall Be Taken That No Concrete Is Placed Within Mounting Socket.



PLAN VIEW

Align support perpendicular to the closed unmarked crosswalk or as shown in plan.

See RD913, RD920 and RD932 for additional closure support placement details.



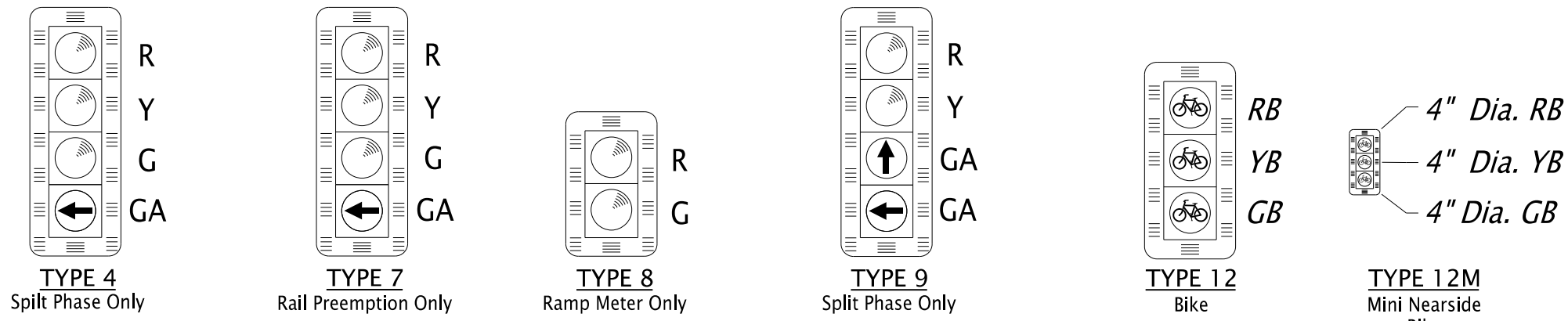
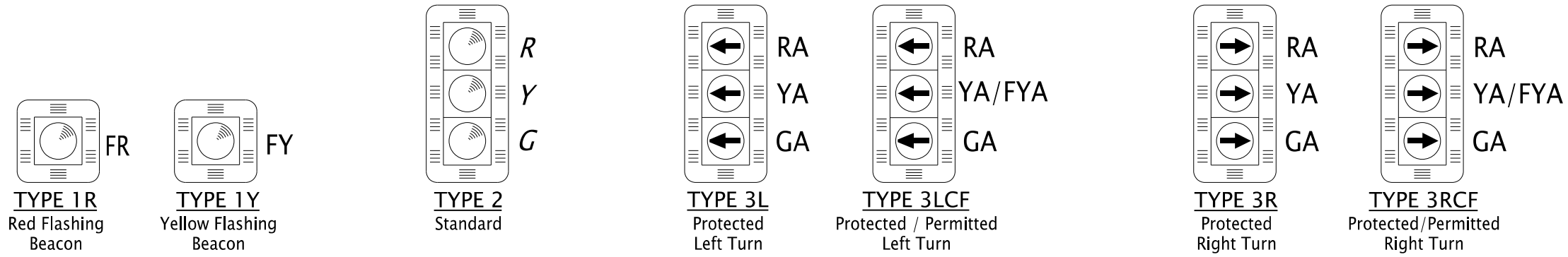
DETAIL "B"

GENERAL NOTES:

1. All Holes In The Tube Support Frame To Be Predrilled By The Manufacturer. (1/32" Larger Than Mounting Bolt)
2. Pipe Swaged By The Manufacturer.

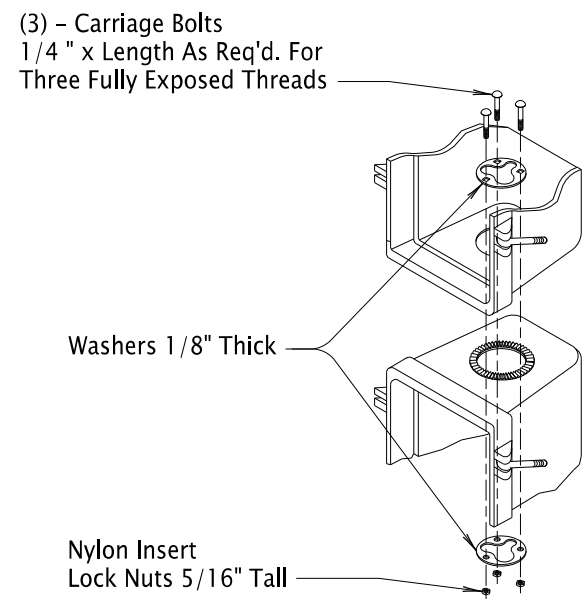
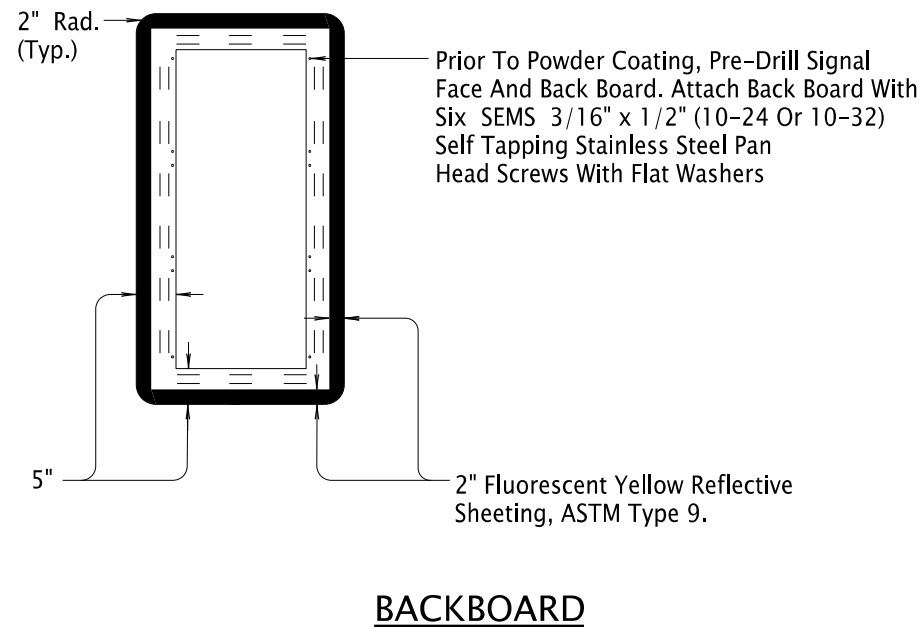
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

All materials shall be in accordance with the current Oregon Standard Specifications.			
OREGON STANDARD DRAWINGS			
CROSSWALK CLOSURE DETAIL			
2024			
DATE	REVISION	DESCRIPTION	
07/2024		Amended Plan View and Crosswalk Closure Support Detail	
CALC. BOOK NO.	N/A	SDR DATE	9-JUL-2024
			TM240



Color Indications	
All Indications Are 12" Diameter Unless Otherwise Shown	
R	Red Circular Ball
Y	Yellow Circular Ball
G	Green Circular Ball
RA	Red Arrow
YA	Yellow Arrow
GA	Green Arrow
FYA	Flashing Yellow Arrow
FR	Flashing Red Circular Ball
FY	Flashing Yellow Circular Ball
RB	Red Bike Symbol
YB	Yellow Bike Symbol
GB	Green Bike Symbol

VEHICLE SIGNAL HEAD DESIGNATIONS AND LENS ARRANGEMENT

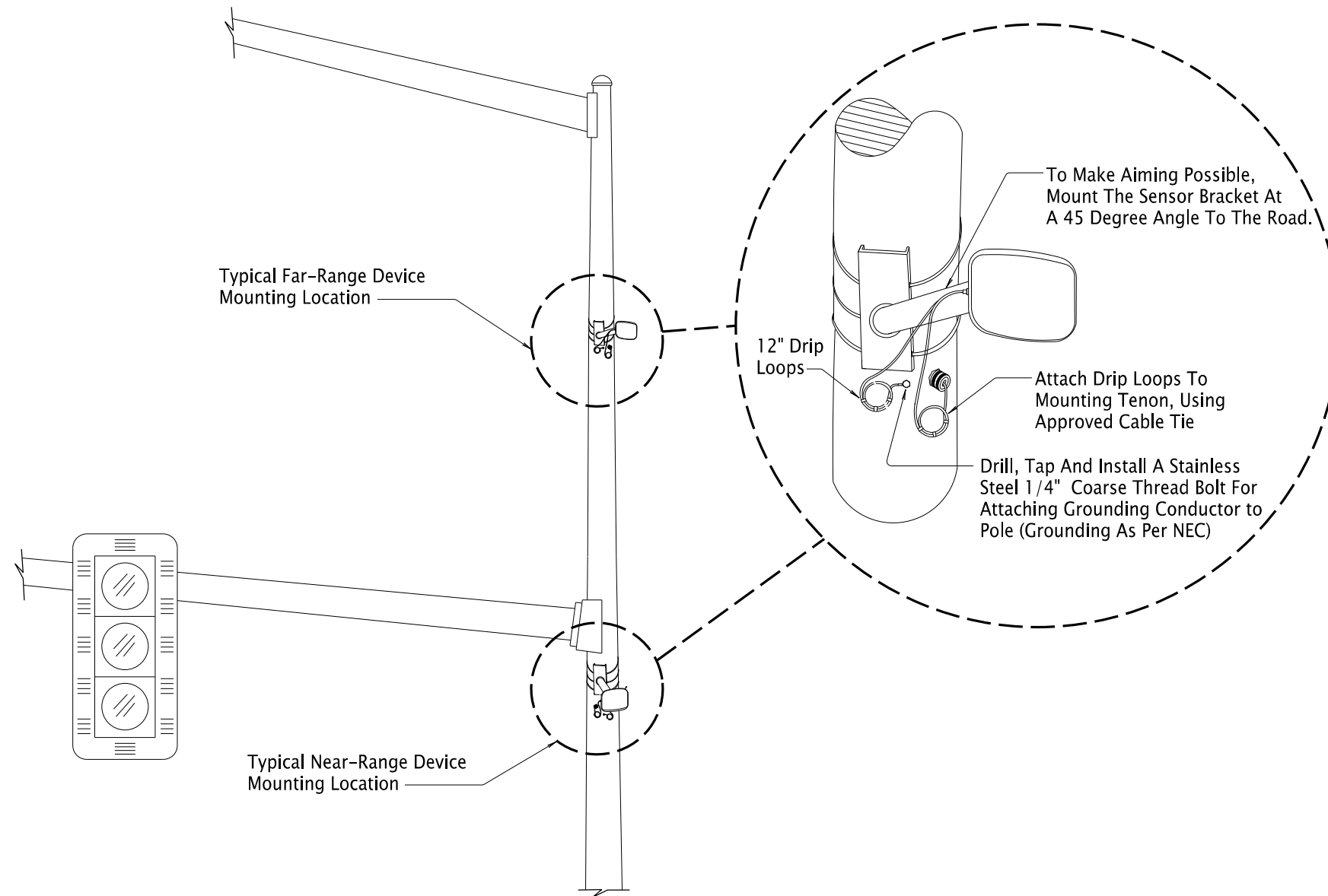


General Notes:

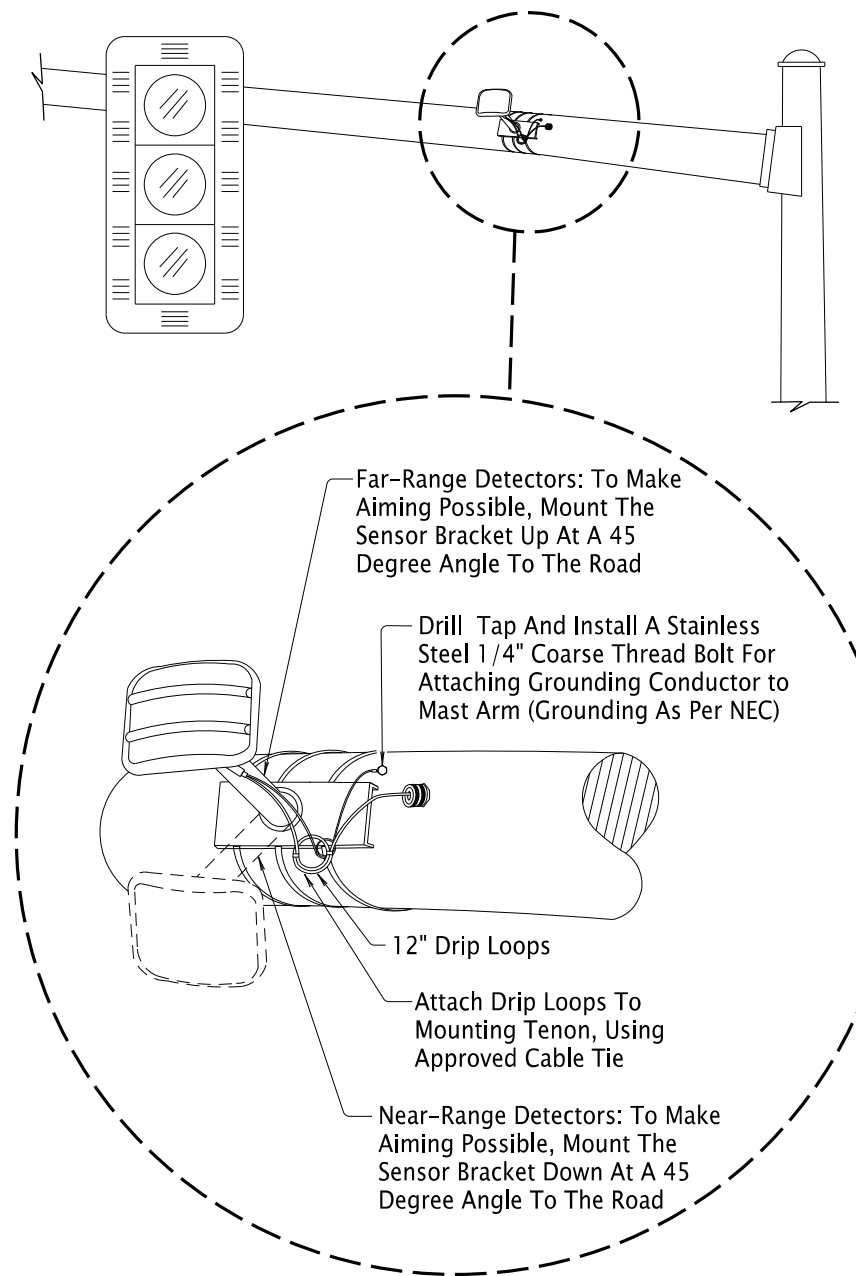
1. All Screws, Bolts, Nuts And Washers Shall Be Type 304 Or 316 Stainless Steel Unless Noted Otherwise.
2. Bolts And Screws Shall Have Square Or Hex Heads Unless Otherwise Noted. Allen Head Fasteners Not Allowed.
3. Assemble The Heavy Duty Polycarbonate Vehicle Signal, Visor, And Backboard With Bolted Connections, Stainless Steel Reinforcing Strips And Stainless Steel Plates.
4. Apply Anti-Seize Compound On All Hardware.

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All materials shall be in accordance with the current Oregon Standard Specifications.			
OREGON STANDARD DRAWINGS			
VEHICLE SIGNAL DETAILS			
2024			
DATE	REVISION	DESCRIPTION	
01-2024	ADDED TYPE 12 AND 12M.	REMOVED TYPE 3LBF, 5, 6L, AND 10.	
07-2024	ADDED GENERAL NOTE 4		
CALC. BOOK NO.	N/A	SDR DATE	12-JUL-2024
			TM460



VERTICAL SIGNAL POLE MOUNT

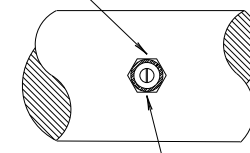


HORIZONTAL MAST ARM MOUNT

GENERAL NOTES:

1. All Bolts, Nuts And Washers Shall Be 304, Or 316 Stainless Steel Unless Noted Otherwise.
2. Mount Radar Detector Assembly As Per Manufacturers Recommendations.

Drill, Tap And Install A Galvanized Metallic Watertight Compression Entrance Fitting For Wiring Entrance From Radar Detector Into Mast Arm Or Pole



Repair Galvanizing According To ASTM A 780

CABLE GRIP

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.

