2021 OREGON STANDARD DRAWINGS

Standard Distribution
Date of Issue: July 2022

William Lee Woods, PE Jul 26 2022 5:06 PM -07:00

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Senior Standards Engineer

This is the July 2022 release of the 2021 Oregon Standard Drawings.

For ODOT Projects the details in the standard drawings will be effective on the **Dec 1, 2022** bid opening where these drawings are called for in the project plans.

These drawings are for use with projects using the **2021 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
RD317	
RD356	
RD386	
RD515	
RD526	
RD535	
RD536	New Drawing
RD545	
RD546	New Drawing
RD575	
RD576	New Drawing
RD595	New Drawing
RD596	New Drawing
RD722	

Drawing Number	Comment
RD908	
BR139	
BR140	
BR222	
BR241	
BR290	
BR400	
BR405	
BR410	
BR415	
BR420	
BR422	
BR445	
TM457	
TM467	
TM472	
TM492	
TM493	New Drawing
TM503	
TM530	
TM628	
TM655	
TM656	
TM800	
TM841	
TM850	
TM853	
TN854	New Drawing
TM870	
TM871	

OREGON STANDARD DRAWINGS 2021
NUMBERS AND REVISION DATES

DRAWING NUMBER	REVISION DATE
RD100	
RD101	
RD110	
RD115	
RD120	
RD130	
RD140	
RD150	
RD160	
RD170	01/2021
RD250	
RD254	
RD255	
RD258	
RD262	
RD266	
RD270	
RD274	
RD278	
RD282	
RD286	
RD300	
RD302	
RD304	
RD306	
RD308	
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RD316	
RD317	07/2022
RD318	
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RD320	
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RD610	
RD615	07/2021
RD700	
RD701	
RD702	01/2022
RD705	
RD706	

OREGON STANDARD DRAWINGS 2021
NUMBERS AND REVISION DATES

DRAWING NUMBER	REVISION DATE
RD707	
RD710	01/2022
RD711	01/2022
RD715	
RD720	
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BR740	

OREGON STANDARD DRAWINGS 2021
NUMBERS AND REVISION DATES

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TM844	01/2022

OREGON STANDARD DRAWINGS 2021
NUMBERS AND REVISION DATES

DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE	DRAWING NUMBER	REVISION DATE
TM850	07/2022				
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TM852					
TM853	07/2022				
TM854	07/2022				
TM860					
TM861					
TM862					
TM870	07/2022				
TM871	07/2022				
TM880	07/2021				

2021 OREGON STANDARD DRAWINGS INDEX

- A -

- B -

- C -

-G-

-M-

-P-

Pavement

Pavement Markings

Pedestrian

Pipe

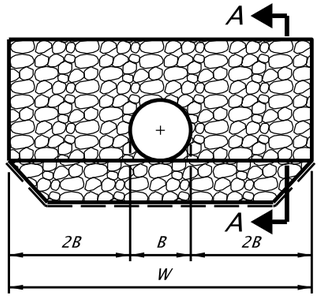
Pipe Fill Height Tables

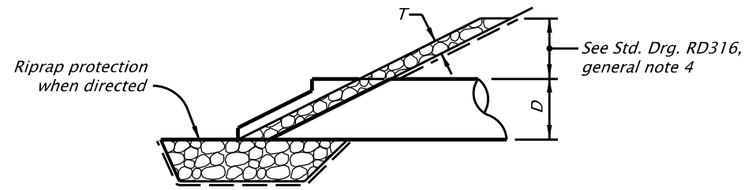
Poles

-R-

-S-

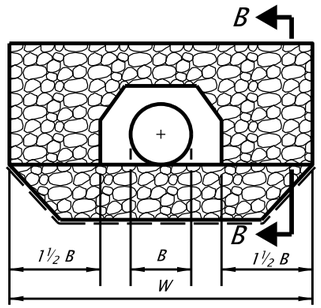
-T-

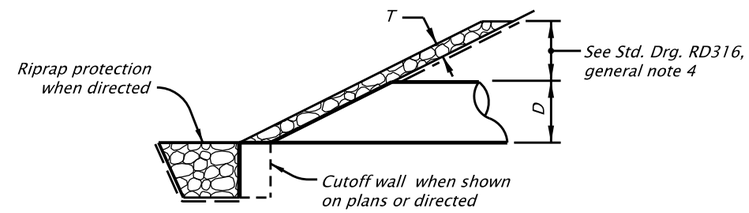




SECTION A-A

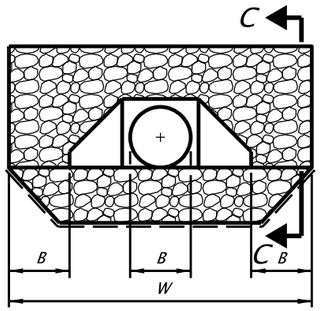
SLOPED OR PROJECTING END

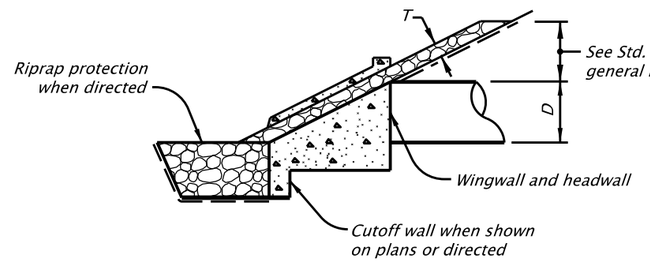




SECTION B-B

SLOPED END WITH SLOPE PAVING



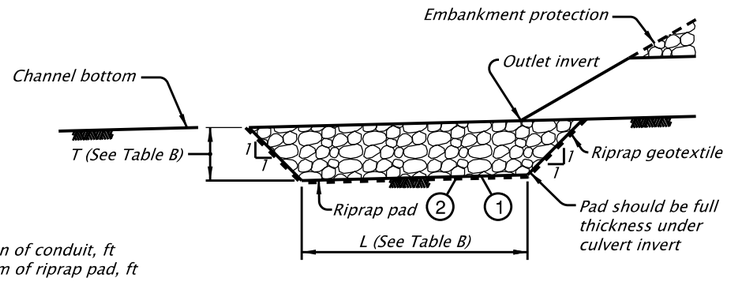


SECTION C-C

HEADWALL AND WINGWALLS

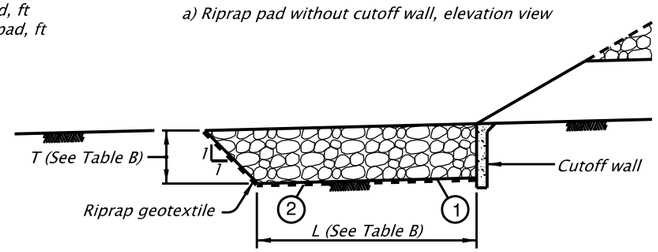
B = Diameter of circular barrel or span of arch pipe, box, or open-bottom arch.
D = Diameter of circular barrel or rise of arch pipe, box, or open-bottom arch.
T = Thickness of riprap blanket, see Table A.

EMBANKMENT PROTECTION



a) Riprap pad without cutoff wall, elevation view

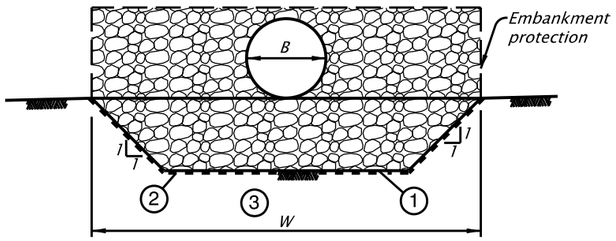
B = Diameter or span of conduit, ft
L = Length of bottom of riprap pad, ft
T = Thickness of riprap pad, ft
W= Width of top of riprap pad, ft



b) Riprap pad with cutoff wall, elevation view

RIPRAP PAD NOTES:

1. *Do not excavate non-erodible rock in order to place riprap.*
2. *Use riprap geotextile under Class 200 and Class 700 loose riprap.*
3. *Top width (W) of the riprap pad is the larger of 5B or the width of the embankment slope protection.*



c) Riprap pad, end view

RIPRAP PADS

TABLE A - Embankment Slope Protection

Riprap Class	T Distance
50	12 Inches
100	18 Inches
200	24 Inches *
700	36 Inches *

** Riprap geotextile required between riprap and embankment*

TABLE B - Riprap Pad Dimensions

Riprap Class	L * (ft)	T (ft)
50	4B or 1.3	2.3
100	4B or 1.6	3.3
200	4B or 2.0	4.3
700	4B or 3.3	5.6

** L is the greater of 4B or the listed dimension.*

GENERAL NOTES FOR ALL DETAILS:

1. *See Std. Drg's. RD300 & RD304 for installation details.*
2. *Open ends of pipes normally require a site specific design, and may require special treatment (sloped ends, culvert embankment protection, paved end slopes, safety end sections, or other measures). See special details or Standard Drawings as called for on plans.*

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

SDR DATE _ _ _ _ _ _ _ _ 30-June-2022 _ _ _ _ _ _ _ _

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

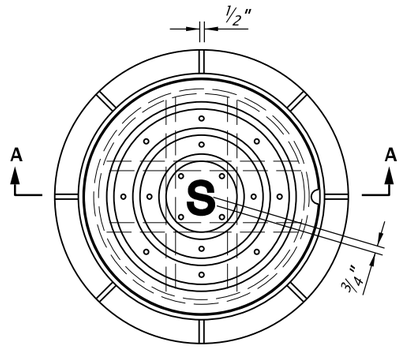
CULVERT EMBANKMENT PROTECTION and RIPRAP PADS

2021

DATE	REVISION DESCRIPTION
06-30-22	Riprap backing to riprap geotextile

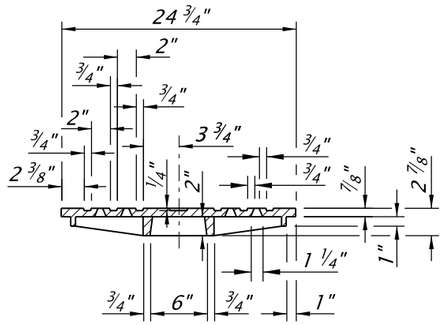
rd317.dgn 06-30-2022

RD317

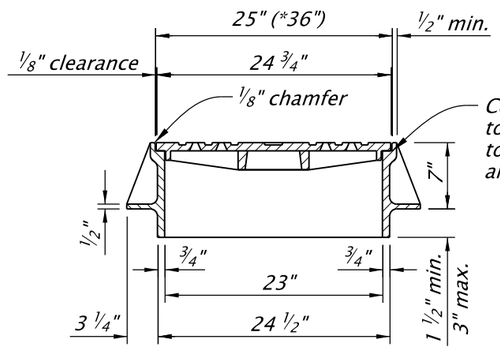


NOTE:
Coat outside of frame with asphalt where frame is to be placed in concrete, pavement, concrete gutter or walk.

PLAN



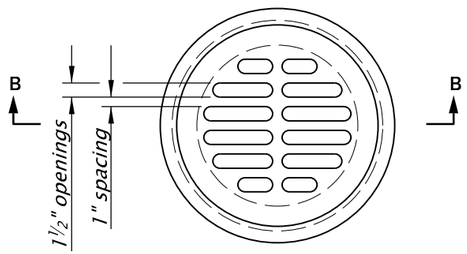
COVER SECTION A-A



*36 inch minimum diameter cover is required for mannholes with depths of 20 feet or greater. See general note 4.

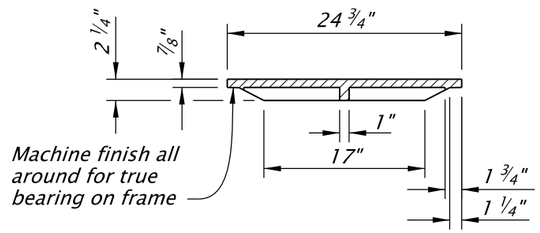
FRAME SECTION A-A

STANDARD MANHOLE COVER AND FRAME



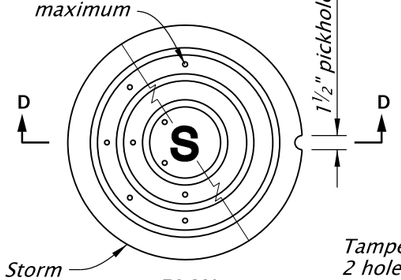
NOTE:
For use with standard manhole frame. See general note 7.

PLAN

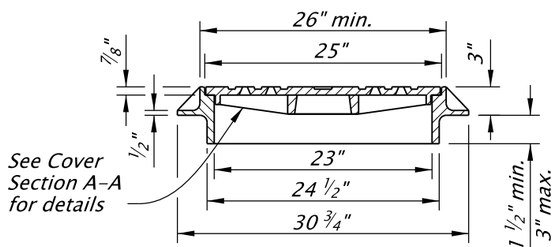


SECTION B-B

STANDARD MANHOLE GRATE



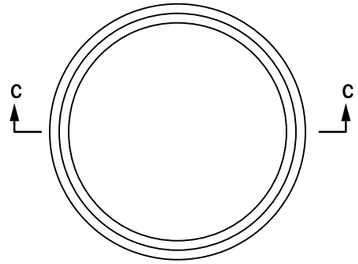
PLAN



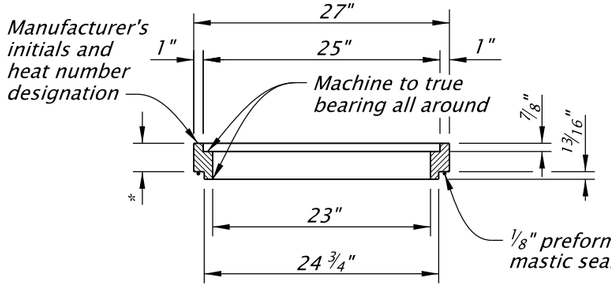
SECTION D-D

CAST IRON SUBURBAN MANHOLE COVER AND FRAME

For use on local streets only, as specified



PLAN

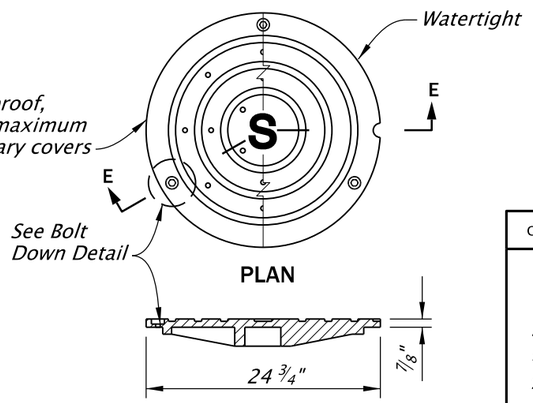


SECTION C-C

* Standard depths 1 1/2", 2", 2 1/2" and 3". Material to be grey cast iron ASTM A48, Class 35B. Tolerance on non-machined surfaces to be ±0.06". See general note 6

MANHOLE ADJUSTMENT RING

For use with Standard Manhole Frame



PLAN

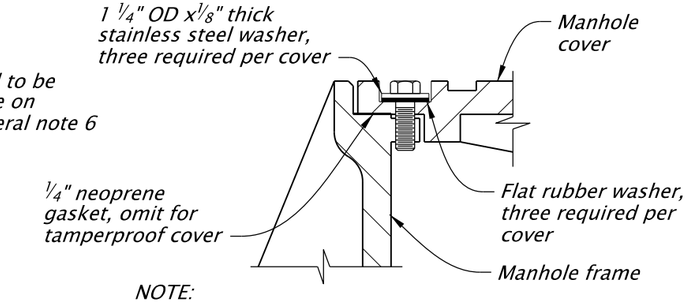
SECTION E-E

CAST IRON TAMPERPROOF AND WATERTIGHT COVER

Frames available in standard or suburban pattern

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Tamperproof covers required on sanitary or storm drain manhole where located in pedestrian ways or easement areas. Covers for sanitary manholes shall have two holes maximum.*
2. *Watertight covers required if located where cover may be submerged (no holes).*
3. *Covers and frames shall be stamped with manufacturer's initials, heat number and point of origin.*
4. *See Std. Dwg. RD336 for manhole steps.*
5. *See Std. Dwg. RD360 for manhole frame adjustment.*
6. *See ODOT's QPL for alternate manhole adjustment rings.*
7. *Manhole grate allowed only in locations not subject to bicycle or pedestrian use.*
8. *See ODOT's QPL for alternate bolt-down products.*



NOTE:
Three required, equally spaced, 1/2"x1 1/2" pentagonal or hexagonal head, bronze or stainless steel. Install frame so that one bolt boss is located over the manhole steps. See general note 8

BOLT DOWN DETAIL

For tamperproof and watertight covers

CALC. BOOK NO. N/A

SDR DATE 15-JUL-2022

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

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OREGON STANDARD DRAWINGS

MANHOLE COVERS AND FRAMES

2021

DATE	REVISION DESCRIPTION
07-2022	REVISED DETAILS AND NOTES

RD356.dgn 15-JUL-2022

Effective Date: December 1, 2022 - May 31, 2023

RD356

RD386.dgn 15-JUL-2022

ALLOWABLE FILL HEIGHTS FOR CIRCULAR CONCRETE PIPE
HS 25 - 44 LIVE LOAD

PIPE DIAMETER (INCHES)	REINFORCED PIPE					
	CLASS III		CLASS IV		CLASS V	
	MINIMUM COVER (Feet)	MAXIMUM COVER (Feet)	MINIMUM COVER (Feet)	MAXIMUM COVER (Feet)	MINIMUM COVER (Feet)	MAXIMUM COVER (Feet)
12	*1.5*	*17*	*1.0*	*27*	*0.5*	*41*
15	*1.5*	*18*	*1.0*	*27*	*0.5*	*42*
18	*1.5*	*18*	*1.0*	*27*	*0.5*	*42*
21	*1.5*	*17*	*1.0*	*27*	*0.5*	*42*
24	*1.5*	*17*	*1.0*	*27*	*0.5*	*42*
27	*1.5*	*17*	*1.0*	*27*	*0.5*	*41*
30	*1.5*	*17*	*1.0*	*27*	*0.5*	*41*
33	*1.5*	*17*	*1.0*	*27*	*0.5*	*41*
36	*1.5*	*17*	*1.0*	*26*	*0.5*	*41*
42	*1.5*	*17*	*1.0*	*26*	*0.5*	*41*
48	*1.5*	*16*	*1.0*	*26*	*0.5*	*41*
54	*1.5*	*16*	*1.0*	*26*		
60	*1.5*	*16*	*1.0*	*26*		
66	*1.5*	*16*	*1.0*	*26*		
72	*1.5*	*16*	*1.0*	*25*		

GENERAL NOTES FOR ALL TABLES ON THIS SHEET:

1. *Maximum height of cover is greatest vertical distance from top of pipe to finish grade.*
2. *Minimum height of cover is least vertical distance from top of pipe to subgrade.*
3. *For ODOT, pipes with diameters greater than 72" must be reviewed by the Geo-Environmental Section.*
4. *For ODOT, pipes with maximum cover greater than those shown in the Tables shall be approved by the Senior Standards Engineer.*
5. *For multiple pipe installations, see Std. Dwg. RD300.*
6. *Open ends of pipes normally require a site specific design, and may require special treatment (sloped ends, culvert embankment protection, paved end slopes, safety end sections, or other measures). See special details or Standard Drawings as called for on plans.*

CALC. BOOK NO. RD07-02

SDR DATE XX-XXX-2022

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

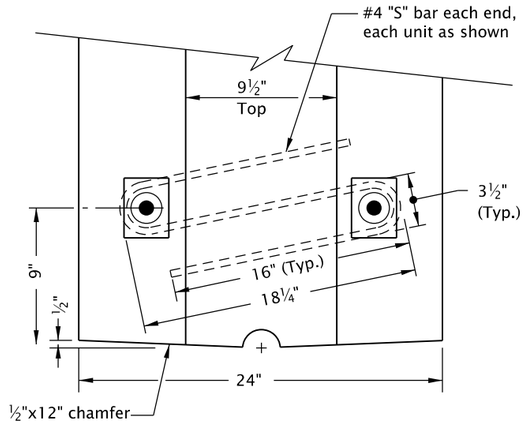
FILL HEIGHT TABLE FOR CIRCULAR CONCRETE PIPE

2021

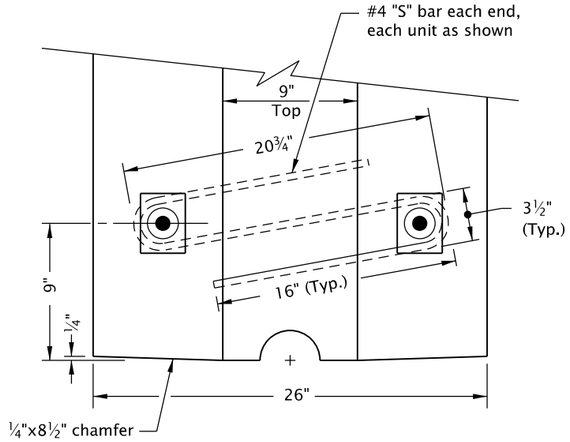
DATE	REVISION DESCRIPTION
04-2022	REVISED NOTES

Effective Date: December 1, 2022 - May 31, 2023

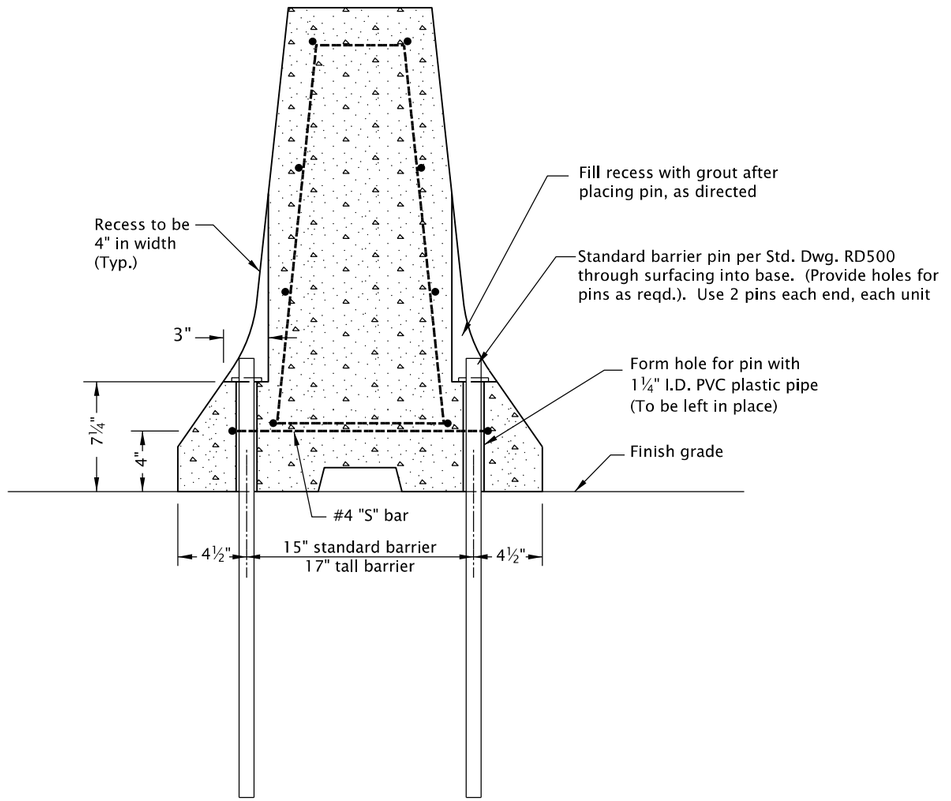
RD386



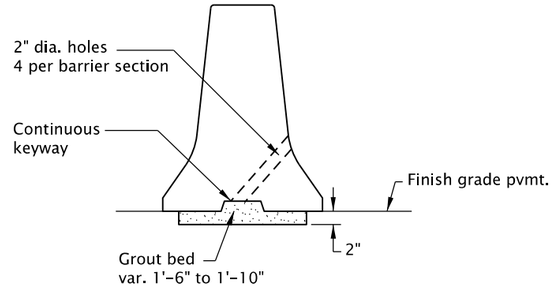
PLAN VIEW AT S BAR
STANDARD BARRIER



PLAN VIEW AT S BAR
TALL BARRIER



ELEVATION VIEW AT ANCHOR RODS
SECURING TO PAVEMENT OPTION



GROUT DETAIL
FOR PRECAST CONCRETE BARRIER

GROUTING HOLES PLAN

GROUTING OPTION

(Dimensions between 2" dia. holes are nominal)

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

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. For use in medians with width less than 8' (as measured between nearest fog lines).
2. See Std. Dwgs. RD503 & RD545 for reinforcement and other details not shown.
3. See Std. Dwg. RD516 for securing concrete barrier to roadway.
4. All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.
5. S bars to be full length as shown.

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.

SDR DATE 15-JUL-2022

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

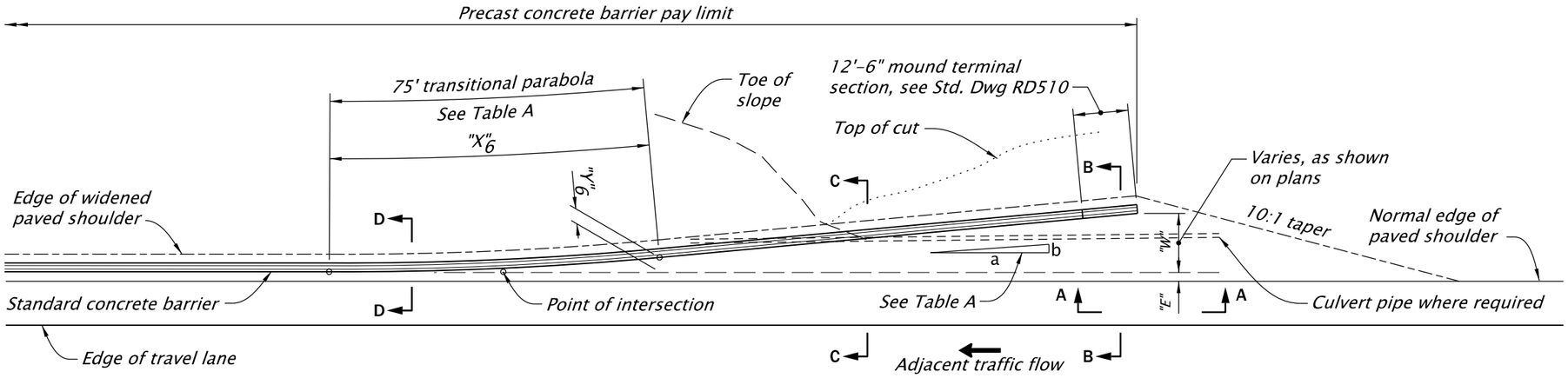
OREGON STANDARD DRAWINGS

MEDIAN BARRIER ANCHORING DETAILS

2021

DATE	REVISION DESCRIPTION
07-2022	REVISED DETAILS AND NOTES

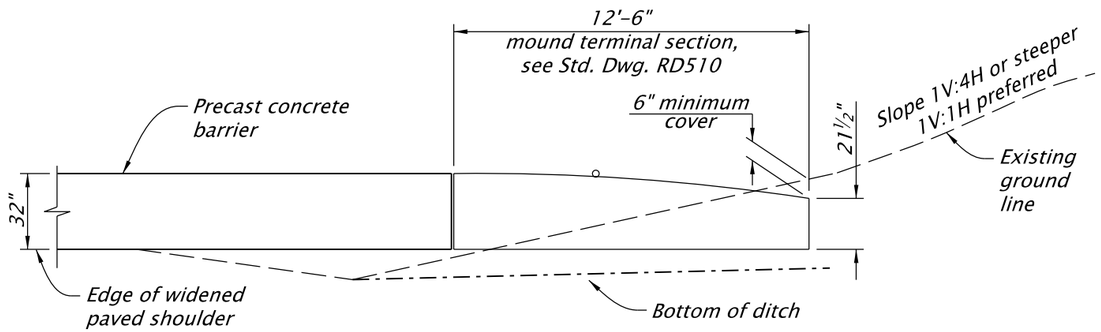
RD515.dgn 15-JUL-2022



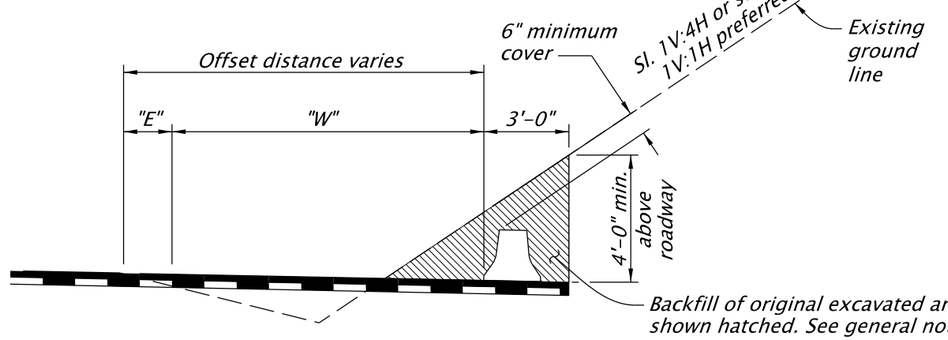
PLAN

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Normal use assumes an existing established slope. This detail is not intended for construction of new slope steeper than a slope of 1V:2H.*
2. *If the slope is flatter than 1V:1H ensure that there is a clear recovery area behind the barrier, with no funneling effect to the back of the obstruction.*
3. *Provide drainage as required.*
4. *See Std. Dwgs. RD500, RD510 and RD516 for details not shown.*
5. *Surfacing details same as adjacent shoulder.*
6. *Barrier sections, connections and appurtenances that retain backslope require stability design calculations stamped by an engineer.*

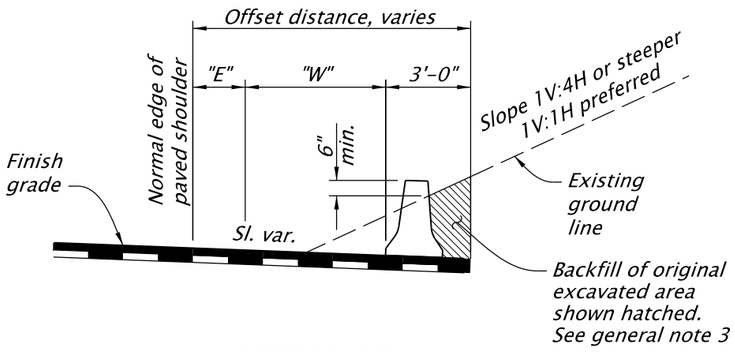


ELEVATION A-A

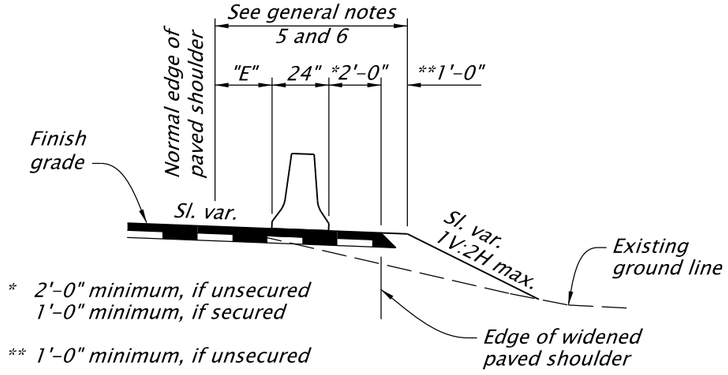


SECTION B-B

"W" = Width of flare
"E" = Shy distance



SECTION C-C



* 2'-0" minimum, if unsecured
1'-0" minimum, if secured

** 1'-0" minimum, if unsecured

SECTION D-D

TABLE A
FLARE RATES AND TRANSITION PARABOLA

FLARE RATE a:b		CONCRETE BARRIER SEGMENT					
		1	2	3	4	5	6
	X (ft)	12.5	25	37.5	50	62.5	75
20:1	Y (ft)	0.10	0.20	0.50	0.80	1.30	1.90

CALC. BOOK NO. N/A

SDR DATE 15-JUL-2022

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.

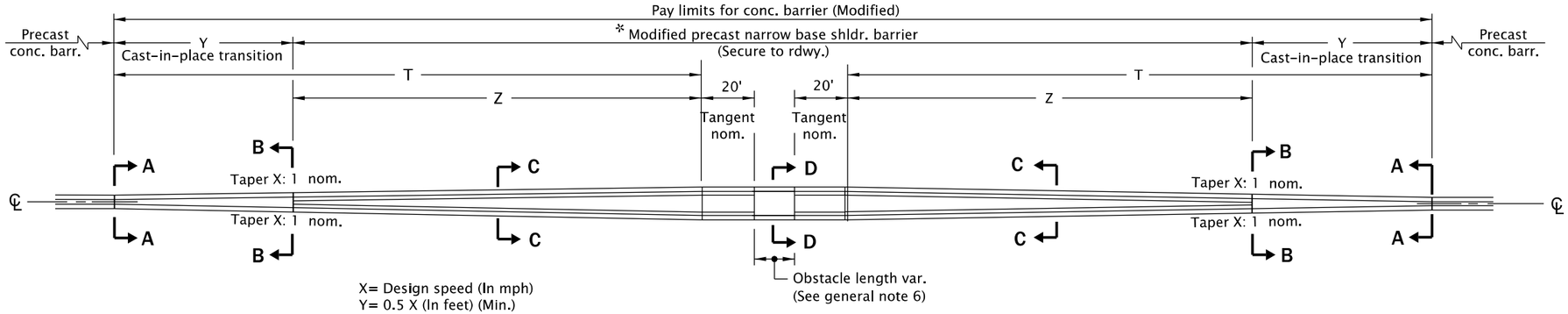
OREGON STANDARD DRAWINGS

STANDARD CONCRETE BARRIER BURIED IN SLOPE

2021

DATE	REVISION DESCRIPTION
07-2022	REVISED DETAILS AND NOTES

RD526.dgn 15-JUL-2022



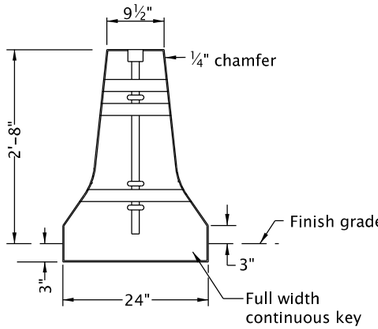
X= Design speed (In mph)
Y= 0.5 X (In feet) (Min.)
T= (½ obstacle width in feet + 0.40' + a) (X)
Z= T - Y

PLAN VIEW

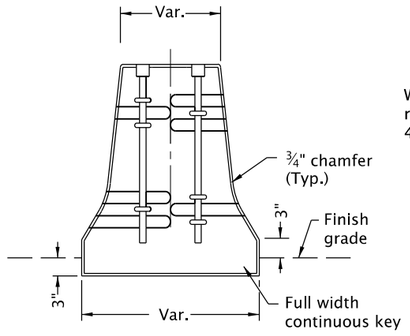
* Modification of barrier consists of providing 1½"x4" paving ledge as shown in Section C-C.

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

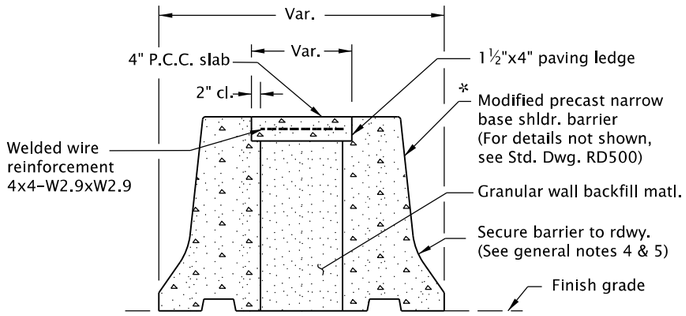
1. Field verify end configurations of connecting barriers prior to forming connections at transitions.
2. All reinforcing bars shall be full length as shown and shall be placed 1½" clear of the nearest face of concrete unless shown otherwise.
3. See Std. Dwgs. RD500 & RD505 for details not shown.
4. 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.
7. See Std. Dwg. RD536 for transition details.



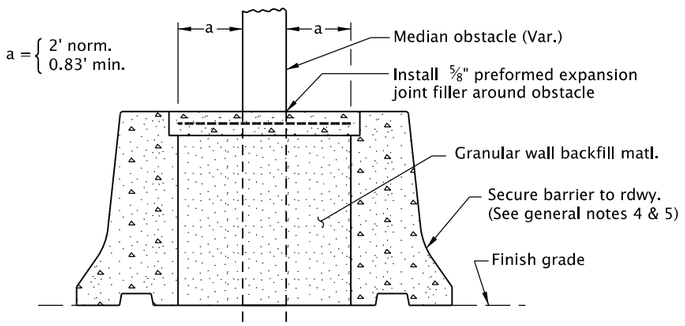
SECTION A-A



SECTION B-B



SECTION C-C



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

ISOMETRIC VIEW

CALC. BOOK NO. N/A

SDR DATE 15-JUL-2022

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

CONCRETE BARRIER (MODIFIED) AROUND MEDIAN OBSTACLE

DRAWING TITLE

2021

DATE	REVISION DESCRIPTION
05-2022	REVISED DETAILS AND NOTES

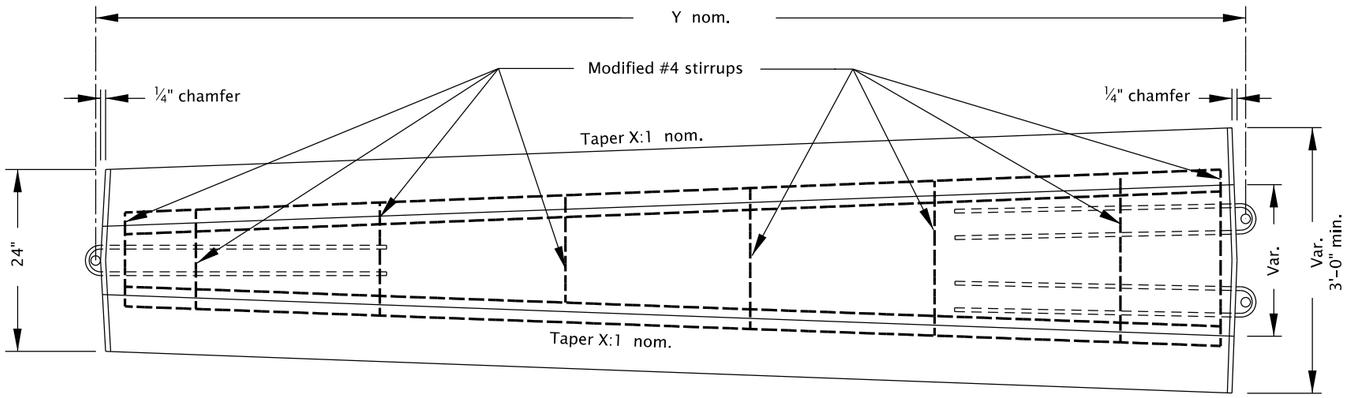
RD535.dgn 15-JUL-2022

rd500s_Sheets.dgn :: rd535 7/18/2022 3:53:27 PM hwye05o

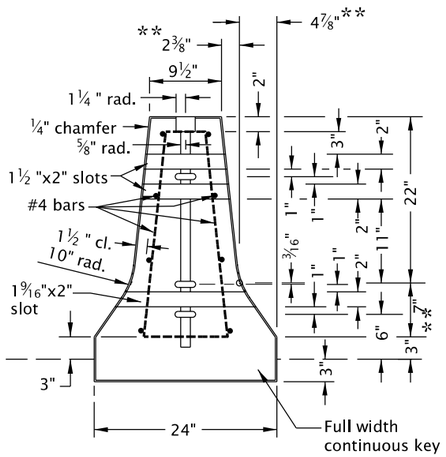
Effective Date: December 1, 2022 - May 31, 2023

RD535

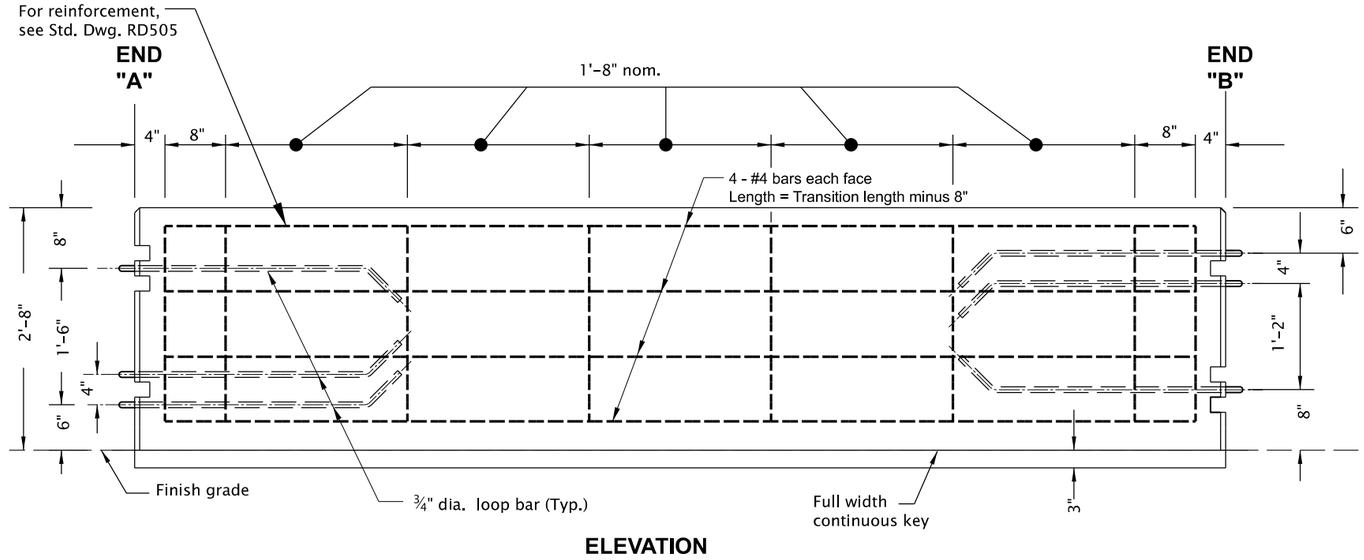
RD536.dgn 15-JUL-2022



PLAN

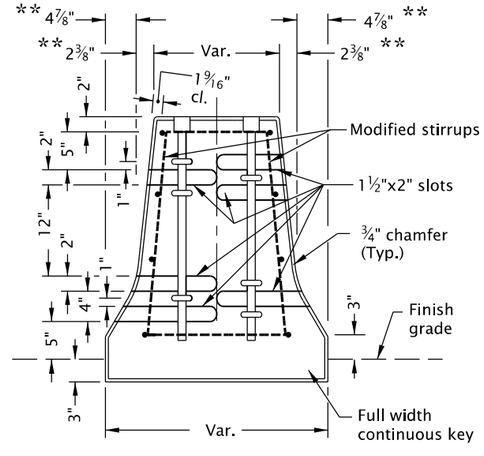


END VIEW A
(See general note 2)

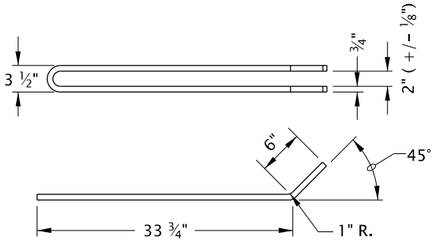


ELEVATION

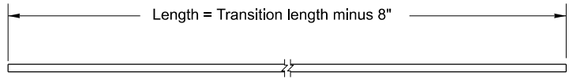
CAST-IN-PLACE TRANSITION



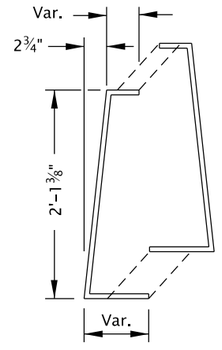
END VIEW B
(See general note 2)



#4 LOOP BAR DETAIL



#4 LONGITUDINAL BAR



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 1½" clear of the nearest face of concrete unless shown otherwise.
3. See Std. Dwgs. RD500, RD501 & RD502 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.

