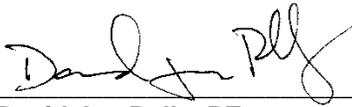


2018 OREGON STANDARD DRAWINGS

Standard Distribution
Date of Issue: January 2020



David Joe Polly, PE
Senior Standards Engineer

This is the January 2020 release of the 2018 Oregon Standard Drawings.

For ODOT Projects the details in the standard drawings will be effective on the **June 1, 2020** bid opening where these drawings are called for in the project plans.

These drawings are for use with projects using the **2018 Oregon Standard Specifications**.

You will notice an “effective date” on the lower right bottom of 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 site at:

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

The Standard Drawing Baseline Reports for the drawings contain 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.

These Standard Drawings are the ones that have updates:

Drawing Number	Comment
RD400	Title Change
RD401	New Drawing
RD402	New Drawing
RD403	New Drawing
RD404	New Drawing
RD405	Title Change
RD407	New Drawing
RD408	New Drawing
RD409	New Drawing
RD410	Title Change
RD412	New Drawing
RD415	Title Change
RD416	New Drawing
RD417	New Drawing
RD419	Title Change
RD420	Title Change
RD421	New Drawing
RD435	Title Change

Drawing Number	Comment
RD436	Title Change
RD437	Title Change
RD438	Title Change
RD440	Title Change
RD441	Discontinued
RD442	New Drawing
RD443	New Drawing
RD444	New Drawing
RD445	
RD450	Title Change
RD451	
RD470	Title Change
RD471	Title Change
RD480	Discontinued
RD481	Title Change
RD482	Title Change
RD530	
RD535	
RD570	
RD580	
RD581	
RD700	
RD722	Title Change
RD725	
RD735	
RD754	
RD755	
RD756	
RD757	
RD759	
RD800	
RD815	
RD820	
RD825	
RD830	
RD835	
RD840	
RD845	
BR139	
BR140	
BR141	
TM455	
TM457	
TM467	
TM470	
TM472	
TM503	
TM622	

Drawing Number	Comment
TM628	
TM629	
TM694	
TM695	
TM696	
TM698	
TM821	
TM822	
TM830	
TM844	Title Change
TM850	
TM860	
TM861	
TM880	

OREGON STANDARD DRAWINGS 2018 NUMBERS AND REVISION DATES

DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE
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RD100	
RD101	
RD110	
RD115	
RD120	01/2018
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RD319	
RD320	
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RD322	
RD324	01/2019
RD325	
RD326	
RD327	
RD328	07/2019
RD330	
RD332	
RD334	07/2018
RD335	07/2019
RD336	01/2019
RD338	07/2019
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RD401	01/2020
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RD404	01/2020
RD405	01/2020
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RD409	01/2020
RD410	01/2020
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RD415	01/2020
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RD436	01/2020
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RD440	01/2020
RD441	Discontinued 01/20
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RD451	01/2020
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RD471	01/2020
RD480	Discontinued 01/20
RD481	01/2020
RD482	01/2020
RD500	01/2019
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RD516	01/2019
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RD526	07/2019
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RD721	07/2019
RD722	01/2020
RD725	01/2020

OREGON STANDARD DRAWINGS 2018 NUMBERS AND REVISION DATES

DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE
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RD730	07/2019
RD735	01/2020
RD740	07/2019
RD745	07/2019
RD750	07/2019
RD752	Discontinued 01/18
RD753	Discontinued 01/18
RD754	01/2020
RD755	01/2020
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RD757	01/2020
RD758	07/2019
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RD771	07/2018
RD810	01/2020
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RD840	01/2020
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RD1005	
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RD1030	
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BR435	07/2018
BR440	07/2018
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BR505	07/2018
BR520	07/2019
BR525	07/2018
BR550	07/2018
BR705	07/2018
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BR707	
BR708	07/2018
BR709	01/2018
BR720	Discontinued 01/19
BR730	01/2018
BR740	01/2018
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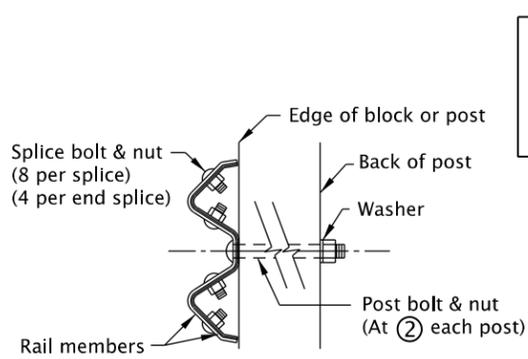
Traffic Signals

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Thrust Blocking	RD250		
Valve Box And Operator			
Extension Assembly	RD258		
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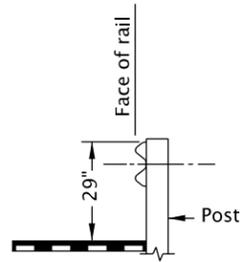
rd400.dgn 13-JAN-2020



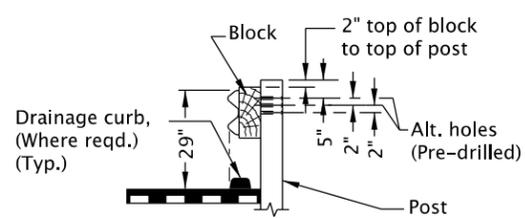
- NOTES:**
- When required by the plans, post bolts to extend beyond the tightened nuts within limits of 1/4" to 1/2".
 - When steel posts are used see "APPURTENANCES" for modified bolt detail, Std. Dwg. RD415.
 - All post bolt threads to be set after assembly for wrench removal only.

FITTINGS

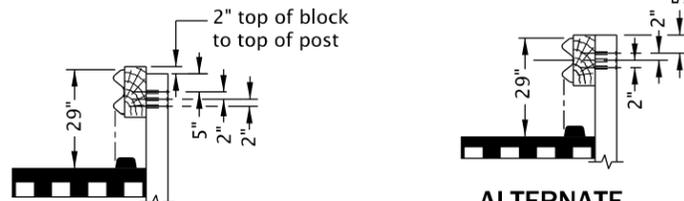
- NOTES:**
- Rail height measured from final paved surface at face of rail to top of rail (Typ. all types).
 - Final paved surfacing to extend to face of post.
 - Drainage curb alignment same as face of guardrail.



TYPE 1 GUARDRAIL
(Use restricted to non-roadway applications)



INITIAL INSTALLATION

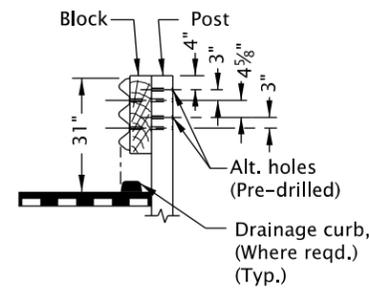


FUTURE ADJUSTMENT

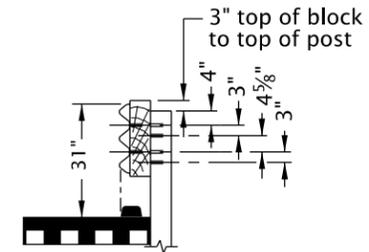
ALTERNATE INITIAL INSTALLATION OR FUTURE ADJUSTMENT

TYPES 2A & 3 GUARDRAIL

(See general note 2)
(For Type 3 use double thickness (2) rail elements)

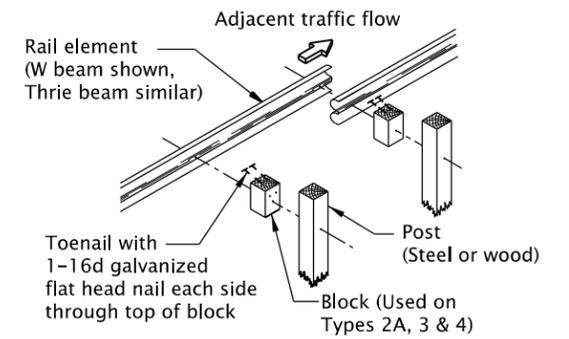


INITIAL INSTALLATION



RAIL AFTER OVERLAY
(Adjust as shown)

TYPE 4 GUARDRAIL



ASSEMBLY DETAILS (RELATION OF PARTS)

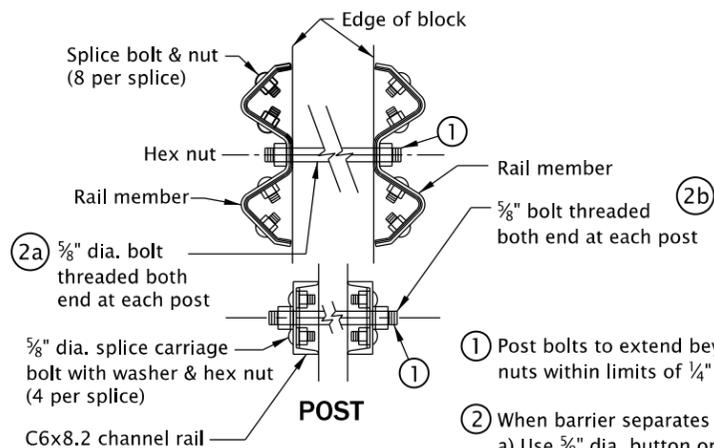
TABLE OF POST SPACING

TYPE	1	2A	3	4
SPACING	12'-6"	6'-3"	3'-1 1/2"	6'-3"

NORMAL RAIL ELEMENT DATA

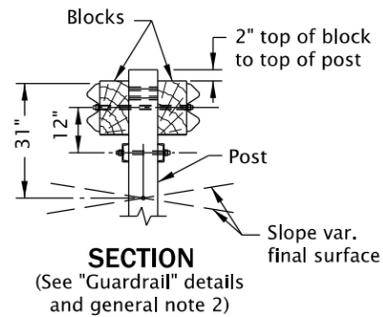
Type	Rail	Effective Lengths	Thkn. *
1, 2A, 3	W beam	6.25', 12.5', 25'	0.105" & 0.135"
4	Thrie beam	6.25', 12.5', 25'	0.105" & 0.135"

* Base metal thkn. nom. (Before galv.)



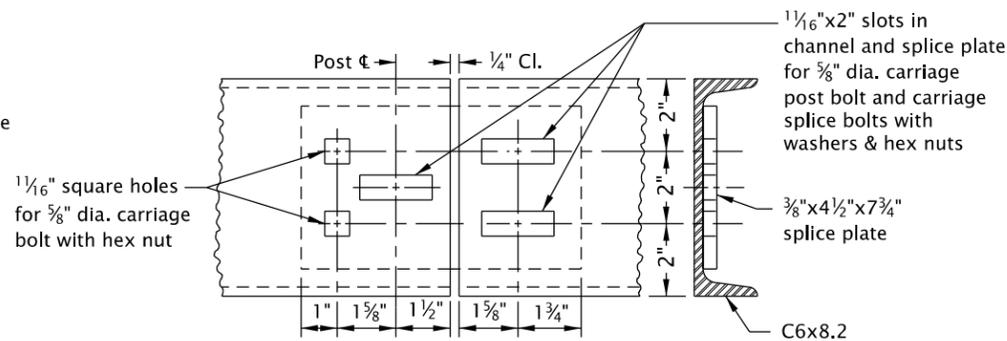
NOTE:
Median barrier post spacing 6'-3". See end construction for variations.

METAL MEDIAN BARRIER

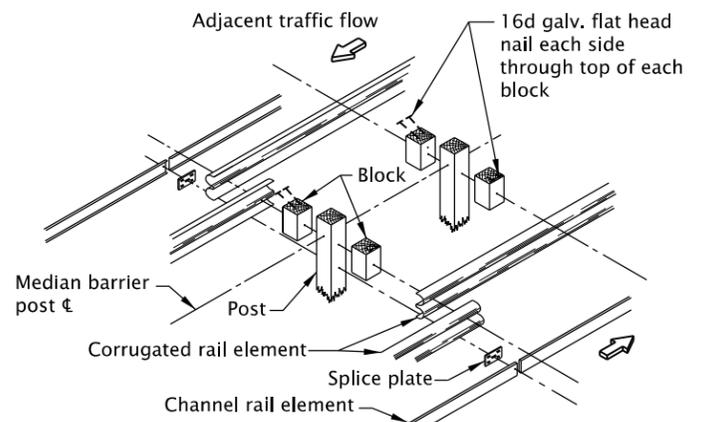


SECTION
(See "Guardrail" details and general note 2)

NOTE:
Clearance to be 1 1/16" at rail splice for bridge expansion joints.

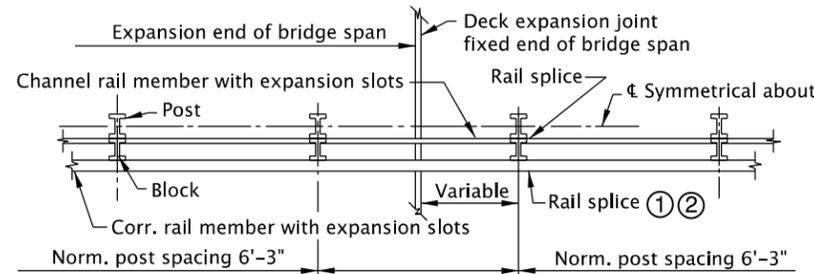


CHANNEL RAIL AND SPLICE PLATE (METAL MEDIAN BARRIER)

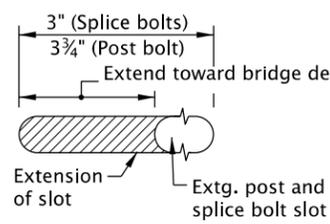


ASSEMBLY DETAILS (RELATION OF PARTS)

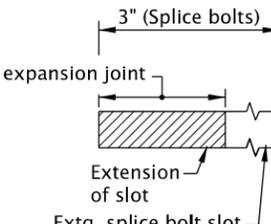
NOTE:
THIS DRAWING IS RETAINED FOR MAINTENANCE PURPOSES. DO NOT USE FOR NEW CONSTRUCTION.



PLAN



CORRUGATED RAIL



CHANNEL RAIL AND SPLICE PLATE

- NOTES:**
- Place 2 - 1/32" polytetrafluoroethylene (TFE) sheets between corrugated rail members. The sheets shall be 12 1/2" x 1'-7".
 - Adjust nuts to provide a sliding fit and set threads to prevent loosening.

METAL MEDIAN BARRIER/SHOULDER GUARDRAIL INSTALLATION AT BRIDGE DECK EXPANSION JOINT

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

- See appropriate guardrail standard drawing(s) for details not shown.
- Use "Alternate Initial Installation", at bridge ends (See Std. Dwg. RD440), adjacent to P.C.C. pvmt. for temporary guardrail, to match existing guardrail, for Type 1 rail or as directed.
- See Std. Dwg. RD701 for drainage curbs, where required.
- Lap guardrail in direction of adjacent traffic.

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

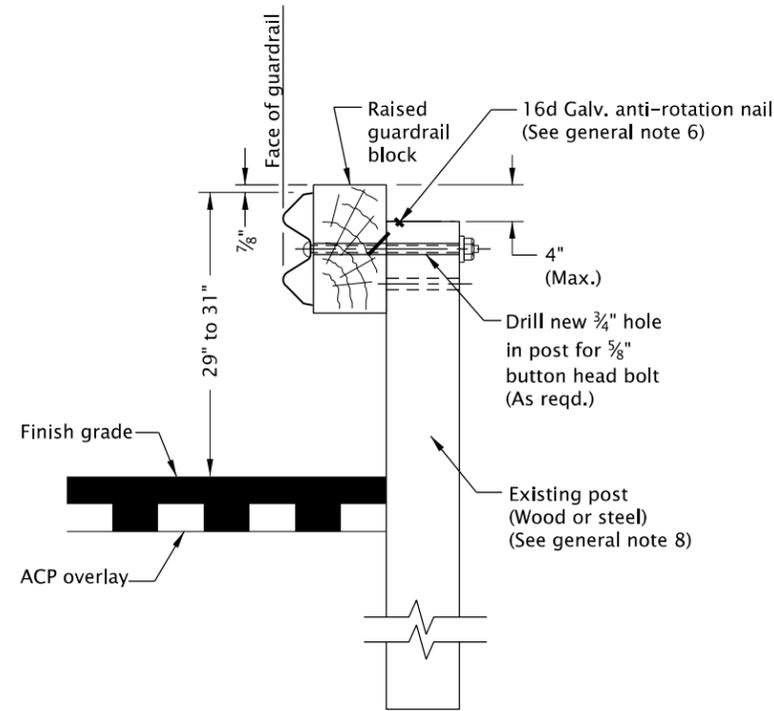
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS GUARDRAIL AND METAL MEDIAN BARRIER (29" RAIL HEIGHT)

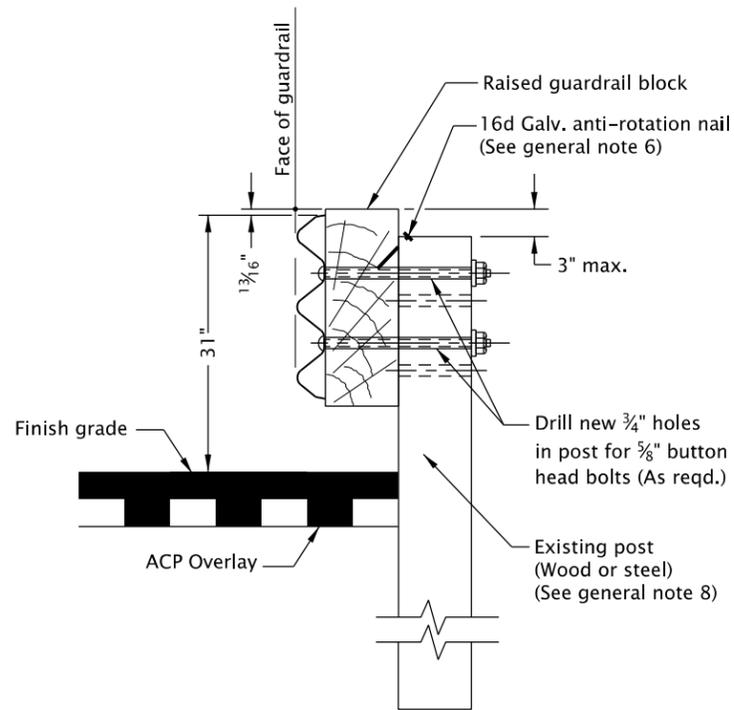
2018

DATE	REVISION DESCRIPTION
01-2020	TITLE CHANGED, ADDED & REVISED NOTES

RD400



RAISING W-BEAM DETAIL
(Adjust as shown)



RAISING THRIE BEAM DETAIL
(Adjust as shown)

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

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

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

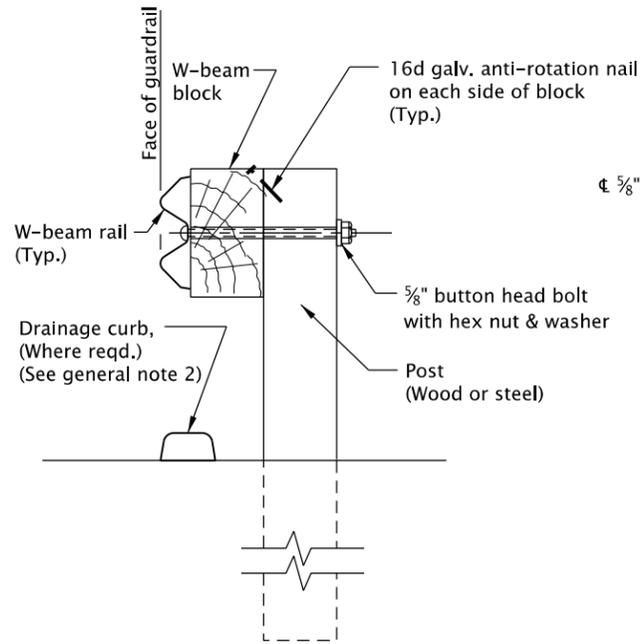
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

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 consulting a Registered Professional Engineer.

OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
RAIL HEIGHT ADJUSTMENT

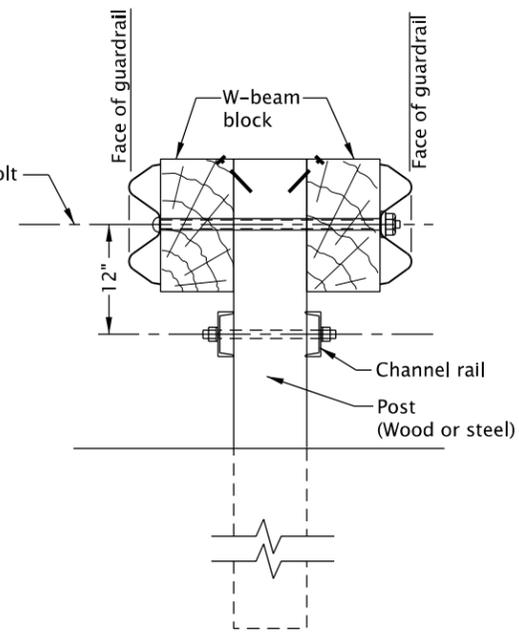
2018

DATE	REVISION	DESCRIPTION
01-2020	NEW DRAWING CREATED	

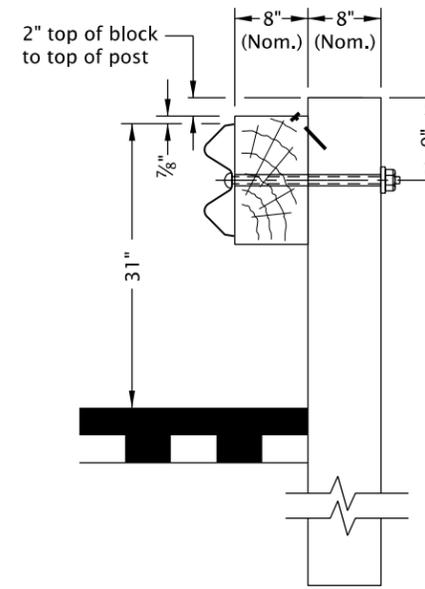


TYPES 2A & 3
(For Type 3 use double thickness (2) rail elements)

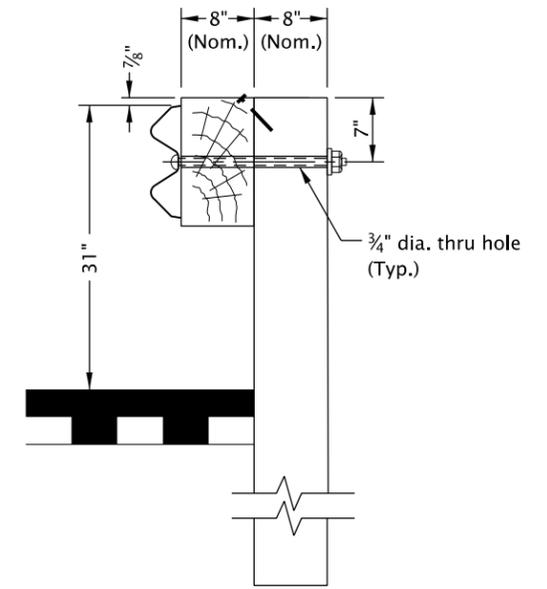
W-BEAM GUARDRAIL



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



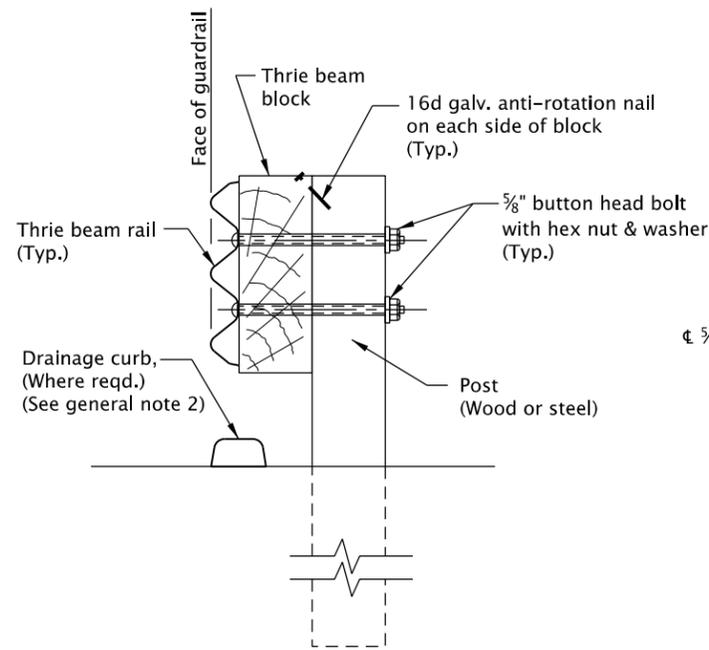
ALTERNATE INSTALLATION



TYPICAL INSTALLATION

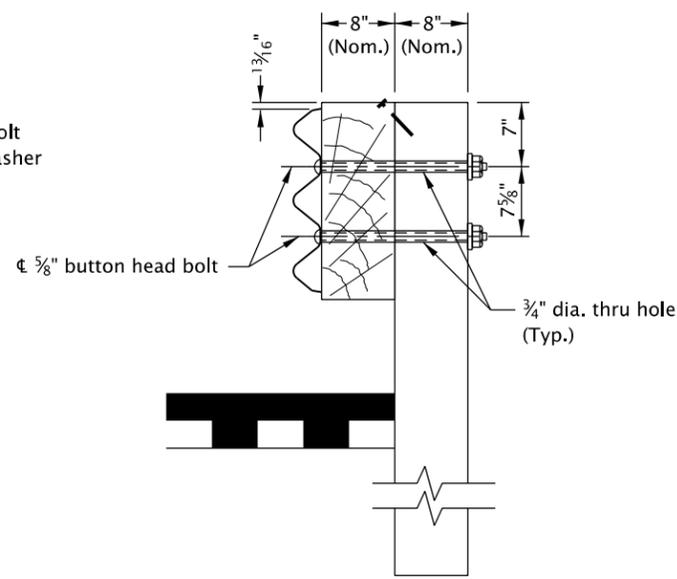
W-BEAM GUARDRAIL ASSEMBLY

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



TYPE 4 & 4 TRANSITION

THRIE BEAM GUARDRAIL



INITIAL INSTALLATION

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

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

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

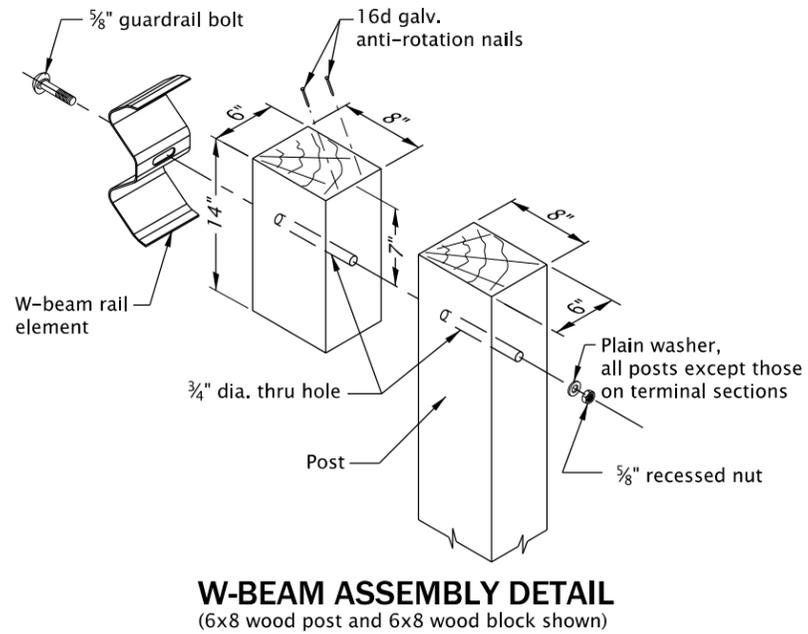
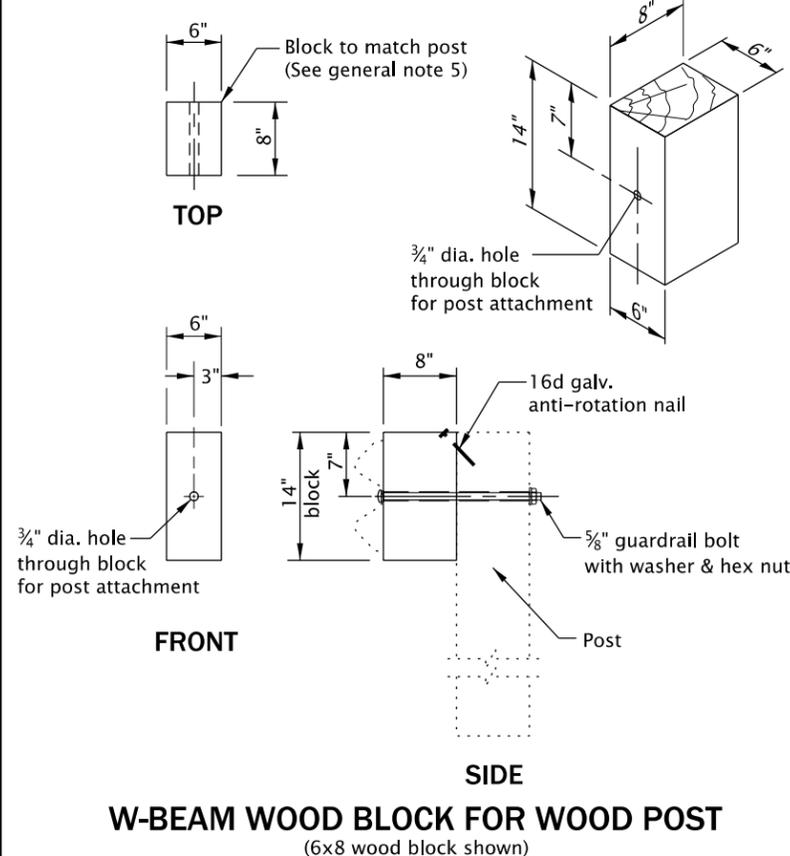
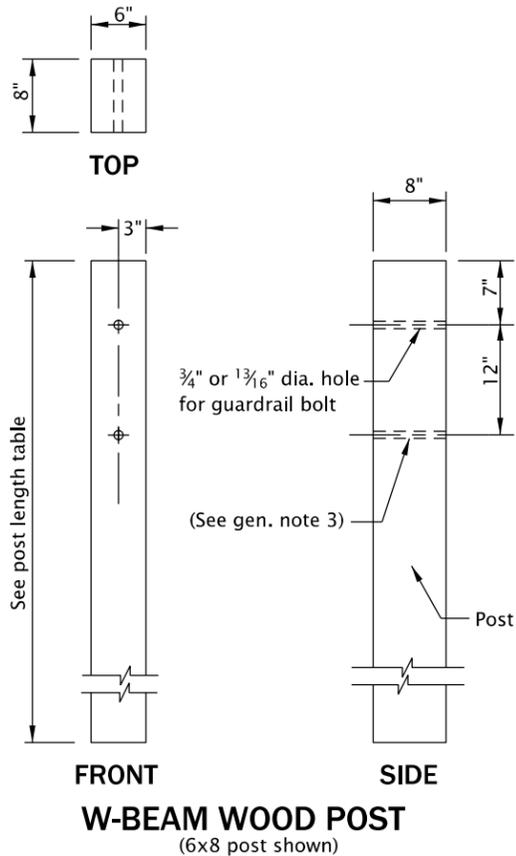
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

**OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
TYPES**

2018

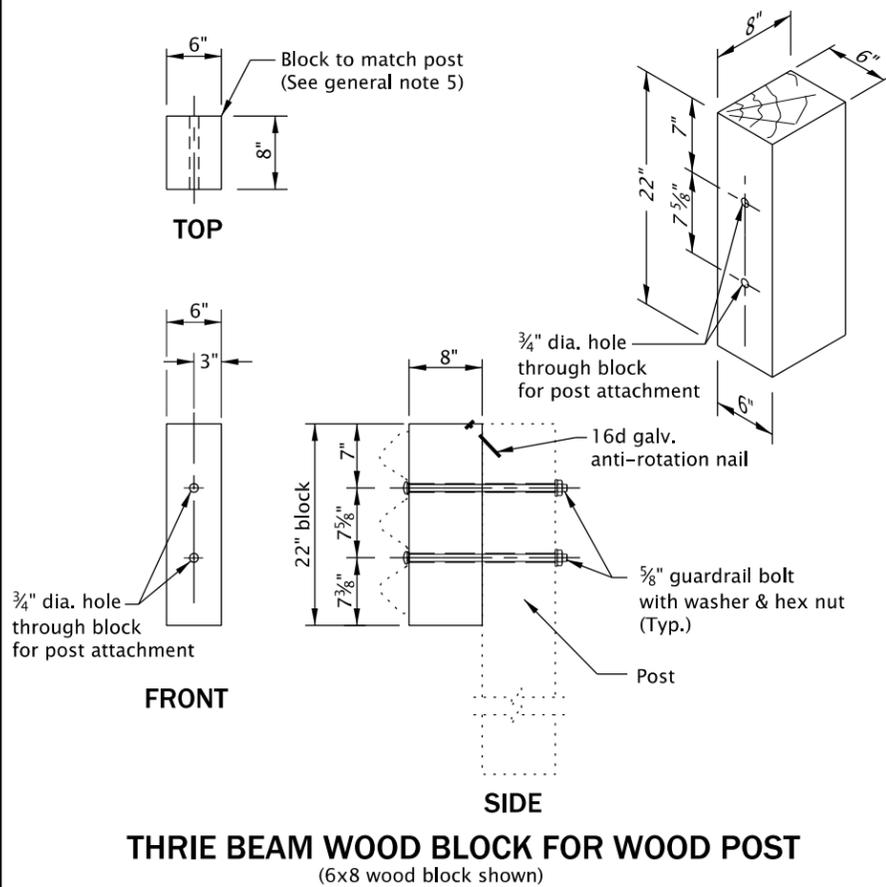
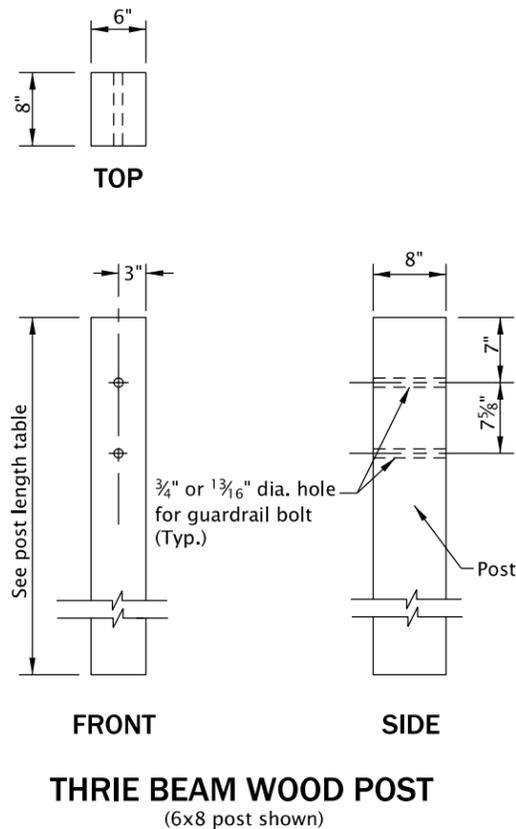
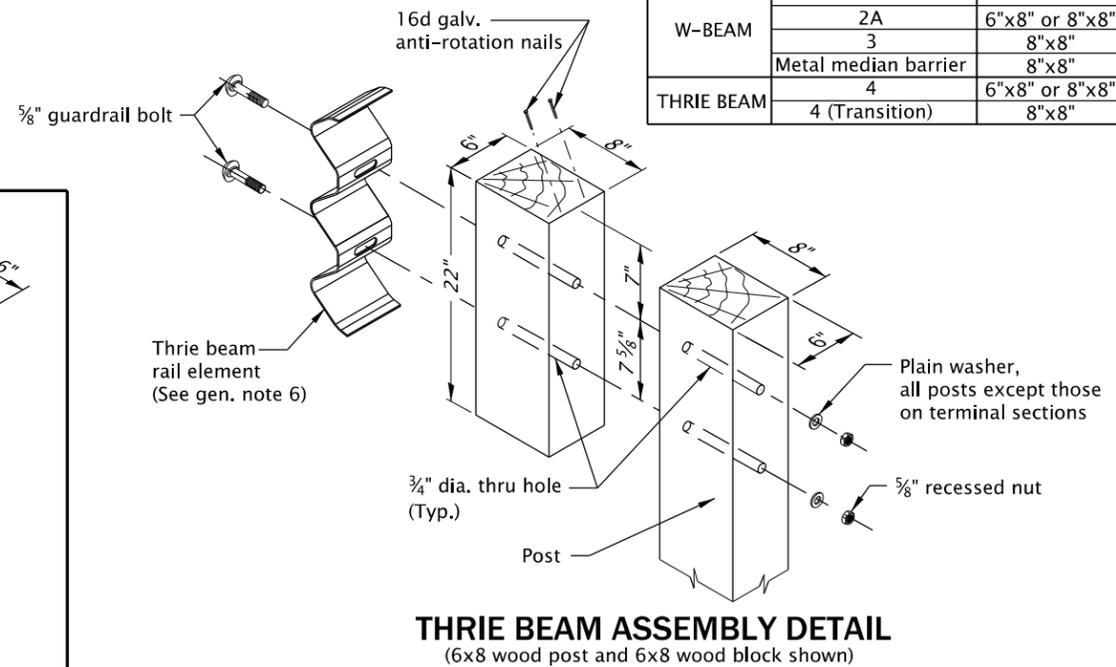
DATE	REVISION	DESCRIPTION
01-2020	TITLE CHANGED	REVISED DETAILS & NOTES

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 consulting a Registered Professional Engineer.

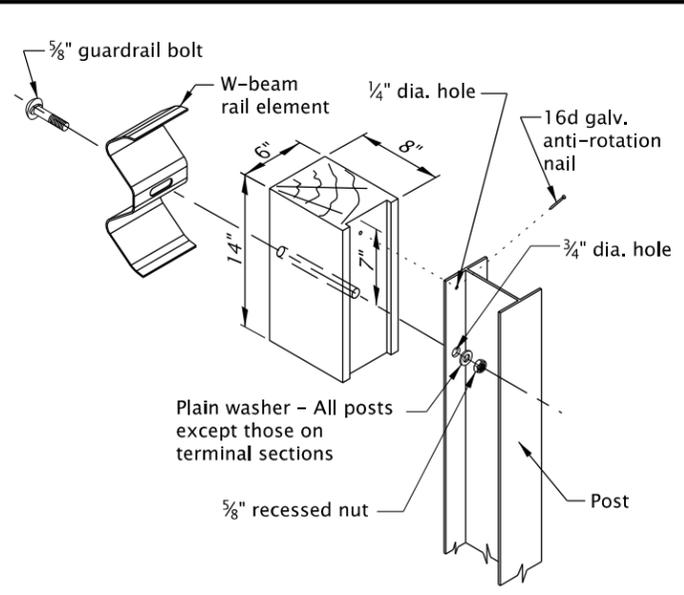
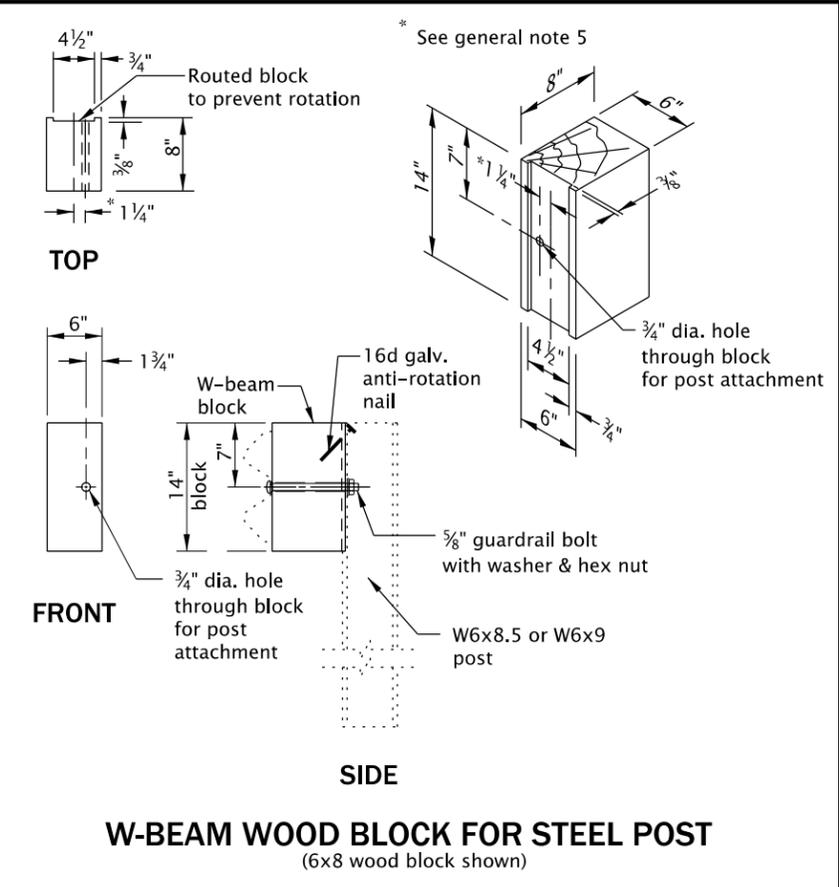
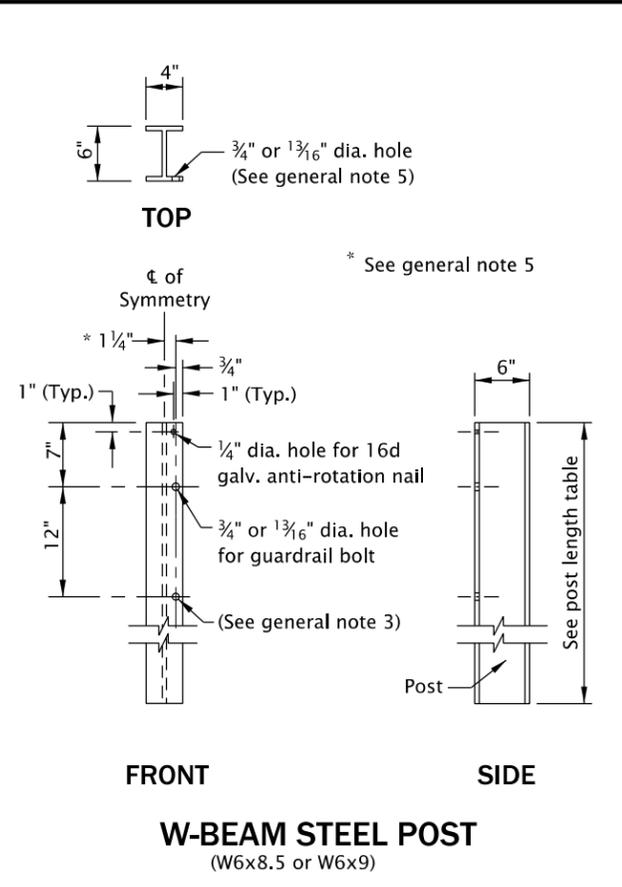


- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:
1. See appropriate guardrail standard drawing(s) for details not shown.
 2. See Bridge Dwgs. for bridge transition guardrail post and block requirements.
 3. Lowest hole(s) required only when channel rail is to be installed. Drill 12" below top 3/4" or 1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

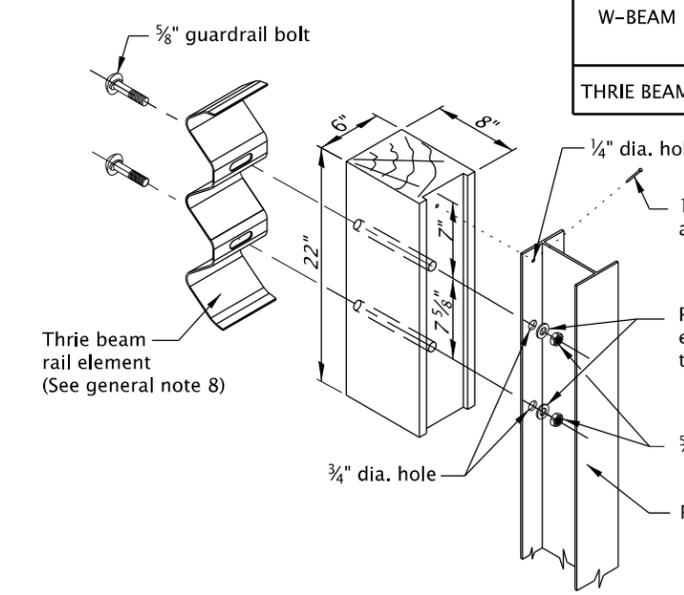
GUARDRAIL WOOD POST TABLE				
	GUARDRAIL TYPE	POST SIZE	POST LENGTH	POST SPACING
W-BEAM	2A	6"x8" or 8"x8"	6'-0"	6'-3"
	3	8"x8"	6'-0"	3'-1 1/2"
	Metal median barrier	8"x8"	6' 6"	6'-3"
THRIE BEAM	4	6"x8" or 8"x8"	7'-0"	6'-3"
	4 (Transition)	8"x8"	6'-0"	3'-1 1/2"



CALC. BOOK NO. N/A	BASELINE REPORT DATE 13-JAN-2020
<p><i>The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.</i></p>	NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications
	OREGON STANDARD DRAWINGS
	MIDWEST GUARDRAIL SYSTEM
	WOOD POST AND BLOCK
	2018
DATE	REVISION DESCRIPTION
01-2020	NEW DRAWING CREATED



W-BEAM ASSEMBLY DETAIL
(W6x8.5 steel post and 6x8 wood block shown)

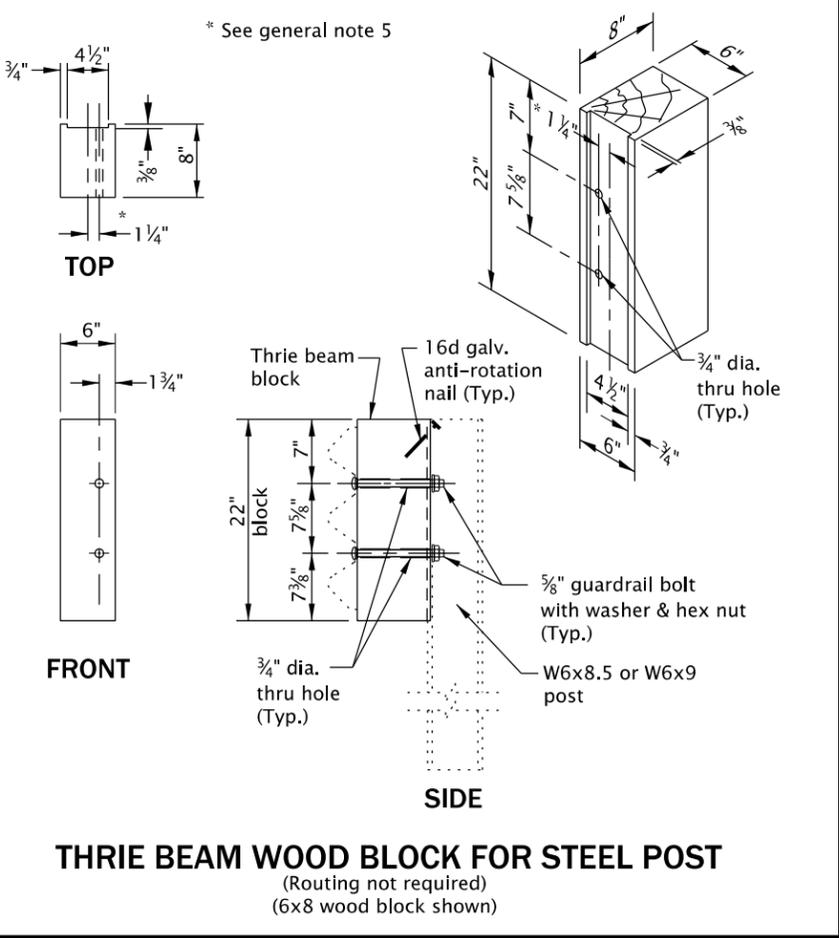
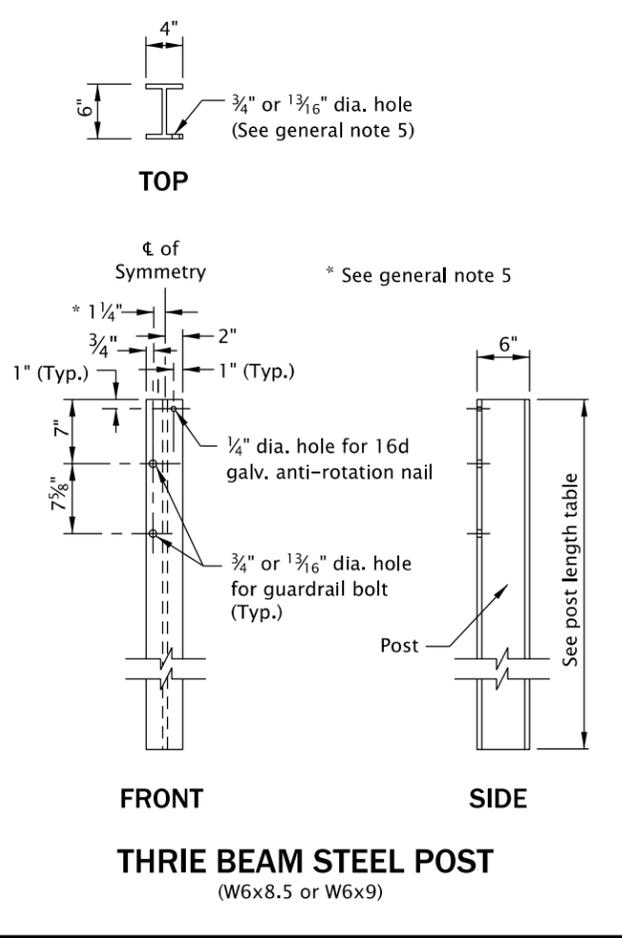


THRIE BEAM ASSEMBLY DETAIL
(W6x8.5 steel post and 6x8 wood block shown)

- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**
1. See appropriate guardrail standard drawing(s) for details not shown.
 2. See Bridge Dwgs. for bridge transition guardrail post and block requirements.
 3. Lowest hole(s) required only when channel rail is to be installed. Drill 1/2" below top 3/4" hole(s) used.
 4. Dimensions shown are for nominal posts and blocks.
 5. Steel posts are shifted to accommodate bolt holes. Holes may be on left, right, or both sides of web. Attach blockouts to steel posts using bolt holes on approaching traffic side of post web.
 6. Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.
 7. Wood block shall be toe-nailed to the post with a 16d galvanized nail to prevent block rotation.
 8. When required by the plans, nested thrie beam steel post shall be W6x9 and a maximum of 3'-1 1/2" on center.

GUARDRAIL STEEL POST TABLE

GUARDRAIL TYPE	POST SIZE	POST LENGTH	POST SPACING
W-BEAM	2A	W6x9 or W6x8.5	6'-6" or 6'-0"
	3	W6x9 or W6x8.5	6'-6"
	Metal median barrier	W6x9 or W6x8.5	6'-6"
THRIE BEAM	4	W6x9 or W6x8.5	7'-0"
	4 (Transition)	W6x9	6'-9"



CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

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NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

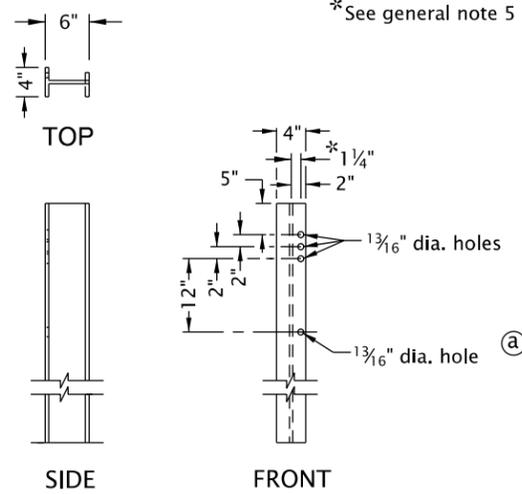
OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
STEEL POST AND BLOCK

2018

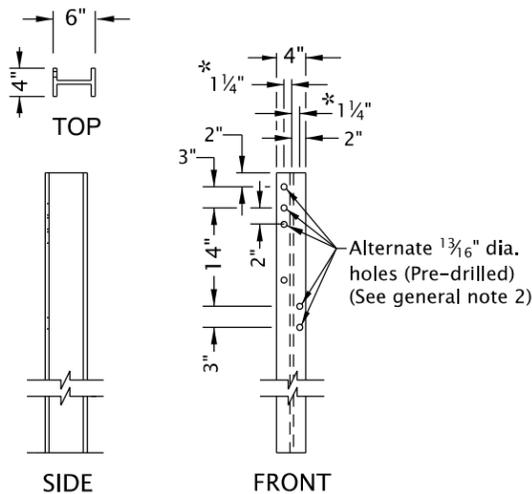
DATE	REVISION	DESCRIPTION
01-2020	TITLE CHANGED	REVISED DETAILS & NOTES

rd405.dgn 13-JAN-2020

STEEL



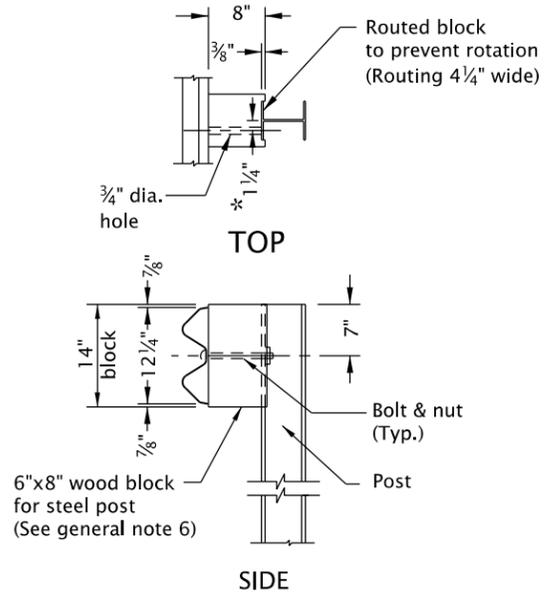
TYPE 2A, 3 OR METAL MEDIAN BARRIER



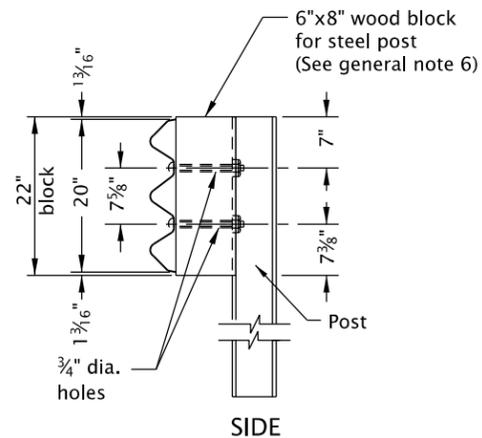
TYPE 4 OR TYPE 4 (TRANSITION) POST

(a) Lowest hole(s) required only where channel rail is to be installed. Drill 12" below top 1 3/16" hole(s) used. (See general note 3)

POSTS



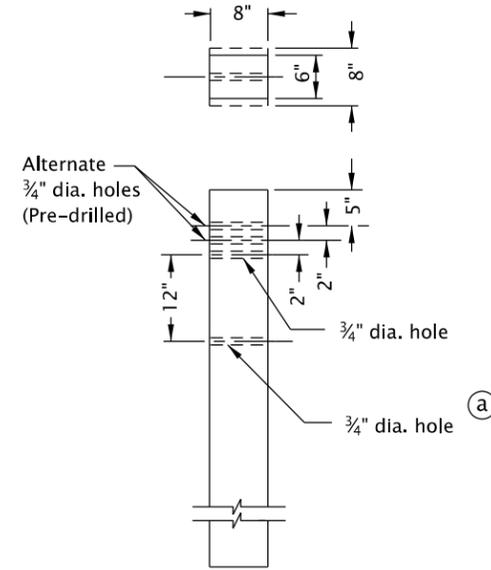
**TYPE 2A, 3 OR METAL MEDIAN BARRIER
WOOD BLOCK FOR STEEL POST**



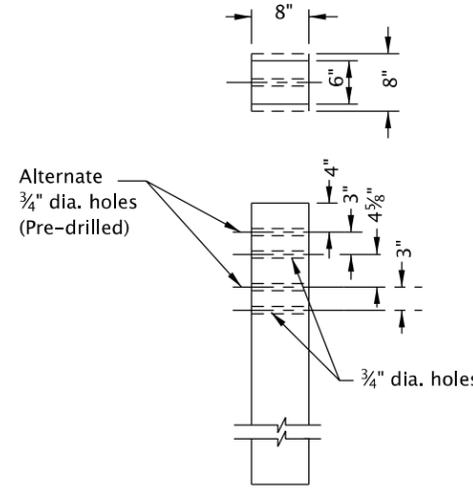
TYPE 4 OR TYPE 4 (TRANSITION) BLOCK

(Routing not required)

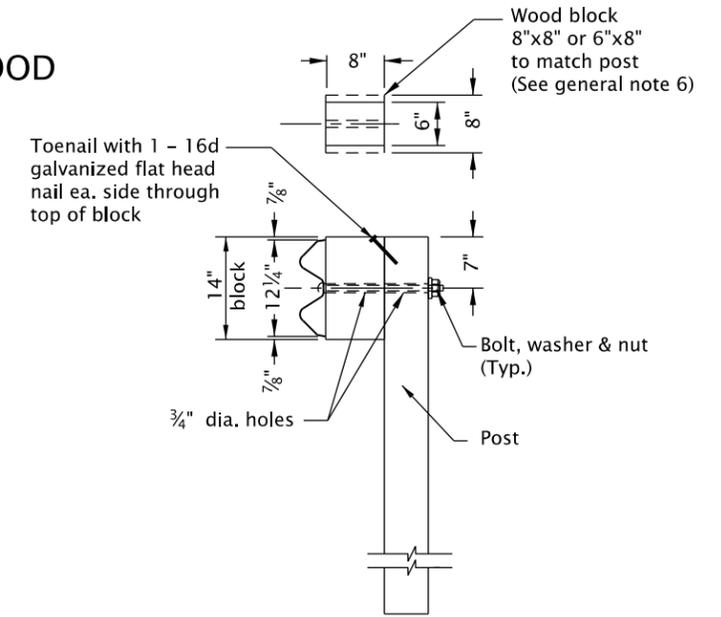
WOOD



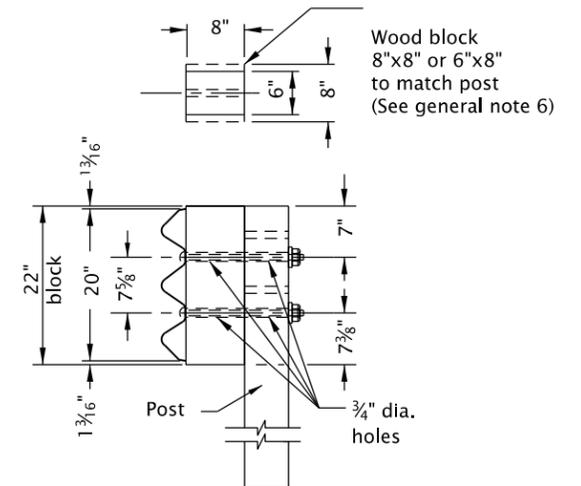
TYPE 1, 2A, 3 OR METAL MEDIAN BARRIER



TYPE 4 OR TYPE 4 (TRANSITION) POST



TYPE 2A, 3 OR METAL MEDIAN BARRIER



TYPE 4 OR TYPE 4 (TRANSITION) BLOCK

NOTE: THIS DRAWING IS RETAINED FOR MAINTENANCE PURPOSES. DO NOT USE FOR NEW CONSTRUCTION.

CALC. BOOK NO. N/A BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

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 consulting a Registered Professional Engineer.

OREGON STANDARD DRAWINGS
GUARDRAIL AND METAL MEDIAN BARRIER PARTS
(29" RAIL HEIGHT)

2018	
DATE	REVISION DESCRIPTION
01-2020	TITLE CHANGED & ADDED NOTE

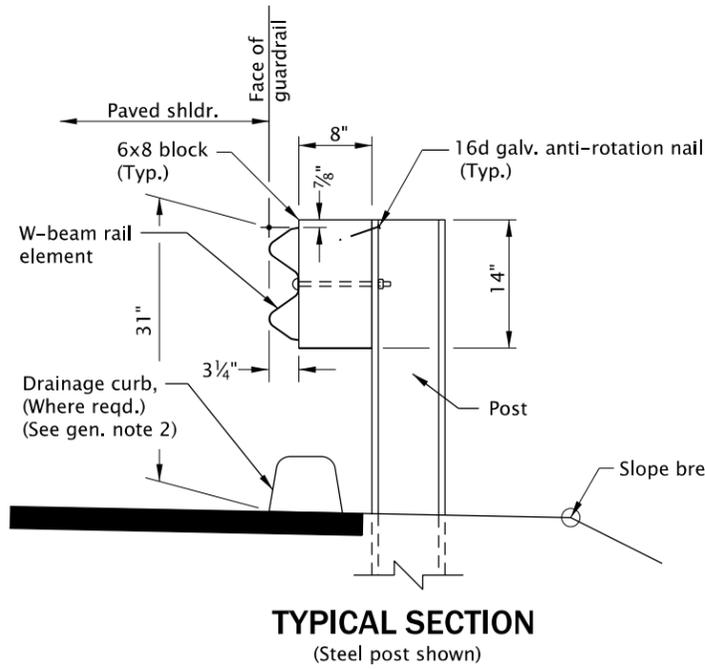
GUARDRAIL POST TABLE				
GUARDRAIL TYPE	POST SIZE		POST LENGTH	
	WOOD	STEEL *	WOOD	STEEL
1	6"x8" or 8"x8"	—	6'-0"	—
2A	6"x8" or 8"x8"	W6x9 or W6x8.5	6'-0"	6'-6" or 6'-0"
3	8"x8"	W6x9 or W6x8.5	6'-0"	6'-6"
Metal median barrier	8"x8"	W6x9 or W6x8.5	6' 6"	6'-6"
4	6"x8" or 8"x8"	W6x9 or W6x8.5	7'-0"	7'-0"
4 (Transition)	8"x8"	W6x9 or W6x8.5	6'-0"	6'-9"

GENERAL NOTES FOR ALL DETAILS:

1. See appropriate guardrail standard drawing(s) for details not shown.
2. See Bridge Dwgs. for bridge transition guardrail post & block requirements. Multiple holes are not required in bridge transition rail posts.
3. Posts and blocks to be pre-drilled for the intended guardrail installation.
4. Post and block dimensions are nominal.
5. Steel posts are shifted to accommodate bolt holes. Holes may be on left, right, or both sides of web.
6. Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.

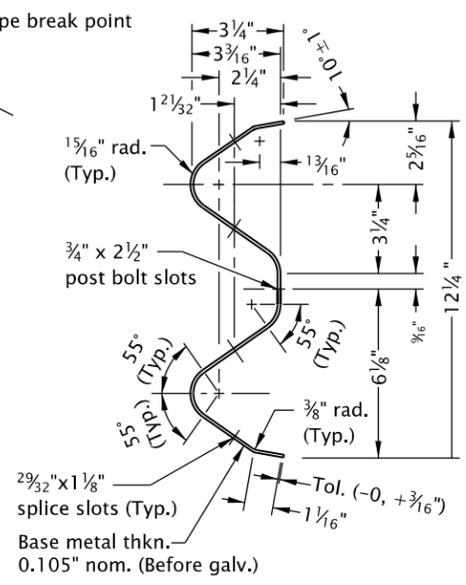
RD405

rd407.dgn 13-JAN-2020

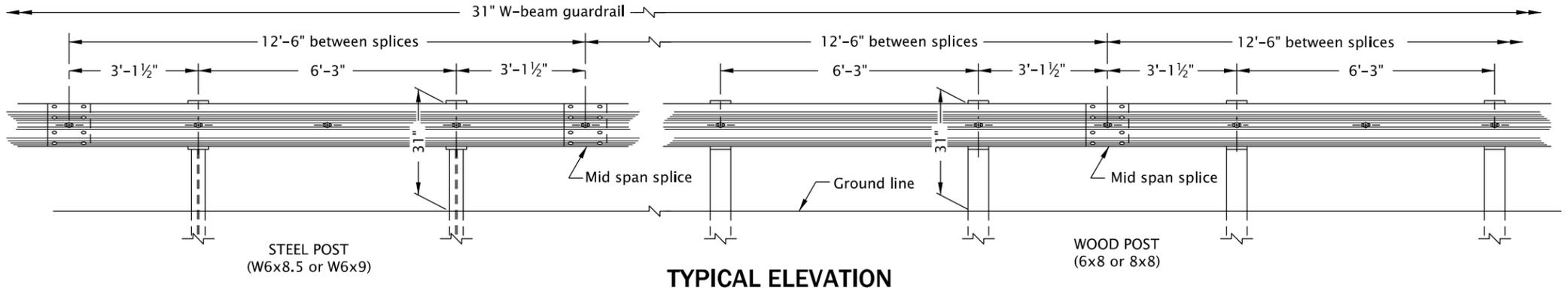


TYPICAL SECTION
(Steel post shown)

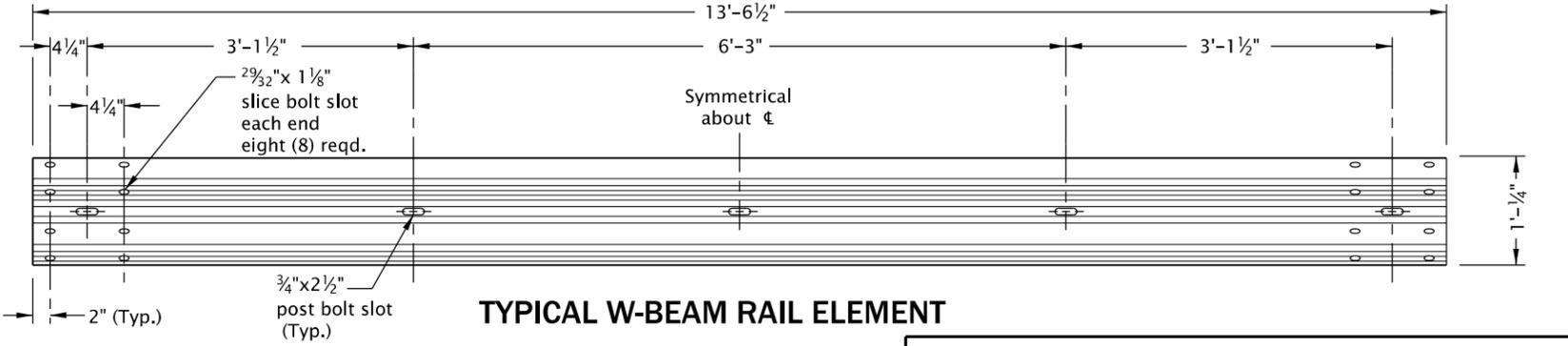
NORMAL RAIL ELEMENT DATA		
Type	Effective Lengths	Thkn. (Galv.)
2A, 3	6.25', 12.5', 25'	10 ga. & 12 ga.



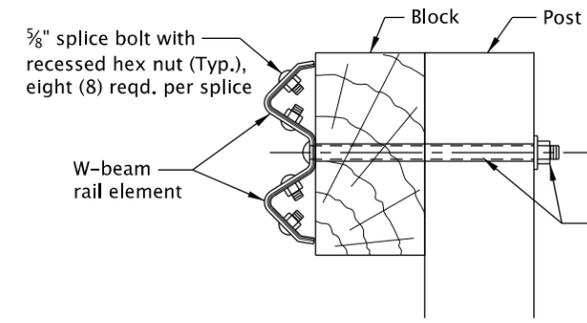
SECTION THRU RAIL ELEMENT



TYPICAL ELEVATION

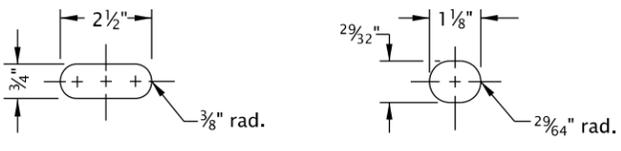


TYPICAL W-BEAM RAIL ELEMENT



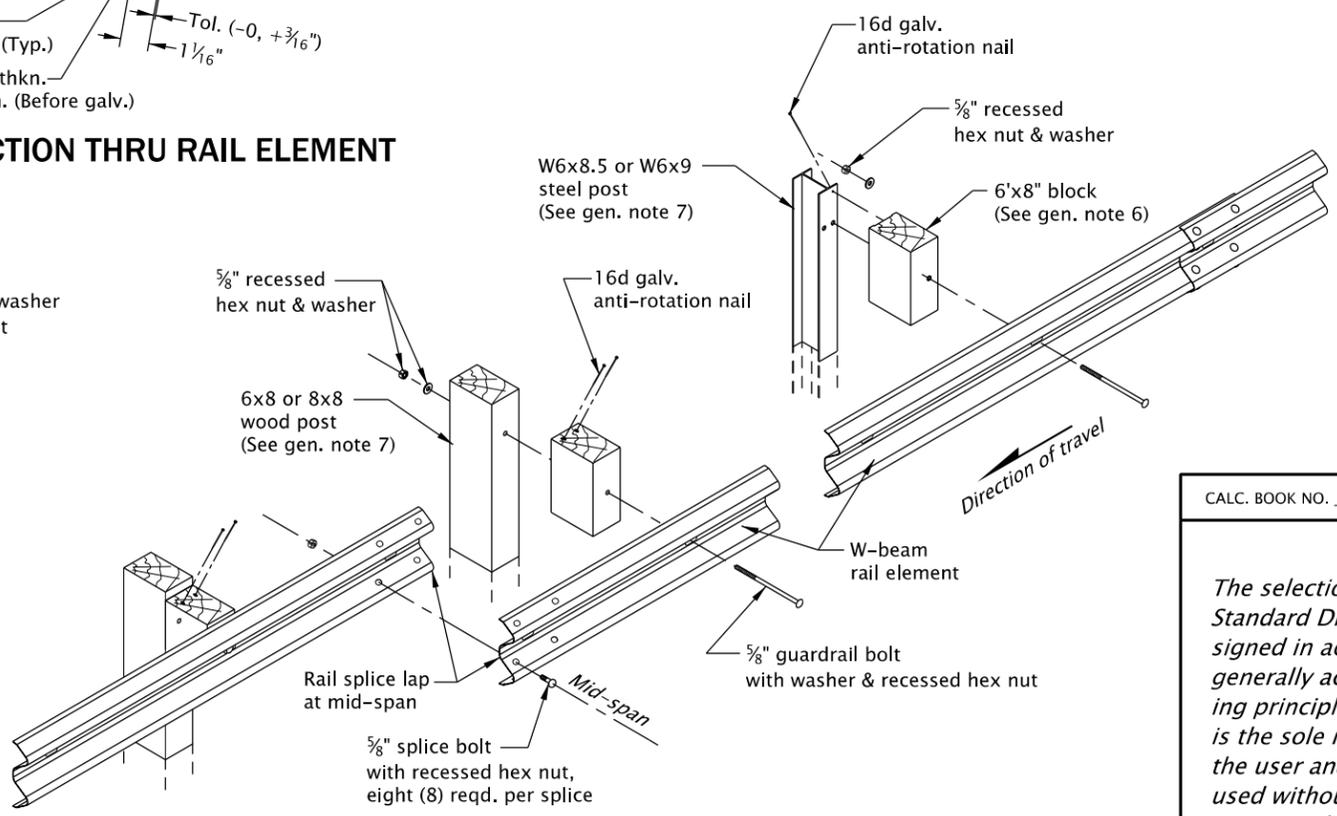
FITTINGS

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



POST BOLT SLOT

SPLICE BOLT SLOT



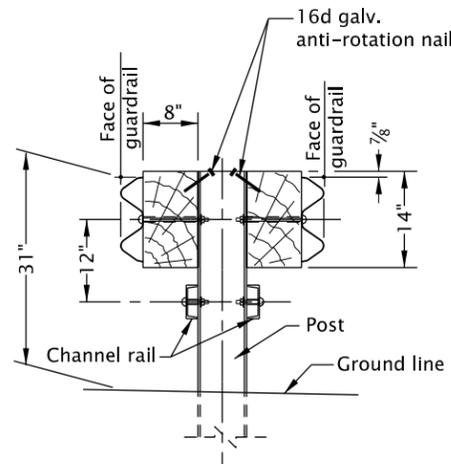
W-BEAM ASSEMBLY DETAILS

- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:
1. See appropriate guardrail standard drawing(s) for details not shown.
 2. When required by the plans, drainage curb alignment same as face of guardrail.
 3. Lap guardrail in direction of adjacent traffic.
 4. Final paved surfacing to extend to face of post. Rail height measured from final paved surface at face of rail to top of rail (Typ. all types). 1" ± tolerance.
 5. Wood block shall be toe-nailed to the post with 2 - 16d galvanized nails in top of block to prevent block rotation.
 6. Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.
 7. All posts for guardrail run shall be of the same type: wood or steel.
 8. For guardrail installed on radii of 150' or less (5' min. radius) use rail elements pre-curved to industry standard. Install "Radius Identification Plate".

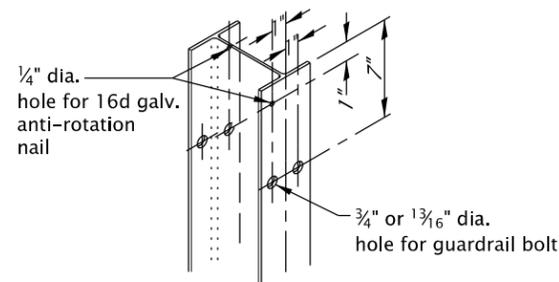
CALC. BOOK NO. N/A	BASELINE REPORT DATE 13-JAN-2020
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS	
MIDWEST GUARDRAIL SYSTEM (W-BEAM)	
2018	
DATE	REVISION DESCRIPTION
01-2020	NEW DRAWING CREATED

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 consulting a Registered Professional Engineer.

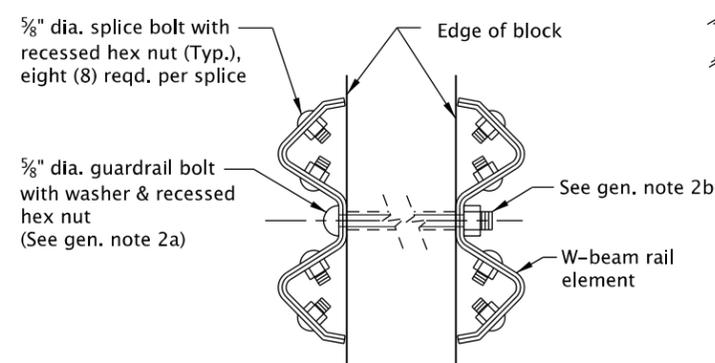
RD407



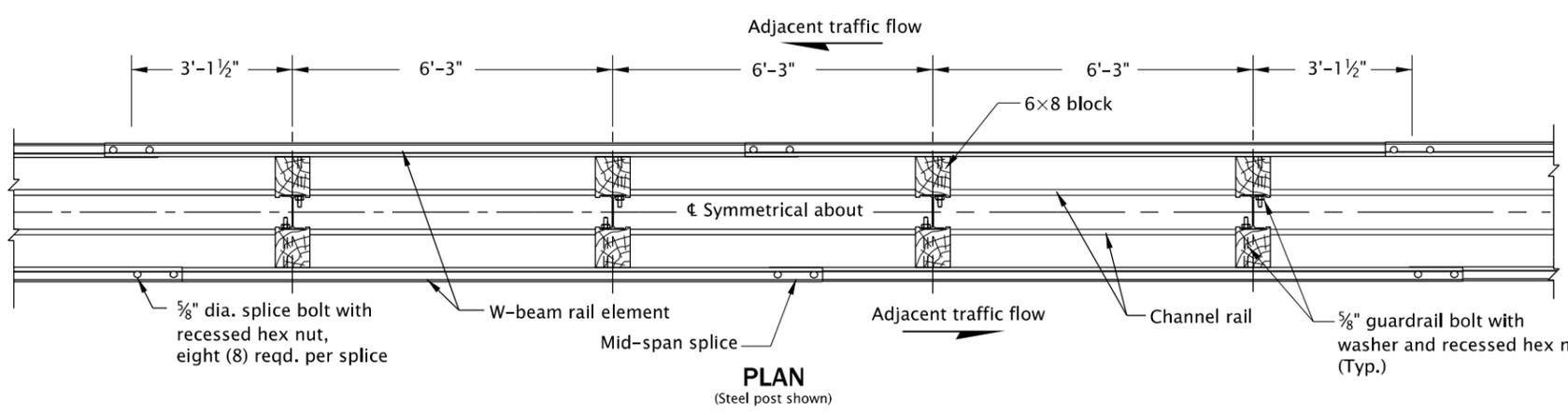
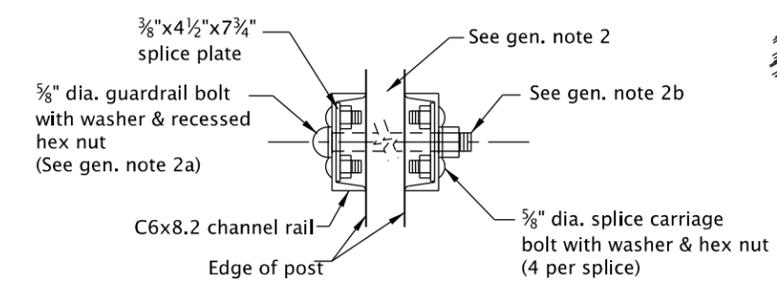
TYPICAL SECTION
(Steel post shown)



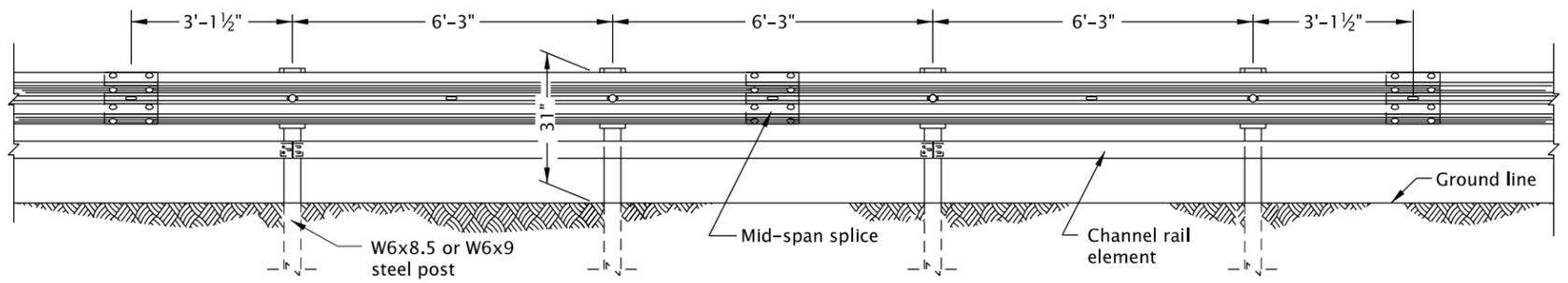
STEEL POST
(All dimensions typ. both sides)



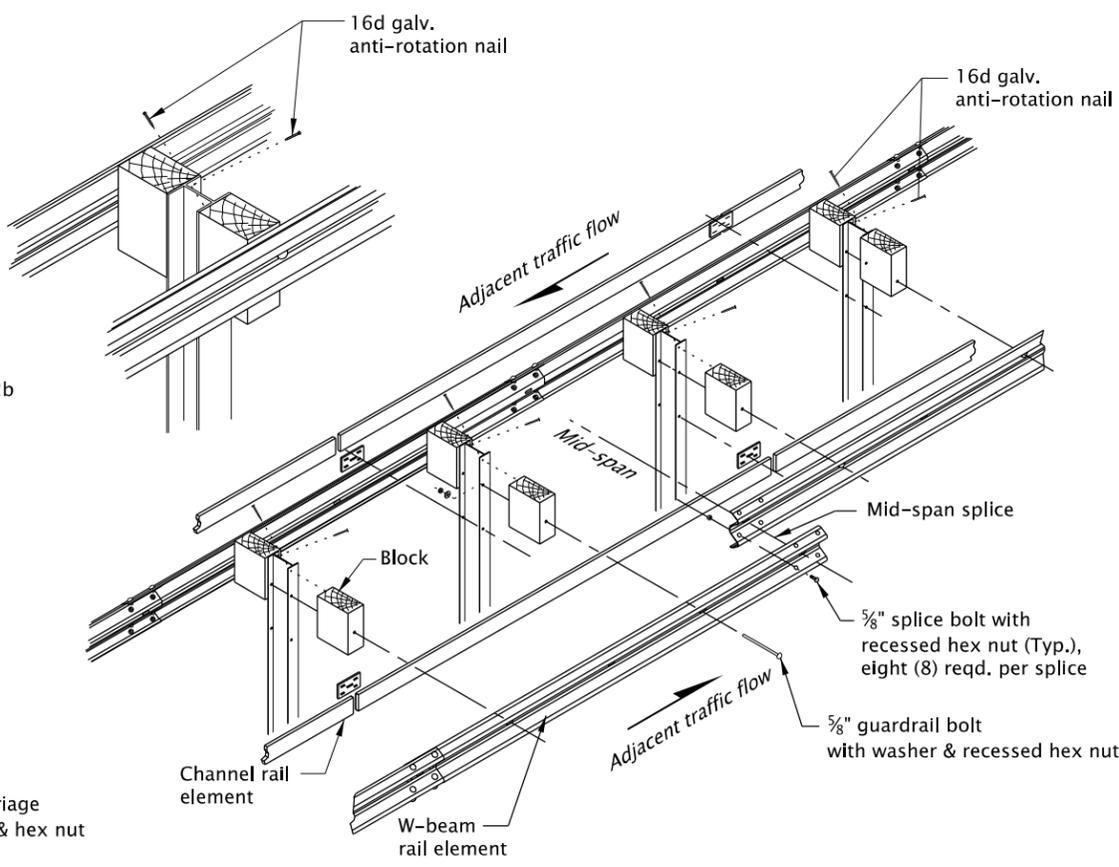
FITTINGS



PLAN
(Steel post shown)



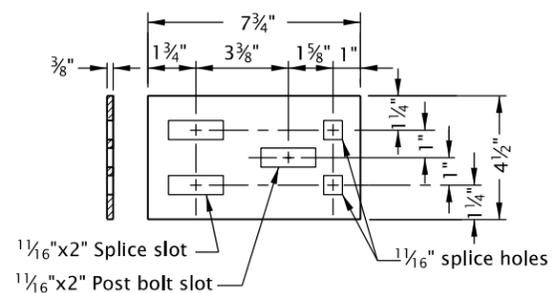
ELEVATION
(Steel post shown)



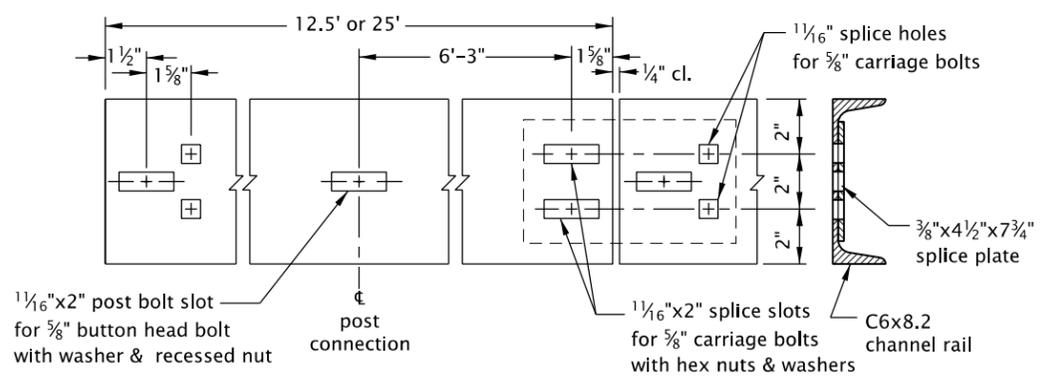
ASSEMBLY DETAILS

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

- See appropriate guardrail standard drawing(s) for details not shown.
- Median barrier post spacing shall be 6' - 3" on centers. See end construction for variations.
 - Use 5/8" dia. button head bolt or 5/8" dia. alternate treated both end bolt with washer and recessed hex nut when barrier separates to double post mounting.
 - Post bolts to extend beyond the tightened nuts within limits of 1/4" to 1/2".
- Lap guardrail in direction of adjacent traffic.
- Wood blocks shall be toe-nailed to post with 2 - 16d galvanized nails in top block to prevent block rotation.
- Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.



SPLICE PLATE



CHANNEL RAIL

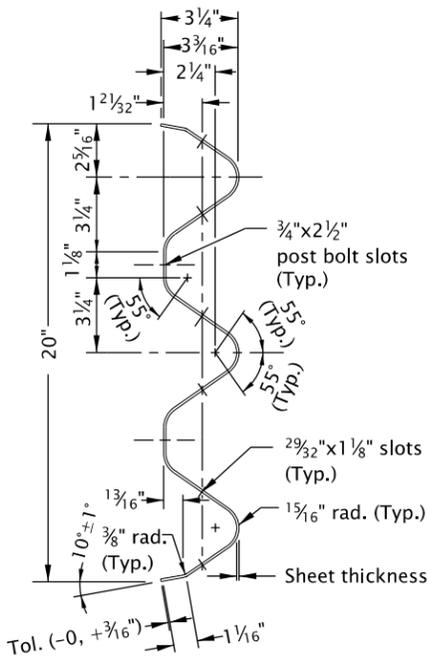
Note: Clearance to be 1 1/16" at rail splice for bridge expansion joints.