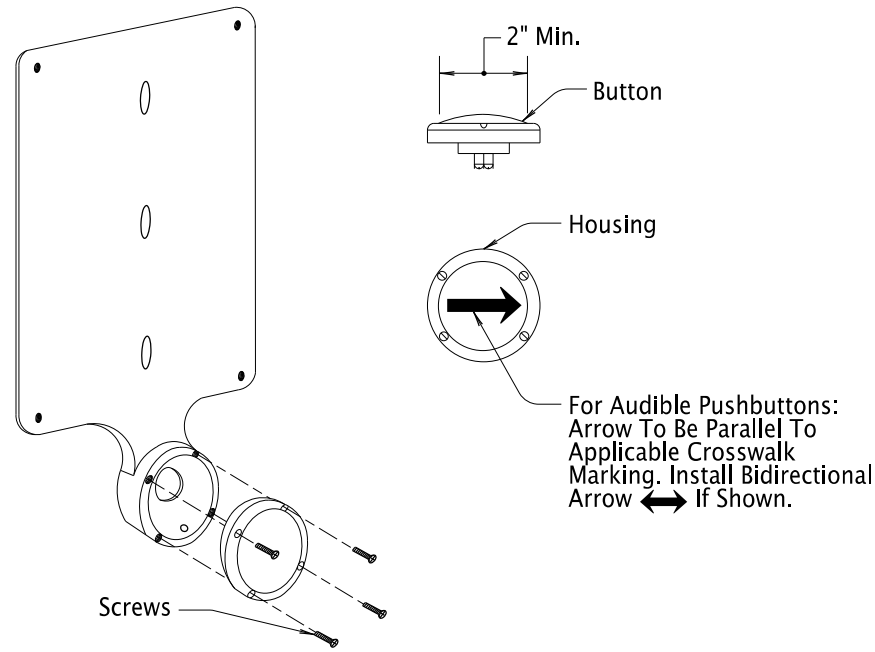
OREGON STANDARD DRAWINGS

RADAR MOUNTING DETAILS

2024

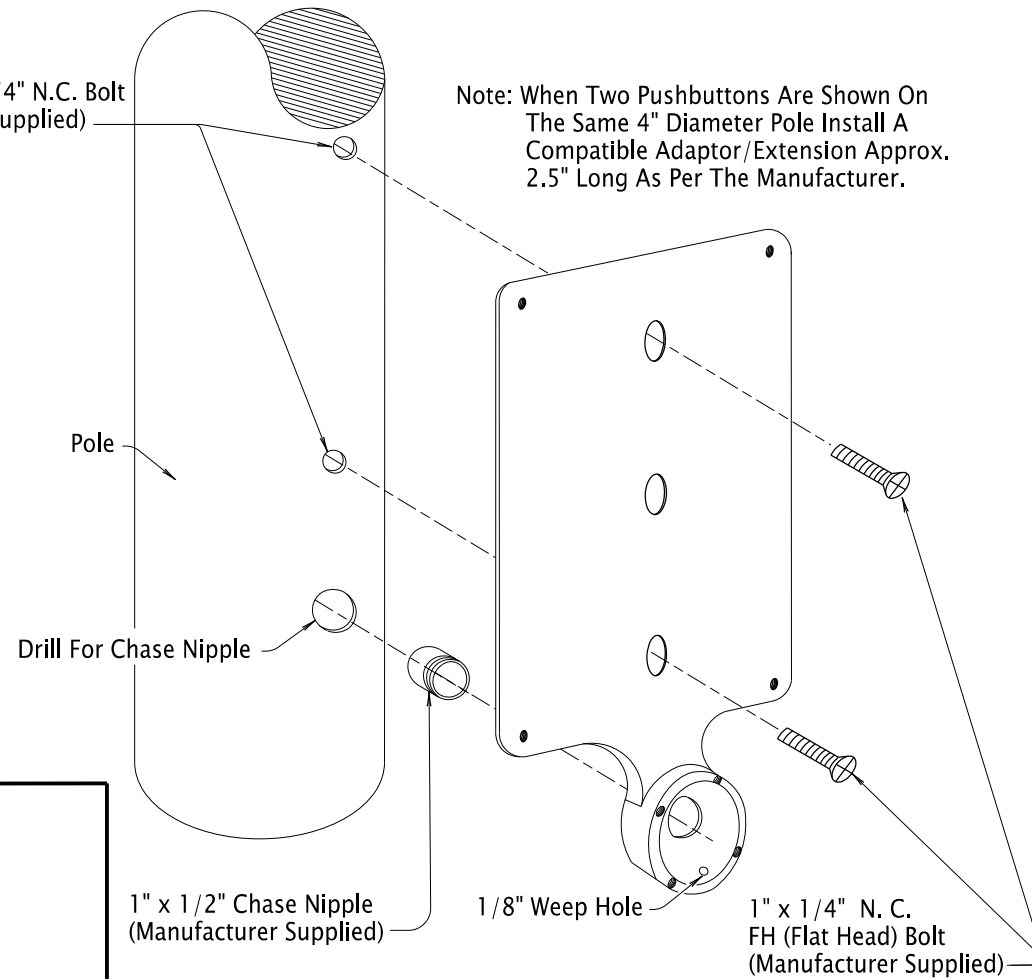
DATE	REVISION	DESCRIPTION
01-2023	ADDED NEAR RANGE DETECTOR INFORMATION	
07-2024	REVISED NAME OF EQUIPMENT PART FOR CONSISTENCY	

CALC. BOOK NO.	N/A	SDR DATE- 12-JUL-2024	TM466
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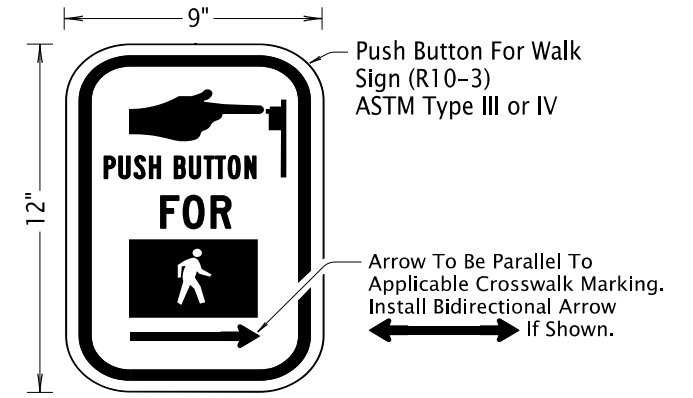


STANDARD PUSHBUTTON

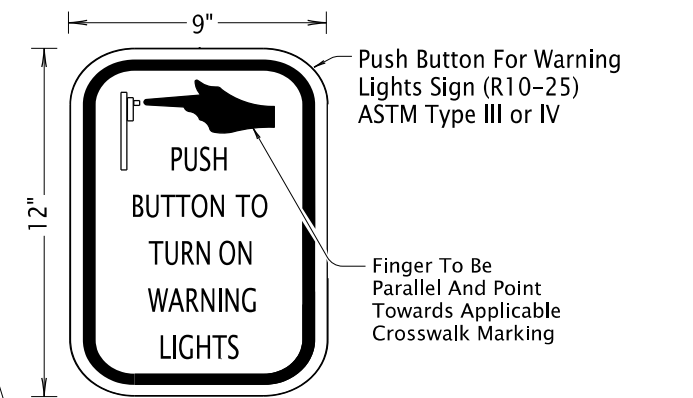
Drill, Tap For 1/4" N.C. Bolt (Manufacturer Supplied)



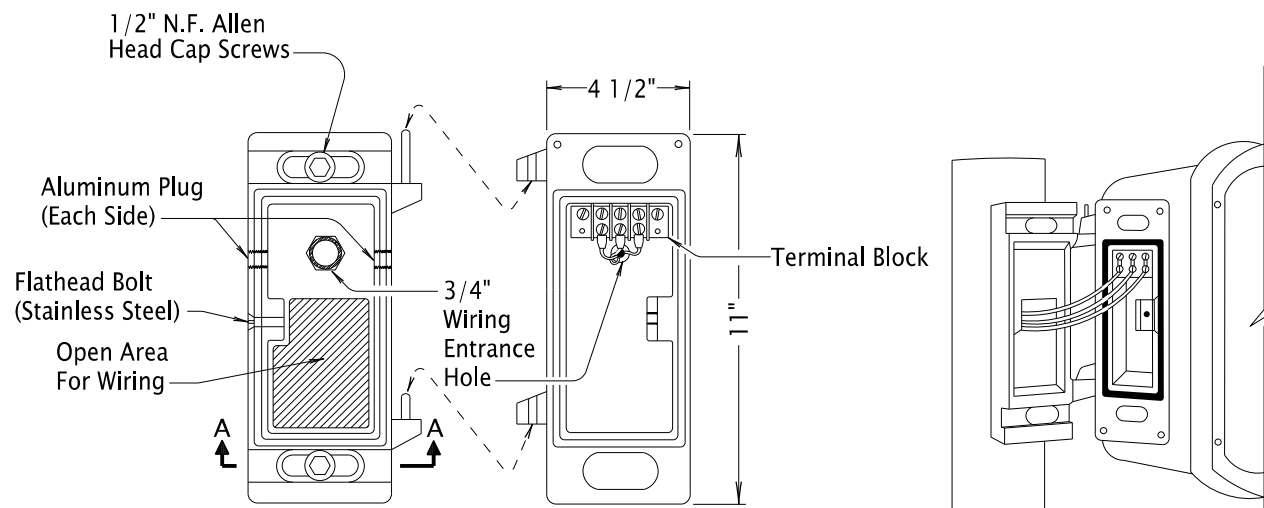
STANDARD PUSHBUTTON STATION AND INSTRUCTION SIGN



SIGN FOR PEDESTRIAN SIGNALS

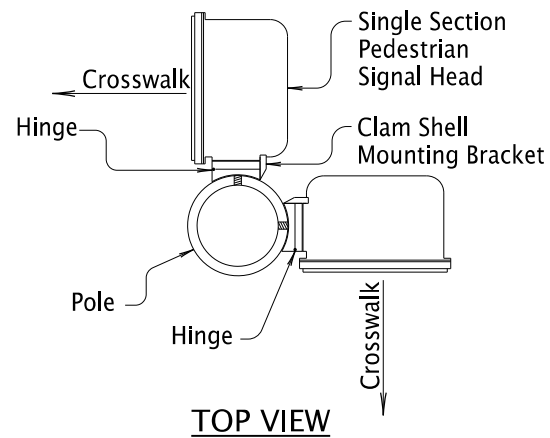


SIGN FOR WARNING BEACON ASSEMBLY

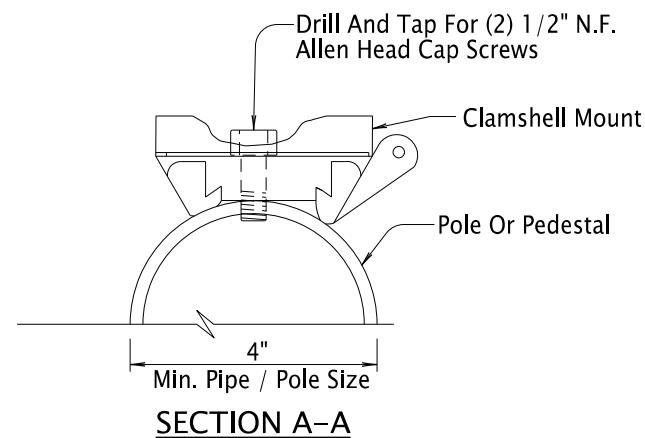


PEDESTRIAN SIGNAL MOUNT (CLAM SHELL)

- NOTES:**
- Where Two Heads Are Side Mounted On 4" Conduit, Proper Clearance To Be Maintained To Allow Legend To Be Fully Visible.
 - Clam Shells To Be Orientated So That The Heads Can Be Opened For Maintenance. (Verify Hinge Placement Of Clamshell).



TOP VIEW



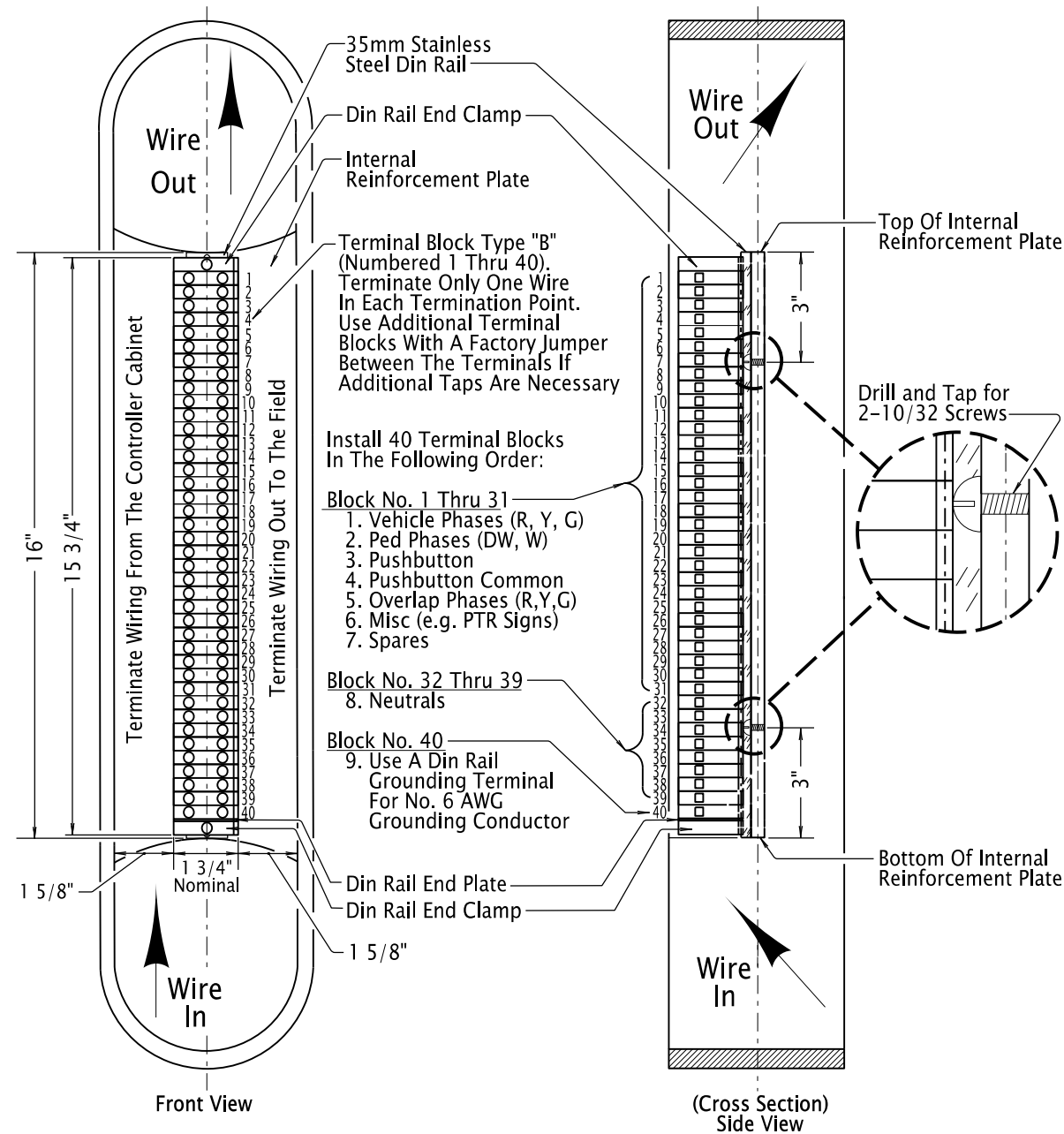
CLAM SHELL ORIENTATION

General Notes:

- All Screws, Bolts, Nuts And Washers To Be Type 304 Or 316 Stainless Steel Unless Noted Otherwise.
- Bolts And Screws To Have Square Or Hex Heads. Allen Head Fasteners Not Allowed.
- Drill And Tap Pole As Per Orientation Shown On Plans.
- Horizontal Reach To The Pushbutton To Be 10 Inches Maximum. See Plans Or Consult Engineer To Ensure Compliance.

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.