CALC. BOOK NO. N/A

SDR DATE 15-JUL-2022

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

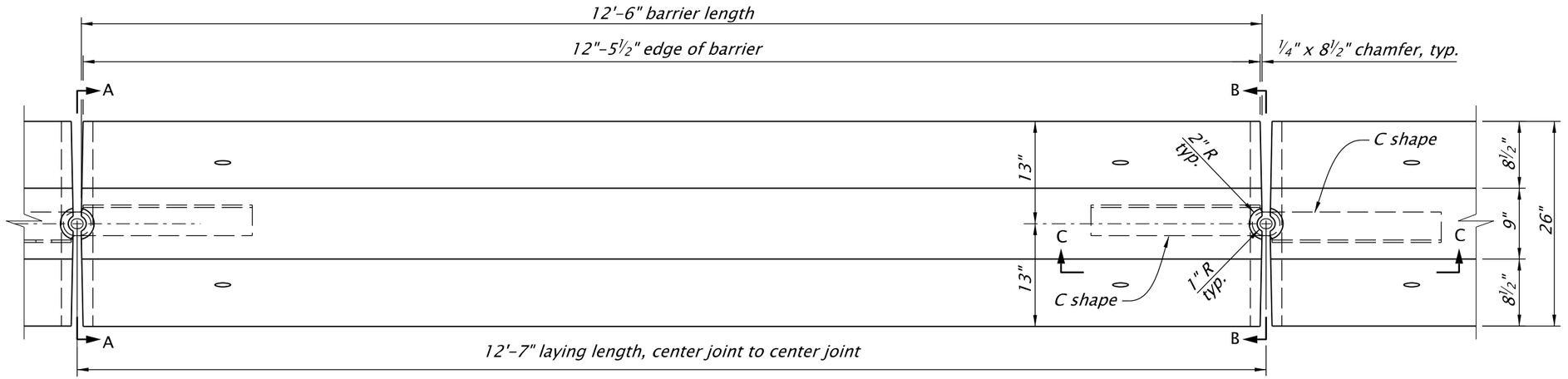
CONCRETE BARRIER (MODIFIED) AROUND MEDIAN OBSTACLE

2021

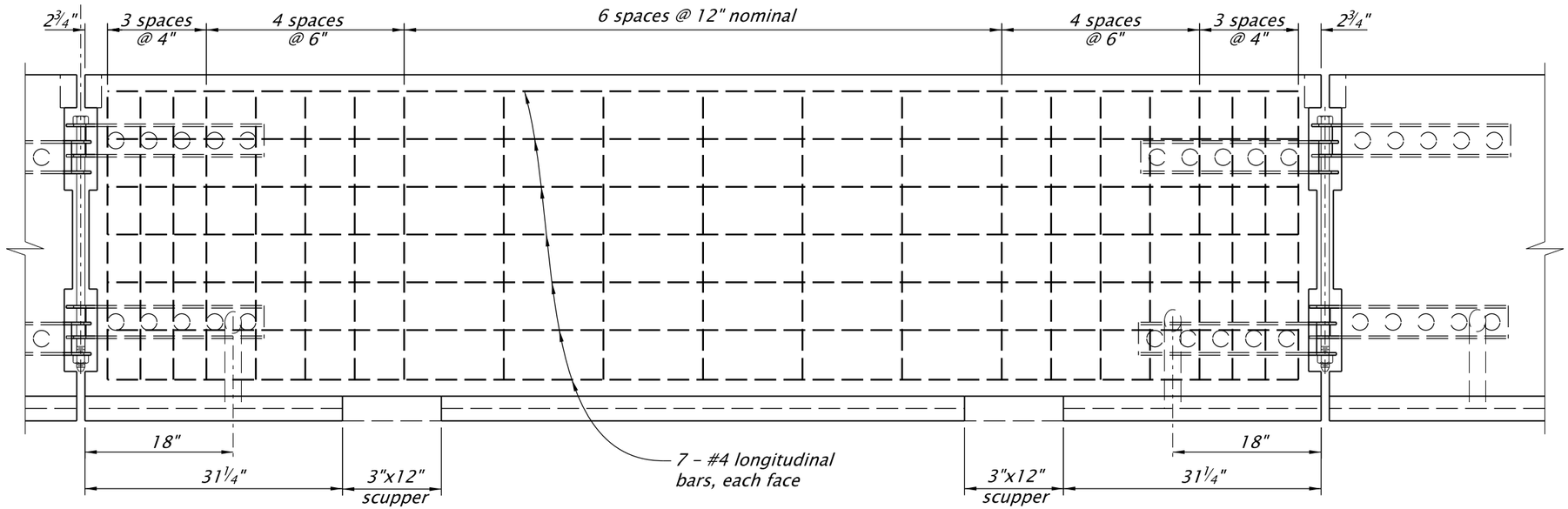
DATE	REVISION DESCRIPTION
07-2022	NEW DRAWING CREATED

Effective Date: December 1, 2022 - May 31, 2023

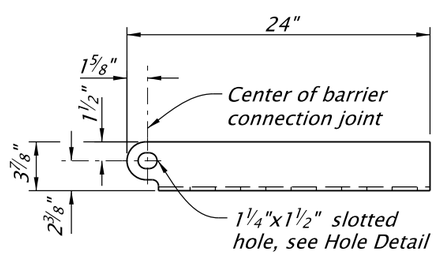
RD536



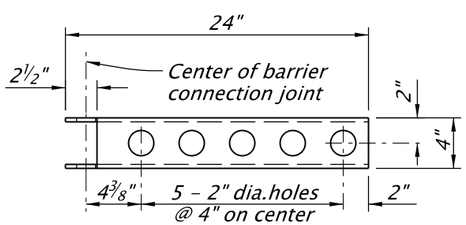
PLAN



ELEVATION

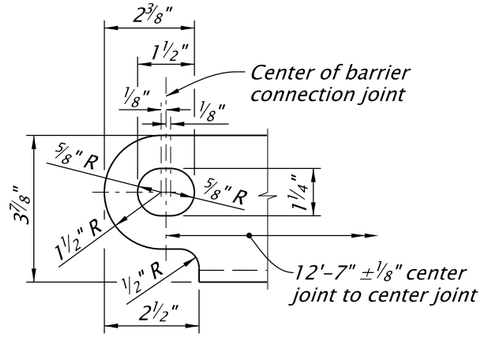


PLAN
Cut from 5/16" thick steel plate
(See note 5 for casting instructions)



ELEVATION
Perforated C-shape

C-SHAPE DETAIL



HOLE DETAIL

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *All reinforcing bars shall be full length as shown and shall be 2" clear of the nearest face of concrete unless shown otherwise.*
2. *All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.*
3. *Normal use of precast tall median barrier is restricted to curves with radii greater than 770'.*
4. *Chamfer all edges ¾", typical.*
5. *Perforated C-shape shall be placed in location shown to a tolerance of ±3/32".*
6. *Estimated barrier weight is 8070 pounds per 12.5' unit length, estimated narrow base barrier weight is 6550 pounds.*
7. *To anchor median barrier see dwg. nos. RD515 and RD516.*
8. *See dwg. no. RD516 for securing concrete barrier to roadway.*
9. *Narrow base shoulder barrier to be used only at locations with backfill behind barrier as shown on plans.*
10. *For barrier location details, see dwg. no. RD500.*
11. *When scuppers are not required, plug them with a minimum 2" of grout, as directed.*

CALC. BOOK NO. N/A

SDR DATE 15-JUL-2022

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

PRECAST TALL (42") CONCRETE BARRIER

2021

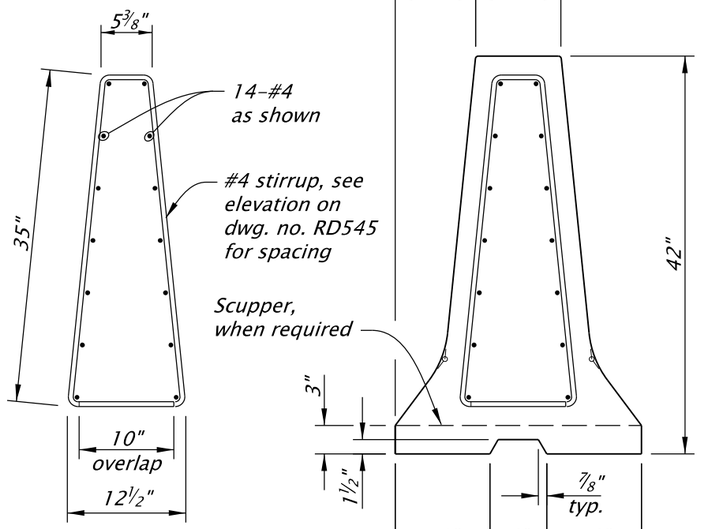
DATE	REVISION DESCRIPTION
07-2022	UPDATED DRAWING TO CONNECT

RD545.dgn 15-JUL-2022

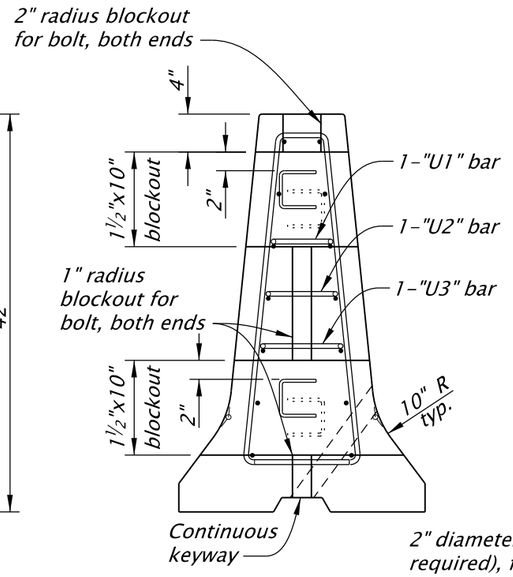
Effective Date: December 1, 2022 - May 31, 2023

RD545

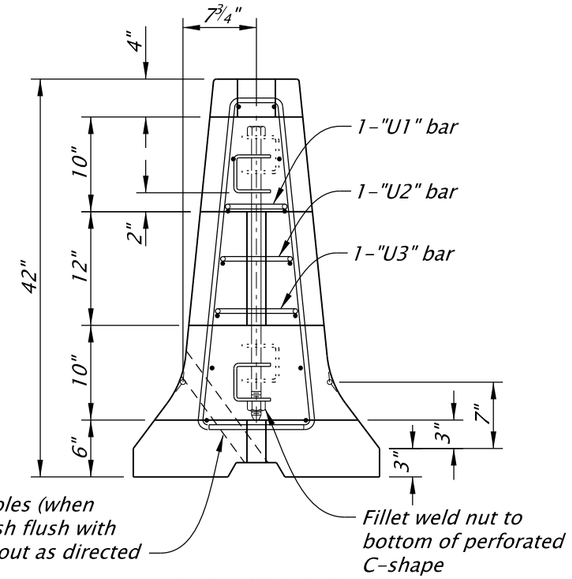
RD546.dgn 15-JUL-2022



TYPICAL SECTION



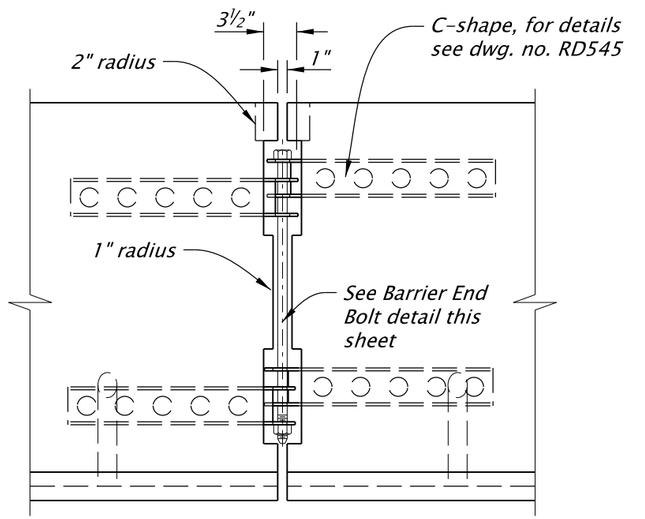
END VIEW A-A



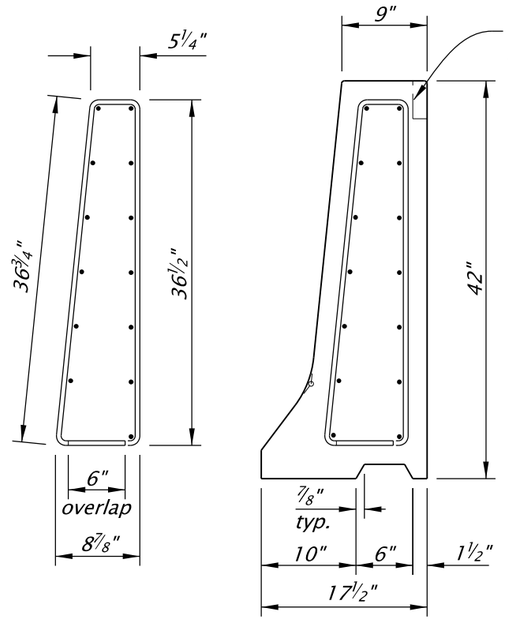
END VIEW B-B

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *All reinforcing bars shall be full length as shown and shall be 2" clear of the nearest face of concrete unless shown otherwise.*
2. *All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.*
3. *Normal use of precast tall median barrier is restricted to curves with radii greater than 770'.*
4. *Chamfer all edges 3/4", typical.*
5. *Perforated C-shape shall be placed in location shown to a tolerance of 3/32".*
6. *Estimated barrier weight is 8070 pounds per 12.5' unit length, estimated narrow base barrier weight is 6,550 pounds.*
7. *To anchor median barrier see dwg. nos. RD515 and RD516.*
8. *See dwg. no. RD516 for securing concrete barrier to roadway.*
9. *Narrow base shoulder barrier to be used only at locations with backfill behind barrier as shown on plans.*
10. *For barrier location details, see dwg. no. RD500.*
11. *When scuppers are not required, plug them with a minimum 2" of grout, as directed.*

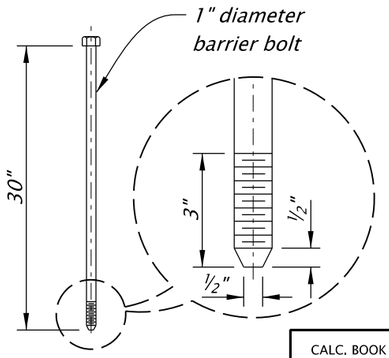


SECTION C-C

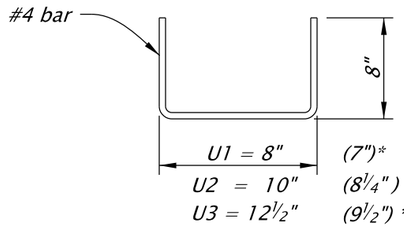


TALL NARROW BASE SHOULDER BARRIER

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



BARRIER END BOLT



U-BAR

** Vertical back barrier*

CALC. BOOK NO. N/A

SDR DATE 15-JUL-2022

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

PRECAST TALL (42") CONCRETE BARRIER

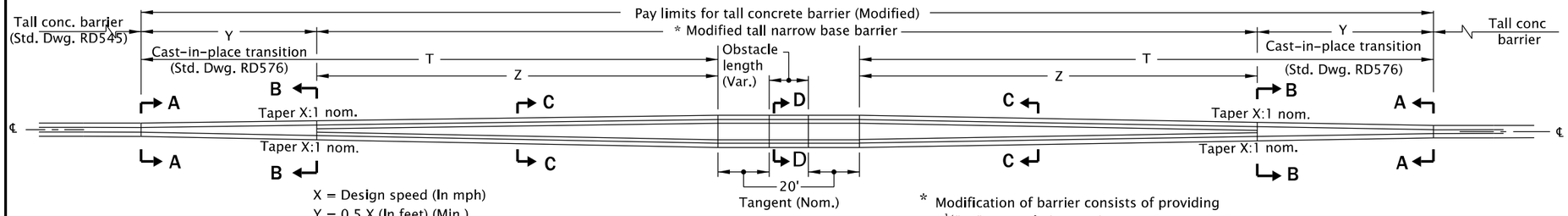
2021

DATE	REVISION DESCRIPTION
07-2022	CREATED NEW DRAWING

Effective Date: December 1, 2022 - May 31, 2023

RD546

RD575.dgn 15-JUL-2022

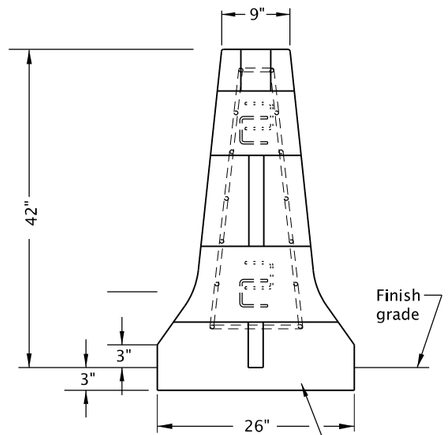


X = Design speed (In mph)
Y = 0.5 X (In feet) (Min.)
T = (½ obstacle width in feet + 0.40' + a) (X)
Z = T – Y

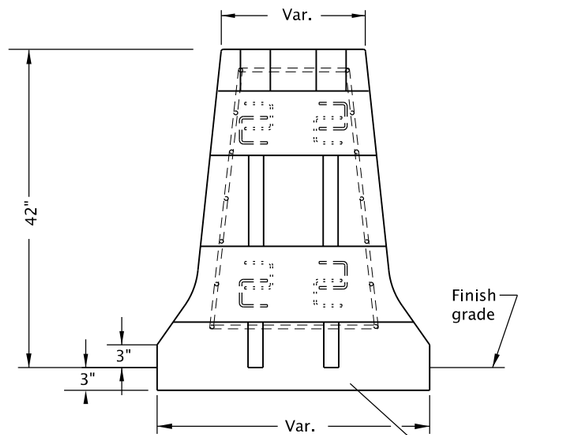
* Modification of barrier consists of providing 1½"x4" paving ledge as shown in Section C-C

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

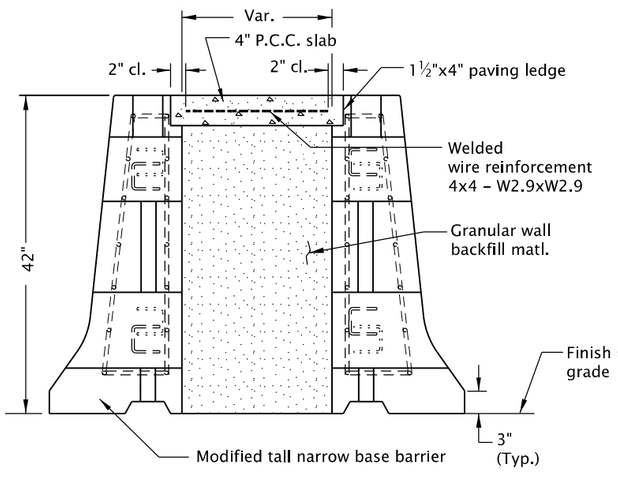
1. Field verify end configurations of connecting barriers prior to forming connections at transitions.
2. All reinforcing bars shall be full length as shown and shall be placed 1½" clear of the nearest face of concrete unless shown otherwise.
3. See Std. Dwg. RD545 for details not shown.
4. Secure precast concrete barrier to roadway, see Std. Dwg. RD516.
5. All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.



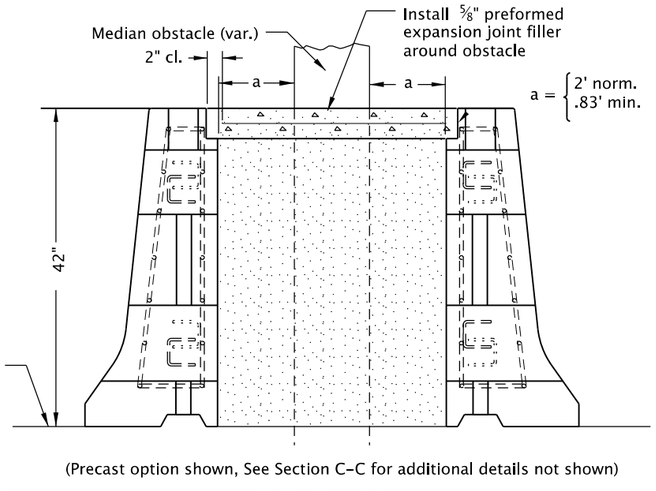
SECTION A-A



SECTION B-B



SECTION C-C

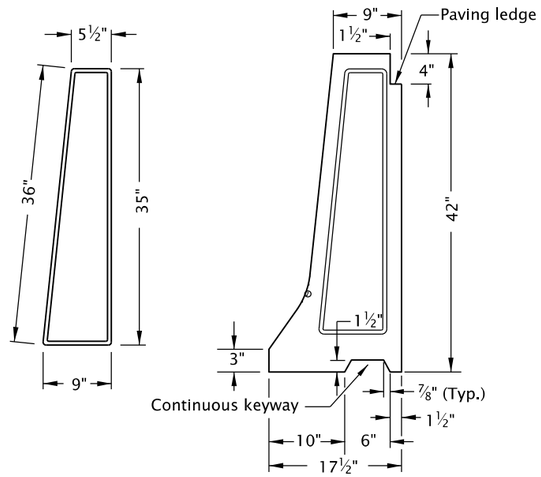


(Precast option shown, See Section C-C for additional details not shown)

SECTION D-D

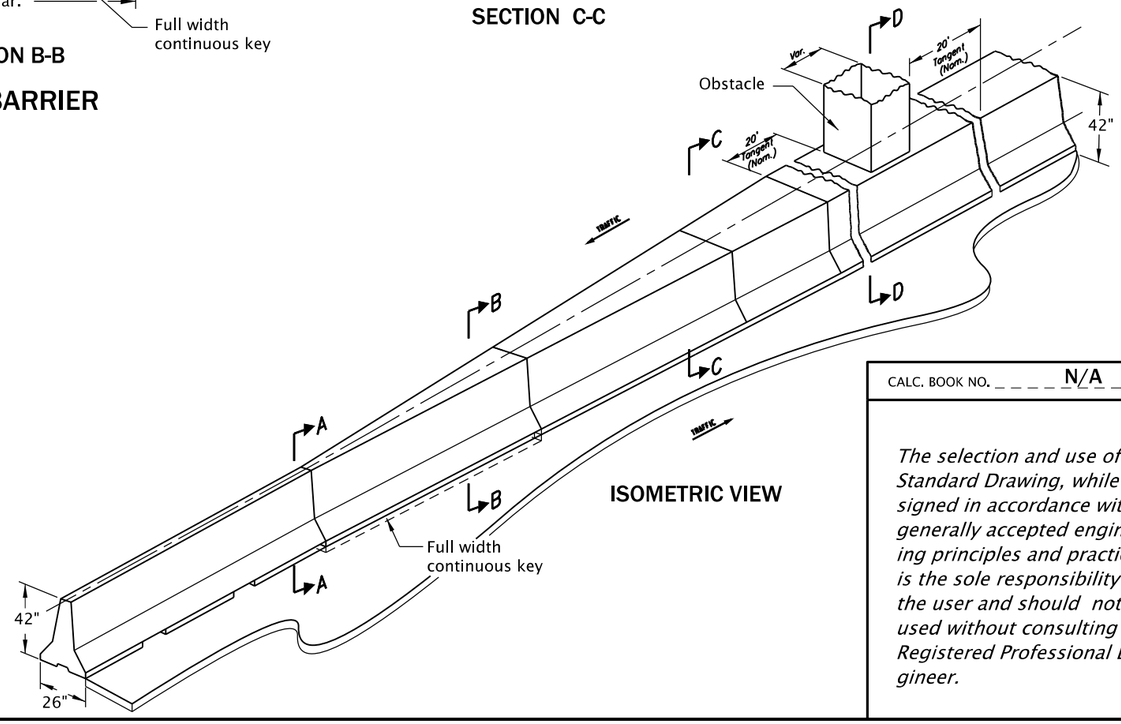
DETAIL WHEN CONNECTING TO PRECAST BARRIER

(See general note 1)



MOD. TALL NARROW BASE SHLDR. BARRIER

NOTE: Only use against retaining walls or as directed.
(For details not shown, see Std. Dwg. No. RD545)



ISOMETRIC VIEW

CALC. BOOK NO. N/A	SDR DATE 15-JUL-2022

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

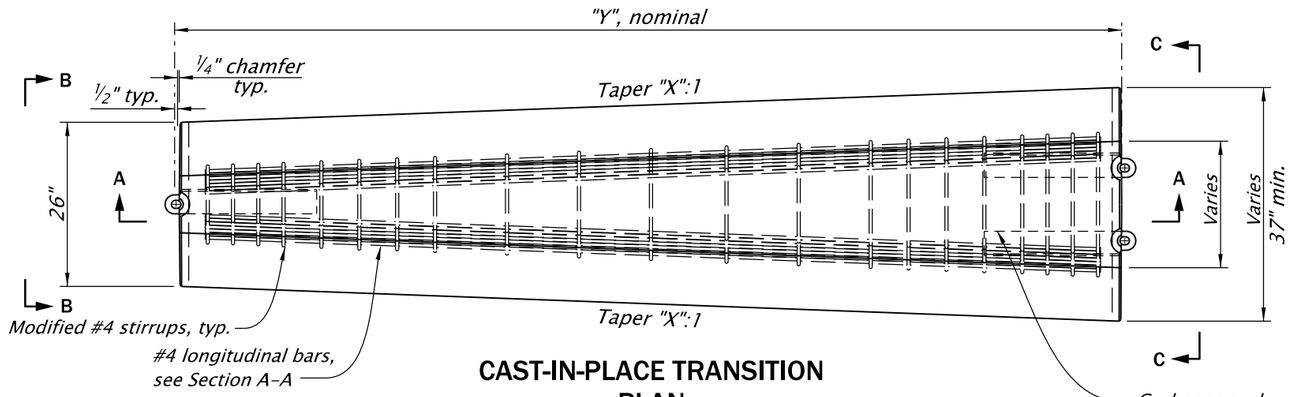
TALL CONCRETE BARRIER (MODIFIED) AROUND MEDIAN OBSTACLE

2021

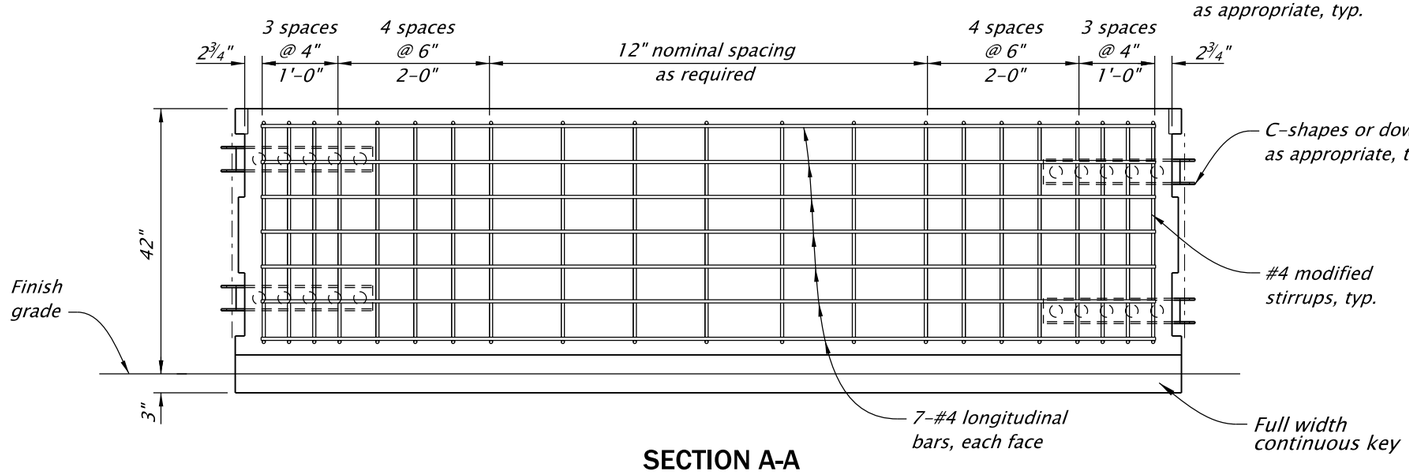
DATE	REVISION DESCRIPTION
07-2022	REVISED DETAILS AND NOTES

Effective Date: December 1, 2022 – May 31, 2023

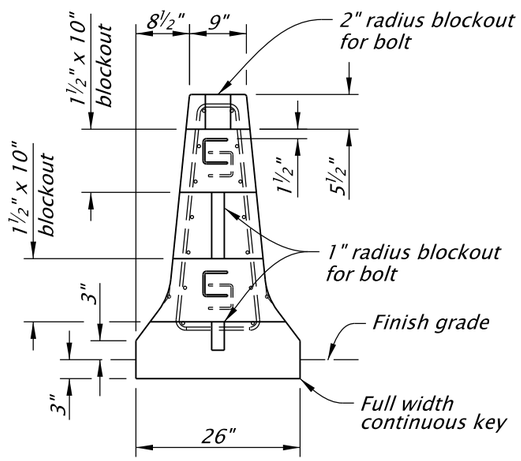
RD575



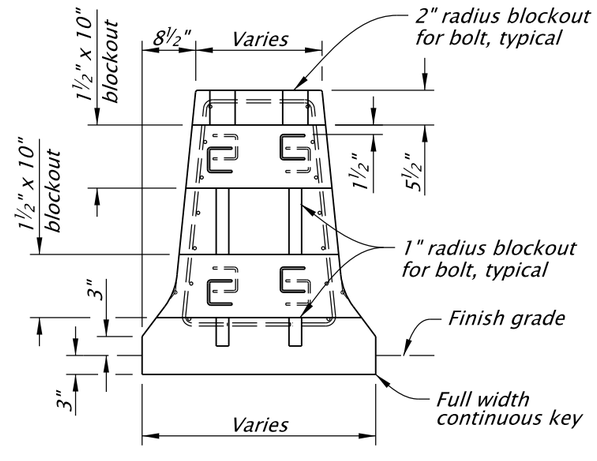
CAST-IN-PLACE TRANSITION PLAN



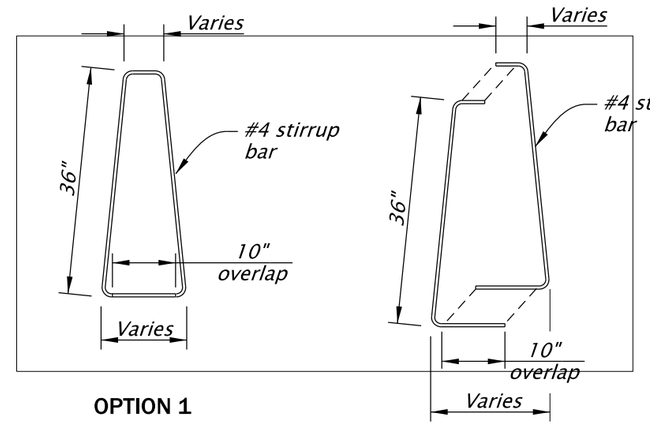
SECTION A-A



VIEW B-B



VIEW C-C



OPTION 1

OPTION 2

MODIFIED STIRRUP

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. RD545 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.*

CALC. BOOK NO. N/A

SDR DATE 15-JUL-2022

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

TALL CONCRETE BARRIER (MODIFIED) AROUND MEDIAN OBSTACLE

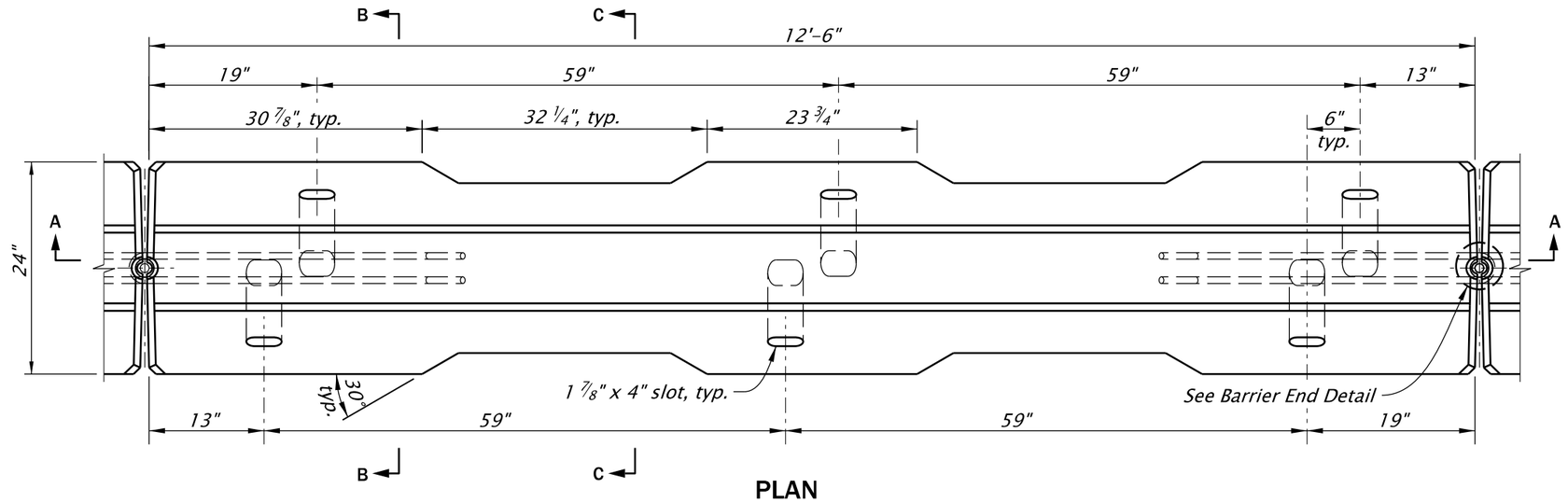
2021

DATE	REVISION DESCRIPTION
07-2022	CREATED NEW DRAWING

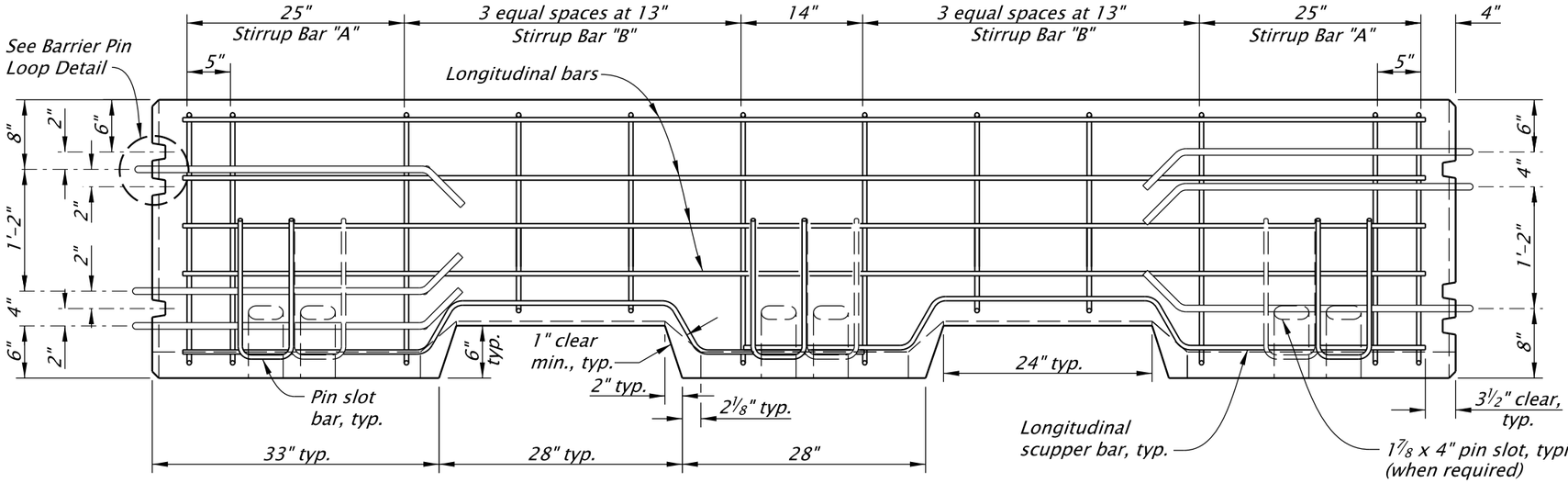
RD576.dgn 15-JUL-2022

Effective Date: December 1, 2022 - May 31, 2023

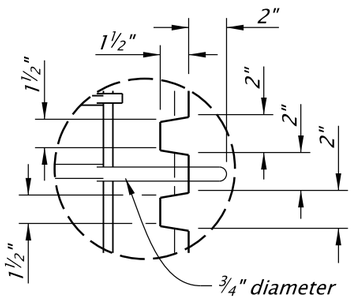
RD576



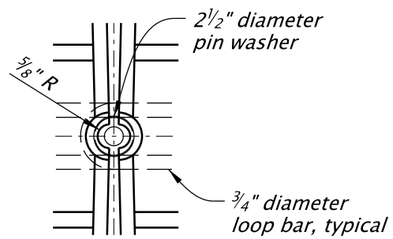
PLAN



SECTION A-A



TYPICAL BARRIER PIN LOOP



BARRIER END

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *All reinforcement shall be full length as shown and shall be 2" clear of nearest face of concrete, unless otherwise shown.*
2. *Maximum chord length for curves with a 1425' radius or less shall be 12.5'. Maximum chord length for curves with radii exceeding 1425' shall be 25'.*
3. *Normal use of precast barrier units is restricted to curvatures with radii greater than 770'.*
4. *Concrete grout for grouting over pins, pinning holes or grouting of scuppers shall be Portland cement grout, weak in strength and of thick consistency, as directed.*
5. *Precast concrete barrier used in medians less than 8' in width shall be secured to roadway. See Std. Dwgs. RD515 and RD516 for details.*
6. *See Std. Dwg. RD501 for details not shown. See Std. Dwg. RD502 for securing concrete barrier to roadway.*
7. *All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.*