CALC. BOOK NO. <u>N/A</u>		BASELINE REPORT DATE <u>13-JAN-2020</u>	
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications			
OREGON STANDARD DRAWINGS			
MIDWEST GUARDRAIL SYSTEM			
METAL MEDIAN BARRIER			
(DOUBLE SIDES)			
2018			
DATE	REVISION DESCRIPTION		
01-2020	NEW DRAWING CREATED		

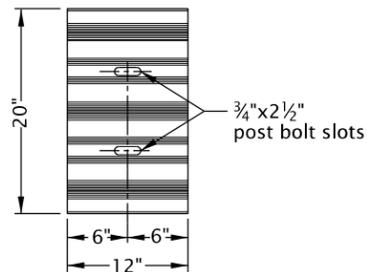
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

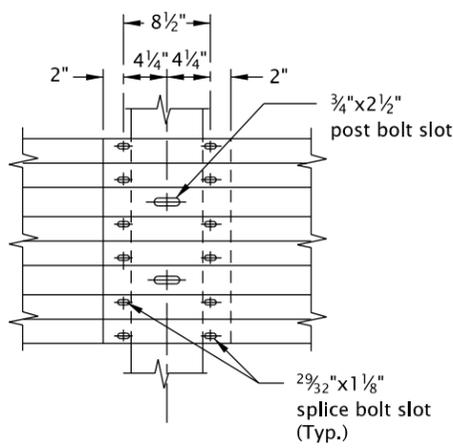
1. See appropriate guardrail standard drawing(s) for details not shown.
2. Lap guardrail in direction of adjacent traffic.
3. Hole layout per manufacturer with appropriate post and block.
4. Final paved surfacing to extend to face of post. Rail height measured from final paved surface at face of rail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



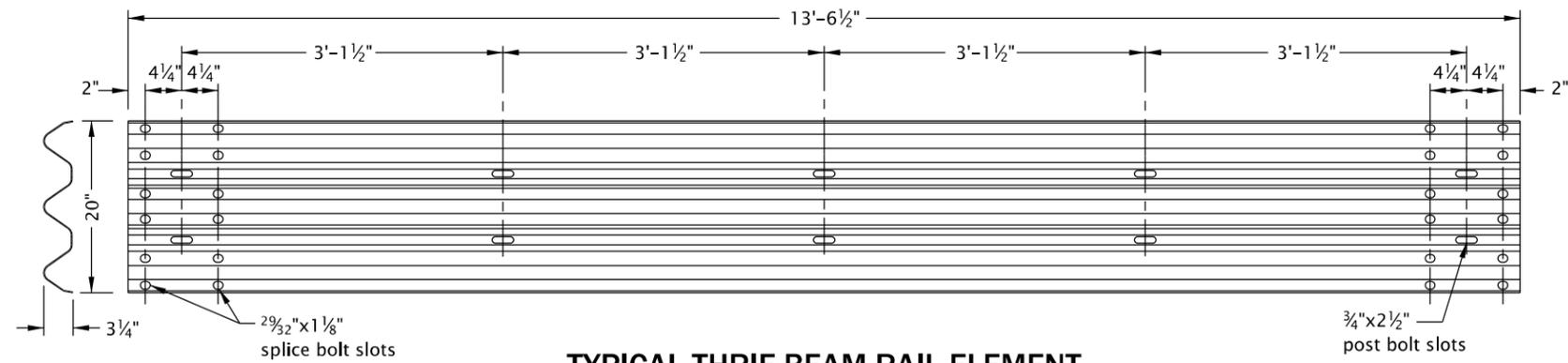
SECTION THRU RAIL ELEMENT



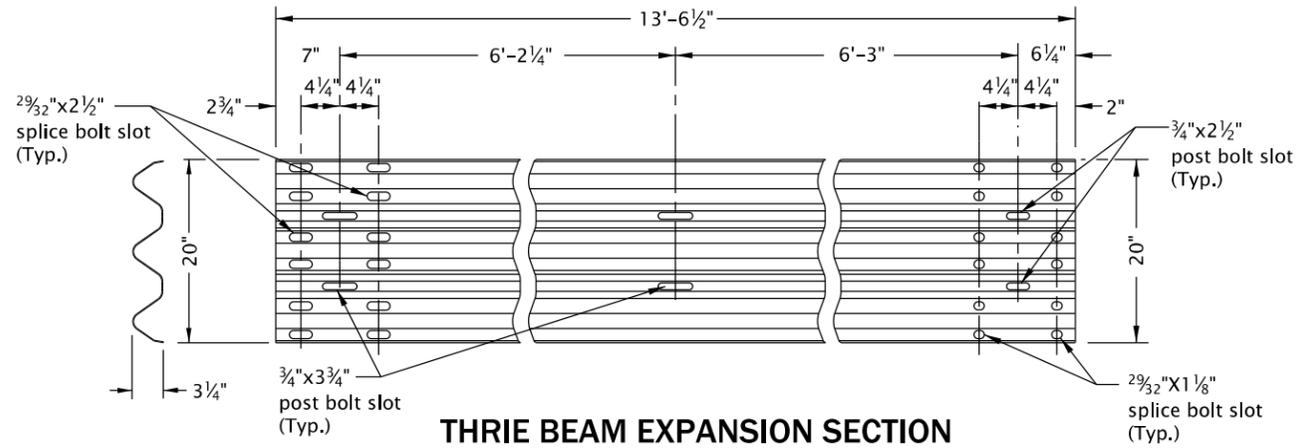
THRIE BEAM BACK-UP PLATE
(For detail not shown, see "Section Thru Rail Element")



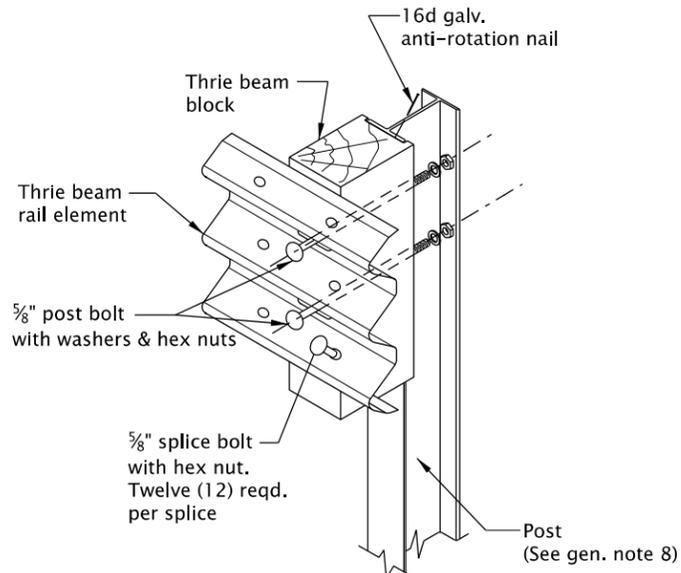
THRIE BEAM SPLICE



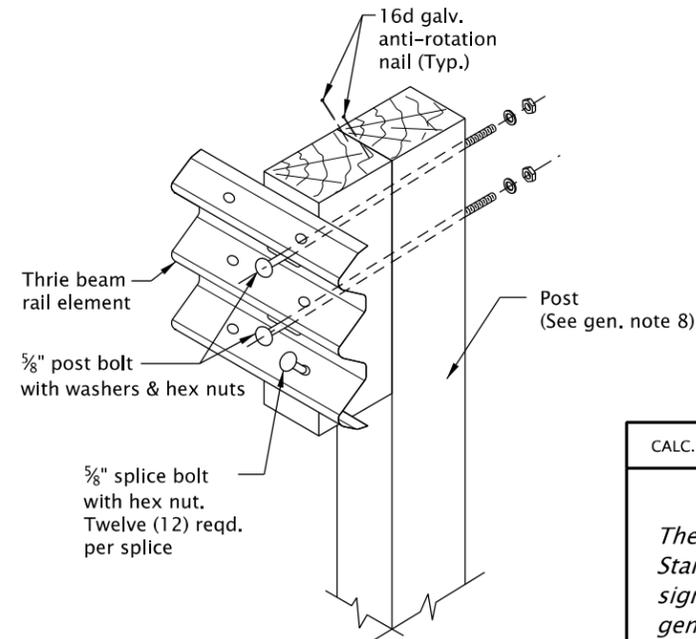
TYPICAL THRIE-BEAM RAIL ELEMENT
(12'-6" length shown)



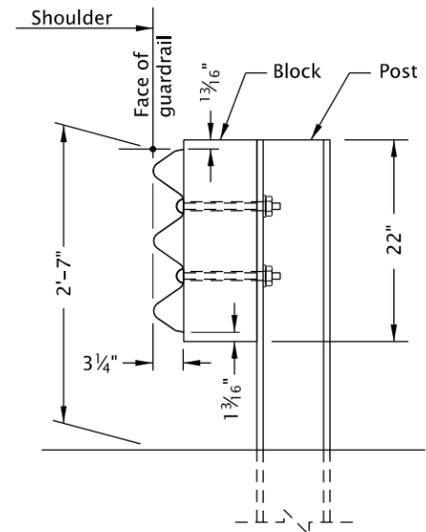
THRIE BEAM EXPANSION SECTION



STEEL POST ASSEMBLY



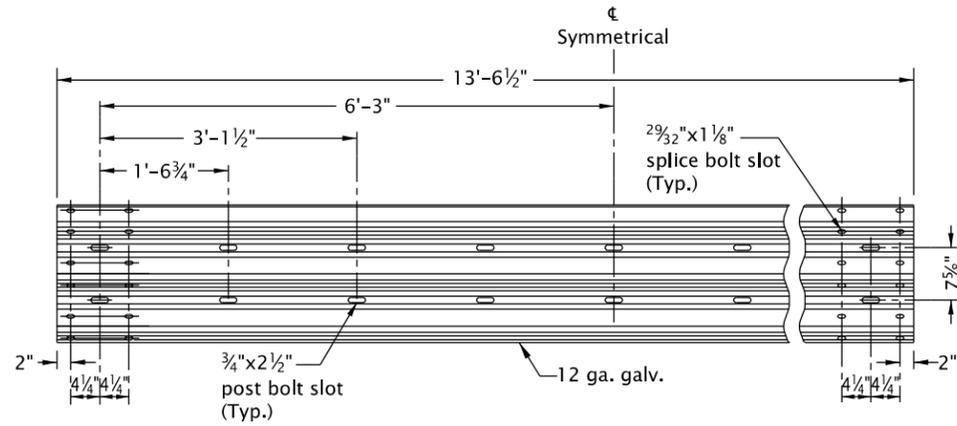
WOOD POST ASSEMBLY



TYPICAL SECTION
(Steel post shown)

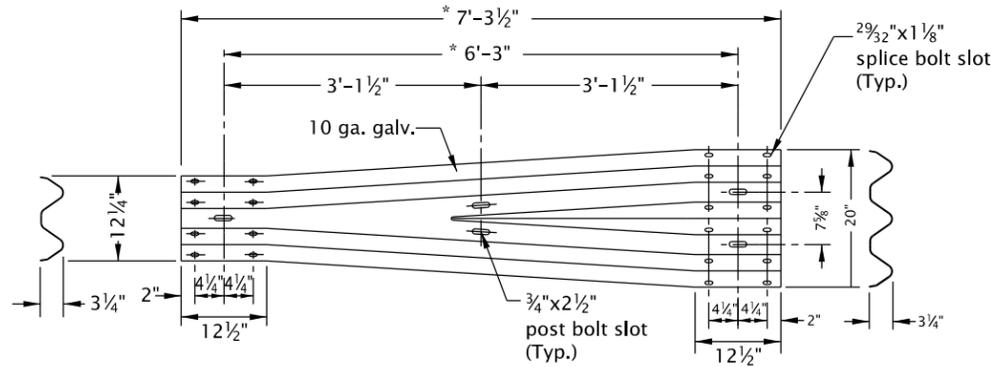
CALC. BOOK NO. N/A	BASILINE REPORT DATE 13-JAN-2020
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS	
THRIE BEAM GUARDRAIL	
2018	
DATE	REVISION DESCRIPTION
01-2020	NEW DRAWING CREATED

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 consulting a Registered Professional Engineer.

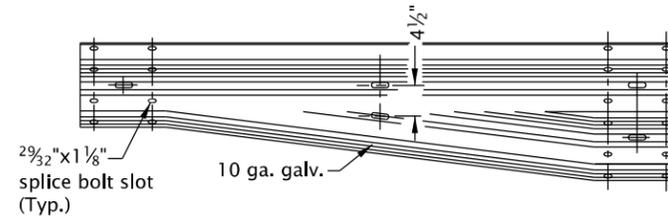


THRIE BEAM RAIL ELEMENT
1/4 POST SPACING
 (12'-6" section shown)

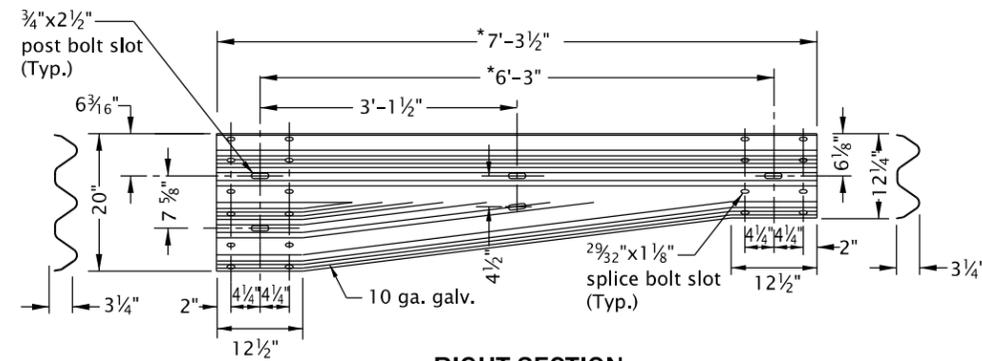
* See general note 4



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



LEFT SECTION
 (Reverse of right section)



RIGHT SECTION
TYPICAL THRIE BEAM TRANSITION ELEMENT

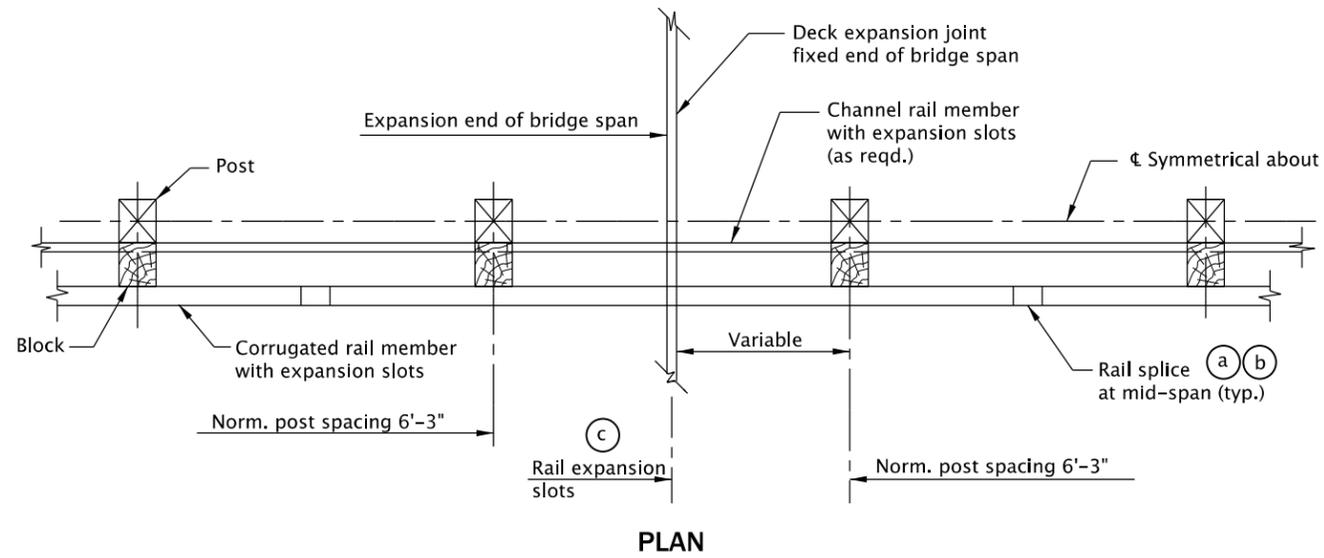
GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

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

CALC. BOOK NO. <u> N/A </u>		BASELINE REPORT DATE <u> 13-JAN-2020 </u>	
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications			
OREGON STANDARD DRAWINGS			
THRIE BEAM GUARDRAIL TRANSITION			
2018			
DATE	REVISION	DESCRIPTION	
01-2020		TITLE CHANGED, REVISED DETAILS & NOTES	

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 consulting a Registered Professional Engineer.

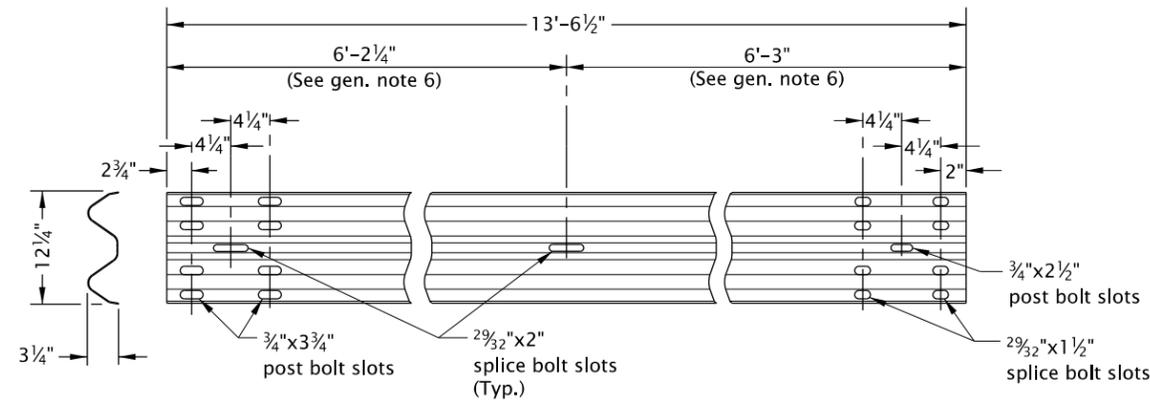
rd412.dgn 13-JAN-2020



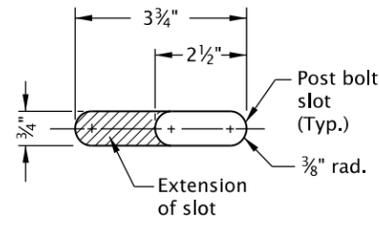
NOTES:

- (a) Place 2 - 1/32" polytetrafluoroethylene (TFE) sheets between corrugated rail members. The sheets shall be 12 1/2"x1'-7".
- (b) Adjust nuts to provide a sliding fit and set threads to prevent loosening.
- (c) Extension of slot toward bridge deck expansion joint.

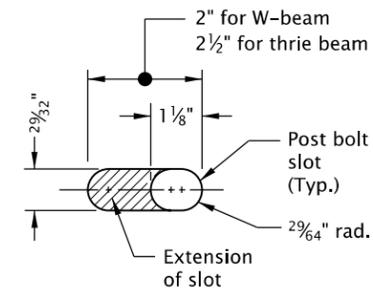
GUARDRAIL INSTALLATION AT BRIDGE DECK EXPANSION JOINT



W-BEAM EXPANSION SECTION



POST BOLT SLOT



SPLICE BOLT SLOT

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail standard drawing(s) for details not shown.
2. Median barrier post spacing shall be 6'-3" on centers.
3. Lap guardrail in direction of adjacent traffic.
4. Wood blocks shall be toe-nailed to post with 16d galvanized nails to prevent block rotation.
5. Wood blocks shown. Blocks of an approved alternate material may be used. See ODOT's QPL.
6. Spacing may vary depending on application.

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS MIDWEST GUARDRAIL SYSTEM INSTALLATION AT BRIDGE DECK EXPANSION JOINT

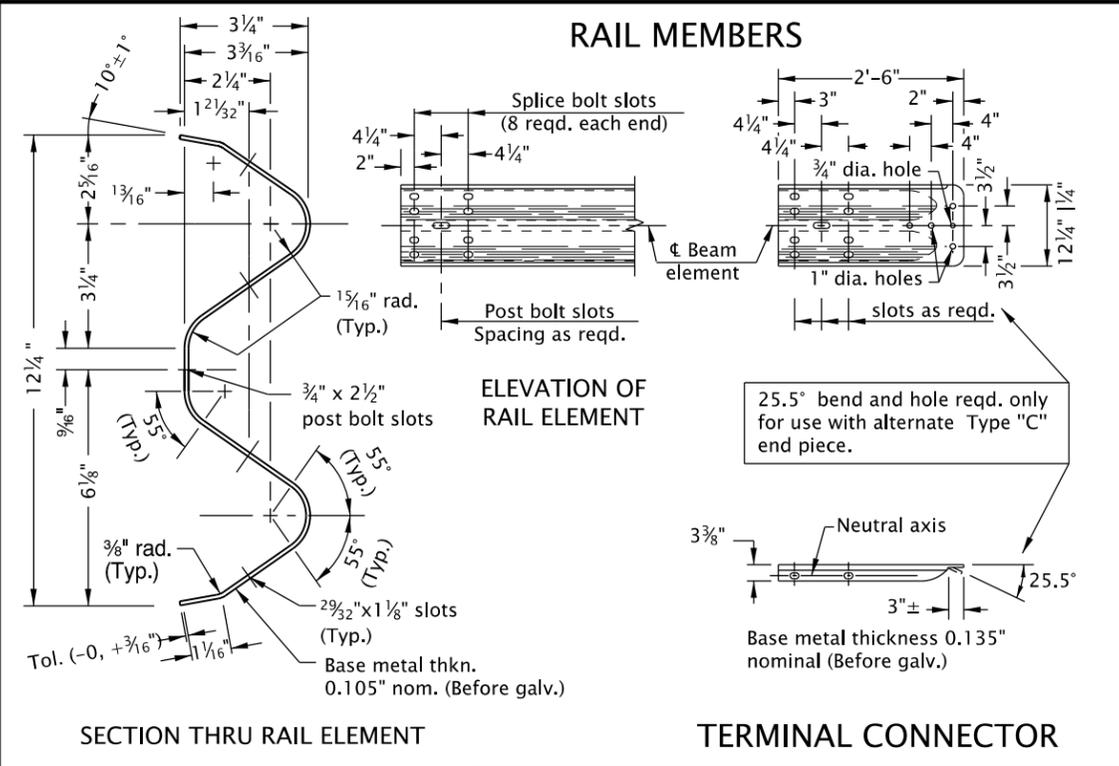
2018

DATE	REVISION	DESCRIPTION
01-2020	NEW DRAWING CREATED	

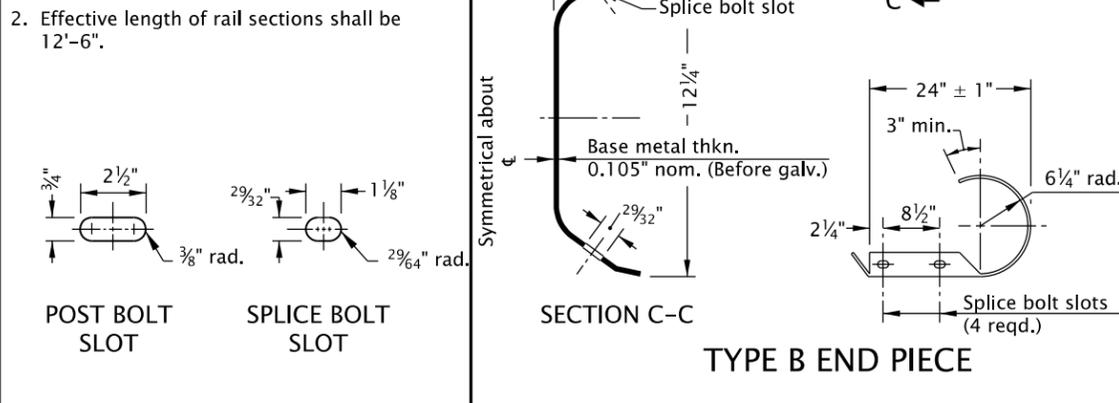
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

RD412

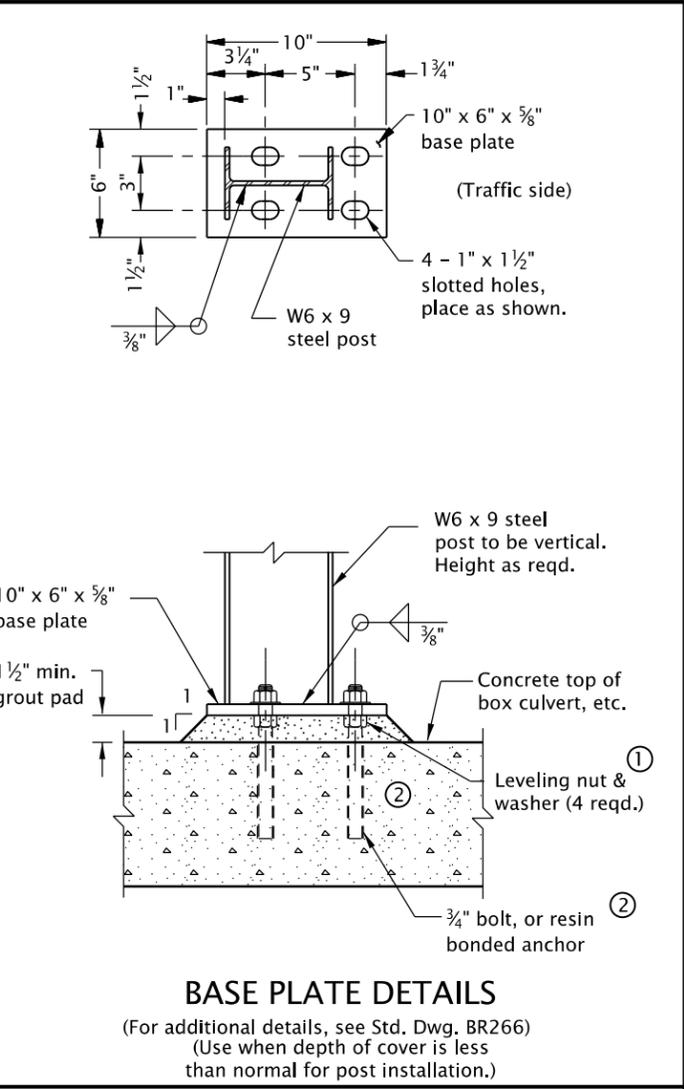
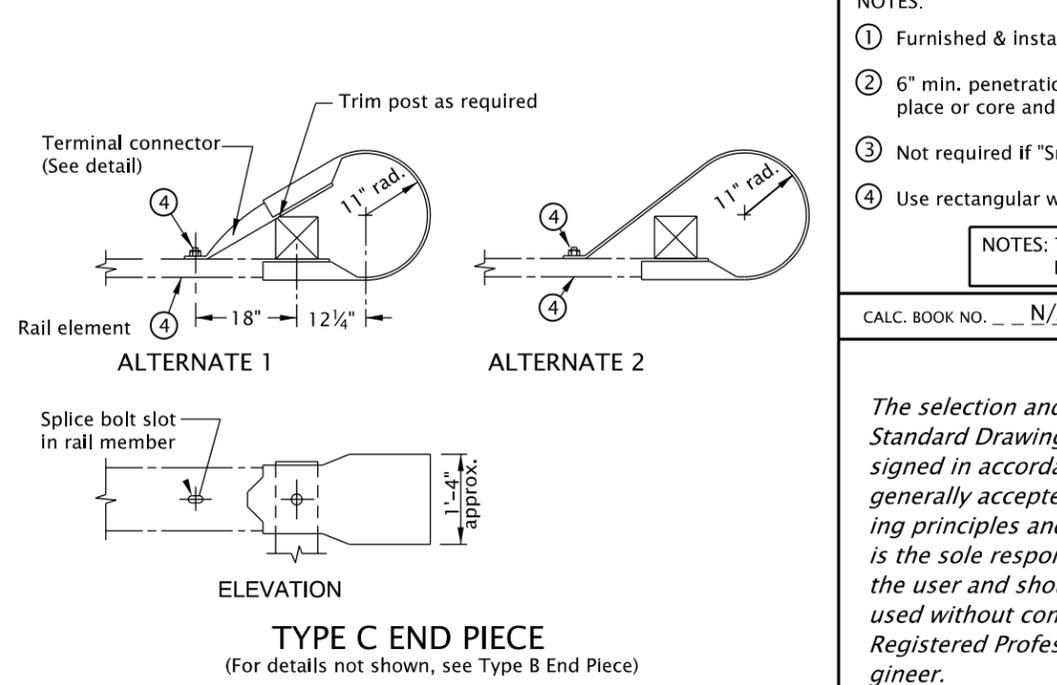
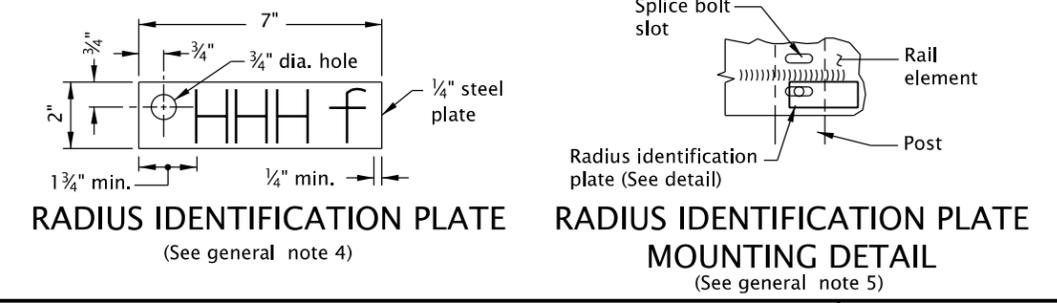
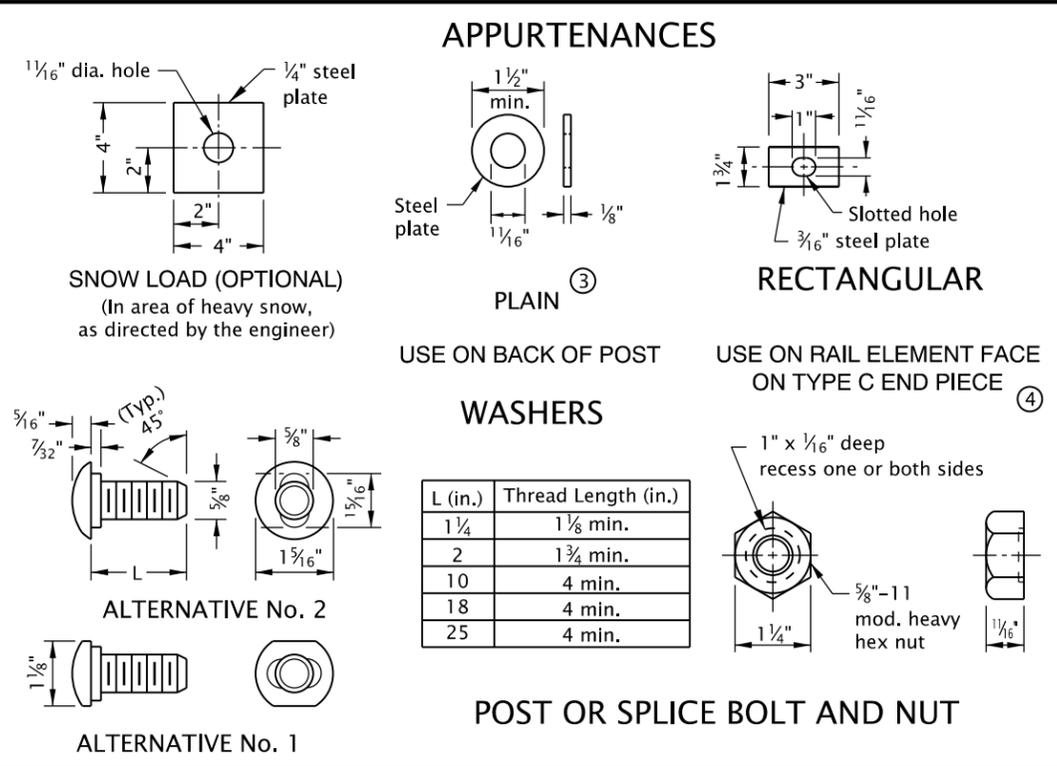
rd415.dgn 13-JAN-2020



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



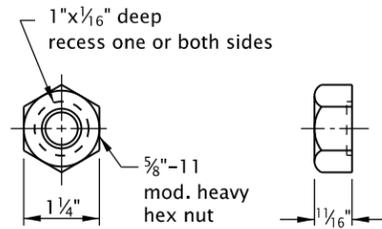
- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:
- See appropriate guardrail standard drawing(s) for details not shown.
 - For details of guardrail connections to structural handrails, see special details or Standard Drawings as called for on plans.
 - All indicated welds shall attain the full strength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



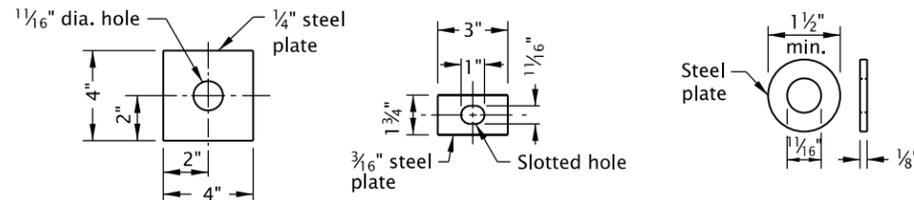
- NOTES:
- Furnished & installed by structure contractor when shown on structure plans.
 - 6" min. penetration into concrete slabs other than bridge decks. Cast in place or core and install using approved resin bonding system.
 - Not required if "Snow Load" washer option is used.
 - Use rectangular washer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

CALC. BOOK NO. N/A	BASELINE REPORT DATE 13-JAN-2020
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS	
GUARDRAIL AND METAL MEDIAN BARRIER PARTS (29" RAIL HEIGHT)	
2018	
DATE	REVISION DESCRIPTION
01-2020	TITLE CHANGED, ADDED NOTE

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 consulting a Registered Professional Engineer.



5/8" DIA. RECESSED HEX NUT

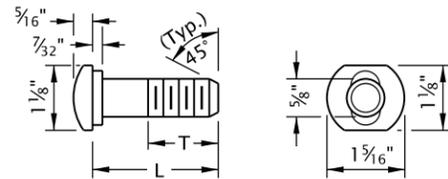


SNOW LOAD POST WASHER

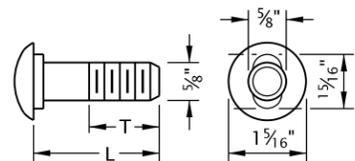
SNOW LOAD RAIL WASHER

PLAIN WASHER
Use on back of post.

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



ALTERNATIVE No. 1

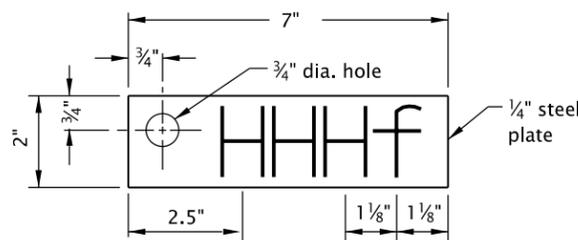


ALTERNATIVE No. 2

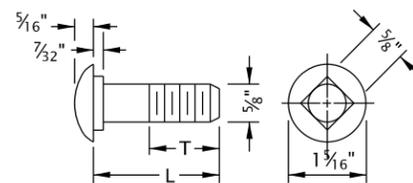
BOLT DIMENSION TABLE

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

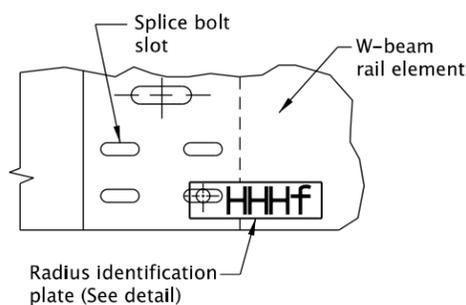
5/8" GUARDRAIL POST/SPIECE BOLT (BUTTON HEADED)



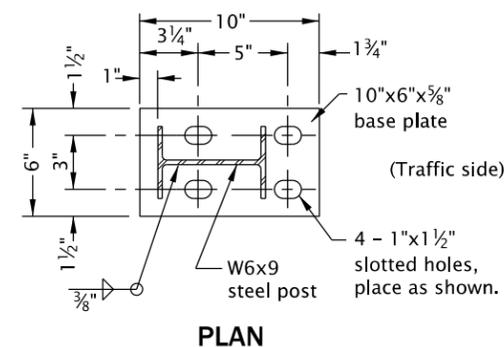
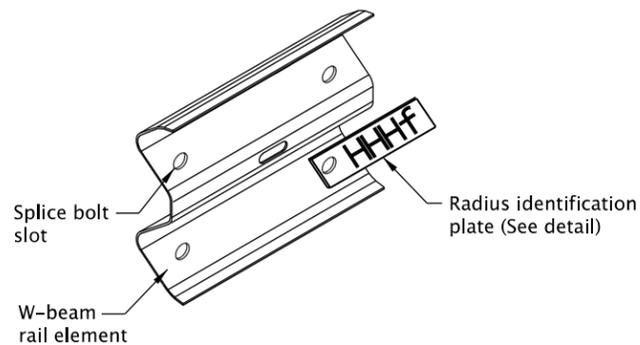
RADIUS IDENTIFICATION PLATE
(See general note 4)



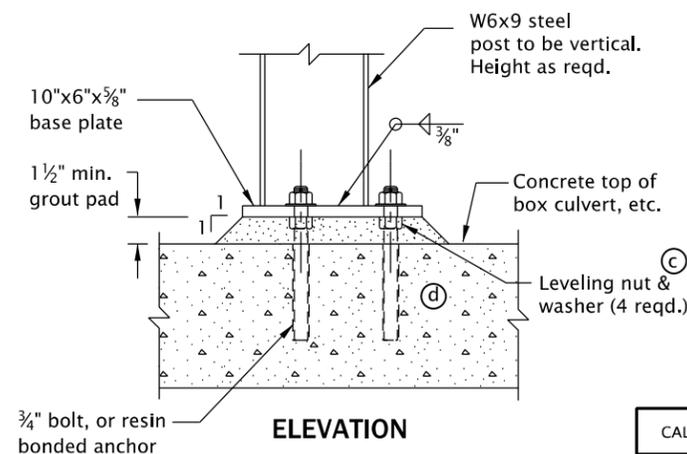
5/8" DIA. CARRIAGE BOLT



RADIUS IDENTIFICATION PLATE MOUNTING DETAIL
(See general note 5)



PLAN



ELEVATION

BASE PLATE DETAILS

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

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

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

SUPPLEMENTARY NOTES:

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

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

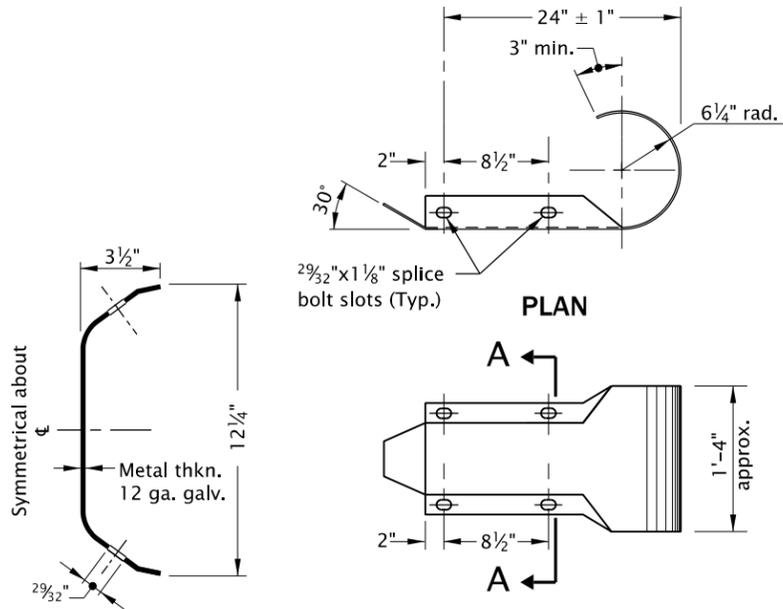
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
STANDARD HARDWARE
(NUTS, BOLTS, WASHERS AND MISC.)

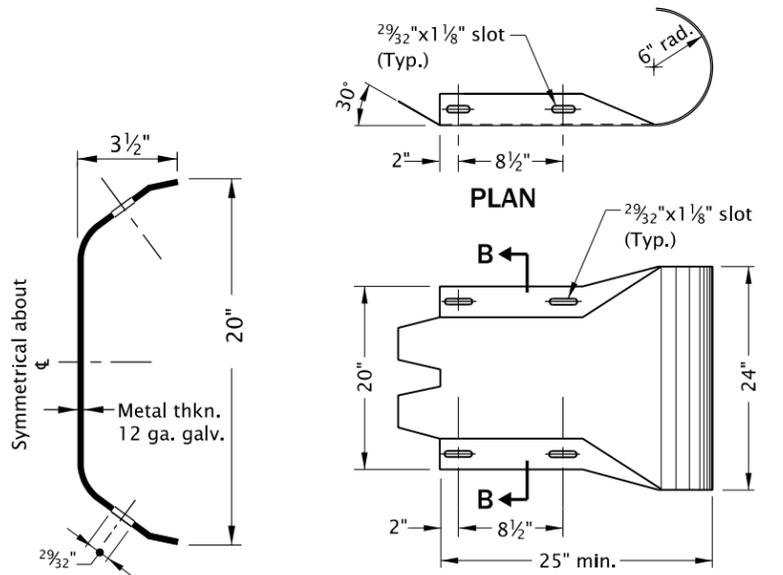
2018

DATE	REVISION	DESCRIPTION
01-2020	NEW DRAWING CREATED	(REVISED DETAILS & NOTES FROM STD. DWG RD415)

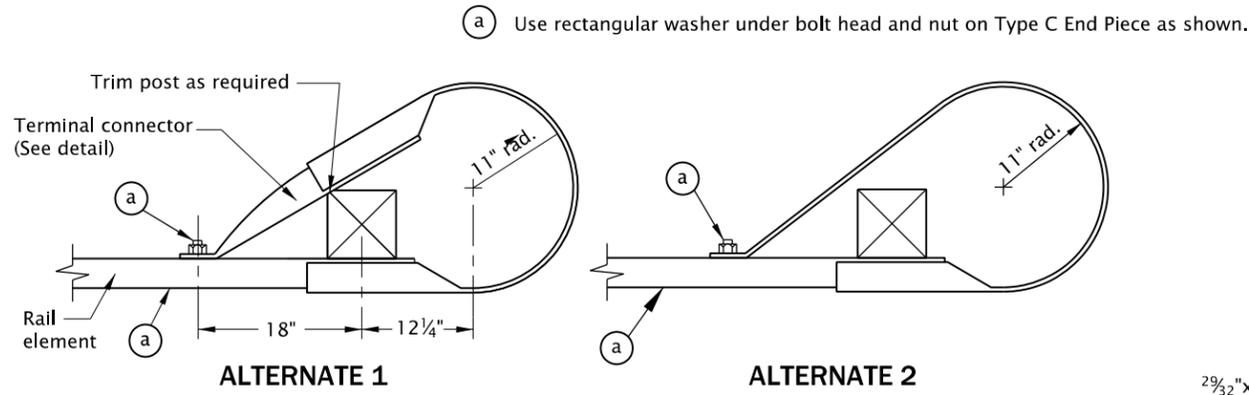
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



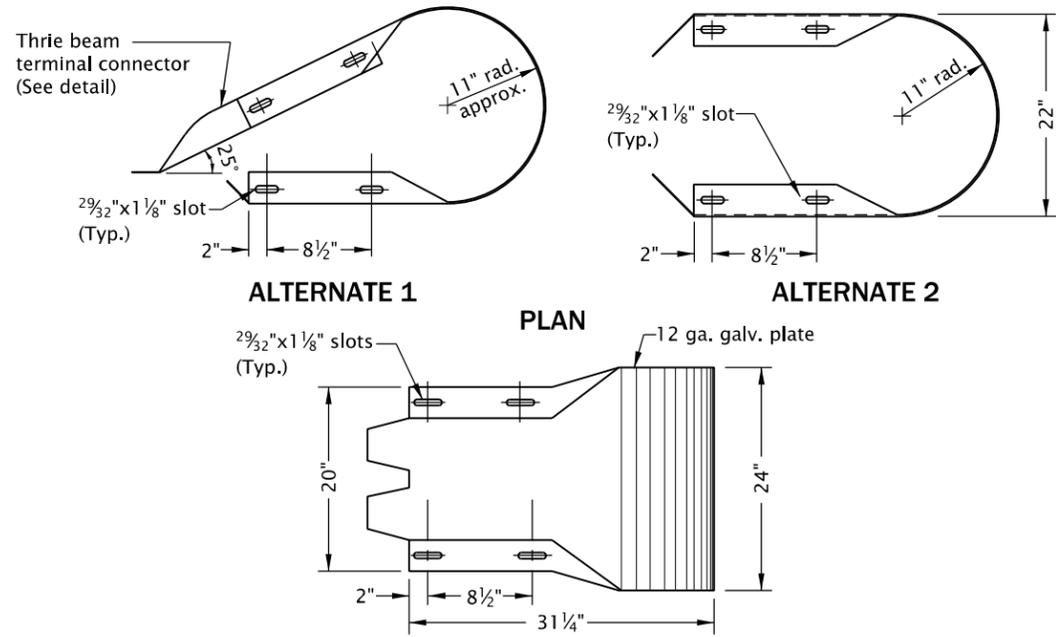
SECTION A-A
W-BEAM TYPE B END PIECE



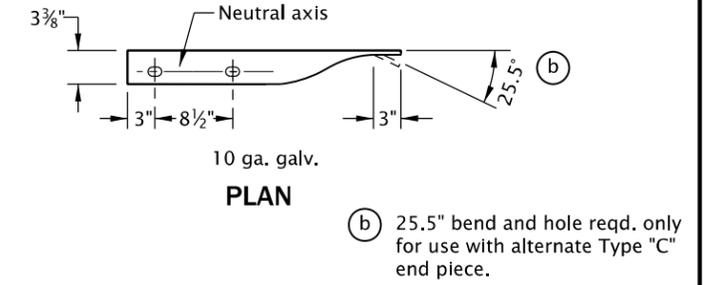
SECTION B-B
THRIE BEAM TYPE B END PIECE



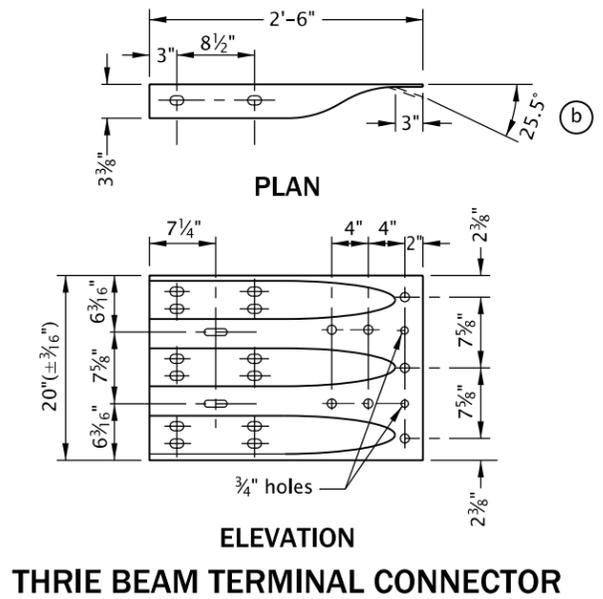
ALTERNATE 1
ALTERNATE 2
W-BEAM TYPE C END PIECE
(For details not shown, see Type B End Piece)



ALTERNATE 1
ALTERNATE 2
ELEVATION
THRIE BEAM TYPE C END PIECE



W-BEAM TERMINAL CONNECTOR
ELEVATION



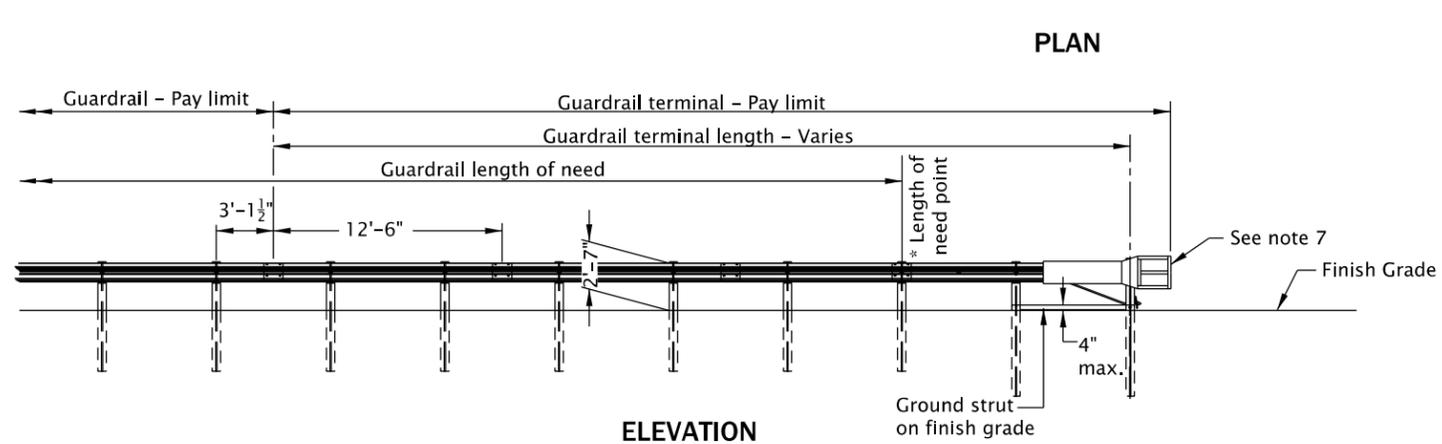
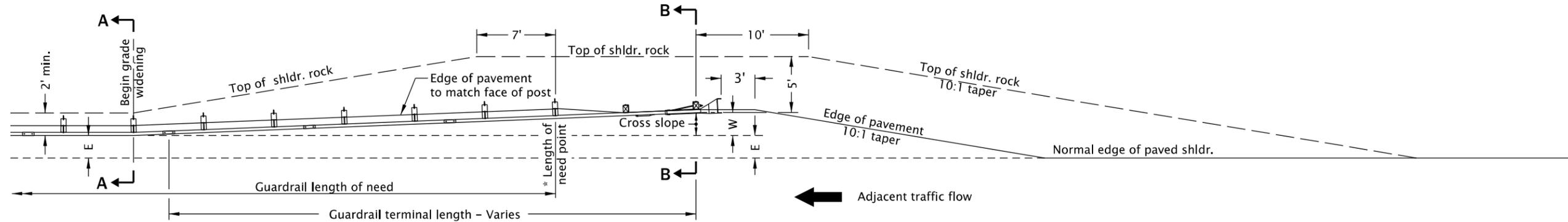
THRIE BEAM TERMINAL CONNECTOR
ELEVATION

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail standard drawing(s) for details not shown.
2. For details of guardrail connections to structural handrails, see special details or Standard Drawings as called for on plans.

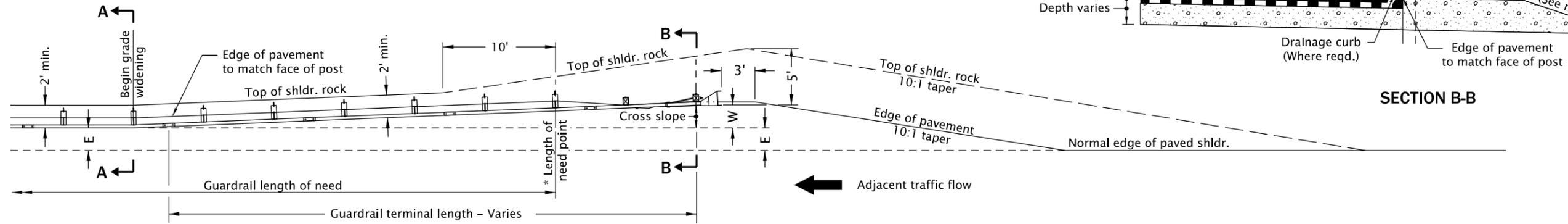
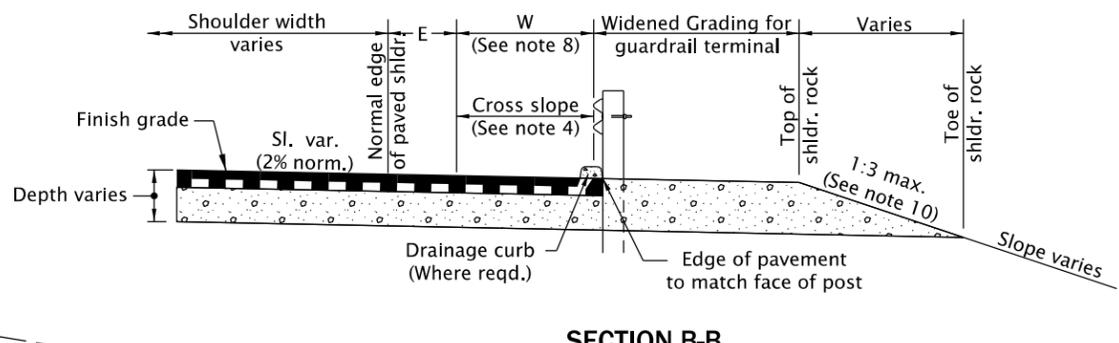
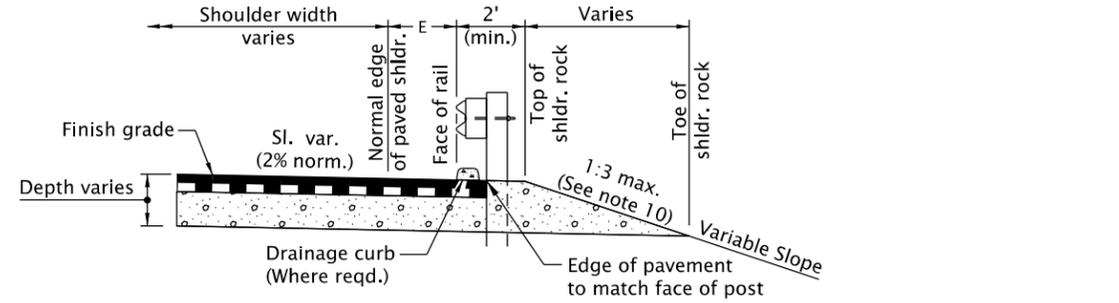
CALC. BOOK NO. <u>N/A</u>		BASELINE REPORT DATE <u>13-JAN-2020</u>	
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications			
OREGON STANDARD DRAWINGS			
MIDWEST GUARDRAIL SYSTEM			
END SECTIONS			
2018			
DATE	REVISION DESCRIPTION		
12-2019	NEW DRAWING CREATED (REVISED DETAILS & NOTES FROM STD. DWG RD415)		

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



* See note 6 and 9

PREFERRED GRADING



GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

- Use details shown as a general guide since manufacturer's details may vary. Install a guardrail terminal system that meets MASH requirements per manufacturer's recommendations. Ensure that guardrail terminal meets appropriate test level for the project.
- See appropriate guardrail standard drawing(s) for details not shown. See project plans for details not shown. See Std. Dwg. RD701 for drainage curbs, where required. E=2' or as shown on project plans.
- Guardrail Non-flared terminal shall be installed with a min. 1 foot offset ensuring that the end piece is entirely off normal shldr.
- Cross slope to match adjacent roadway cross slope (preferred). If required, maximum shoulder slope 10% for guardrail widening. If required, maximum grade break at normal edge of shoulder 8%.

- On two way two lane highways, both ends of guardrail runs shall be provided with a terminal flared or non-flared. Paving of widened shldr. to the face of posts on both ends of guardrail runs is required.
- Provide guardrail terminal from ODOT's QPL. Install according to manufacturer's recommendations (post count varies). Provide shop drawings to Engineer.
- Install a reflectorized object marker on head of every guard rail terminal with "W" 4 feet or less according to manufacturer's recommendations.
- "W" distance is measured to face of guardrail at end post, exclusive of end piece.
- Length of need post location varies by manufacturer.
- 1:4 slope or flatter preferable, 1:3 max.

CALC. BOOK NO. N/A

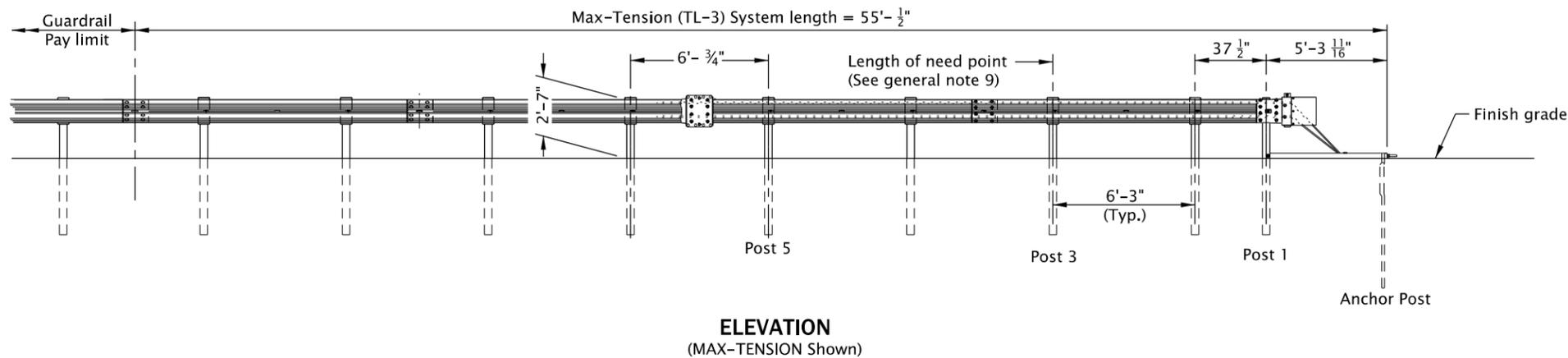
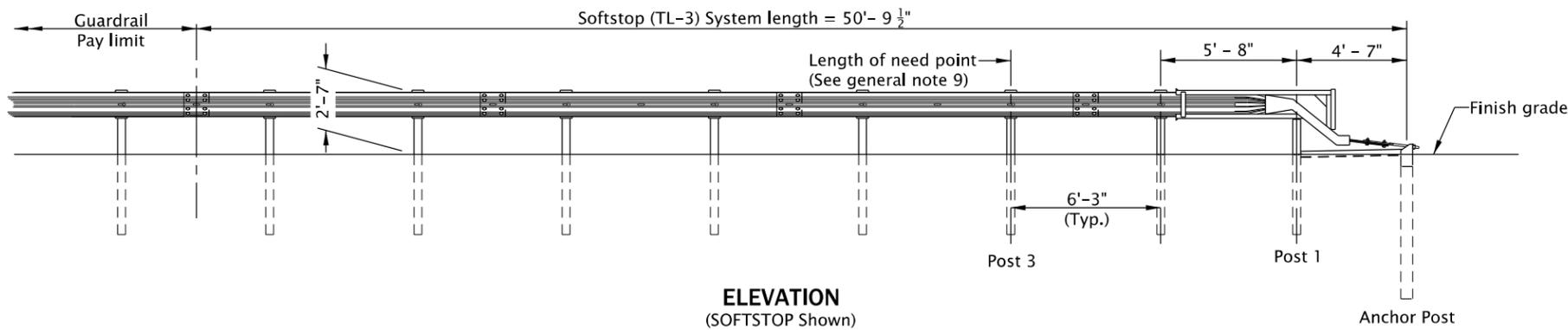
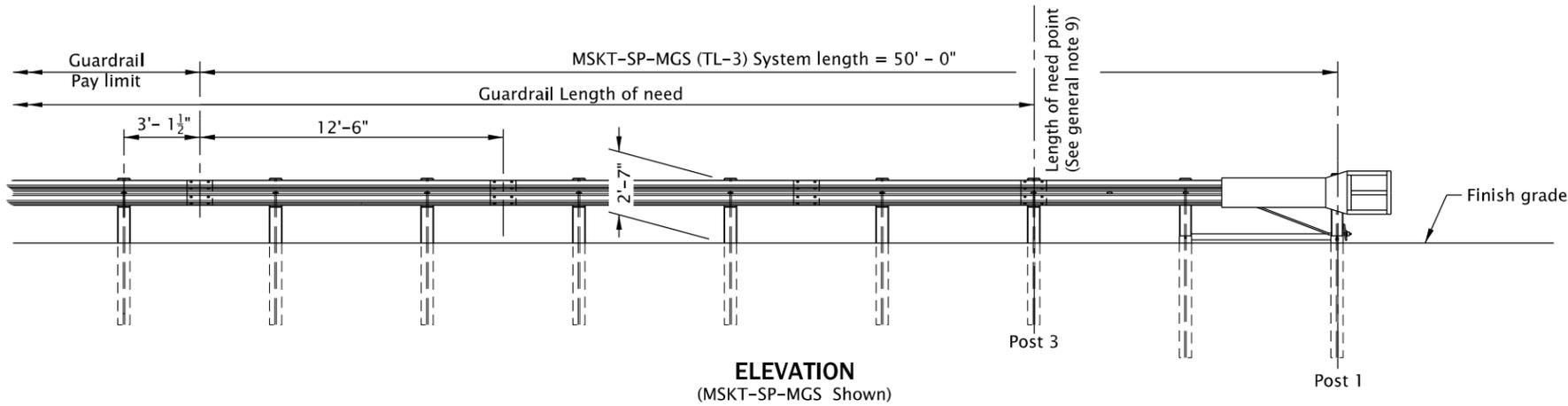
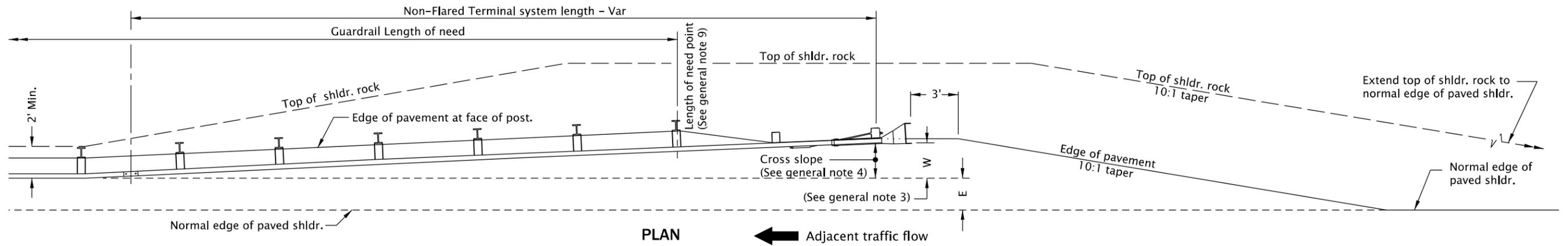
BASELINE REPORT DATE 13-JAN-2020

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 consulting a Registered Professional Engineer.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

**OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
GRADING FOR TERMINALS**

2018	
DATE	REVISION DESCRIPTION
01-2018	REVISED DETAILS & NOTES
07-2018	REVISED DETAILS & ADDED NOTES
01-2020	TITLE CHANGED & REVISED NOTE



GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

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

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

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

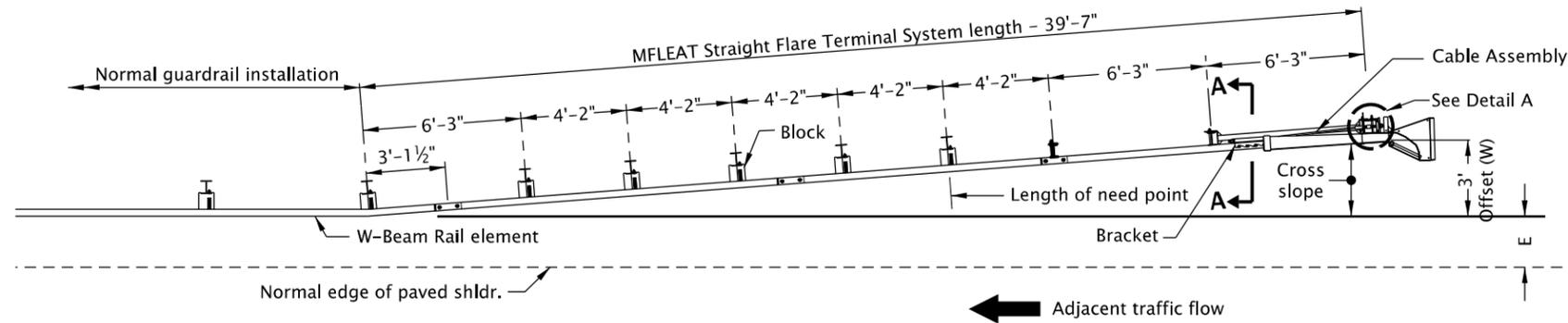
2018

DATE	REVISION	DESCRIPTION
01-2018	REVIS	REVISED NOTES
07-2018	REVIS	REVISED DETAILS & NOTES
01-2020	TITLE	TITLE CHANGED

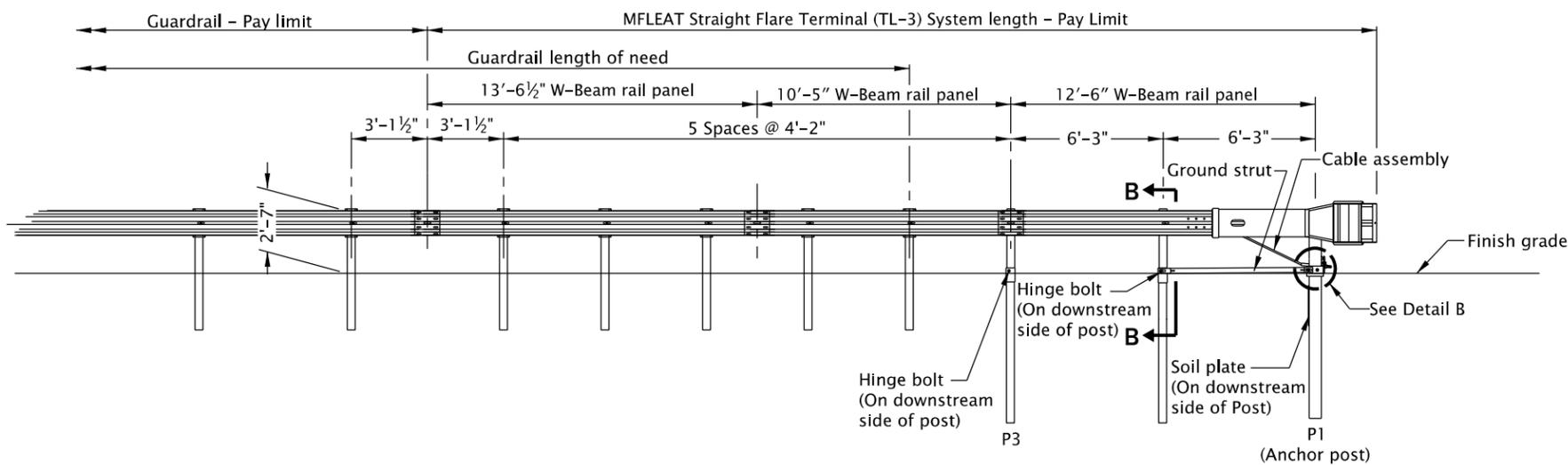
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

rd421.dgn 13-JAN-2020

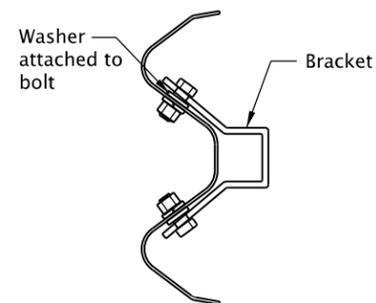
RD421



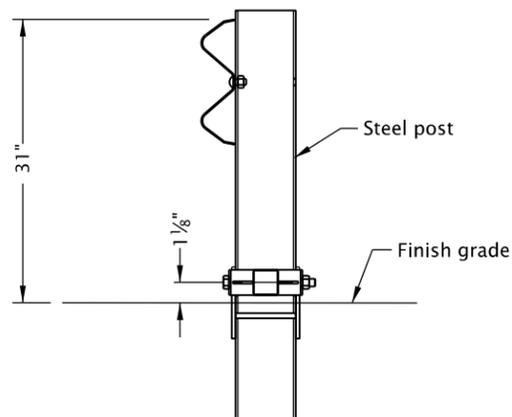
PLAN



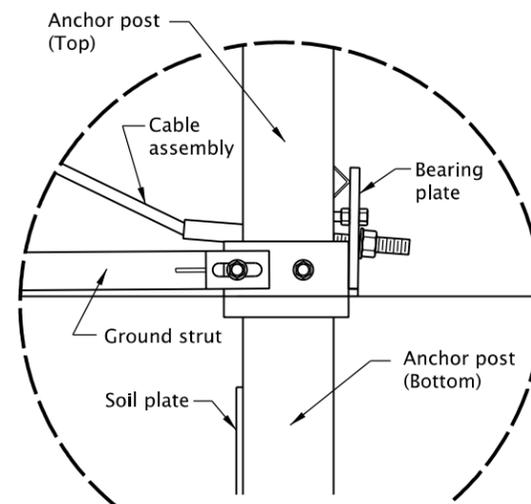
ELEVATION



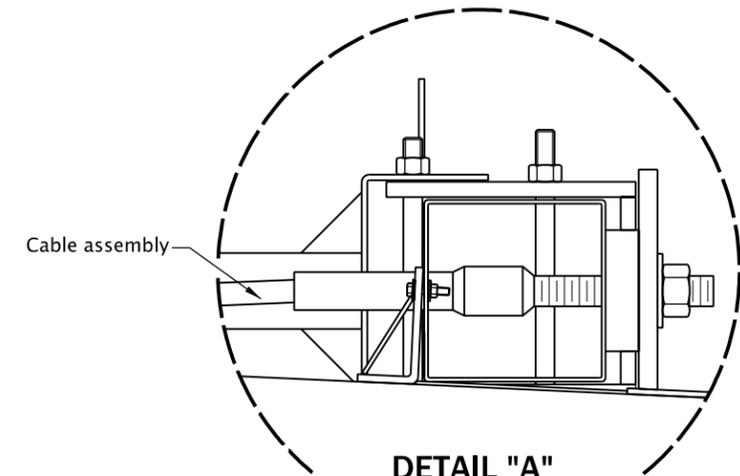
SECTION A-A
ANCHOR BRACKET



SECTION B-B
POST #2



DETAIL "B"
ANCHOR POST CONNECTION



DETAIL "A"
IMPACT HEAD CONNECTION

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Use details shown as a general guide since manufacturer's details may vary. Install a guardrail terminal system that meets MASH requirements per manufacturer's recommendations. Ensure that guardrail terminal meets appropriate test level for the project.
2. See appropriate guardrail standard drawing(s) for details not shown. See project plans for details not shown. See Std. Dwg. RD701 for drainage curbs, where required. E=2' or as shown on project plans.
3. Cross slope to match adjacent roadway cross slope (preferred). If required, maximum shoulder slope 10% for guardrail widening. If required, maximum grade break at normal edge of shoulder 8%.
5. Paving of widened shldr. to the face of posts on both ends of guardrail runs is required.
6. Provide guardrail terminal from ODOT's QPL. Install according to manufacturer's recommendations (post count varies). Provide shop drawings to Engineer.
7. Install a reflectorized object marker on head of every guard rail terminal with
8. "W" distance is measured to face of guardrail at end post, exclusive of end piece.
9. Length of need post location varies by manufacturer.

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

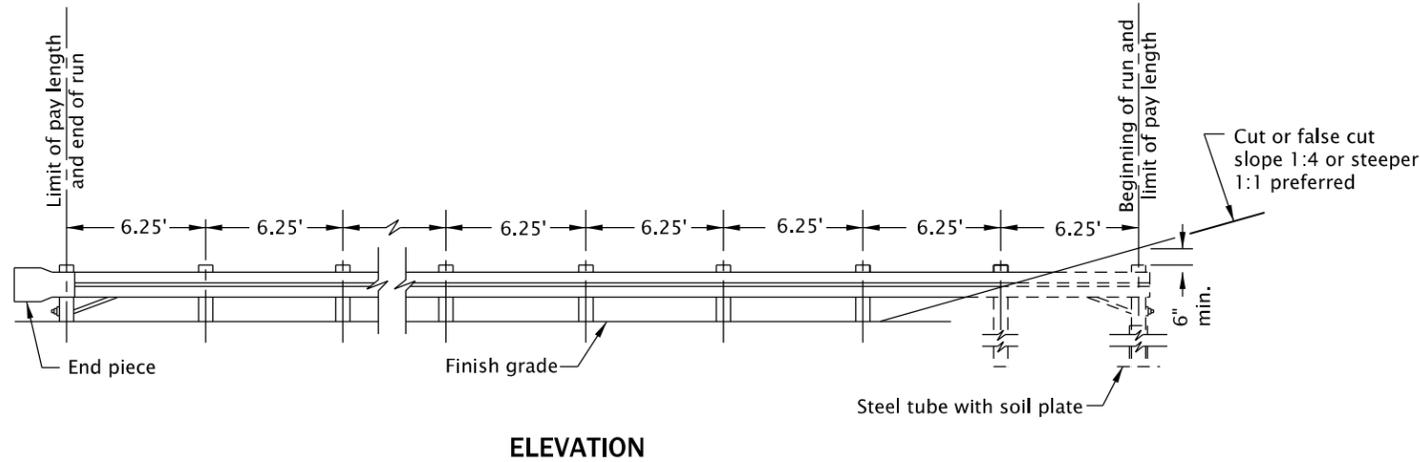
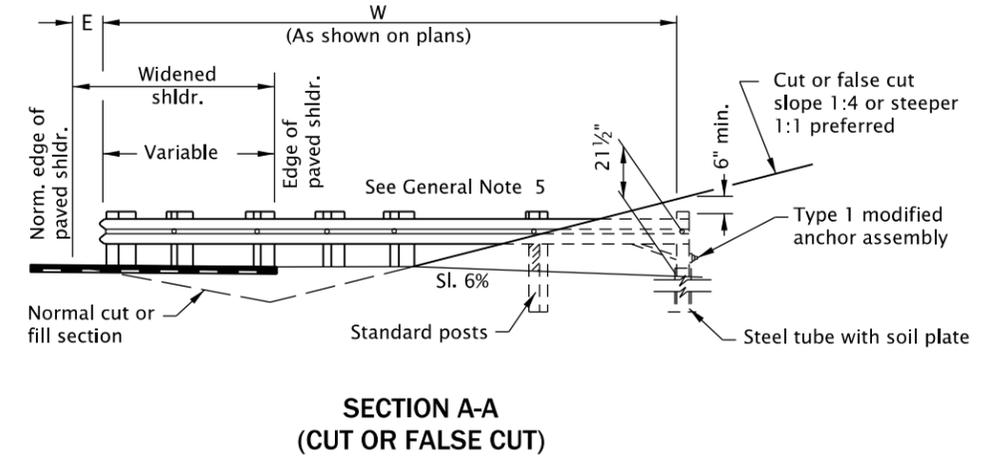
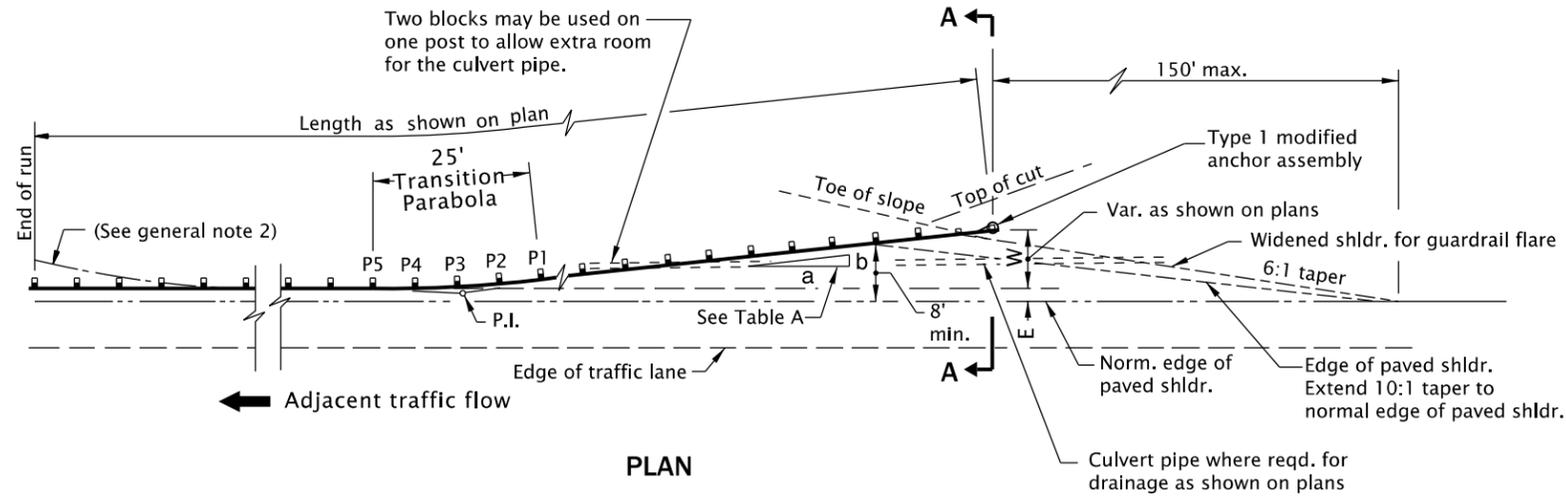
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
FLARED ENERGY-ABSORBING
TERMINAL (MFLEAT)

2018

DATE	REVISION	DESCRIPTION
01-2020	NEW DRAWING CREATED	

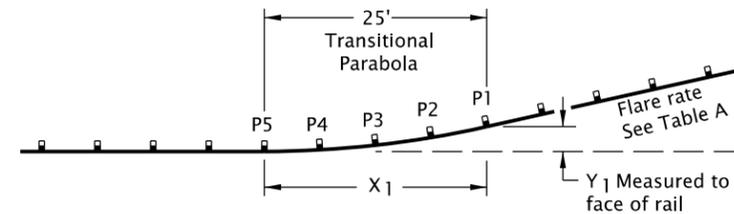
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



**TABLE A
FLARE RATE & 25' TRANSITION PARABOLA**

FLARE RATE a : b		POST NUMBER				
		P5	P4	P3	P2	P1
15:1	X (ft)	0	6.25	12.49	18.72	24.92
	Y (ft)	0	0.05	0.21	0.47	0.83

E= 2' where shown on plans.



GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

- See appropriate guardrail standard drawing(s) for details not shown.
- On two way, two lane highways, both ends of guardrail runs shall be provided with a flared or non-flared terminal from ODOT's QPL if not buried, as detailed on plans.
- Type 2A guardrail shown.
- Where terminal end is buried, a Type 1 modified anchor will be attached to the end post.
- Trailing ends (freeways, multilane and similar one-way facilities) no exposed to opposing traffic:
 - Guardrail terminals, use a Type 1 modified anchor, Type B end piece and do not flare.
 - At bridge ends, omit Transition Guardrail & Type 3 guardrail and substitute the normal required guardrail.
- All bolts except adjustment bolts shall be drawn tight on rails and components on initial installation.
 - Final tightness check on rail and component bolts and retightening as required to be done 30 days after initial installation.
- If the cut or false cut slope is flatter than 1:1 ensure that there is a clear recovery area behind the guardrail, with no funneling effect to the back of the obstruction.
- "W" distance is measured to face of guardrail at end post.

NOTE:
THIS DRAWING IS RETAINED FOR MAINTENANCE PURPOSES.
DO NOT USE FOR NEW CONSTRUCTION.

CALC. BOOK NO. N/A BASELINE REPORT DATE 13-JAN-2020

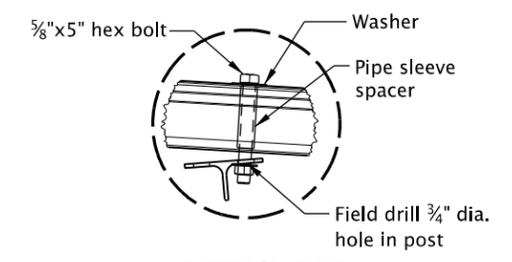
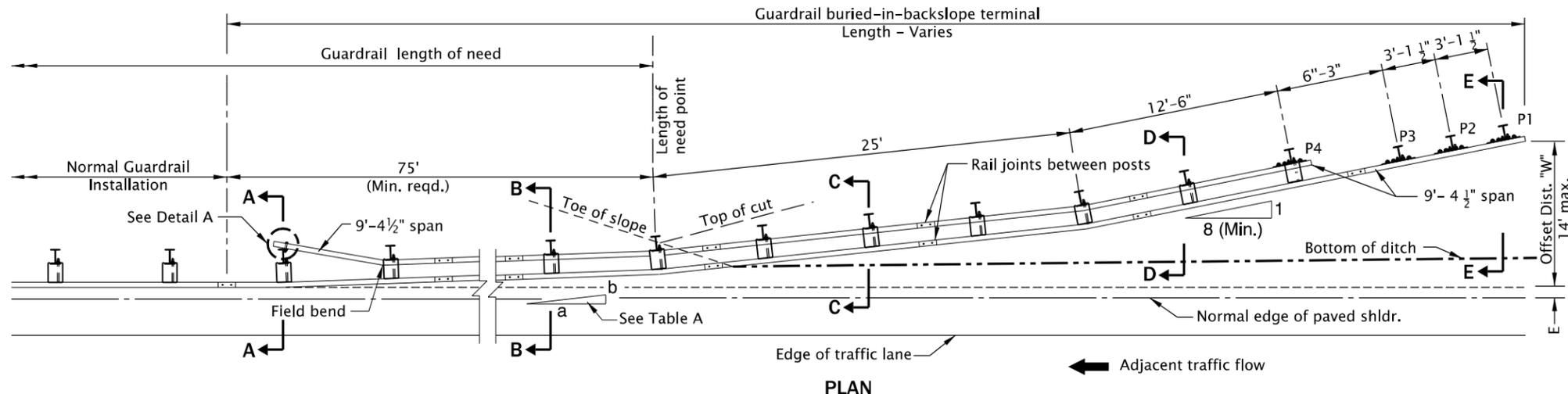
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

**OREGON STANDARD DRAWINGS
GUARDRAIL INSTALLATION
TERMINAL (CUT OR FALSE CUT)
(29" RAIL HEIGHT)**

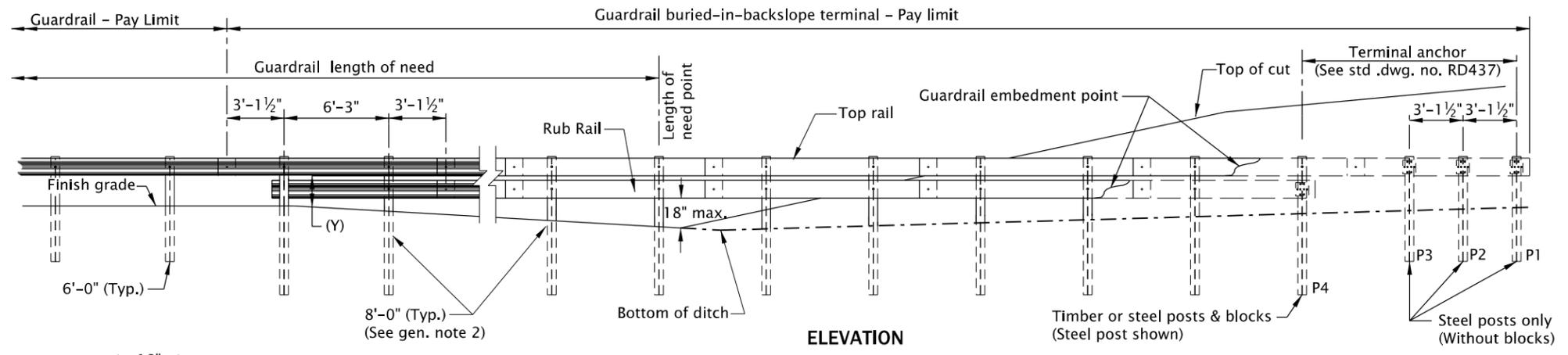
2018

DATE	REVISION DESCRIPTION
01-2020	TITLE CHANGED, REVISED & ADDED NOTE

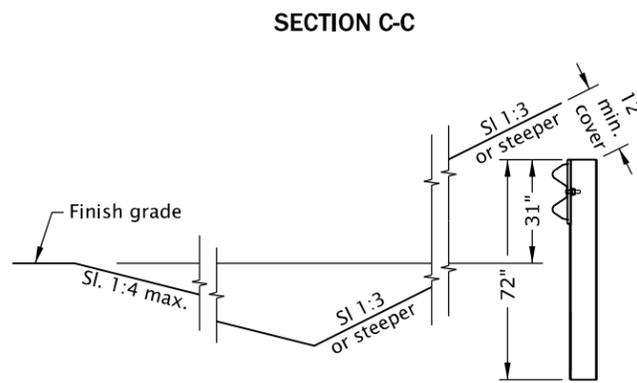
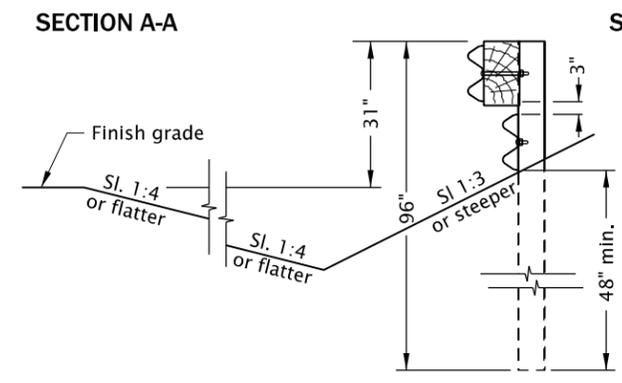
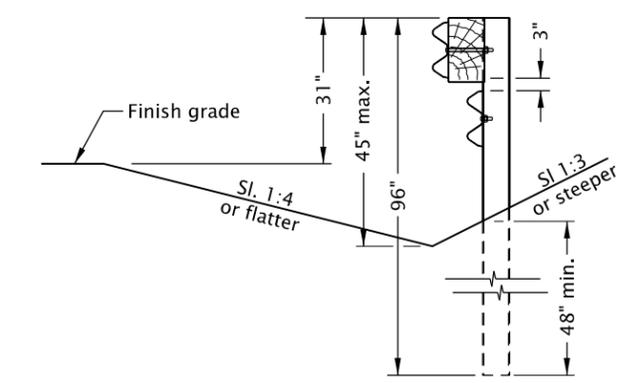
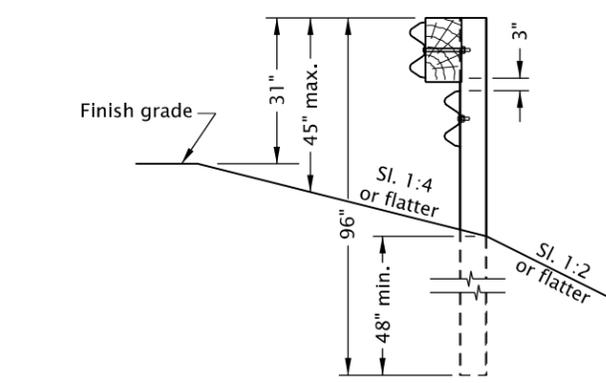
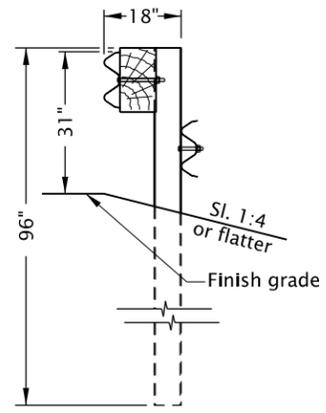
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**
- See Std. Dwg. RD437 for Buried-in-backslope terminal anchorage parts. See appropriate guardrail standard drawing(s) for additional details not shown.
 - On two way, two lane highways, both ends of guardrail runs shall be provided with a flared or non-flared terminal from ODOT's QPL if not buried, as detailed on plans.
 - Eight foot long guardrail post required when connected to rub rail.
 - The flare rate of the guardrail may be increased after crossing the ditch bottom to shorten the length of the terminal.
 - Trailing ends (freeways, multilane and similar one-way facilities) not exposed to opposing traffic:
 - Guardrail terminals, use a Downstream Anchor Terminal (DAT) (Std. Dwg. RD438), Type B end piece and do not flare.
 - At bridge ends, omit Transition Guardrail & Type 3 guardrail and substitute the normal required guardrail.
 - All bolts except adjustment bolts shall be drawn tight on rails and components on initial installation.
 - Final tightness check on rail and component bolts and retightening as required to be done 30 days after initial installation.
 - Bend the downstream end of the bottom rail to the backside of the post and bolt to post.
 - Field drilled steel posts are allowed for bottom rail element. Use zinc rich paint to coat field drilled holes in posts or rail elements. Galvanizing required for plate and hardware.
 - Hold the top guardrail element constant with the typical barrier installation. Go up stream 1 post and add a bottom rail element under the standard guardrail element when the bottom of the top guardrail element exceeds 18 inch, at any point of the slope, point (Y) elevation view. Slope both elements down to maintain a maximum height of 45 inch in front of the toe of slope if the top of installation exceeds 45 inch from the ground, at any point in the installation.
 - Use in established slopes. Do not build a mound to use Buried-in-backslope terminal. Do not use the Buried-in-backslope terminal in locations where the backslope is flatter than 3:1, and there is no ditch or a narrow shallow ditch and the toe of slope is within 20 ft of the travel lane.



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



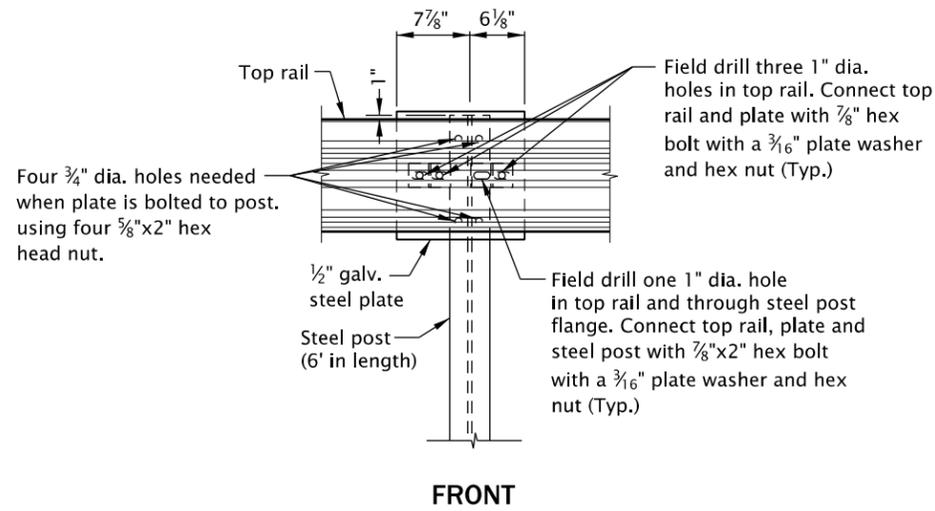
CALC. BOOK NO. N/A

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 consulting a Registered Professional Engineer.