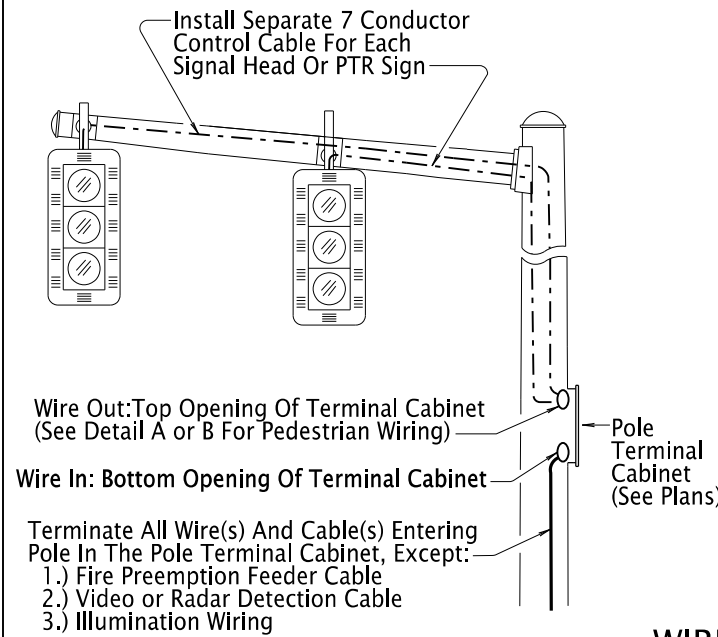
All materials shall be in accordance with the current Oregon Standard Specifications.			
OREGON STANDARD DRAWINGS PEDESTRIAN SIGNAL MOUNT AND PEDESTRIAN PUSHBUTTON DETAILS 2024			
DATE	REVISION	DESCRIPTION	
07-2022	1	ADDED R10-25 SIGN. ADDED EXTENSION MOUNTING NOTE FOR 2 PUSHBUTTONS ON SAME 4" DIA. POLE.	
07-2024	2	ADDED ARROW TO PUSHBUTTON. ADDED BI-DIRECTIONAL ARROW.	
CALC. BOOK NO.	N/A	SDR DATE	12-JUL-2024
			TM467



DIN RAIL, TERMINAL BLOCKS, & WIRING IN POLE RECESSED TERMINAL CABINET

7 Conductor Control Cable			Pedestrian Phases	Vehicle Phases	Signal Head Types			
Conductor Number	Base Color	First Tracer	1 Pedestrian Phase	1 Vehicle Phase	6L or 3LBF	4L, 5, or 7	1R, 1Y, 2, 3L, 3LCF, 3U, 3R, 4, 9, 12, or 12M	10
1	White	—	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
2	Black	—	Walk	Yellow	Yellow	Yellow	Yellow	Yellow
3	Red	—	Dont Walk	Red	Red	Red	Red	Red 1
4	Orange	—	P.B. Common	Spare	Flashing Yellow	Turn Yellow	Spare	Red 2
5	Green	—	Pushbutton	Green	Green	Green	Green	Spare
6	Blue	—	Spare	Spare	Spare	Turn Green	Spare	Spare
7	White	Black	Spare	Spare	Spare	Spare	Spare	Spare

COLOR CODE CHART CONTROL CABLE



Ped Phase	Function	Base Color	First Tracer	Second Tracer
2	Walk	Black	White	—
2	Dont Walk	Blue	Black	—
6	Walk	Black	—	—
6	Dont Walk	Blue	—	—
4	Walk	Tan	—	—
4	Dont Walk	Purple	—	—
8	Walk	Tan	Blue	—
8	Dont Walk	Purple	Blue	—
2	Pushbutton	Tan	White	—
6	Pushbutton	Purple	White	—
4	Pushbutton	Brown	—	—
8	Pushbutton	Brown	Blue	—
All	Pushbutton Common	Brown	White	—
All	Signal Head Neutral	White	—	—

For Odd Pedestrian Phases 1, 3, 5, & 7 Use The Following:

Ph. 1 Ped	Ph. 2 Ped	Color Code With The Addition Of A Yellow Second Tracer
Ph. 3 Ped	Ph. 4 Ped	
Ph. 5 Ped	Ph. 6 Ped	
Ph. 7 Ped	Ph. 8 Ped	

Color Code Chart Pedestrian Single Conductors (See Detail B)

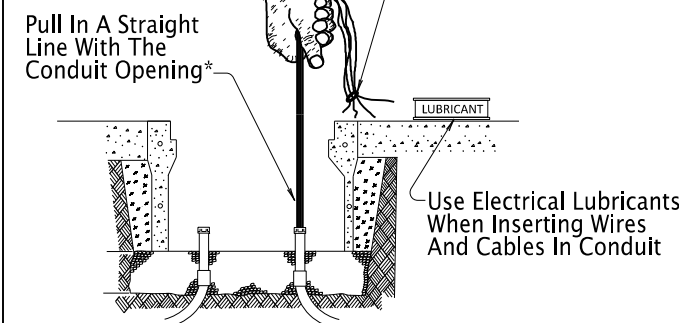
WIRE & CABLE IN POLES

General Notes:

1. Install All Wire And Cable Between Terminal Blocks Without Splicing.
2. Mark Phase Number Or Identification On All Cable In Junction Boxes, Terminal Cabinets, Service Cabinets, And Controller Cabinets With Permanent Tags. Use Handheld Labeler (Brady M210 Label Maker With Vinyl B-595 Tape). Overlaps Shall Be Labeled (OLA,OLB,OLC,OLD).
3. Mark Phase Number & Function Or Identification On All Wires Terminated In Controller Cabinet And Terminal Cabinet With Permanent Tags. Use Handheld Labeler (Brady M210 Label Maker With Vinyl B-595 Tape). Overlaps Shall Be Labeled (OLA,OLB,OLC,OLD).
4. Install No. 16 AWG TFFN Orange Base With Blue Tracertone Wire In All Conduits As A Locate Wire. Leave Slack As Required In General Note 5 And Install A Wire Nut. Do Not Join Multiple Locate Wires Under A Common Wire Nut Unless Otherwise Shown.
5. Tape The Ends Of Unsued Conductors With Insulated Vinyl Plastic Tape.
6. Leave Slack In Each Wire And Cable As Follows:
 - A.) 2 Feet In Junction Boxes And Poles
 - B.) 6 Feet In The First Junction Box Nearest The Controller Cabinet
 - C.) 6 Feet In Controller Cabinet And Service Cabinet
7. Install Polyethylene Pull Line In All Conduits Noted On The Plans For Future Use (No Wires/Cables In Conduit). Leave 6 Feet Of Slack Pull Line.
8. At Existing Installations Re-wire And Re-label New And Existing Control Cables And Wires, In All Junction Boxes, Terminal Cabinets, Service Cabinets, And Controller Cabinets.

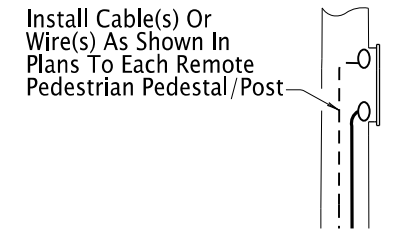
Pull All Wires And Cables By Hand Only

Temporarily Bundling Cables Or Wire (Tapes, Straps, Ties, Or Other Binding Material) Allowed Only At The Terminating End Points For Pulling Only

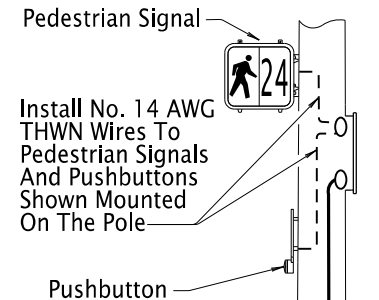


* Use A Pulley Device To Achieve A Straight Line If Pulls Are Made With Poles Or Controller Cabinets In Place

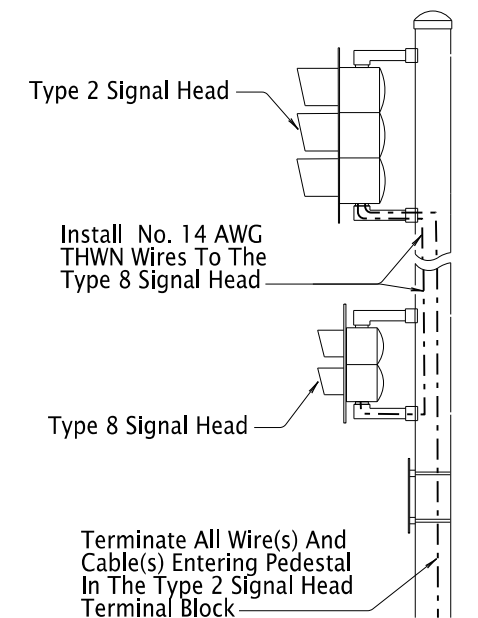
WIRE & CABLE IN CONDUITS



Detail A



Detail B



WIRE & CABLE IN RAMP METER PEDESTALS

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

OREGON STANDARD DRAWINGS

WIRE & CABLE INSTALLATION

2024

DATE	REVISION	DESCRIPTION
01-2024		REVISED SIGNAL HEAD TYPES IN COLOR CODE CHART CONTROL CABLE DETAIL
07-2024		ADDED GEN. NOTE 3, ADDED PED COLOR CODE, ADDED FACTORY JUMPERS

CALC. BOOK NO. ---	N/A ---	SDR DATE: 12-JUL-2024	TM470
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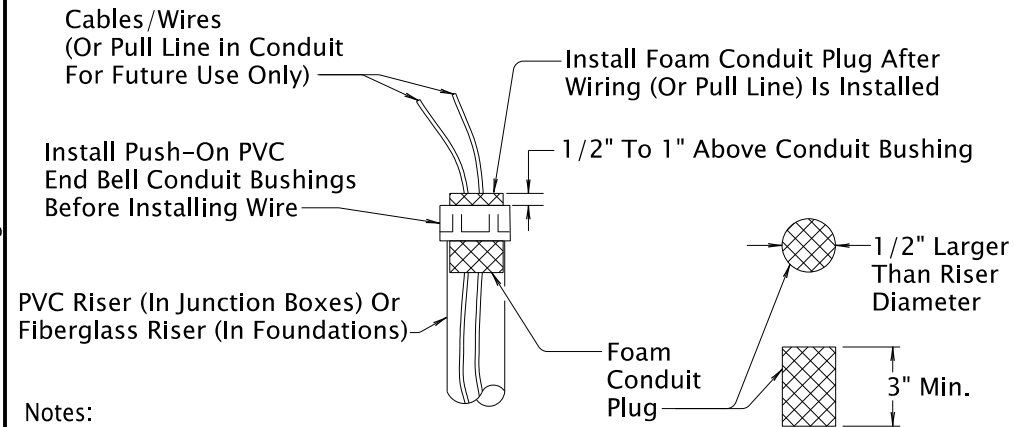
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without first consulting a Registered Professional Engineer.

12-JUL-2024
TM471.dgn

Type Of Conduit	Minimum Cover From Top of Finished Surface (Use Permit Depth If Greater Than These)	
	Roadway & Shoulders	Other Areas
Metallic	24"	18"
Non-Metallic	30"(See Note 2)	18"

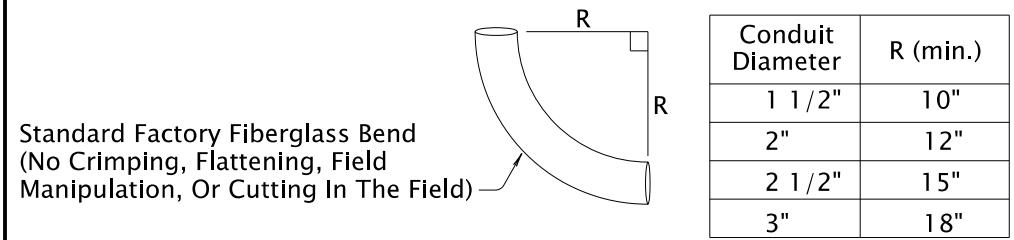
- Notes:
- Additional Cover Depth May Be Necessary Near Foundations And Junction Boxes To Accommodate The Minimum Radius ("R") Of The Conduit Elbow. See "Conduit Elbow", "Conduit Installation In Foundations" And "Conduit Installation In Junction Boxes" Details For More Information.
 - For Non-Metallic Conduit Under Roadway & Shoulders Installed Horizontally Into Fiber Optic Hand Hole As Per TM472, The Minimum Cover Depth Is 24 Inches.

MINIMUM COVER FROM FINISHED SURFACE

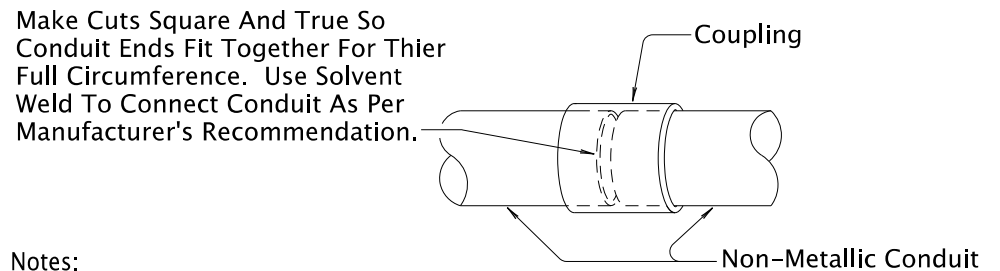


- Notes:
- Ream Conduit Ends To Remove Rough Edges And Burrs
 - Temporarily Plug Or Cap Conduit Ends At All Times To Keep Debris Out

CONDUIT ENDS AND BUSHINGS

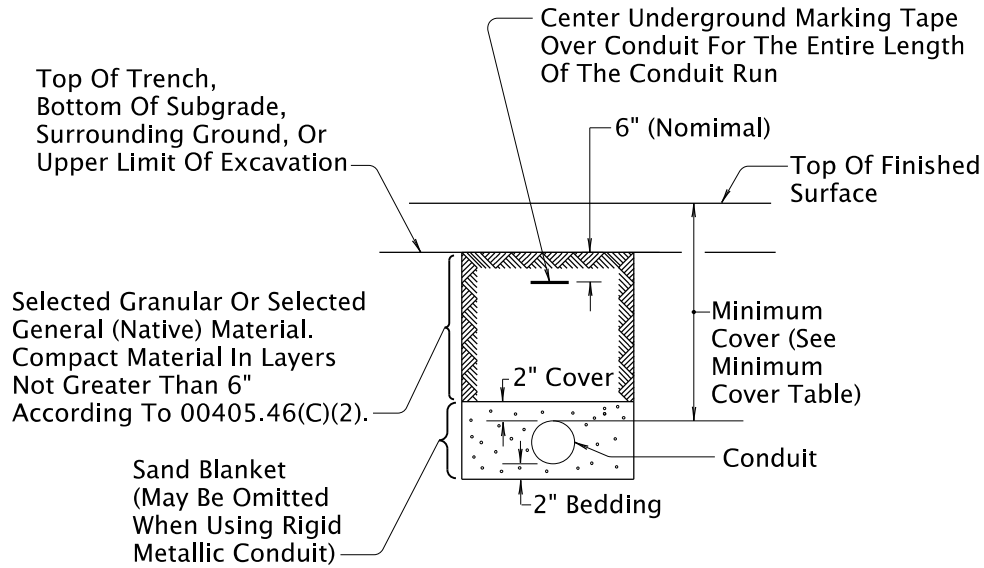


CONDUIT ELBOWS

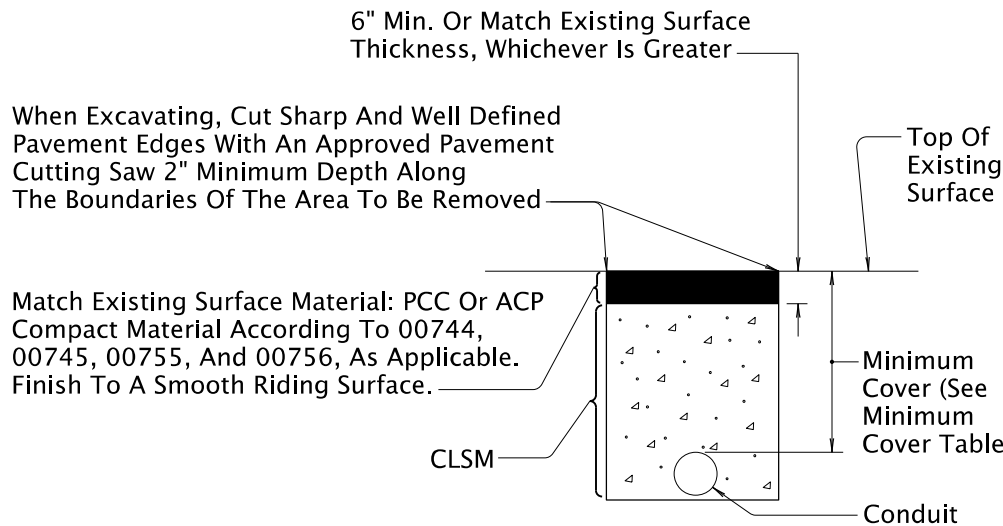


- Notes:
- Slip Joints, Running Threads Or Reducing Couplings Not Allowed. Use The Same Size Conduit For The Entire Length, Outlet To Outlet.

CONDUIT COUPLINGS



UNSURFACED AREAS
(new roadway prior to paving, shoulders, under sidewalk, landscaped areas, etc.)