CALC. BOOK NO. N/A

SDR DATE 15-JUL-2022

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

32" PRECAST TYPE "F" CONCRETE BARRIER WITH SCUPPERS

2021

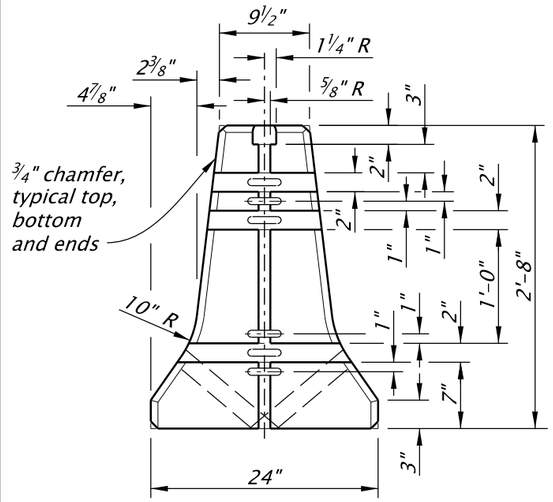
DATE	REVISION DESCRIPTION
07-2022	REVISED DETAILS AND NOTES

Effective Date: December 1, 2022 - May 31, 2023

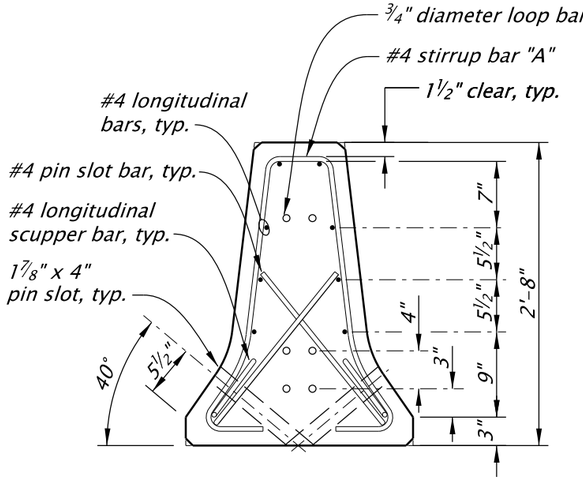
RD595

RD595.dgn 15-JUL-2022

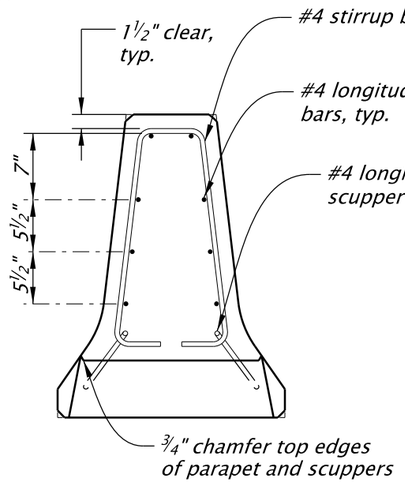
RD596.dgn 15-JUL-2022



END VIEW



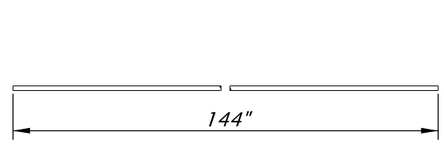
SECTION B-B



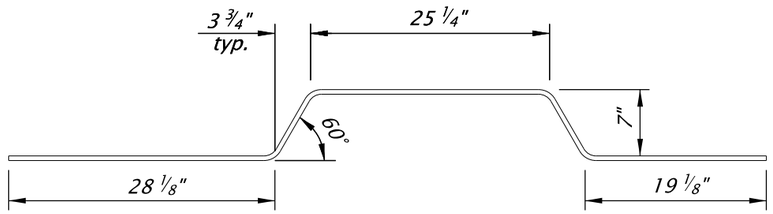
SECTION C-C

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

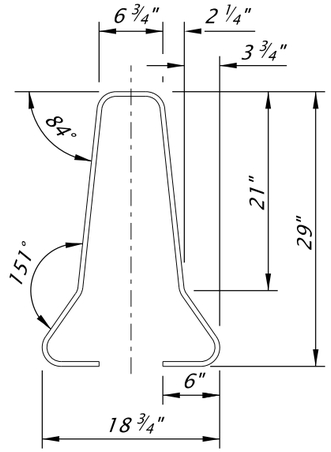
1. *All reinforcement shall be full length as shown and shall be 2" clear of nearest face of concrete, unless otherwise shown.*
2. *Concrete grout for grouting over pins, pinning holes or grouting of scuppers shall be portland cement grout, weak in strength and of thick consistency, as directed.*
3. *See Std. Dwg. RD516 for securing concrete barrier to roadway.*
4. *All pins, bolts, dowels, loop bars, and connectors shall be hot-dip galvanized after fabrication.*



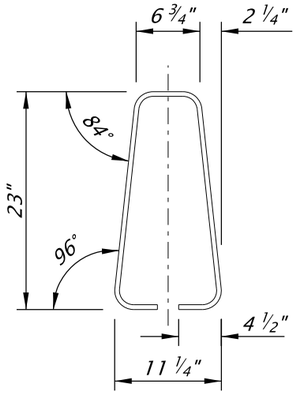
LONGITUDINAL BAR



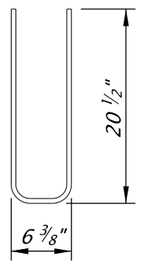
LONGITUDINAL SCUPPER BAR



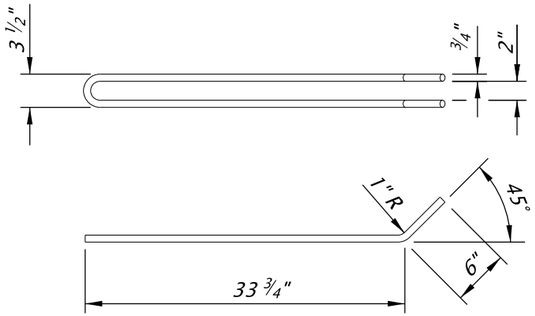
STIRRUP BAR "A"



STIRRUP BAR "B"

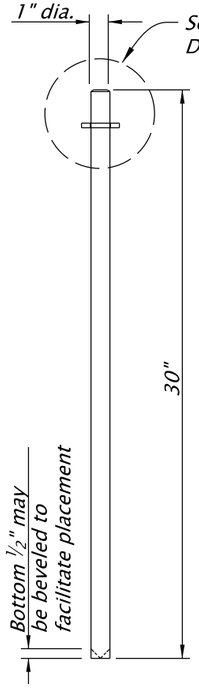


PIN SLOT BAR
(When required)

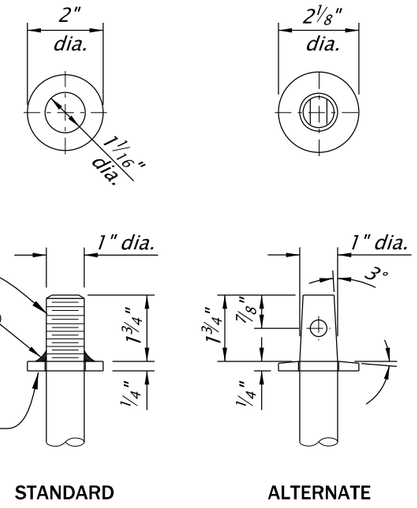


LOOP BAR

REINFORCING STEEL BENDING DIAGRAM



PIN DETAIL



WASHER DETAIL

PIN NOTE:
Washer shall be forged as integral part of pin or shall be welded as shown.

CONNECTING PIN ASSEMBLY DETAIL

CALC. BOOK NO. N/A

SDR DATE 15-JUL-2022

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

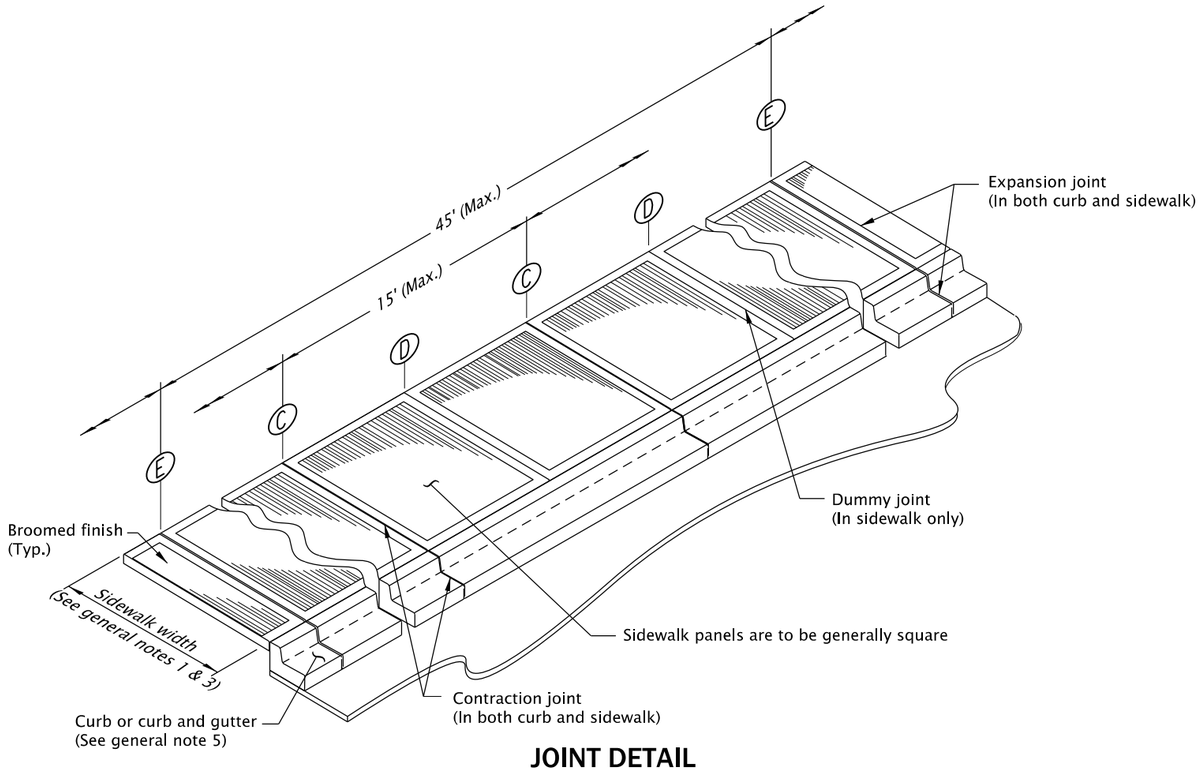
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

OREGON STANDARD DRAWINGS
32" PRECAST TYPE "F" CONCRETE BARRIER WITH SCUPPERS REINFORCING
2021

DATE	REVISION DESCRIPTION
07-2022	DRAWING CREATED

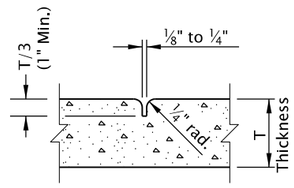
Effective Date: December 1, 2022 - May 31, 2023

RD596

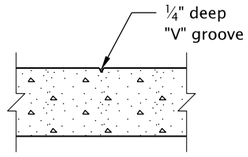


JOINT DETAIL

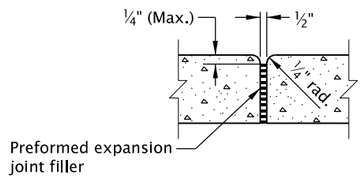
(Curb line sidewalk with curb and gutter shown)



Ⓒ **CONTRACTION JOINT**
(See general note 6)



Ⓓ **DUMMY JOINT**



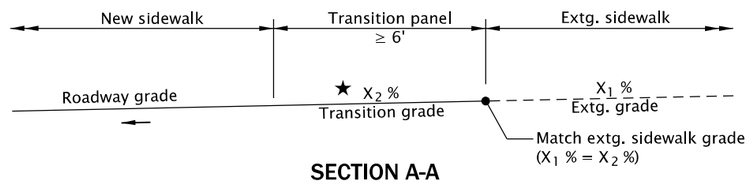
Ⓔ **EXPANSION JOINT**
(See general notes 2 & 5)

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. See Std. Dwgs. RD720 and 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, provide construction expansion joints at 45 feet maximum spacing.
3. On sidewalks 8 feet and wider, provide a longitudinal joint at the midpoint of sidewalk panel.
4. See Std. Dwgs. RD700 and RD701 for concrete curb details. See project plans for the curb design specified.
5. Do not place expansion joints between separate concrete pours for curb ramp system components construction. Place expansion joints outside of curb ramp runs when required. Install expansion joints flush with surface for structures protruding through the curb ramp system. See Std. Dwg. RD900.
6. Construct contraction joints at 15 feet maximum spacing, and at each curb ramp, driveway, sidewalk and curb.

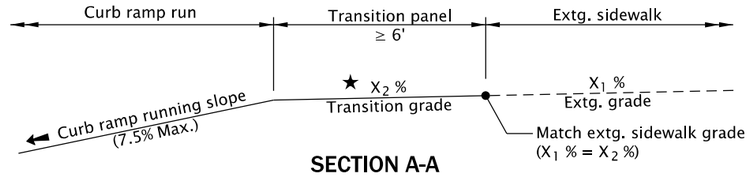
LEGEND:

- 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

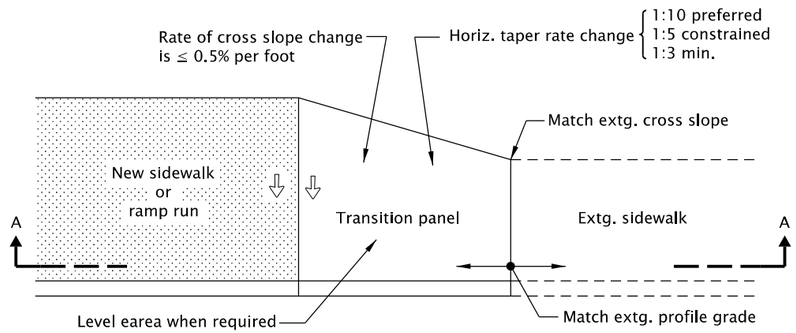


SECTION A-A
(SIDEWALK TRANSITION PANEL SHOWN)

★ Project the 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

CALC. BOOK NO. N/A

SDR DATE 08-JUL-2022

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

SIDEWALK JOINTS AND TRANSITION PANELS

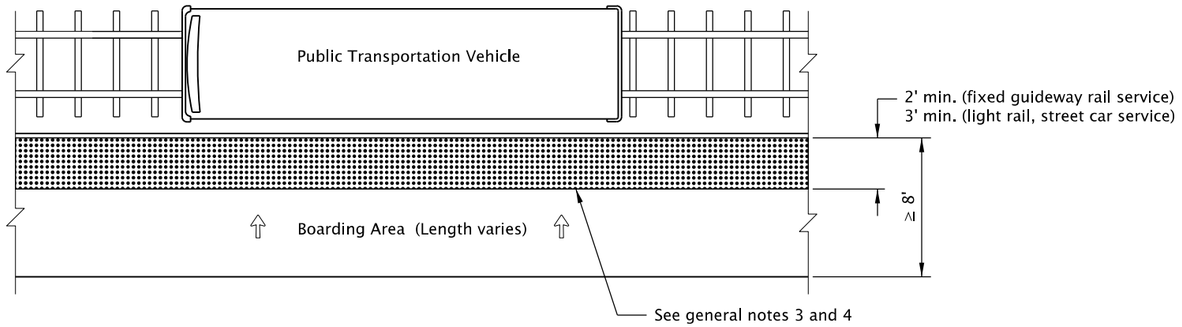
2021

DATE	REVISION DESCRIPTION
07-2022	REVISED NOTES

RD722.dgn 08-JUL-2022

Effective Date: December 1, 2022 - May 31, 2023

RD722

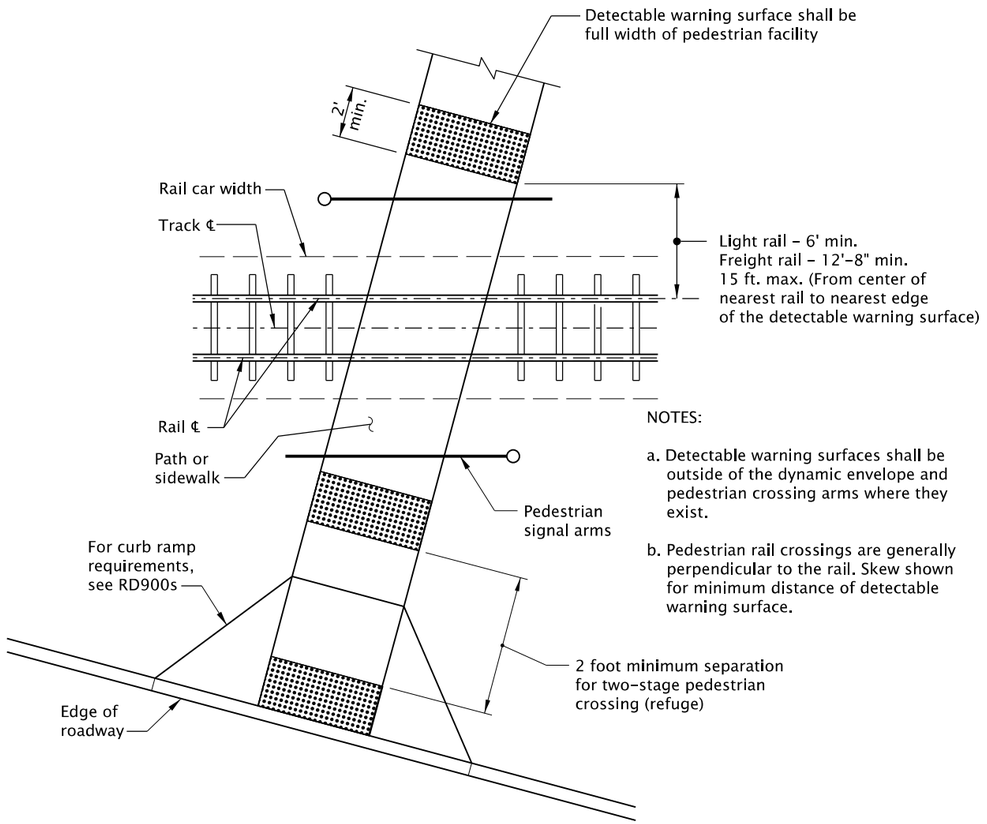


LEGEND:

Detectable warning surface

Cross slope 1.5% max.
(Max. 2.0% finished surface slope)

PUBLIC TRANSPORTATION STATION
Rail or Transit Service

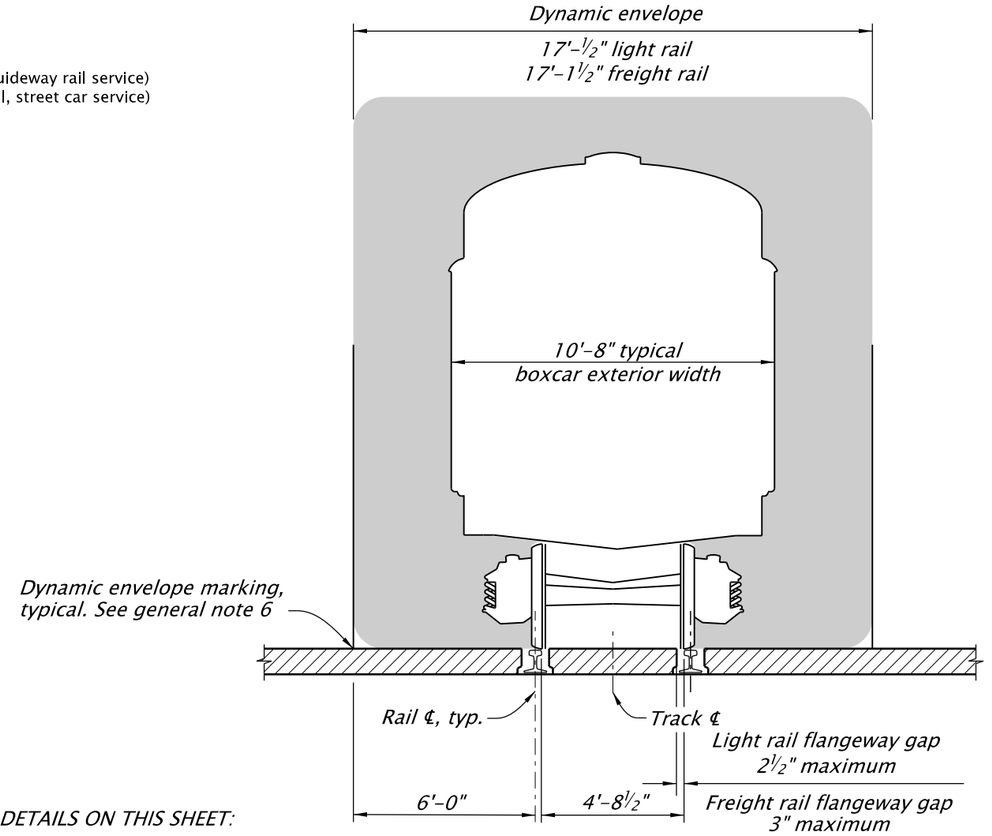


NOTES:

a. Detectable warning surfaces shall be outside of the dynamic envelope and pedestrian crossing arms where they exist.

b. Pedestrian rail crossings are generally perpendicular to the rail. Skew shown for minimum distance of detectable warning surface.

AT-GRADE RAIL CROSSING



RAIL TRACK SECTION VIEW

GENERAL NOTES FOR ALL DETAILS ON THIS SHEET:

1. *Detectable warning surface details and locations are based on applicable ODOT Standards.*
2. *See project plans for details not shown. See Std. Dwg. RD902 for detectable warning surface installation details.*
3. *Place detectable warning surface along the full length of the rail station, when not protected by screens or guards on raised platforms, sidewalk, and street level boarding areas.*
4. *Place detectable warning surface along the full length of the transit station, when not protected by screens or guards on raised platforms and sidewalk boarding areas.*
5. *Detectable warning surfaces shall be outside of the dynamic envelope.*
6. *Dynamic envelope shall be clear of all fixed obstructions unless otherwise shown on Rail Crossing Order.*

CALC. BOOK NO. N/A

SDR DATE 15-JUL-2022

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.

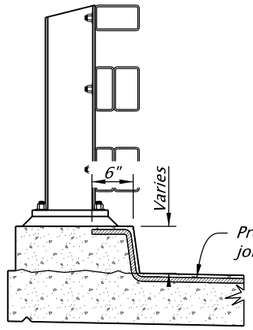
OREGON STANDARD DRAWINGS

DETECTABLE WARNING SURFACE PLACEMENT FOR RAIL

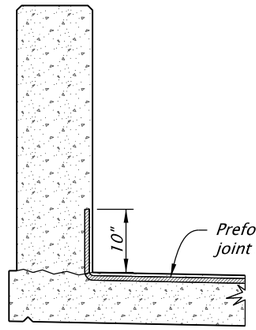
2021

DATE	REVISION DESCRIPTION
07-2020	DRAWING CREATED
07-2022	REVISED DETAIL AND NOTES

RD908.dgn 15-JUL-2022

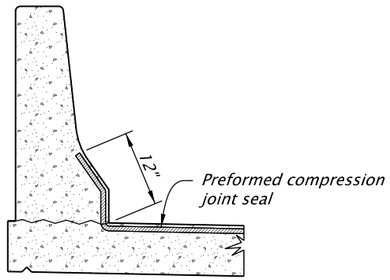


3-TUBE CURB MOUNT RAIL
Scale: ½"=1'-0"

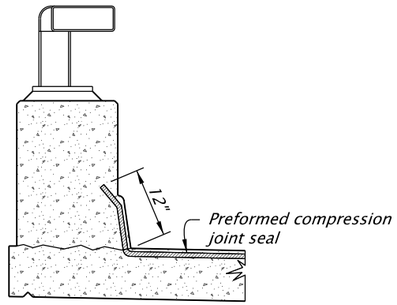


VERTICAL CONCRETE PARAPET
Scale: ½"=1'-0"

NOTE
Bridge rails mounted on curb similar.

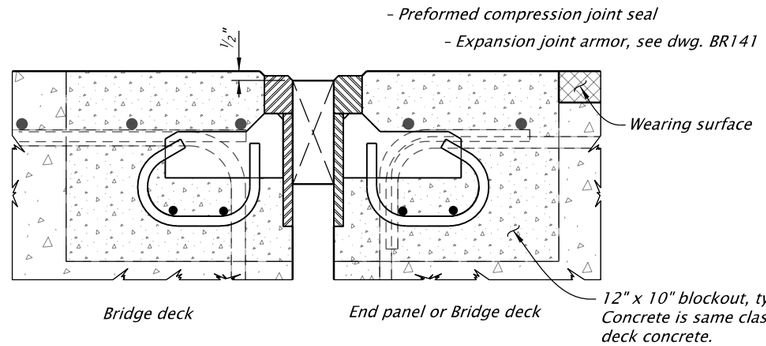


TYPE "F" CONCRETE RAIL
Scale: ½"=1'-0"



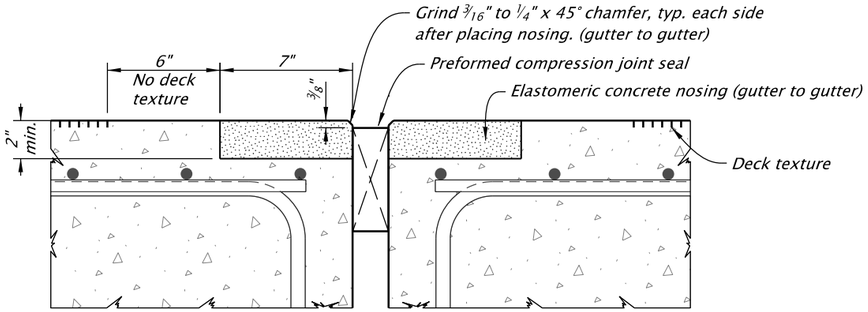
CONCRETE PARAPET WITH STEEL POST
Scale: ½"=1'-0"

BRIDGE RAIL TYPES



ARMORED JOINT SECTION

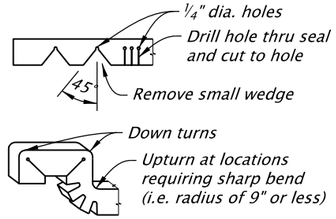
NOTE
Use details for new construction.



NON-ARMORED JOINT SECTION

1 NOTE
Use details for new construction and joint rehabilitation. Elastomeric concrete nosing may be omitted, when concrete joint surfaces are in good condition.

Preformed Compression Joint Seal						
		Nominal Size		Joint Width		
Seal Type	Total Movement Range	Width	Height	Min.	Max.	Minimum Installation Width
A	½"	1¼"	1¼"	½"	1"	¾"
B	¾"	2"	2"	7/8"	1⅝"	1¼"
C	1"	2½"	2¾"	1"	2"	1½"
D	1¼"	3"	3¼"	1¼"	2½"	1¾"
E	1½"	3½"	3½"	1⅜"	2⅞"	2¼"



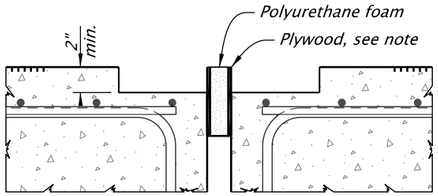
CORNER DIAGRAM

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.

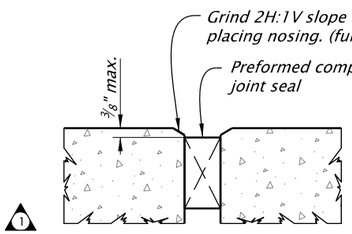
Prepare joint surfaces and install preformed compression joint seal (gutter to gutter) in one continuous piece.

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



PROPOSED TEMPORARY BLOCKOUT

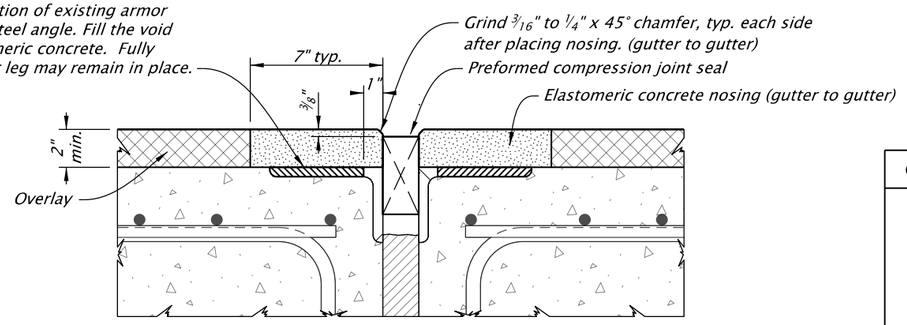
NOTE
Blockout joint with sandwich of polyurethane foam and ¼" to ½" plywood as shown prior to placing elastomeric concrete nosing.



1 NOTE:
Provide joint seal having firm, stable and slip resistance top surface.

SIDEWALK JOINT SECTION

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.

CALC. BOOK NO. _-_ _ _ _ _ _ _ _ _ _ _ _

SDR DATE: 08-July-2022

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

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OREGON STANDARD DRAWINGS

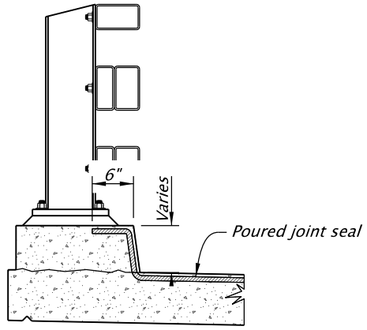
PREFORMED COMPRESSION JOINT SEAL

2022

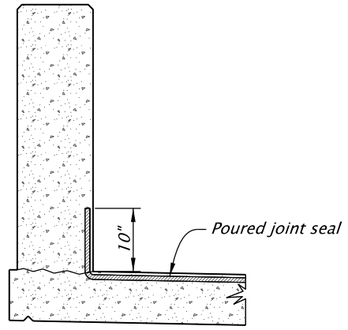
	DATE	REVISION DESCRIPTION
2	06-2022	Revised sidewalk details.
1	06-2022	Added joint note.
	-	-
	-	-
	-	-

06/22/2022

br140.dgn

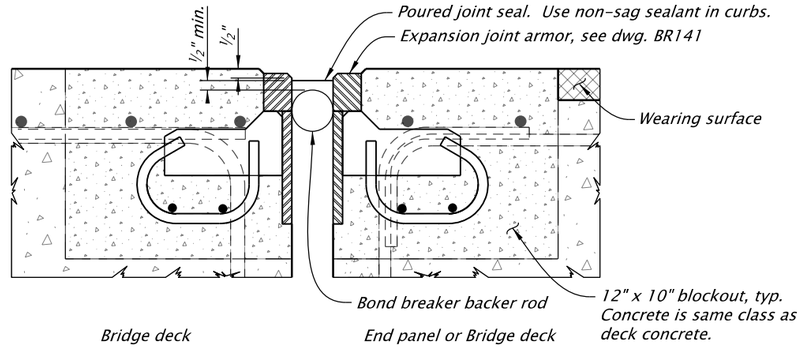


3-TUBE CURB MOUNT RAIL
Scale: 1/2"=1'-0"



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

NOTE
Bridge rails mounted on curb similar.

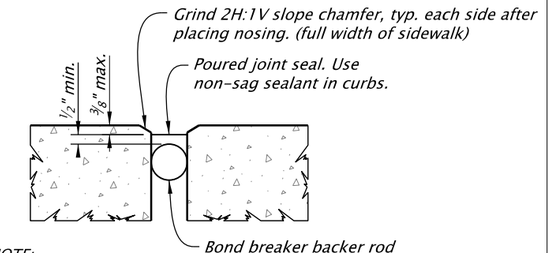


ARMORED JOINT SECTION

NOTE
Use details for new construction.

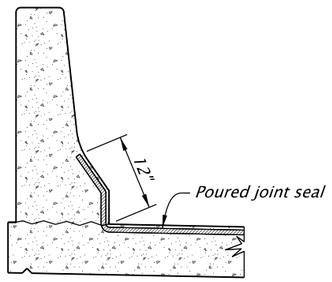
Poured Joint Seals			
Total Movement Range (max.)	Joint Width Min.	Joint Width Max.	Minimum Installation Width
1 1/2"	1/4"	1"	1/2"
	1/2"	2"	1"
	1"	2 1/2"	1 1/2"
	1 1/2"	3"	2"

△1

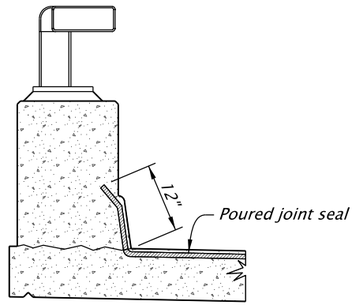


NOTE:
Provide joint seal having firm, stable and slip resistance top surface. △1

SIDEWALK JOINT SECTION

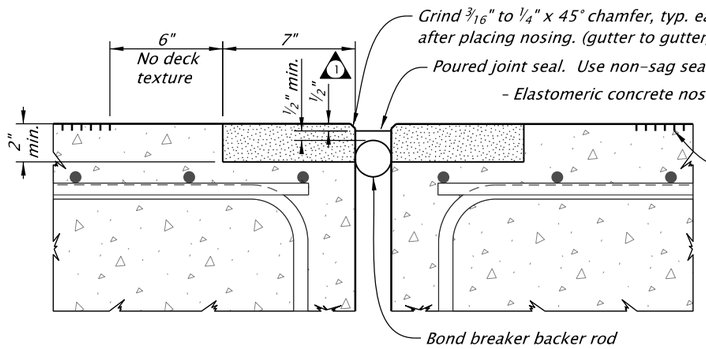


TYPE "F" CONCRETE RAIL
Scale: 1/2"=1'-0"



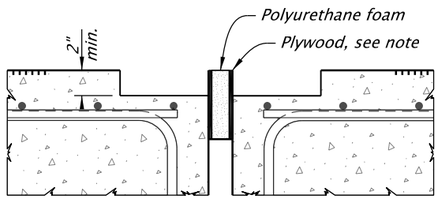
CONCRETE PARAPET WITH STEEL POST
Scale: 1/2"=1'-0"

BRIDGE RAIL TYPES



NON-ARMORED JOINT SECTION

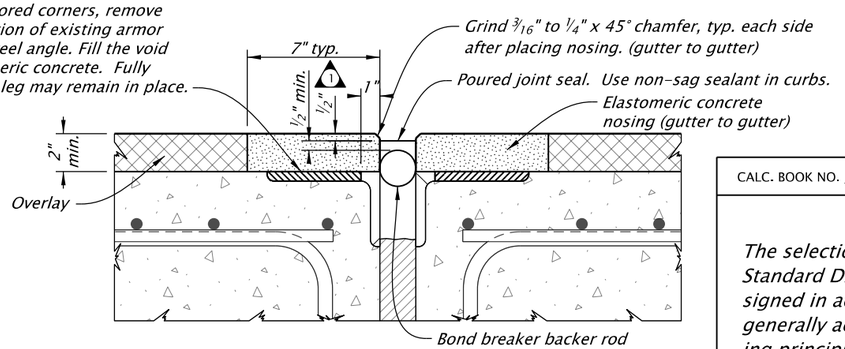
NOTE
△1 Use details for new construction and joint rehabilitation. Elastomeric concrete nosing may be omitted, when concrete joint surfaces are in good condition.



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.

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.

CALC. BOOK NO. -

SDR DATE: 08-July-2022

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OREGON STANDARD DRAWINGS

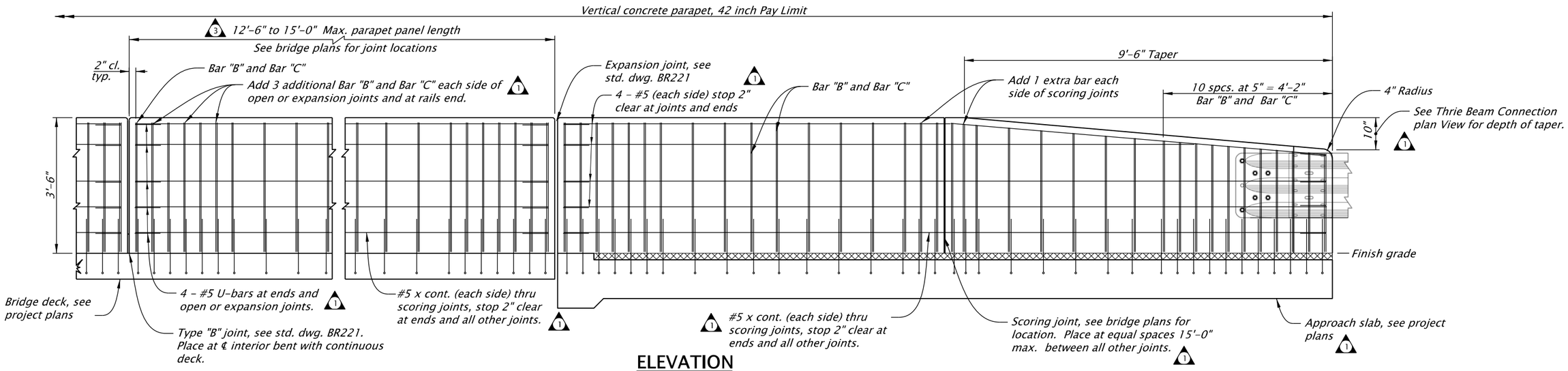
POURED JOINT SEAL

2022

	DATE	REVISION DESCRIPTION
△2	06-2022	Revised sidewalk details.
△1	06-2022	Revised joint recess, notes and joint table.
	-	-
	-	-
	-	-

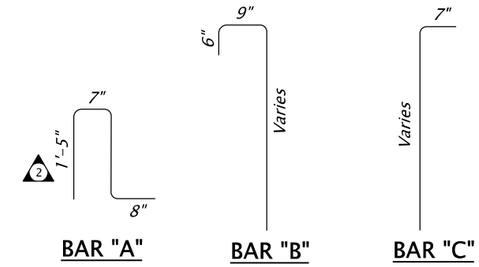
BR140

Effective Date: December 1, 2022 - May 31, 2023

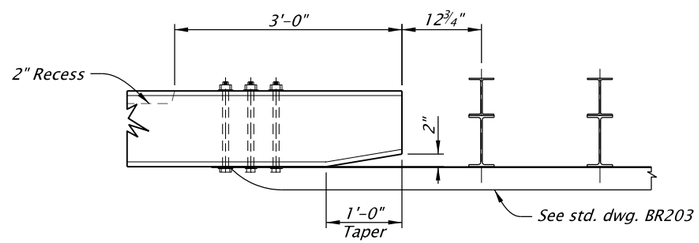


ELEVATION

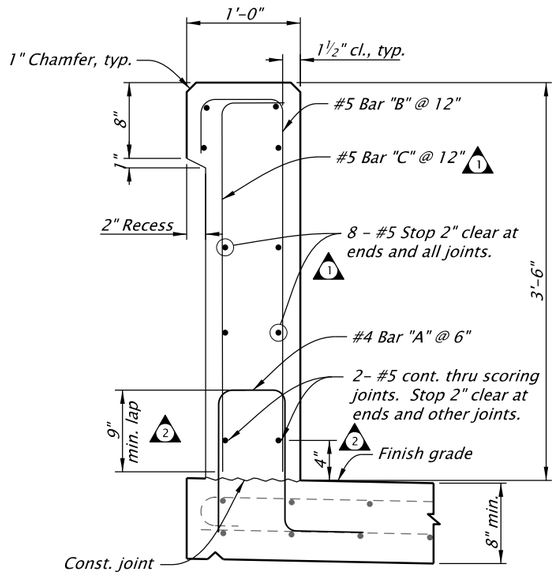
Scale: 1/4"=1'-0"



BAR "A" BAR "B" BAR "C"

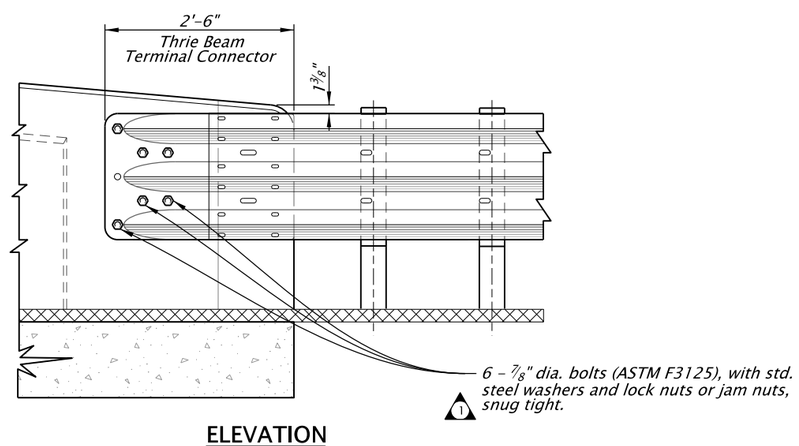


PLAN



TYPICAL SECTION

Scale: 3/4"=1'-0"



ELEVATION

THRIE BEAM CONNECTION

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

NOTE:

Drill horizontal bolt holes (bolt dia. + 1/8") in hardened concrete with low-impact rotary drill. Cut bolts after installation so they extend 3/4" max. beyond nut. Grind smooth and cold galvanize.

