Washington State Department of Transportation

Publications Transmittal

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Remarks and Instructions

The complete manual and revision packages can be accessed at www.wsdot.wa.gov/design/standards/plans.htm.

Please contact Bill Berens at 360-705-7256 or berensb@wsdot.wa.gov with comments, questions, or suggestions for improvement to the manual.

Instructions

- Replace Cover page with **new Cover page** provided.
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John Donahue
Approved By

Signature

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Washington State
Department of Transportation

Standard Plans

M 21-01

September 2020

Engineering and Regional Operations
Development Division, Design Office

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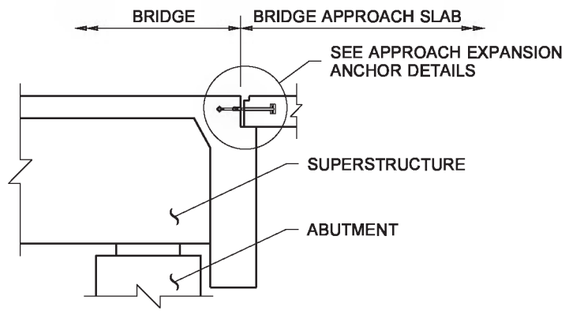
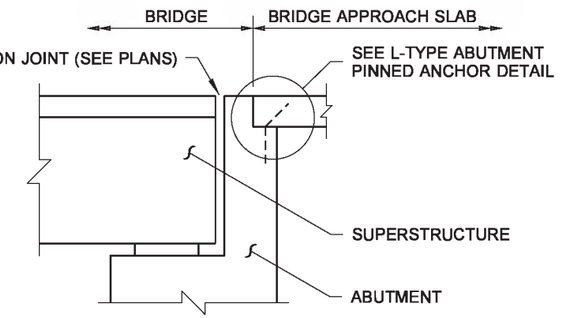


LONGITUDAL SECTION

SEMI-INTEGRAL TYPE ABUTMENT

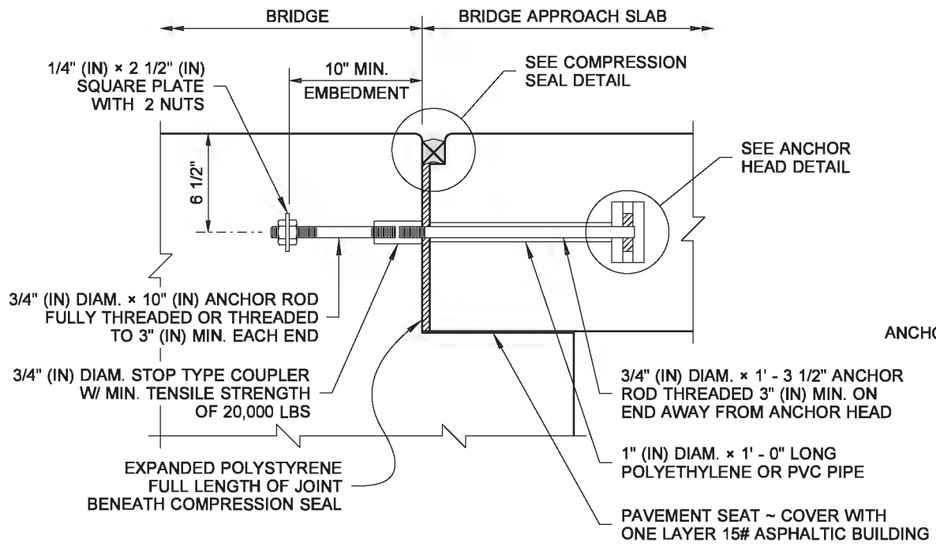
NOTE

THE METAL COMPONENTS OF THE APPROACH EXPANSION ANCHOR SHALL EITHER BE PAINTED WITH ONE COAT OF INORGANIC ZINC PAINT CONFORMING TO **STANDARD SPECIFICATION SECTION 9-08.1(2)**F OR BE GALVANIZED IN ACCORDANCE WITH **AASHTO M 232.**



LONGITUDINAL SECTION

L - TYPE ABUTMENT



APPROACH EXPANSION ANCHOR ~ METHOD A

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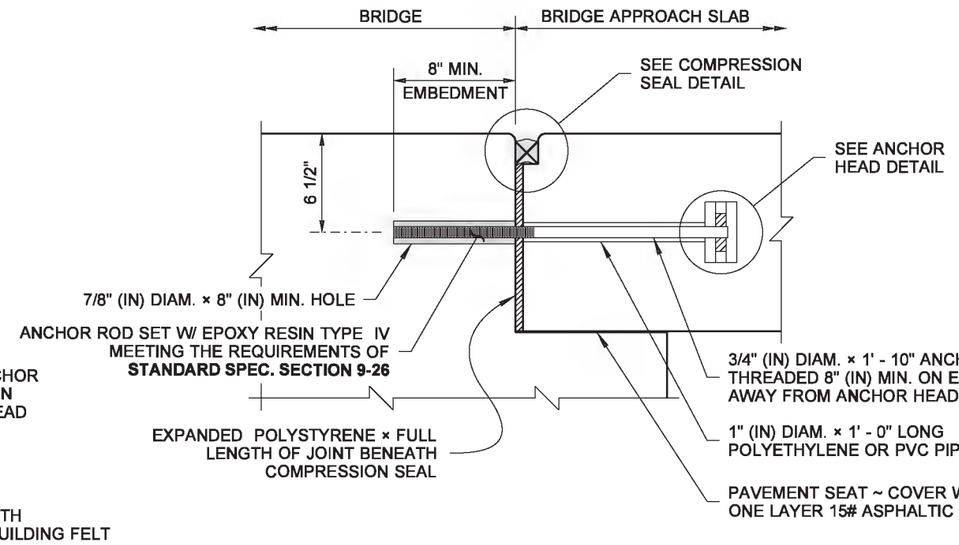

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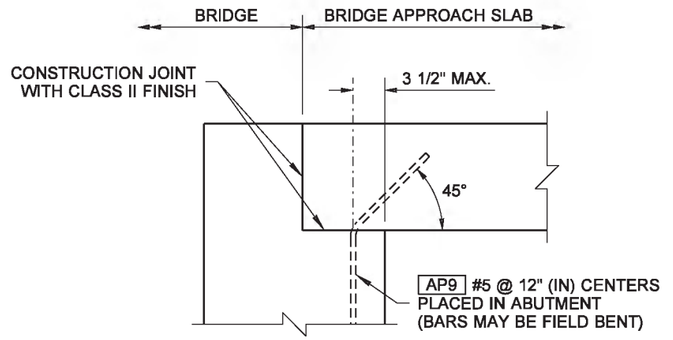

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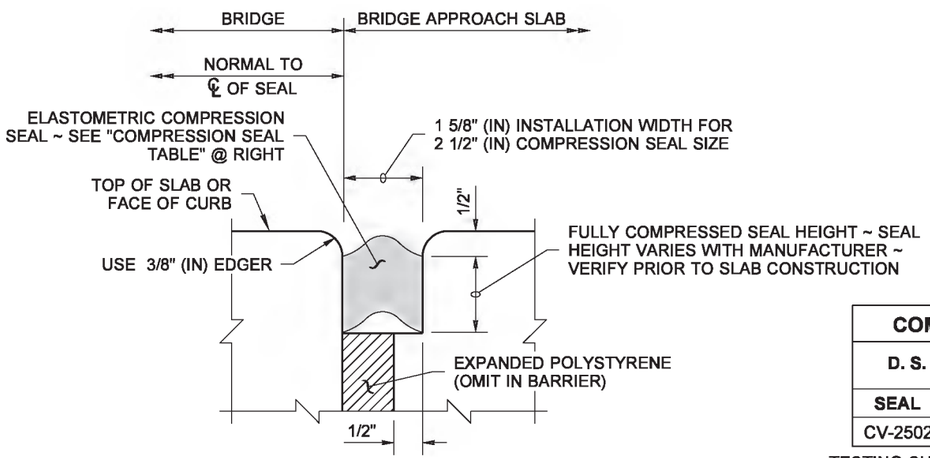
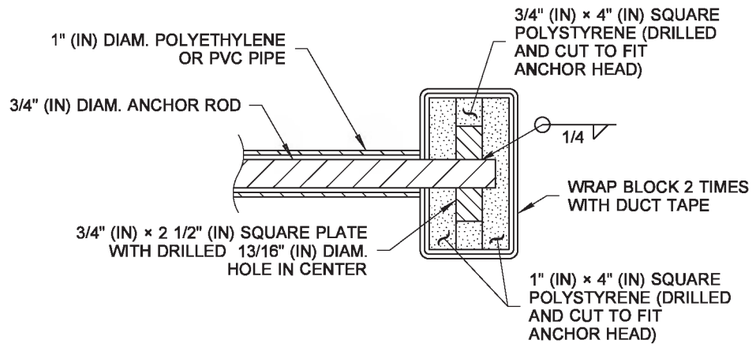


COMPRESSION SEAL DETAIL

COMPRESSION SEAL TABLE			
D. S. BROWN		WATSON BOWMAN ACME	
SEAL	WIDTH	SEAL	WIDTH
CV-2502	2 1/2	WA-250	2 1/2

TESTING SHALL BE PER **ASTM D2628** PRIOR TO USE



ANCHOR HEAD DETAIL

FOR LOCAL AGENCY USE ONLY

BIJAN KHALEGHI
STATE OF WASHINGTON
27695
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER

Khaleghi, Bijan
Bijan Khaleghi Dec 22 2014 7:33 AM

BRIDGE APPROACH SLAB

STANDARD PLAN A-40.50-02

SHEET 2 OF 2 SHEETS

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Bakotich, Pasco
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Washington State Department of Transportation

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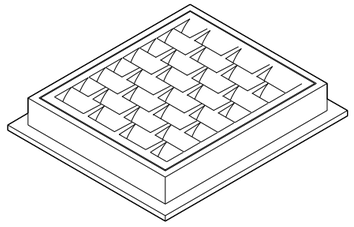

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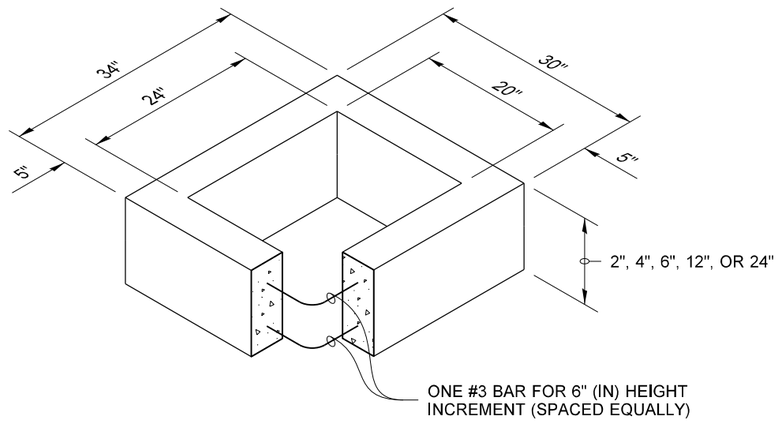


RECTANGULAR ADJUSTMENT SECTION

PIPE ALLOWANCES	
PIPE MATERIAL	**MAXIMUM INSIDE DIAMETER (INCHES)**
REINFORCED OR PLAIN CONCRETE	12"
ALL METAL PIPE	15"
CPSSP * **(STD. SPEC. SECT. 9-05.20)**	12"
SOLID WALL PVC **(STD. SPEC. SECT. 9-05.12(1))**	15"
PROFILE WALL PVC **(STD. SPEC. SECT. 9-05.12(2))**	15"

* CORRUGATED POLYETHYLENE STORM SEWER PIPE

NOTES

1. As acceptable alternatives to the rebar shown in the **PRECAST BASE SECTION**, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot shall be used with the minimum required rebar shown in the **ALTERNATIVE PRECAST BASE SECTION**. Wire mesh shall not be placed in the knockouts.

2. The knockout diameter shall not be greater than 20" (in). Knockouts shall have a wall thickness of 2" (in) minimum to 2.5" (in) maximum. Provide a 1.5" (in) minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with **Standard Specification Section 9-04.3**.

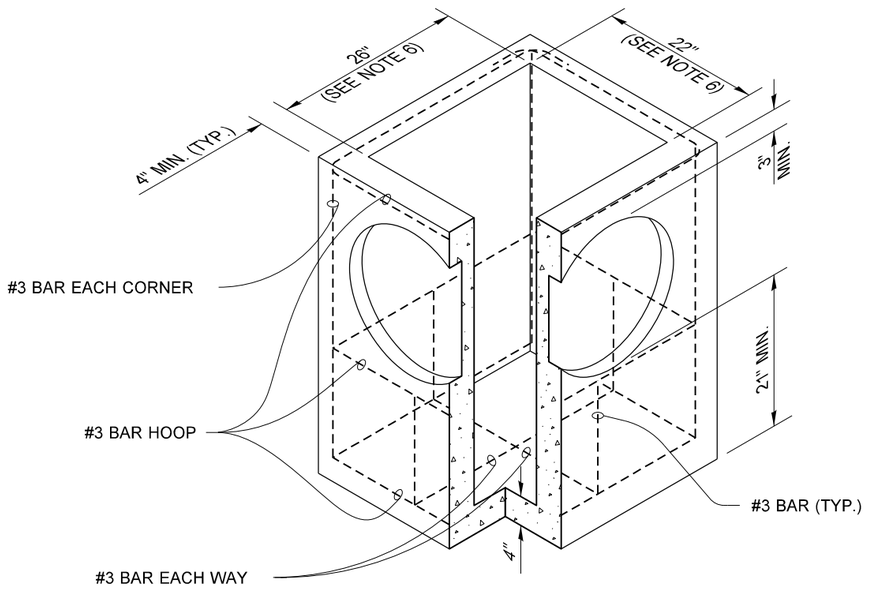
3. The maximum depth from the finished grade to the lowest pipe invert shall be 5' (ft).

4. The frame and grate may be installed with the flange down, or integrally cast into the adjustment section with flange up.

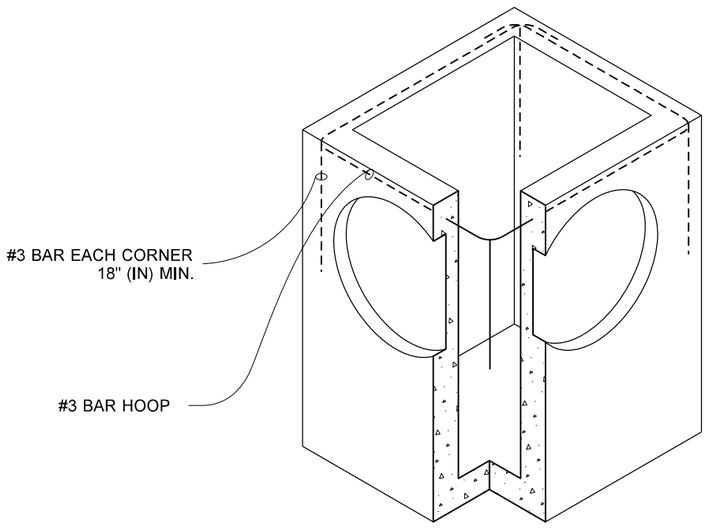
5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1 : 24 or steeper.

6. The opening shall be measured at the top of the **Precast Base Section**.

7. All pickup holes shall be grouted full after the basin has been placed.



PRECAST BASE SECTION



(SEE NOTE 1)

ALTERNATIVE PRECAST BASE SECTION

Julie Heilman
2020.09.01 07:52:50 -07'00'

CATCH BASIN TYPE 1

STANDARD PLAN B-5.20-03

SHEET 1 OF 1 SHEET

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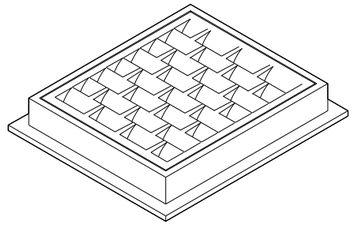
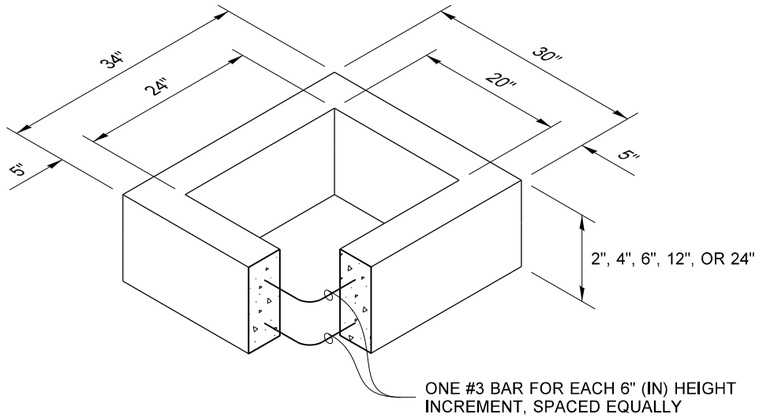
Roark, Steve
Digitally signed by Roark, Steve
Date: 2020.09.09 09:45:23 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: LISA CYFORD



FRAME AND VANED GRATE



RECTANGULAR ADJUSTMENT SECTION

PIPE ALLOWANCES	
PIPE MATERIAL	**MAXIMUM INSIDE DIAMETER (INCHES)**
REINFORCED OR PLAIN CONCRETE	18"
ALL METAL PIPE	21"
CPSSP * **(STD. SPEC. SECT. 9-05.20)**	18"
SOLID WALL PVC **(STD. SPEC. SECT. 9-05.12(1))**	21"
PROFILE WALL PVC **(STD. SPEC. SECT. 9-05.12(2))**	21"

* CORRUGATED POLYETHYLENE STORM SEWER PIPE

NOTES

1. As acceptable alternatives to the rebar shown in the **PRECAST BASE SECTION**, fibers (placed according to the Standard Specifications), or wire mesh having a minimum area of 0.12 square inches per foot, shall be used with the minimum required rebar shown in the ALTERNATIVE **PRECAST BASE SECTION**. Wire mesh shall not be placed in the knockouts.

2. The knockout shall not be greater than 26" (in), in any direction. Knockouts shall have a wall thickness of 2" (in) minimum to 2.5" (in) maximum. Provide a 1.5" (in) minimum gap between the knockout wall and the outside of the pipe. After the pipe is installed, fill the gap with joint mortar in accordance with **Standard Specification Section 9-04.3**.

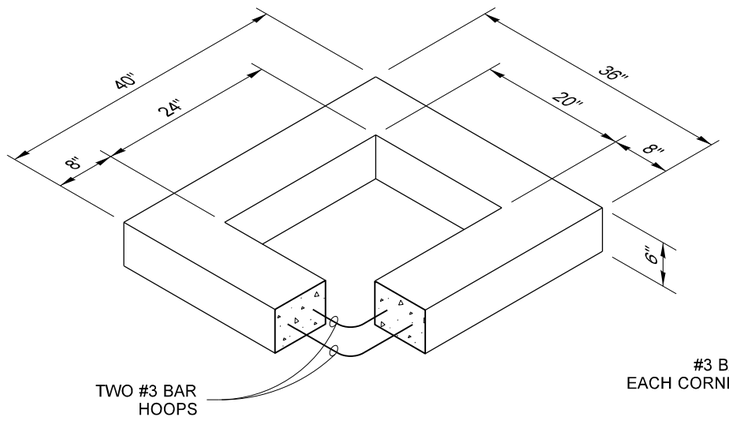
3. The maximum depth from the finished grade to the lowest pipe invert shall be 5' (ft).

4. The frame and grate may be installed with the flange down or integrally cast into the adjustment section with flange up.

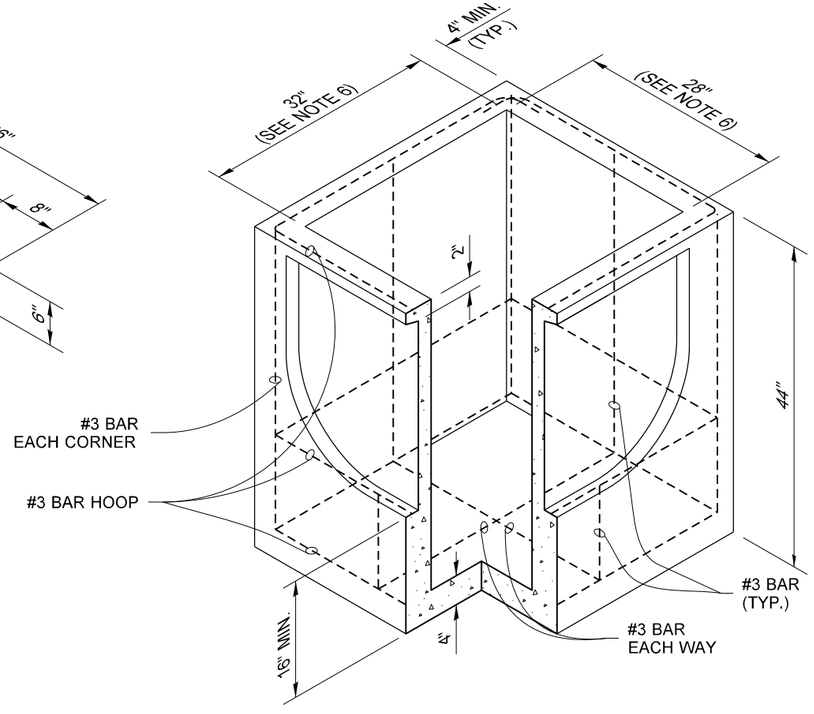
5. The Precast Base Section may have a rounded floor, and the walls may be sloped at a rate of 1 : 24 or steeper.

6. The opening shall be measured at the top of the Precast Base Section.

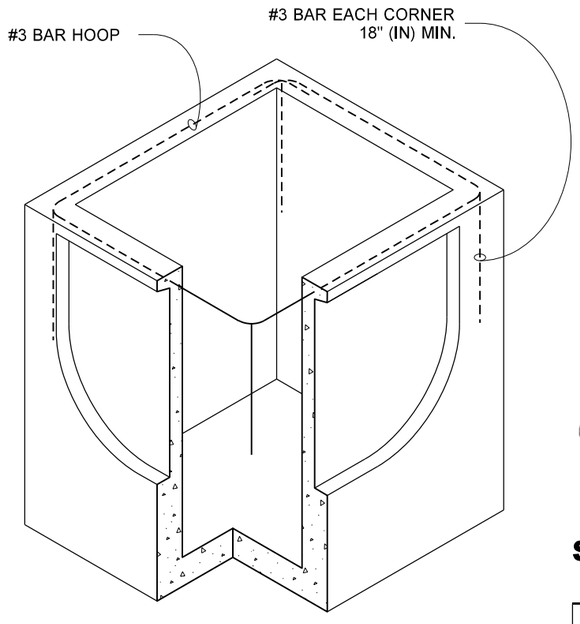
7. All pickup holes shall be grouted full after the basin has been placed.