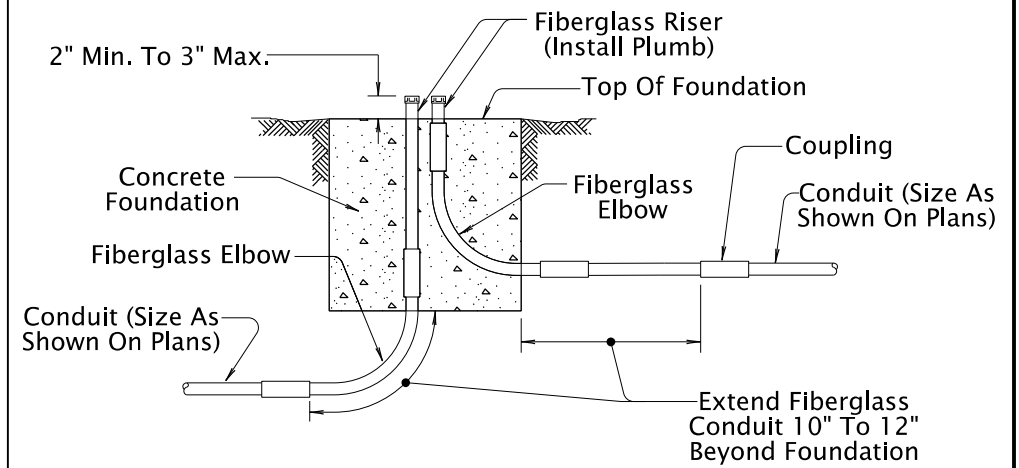


EXISTING PAVED AREAS

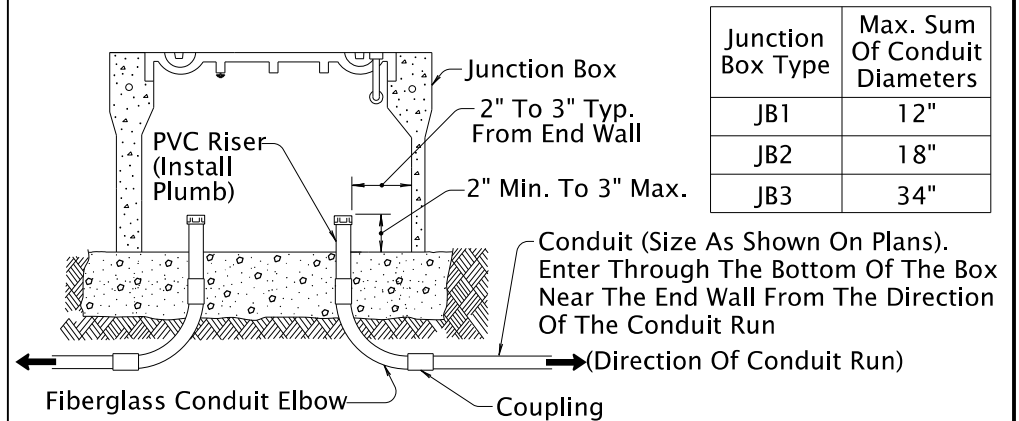
Trenching & Backfill Notes:

- Excavate According To 00960.40. In Areas To Be Paved Or Landscaped, Place All Conduit Before Paving Or Landscaping.
- Hold Trench Width To A Practical Minimum
- Do Not Backfill Trenches Until Inspected By The Engineer
- Furnish Backfill Materials According To 00960.10

CONDUIT OPEN TRENCH EXCAVATION & BACKFILL



CONDUIT INSTALLATIONS IN FOUNDATIONS
(Applicable for Pole, Pedestal, Post, Service Cabinet and Controller Cabinet Foundations)



Junction Box Type	Max. Sum Of Conduit Diameters
JB1	12"
JB2	18"
JB3	34"

CONDUIT INSTALLATION IN JUNCTION BOXES

General Notes:

- Install Non-Metallic Conduit Unless Otherwise Shown. Conduit Runs Shall Be Continuous Between Any Pole, Junction Box, Or Cabinet.
- Install Conduit By Open Trench Method, Horizontal Directional Drilling, Or As Shown
- Conduit Runs Shown On Plans Are For Bidding Purposes Only. Locations May Be Changed To Avoid Obstructions.
- Larger Conduit Than Specified May Be Used At The Option And Cost Of The Contractor If Max. Sum Of Conduit Diameters In Junction Box Is Not Exceeded.

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.

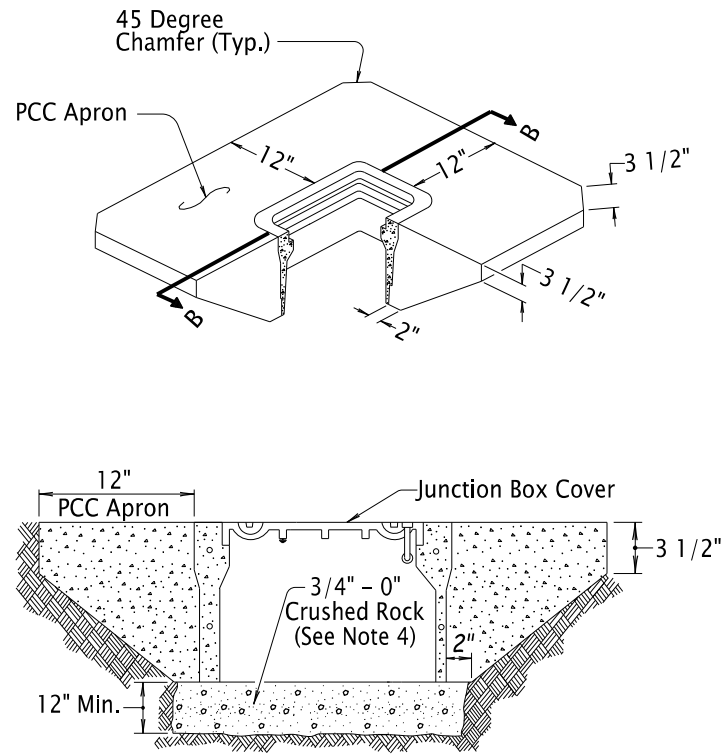
All materials shall be in accordance with the current Oregon Standard Specifications.

OREGON STANDARD DRAWINGS
TRENCHING & CONDUIT INSTALLATION

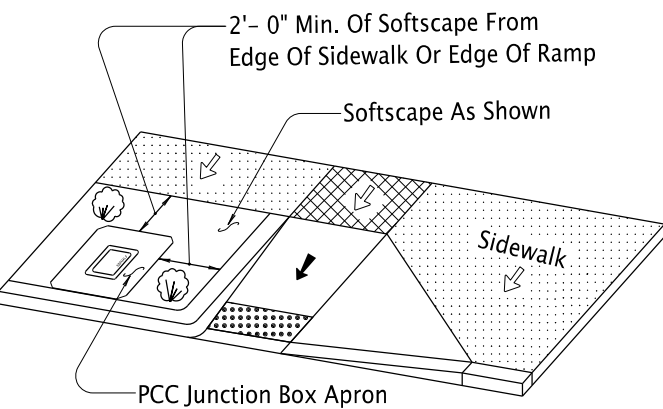
2024

DATE	REVISION	DESCRIPTION
01-2021	ADDED NOTE 1 TO "MINIMUM COVER FROM FINISHED SURFACE" DETAIL	
07-2024	ADDED NOTE 2 TO "MINIMUM COVER FROM FINISHED SURFACE" DETAIL	

CALC. BOOK NO. - - -	N/A - - -	SDR DATE- 12-JUL-2024	TM471
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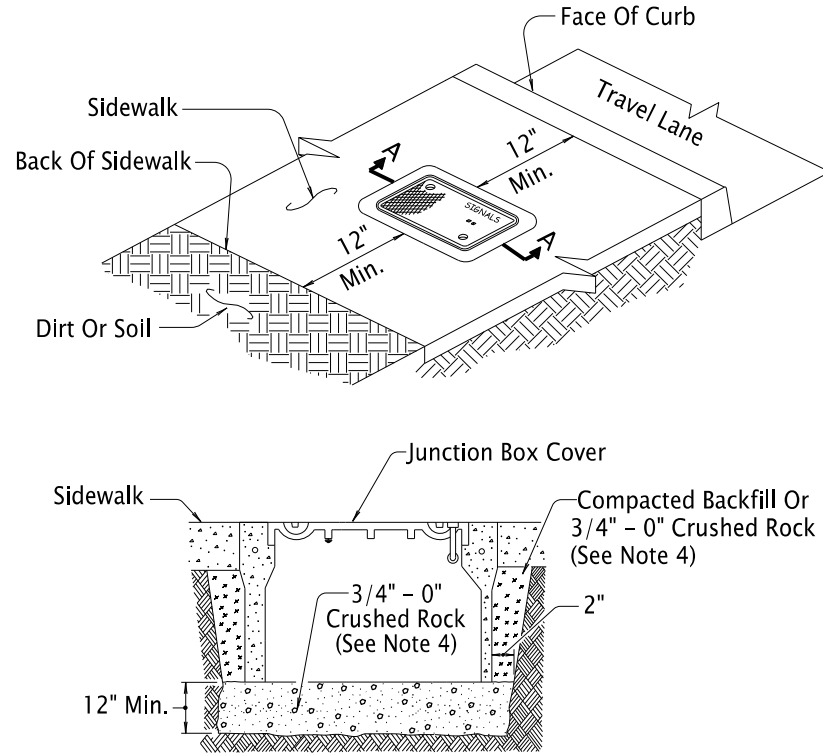


SECTION B-B



JUNCTION BOX INSTALLATION IN UNSURFACED AREA

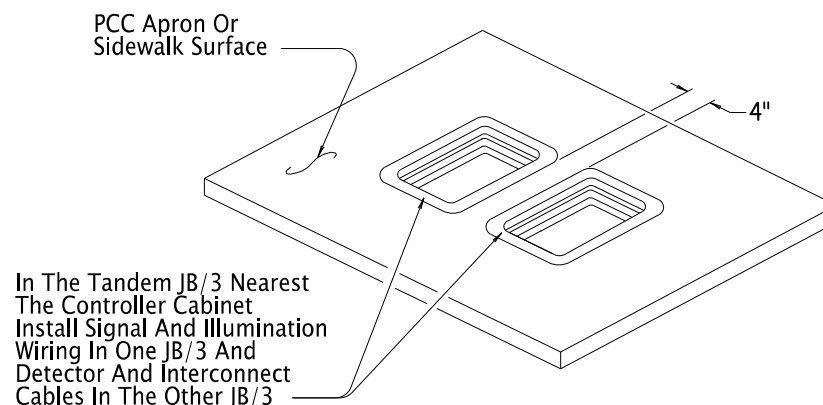
(This Detail Only Applicable for Junction Boxes Located In Incidental Travel Areas; Gravel Shoulders, Behind Guardrail, Etc. Do Not Install In Travel Lanes, Paved Shoulders, Or Other Areas Exposed To Traffic.)



SECTION A-A

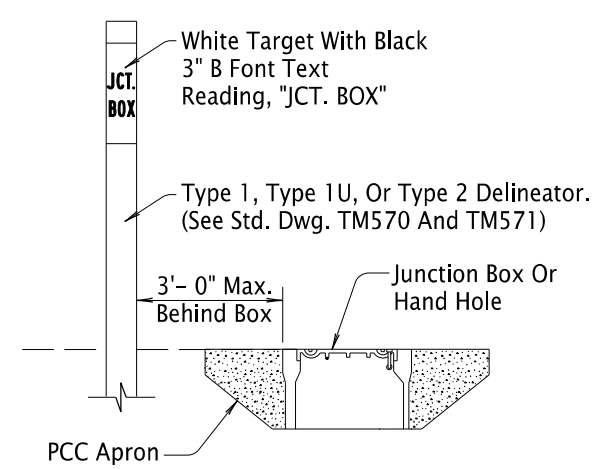
JUNCTION BOX INSTALLATION IN PCC SIDEWALK

(This Detail Only Applicable for Junction Boxes Located In Flat Areas Of Sidewalks. Do Not Install In Slopes Of Ramps Or Driveways)

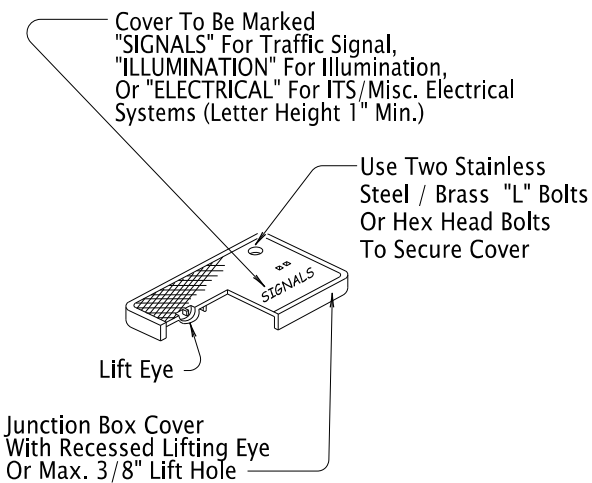


In The Tandem JB/3 Nearest The Controller Cabinet Install Signal And Illumination Wiring In One JB/3 And Detector And Interconnect Cables In The Other JB/3

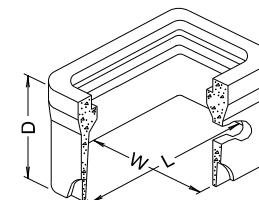
TANDEM JB/3A JUNCTION BOX DETAILS



DELINEATION OF JUNCTION BOX & HAND HOLE IN UNSURFACED AREA



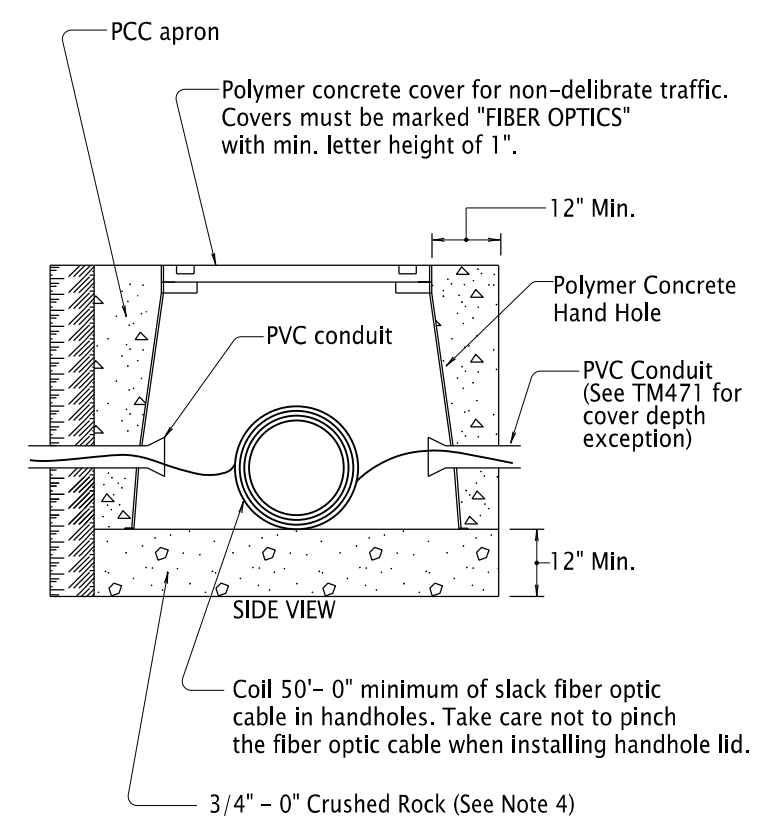
JUNCTION BOX COVER DETAILS



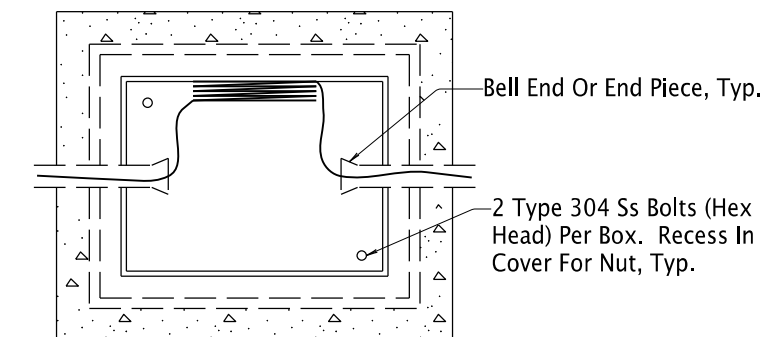
Type*	L	W	D
JB1	17"	10"	12"
JB2	22"	12"	12"
JB3	30"	17"	12"
HH-1	24"	30"	24"
HH-2	30"	48"	24"
HH-3	30"	48"	36"

*Junction Box Or Handhole Type As Shown On Plans

DIMENSION TABLE



SIDE VIEW



TOP VIEW

FIBER OPTIC CABLE HAND HOLE INSTALLATION

GENERAL NOTES:

1. Install Top of Junction Box And Hand Hole Flush With The Sidewalk, Surrounding Grade, Or Top Of Curb. For Hand Holes Installed In The Roadway Or Shoulder, Leave The Top Of The Hand Hole 1/2" Below The Pavement Surface.
2. Install Junction Boxes And Hand Holes At The Approximate Locations Shown, Or If Not Shown, No More Than 300 Feet Apart For Junction Boxes And No More Than 1000 Feet Apart For Hand Holes.
3. More Junction Boxes And Hand Holes Than Specified May Be Installed To Facilitate The Work At The Option And Cost Of The Contractor
4. Use Materials According To 00640.10 and 00640.16. Use Compaction Equipment Suitable For Area And Compact Each Six Inch Layer With Sufficient Coverages To Produce A Firm Unyielding Surface. Do Not Install Conductors Until Surface Has Been Constructed.