GENERAL NOTES

Rail evaluated to meet MASH TL-4 requirements. This rail can be used for speeds of 45 mph and greater when a TL-3 rated guardrail transition is used.

Provide all reinforcing steel conforming to AASHTO M31 (ASTM A615), Grade 60 or ASTM A706.

Place all bars 1½" clear of the nearest face of concrete unless shown otherwise.

Provide Class 3300 -1½ or ¾ concrete.

Provide steel cover plates conforming to AASHTO M183 (ASTM A36). Hot dip galvanize after fabrication.

At skewed bents up to 20° make joints parallel to the bent center line.

For skews greater than 20° make joints normal to rail.

1 See project plans for spacing, joint locations and details not shown.

Accompanied by dwg. BR203, BR221

CALC. BOOK NO. -

SDR DATE: 08-July-2022

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OREGON STANDARD DRAWINGS

VERTICAL CONCRETE PARAPET, 42 INCH

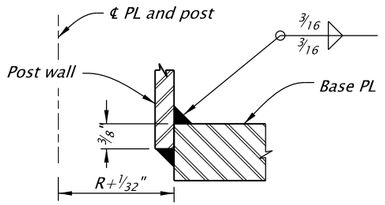
2022

	DATE	REVISION DESCRIPTION
1	07-2021	Note changes, CAD edits
2	01-2022	Modified detail notes and dimensions.
3	06-2022	Modified dimension.
	-	-
	-	-

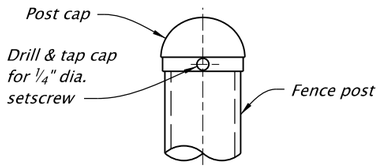
Effective Date: December 1, 2022 - May 31, 2023

BR222

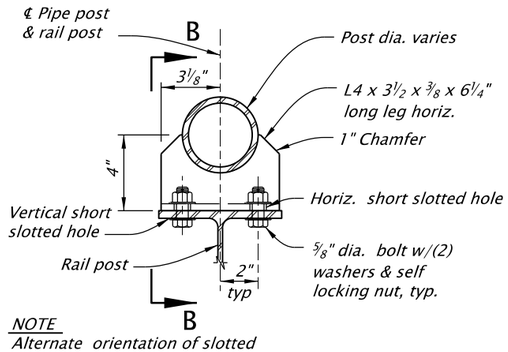
br222.dgn 07-2022



SOCKET WELD



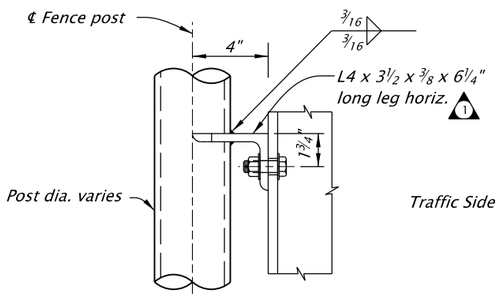
POST CAP



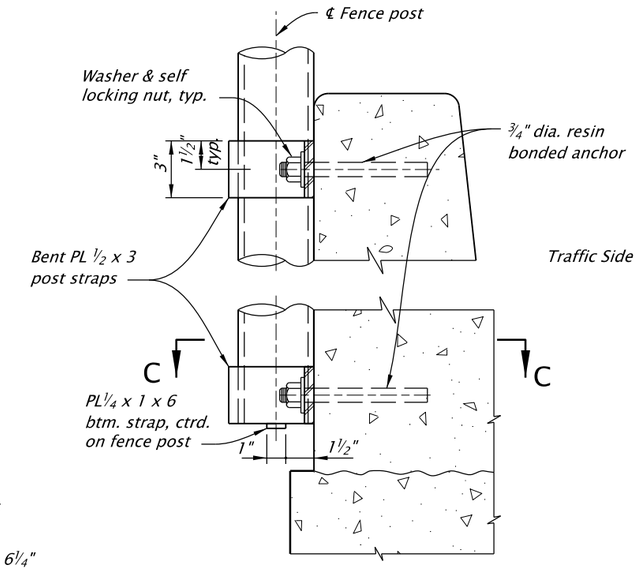
NOTE
Alternate orientation of slotted holes on the lower clip angle.

SECTION A-A

(See dwg. BR240 for location of Section A-A)

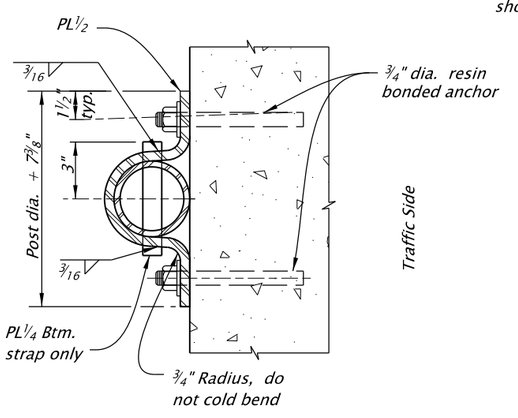


SECTION B-B

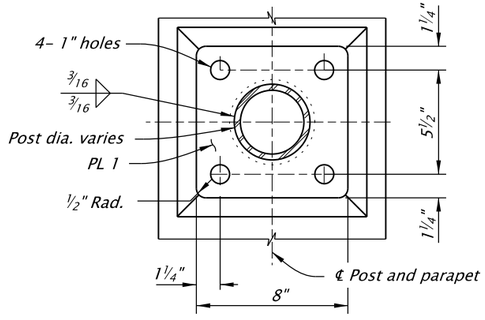


TYPE "C" FENCE

NOTE
As an alternate to resin bonded anchor use 2-3/4" dia. x 5" ± embedment concrete insert with minimum safe working loads in 3300 psi concrete of 4.3 kips tension.

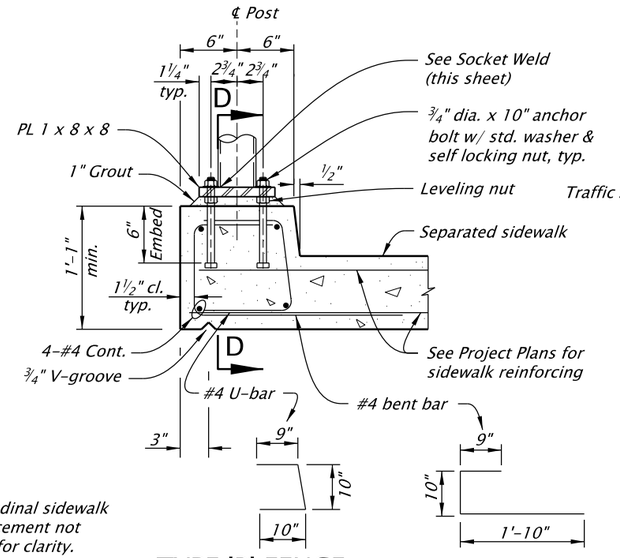


SECTION C-C



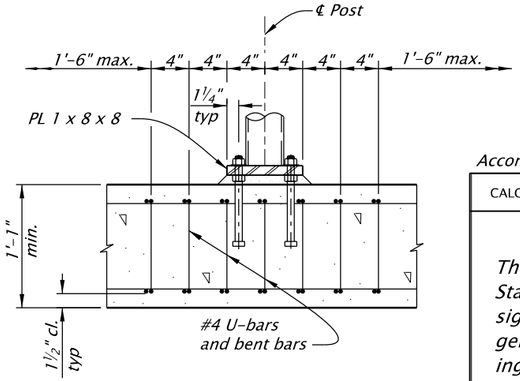
PLAN

Traffic Side

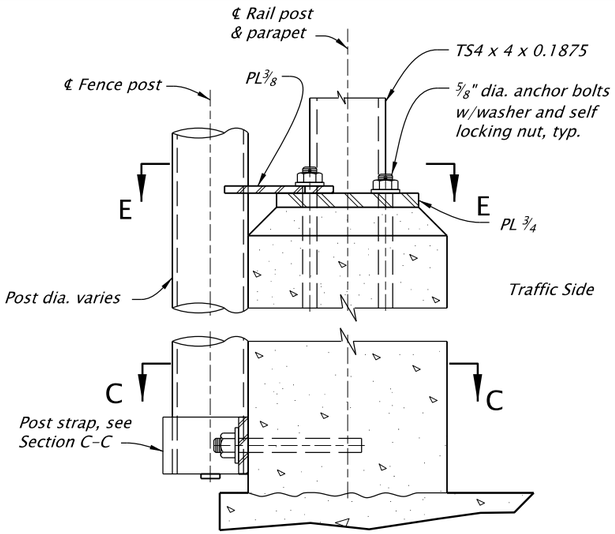


NOTE
Longitudinal sidewalk reinforcement not shown for clarity.

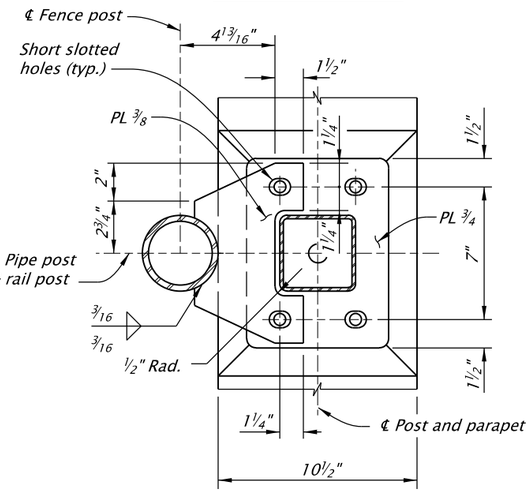
TYPE 'B' FENCE



SECTION D-D



TYPE 'A' FENCE



SECTION E-E

Accompanied by dwg. BR240 and BR242

CALC. BOOK NO. -

SDR DATE: 08-July-2022

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OREGON STANDARD DRAWINGS

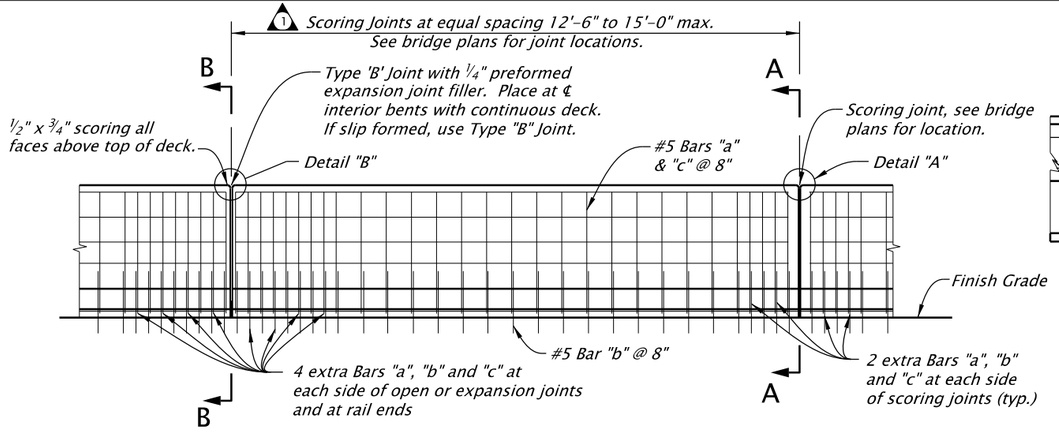
PROTECTIVE FENCING DETAILS-1

2022

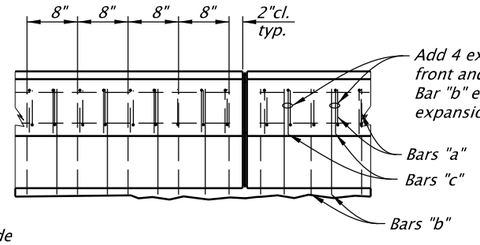
	DATE	REVISION DESCRIPTION
1	06-2022	Revised angle size callout
	-	-
	-	-
	-	-
	-	-

br241.dgn 07-2022

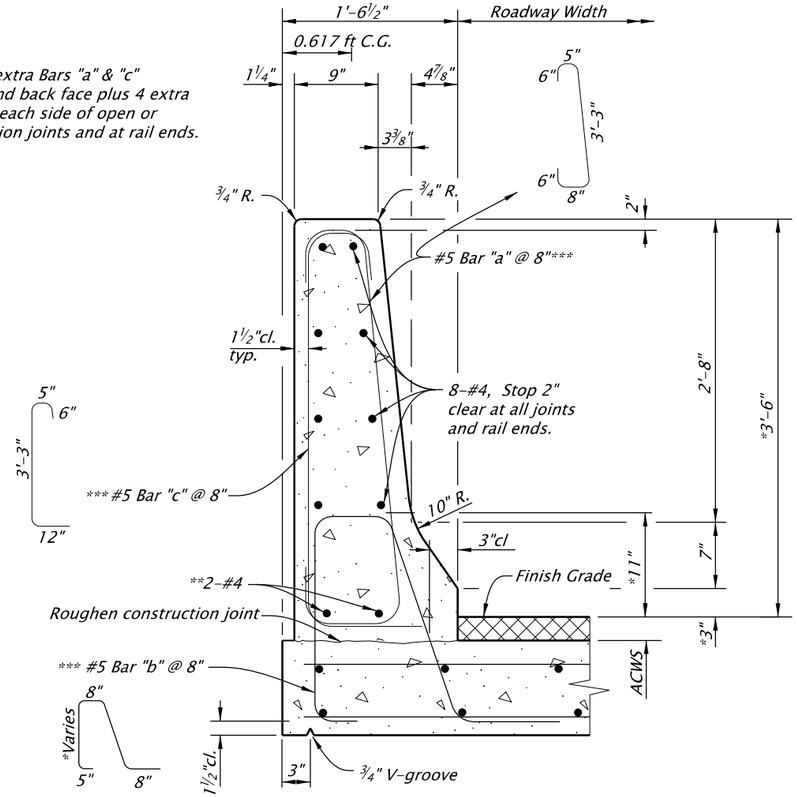
BR241



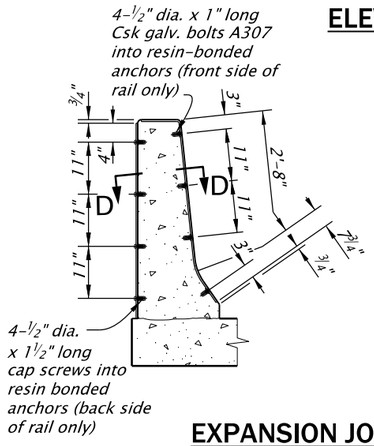
ELEVATION: CONCRETE BRIDGE RAIL (FIXED FORMS)



PLAN: BARS AT OPEN OR EXPANSION JOINTS AND RAIL ENDS

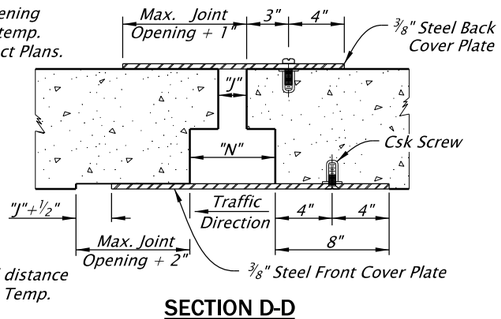


TYPICAL SECTION (FIXED FORMS)



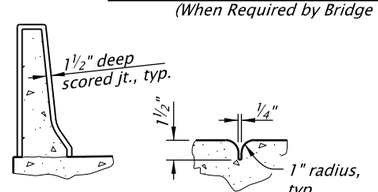
EXPANSION JOINT COVER PLATE

(When Required by Bridge Plans)



SECTION D-D

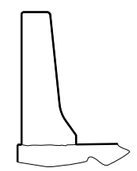
NOTES:
*Place top of parapet 3'-6" above finish grade. Increase dimensions marked thus (*) by depth of ACWS.
**Continuous thru scoring joints. Stop 2" clear at ends and all other joints.
See dwg. BR291 for rail on end panel.
***See PLAN: BARS AT OPEN or EXPANSION JOINTS AND RAIL ENDS

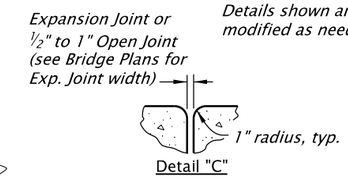


SECTION A-A

DETAIL "A"

SCORING JOINT DETAIL (SLIP-FORMED) (FIXED FORMS)





Detail "C"

OPEN OR EXPANSION JOINT DETAIL (SLIP-FORMED OR FIXED FORMS)

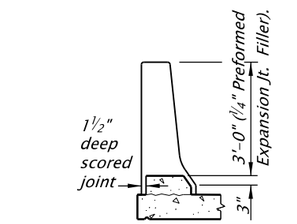
NOTE:
Details shown are general details only and should be modified as needed to fit specific project requirements.

ESTIMATED QUANTITIES

	3'-6" Ht.	1" added Ht.
Concrete	3.45 ft.³/ft.	0.12 ft.³/ft.
Bars "a" & longit.	17.3 #/ft.	———

Bar weight assume joints at 15'-0" ctrs.

GENERAL NOTES:
Rail designed and crash tested to meet NCHRP 350 TL-5 requirements.
Provide all reinforcing steel conforming to ASTM A706 or AASHTO M31 (ASTM A615) Grade 60.
Place all bars 2" clear of the nearest face of concrete unless shown otherwise.
Splice #4 bars 1'-4" min., splice #5 bars 1'-8" min.
Provide Class 3300 - 1½ or ¾ concrete.
Provide steel cover plates conforming to AASHTO M183 (ASTM A36).
Hot-dip galvanize after fabrication.
At skewed bents up to 20° make joints parallel to the bent center line.
For skews greater than 20° make joints normal to rail.

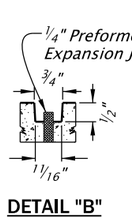


SECTION C-C

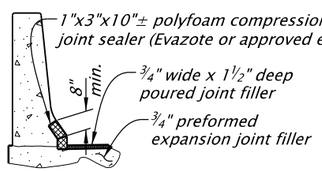
TYPE "B" JOINT DETAIL (SLIP-FORMED)

SECTION B-B

TYPE "B" JOINT DETAIL (FIXED FORMS)



DETAIL "B"



Use when water drains towards rail and no deck joint seal is used. Use joint fillers for length of joint opening "J"+6".

DETAIL "D"

Accompanied by dwg. BR291

CALC. BOOK NO. -

SDR DATE: 08-July-2022

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

TYPE "F" CONCRETE RAIL, 42 INCH

2022

	DATE	REVISION DESCRIPTION
1	06-2022	Modified dimensions.
	-	-
	-	-
	-	-
	-	-

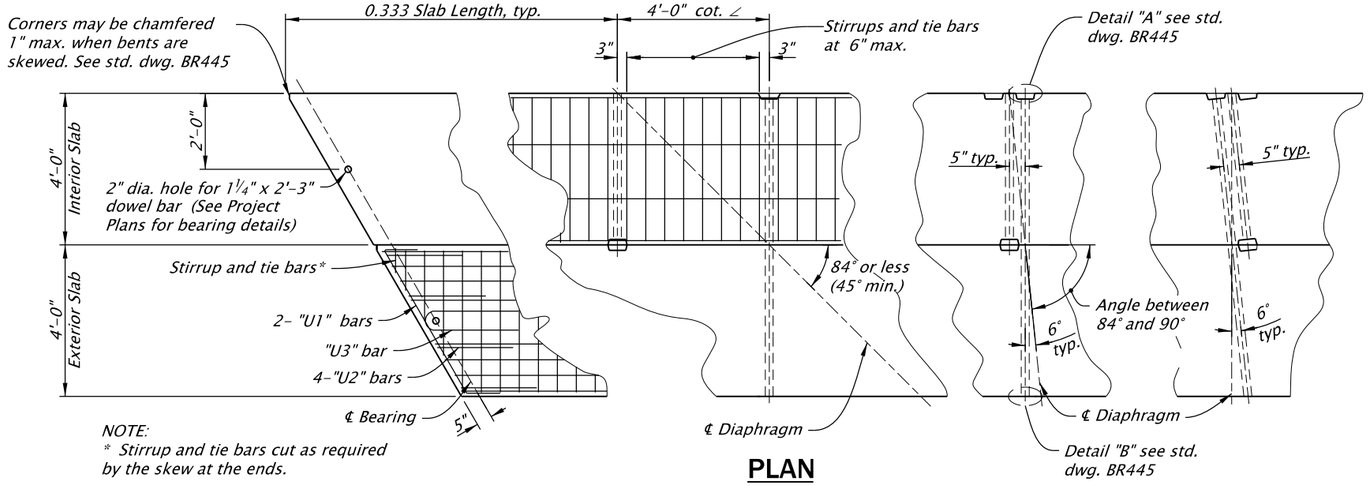
br290.dgn 07-2022

BR290

Effective Date: December 1, 2022 - May 31, 2023

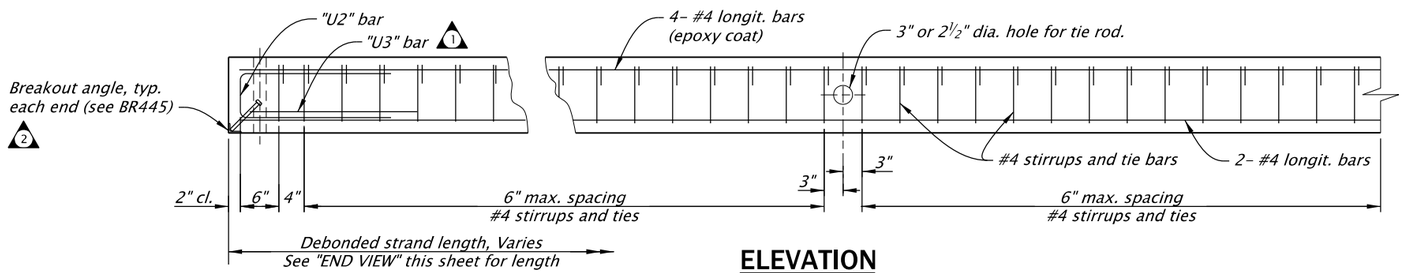
BR290

br400.dgn 07-2022

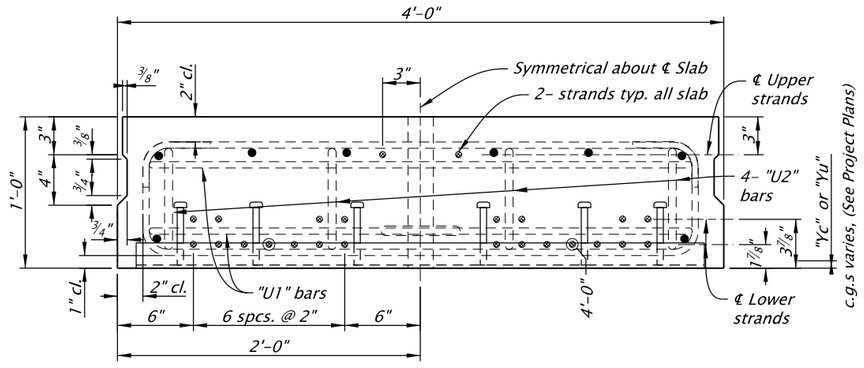


NOTE:
* Stirrup and tie bars cut as required by the skew at the ends.

PLAN
Scale: ¼" = 1'-0"

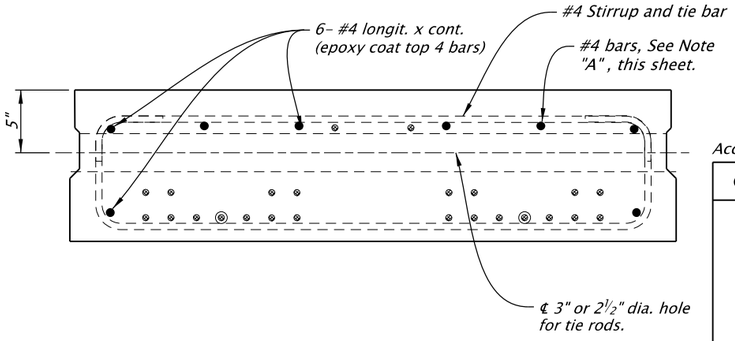


ELEVATION
Scale: ½" = 1'-0"



END VIEW
Scale: 1" = 1'-0"

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



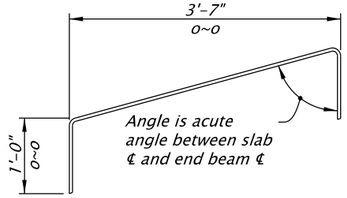
MIDSPAN VIEW
Scale: 1" = 1'-0"

NOTE "A" (Slab End Bars)
2- #4 x 7'-6", slabs 6, 7 and 8.
Place bars each end of each slab (Epoxy coat).

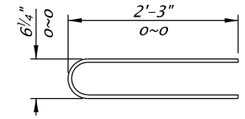
NOTE:
Grout keyway as specified in General Notes.
Omit keyway on exterior side of exterior slabs.
Keyway is continuous.

SECTION PROPERTIES

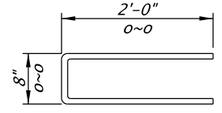
Area =	568 in²
c.g. =	5.97 in
I =	6,851 in⁴
St =	1137 in³
Sb =	1147 in³
Weight =	612 lbs/ft
J =	23,400 in⁴
K =	0.59
V/S =	4.74



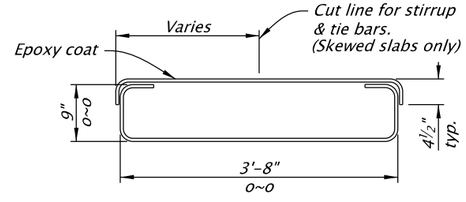
#4 "U1" BAR
(4- required per slab)



#6 "U3" BAR (A706)
(2- required per slab)



#5 "U2" BAR
(8- required per slab)



#4 STIRRUP & TIE

Accompanied by dwg. BR445

CALC. BOOK NO. -

SDR DATE: 08-July-2022

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

12" PRECAST PRESTRESSED SLAB

2022

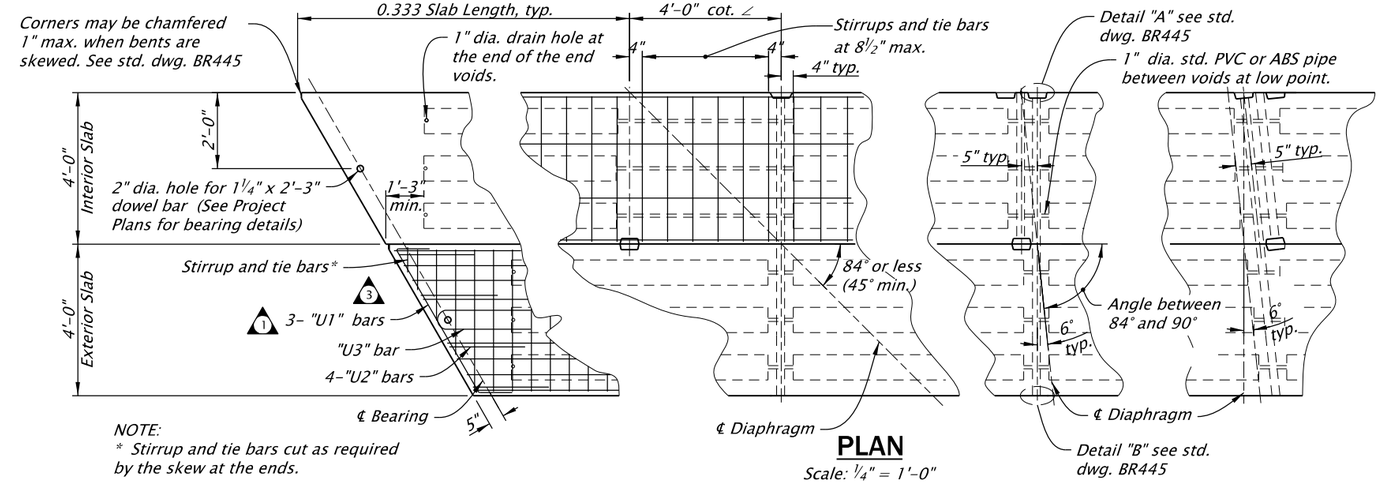
	DATE	REVISION DESCRIPTION
1	07/2020	Revised stirrup and tie bar spacing
	07/2020	Updated drawing to current stds.
2	07/2022	Added breakout angle.
	-	-
	-	-

BR400

Effective Date: December 1, 2022 - May 31, 2023

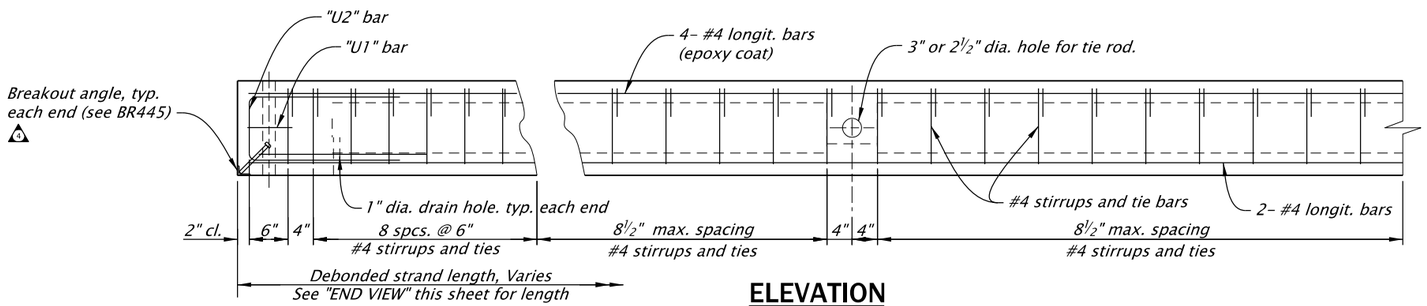
BR400

br405.dgm 07-2022



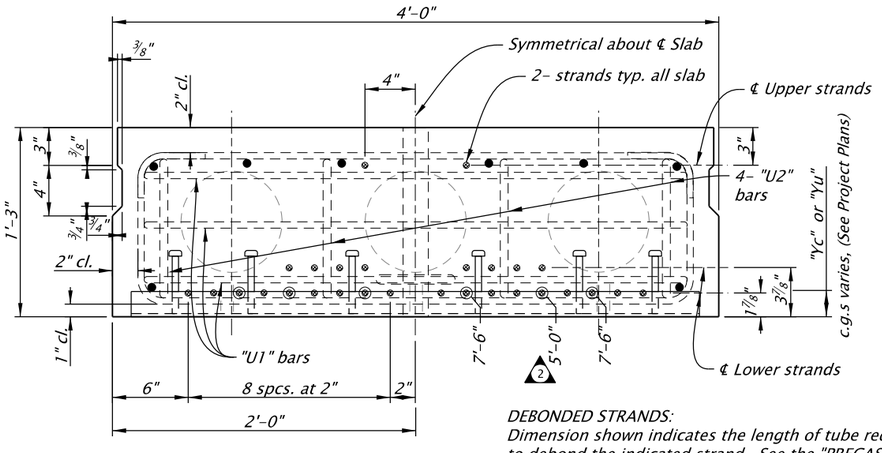
PLAN

Scale: ¼" = 1'-0"



ELEVATION

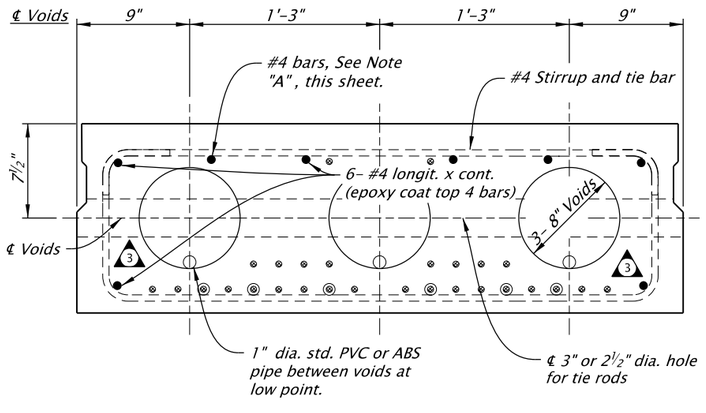
Scale: ½" = 1'-0"



END VIEW

Scale: 1" = 1'-0"

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



MIDSPAN VIEW

Scale: 1" = 1'-0"

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

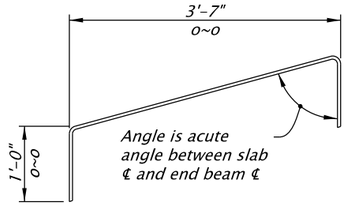
NOTE:
Grout keyway as specified in General Notes.
Omit keyway on exterior side of exterior slabs.
Keyway is continuous.

SECTION PROPERTIES

Area =	562in²
c.g. =	7.45 in
I =	12,769 in⁴
St =	1691in³
Sb =	1714 in³
Weight =	605 lbs/ft
J =	31,900 in⁴
K =	0.69
V/S =	4.46
Form wt = (tubes)	10 lbs/ft
Total wt w/forms=	615 lbs/ft

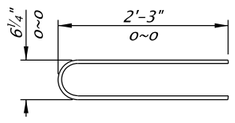
Diaphragm Weight

No Skew	170 lb
15° Skew	270 lb
30° Skew	470 lb
45° Skew	750 lb



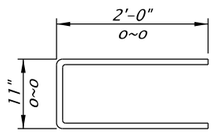
#4 "U1" BAR

1 (6- required per slab)



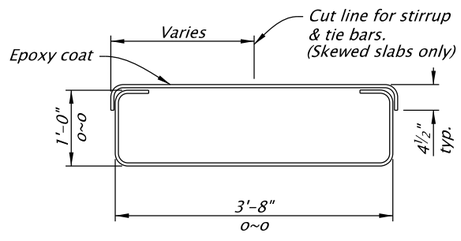
#6 "U3" BAR (A706)

(2- required per slab)



#5 "U2" BAR

(8- required per slab)



#4 STIRRUP & TIE

Accompanied by dwg. BR445

CALC. BOOK NO. -

SDR DATE: 08-July-2022

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.

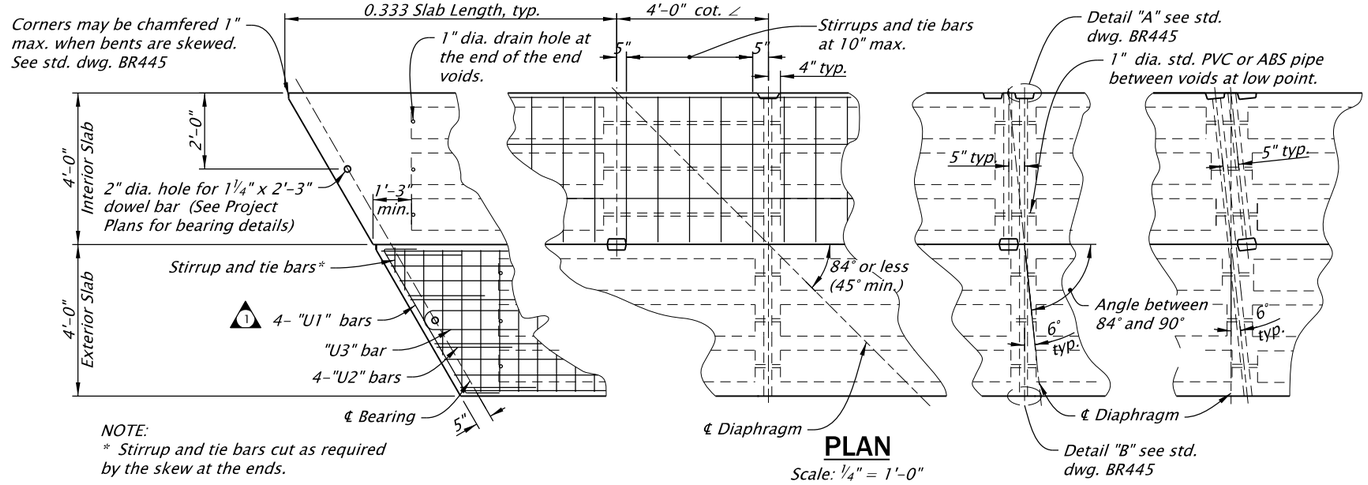
OREGON STANDARD DRAWINGS

15" PRECAST PRESTRESSED SLAB

2022

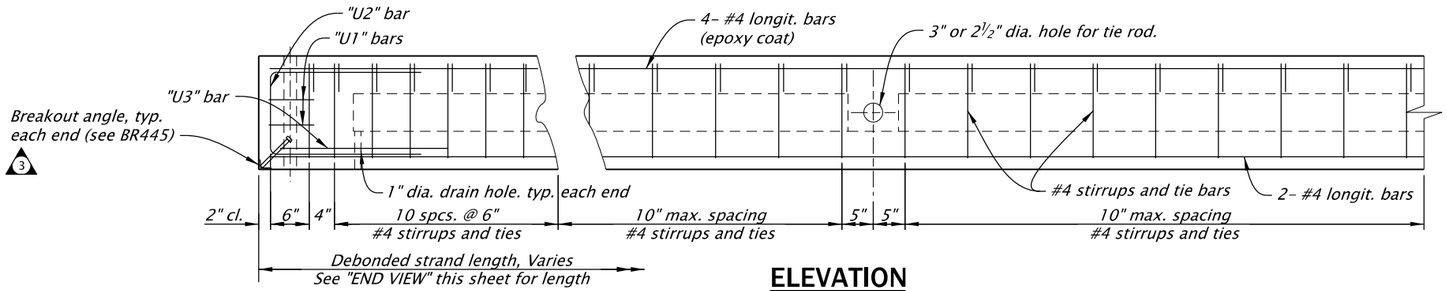
	DATE	REVISION DESCRIPTION
3	07/2020	Added end zone reinf.
4	07/2020	Revised debonded lengths
	07/2020	Updated drawing to current stds.
5	01/2022	Revised #4 bars to be inside of #4 stirrup, Removed "D1" hoop notation.
6	07/2022	Added breakout angle.

br410.dgn 07-2022



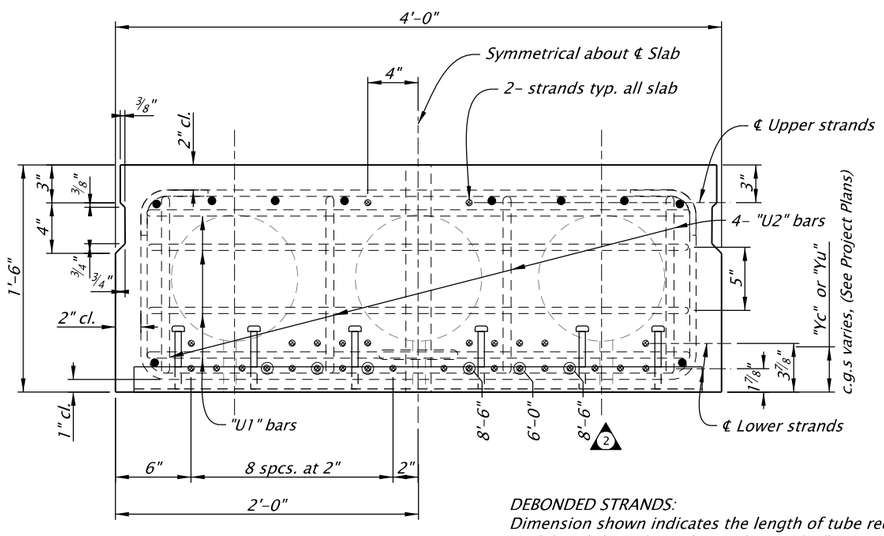
PLAN

Scale: ¼" = 1'-0"



ELEVATION

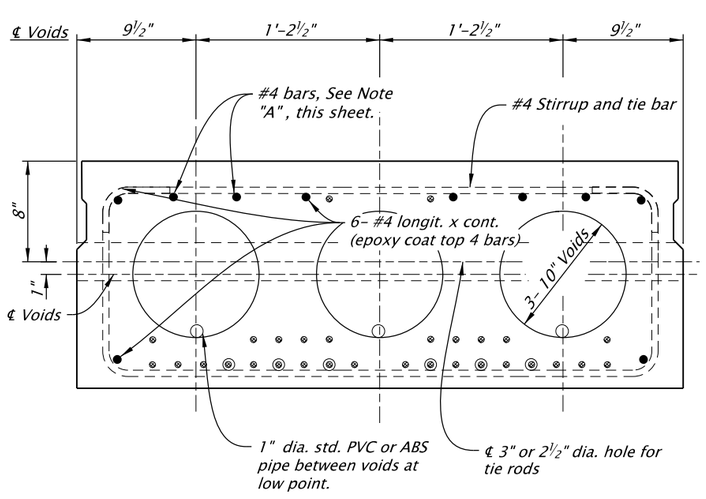
Scale: ½" =1'-0"



END VIEW

Scale: 1" = 1'-0"

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



MIDSPAN VIEW

Scale: 1" = 1'-0"

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

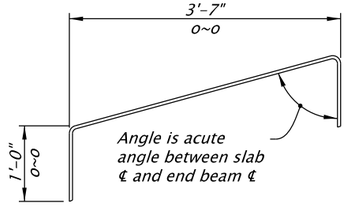
NOTE:
Grout keyway as specified in General Notes.
Omit keyway on exterior side of exterior slabs.
Keyway is continuous.