BASELINE REPORT DATE <u>13-JAN-2020</u>	
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS	
MIDWEST GUARDRAIL SYSTEM	
BURIED IN BACKSLOPE (BIB)	
TERMINAL	
2018	
DATE	REVISION DESCRIPTION
01-2019	DRAWING CREATED
06-2019	REVISED NOTES
01-2020	TITLE CHANGED & REVISED NOTES

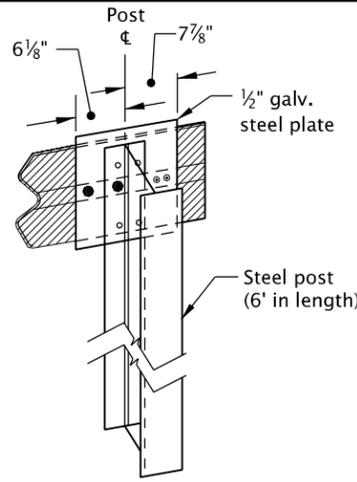
rd436.dgn 13-JAN-2020

RD436

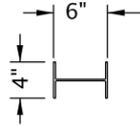


FRONT

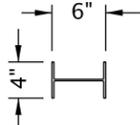
TOP RAIL ANCHOR POST/PLATE ATTACHMENT



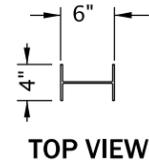
REAR



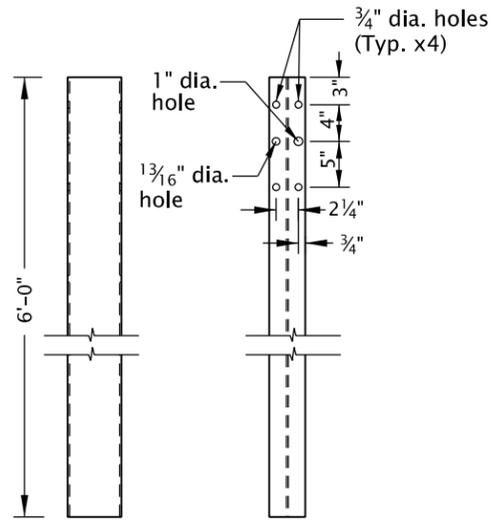
TOP VIEW



TOP VIEW



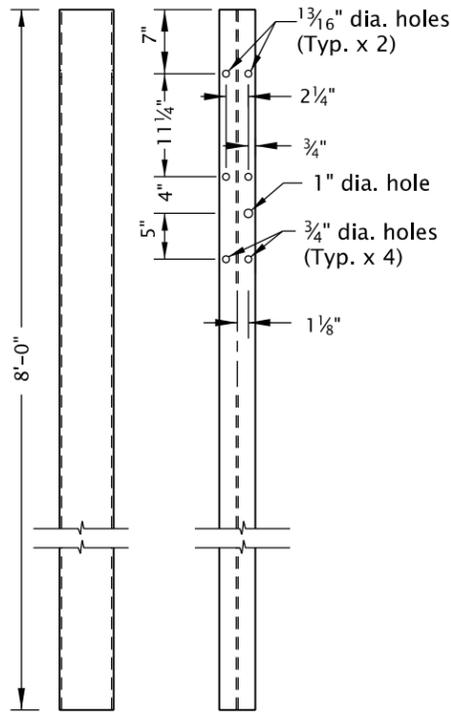
TOP VIEW



SIDE

FRONT

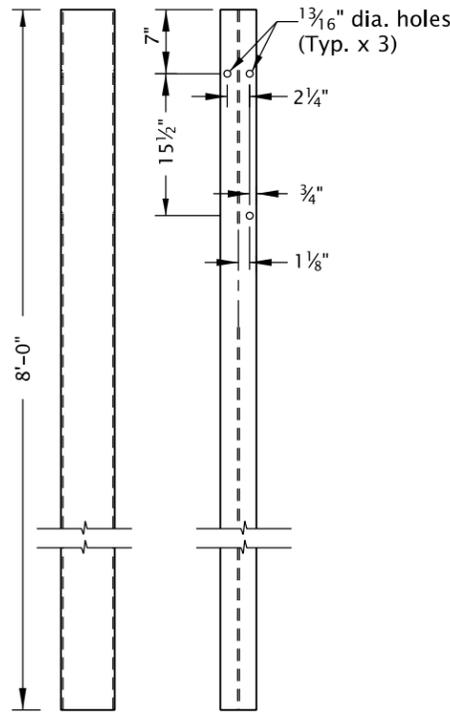
6' - 0" LENGTH
(Post 1-3)



SIDE

FRONT

8' - 0" LENGTH
(Post 4)

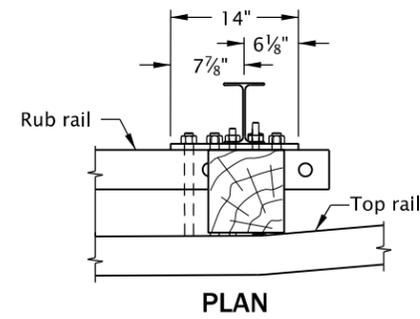


SIDE

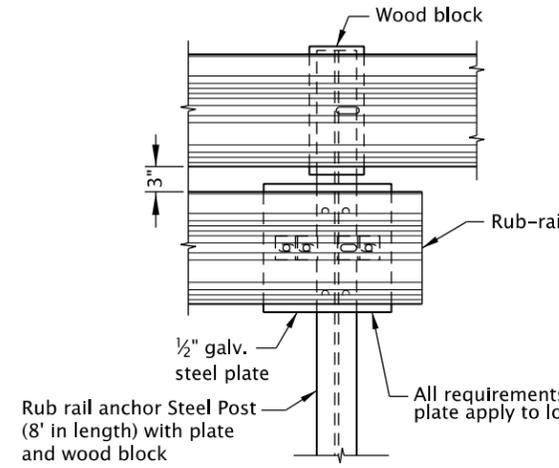
FRONT

8' - 0" LENGTH

WIDE-FLANGE STEEL POST
(W6 x 9 or W6 x 8.5)

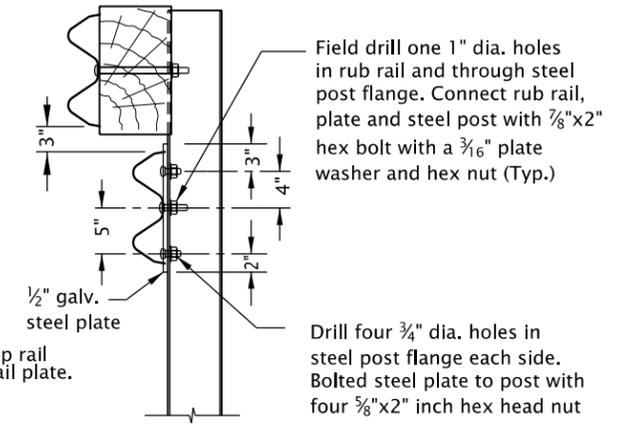


PLAN

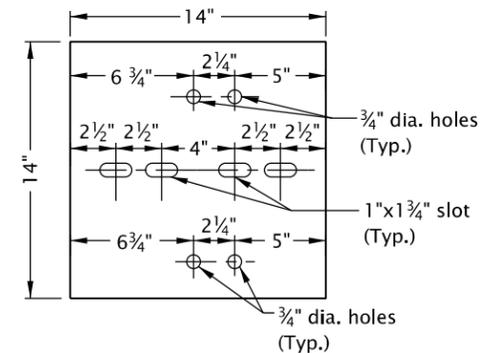


FRONT

RUB RAIL ANCHOR POST/PLATE ATTACHMENT

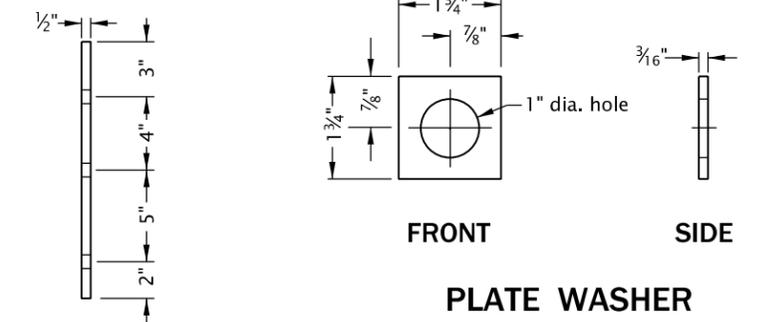


SIDE



FRONT

BURIED IN BACKSLOPE STEEL ANCHOR PLATE



FRONT

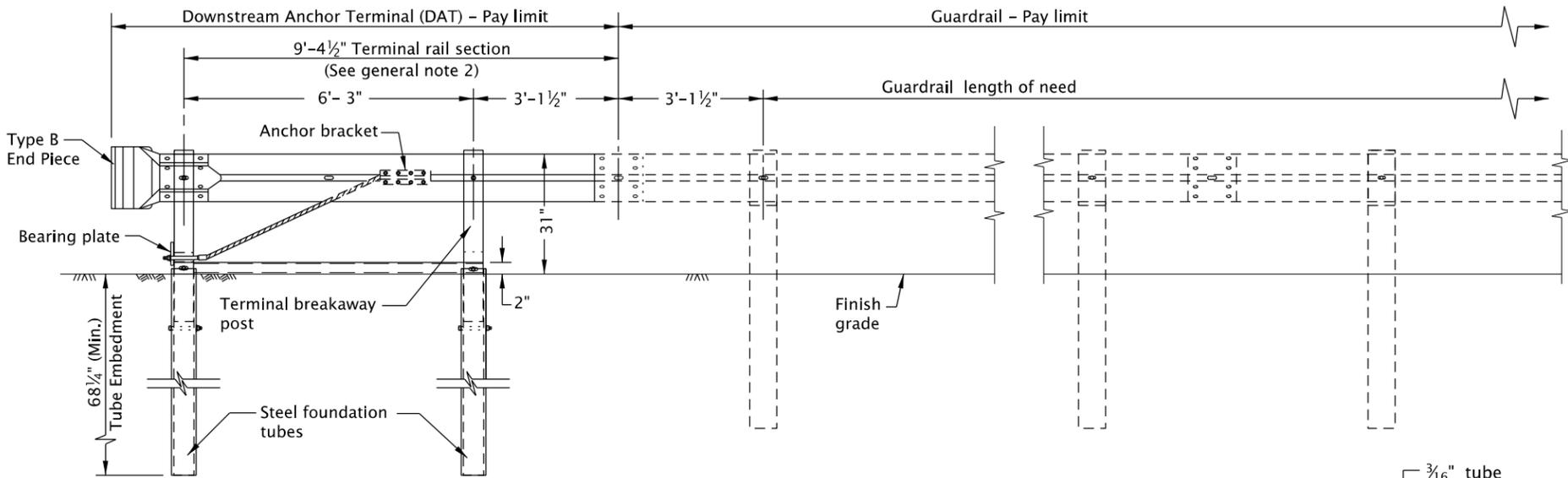
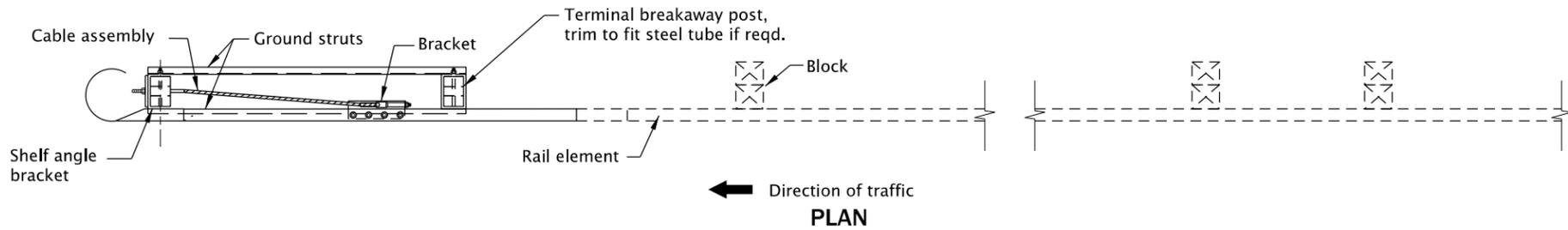
SIDE

PLATE WASHER

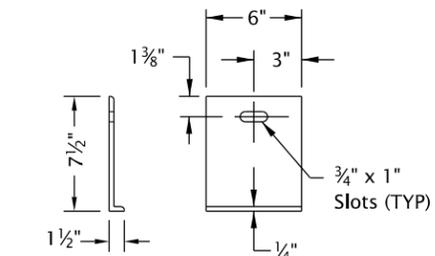
CALC. BOOK NO. <u>N/A</u>		BASELINE REPORT DATE <u>13-JAN-2020</u>	
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications			
OREGON STANDARD DRAWINGS			
MIDWEST GUARDRAIL SYSTEM			
BURIED IN BACKSLOPE			
TERMINAL ANCHOR PARTS			
2018			
DATE	REVISION DESCRIPTION		
01-2019	DRAWING CREATED		
01-2020	TITLE CHANGED & REVISED NOTES		

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 consulting a Registered Professional Engineer.

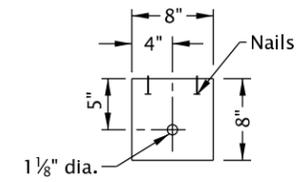
rd438.dgn 13-JAN-2020



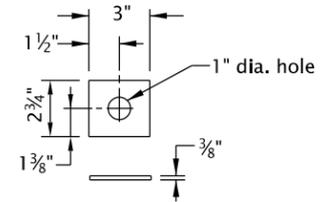
ELEVATION
DOWNSTREAM ANCHOR TERMINAL (DAT)
 (See general note 1)



SHELF ANGLE BRACKET

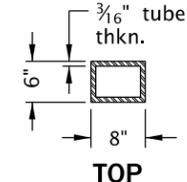


BEARING PLATE

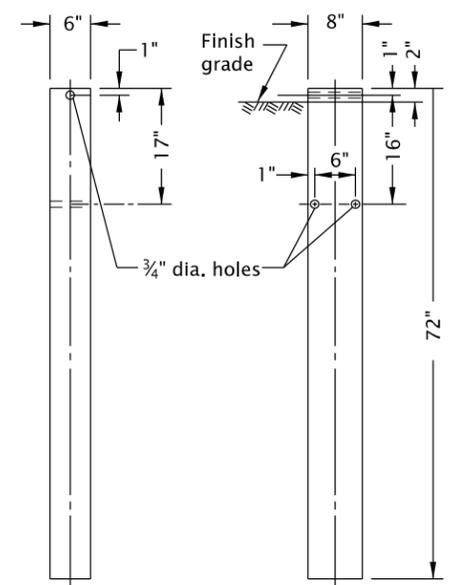


END PLATE

NOTE: Drive nails and bend over to prevent plate rotation



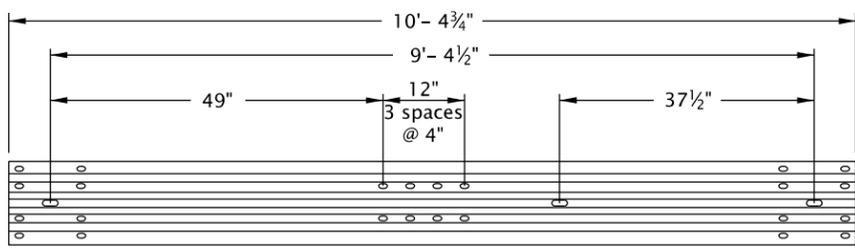
TOP



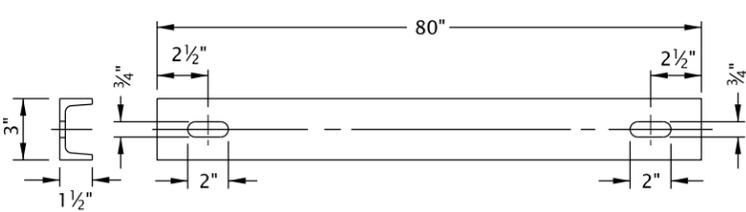
SIDE

FRONT

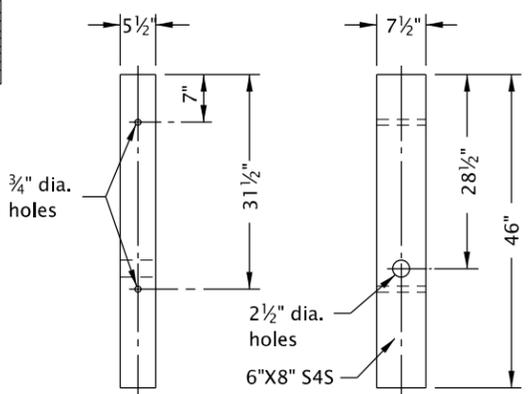
STEEL FOUNDATION TUBE



TERMINAL RAIL ELEMENT



CHANNEL STRUT



SIDE

FRONT

TERMINAL BREAKAWAY POST

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" 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.

CALC. BOOK NO. <u>N/A</u>	BASELINE REPORT DATE <u>13-JAN-2020</u>
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NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
DOWNSTREAM ANCHOR TERMINAL (DAT)
 2018

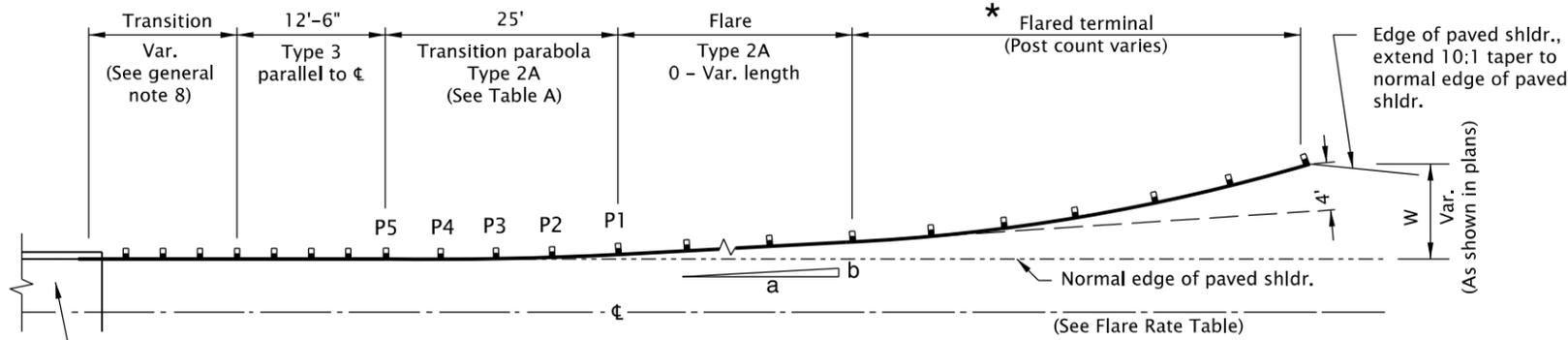
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

DATE	REVISION	DESCRIPTION
06-2019	DRAWING CREATED	
01-2020	TITLE CHANGED & REVISED NOTE	

RD438

rd440.dgn 13-JAN-2020

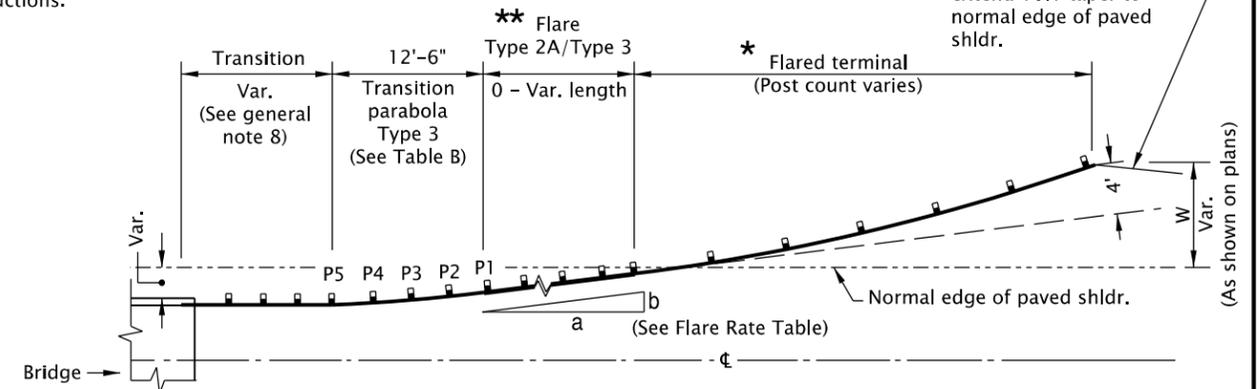
* Provide from ODOT's QPL.
Install according to manufacturer's instructions.



BRIDGE END RUNS WITH "W" MORE THAN 4'

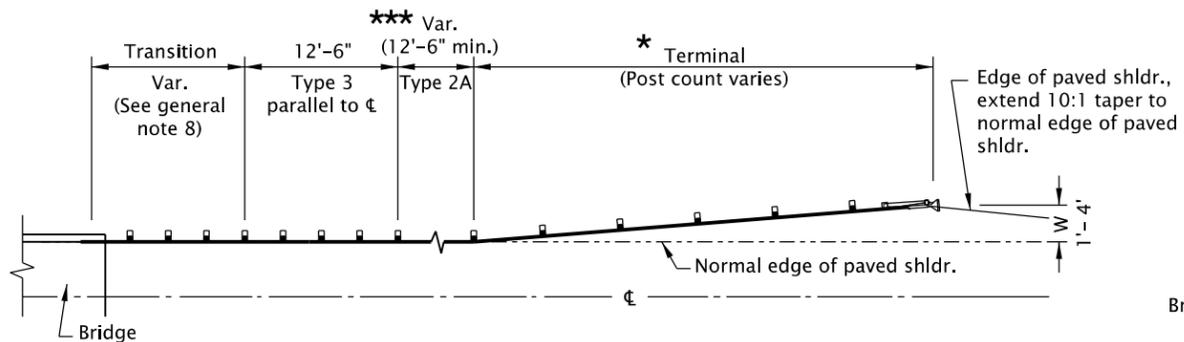
Additional Type 2A rail may be needed to meet length of need requirements

These details are retained for maintenance purposes. Do not use for new construction.



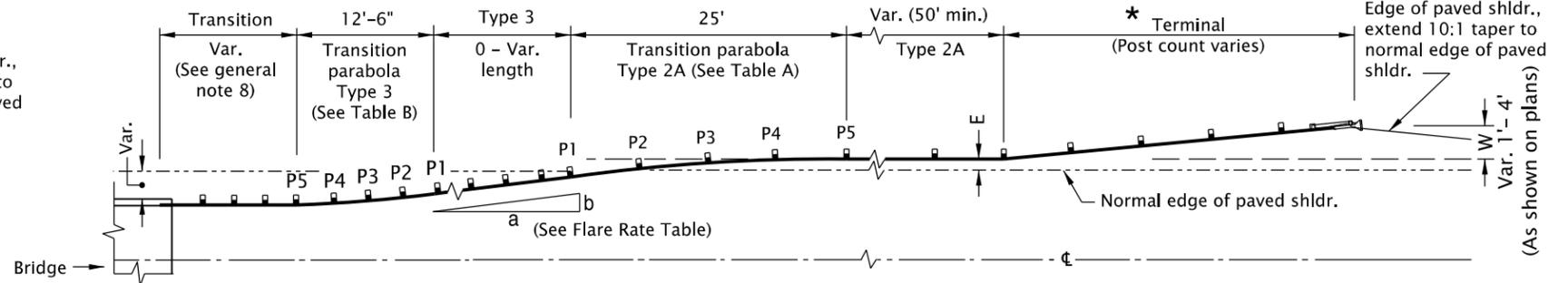
BRIDGE END RUNS WITH "W" MORE THAN 4' (NARROW BRIDGE SITUATION)

** Type 3 to edge of paved shldr./Type 2A beyond paved shldr.

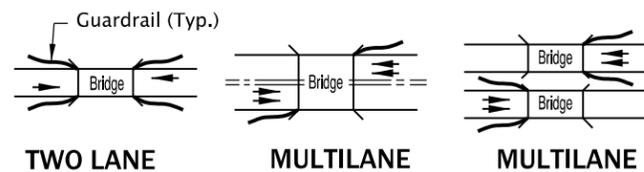


BRIDGE END RUNS "W" 1'-4'

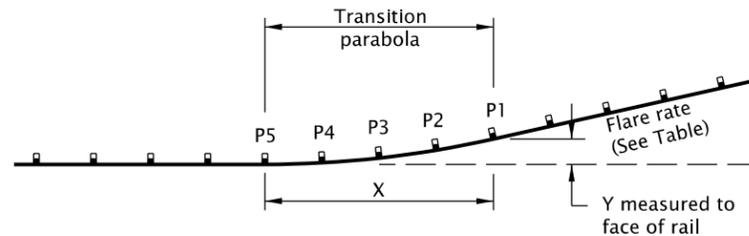
*** Length of need calculation will determine quantity of Type 2A reqd.



BRIDGE END RUNS CONNECTING TO GUARDRAIL INSTALLATION (NARROW BRIDGE SITUATION)



LOCATIONS AT BRIDGE ENDS (MINIMUM SHOWN)



E= 2' where shown on plans.

**TABLE A
25' TRANSITION PARABOLA**

	POST NUMBER				
	P5	P4	P3	P2	P1
X (ft)	0	6.25	12.49	18.72	24.92
Y (ft)	0	0.05	0.21	0.47	0.83

**TABLE B
12.5' TRANSITION PARABOLA**

	POST NUMBER				
	P5	P4	P3	P2	P1
X (ft)	0	3.125	6.25	9.375	12.49
Y (ft)	0	0.03	0.1	0.23	0.42

FLARE RATE TABLE

FLARE RATE a:b	NORMAL FLARE LENGTH (ft)	NORMAL W (ft)
15:1	12.5	8.1

NOTE: THIS DRAWING IS RETAINED FOR MAINTENANCE PURPOSES. DO NOT USE FOR NEW CONSTRUCTION.

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

- See appropriate guardrail standard drawing(s) for details not shown.
- Guardrail at indicated positions is required for protection at bridge ends. Additional guardrail is to be installed as required by guardrail warrant and fastened to bridge.
- Face of guardrail at locations shown above must match face of bridge curb or bridge rail on structures without curb.
- Trailing ends (freeways, multilane and similar one-way facilities) not exposed to opposing traffic:
 - Guardrail terminals, use a Downstream Anchor Terminal (DAT) (RD438), Type B end piece and do not flare.
 - At bridge ends, omit transition guardrail & Type 3 guardrail. Use bridge connection (Bridge Dwg. BR236) and guardrail as required in plans.

- Rail expansion slots to be provided at bridge end connections. See Std. Dwg. RD400 "METAL MEDIAN BARRIER/SHOULDER GUARDRAIL INSTALLATION AT BRIDGE DECK EXPANSION JOINT" details and notes.
- Where bridges employ guardrail in lieu of handrail or vehicular barriers, adjacent connecting guardrail runs shall be the same type.
- (a) All bolts except adjustment bolts shall be drawn tight on rails and components on initial installation. (b) Final tightness check on rail and components bolts and retightening as required to be done 30 days after initial installation.
- For transition guardrail detail and installation limits at bridge ends, see applicable bridge drawings.
- "W" distance is measured to face of guardrail at end post, exclusive of end piece.
- Paving of widened shldr. to the face of posts on both ends of guardrail runs is required.

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

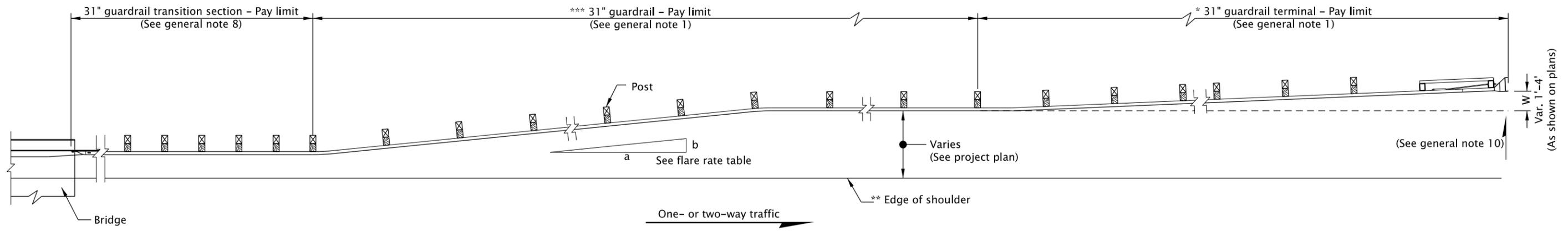
**OREGON STANDARD DRAWINGS
GUARDRAIL INSTALLATION
AT BRIDGE ENDS
(29" RAIL HEIGHT)**

2018

DATE	REVISION	DESCRIPTION
06-2019	REVISED NOTES	
01-2020	TITLE CHANGED & ADDED NOTE	

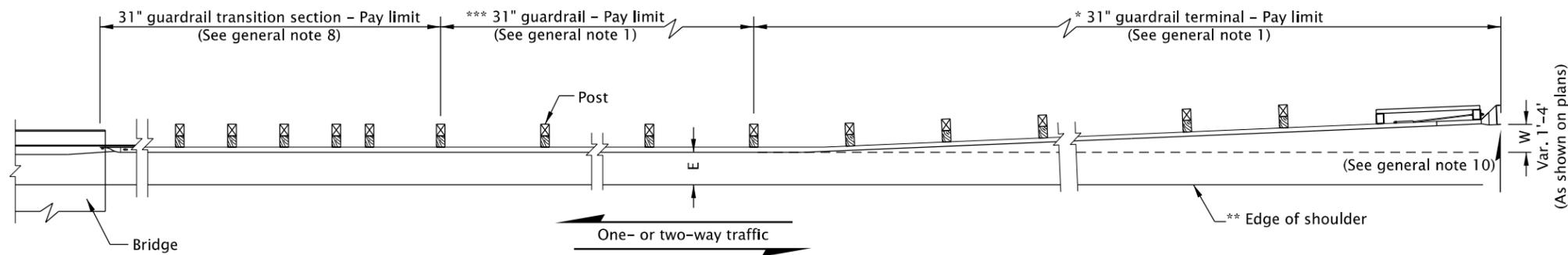
RD440

rd442.dgn 13-JAN-2020

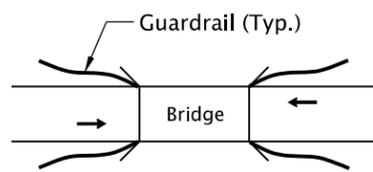


NARROW BRIDGE ON ONE OR TWO-WAY TRAFFIC

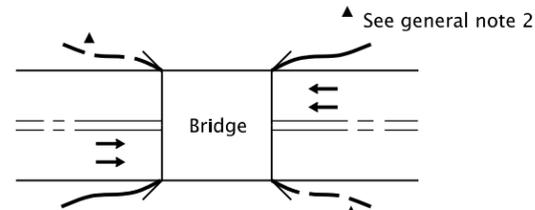
(See general note 10)



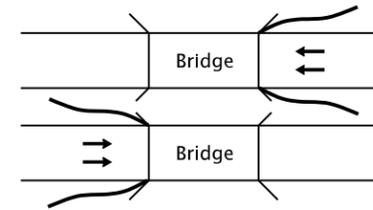
ONE OR TWO-WAY TRAFFIC



TWO LANE



MULTILANE



MULTILANE

**LOCATIONS AT BRIDGE ENDS
(MINIMUM SHOWN)**

- * Provide from ODOT's QPL. Install according to manufacturer's instruction.
- ** Type 3 to edge of pavement shoulder/Type 2 beyond paved shoulder.
- *** Length of need calculation will determine quantity of Type 2A required.

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

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate standard drawing(s) for details not shown.
2. Guardrail at indicated positions is required for protection at bridge ends. Additional guardrail is to be installed as required by guardrail warrant and fastened to bridge.
3. Face of guardrail at locations shown above must match face of bridge curb or bridge rail on structure without curb.
4. Trailing ends (Freeway, multilane and similar one-way facilities) not exposed to opposing traffic:
 - (a) Guardrail terminals, use a Downstream Anchor Terminal (DAT) (RD438), Type B end piece and do not flare.
 - (b) At bridge ends, omit transition guardrail & Type 3 guardrail. Use bridge connection (Bridge drawing BR236) and guardrail as required in plans.
5. Rail expansion slots to be provided at bridge end connections. See Std. Dwg. RD412 "MIDWEST GUARDRAIL SYSTEM INSTALLATION AT BRIDGE DECK EXPANSION JOINT" details and notes.
6. Where bridges employ guardrail in lieu of handrail or vehicular barriers, adjacent connecting guardrail runs shall be the same type.
7. (a) All bolts except adjustment bolts shall be drawn tight on rails and components on initial installation. (b) Final tightness check on rail and component bolts and re-tightening as required to be done 30 days after initial installation.
8. For transition guardrail detail and installation limits at bridge ends, see applicable bridge drawings.
9. "W" distance is measured from face of guardrail at end post, exclusive of end piece.
10. The slope from the edge of the shoulder into the face of the guardrail should not be steeper than 10H : 1V when the guardrail is within 12'-0" from the edge of the shoulder. Paving of widened shoulder to face of posts in both ends of guardrail runs is required.
11. Wood or steel post. Wood post shown.

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

**OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
TYPICAL LAYOUTS
AT BRIDGE ENDS**

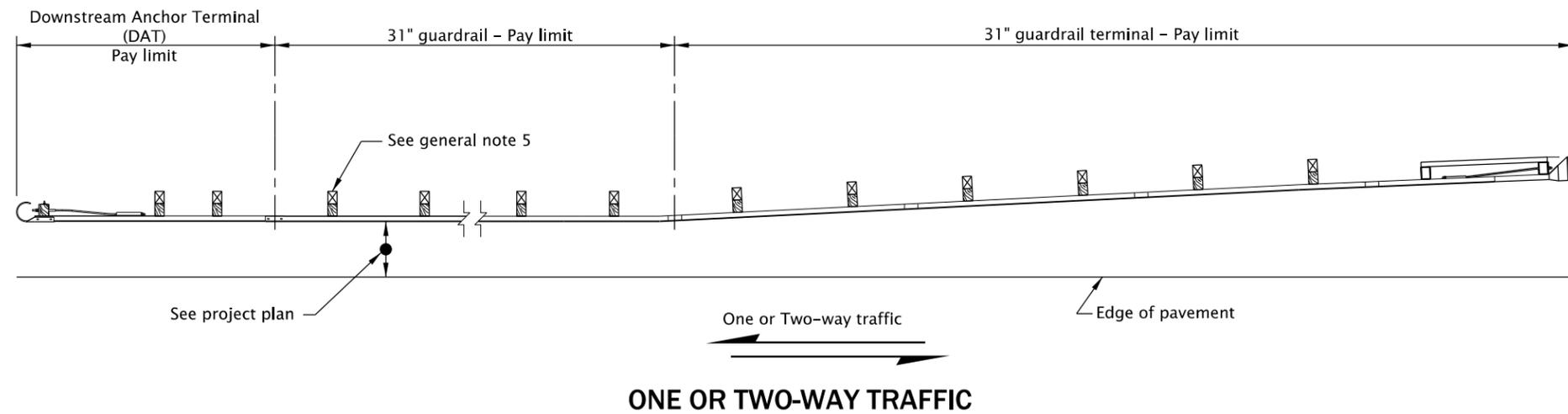
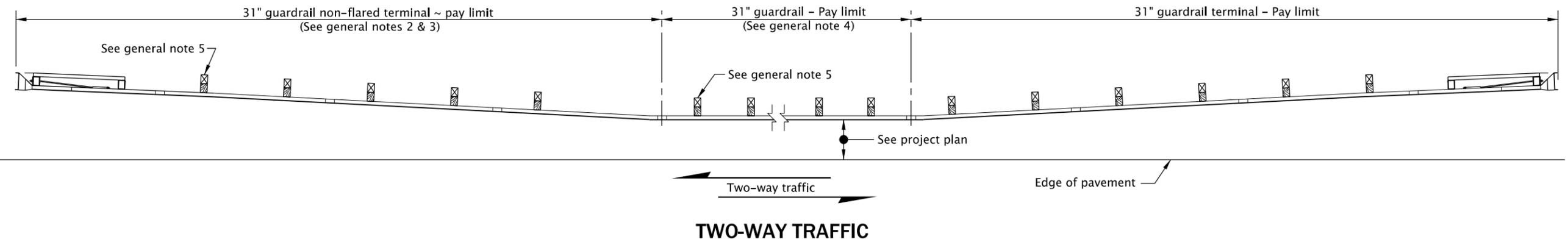
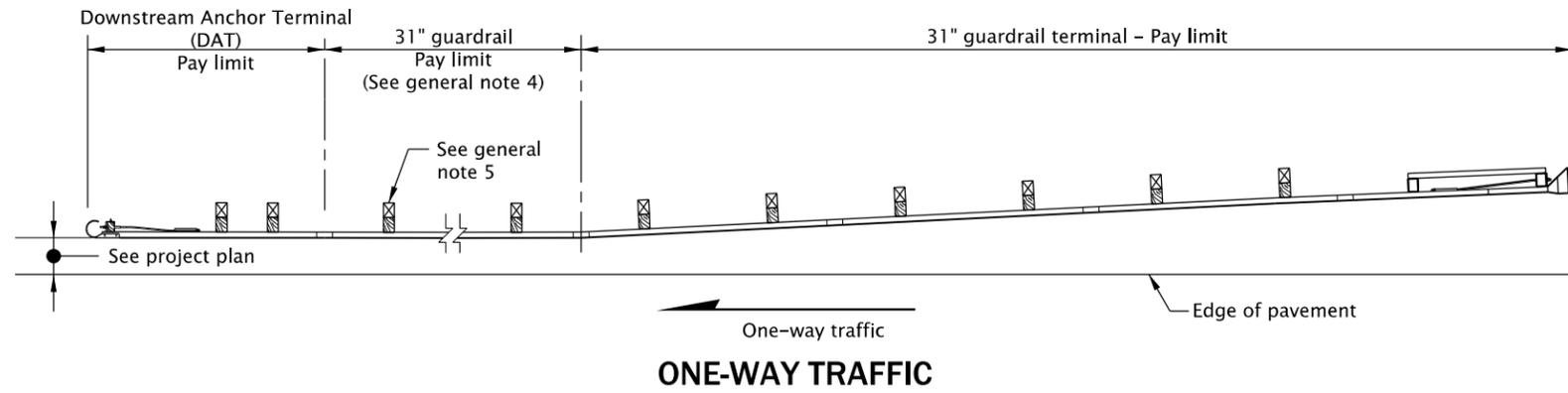
2018

DATE	REVISION	DESCRIPTION
01-2020	NEW DRAWING CREATED	

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 consulting a Registered Professional Engineer.

RD442

rd443.dgn 13-JAN-2020



GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail standard drawing(s) for details not shown.
2. Where a crashworthy terminal is required, use a Downstream Anchor Terminal (DAT). See Std. Dwg. RD438.
3. For terminal type and details, see project plans and applicable drawings.
4. For additional details not shown on this plan, refer to Std. Dwg. RD407.
5. Wood or steel post. Wood post shown.

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

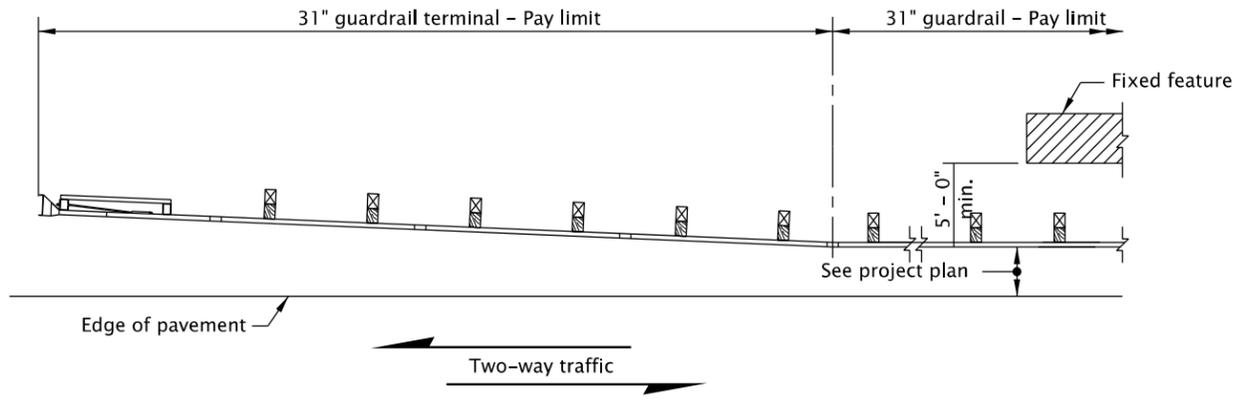
**OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
TYPICAL LAYOUTS FOR
EMBANKMENTS**

2018

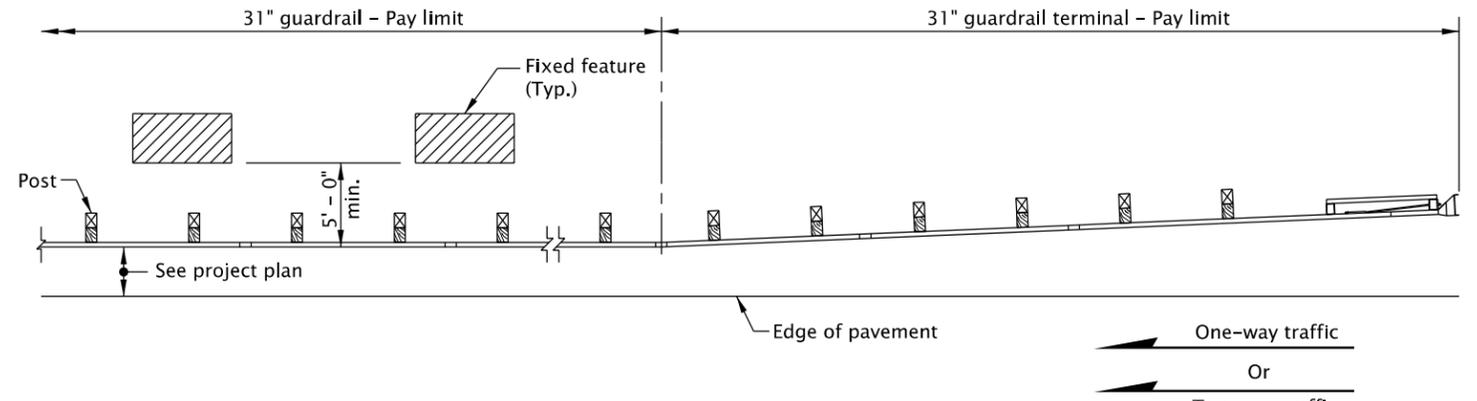
DATE	REVISION DESCRIPTION
01-2020	NEW DRAWING CREATED

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 consulting a Registered Professional Engineer.

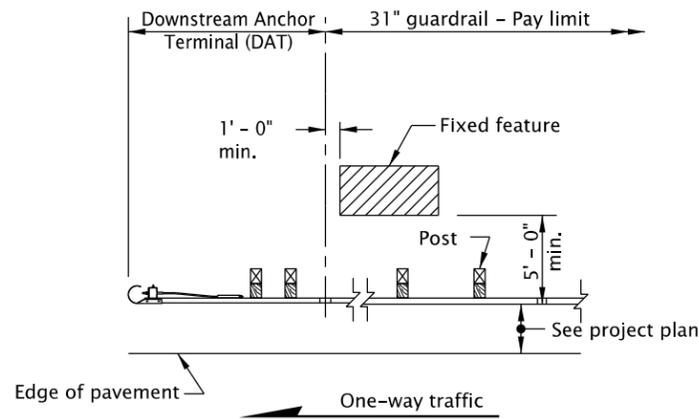
RD443



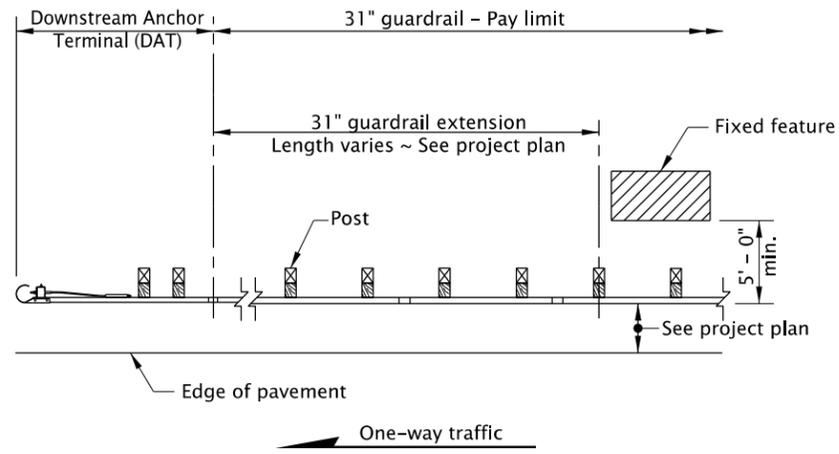
TRAILING END TWO-WAY TRAFFIC



APPROACHED END ON ONE OR TWO-WAY TRAFFIC



TRAILING END ONE-WAY TRAFFIC



GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See appropriate guardrail standard drawing(s) for details not shown.
2. Where a crashworthy terminal is not required, use a Downstream Anchor Terminal (DAT). See Std. Dwg. RD438.
3. For terminal type and details, see project plans and applicable drawings.
4. For additional details not shown on this plan, refer to Std. Dwg. RD407.
5. Wood or steel post. Wood post shown.

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

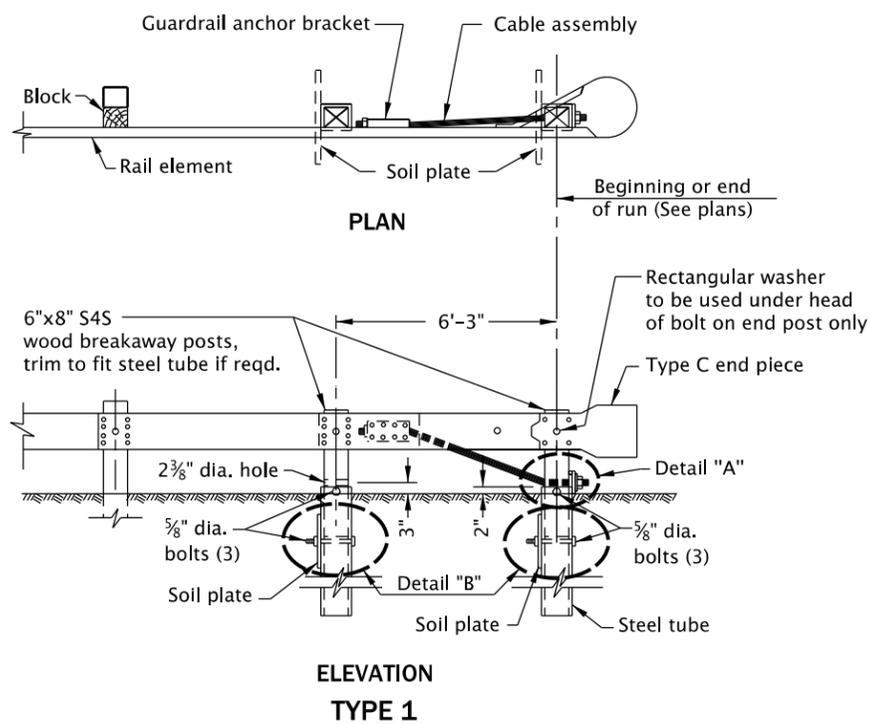
**OREGON STANDARD DRAWINGS
MIDWEST GUARDRAIL SYSTEM
TYPICAL LAYOUTS
FOR FIXED OBJECTS**

2018

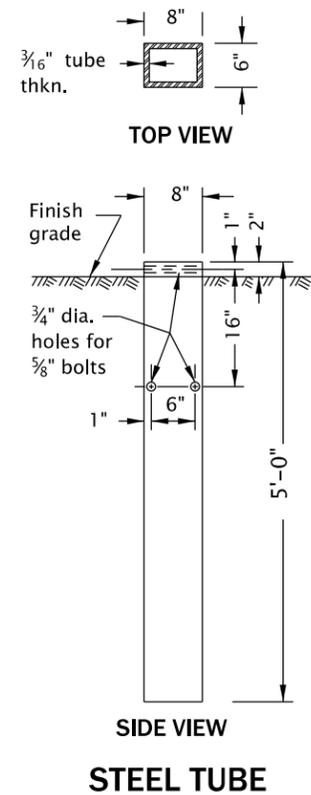
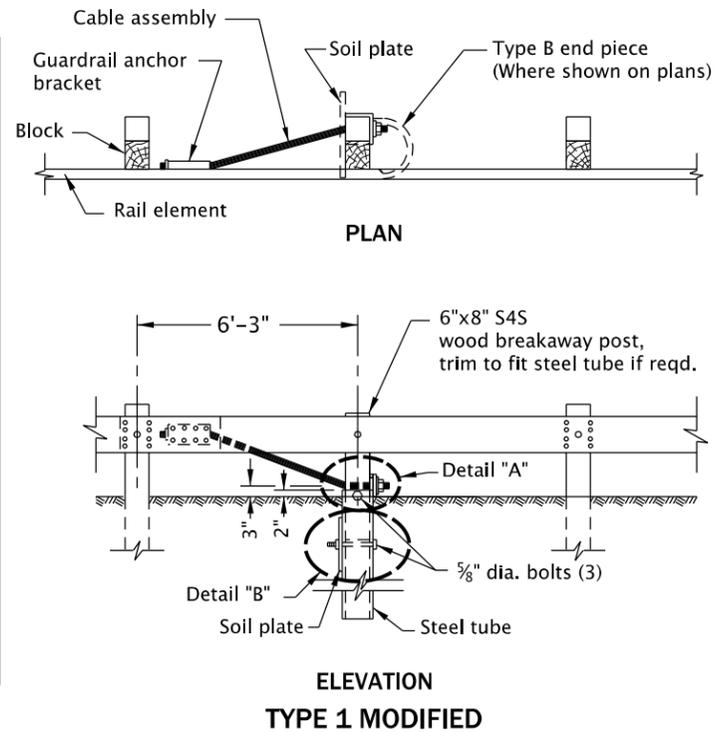
DATE	REVISION	DESCRIPTION
01-2020	NEW DRAWING CREATED	

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 consulting a Registered Professional Engineer.

rd450.dgn 13-JAN-2020

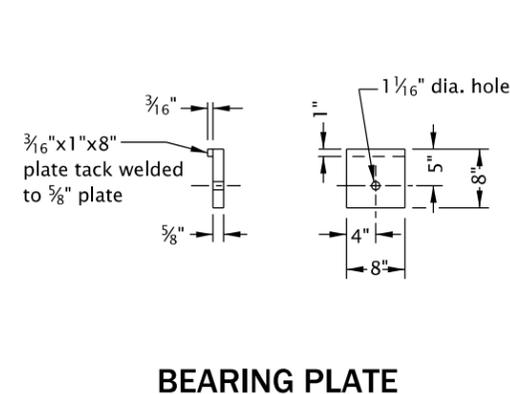
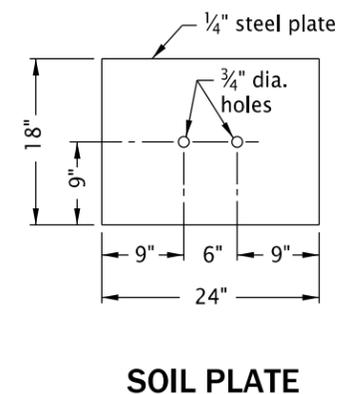
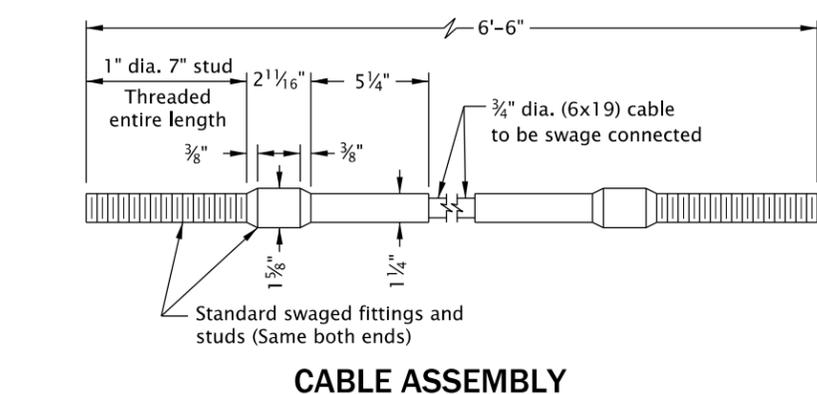
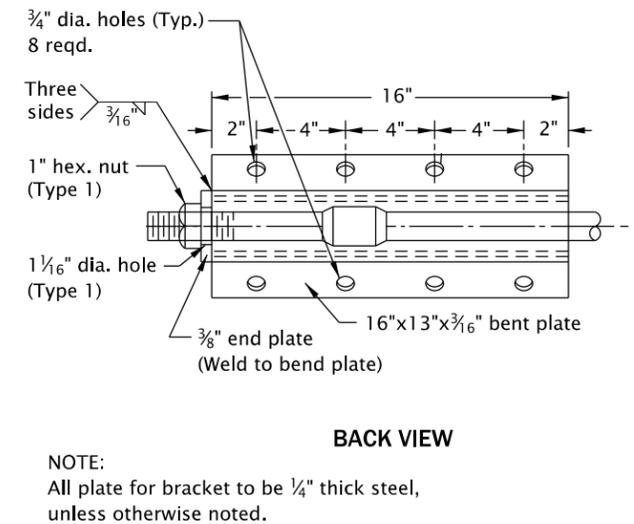
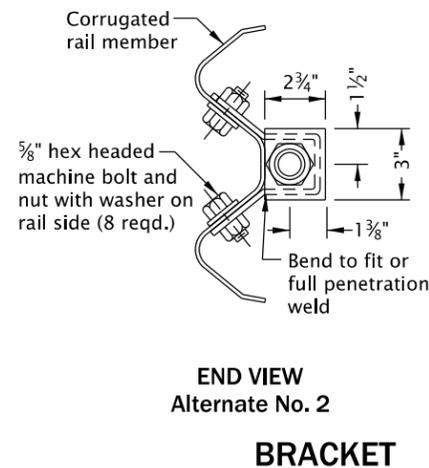
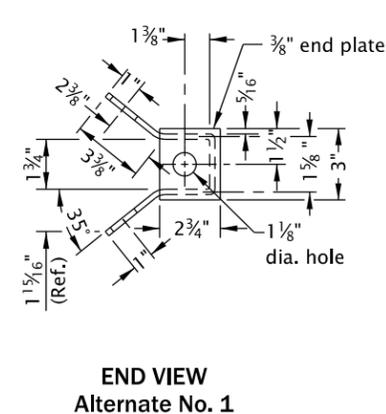
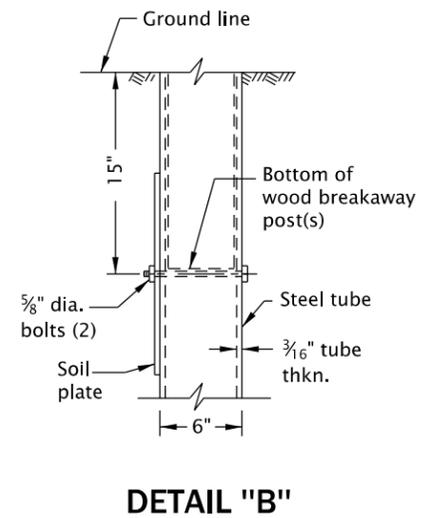
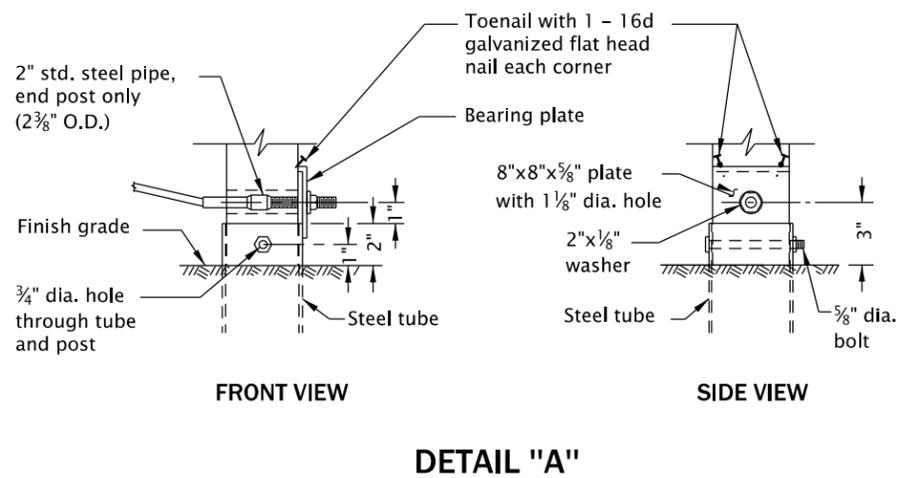


GUARDRAIL STEEL ANCHORS
(Where shown on plans)



GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

- (a.) Cable assembly to be tightened to a taut condition on initial installation.
- (b.) Final tension check and tightening of cable assembly as required to be done 30 days following initial installation.
- See appropriate guardrail standard drawing(s) for details not shown.
- See Std. Dwg. RD451 for wood breakaway posts.



CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

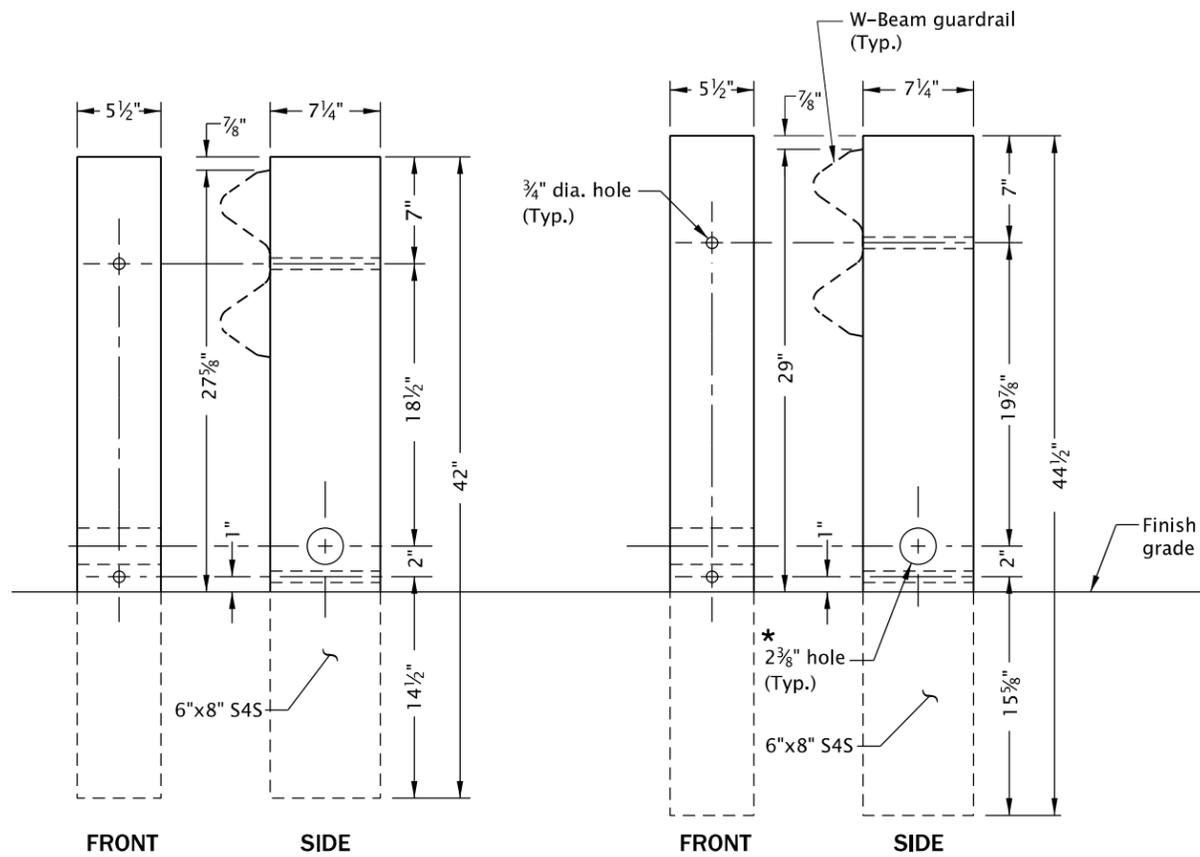
OREGON STANDARD DRAWINGS
GUARDRAIL ANCHORS (STEEL)

2018

DATE	REVISION	DESCRIPTION
01-2020	REVISED DETAILS & NOTES	

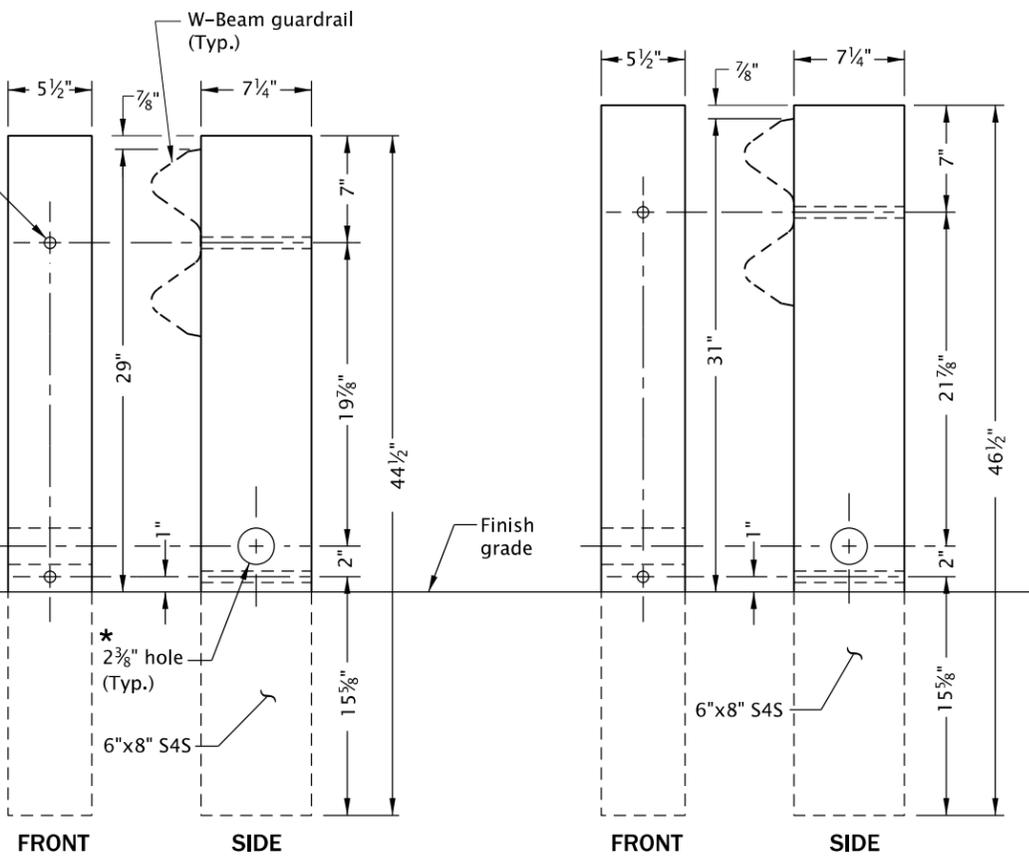
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

RD450

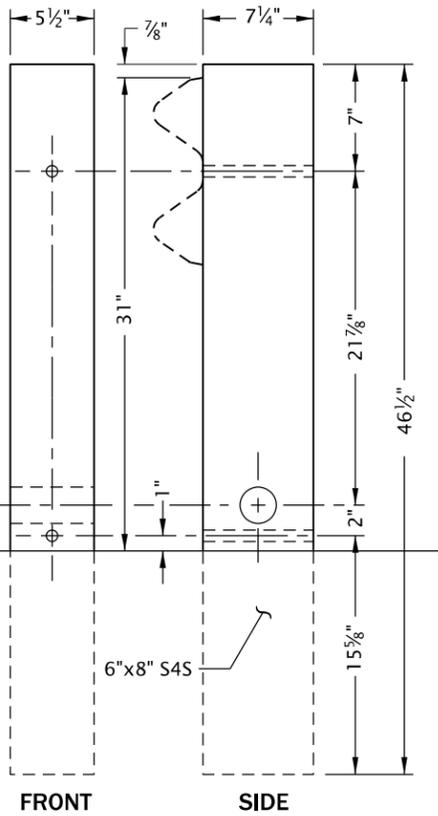


**TOP OF RAIL
HEIGHT 27 5/8"**

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



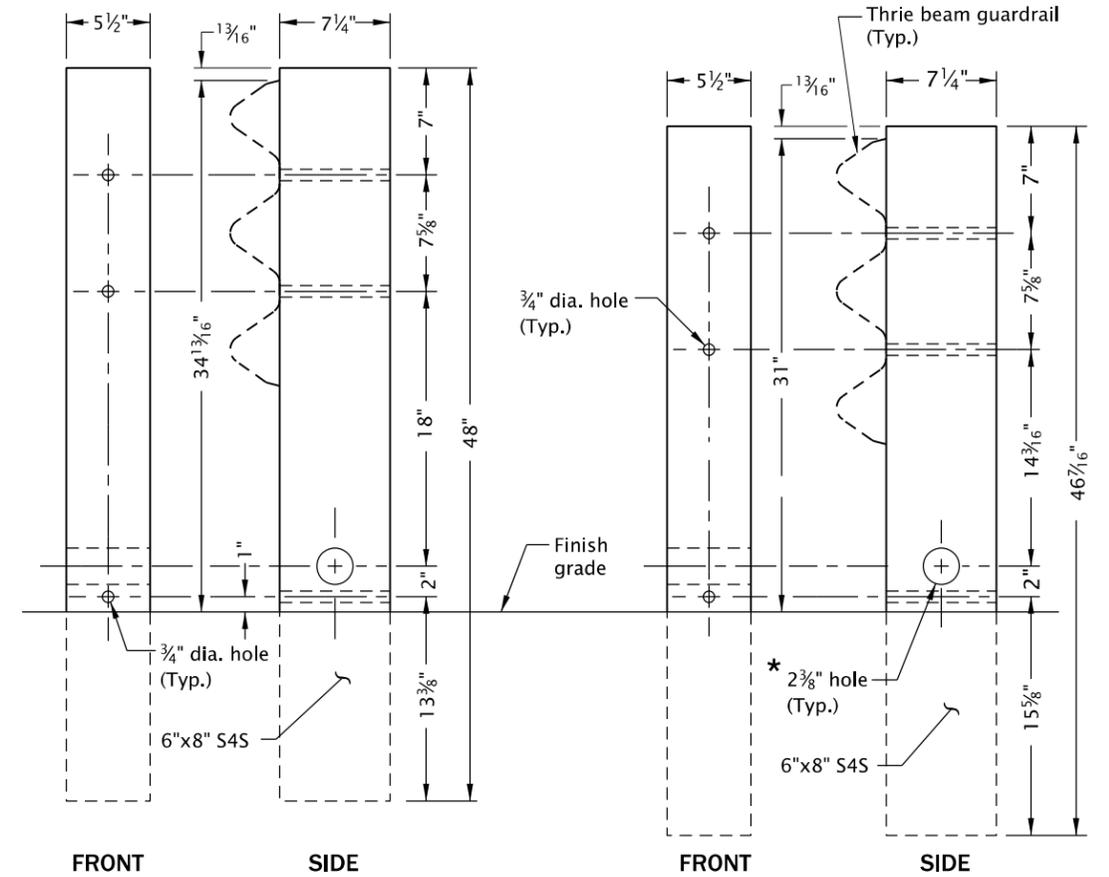
**TOP OF RAIL
HEIGHT 29"**



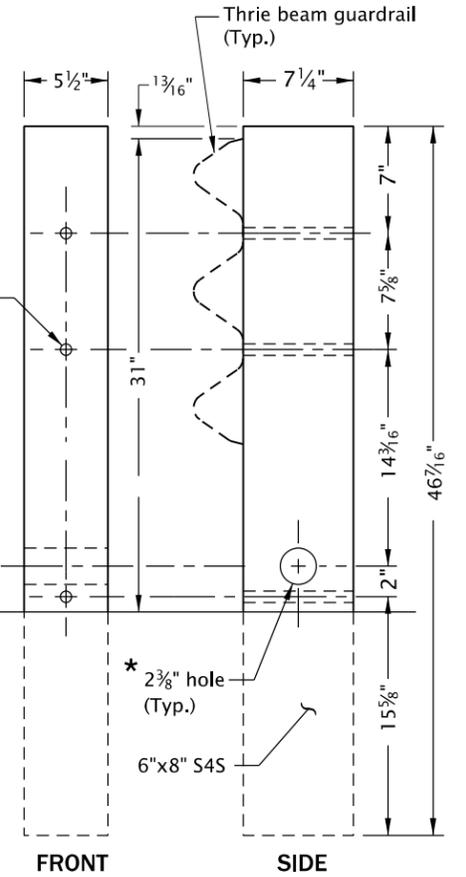
**TOP OF RAIL
HEIGHT 31"**

* 2" std. pipe in end post only, 2 3/8" dia.hole

W-BEAM WOOD BREAKAWAY POST



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



**TOP OF RAIL
HEIGHT 31"**

THRIE BEAM WOOD BREAKAWAY POST

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

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

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

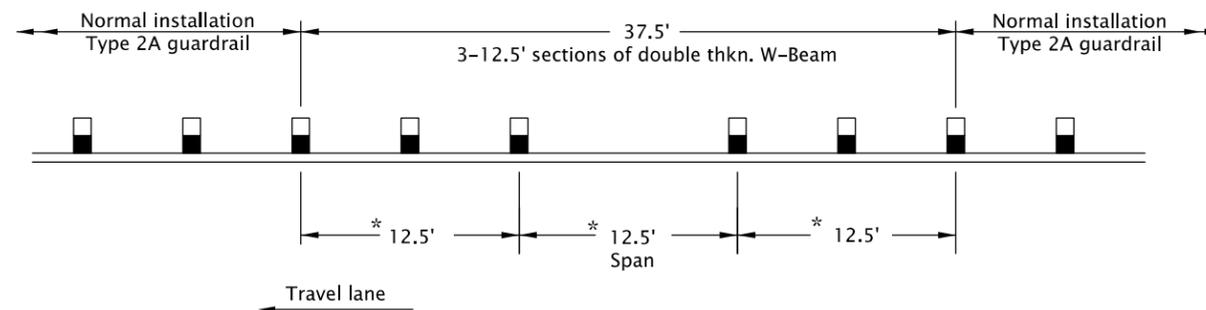
WOOD BREAKAWAY POSTS

2018

DATE	REVISION	DESCRIPTION
01-2020		REVISED DETAILS & NOTES

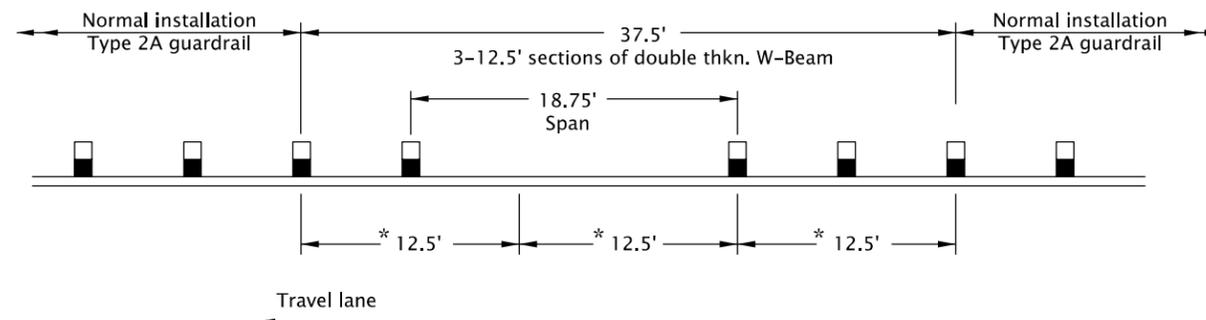
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

rd470.dgn 13-JAN-2020



DETAIL "A"
MODIFIED TYPE 2A GUARDRAIL
(12.5' SPAN)

* = Double thkn. (2 rail elements)



DETAIL "B"
MODIFIED TYPE 2A GUARDRAIL
(18.75' SPAN)

NOTES: THIS DRAWING IS RETAINED FOR MAINTENANCE PURPOSES.
 DO NOT USE FOR NEW CONSTRUCTION.

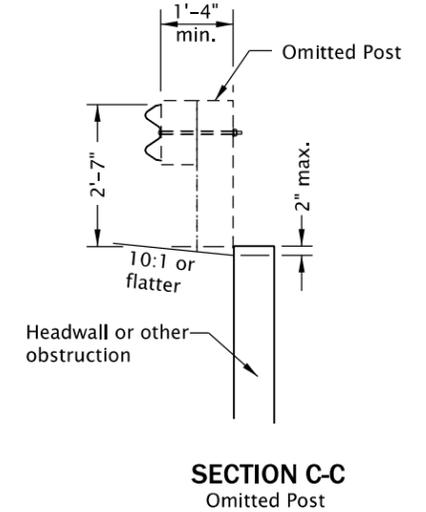
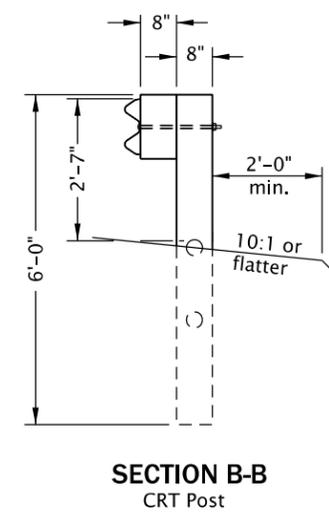
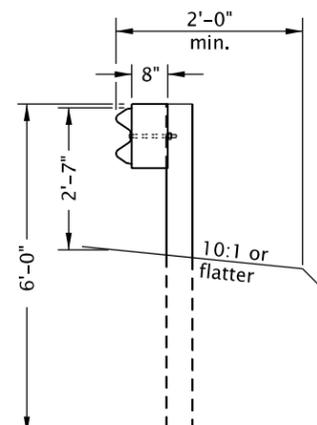
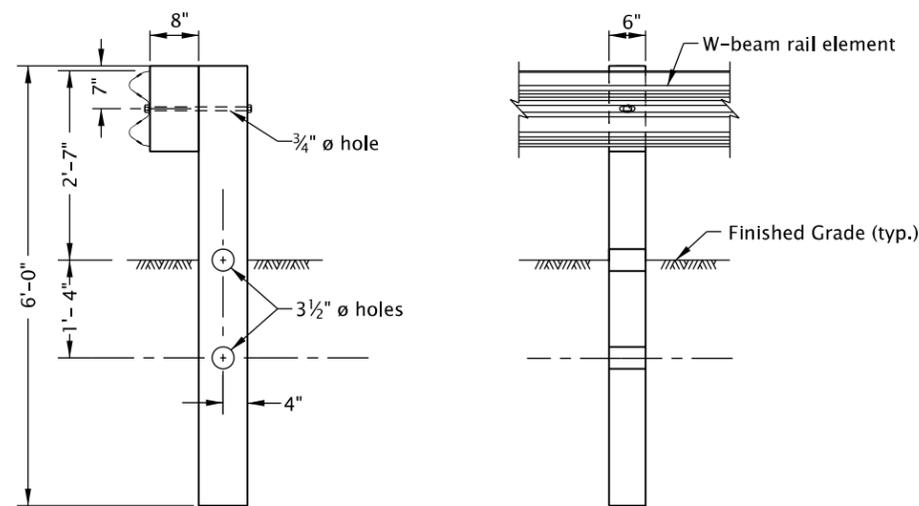
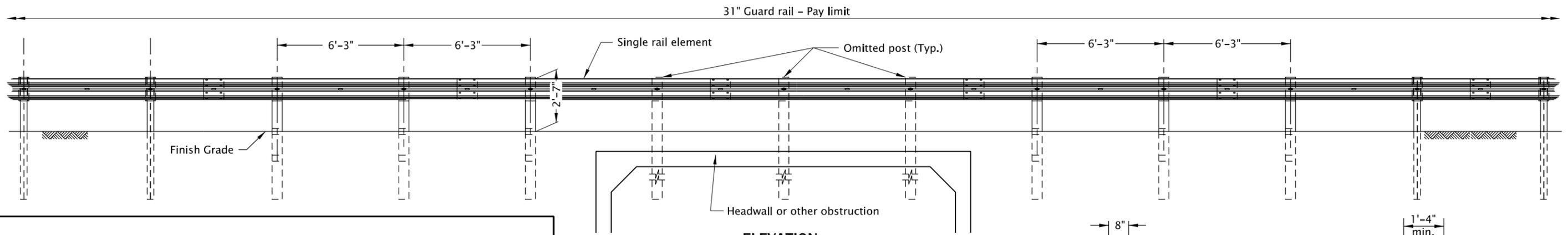
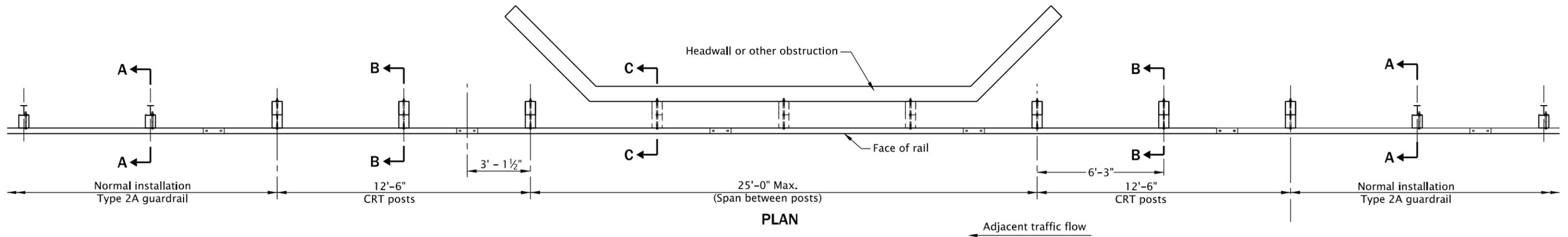
GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

- See appropriate guardrail standard drawing(s) for details not shown.

CALC. BOOK NO. <u> N/A </u>		BASELINE REPORT DATE <u> 13-JAN-2020 </u>	
<p><i>The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.</i></p>		NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
		<p>OREGON STANDARD DRAWINGS</p> <p>GUARDRAIL</p> <p>OVER LOW-FILL CULVERTS</p> <p>(29" RAIL HEIGHT)</p> <p>2018</p>	
		DATE	REVISION DESCRIPTION
01-2020	TITLE CHANGED & REVISED NOTES		

RD470

rd471.dgn 13-JAN-2020



GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

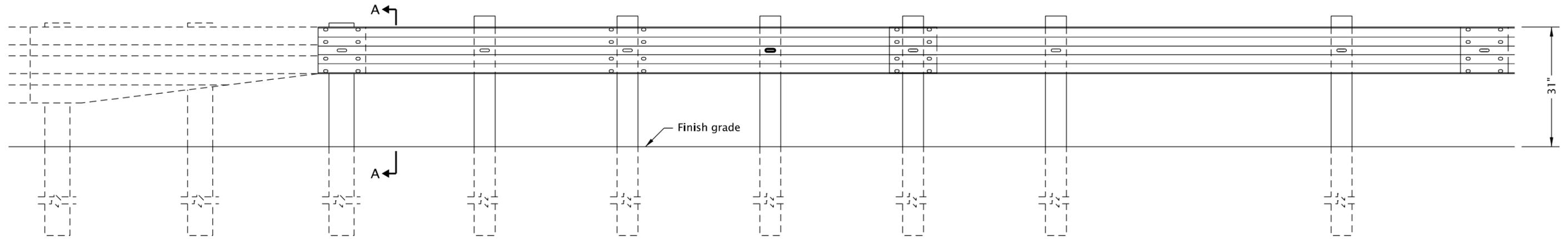
1. See appropriate guardrail standard drawing(s) for details not shown.
2. Only those posts required to span the obstacle shall be eliminated.
A maximum of three posts may be eliminated within a 25' span of W-beam guardrail.
3. CRT post to be wood only
4. Guardrail shall be lapped in the direction of adjacent traffic.

CALC. BOOK NO. <u>N/A</u>		BASELINE REPORT DATE <u>13-JAN-2020</u>	
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications			
OREGON STANDARD DRAWINGS			
MIDWEST GUARDRAIL SYSTEM OVER LOW-FILL CULVERTS			
2018			
DATE	REVISION	DESCRIPTION	
01-2019	REVISED	DETAILS & NOTES	
01-2020	TITLE	CHANGED	

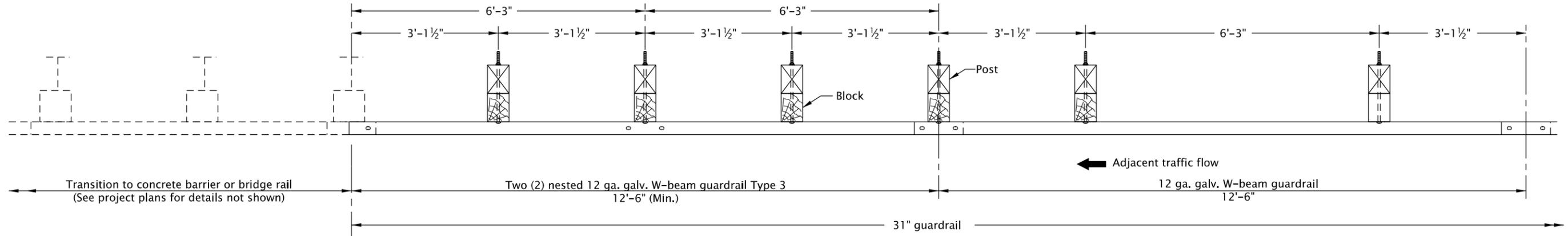
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

rd482.dgn 13-JAN-2020

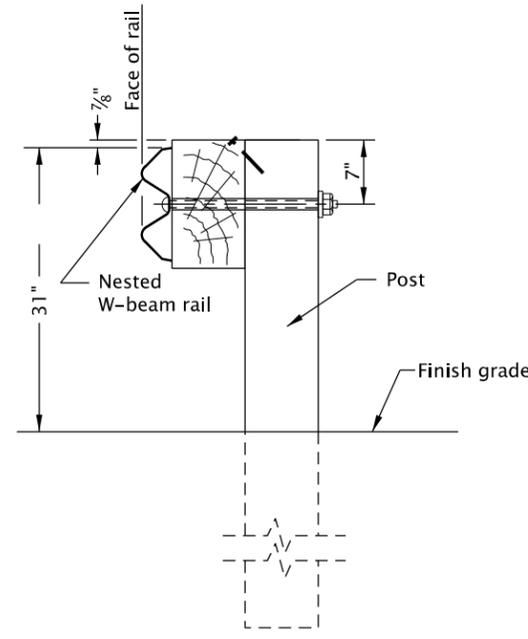
RD482



ELEVATION



PLAN



SECTION A-A

- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:
1. See appropriate guardrail standard drawing(s) for details not shown.
 2. See Std. Dwg. RD701 for drainage curbs, where required.
 3. Lap guardrail in direction of adjacent traffic.
 4. Guardrail shoulder installation shown, metal median barrier installation similar.
 5. Guardrail height measured from finish grade to top of metal guardrail beam.
 6. See project plans for details not shown.

CALC. BOOK NO. N/A BASELINE REPORT DATE 13-JAN-2020

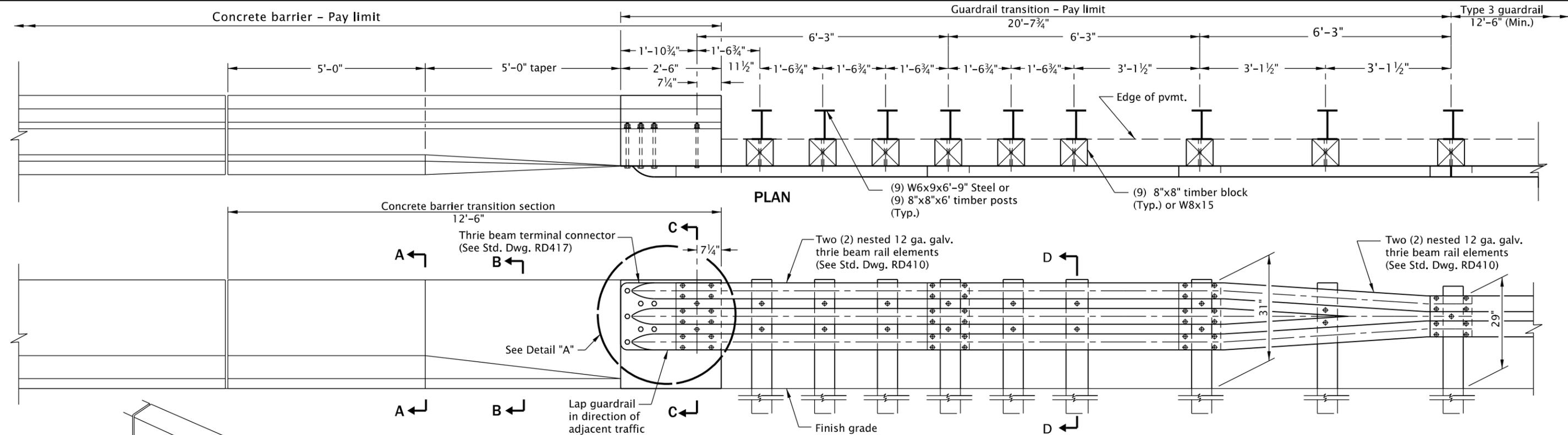
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

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 consulting a Registered Professional Engineer.