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

OREGON STANDARD DRAWINGS

JUNCTION BOXES/HAND HOLES

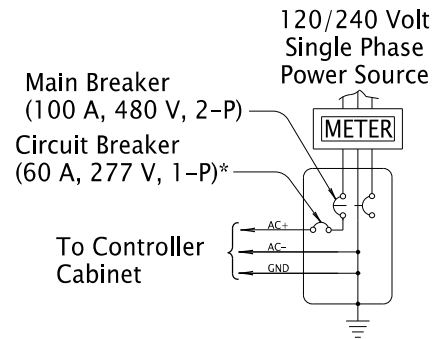
2024

DATE	REVISION	DESCRIPTION
07-2022	ADDED NEW MARKING (ILLUMINATION & ELECTRICAL) FOR JB COVER	
01-2024	CHANGED DIMENSION FOR JB DELINEATION	
07-2024	CHANGED SOFTSCAPE MIN. FROM 3' TO 2'. ADDED HAND HOLE CONDUIT NOTE	

CALC. BOOK NO.	N/A	SDR DATE	12-JUL-2024	TM472
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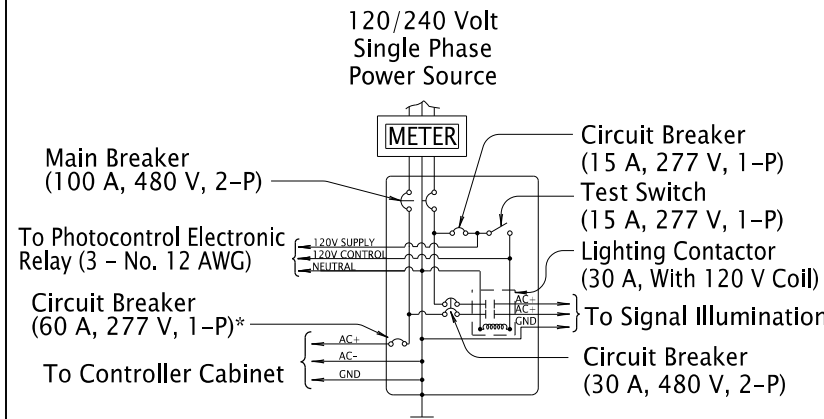
12-JUL-2024
TM485.dgn

* When installing the service cabinet for an RRFB use a 20 A, 277 V, 1-P circuit breaker

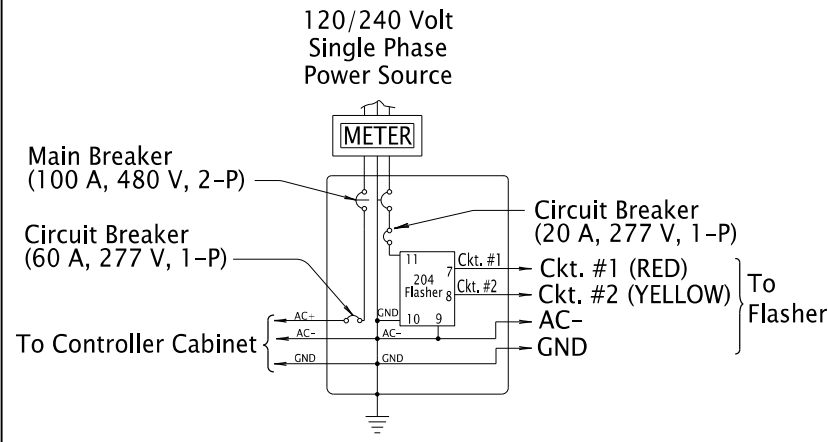


SERVICE CABINET WIRING: (BMC) (SC)
(Signal System)

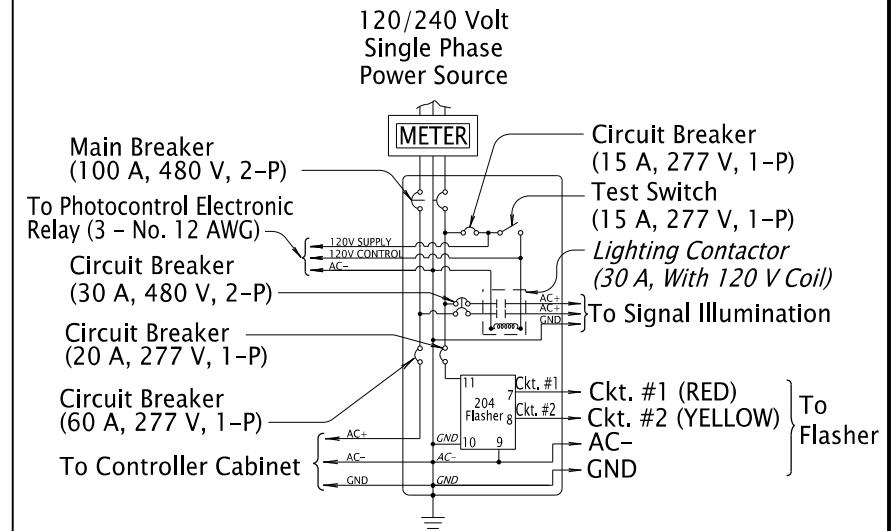
* When installing the service cabinet for an RRFB use a 20 A, 277 V, 1-P circuit breaker



SERVICE CABINET WIRING: (BMCL) (SCL)
(Signal + Illumination System)

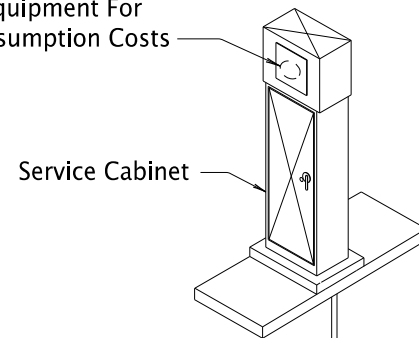


SERVICE CABINET WIRING: (BMCF)
(Signal + Flashing Beacon System)



SERVICE CABINET WIRING: (BMC FL)
(Signal + Flashing Beacon + Illumination System)

Utility Provider To Supply And Install Meter Or Required Equipment For Flat-Rate Power Consumption Costs



Install Utility Conduit As Per The Size, Material, Depth, And Mounting Requirements Of The Utility Provider. Utility Provider To Install Wiring.

To Commercial Power Source. Service Point Shown On Plans Is Approximate Only. Exact Location Shall Be Verified In The Field.

UTILITY PROVIDER DETAILS

General Notes:

1. Notify Utility Before Making Any Connections To Utility Poles.
2. Service Cabinet Shall Have A Solid Copper Neutral Bus And The Number And Size Of Switches Or Circuit Breakers As Shown. Service Cabinet Can Accommodate A Maximum Of 10 Circuit Breakers.
3. Wiring Connections To The Terminal Screws On The Circuit Breakers And Contactors Shall Make Full Contact Under The Screw Head.
4. Circuit Breakers Shall Be UL489 Listed, Unenclosed, Molded Case Bolt-On Type With End Conductor Terminals Suitable For Surface Mounting In The Cabinet On A False Back Or Bracket.
5. Label Circuit Breakers And Equipment With An Engraved Permanent Label On The Dead Front Panel To Indicate The Circuit Controlled.
6. Fill Out Manufacturer Provided Arc Flash Stickers Using A Permanent Handheld Labeler (Brady IDXPRT with XC-1500-580-WT-BK Tags Or Approved Equal).

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

SERVICE CABINET WIRING DETAILS

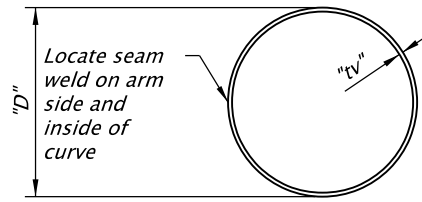
2024

DATE	REVISION	DESCRIPTION
07-2023	REVISED SERVICE CABINET WIRING TITLES. ADDED NOTE 6.	
01-2024	ADDED NOTE FOR RRFB 20 AMP BREAKER IN BMC & BMCL DETAILS	
07-2024	MINOR TEXT REVISIONS FOR UNIFORMITY	

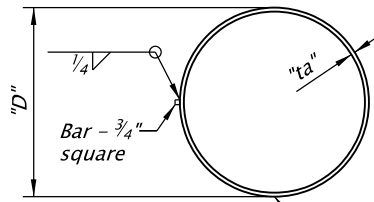
CALC. BOOK NO. - - -	N/A - - -	SDR DATE - 12-JUL-2024	TM485
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12-JUL-2024

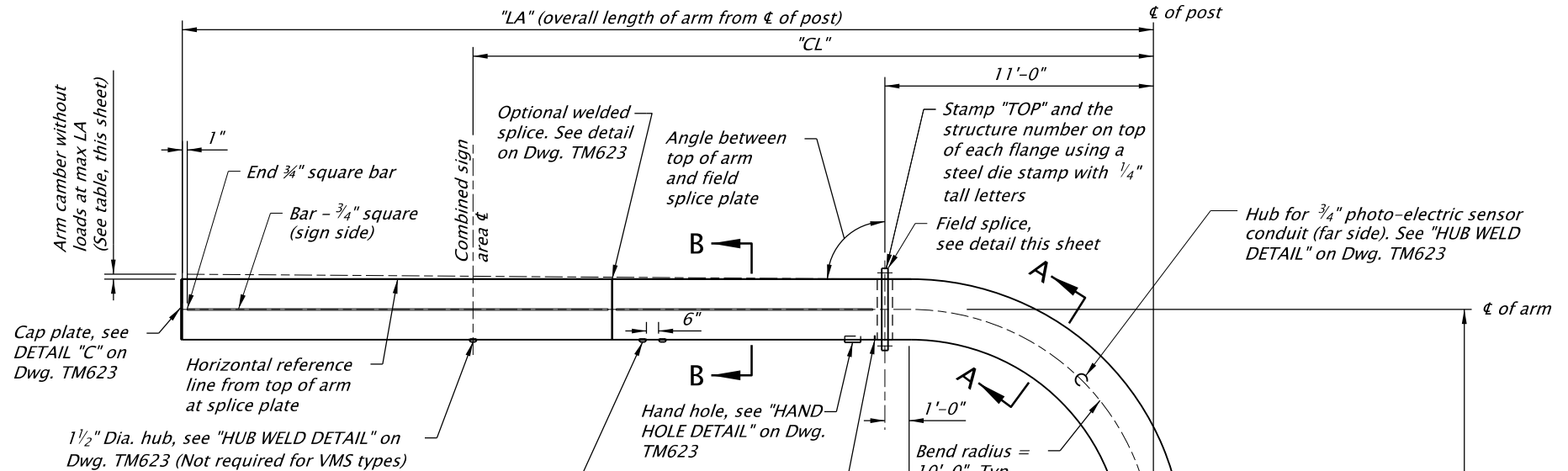
TM621.dgn



SECTION A-A
(TYPICAL POST SECTION)
No Scale



SECTION B-B
(TYPICAL ARM SECTION)
No Scale



Optional welded splice. See detail on Dwg. TM623

Angle between top of arm and field splice plate

Stamp "TOP" and the structure number on top of each flange using a steel die stamp with 1/4" tall letters

Field splice, see detail this sheet

Hub for 3/4" photo-electric sensor conduit (far side). See "HUB WELD DETAIL" on Dwg. TM623

1 1/2" Dia. hub, see "HUB WELD DETAIL" on Dwg. TM623 (Not required for VMS types)

Hand hole, see "HAND HOLE DETAIL" on Dwg. TM623

1/2" Dia. moisture drain centered on bottom of tube, 1" from field splice plate

Horizontal reference line from top of arm at splice plate

Cap plate, see DETAIL "C" on Dwg. TM623

Arm camber without loads at max LA (See table, this sheet)

End 3/4" square bar

Bar - 3/4" square (sign side)

Combined sign area

11'-0"

1'-0"

Bend radius = 10'-0", Typ.

90° Bend

1'-0"

6"

1"

1'-0" (max.)

CL

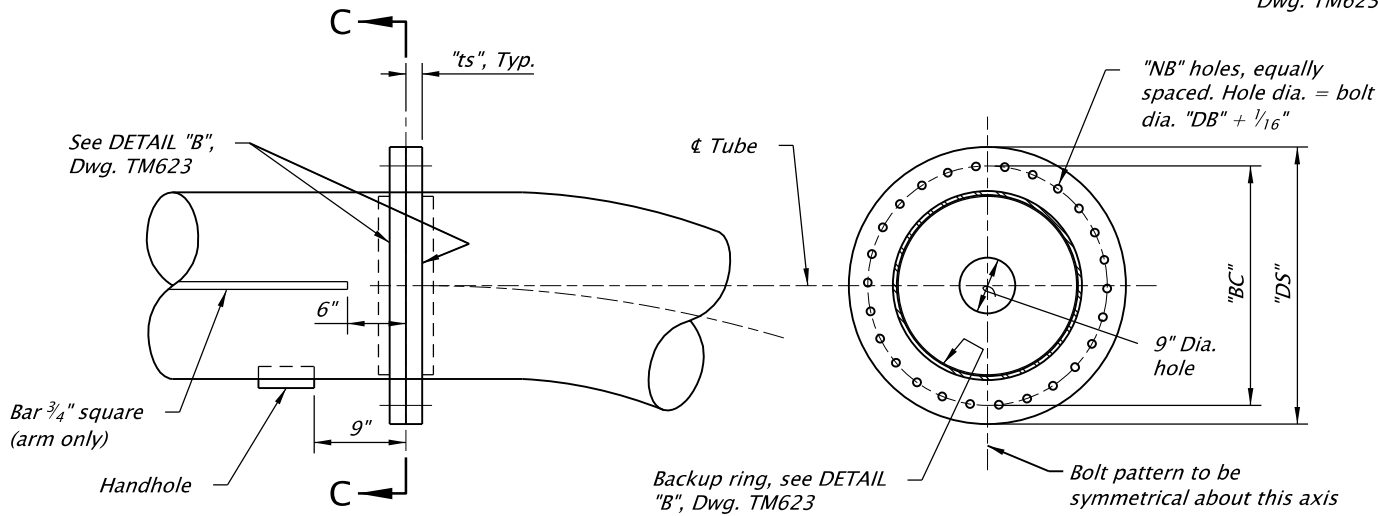
CL

CL of post

CL of arm

Post length = 30'-0" (max.)

Field verify post length prior to fabrication



FIELD SPLICE
No Scale

SECTION C-C
No Scale

See Dwg. TM622 through TM628

Advisory Note: This standard applies only if total sign area is less than or equal to "maximum sign area", and actual arm length, measured from center of sign to centerline of post, is less than or equal to "CL" in the Table and if actual height of post is less than or equal to 30'-0". VMS signs may not exceed the dimensions and weights in the table.

VMS Type	Access	VMS Height (ft)	VMS Length (ft)	Max. VMS Area (ft ²)	VMS Depth	Weight (lbs)
1W	Walk-In	8	30	240	4'-0"	3950
2F	Front	8	30	240	1'-4"	2290
3F	Front	8	21	168	1'-4"	1680
4F	Front	6	15	90	1'-4"	900

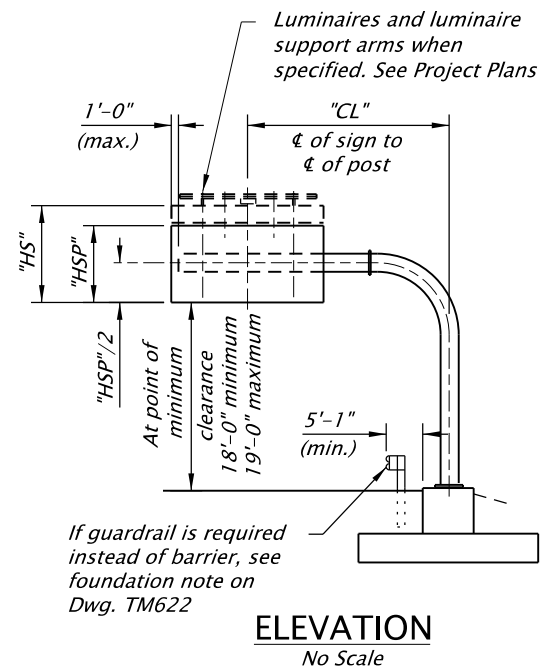
Note: Use TM690 and TM691 for walk-in access VMS. Use TM695 and TM696 for front access VMS with a walkway.