SECTION PROPERTIES

Area =	621in²
c.g. =	8.94 in
I =	21,626 in⁴
St =	2386 in³
Sb =	2420 in³
Weight =	668 lbs/ft
J =	52,200 in⁴
K =	0.71
V/S =	4.70
Form wt = (tubes)	14 lbs/ft
Total wt w/forms=	682 lbs/ft

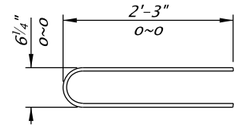
Diaphragm Weight

No Skew	260 lb
15° Skew	430 lb
30° Skew	740 lb
45° Skew	1170 lb



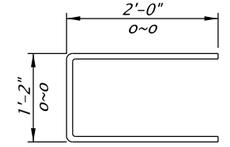
1 #4 "U1" BAR

(8- required per slab)



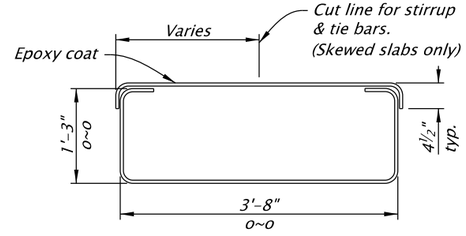
#6 "U3" BAR (A706)

(2- required per slab)



#5 "U2" BAR

(8- required per slab)



#4 STIRRUP & TIE

Accompanied by dwg. BR445

CALC. BOOK NO. -

SDR DATE: 08-July-2022

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.

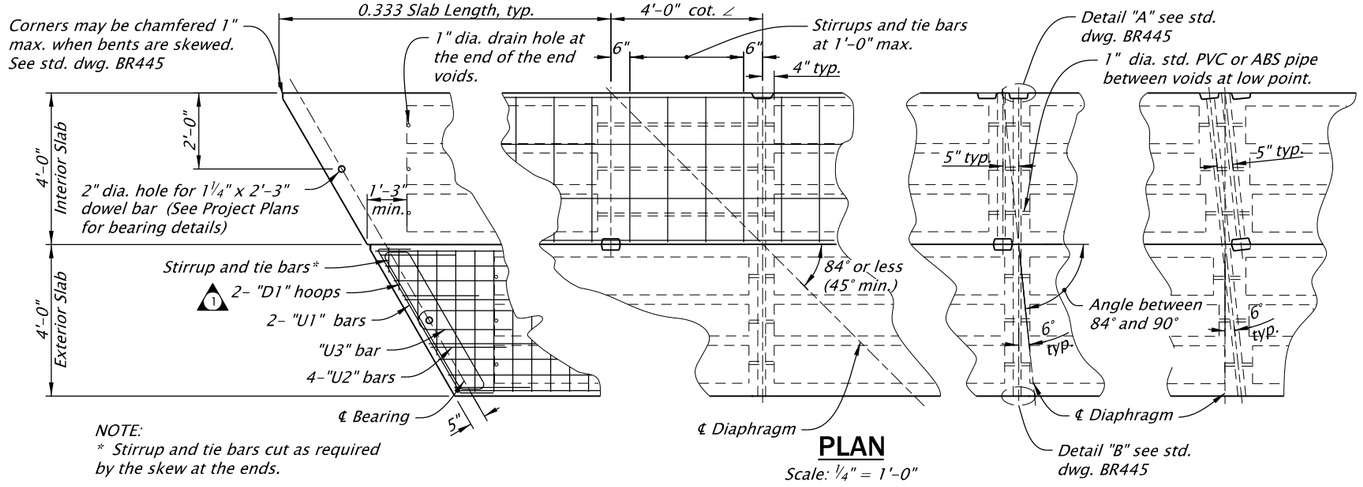
OREGON STANDARD DRAWINGS

18" PRECAST PRESTRESSED SLAB

2022

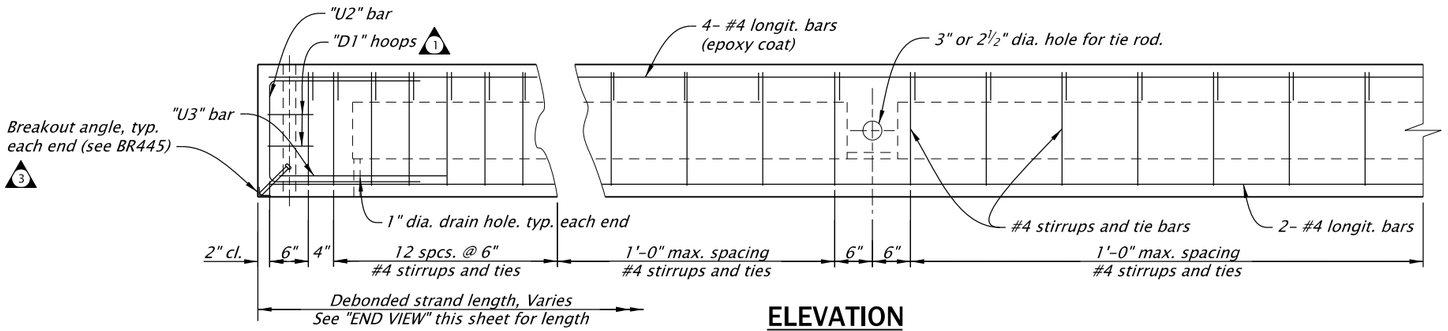
DATE	REVISION DESCRIPTION
1 07/2020	Added end zone reinf.
2 07/2020	Revised debonded lengths
3 07/2020	Updated drawing to current stds.
07/2022	Added breakout angle.
-	-

br415.dgn 07-2022



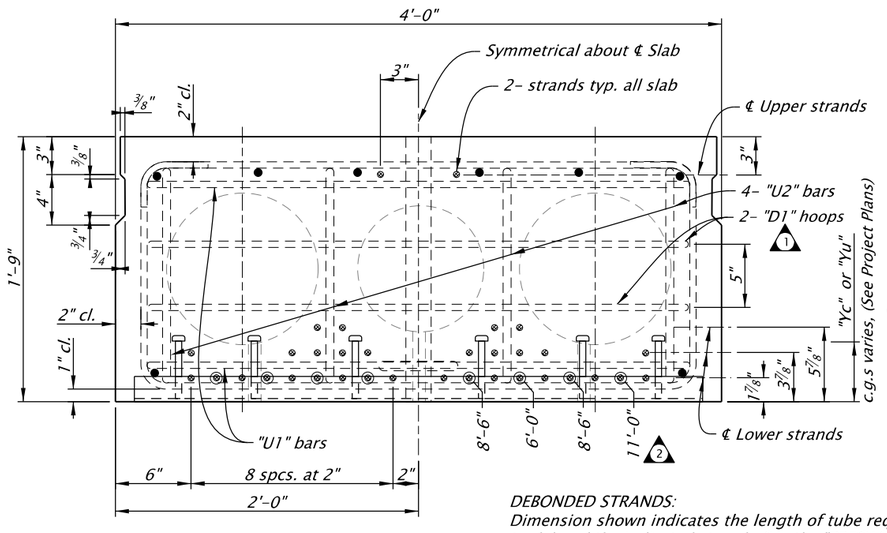
PLAN

Scale: ¼" = 1'-0"



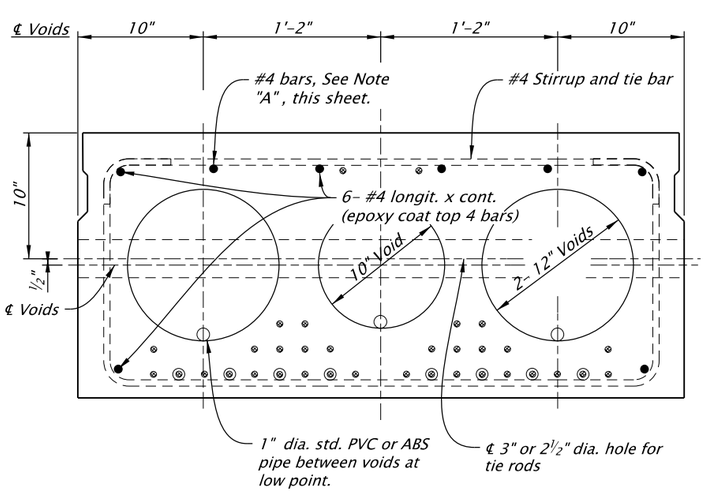
ELEVATION

Scale: ½" =1'-0"



END VIEW

Scale: 1" = 1'-0"



MIDSPAN VIEW

Scale: 1" = 1'-0"

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

NOTE "A" (Slab End Bars)
2- #4 x 10'-0", slabs 6 and 7
2- #4 x12'-6", slabs 8 and 9
2- #4 x 15'-0", slabs10 and 11
Place bars each end of each slab (Epoxy coat).

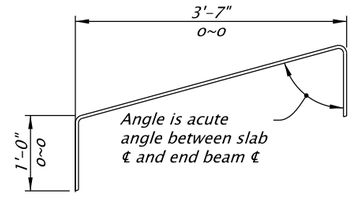
NOTE:
Grout keyway as specified in General Notes.
Omit keyway on exterior side of exterior slabs.
Keyway is continuous.

SECTION PROPERTIES

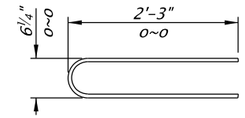
Area =	696in²
c.g. =	10.43 in
I =	34,152 in⁴
St =	3230in³
Sb =	3275in³
Weight =	749 lbs/ft
J =	77,100 in⁴
K =	0.73
V/S =	5.04
Form wt = (tubes)	16 lbs/ft
Total wt w/forms=	765 lbs/ft

Diaphragm Weight

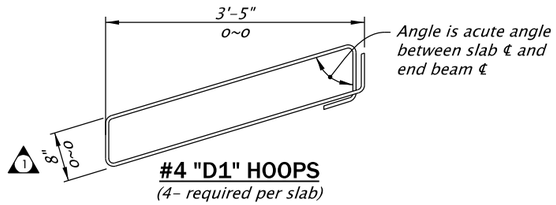
No Skew	340 lb
15° Skew	560 lb
30° Skew	960 lb
45° Skew	1520 lb



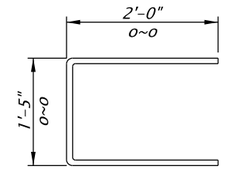
#4 "U1" BAR
(4- required per slab)



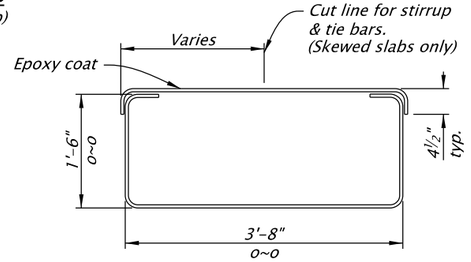
#6 "U3" BAR (A706)
(2- required per slab)



#4 "D1" HOOPS
(4- required per slab)



#5 "U2" BAR
(8- required per slab)



#4 STIRRUP & TIE

Accompanied by dwg. BR445

CALC. BOOK NO. -

SDR DATE: 08-July-2022

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

21" PRECAST PRESTRESSED SLAB

2022

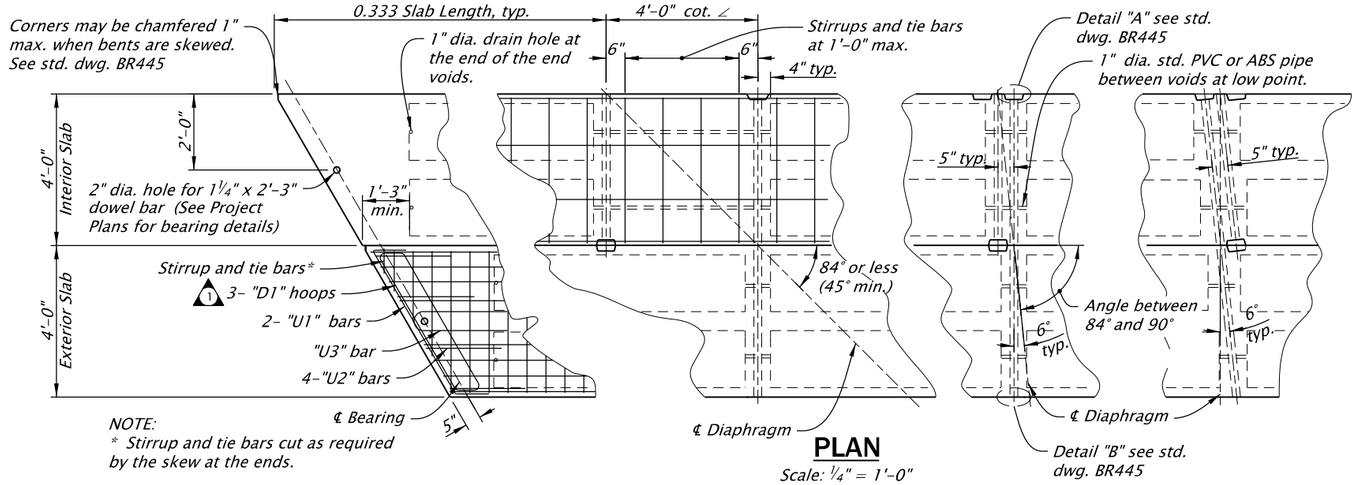
	DATE	REVISION DESCRIPTION
1	07/2020	Added end zone reinf.
2	07/2020	Revised debonded length.
3	07/2020	Updated drawing to current stds.
3	07/2022	Added breakout angle.
	-	-

BR415

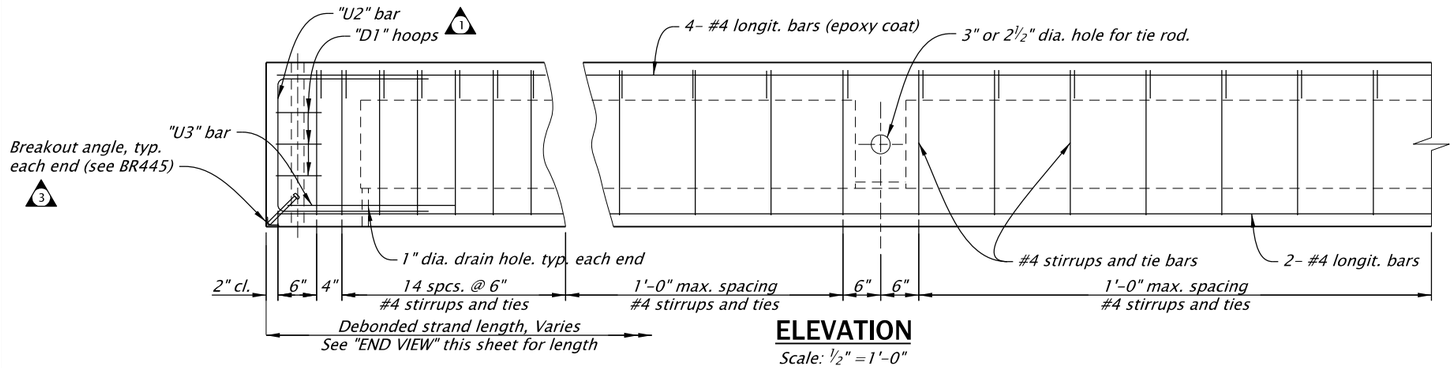
Effective Date: December 1, 2022 - May 31, 2023

BR415

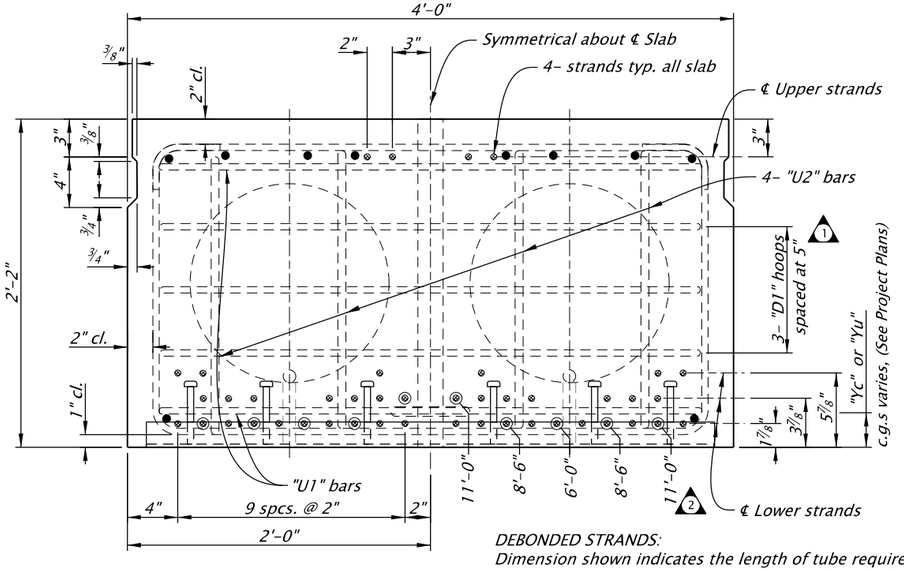
br420.dgn 07-2022



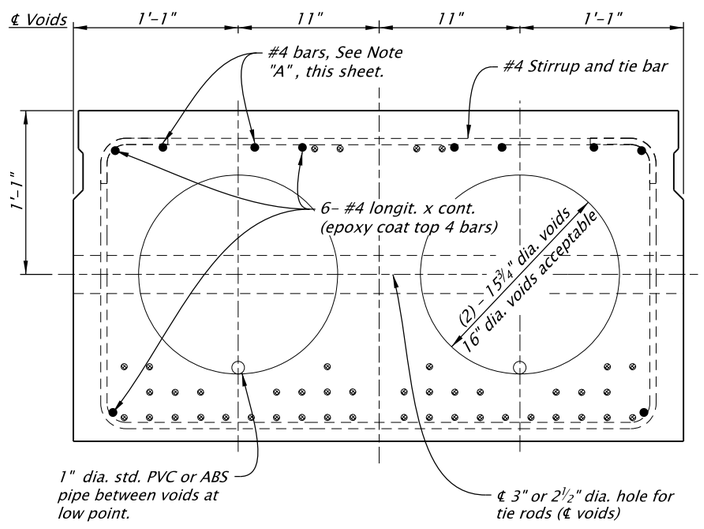
PLAN
Scale: ¼" = 1'-0"



ELEVATION
Scale: ½" =1'-0"



END VIEW
Scale: 1" = 1'-0"



MIDSPAN VIEW
Scale: 1" = 1'-0"

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

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

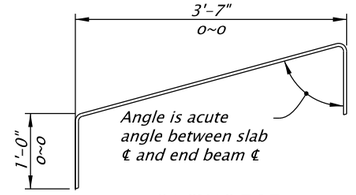
NOTE:
Grout keyway as specified in General Notes.
Omit keyway on exterior side of exterior slabs.
Keyway is continuous.

SECTION PROPERTIES

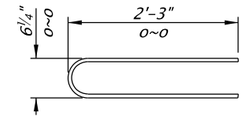
Area =	851in²
c.g. =	12.92 in
I =	63,596 in⁴
St =	4862in³
Sb =	4923in³
Weight =	916 lbs/ft
J =	128,800 in⁴
K =	0.77
V/S =	5.75
Form wt = (tubes)	20 lbs/ft
Total wt w/forms=	936 lbs/ft

Diaphragm Weight

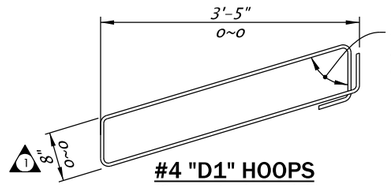
No Skew	430 lb
15° Skew	710 lb
30° Skew	1230 lb
45° Skew	1940 lb



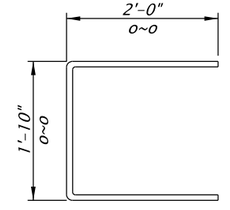
#4 "U1" BAR
(4- required per slab)



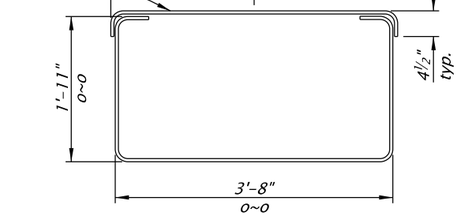
#6 "U3" BAR (A706)
(2- required per slab)



#4 "D1" HOOPS
(6- required per slab)



#5 "U2" BAR
(8- required per slab)



#4 STIRRUP & TIE

Accompanied by dwg. BR445

CALC. BOOK NO. -

SDR DATE: 08-July-2022

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

26" PRECAST PRESTRESSED SLAB

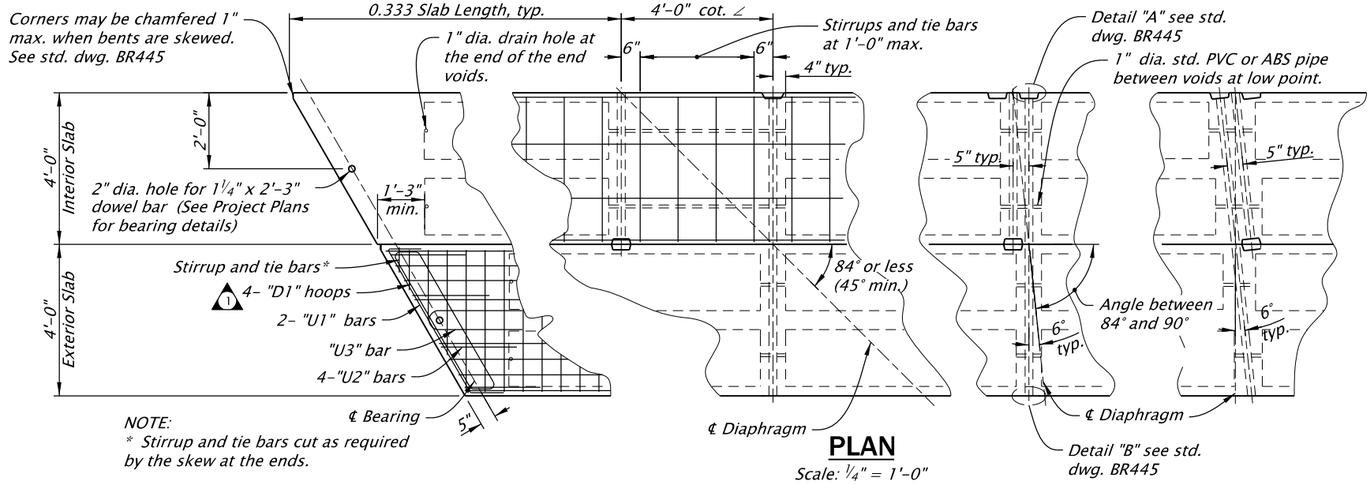
2022

	DATE	REVISION DESCRIPTION
1	07/2020	Added end zone reInf.
2	07/2020	Revised debonded length.
3	07/2020	Updated drawing to current stds.
3	07/2022	Added breakout angle.
	-	-

BR420

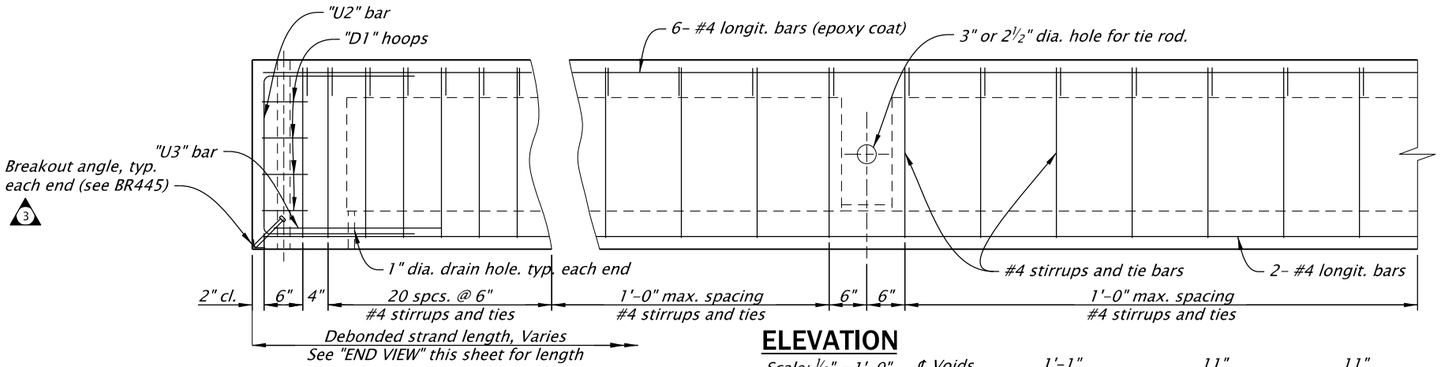
Effective Date: December 1, 2022 - May 31, 2023

BR420



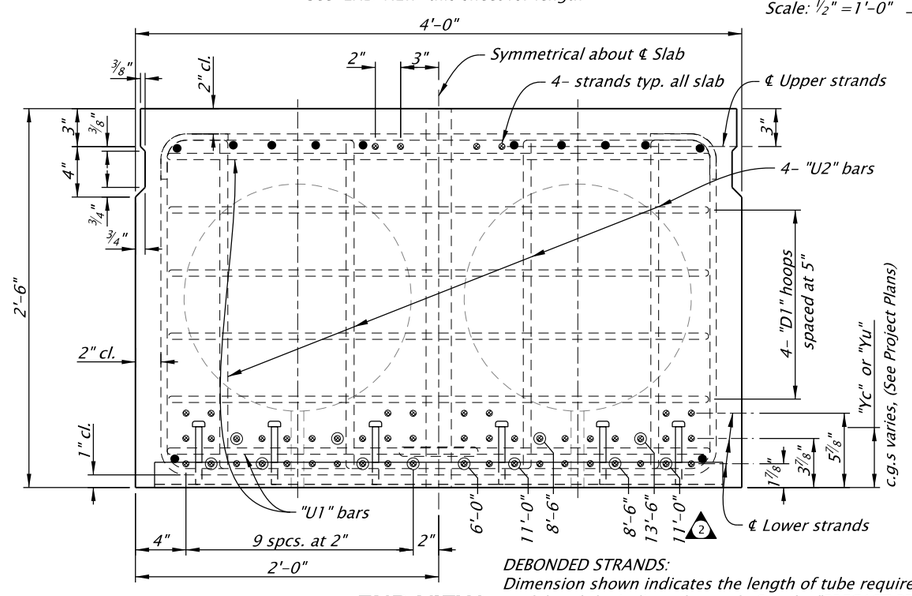
PLAN

Scale: ¼" = 1'-0"



ELEVATION

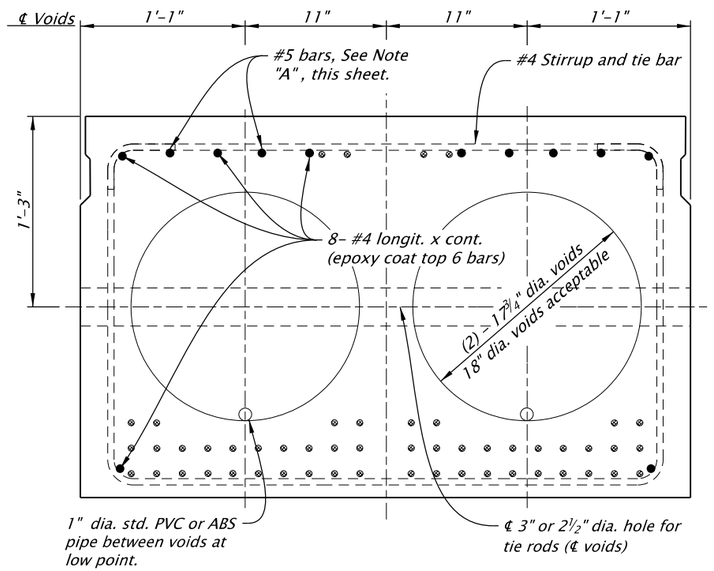
Scale: ½" = 1'-0"



END VIEW

Scale: 1" = 1'-0"

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



MIDSPAN VIEW

Scale: 1" = 1'-0"

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

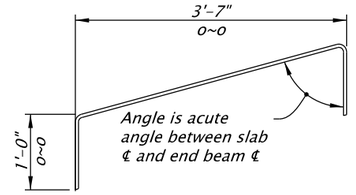
NOTE:
Grout keyway as specified in General Notes.
Omit keyway on exterior side of exterior slabs.
Keyway is continuous.

SECTION PROPERTIES

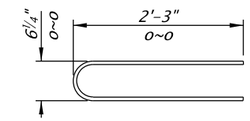
Area =	938 in²
c.g. =	14.91 in
I =	97,278 in⁴
St =	6447 in³
Sb =	6524 in³
Weight =	1009 lbs/ft
J =	180,800 in⁴
K =	0.80
V/S =	6.01
Form wt = (tubes)	27 lbs/ft
Total wt w/forms=	1036 lbs/ft

Diaphragm Weight

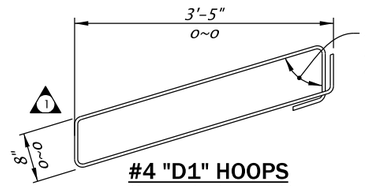
No Skew	550 lb
15° Skew	900 lb
30° Skew	1560 lb
45° Skew	2380 lb



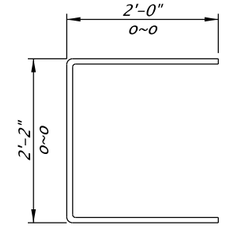
#4 "U1" BAR
(4- required per slab)



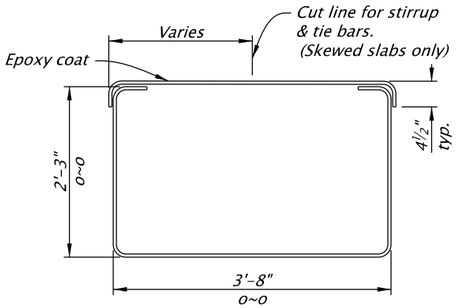
#6 "U3" BAR (A706)
(2- required per slab)



#4 "D1" HOOPS
(8- required per slab)



#5 "U2" BAR
(8- required per slab)



#4 STIRRUP & TIE

Accompanied by dwg. BR445

CALC. BOOK NO. -

SDR DATE: 08-July-2022

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

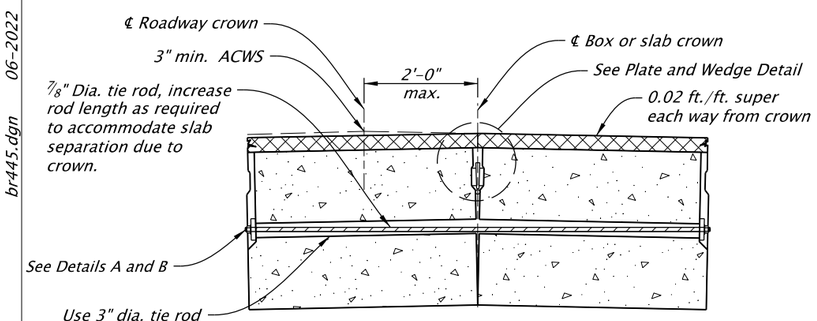
30" PRECAST PRESTRESSED SLAB

2022

	DATE	REVISION DESCRIPTION
1	07/2020	Added end zone reInf.
2	07/2020	Revised debonded lengths and locations.
3	07/2020	Updated drawing to current stds.
3	07/2022	Added breakout angle.
-	-	-

BR422

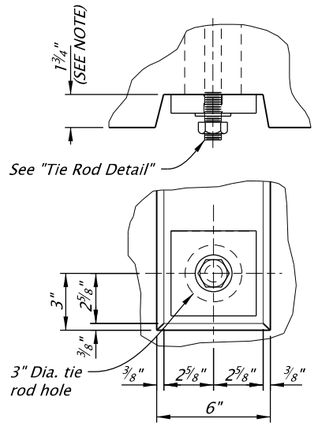
br445.dgn 06-2022



TYPICAL DETAIL FOR INSTALLING BOXES OR SLABS ON CROWN

NOTE:
Tighten tie rods until the bottom corners of the boxes or slabs are in contact. Loosen the tie rod and install the plates and wedges per detail. Shift wedge location as required to avoid conflict with the tie rod.

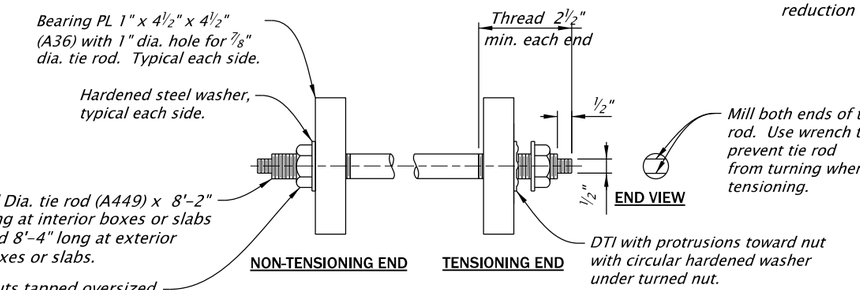
Tension the tie rods. Install boxes or slabs level and build up roadway crown with AC wearing surface when roadway width is 28' or less (for bridges with ACWS).



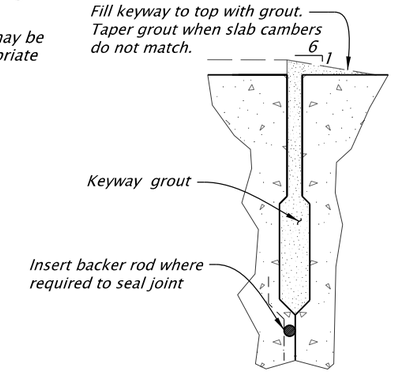
DETAIL "A"

Non-Tensioning End

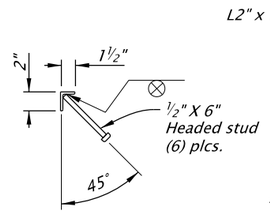
NOTE:
1 3/4" @ tie rod ℄ (2 1/2" depth may be used for slabs with an appropriate reduction in tie rod length)

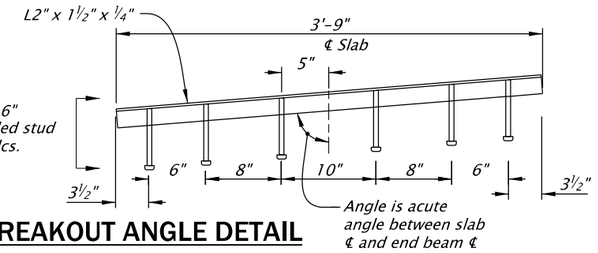


TIE ROD DETAIL



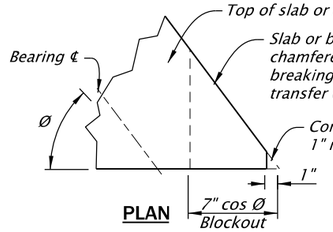
KEYWAY GROUT DETAIL

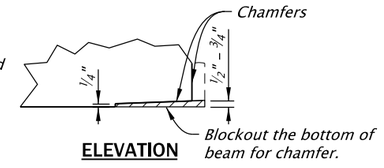




BREAKOUT ANGLE DETAIL

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





PARTIAL ELEVATION CHAMFER DETAIL

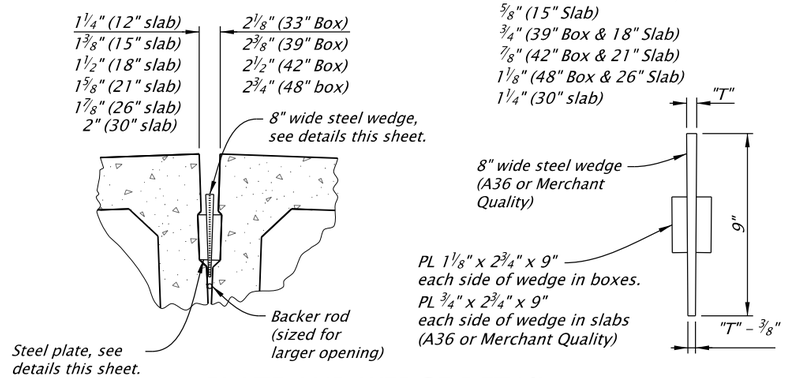
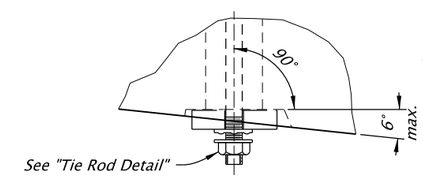
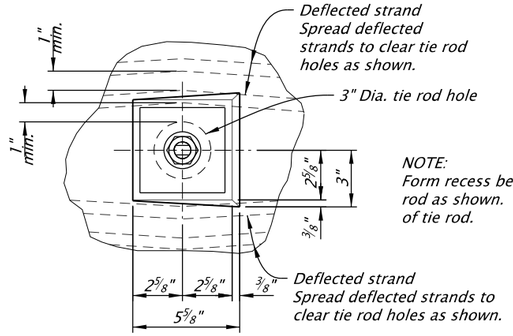


PLATE AND WEDGE DETAIL

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





DETAIL "B"

Tensioning End

GENERAL NOTES FOR PRESTRESSED BOXES AND SLABS

Boxes and slabs are designed for live and superimposed dead loading as shown in the General Notes for the Project.

Provide the class of concrete shown in the Slab or Box Schedule with nominal maximum size aggregate of 1 or 3/4 . Transfer prestress after the concrete reaches the minimum concrete strength at transfer shown in the Slab or Box Schedule.