REDUCING SECTION



PRECAST BASE SECTION



(SEE NOTE 1)

ALTERNATIVE PRECAST BASE SECTION

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Jan 25 2017 2:56 PM
cosign

CATCH BASIN TYPE 1L

STANDARD PLAN B-5.40-02

SHEET 1 OF 1 SHEET

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Jan 26 2017 6:49 AM
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Washington State Department of Transportation

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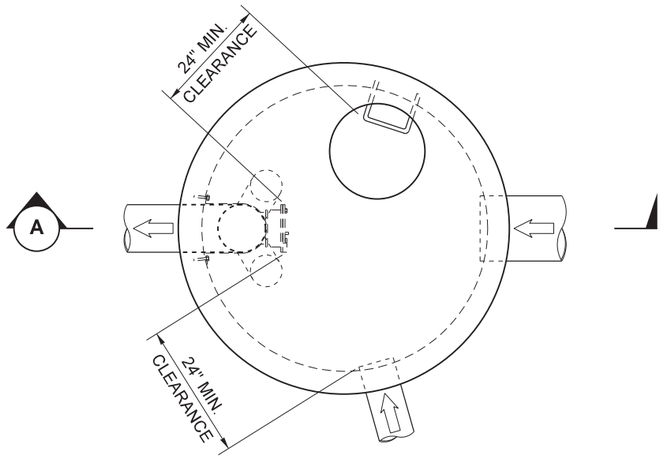
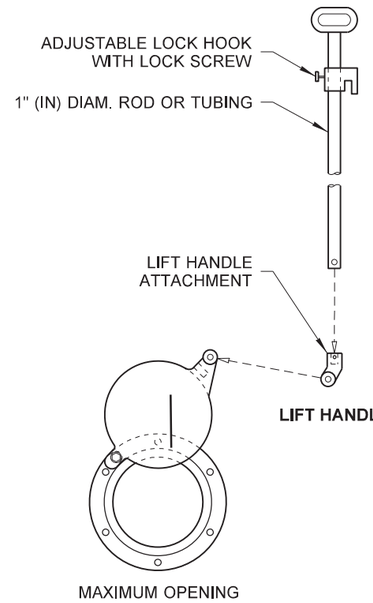
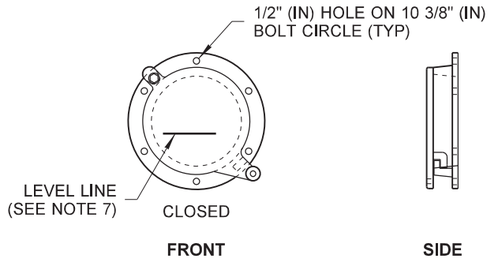
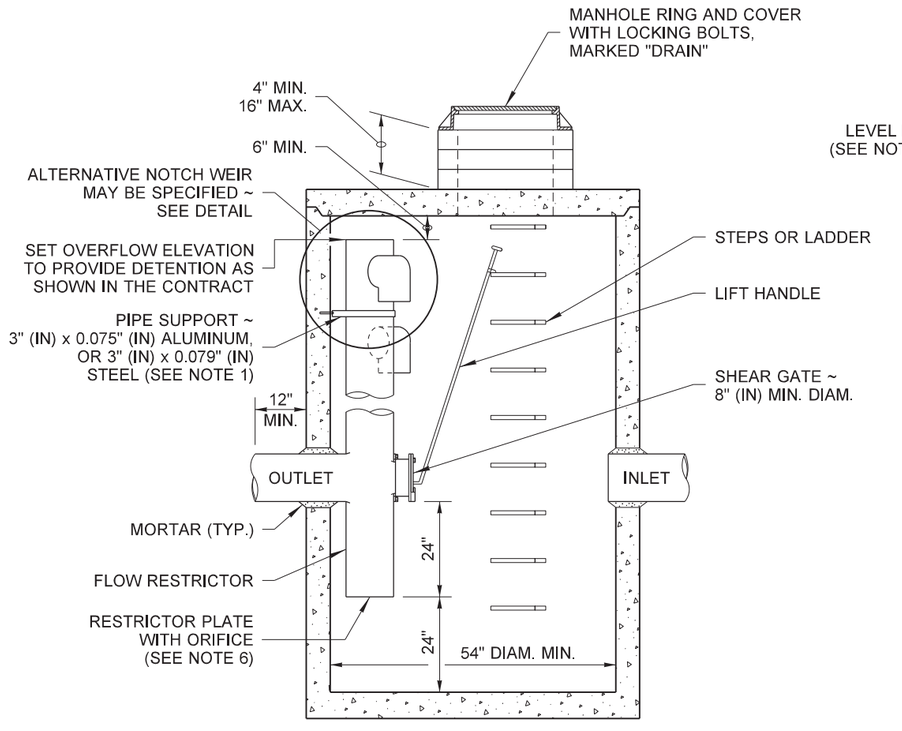


PLAN VIEW

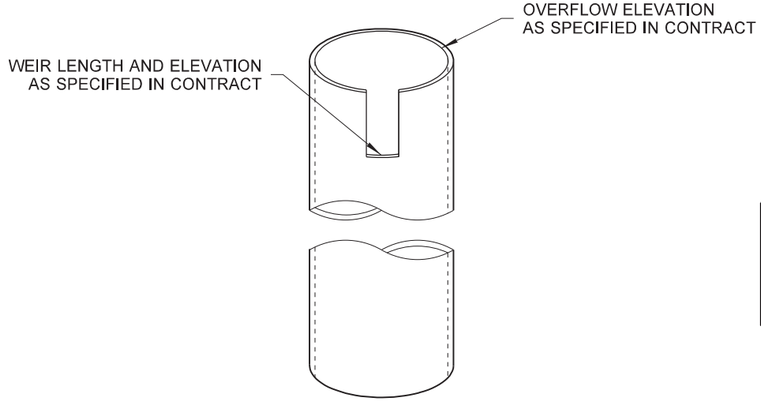




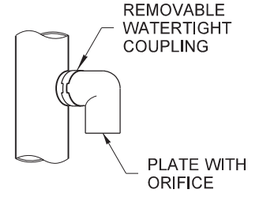
SHEAR GATE DETAILS



SECTION (A)



NOTCH WEIR DETAIL



ELBOW DETAIL

NOTES

1. The pipe supports and the flow restrictor shall be constructed of the same material and be anchored at a maximum spacing of 36" (in). Attach the pipe supports to the manhole with 5/8" (in) stainless steel expansion bolts or embed the supports into the manhole wall 2" (in).
2. The vertical riser stem of the flow restrictor shall be the same diameter as the horizontal outlet pipe with a minimum diameter of 8" (in).
3. The flow restrictor shall be fabricated from one of the following materials:

   0.060" (in) Corrugated Aluminum Alloy Drain Pipe
   0.064" (in) Corrugated Galvanized Steel Drain Pipe with Treatment 1
   0.064" (in) Corrugated Aluminized Steel Drain Pipe
   0.060" (in) Aluminum alloy flat sheet, in accordance with **ASTM B 209, 5052 H32 or EPS** High Density Polyethylene Storm Sewer Pipe
4. The frame and ladder or steps are to be offset so that: the shear gate is visible from the top; the climb-down space is clear of the riser and gate; the frame is clear of the curb.
5. The multi-orifice elbows may be located as shown, or all placed on one side of the riser to assure ladder clearance. The size of the elbows and their placement shall be specified in the Contract.
6. Restrictor plate with orifice as specified in the Contract. The opening is to be cut round and smooth.
7. The shear gate shall be made of aluminum alloy in accordance with **ASTM B 26 and ASTM B 275**, designation **ZG32A**; or cast iron in accordance with **ASTM A 48, Class 30B**.

   The lift handle shall be made of a similar metal to the gate (to prevent galvanic corrosion), it may be of solid rod or hollow tubing, with adjustable hook as required.

   A neoprene rubber gasket is required between the riser mounting flange and the gate flange.

   Install the gate so that the level-line mark is level when the gate is closed.

   The mating surfaces of the lid and the body shall be machined for proper fit.

   All shear gate bolts shall be stainless steel.
8. The shear gate maximum opening shall be controlled by limited hinge movement, a stop tab, or some other device.
9. Alternative shear gate designs are acceptable if material specifications are met.

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Jan 25 2017 2:57 PM
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CATCH BASIN TYPE 2 WITH FLOW RESTRICTOR

STANDARD PLAN B-10.40-01

SHEET 1 OF 1 SHEET

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Washington State Department of Transportation

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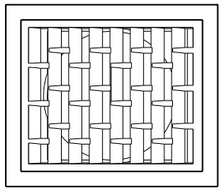
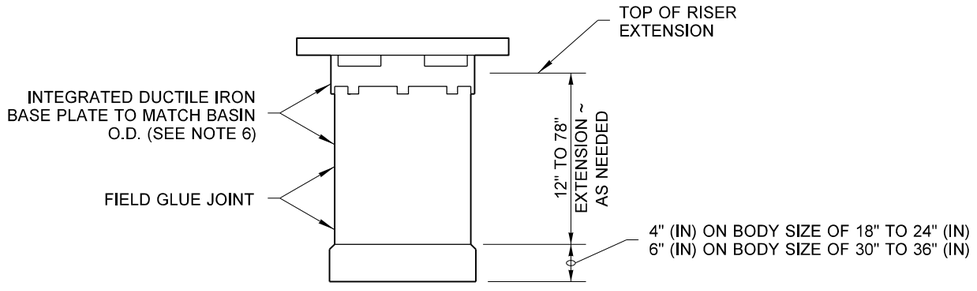
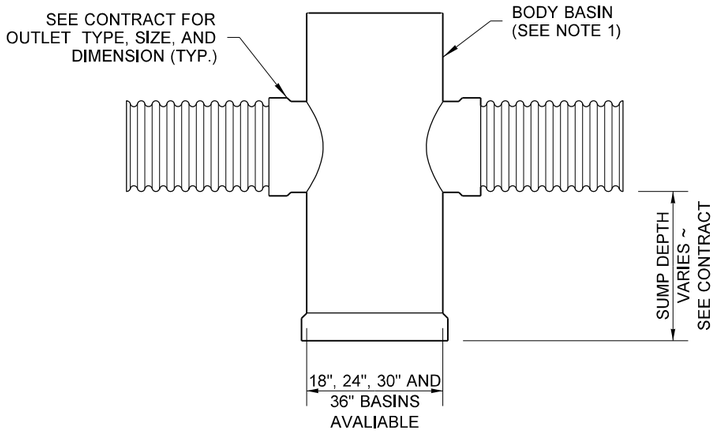


PLAN VIEW

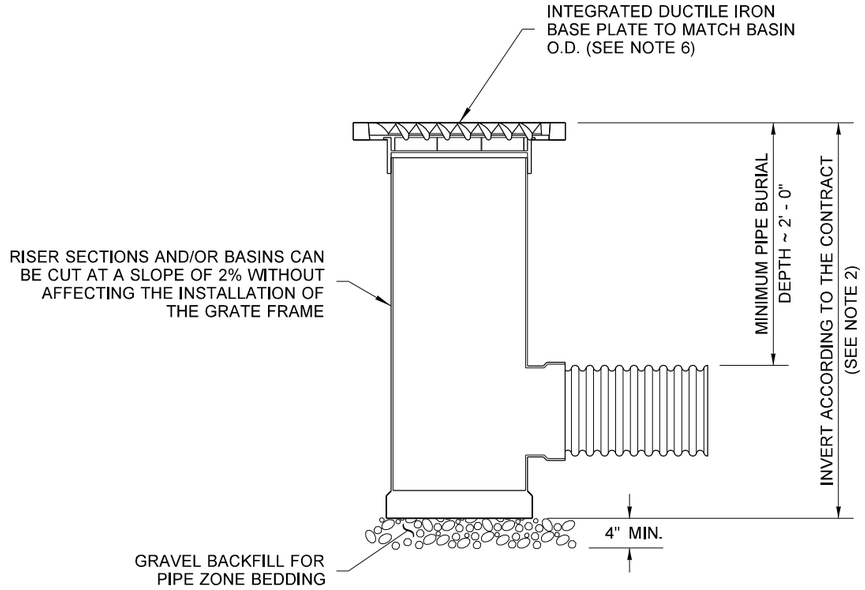
FRAME AND VANED GRATE



RISER EXTENSION



BASIN BODY



ELEVATION VIEW

NOTES

1. Drain basin to be custom manufactured according to plan details. Risers are needed for basins over 84" (in) due to shipping restrictions. The maximum depth from finished grade to the lowest invert shall be 8' (ft).
2. Drainage connections shall utilize flexible elastometric seals conforming to **ASTM F477** and shall meet the requirements of **ASTM D3212**.
3. Risers can be trimmed down to 3" (in) extension without interfering with the installation of the frame.
4. These structures can be used for Type 1, Type 1L, and Type 2 structures. Usage for the Type 2 structures shall be limited to pipe size use only.
5. Basins shall be manufactured from PVC pipe stock meeting the requirements of **ASTM D1784**, cell classification **12454**.
6. Ductile iron castings for PVC catch basins shall conform to the requirements of **ASTM A536**, **grade 70-50-05**, and shall meet the proof load testing requirements of **AASHTO M 306**.
7. Bolt-down capability is required on all frames, grates, and covers, unless specified otherwise in the Contract. Provide 2 holes in the frame that are vertically aligned with the grate or cover slots. The frame shall accept the 304 Stainless Steel (S.S.) 5/8" (in) - 11 NC × 2" (in) allen head cap screw by being tapped, or other approved mechanism. Location of bolt-down holes varies by manufacturer.
8. This item requires approval from HQ Hydraulics before use on a project.
9. Optional ladder is available for 36" diameter catch basin.

JULIE HEILMAN
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Julie Heilman
2020.09.01 07:51:54 -07'00'

CATCH BASIN - PVC

STANDARD PLAN B-10.70-01

SHEET 1 OF 1 SHEET

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Roark, Steve
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Date: 2020.09.09 09:47:37 -07'00'
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Washington State Department of Transportation

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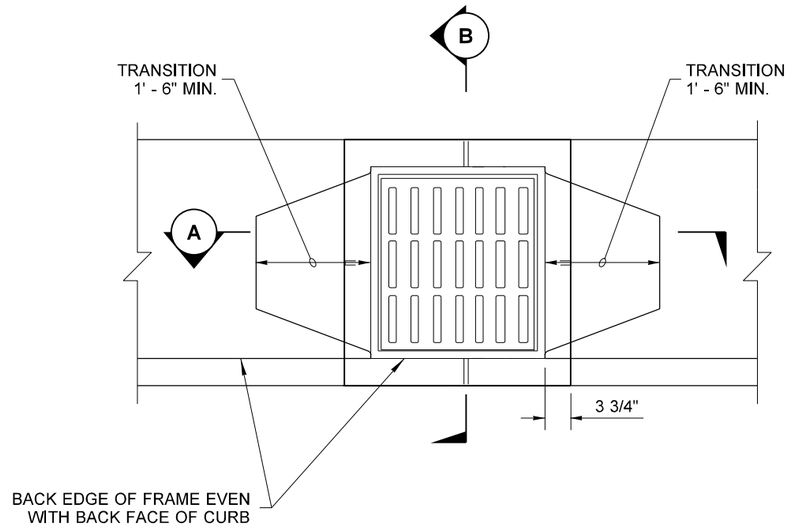
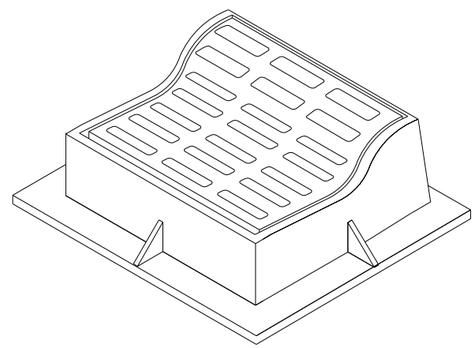


PLAN

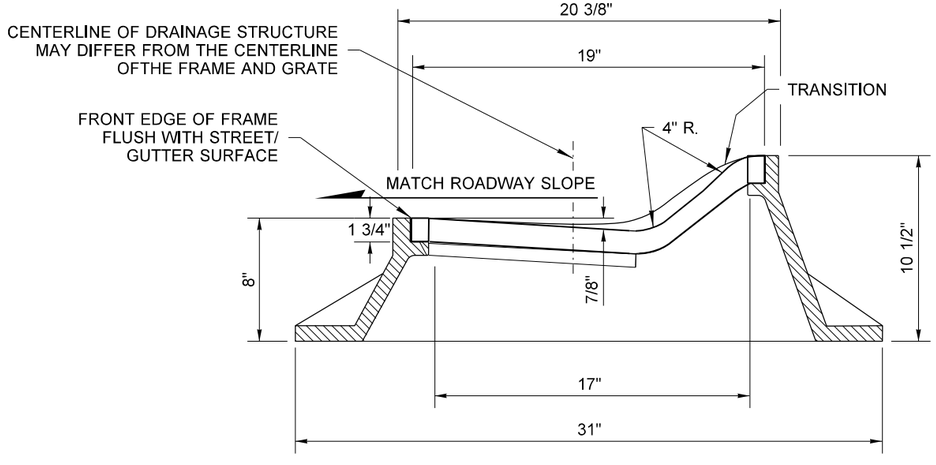
ROLLED INLET

NOTES

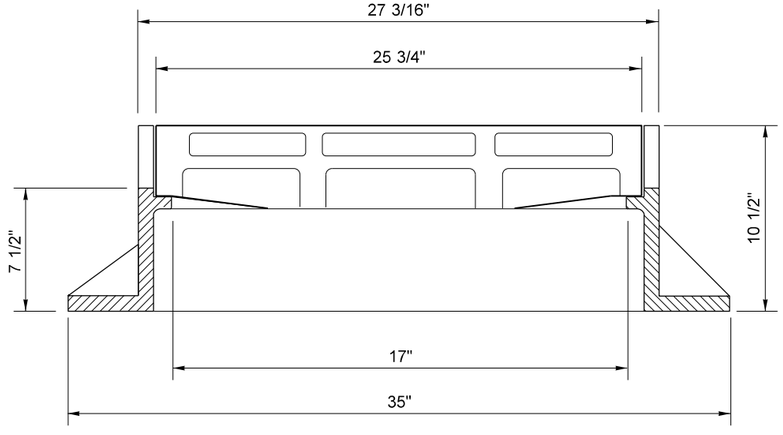
1. Bolt down capability is required on all frames, grates, and covers, unless specified otherwise in the contract. Provide 2 holes in the frame that are vertically aligned with the grate or cover slots. The frame shall accept the 304 Stainless Steel (S.S.) 5/8" (in) - 11 NC x 2" allen head cap screw by being tapped, or other approved mechanism. Location of bolt-down holes varies by manufacturer.
2. Refer to **Standard Specification, Section 9-05.15** and **9-05.15(2)** for additional requirements.
3. For Adjustment Section Details ~ See **Standard Plan B-30.90**.
4. Size and dimensions of drains vary by Manufacturer, but open area shall be 1.5 square feet minimum.



ISOMETRIC VIEW



SECTION A



SECTION B

JULIE HEILMAN
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41819
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PROFESSIONAL ENGINEER

Julie Heilman
Julie Heilman
2020.09.01 07:51:27 -07'00'

ROLLED CURB DRAIN

STANDARD PLAN B-30.05-00

SHEET 1 OF 1 SHEET

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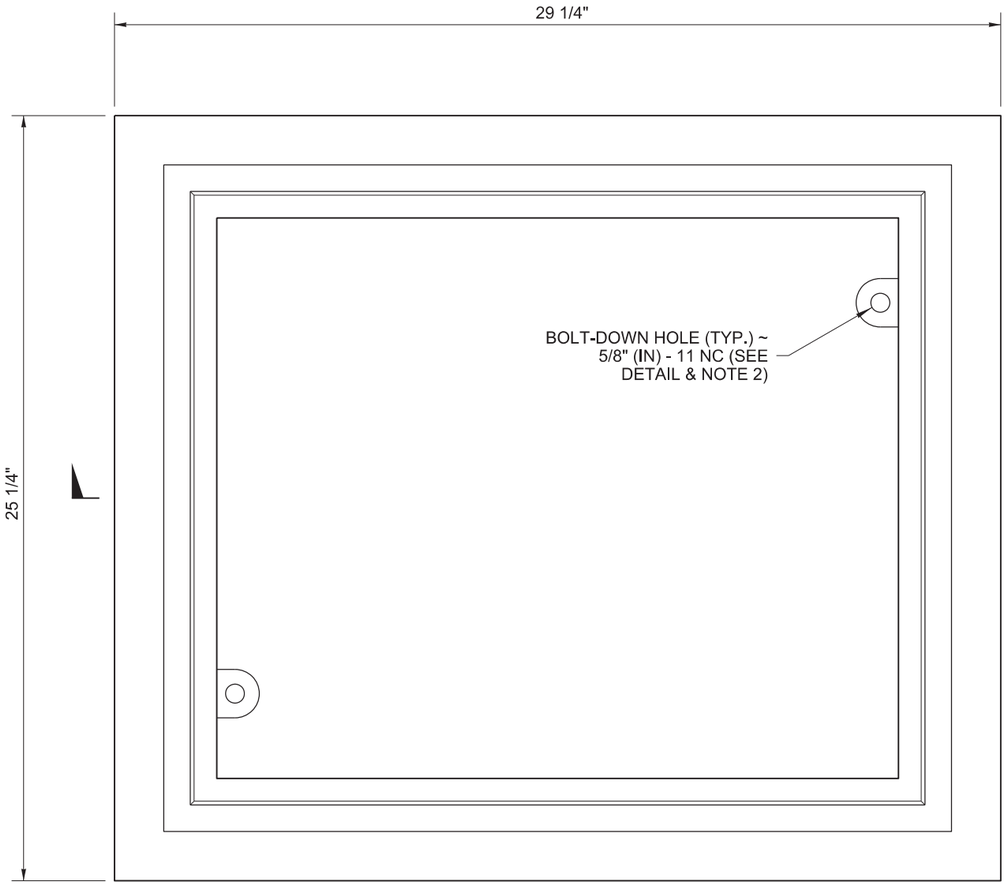

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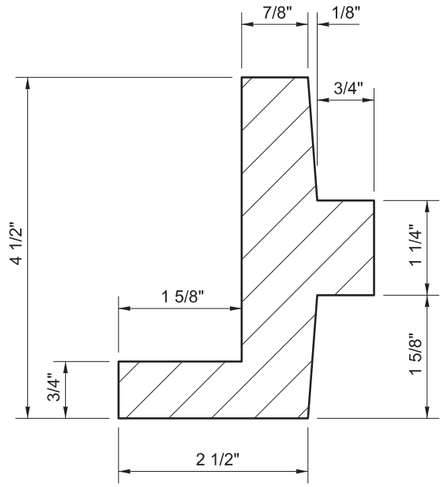
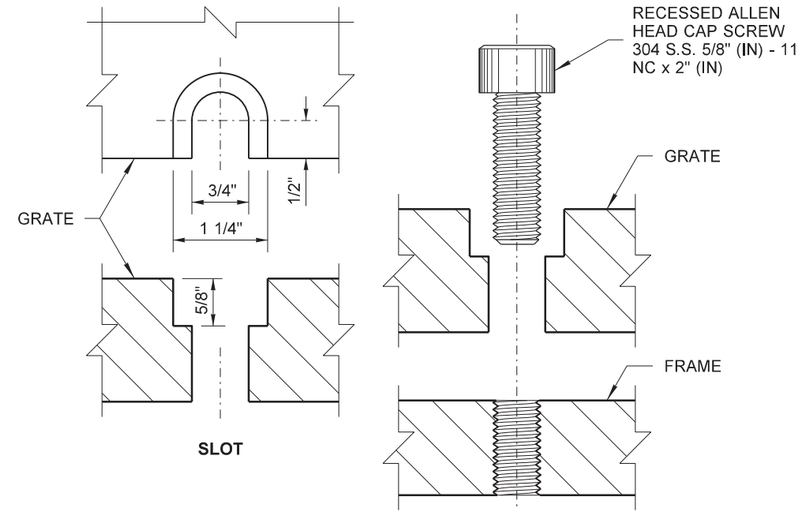


DETAIL B

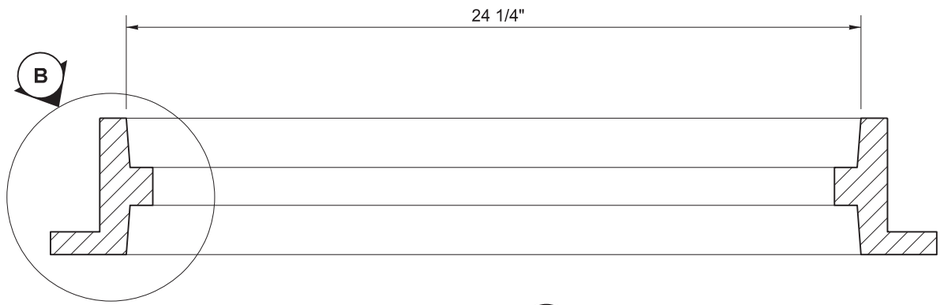
NOTES

1. This frame is designed to accommodate 20" (in) × 24" (in) grates or covers as shown on **Standard Plans B-30.20, B-30.30, B-30.40,** and **B-30.50.**
2. Bolt-down capability is required on all frames, grates, and covers, unless specified otherwise in the Contract. Provide 2 holes in the frame that are vertically aligned with the grate or cover slots. The frame shall accept the 304 Stainless Steel (S.S.) 5/8" (in) - 11 NC × 2" (in) allen head cap screw by being tapped, or other approved mechanism. Location of bolt-down holes varies by manufacturer.
3. Refer to **Standard Specification Section 9-05.15** and **9-05.15(2)** for additional requirements.