Structure Design No.	Max. "LA" (ft)	* Max. "CL"	* Max. Sign Area (ft ²)	VMS Type	Arm and Post Dimensions							*** Arm Camber without walkway	*** Arm Camber with walkway	
					"D"	"ta"	"tv"	"DB"	"NB"	"DS"	"BC"			"ts"
1	42	28'-6"	350	-	2'-6"	1/2"	3/8"	7/8"	26	3'-8"	3'-2"	2 3/4"	3 3/4"	-
2	50	40'-0"	253	3F, 4F	2'-6"	1/2"	3/8"	7/8"	26	3'-8"	3'-2"	2 3/4"	6 1/4"	8 3/4"
3	40	30'-0"	253	-	2'-6"	3/8"	1/2"	7/8"	20	3'-8"	3'-2"	2 1/2"	3 1/2"	-
4	50**	42'-6"	153	4F	2'-6"	3/8"	1/2"	7/8"	20	3'-8"	3'-2"	2 1/2"	6"	7"
5	40	32'-6"	153	-	2'-6"	3/8"	1/2"	7/8"	20	3'-8"	3'-2"	2"	3 1/2"	-
6	30	22'-6"	153	-	2'-0"	3/8"	1/2"	7/8"	18	3'-2"	2'-8"	2 1/2"	2 3/4"	-
7	50	46'-6"	54	-	2'-0"	3/8"	3/8"	7/8"	16	3'-2"	2'-8"	2 1/2"	10 1/4"	-
8	30	26'-6"	54	-	1'-6"	3/8"	3/8"	7/8"	12	2'-8"	2'-2"	2 1/2"	4 3/4"	-
9	45	-	-	1W, 2F, 3F, 4F	2'-6"	1/2"	3/8"	7/8"	26	3'-8"	3'-2"	2 3/4"	-	7"

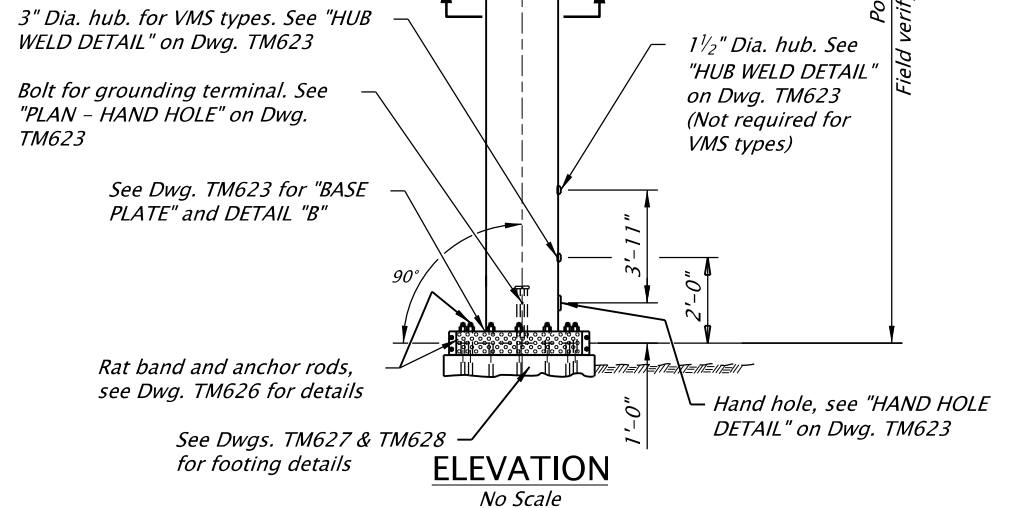
* Limits do not apply to VMS Signs

** "LA" is limited to 45 ft. for Design No. 4 when a walkway is used.

*** Arm Camber for VMS types according to Project Plans



ELEVATION
No Scale



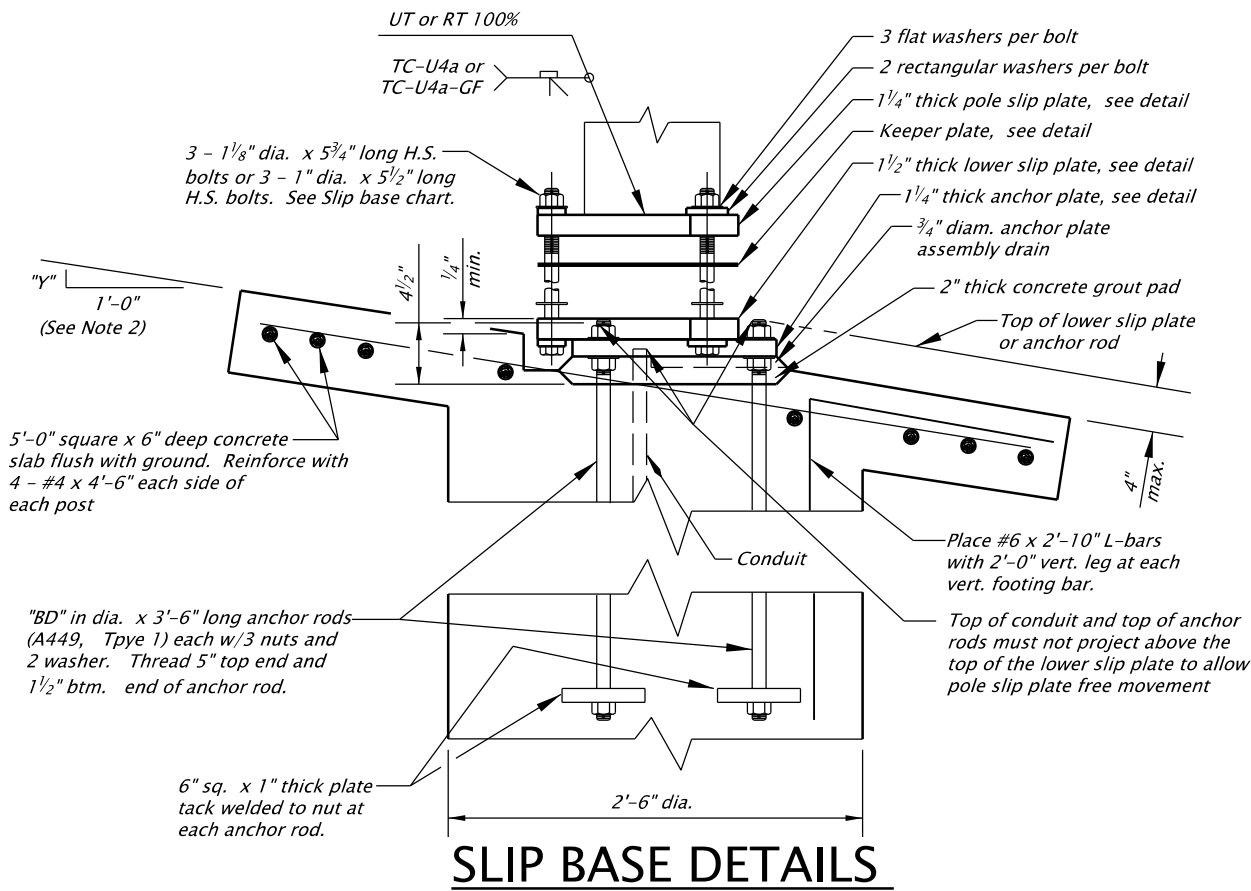
ELEVATION
No Scale

Accompanied by dwgs. TM621, TM623, TM624, TM625, TM626, TM627, TM628, TM690, TM691, TM694, TM695 and TM696

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	
STD. MONOTUBE SIGN/VMS CANTILEVER GENERAL DESIGN CRITERIA	
2024	
DATE	REVISION DESCRIPTION
01-2021	REVISED CAMBER VALUES AND REMOVED CAMBER VALUES NOT USED
07-2023	REMOVED FIELD SPLICE NO. 2, REMOVED HANDHOLE, ADDED TM694, TM695 AND TM696 ACCOMPANIED BY DRAWINGS, AND ADDED VMS WALKWAY NOTE
07-2024	GROUNDING TERMINAL WAS OPPOSITE HANDHOLE
CALC. BOOK NO.	SDR DATE
6921-6930, 6974	12-JUL-2024
TM621	

Effective Date: December 1, 2024 – May 31, 2025



SLIP BASE DETAILS

No Scale

SLIP BASE CHART					
Bolt or Anchor rod "BD"	No. of Luminaire arms		Torque ft-lbs		Footing Depth
	1	2	"T ₁ "	"T ₂ "	
1"	"BL" ≤ 50'	"BL" ≤ 40'	700	90	8'-0"
1 1/8"	"BL" > 50'	"BL" > 40'	850	100	8'-6"

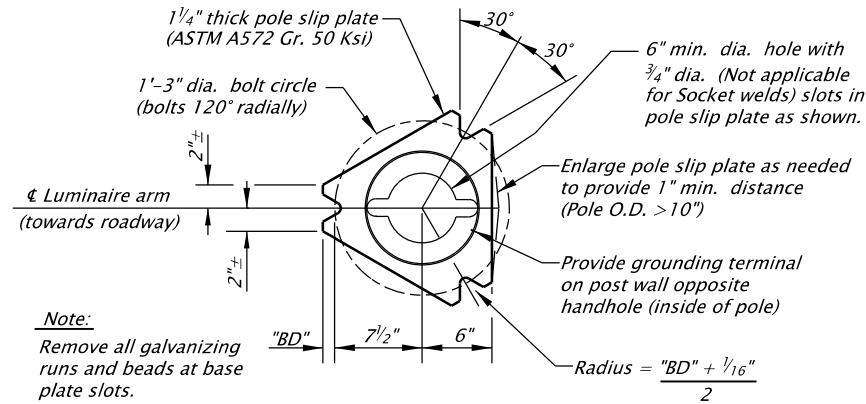
- Notes:**
- "BL" shall not exceed 55' for single luminaire arm poles. "BL" shall not exceed 45' for double luminaire arm poles. Top of rods must not project above top of lower slip plate.
 - The maximum slope rise "Y" is 2.50 inches per foot and a grade of 1V:4.80H.
 - The assumed cohesive soil minimum undrained shear strength, c, is 600 psf. The assumed non-cohesive soil friction angle is 25 degrees, the bulk weight is 100 pcf, and fully saturated.
 - Engineer of Record shall confirm site specific conditions satisfy the assumed soil parameters and satisfy the slope requirements. If conditions are not satisfied, Engineer of Record must adjust the shaft design as needed.

SLIP BASE BOLTING PROCEDURE (see 00962.46(j)(2)(b))

- Erect pole on an anchor assembly using 3 flat washers and 2 rectangular washers per bolt along with the keeper plate. Place 1 flat washer and the keeper plate between the pole base plate and the anchor plate.
- Adjust anchor rod leveling nuts as required to rake pole.
- Tighten high strength bolts to "T₁" ft-lbs torque.
- Loosen each bolt and retighten to "T₂" ft-lbs torque. **DO NOT OVERTIGHTEN!**
- Burr bolt threads at junction with nut using a center punch.

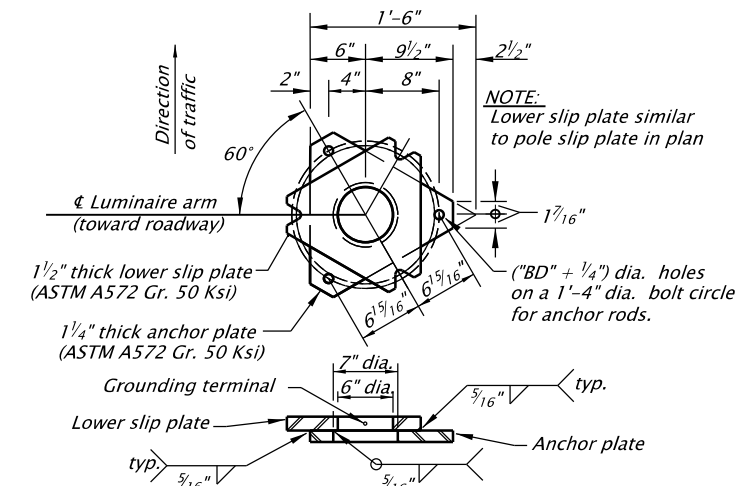
NOTE:

Tightening of slip base bolts shall not be done without an inspector present.



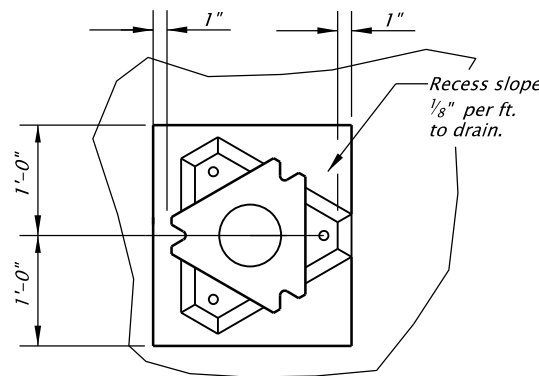
PLAN - POLE SLIP PLATE - SLIP BASE POLE

No Scale



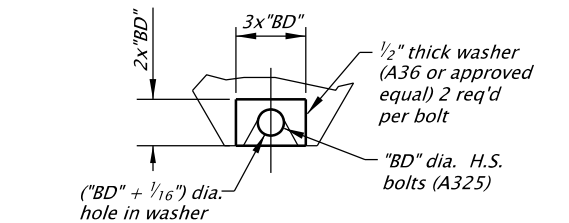
ANCHOR PLATE ASSEMBLY - SLIP BASE POLE

No Scale



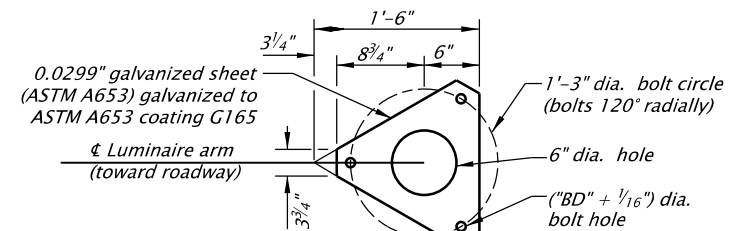
ANCHOR PLATE RECESS - SLIP BASE POLE

No Scale



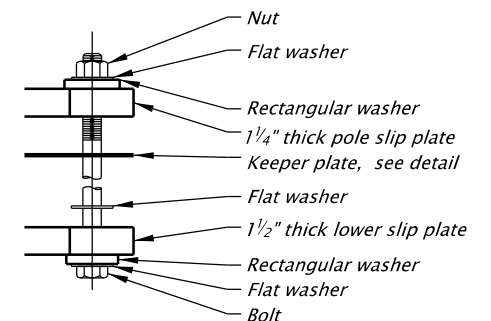
RECTANGULAR WASHER DETAIL

No Scale



KEEPER PLATE - SLIP BASE POLE

No Scale



BOLT ASSEMBLY DETAIL

No Scale

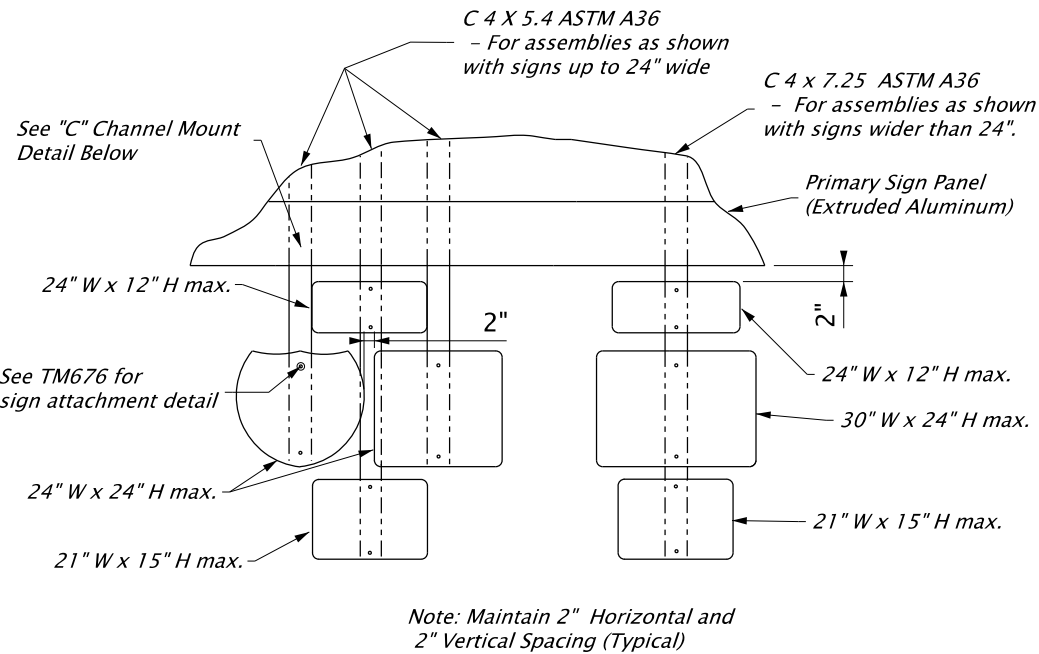
Accompanied by dwgs. TM629, TM631

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.