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

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

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

Provide smooth dowels conforming to AASHTO M31, Grade 60 (ASTM A615, Grade 60), ASTM F1554, Grade 55 or ASTM A529, Grade 55. (2) (1)

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

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

Provide high strength tie rods conforming to ASTM A449. Provide heavy hexagon nuts conforming to ASTM A563. Provide hardened steel washers conforming to ASTM F436. Hot-dip galvanize tie rods, plates, nuts and washers (except DTIs) after fabrication. (1)

Tighten tie rods to 39 kips (minimum) using mechanically galvanized direct tension indicators (DTIs) conforming to ASTM F959 and ASTM F3125, Grade A325. Tighten all tie rods (per box or slab) to about one half the specified tension before proceeding with final tensioning. (1)

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

CALC. BOOK NO. -

SDR DATE: 08-July-2022

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

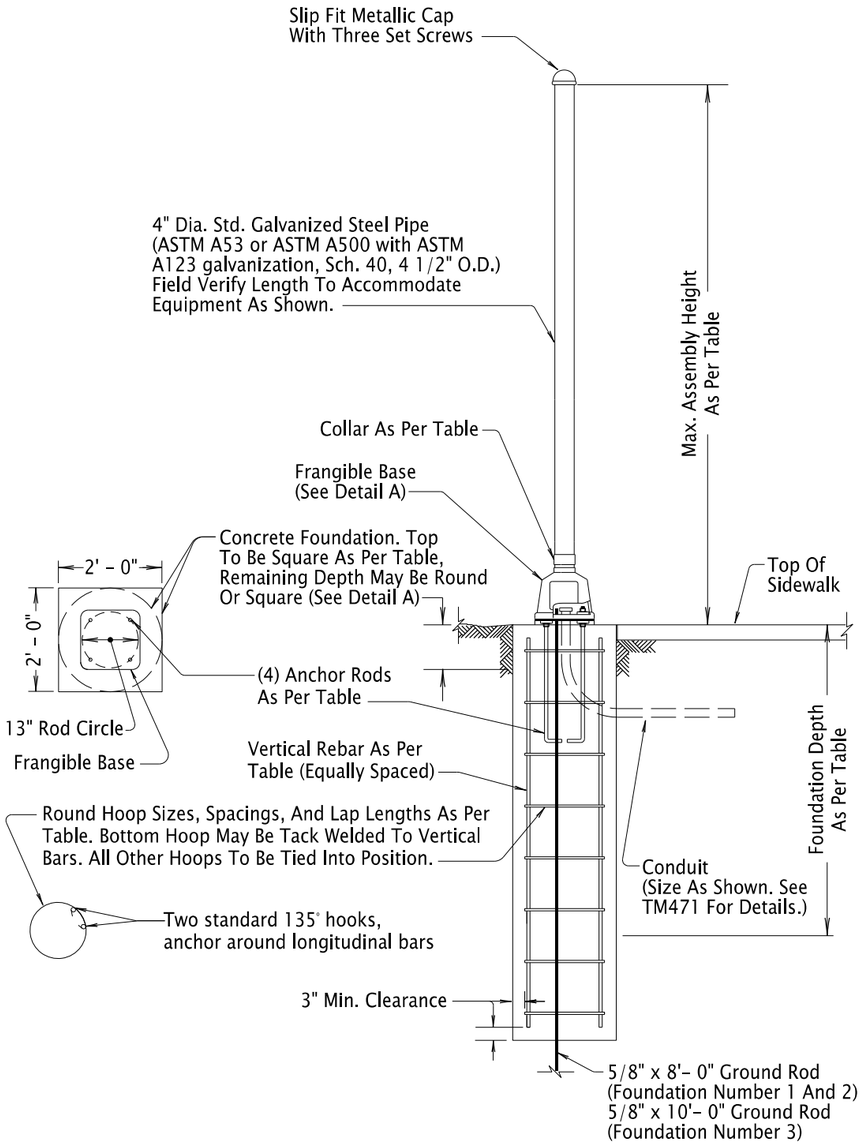
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

OREGON STANDARD DRAWINGS

PRECAST PRESTRESSED BOX AND SLAB DETAILS

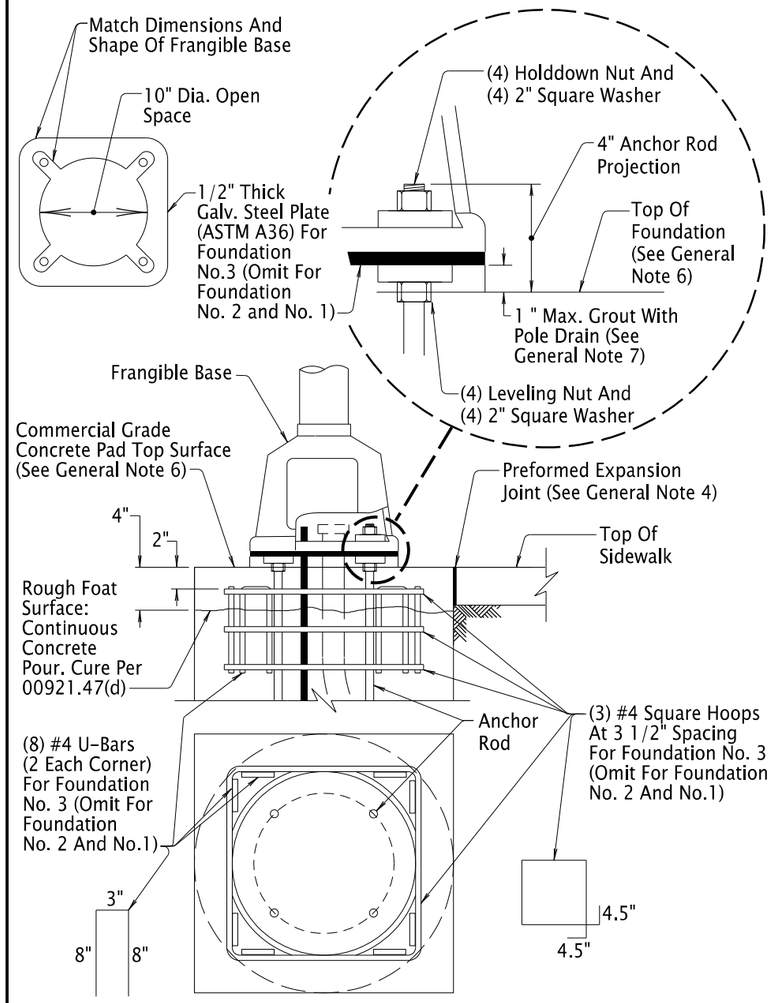
2022

	DATE	REVISION DESCRIPTION
(2)	07/2020	Revised steel grade for dowels and tie rods.
(1)	07/2020	Updated drawing to current stds.
(1)	07/2020	Moved rail anchorage detail to det3465.
(2)	06-2022	Revised General Notes. Added breakout Angle Detail.
-	-	-



Pedestal Foundation Number	Max. Assembly Height	Foundation Depth	Depth of Square Foundation	Anchor Rods (ASTM F 1554 Grade 36)	Reinforcing Steel			Collar
					Vertical Rebar	Hoop Size & Spacing	Hoop Lap Length	
1	6' - 0"	2' - 0"	4"	3/4" x 18" x 4" (6" Thread)	N/A	N/A	N/A	N/A
2	10' - 0"	3' - 0"	4"					
3	20' - 6"	8' - 0"	12"	1" x 36" x 4" (6" Thread)	8-#6	#4-12"	6" with 2 hooks	Req'd

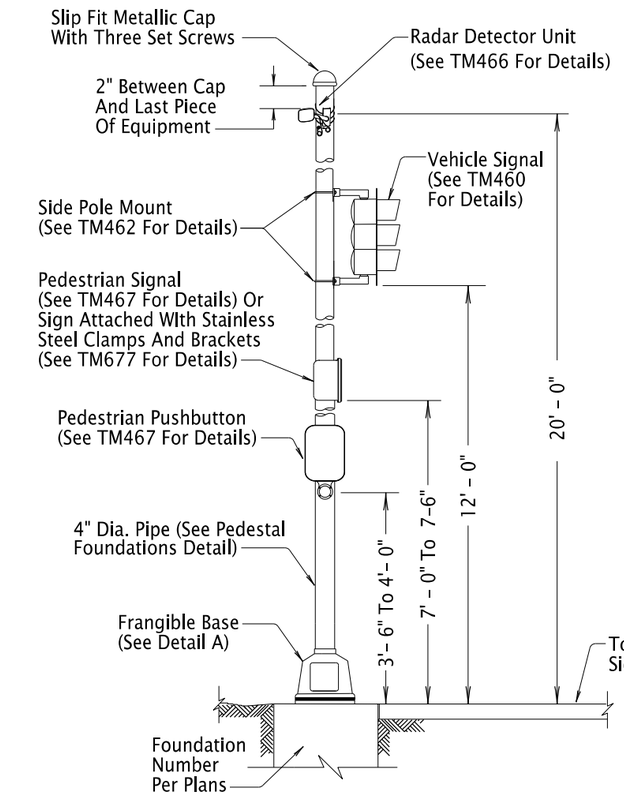
PEDESTAL FOUNDATIONS



DETAIL A - FRANGIBLE BASE

General Notes:

1. All Bolts, Nuts And Washers To Conform To 02560.20 And Be Galvanized Steel According To 02560.40 Unless Noted Otherwise.
2. All Anchor Rods To Be Galvanized Steel Conforming To 02560.30.
3. All Pole Entrances Containing Wiring To Be Smooth.
4. Install 1/4" Thick Preformed Expansion Joint Filler Around Footing In Sidewalk Areas.
5. The Entire Foundation To Be Located On A Single Plane With Less Than 3% Slope. The Flat Edge(s) Of The Foundation May Be Adjacent To The Turn Space, Back Of Walk, Or A Curb Ramp Grade Break Line.
6. Install Commercial Grade Concrete Pad Above Rough Float Surface With Top Surface Matching Sidewalk Grade And Less Than 1/4 " Vertical Exposure From Adjacent Grade. Clean Rough Float Surface Prior To Placing Fresh Concrete By Removing All Scum, Laitance, Loose Gravel, And Sediment. Pour During Sidewalk Installation After Installing Pipe And Appurtenances.
7. Non-Shrink High Early Strength Grout (Non-Ferrous) with 3/4" Diameter Pole Drain And A Minimum Strength of 5000 psi. Do Not Use Footing Concrete.



Notes:

1. Equipment Shown In the Assembly Detail Is An Example Of The Equipment That May Be Mounted. Install Equipment As Shown.
2. See TM492 For Ramp Meter Pedestal Mounting Details.
3. See TM493 For RRFB Pedestal Mounting Details.

TRAFFIC SIGNAL PEDESTAL ASSEMBLY

CALC. BOOK NO. N/A

SDR REPORT DATE 8-Jul-2022

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

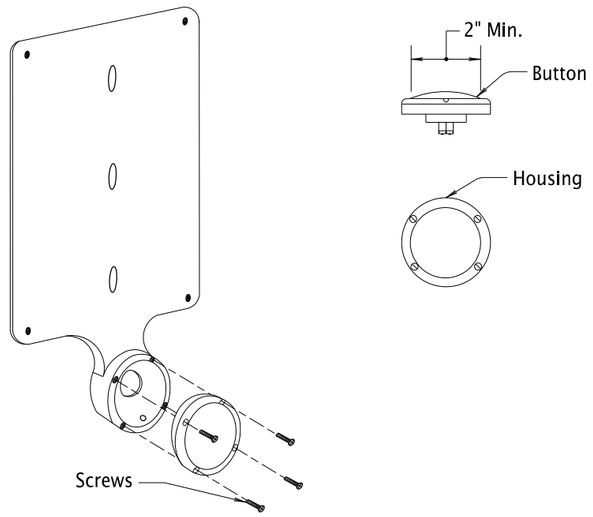
The selection and use of this Standard Drawing, while designed in accordance with generally accepted engineering principles and practices, is the sole responsibility of the user and should not be used without consulting a Registered Professional Engineer.

OREGON STANDARD DRAWINGS

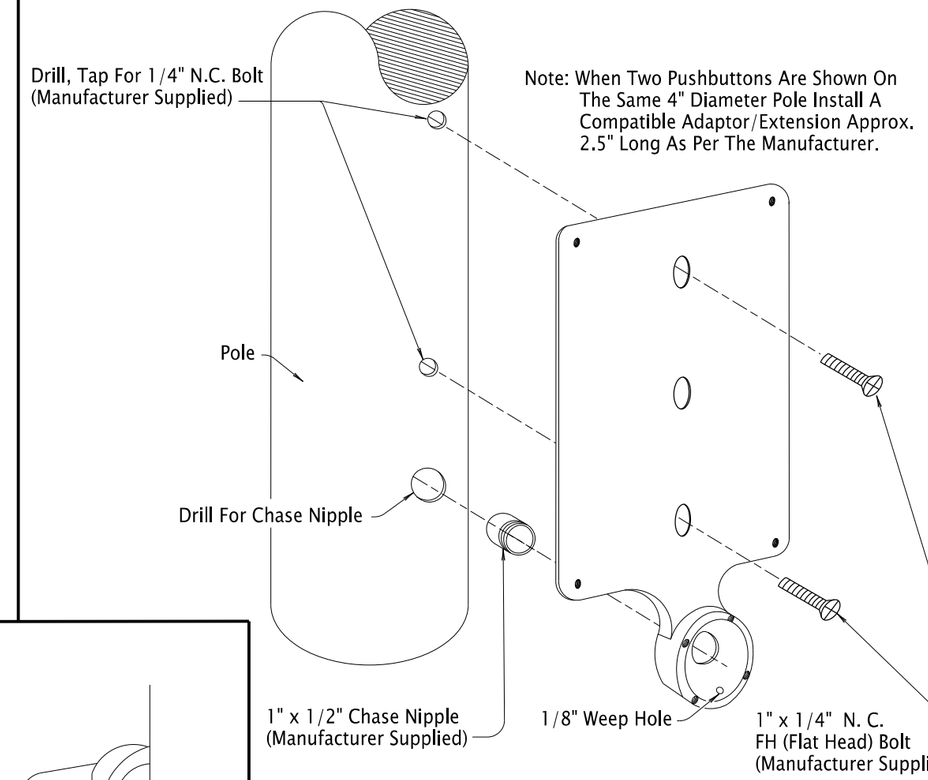
PEDESTAL FOUNDATION AND TRAFFIC SIGNAL ASSEMBLY

2021

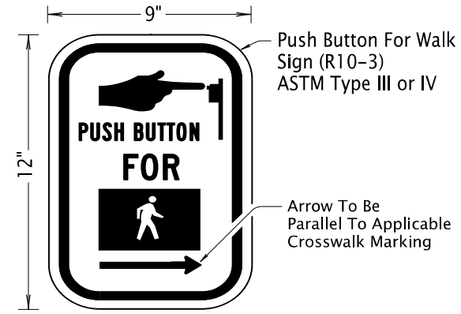
DATE	REVISION DESCRIPTION
01/21	Updated All Anchor Rod Details. Corrected Std. Dwg. Reference
7/22	Complete redesign of foundation and installation proceedure



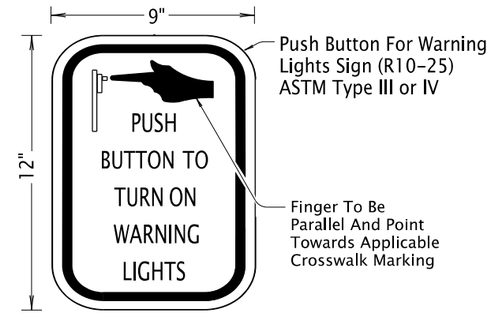
STANDARD PUSHBUTTON



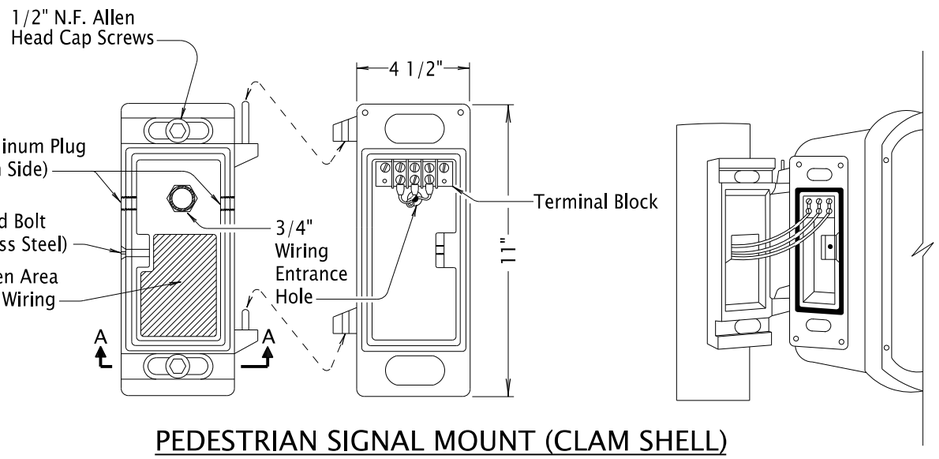
STANDARD PUSHBUTTON STATION AND INSTRUCTION SIGN



SIGN FOR PEDESTRIAN SIGNALS



SIGN FOR WARNING BEACON ASSEMBLY



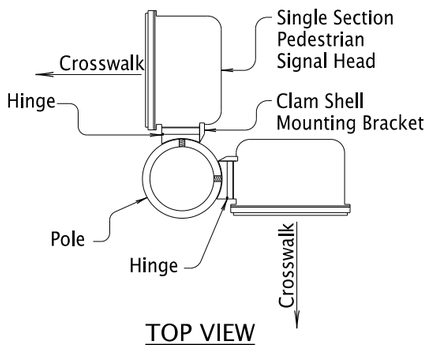
PEDESTRIAN SIGNAL MOUNT (CLAM SHELL)

General Notes:

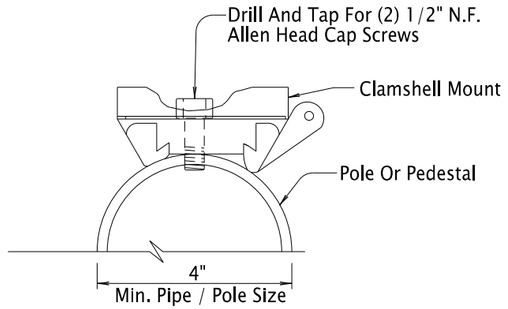
1. All Screws, Bolts, Nuts And Washers To Be Type 304 Or 316 Stainless Steel Unless Noted Otherwise.
2. Bolts And Screws To Have Square Or Hex Heads. Allen Head Fasteners Not Allowed.
3. Drill And Tap Pole As Per Orientation Shown On Plans.
4. Horizontal Reach To The Pushbutton To Be 10 Inches Maximum.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

NOTES:

1. Where Two Heads Are Side Mounted On 4" Conduit, Proper Clearance To 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



SECTION A–A

CLAM SHELL ORIENTATION

CALC. BOOK NO. N/A

SDR REPORT DATE 8-Jul-2022

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.

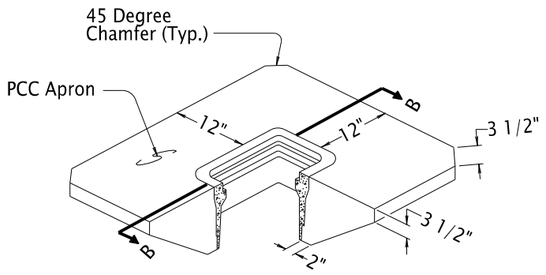
OREGON STANDARD DRAWINGS

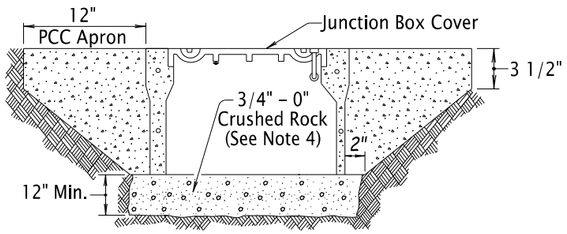
PEDESTRIAN SIGNAL MOUNT AND PEDESTRIAN PUSHBUTTON DETAILS

2021

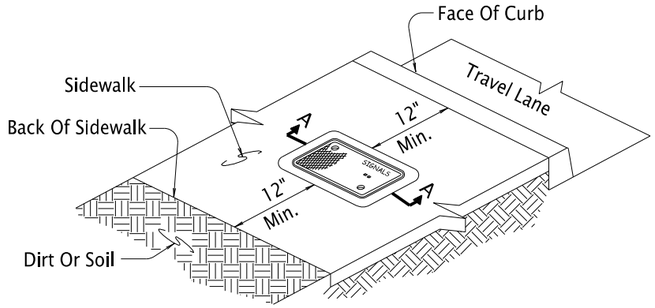
DATE	REVISION DESCRIPTION
7/22	Added R10-25 sign. Added extension mounting note for 2 pushbuttons on same 4" dia. pole.

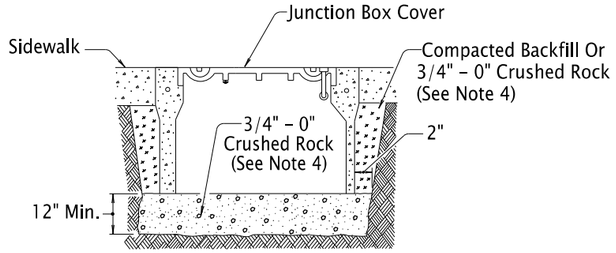
TM467





SECTION B-B

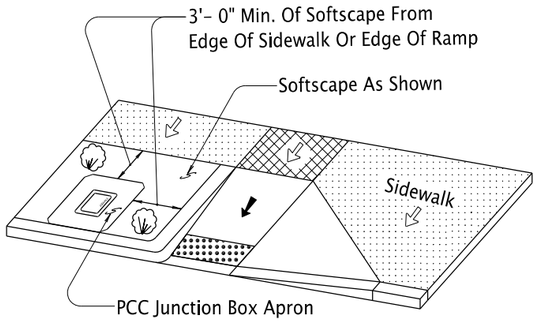




SECTION A-A

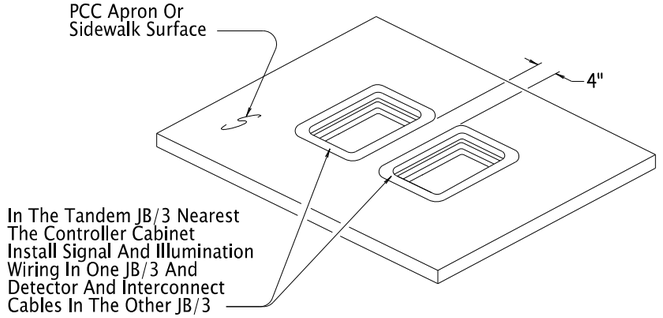
JUNCTION BOX INSTALLATION IN PCC SIDEWALK

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

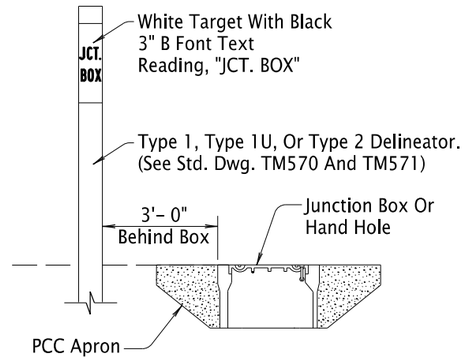


JUNCTION BOX INSTALLATION IN UNSURFACED AREA

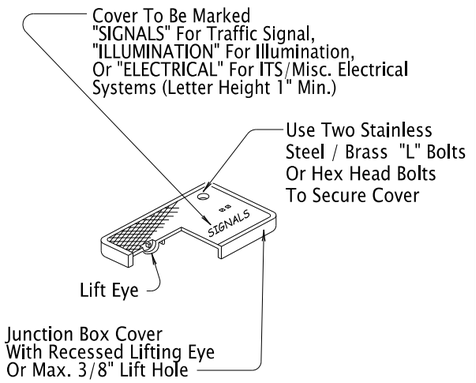
(This Detail Only Applicable for Junction Boxes Located In Incidental Travel Areas; Gravel Shoulders, Behind Guardrail, Etc. Do Not Install In Travel Lanes, Paved Shoulders, Or Other Areas Exposed To Traffic.)



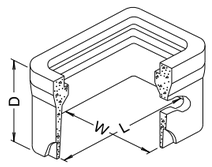
TANDEM JB/3A JUNCTION BOX DETAILS



DELINEATION OF JUNCTION BOX & HAND HOLE IN UNSURFACED AREA



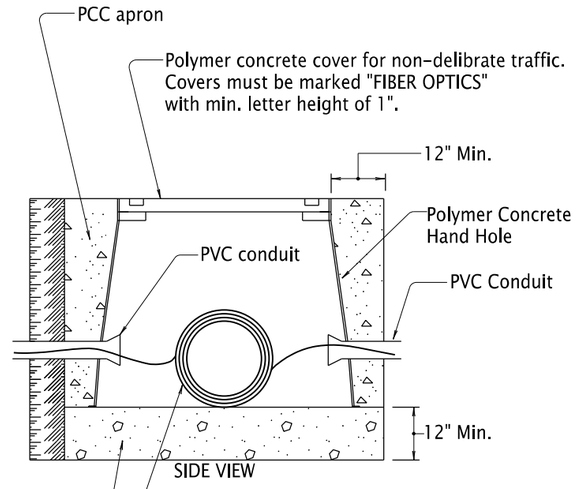
JUNCTION BOX COVER DETAILS

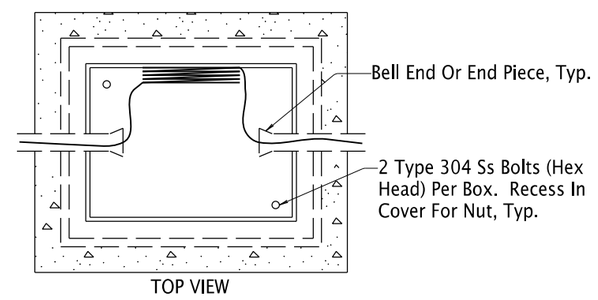


Type*	L	W	D
JB1	17"	10"	12"
JB2	22"	12"	12"
JB3	30"	17"	12"
HH-1	24"	30"	24"
HH-2	30"	48"	24"
HH-3	30"	48"	36"

*Junction Box Or Handhole
Type As Shown On Plans

DIMENSION TABLE





FIBER OPTIC CABLE HAND HOLE INSTALLATION

GENERAL NOTES:

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

CALC. BOOK NO. N/A

SDR REPORT DATE 8-Jul-2022

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.

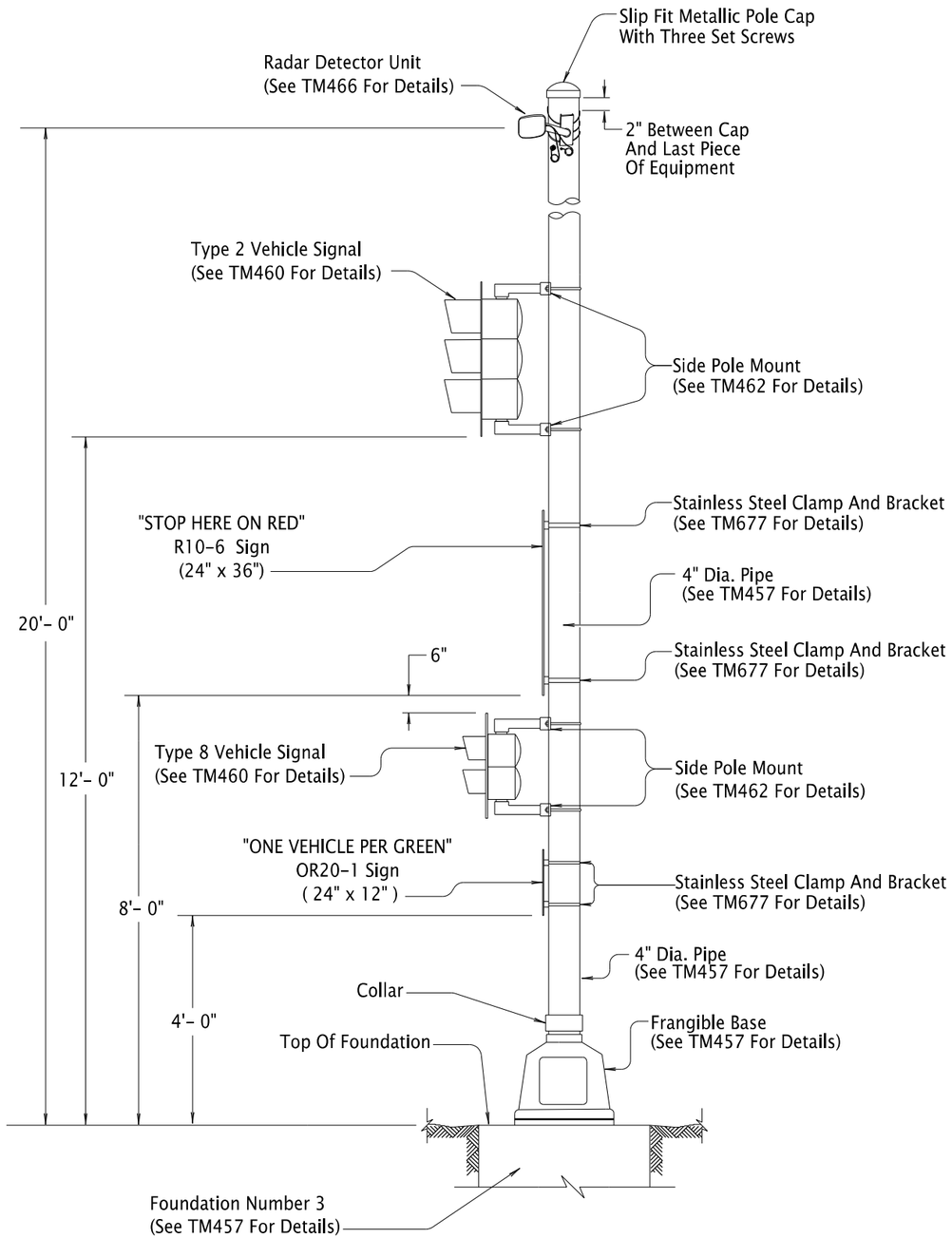
OREGON STANDARD DRAWINGS

JUNCTION BOXES/ HAND HOLES

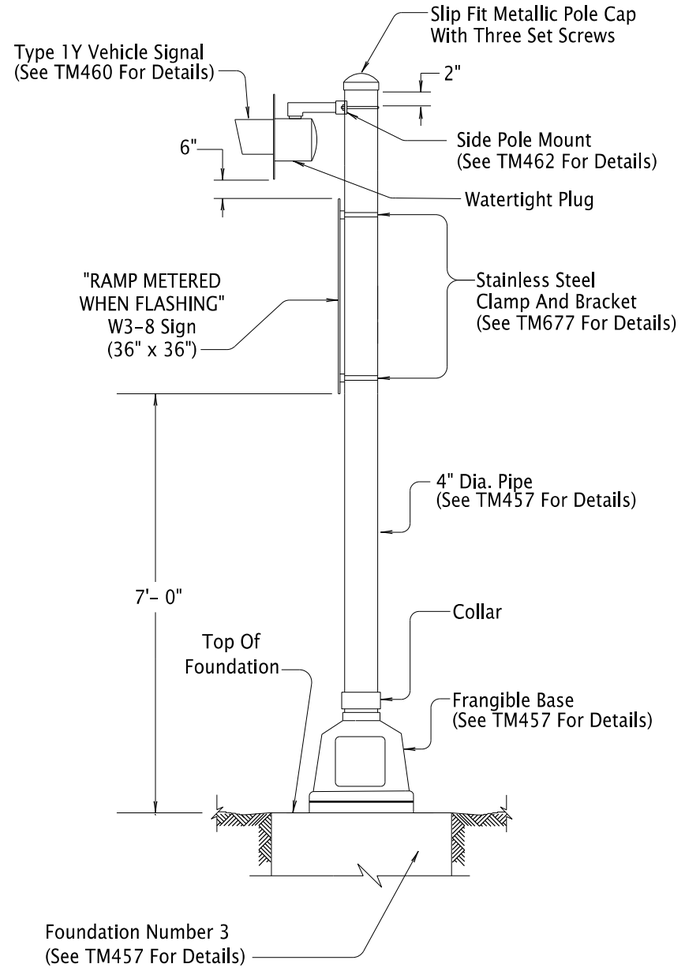
2021

DATE	REVISION DESCRIPTION
7/22	Added new marking (ILLUMINATION & ELECTRICAL) for JB cover

TM472



RAMP METER SIGNAL ASSEMBLY



RAMP METER ADVANCE WARNING SIGN ASSEMBLY

General Notes:

1. Equipment Shown In the Assembly Details Is An Example Of The Equipment That May Be Mounted. Install Equipment As Shown.
2. Do NOT Install Assemblies Within Paved Gore Area.
3. Locate Ramp Meter Signal Assembly 25'- 0" Beyond Stop Line Or As Shown.

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.

SDR REPORT DATE 8-Jul-2022 _ _ _ _ _ _ _ _ _ _ _ _

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

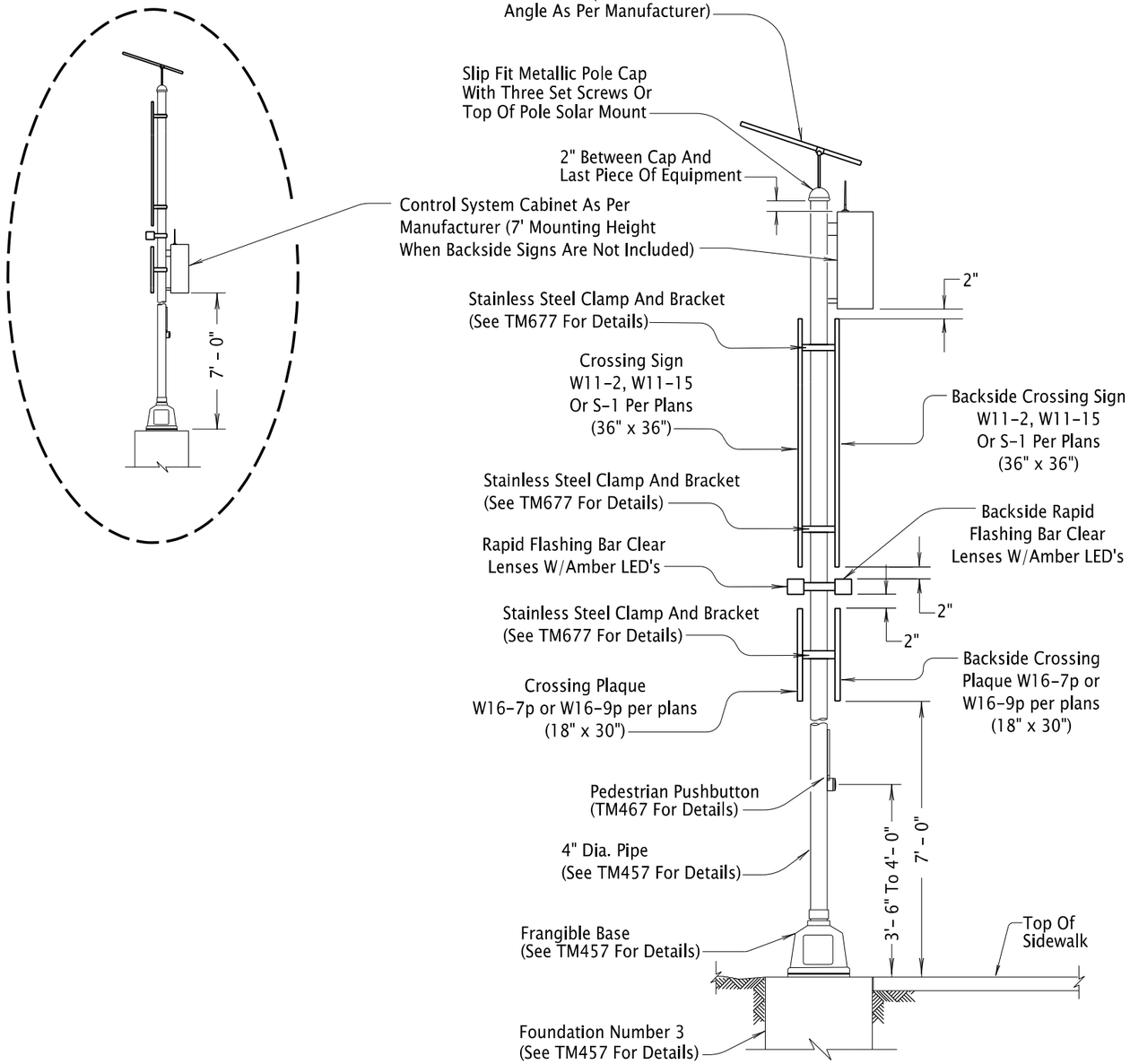
OREGON STANDARD DRAWINGS

RAMP METER ASSEMBLIES

2021

DATE	REVISION DESCRIPTION
01/21	Revised Drafting, Added Radar Mount Reference, Added Sloped Ground Details, Changed Note 2 From 10 To 25 Feet.
1/22	Referenced TM457 for all pipe info
7/22	Revised to match TM457 revisions/format

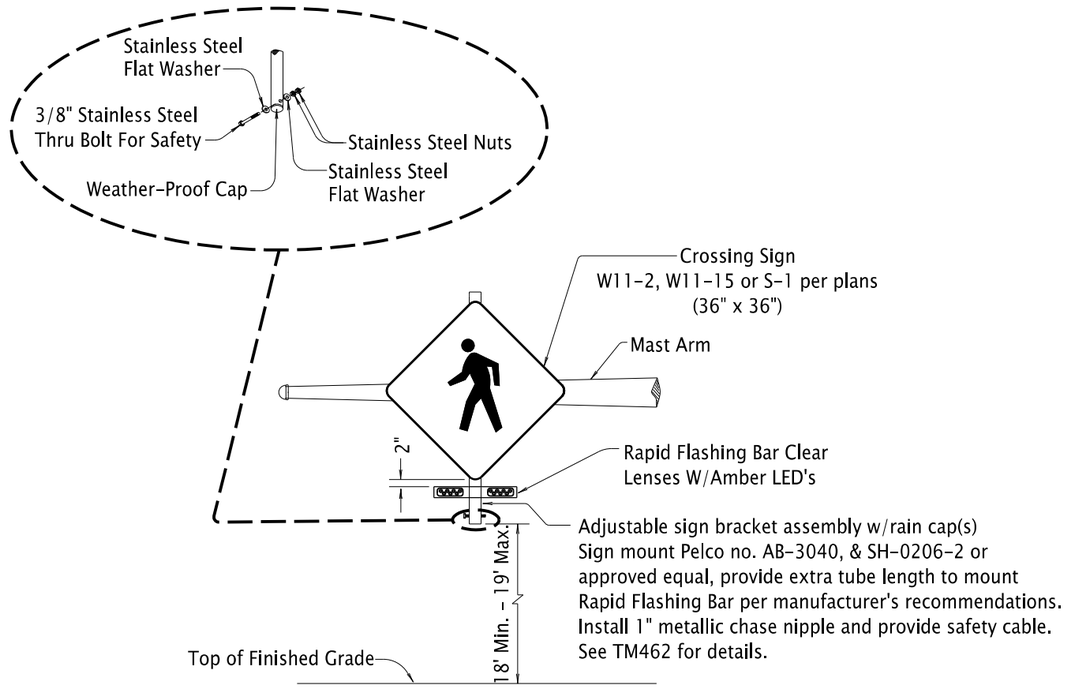
TM492



Note:

1. Equipment Shown In the Assembly Detail Is An Example Of The Equipment That May Be Mounted. Install Equipment As Shown.
2. This detail is also applicable to mounting RRFB equipment on a large signal pole.