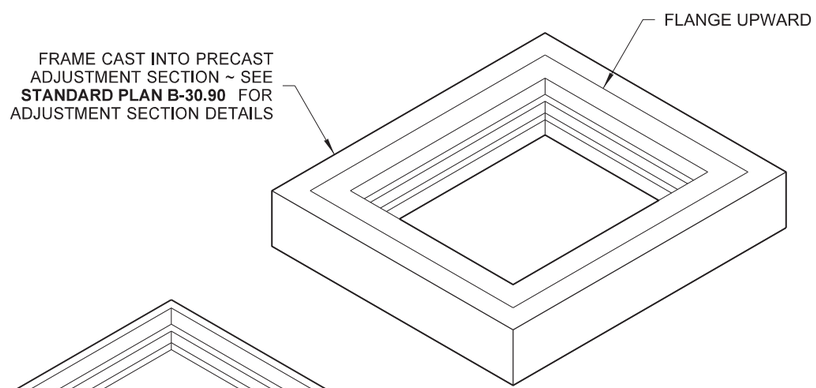


SLOT **HOLE**

BOLT-DOWN DETAILS
SEE NOTE 2



SECTION A



ISOMETRIC VIEW
SHOWING THE VARIATIONS

JULIE HEILMAN
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41819
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Heilman, Julie
Feb 20 2018 12:52 PM

RECTANGULAR FRAME (REVERSIBLE)

STANDARD PLAN B-30.10-03

SHEET 1 OF 1 SHEET

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Carpenter, Jeff
Feb 27 2018 7:55 AM

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Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

DRAWN BY: BILL BERENS

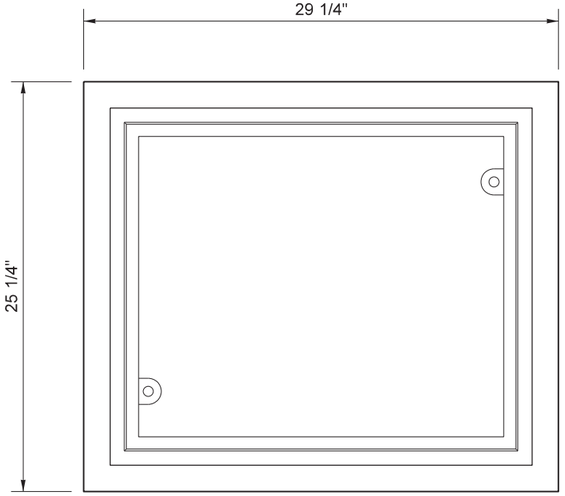
NOTES

1. Bolt-down capability is required on all frames, grates, and covers, unless specified otherwise in the Contract. Provide 2 holes in the frame that are vertically aligned with the grate or cover slots. The frame shall accept the 304 Stainless Steel (S.S.) 5/8" (in) - 11 NC × 2" (in) Allen head cap screw by being tapped, or other approved mechanism. Location of bolt-down holes varies by manufacturer.

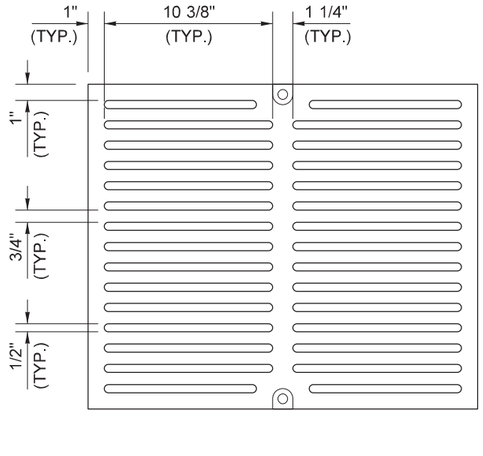
2. All grates shall be 20" (in) x 24" (in).

3. Grate alternatives shown for informational purposes. Grate design varies by manufacturer and must meet ADA requirements.

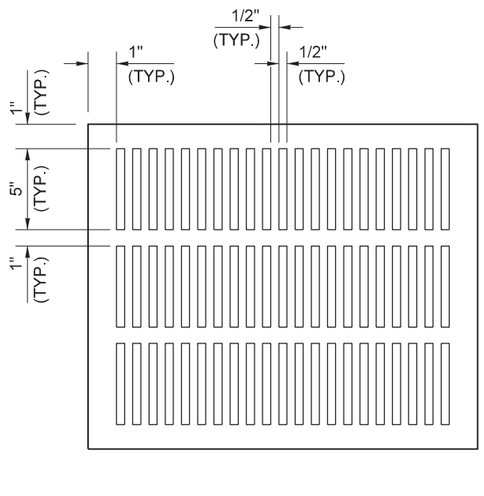
4. Refer to **Standard Specification Section 9-05.15 and 9-05.15 (2)** for additional requirements.



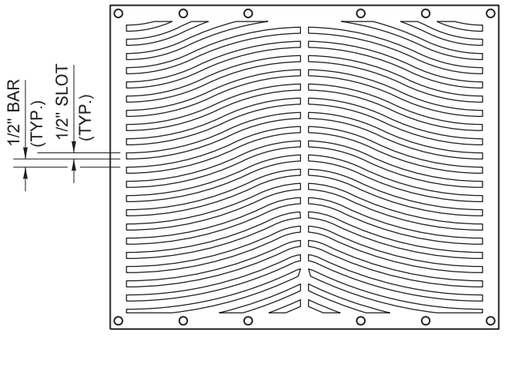
PLAN VIEW
GRATE FRAME
FOR DETAILS NOT SHOWN,
SEE STANDARD PLAN B-30.10



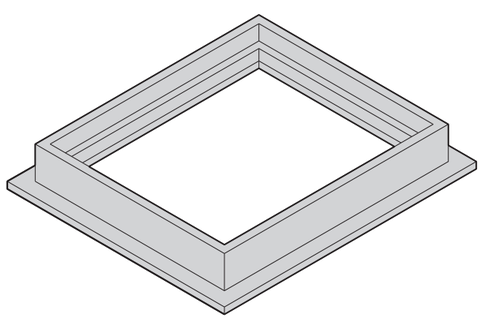
PLAN VIEW
GRATE
ALTERNATIVE 1

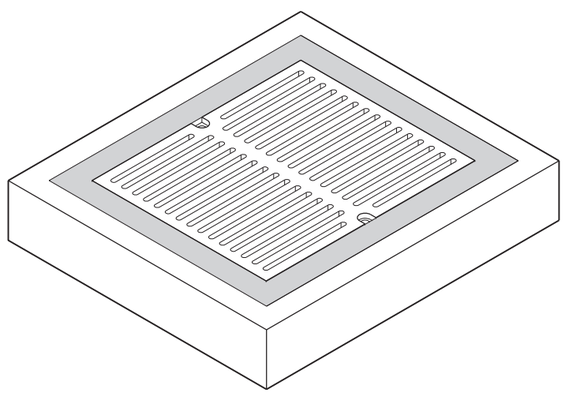


PLAN VIEW
GRATE
ALTERNATIVE 2



PLAN VIEW
GRATE
ALTERNATIVE 3





ISOMETRIC VIEWS
(GRATE ALTERNATIVE 1 SHOWN)

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:53 PM

ADA GRATES FOR RECTANGULAR FRAMES

STANDARD PLAN B-30.15-00

SHEET 1 OF 1 SHEET

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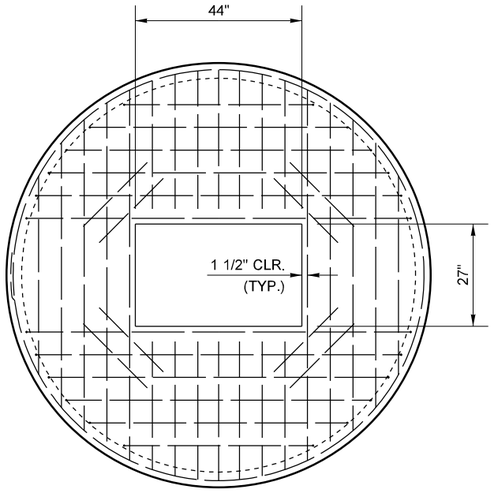
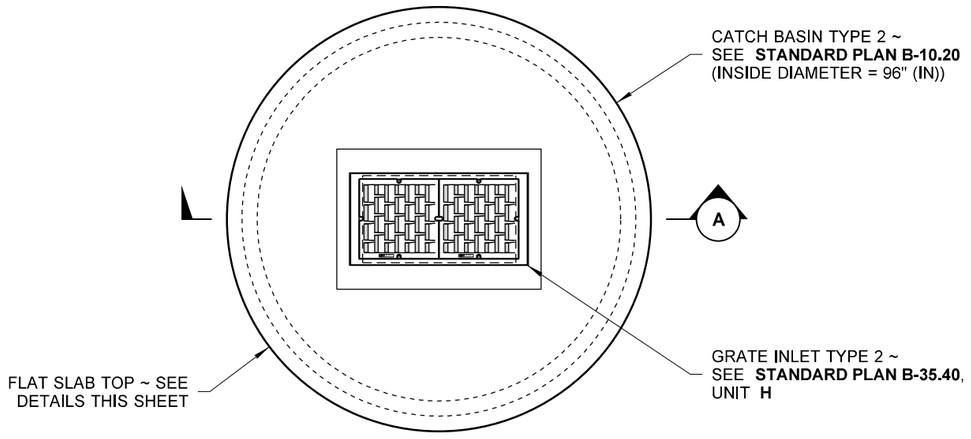
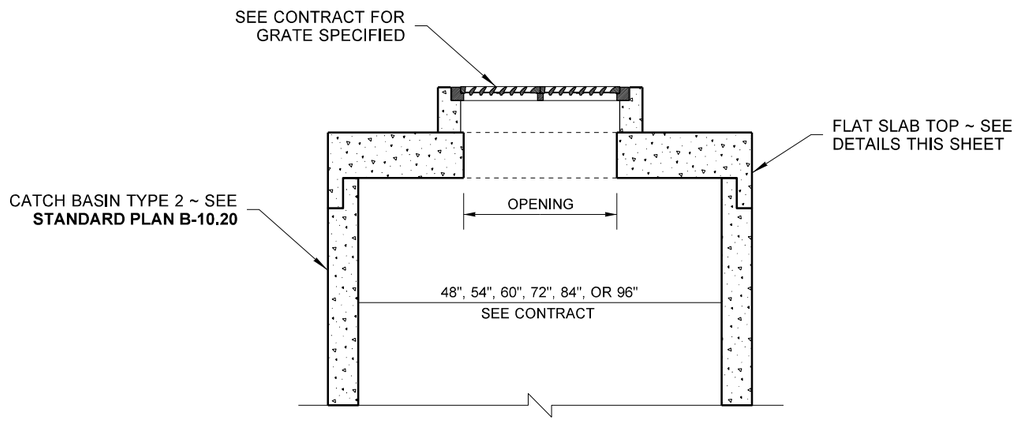


FLAT SLAB TOP DETAIL

(96" (IN) DIAMETER FLAT SLAB SHOWN)



PLAN



SECTION (A)

NOTES

1. For dimensions not shown, refer to **Standard Plan B-30.90**.
2. See **Standard Specification, Section 9-07.1(2)** for bending diameters.
3. See **Standard Plans B-40.20** and B**-40.40** for grate details.
4. Reinforcement shall meet the requirements of **AASHTO M199** and is shown for informational purposes only.

JULIE HEILMAN
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Julie Heilman
Julie Heilman
2020.09.01 07:53:35 -07'00'

GRATE INLET ON CATCH BASIN - TYPE 2

STANDARD PLAN B-30.60-00

SHEET 1 OF 1 SHEET

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Date: 2020.09.09 09:50:59 -07'00'

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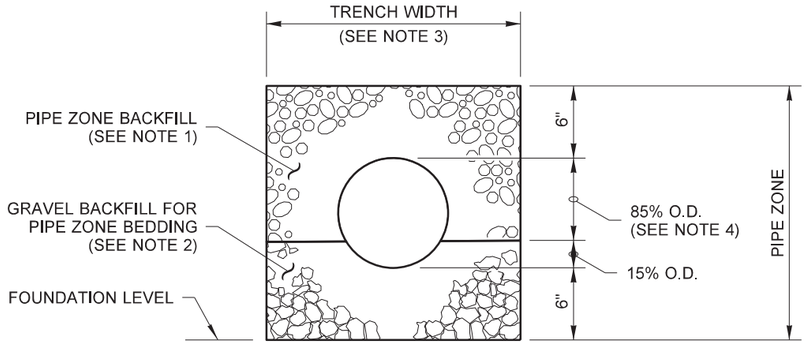
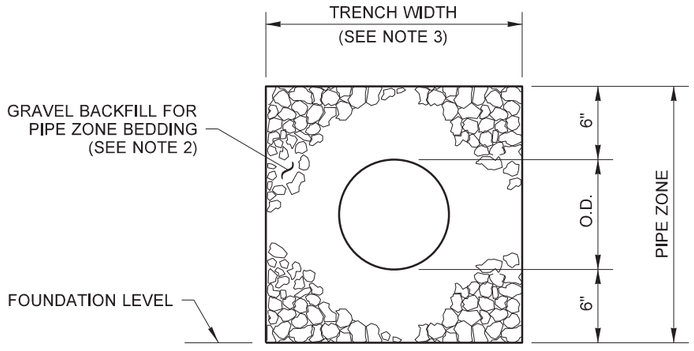
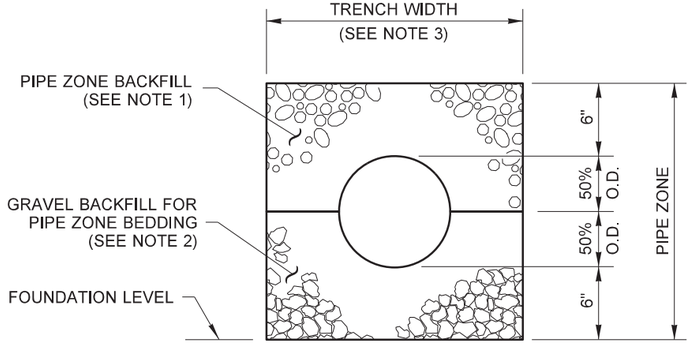


CONCRETE AND DUCTILE IRON PIPE



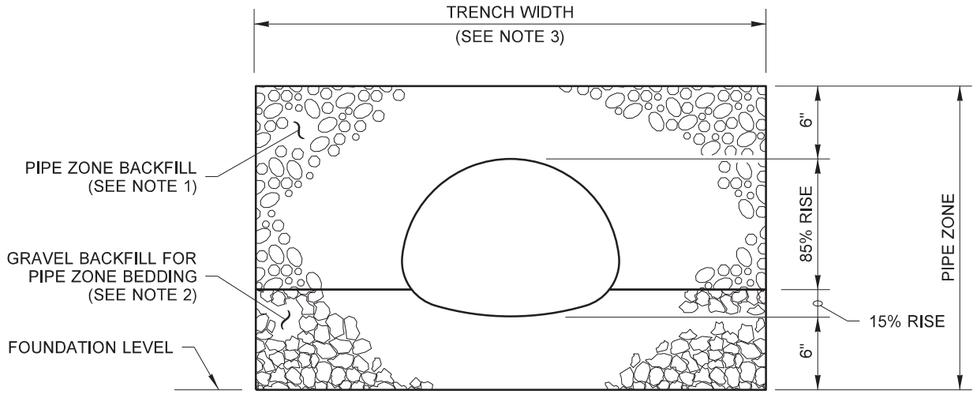
THERMOPLASTIC PIPE



METAL AND STEEL RIB REINFORCED POLYETHYLENE PIPE

NOTES

1. See **Standard Specifications Section 7-08.3(3)** for Pipe Zone Backfill.
2. See **Standard Specifications Section 9-03.12(3)** for Gravel Backfill for Pipe Zone Bedding.
3. See **Standard Specifications Section 2-09.4** for Measurement of Trench Width.
4. For sanitary sewer installation, concrete pipe shall be bedded to spring line.



PIPE ARCHES

CLEARANCE BETWEEN PIPES FOR MULTIPLE INSTALLATIONS		
PIPE	**SIZE**	**MINIMUM DISTANCE BETWEEN BARRELS**
CIRCULAR PIPE (DIAMETER)	**UP TO 48"**	**24"**
METAL PIPE ARCH (SPAN)	**48" AND LARGER**	**DIAMETER/2 OR 36" WHICHEVER IS LESS**

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:56 PM

PIPE ZONE BEDDING AND BACKFILL

STANDARD PLAN B-55.20-02

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Feb 27 2018 8:01 AM

STATE DESIGN ENGINEER

Washington State Department of Transportation

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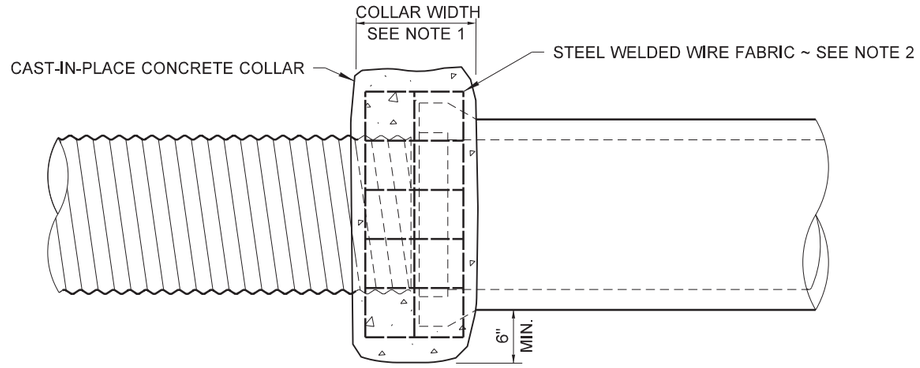
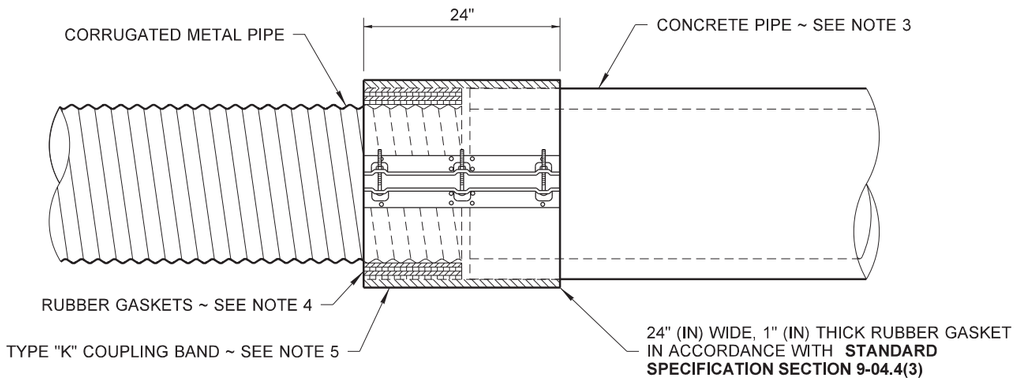
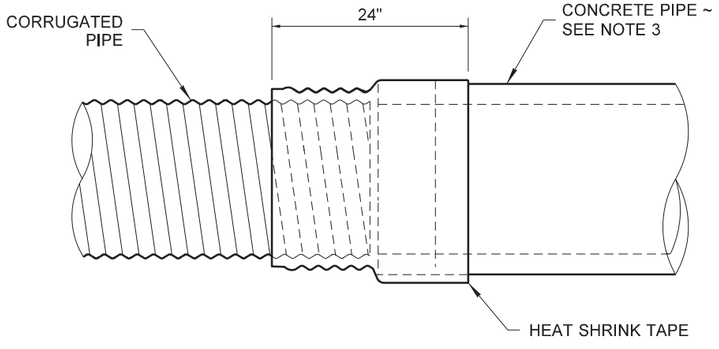


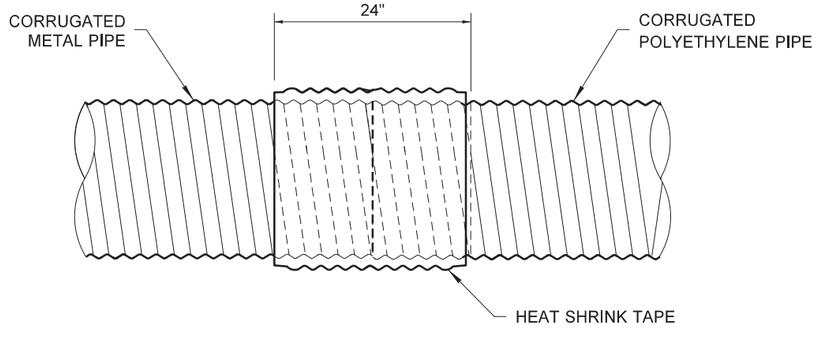
CONCRETE COLLAR OPTION



COUPLING BAND OPTION



HEAT SHRINK OPTION
CORRUGATED PIPE TO CONCRETE PIPE



HEAT SHRINK OPTION
CORRUGATED METAL PIPE TO CORRUGATED POLYETHYLENE PIPE

NOTES

1. The Concrete Collar width shall be one half of the outside pipe diameter of the largest pipe. The minimum Concrete Collar width shall be 12" (in). Concrete Collars may be used with all pipe materials and diameters. The Concrete Collar option shall only be used to extend existing pipes. Concrete shall be Commercial Concrete in accordance with **Standard Specification Section 6-02.3(2).**

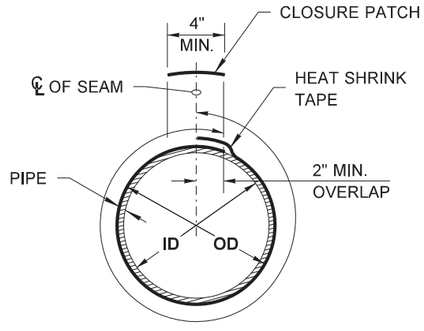
2. Steel Welded Wire Fabric shall be in accordance with **Standard Specification Section 9-07.7**. Install two wraps for size 6 × 6 W1.4 × W1.4 (10 Gage) Steel Welded Wire Fabric or one wrap for any of the following sizes:
   6 × 6 W2.1 × W2.1 (8 Gage)
   6 × 6 W2.9 × W2.9 (6 Gage)
   4 × 4 W2.9 × W2.9 (6 Gage)
   4 × 4 W4.0 × W4.0 (4 Gage)
   Provide 1 1/2" min. covering over wire fabric.

3. When a Coupling Band connection requires attachment to the bell end of a concrete pipe, the bell end of the pipe shall be removed before the connection is installed.

4. Increase the outside diameter of the metal pipe to match the outside diameter of the concrete pipe by installing 12" (in) wide rubber gaskets, thickness as required (Coupling Band only). The rubber gaskets shall be in accordance with **Standard Specification Section 9-04.4(3).**

5. Use a flat Type K Coupling Band. Type K Coupling Bands with dimples are not allowed for the installation detail shown. The Coupling Band option shall only be used for extending existing pipes that have an inside diameter of 36" (in) or less.

6. Heat shrink shall have a width of 24" (in). The material shall be wrapped around the outside of the pipe with a 2" (in) minimum overlap.There shall also be a 4" (in) minimum closure patch of material centered along the entire length of the seam.