OREGON STANDARD DRAWINGS	
MIDWEST GUARDRAIL SYSTEM TYPE 3 (NESTED W-BEAM)	
2018	
DATE	REVISION DESCRIPTION
01-2020	TITLE CHANGED, ADDED DETAIL, REVISED DETAILS & NOTES

rd530.dgn 13-JAN-2020

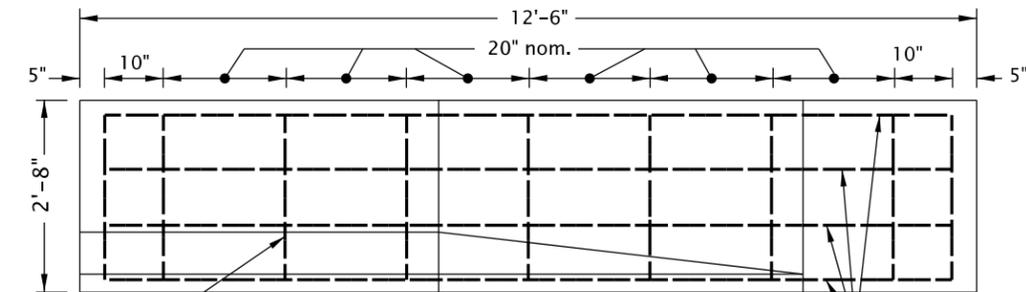
RD530



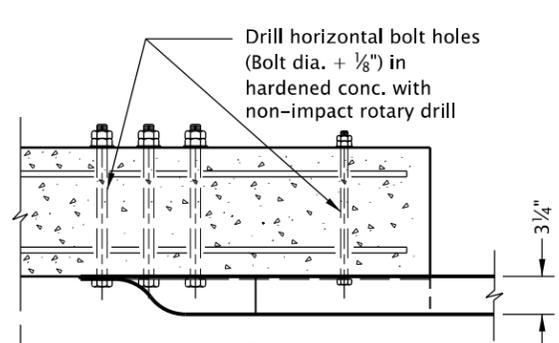
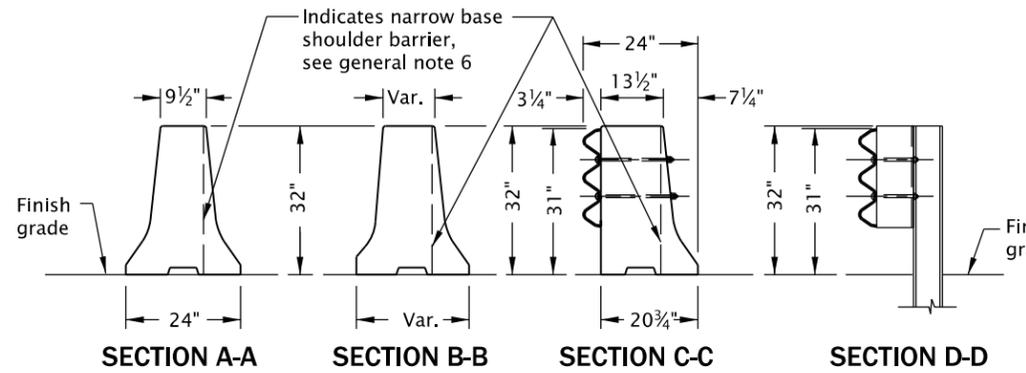
PLAN

ELEVATION
(Steel post shown)

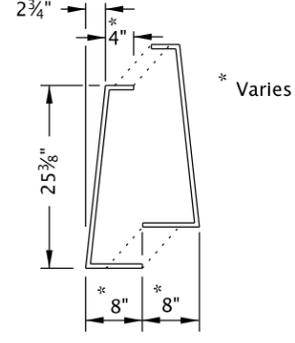
CONCRETE BARRIER TRANSITION SECTION



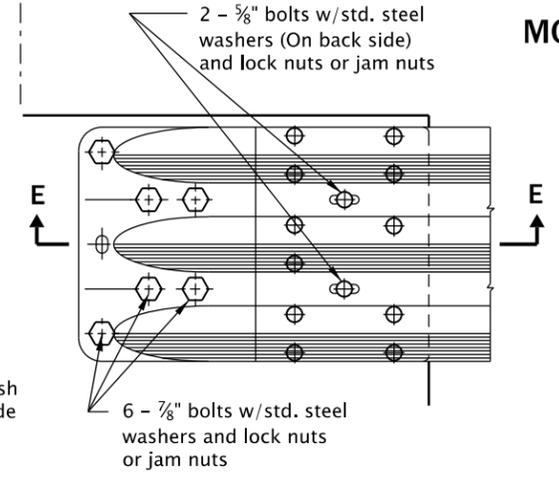
CONCRETE BARRIER TRANSITION SECTION REBAR PLACEMENT



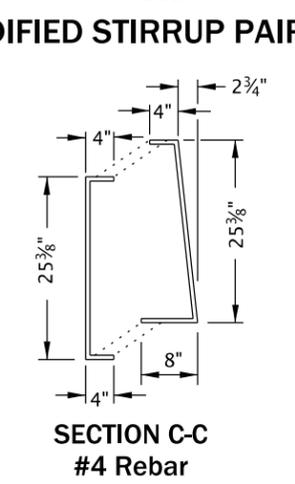
SECTION E-E



SECTION B-B
#4 Rebar
MODIFIED STIRRUP PAIR



DETAIL "A"



SECTION C-C
#4 Rebar
MODIFIED STIRRUP PAIR

- 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. See Std. Dwgs. RD400, RD405, RD410, RD415, RD417, RD500, RD505 & BR203, for details not shown.
 3. For trailing end guardrail connection see Std. Dwg. BR236, Detail A.
 4. If trench method is used to install posts, ensure compaction according to 00810.41, 2nd paragraph.
 5. See Std. Dwg. RD516 for securing concrete barrier to roadway.
 6. Narrow base shoulder barrier to be used only at locations with backfill behind barrier as shown on plans.
 7. All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.

CALC. BOOK NO. N/A BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

GUARDRAIL TRANSITION TO CONCRETE BARRIER

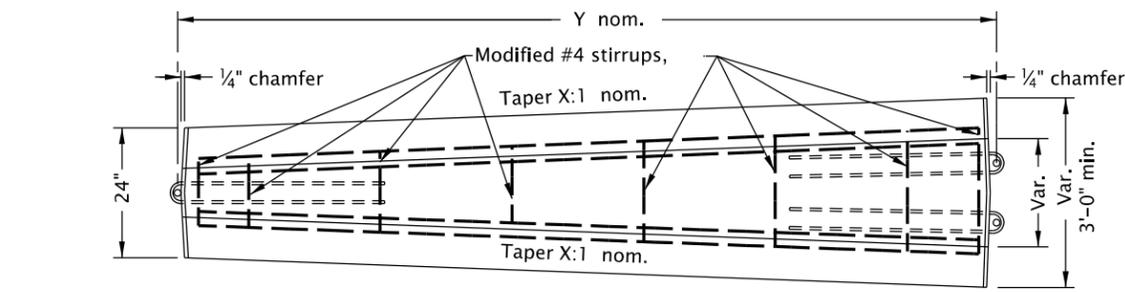
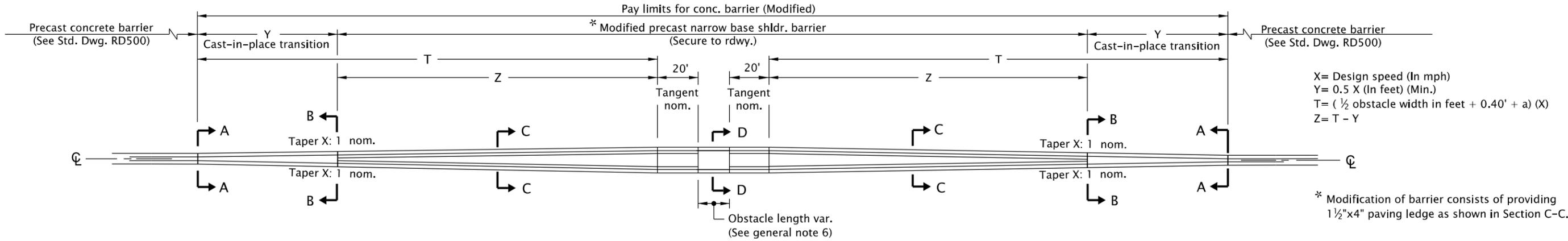
2018

DATE	REVISION	DESCRIPTION
06-2019	REVISED NOTES	
01-2020	REVISED DETAILS & NOTES	

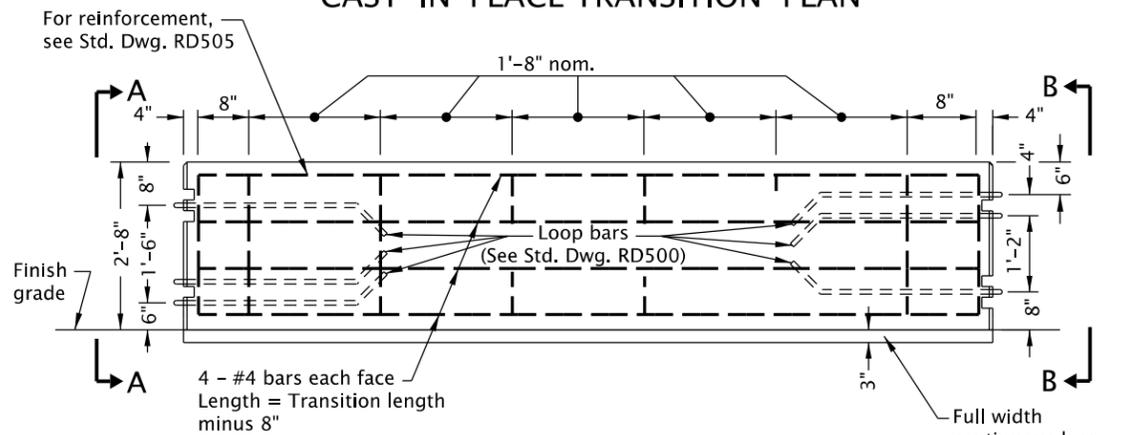
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

rd535.dgn 13-JAN-2020

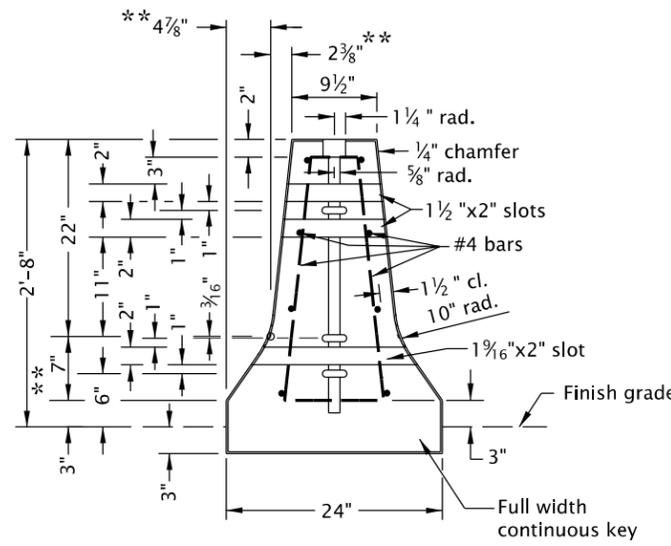
RD535



CAST-IN-PLACE TRANSITION PLAN

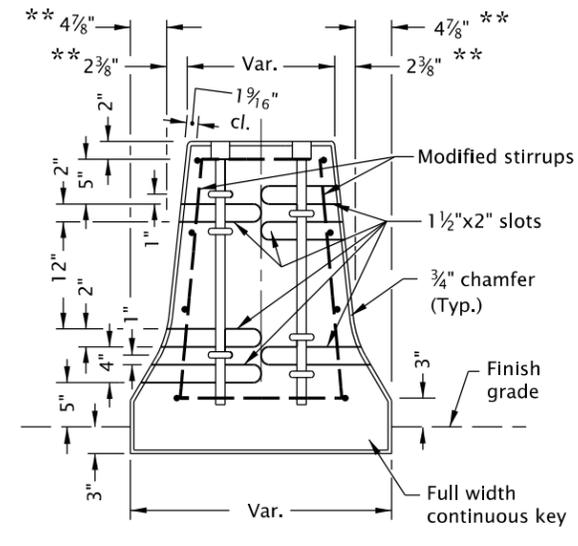


CAST-IN-PLACE TRANSITION ELEVATION

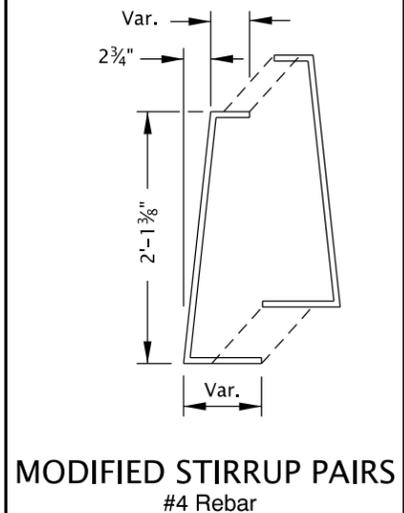


END VIEW A-A (See general note 2)

** Dimensions marked thus are to the intersection point of the barrier slopes. Construct the 10" radius to provide a smooth transition between the slopes.

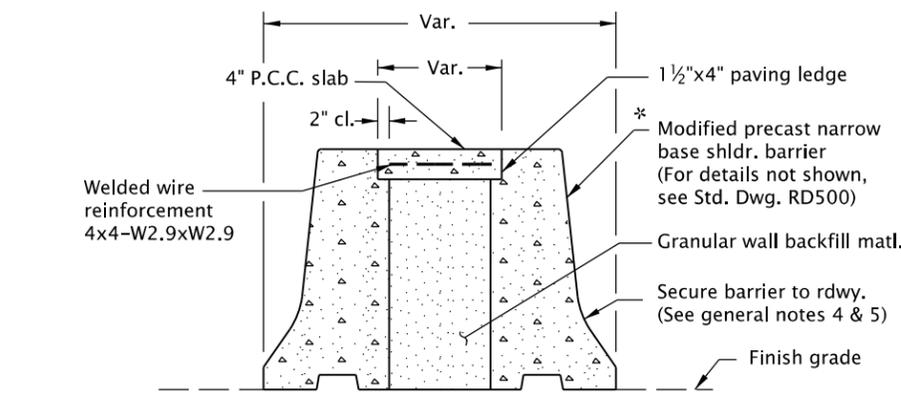


END VIEW B-B (See general note 2)

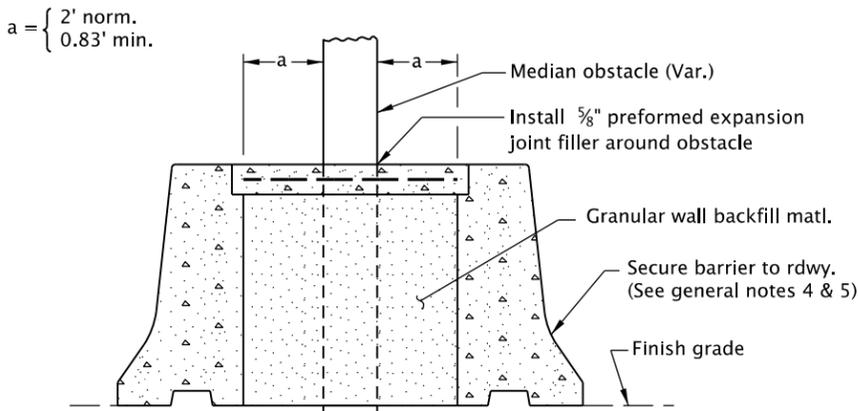


MODIFIED STIRRUP PAIRS #4 Rebar

- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:
1. Field verify end configurations of connecting barriers prior to forming connections at transitions.
 2. All reinforcing bars shall be full length as shown and shall be placed 1 1/2" clear of the nearest face of concrete unless shown otherwise.
 3. See Std. Dwg. RD500 & RD505 for details not shown.
 4. Secure precast concrete barrier to roadway, see Std. Dwg. RD516.
 5. All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.
 6. This barrier is not for use with bridge railing.



SECTION C-C



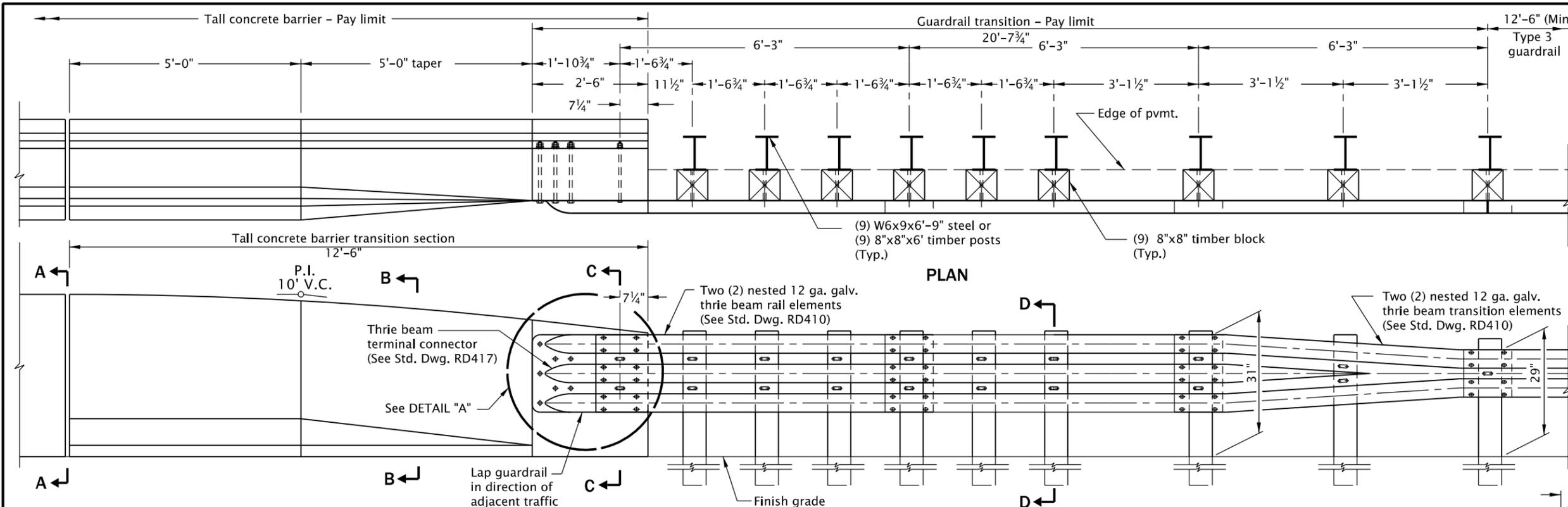
SECTION D-D

(Precast option shown, see Section C-C for additional details not shown)

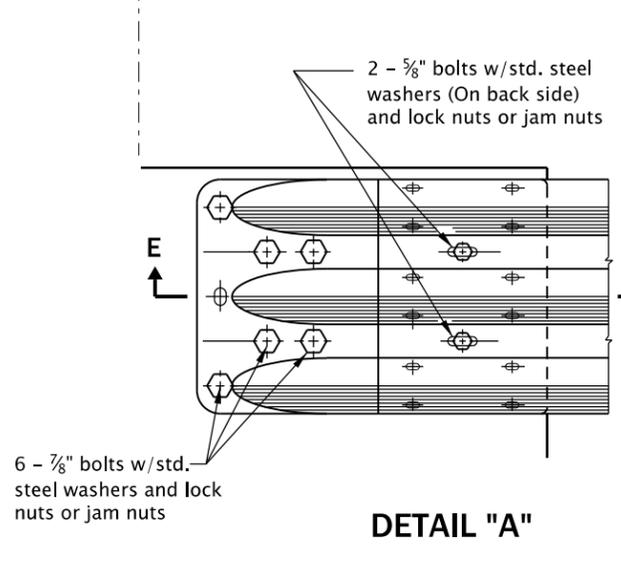
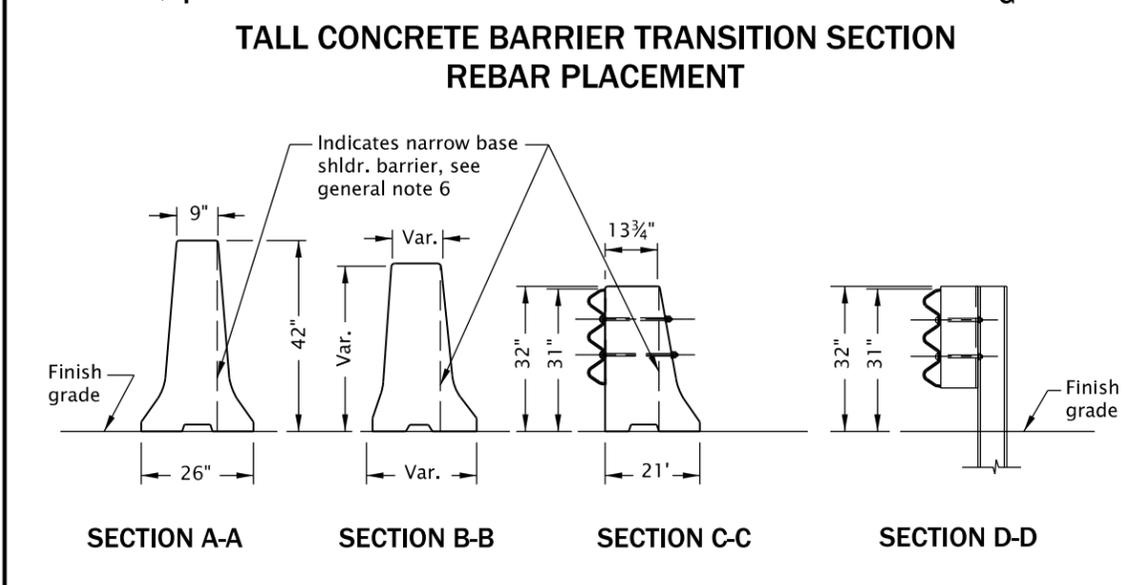
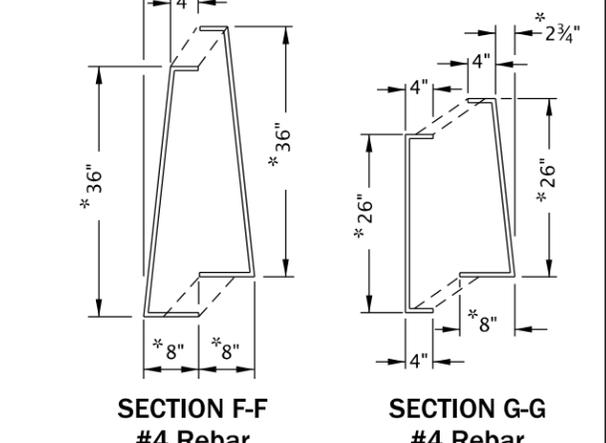
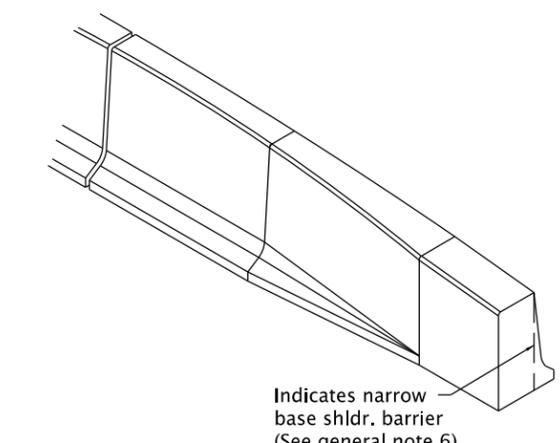
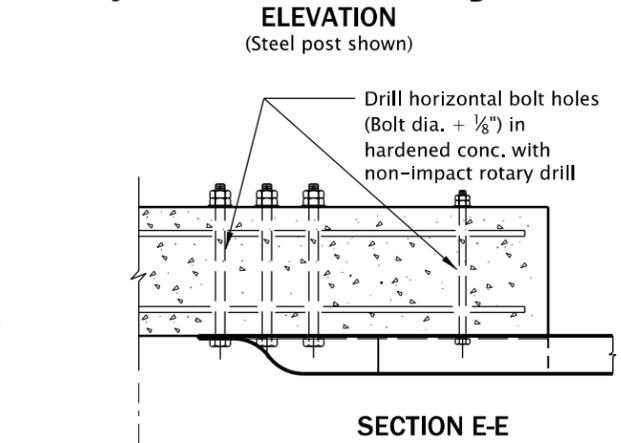
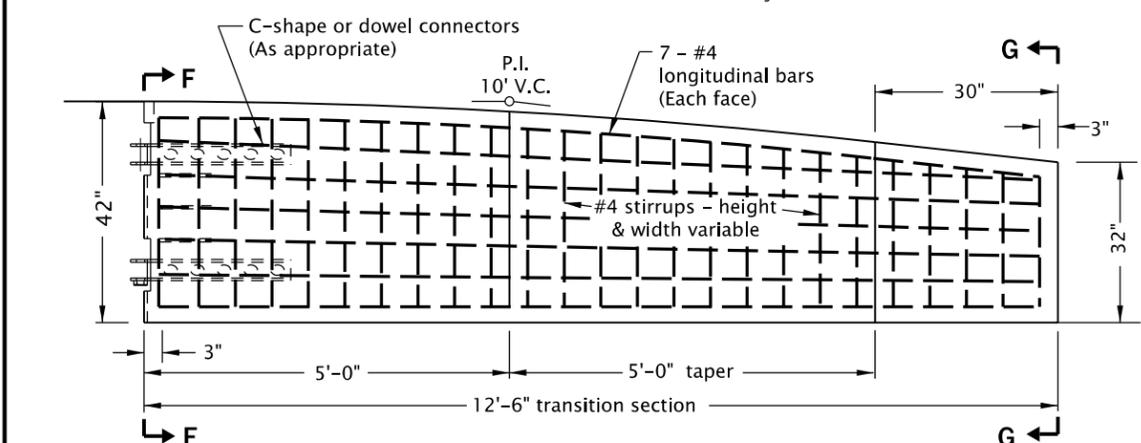
CALC. BOOK NO. N/A	BASELINE REPORT DATE 13-JAN-2020
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS	
CONCRETE BARRIER (MODIFIED) AROUND MEDIAN OBSTACLE	
2018	
DATE	REVISION DESCRIPTION
01-2018	REVISED NOTES
01-2020	ADDED NOTES

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 consulting a Registered Professional Engineer.

rd570.dgn 13-JAN-2020



- 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 conc. unless shown otherwise.
 2. See Std. Dwgs. RD400, RD405, RD410, RD415, RD417 & RD545 for details not shown.
 3. For trailing end guardrail connection, see Std. Dwg. BR236, Detail A.
 4. If trench method is used to install posts, ensure compaction according to 00810.41 2nd paragraph.
 5. See Std. Dwg. RD516 for securing concrete barrier to roadway.
 6. Narrow base shldr. barrier to be used only at locations with backfill behind barrier as shown on plans.
 7. All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.



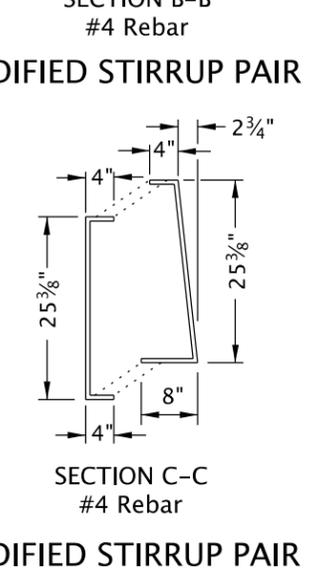
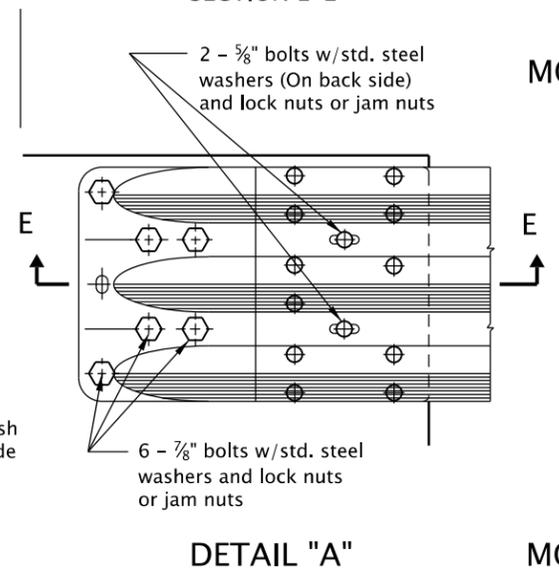
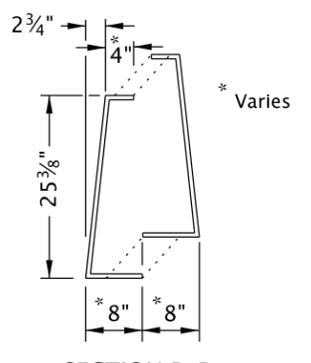
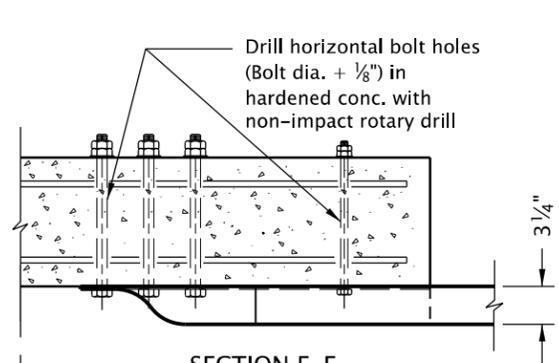
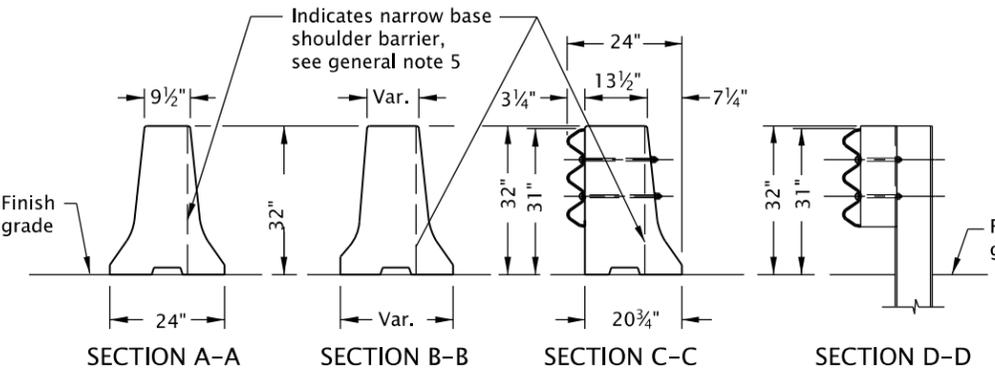
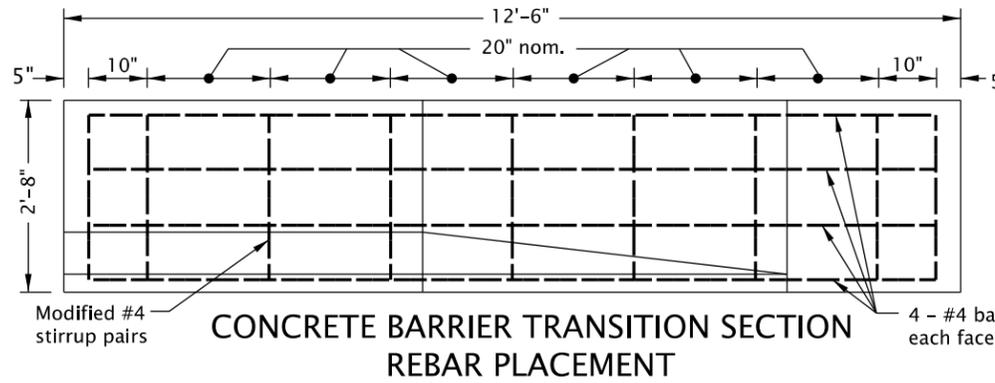
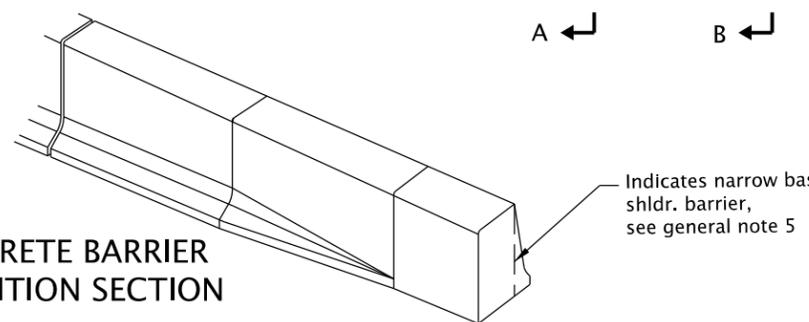
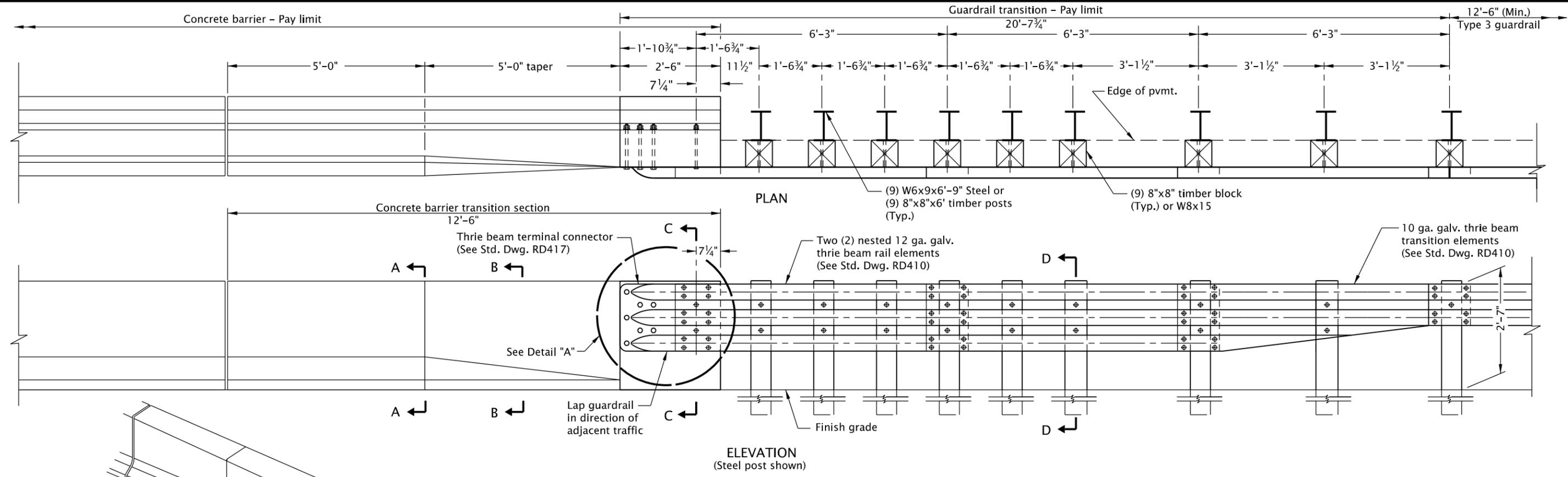
CALC. BOOK NO. N/A

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 consulting a Registered Professional Engineer.

BASELINE REPORT DATE 13-JAN-2020	
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS	
GUARDRAIL TRANSITION TO TALL CONCRETE BARRIER	
2018	
DATE	REVISION DESCRIPTION
01-2020	REVISED DETAILS & NOTES

RD570

rd580.dgn 13-JAN-2020



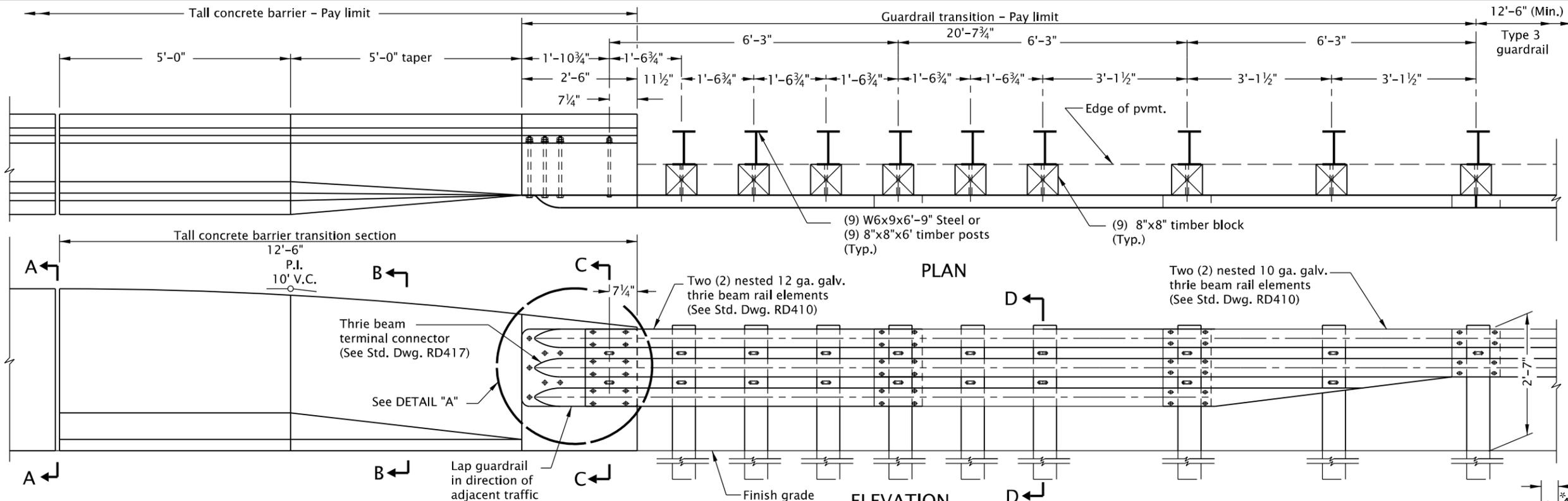
- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**
1. All reinforcing bars shall be full length as shown and shall be 2" clear of the nearest face of concrete unless shown otherwise.
 2. See Std. Dwg. RD405, RD410, RD415, RD417, RD480, RD481, RD482, RD500, RD505 & BR203, for details not shown.
 3. If trench method is used to install posts, ensure compaction according to 00810.41 2nd paragraph.
 4. See Std. Dwg. RD516 for securing concrete barrier to roadway.
 5. Narrow base shoulder barrier to be used only at locations with backfill behind barrier as shown on plans.
 6. All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.

CALC. BOOK NO. N/A		BASELINE REPORT DATE 13-JAN-2020	
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications			
OREGON STANDARD DRAWINGS			
MIDWEST GUARDRAIL SYSTEM			
TRANSITION			
TO CONCRETE BARRIER			
2018			
DATE	REVISION	DESCRIPTION	
01-2020		TITLE CHANGED, REVISED DETAILS & NOTES	

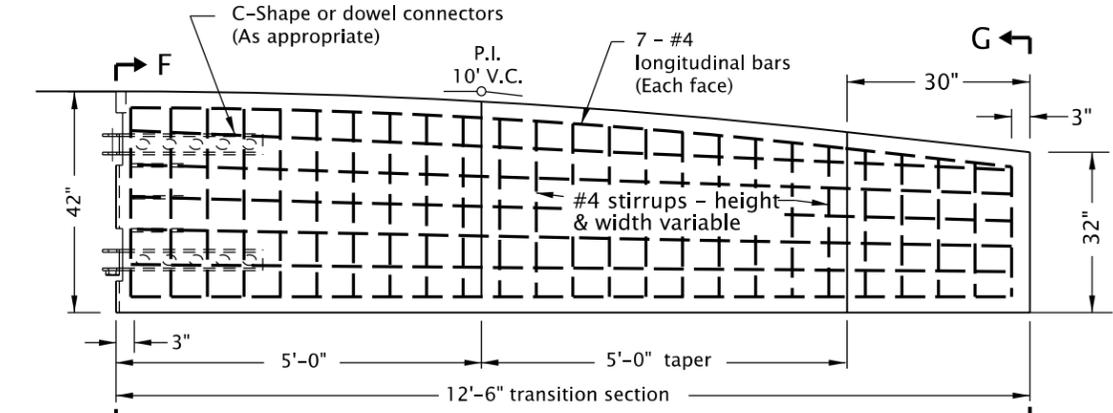
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

rd581.dgn 13-JAN-2020

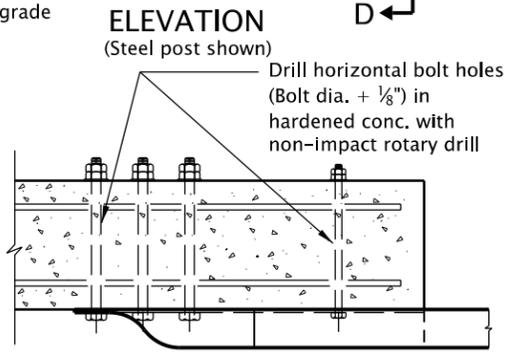
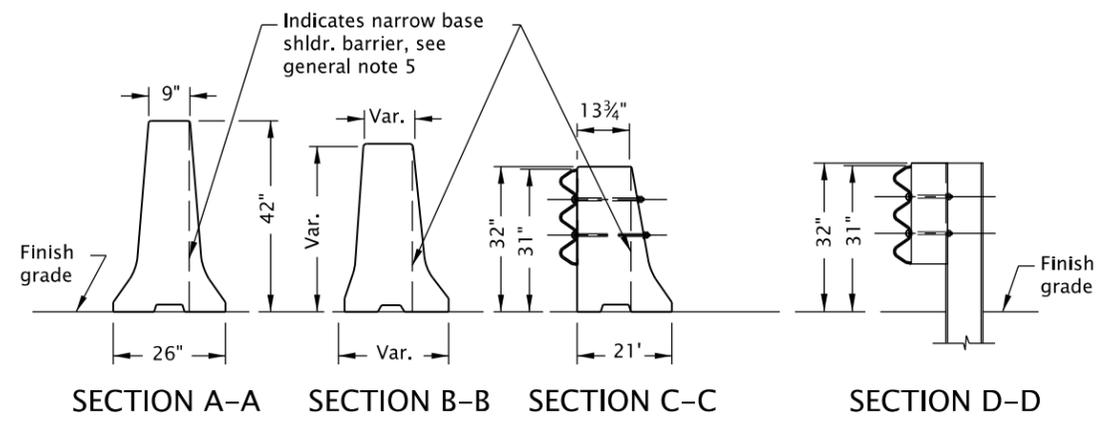
RD581



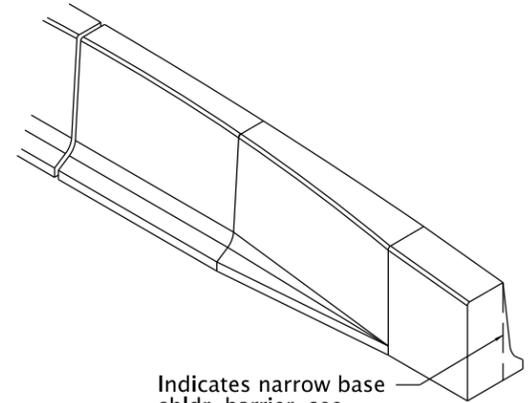
- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**
1. All reinforcing bars shall be full length as shown and shall be 2" clear of the nearest face of conc. unless shown otherwise.
 2. See Std. Dwg. RD405, RD410, RD415, RD417, RD480, RD481, RD482 & RD545 for details not shown.
 3. If trench method is used to install posts, ensure compaction according to 00810.41, 2nd paragraph.
 4. See Std. Dwg. RD516 for securing concrete barrier to roadway.
 5. Narrow base shldr. barrier to be used only at locations with backfill behind barrier as shown on plans.
 6. All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.



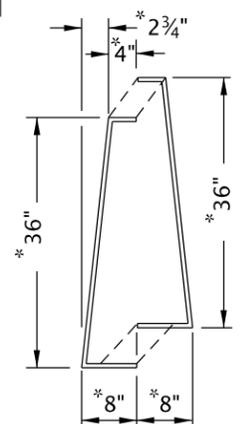
TALL CONCRETE BARRIER TRANSITION SECTION REBAR PLACEMENT



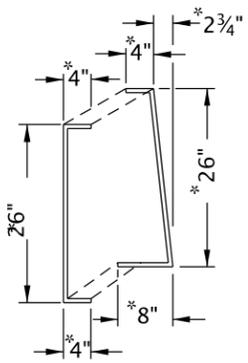
SECTION E-E



TALL CONCRETE BARRIER TRANSITION SECTION ISOMETRIC VIEW

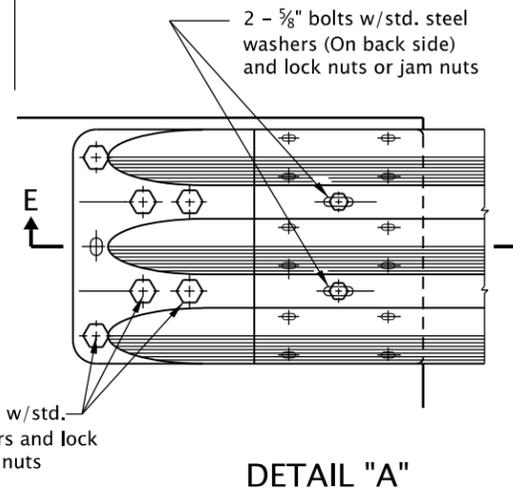


SECTION F-F #4 Rebar MODIFIED STIRRUP PAIR



SECTION G-G #4 Rebar MODIFIED STIRRUP PAIR

*Dimension variable through transition section. (4" min. overlap)



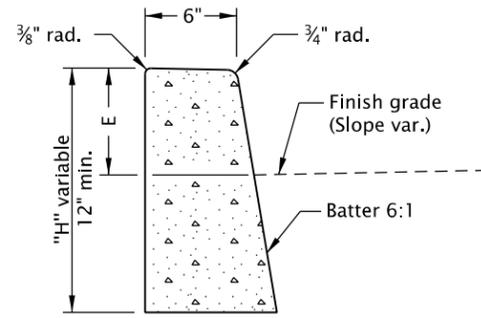
DETAIL "A"

CALC. BOOK NO. N/A

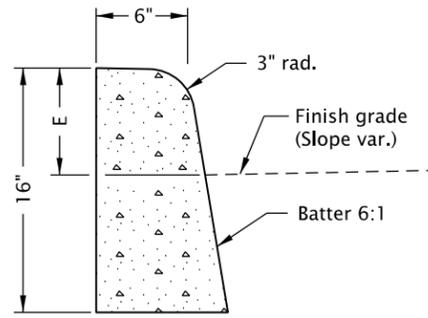
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

BASELINE REPORT DATE 13-JAN-2020	
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS	
MIDWEST GUARDRAIL SYSTEM	
TRANSITION TO	
TALL CONCRETE BARRIER	
2018	
DATE	REVISION DESCRIPTION
01-2020	TITLE CHANGED, REVISED DETAILS & NOTES

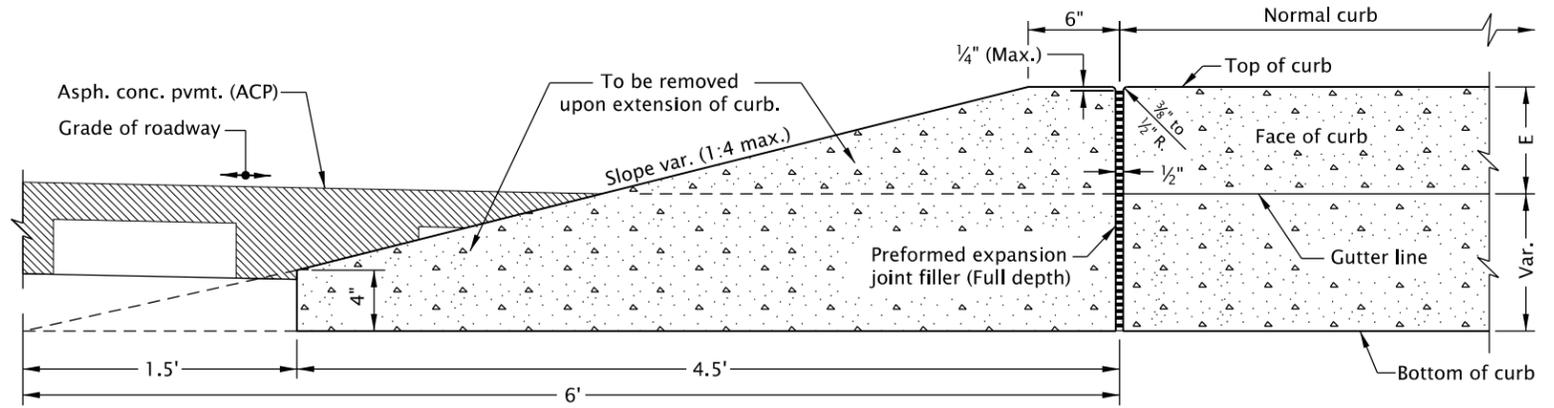
rd700.dgn 13-JAN-2020



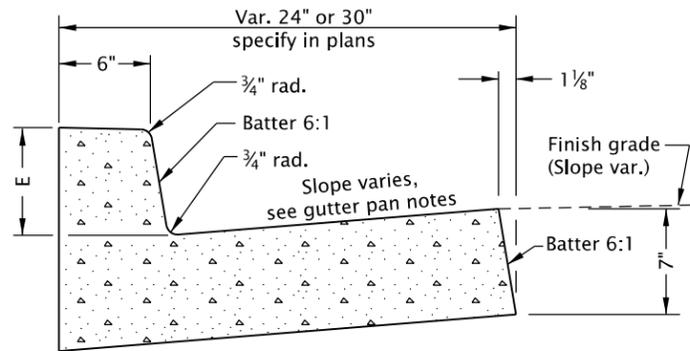
O.D.O.T. & City of Portland Standard "H"=16" STANDARD CURB
(See general note 11)



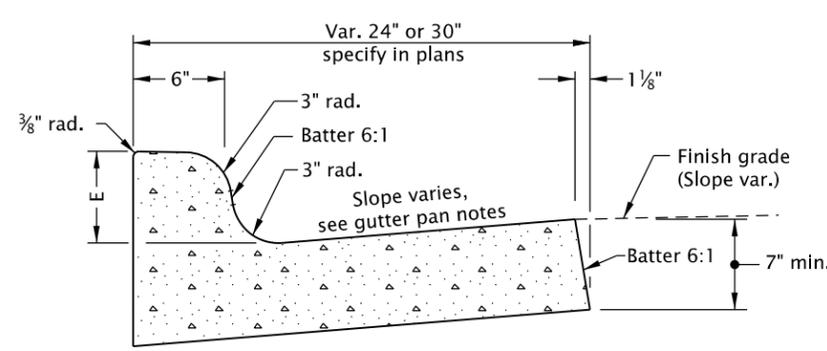
MOUNTABLE CURB
(See general note 11)



CURB ENDING DETAIL

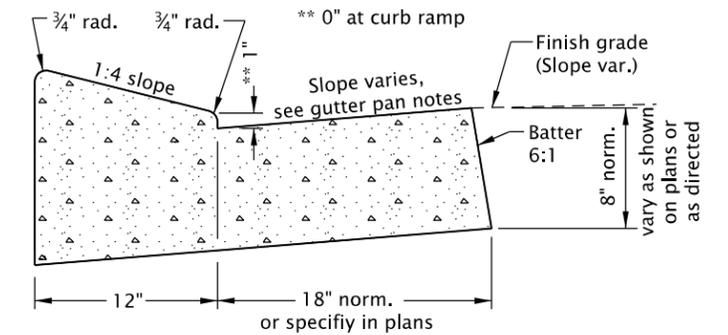


CURB AND GUTTER

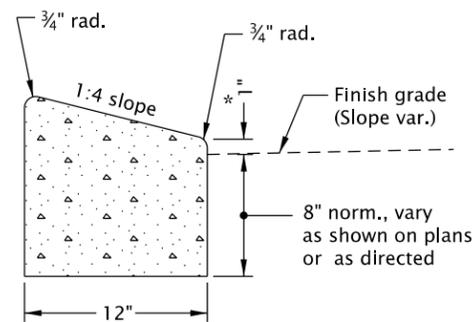


MOUNTABLE CURB AND GUTTER

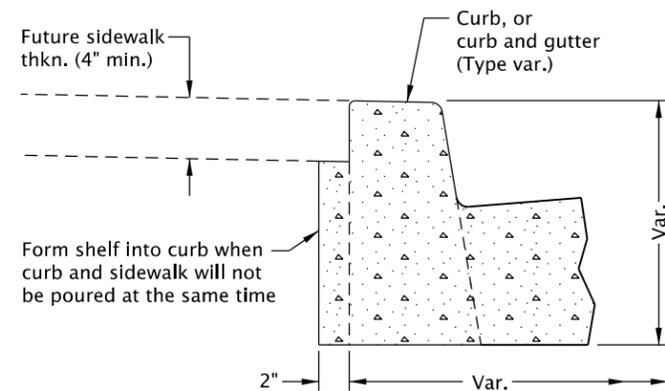
GUTTER PAN NOTES:
Slope 5.0% normal.
Slope 4.0% max. at curb ramps.
Vary slope as reqd. for drainage. Vary where shown on plans, and allowed by jurisdiction.



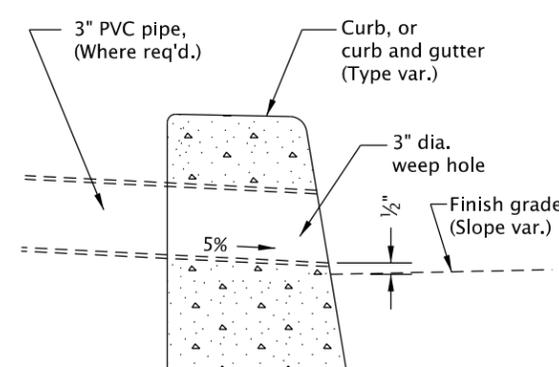
LOW PROFILE MOUNTABLE CURB AND GUTTER
(Where shown on plans)



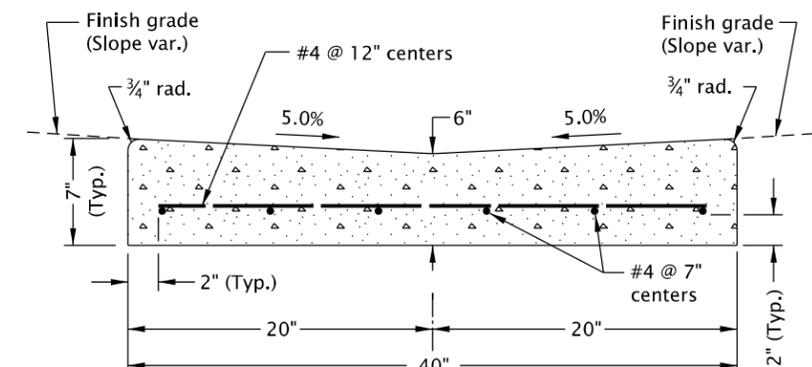
LOW PROFILE MOUNTABLE CURB
(See general note 11)



MODIFICATION FOR KEYWAY
(Where shown on plans)



WEEP HOLE DETAIL
(Where shown on plans, and allowed by jurisdiction)



VALLEY GUTTER

CALC. BOOK NO. N/A BASELINE REPORT DATE 13-JAN-2020

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Curb exposure "E" = 6" to 9", as measured vertically from flowline to highest point on curb. Vary as shown on plans or as directed. O.D.O.T standard "E"=7".
2. Const. curb expansion joints at 200' maximum spacing, and at points of tangency, and at ends of each driveways.
3. Const. curb contraction joints at 15' maximum spacing, and at ends of each inlet and curb ramp.
4. Transitions shall be used to connect curbs of different exposures "E". ("E" Is the total vertical dimension of those curb surfaces having a slope of 1:1 or steeper). Minimum desirable transition length shall be 20' for each 1" difference in "E".

5. Tops of all curbs shall slope toward the roadway at 1.5% max. (Max. 2.0% finished surface slope), unless otherwise shown, or as directed.
6. Dimensions are nominal, vary to conform with curb machine approved by the engineer.
7. Dimensions adjacent to radii are measured to the point of intersection of curb surfaces.
8. For sidewalk details, and monolithic curb & sidewalk, see Std. Dwgs. RD720 & RD721.
9. For drainage curbs, see Std. Dwg. RD701.
10. For curb ramp details, see Std. Dwg. RD755.
11. On or along state highways, curb and gutter is required at curb ramp.

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 consulting a Registered Professional Engineer.

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

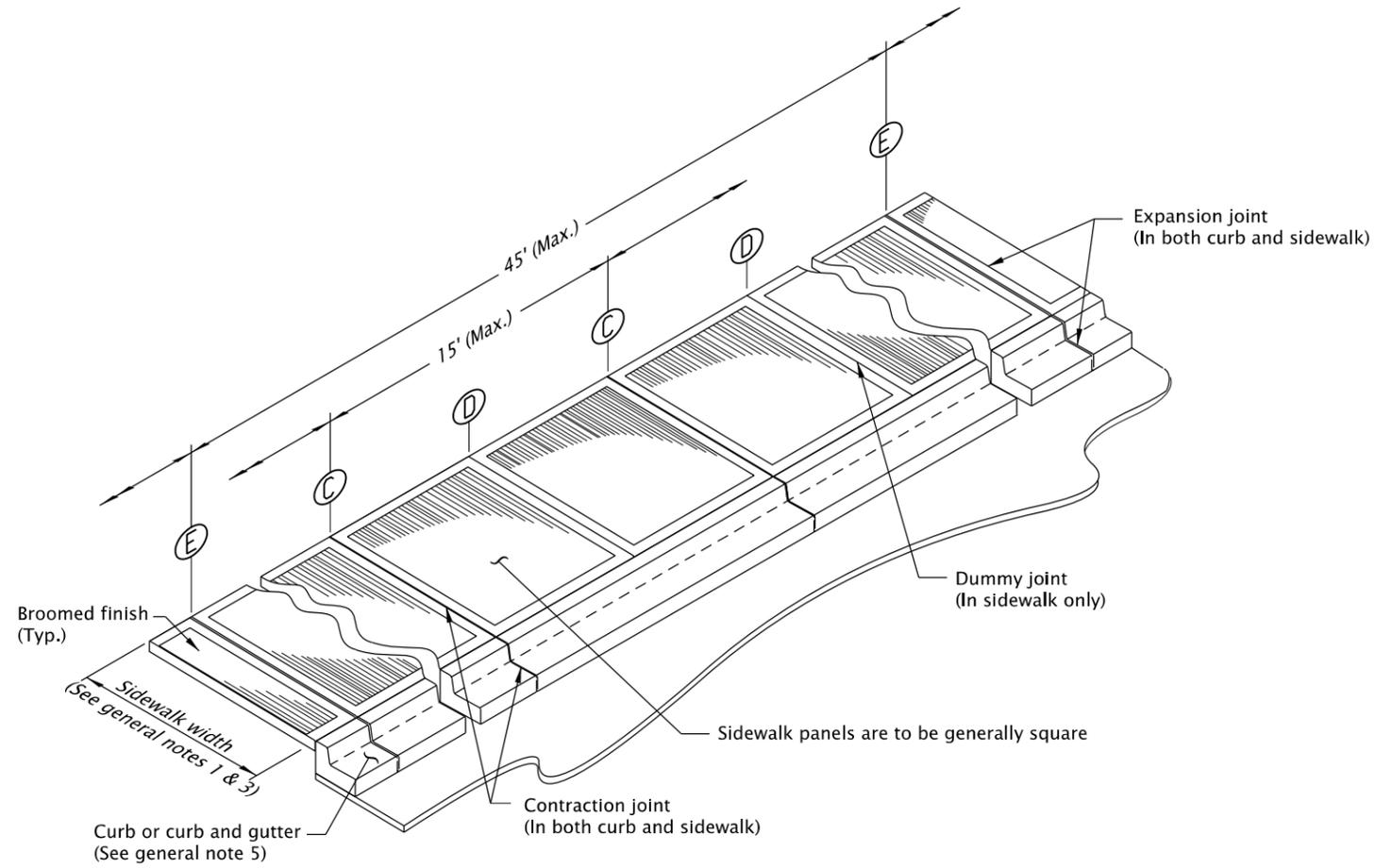
CURBS

2018

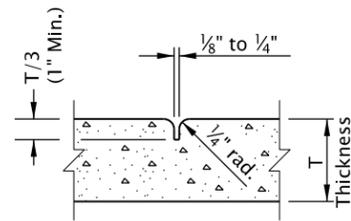
DATE	REVISION DESCRIPTION
01-2018	REVISED & ADDED NOTES
05-2018	REVISED NOTE
07-2018	ADDED DETAIL & REVISED NOTES
06-2019	REVISED NOTES
01-2020	REVISED DETAIL & NOTES

RD700

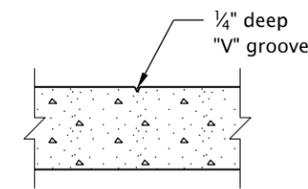
rd722.dgn 13-JAN-2020



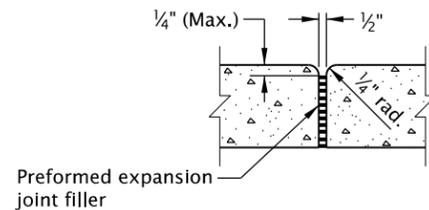
JOINT DETAIL
(Curb line sidewalk with curb and gutter shown)



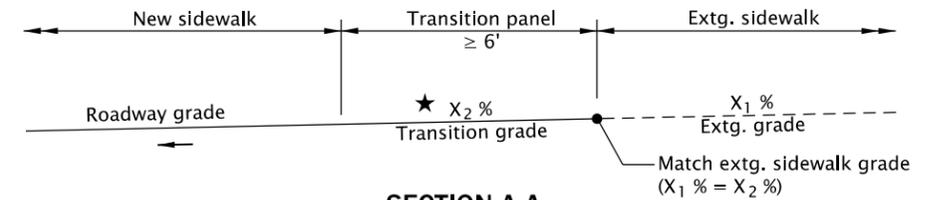
C CONTRACTION JOINT
(See general note 6)



D DUMMY JOINT

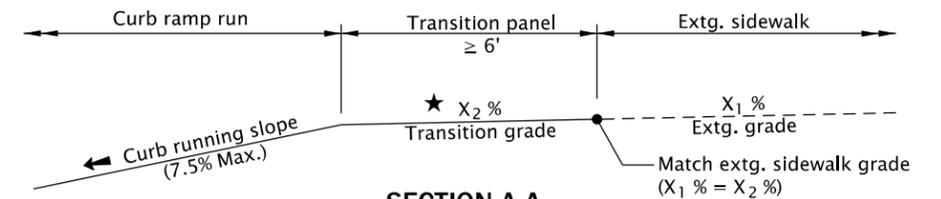


E EXPANSION JOINT
(See general notes 2 & 5)

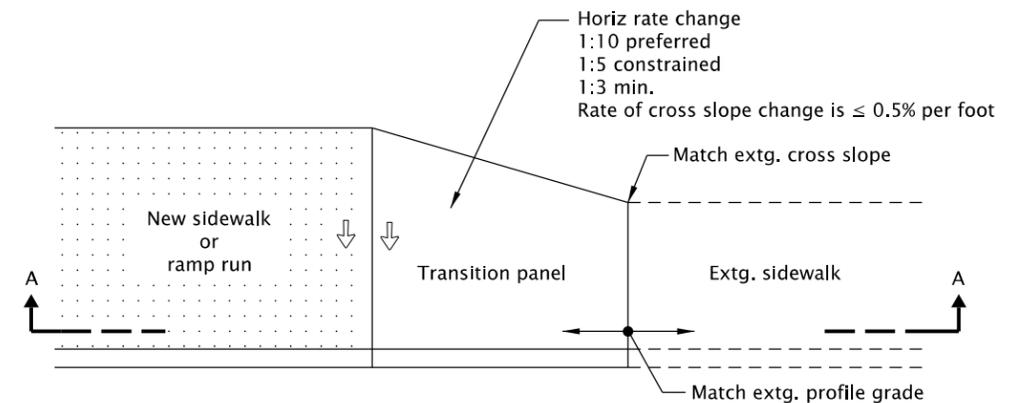


SECTION A-A
(SIDEWALK TRANSITION PANEL SHOWN)

★ Project existing sidewalk profile grade through transition panel to new sidewalk or curb ramp run.



SECTION A-A
(CURB RAMP TRANSITION PANEL SHOWN)



PLAN

SIDEWALK AND CURB RAMP TRANSITION PANELS

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See Std. Dwgs. RD720 & RD721 for concrete sidewalk details. see project plans for sidewalk width, placement and design specified.
2. Provide expansion joints around poles, boxes, at ends of each driveway and other fixtures which protrude through or against the structures. For sidewalk, monolithic curb and sidewalk, construction expansion joints at 45' max. spacing.
3. On sidewalks 8' and wider, provide a longitudinal joint at the midpoint of sidewalk panel.
4. See Std. Dwgs. RD700 & RD701 for concrete curb details. See project plans for the curb design specified.
5. For curb ramps, do not place expansion joints within the limits of curb ramps and between separate concrete pours.
6. Const. contraction joints at 15' max. spacing, and at each curb ramp, driveway, sidewalk and curb.

LEGEND:

- New sidewalk or ramp run
- Slope 1.5% max. (Max. 2.0% finished surface slope) (Normal sidewalk cross slope)
- Slope 7.5% max. (Max. 8.3% finished surface slope)
- Zero exposure

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS
SIDEWALK JOINTS AND TRANSITION PANELS

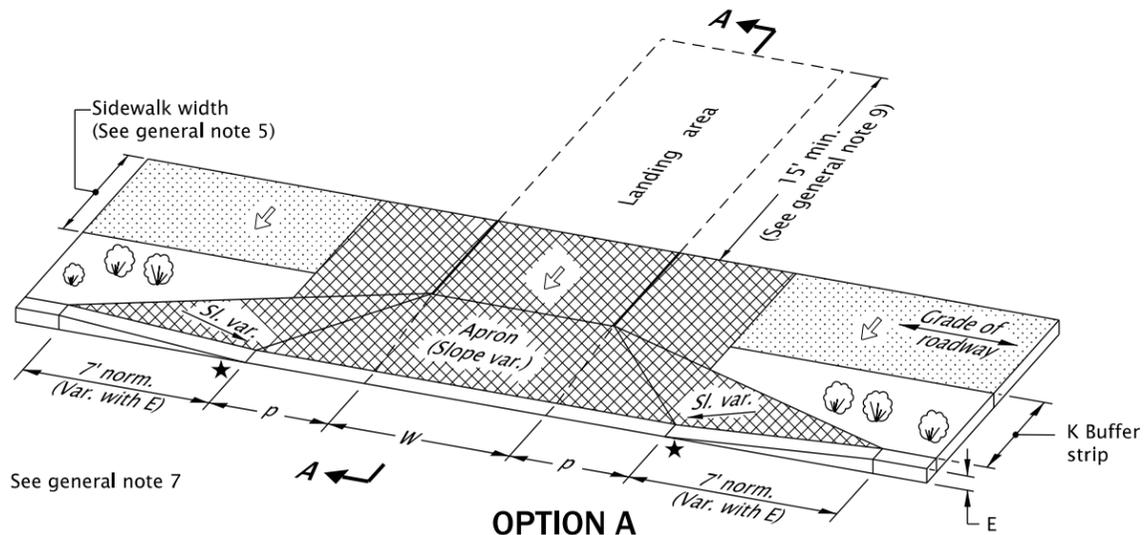
2018

DATE	REVISION DESCRIPTION
06-2019	DRAWING CREATED
01-2020	TITLE CHANGED, REVISED DETAILS & NOTES

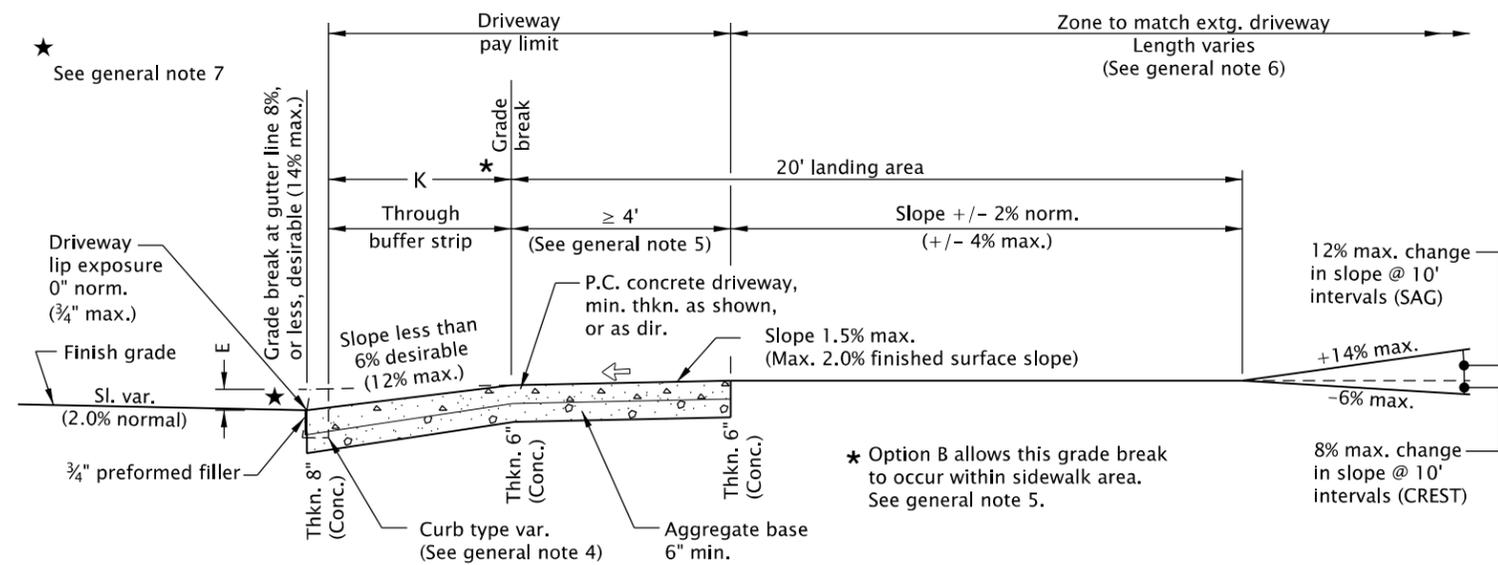
Effective Date: June 1, 2020 – November 30, 2020

RD722

RD722



OPTION A
TYPICAL SEPARATED SIDEWALK DRIVEWAY
 (Use one of the options below if slope requirements shown in Section A-A cannot be met)



SECTION A-A

★ See general note 7

★ See general note 7

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

- Details are based on ODOT applicable standards.
- Only use details allowed by jurisdiction.
- The following dimensions are as shown on plans, or as directed: driveway width, driveway slope, sidewalk slope, buffer strip width, curb exposure, driveway lip exposure, landing area length and width. See project plans for details not shown.
- Curb, gutter, and sidewalk types varies, see plans. See Std. Dwgs. RD700 & RD701 for curb details. See Std. Dwg. RD721 for sidewalk details. See Std. Dwg. RD722 for joint details.
- A greater than or equal to 4' unobstructed clear passage with cross slope 1.5% max. (Max. 2.0% finished surface slope) is required behind driveway apron. Sidewalk profile grade of the pedestrian accessible route shall not exceed the adjacent roadway profile grade.
- Where existing driveway is in good condition, and meets slope requirements, construct only as much as required for satisfactory connection with new work.
- Check the gutter flow depth at driveway locations to assure that the design flood does not overtop the back of sidewalk at driveway. If overtopping occurs place an inlet at upstream side of driveway or perform other approved design mitigation.
- Construct a full depth expansion joints with 1/2" (1n) preformed joint filler at ends of each driveway. Tooled joints are required at all driveway slope break lines.
- 15' min. of the driveway behind the sidewalk should be surfaced to prevent tracking of gravel onto the sidewalk.

LEGEND:

- Sidewalk
- Driveway pay limit (See project plans for details not shown)
- Slope 1.5% max. (Max. 2.0% finished surface slope) (Normal sidewalk cross slope)
- Slope 7.5% max. (Max. 8.3% finished surface slope)
- W Width of driveway
- K Buffer strip width (5' normal, 3' min.)
- E Curb exposure
- p 7.0' in commercial land use types
3.5' in residential land use types

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

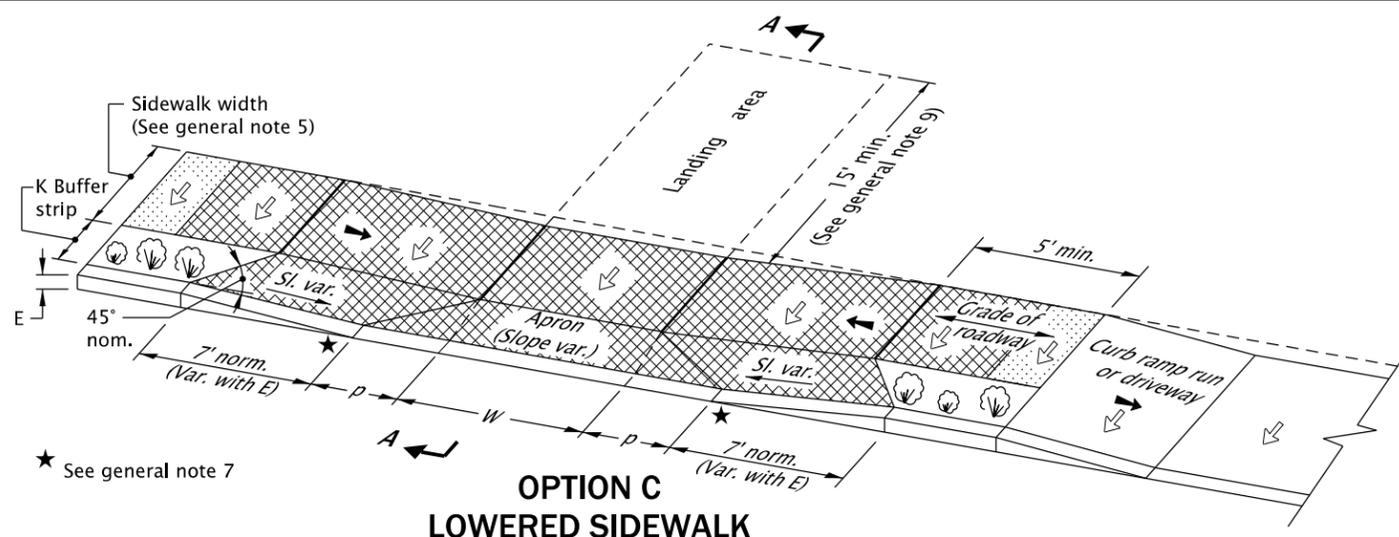
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS
SEPARATED SIDEWALK DRIVEWAYS
OR ALLEYS (OPTIONS A, B & C)
ODOT HIGHWAYS

2018

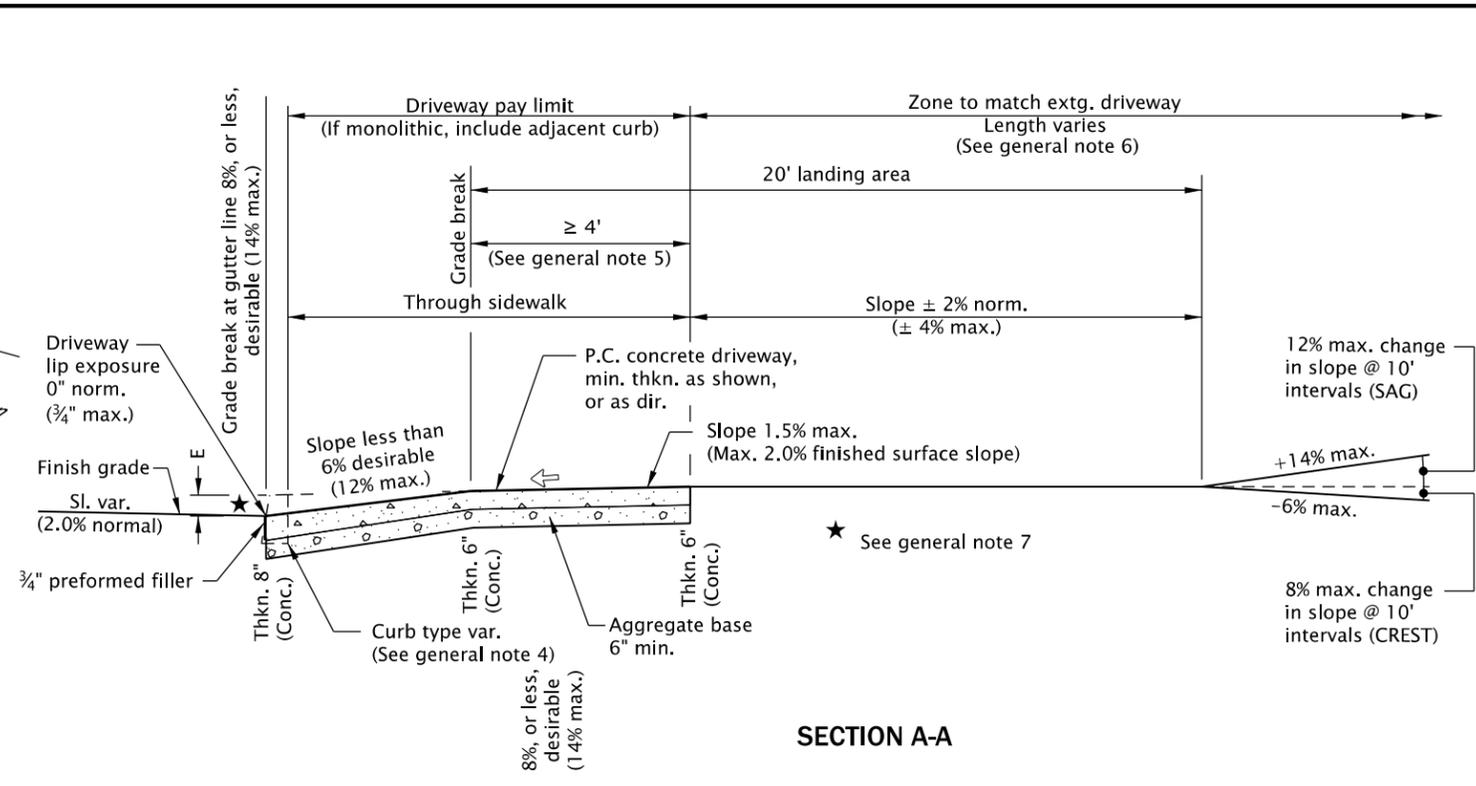
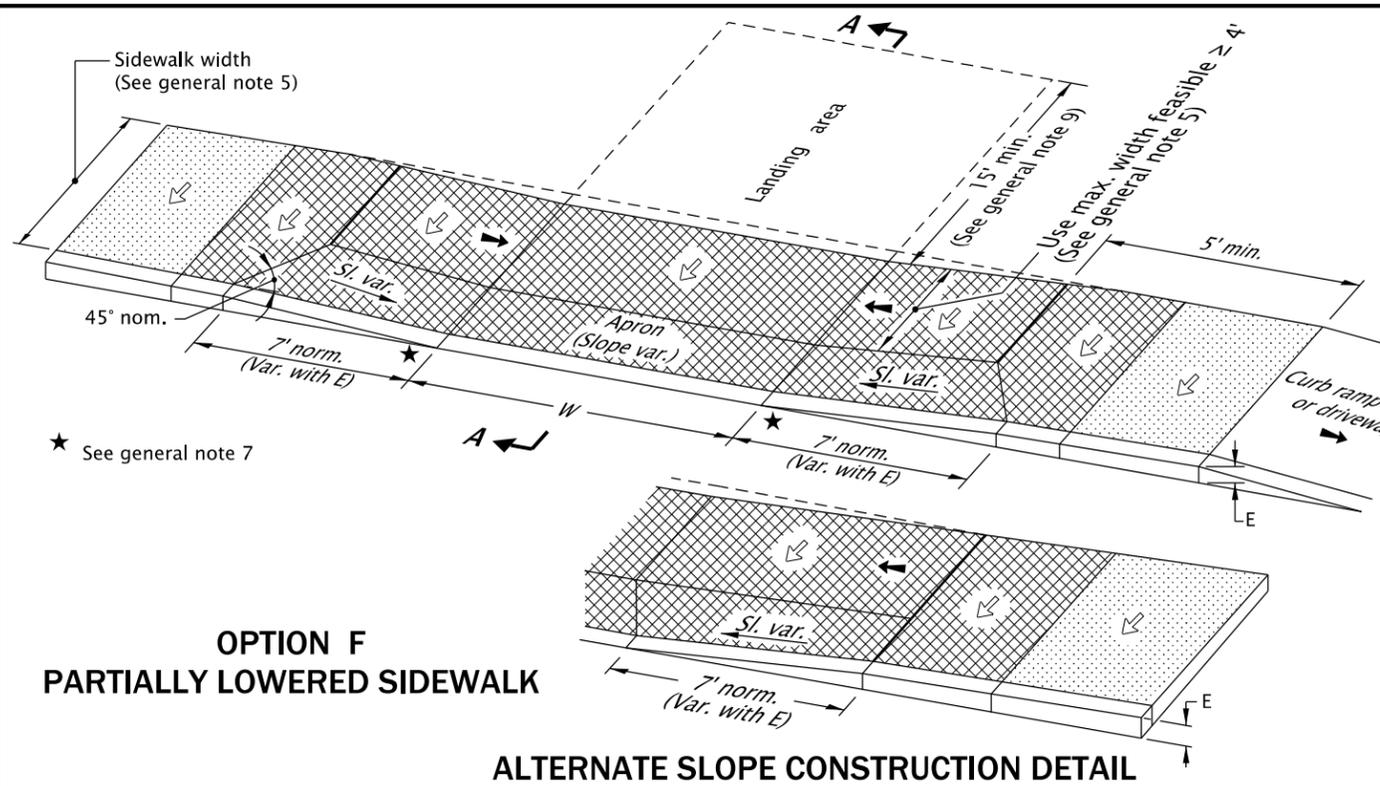
DATE	REVISION DESCRIPTION
01-2018	REVISED & ADDED NOTES
07-2018	REVISED NOTE
01-2019	REVISED DETAILS & NOTES
06-2019	REVISED DETAILS & NOTES
01-2020	REVISED DETAILS & NOTES

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 consulting a Registered Professional Engineer.



OPTION C
LOWERED SIDEWALK

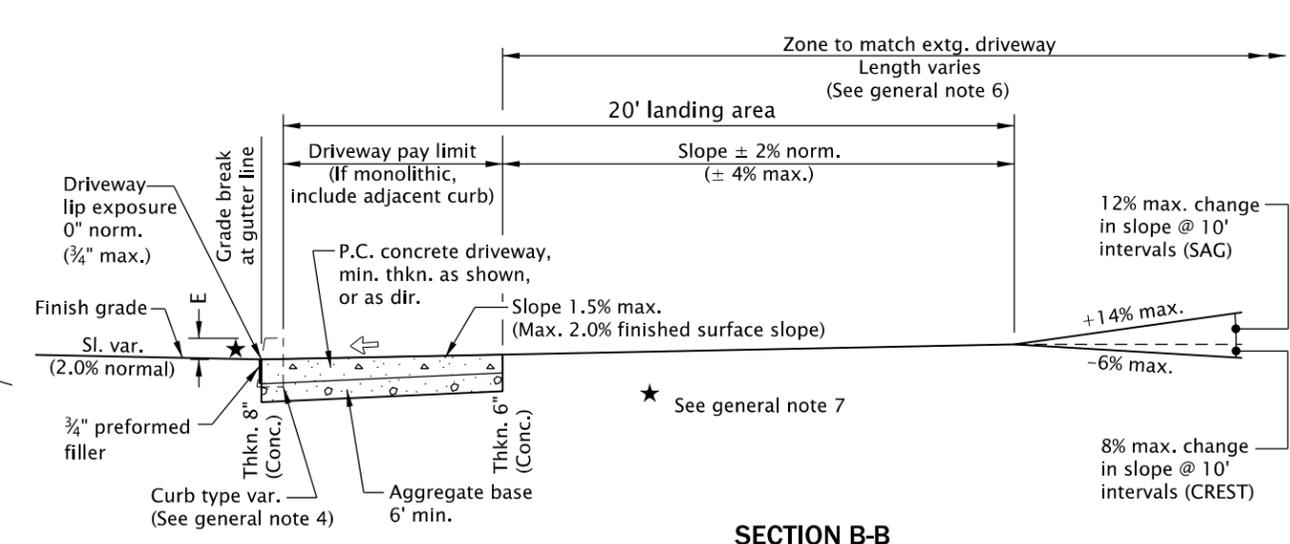
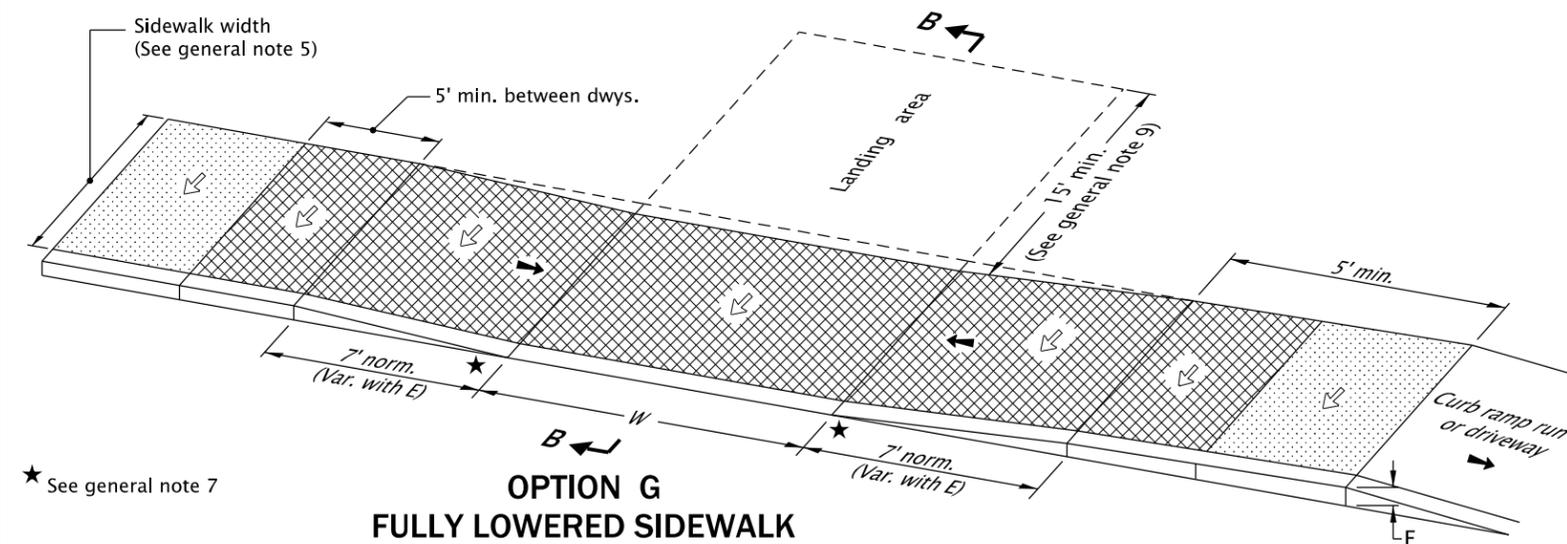
★ See general note 7



**OPTION F
PARTIALLY LOWERED SIDEWALK**

ALTERNATE SLOPE CONSTRUCTION DETAIL

SECTION A-A



**OPTION G
FULLY LOWERED SIDEWALK**

SECTION B-B

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

- Details are based on ODOT applicable standards.
- Only use details allowed by jurisdiction.
- The following dimensions are as shown on plans, or as directed: driveway width, driveway slope, sidewalk width, curb exposure, driveway lip exposure, landing area length and width. See project plans for details not shown.
- Curb, gutter, and sidewalk types varies, see plans. See Std. Dwgs. RD700 & RD701 for curb details. See Std. Dwg. RD720 for sidewalk details. See Std. Dwg. RD722 for joint details.
- A greater than or equal 4' unobstructed clear passage with cross slope 1.5% max. (Max. 2.0% finished surface slope) is required behind driveway apron.
- Where existing driveway is in good condition, and meets slope requirements, construct only as much as required for satisfactory connection with new work.
- Check the gutter flow depth at driveway locations to assure that the design flood does not overtop the back of sidewalk at driveway. If overtopping occurs place an inlet at upstream side of driveway or perform other approved design mitigation.
- Construct a full depth expansion joints with 1#2" (1in) preformed joint filler at ends of each driveway. Tooled joints are required at all driveway slope break lines.
- 15' min. of the driveway behind the sidewalk should be surfaced to prevent tracking of gravel onto the sidewalk.
- Monolithic curb & sidewalk shall retain thickened edge through lowered profile, to accommodate driveway use. See Std. Dwg. RD720 for details.