RECTANGULAR RAPID FLASHING BEACON PEDESTAL ASSEMBLY
(Use Green Sheet Listed Items Only)



RECTANGULAR RAPID FLASHING BEACON MAST ARM ASSEMBLY
(Use Green Sheet Listed Items Only)

CALC. BOOK NO. N/A

SDR REPORT DATE 8-Jul-2022

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

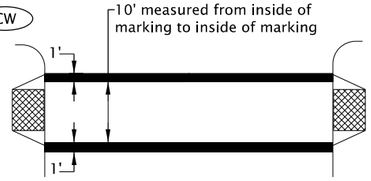
RECTANGULAR RAPID FLASHING BEACON (RRFB) ASSEMBLIES

2021

DATE	REVISION DESCRIPTION
7/22	New Drawing

TM493

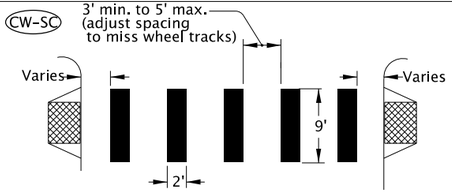
CW



STANDARD CROSSWALK
TWO 1' WHITE BARS

Install per Standard Drawing TM530

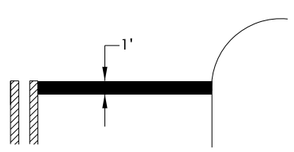
CW-SC



STAGGERED CONTINENTAL CROSSWALK
2' WHITE BARS

Install per Standard Drawing TM530

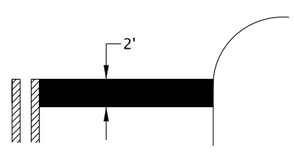
S



STOP BAR
1' WHITE BAR

Install per Standard Drawing TM530

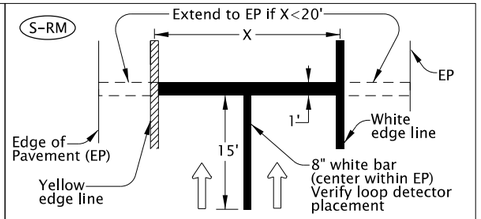
S-2



STOP BAR – LARGE
2' WHITE BAR

Install per Standard Drawing TM530

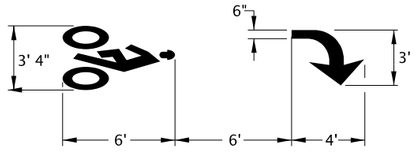
S-RM



RAMP METER STOP BAR
1' & 8" WHITE BARS

For multi-lane ramp meter applications

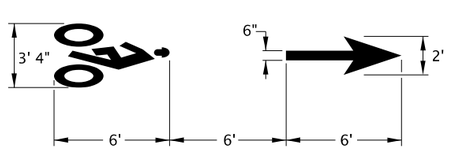
BR



BIKE RIGHT TURN STENCIL (white)

Center marking within lane width
For proportion details, see current version of Standard Highway Signs

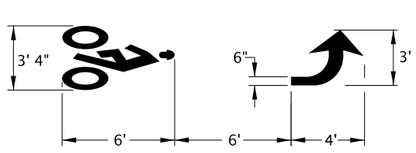
BS



BIKE LANE STANDARD STENCIL (white)

Center marking within lane width
For proportion details, see current version of Standard Highway Signs

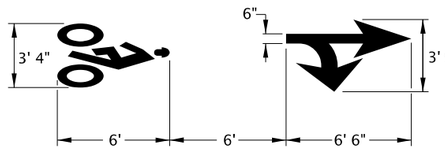
BL



BIKE LEFT TURN STENCIL (white)

Center marking within lane width
For proportion details, see current version of Standard Highway Signs

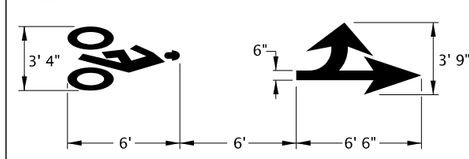
BRS



BIKE RIGHT TURN STRAIGHT STENCIL (white)

Center marking within lane width
For proportion details, see current version of Standard Highway Signs

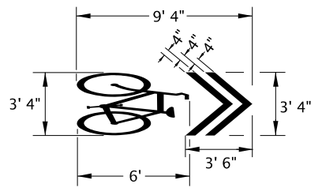
BLS



BIKE LEFT TURN STRAIGHT STENCIL (white)

Center marking within lane width
For proportion details, see current version of Standard Highway Signs

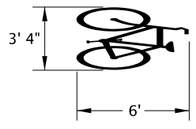
SLM



SHARED LANE MARKING (white)

Center marking within lane width or as shown
For proportion details, see current version of Standard Highway Signs

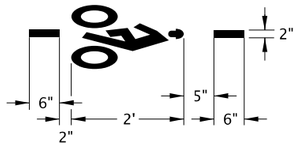
B



BIKE STENCIL (white)

Used for Intersection Bicycle Box applications
Place marking within bicycle box, ceneterd with motor vehicle lane width

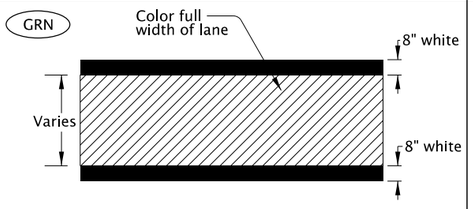
BD



BICYCLE DETECTOR MARKING (white)

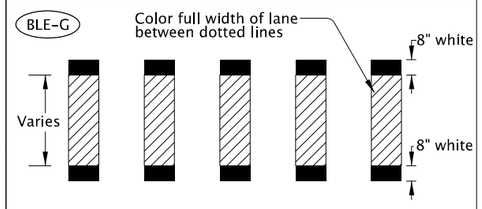
PLace Bicycle Detector Pavement Marking in optimum loction where bicycle acuates the traffic signal

GRN



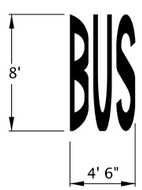
GREEN SUPPLEMENTAL BICYCLE LANE
SOLID LINE (green)

BLE-G



GREEN SUPPLEMENTAL BICYCLE LANE
DOTTED LINE EXTENSION (green)

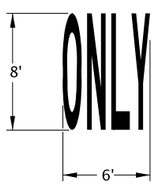
BUS



BUS (white)

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

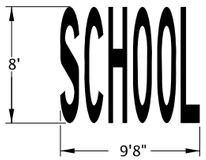
ON



ONLY (white)

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

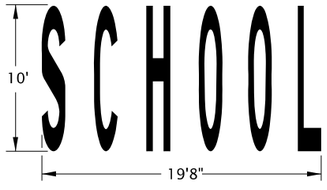
SCH



SCHOOL (white)

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

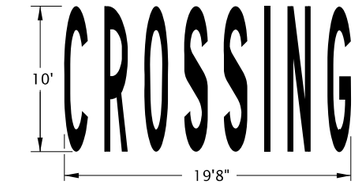
SCH-LG



SCHOOL – LARGE (white)

Center marking within width of two lanes
For letter proportion details, see current version of Standard Highway Signs

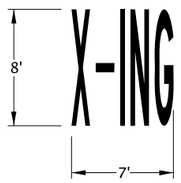
CRS-LG



CROSSING – LARGE (white)

Center marking within width of two lanes
For letter proportion details, see current version of Standard Highway Signs

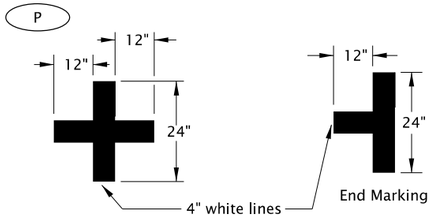
XNG



X-ING (white)

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

P



ON-STREET PARKING DETAIL (white)

General Note:

1. Arrow, letter, and bike symbol dimensions nominal.

LEGEND

Direction of Travel

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.

CALC. BOOK NO. N/A

SDR DATE 07/08/2022

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

OREGON STANDARD DRAWINGS

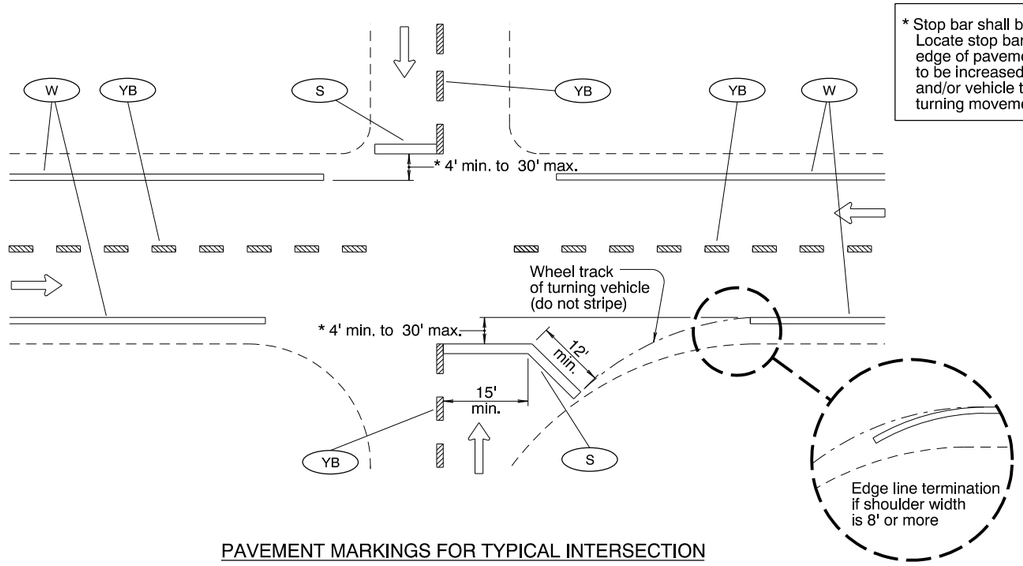
PAVEMENT MARKING STANDARD DETAIL BLOCKS

2021

DATE	REVISION DESCRIPTION
07/2022	Added note for measurement of Standard Crosswalk

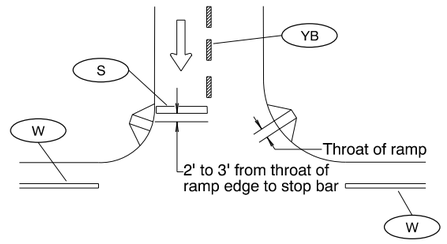
TM503

TM530.dgn 7-06-2022

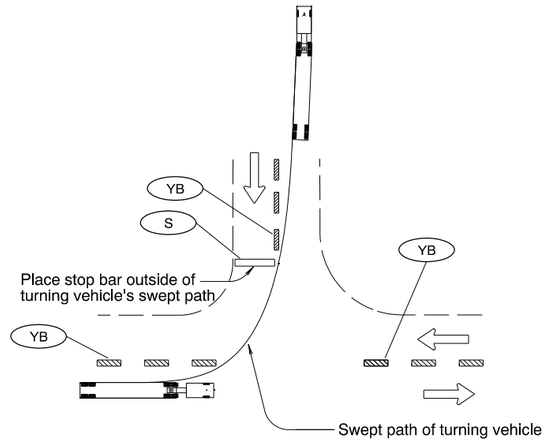


PAVEMENT MARKINGS FOR TYPICAL INTERSECTION

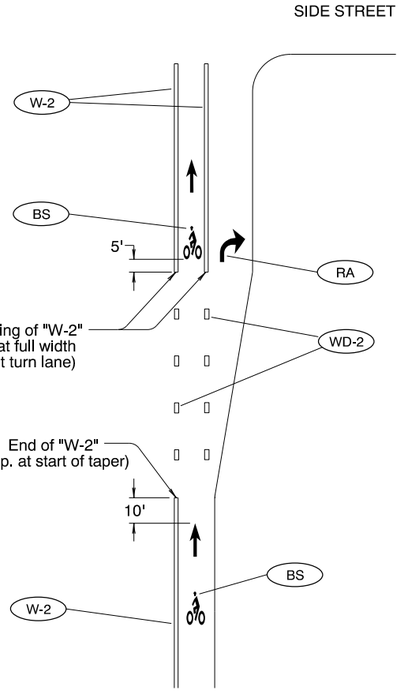
* Stop bar shall be placed as near as possible to the intersecting traveled way. Locate stop bar 4' min. to 30' max. in advance of the extended fog line, edge of pavement, or curb face. Minimum stop bar distance may need to be increased, depending on location of pedestrian ramps (see Detail "A") and/or vehicle turn radii (see Detail "B"). Field verify sight distance and truck turning movements.



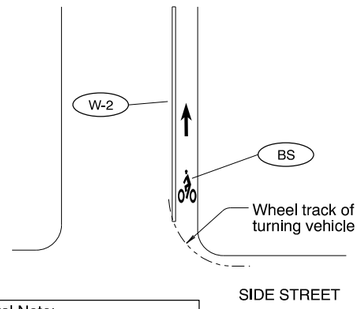
Detail "A"
STOP BAR PLACEMENT WITH
RESPECT TO PEDESTRIAN RAMPS



Detail "B"
STOP BAR PLACEMENT WITH
RESPECT TO TURN RADII



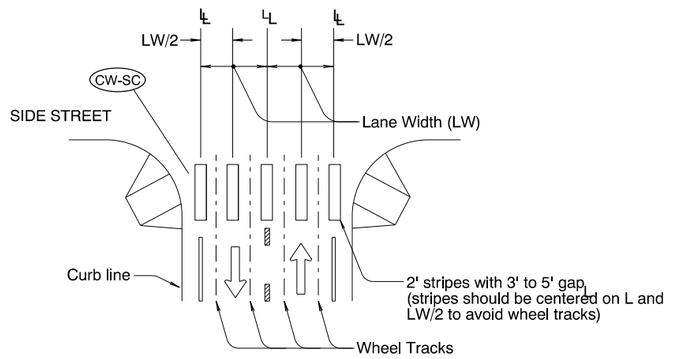
INSTALLATION OF BIKE LANE STENCILS
FOR BIKE LANE SEPARATED BY RIGHT TURN LANE



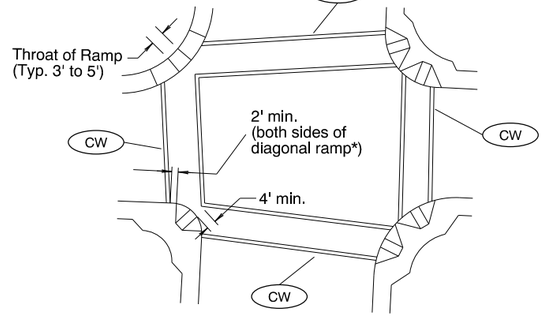
General Note:

Install bike lane stencil to avoid right turning vehicle wheel tracks.

INSTALLATION OF BIKE LANE STENCILS
FOLLOWING INTERSECTIONS



STAGGERED CONTINENTAL LAYOUT



STANDARD CROSSWALK BARS
AT INTERSECTION

* = Refer to Std Dwg RD916

To be accompanied by Standard Dwg. Nos. TM500 thru TM504

General Note:

1. Install crosswalk bars such that the throat of the ADA ramp is entirely within crosswalk markings, or 5' back of extended fog line, edge of pavement, or curb face.

LEGEND

⇦ Direction of Travel

L - Lane line dimensions are shown on the striping plans

CALC. BOOK NO. N/A

SDR DATE July 06, 2022

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.

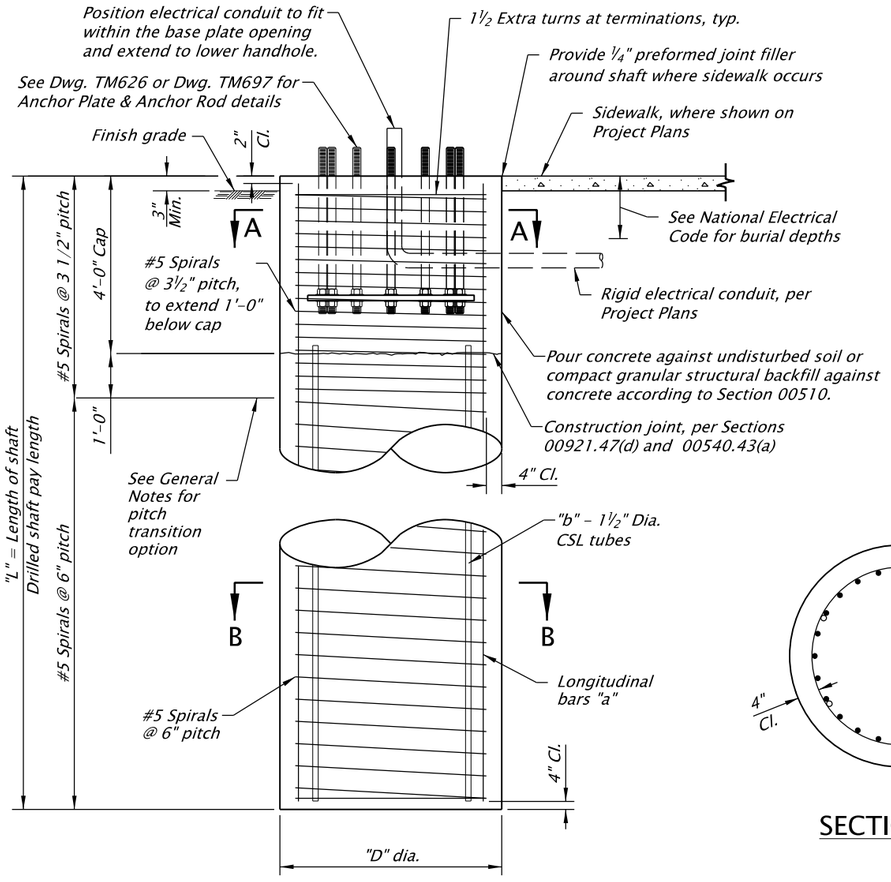
OREGON STANDARD DRAWINGS
INTERSECTION PAVEMENT MARKINGS (CROSSWALK, STOP BAR & BIKE LANE STENCIL)

2021

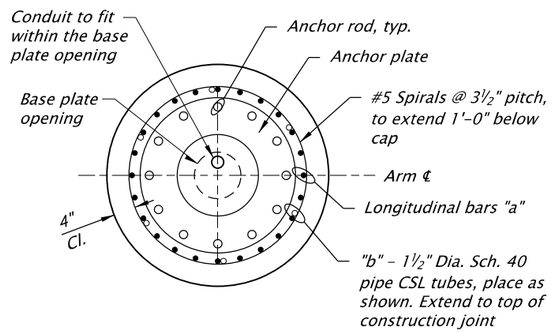
DATE	REVISION DESCRIPTION
7/06/22	Added Roadway Standard Drawing reference to detail for clarity

TM530

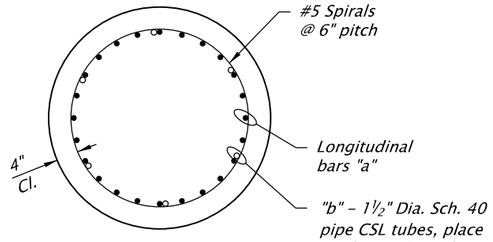
Effective Date: December 1, 2022 - May 31, 2023



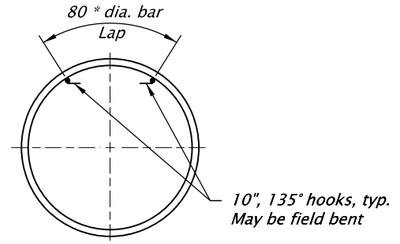
ELEVATION



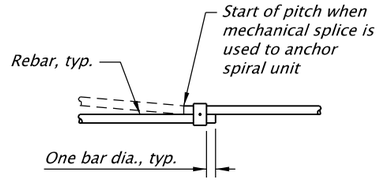
SECTION A-A



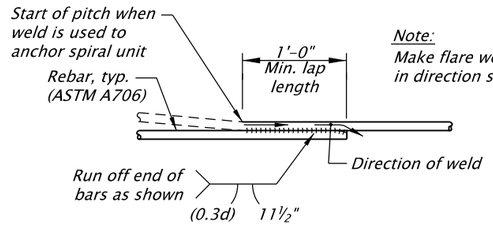
SECTION B-B



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 - ¾" commercial grade, classified as a structural item. Remainder of shaft shall be Class 4000 - ⅜" without air entrainment and with 8 ½" ± 1 ½" 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 1½ 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.

DRILLED SHAFT DETAILS
No Scale

Monotube Cantilever Design No.	Monotube VMS/Sign Bridge Design No.	Reinf. Steel "a"	Shaft Dia. "D"	No. of CSL Tubes "b"	Reaction At Base Plate (Factored) Axial (lb)	Shear (lb)	Moment (ft-lb)	Torsion (ft-lb)	Reaction At Base Plate (Service) 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

SDR DATE 08-JUL-2022

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

STD. MONOTUBE SIGN/VMS SUPPORT DRILLED SHAFT DETAILS

2021

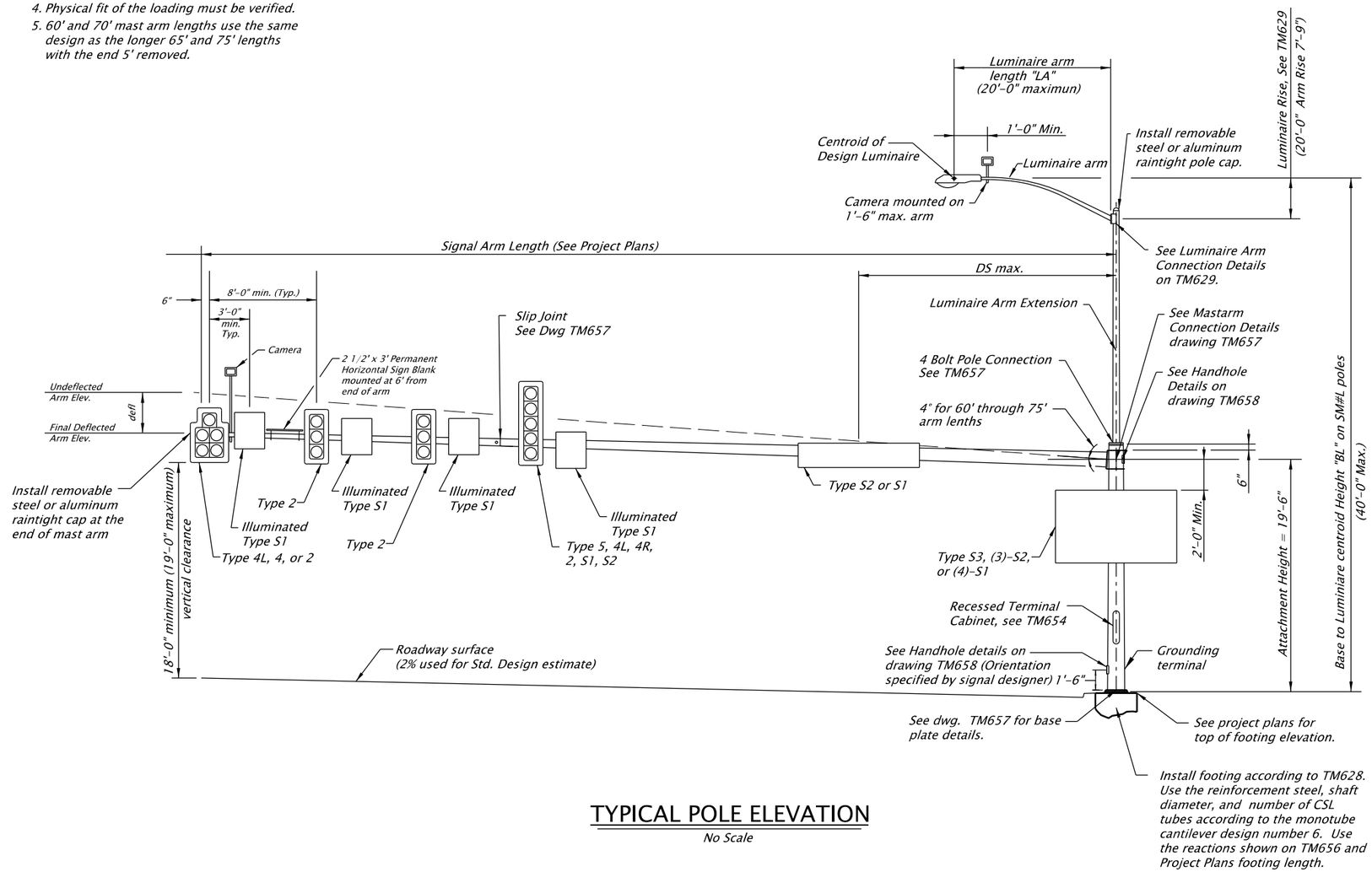
DATE	REVISION DESCRIPTION
07/20	Added "Monotube" to the design number columns.
01/21	Changed conduit note.
01/22	Slump was 8" ± 1/2".
07/22	Added spiral tie notes and conduit base plate note.

Effective Date: December 1, 2022 – May 31, 2023

STANDARD SIGNAL ARM LOADS									DEFLECTIONS
Signal Pole Type	Signal Arm Length	Signals			Sign			DS Max. for S2 *	Estimated "defl" End of Arm
		4L Qty.	2 Qty.	5 * Qty.	S1 Qty.	S2 * Qty.	Horz. Blank		
SM6L	60', 65'	1	2	1	4	1	58'-0"	21'-1"	2'-9"
SM7L	70', 75'	1	2	1	4	1	68'-0"	21'-1"	3'-9"

* – Load location is the closest sign or signal of that type to the vertical post.

1. Camera mounted on 6 ft arm placed at any location on signal arm.
2. Fire Pre-Emption may be placed at any location along the mast arm.
3. Modifications to the loading shown require analysis to verify the structural adequacy of the pole.
4. Physical fit of the loading must be verified.
5. 60' and 70' mast arm lengths use the same design as the longer 65' and 75' lengths with the end 5' removed.

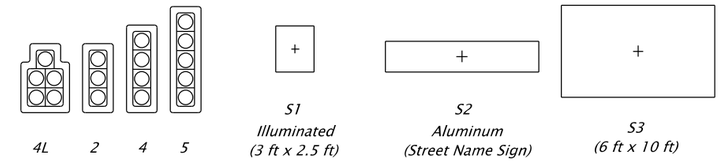


TYPICAL POLE ELEVATION

No Scale

VERTICAL POST LOADS								
Description	Maximum Centerline Elevation	Height (Each)	Width (Each)	Depth (Each)	Area Front (sq. ft)	Area Side (sq. ft)	Area Bottom (sq. ft)	Weight 0" Ice (lbs)
2-Ped. Push Buttons	3'-6"	7 3/4"	5"	3 3/8"	0.27	0.18	0.12	3.0
Controller Cabinet	5'-9"	46"	24"	22"	7.67	7.03	3.67	300
2-Pedestrian Signals	8'-3 1/2"	18 3/4"	19"	19"	2.47	2.47	2.51	25.0
Terminal Cabinet	10'-9"	18 1/8"	6 3/4"	8 3/8"	0.85	1.05	0.39	25.0
Guide Sign (S3)	15'-0"	72"	120"	8 3/8"	60.0	1.00	1.67	395
Photoelectric Cell	38'-4"	2 1/4"	3 1/4"	3 1/4"	0.05	0.05	0.07	5.0

1. Physical fit of the loading must be verified.



SIGNAL POLE APPURTENANCE TYPES

APPURTENANCE LOADS				
Type	Area Front (sq. ft)	Area Side (sq. ft)	Area Bottom (sq. ft)	Weight 0" Ice (lbs)
4L	12.4	6.61	3.64	145
2	8.67	6.61	1.95	85.0
4	11.0	8.49	1.95	97.0
5	13.3	10.36	1.95	142
S1	7.50	2.38	1.72	71.0
S2	21.0	0.00	1.67	105
Horz. Blank	1.72	2.38	7.50	45.0
Signal Camera	1.64	2.55	0	60
Lum. Camera	0.65	1.42	0	25

Accompanied by dwgs. TM654, TM656, TM657, TM658, TM628

CALC. BOOK NO. 7088

SDR DATE 08-JUL-2022

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

TRAFFIC SIGNAL 60' THROUGH 75' MAST ARM SUPPORTS GENERAL DETAILS & DESIGN CRITERIA

2021

DATE	REVISION DESCRIPTION
07/20	Replaced hub with recessed terminal cabinet, added accompanied by dwg TM654, and changed sign 7' distance to 6'.
07/22	Added TM656 base reactions and clarified TM628 table detail requirements.

Effective Date: December 1, 2022 – May 31, 2023

TM655

tm655.dgn 08-JUL-2022

GENERAL NOTES:

1. *Signal supports shall be designed in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals LRFD 1st edition with 2017 and 2018 interim revisions.*
2. *All traffic signal supports shall conform to the design criteria and details shown on these drawings except as approved by the Engineer.*
3. *The design basic wind speed (3 second gust) shall be 145 mph, gust factor G = 1.14, 50 yr recurrence, Fatigue Category I, no galloping, and truck speed = 65 mph.*
4. *The design service basic wind speed (3 second gust) shall be 91 mph.*
5. *Signal poles from this standard are not allowed over highways I-5, I-84, I-205, I-405, US 26 (Sunset Hwy) between mile points 64.3 - 73.0, I-105, and I-82.*
6. *Pole and arm shafts must be round. Dimensional tolerances of ASTM A595 shall apply to all tapered steel tubing members. Additionally, the diameter of round tapered steel tubing members not vary more than 2% from specified dimension. Two ply and fluted poles or arms are not permitted.*
7. *Pole taper shall be equal to .0117 in/in.*
8. *Anchor rods shall conform to ASTM Specification F1554 Gr. 55, Supplemenetary Requirement "S2" that include grade and manufacturer's identification.*
9. *High strength bolts shall conform to ASTM Specification F3125 Grade A325 Type 1.*
10. *Nuts for high strength bolts shall be heavy hex and conform to ASTM A563 Grade DH with supplmentary requirements "S1" and "S2".*
11. *Hardened steel washers shall conform to ASTM F436 Type 1.*
12. *Direct Tension Indicators (DTI) shall be the compressible-washer type, mechanically galvanized, conforming to ASTM F959.*
13. *Steel sheet for poles and arm shall conform ASTM A595, Grades A or B, ASTM A572 Gr. 50, or approved equal. All other steel sheet and plate shall conform to AASHTO specification M223 (ASTM A572), or approved equal. Supplement S18 of ASTM A6 regarding maximum tensile strength shall apply.*
14. *All structural steel including fasteners shall be hot dip galvanized after fabrication unless otherwise noted.*
15. *Galvanize-Control Silicon, typical. Silicon content of the base metal shall be in the range of 0 to 0.06% or 0.13% to 0.25%.*
16. *Footing concrete shall be according to TM628.*
17. *Reinforcing steel shall conform to AASHTO M31, Grade 60 (ASTM A615 or A706). A min. lap splice length of 32 bar diameters shall be used unless shown otherwise.*
18. *Computed deflection of these poles at full design loading shall be limited to 5% of the pole length. Computed dead load deflection of the poles shall be limited to 1% of the pole length. Rake pole, apply mast arm and appurtenance loads, and verify final pole position is plumb.*
19. *Luminaire arms and pole extensions to support luminaire arms shall meet requirements of drawing TM629.*
20. *Hubs for cabinets and/or other appurtenances shall be welded into the pole prior to galvanizing. Poles may be tapped for up to 1" galvanized bolts after pole has been galvanized.*
21. *Longitudinal seam welds within 6" of a cirumferential weld shall be complete penetration welds. Weld inspection shall be in accordance with AWS D1.1 and the special provisions. Inspect seam welds using cyclically loaded criteria. Hubs shall be 3000# threaded forged carbon steel flat weld hubs by Anvil Products Inc., Phoenix Forging Co., Bonney Forge & Tool Works or approved equal.*
22. *Grounding terminal shall be ½" UNC x 1½" Type 308, 309 or 310 threaded stainless steel weld studs.*
23. *Tighten 4 bolt connection bolts in accordance with 962.46(j)(2).*
24. *Tighten 8 bolt arm connection bolts in accordance with 930.40(d).*
25. *Round and smooth all edges along electrical way.*

Signal Pole Type	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)
SM6L	7,430	13,000	301,000	322,000	6,520	5,200	163,000	127,000
SM7L	8,860	13,100	349,000	385,500	8,080	5,190	212,720	153,000

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 the table on TM628 for the required design number are not adequate for local soil conditions, Engineer of Record must adjust the shaft design accordingly.

Accompanied by dwgs. TM654, TM655, TM657, TM658, TM628

CALC. BOOK NO. 7088

SDR DATE 08-JUL-2022

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

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OREGON STANDARD DRAWINGS

TRAFFIC SIGNAL 60' THROUGH 75' MAST ARM SUPPORTS NOTES AND REACTIONS

2021

DATE	REVISION DESCRIPTION
07/20	Added Accompanied by dwg TM654.
07/22	Added Reactions to title and added reactions table.

tm656.dgn 08-JUL-2022

TM656

Effective Date: December 1, 2022 – May 31, 2023

TAPER TYPES & FORMULAS	
TAPER	FORMULA
Merging (Lane Closure)	"L"
Shifting	"L"/2 or ½"L"
Shoulder Closure	"L"/3 or ⅓"L"
Flagging (See Drg. TM850)	50' – 100'
Downstream (Termination)	Varies (See Drawings)

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

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

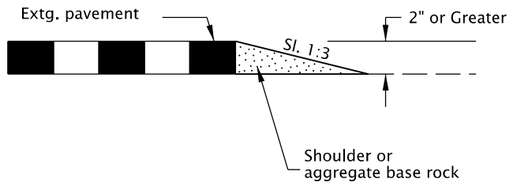
MINIMUM LENGTHS TABLE					
"L" VALUE FOR TAPERS (ft)					BUFFER "B" (ft)
★ SPEED (mph)	W = Lane or Shoulder Width being closed or shifted				
	W ≤ 10	W = 12	W = 14	W = 16	
25	105	125	145	165	75
30	150	180	210	240	100
35	205	245	285	325	125
40	265	320	375	430	150
45	450	540	630	720	180
50	500	600	700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

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

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

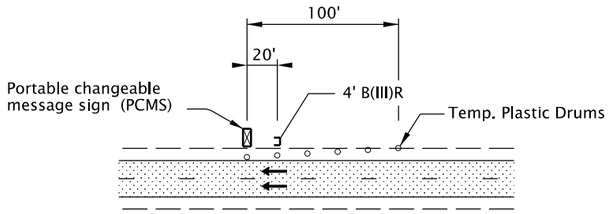
NOTES:
- Place traffic control devices on 10 ft. spacing for intersection and access radii.
- When necessary, sign spacing may be adjusted to fit site conditions. Limit spacing adjustments to 30% of the "A" dimension for all speeds.

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



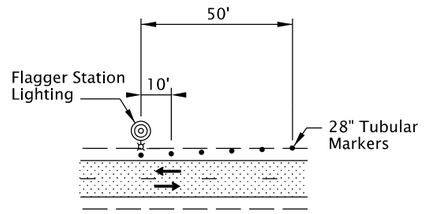
EXCAVATION ABRUPT EDGE

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



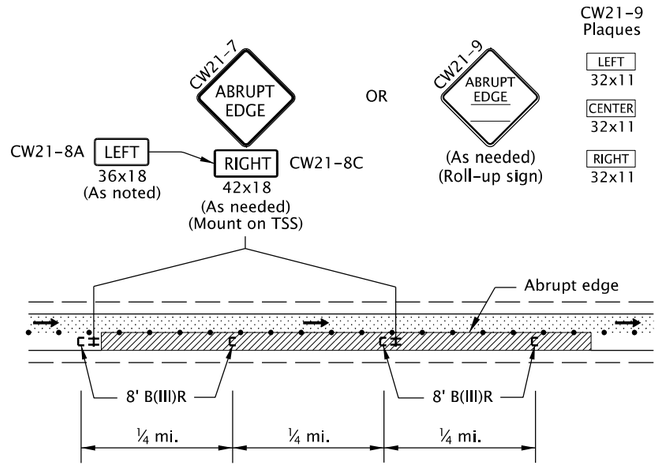
PORTABLE CHANGEABLE MESSAGE SIGN (PCMS) INSTALLATION

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



FLAGGER STATION LIGHTING DELINEATION

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



TYPICAL ABRUPT EDGE DELINEATION

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

○ ○ ○ Temp. Plastic Drums See TCD Spacing Table for max. spacing.

• • • 28" Tubular Markers See TCD Spacing Table for max. spacing.

UNDER TRAFFIC

UNDER CONSTRUCTION

CALC. BOOK NO. TM09-01

SDR DATE 01-JUL-2022

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

TABLES, ABRUPT EDGE AND PCMS DETAILS

2021

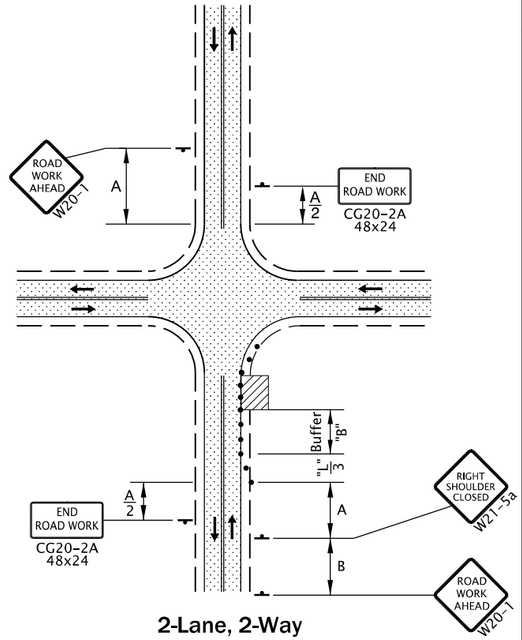
DATE	REVISION DESCRIPTION
07/01/22	Added a note for TPARs.

tm800.dgn 01-JUL-2022

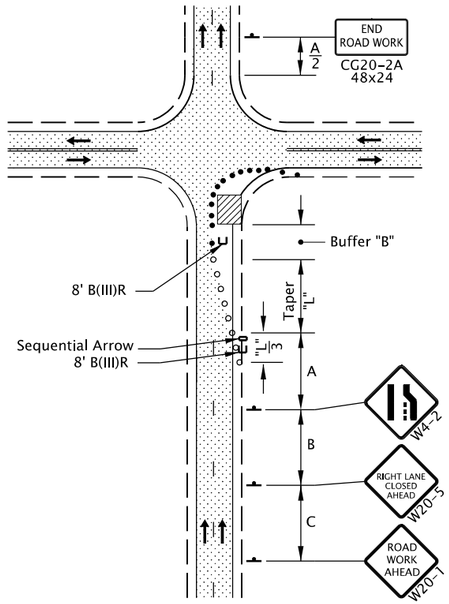
TM800

Effective Date: December 1, 2022 – May 31, 2023

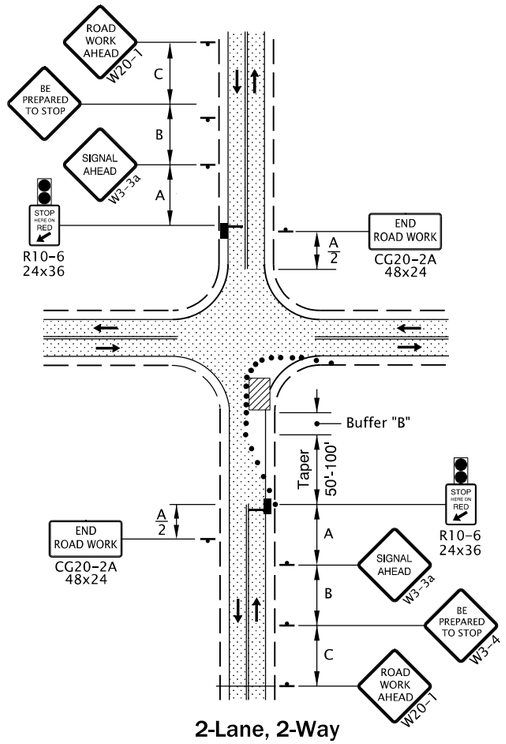
tm841.dgn 01-JUL-2022



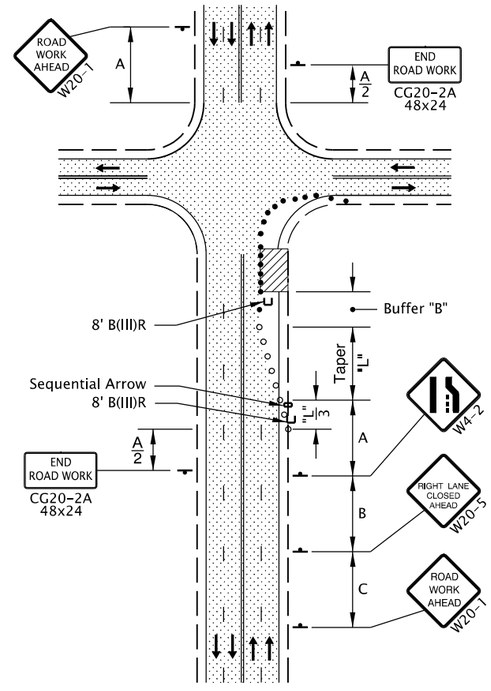
2-Lane, 2-Way
SHOULDER CLOSURE



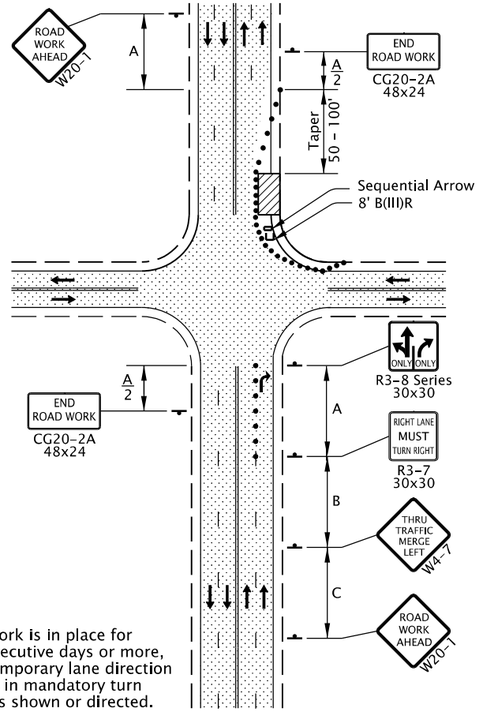
2-LANE, 1-WAY
RIGHT LANE CLOSURE



2-Lane, 2-Way
ONE LANE CLOSURE



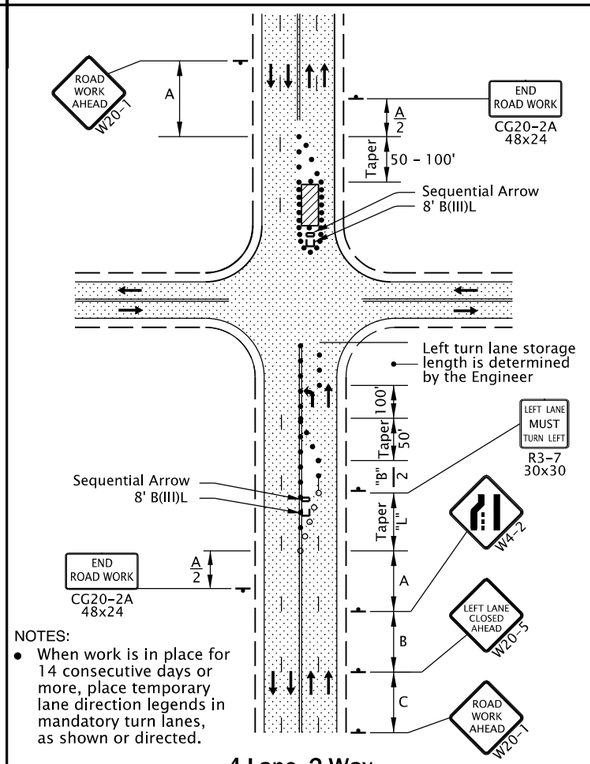
4-Lane, 2-Way
RIGHT LANE CLOSURE, NEAR SIDE



NOTES:

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

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



NOTES:

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

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

GENERAL NOTES FOR ALL DETAILS:

- Additional Traffic Control Measures (TCM) may be required for all legs of the intersection.
- The "SIGNAL AHEAD" (W3-3a) sign may be substituted with the signal ahead symbol (W3-3) sign.
- To determine Taper Length ("L") and Buffer Length ("B"), use the "MINIMUM LENGTHS TABLE" on Dwg. TM800.
- For left lane or shoulder work, place TCD to close left lane or shoulder. Use "LEFT LANE CLOSED AHEAD" (W20-5) sign, "LEFT LANE ENDS" (W4-2L) symbol sign, or "LEFT SHOULDER CLOSED" (W21-5a) sign, where applicable.
- To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Dwg. TM800.
- When a through road intersects within the work zone, place a "ROAD WORK AHEAD" (W20-1) sign in advance of the intersection at sign spacing A.
- Tubular markers may be used in lane closure tapers where posted speed is 40 mph or less.
- Where shoulder width is limited, Sequential Arrow may be placed within the lane closure taper.
- Place channelizing devices around intersection radii, business accesses and driveways at 10' spacing.
- Install a "BICYCLES ON ROADWAY" (CW11-1) sign in advance of the closure when a bike lane is closed, or when the shoulder is closed and bikes are expected.
- To be accompanied by Dwg. Nos. TM820, TM821 TM840 & TM854.