SECTION DETAIL

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED PROFESSIONAL ENGINEER

Julie Heilman
Julie Heilman
2020.09.01 07:54:03 -07'00'

CONNECTION DETAILS FOR DISSIMILAR CULVERT PIPE

STANDARD PLAN B-60.20-02

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Roark, Steve
Digitally signed by Roark, Steve
Date: 2020.09.09 09:52:35 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

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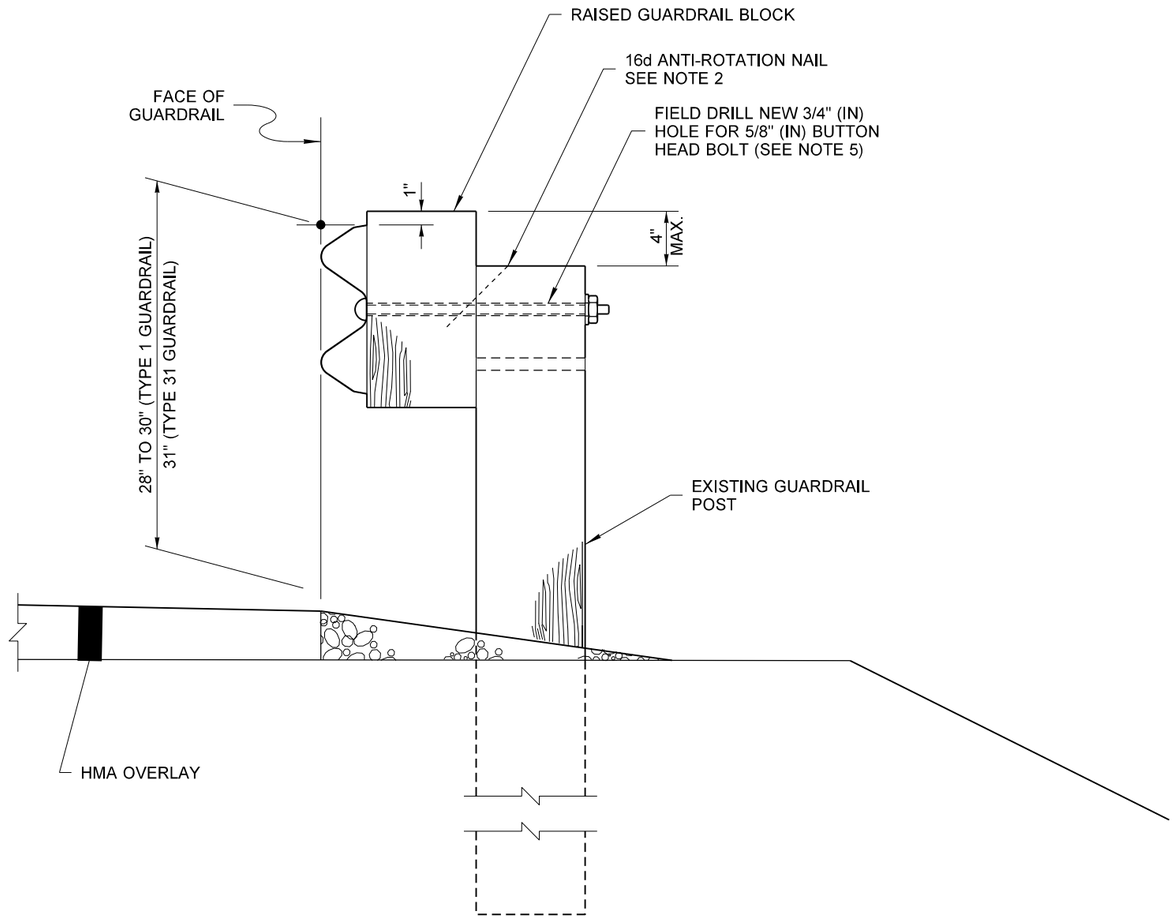

RAISING BEAM GUARDRAIL DETAIL
HMA OVERLAY OR LOW GUARDRAIL ~ (HMA OVERLAY CONDITION SHOWN)

NOTES

1. Remove all rail washers, also called "Snow Load Rail Washers" when encountered during Raising Beam Guardrail work and when the guardrail raising work requires removal of the rail.
2. Timber blocks shall be toe-nailed to the post with a 16d galvanized nail to prevent block rotation.
3. For post and block details, see **Standard Plan C-1b**.
4. Existing posts shall not be raised. Replace posts as necessary to achieve required guardrail height.
5. For steel posts, holes shall be located on approach traffic side of web.

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
REGISTERED
PROFESSIONAL ENGINEER

2020.08.27
09:26:27 -07'00'

RAISING BEAM GUARDRAIL DETAIL

STANDARD PLAN C-1

SHEET 1 OF 1 SHEET

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Date: 2020.09.09
09:56:33 -07'00'
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Washington State Department of Transportation

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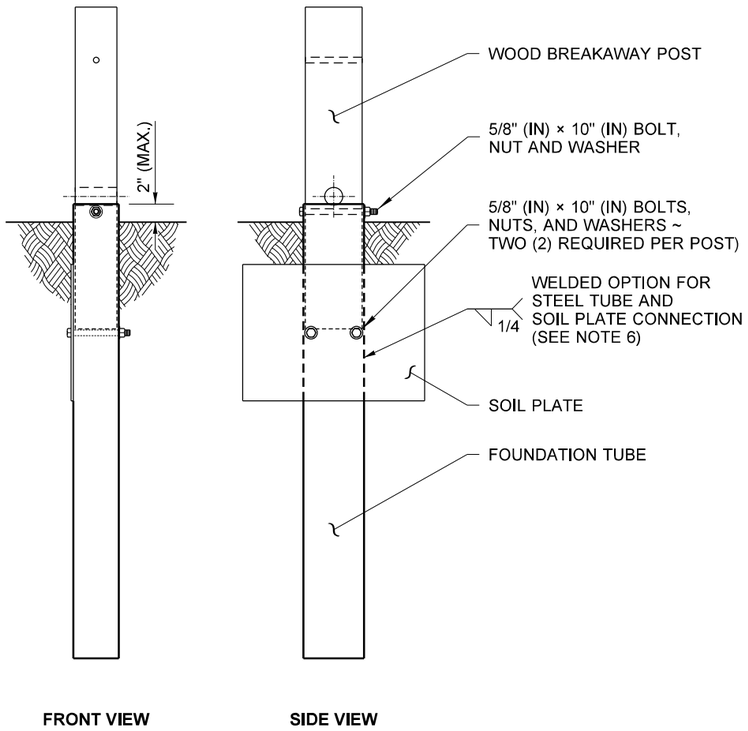
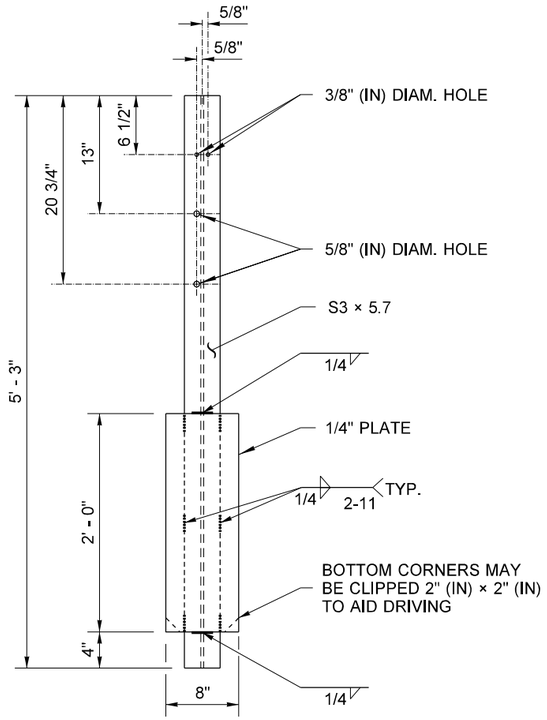
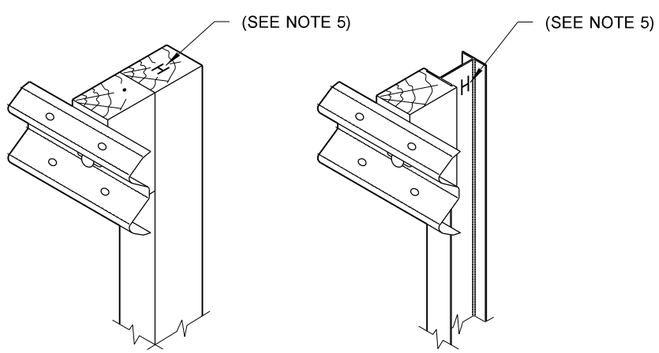


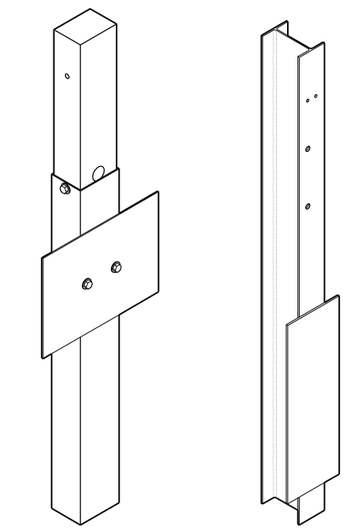
ANCHOR POST ASSEMBLY



G-2 POST



PARTIAL ASSEMBLY DETAIL



ISOMETRIC

NOTES

1. Wood posts for all guardrail placement plans shall be 6 × 8 except where noted otherwise.
2. Lower hole is for Rub Rail of Type 2 and Type 3 Beam Guardrail.
3. W6×8.5 or W6×9 steel posts and timber blocks are alternates for 6×8 timber posts and blocks. W6×15 steel posts and timber blocks are alternates for 10×10 timber posts and blocks.
4. Attach blockouts to steel posts using bolt holes on approaching traffic side of post web.
5. When "Beam Guardrail Type - _ _ Ft. Long Post" is specified in the Contract, the post length shall be stamped with numbers, 1 1/2" (in) min. high and 3/4" (in) wide at the location where the letter "H" is shown in the ASSEMBLY DETAIL. For wood post applications, the letter shall be stamped to a minimum depth of 1/4" (in). For steel post applications, the letter shall be legible after the post is galvanized. After post installation, it shall be the Contractor's responsibility to ensure the stamped numbers remain visible.
6. Soil plate may be welded to foundation tube. If so, holes in soil plate and foundation tube may be omitted.

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
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PROFESSIONAL ENGINEER

2020.08.27 09:45:39 -07'00'

BEAM GUARDRAIL POSTS AND BLOCKS

STANDARD PLAN C-1b

SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION
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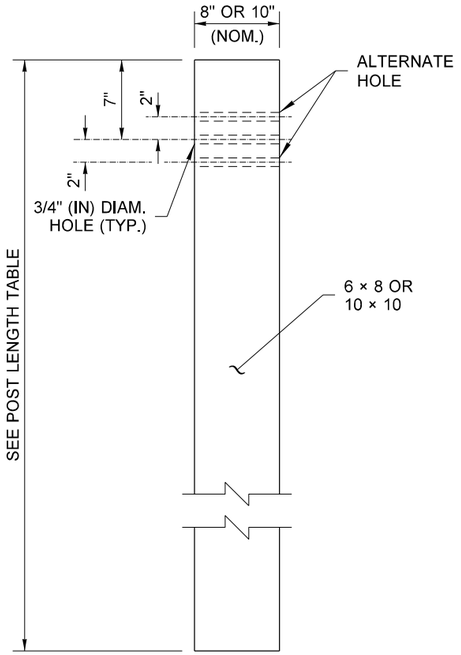
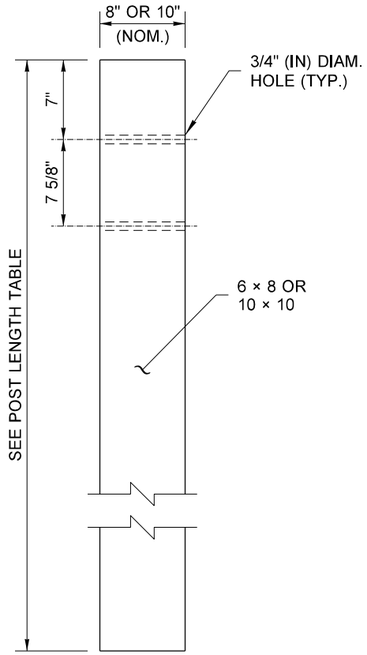
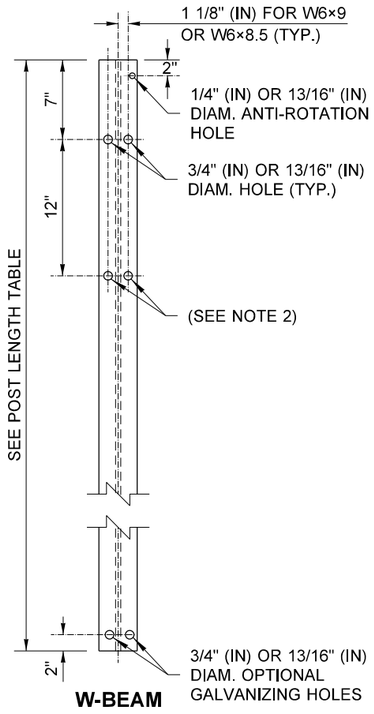
Washington State Department of Transportation



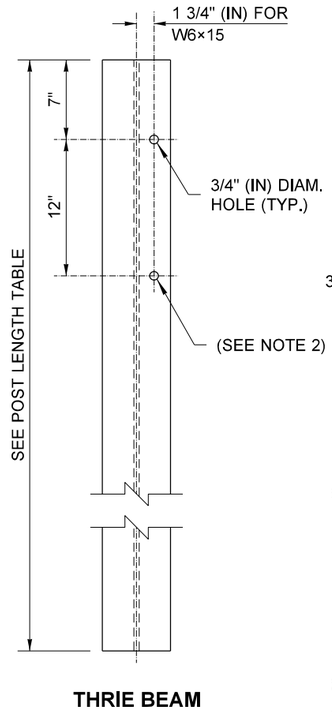
W-BEAM



THRIE BEAM

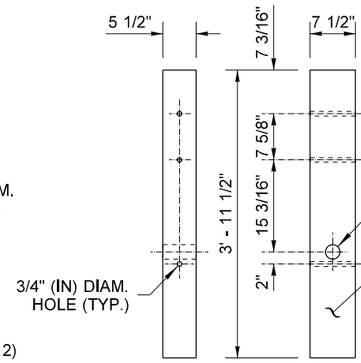


W-BEAM

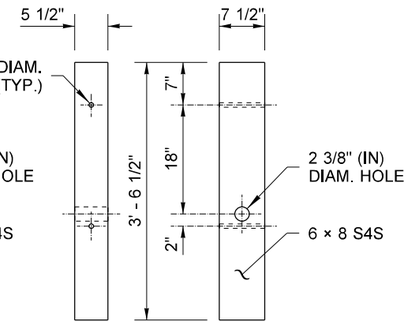


THRIE BEAM

STEEL POST
(SEE NOTES 3 AND 4)

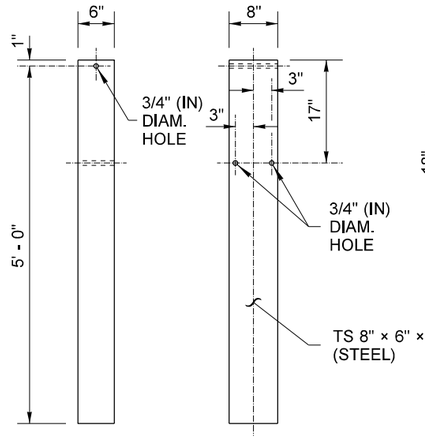


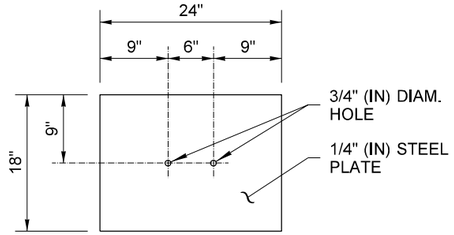
THRIE BEAM



W-BEAM

WOOD BREAKAWAY POST





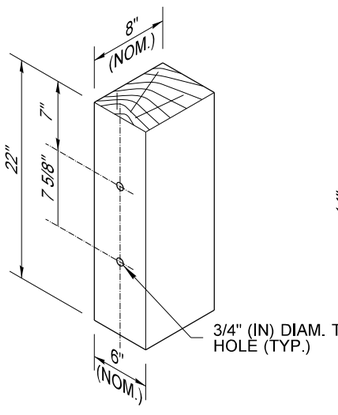
SOIL PLATE

FOUNDATION TUBE

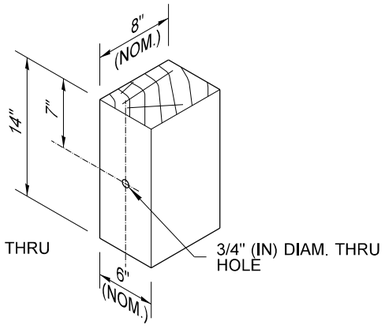
WOOD POST

POST LENGTH TABLE	
GUARDRAIL TYPE	**LENGTH**
1 through 4 & 31	6' - 0" *
10 or 11	6' - 6"

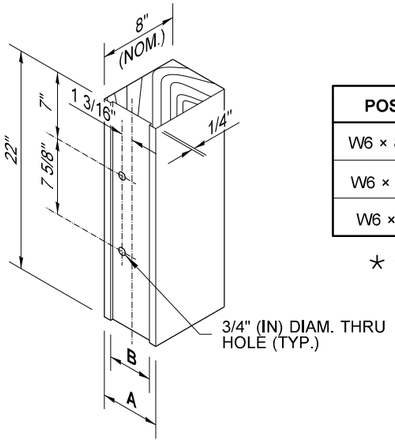
* SEE CONTRACT FOR "BEAM GUARDRAIL TYPE - __ FT. LONG POST" LENGTHS. (SEE NOTE 5)



THRIE BEAM WOOD BLOCK FOR WOOD POST



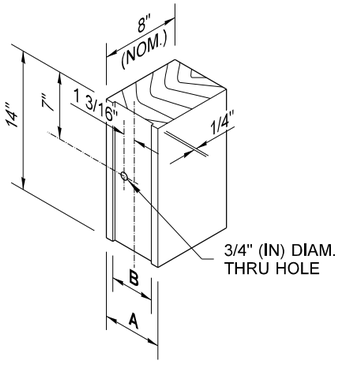
W-BEAM WOOD BLOCK FOR WOOD POST



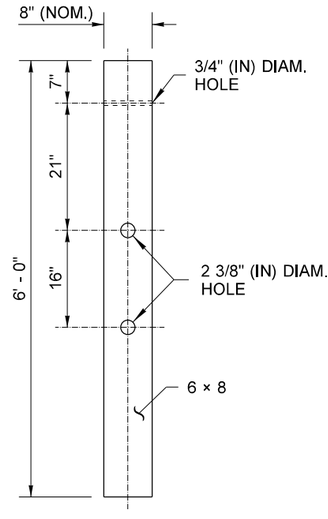
THRIE BEAM WOOD BLOCK FOR STEEL POST

POST	A	B
W6 × 8.5	8" * *	6 1/4"
W6 × 15	8" * *	6 1/4"
W6 × 9	6" * *	4 1/4"

* * NOMINAL (NOM.)



W-BEAM WOOD BLOCK FOR STEEL POST



CONTROLLED RELEASING TERMINAL (CRT) POST

DRAWN BY: FERN LIDDELL

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
REGISTERED
PROFESSIONAL ENGINEER

2020.09.11 13:57:54 -07'00'

BEAM GUARDRAIL POSTS AND BLOCKS

STANDARD PLAN C-1b

SHEET 2 OF 2 SHEETS

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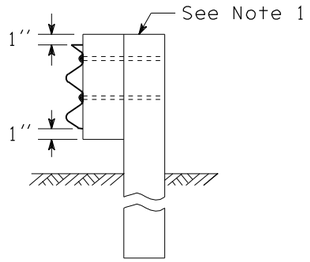
Date: 2020.09.09 09:59:16 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

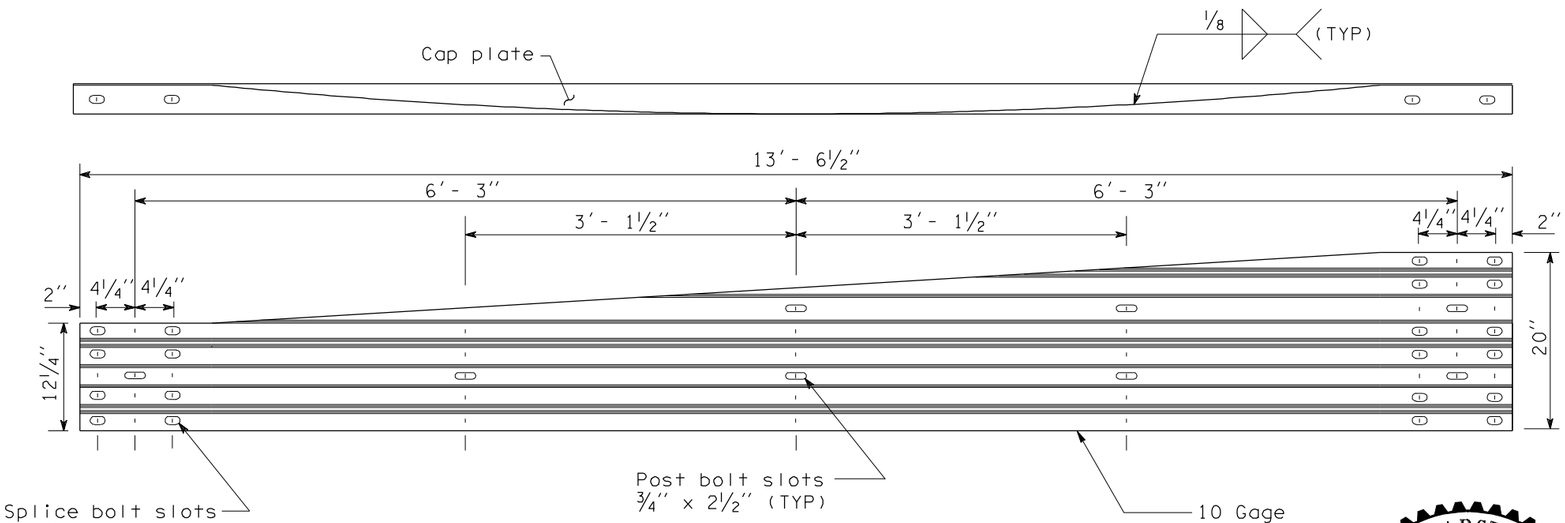


INTERMEDIATE GUARDRAIL
POST CONNECTION DETAILS

(Type A shown)

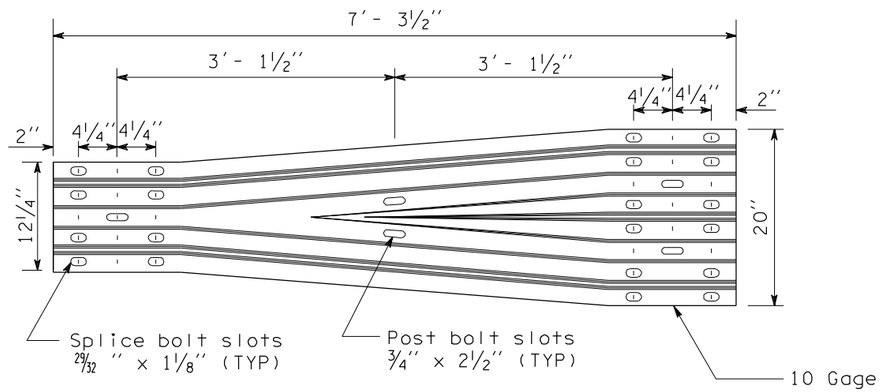
NOTES

1. For wood posts, saw top of post and block to 1'' above thrie beam guardrail reducer section. For steel posts, drive post down to 1'' maximum above the thrie beam guardrail reducer section.