LEGEND:

- Sidewalk
- Driveway pay limit (If monolithic, include adjacent curb) (See project plans for details not shown)
- Slope 1.5% max. (Max. 2.0% finished surface slope) (Normal sidewalk cross slope)
- Slope 7.5% max. (Max. 8.3% finished surface slope)
- W** Width of driveway
- E** Curb exposure

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

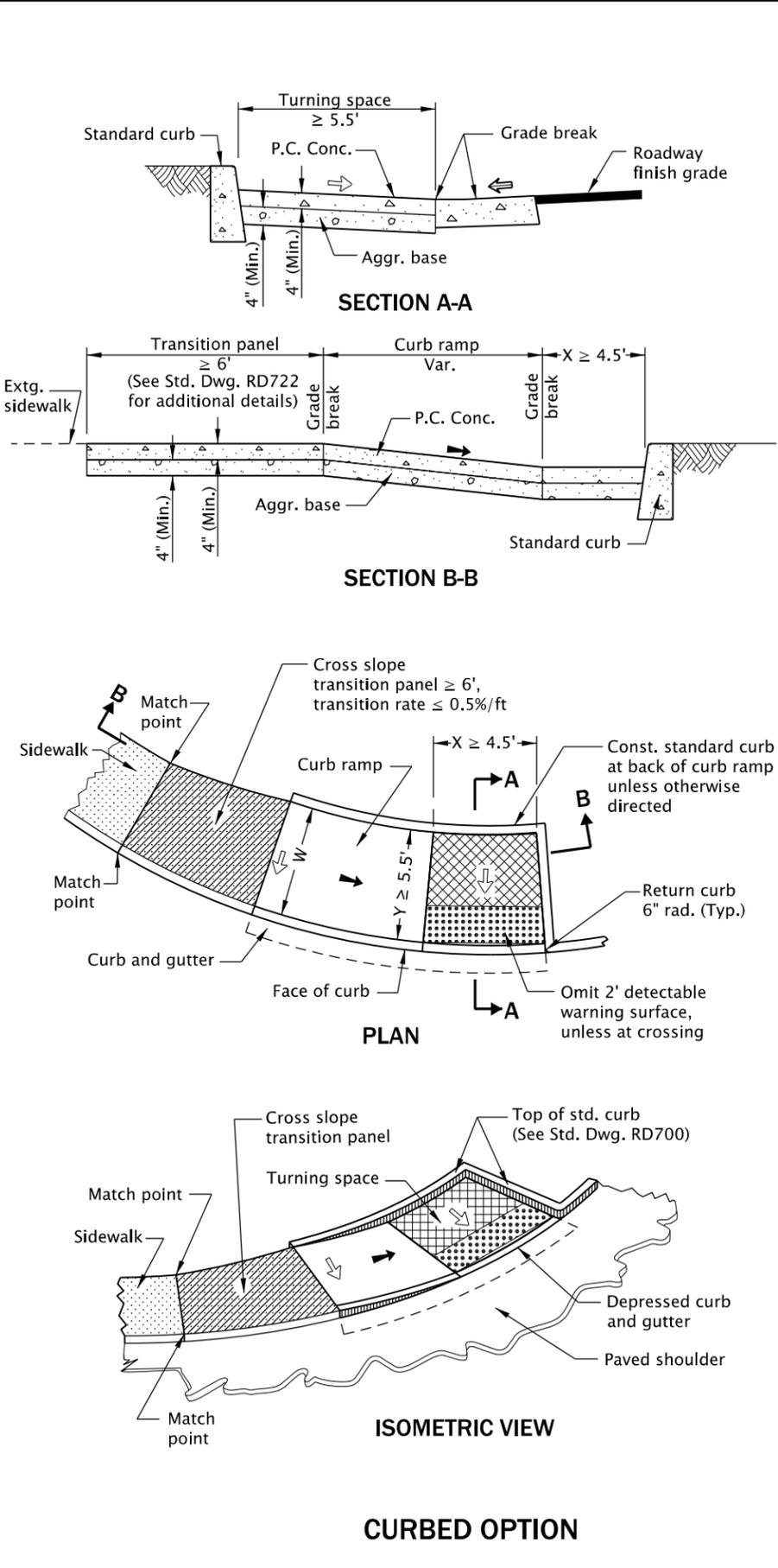
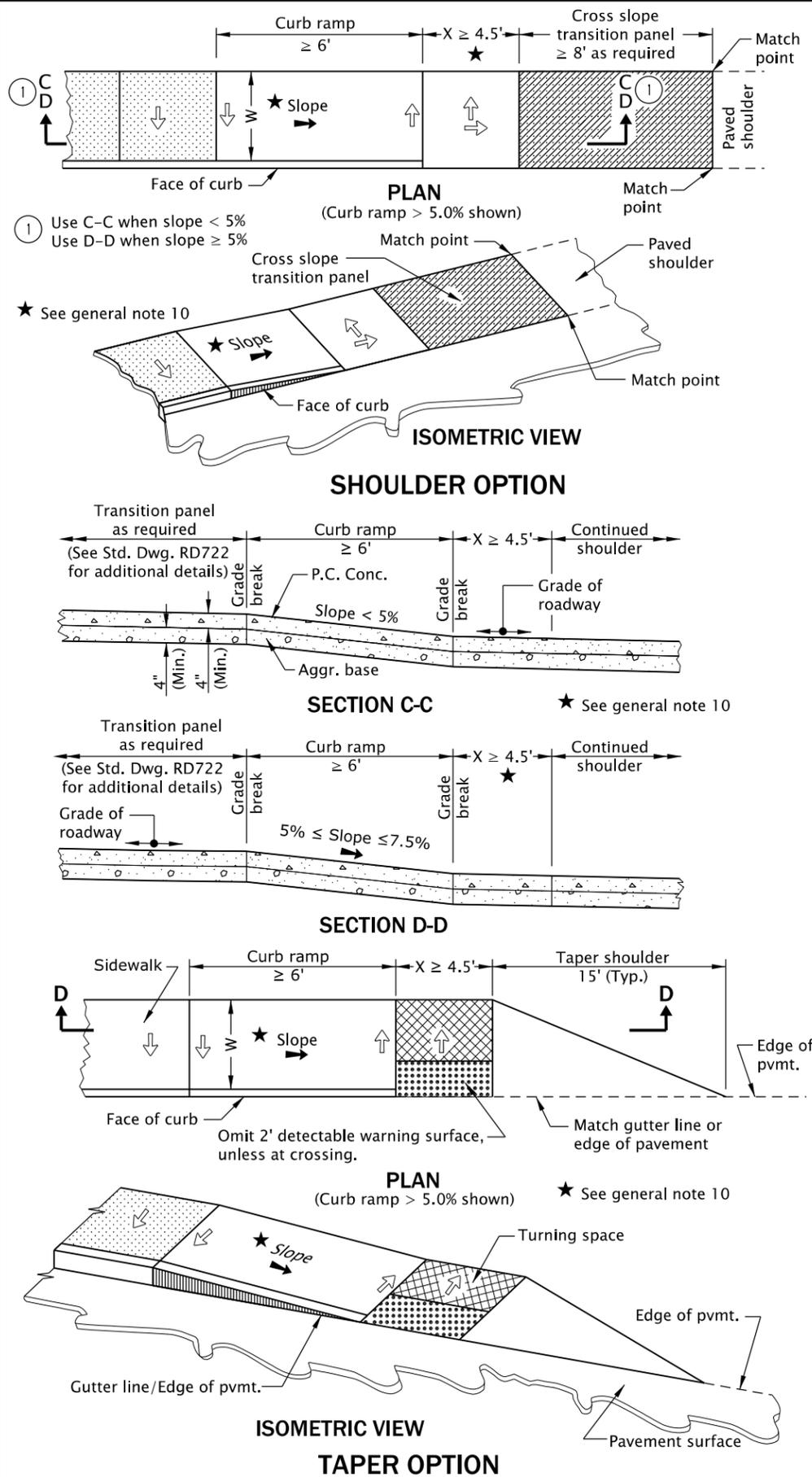
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

**OREGON STANDARD DRAWINGS
CURB LINE SIDEWALK DRIVEWAYS
OR ALLEYS (OPTIONS F & G)
ODOT HIGHWAYS**

2018	
DATE	REVISION DESCRIPTION
01-2018	REVISED & ADDED NOTES
07-2018	REVISED NOTE
01-2019	REVISED DETAILS & NOTES
06-2019	REVISED DETAILS & NOTES
01-2020	REVISED & ADDED NOTES

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 consulting a Registered Professional Engineer.

rd754.dgn 13-JAN-2020



GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Curb ramp details are based on ODOT applicable Standards.
2. See project plans for details not shown.
See Std. Dwg. RD700 & RD701 for curbs.
See Std. Dwg. RD720 & RD721 for sidewalks.
See Std. Dwg. TM503 & TM530 for crosswalk markings, widths, etc.
See Std. Dwg. RD755 for curb ramp details not shown.
See Traffic Standard Drawings for signal pole and pedestrian pedestal details.
3. Tooled dummy joints are required at all curb ramp grade break lines.
4. Curb ramp slopes shown are relative to the true level horizon (Zero bubble).
5. Check the gutter flow depth to assure that the design flood does not overtop the back of sidewalk. If overtopping occurs place an inlet at upstream side or perform other approved design mitigation.
6. When a shared use path terminates, the curb ramp shall be the full width of the path and generally use taper or shoulder option. If curbed option is used, the turning space x-dimension should be minimum 8' wide to enable bicycles to ride from ramp to shoulder.
7. Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.
8. On or along state highways, curb and gutter is required at curb ramps.
9. All end of sidewalk options can be used for curved or tangent roadway sections.
10. When the slope of the curb ramp is greater than 5.0%, a min. landing space of 4.5' x 4.5' with a 1.5% max. slope (2.0% finished surface) is required at the bottom of the curb ramp. See section D-D.

LEGEND:

- Sidewalk
- Transition panel
- Turning space
When not constrained 4.5' x 4.5' (4' x 4' min. finished surface).
When constrained 4.5' x 5.5' (4' x 5' min. finished surface with longer dimension in direction of pedestrian street crossing). The landing area shall have a slope of 1.5% max. (Max. 2.0% finished surface slope).
- Detectable warning surface
- Slope 1.5% max.
(Max. 2.0% finished surface slope)
(Normal sidewalk cross slope)
- Slope 7.5% max.
(Max. 8.3% finished surface slope)
- Counter slope
4% max. ascending or descending,
slope as required for drainage
- W
New construction sidewalk width.
See contract plans for dimension.

CALC. BOOK NO. N/A BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS
CURB RAMP AND TURNING SPACE
(FOR ENDS OF SIDEWALKS)

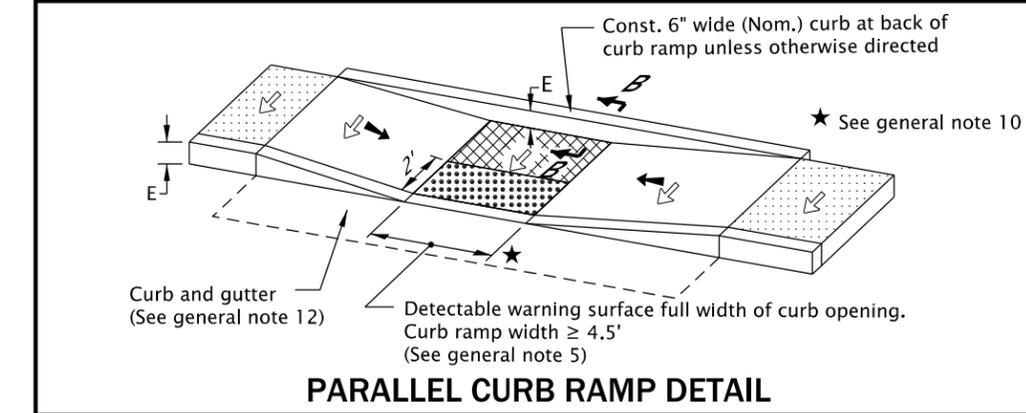
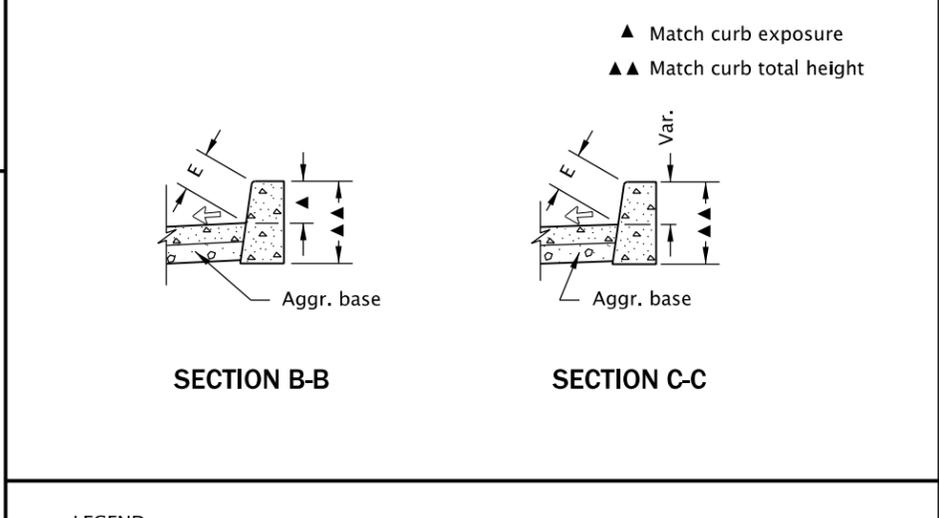
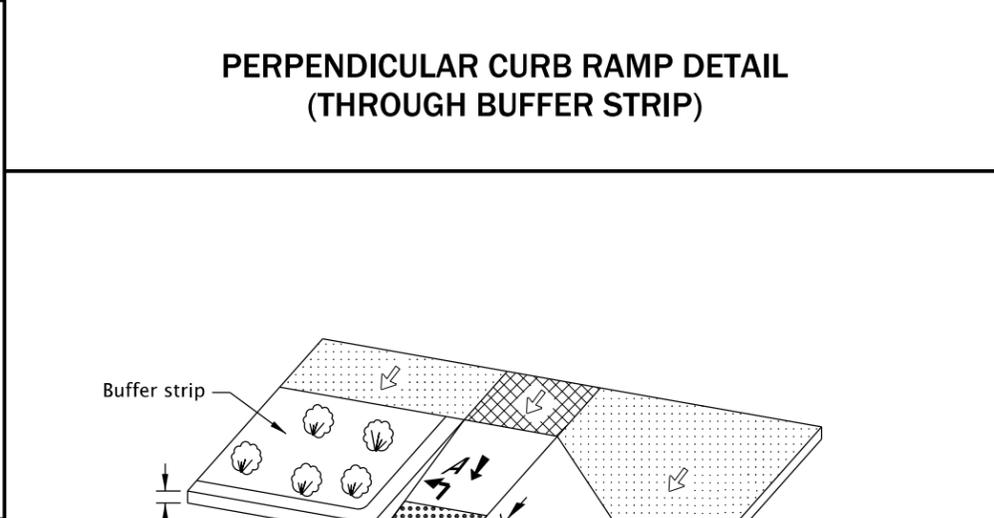
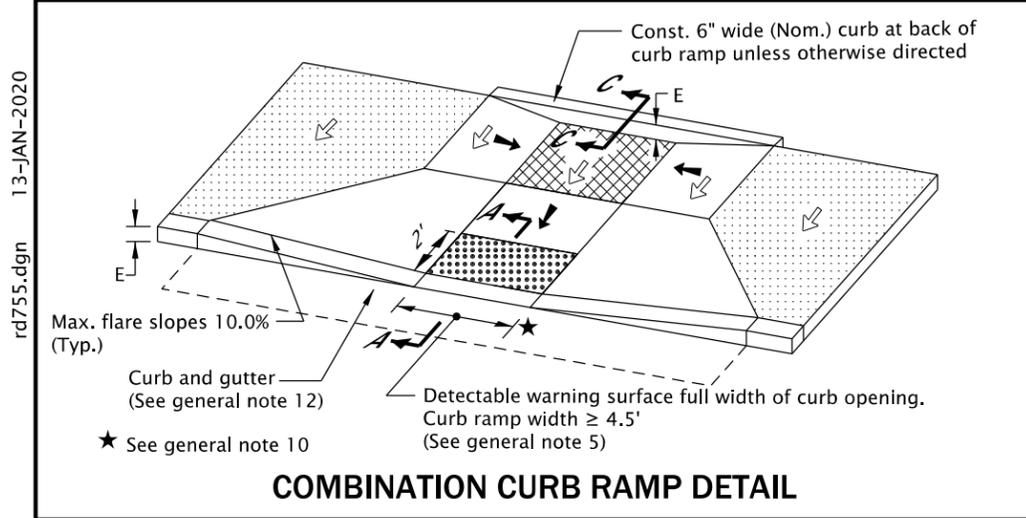
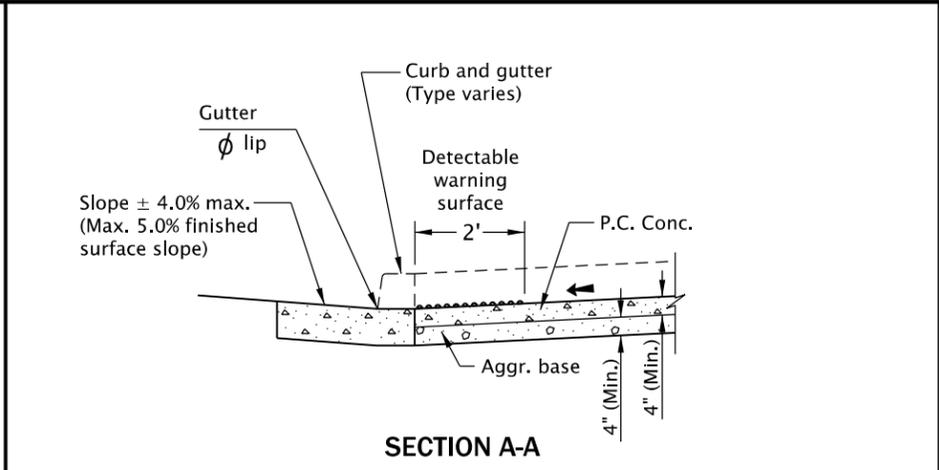
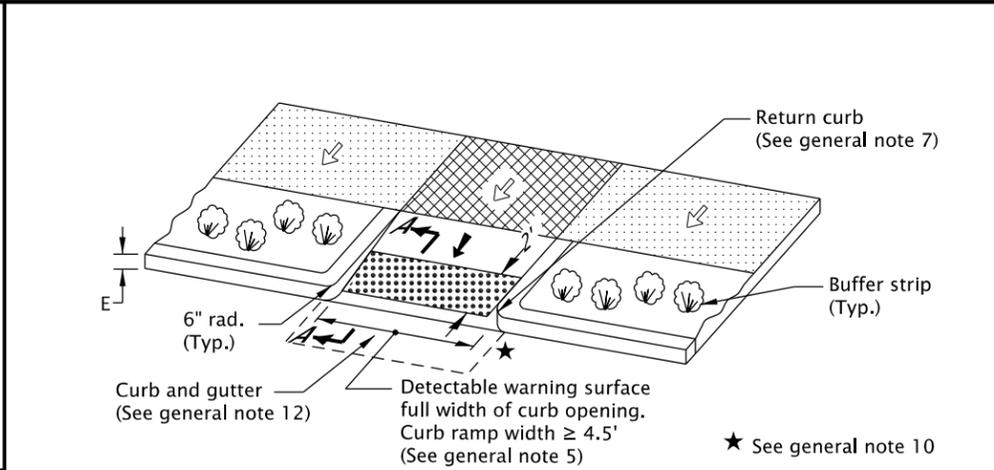
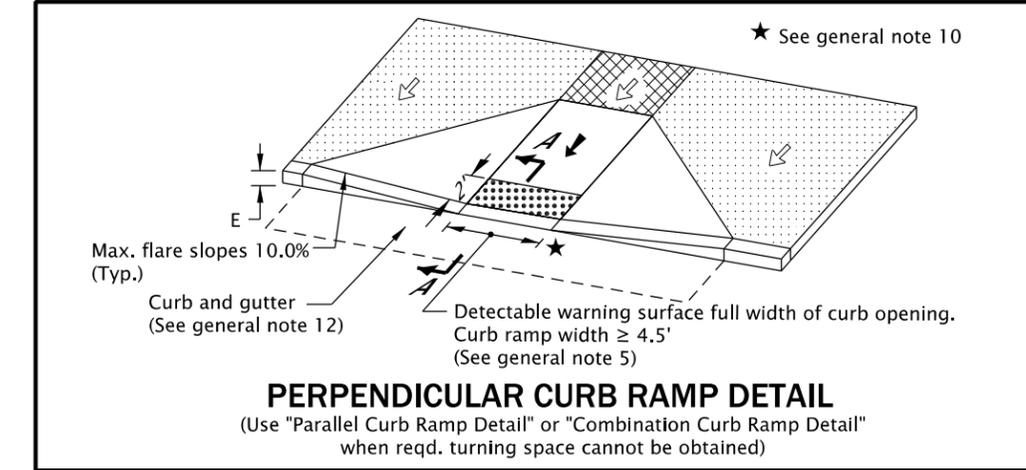
2018

DATE	REVISION DESCRIPTION
03-2018	ADDED SHOULDER OPTION DETAIL, REVISED DETAILS & NOTES
07-2018	REVISED DETAILS & NOTES
01-2019	REVISED DETAILS & NOTES
06-2019	REVISED DETAILS & NOTES
01-2020	REVISED NOTES

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 consulting a Registered Professional Engineer.

RD754

rd755.dgn 13-JAN-2020



LEGEND:

- Sidewalk
- Turning space
When not constrained 4.5' x 4.5' (4' x 4' min. finished surface).
When constrained 4.5' x 5.5' (4' x 5' min. finished surface with longer dimension in direction of pedestrian street crossing).
For the purposes of this application, a max. 2.0% finished surface slope (for drainage) is considered level.
- Detectable warning surface
- Slope 1.5% max. (Max. 2.0% finished surface slope)
(Normal sidewalk cross slope)
- Slope 7.5% max. (Max. 8.3% finished surface slope)

- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**
1. Curb ramp details are based on ODOT applicable standards.
 2. See Std. Dwgs. RD700 & RD701 for curbs. See Std. Dwgs. RD720 & RD721 for sidewalks. See Std. Dwgs. TM503 & TM530 for crosswalk markings, widths, etc.
 3. Tooled dummy joints are required at all curb ramp grade break lines.
 4. Curb ramp slopes shown are relative to the true level horizon (Zero bubble).
 5. Place detectable warning surface at the back of curb for a minimum depth of 2' at curb ramp that is adjacent to traffic. For details not shown, see Std. Dwgs. RD758 & RD759.
 6. Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.
 7. Return curb may be provided in lieu of flared slope only if protected from traverse travel by landscaping. Return curb shall not reduce width of approaching sidewalk.
 8. Curb ramps for paths intersecting a roadway should be full width of path, excluding flares. When a curb ramp is used to provide bicycle access from a roadway to a sidewalk, the curb ramp should be 8' wide.
 9. For curb ramp placement options, see Std. Dwgs. RD756 & RD757.
 10. Check the gutter flow depth at curb ramp locations to assure that the design flood does not overtop the back of sidewalk at curb ramp. Place an inlet at upstream side of curb ramp or perform other approved design mitigation.
 11. Site conditions normally require a project specific design. See project plans for details not shown.
 12. On or along state highways, curb and gutter is required at curb ramps.

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

CURB RAMP DETAILS

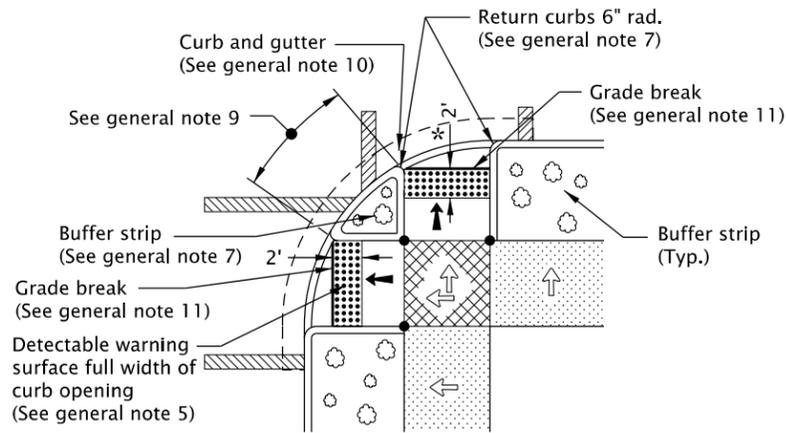
2018

DATE	REVISION DESCRIPTION
01-2018	REVISED DETAILS, REVISED & ADDED NOTES
07-2018	REVISED DETAILS, REVISED & ADDED NOTES
01-2019	REVISED DETAIL & ADDED DIAGRAM
06-2019	REVISED DETAILS & NOTES
01-2020	REVISED DETAILS & NOTES

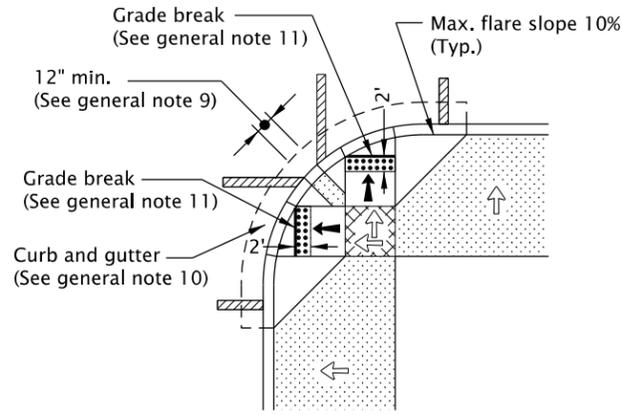
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

RD755

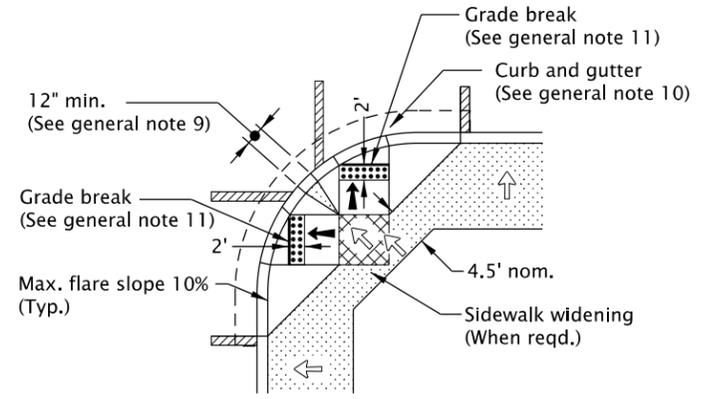
rd756.dgn 13-JAN-2020



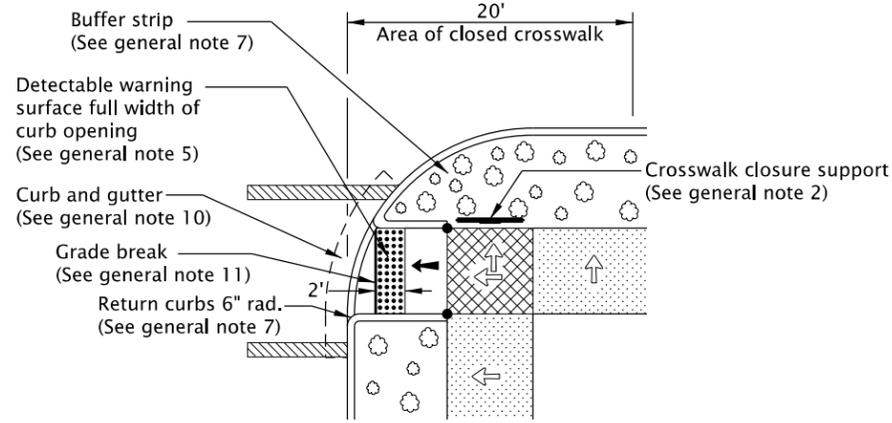
CURB RAMPS WITH LANDSCAPED BUFFER STRIP



CURB RAMPS FOR WIDE SIDEWALKS

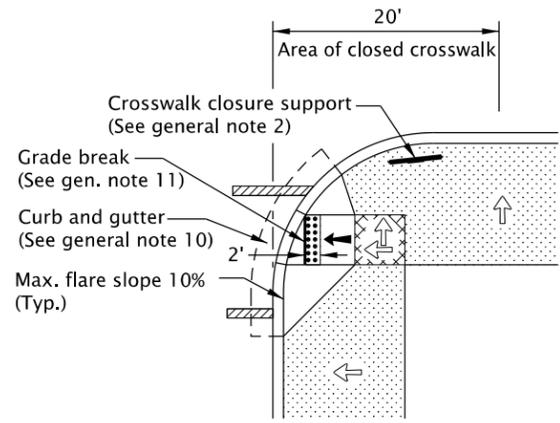


CURB RAMPS FOR NARROW SIDEWALKS



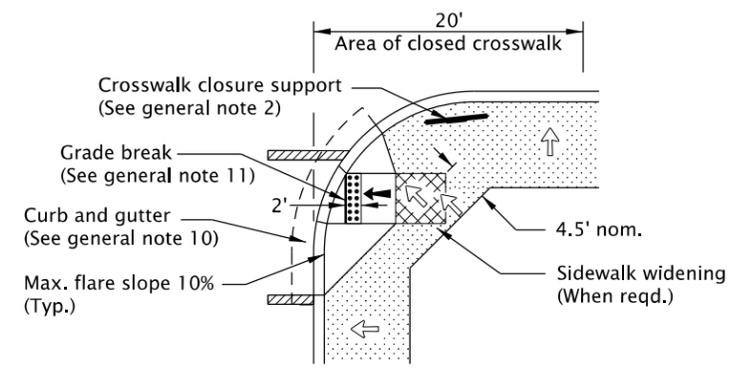
CURB RAMPS WITH CROSSWALK CLOSURE

OPTION "A"



CURB RAMPS WITH CROSSWALK CLOSURE

OPTION "B"



CURB RAMPS WITH CROSSWALK CLOSURE

OPTION "C"

LEGEND:			
	Marked or intended crossing location		Turning space When not constrained 4.5' x 4.5' (4' x 4' min. finished surface). When constrained 4.5' x 5.5' (4' x 5' min. finished surface with longer dimension in direction of pedestrian street crossing). For the purposes of this application, a max. 2.0% finished surface slope (for drainage) is considered level.
	Sidewalk		Slope 1.5% max. (Max. 2.0% finished surface slope) (Normal sidewalk cross slope)
	Detectable warning surface		Slope 7.5% max. (Max. 8.3% finished surface slope)
			Zero curb exposure

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Curb ramp details are based on ODOT applicable standards.
2. See project plans for details not shown.
See Std. Dwgs. RD700 & RD701 for curbs.
See Std. Dwgs. RD720 & RD721 for sidewalks.
See Std. Dwgs. TM503 & TM530 for crosswalk marking, widths, etc.
See Std. Dwg. RD755 for curb ramp details.
See Std. Dwg. TM240 for crosswalk closure detail.
See Traffic Standard Drawings for signal pole and pedestrian pedestal details.
3. Tooled dummy joints are required at all curb ramp grade break lines.
4. Curb ramp slopes shown are relative to the true level horizon (Zero bubble).
5. Place detectable warning surface at the back of curb for a minimum depth of 2' at curb ramp that is adjacent to traffic. For details not shown, see Std. Dwgs. RD758 & RD759.
6. Check the gutter flow depth to assure that the design flood does not overtop the back of sidewalk. Place an inlet at upstream side or perform other approved design mitigation.
7. Return curb may be provided in lieu of flared slope only if protected from traverse travel by landscaping. Return curb shall not reduce width of approaching sidewalk.
8. Curb ramps for paths intersecting a roadway should be full width of path, excluding flares. When a curb ramp is used to provide bicycle access from a roadway to a sidewalk, the curb ramp should be 8' wide.
9. When 2 curb ramps are immediately adjacent as in Options B & C, the curb exposure (E) between the adjacent side flares may range between 3" and full design exposure.
10. On or along state highways, curb and gutter is required at curb ramps.
11. Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

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 consulting a Registered Professional Engineer.

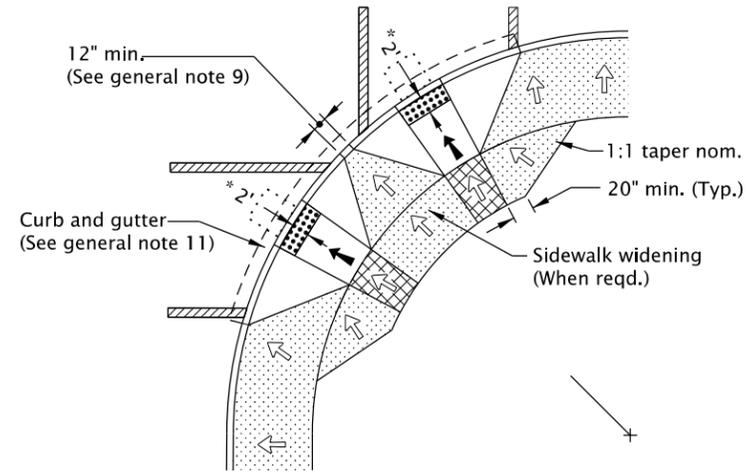
OREGON STANDARD DRAWINGS
CURB RAMP LAYOUT OPTIONS
SMALL RADII

DATE	REVISION DESCRIPTION
01-2018	REVISED DETAILS, REVISED & ADDED NOTES
07-2018	REVISED DETAIL & NOTES
01-2019	ADDED DIAGRAM DETAIL, REVISED DETAILS & NOTES
06-2019	REVISED DETAIL & NOTES
01-2020	REVISED DETAIL & NOTES

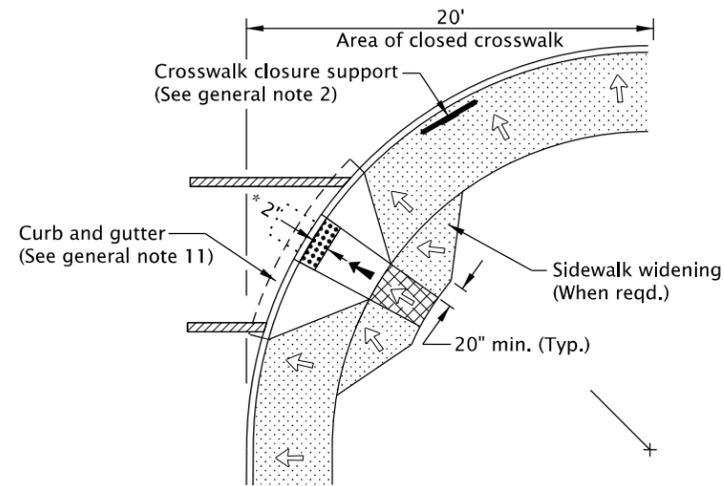
RD756

rd757.dgn 13-JAN-2020

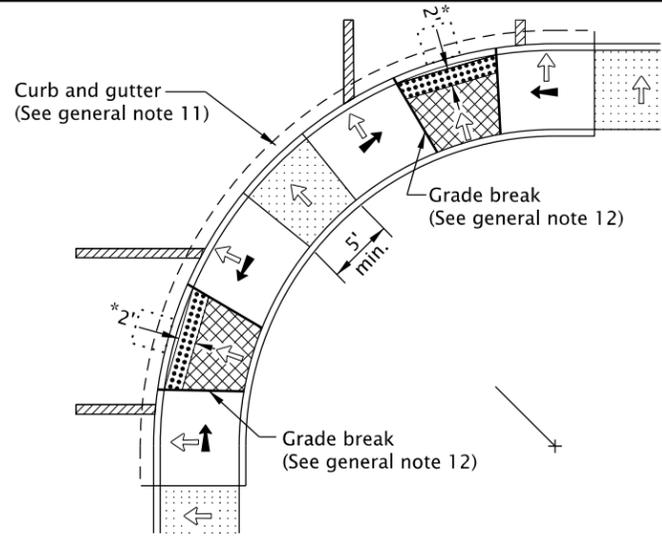
RD757



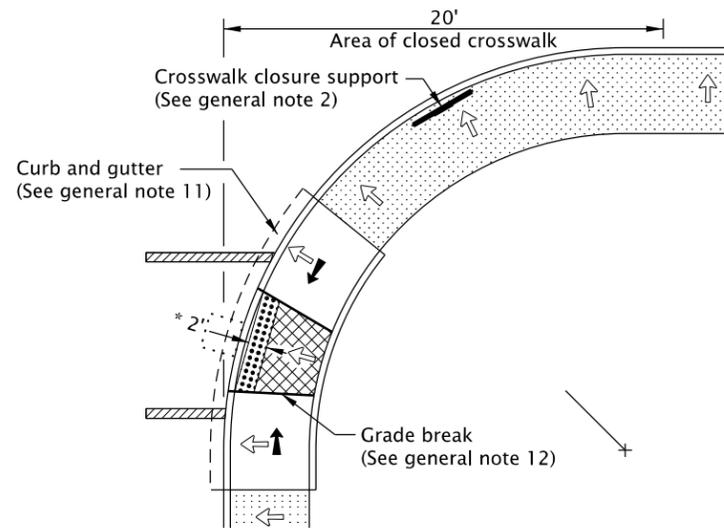
CURB RAMPS FOR NARROW SIDEWALKS



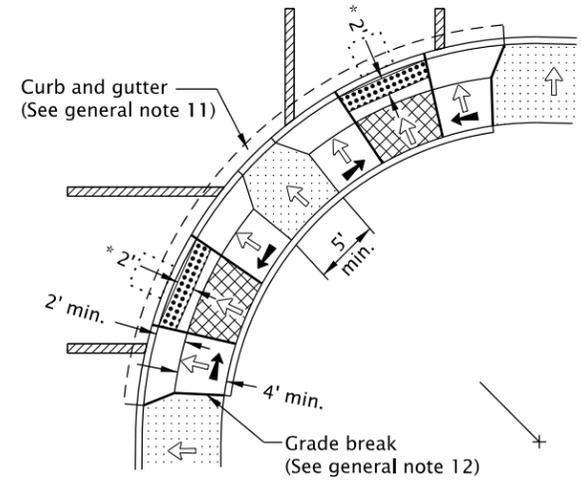
**CURB RAMPS WITH CROSSWALK CLOSURE
OPTION "G"**



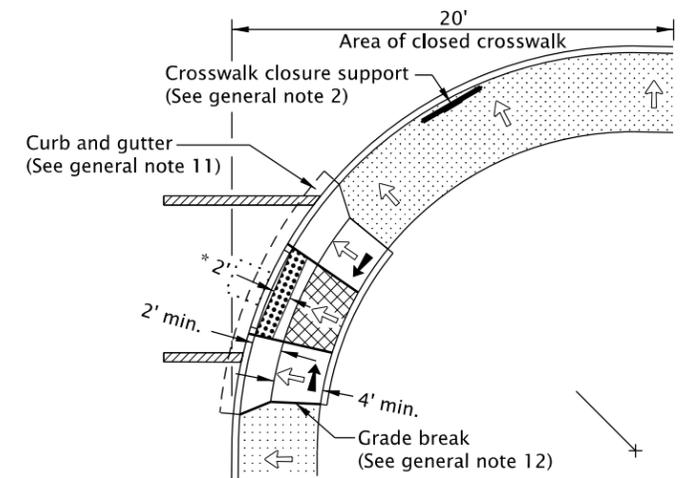
CURB RAMPS FOR NARROW SIDEWALKS



**CURB RAMPS WITH CROSSWALK CLOSURE
OPTION "H"**



CURB RAMPS FOR WIDE SIDEWALKS



**CURB RAMPS WITH CROSSWALK CLOSURE
OPTION "I"**

<p>LEGEND:</p> <p> Marked or intended crossing location</p> <p> Sidewalk</p> <p> Detectable warning surface</p>	<p> Turning space When not constrained 4.5' x 4.5' (4' x 4' min. finished surface). When constrained 4.5' x 5.5' (4' x 5' min. finished surface with longer dimension in direction of pedestrian street crossing). For the purposes of this application, a max. 2.0% finished surface slope (for drainage) is considered level.</p>	<p> Slope 1.5% max. (Max. 2.0% finished surface slope) (Normal sidewalk cross slope)</p> <p> Slope 7.5% max. (Max. 8.3% finished surface slope)</p>	<p>* 2' See general note 5</p> <p> 4' x 4' clear space</p>
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GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Curb ramp details are based on ODOT applicable standards.
2. See project plans for details not shown.
See Std. Dwgs. RD700 & RD701 for curbs.
See Std. Dwgs. RD720 & RD721 for sidewalks.
See Std. Dwgs. TM503 & TM530 for crosswalk markings, widths, etc.
See Std. Dwg. RD755 for curb ramp details.
See Std. Dwg. TM240 for crosswalk closure detail.
See Traffic Standard Drawings for signal pole and pedestrian pedestal details.
3. Tooled dummy joints are required at all curb ramp slope break lines.
4. Curb ramp slopes shown are relative to the true level horizon (Zero bubble).
5. Place detectable warning surface in the lower 2' of curb ramp that is adjacent to traffic.
For details not shown, see Std. Dwgs. RD758 & RD759.
6. Check the gutter flow depth to assure that the design flood does not overtop the back of sidewalk.
If overtopping occurs place an inlet at upstream side or perform other approved design mitigation.

7. Return curb may be provided in lieu of flared slope only if protected from traverse travel by landscaping.
Return curb shall not reduce width of approaching sidewalk.
8. Curb ramps for paths intersecting a roadway should be full width of path, excluding flares.
When a curb ramp is used to provide bicycle access from a roadway to a sidewalk, the curb ramp should be 8' wide.
9. When 2 curb ramps are immediately adjacent as in Option G, the curb exposure (E) between the adjacent side flares may range between 3" and full design exposure.
10. Only use options allowed by jurisdiction.
11. On or along state highways, curb and gutter is required at curb ramps.
12. Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces.
Surface slopes that meet at grade breaks shall be flush.

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

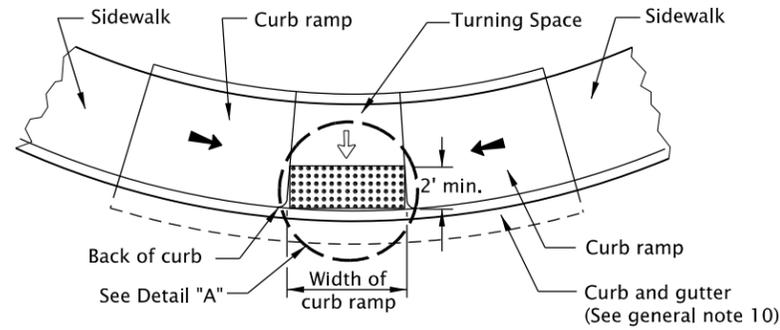
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

**OREGON STANDARD DRAWINGS
CURB RAMP LAYOUT OPTIONS
LARGE RADII**

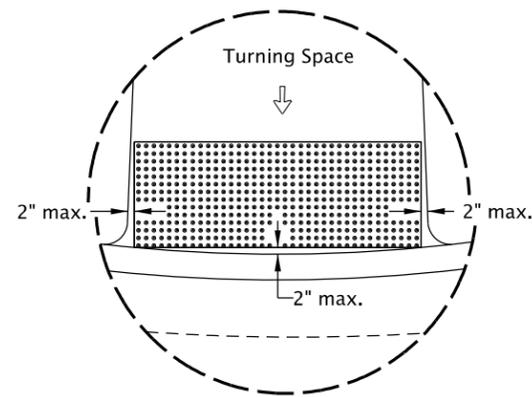
2018

DATE	REVISION DESCRIPTION
07-2018	REVISED NOTES
09-2018	ADDED DIAGRAM & REVISED NOTE
01-2019	REVISED DETAILS & NOTES
06-2019	REVISED DETAILS & NOTES
01-2020	REVISED DETAILS & NOTES

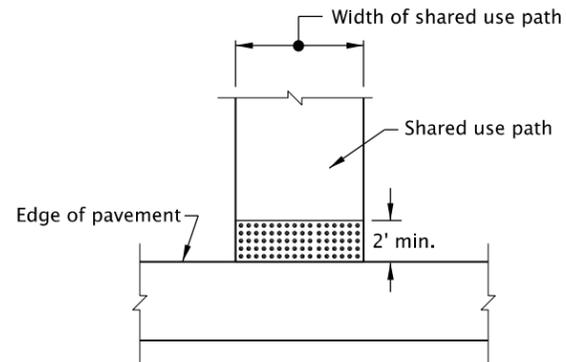
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.



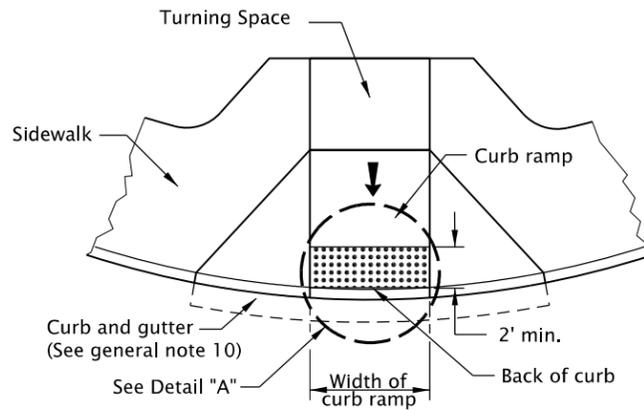
PARALLEL CURB RAMP



DETAIL "A"

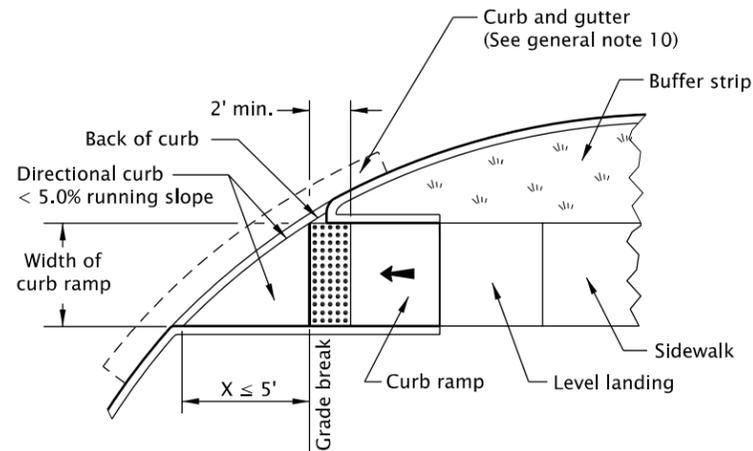


SHARED-USE PATH CONNECTION



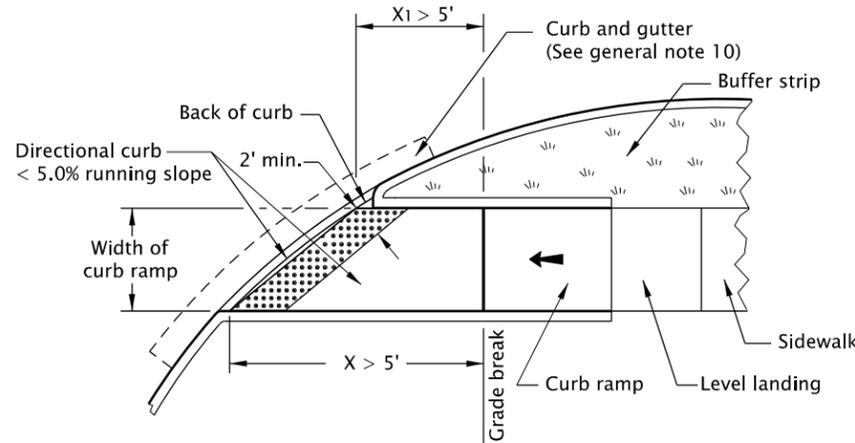
**PERPENDICULAR CURB RAMP
GRADE BREAK IN FRONT OF CURB**

(Detectable warning surface shall be placed in the lower 2' at the back of curb ramp that is adjacent to traffic)



**CURB RAMP CROSSING
GRADE BREAK ≤ 5 FT. FROM BACK OF CURB**

(Detectable warning surface shall be placed on the bottom of the curb ramp directly above the grade break)



**CURB RAMP CROSSING
GRADE BREAK (X or X1) > 5 FT. FROM BACK OF CURB**

(Detectable warning surface shall be placed in the lower 2' at the back of curb ramp that is adjacent to traffic)

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

- Detectable warning surface details & locations are based on ODOT applicable Standards.
- See project plans for details not shown.
See Std. Dwg. RD700 & RD701 for curbs.
See Std. Dwg. RD720 for sidewalks.
See Std. Dwg. TM503 & TM530 for crosswalk markings, widths, etc.
See Std. Dwg. RD705 & RD710 for islands.
- The Detectable Warning Surface shall extend the full width of the curb ramp, or other roadway entrance as applicable. A gap of up to 2 inches on each side of the Detectable warning surface is permitted (Measured at the leading edge of the detectable warning surface panel).
- Detectable warning surface shall be placed at the back of curb for a minimum depth of 2 ft. at curb ramps that adjacent to traffic. Detectable warning surface may be radial or rectangular, but must comply with the truncated dome size and spacing standards. Detectable warning surface may be cut to meet necessary shape as shown in plans. Color to be safety yellow if no color specified in construction note. For detectable warning surface on or along state highway, alternative colors must be approved.
- Detectable warning surface shall be used in the following locations:
 - Curb ramps (See Std. Dwg. RD755, RD756, & RD757).
 - Crossing islands (Accessible Route Islands), (See Std. Dwg. RD710).
 - Rail crossings (See Std. Dwg. RD758).
- Where public transportation stations (rail, bus, etc.) use platform boarding, detectable warning surface shall be placed along the full edge length of the station, when not protected by platform screens or guards (See Std. Dwg. RD758).
- Detectable warning surface shall not be used on the following locations:
 - End of sidewalk transitions that are not at a crosswalk, (See Std. Dwg. RD754).
 - Driveways, unless constructed with curb return, (See Std. Dwg. RD725, RD730, RD735, RD740, RD745, & RD750).
 - Parking lots.
- Grade breaks at the top and bottom of curb ramp runs shall be perpendicular to the direction of the ramp run. Grade breaks shall not be permitted on the surface of ramp runs and turning spaces. Surface slopes that meet at grade breaks shall be flush.
- Where no curb is present, the detectable warning surface shall be placed at the edge of the roadway.
- On or along state highways, curb and gutter is required at curb ramps.
- Detectable warning surface placement for perpendicular ramps vary as shown.

-  Detectable warning surface
-  Slope 1.5% max.
(Max. 2.0% finished surface slope)
-  Slope 7.5% max.
(Max. 8.3% finished surface slope)

CALC. BOOK NO. N/A BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

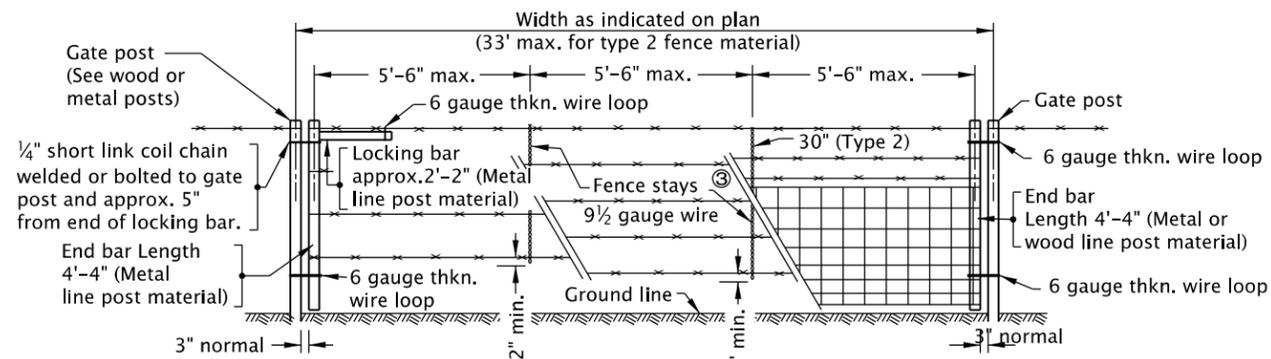
**OREGON STANDARD DRAWINGS
DETECTABLE WARNING SURFACE
DETAILS & PLACEMENT
LOCATIONS**

2018

DATE	REVISION DESCRIPTION
07-2018	REPLACED DRAWING TITLE, REVISED DETAILS & NOTES
09-2018	REVISED DETAIL & NOTES
01-2019	REVISED DETAIL & NOTES
06-2019	REVISED DETAIL & NOTES
01-2020	ADDED DETAIL & REVISED NOTES

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rd810.dgn 13-JAN-2020



- NOTES:
 ① Match adjoining fence type.
 ② For details not shown see fence type.
 ③ For wooden stays, see Type 1 fence details.

GATEWAY
 TYPE 1 Fence material ①②
 TYPE 1-5W Fence material ①②
 TYPE 2 Fence material ①②

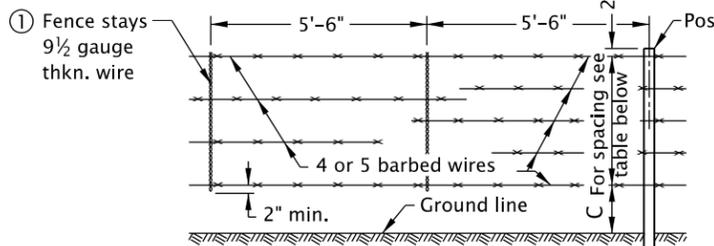


TABLE OF DIMENSIONS

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

- ① NOTE:
 Wooden Stays to be used in areas of heavy snowfall or snow drifts over 36". Stays to be 2"x2"x52" min. length, sound, untreated Douglas Fir, Western Hemlock or Western Pine, spaced as shown for wire stays and to rest firmly on the ground.
 Horizontal wires to be stapled are: single wires and a minimum of 4 wires for woven wire fabric.

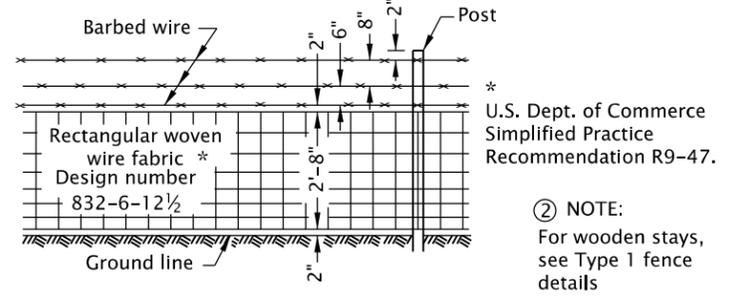
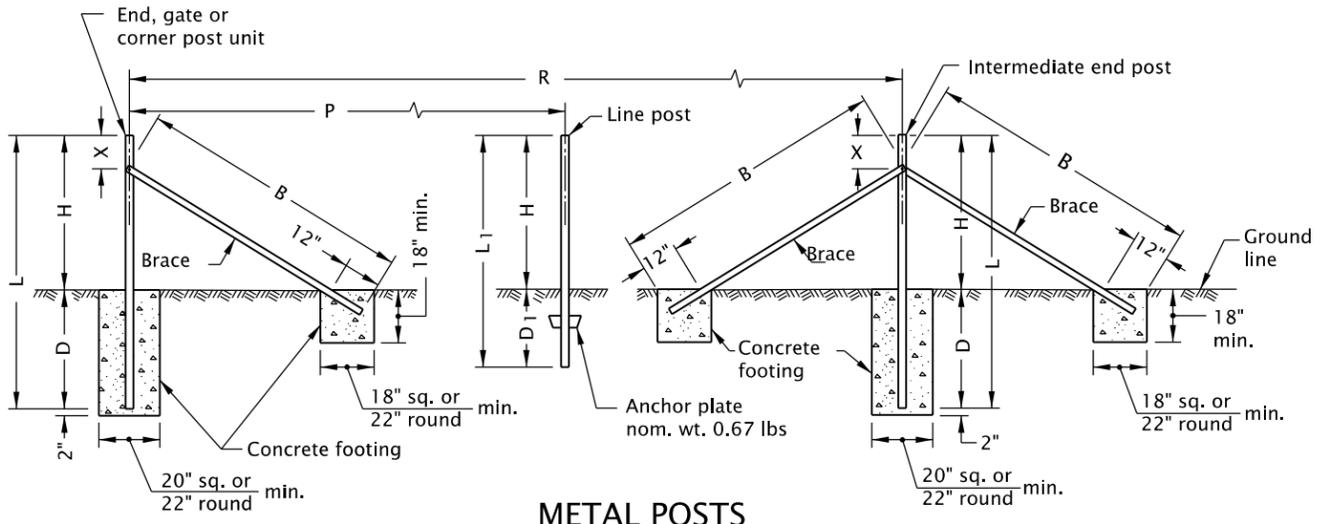


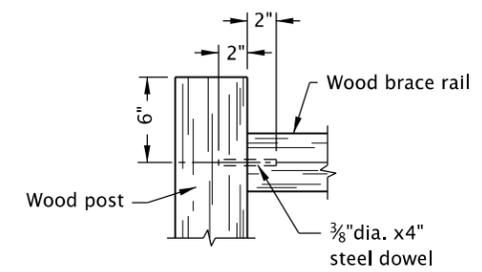
TABLE 1 (For wood posts)

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

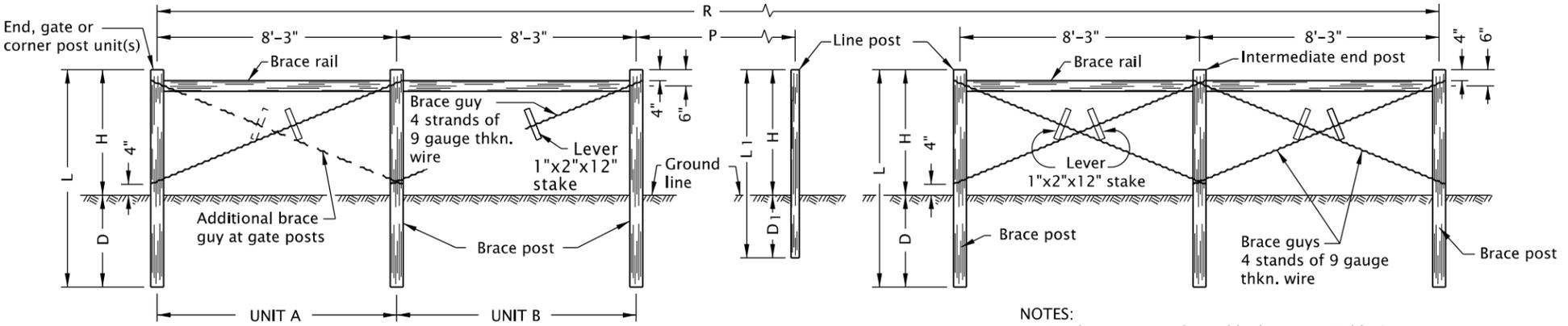
* Unit A required at gate post.
 Either Unit A or Units A & B are required in existing fence line at intersection with new fence line.



METAL POSTS



BRACE RAIL CONNECTION



WOOD POSTS

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

- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:
 1. For dimensions indicated by letter see Table 2.
 2. Line post spacing same as dimension P.
 3. For shapes, weights and dimensions of members see Table 3.

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

TABLE 2

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

TABLE 3

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

* Max. taper 1":48".
 † Max. allowable size 1" additional in each dimension.
 ④ In accordance with ASTM A 702.
 ④ In accordance with AASHTO M 181.

CALC. BOOK NO. N/A
 BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS
BARBED AND WOVEN WIRE FENCES

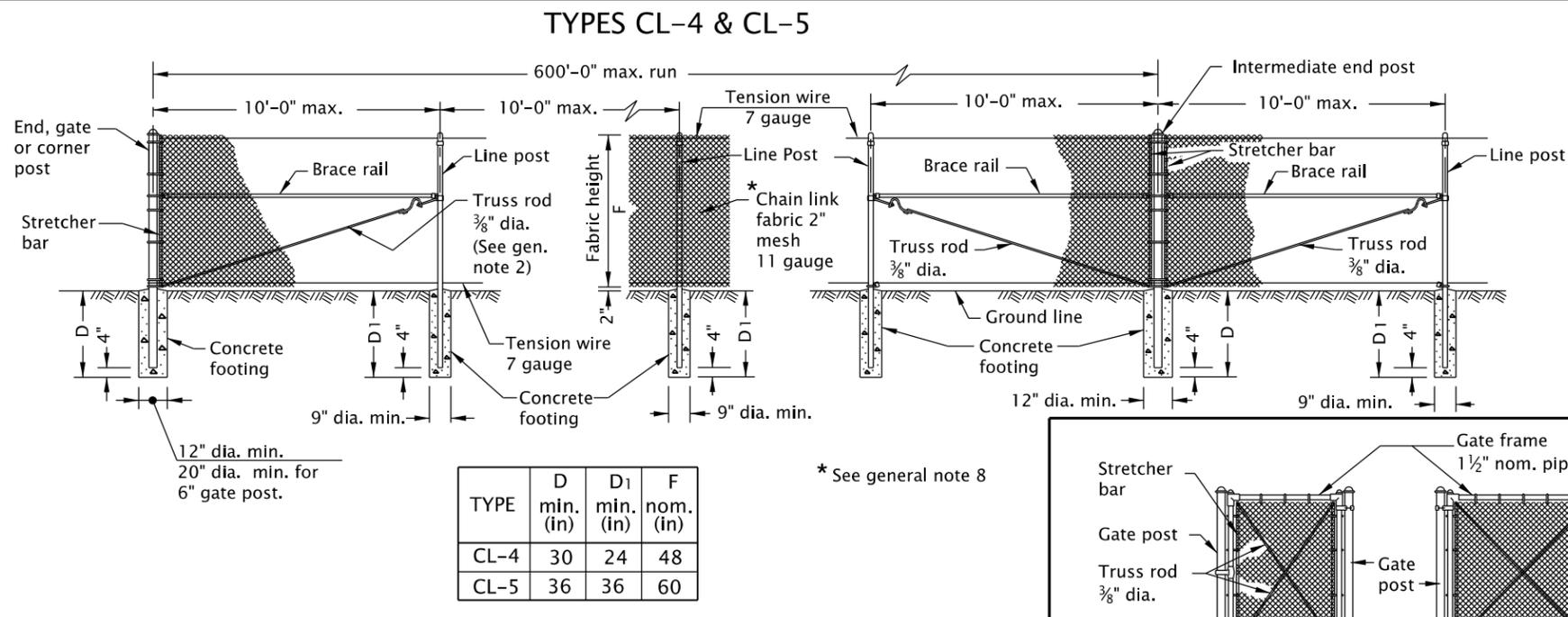
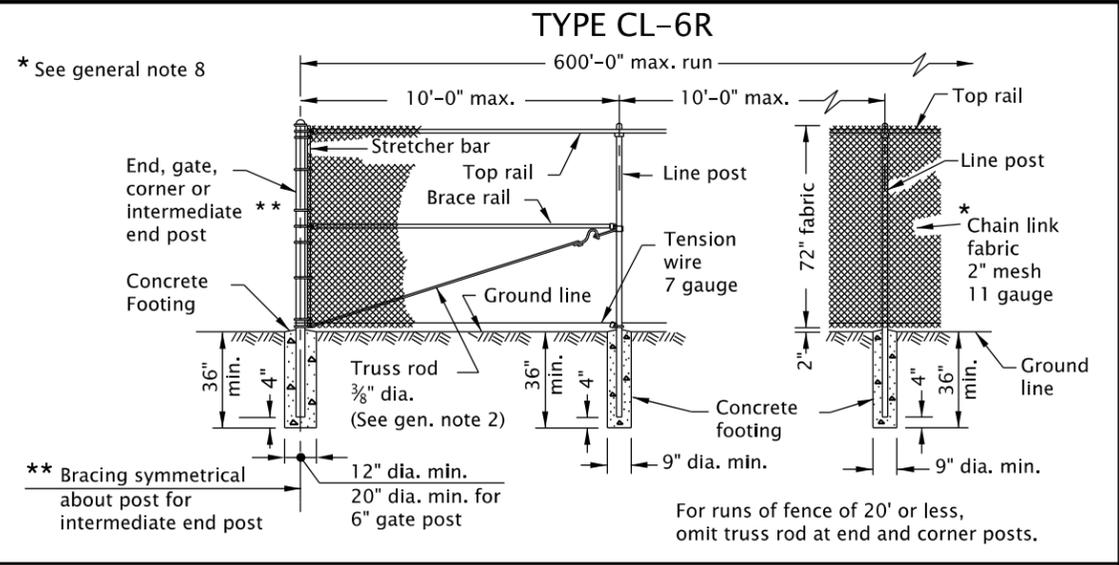
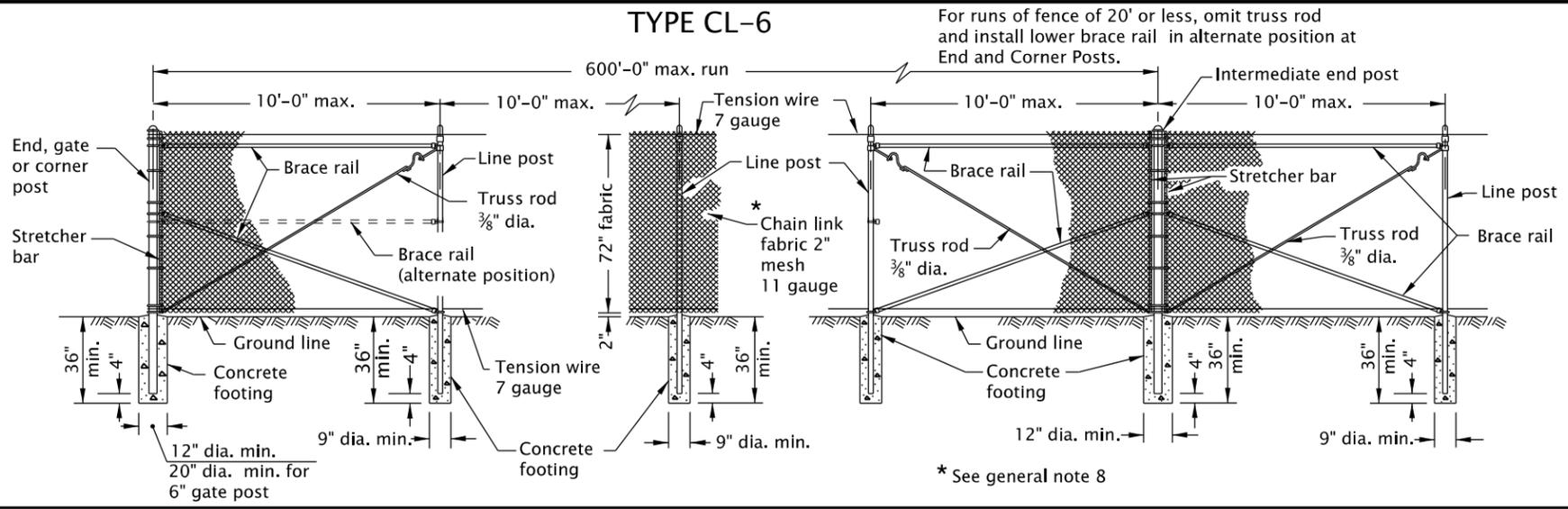
2018

DATE	REVISION	DESCRIPTION
01-2020	REVISED NOTES	

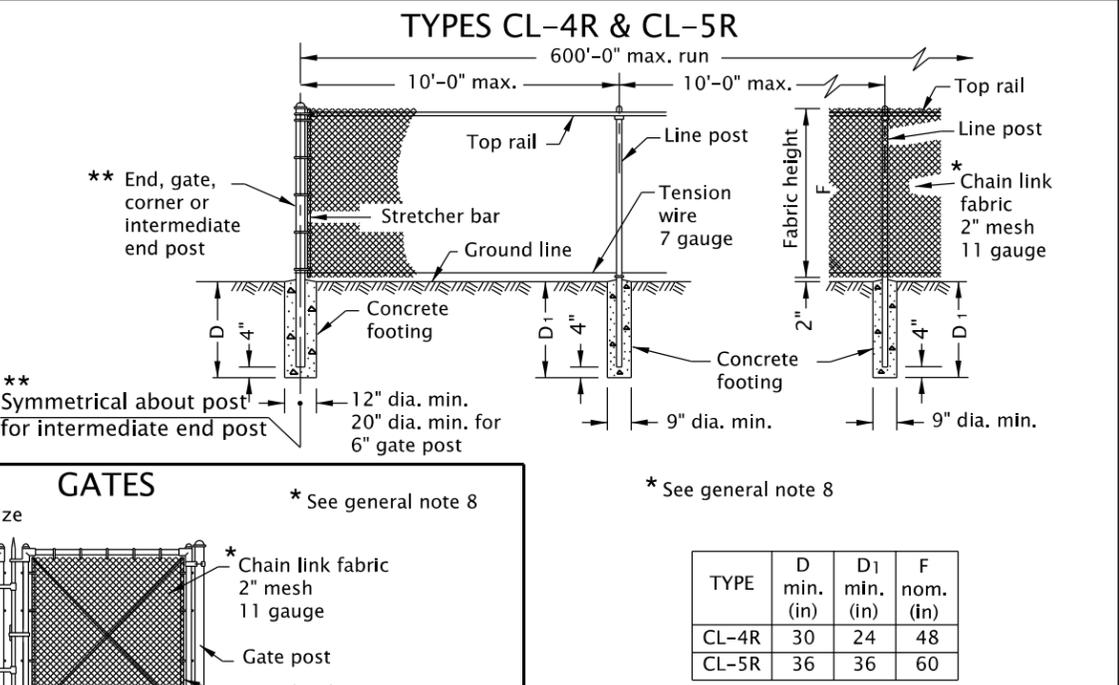
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

RD810

rd15.dgn 13-JAN-2020



TYPE	D min. (in)	D1 min. (in)	F nom. (in)
CL-4	30	24	48
CL-5	36	36	60



TYPE	D min. (in)	D1 min. (in)	F nom. (in)
CL-4R	30	24	48
CL-5R	36	36	60

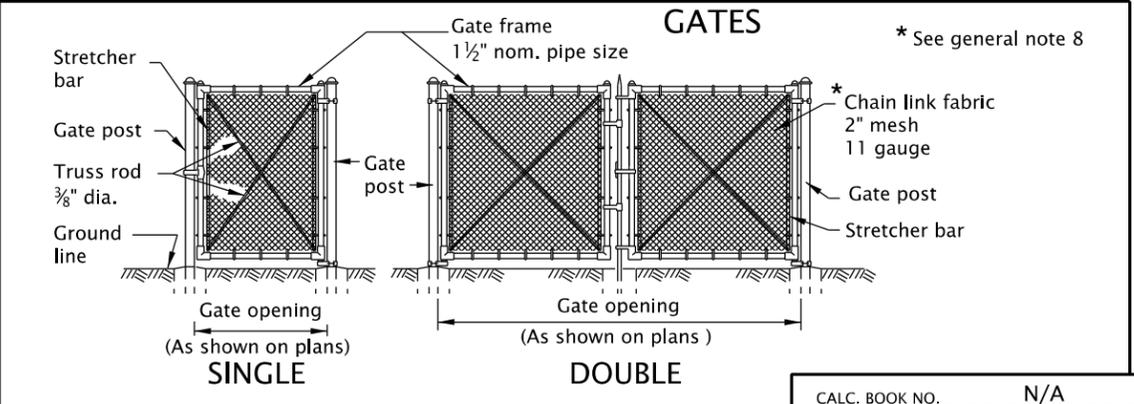


TABLE 1

TYPE	MEMBER											
	BRACE AND TOP RAILS		LINE POSTS				END, CORNER & INTERMEDIATE END POST		GATE OPENING (ft)		GATE POSTS	
	TUBULAR	TUBULAR	H-SECTION		TUBULAR		SINGLE GATE	DOUBLE GATE	TUBULAR			
CL-4 & CL-4R CL-5 & CL-5R	Fence Industry (in) 1 5/8	Nom. Dia. (in) 1 1/4	Fence Industry (in) 1 7/8	Nom. Dia. (in) 1 1/2	Size (in) 1 7/8 x 1 5/8	Wt. lb/ft 2.72	Fence Industry (in) 2 3/8	Nom. Dia. (in) 2	Up thru 6	Up thru 12	Fence Industry (in) 2 7/8	Nom. Dia. (in) 2 1/2
CL-6 & CL-6R	1 5/8	1 1/4	2 3/8	2	2 1/4 x 2	4.10	2 7/8	2 1/2	7 thru 13	13 thru 26	4	3 1/2
									14 thru 18	27 thru 36	6 5/8	6

NOTE: For CL-6, CL-6R, CL-8, CL-8R, CL-10 & CL-10R, the hardware is minimum and does not include slat wind loading.

- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:**
- Do not use top rail where fence can be struck by an errant vehicle.
 - Fittings shown are illustrative of use and not specific as to design.
 - Gate posts on each side of a gate opening to be the same size. At a double gate installation with unequal width gates, size of both posts to be as indicated for a single gate installation of the wider gate width.
 - For cross sectional dimensions of members, see Table 1.
 - Posts and rails with sections not shown that meet the requirements of AASHTO M181 are acceptable alternates. See ODOT's QPL for acceptable alternates.
 - All concrete shall be commercial grade concrete.
 - All chain link fabric top and bottom selvage shall be knuckled finish.
 - Chain link fabric for the fence to be installed with pickets shall be 9 gauge wire woven in 3 1/2" by 5 1/2" diamond mesh.
 - See project plans for details not shown.
 - Add fence grounding as required.

CALC. BOOK NO. N/A

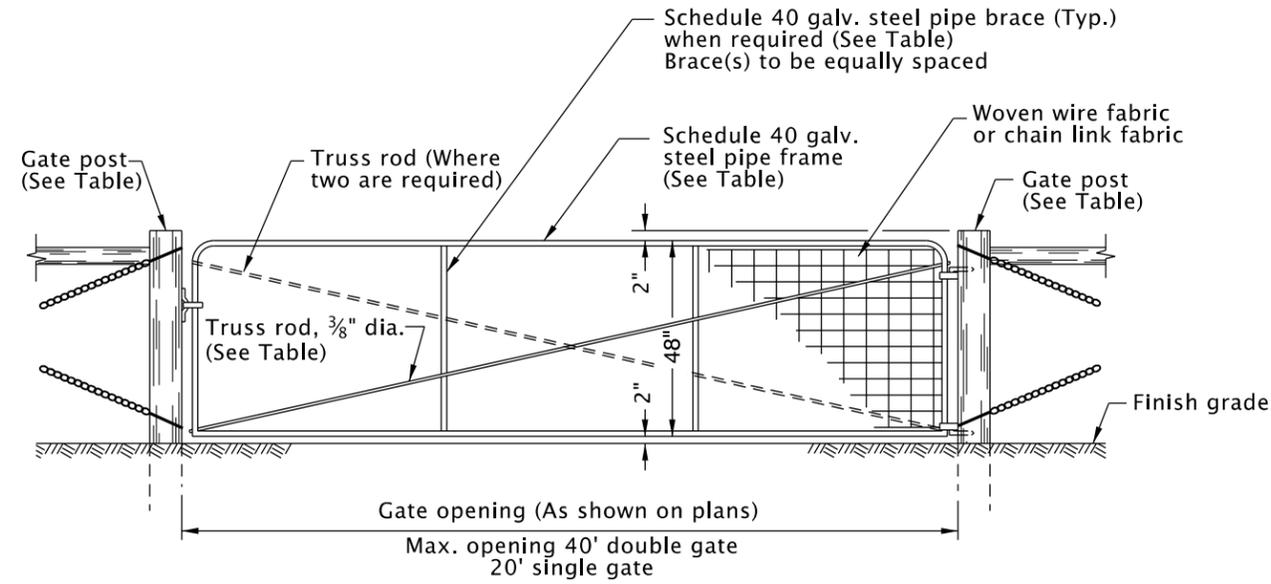
BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS	
CHAIN LINK FENCE	
2018	
DATE	REVISION DESCRIPTION
06-2019	REVISED DETAIL & NOTES
01-2020	REVISED NOTE

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 consulting a Registered Professional Engineer.

RD815



GATE COMPONENTS							GATE POSTS ① ②						
GATE OPENING (ft)		SCHEDULE 40 GALV. STEEL PIPE FRAME		SCHEDULE 40 GALV. STEEL PIPE BRACE			TRUSS RODS	WOOD * ROUND			SQUARE	STEEL SCHEDULE 40 GALV. STEEL PIPE	
SINGLE GATE	DOUBLE GATE	NOM. DIA. (in)	MIN. WT. (lb/ft)	NUMBER	NOM. DIA. (in)	MIN. WT. (lb/ft)		DIA. OF SMALL END (in)			NOM. SIZE (in)	NOM. DIA. (in)	MIN. WT. (lb/ft)
								Min.	Max.	Min. Avg.			
UP thru 6	UP thru 12	1	1.68	-	-	-	-	5	7	6	6x6	2½	5.79
7 thru 11	13 thru 22	1¼	2.27	1	1	1.68	1	5	7	6	6x6	3½	9.11
12 thru 16	23 thru 32	1½	2.72	2	1¼	2.27	2	7	9	8	8x8	6	18.97
17 thru 20	33 thru 40	2	3.65	2	1¼	2.27	2	9	11	10	10x10	6	18.97

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

* Max. taper 1" in 4'

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

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

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

FENCE GATES

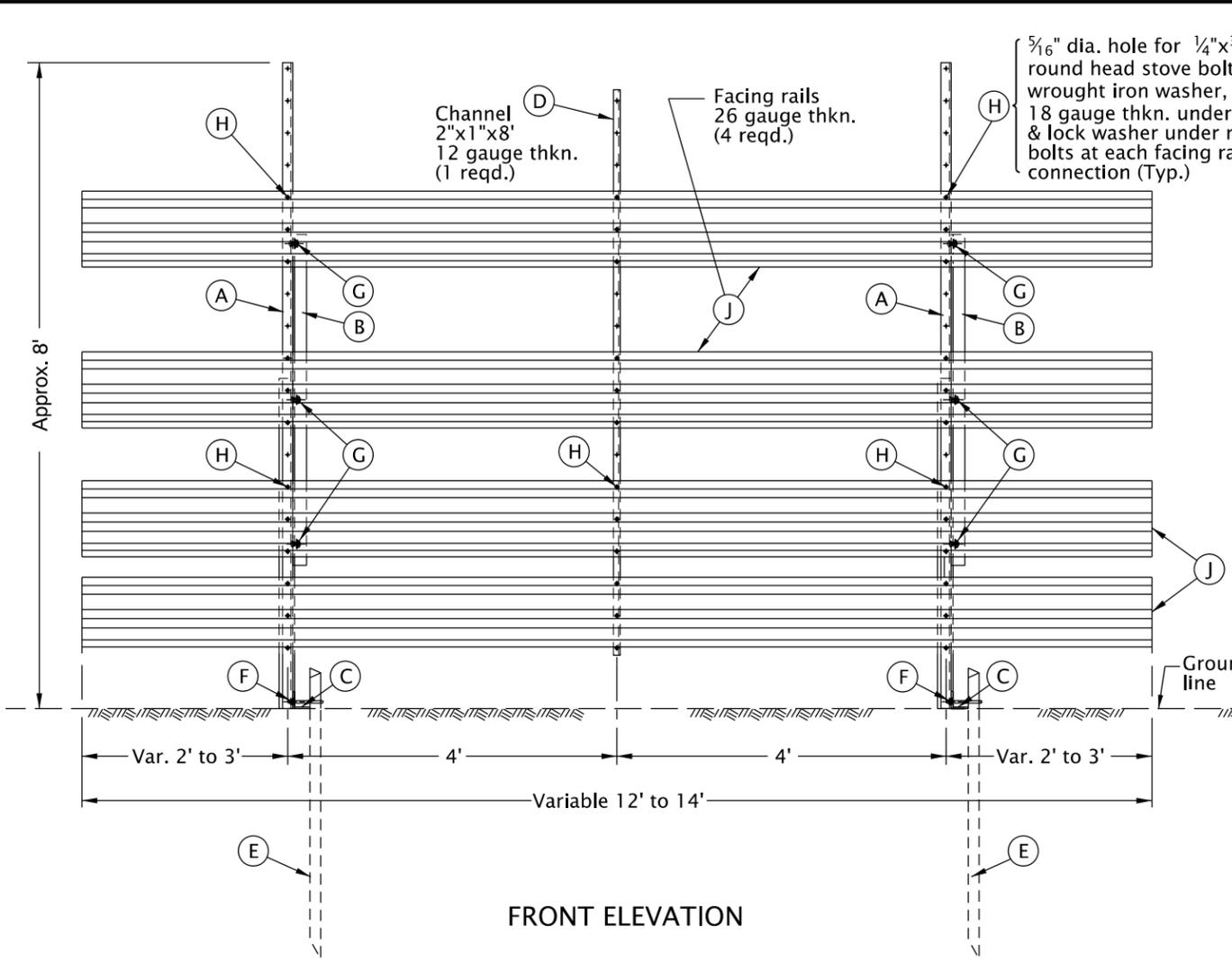
2018

DATE	REVISION	DESCRIPTION
01-2020	REVIS	NOTE

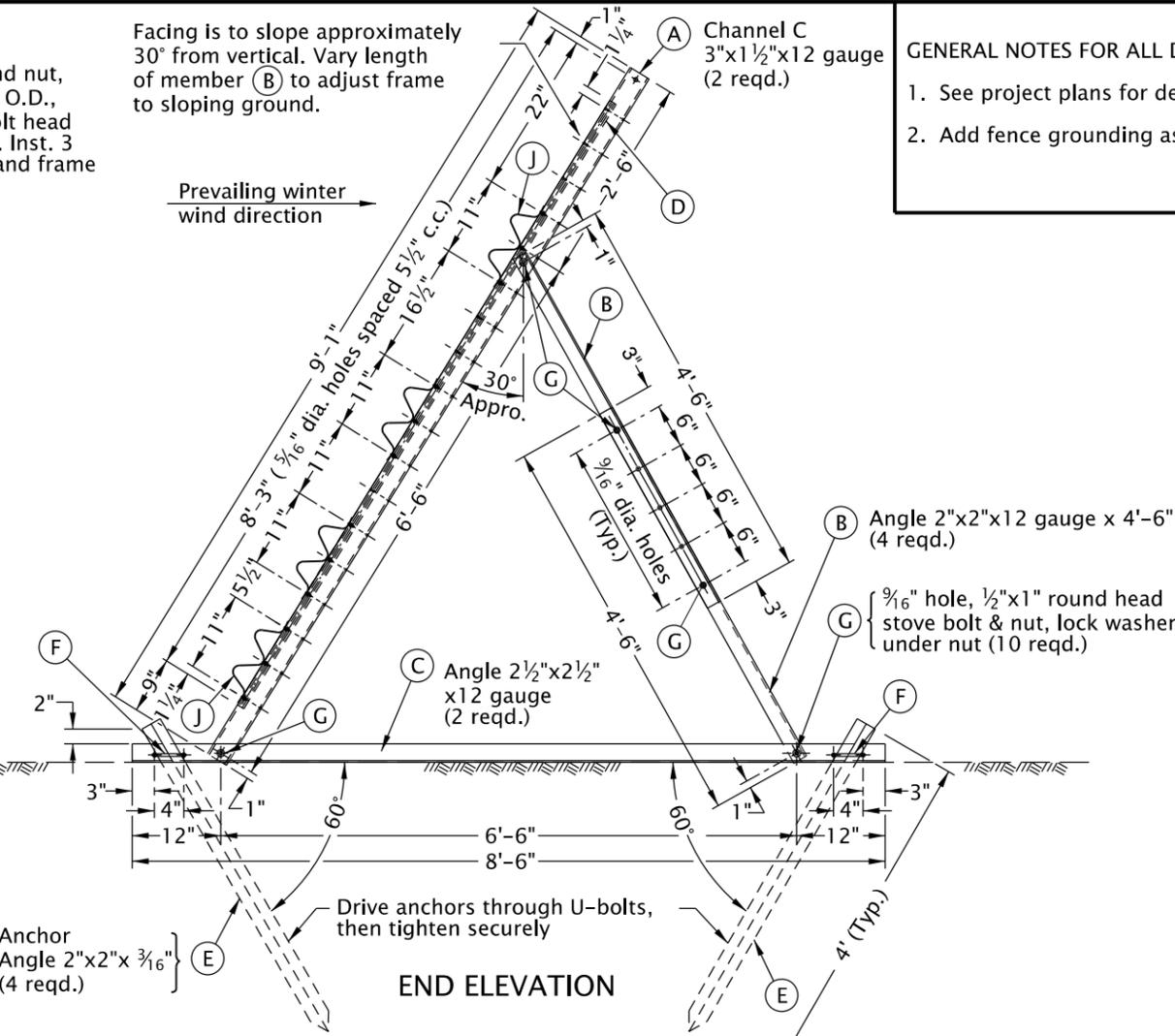
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rd825.dgn 13-JAN-2020

RD825

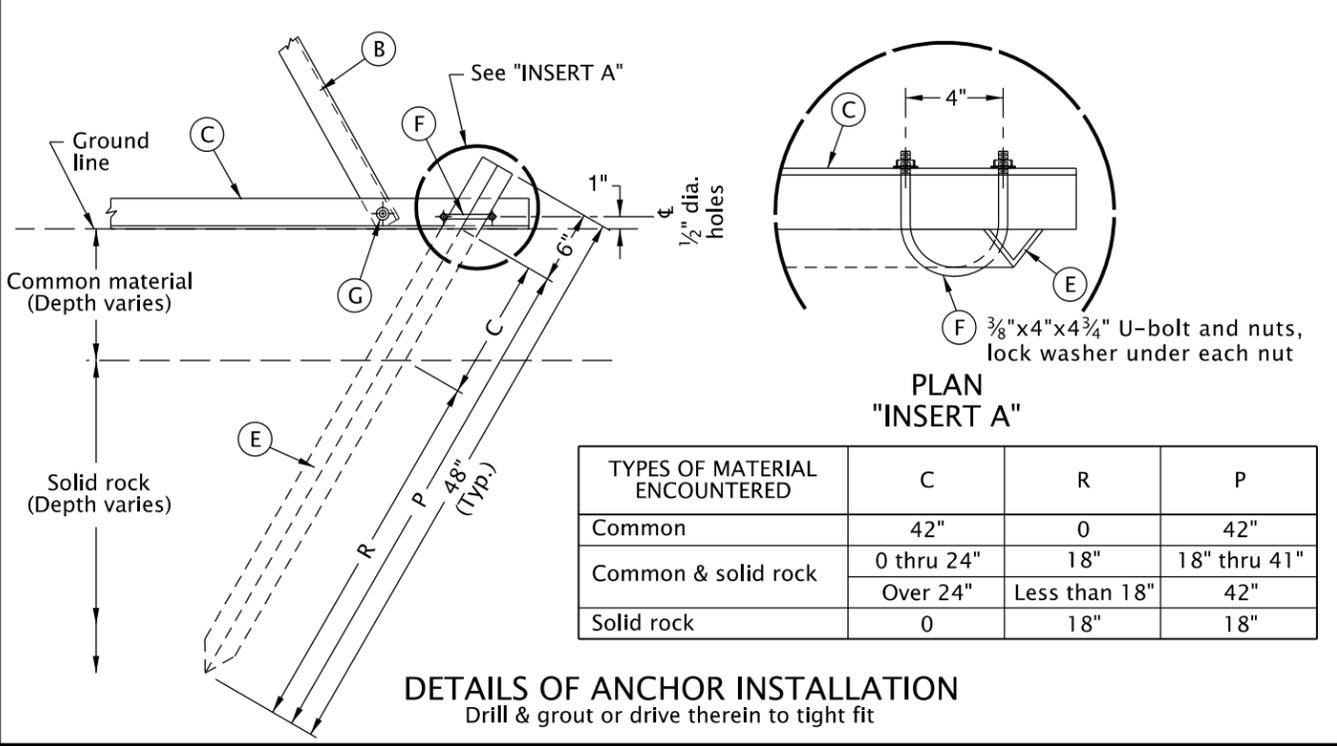


FRONT ELEVATION



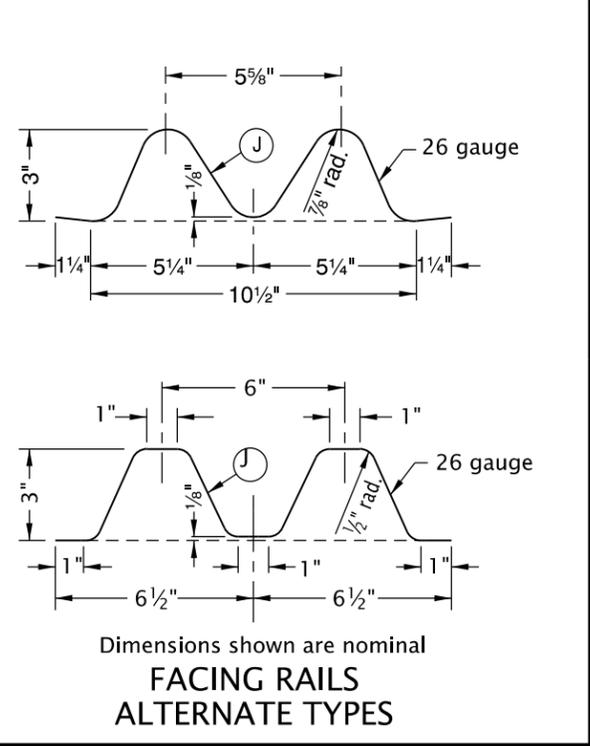
END ELEVATION

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:
 1. See project plans for details not shown.
 2. Add fence grounding as required.