Automated Flagging Assistance Device (AFAD)

28" Tubular Markers See TCD Spacing Table on TM800 for max. spacing.

Temp. Plastic Drums See TCD Spacing Table on TM800 for max. spacing.

UNDER TRAFFIC

UNDER CONSTRUCTION

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.

SDR DATE 01-JUL-2022

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

OREGON STANDARD DRAWINGS

INTERSECTION WORK ZONE DETAILS

2021

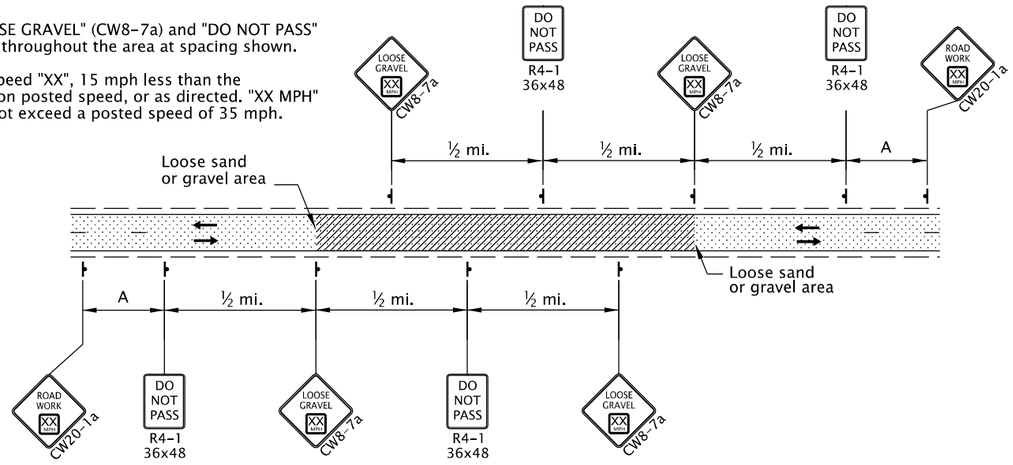
DATE	REVISION DESCRIPTION
07/01/22	Added AFADs to the drawing.

TM841

Effective Date: December 1, 2022 – May 31, 2023

NOTE:

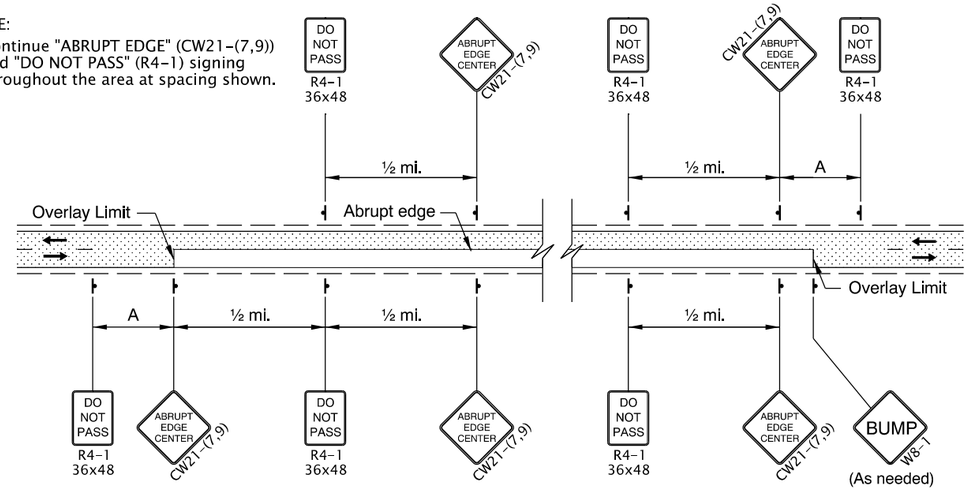
- Continue "LOOSE GRAVEL" (CW8-7a) and "DO NOT PASS" (R4-1) signing throughout the area at spacing shown.
- Use advisory speed "XX", 15 mph less than the pre-construction posted speed, or as directed. "XX MPH" placard shall not exceed a posted speed of 35 mph.



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

NOTE:

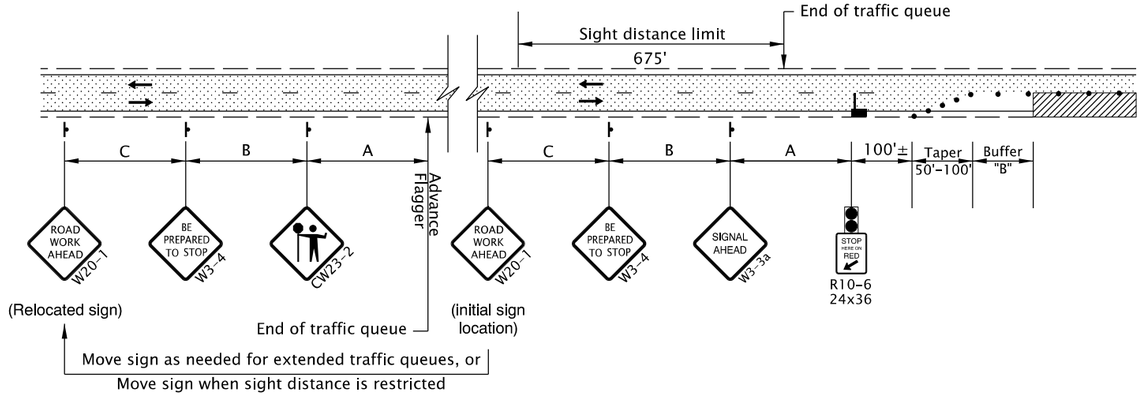
- Continue "ABRUPT EDGE" (CW21-(7,9)) and "DO NOT PASS" (R4-1) signing throughout the area at spacing shown.



2-Lane, 2-Way Roadway
OVERLAY AREA SIGNING

NOTES:

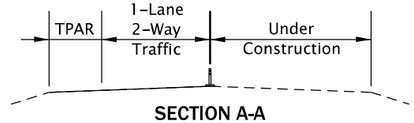
- Place Advance Flagger and additional signing when traffic queues extend beyond initial warning signing OR when sight distance is restricted.
- Relocate initial "ROAD WORK AHEAD" (W20-1) sign in advance of additional "BE PREPARED TO STOP" (W3-4) and Flagger Ahead (CW23-2) signs, as shown.
- Place additional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



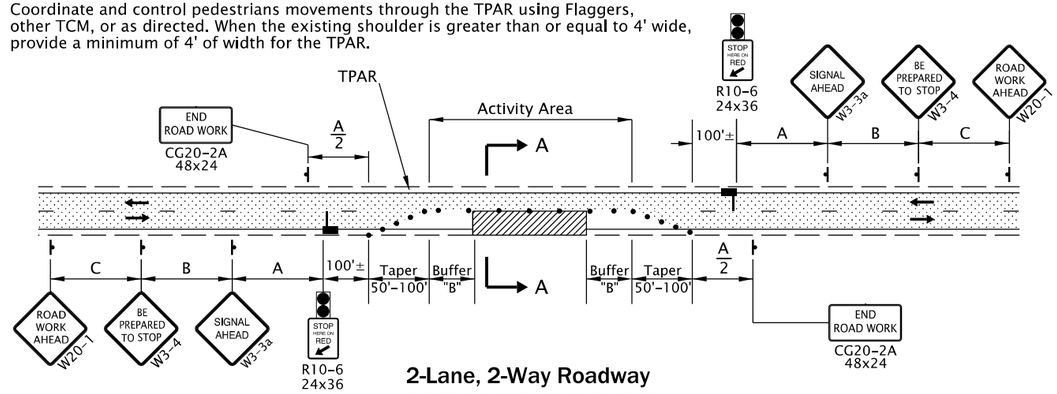
ADVANCE FLAGGER FOR EXTENDED TRAFFIC QUEUES

NOTE:

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



SECTION A-A



2-Lane, 2-Way Roadway
ONE LANE CLOSURE

GENERAL NOTES FOR ALL DETAILS:

- The "SIGNAL AHEAD" (W3-3a) sign may be substituted with the Signal Ahead (W3-3) symbol sign.
- Cover existing passing zone signing, as directed.
- Install temporary striping as required.
- To determine Taper Length ("L") and Buffer Length ("B"), use the "MINIMUM LENGTHS TABLE" shown on Dwg. No. TM800.
- To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Dwg. No. TM800.
- Install a "BICYCLES ON ROADWAY" (CW11-1) sign in advance of the closure when a bike lane is closed, or when the shoulder is closed and bikes are expected.
- At night, flagger stations shall be illuminated according to the FLAGGER STATION LIGHTING DELINEATION detail on Dwg No. TM800.
- To be accompanied by Dwg. Nos. TM820, TM821 & TM854.

Automated Flagging Assistance Device (AFAD)

• • • • • 28" Tubular Markers on 20' max. spacing for flagger tapers and stations

• • • 28" Tubular Markers See TCD Spacing Table on TM800 for max. spacing.

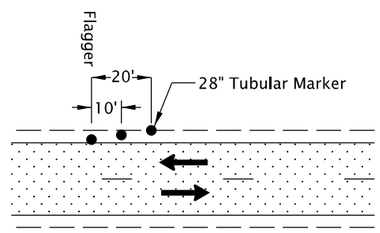
UNDER TRAFFIC

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

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.

CALC. BOOK NO. N/A

SDR DATE 01-JUL-2022

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

OREGON STANDARD DRAWINGS

2-LANE, 2-WAY ROADWAYS

2021

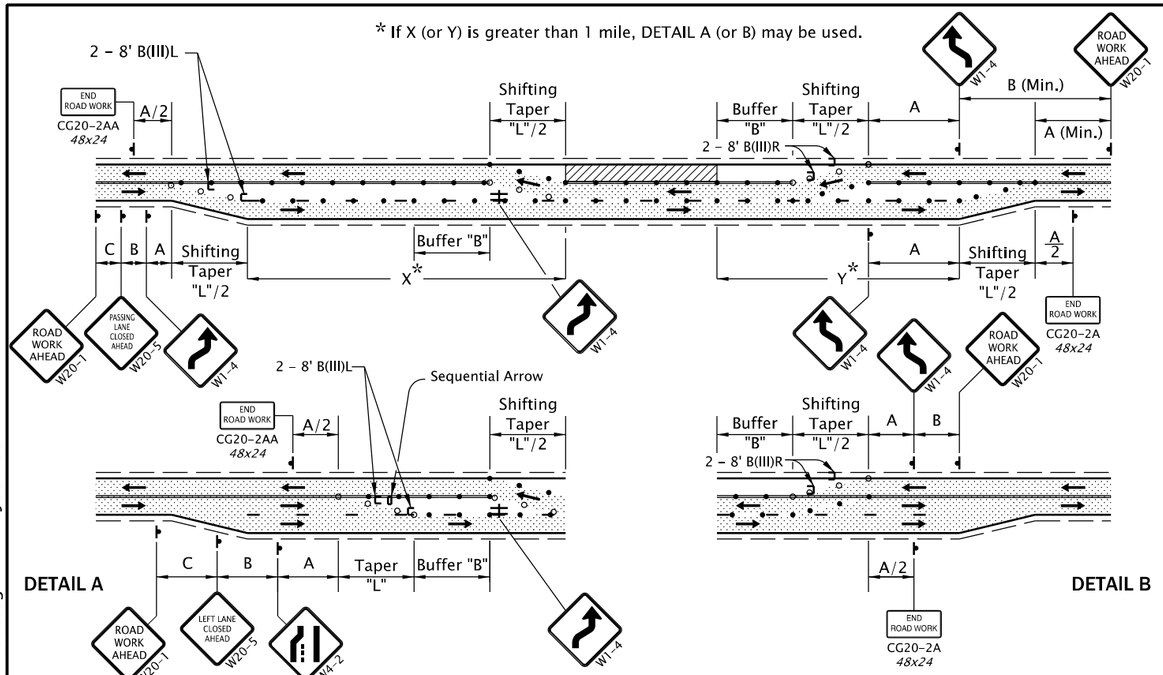
DATE	REVISION DESCRIPTION
07/01/22	Added AFADs to drawing.

01-JUL-2022

tm850.dgn

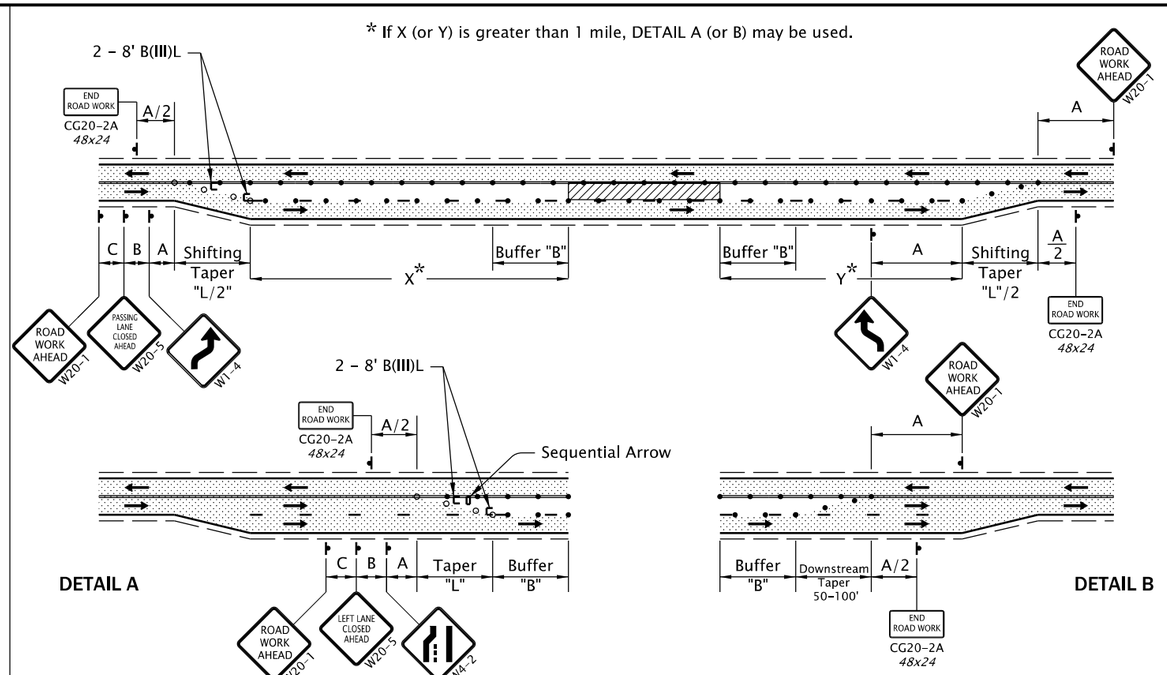
TM850

Effective Date: December 1, 2022 – May 31, 2023



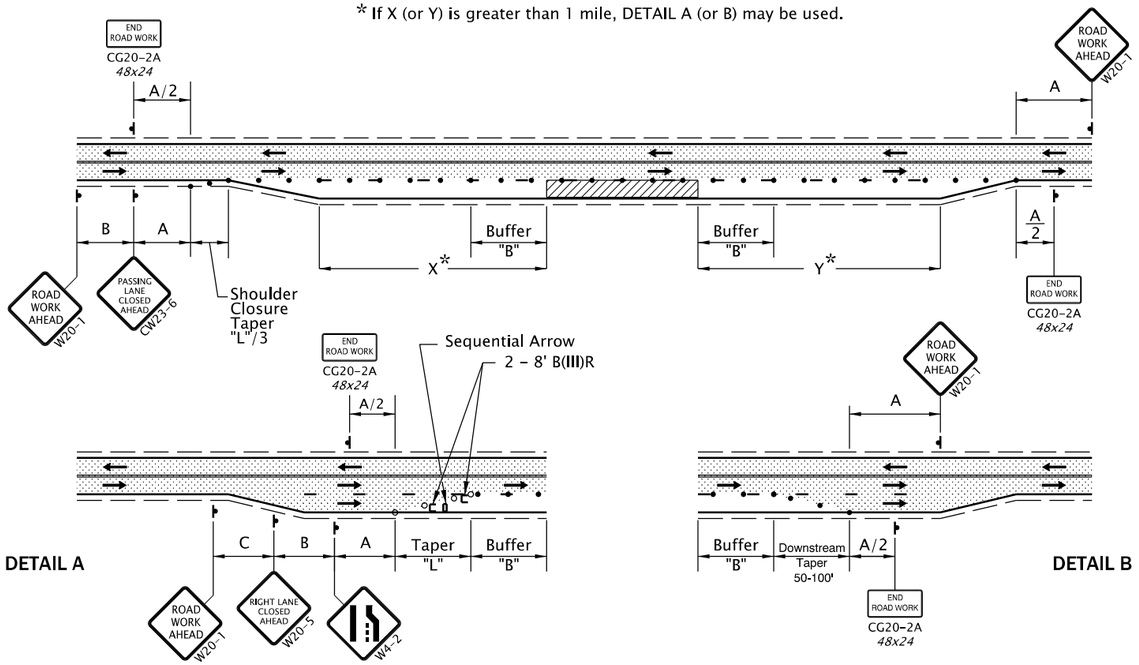
3-Lane, 2-Way Roadway

ONE LANE CLOSURE, CROSSOVER



3-Lane, 2-Way Roadway

ONE LANE CLOSURE



3-Lane, 2-Way Roadway

PASSING LANE CLOSURE

* If X (or Y) is greater than 1 mile, DETAIL A (or B) may be used.

GENERAL NOTES FOR ALL DETAILS:

- Install temporary striping as directed.
- Signing and other TCD shown to be installed in conjuction with the work areas, shall move with the work areas.
- To determine Taper Length ("L") and Buffer Length ("B"), use the "MINIMUM LENGTHS TABLE" on Dwg. No. TM800.
- Cover all applicable existing passing lane signing prior to installing TCD.
- Install Type III barricades in closed lanes at ¼ mile intervals.
- When passing is allowed in opposing lanes, restrict passing with double yellow centerline and appropriate signing as directed.
- Channelization devices may be placed on 10' around the Work Area for emphasis or if the area is to exposed to traffic on both sides simultaneously.
- 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 determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Dwg. No. TM800.
- When the length of the area under construction is less than 600 ft. use a DOUBLE REVERSE CURVE (W24-1) sign in place of the first REVERSE CURVE (W1-4) sign in each direction.

• • • 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

SDR DATE 01-JUL-2022

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

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OREGON STANDARD DRAWINGS

NON-FREEWAY MULTI-LANE SECTIONS

2021

DATE	REVISION DESCRIPTION
07/01/22	Replaced temporary traffic control sign in detail.

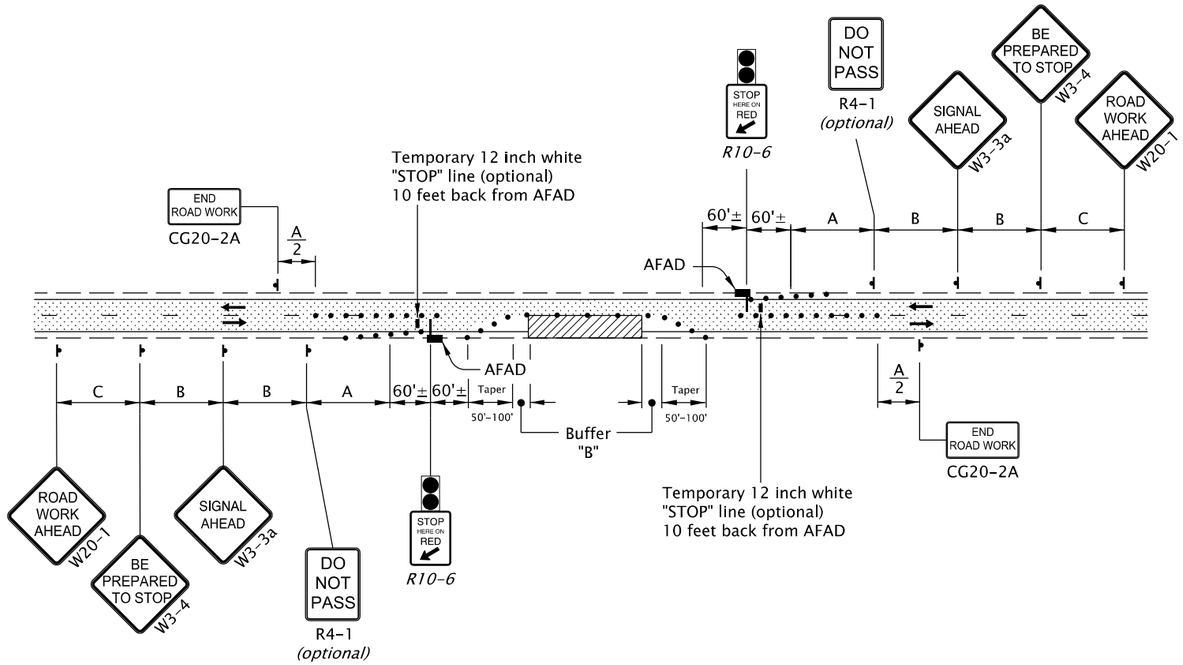
Effective Date: December 1, 2022 – May 31, 2023

TM853

TM853

NOTES:

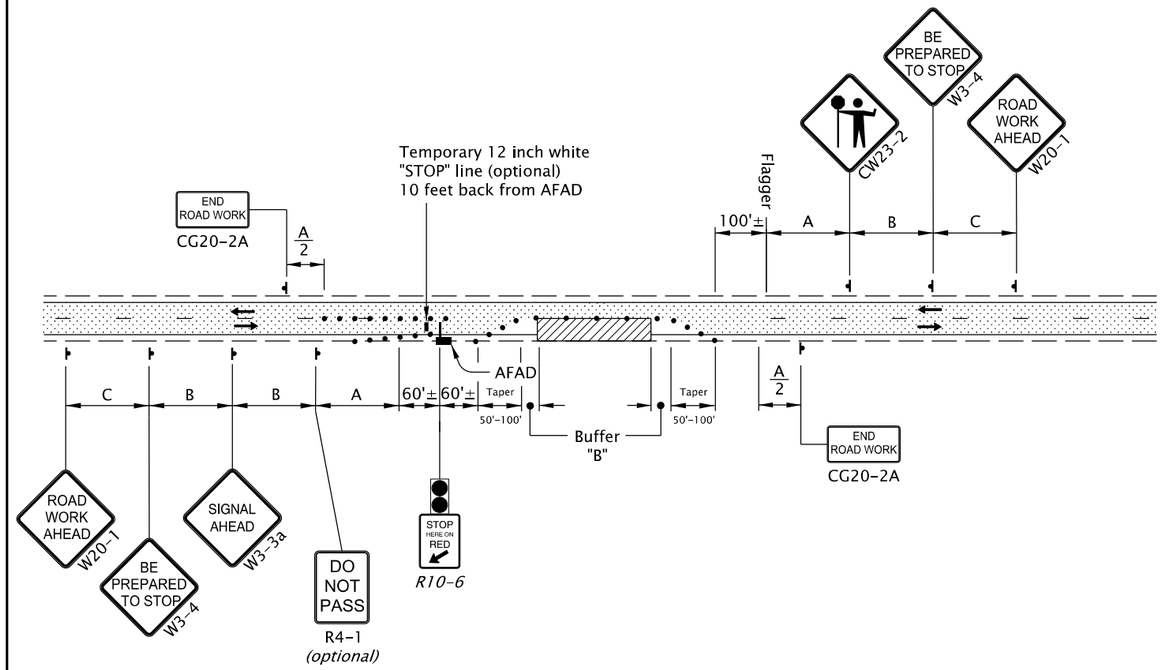
- An AFAD operator shall be provided for each AFAD. A single operator may not simultaneously operate two AFADs.



2-Lane, 2-Way Roadway
ONE LANE CLOSURE, TWO AFADs

NOTES:

- The AFAD operator shall not flag traffic and operate an AFAD at the same time.



2-Lane, 2-Way Roadway
ONE LANE CLOSURE, ONE AFAD & ONE FLAGGER

GENERAL NOTES FOR ALL DETAILS:

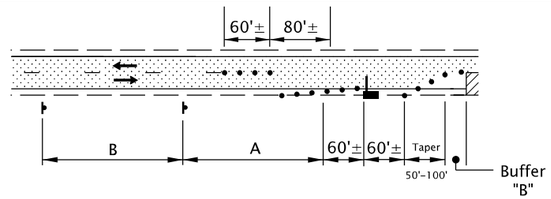
- Flagger station shall be delineated according to "FLAGGER STATION" detail shown on Standard Drawing TM800
- Bottom of lens housing shall be a minimum of 7 ft. above surface when mounted on shoulder and at least 17 ft. above any portion of the travel lane.
- The gate arm shall cover at least one half of the approaching vehicle travel lane.
- Signing and other TCD installed in conjunction with the work area, shall move with the work area.
- Use 1/3 "L" taper for shoulder closure, where necessary.
- For Taper Length ("L") and Buffer Length ("B") shown on this sheet, use the "MINIMUM LENGTHS TABLE" shown on Drg. No. TM800.
- The AFAD operator shall be a certified flagger who has been trained in the operation of the AFAD in use.
- Operator shall operate AFAD from a designated area. Designated area should maintain visual presence of the AFAD and should be at least 50' away from the AFAD and have an escape route available for the operator.
- Remove existing striping and install temporary striping as required.
- See "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Drg. TM800 for sign spacing A, B, and C.
- Cover existing passing lane signing (as directed)
- When extended traffic queues develop during AFAD operations, protect traffic by providing advance flaggers(s) and signing according to the "Extended Traffic Queues Detail" shown on Standard Drawing TM850.
- When AFAD is not in use for less than one work shift, turn off AFAD, or switch YELLOW lens to flashing mode, and cover or remove all accompanying signing.
- When AFAD is not in use for longer than one work shift, remove AFAD and all accompanying signing from the roadway.
- Do not use the AFAD to control more than one lane of approaching traffic.
- Use temporary pavement markings or a white portable rumble strip for temporary stop line. Remove temporary stop line when AFAD is no longer in use.
- Tubular markers along centerline placed in advance of AFAD to first sign are optional, unless the DO NOT PASS sign is used.

Automated Flagger Assistance Device (AFAD)

28" Tubular Markers
See TCD spacing table on TM800 for max. spacing.

UNDER TRAFFIC

UNDER CONSTRUCTION



OVER-DIMENSIONAL VEHICLE ACCOMMODATION DETAIL

CALC. BOOK NO. _ _ _ _ _ _ _ _ _ _ _ _

SDR DATE _ _ _ _ 01-JUL-2022 _ _ _ _

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

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OREGON STANDARD DRAWINGS

2-LANE, 2-WAY ROADWAYS

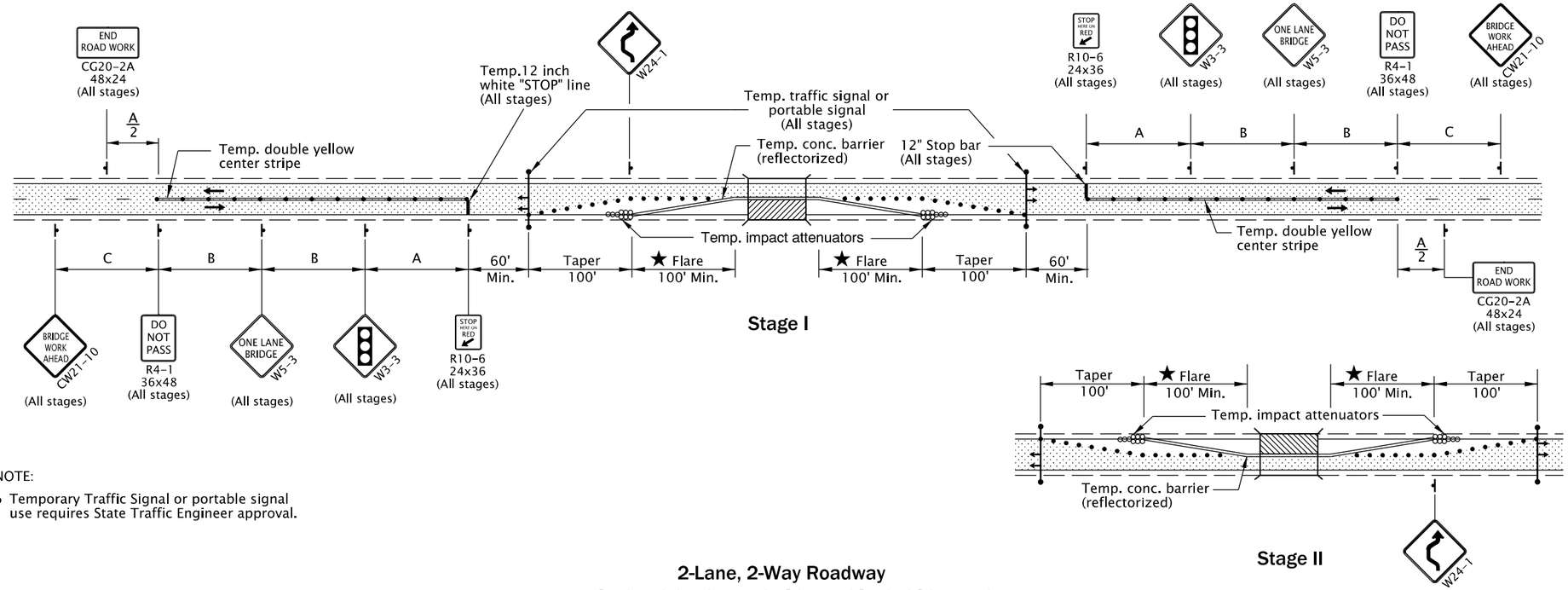
2021

DATE	REVISION DESCRIPTION

tm854.dgn 01-JUL-2022

TM854

Effective Date: December 1, 2022 – May 31, 2023



NOTE:

- Temporary Traffic Signal or portable signal use requires State Traffic Engineer approval.

2-Lane, 2-Way Roadway
BRIDGE CONSTRUCTION USING SIGNALS

GENERAL NOTES FOR ALL DETAILS:

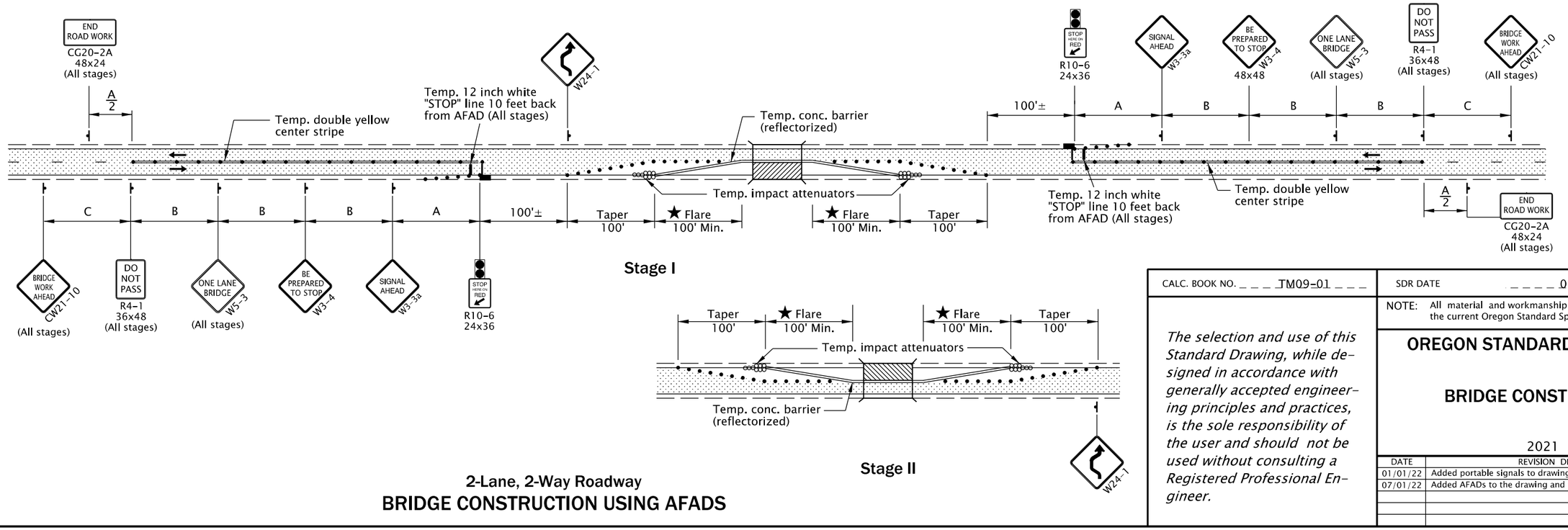
- For single lane operations, maintain 19' minimum horizontal clearance between positive barriers, or as directed. If overwidth loads are diverted, the roadway width may be adjusted, as directed.
- Bridge replacement requires use of positive protection (i.e. temp. barrier) for the work area.
- To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Dwg. No. TM800.
- DOUBLE REVERSING CURVE (W24-1) symbol sign may be used for work areas up to 600'. For longer work areas, use "REVERSING CURVE" (W1-4) [L and R] signs.
- "SIGNAL AHEAD" (W3-3a) sign may be subsituted with Signal Ahead (W3-3) symbol sign.
- ★ Install a "BICYCLES ON ROADWAY" (CW11-10) sign in advance of the closure when a bike lane is closed, or when the shoulder is closed and bikes are expected.
- See "TEMPORARY BARRIER FLARE RATE TABLE" on Dwg. No. TM800.
- To be accompanied by Dwg. Nos. RD500, TM820, TM821, TM830, TM831 & TM854.

Automated Flagging Assistance Device (AFAD)

• • • • • 28" Tubular Markers on 20' max. spacing

UNDER TRAFFIC

UNDER CONSTRUCTION



2-Lane, 2-Way Roadway
BRIDGE CONSTRUCTION USING AFADS

CALC. BOOK NO. TM09-01

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.

SDR DATE 01-JUL-2022

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

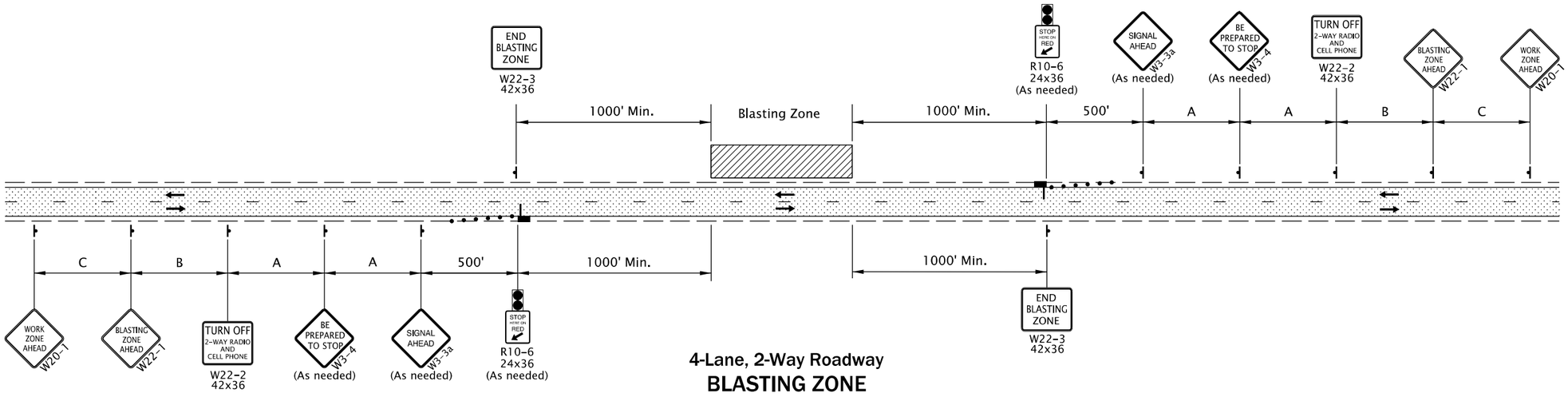
OREGON STANDARD DRAWINGS

BRIDGE CONSTRUCTION

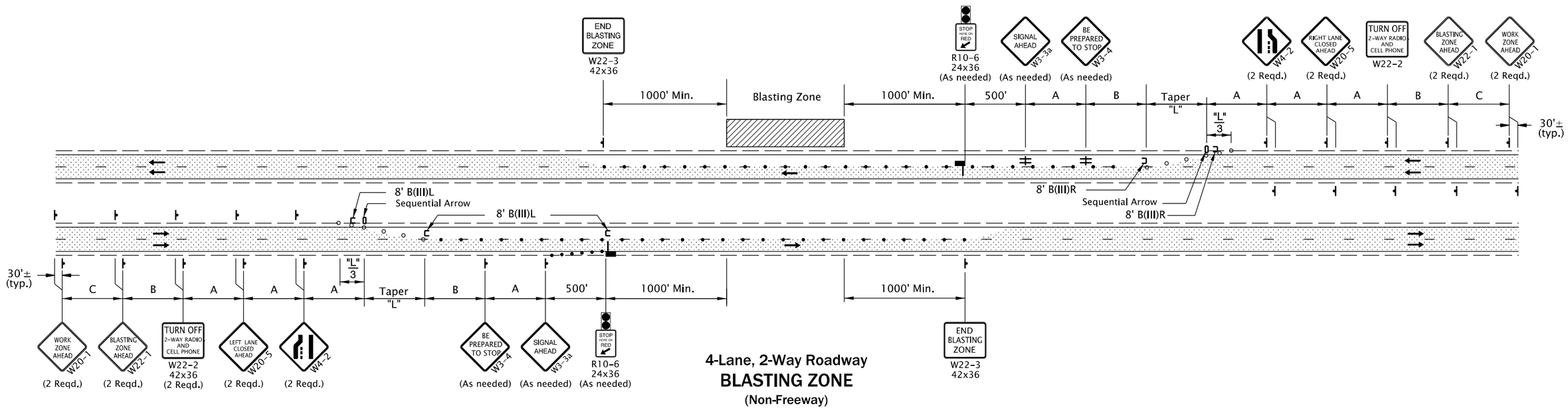
2021

DATE	REVISION DESCRIPTION
01/01/22	Added portable signals to drawing.
07/01/22	Added AFADs to the drawing and tubular markers on centerline.

Effective Date: December 1, 2022 – May 31, 2023



4-Lane, 2-Way Roadway
BLASTING ZONE



4-Lane, 2-Way Roadway
BLASTING ZONE
(Non-Freeway)

GENERAL NOTES FOR ALL DETAILS:

- Configurations are NOT to be used on freeways. For freeways, a total closure or rolling slowdown should be used for blasting operations, as shown in the plans or directed.
- The signs shall be covered or removed when there are no explosives in the area or when the area is otherwise secure.
- Whenever a side road intersects the roadway between the "BLASTING ZONE AHEAD" (W22-1) sign and the "END BLASTING ZONE" (W22-3)sign, or a side road is within 1000' of any blasting cap, similar signing, as on the mainline, shall be erected on the side road.
- Before blasting, the "Explosives Specialist" shall determine whether highway traffic in the blasting zone will be endangered by the blasting operation. If there is danger, highway traffic shall not be permitted to pass through the blasting zone during blasting operations.
- The "SIGNAL AHEAD" (W3-3a) sign may be subsituted with the Signal Ahead (W3-3) symbol sign.
- Do not stop or hold traffic in excess of 20 minutes including rock and debris clean up.
- All offsets between sign pairs in multi-lane sections are 30' with median signs closest to approaching traffic.
- To determine Taper Length "L" and Buffer Length "B" use the "MINIMUM LENGTHS TABLE" on Dwg. No. TM800.
- To determine sign spacing A, B, and C, use "TRAFFIC CONTROL DEVICES (TCD) SPACING TABLE" on Dwg. No. TM800.
- To be accompanied by Dwg. No. TM820, TM821 & TM854.

Automated Flagging Assistance Device (AFAD)

28" Tubular Markers
See TCD Spacing Table on TM800 for max. spacing.

Temp. Plastic Drums
See TCD Spacing Table on TM800 for max. spacing.

UNDER TRAFFIC

UNDER CONSTRUCTION

CALC. BOOK NO. N/A

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SDR DATE 01-JUL-2022

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

OREGON STANDARD DRAWINGS

BLASTING ZONES

2021

DATE	REVISION DESCRIPTION
07/01/22	Added AFADs to the drawing.

TM871

Effective Date: December 1, 2022 – May 31, 2023