THRIE BEAM GUARDRAIL REDUCER SECTION
TYPE A

(Left section shown, right section reversed)



THRIE BEAM GUARDRAIL REDUCER SECTION
TYPE B

RICHARD BARSTOW ALBIN
STATE OF WASHINGTON
34042
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES JULY 24, 2004

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

THRIE BEAM GUARDRAIL REDUCER SECTION

STANDARD PLAN C-1d

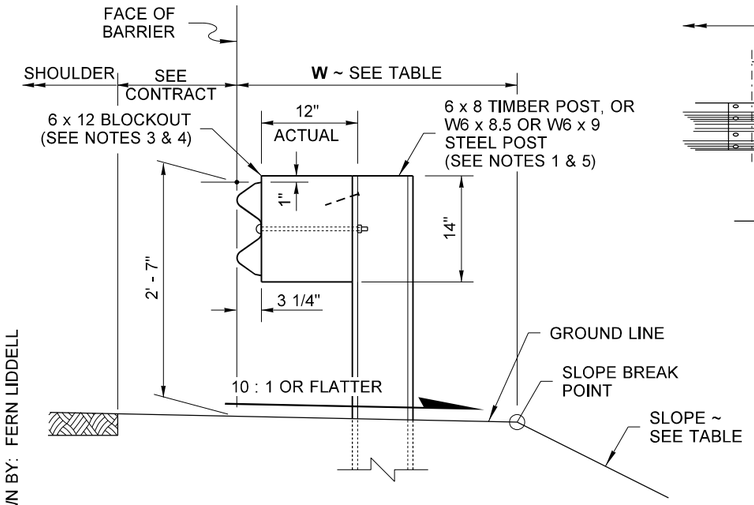
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

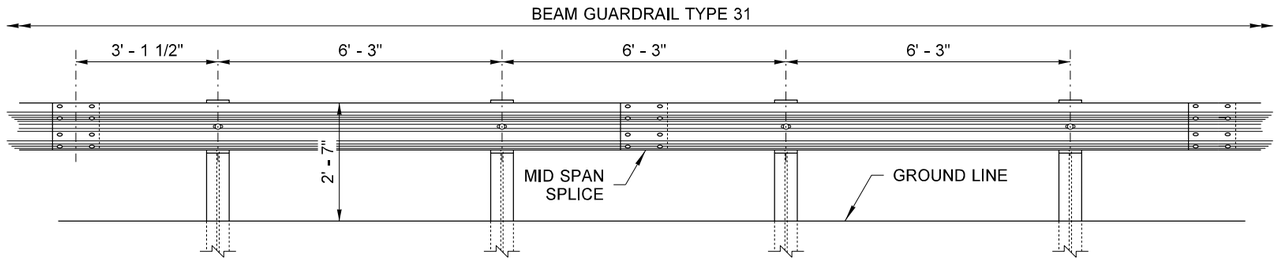
Harold J. Peterfeso — STATE DESIGN ENGINEER — *10-31-03* — DATE

Washington State Department of Transportation

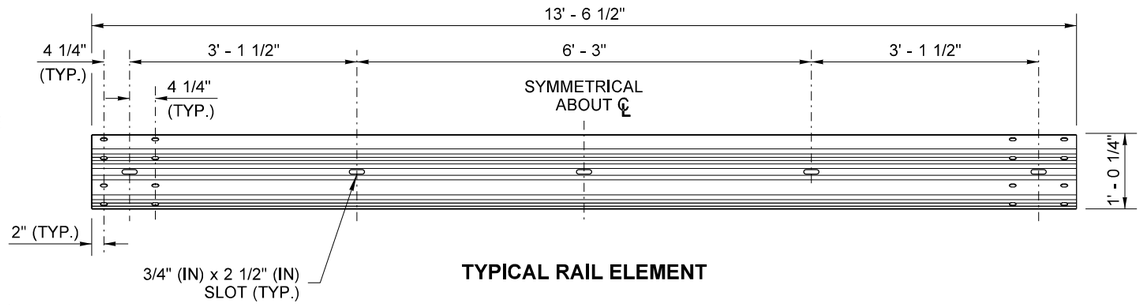
DATE	REVISION	BY
09/2003	ADDED 10 GAGE STEEL DESIGNATION; REV. NOTE 1	RG



TYPICAL SECTION ~ WITHOUT CURB
(6' - 0" POSTS)



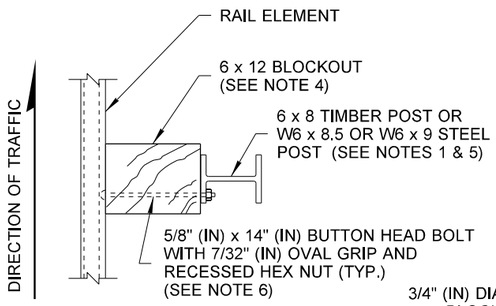
TYPICAL ELEVATION



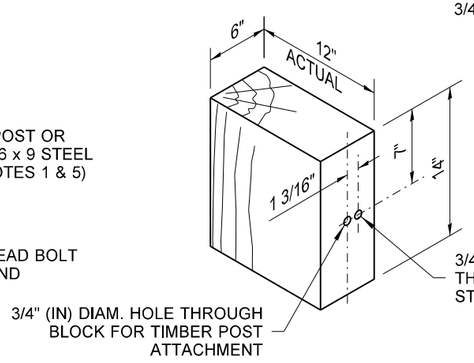
TYPICAL RAIL ELEMENT

NOTES

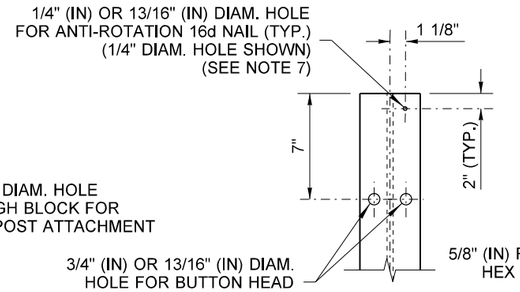
1. Refer to **Standard Plan C-1b** and **C-20.11** for additional details not shown on this plan.
2. Extend shoulder pavement to provide a base for the extruded curb. See Contract Plans for exceptions to distances shown.
3. Use a single block or combination of blocks (no more than two (2) to achieve the actual 12" (in) offset. See **Standard Specification, Section 9-16.3(2)**. Wood blocks shall be secured to the posts with anti-rotation nails. If combination blocks are used, the adjacent blocks shall be toenailed with two 16d galvanized nails to prevent block rotation.
4. Wood blocks are shown. Blocks of an approved alternative material may be used. See **Standard Specification, Section 9-16.3(2).**
5. All posts for any standard barrier run shall be of the same type: timber or steel.
6. Attach blockouts to steel posts using bolt holes on approaching traffic side of post web.
7. Anti-rotation holes in steel posts are not required when using blocks with anti-rotation features (e.g., routed blocks).



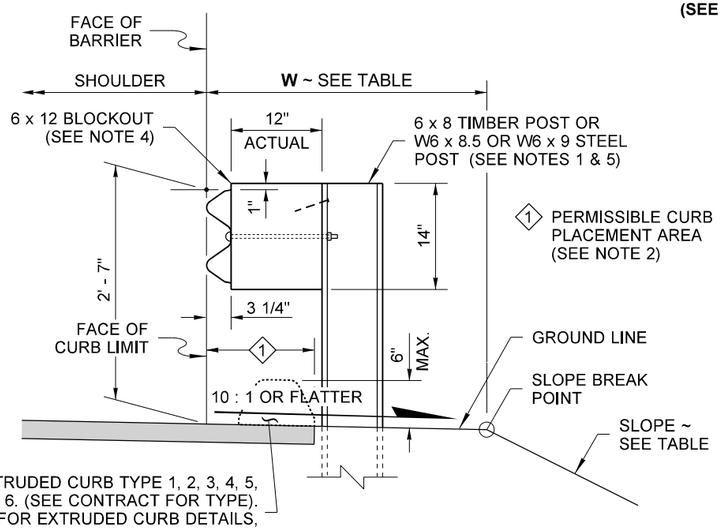
PLAN VIEW



WOOD BLOCK
(SEE NOTE 4)



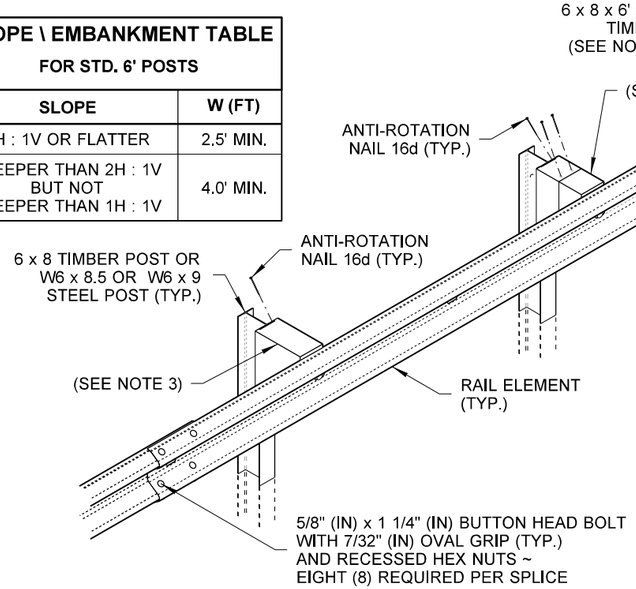
STEEL POST

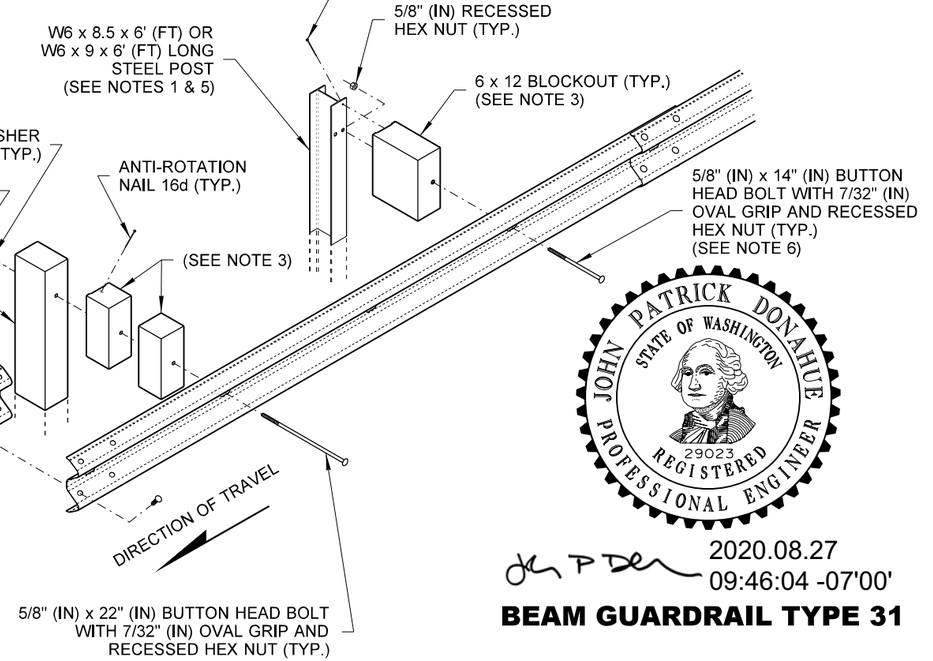


ELEVATION VIEW

TYPICAL SECTION ~ WITH CURB
(6' - 0" LONG POSTS)

SLOPE \ EMBANKMENT TABLE FOR STD. 6' POSTS	
SLOPE	**W (FT)**
2H : 1V OR FLATTER	2.5' MIN.
STEEPER THAN 2H : 1V BUT NOT STEEPER THAN 1H : 1V	4.0' MIN.





ISOMETRIC VIEW

JOHN PATRICK DONAHUE
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29023
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2020.08.27
09:46:04 -07'00'

BEAM GUARDRAIL TYPE 31

STANDARD PLAN C-20.10-06

SHEET 1 OF 1 SHEET

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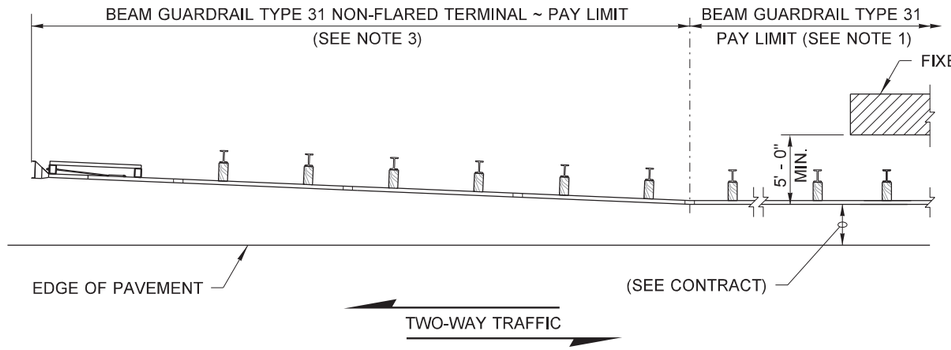
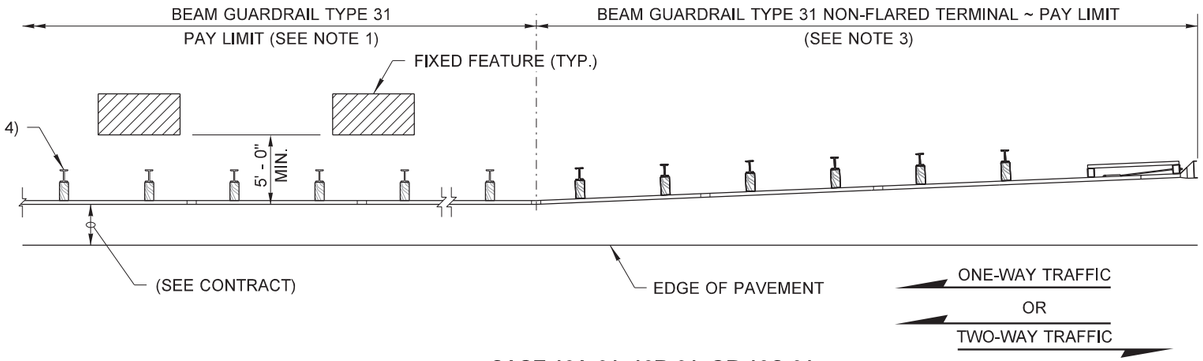
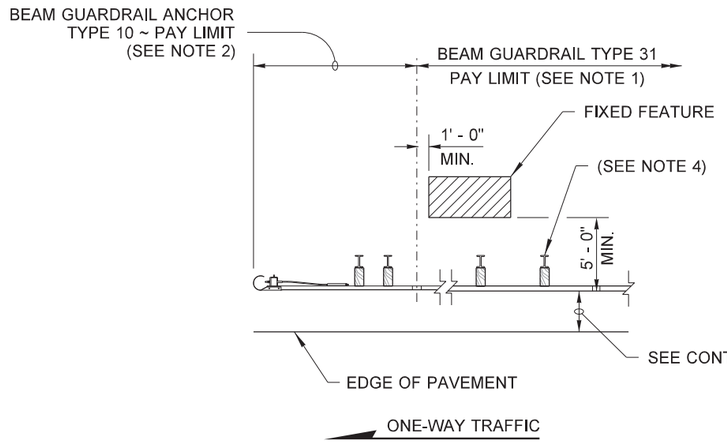


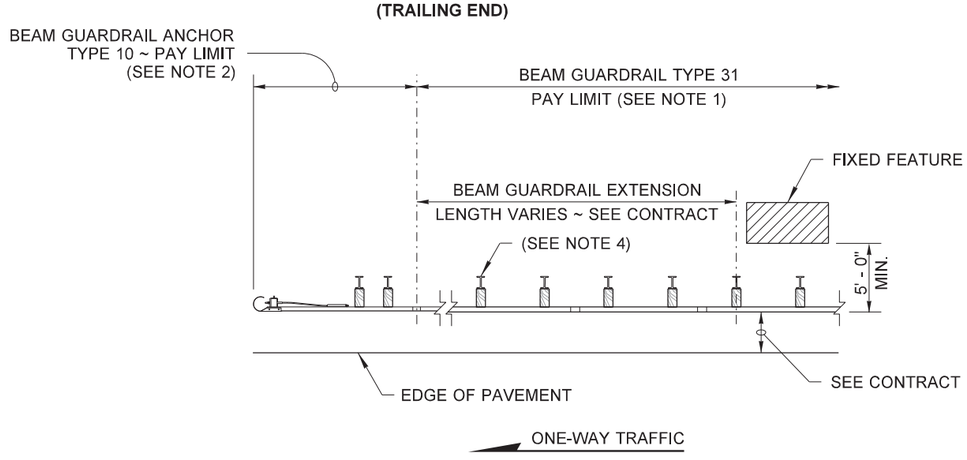
CASE 10A - 31
(TRAILING END)



CASE 10A-31, 10B-31, OR 10C-31
(APPROACH END)



CASE 10B-31
(TRAILING END)



CASE 10C-31
(TRAILING END)

NOTES

1. For details see **Standard Plan C-20.10.**
2. For details, see **Standard Plan C-23.60**.
3. For details, see **Standard Plan C-22.40** or **C-22.45**.
4. Timber or steel post. Steel post shown.

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Donahue, John
Aug 10 2019 1:48 PM

BEAM GUARDRAIL TYPE 31 PLACEMENT (CASES 10A-31, 10B-31 & 10C-31)

STANDARD PLAN C-20.18-03

SHEET 1 OF 1 SHEET

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Aug 12 2019 11:49 AM
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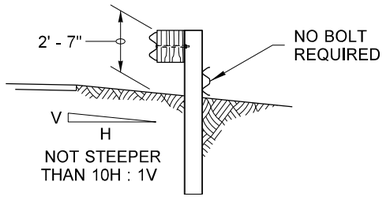
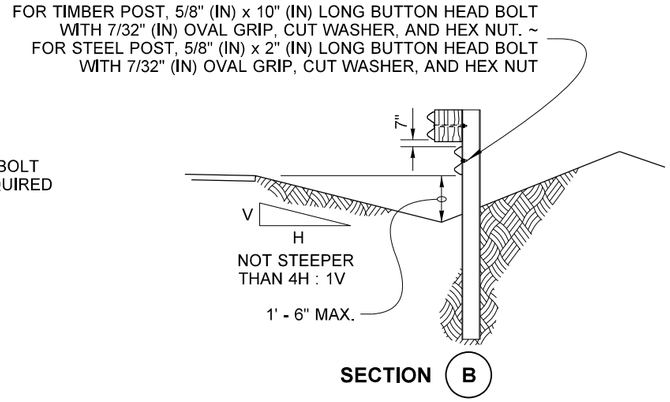
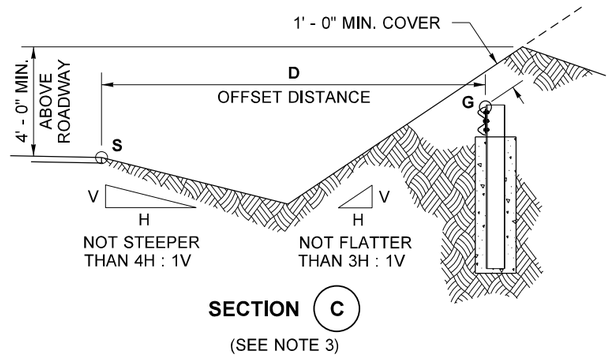


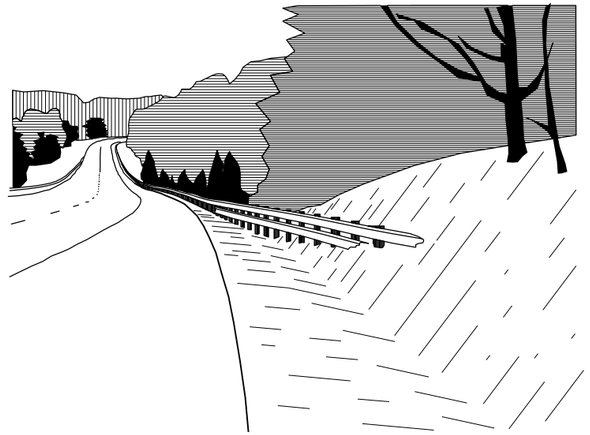
SECTION A



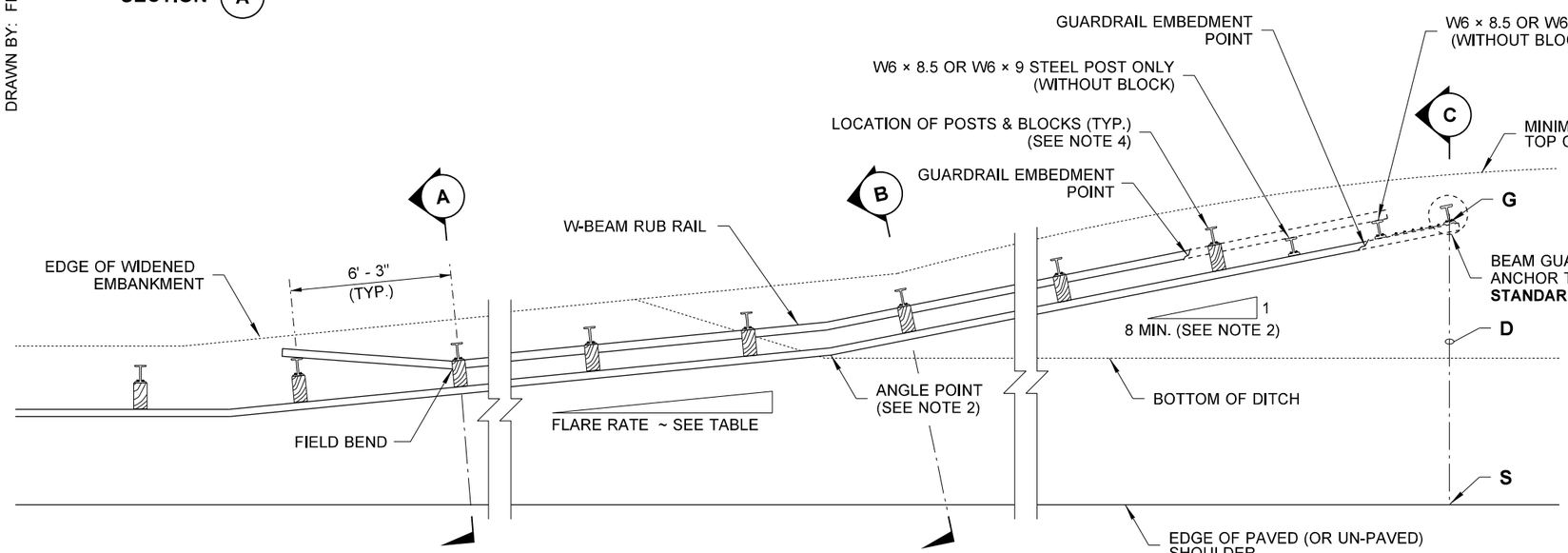
SECTION B



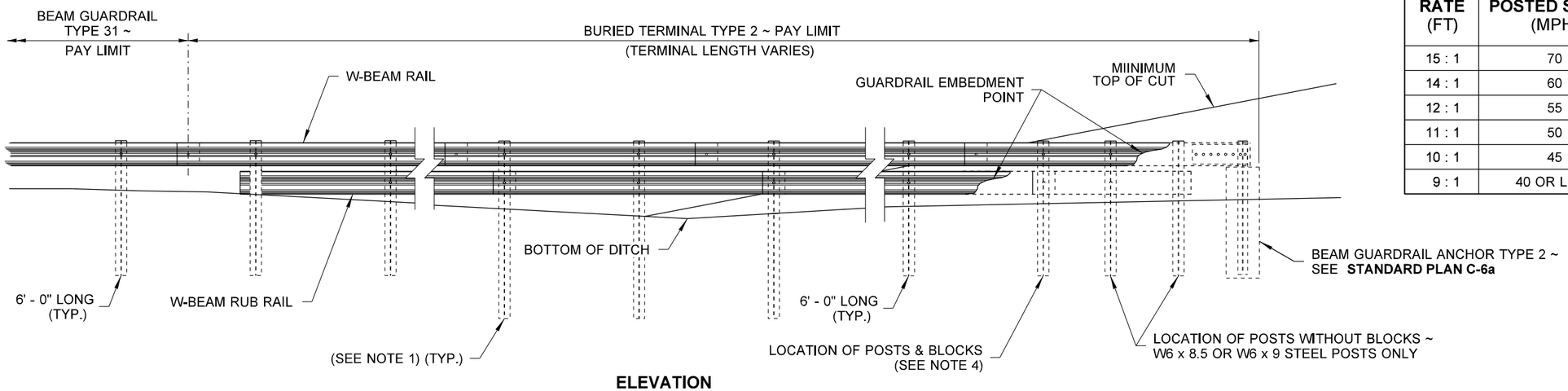
SECTION C
(SEE NOTE 3)



PERSPECTIVE



PLAN



ELEVATION
(PROFILE ALONG RAIL)

NOTES

1. Posts installed on shoulder slopes steeper than 10H : 1V shall be 8' (ft) long.
2. The flare rate of the guardrail may be increased after crossing the ditch bottom to shorten the length of the terminal.
3. Determine the height of the W-Beam at the Anchor (**G**) by first calculating the perpendicular offset distance (**D**) from the edge of shoulder (**S**) to the Anchor (on station). Multiply that distance by 0.1, then subtract the product from the elevation of the same point (**S**) on the edge of shoulder used to obtain the offset distance (at the same station). Add Beam Guardrail design height (31" (in)) to that remainder for a sum that equals the elevation of the top of the W-Beam at the Anchor.