DETAILS OF ANCHOR INSTALLATION

TYPES OF MATERIAL ENCOUNTERED	C	R	P
Common	42"	0	42"
Common & solid rock	0 thru 24"	18"	18" thru 41"
Solid rock	Over 24"	Less than 18"	42"
	0	18"	18"



Dimensions shown are nominal
 FACING RAILS
 ALTERNATE TYPES

- REFERENCE GUIDE FOR ALL DETAILS
- FRAME MEMBERS (A), (B), (C) & (D)
 - ANCHORS (E)
 - U-BOLTS (F)
 - 1/2" BOLTS, NUTS & LOCK WASHERS (G)
 - 1/4" BOLTS, NUTS, LOCK WASHERS & 3/4" O.D. WASHERS (H)
 - FACING RAILS (J)

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

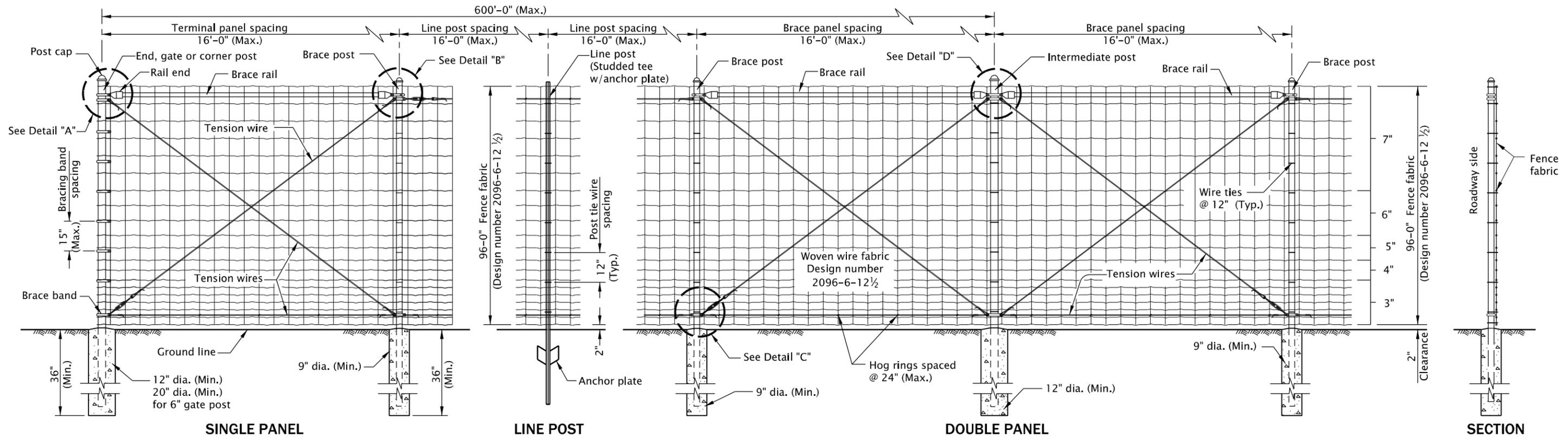
OREGON STANDARD DRAWINGS

METAL SNOW FENCE

2018

DATE	REVISION	DESCRIPTION
01-2020	REVISED NOTES	

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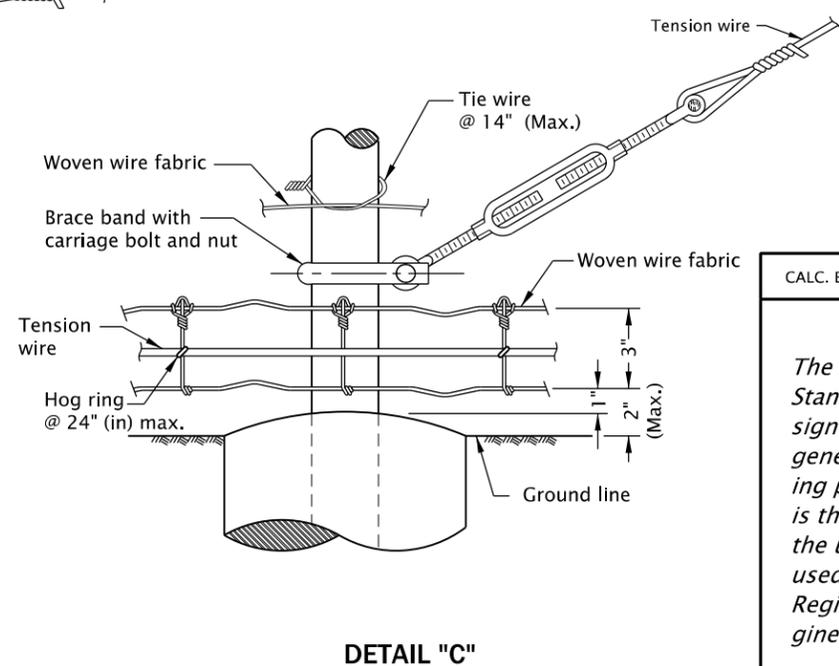
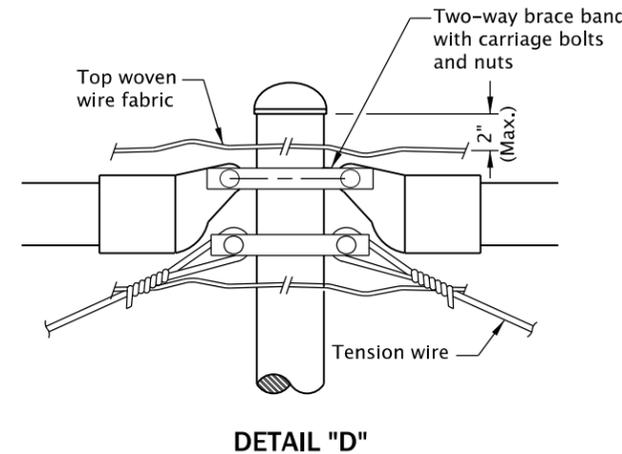
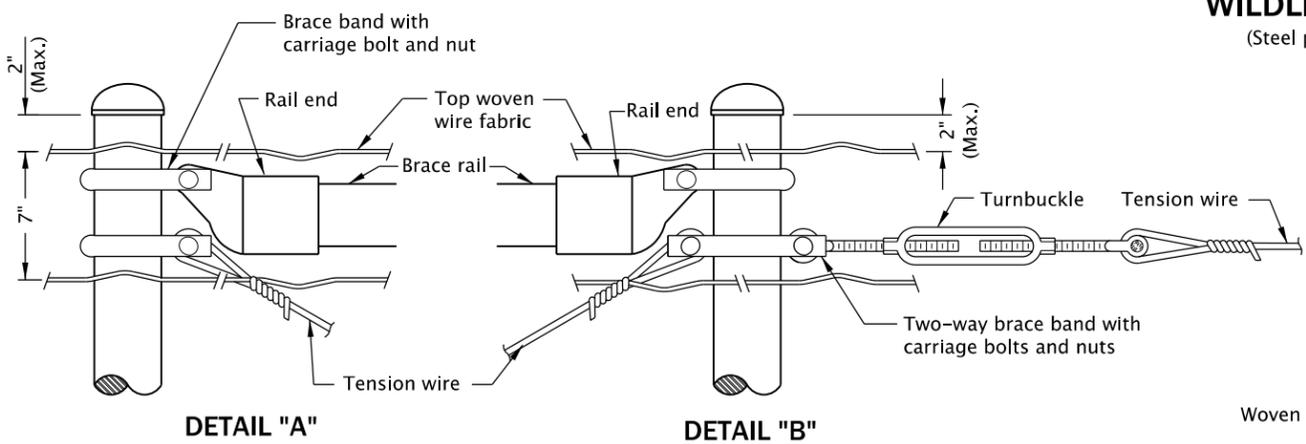
SINGLE PANEL

LINE POST

DOUBLE PANEL

SECTION

WILDLIFE FENCE
(Steel post shown)

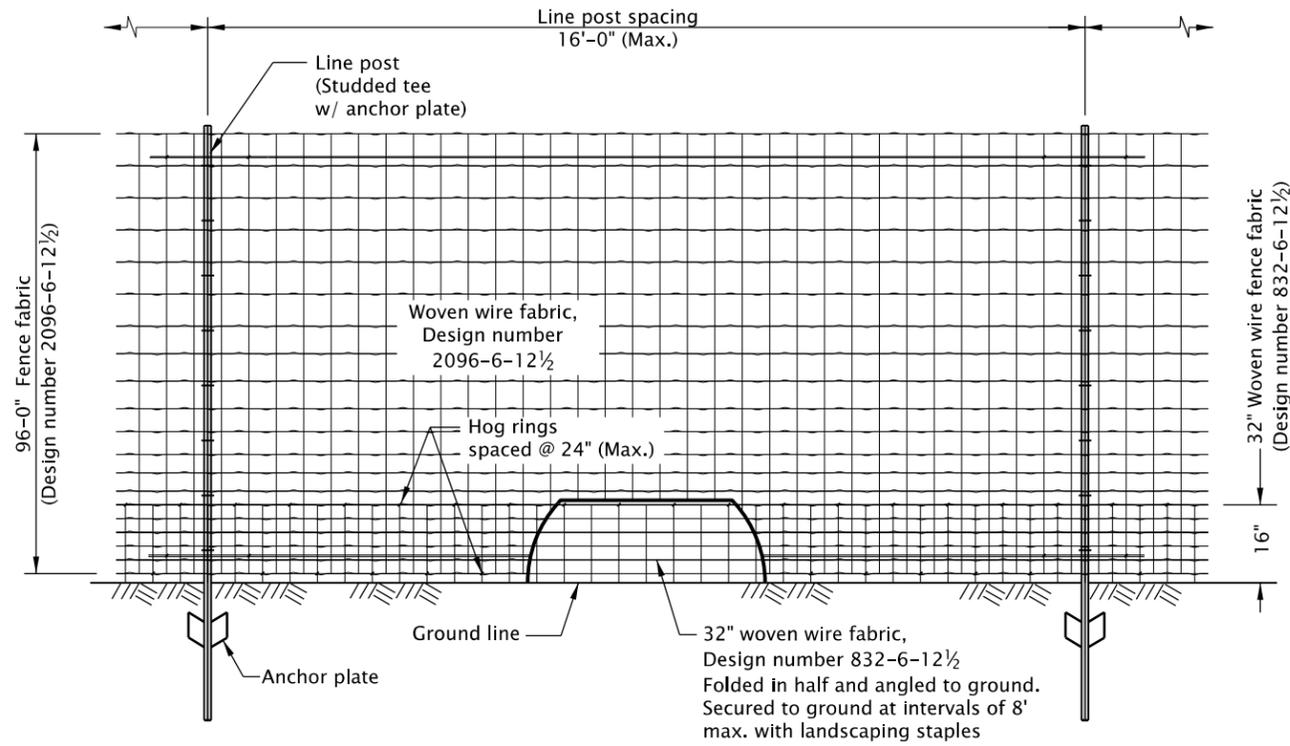


MEMBER	PIPE		T-POST
	Fence Industry (in)	Nom. Dia. (in)	Weight (lb/ft)
BRACE RAILS	1 5/8	1 1/4	
END, CORNER, OR INTERMEDIATE POST	2 7/8	2 1/2	
BRACE POST	2 3/8	2	
LINE POST			1.33

- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:
1. See Std. Dwg. RD840 for details not shown. See Std. Dwg. RD845 for escape ramps and jump outs installation.
 2. Woven wire fabric shall conform to ASTM A116-05 design No. 2096-12-12½ type Z, class 3, factory-painted matte black.
 3. Post shall be placed on the highway side of the fencing, shall consist of tubular steel posts (Round post) and heavy duty T-post.
 4. T-post shall be heavy duty (133), conforming to ASTM A702. Tubular steel posts shall be schedule 40 pipe.
 5. All tubular steel posts (Round post) shall be fitted with approved top caps, which shall be designed to fit securely.
 6. Woven wire fabric shall be fastened to each post at the top and bottom of fabric and 2' max. spacing.
 7. Add fence grounding as required.

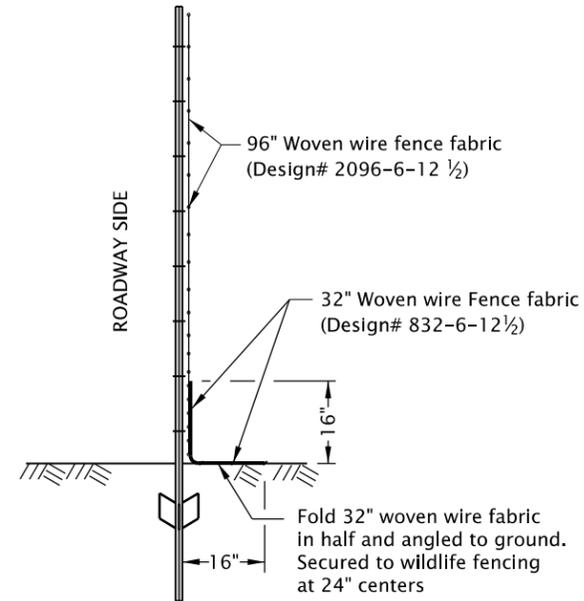
CALC. BOOK NO. N/A	BASELINE REPORT DATE 13-JAN-2020
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS	
WILDLIFE FENCE INSTALLATION	
SHEET 1 OF 4	
2018	
DATE	REVISION DESCRIPTION
06-2019	DRAWING CREATED
01-2020	REVISED NOTE

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 consulting a Registered Professional Engineer.

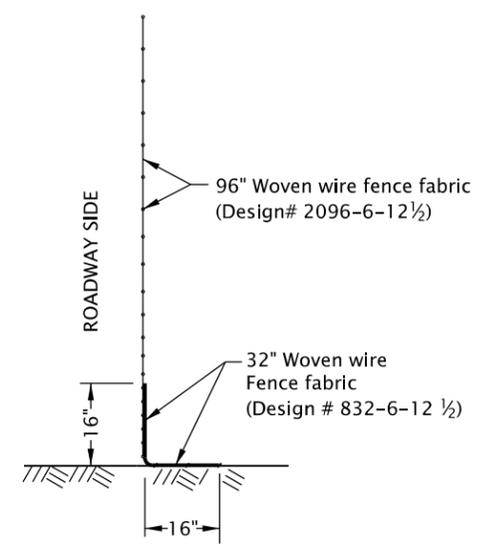


ELEVATION

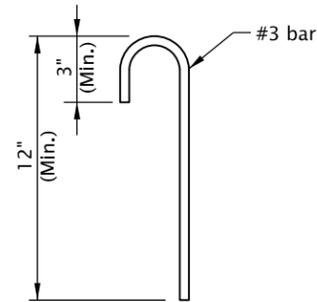
WILDLIFE FENCE WITH ANTI-BURROW APRON
(As required)



SECTION AT LINE POSTS



SECTION BETWEEN POSTS



LANDSCAPING STAPLE DETAIL

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See Std. Dwgs. RD830 and RD840 for details not shown. See Std. Dwg. RD845 for escape ramps and jumpouts installation.
2. 32" woven wire fabric shall conform to ASTM A116-05 design no. 832-6-12½ type Z, class 3, factory-painted matte black.
3. Add fence grounding as required.

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

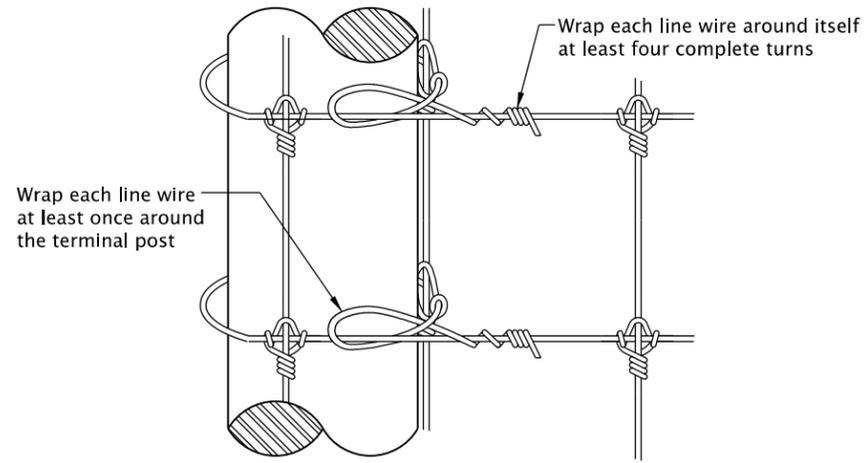
OREGON STANDARD DRAWINGS
WILDLIFE FENCE WITH ANTI-BURROW APRON

2018

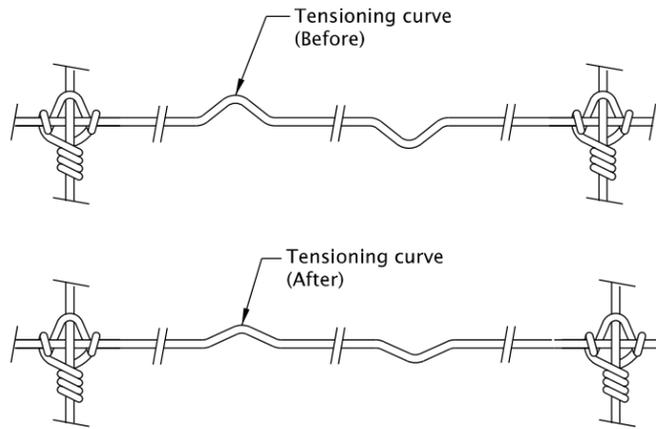
DATE	REVISION DESCRIPTION
06-2019	DRAWING CREATED
01-2020	REVISED NOTE

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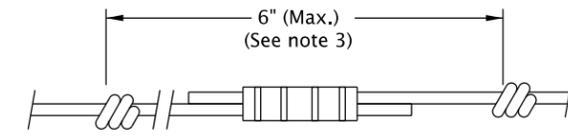
rd840.dgn 13-JAN-2020



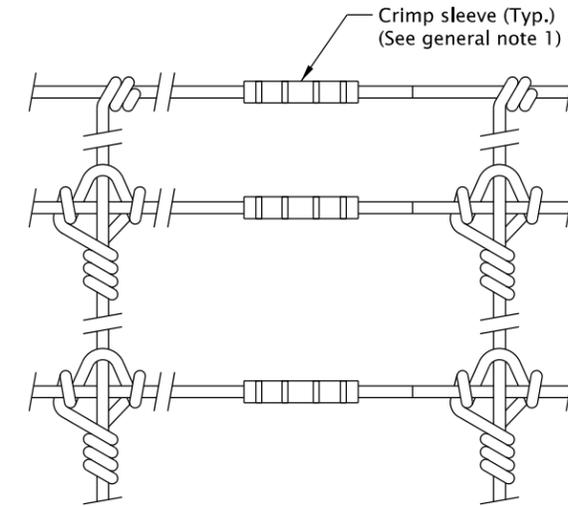
FENCE TERMINATION DETAIL



TENSIONING CURVE DETAILS
(See general note 2)

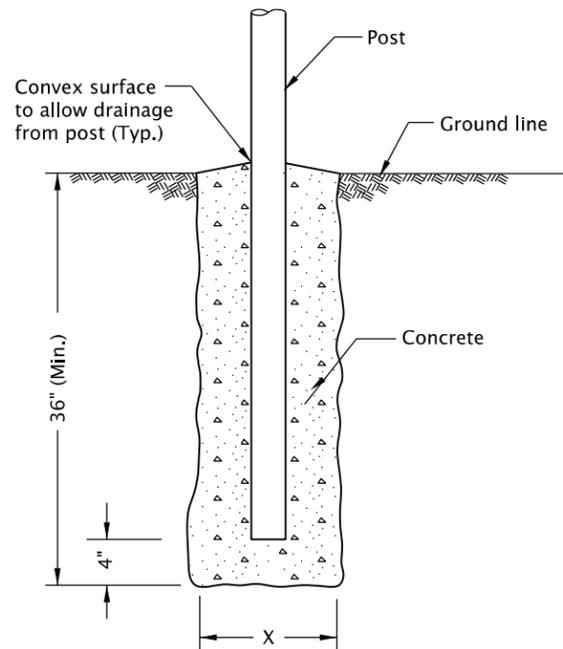


PLAN

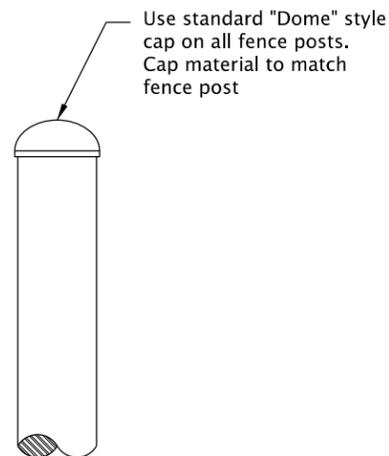


ELEVATION

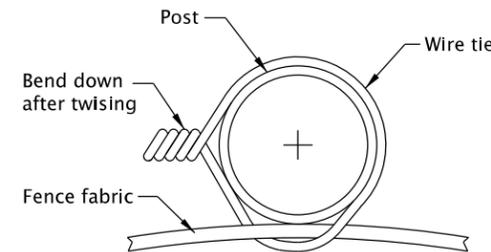
CRIMP SLEEVE SPLICING DETAIL



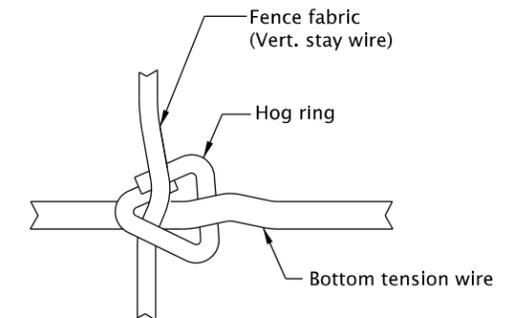
POST FOOTING DETAIL



POST CAP DETAIL



FASTENED WIRE TIE DETAIL



HOG RING TIE DETAIL

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. Each line wire shall be spliced with a crimp sleeve. Crimp sleeves shall be installed in accordance with the manufacturer's instructions for the type of fence fabric installed.
2. The tensioned curves shall be one half the size of the untensioned curves.
3. Both fabric end vertical stay wires to be within a maximum of 6" centers.
4. To attach fence wires to terminal post, remove wire knots from the end of the fence close to the post to create 2' of loose end wires. Place the first complete vertical stay wire against post. Start at the middle of the horizontal line wires, wrapping around the end post at least one time and then wrapping around itself four times.
5. Add fence grounding as required.

CALC. BOOK NO. N/A

BASELINE REPORT DATE 13-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS
WILDLIFE FENCE
MISCELLANEOUS DETAILS

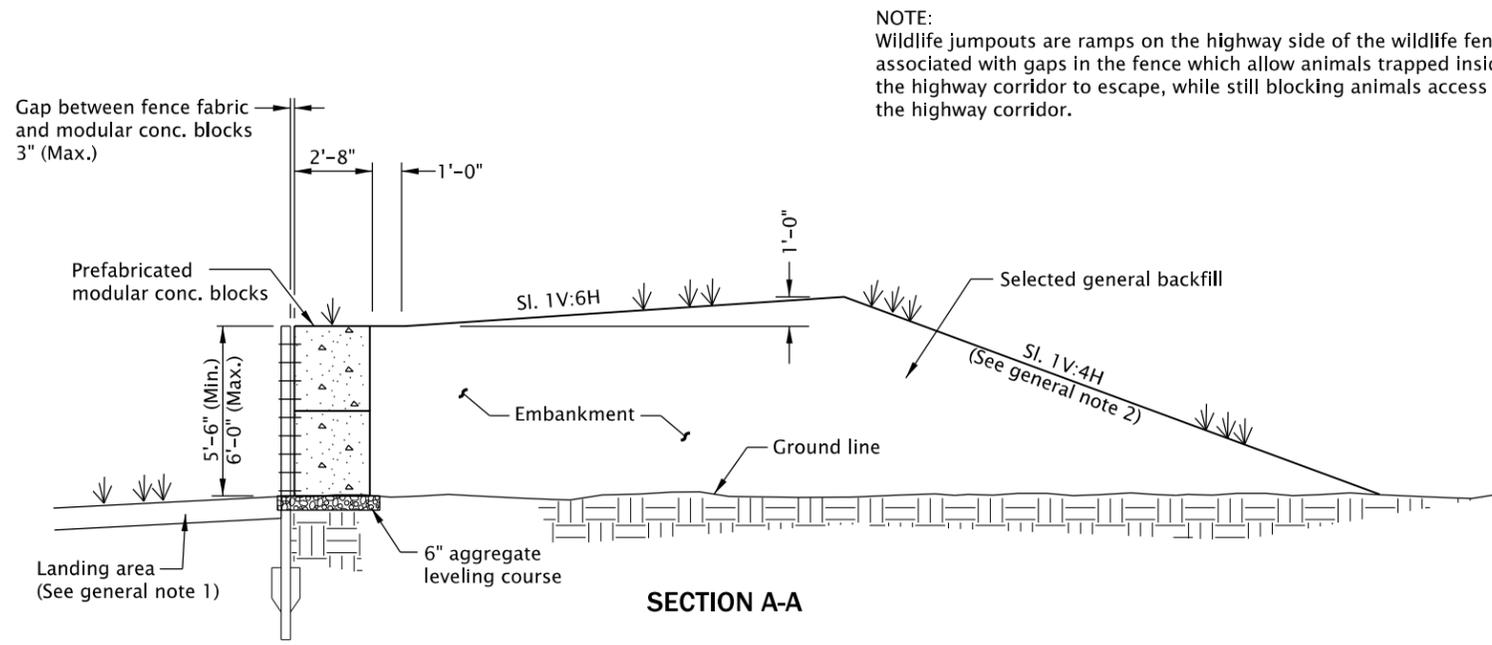
2018

DATE	REVISION	DESCRIPTION
06-2019	DRAWING CREATED	
01-2020	REVISED NOTE	

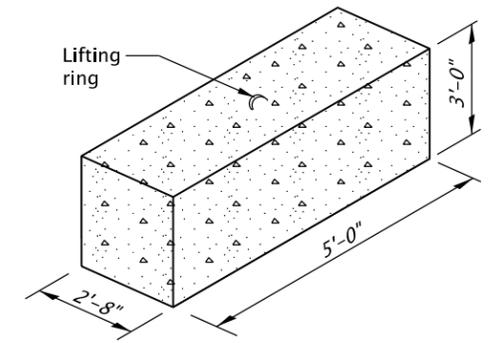
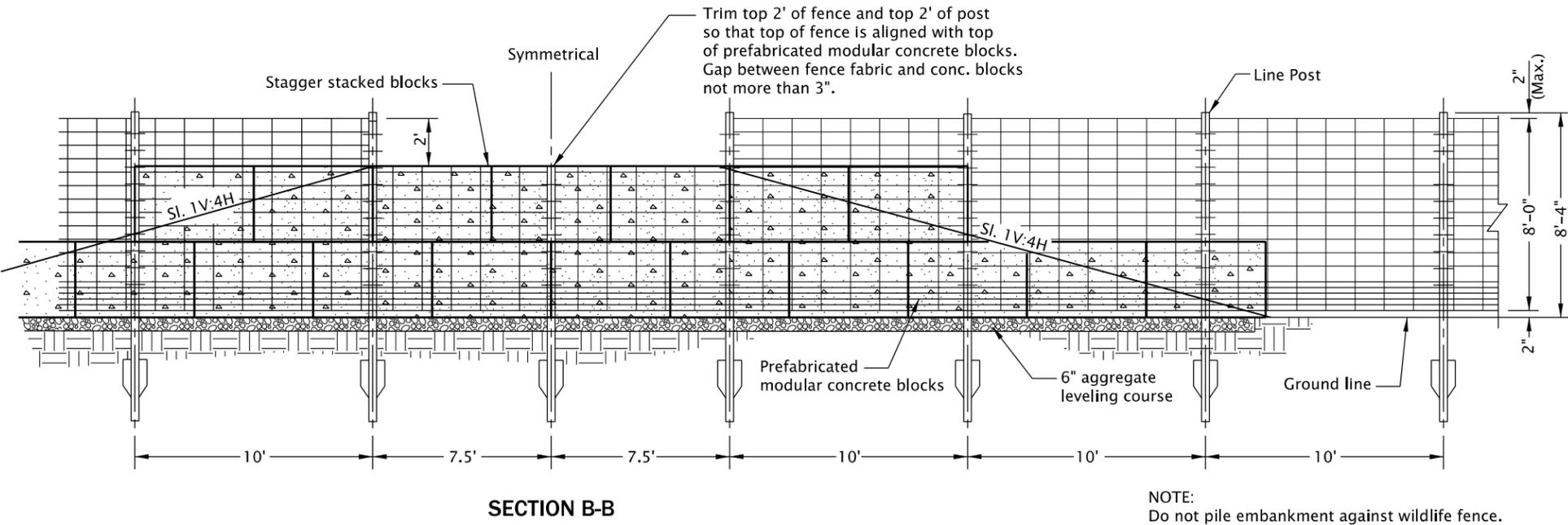
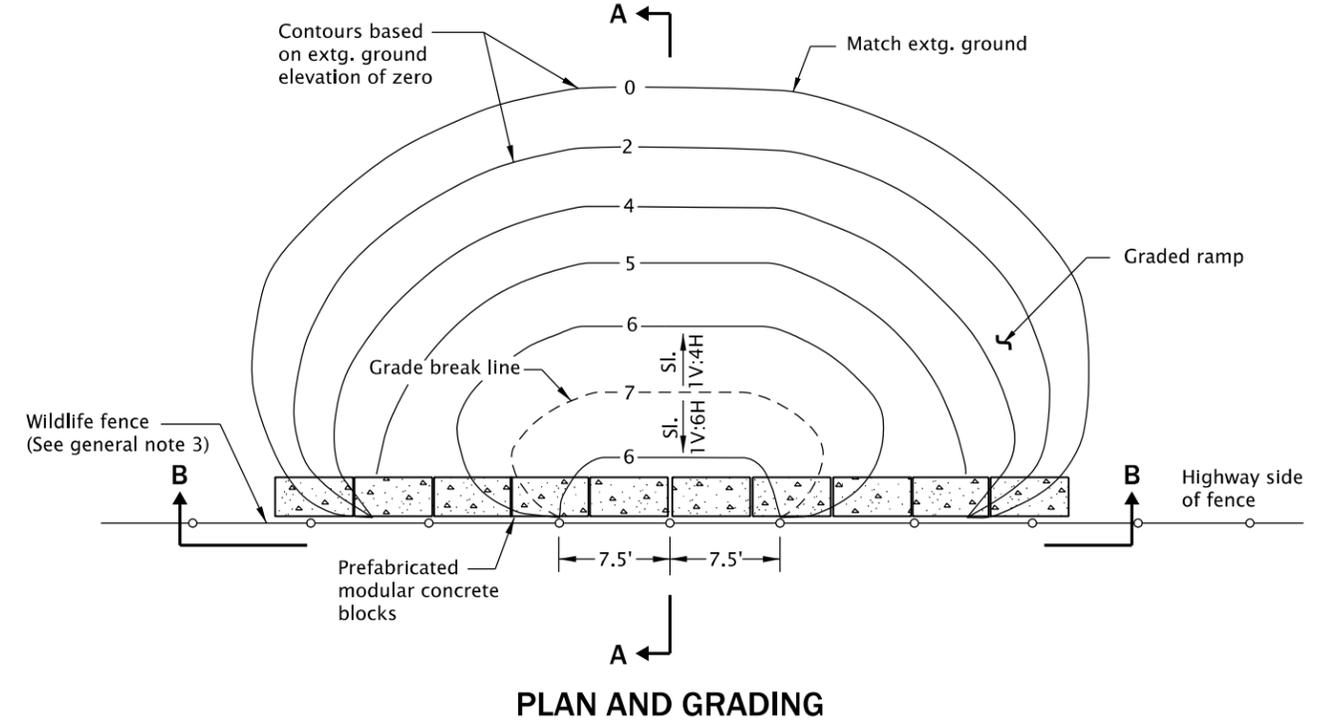
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

RD840

rd845.dgn 13-JAN-2020



NOTE:
Wildlife jumpouts are ramps on the highway side of the wildlife fence, associated with gaps in the fence which allow animals trapped inside the highway corridor to escape, while still blocking animals access to the highway corridor.



NOTE:
Remove lifting ring from top course of prefabricated modular concrete block at jumpout.

- GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:
1. The landing area shall be graded smoothly away from the base of the ramp with a slope of 1V:3H or flatter.
 2. Ramps shall be constructed so as not to encroach on highway drainage.
 3. Wildlife fence as shown on project plans.
See Std. Dwgs. RD830, RD835 and RD840 for Wildlife fence installations.
 4. Use details shown as a general guide since existing terrain may vary.
 5. Add fence grounding as required.

NOTE:
Do not pile embankment against wildlife fence.
Grade such that only prefabricated modular.

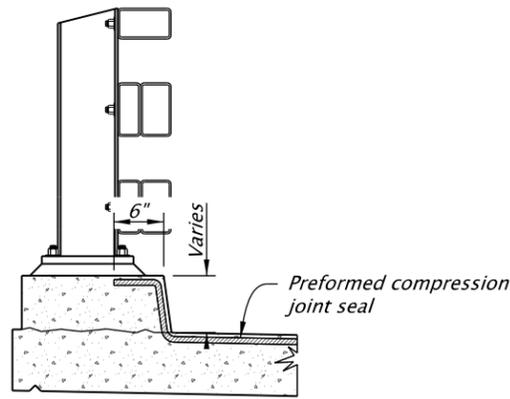
CALC. BOOK NO. N/A	BASELINE REPORT DATE 13-JAN-2020								
<p><i>The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.</i></p>	NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications								
	OREGON STANDARD DRAWINGS WILDLIFE ESCAPE RAMPS (JUMPOUTS)								
	2018								
	<table border="1"> <thead> <tr> <th>DATE</th> <th>REVISION</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>06-2019</td> <td>DRAWING CREATED</td> <td></td> </tr> <tr> <td>01-2020</td> <td>REVISED NOTE</td> <td></td> </tr> </tbody> </table>	DATE	REVISION	DESCRIPTION	06-2019	DRAWING CREATED		01-2020	REVISED NOTE
DATE	REVISION	DESCRIPTION							
06-2019	DRAWING CREATED								
01-2020	REVISED NOTE								

Effective Date: June 1, 2020 - November 30, 2020

RD845

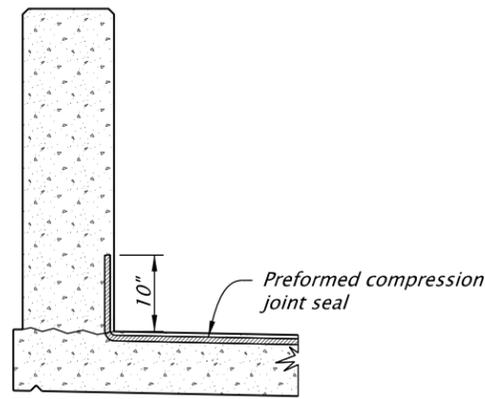
01/06/2020

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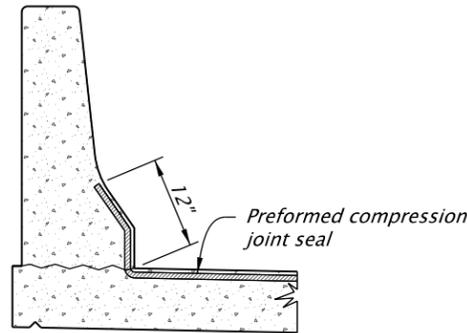


3-TUBE CURB MOUNT RAIL
Scale: 1/2"=1'-0"

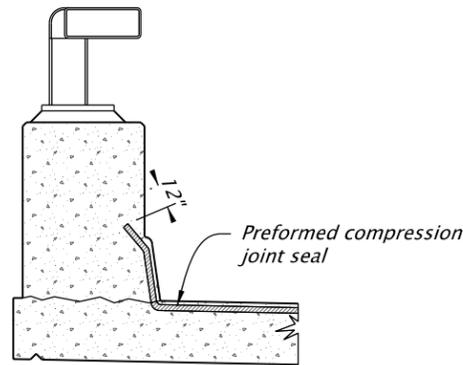
NOTE
Bridge rails mounted on curb similar.



VERTICAL CONCRETE PARAPET
Scale: 1/2"=1'-0"

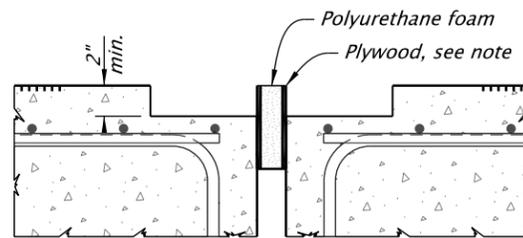


TYPE "F" CONCRETE RAIL
Scale: 1/2"=1'-0"



CONCRETE PARAPET WITH STEEL POST
Scale: 1/2"=1'-0"

BRIDGE RAIL TYPES



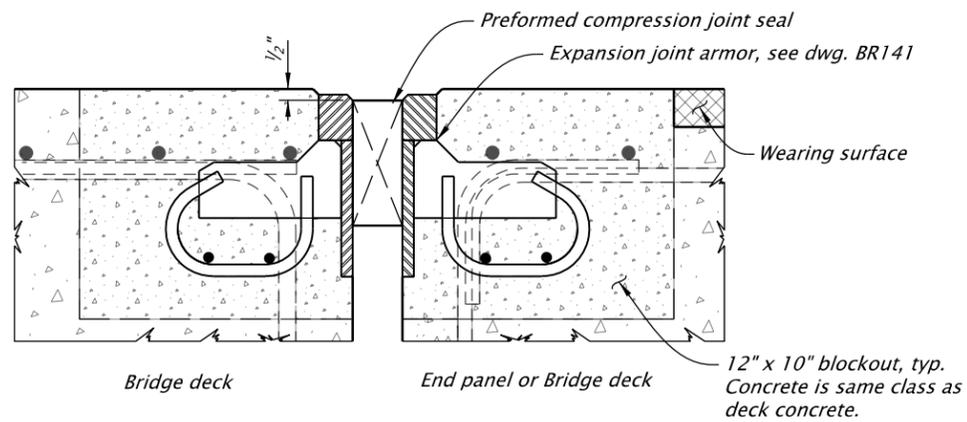
PROPOSED TEMPORARY BLOCKOUT

NOTE
Blockout joint with sandwich of polyurethane foam and 1/4" to 1/2" plywood as shown prior to placing elastomeric concrete nosing.

Grind 3/16" to 1/4" x 45° chamfer, typ. each side after placing nosing. (gutter to gutter)
Preformed compression joint seal

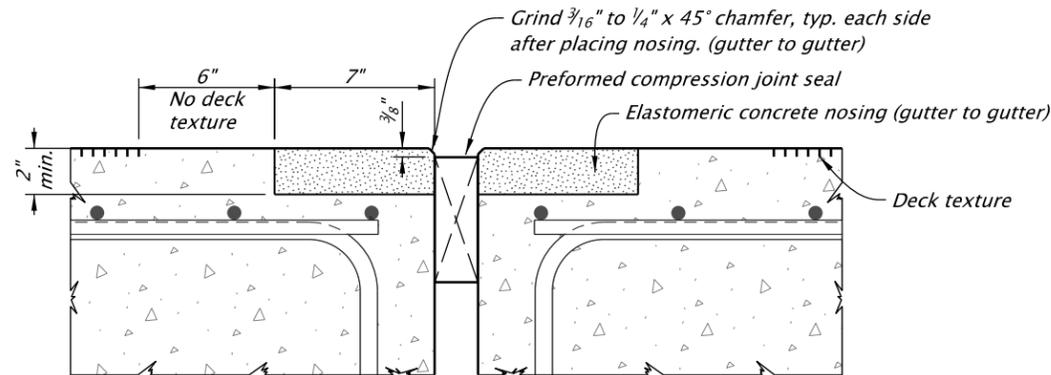


SIDEWALK JOINT SECTION



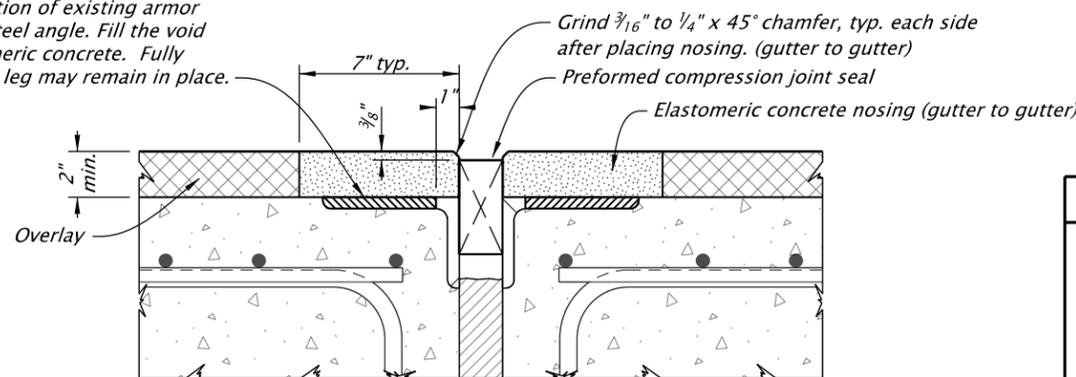
ARMORED JOINT SECTION

NOTE
Use details for new construction.



NON-ARMORED JOINT SECTION

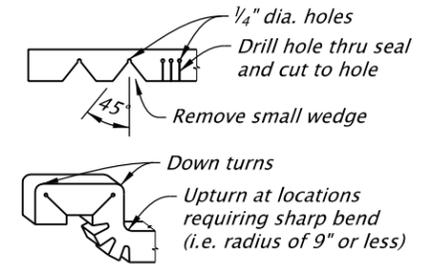
NOTE
Use details for new construction and joint rehabilitation.



ARMORED JOINT WITH OVERLAY

NOTE
Use details for joint rehabilitation. When existing armor leg remains in place. See project plans and specifications for surface preparation before elastomeric concrete placement.

Seal Type	Total Movement Range	Preformed Compression Joint Seal				Minimum Installation Width
		Nominal Size		Joint Width		
		Width	Height	Min.	Max.	
A	1/2"	1 1/4"	1 1/4"	1/2"	1"	3/4"
B	3/4"	2"	2"	7/8"	1 5/8"	1 1/4"
C	1"	2 1/2"	2 3/4"	1"	2"	1 1/2"
D	1 1/4"	3"	3 1/4"	1 1/4"	2 1/2"	1 3/4"
E	1 1/2"	3 1/2"	3 1/2"	1 3/8"	2 7/8"	2 1/4"



CORNER DIAGRAM

NOTES:
See project plans for joint size and details not shown.

Blockout joint with temporary blockout prior to placing elastomeric concrete nosing. See Proposed Temporary Blockout detail this sheet.

Prepare joint surfaces and install preformed compression joint seal (gutter to gutter) in one continuous piece.

See dwg. BR141 for joint armor when shown on project plans.

CALC. BOOK NO. -	BASLINE REPORT DATE 06-Jan.-2020
------------------	----------------------------------

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

**OREGON STANDARD DRAWINGS
PREFORMED COMPRESSION
JOINT SEAL**

2018

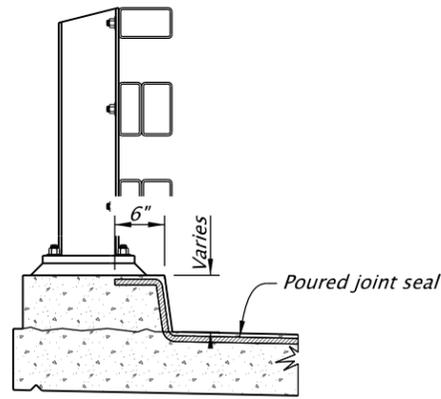
DATE	REVISION DESCRIPTION
1/6/2020	Update drawing details and notes for consistency
-	-
-	-
-	-

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 consulting a Registered Professional Engineer.

BR139

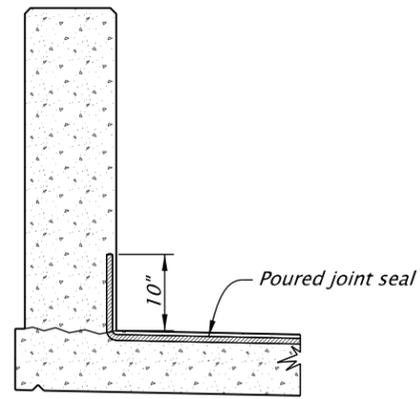
01/06/2020

br140.dgn

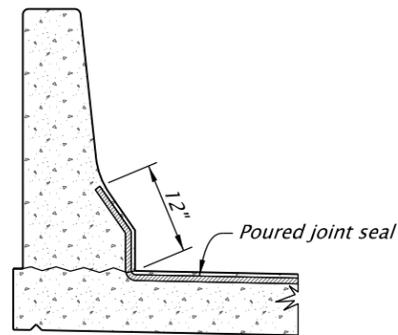


3-TUBE CURB MOUNT RAIL
Scale: 1/2"=1'-0"

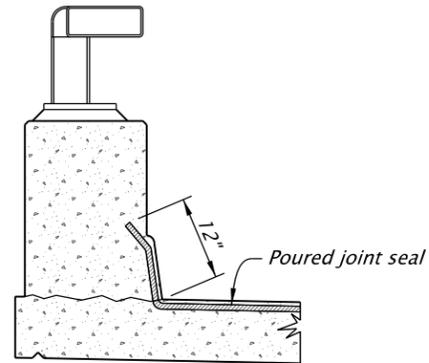
NOTE
Bridge rails mounted on curb similar.



VERTICAL CONCRETE PARAPET
Scale: 1/2"=1'-0"

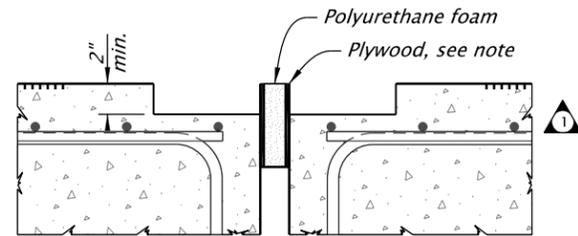


TYPE "F" CONCRETE RAIL
Scale: 1/2"=1'-0"



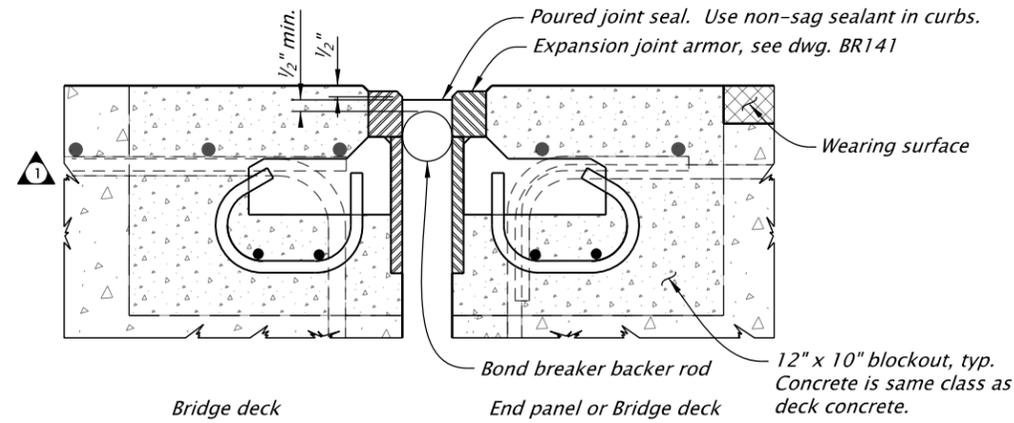
CONCRETE PARAPET WITH STEEL POST
Scale: 1/2"=1'-0"

BRIDGE RAIL TYPES



PROPOSED TEMPORARY BLOCKOUT

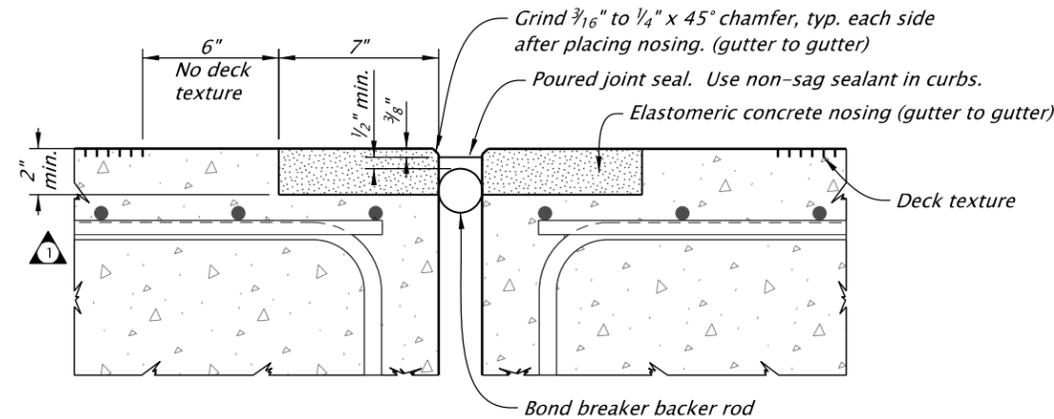
NOTE
Blockout joint with sandwich of polyurethane foam and 1/4" to 1/2" plywood as shown prior to placing elastomeric concrete nosing.



ARMORED JOINT SECTION

NOTE
Use details for new construction.

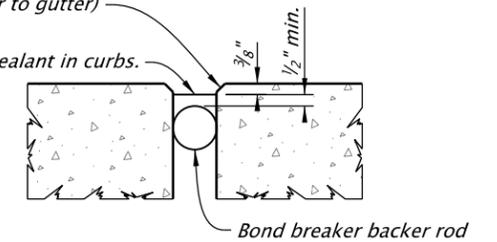
Grind 3/16" to 1/4" x 45° chamfer, typ. each side after placing nosing. (gutter to gutter)



NON-ARMORED JOINT SECTION

NOTE
Use details for new construction and joint rehabilitation.

Poured joint seal. Use non-sag sealant in curbs.



SIDEWALK JOINT SECTION

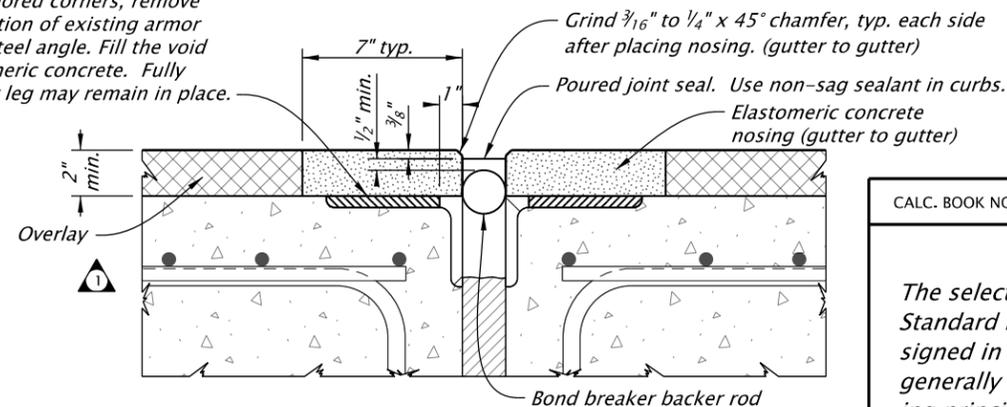
NOTES:
See project plans for joint size and details not shown.

Blockout joint with temporary blockout prior to placing elastomeric concrete nosing. See Proposed Temporary Blockout detail this sheet.

Prepare joint surfaces. Install bond breaker backer rod, and install poured joint seal in one continuous piece. (gutter to gutter)

For joint armor when shown on the project plans, see dwg. BR141.

Existing armored corners, remove hatched portion of existing armor horizontal steel angle. Fill the void with elastomeric concrete. Fully intact armor leg may remain in place.



ARMORED JOINT WITH OVERLAY

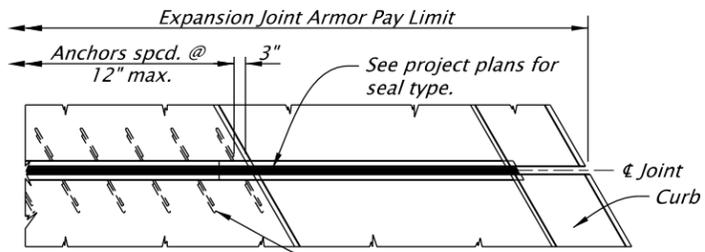
NOTE
Use details for joint rehabilitation. When existing armor leg remains in place. See project plans and specifications for surface preparation before elastomeric concrete placement.

Poured Joint Seals		
Total Movement Range	Joint Width	
	Min.	Max.
1/2"	1"	1 1/2"
3/4"	1"	1 3/4"
1"	1"	2"
1 1/4"	1 1/4"	2 1/2"
1 1/2"	1 1/2"	3"

CALC. BOOK NO. -	BASELINE REPORT DATE 06-Jan.-2020														
<p>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 consulting a Registered Professional Engineer.</p>	NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications														
	OREGON STANDARD DRAWINGS														
	POURED JOINT SEAL														
	2018														
	<table border="1"> <thead> <tr> <th>DATE</th> <th>REVISION</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>1/7/2019</td> <td>Updated drawing details to include reinforcement</td> <td></td> </tr> <tr> <td>1/6/2020</td> <td>Updated details for consistency</td> <td></td> </tr> <tr> <td>-</td> <td>-</td> <td>-</td> </tr> <tr> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	DATE	REVISION	DESCRIPTION	1/7/2019	Updated drawing details to include reinforcement		1/6/2020	Updated details for consistency		-	-	-	-	-
DATE	REVISION	DESCRIPTION													
1/7/2019	Updated drawing details to include reinforcement														
1/6/2020	Updated details for consistency														
-	-	-													
-	-	-													

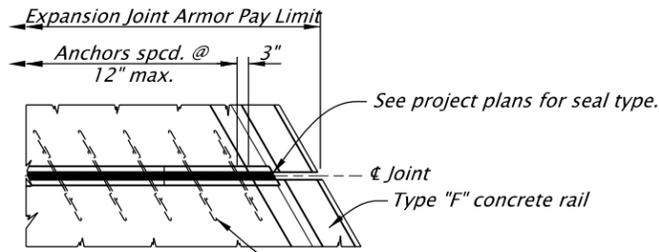
01/06/2020

br141.dgn



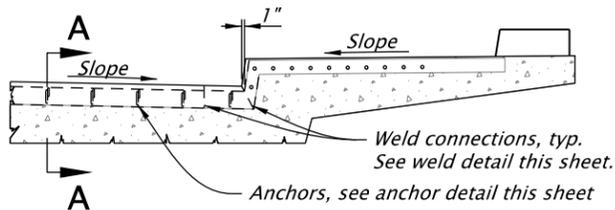
PLAN VIEW

Spaces measured along joint ϕ . Plates welded parallel to roadway ϕ .



PLAN VIEW

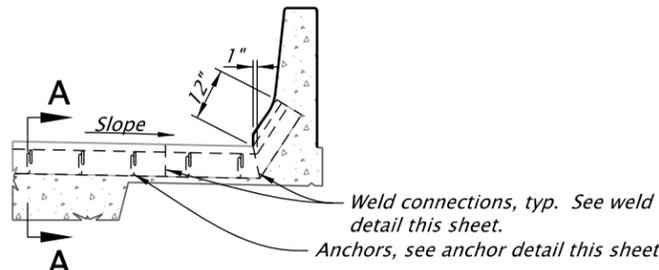
Spaces measured along joint ϕ . Plates welded parallel to roadway ϕ .



SECTION

SIDEWALK DETAILS

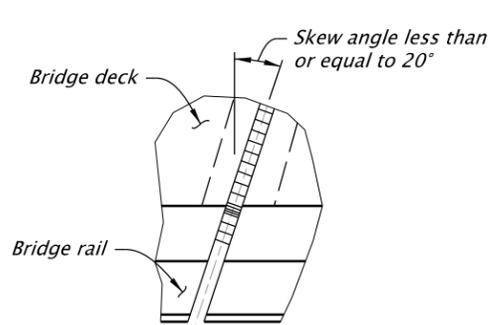
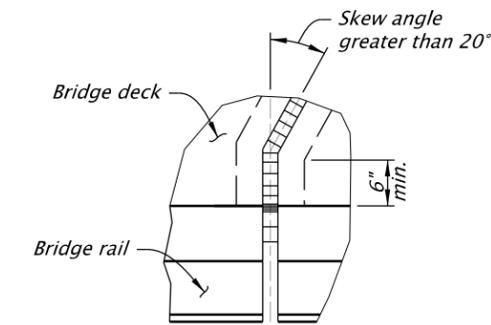
Scale: $\frac{3}{8}" = 1'-0"$



SECTION

TYPE "F" CONCRETE RAIL DETAILS

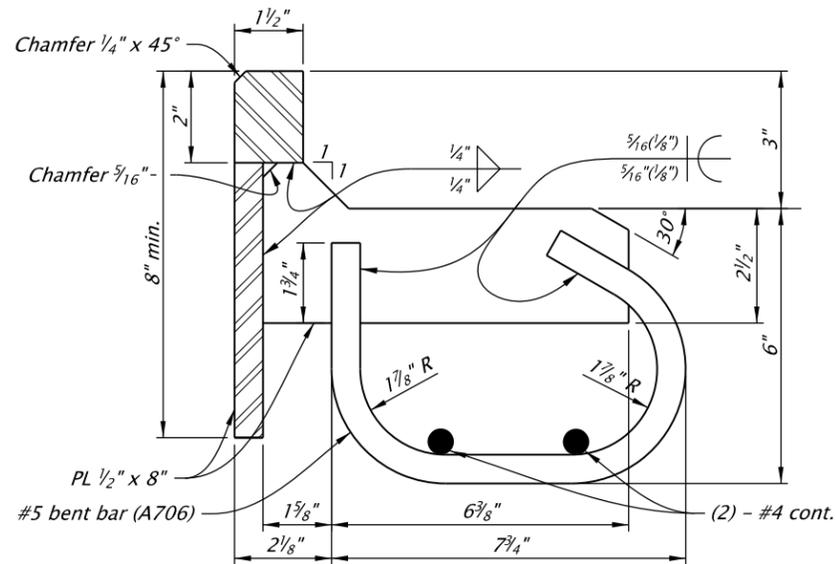
Scale: $\frac{3}{8}" = 1'-0"$



NOTE: For deck skew angle greater than 30°, see Joint Specialst.

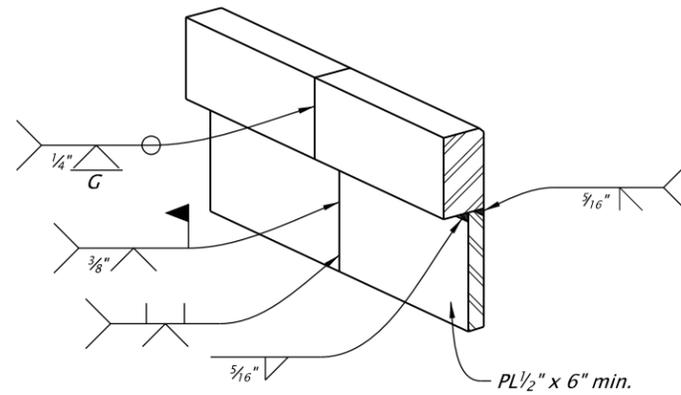
JOINT AT RAIL DETAILS

Scale: $\frac{1}{2}" = 1'-0"$



ANCHOR DETAIL

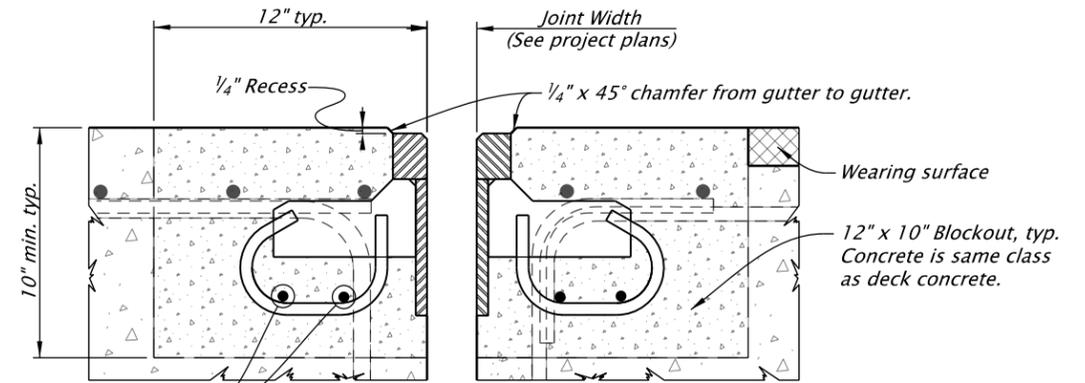
Scale: $\frac{3}{8}" = 1'-0"$



WELD DETAIL

Scale: $\frac{3}{8}" = 1'-0"$

NOTE: Field welding shall be witnessed and inspected with VT (visual test) by the CWI.



(2) #4 cont. typ.

NOTE: Seal not shown, see project plans.

SECTION A-A

Scale: $1\frac{1}{2}" = 1'-0"$

NOTES:

See project plans for seal type, size and blockout reinforcing steel.

Use reinforcing steel conforming to ASTM Specification A706.

Use structural steel shapes and plates conforming to AASHTO Specification M183 (ASTM A36).

All welding shall be in accordance with AWS D1.5

Support the joint assembly so that proper grade is maintained during concrete placement.

The pay limit of the joint armor is the horizontal length of the deck joint unless shown otherwise on the project plans. No measurement or payment will be made for the vertical portion of the joint seal in the curb or rail.

Seal Types

Precompressed Foam Silicone Joint Seal, see project plans and dwg. DET3138

Preformed Compression Joint Seal, dwg. BR139

Poured Joint Seal, dwg. BR140

The joint assembly may be shipped full length or field welded before or after setting to grade in the blockout.

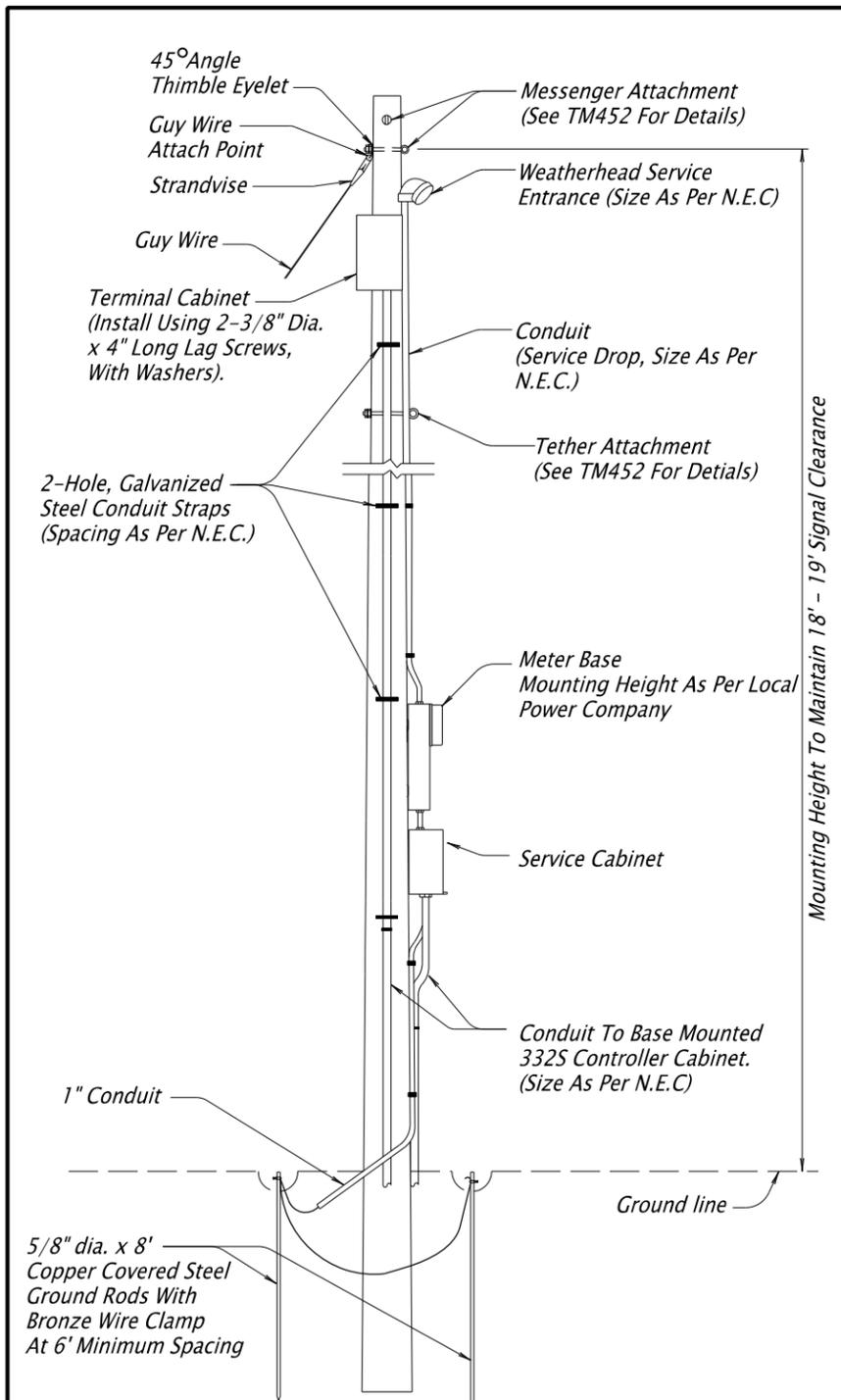
See special provisions for additional requirements.

Accompanied by dwgs. BR139 or BR140

CALC. BOOK NO. -	BASELINE REPORT DATE 06-Jan.-2020
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS EXPANSION JOINT DETAILS	
2018	
DATE	REVISION DESCRIPTION
1/6/2020	Updated and included details for consistency
-	-
-	-
-	-
-	-

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 consulting a Registered Professional Engineer.

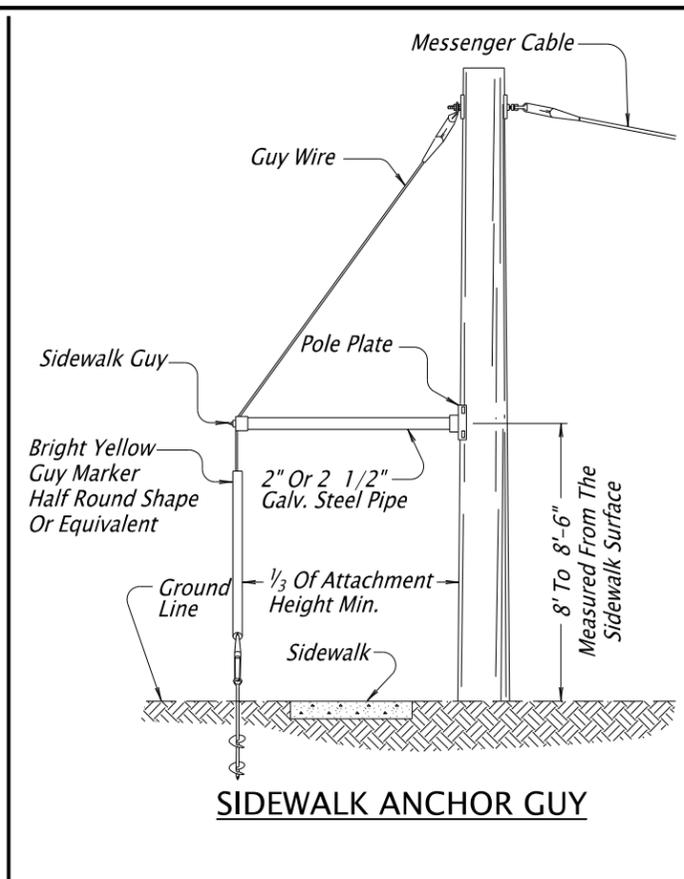
BR141



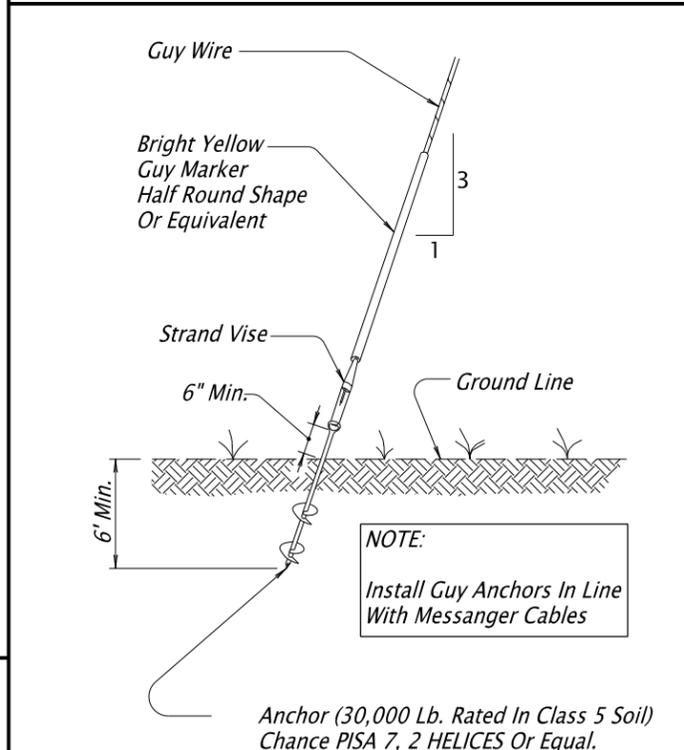
TYPICAL SERVICE ON WOOD POLE

GENERAL NOTES:

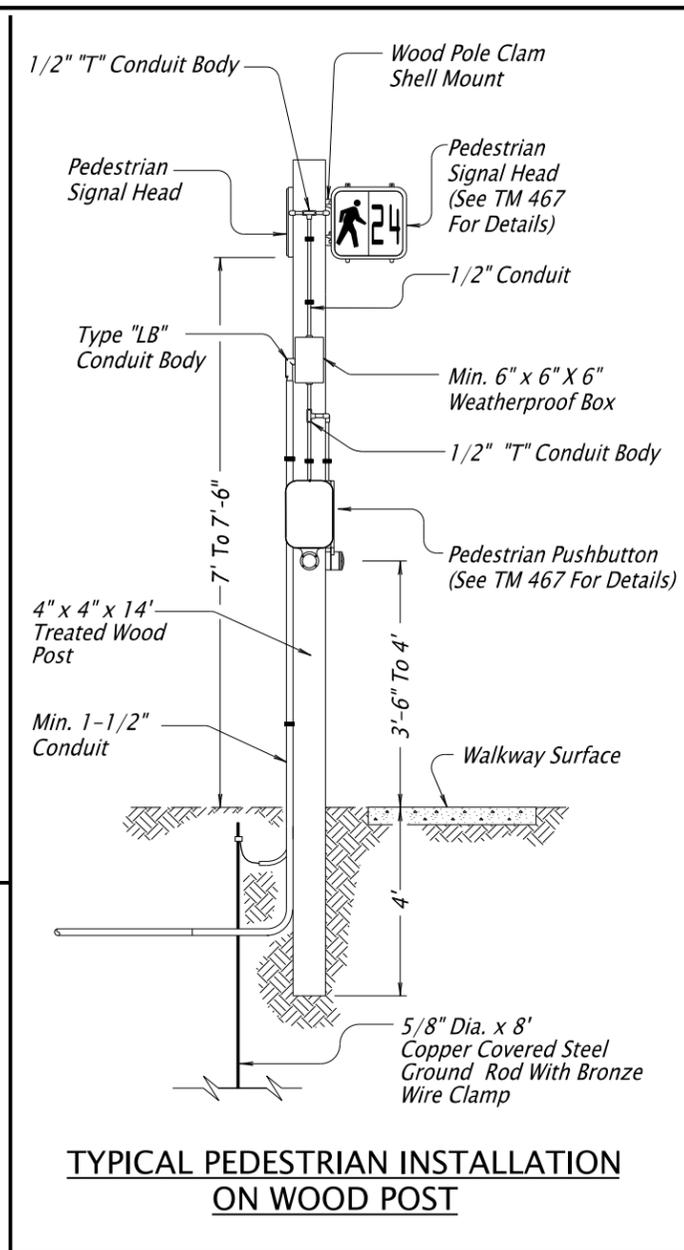
1. All Screws, Bolts, Nuts And Washers Shall Be Type 304 or 316 Stainless Steel Unless Noted Otherwise.
2. Bolts And Screws Shall Have Hex Or Square Heads. Allen Head Fasteners Not Allowed.
3. Conduit Mounted On Wood Poles/Posts May Be Liquid Tight Flex Conduit.



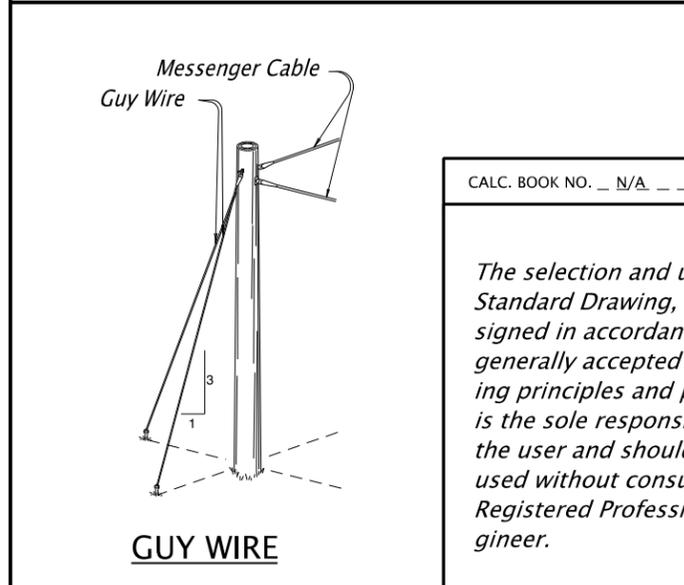
SIDEWALK ANCHOR GUY



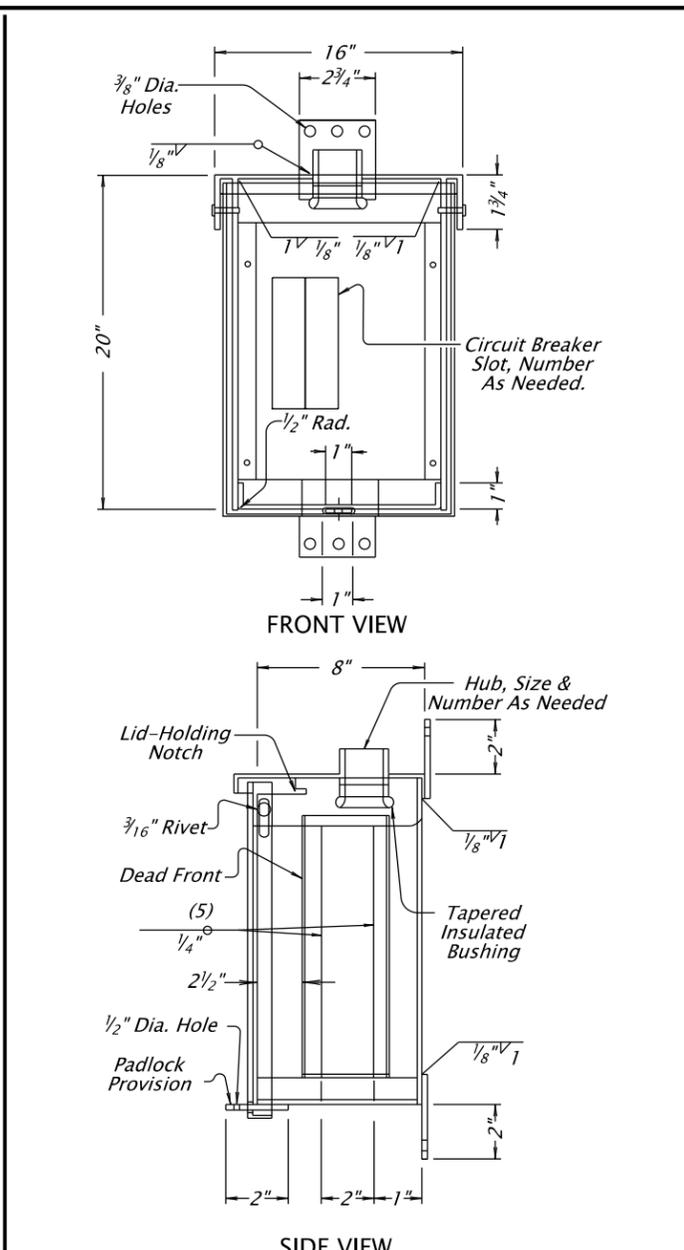
GUY ANCHOR ASSEMBLY



TYPICAL PEDESTRIAN INSTALLATION ON WOOD POST



GUY WIRE



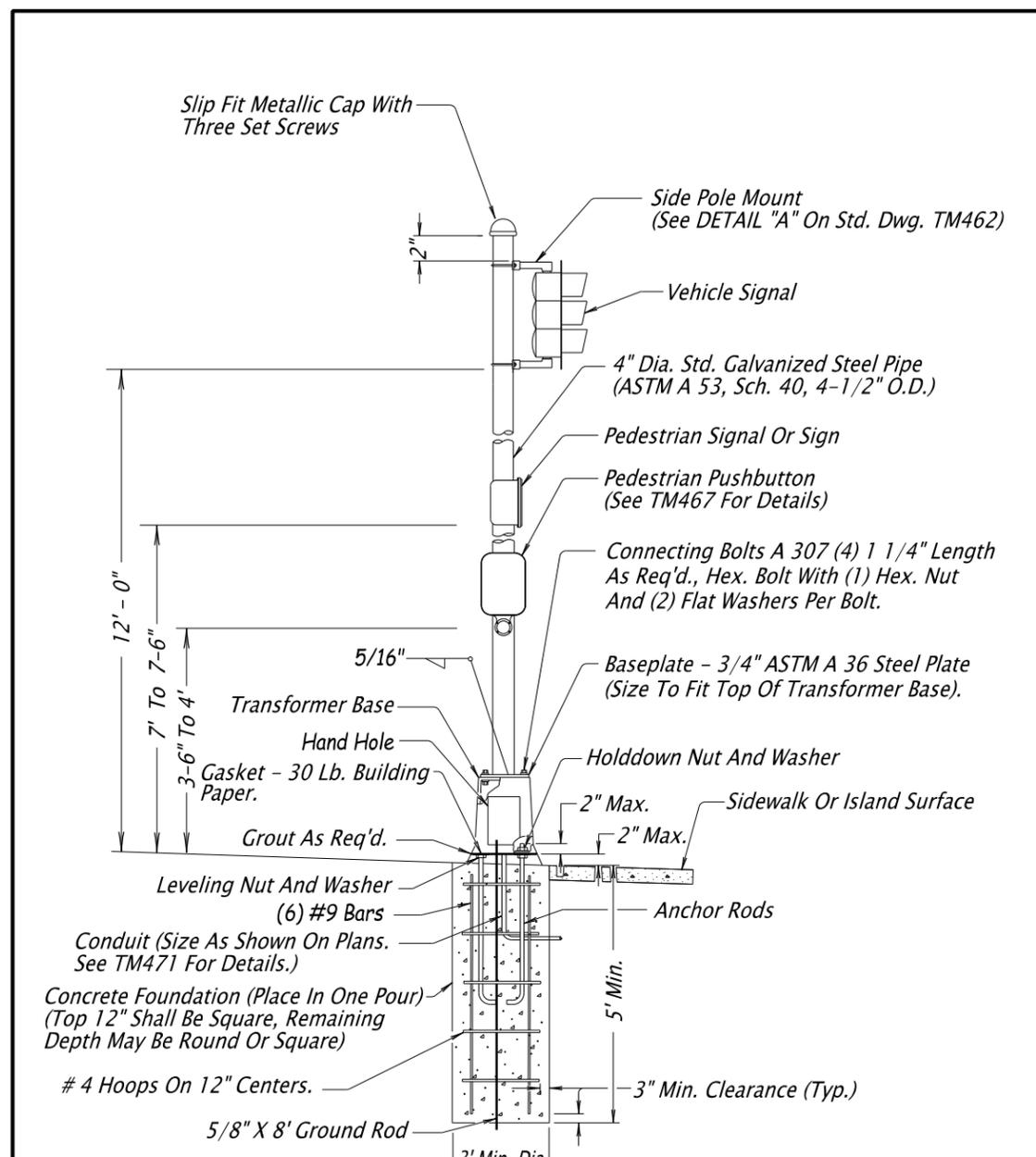
NOTE: See TM485 for Wiring Diagrams

TEMPORARY SERVICE CABINET

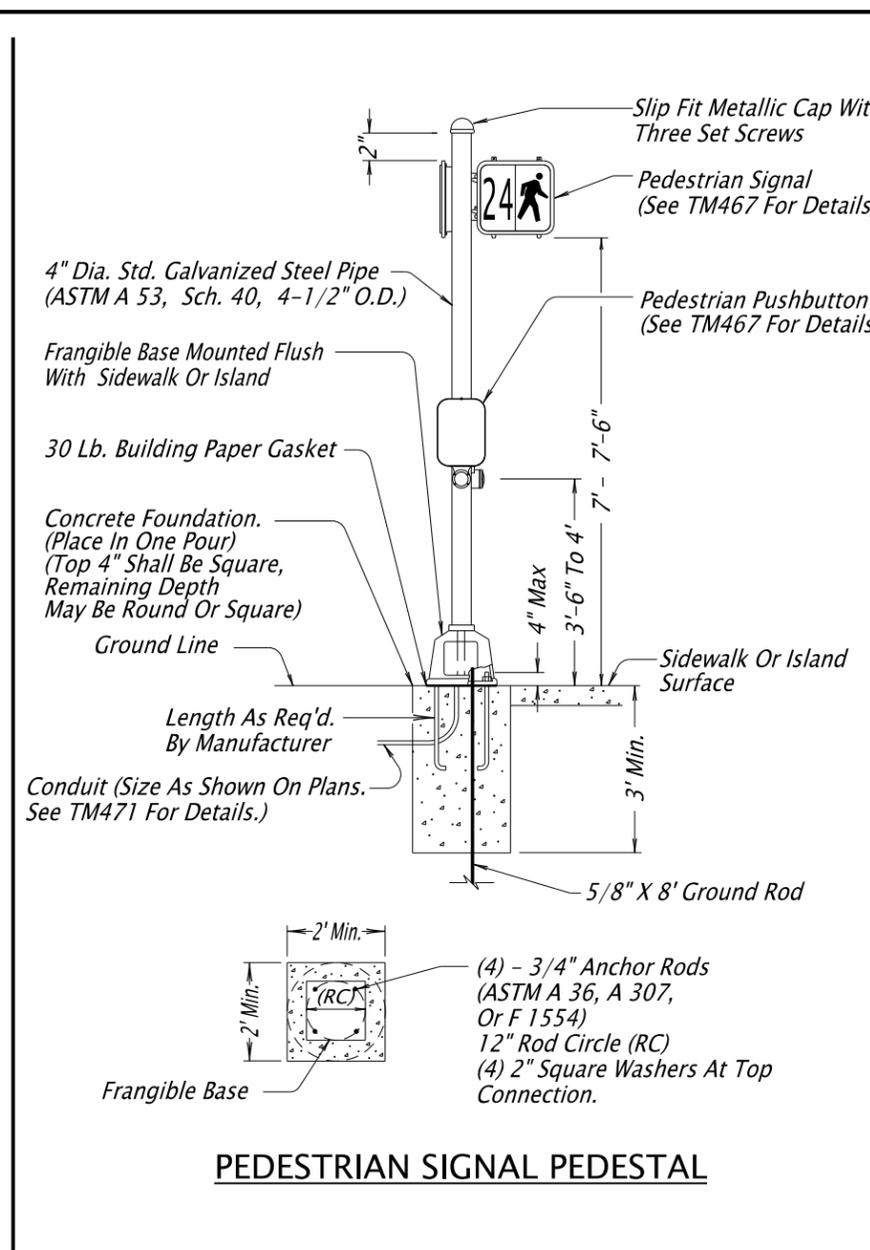
CALC. BOOK NO. N/A	BASELINE REPORT DATE 2-Jan-2020
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS TEMPORARY SIGNAL POLE DETAILS 2018	
DATE	REVISION DESCRIPTION
07/18	Added Clarification To Several Notes/Dimensions
01/20	Added General Note 3

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 consulting a Registered Professional Engineer.

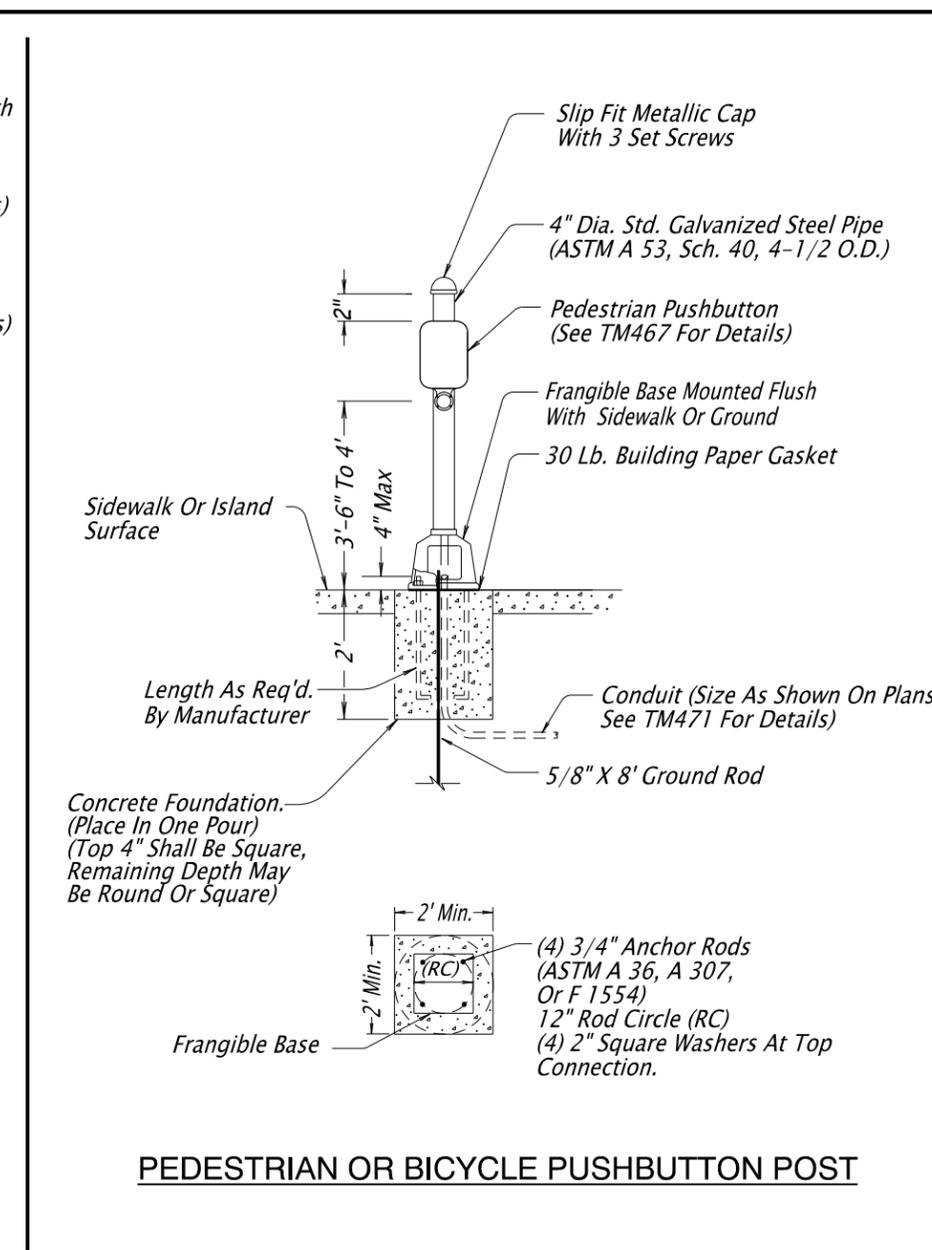
TM457



VEHICLE SIGNAL PEDESTAL



PEDESTRIAN SIGNAL PEDESTAL

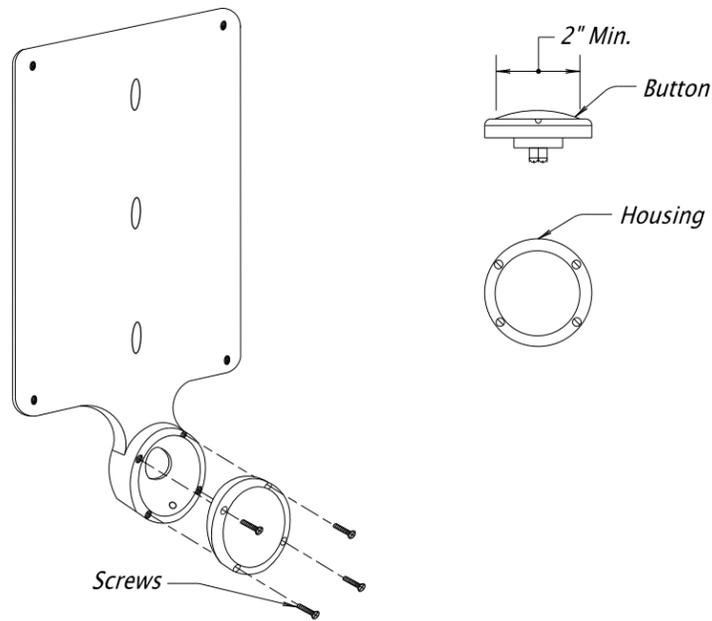


PEDESTRIAN OR BICYCLE PUSHBUTTON POST

- General Notes:**
1. All Bolts, Nuts And Washers Shall Conform To 02560.20 And Be Galvanized Steel According To 02560.40 Unless Noted Otherwise.
 2. All Anchor Rods Shall Be Galvanized Steel Conforming To 02560.30.
 3. All Pole Entrances Containing Wiring Shall Be Smooth.
 4. Install 1/4" Thick Prefomed Expansion Joint Filler Around Footing In Sidewalk Area As Per Tm653.
 5. Top Of Foundations Shall Have 0" - 1/4" Exposure Above Finish Grade.
 6. Flat Side Of Foundation Should Line Up With Back Of Sidewalk.