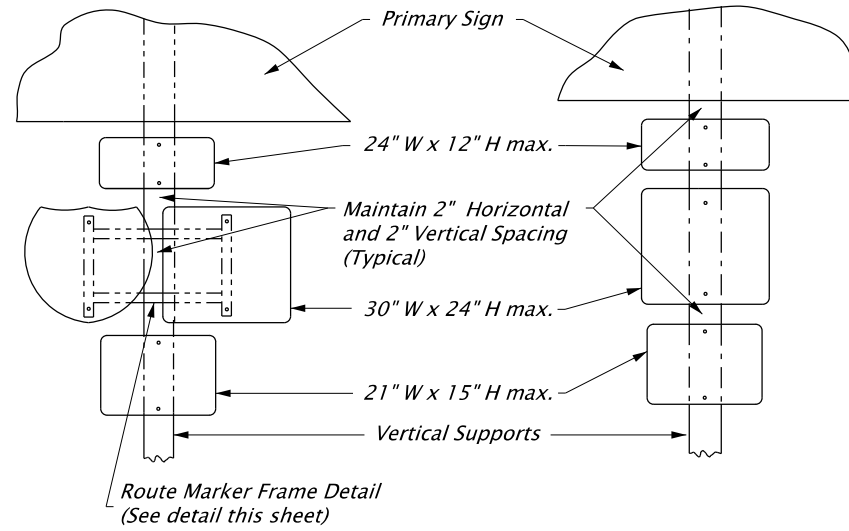
All materials shall be in accordance with the current Oregon Standard Specifications.		
OREGON STANDARD DRAWINGS		
SLIP BASE LUMINAIRE SUPPORTS		
BASE PLATE & FOOTING DETAILS		
2024		
DATE	REVISION	DESCRIPTION
07-2021	UPDATED TO THE LRFD AND MOVED FIXED BASE DETAILS TO TM631	
01-2024	CONDUIT AND ANCHOR ROD SLIP PLATE CLEARANCE CLARIFIED	
07-2024	ADDED GROUT PAD DRAIN HOLE	
CALC. BOOK NO.	7481	SDR DATE: 12-JUL-2024
		TM630

12-JUL-2024

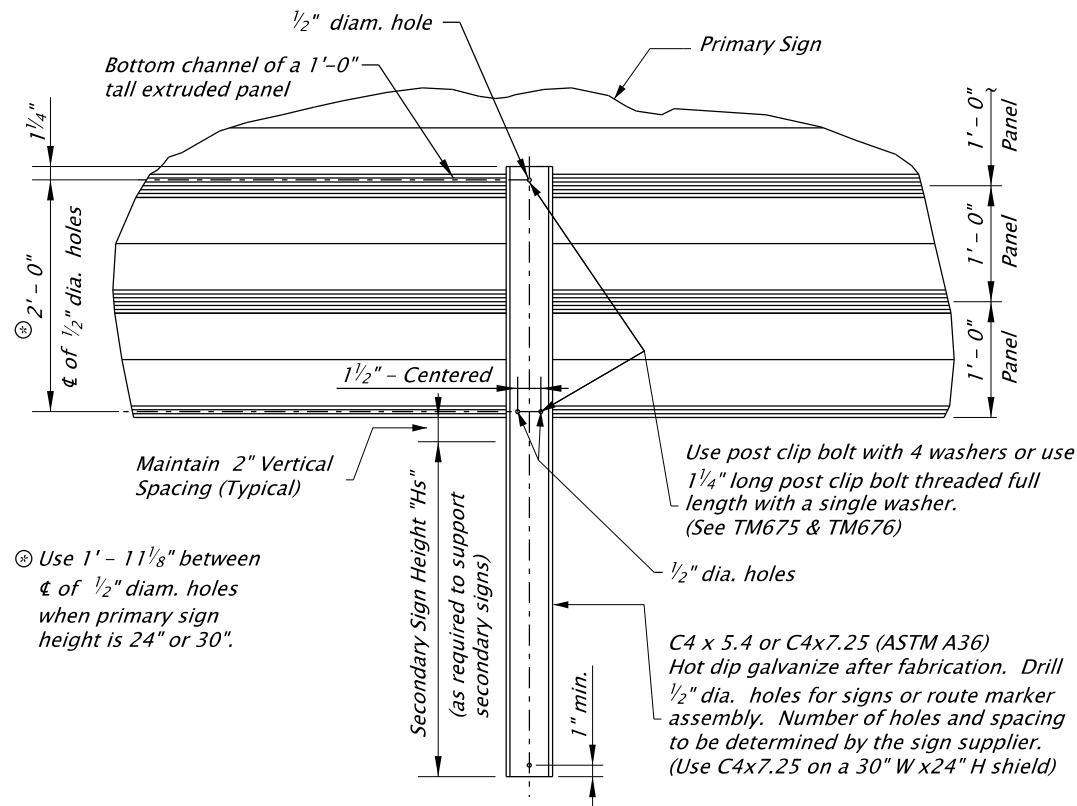
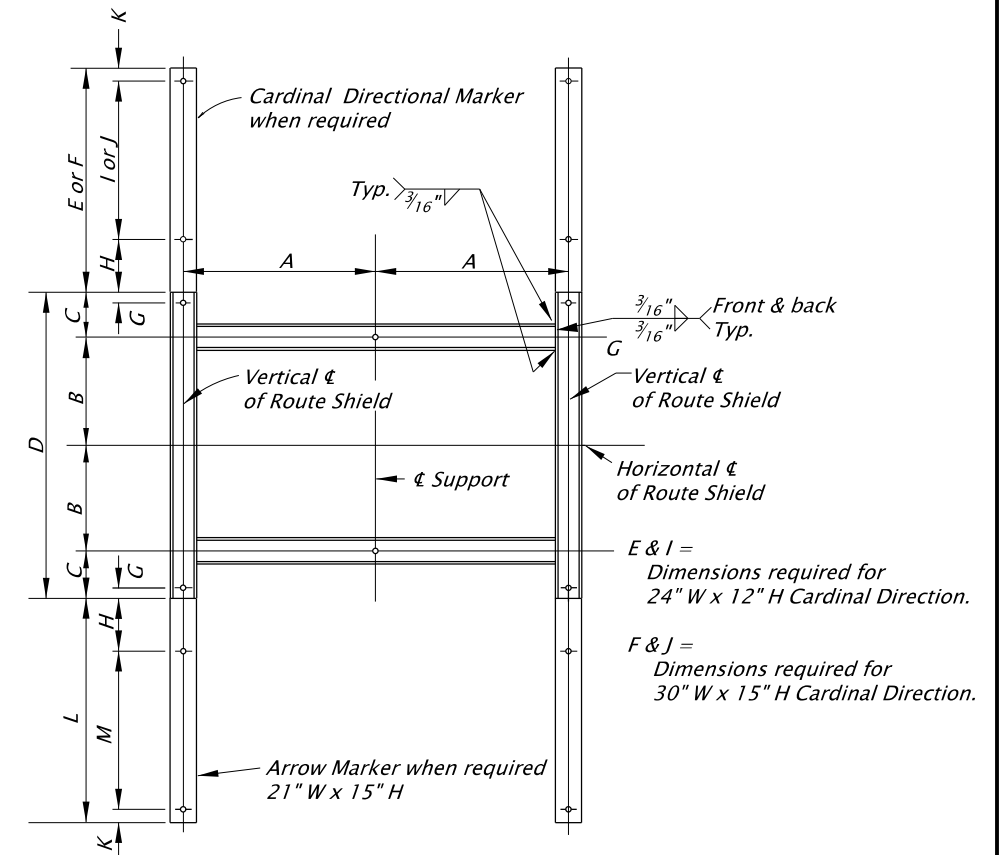
TM678.dgn



ROUTE MARKERS MOUNTED TO EXTRUDED PANELS
No Scale



ROUTE MARKERS MOUNTED TO VERTICAL SUPPORTS
No Scale



"C" CHANNEL CONNECTION DETAIL
No Scale

Shield Sizes	A	B	C	D	E	F	G	H	I	J	K	L	M
2 - 24" x 24"	13	8	3 1/2	23	14	17	3/4	4	9	12	1	17	12
1 - 24" x 24" & 1-30" x 24"	16	8	3 1/2	23	14	17	3/4	4	9	12	1	17	12
2 - 30" x 24"	16	8	3 1/2	23	14	17	3/4	4	9	12	1	17	12
2 - 36" x 36"	19	12	5 1/2	35	14	17	1 3/8	4	9	12	1	17	12
1 - 36" x 36" & 1-45" x 36"	23 1/2	12	5 1/2	35	14	17	1 3/8	4	9	12	1	17	12
2 - 45" x 36"	23 1/2	12	5 1/2	35	14	17	1 3/8	4	9	12	1	17	12

Note: Route Marker frames shall be constructed from 2" x 2" x 3/16" ASTM A53 GR B tubing, galvanized after fabrication. Provide 7/16" holes, 3/8" galvanized steel bolts, washers, and lock-nuts for mounting route marker frame to post. For sign attachments see TM676. Dimensions are in inches and signs are shown in width and height.

ROUTE MARKER FRAME DETAIL
No Scale

Accompanied by dwgs. TM675, TM676

GENERAL NOTES:

1. W = Width of sign.
2. H = Height of sign.

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All materials shall be in accordance with the current Oregon Standard Specifications.	
OREGON STANDARD DRAWINGS	
SECONDARY SIGN MOUNTING DETAILS	
2024	
DATE	REVISION DESCRIPTION
01-2022	REVISED "C" CHANNEL DETAILS AND ADDED 30" SIGN TO CUSTOM HOLE SPACING
07-2024	SECOND ROW A DIMENSION WAS 14 1/2, FIFTH ROW A DIMENSION WAS 21 1/4, UPDATED ALL SIGNS TO WIDTH BY HEIGHT, DEFINED W. AND DEFINED H
CALC. BOOK NO.	SDR DATE
N/A	12-JUL-2024
TM678	

Effective Date: December 1, 2024 – May 31, 2025

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

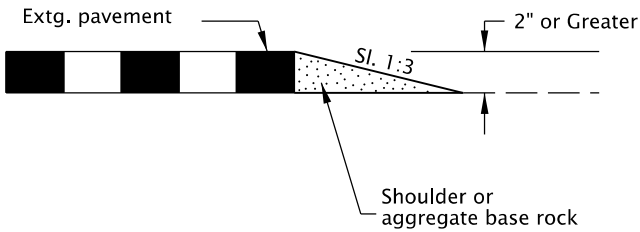
MINIMUM LENGTHS TABLE					
"L" VALUE FOR TAPERS (ft)					BUFFER "B" (ft)
★ SPEED (mph)	W = Lane or Shoulder Width being closed or shifted				
	W ≤ 10	W = 12	W = 14	W = 16	
25	105	125	145	165	75
30	150	180	210	240	100
35	205	245	285	325	125
40	265	320	375	430	150
45	450	540	630	720	180
50	500	600	700	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 = S²W/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

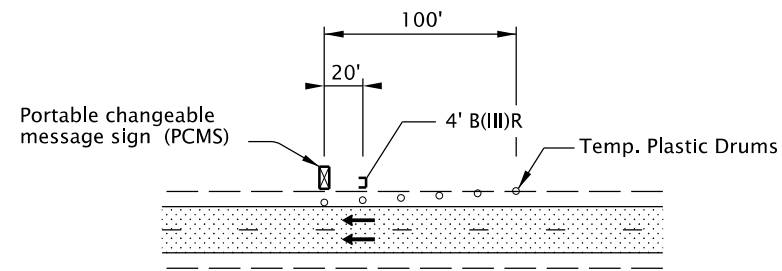
- NOTES:
- Place traffic control devices on 10 ft. spacing for intersection and access radii.
 - When necessary, sign spacing may be adjusted to fit site conditions. Limit spacing adjustments to 30% of the "A" dimension for all speeds.

- 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.



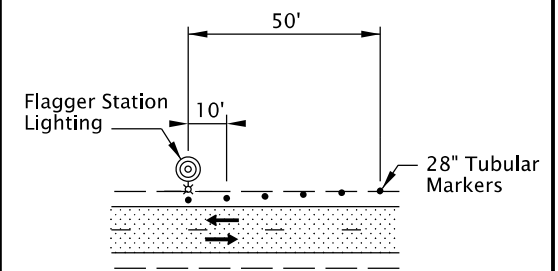
EXCAVATION ABRUPT EDGE

- 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



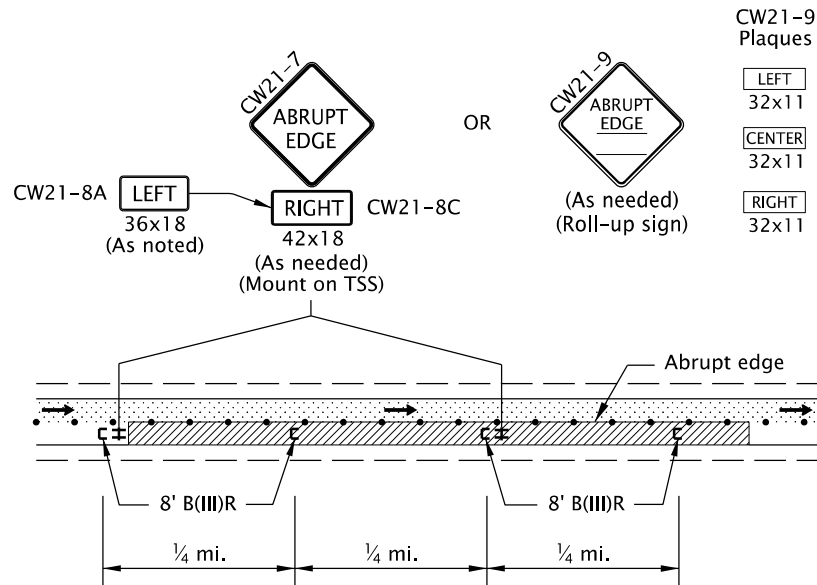
PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) INSTALLATION

- 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.
 - Provide a truck mounted attenuator (TMA) to protect the active work area on high speed divided highways or freeways when positive protection is not available, or as directed.
 - To be accompanied by Dwg. Nos. TM820 & TM821.