   Refer to SECTION "C":

   Elevation $_{G}$ = [(Elevation $_{S}$ - **D** x (0.1)) + (31" / 12)]
4. Timber or steel post. Steel post shown.

FLARE RATE TABLE	
RATE (FT)	**POSTED SPEED** (MPH)
15 : 1	70
14 : 1	60
12 : 1	55
11 : 1	50
10 : 1	45
9 : 1	40 OR LESS

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2020.08.27 09:46:30 -07'00'

BEAM GUARDRAIL TYPE 31 - BURIED TERMINAL TYPE 2

STANDARD PLAN C-22.16-07

SHEET 1 OF 1 SHEET

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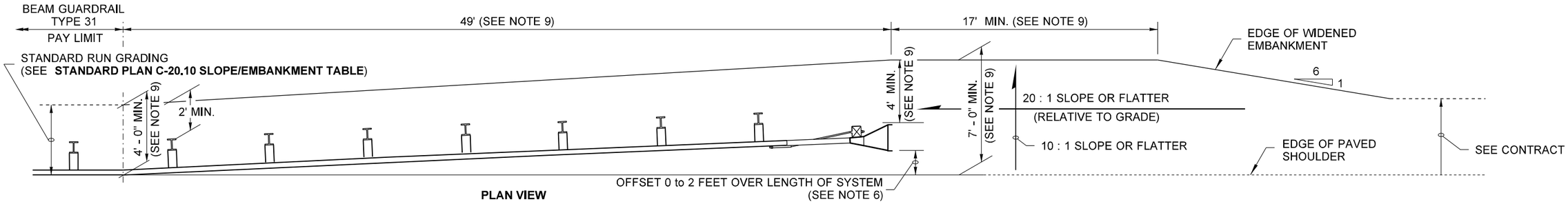
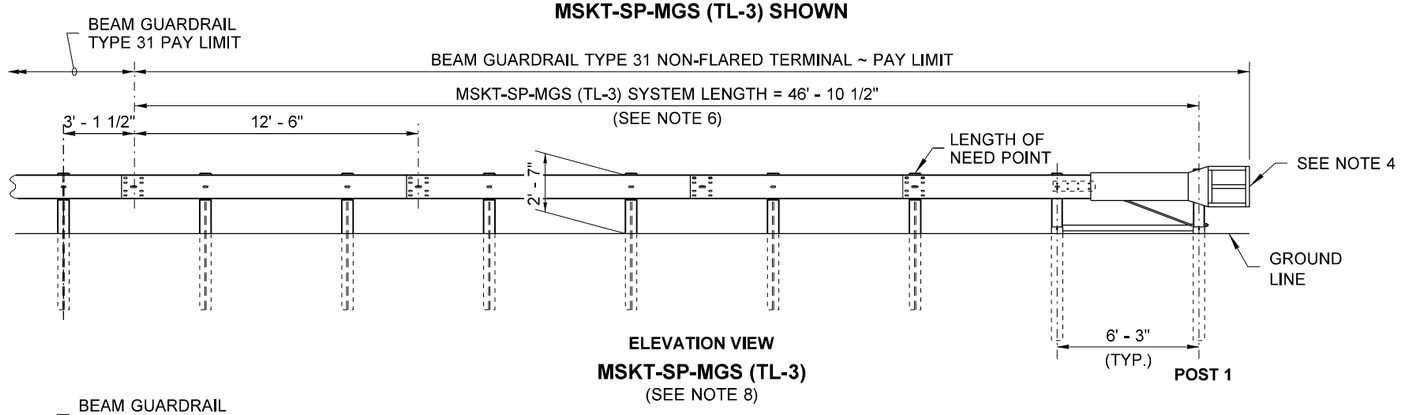


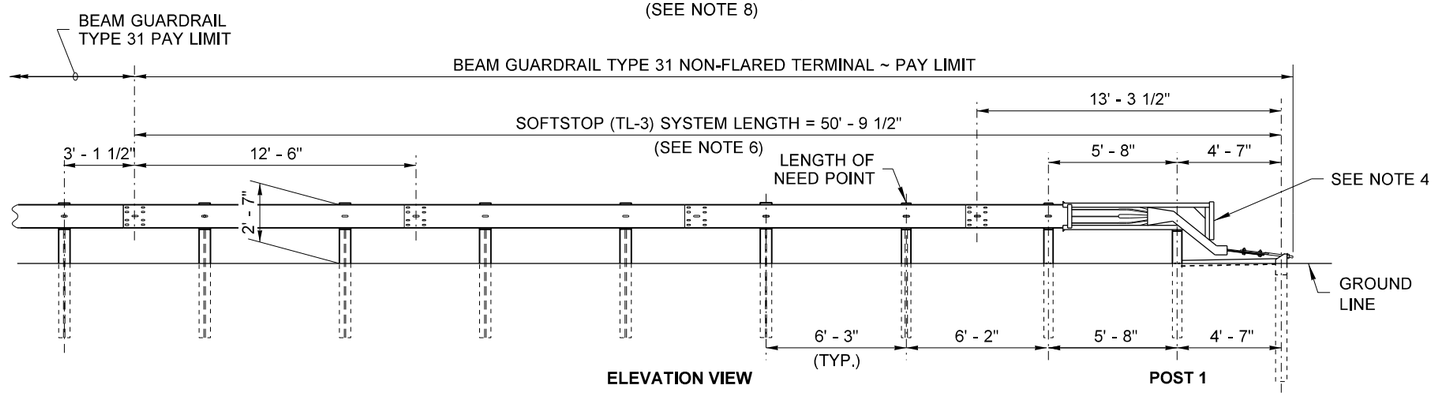
PLAN VIEW

MSKT-SP-MGS (TL-3) SHOWN



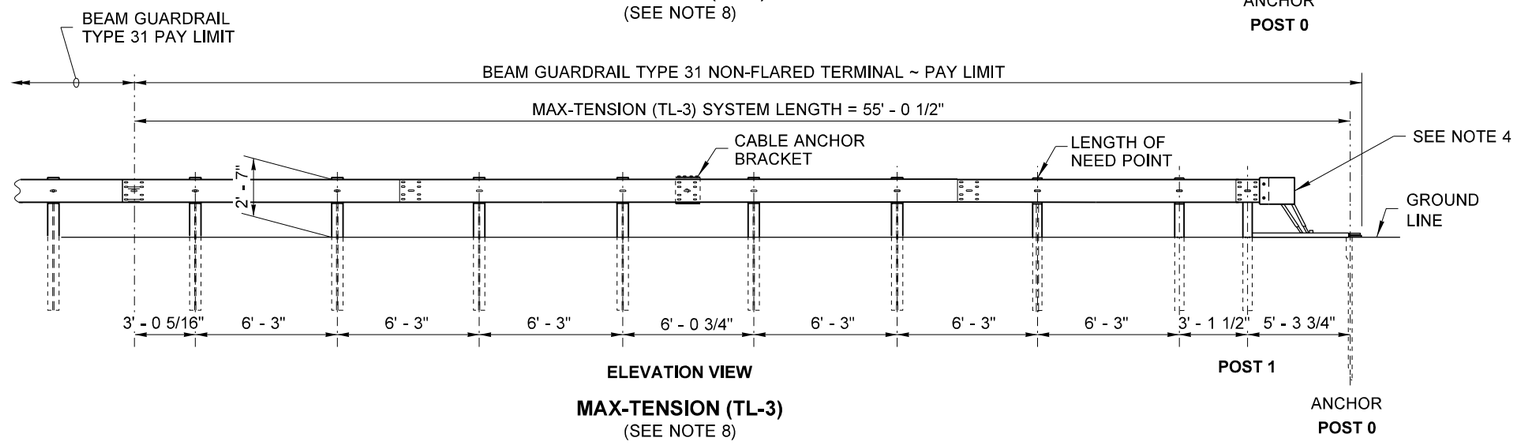
ELEVATION VIEW

MSKT-SP-MGS (TL-3)
(SEE NOTE 8)



ELEVATION VIEW

SOFTSTOP (TL-3)
(SEE NOTE 8)



ELEVATION VIEW

MAX-TENSION (TL-3)
(SEE NOTE 8)

NOTES

1. The Implementation of the Manual for Assessment of Safety Hardware (MASH) criteria may result in the acceptance of guardrail terminal systems currently not shown on this plan. Non-Flared terminals shall be selected from the WSDOT Qualified Products List (QPL) or approved through the WSDOT Request for Approval of Materials (RAM) process.
2. This terminal is MASH compliant at Test Level Three (TL-3) and may be used for all posted speeds.
3. An MSKT-SP-MGS (TL-3) as manufactured by Road Systems, Inc, SOFTSTOP (TL-3) as manufactured by Trinity Highway Products, LLC, or MAX-TENSION (TL-3) as manufactured by Lindsay Transportation Solutions, shall be installed according to manufacturer's recommendations.
4. A reflectorized object marker shall be installed according to manufacturer's recommendations.
5. Snow load rail washers shall not be installed within the terminal limits.
6. Provide an offset between 0 to 2 feet so that the impact head does not encroach onto the paved shoulder. The offset is provided over the length of the terminal system from the center of the last post splice to either: (1) The face of the impact head at its leading edge (MSKT-SP-MGS), or (2) The center of Anchor **Post 0** (Softstop or Max-Tension). Provide maximum offset where practicable.
7. For terminal details, see WSDOT approved manufacturer's drawings.
8. These terminals are supplied with steel posts only. They can be used with beam guardrail Type 31 runs composed of steel or wood guardrail posts.
9. The widened embankment dimensions shown on this plan will satisfy the installation requirements of all 3 guardrail terminal systems shown on this plan.

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2020.08.27 09:46:51 -07'00'

BEAM GUARDRAIL TYPE 31 NON-FLARED TERMINAL (ALL POSTED SPEEDS) STANDARD PLAN C-22.40-08

SHEET 1 OF 1 SHEET

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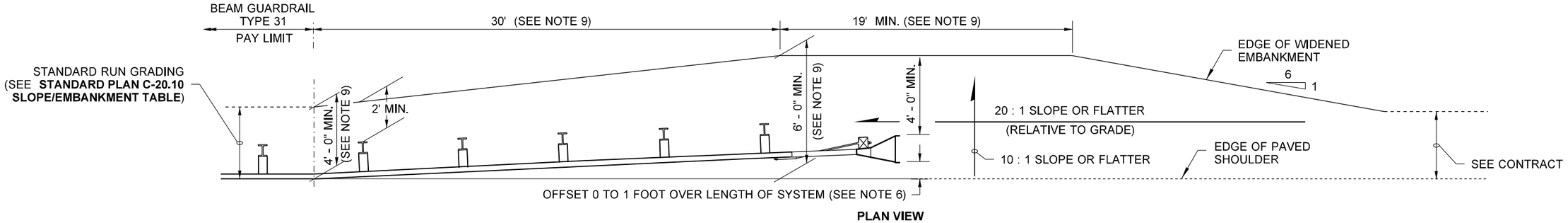
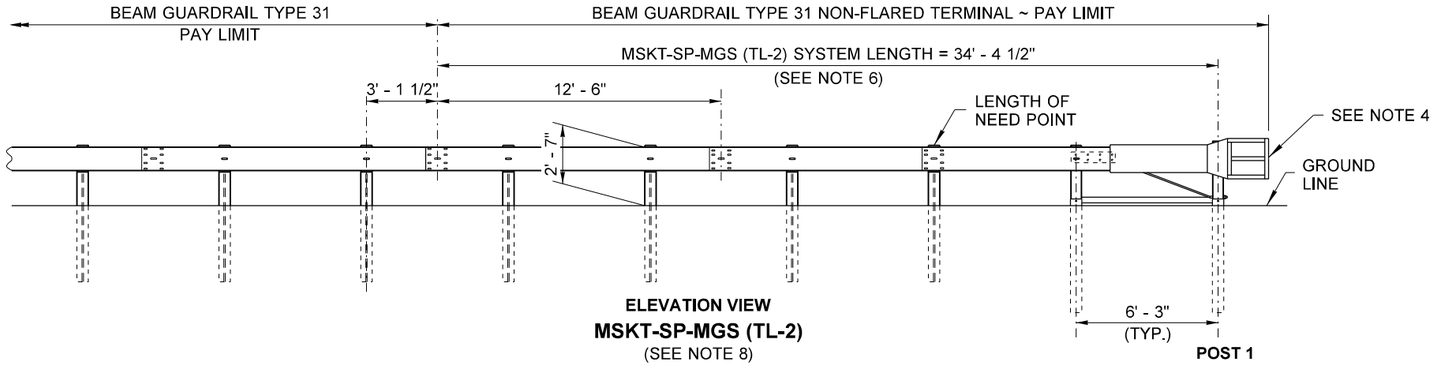
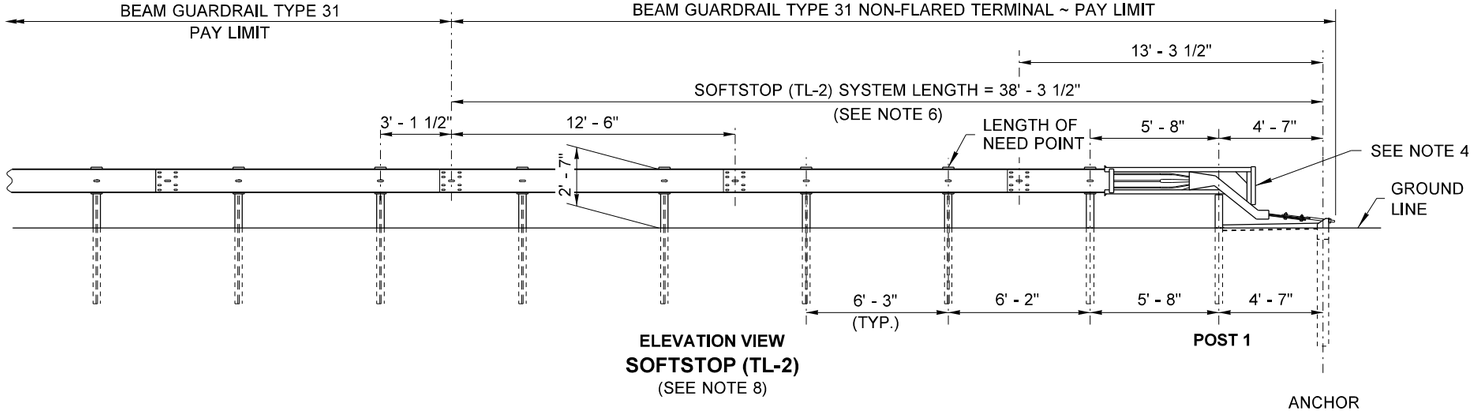


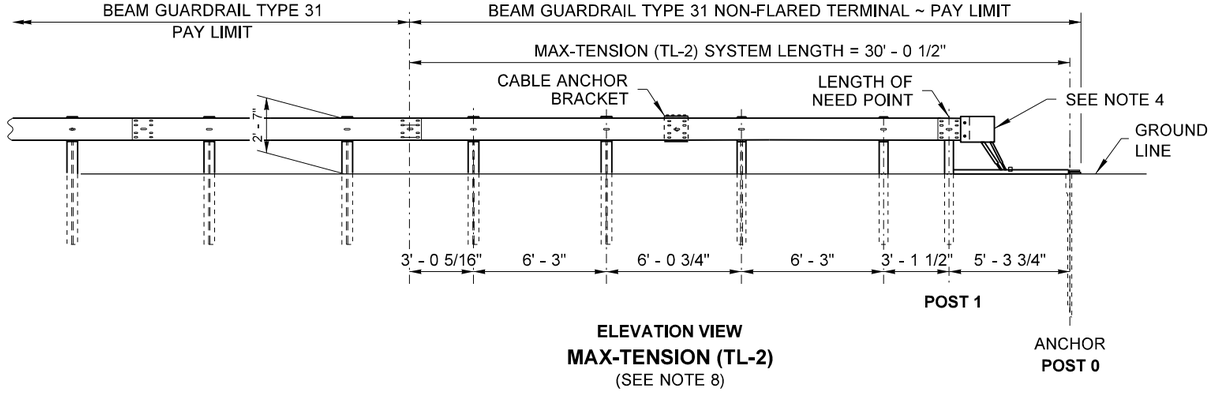
PLAN VIEW
(MSKT-SP-MGS (TL-2) SHOWN)



ELEVATION VIEW
MSKT-SP-MGS (TL-2)
(SEE NOTE 8)



ELEVATION VIEW
SOFTSTOP (TL-2)
(SEE NOTE 8)



ELEVATION VIEW
MAX-TENSION (TL-2)
(SEE NOTE 8)

NOTES

1. The Implementation of the Manual for Assessment of Safety Hardware (MASH) criteria may result in the acceptance of guardrail terminal systems currently not shown on this plan. Non-Flared terminals shall be selected from the WSDOT Qualified Products List (QPL) or approved through the WSDOT Request for Approval of Materials (RAM) process.
2. This terminal is MASH compliant at Test Level Two (TL-2) and may be used in applications with posted speed of 45 mph or less.
3. An MSKT-SP-MGS (TL-2) as manufactured by Road Systems, Inc, SOFTSTOP (TL-2) as manufactured by Trinity Highway Products, LLC, or MAX-TENSION (TL-2) as manufactured by Lindsay Transportation Solutions, shall be installed according to manufacturer's recommendations.
4. A reflectorized object marker shall be installed according to manufacturer's recommendations.
5. Snow load rail washers shall not be installed within the terminal limits.
6. Provide an offset between 0 to 1 foot so that the impact head does not encroach onto the paved shoulder. The offset is provided over the length of the terminal system from the center of the last post splice to either: (1) The face of the impact head at its leading edge (MSKT-SP-MGS), or (2) The center of anchor **Post 0** (Softstop or Max-Tension). Provide the maximum offset where practicable.
7. For terminal details, see WSDOT approved manufacturer's drawings.
8. These terminals are supplied with steel posts only. They can be used with beam guardrail Type 31 runs, composed of steel or wood guardrail posts.
9. The widened embankment dimensions shown on this plan will satisfy the installation requirements of all 3 guardrail terminal systems shown on this plan.

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BEAM GUARDRAIL TYPE 31 NON-FLARED TERMINAL (POSTED SPEED 45 MPH AND BELOW)

STANDARD PLAN C-22.45-05

SHEET 1 OF 1 SHEET

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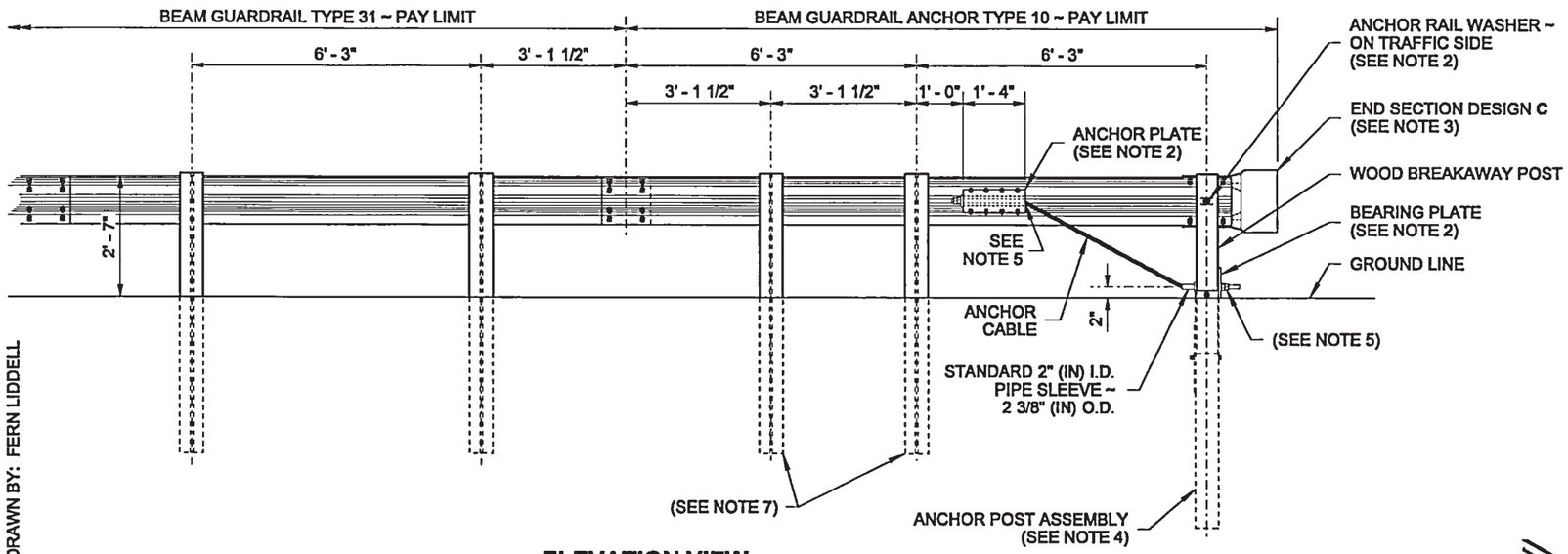
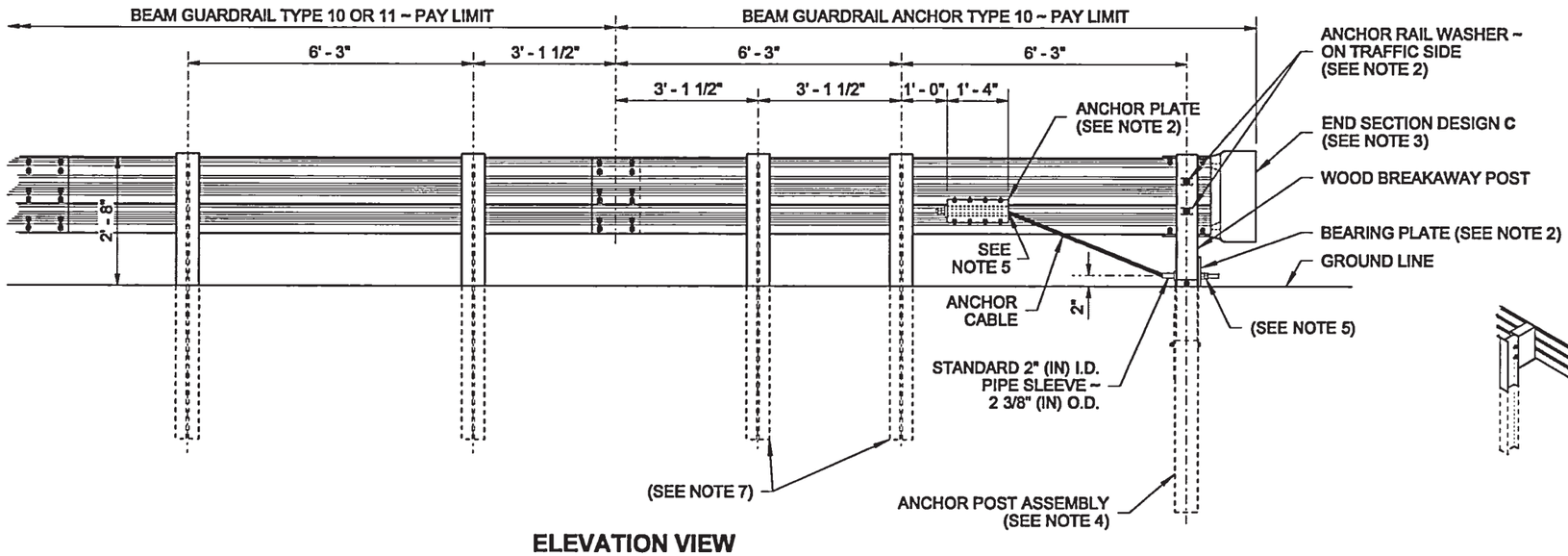


ELEVATION VIEW
W-BEAM

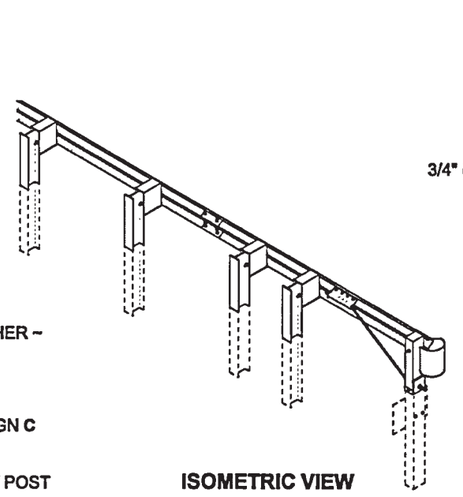
DRAWN BY: FERN LIDDELL



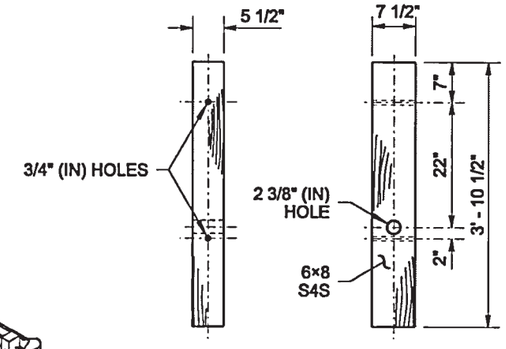
ELEVATION VIEW
THRIE BEAM

NOTES

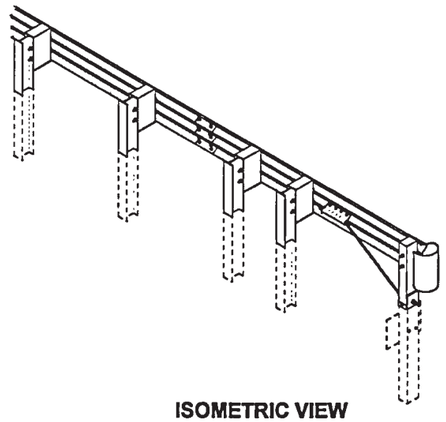
1. For use on the end of guardrail runs when a crashworthy terminal is not required.
2. For additional details not shown, see **Sheet 2** of this Plan.
3. For end section details, see **Standard Plans C-7** and **C-7a**.
4. Use details for Wood Breakaway post shown on this plan and components shown on **Standard Plan C-1b**.
5. Fasten the Anchor Cable using two 1" (in) nuts and washer, at both ends of cable. Outside nut shall be torqued against inside nut a minimum of 100 ft.-lbs.
6. Wood blocks shown. Blocks of alternate material may be used. See **Standard Specification, Section 9-16.3(2)**.
7. Posts shall match those of the connecting run: timber or steel.
8. Anchor plate may be constructed from 1/4" (in) plates welded to equal strength and dimensions as shown.
9. Eight 5/8" (in) x 1/2" (in) machine bolts with hex nut and washer. Place washer on face side of rail.