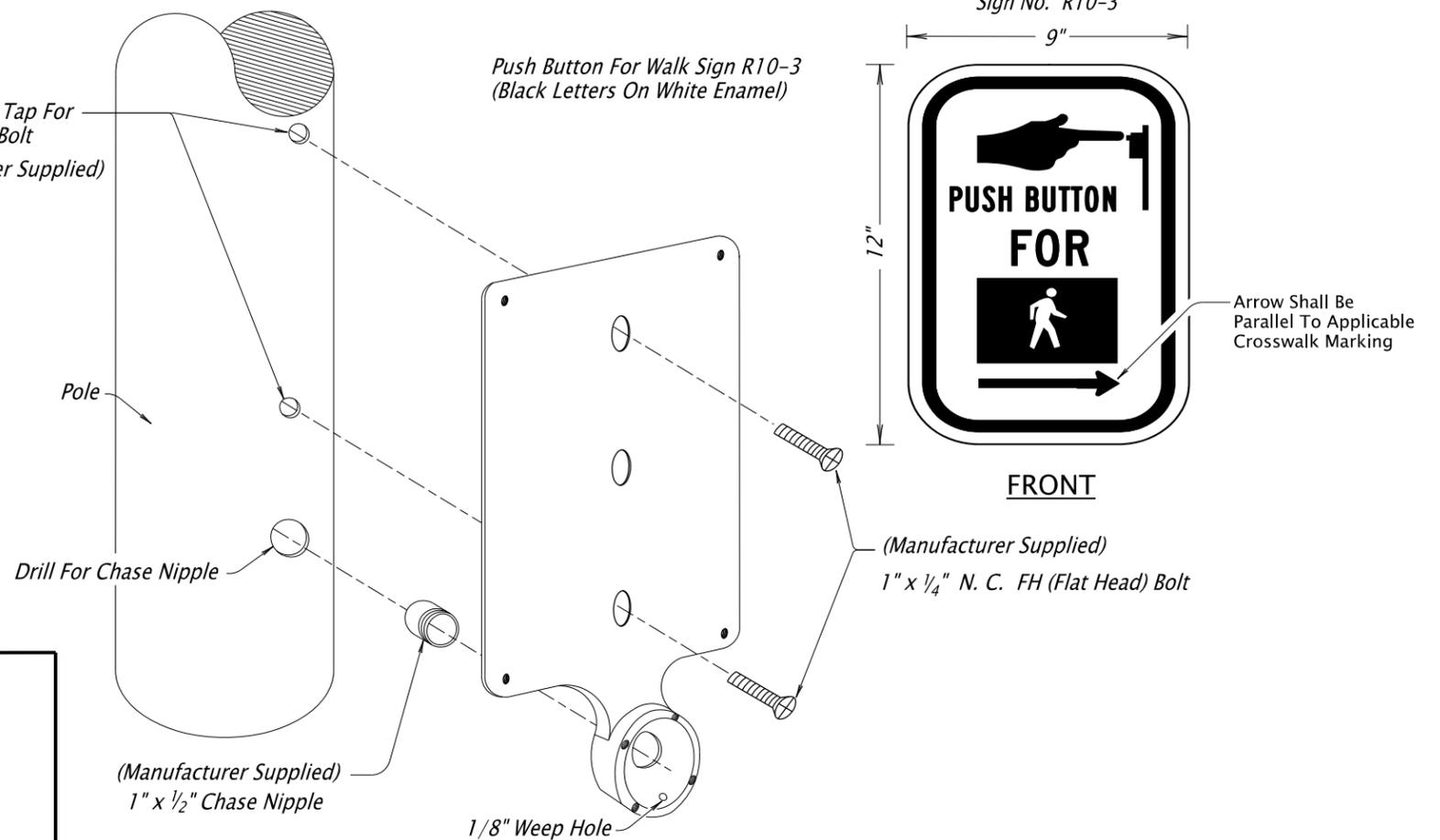
CALC. BOOK NO. _ N/A _	BASLINE REPORT DATE _ 2-Jan-2020 _
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS	
VEHICLE, PEDESTRIAN SIGNAL AND PUSHBUTTON MOUNTING OPTION DETAILS	
2018	
DATE	REVISION DESCRIPTION
07/18	Added References To Several Notes
01/20	Corrected Misspelling

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 consulting a Registered Professional Engineer.



STANDARD PUSHBUTTON

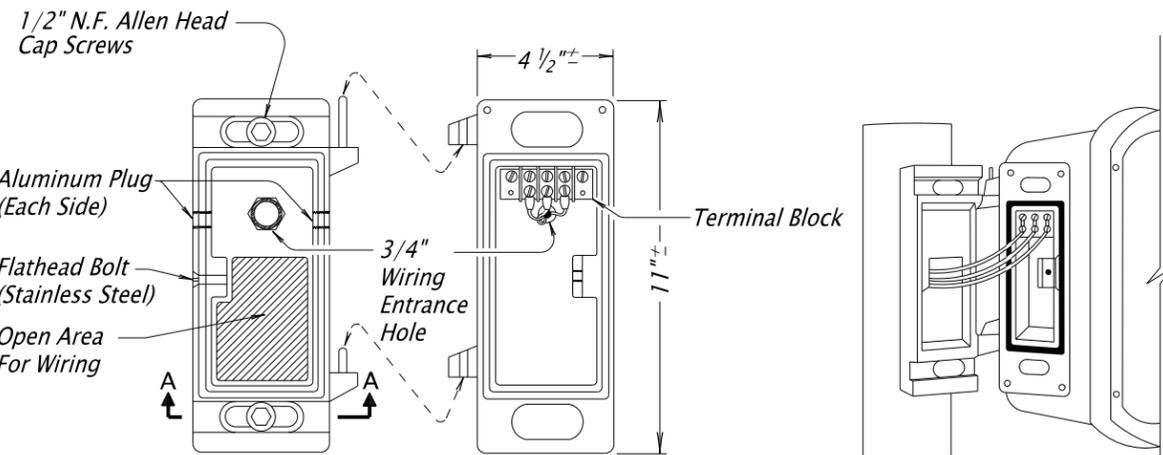
Drill And Tap For
1/4" N.C. Bolt
(Manufacturer Supplied)



STANDARD PUSHBUTTON STATION AND INSTRUCTION SIGN

General Notes:

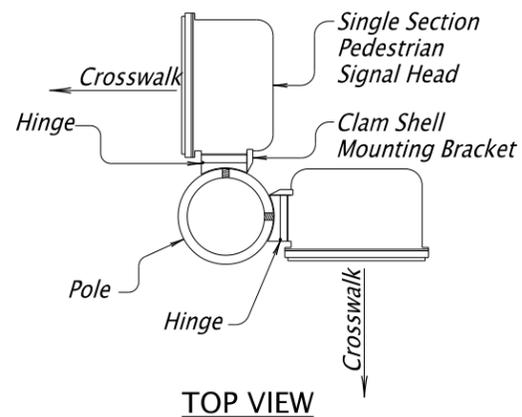
1. All Screws, Bolts, Nuts And Washers Shall Be Type 304 Or 316 Stainless Steel Unless Noted Otherwise.
2. Bolts And Screws Shall Have Square Or Hex Heads. Allen Head Fasteners Not Allowed.
3. Drill And Tap Pole As Per Orientation Shown On Plans.
4. Horizontal Reach To The Pushbutton Shall Be 10 Inches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



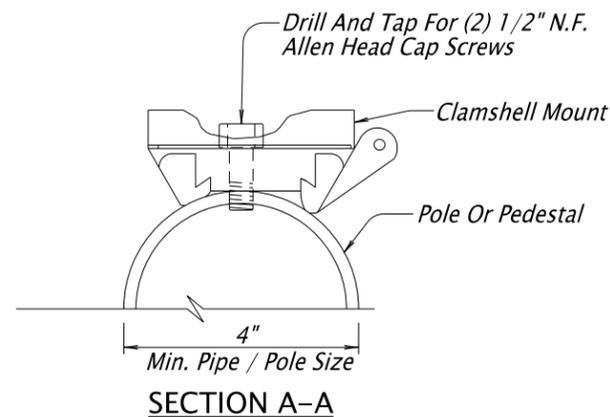
PEDESTRIAN SIGNAL MOUNT (CLAM SHELL)

NOTES:

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



TOP VIEW



CLAM SHELL ORIENTATION

CALC. BOOK NO. N/A

BASELINE REPORT DATE 2-Jan-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

**OREGON STANDARD DRAWINGS
PEDESTRIAN SIGNAL MOUNT
AND
PEDESTRIAN PUSHBUTTON
DETAILS**

2018

DATE	REVISION DESCRIPTION
07/18	Modified General Notes, Removed Redundant Notes And Modified Drawing Title
01/20	Modified General Note 3. Added General Note 4

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

**COLOR CODE CHART
SINGLE CONDUCTOR**

PHASE	FUNCTION	BASE COLOR	FIRST TRACER	SECOND TRACER
2	RED	RED	—	—
2	YELLOW	YELLOW	—	—
2	GREEN	GREEN	—	—
2S	SPARE RED	RED	GREY	—
2S	SPARE YELLOW	YELLOW	GREY	—
2S	SPARE GREEN	GREEN	GREY	—
2	WALK	BLACK	WHITE	—
2	DONT WALK	BLUE	BLACK	—
6	RED	PINK	—	—
6	YELLOW	ORANGE	—	—
6	GREEN	GREY	—	—
6S	SPARE RED	PINK	YELLOW	—
6S	SPARE YELLOW	ORANGE	YELLOW	—
6S	SPARE GREEN	GREY	YELLOW	—
6	WALK	BLACK	—	—
6	DONT WALK	BLUE	—	—
4	RED	RED	WHITE	—
4	YELLOW	YELLOW	WHITE	—
4	GREEN	GREEN	WHITE	—
4S	SPARE RED	RED	BROWN	—
4S	SPARE YELLOW	YELLOW	BROWN	—
4S	SPARE GREEN	GREEN	BROWN	—
4	WALK	TAN	—	—
4	DONT WALK	PURPLE	—	—
8	RED	RED	WHITE	BLUE
8	YELLOW	YELLOW	WHITE	BLUE
8	GREEN	GREEN	WHITE	BLUE
8S	SPARE RED	RED	PURPLE	—
8S	SPARE YELLOW	YELLOW	PURPLE	—
8S	SPARE GREEN	GREEN	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	—
1	RED	PINK	WHITE	—
1	YELLOW	ORANGE	WHITE	—
1	GREEN	GREY	WHITE	—
1	FLASH YELLOW	ORANGE	GREY	BLUE
1S	SPARE RED	PINK	PURPLE	—
1S	SPARE YELLOW	ORANGE	PURPLE	—
1S	SPARE GREEN	GREY	PURPLE	—
5	RED	RED	BLACK	—
5	YELLOW	YELLOW	BLACK	—
5	GREEN	GREY	BLACK	—
5	FLASH YELLOW	YELLOW	GREY	BLUE
5S	SPARE RED	RED	BLUE	—
5S	SPARE YELLOW	YELLOW	BLUE	—
5S	SPARE GREEN	GREY	BLUE	—
3	RED	PINK	WHITE	BLUE
3	YELLOW	ORANGE	WHITE	BLUE
3	GREEN	GREY	WHITE	BLUE
3	FLASH YELLOW	ORANGE	BROWN	BLUE
3S	SPARE RED	PINK	BROWN	—
3S	SPARE YELLOW	ORANGE	BROWN	—
3S	SPARE GREEN	GREY	BROWN	—
7	RED	RED	BLACK	BLUE
7	YELLOW	YELLOW	BLACK	BLUE
7	GREEN	GREEN	BLACK	BLUE
7	FLASH YELLOW	YELLOW	BROWN	BLUE
7S	SPARE RED	RED	PINK	—
7S	SPARE YELLOW	YELLOW	PINK	—
7S	SPARE GREEN	GREEN	PINK	—
ALL	PUSHBUTTON COMMON	BROWN	WHITE	—
ALL	SIGNAL HEAD NEUTRAL	WHITE	—	—

All Wire Tracer Colors Are To Have Recognizable Paint Strips, Marked Full Length.

**COLOR CODE CHART
CONTROL CABLE**

7 CONDUCTOR CONTROL CABLE			PEDESTRIAN PHASES	VEHICLE PHASES	SIGNAL HEAD TYPES			
CONDUCTOR NUMBER	BASE COLOR	FIRST TRACER	1 Pedestrian Phase	1 Vehicle Phase	6L, 3LBF	5 or 7	1R, 1Y, 2, 3L, 3LCF, 3R, 4 or 9	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

Type 8 Signal Head Indications For Ramp Meters Shall Be Wired From The Type 2 Signal Head Terminal Block For The Same Phase.

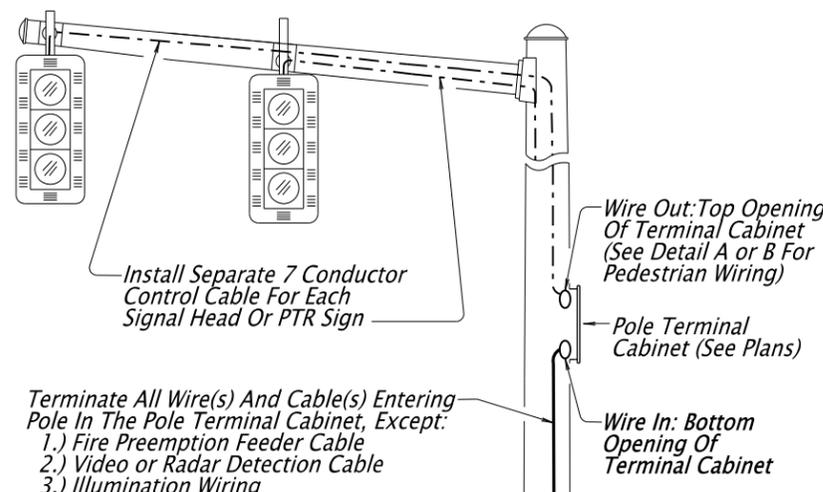
Mark Phase Number/Identification On All Cable In Junction Boxes, Terminal Cabinets, Service Cabinets, And Controller Cabinets With Permanent Tags. Use Handheld Labeler (Brady IDXPRT With XC-1500-580-WT-BK Tags Or Approved Equal).

At Existing Installations The Contractor Is Responsible For The Re-wiring And Re-numbering Of New And Existing Control Cables, In All Junction Boxes, Terminal Cabinets, Service Cabinets, And Controller Cabinets.

ODD PHASE PED WIRE COLOR CODE

STANDARD COLOR CODE FOR THE WIRING OF PEDESTRIAN PHASES 1, 3, 5, AND 7. USE THE FOLLOWING:

PHASE 1 PED	PHASE 2 PED	} COLOR CODE WITH THE ADDITION OF A YELLOW TRACER
PHASE 3 PED	PHASE 4 PED	
PHASE 5 PED	PHASE 6 PED	
PHASE 7 PED	PHASE 8 PED	

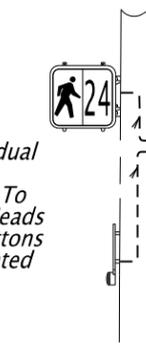


Terminate All Wire(s) And Cable(s) Entering Pole In The Pole Terminal Cabinet, Except:
1.) Fire Preemption Feeder Cable
2.) Video or Radar Detection Cable
3.) Illumination Wiring

INSTALLING AND TERMINATING WIRING IN POLE

Install Cable(s) Or Wire(s) As Shown In Plans To Each Remote Pedestrian Pedestal/Post

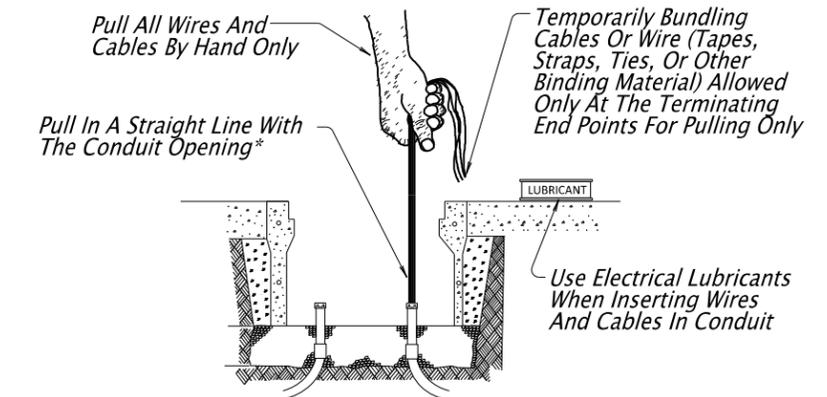
Detail A



Detail B

General Notes:

1. Install All Wire And Cable Between Terminal Blocks Without Splicing
2. All Tracer Colors To Be Spiraled At All Exposed Locations (Junction Boxes, Terminal Cabinets, Service Cabinets, And Controller Cabinets).
3. Wiring For Overlaps Shall Be Labeled (OLA, OLB, OLC, OLD) On All Ends. Unused Colors From Single Conductor Chart, With Additional Tracers, May Be Used For Overlaps.
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 6 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.

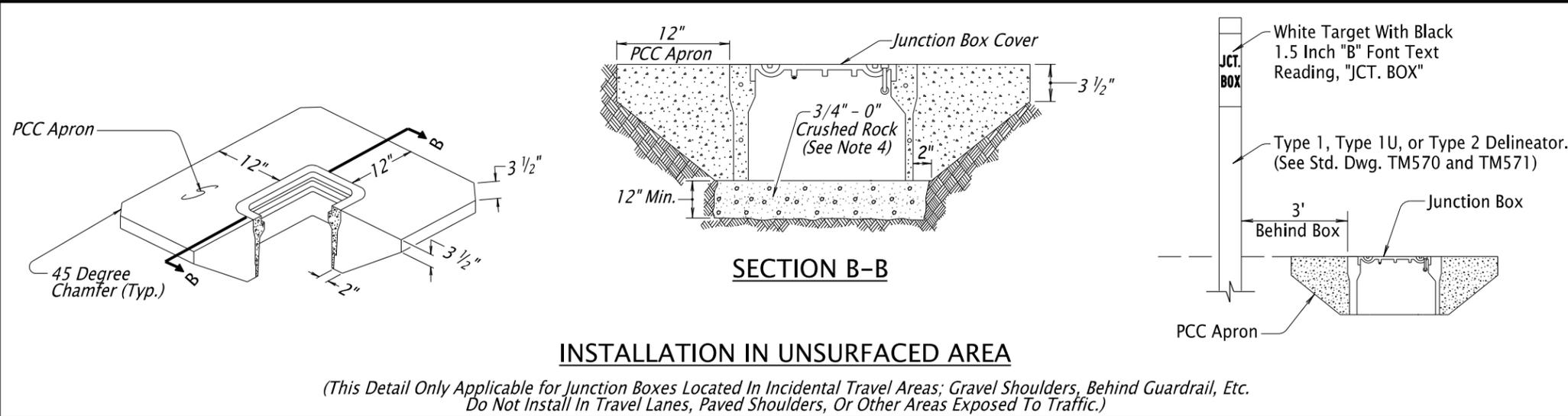


* Use A Pulley Device To Achieve A Straight Line If Pulls Are Made With Poles Or Controller Cabinets In Place

INSTALLING WIRE AND CABLE IN CONDUITS

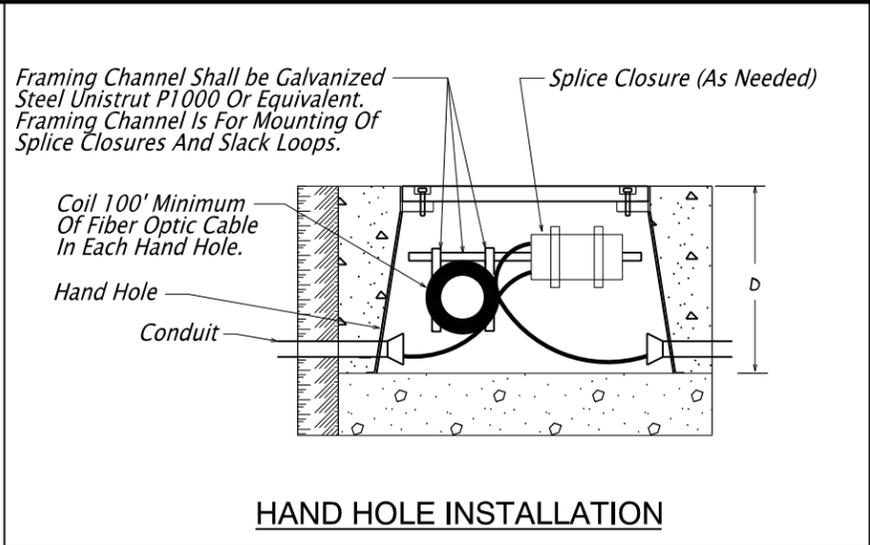
CALC. BOOK NO. _ N/A _	BASELINE REPORT DATE _ 2-Jan-2020 _
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS	
WIRE & CABLE INSTALLATION AND COLOR CODE CHARTS	
2018	
DATE	REVISION DESCRIPTION
07/18	Added New Details & General Notes And Modified Drawing Title
07/19	Clarified exposed locations for marking cables
01/20	Revised Detail In Lower Right Corner For Clarity

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 consulting a Registered Professional Engineer.

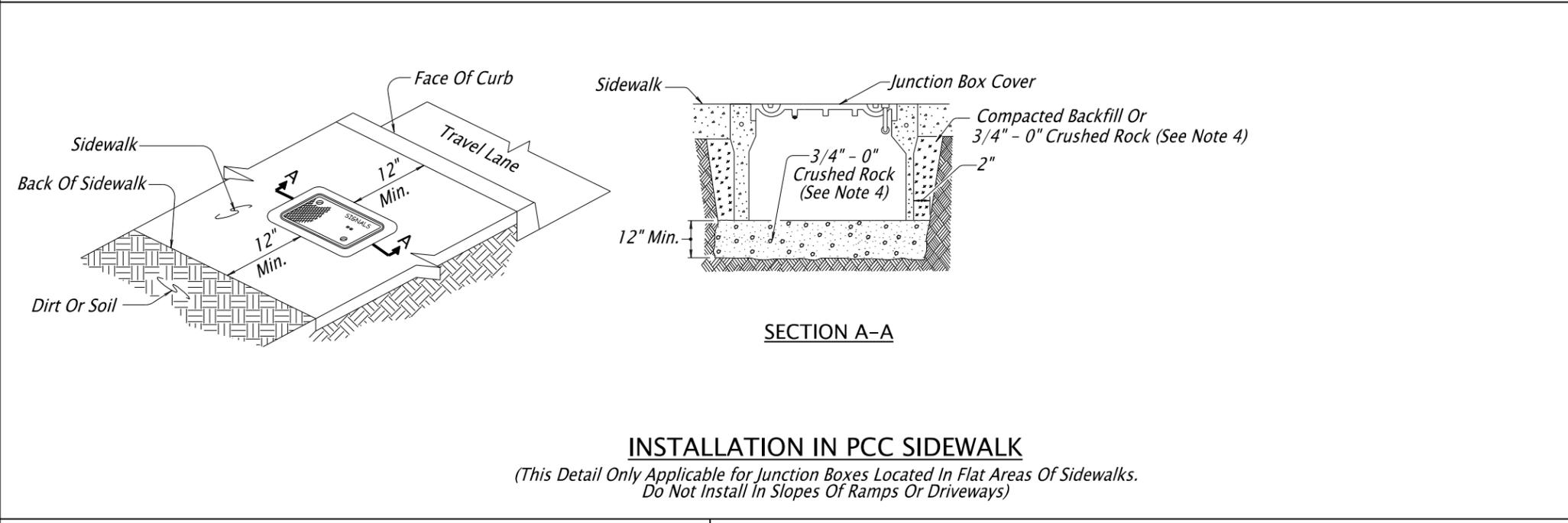


INSTALLATION IN UNSURFACED AREA

(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.)

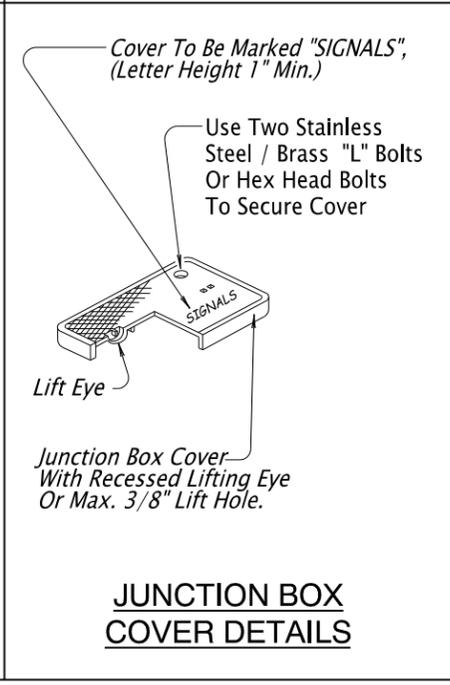


HAND HOLE INSTALLATION



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)

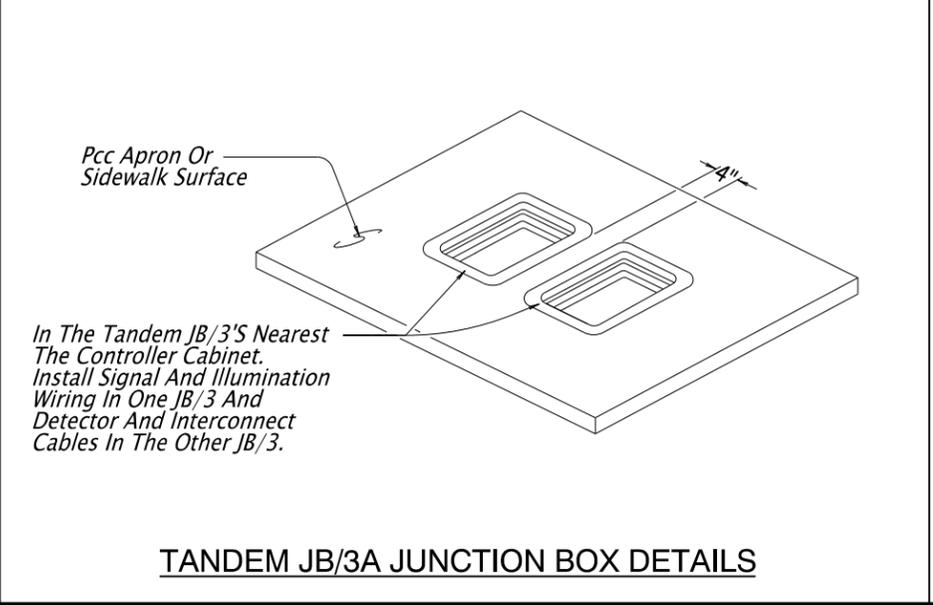


JUNCTION BOX COVER DETAILS

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



TANDEM JB/3A JUNCTION BOX DETAILS

- GENERAL NOTES:**
1. Install Top of Junction Box Flush With The Sidewalk, Surrounding Grade, Or Top Of Curb
 2. Install Junction Boxes At The Approximate Locations Shown, Or If Not Shown, No More Than 300 Feet Apart
 3. More Junction Boxes 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.

CALC. BOOK NO. _ N/A _

BASELINE REPORT DATE _ 2-Jan-2020 _

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

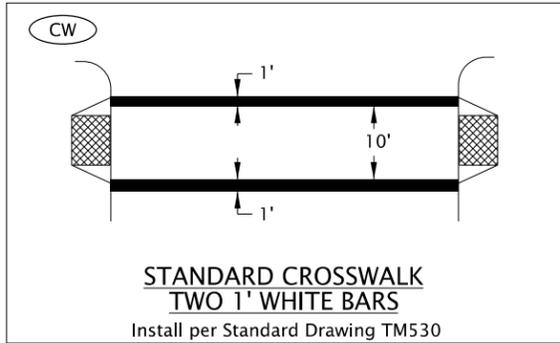
TRAFFIC SIGNAL JUNCTION BOXES/ HAND HOLES

2018

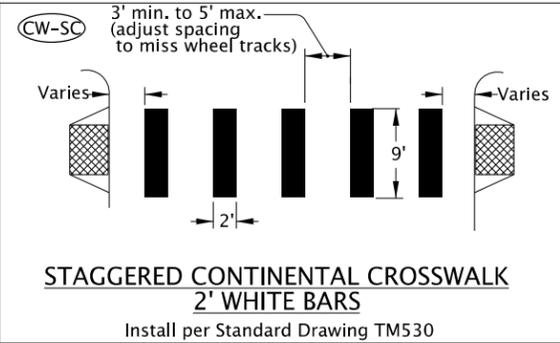
DATE	REVISION DESCRIPTION
07/18	Added A New Detail & Notes, Revised & Simplified Details
01/20	Added General Note 4

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

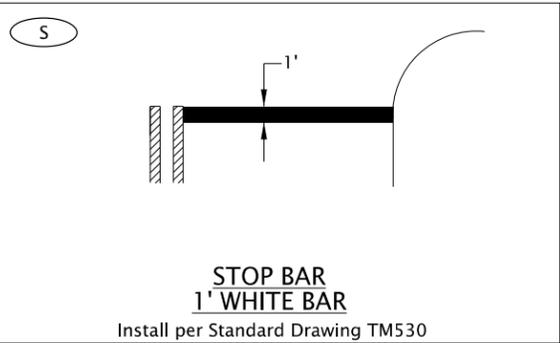
TM472



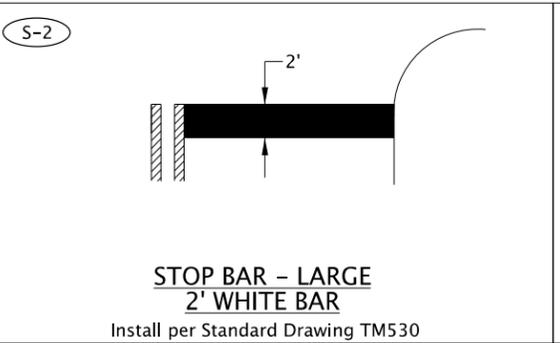
STANDARD CROSSWALK
TWO 1' WHITE BARS
Install per Standard Drawing TM530



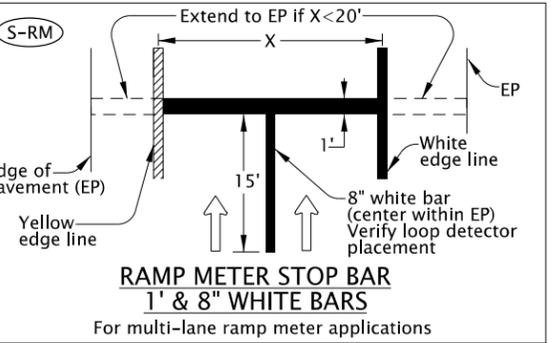
STAGGERED CONTINENTAL CROSSWALK
2' WHITE BARS
Install per Standard Drawing TM530



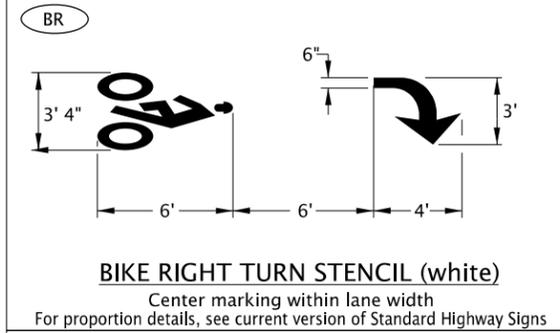
STOP BAR
1' WHITE BAR
Install per Standard Drawing TM530



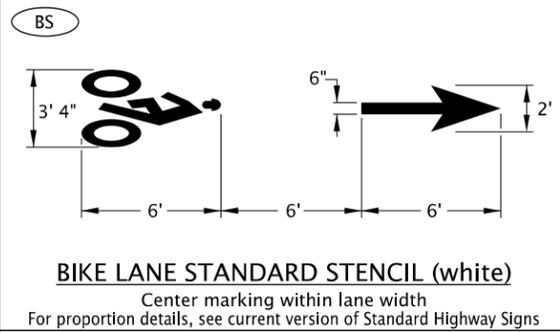
STOP BAR - LARGE
2' WHITE BAR
Install per Standard Drawing TM530



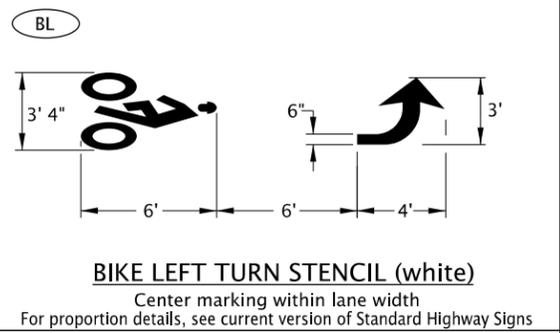
RAMP METER STOP BAR
1' & 8" WHITE BARS
For multi-lane ramp meter applications



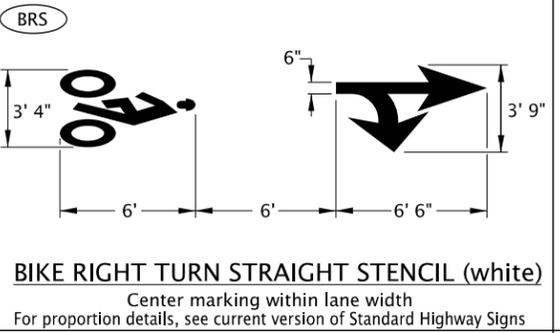
BIKE RIGHT TURN STENCIL (white)
Center marking within lane width
For proportion details, see current version of Standard Highway Signs



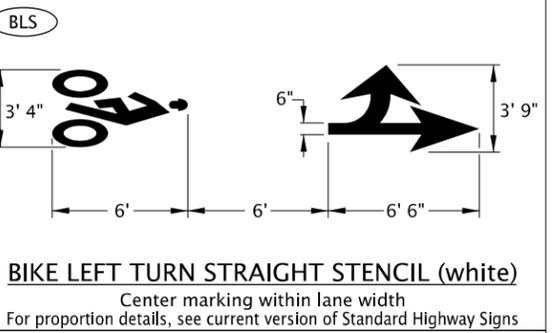
BIKE LANE STANDARD STENCIL (white)
Center marking within lane width
For proportion details, see current version of Standard Highway Signs



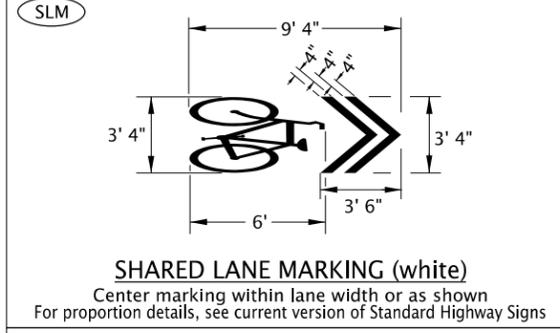
BIKE LEFT TURN STENCIL (white)
Center marking within lane width
For proportion details, see current version of Standard Highway Signs



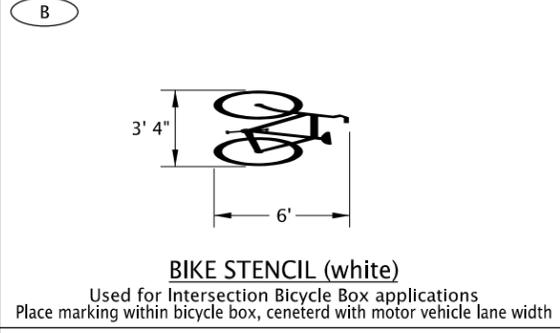
BIKE RIGHT TURN STRAIGHT STENCIL (white)
Center marking within lane width
For proportion details, see current version of Standard Highway Signs



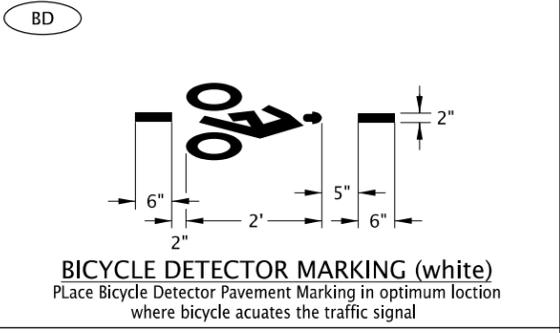
BIKE LEFT TURN STRAIGHT STENCIL (white)
Center marking within lane width
For proportion details, see current version of Standard Highway Signs



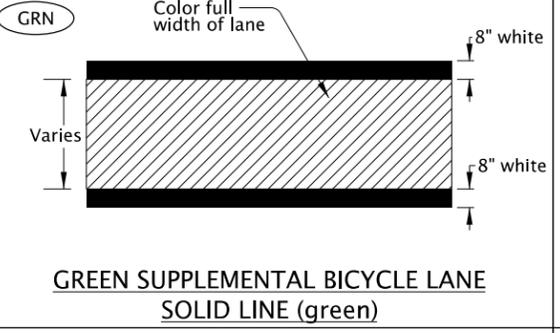
SHARED LANE MARKING (white)
Center marking within lane width or as shown
For proportion details, see current version of Standard Highway Signs



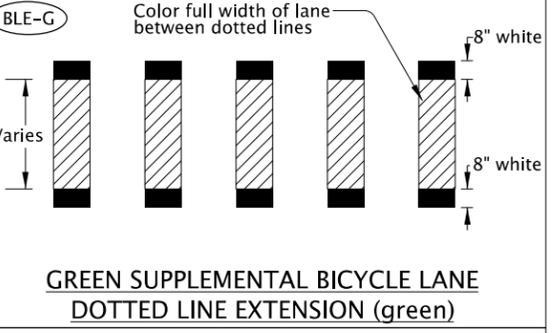
BIKE STENCIL (white)
Used for Intersection Bicycle Box applications
Place marking within bicycle box, centered with motor vehicle lane width



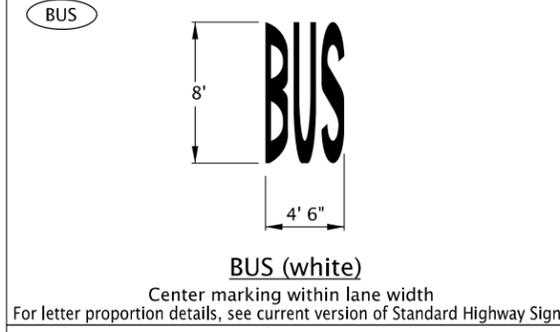
BICYCLE DETECTOR MARKING (white)
Place Bicycle Detector Pavement Marking in optimum location where bicycle acuates the traffic signal



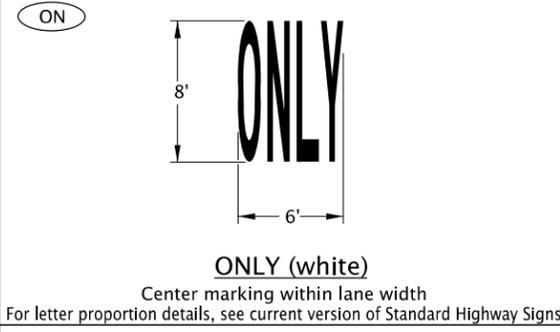
GREEN SUPPLEMENTAL BICYCLE LANE
SOLID LINE (green)



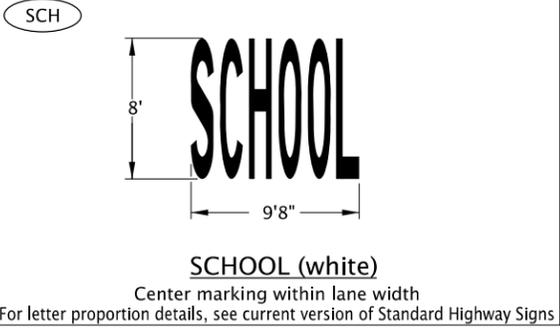
GREEN SUPPLEMENTAL BICYCLE LANE
DOTTED LINE EXTENSION (green)



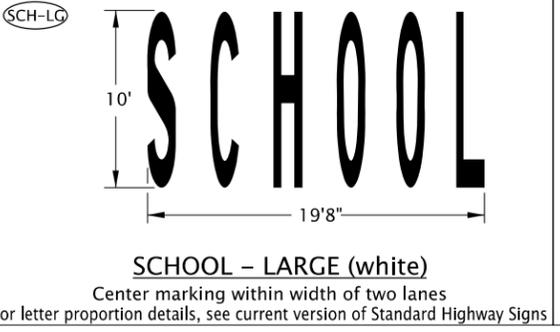
BUS (white)
Center marking within lane width
For letter proportion details, see current version of Standard Highway Signs



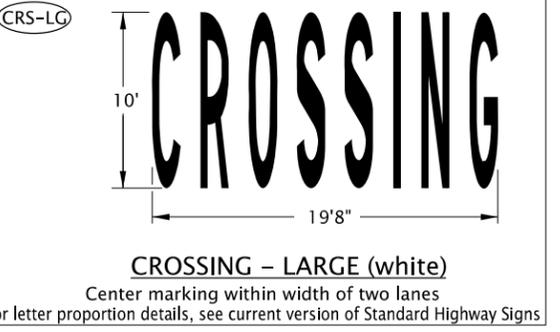
ONLY (white)
Center marking within lane width
For letter proportion details, see current version of Standard Highway Signs



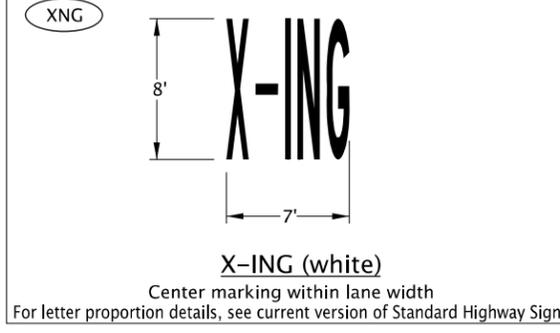
SCHOOL (white)
Center marking within lane width
For letter proportion details, see current version of Standard Highway Signs



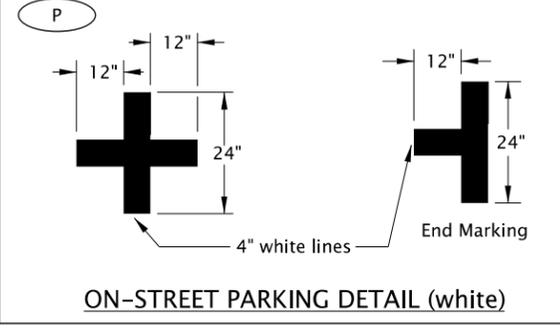
SCHOOL - LARGE (white)
Center marking within width of two lanes
For letter proportion details, see current version of Standard Highway Signs



CROSSING - LARGE (white)
Center marking within width of two lanes
For letter proportion details, see current version of Standard Highway Signs



X-ING (white)
Center marking within lane width
For letter proportion details, see current version of Standard Highway Signs



ON-STREET PARKING DETAIL (white)

General Note:
1. Arrow, letter, and bike symbol dimensions nominal.

LEGEND
← Direction of Travel

CALC. BOOK NO. ___ N/A ___

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 consulting a Registered Professional Engineer.

BASELINE REPORT DATE ___ 01/03/2020 ___	
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications.	
OREGON STANDARD DRAWINGS	
PAVEMENT MARKING	
STANDARD DETAIL BLOCKS	
2018	
DATE	REVISION DESCRIPTION
07/18	Added B, BD, GRN, BLE-G details
01/20	Added BRS and BLS. Rearranged layout and updated BS Modified GRN and BLE-G dimension notation Changed notes for B and BD

TM503

GENERAL NOTES:

Standard Monotube Cantilever Sign Support Structures are designed in accordance with AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals 1st edition, 2015 and interim revisions thru 2017.

Basic wind speed (3 second gust) used for Extreme I Limit State is 145 mph. $G = 1.14$, 1700 year recurrence interval, fatigue importance factor $I_f = 1.0$ and Exposure C were used for design.

The maximum design sign area for the Standard Monotube Cantilever Sign Support Structure is shown on Dwg. TM621. The design sign panel and mounting members weigh 5 pounds per square foot. The design luminaire including mounting channels weighs 20 pounds per linear foot. The design luminaire wind loading area including mounting channels is 1 square foot per linear foot, has rectangular flat side shapes, is as long as the design sign, and the resulting projected area is not part of the maximum sign area. The sign lengths for structure design 1 is 25 feet, for structure designs 2 and 3 are 22 feet, for structural designs 4 through 6 are 17 feet, and for structural designs 7 through 8 are 9 feet.

The allowable variation from field verified working drawing camber is -0% to +25%, post length is -0" to +3", and overall length "LA" is -1/8" to +1/8". These lengths shall be measured prior to galvanizing using a steel tape or other approved measuring method.

The VMS design loads include 100 pounds per linear foot applied from center of vertical post to end of arm for the weight of a walkway along with a 500 pound concentrated live load. The design walkway wind loading area is 1.0 square feet per linear foot, extends from center of vertical post to end of arm, and the resulting projected area is not part of the maximum sign area. VMS dimensions and design loads are shown on TM621.

Snow and ice loads are not included in the design loads. The Engineer shall evaluate the design in regions of heavy snow or ice accumulations.

The signs are to be positioned horizontally as shown on Project Data for Std. Monotube Cantilever Sign Support Sheet and vertically as shown on Dwg. TM621.

Material for circular tube sections shall be ASTM A53 Grade B; ASTM A500 Grade B or C; ASTM A501 Grade A or B; or API 5L PSL2 Grade B, X42 or X52. All other structural steel shall conform to ASTM A572 Grade 50, or A992, unless noted otherwise.

Bend tube using induction heating methods in accordance with TPA-IBS-98, "Recommended Standards for Induction Bending of Pipe and Tube."

Notch toughness of all structural steel members and plates greater than 1/2" thick shall conform to Zone 2 fracture critical requirements of ASTM A709.

High strength bolts shall conform to ASTM A325, Type 1. Nuts for high strength bolts shall be heavy hex and conform to ASTM A563 Grade DH, with supplementary requirements "S1" and "S2". Hardened steel washers shall conform to ASTM F436, Type 1. Use washers under turning element in tightening unless otherwise specified.

Bolts connecting galvanized steel members to aluminum members shall meet the requirements of ASTM A193 Class 2 Grade B8M. Nuts used with A193 bolts shall be heavy hex and shall meet the requirements of ASTM A194 Grade 8M with supplementary requirement "S1". Use a stainless steel flat washer and double nut at each bolt.

Final elevations shall be field verified prior to fabrication of the post members and footing reinforcement.

All fasteners, except mechanically galvanized direct tension indicator (DTI) washers, shall be hot-dip galvanized (except stainless steel and non-ferrous fasteners). All structural steel shall be hot-dip galvanized after fabrication, unless noted otherwise.

The silicon content of the base metal shall be in the ranges of 0.0% to 0.06% or 0.13% to 0.25% for all hot-dip galvanized steel, unless noted otherwise.

All H.S. bolts shall be considered slip critical and tightened according to Section 00930.40(d)(2)a, unless noted otherwise. Design slip resistance for bolts shall conform to the Bolt Specifications for Class C slip coefficient = 0.33.

This Standard Monotube Cantilever Sign Support has been designed for the stated loading only. No additional signs or additional loadings are permitted. Other uses and loadings shall be considered non-standard, and are outside the scope of this design.

Splices in posts or arms and welds connecting posts or arms to base connection plates shall be full penetration welds as shown on Dwg. TM623.

Fabrication drawings shall show the weight of all parts.

Verify that top of pedestal is level and at correct elevation, prior to post installation.

Install sign mounts and sign on fully erected structure. Do not install sign until after support structure erection and bolt tightening is 100% complete.

A preconstruction meeting is recommended to make sure the contractor understands ODOT requirements and that ODOT understands the contractor's plan.

Use self locking nuts on non-high strength (H.S.) bolts, unless otherwise shown or specified.

See Dwg. TM623 for typical high strength bolt connection.

If a 20 minute rolling traffic stop is used to install the overhead sign support arm, the rolling stop shall meet the following requirements:

- a) Verify (prior to arm lift) adequate crane capacity and boom length to perform complete installation from side of road.
- b) Set crane on side of road and do not re-set crane during lift.
- c) Verify (prior to lift) that lifting equipment and lifting points meet requirements of plans.
- d) Verify (prior to lift) that base plate is level and at the correct elevation.
- e) Rig lift before beginning rolling stop.
- f) Make sure all required tools and hardware are on site.
- g) Do not resume traffic until all arm to post connection bolts are at least snug tight.
- h) Support arm with crane until arm connection bolt tightening is 100% complete.
- i) Another rolling stop will be required to install the sign onto the arm.
- j) Rolling stops shall be at night and shall conform to the Special Provisions.
- k) Follow all required safety procedures.

FOUNDATION NOTES:

Foundation type shall be as shown on Project Plans. Spread footing details are shown on Dwg. TM627 and drilled shaft details are shown on Dwg. TM628.

Provide shoring for the footing if required. Installation of temporary guardrail or barrier should precede any other work involving the construction of the footing.

Top surface of concrete pedestal (including area under base plate and around anchor bolts) shall be floated and troweled to a flat and level surface. This surface shall not vary more than 1/8" from a horizontal plane. Provide a 3/4" chamfer on all exposed edges of the pedestal.

Concrete for spread footings shall be Class 3600 - 3/4" Commercial Grade Concrete classified as a structural item. Concrete for drilled shafts shall be as noted on Dwg. TM628.

Place bars 2" clear of the nearest face of concrete, unless shown otherwise.

Concrete shall be placed using a tremie when free fall exceeds 4'-0". Cold joints shall be cause for rejection of the foundation, except between footing and pedestal and top of drilled shaft.

All reinforcing steel shall conform to ASTM A706 or A615 Gr. 60, unless shown otherwise.

Anchor rods shall conform to ASTM F1554, Gr. 55, with supplementary requirements "S2" that includes grade and manufacturer's identification and "S4". Anchor rod washers shall conform to ASTM F436. Anchor rod nuts shall conform to ASTM A563 Grade DH with supplementary requirements "S1" and "S2".

Anchor rod template, temporary support members, and anchor plate shall conform to ASTM A36.

Anchor rods shall be hot-dip galvanized full length.

Provide 1 -2" dia. rigid electrical conduit as shown on Dwg. TM627 & TM628 and as directed. Extend sign support end of conduit to the center of the lower hand hole. If luminaires are not required, extend the other end of the conduit into the nearest illumination circuit junction box and identify conduit by attaching a tag which says "future sign lighting". Install "pull string" in conduit for future use. Install conduit cap on each end. When luminaires are required, extend the sign support end of conduit per Project Plans.

The elevation and location of anchor rods are critical. Use survey techniques to verify the elevation, location, and orientation of anchor bolt groups prior to placement of foundation concrete.

Where the footing of a Cantilever Monotube Sign Support interferes with guard rail posts, the depth of footing may be increased to the maximum shown on Dwg. TM627, or concrete barrier may be used instead of guard rail, or guard rail posts may be attached to footing in accordance with Dwg. BR266. All buried steel shall be coated for immersion exposure with an approved product from the qualified products for structural coatings (<http://www.odot.state.or.us/tsconstruction/>). Prepare and coat surfaces according to Section 00594 of Oregon Std. Specifications for Construction.

CONSTRUCTION PROCEDURE AND SEQUENCE:

1. Construct foundation according to plans. Verify elevation, location and orientation of anchor bolts. Steel template, shown on Dwg. TM626, shall be used to accurately locate and hold the anchor rods plumb and in proper alignment. This template shall be in place during concrete placement and shall remain in place for a minimum of 24 hours after the concrete placement has been completed. Out of position anchor rods and anchor rods greater than 1:40 out of plumb are cause for rejection of the foundation. Bending of anchor rods to straighten or move them into position, or alterations of the base plate shall not be permitted and are cause for rejection of the foundation and/or post weldment.
2. Pedestal pour may begin after spread footing concrete has satisfied Section 00540.52. The post erection may begin after concrete has satisfied Section 00540.52.
3. Install bearing nuts on anchor rods. Level the bearing nuts. Install hardened flat washers above bearing nuts.
4. Use crane to lift post onto anchor rods. Maintain crane connection as a safety measure until post installation is complete. No grout shall be used under the base plate. Install hardened flat washers above base plate.
5. Generously apply an approved lubricant for galvanized fasteners from the QPL to the top nut bearing surface and internal threads, and install nut on anchor rods to snug tight condition. Snug tight is defined as the condition when all plies are in firm contact and can usually be obtained by the full effort of a worker on a 12 inch long wrench or a few impacts of an impact wrench. Several passes may be required to obtain uniform tightness.
6. Tighten bearing nuts upward against base plate in a similar manner, to assure a uniform snug tight condition.
7. Mark position of each anchor rod and top nut with a felt tip pen so subsequent nut rotation can be verified. Rotate all top nuts an additional 1/6 turn in two passes (1/12 turn per pass).
8. Lift the arm into position using a crane. Lubricate arm connection bolts with an approved lubricant for galvanized fasteners from the QPL. Maintain crane support during tightening.
9. Evenly tighten arm connection bolts to a snug tight condition, and then fully tension arm connection bolts according to Section 00930.40(d)(2)a.

LUMINAIRE NOTES:

Hubs, handholes, grounding terminals, hook and foundation conduit shall always be installed for possible future use. Luminaires, luminaire support arms and luminaire support channels noted on Dwg. TM624 & TM625 should only be provided when luminaires are required (See Project Plans).

Conduit diameters shown on plans are nominal or trade sizes.

WALKWAY NOTES:

Grating shall be welded steel grating with 1 1/2" x 1/8" bearing bars spaced at 13 1/16" centers and 1/4" x 1/4" nominal square cross bars (or equivalent) spaced at 4" centers. Steel plates and bars including grating elements shall conform to ASTM A36 or approved equal.

Rail members and post brackets shall be structural steel tubing conforming to ASTM Specification A500, Grade A or B.

Grating may be spliced at an interior support by welding 1/8" x 1 1/2" bars to ends of bearing bars across full width of grating and bolting bars together with 1/4" dia. bolts at 12 inch maximum centers.

Top of walkway grating shall not be more than 6 inches below the threshold into the VMS cabinet.

Walkway contractor to verify prior to fabrication that walkway, grating and rails do not interfere with VMS door or VMS housing. No gaps greater than 1 inch between walkway rails, grating and toe board, and VMS housing are allowed.

All bolts, including U-bolts, shall conform to ASTM Specification A307, unless otherwise noted.

Accompanied by dwgs. TM621, TM623, TM624, TM625, TM626, TM627, TM628, TM690, TM691

CALC. BOOK NO. 6921-6930, 6974		BASELINE REPORT DATE 10-JAN-2020	
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications			
OREGON STANDARD DRAWINGS			
STD. MONOTUBE SIGN/VMS CANTILEVER NOTES			
2018			
DATE	REVISION DESCRIPTION		
01/18	Changed from square to round		
07/19	Added API circular tube material.		
01/20	Post tolerance was +/- 1/8".		

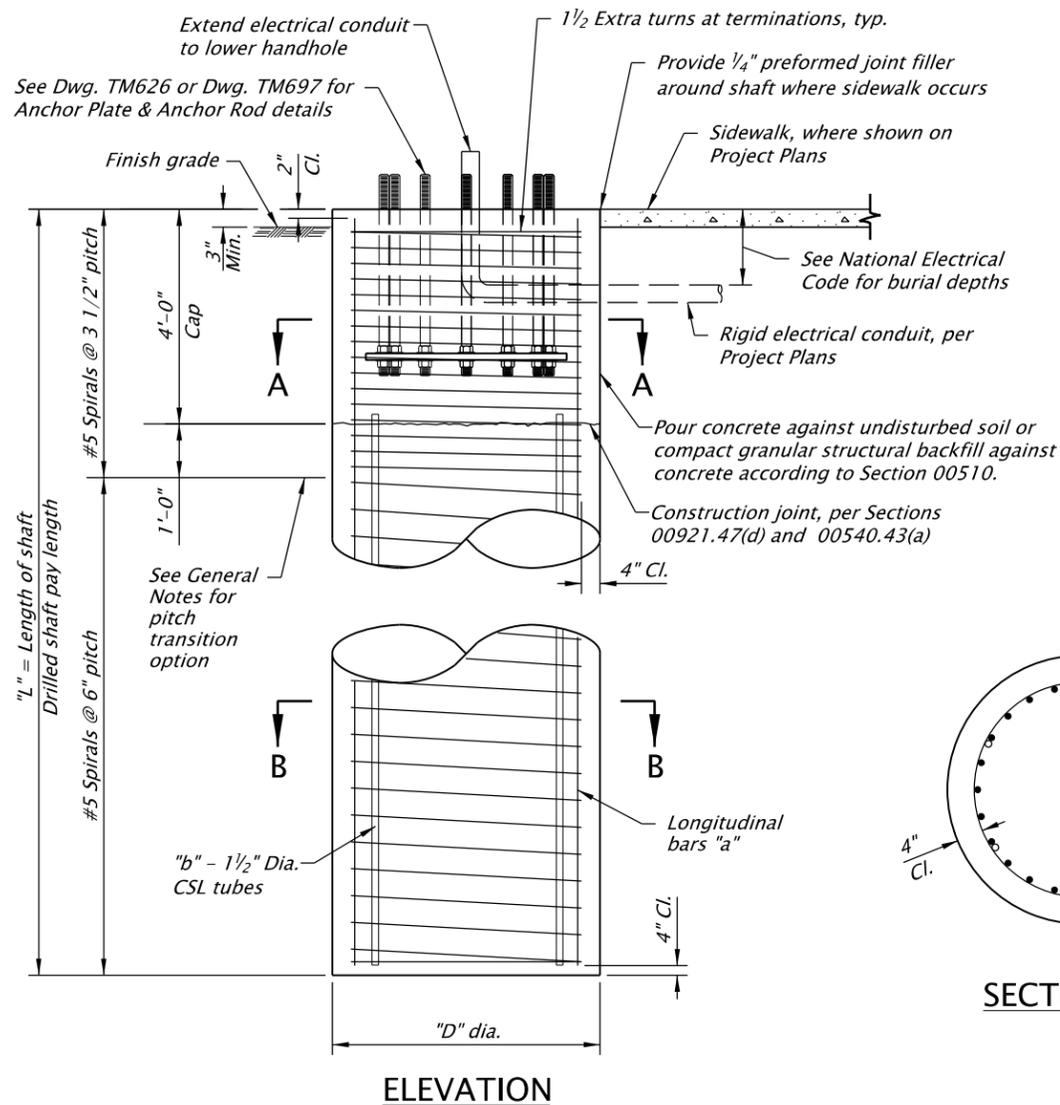
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

tm622.dgn 10-JAN-2020

TM622

tm628.dgn 10-JAN-2020

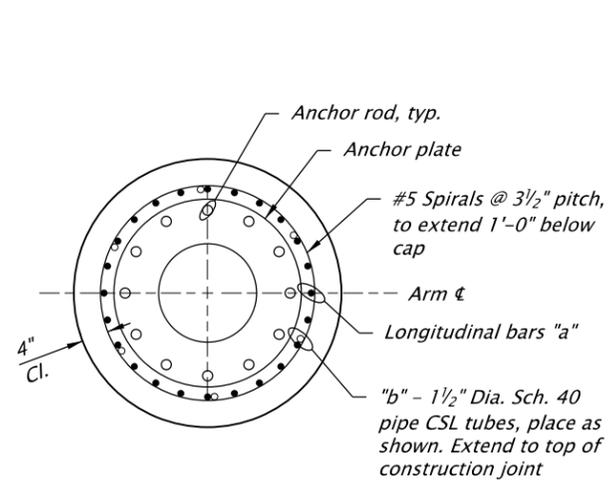
TM628



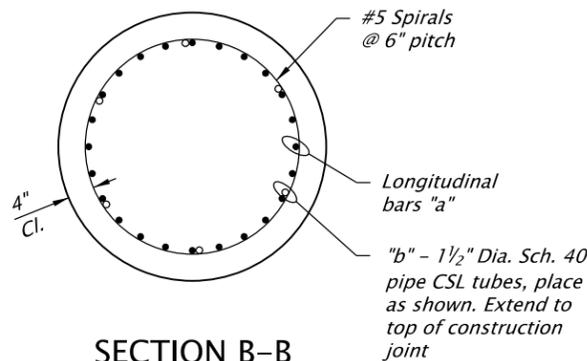
ELEVATION

DRILLED SHAFT DETAILS

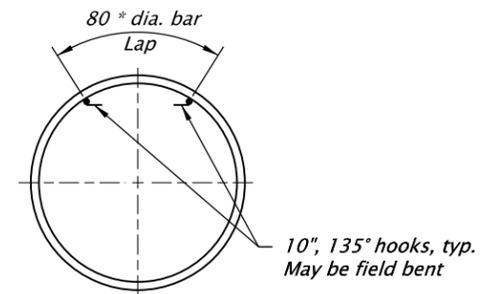
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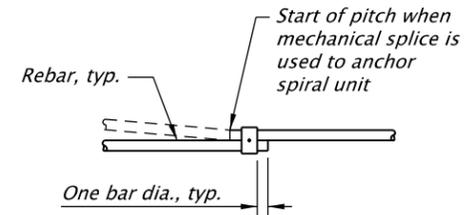
SECTION A-A



SECTION B-B

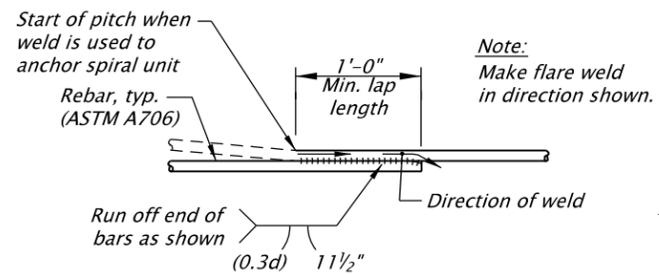


LAPPED SPLICE



MECHANICAL SPLICE

(Not allowed for ASTM A82 spirals)



WELDED SPLICE

SPIRAL SPLICE DETAIL

No Scale

GENERAL NOTES:

Use ASTM A706 for all welded splices, except ASTM A615 Grade 60, ASTM A82 or ASTM A496 may be used if copies of the chemical composition analysis are submitted and approved as weldable by the Engineer.

Anchor spirals at each end or discontinuity with one extra turn and a splice to itself as shown. Where permitted on plans, provide closed hoops conforming to the requirements of this detail.

Securely tie CSL tubes to reinforcement.

Use temporary casing as required. Permanent casing not permitted.

Cap concrete shall be Class 3600 - 3/4" commercial grade, classified as a structural item. Remainder of shaft shall be Class 4000 - 3/8" without air entrainment and with 8" ± 1/2" slump.

Contractor shall field verify elevations prior to installation.

The transition between the 3 1/2" to 6" pitches may use two separate spiral cages with 1 1/2" horizontal turns at the start and end of each cage and the lapped splice details between the cages.

Note:

The base plate reactions shown in the table are worst case Extreme I and Service I loads. Engineer of Record to specify shaft depth and confirm shaft design for local soil conditions based on a site specific geotechnical study and loads shown in table. If shaft size or reinforcement shown in table are not adequate for local soil conditions, Engineer of Record must adjust the shaft design accordingly.

The shafts designs shown in table were based on an analysis to encompass worst case soil conditions by applying Extreme I loads to the top of shaft and analyzing below ground shaft forces using Brom's method for two different soil types. The assumed cohesive soil minimum undrained shear strength, *c*, is 600 psf. The assumed non-cohesive soil friction angle is 25 degrees and bulk weight is 100 pcf.

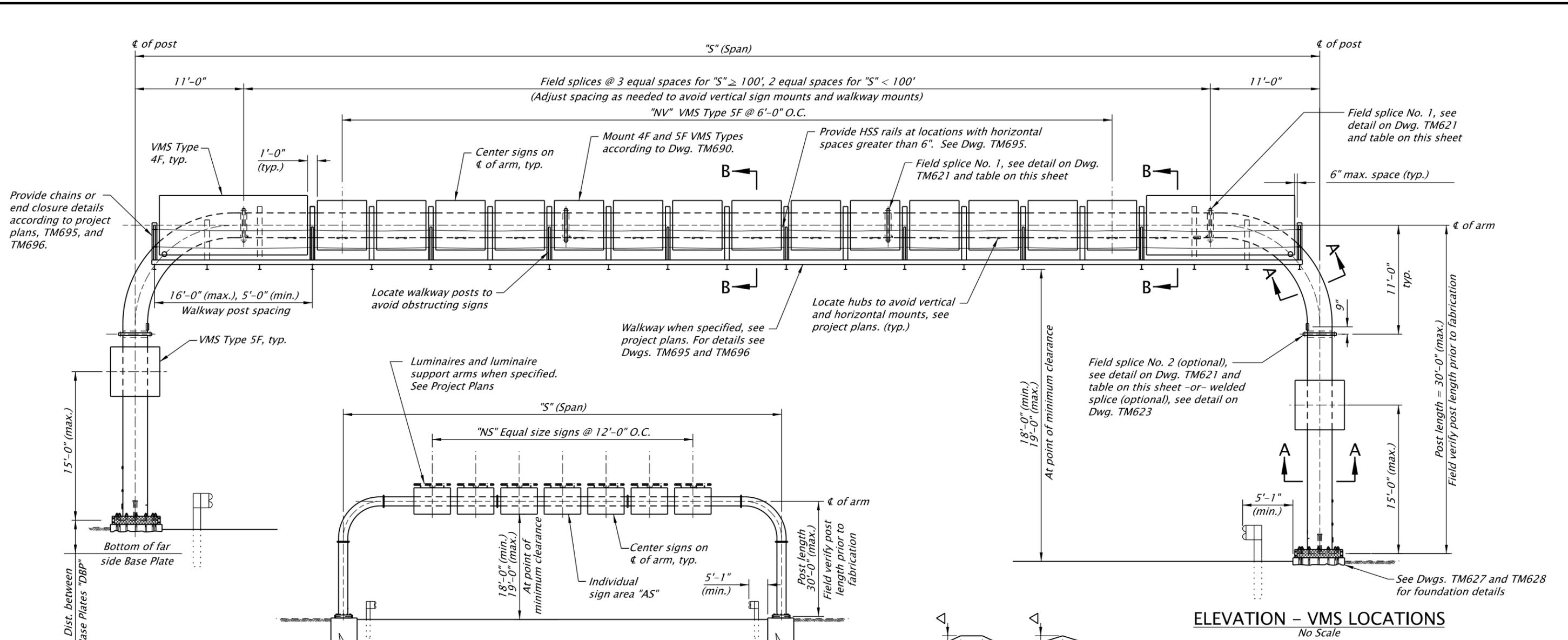
Cantilever Structure Design No.	VMS/Sign Bridge Structure Design No.	Reinf. Steel "a"	Shaft Dia. "D"	No. of CSL Tubes "b"	Reaction At Base Plate (Factored)				Reaction At Base Plate (Service)			
					Axial (lb)	Shear (lb)	Moment (ft-lb)	Torsion (ft-lb)	Axial (lb)	Shear (lb)	Moment (ft-lb)	Torsion (ft-lb)
1	-	30 - #9	5'-0"	6	22,600	26,200	839,000	672,000	20,500	10,100	384,000	259,000
2	-	30 - #9	5'-0"	6	28,100	20,000	784,200	707,000	25,500	8,500	501,200	279,000
3	-	30 - #9	5'-0"	6	18,400	19,600	622,000	517,000	16,700	7,700	293,000	204,000
4	-	30 - #9	5'-0"	6	21,800	13,200	500,800	430,000	19,800	5,200	339,200	169,000
5	-	30 - #9	5'-0"	6	16,900	13,400	431,600	357,000	15,300	5,300	222,000	140,000
6	-	24 - #9	4'-6"	5	12,800	12,300	381,000	240,000	11,600	4,900	171,000	94,000
7	-	24 - #9	4'-6"	5	13,000	7,200	268,000	222,000	11,800	2,800	181,000	87,000
8	-	20 - #9	4'-0"	5	7,800	5,600	170,000	110,000	7,100	2,200	86,000	44,000
9	-	30 - #9	5'-0"	6	26,900	26,500	884,000	745,000	24,400	10,500	498,000	294,000
-	1	30 - #9	5'-0"	6	36,800	40,700	952,600	396,000	33,400	27,000	449,600	156,000
-	2	30 - #9	5'-0"	6	28,500	30,300	754,700	252,000	25,900	17,900	343,500	99,500
-	3	30 - #9	5'-0"	6	23,200	22,900	592,300	128,700	21,100	12,100	261,700	51,000

Accompanied by dwgs. TM621, TM622, TM623, TM624, TM625, TM626, TM627

CALC. BOOK NO. 6921-6930, 6969-6972 6974	BASILINE REPORT DATE 10-JAN-2020
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS	
STD. MONOTUBE SIGN/VMS SUPPORT DRILLED SHAFT DETAILS	
2018	
DATE	REVISION DESCRIPTION
01/18	Drawing created
01/19	Changed 80 degrees to 80° dia. bar, added spiral dim. lines, added 1'-0" spiral dim. below cold joint, and added splice option.
01/20	Added Backfill requirement and added 00921.47(d) to constr. joint.

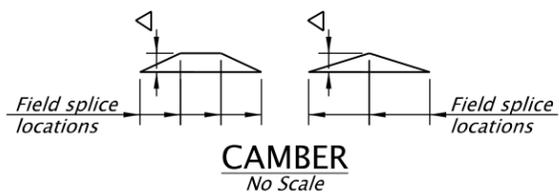
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

tm693.dgn 10-JAN-2020



ELEVATION - SIGN LOCATIONS
No Scale

ELEVATION - VMS LOCATIONS
No Scale



Camber may be obtained in sections by beveling the ends of each arm segment with the flange faces vertical at the splice locations.

For additional details and sections not shown, see Dwg. TM621 through TM628, TM690 and TM691

VMS Type	Access	VMS Height (ft)	VMS Length (ft)	Max. VMS Area (ft ²)	VMS Depth	Weight (lbs)
4F	Front	6	15	90	1'-4"	900
5F	Front	5	5	25	1'-2"	500

Structure Design No.	"TR"	Base Plate				Anchor Rods			
		"A"	"B"	"C"	"T"	"DA"	"N"	∅ (deg.)	"PR"
1	2 1/4"	3'-8"	3'-2"	9"	2 1/2"	1 1/2"	18	20	9"
2	1 3/4"	3'-8"	3'-2"	9"	2 1/2"	1 1/2"	14	25.7	9"
3	1 1/2"	3'-8"	3'-2"	9"	2 1/2"	1 1/2"	12	30	9"

Accompanied by dwgs. TM627, TM628, TM694, TM695, TM696, TM697

CALC. BOOK NO. 6969-6972 BASELINE REPORT DATE 10-JAN-2020

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

STD. MONOTUBE VMS/SIGN BRIDGE GENERAL DESIGN CRITERIA

2018

DATE	REVISION DESCRIPTION
01/18	Drawing created
07/18	Added VMS mounting note.
07/19	Added Anchor Rod projection "PR".
01/20	Added dim. between base plates, maximum rail open space, hub note, and end walkway requirements.

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 consulting a Registered Professional Engineer.

TM693

Structure Design No.	Max. "S" (ft)	Max. "NV"	Max. "NS"	Max. "AS" (ft ²)	Arm and Post Dimensions			Field Splice No. 1					Field Splice No. 2 (Optional)					Camber Δ (in)
					"D"	"ta"	"tv"	"DB"	"NB"	"DS"	"BC"	"ts"	"DB"	"NB"	"DS"	"BC"	"ts"	
1	120	14	7	110	2'-6"	1/2"	3/8"	7/8"	26	3'-8"	3'-2"	2"	1"	24	3'-8"	3'-2"	2 1/2"	4 1/4"
2	100	10	5	121	2'-6"	3/8"	1/2"	7/8"	22	3'-8"	3'-2"	2"	7/8"	24	3'-8"	3'-2"	2 1/2"	2 3/4"
3	80	6	3	154	2'-6"	3/8"	3/8"	7/8"	20	3'-8"	3'-2"	2"	7/8"	20	3'-8"	3'-2"	2 1/2"	1 3/4"

tm694.dgn 10-JAN-2020

TM694

GENERAL NOTES:

Standard Monotube VMS/Sign Bridge Structures are designed in accordance with AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals 1st edition, 2015 and interim revisions thru 2017.

Basic wind speed (3 second gust) used for Extreme I Limit State is 145 mph. $G = 1.14$, 1700 year recurrence interval, fatigue importance factor $I_f = 1.0$ and Exposure C were used for design.

The maximum design sign area for the Standard Monotube VMS/Sign Bridge Structure is shown on Dwg. TM693. The design sign panel and mounting members weigh 5 pounds per square foot. The design luminaire including mounting channels weighs 20 pounds per linear foot. The design luminaire wind loading area including mounting channels is 1 square foot per linear foot, has rectangular flat side shapes, is as long as the design sign, and the resulting projected area is not part of the maximum sign area. Drag coefficient C_d used for signs is 1.20, for a maximum length/width ration of 5.0.

The allowable variation from field verified working drawing camber is -0% to +25%, post length is -0" to +3", top span length "S" is -1/4" to +1/4", span length between centers of base plates is -1/4" to +1/4", and the vertical distance between base plates "DBP" is -1/4" to +1/4". Verify that the span length between base plates is within $\pm 1/2$ " of the field surveyed span length between centers of anchor rod clusters. The two opposing diagonal distance tolerances measured from 1'-6" below the start of the bend to 6" above the higher baseplate shall be -1/2" to +1/2". The frame lengths shall be measured prior to galvanizing using a steel tape or other approved measuring method.

Drag coefficient C_d used for VMS is 1.70, and for the walkway is 1.20. The VMS design loads include 100 pounds per linear foot applied from center to center of vertical posts for the weight of a walkway along with a 500 pound concentrated live load. The design walkway wind loading area is 1.0 square feet per linear foot, extends from center to center of vertical posts, and the resulting projected area is not part of the maximum sign area. VMS dimensions and design loads are shown on TM693. The walkway vertical mounts and the VMS vertical mounts are separate.

Snow and ice loads are not included in the design loads. The Engineer shall evaluate the design in regions of heavy snow or ice accumulations.

The signs are to be positioned horizontally as shown on Project Data for Std. Monotube VMS/Sign Bridge Sheet and vertically as shown on Dwg. TM693.

Material for circular tube sections shall be ASTM A53 Grade B; ASTM A500 Grade B or C; ASTM A501 Grade A or B; or API 5L PSL2 Grade B, X42 or X52. All other structural steel shall conform to ASTM A572 Grade 50, or A992, unless noted otherwise.

Band tube using induction heating methods in accordance with TPA-IBS-98, "Recommended Standards for Induction Bending of Pipe and Tube."

Notch toughness of all structural steel members and plates greater than 1/2" thick shall conform to Zone 2 fracture critical requirements of ASTM A709.

High strength bolts shall conform to ASTM A325, Type 1. Nuts for high strength bolts shall be heavy hex and conform to ASTM A563 Grade DH, with supplementary requirements "S1" and "S2". Hardened steel washers shall conform to ASTM F436, Type 1. Use washers under turning element in tightening unless otherwise specified.

Bolts connecting galvanized steel members to aluminum members shall meet the requirements of ASTM A193 Class 2 Grade B8M. Nuts used with A193 bolts shall be heavy hex and shall meet the requirements of ASTM A194 Grade 8M with supplementary requirement "S1". Use a stainless steel flat washer and double nut at each bolt.

Final elevations shall be field verified prior to fabrication of the post members and footing reinforcement.

All fasteners, except mechanically galvanized direct tension indicator (DTI) washers, shall be hot-dip galvanized (except stainless steel and non-ferrous fasteners). All structural steel shall be hot-dip galvanized after fabrication, unless noted otherwise.

The silicon content of the base metal shall be in the ranges of 0.0% to 0.06% or 0.13% to 0.25% for all hot-dip galvanized steel, unless noted otherwise.

All H.S. bolts shall be considered slip critical and tightened according to Section 00930.40(d)(2)a, unless noted otherwise. Design slip resistance for bolts shall conform to the Bolt Specifications for Class C slip coefficient = 0.33.

This Standard Monotube VMS/Sign Bridge has been designed for the stated loading only. No additional signs or additional loadings are permitted. Other uses and loadings shall be considered non-standard, and are outside the scope of this design.

Splices in posts or arms and welds connecting posts or arms to base connection plates shall be full penetration welds as shown on Dwg. TM623.

Fabrication drawings shall show the weight of all parts.

Verify that top of pedestal is level and at correct elevation, prior to post installation. Install sign mounts and sign on fully erected structure. Do not install sign until after support structure erection and bolt tightening is 100% complete.

A preconstruction meeting is recommended to make sure the contractor understands ODOT requirements and that ODOT understands the contractor's plan.

Use self locking nuts on non-high strength (H.S.) bolts, unless otherwise shown or specified. See Dwg. TM623 for typical high strength bolt connection.

If a 20 minute rolling traffic stop is used to install the overhead sign support arm, the rolling stop shall meet the following requirements:

- a) Verify (prior to arm lift) adequate crane capacity and boom length to perform complete installation from side of road.
- b) Set crane on side of road and do not re-set crane during lift.
- c) Verify (prior to lift) that lifting equipment and lifting points meet requirements of plans.
- d) Verify (prior to lift) that vertical end posts are at correct elevations, plumb, and that the distance between the field splices at each post matches the horizontal arm length.
- e) Rig lift before beginning rolling stop.
- f) Make sure all required tools and hardware are on site.
- g) Do not resume traffic until all arm to post connection bolts are at least snug tight.
- h) Support arm with crane until arm connection bolt tightening is 100% complete.
- i) Another rolling stop will be required to install the sign onto the arm.
- j) Rolling stops shall be at night and shall conform to the Special Provisions.
- k) Follow all required safety procedures.

FOUNDATION NOTES:

Foundation type shall be as shown on Project Plans. Spread footing details are shown on Dwg. TM627 and drilled shaft details are shown on Dwg. TM628.

Provide shoring for the footing if required. Installation of temporary guardrail or barrier should precede any other work involving the construction of the footing.

Top surface of concrete pedestal (including area under base plate and around anchor bolts) shall be floated and troweled to a flat and level surface. This surface shall not vary more than 1/8" from a horizontal plane. Provide a 3/4" chamfer on all exposed edges of the pedestal.

Concrete for spread footings shall be Class 3600 - 3/4" Commercial Grade Concrete classified as a structural item. Concrete for drilled shafts shall be as noted on Dwg. TM628.

Place bars 2" clear of the nearest face of concrete, unless shown otherwise.

Concrete shall be placed using a tremie when free fall exceeds 4'-0". Cold joints shall be cause for rejection of the foundation, except between footing and pedestal and top of drilled shaft.

All reinforcing steel shall conform to ASTM A706 or A615 Gr. 60, unless shown otherwise.

Anchor rods shall conform to ASTM F1554, Gr. 55, with supplementary requirements "S2" that includes grade and manufacturer's identification and "S4". Anchor rod washers shall conform to ASTM F436. Anchor rod plate washers shall conform to ASTM A572 Grade 50. Anchor rod nuts shall conform to ASTM A563 Grade DH with supplementary requirements "S1" and "S2".

Anchor rod template, temporary support members, and anchor plate shall conform to ASTM A36.

Anchor rods shall be hot-dip galvanized full length.

Provide 1 - 2" dia. rigid electrical conduit as shown on Dwg. TM627 & TM628 and as directed. Extend sign support end of conduit to the center of the lower hand hole. If luminaires are not required, extend the other end of the conduit into the nearest illumination circuit junction box and identify conduit by attaching a tag which says "future sign lighting". Install "pull string" in conduit for future use. Install conduit cap on each end. When luminaires are required, extend the sign support end of conduit per Project Plans.

The elevation and location of anchor rods are critical. Use survey techniques to verify the elevation, location, and orientation of anchor bolt groups prior to placement of foundation concrete.

Where the footing of a Standard Monotube VMS/Sign Bridge Structure interferes with guard rail posts, the depth of footing may be increased to the maximum shown on Dwg. TM627, or concrete barrier may be used instead of guard rail, or guard rail posts may be attached to footing in accordance with Dwg. BR266. All buried steel shall be coated for immersion exposure with an approved product from the qualified products for structural coatings (<http://www.odot.state.or.us/tsconstruction/>). Prepare and coat surfaces according to Section 00594 of Oregon Std. Specifications for Construction.

CONSTRUCTION PROCEDURE AND SEQUENCE:

1. Construct foundation according to plans. Verify elevation, location and orientation of anchor rods. A steel template, shown on Dwg. TM697, shall be used to accurately locate and hold the anchor rods plumb and in proper alignment. This template shall be in place during concrete placement and shall remain in place for a minimum of 24 hours after the concrete placement has been completed. Submit anchor rod survey information before final fabrication. Out of position anchor rods and anchor rods greater than 1:40 out of plumb are cause for rejection of the foundation. Bending of anchor rods to straighten or move them into position, or alterations of the base plate shall not be permitted and are cause for rejection of the foundation and/or post weldment.
2. Pedestal pour may begin after spread footing concrete has satisfied Section 00540.52. The post erection may begin after concrete has satisfied Section 00540.52.
3. Install bearing nuts on anchor rods. Level the bearing nuts. Install hardened flat washers above bearing nuts.
4. Use crane to lift post onto anchor rods. Maintain crane connection as a safety measure until post installation is complete. No grout shall be used under the base plate. Install hardened flat washers above base plate.
5. Generously apply an approved lubricant for galvanized fasteners from the QPL to the top nut bearing surface and internal threads, and install nut on anchor rods to snug tight condition. Snug tight is defined as the condition when all plies are in firm contact and can usually be obtained by the full effort of a worker on a 12 inch long wrench or a few impacts of an impact wrench. Several passes may be required to obtain uniform tightness.
6. Tighten bearing nuts upward against base plate in a similar manner, to assure a uniform snug tight condition.
7. Lift the arm into position using a crane. Lubricate arm connection bolts with an approved lubricant for galvanized fasteners from the QPL. Maintain crane support during tightening.
8. Evenly tighten arm connection bolts to a snug tight condition, and then fully tension arm connection bolts according to Section 00930.40(d)(2)a.
9. Verify all bearing nuts and top nuts are snug tight. Mark position of each anchor rod and top nut with a felt tip pen so subsequent nut rotation can be verified. Rotate all top nuts an additional 1/6 turn in two passes (1/12 turn per pass).

LUMINAIRE NOTES:

Hubs, handholes, grounding terminals, hook and foundation conduit shall always be installed for possible future use. Luminaires, luminaire support arms and luminaire support channels noted on Dwg. TM624 & TM625 should only be provided when luminaires are required (See Project Plans).

Conduit diameters shown on plans are nominal or trade sizes.

WALKWAY NOTES:

Grating shall be welded steel grating with 1 1/2" x 1/8" bearing bars spaced at 13 1/16" centers and 1/4" x 1/4" nominal square cross bars (or equivalent) spaced at 4" centers. Steel plates and bars including grating elements shall conform to ASTM A36 or approved equal.

Vertical posts shall be structural steel tubing conforming to ASTM Specification A500, Grade A or B.

Grating may be spliced at an interior support by welding 1/8" x 1 1/2" bars to ends of bearing bars across full width of grating and bolting bars together with 1/4" dia. bolts at 12 inch maximum centers.

All bolts, including U-bolts, shall conform to ASTM Specification A307, unless otherwise noted.

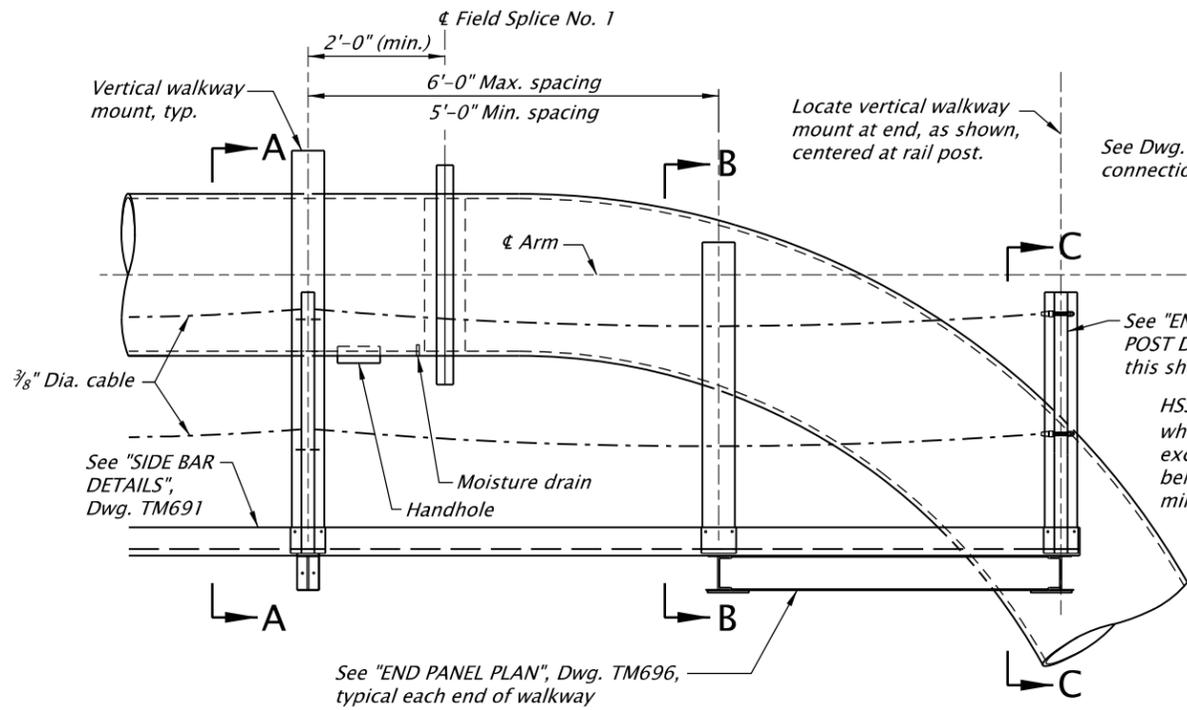
Cable shall be 3/8" dia. zinc coated 7-strand wire rope conforming to A475, Class A, with a minimum breaking strength of 11,500 lbs.