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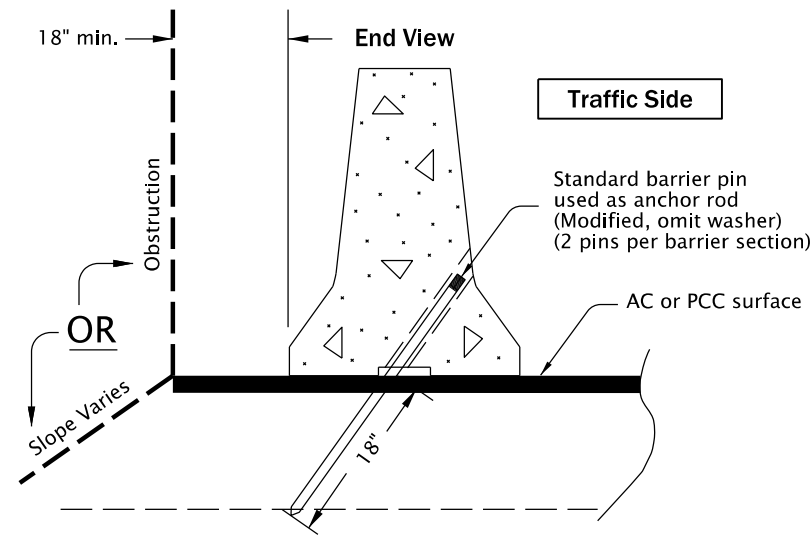
All materials shall be in accordance with the current Oregon Standard Specifications.			
OREGON STANDARD DRAWINGS			
TABLES, ABRUPT EDGE AND PCMS DETAILS			
2024			
DATE	REVISION DESCRIPTION		
07-2022	Added a note for TPARs		
07-2024	Added a note for TMAs		
CALC. BOOK NO.	N/A	SDR DATE	12-JUL-2024
			TM800

12-JUL-2024

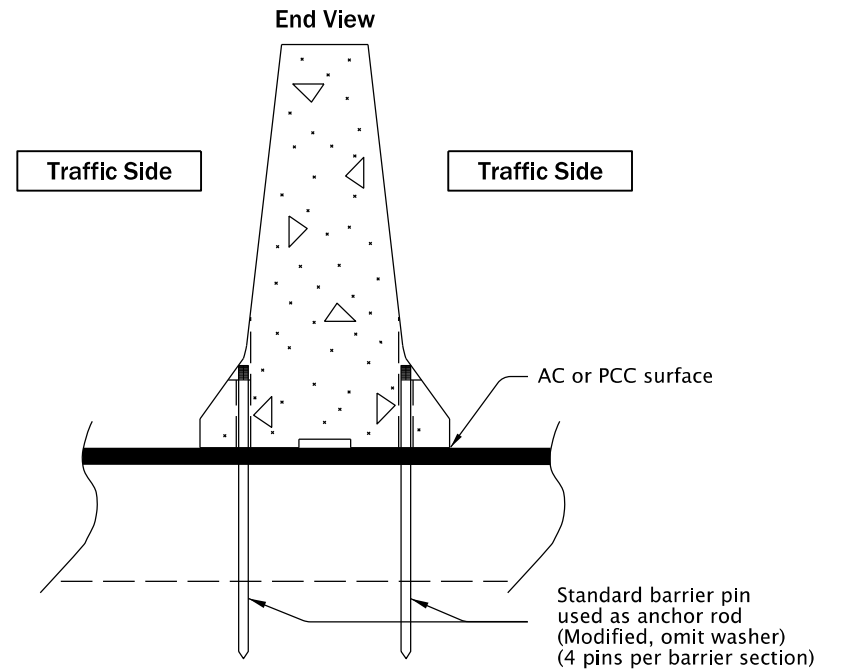
TM830.dgn

NOTES:

- DO NOT USE ON BRIDGE DECKS. Restrain barrier on bridge decks according to Bridge Design Manual. See Chapter 1.13.1.10
- Pre-drill pin holes for PCC pavement placement.
- Excavation height greater than 3 feet requires proper backslope based on angle of repose, or shoring as directed.
- Place temporary barrier on smooth, solid surfacing. Maintain, smooth solid surfacing for clear area behind temporary barrier.
- Follow manufacturer recommendations when securing barriers other than concrete.
- To be accompanied by Dwg. Nos. RD503, RD515 & RD516.



SECURING TEMPORARY CONCRETE BARRIER
(Shoulder Installation)

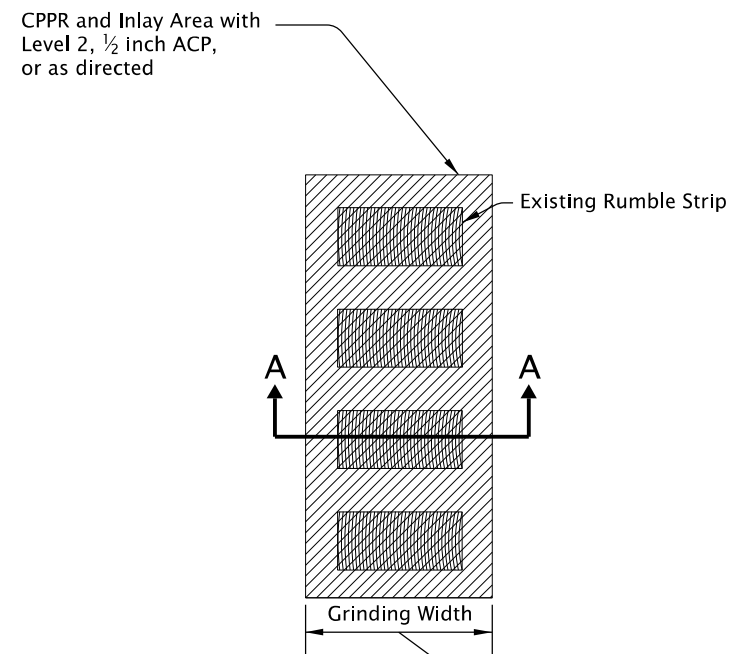


SECURING TEMPORARY TALL CONCRETE BARRIER
(Median Installation)

NOTES:

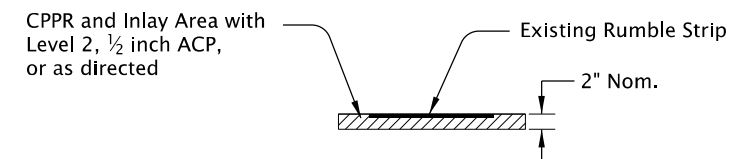
- CPPR and inlay existing rumble strips prior to staging traffic across the area. Common application is staging for freeway crossovers and lane shifts.
- Remove and replace existing striping as required.

UNDER CONSTRUCTION



EXISTING RUMBLE STRIP REMOVAL

24" Typical - Shoulder Rumble Strips
18" Typical - Centerline Rumble Strips



SECTION A-A

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

OREGON STANDARD DRAWINGS

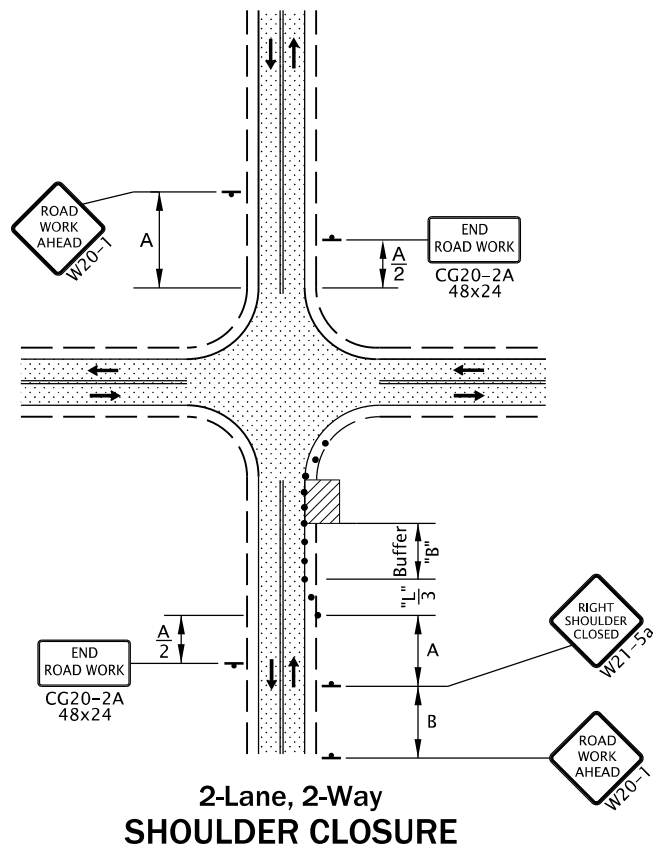
TEMPORARY CONCRETE BARRIER AND RUMBLE STRIP DETAILS

2024

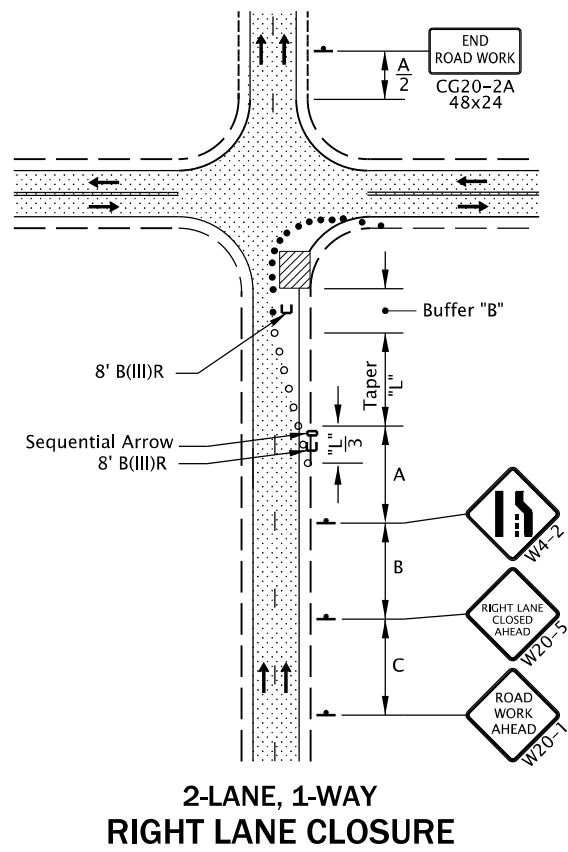
DATE	REVISION DESCRIPTION
07-2021	Revised clear space to obstruction
01-2022	Added note for surfacing behind barrier
07-2024	Added note for securing barriers other than concrete
07-2024	Added references to roadway details for barrier pin and loop, and anchoring

CALC. BOOK NO. --- N/A --- SDR DATE- 12-JUL-2024 - **TM830**

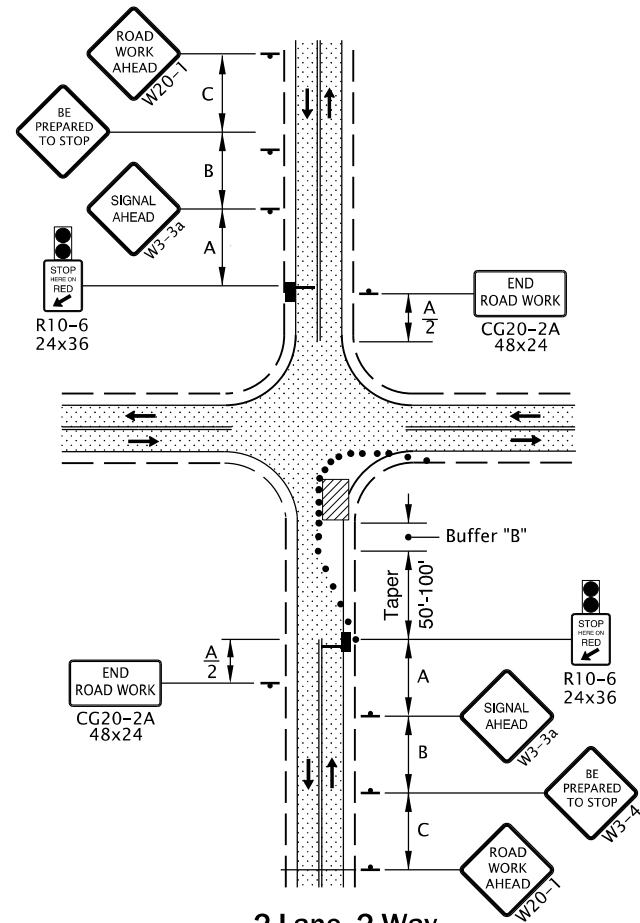
Effective Date: December 1, 2024 – May 31, 2025



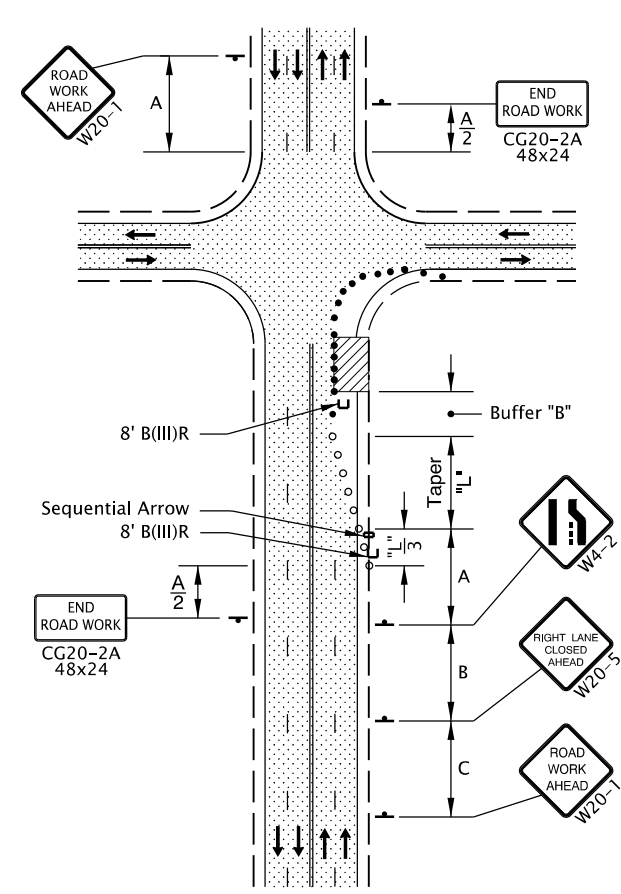
**2-Lane, 2-Way
SHOULDER CLOSURE**



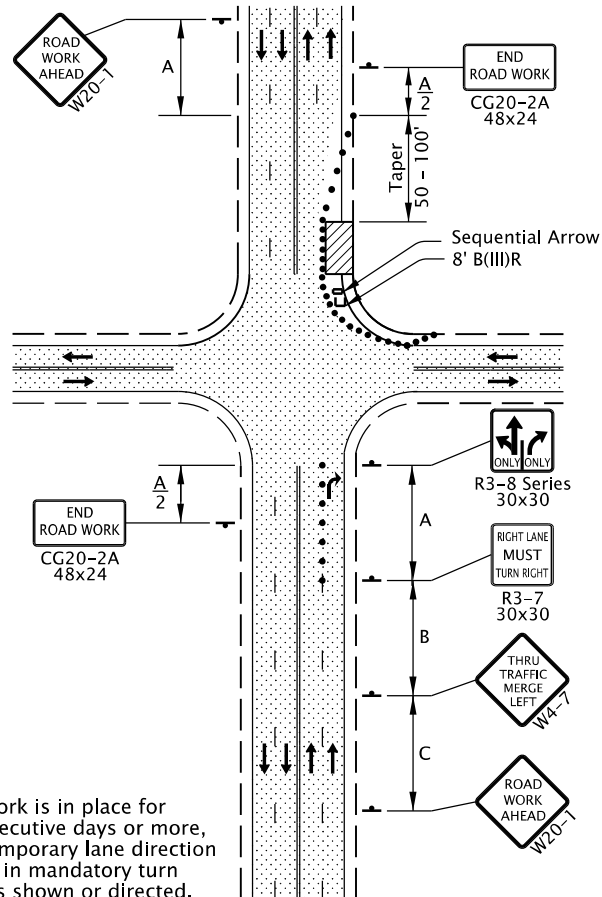
**2-LANE, 1-WAY
RIGHT LANE CLOSURE**



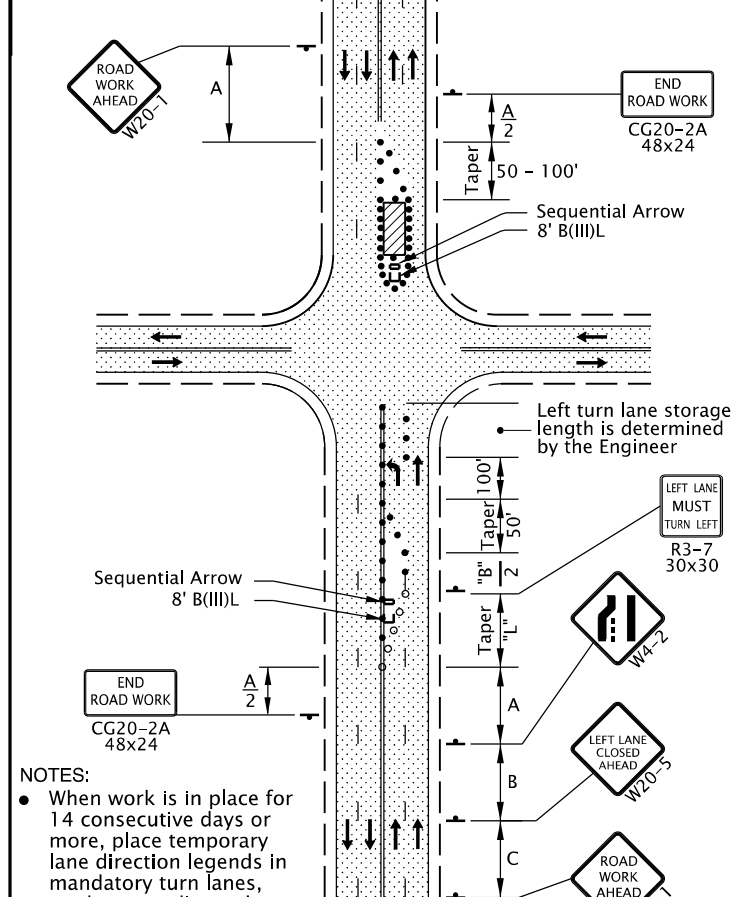
**2-Lane, 2-Way
ONE LANE CLOSURE**



**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, TM821, 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.			
OREGON STANDARD DRAWINGS			
2024			
DATE	REVISION DESCRIPTION		
01-2022	Added AFADs to drawing.		
07-2024	Fixed a typo.		
CALC. BOOK NO.	N/A	SDR DATE	12-JUL-2024
			TM841