ISOMETRIC VIEW



WOOD BREAKAWAY POST DETAIL



ISOMETRIC VIEW

JEFFERY K. PETTERSON
STATE OF WASHINGTON
36937
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PROFESSIONAL ENGINEER

Petterson, Jeff (IIQ Design)
Jul 6 2017 3:15 PM
cosign

BEAM GUARDRAIL (TYPE 31) ANCHOR TYPE 10

STANDARD PLAN C-23.60-04

SHEET 1 OF 2 SHEETS

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Carpenter, Jeff
Jul 21 2017 8:25 AM
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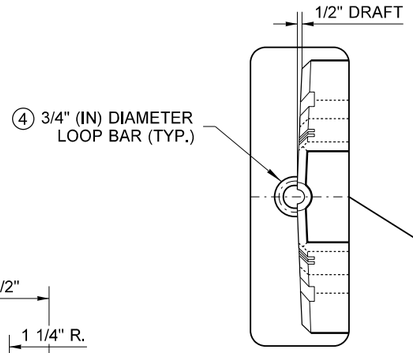
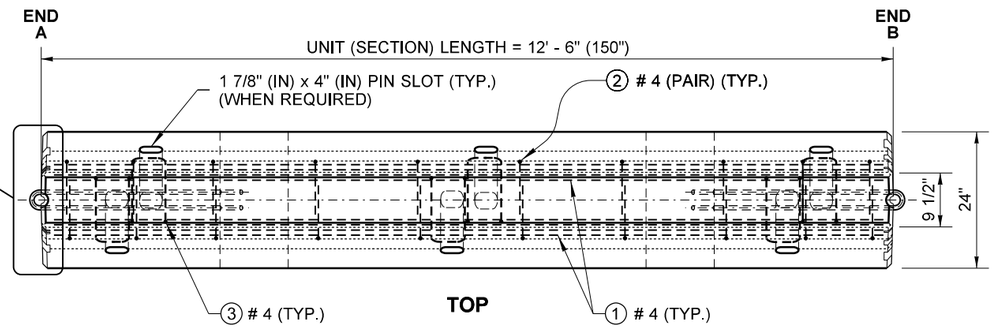
NOTES

1. Concrete for Barrier Type F (Precast) shall be Class 5000.
2. The reinforcing steel details for the NARROW BASE barrier are the same as those shown for the 24" (in) wide barrier except for the stirrup bars (see Stirrup Bar Narrow Base Detail), Bar - 6 runs along the vertical face of the narrow base barrier with a 1 1/2" (in) clearance.



BARRIER END DETAIL



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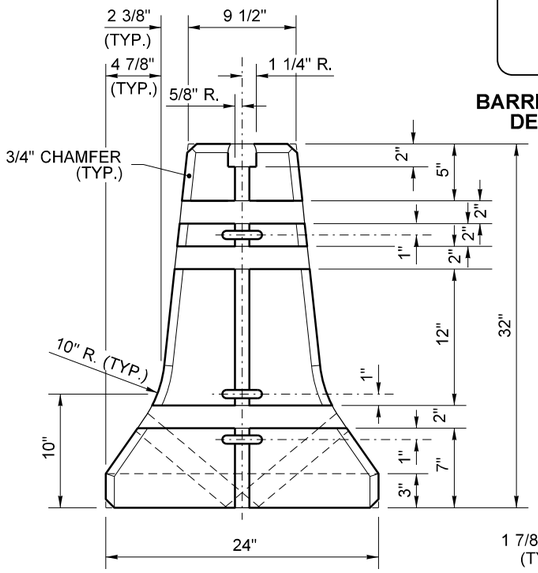
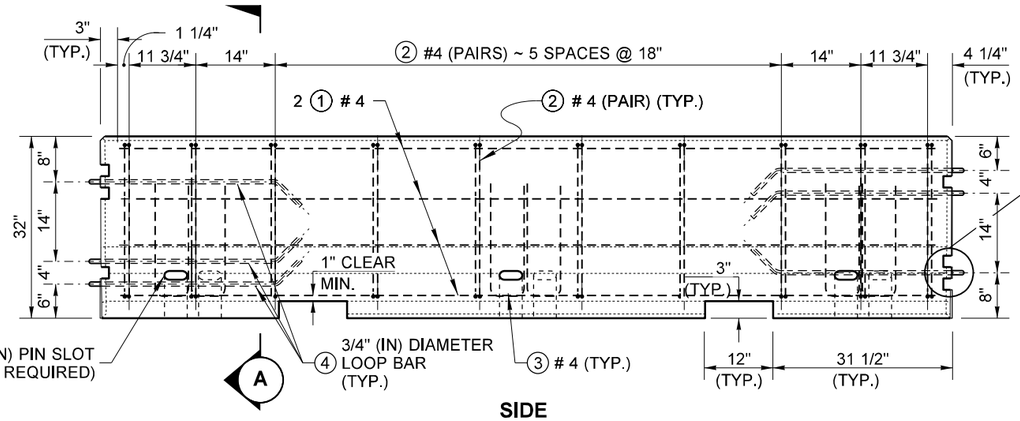
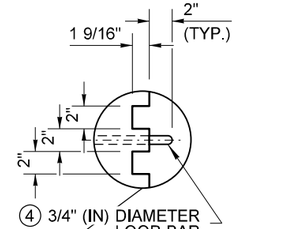


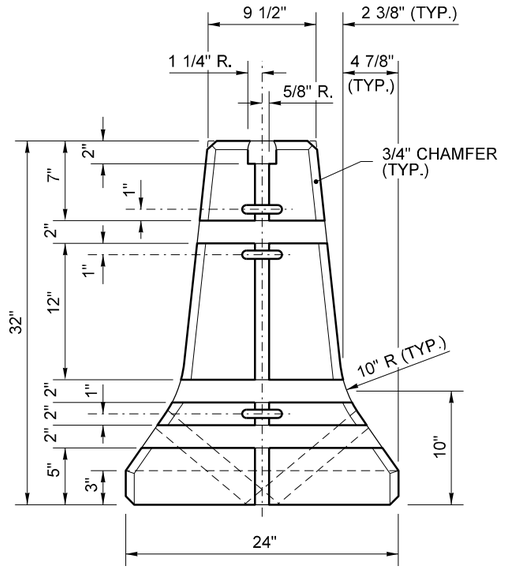
END A



SIDE



TYPICAL BARRIER PIN LOOP DETAIL



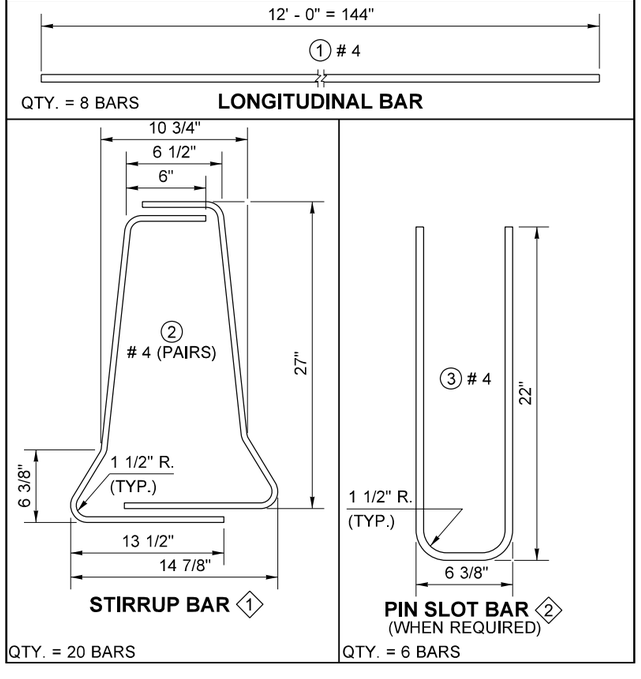
END B

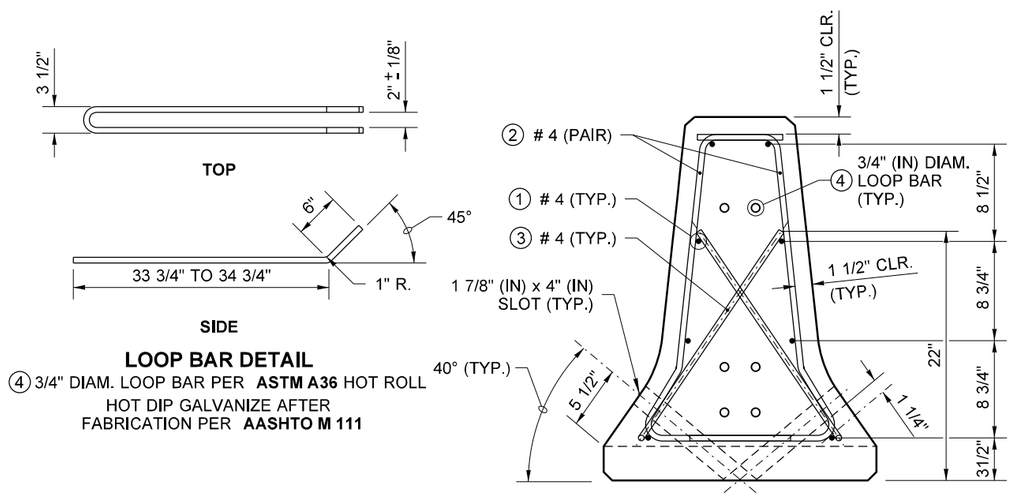
END

NARROW BASE

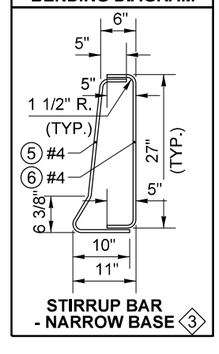
NO PIN SLOTS REQUIRED

REINFORCING STEEL BENDING DIAGRAM





SECTION (A)



◇1 ◇2 STIRRUP BAR MAY BE FABRICATED AS A SINGLE PIECE

◇2 ◇3 HOT DIP GALVANIZE AFTER FABRICATION PER **ASTM A767**

◇3 STIRRUP BAR - NARROW BASE MAY BE FABRICATED AS A SINGLE PIECE

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2020.09.17 10:57:38 -07'00'

CONCRETE BARRIER TYPE F (PRECAST)

STANDARD PLAN C-60.10-01

SHEET 1 OF 2 SHEETS

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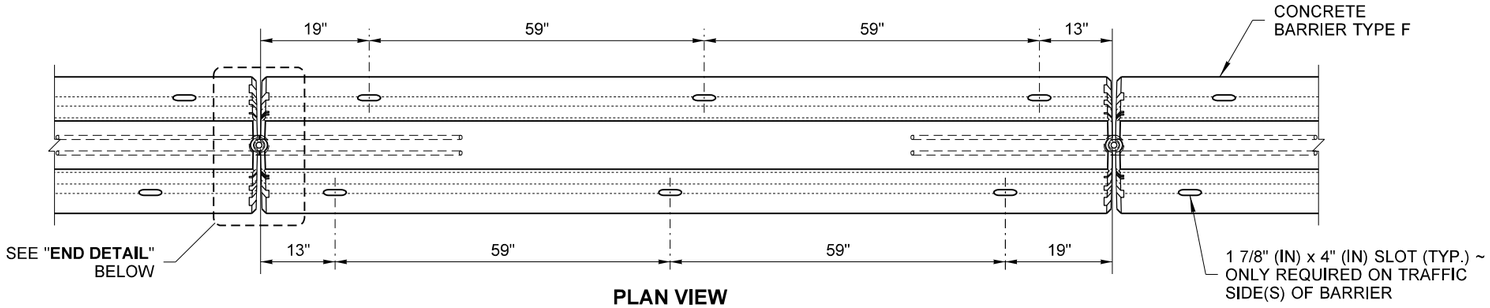
Washington State Department of Transportation

DRAWN BY: BILL BERENS



PLAN VIEW

CONCRETE BARRIER TYPE F - ANCHORING PIN LOCATIONS

NOTES (Anchoring and joining Barrier)

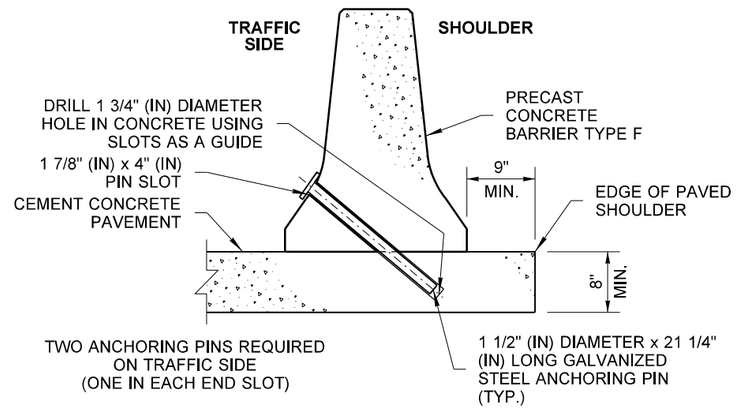
1. **Precast Concrete Barrier Type F** can be installed in the following configurations:

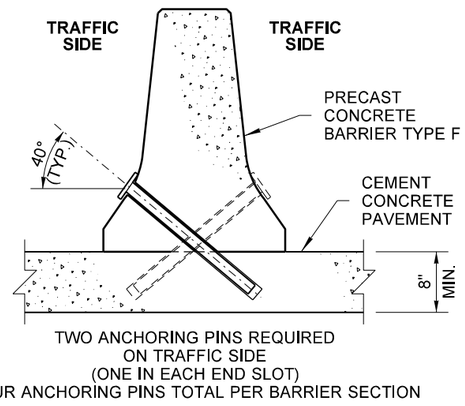
   A. Unanchored on hot mix asphalt (HMA), or cement concrete pavement in permanent or temporary installations, and on compacted soil in temporary installations. It is permissible to manufacture the Type F barrier without pin slots and pin slot bars when barrier is not anchored.
   B. Anchored on hot mix asphalt (HMA) or cement concrete pavement in permanent or temporary installations as shown on this plan. See **Standard Plan K-80.35** and **K-80.37** for anchoring Type F Narrow Base in temporary installations on cement concrete pavement or bridge decks.

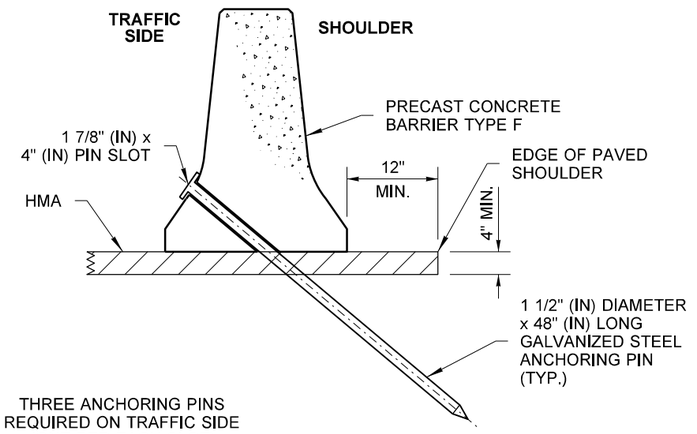
2. See **Standard Plan C-60.70** for anchoring patterns when transitioning from Type F anchored runs to another type of barrier run.

3. After removing the anchoring pins, clean the pin holes and fill them with sealant according to **Standard Specification Section 9-04.2**.

4. Remove slack between barrier segments after inserting the connecting pin.

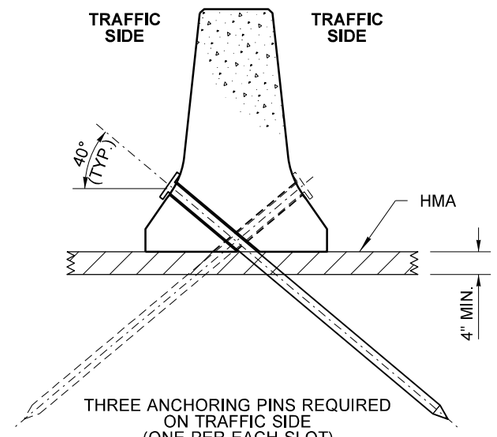






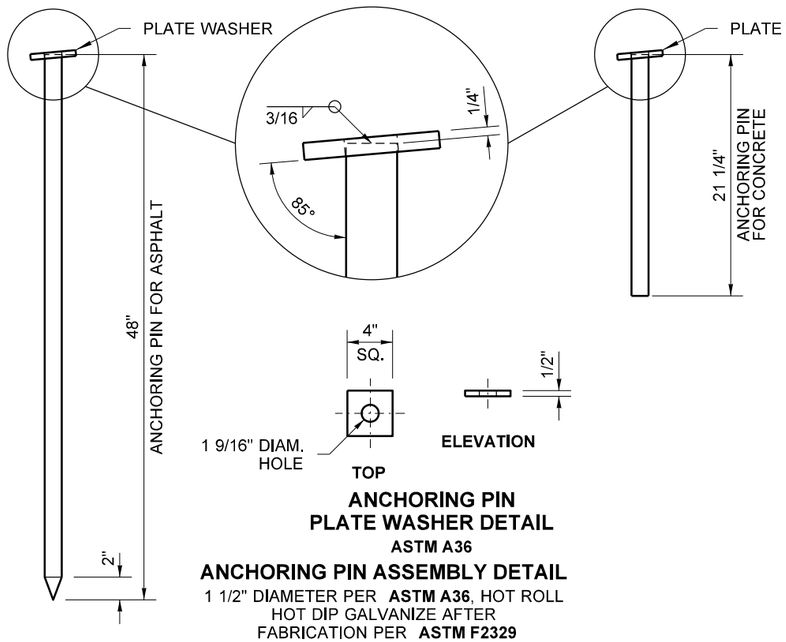
SECTION VIEWS

CONCRETE ANCHORING PIN LOCATIONS



SECTION VIEWS

HMA ANCHORING PIN LOCATIONS

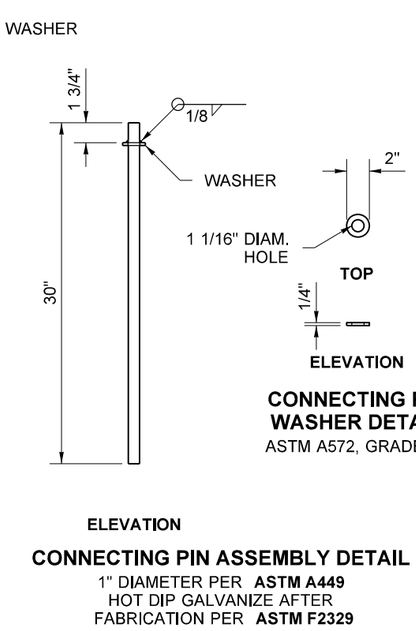


ANCHORING PIN PLATE WASHER DETAIL

ASTM A36

ANCHORING PIN ASSEMBLY DETAIL

1 1/2" DIAMETER PER **ASTM A36**, HOT ROLL HOT DIP GALVANIZE AFTER FABRICATION PER **ASTM F2329**



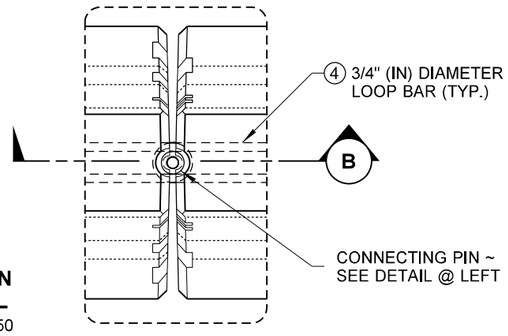
CONNECTING PIN WASHER DETAIL

ASTM A572, GRADE 50

ELEVATION

CONNECTING PIN ASSEMBLY DETAIL

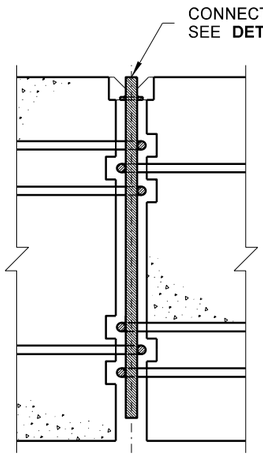
1" DIAMETER PER **ASTM A449**
HOT DIP GALVANIZE AFTER FABRICATION PER **ASTM F2329**



TOP

END DETAIL

JOINING TWO BARRIER SEGMENTS



SECTION (B)

(SEE NOTE 4)

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CONCRETE BARRIER TYPE F (PRECAST)