Accompanied by dwgs. TM627, TM628, TM693, TM695, TM696, TM697

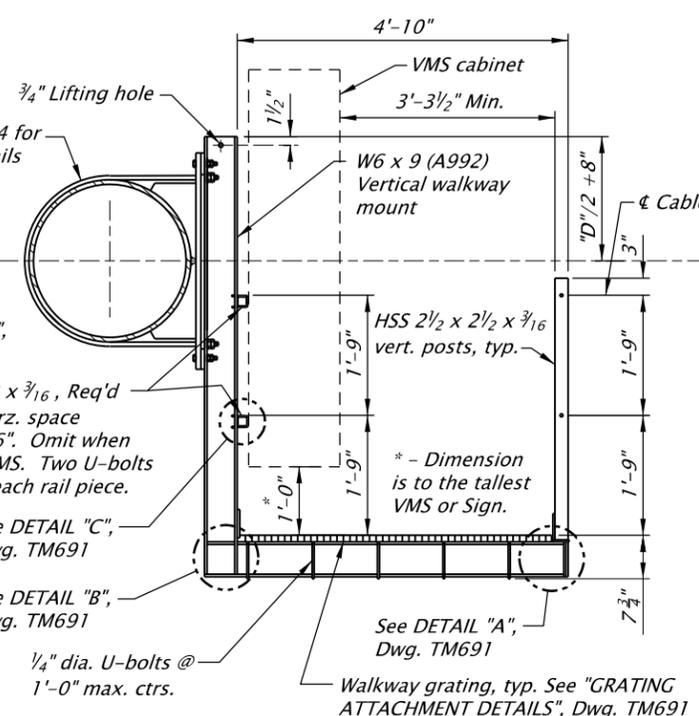
CALC. BOOK NO. <u>6969-6972</u>		BASELINE REPORT DATE <u>10-JAN-2020</u>	
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications			
OREGON STANDARD DRAWINGS			
STD. MONOTUBE VMS/SIGN BRIDGE NOTES			
2018			
DATE	REVISION DESCRIPTION		
01/18	Drawing created		
07/18	Added vertical mounts note.		
07/19	Added API circular tube material.		
01/20	Post tolerance was +/- 1/8", added base plates dimension tolerance, and diagonal dimensions tolerance.		

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 consulting a Registered Professional Engineer.

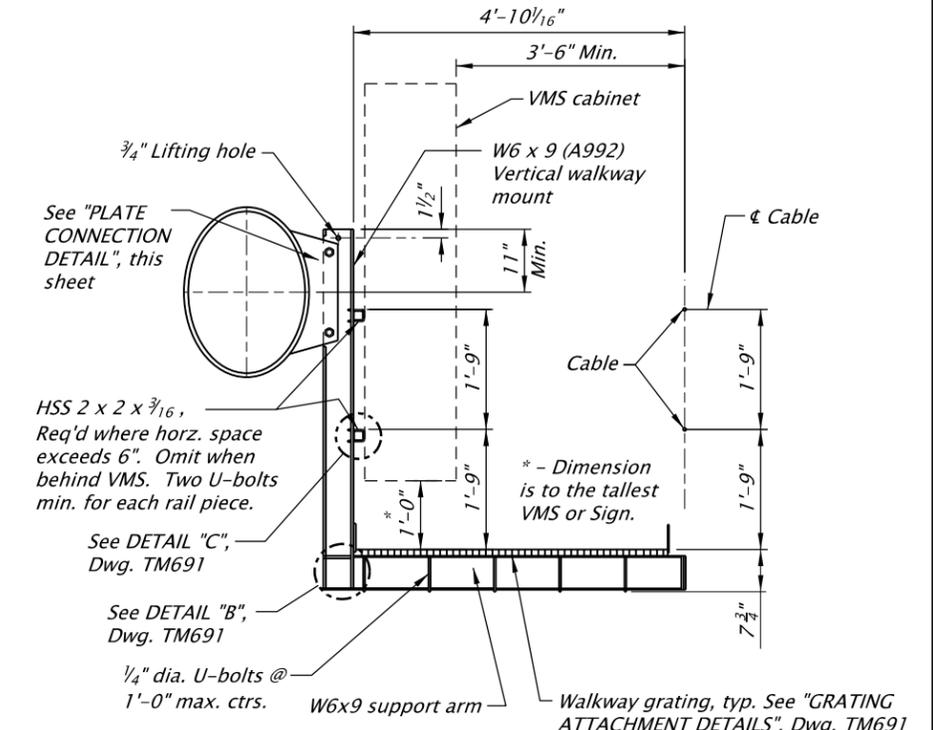
tm695.dgn 10-JAN-2020



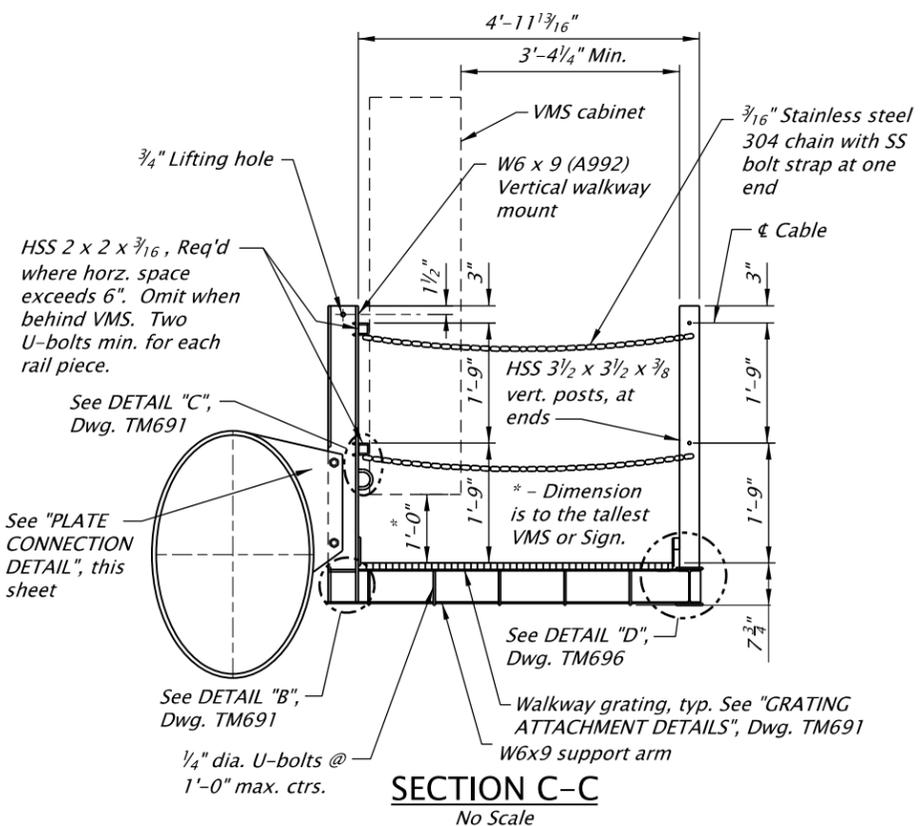
WALKWAY DETAILS
No Scale



SECTION A-A
No Scale



SECTION B-B
No Scale



SECTION C-C
No Scale

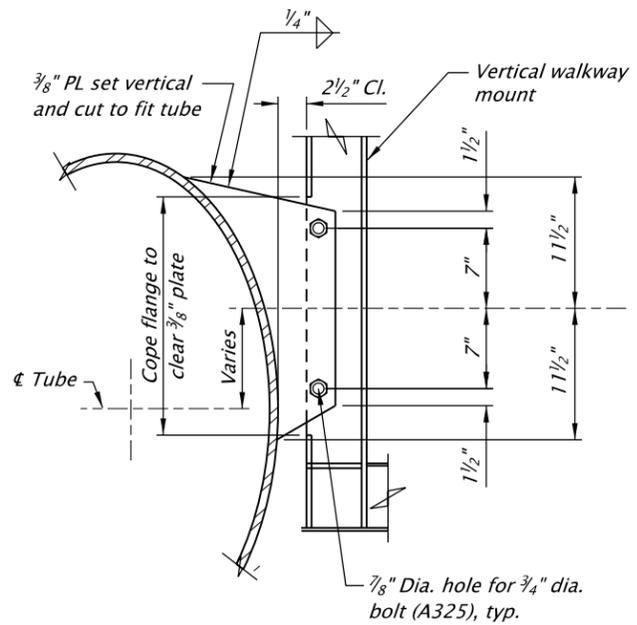
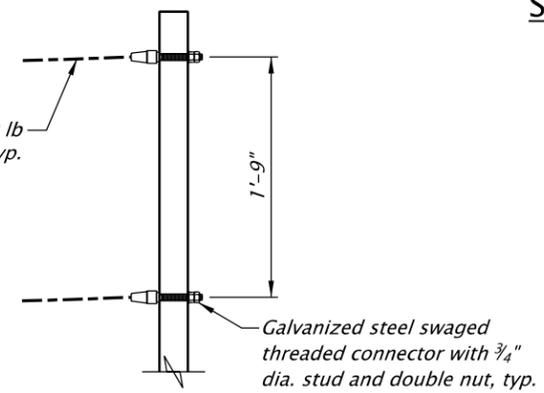


PLATE CONNECTION DETAIL
No Scale

Tension cable to 100 lb min., 130 lb. max., typ.



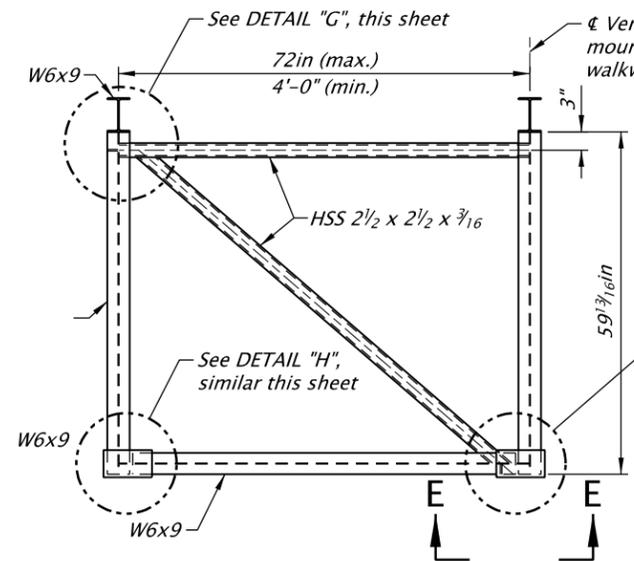
END POST DETAIL
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Accompanied by dwgs. TM627, TM628, TM693, TM694, TM696, TM697

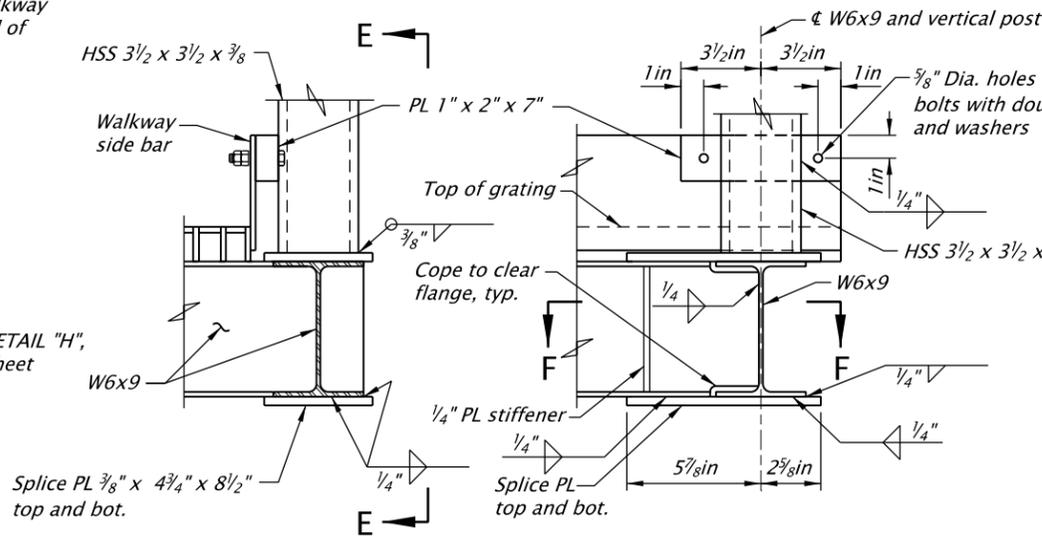
CALC. BOOK NO. 6969-6972		BASELINE REPORT DATE 10-JAN-2020	
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications			
OREGON STANDARD DRAWINGS			
STD. MONOTUBE VMS/SIGN BRIDGE WALKWAY DETAILS (SH. 1)			
2018			
DATE	REVISION DESCRIPTION		
01/18	Drawing created		
07/18	Removed "minimum" from the the 1'-0" distances, added the tallest VMS or Sign notes, and added 7 3/4" dimensions.		
01/20	Changed rail note behind VMS, added 2 min. U-bolts, and added 6" maximum space.		

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 consulting a Registered Professional Engineer.

TM695

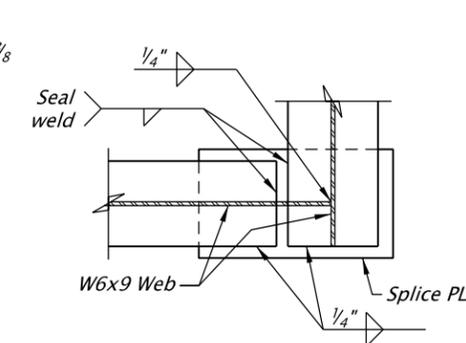


END PANEL PLAN
No Scale
(Grating and walkway posts not shown)

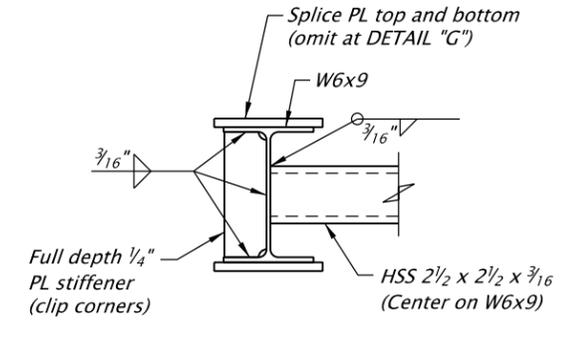


DETAIL "D"
No Scale

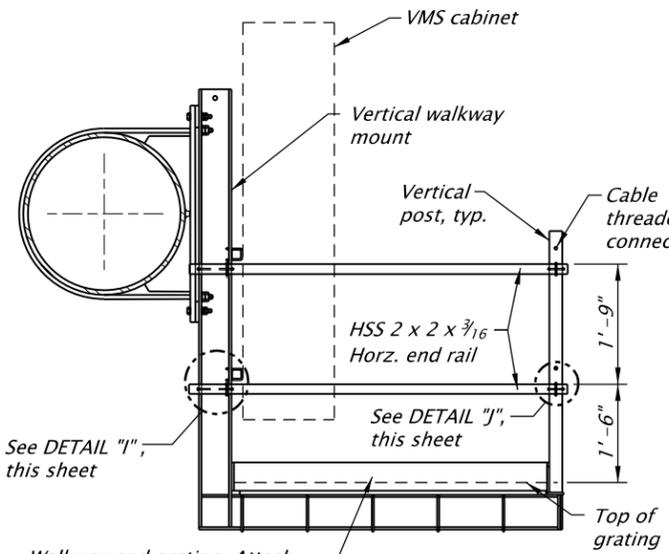
SECTION E-E
No Scale



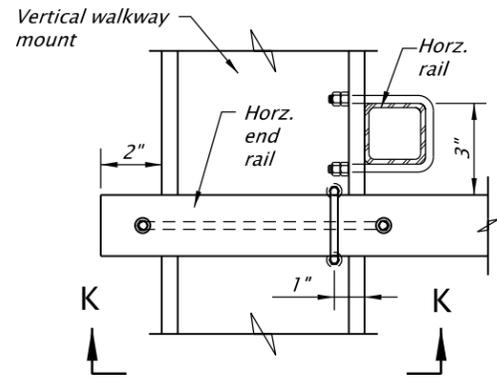
SECTION F-F
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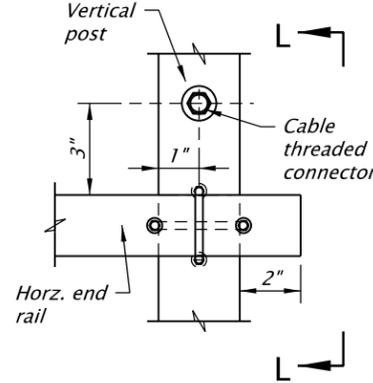
SECTION J-J
No Scale



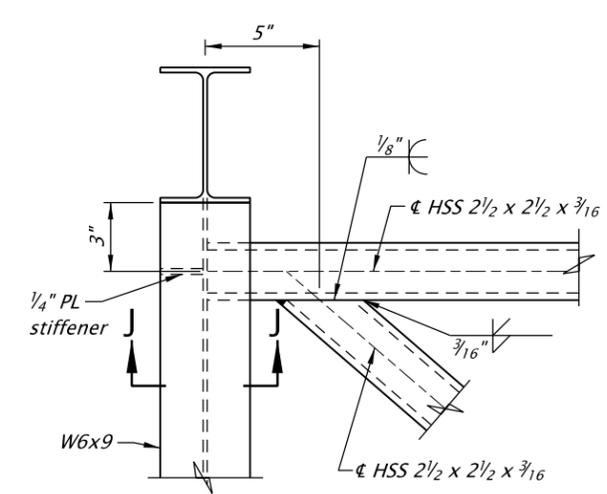
END CLOSURE DETAIL
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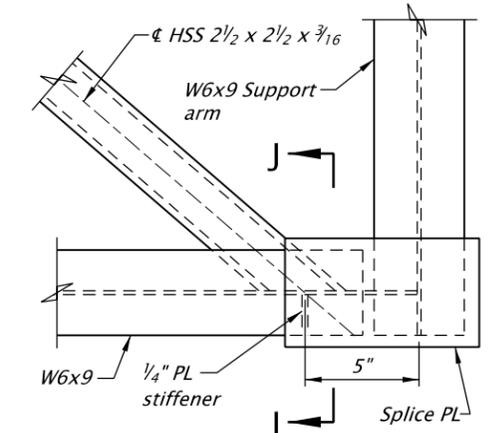
DETAIL "I"
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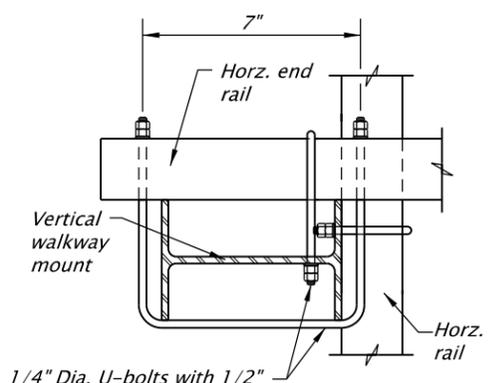
DETAIL "J"
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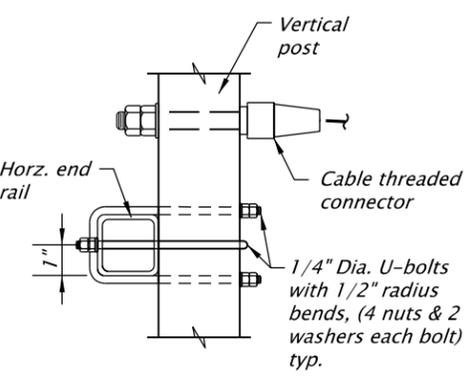
DETAIL "G"
No Scale



DETAIL "H"
No Scale



SECTION K-K
No Scale

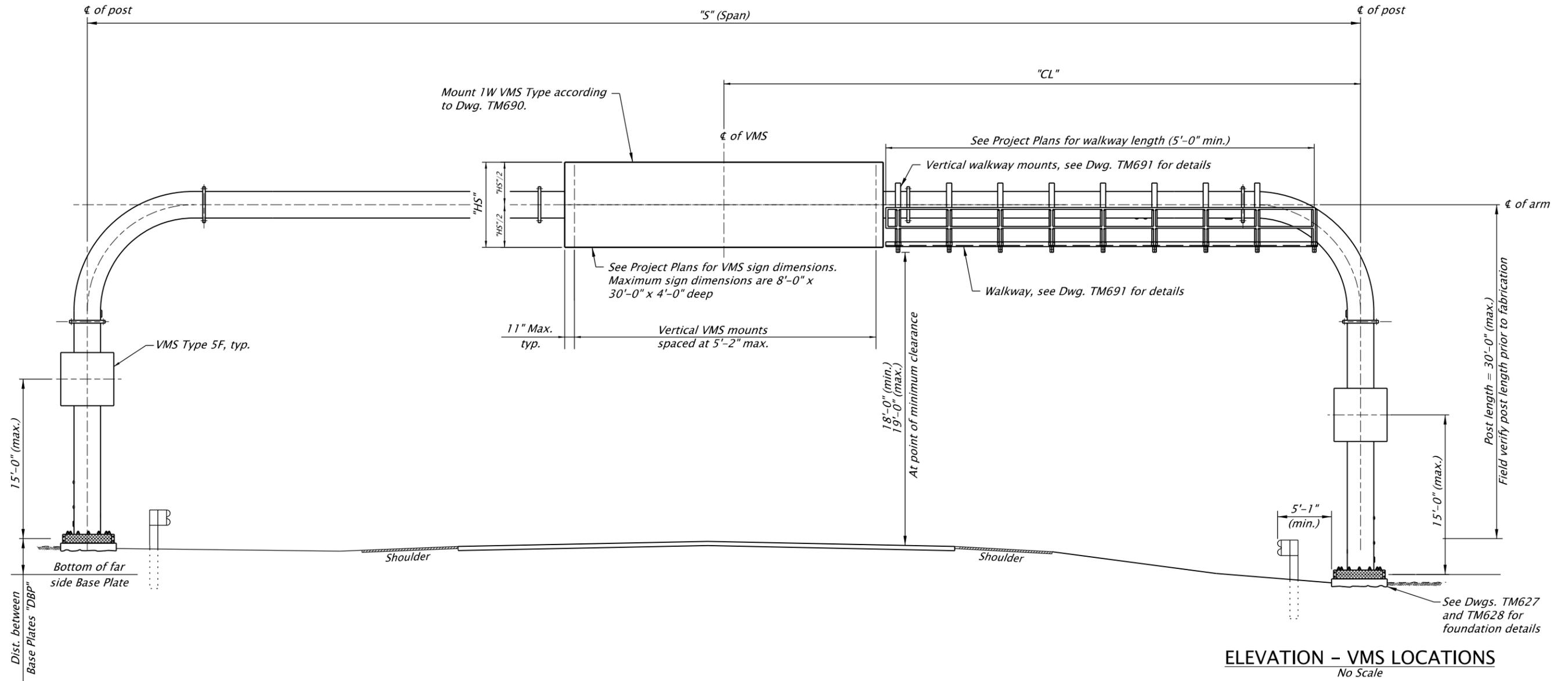


SECTION L-L
No Scale

Accompanied by dwgs. TM690, TM691, TM693, TM694, TM695, TM697

CALC. BOOK NO. 6969-6972		BASELINE REPORT DATE 10-JAN-2020	
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications			
OREGON STANDARD DRAWINGS			
STD. MONOTUBE VMS/SIGN BRIDGE WALKWAY DETAILS (SH. 2)			
2018			
DATE	REVISION DESCRIPTION		
01/18	Drawing created		
01/20	Added end closure walkway details.		

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 consulting a Registered Professional Engineer.



ELEVATION - VMS LOCATIONS
No Scale

Structure Design No.	Max. "S" (ft)	Max. "CL"
1	120	94
2	100	74
3	80	54

See TM693 for details not shown.

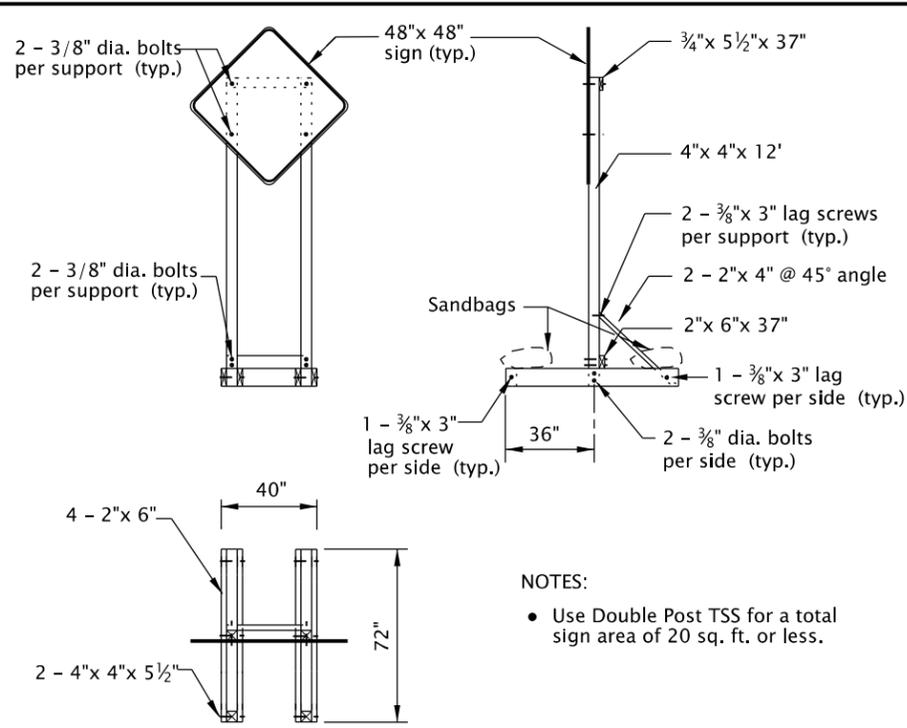
VMS Type	Access	VMS Height (ft)	VMS Length (ft)	Max. VMS Area (ft ²)	VMS Depth	Weight (lbs)
1W	Walk-in	8	30	240	4'-0"	3950
5F	Front	5	5	25	1'-2"	500

Accompanied by dwgs: TM621 through TM628, TM690, TM691, TM693, TM694, TM697

CALC. BOOK NO. <u>7069</u>	BASELINE REPORT DATE <u>10-JAN-2020</u>
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS	
STD. MONOTUBE TYPE 1 VMS WALK-IN BRIDGE GENERAL DESIGN CRITERIA	
2018	
DATE	REVISION DESCRIPTION
01/19	Drawing created
01/20	Added distance between base plates.

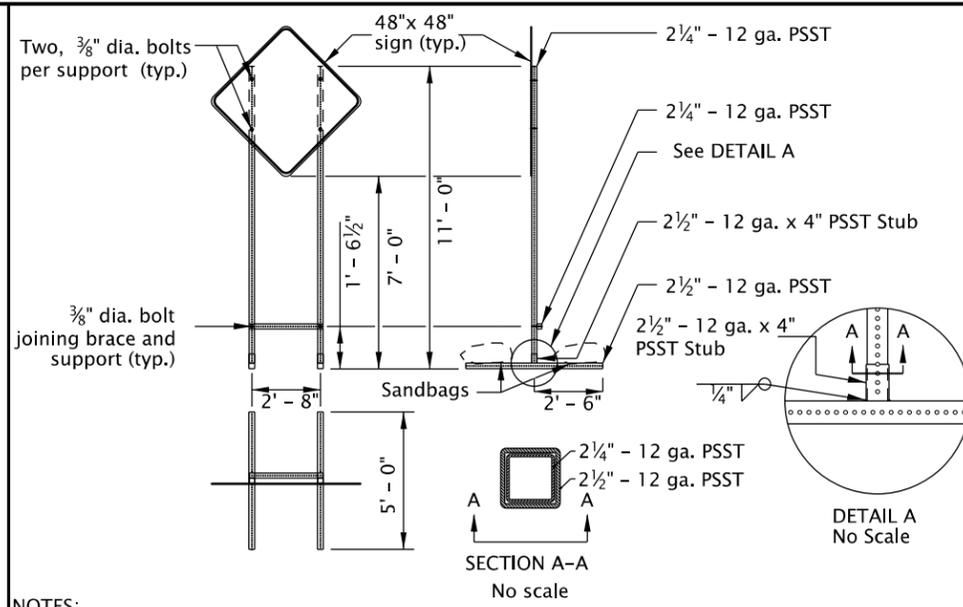
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

tm821.dgn 01-JAN-2020



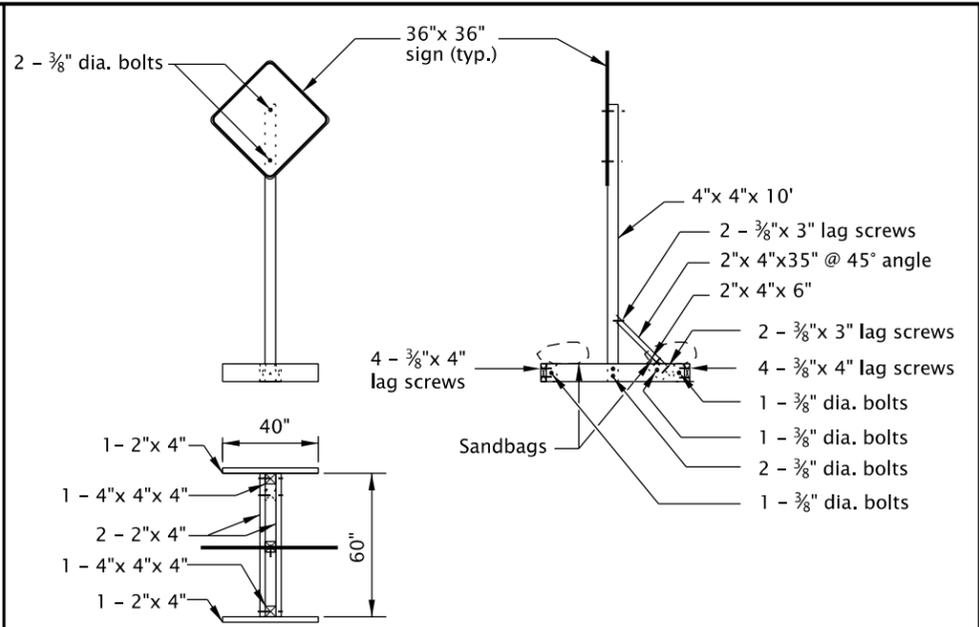
**DOUBLE POST
TEMPORARY SIGN SUPPORT (TSS)**

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



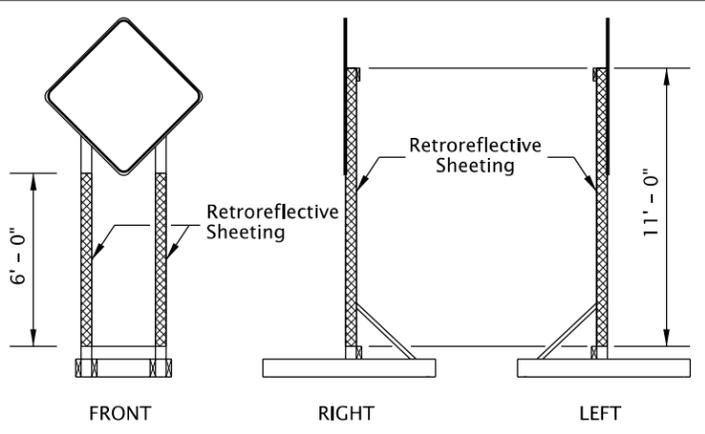
**PERFORATED STEEL SQUARE TUBE (PSST)
TEMPORARY SIGN SUPPORT (TSS)**

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

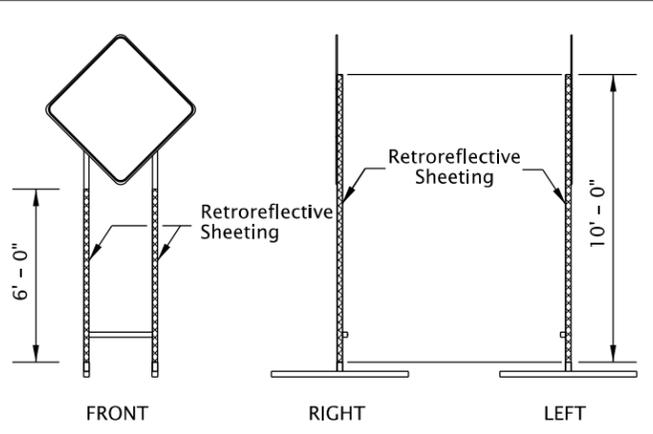


**SINGLE POST
TEMPORARY SIGN SUPPORT (TSS)**

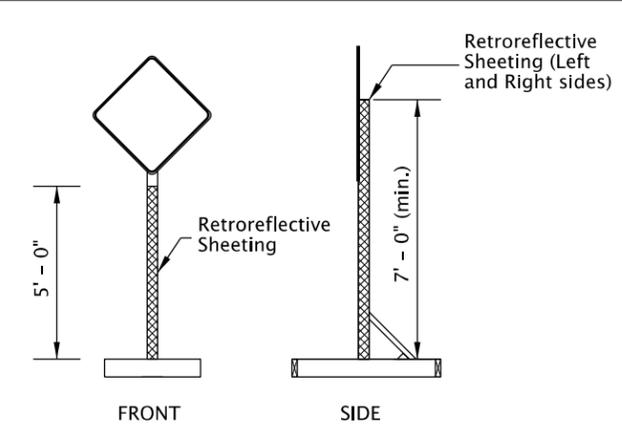
- NOTES:
- Use Single Post TSS for a total sign area of 12 sq. ft. or less.
 - Use Single Post TSS for mounting "Business Access" (CG20-11) signs. Do not mount signs on Type II or III Barricades.



**DOUBLE POST
TEMPORARY SIGN SUPPORT (TSS)**



**PERFORATED STEEL SQUARE TUBE (PSST)
TEMPORARY SIGN SUPPORT (TSS)**



**SINGLE POST
TEMPORARY SIGN SUPPORT (TSS)**

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

SIGN POST REFLECTIVE SHEETING PLACEMENT

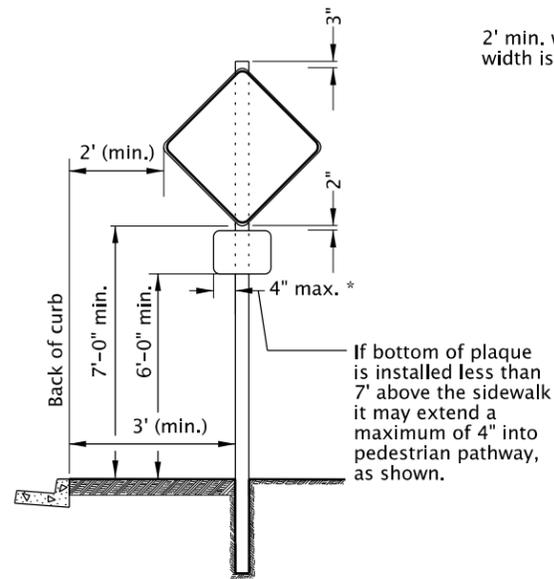
- TEMPORARY SIGN SUPPORT GENERAL NOTES:
- DO NOT TIP OVER TSS AT ANY TIME.
 - Do not locate TSS's in locations that block pedestrian/bicycle traffic.
 - For wooden TSS's, use either Douglas Fir or Hem Fir, which is surfaced four sides (S4S) and free of heart center (FOHC).
 - See "Temporary Sign Placement"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

CALC. BOOK NO. _____ N/A _____	BASELINE REPORT DATE _____ 01-JAN-2020 _____
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS	
TEMPORARY SIGN SUPPORTS	
2018	
DATE	REVISION DESCRIPTION
01-2019	REVISED NOTES
01-2020	REVISED NOTES

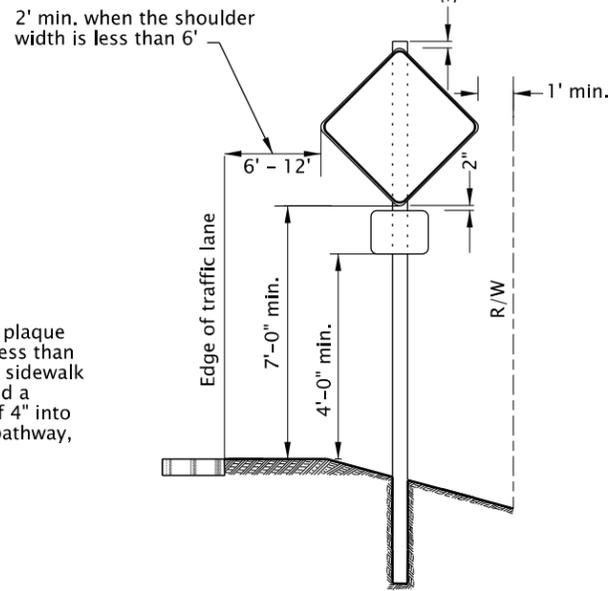
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

NOTES:

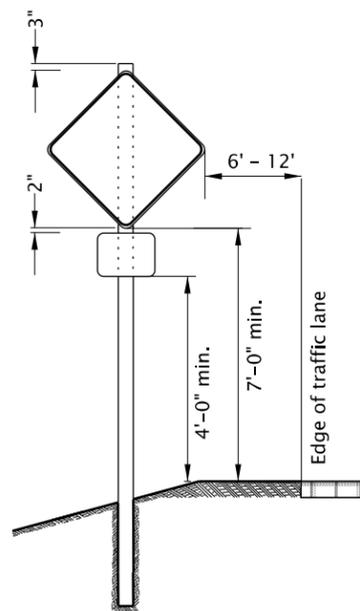
- Do not block bicycle lanes, sidewalks, or TPAR's with sign supports. Maintain minimum widths for these facilities according TCP Design Manual, MUTCD, ADA, or as directed.
- To be accompanied by Drg. Nos. TM670, TM671, TM687, TM688 & TM689.



URBAN AREAS WITH CURB/SIDEWALK

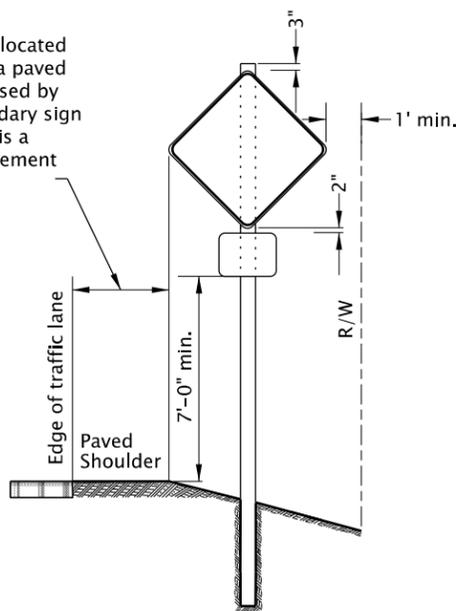


RURAL AREAS



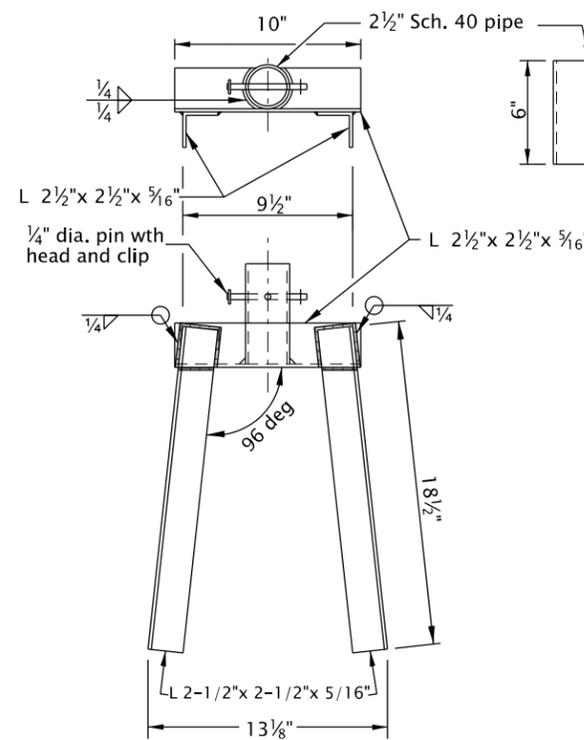
DIVIDED HIGHWAY/FREEWAY MEDIANS
NO CURB/SIDEWALK

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



RURAL OR URBAN AREAS - CURB OR NO CURB
BICYCLES ON SHOULDER

TEMPORARY SIGN PLACEMENT



NOTES:

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

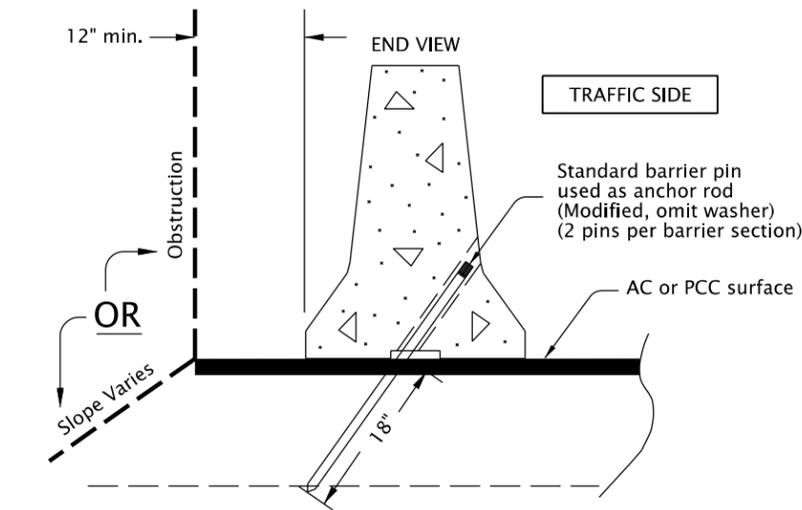
CONCRETE BARRIER SIGN SUPPORT

CALC. BOOK NO. _____ N/A _____	BASELINE REPORT DATE _____ 01-JAN-2020 _____												
<p><i>The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.</i></p>	NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications												
	OREGON STANDARD DRAWINGS												
	TEMPORARY SIGN SUPPORTS												
	2018												
	<table border="1"> <thead> <tr> <th>DATE</th> <th>REVISION</th> <th>DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>01-2018</td> <td>REVISED DRAWING</td> <td></td> </tr> <tr> <td>01-2019</td> <td>REVISED NOTES</td> <td></td> </tr> <tr> <td>01-2020</td> <td>REVISED NOTES</td> <td></td> </tr> </tbody> </table>	DATE	REVISION	DESCRIPTION	01-2018	REVISED DRAWING		01-2019	REVISED NOTES		01-2020	REVISED NOTES	
DATE	REVISION	DESCRIPTION											
01-2018	REVISED DRAWING												
01-2019	REVISED NOTES												
01-2020	REVISED NOTES												

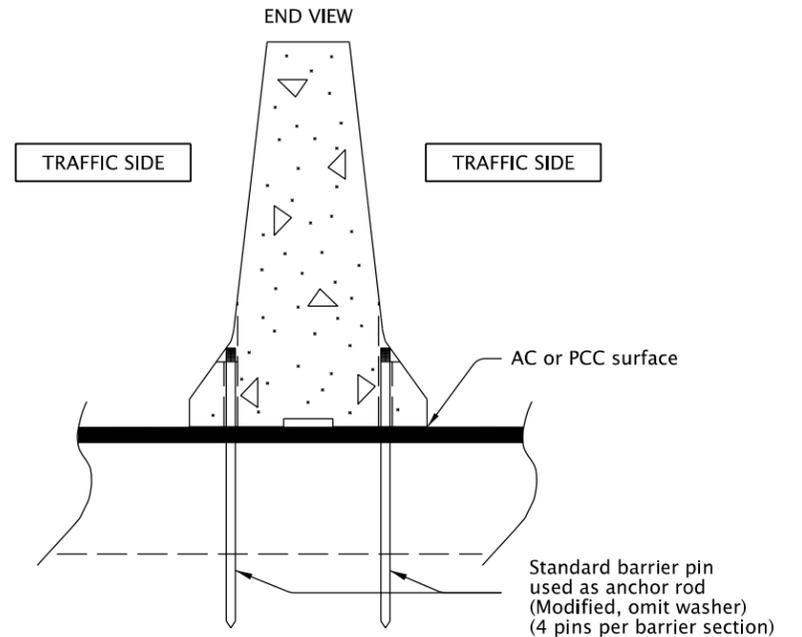
tm830.dgn 01-JAN-2020

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 placement.
- Excavation height greater than 3 feet requires proper backslope based on angle of repose, or shoring as directed.



**SHOULDER INSTALLATION
SECURING TEMPORARY CONCRETE BARRIER**

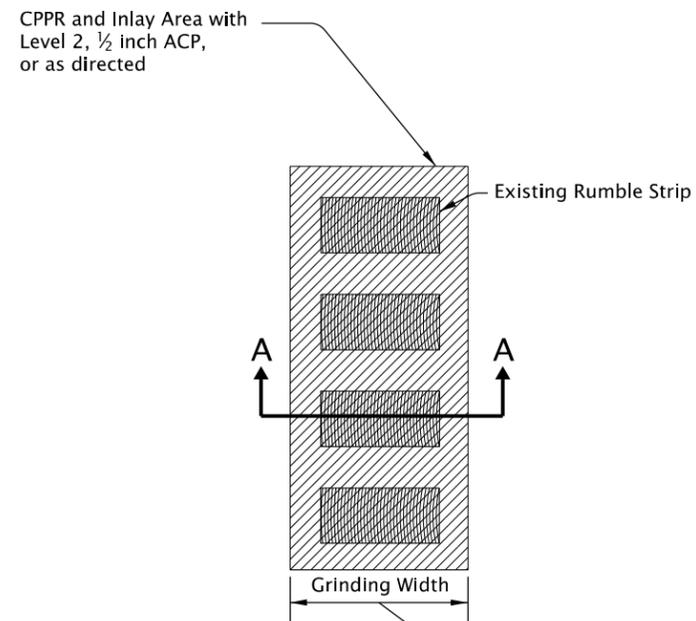


**MEDIAN INSTALLATION
SECURING TEMPORARY TALL CONCRETE BARRIER**

NOTES:

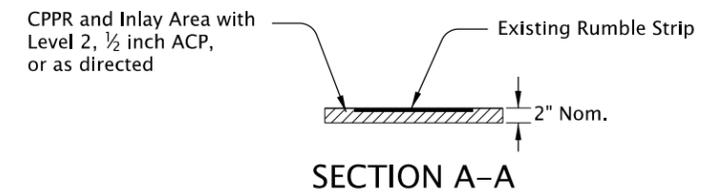
- CPPR and inlay existing rumble strips prior to staging traffic across the area. Common application is staging for freeway crossovers and lane shifts.
- Remove and replace existing striping as required.

UNDER CONSTRUCTION



EXISTING RUMBLE STRIP REMOVAL

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

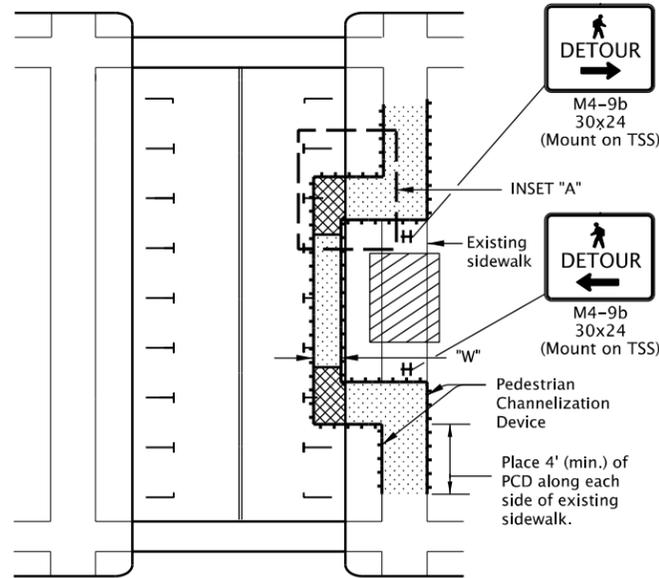


SECTION A-A

CALC. BOOK NO. _____ N/A _____	BASELINE REPORT DATE _____ 01-JAN-2020 _____
<p><i>The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.</i></p>	NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications
	OREGON STANDARD DRAWINGS
	TEMPORARY CONCRETE BARRIER AND RUMBLE STRIP DETAILS
	2018
DATE	REVISION DESCRIPTION
01-2019	REVISED NOTES
01-2020	REVISED DRAWING AND NOTES

TM830

tm844.dgn 01-JAN-2020



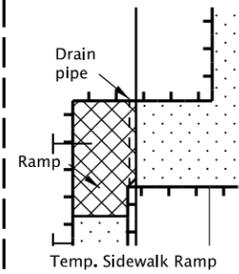
WITHIN ROADWAY SIDEWALK DIVERSION

NOTES:

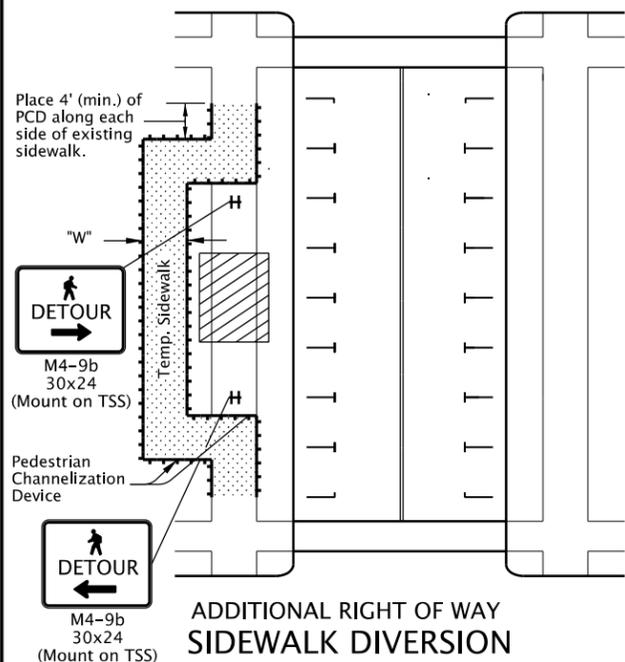
- Place or construct temp. sidewalk ramp, as needed.
- For roadways with a pre-construction posted speed of 40 mph or less.
- See inset "A" for Temp. Sidewalk Ramp details.
- "W" = 60", or, where 60" width cannot be maintained through the entire route, provide 48" min. width with 60" x 60" passing spaces every 200 ft.
- Use temporary ADA compliant surfaces to cross planter strips or other non-traversable surfaces.

NOTES:

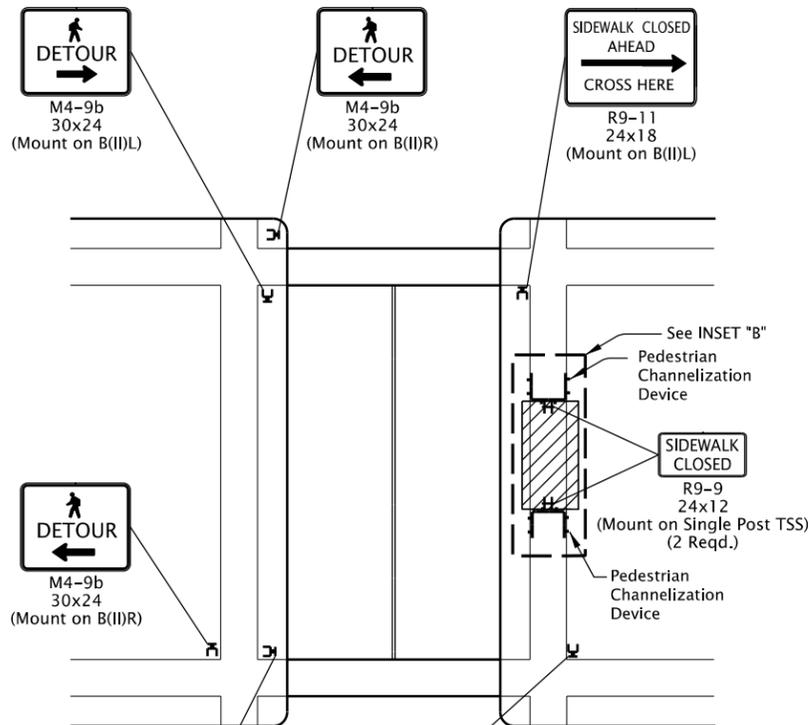
- Ramp size will vary. Ramp must meet ADA requirements incl. max design grade of 7.5% and max design cross slope of 1.5%.



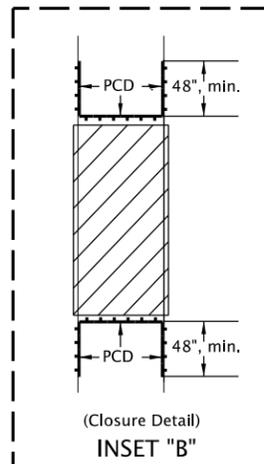
INSET "A"



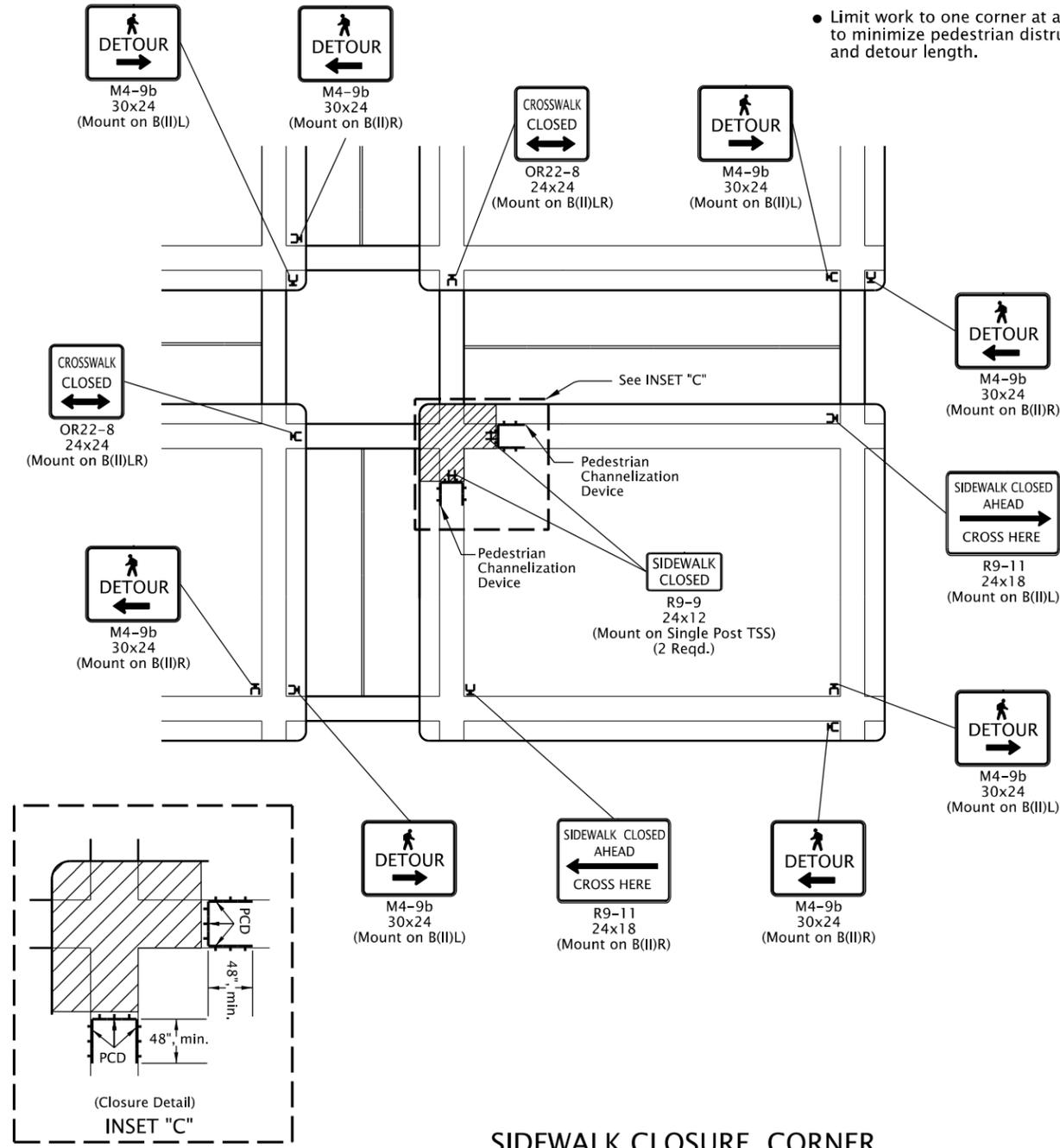
ADDITIONAL RIGHT OF WAY SIDEWALK DIVERSION



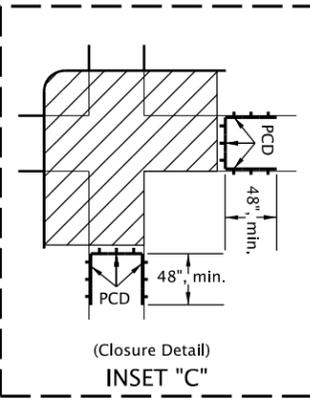
SIDEWALK CLOSURE, MIDBLOCK



INSET "B"



SIDEWALK CLOSURE, CORNER



INSET "C"

GENERAL NOTES FOR ALL DETAILS:

- When closing or relocating crosswalks or other pedestrian facilities provide ADA compliant facilities. Include accessibility features consistent with existing pedestrian facilities by providing adequate slope transitions and surfacing.
- Provide non-slip, 60 inch minimum wide surface through entire pedestrian route. If not possible, provide 48" min. width with 60" x 60" passing spaces every 200 feet along the route.
- Only TCD for pedestrians are shown. Other devices may be necessary to control vehicular traffic.
- Stage work, as necessary, to provide a temporary pedestrian access route at all times. For roadways with no available detours, maintain one open sidewalk at all times.
- Minimize pedestrian out-of-direction travel.
- To be accompanied by Drg. Nos. TM820 & TM821.

- UNDER PEDESTRIAN TRAFFIC
- UNDER CONSTRUCTION
- PEDESTRIAN CHANNELIZATION DEVICE

CALC. BOOK NO. _____ N/A _____

BASELINE REPORT DATE _____ 01-JAN-2020 _____

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS
TEMPORARY PEDESTRIAN ACCESSIBLE ROUTING

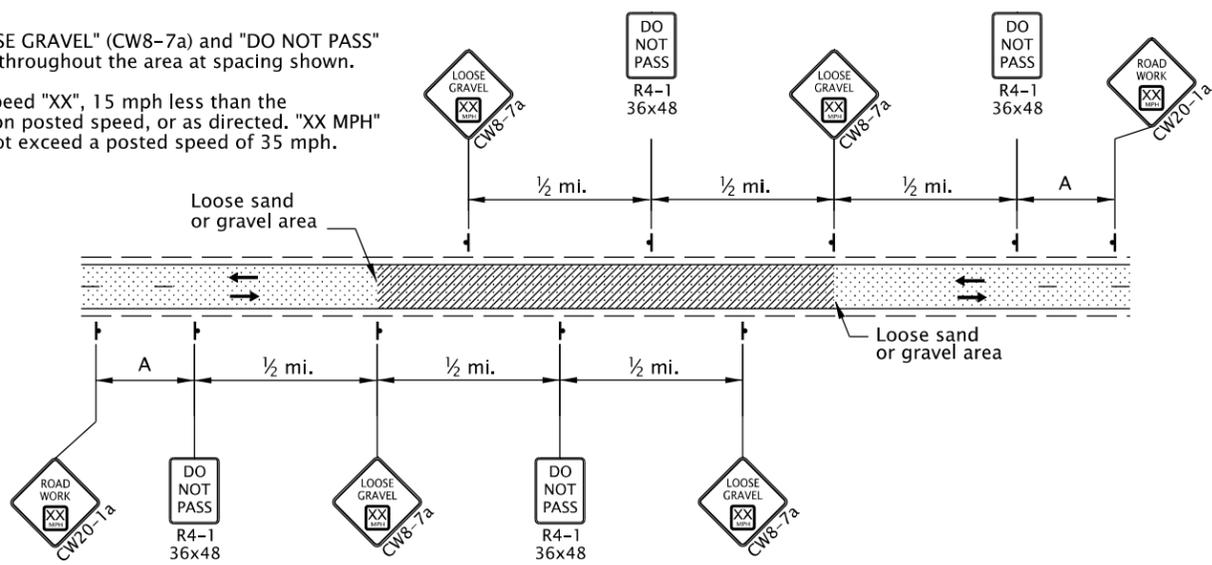
2018

DATE	REVISION DESCRIPTION
01-2019	REVISED NOTES
01-2020	REVISED TITLE

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 consulting a Registered Professional Engineer.

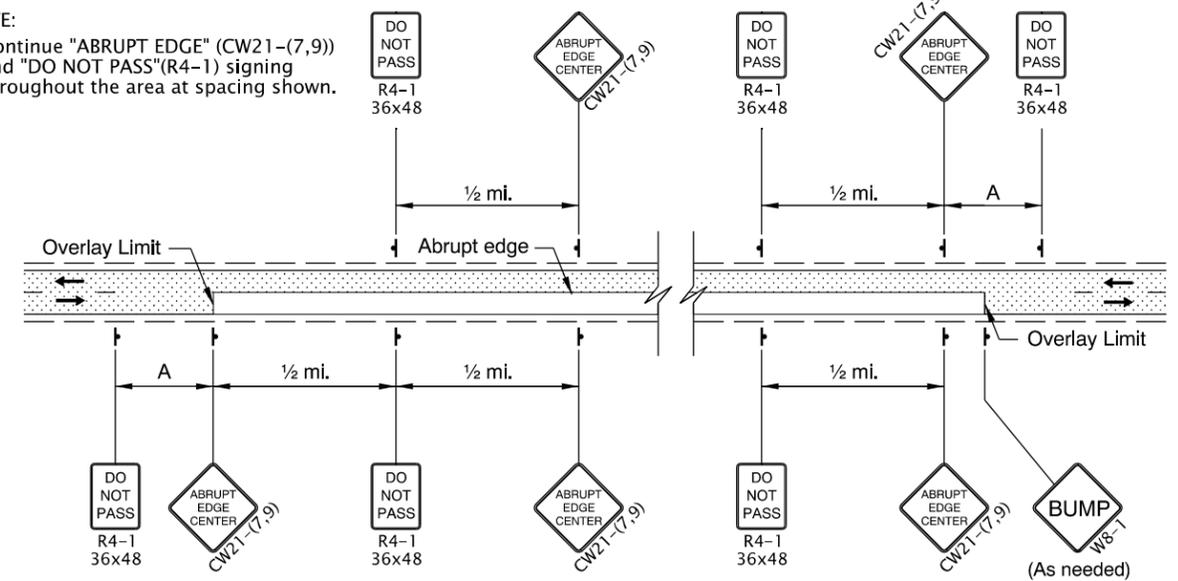
tm850.dgn 01-JAN-2020

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



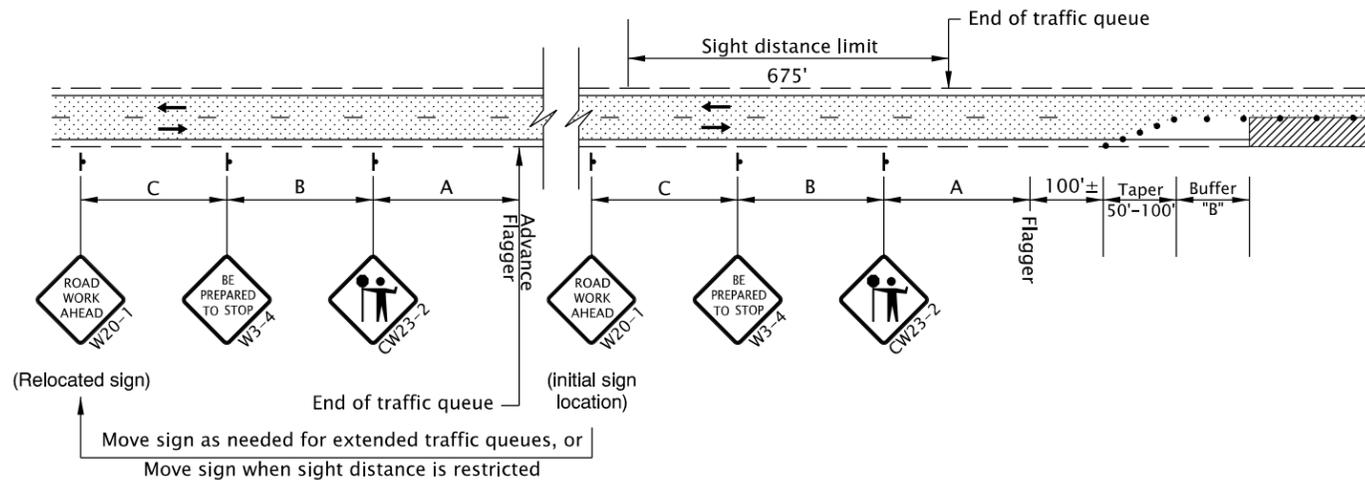
2-LANE, 2-WAY ROADWAY
LOOSE GRAVEL IN ROADWAY SIGNING

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

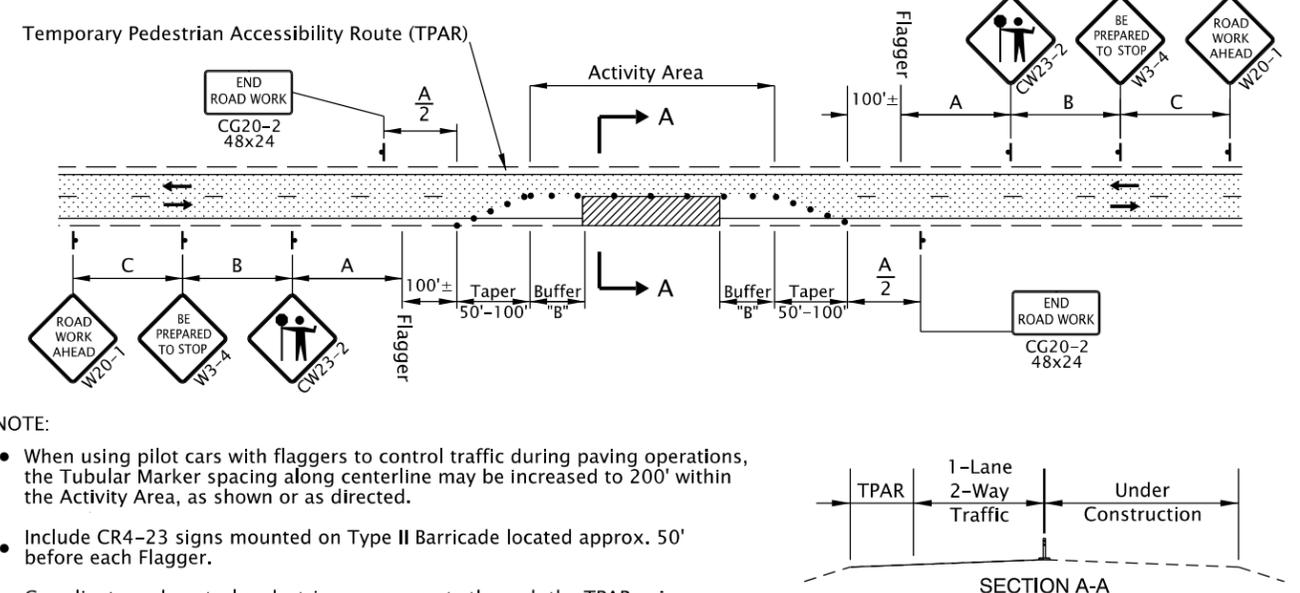


2-LANE, 2-WAY ROADWAY
OVERLAY AREA SIGNING

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



ADVANCE FLAGGER FOR EXTENDED TRAFFIC QUEUES



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

2-LANE, 2-WAY ROADWAY
ONE LANE CLOSURE

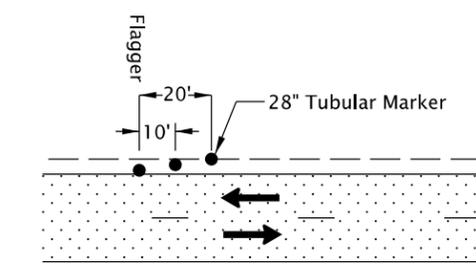
GENERAL NOTES FOR ALL DETAILS:

- The "FLAGGER" (CW23-2) symbol sign shall be used only in conjunction with the "BE PREPARED TO STOP" (W3-4) sign.
- Cover existing passing zone signing, as directed.
- Install temporary striping as required.
- To determine Taper Length ("L") and Buffer Length ("B"), use the "MINIMUM LENGTHS TABLE" shown on Drg. No. TM800.
- To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Drg. No. TM800.
- Install a "BICYCLES ON ROADWAY" (CW11-1) sign in advance of the closure when a bike lane is closed, or when the shoulder is closed and bikes are expected.
- To be accompanied by Drg. Nos. TM821.

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

- UNDER TRAFFIC
- UNDER CONSTRUCTION
- CONSTRUCTION UNDER TRAFFIC

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



FLAGGER STATION DELINEATION

CALC. BOOK NO. _ _ _ _ N/A _ _ _ _

BASELINE REPORT DATE _ _ _ _ 01-JAN-2020 _ _ _ _

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

OREGON STANDARD DRAWINGS

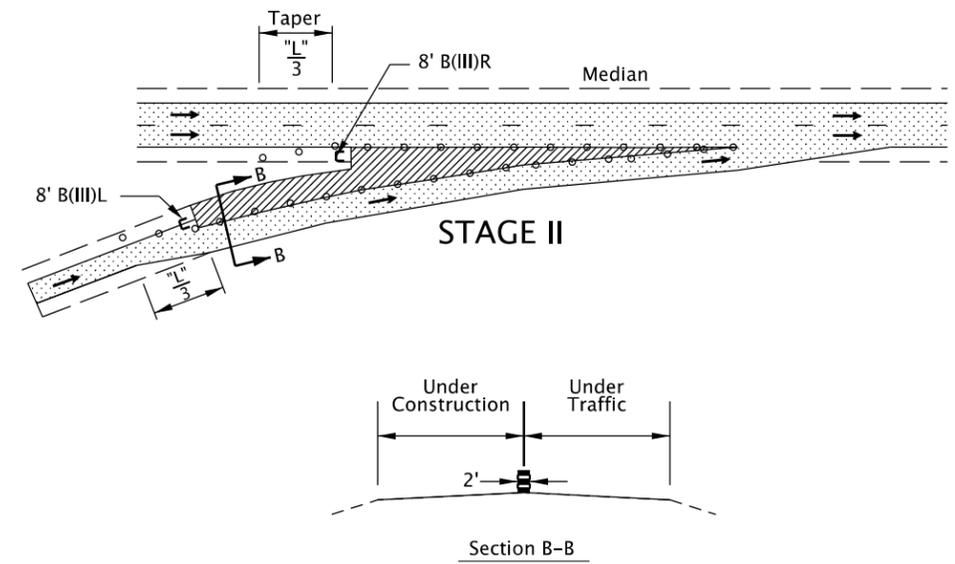
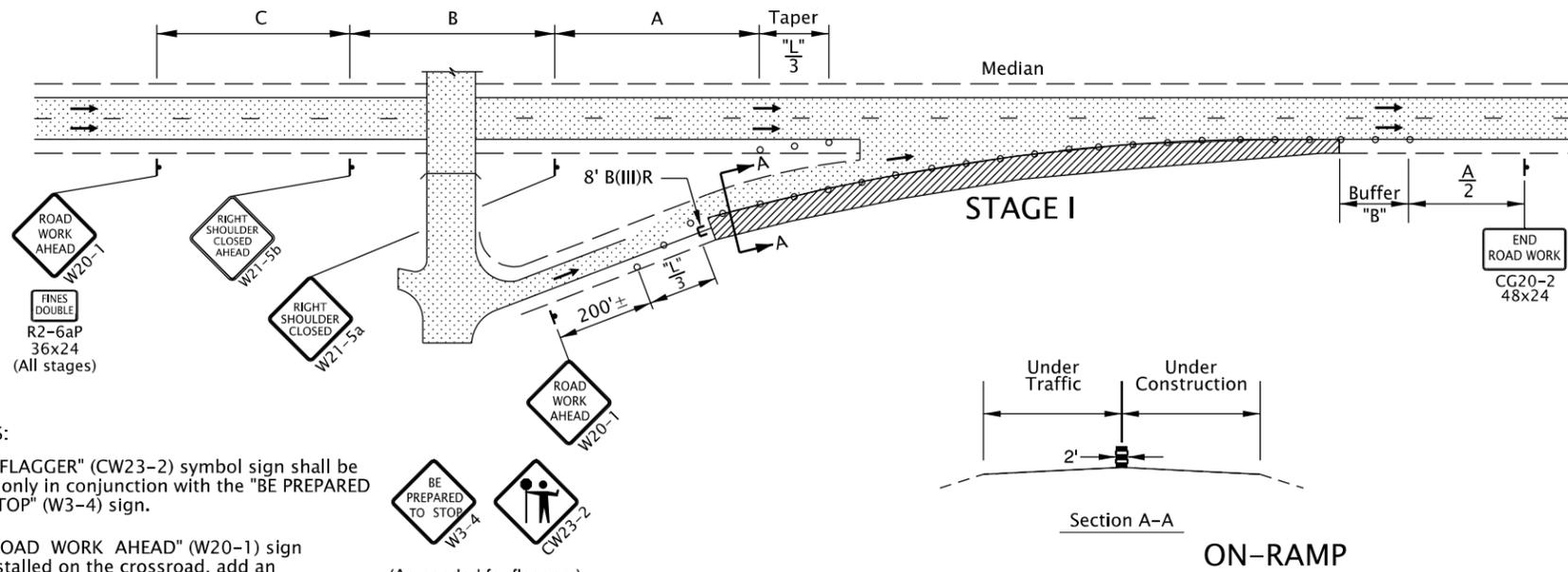
2-LANE, 2-WAY ROADWAYS

2018

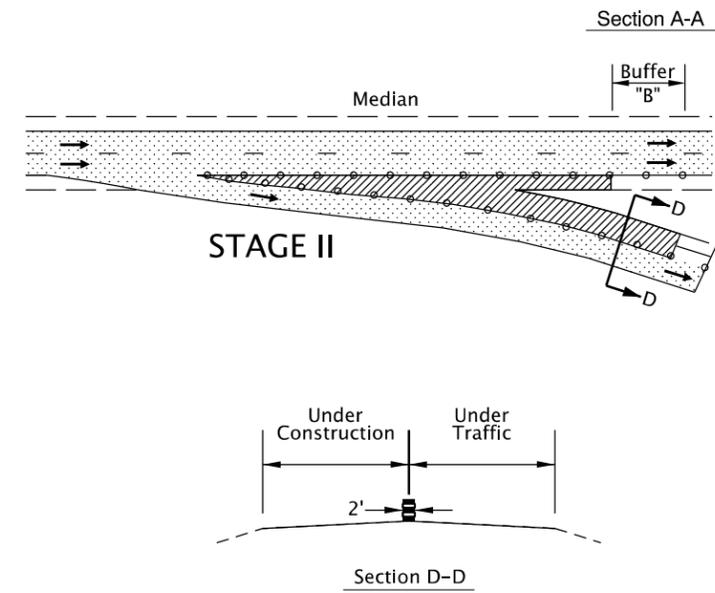
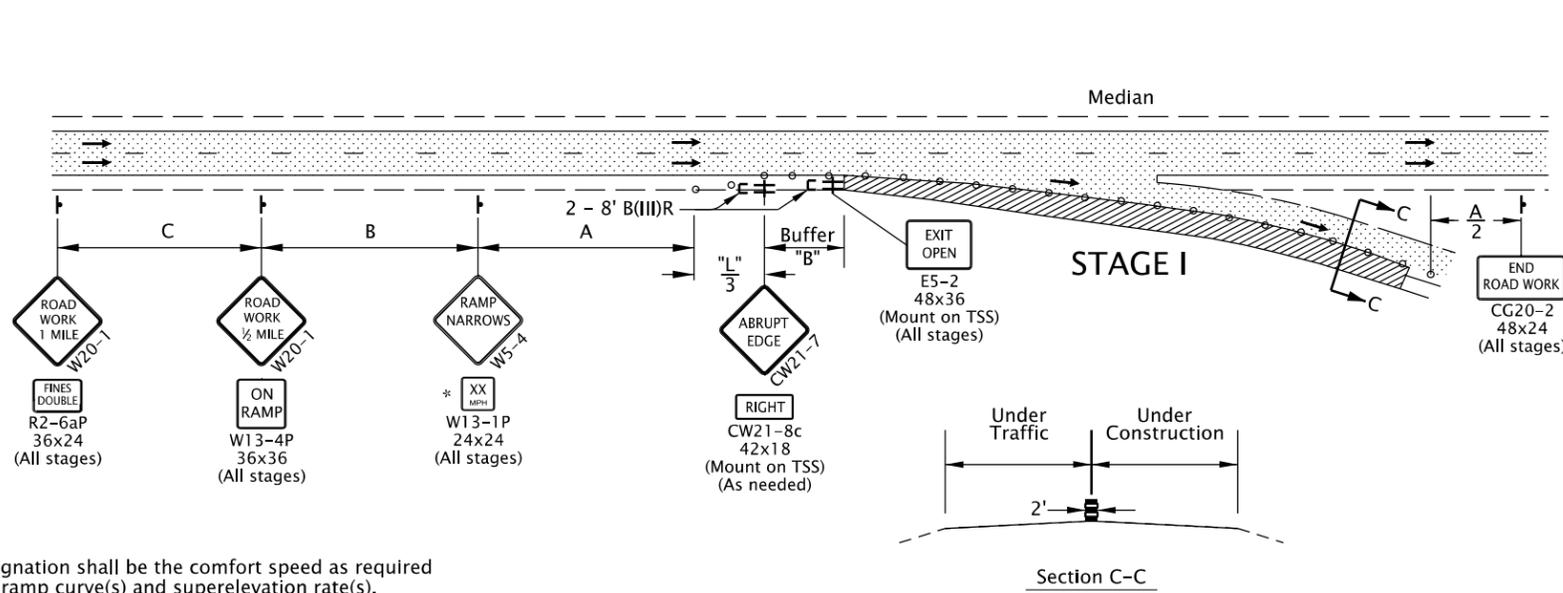
DATE	REVISION DESCRIPTION
01-2018	REVISED DRAWING AND NOTES
01-2020	REVISED NOTES

TM850

tm860.dgn 01-JAN-2020



- NOTES:**
- The "FLAGGER" (CW23-2) symbol sign shall be used only in conjunction with the "BE PREPARED TO STOP" (W3-4) sign.
 - If "ROAD WORK AHEAD" (W20-1) sign is installed on the crossroad, add an "ON RAMP" (W13-4P) plaque below the sign.



* Speed designation shall be the comfort speed as required by radii of ramp curve(s) and superelevation rate(s). See Highway Design Manual Comfort Speed Table 3-5.

GENERAL NOTES FOR ALL DETAILS:

- Signing and other TCD shown to be installed in conjunction with the work areas, shall move with the work areas.
- Use Concrete Barrier Sign Supports for mounting signs with a maximum 12 sq. ft. of total sign area. (See Drg. No. TM822 for Concrete Barrier Sign Support Details)
- Unless otherwise shown, use the "MINIMUM LENGTHS TABLE" on Drg. No. TM800 to determine Taper Length ("L") and Buffer Length ("B").
- Flaggers are not permitted to stop or hold freeway traffic.
- To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Drg. No. TM800.
- Speeds shown on signing shall be in MPH. Distances shown on signing shall be in feet or miles.
- A Truck mounted attenuator (TMA) may be used to additional protection for the active work area. Locate TMA as per manufacturer's instructions, or as directed.
- During partial ramp closures provide a minimum of 16' of horizontal clearance between channelization devices, or as otherwise directed.
- To be accompanied by Drg. Nos. TM820 & TM821.



CALC. BOOK NO. _ _ _ _ TM09-01 _ _ _ _

BASELINE REPORT DATE _ _ _ _ 01-JAN-2020 _ _ _ _

NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications

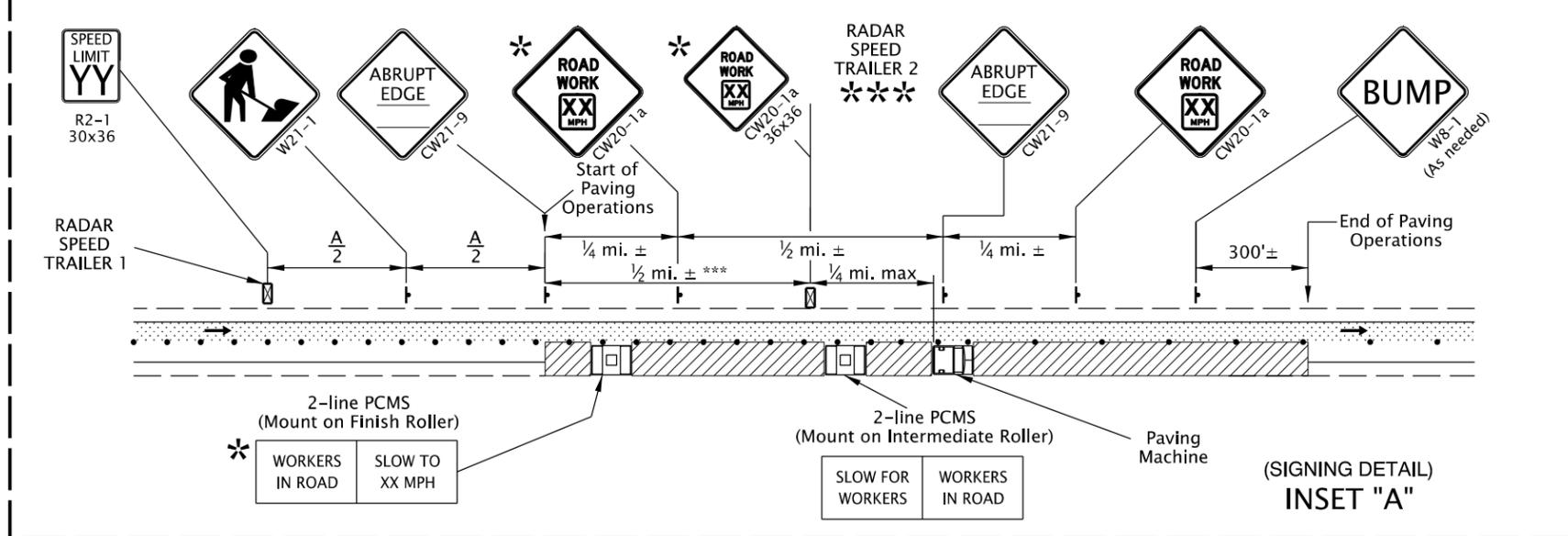
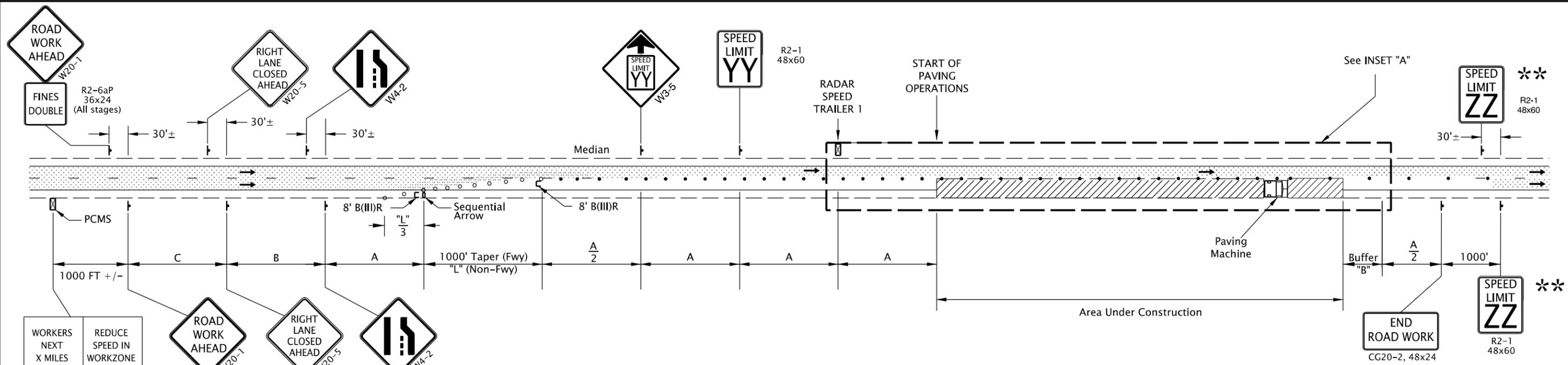
OREGON STANDARD DRAWINGS

FREWAY SECTIONS - RAMPS

2018	
DATE	REVISION DESCRIPTION
01-2018	REVISED NOTES
07-2019	REVISED DRAWING
01-2020	REVISED DRAWING

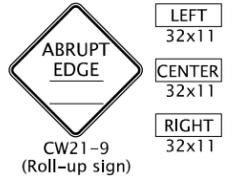
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TM860



FREEWAY OR DIVIDED HIGHWAY
ONE LANE CLOSURE WITH SPEED REDUCTION (PAVING OPERATIONS)
 (Must be accompanied by an approved Speed Zone Order)

- NOTES:**
- Use "ABRUPT EDGE" (CW21-(7,9)) and "BUMP" (W8-1) signing for longitudinal abrupt edges of 1 inch or greater. See Inset A.
 - Additional alternating "ABRUPT EDGE" (CW21-(7,9)) signs with appropriate plaques and "ROAD WORK XX MPH" (CW20-1a) to be installed on 1/2 mile intervals throughout the active work area where applicable, as shown.
 - If roll-up signs are used, attach the correct plaques to the ABRUPT EDGE (CW21-9) sign face using hook and loop fasteners.
- * Mount PCMS on finish and intermediate rollers, as shown. Use speed of "XX" on 2-line PCMS and "ROAD WORK XX MPH" (CW20-1a) signs, as follows:
- 15 mph below speed zone order for freeways ("YY"-15)
 - 10 mph below speed zone order for non-freeways ("YY"-10)
- ** Install two "SPEED LIMIT "ZZ" (R2-1) signs displaying the pre-construction speed limit. Do not install the two "SPEED LIMIT "ZZ" signs if located 1000' or less in advance of existing SPEED LIMIT signs, or as directed.
- *** Once the Paving Machine is approximately 1/2 mile from the start of the paving operations, place the "Radar Speed Trailer 2" and other signing and TCD, as shown. Move "Radar Speed Trailer 2" as work progresses. Maintain "Radar Speed Trailer 2" within a 1/4 mile of the paving machine.



GENERAL NOTES FOR ALL DETAILS:

- Drawing intended for continuous or intermittently moving paving or pavement preservation activities on freeways or high-speed divided highways.
- Flaggers are not permitted to stop or hold freeway traffic.
- If the inside shoulder in either direction is less than 4' use 36x36 signs, as shown on Drgs. TM821 and TM822.
- Unless otherwise shown, use the "MINIMUM LENGTHS TABLE" on Drg. No. TM800 to determine Taper Length "L" and Buffer Length "B".
- Place a Type III barricade in closed lane on 1/4 mile spacing, as shown, after rollers have completed compaction.

- Decrease Tubular Marker spacing to 40 ft. behind the paving machine as work progresses.
- To determine sign spacing A, B, and C, use TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE on Drg. TM800.
- For work in the left lane, place TCD to close the left lane. Use "LEFT LANE CLOSED AHEAD" (W20-5) signs and the appropriate "LEFT LANE ENDS" (W4-2) signs.
- Speed ("YY") shown on signs to be determined by an approved Speed Zone Order from the State Traffic Engineer.
- Do not delineate Radar Speed Trailers. Locate trailer as shown, or as directed.
- To be accompanied by Drg. Nos. TM820 & TM821.

- 28" Tubular Markers @ 80 ft. max spacing.
 - 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

CALC. BOOK NO. _____ N/A _____

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 consulting a Registered Professional Engineer.

BASELINE REPORT DATE 01-JAN-2020	
NOTE: All material and workmanship shall be in accordance with the current Oregon Standard Specifications	
OREGON STANDARD DRAWINGS	
FREEWAY or DIVIDED HIGHWAY	
SPEED REDUCTION	
(PAVING OPERATIONS)	
2018	
DATE	REVISION DESCRIPTION
01-2018	REVISED DRAWING AND NOTES
01-2020	REVISED DRAWING AND NOTES