STANDARD PLAN C-60.10-01

SHEET 2 OF 2 SHEETS

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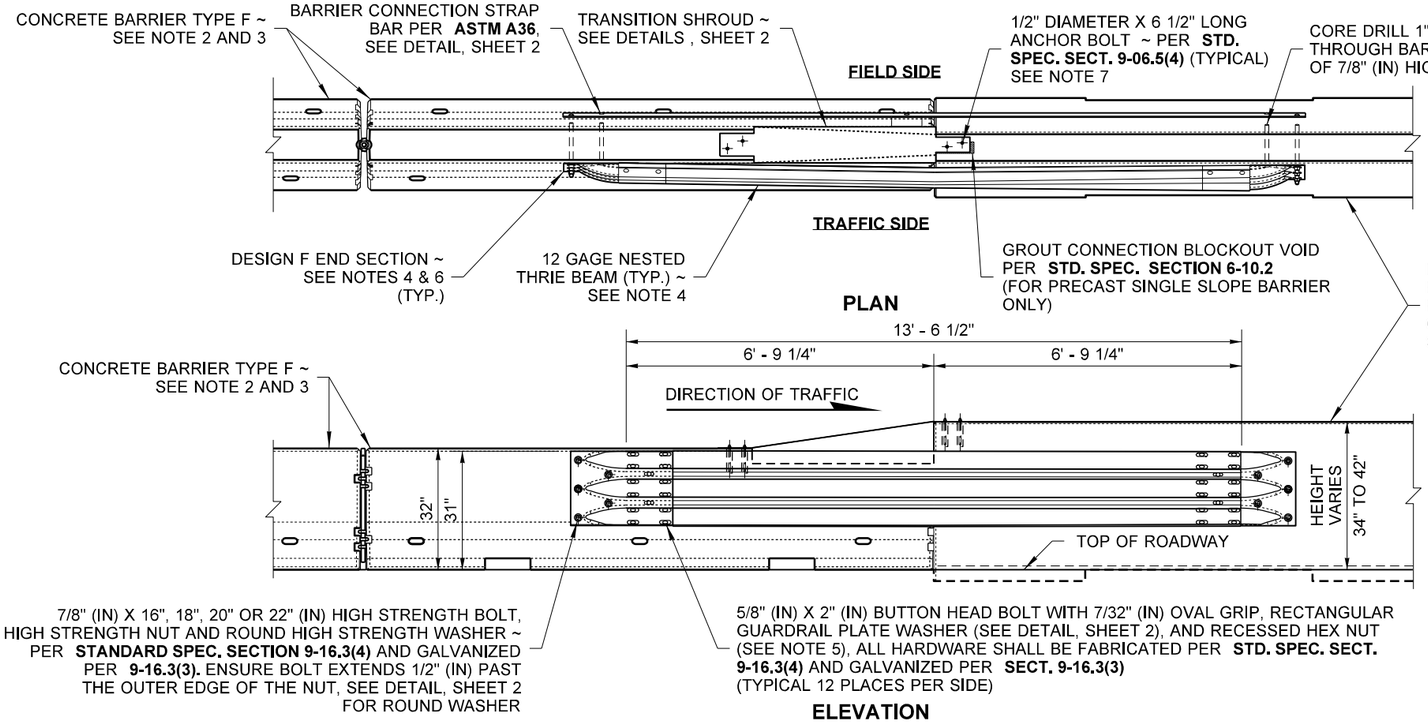
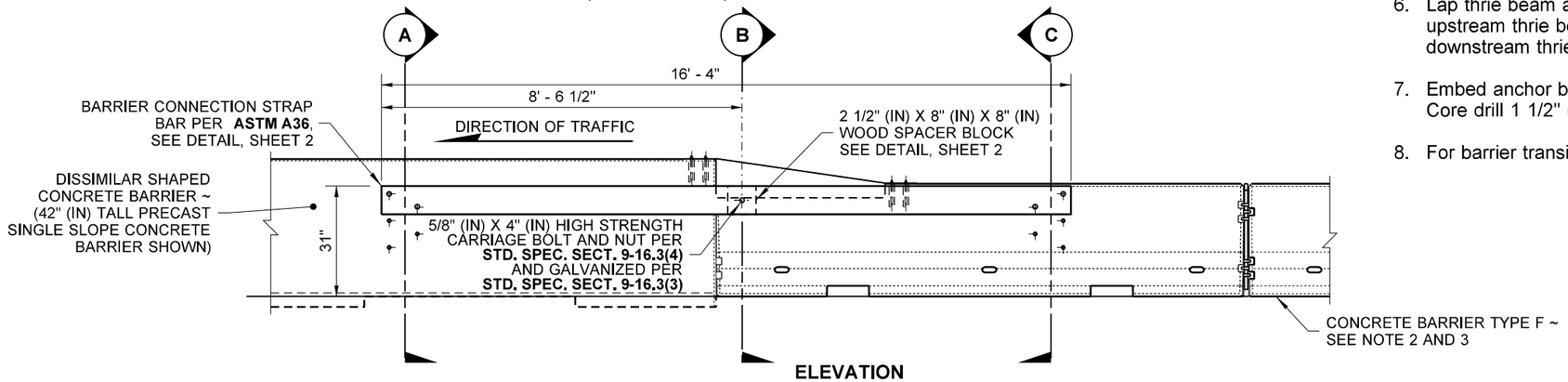
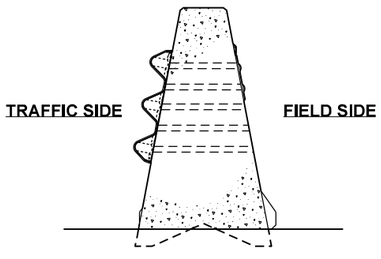
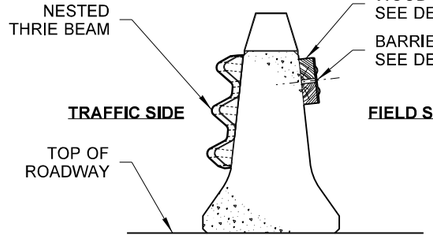


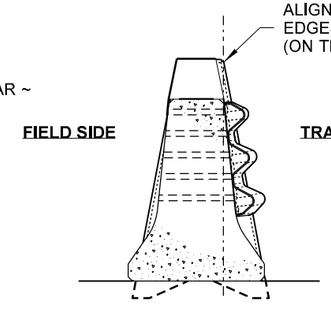




SECTION A
(LEFT ELEVATION)



SECTION B



SECTION C
(RIGHT ELEVATION)

NOTES

1. The intent of this plan is to provide a transition from the anchored Type F concrete barrier system to various types of concrete barrier systems (e.g. Single Slope) up to 42" (in) tall. This transition plan applies to roadside or wide median applications where the barrier transition can be impacted on the Traffic Side Only. This transition can be installed on cement concrete pavement or hot mix asphalt pavement.

2. **Transition Installation Procedure:**
   1) Procure a segment of Type F Concrete Barrier (**Standard Plan C-60.10**).

   2) Cut the end loops off of the Loop Bars of the Type F section located closest to the dissimilar shaped concrete barrier section.

   3) Abut the two sections and align the top front edges (traffic side) of the barrier sections. (See Section C, this sheet).

   4) Install the nested thrie beam rail on the traffic side, the barrier connection strap bar on the field side, and the transition shroud to secure the two barrier sections together.

   5) Install the anchor pins.

3. Refer to **Standard Plan C-60.10 Concrete Barrier Type F** for additional details not shown on this plan.

4. Refer to **Standard Plan C-1a Beam Guardrail (Thrie Beam)** and **C-7a Thrie Beam End Sections** for additional details not shown on this plan.

5. Install rectangular guardrail plate washers under the bolt head on upstream end and under the nut on the downstream end. See sheet 2 for details.

6. Lap thrie beam and thrie beam end section in direction of adjacent traffic. The upstream thrie beam end section is installed on top of thrie beam rail, and the downstream thrie beam end section is installed under thrie beam rail.

7. Embed anchor bolt 5" (in) into barrier and secure to barrier with Type I epoxy. Core drill 1 1/2" (in) diameter holes into top of barriers.

8. For barrier transition pinning details, See **Standard Plan C-60.70**.

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PRECAST TYPE F BARRIER TO DISSIMILAR SHAPED BARRIER TRANSITION

STANDARD PLAN C-60.20-00

SHEET 1 OF 2 SHEETS

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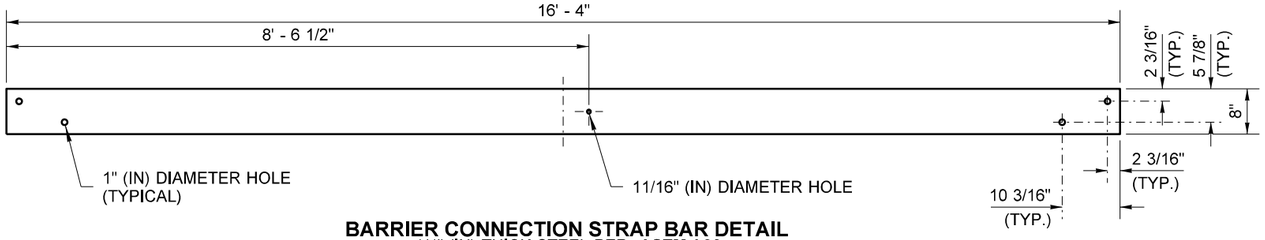
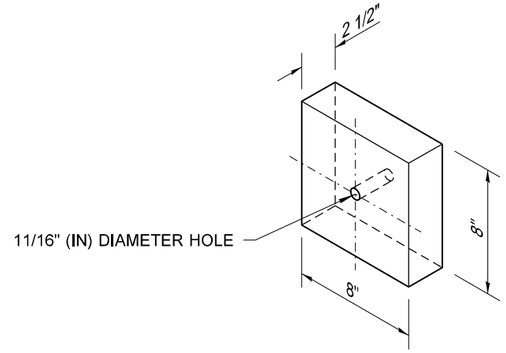
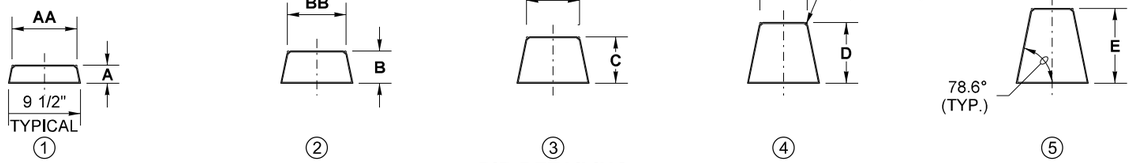


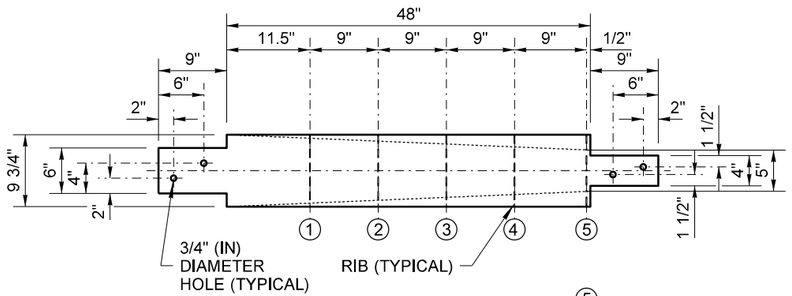
BARRIER CONNECTION STRAP BAR DETAIL
1/4" (IN) THICK STEEL PER **ASTM A36**
HOT DIP GALVANIZE, AFTER FABRICATION
PER **AASHTO M 111** OR **ASTM F2329**

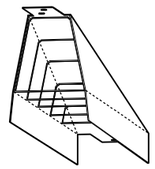


WOOD SPACER BLOCK DETAIL
WOOD BLOCK SHALL CONFORM TO **STD. SPEC. SECTION 9-09.2(2),**
AND BE PRESSURE TREATED PER **STD. SPEC. SECTION 9-09.3(1)**

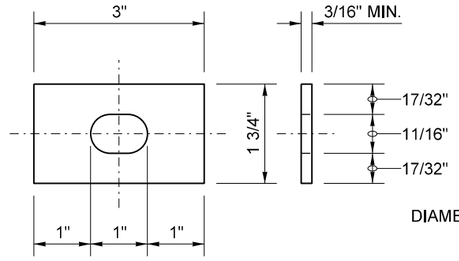


RIB DETAILING
(10" HEIGHT (H) SHROUD SHOWN)

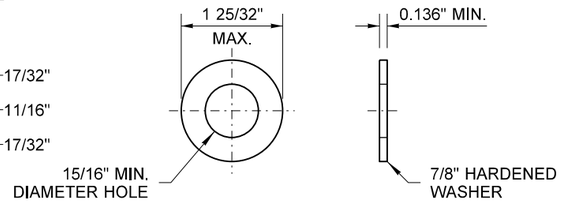




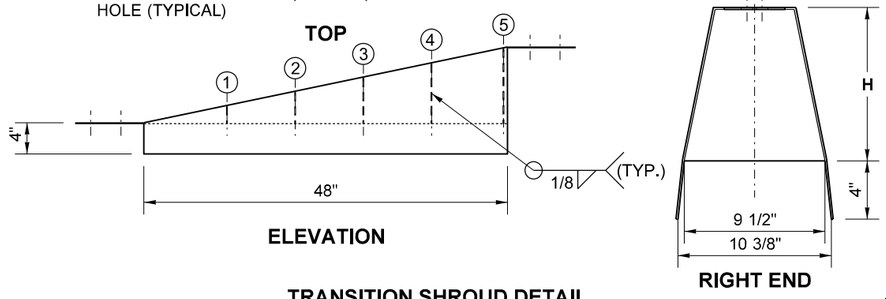
OBLIQUE VIEW



RECTANGULAR GUARDRAIL PLATE WASHER DETAIL
SEE NOTE 5
RECTANGULAR PLATE WASHER SHALL BE HIGH STRENGTH AND CONFORM TO **STD. SPEC. SECTION 9-16.3(4)** AND BE GALVANIZED PER **STD. SPEC. SECT. 9-16.3(3)**



ROUND WASHER DETAIL
ROUND WASHER SHALL BE HIGH STRENGTH AND CONFORM TO **STD. SPEC. SECTION 9-16.3(4)** AND GALVANIZED PER **STD. SPEC. SECT. 9-16.3(3)**



TRANSITION SHROUD DETAIL
(10" (IN) TALL TRANSITION SHROUD SHOWN)
1/8" (IN) THICK STEEL PER **ASTM A36**
HOT DIP GALVANIZE, AFTER FABRICATION PER **ASTM F2329**

TRANSITION SHROUD NOTES:

① Prior to transition shroud fabrication, verify the height of the dissimilar shaped barrier that the 32" (in) Tall F-shape transition is abutting to. Shroud height: (**H**) ranges from 1" to 10" tall.

② For dimensioning not shown in the table, interpolate dimensions.

③ No transition shroud is necessary if the dissimilar shaped barrier is the same height, or up to 1" (in) taller than the 32" (in) Type F barrier.

④ Barriers that Type F barrier may transition to include but are not limited to:
A.) Concrete Barrier Type 2 ~ See **WSDOT Plan Sheet Library** for details
B.) Single-Slope Concrete Barrier (Precast) ~ See **Standard Plan C-70.10** for details
C.) Single-Slope Concrete Barrier (CIP) ~ See **Standard Plan C-80.10** for details
D.) High Performance (HP) Single-Sloped Concrete Bridge Barrier ~ See Bridge Standard Drawings
E.) High Performance (HP) F-Shape Bridge Barrier ~ See Bridge Standard Drawings

TRANSITION SHROUD TABLE

(H)	DIMENSION										NOTES
	A	AA	B	BB	C	CC	D	DD	E	EE	
2"	1/2"	7 13/16"	7/8"	7"	1 1/4"	6 1/4"	1 5/8"	5 1/2"	1 7/8"	4 3/4"	THE TOP AND SIDES OF THE SHROUD MAY BE FABRICATED FROM SEPARATE PLATES AND WELDED TOGETHER AT THE JOINTS, OR MADE FROM A SINGLE PLATE/SHEET AND BENT (BEND RADII - 1/4" (IN) MAX.) OR MADE WITH A COMBINATION OF BOTH METHODS.
4"	1"	7 13/16"	1 3/4"	7"	2 1/2"	6 1/4"	3 1/4"	5 1/2"	3 7/8"	4 3/4"	
6"	1 3/8"	7 13/16"	2 1/2"	7"	3 5/8"	6 1/4"	4 3/4"	5 1/2"	5 7/8"	4 3/4"	
8"	1 7/8"	7 13/16"	3 3/8"	7"	4 7/8"	6 1/4"	6 3/8"	5 1/2"	7 7/8"	4 3/4"	
10"	2 3/8"	7 13/16"	4 1/4"	7"	6 1/8"	6 1/4"	8"	5 1/2"	9 7/8"	4 3/4"	

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PRECAST TYPE F BARRIER TO DISSIMILAR SHAPED BARRIER TRANSITION

STANDARD PLAN C-60.20-00

SHEET 2 OF 2 SHEETS

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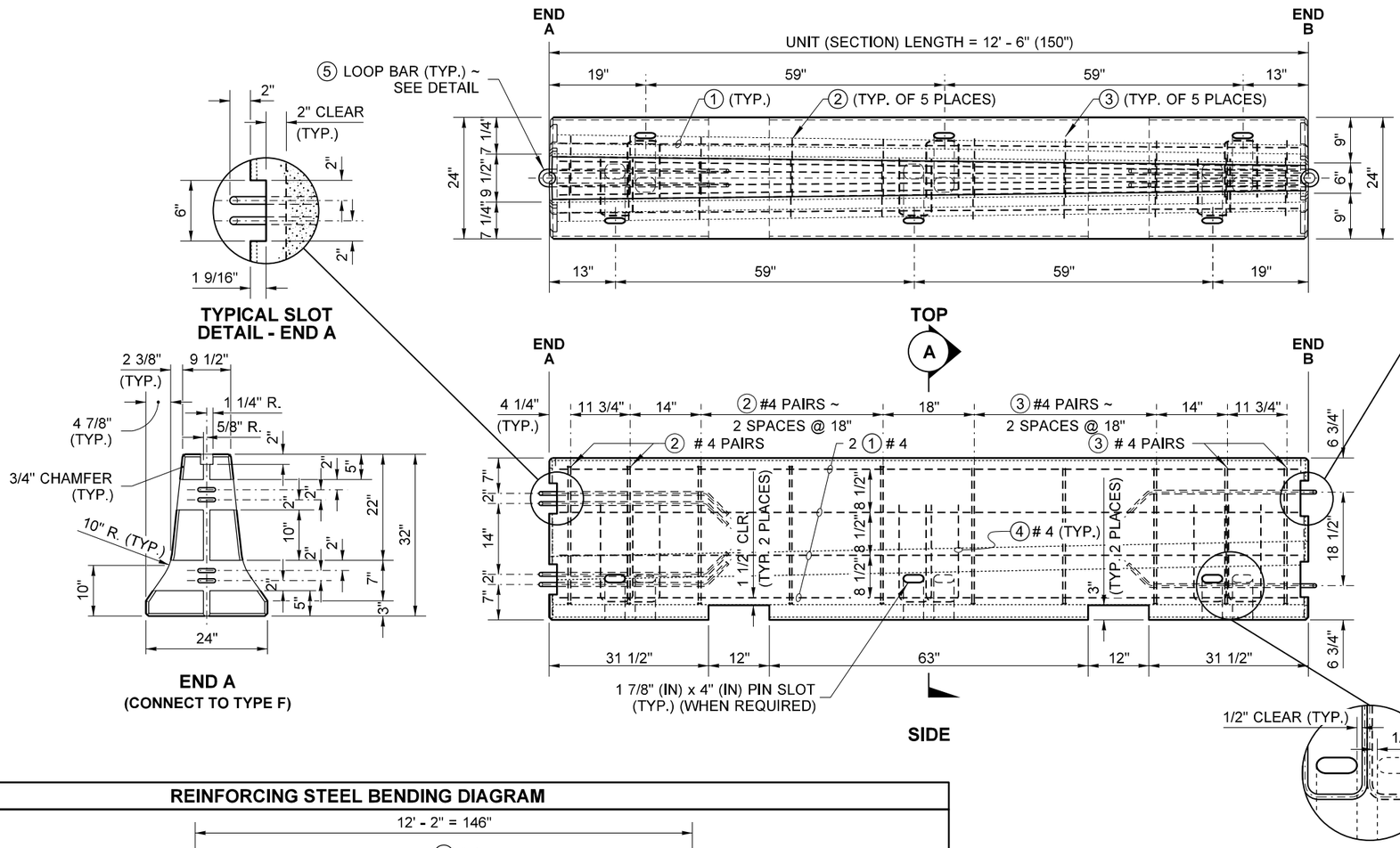
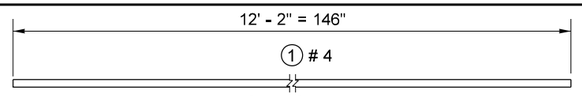


NOTES

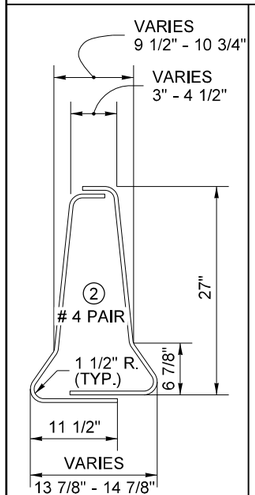
1. Concrete for Type F transition to Type 2 barrier shall be Class 5000.
2. Remove slack between barrier segments after inserting the connecting pin.
3. See **Standard Plan C-60.10** and **C-60.70** for Barrier Anchoring Details (when being anchored).
4. Provide 2" minimum concrete cover over reinforcing steel, except for areas noted on plan.

REINFORCING STEEL BENDING DIAGRAM

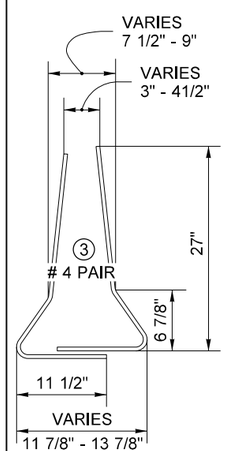


QTY. = 8 BARS

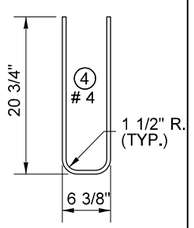
LONGITUDINAL BAR



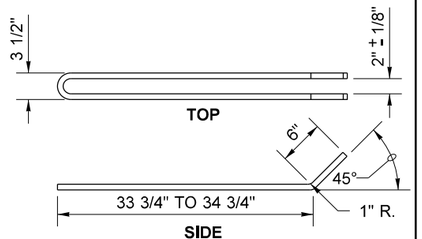
STIRRUP BAR A
QTY. = 10 BARS



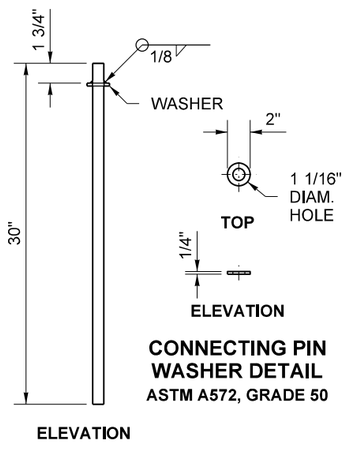
STIRRUP BAR B
QTY. = 10 BARS



PIN SLOT BAR
(WHEN REQUIRED)
HOT DIP GALVANIZE AFTER FABRICATION PER **ASTM A767**
QTY. = 6 BARS

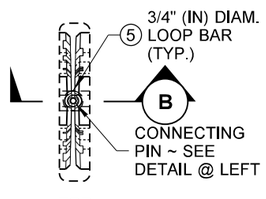


LOOP BAR DETAIL
⑤ 3/4" DIAM. LOOP BAR (**ASTM A36**) HOT ROLL
HOT DIP GALVANIZE AFTER FABRICATION (**AASHTO M 111**)
QTY. = 6 BARS

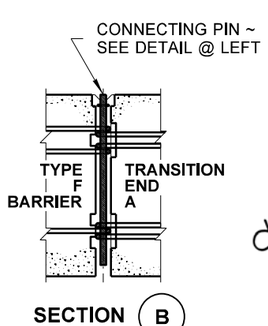


CONNECTING PIN WASHER DETAIL
ASTM A572, GRADE 50

CONNECTING PIN ASSEMBLY DETAIL
1" DIAMETER PER **ASTM A449**
HOT DIP GALVANIZE AFTER FABRICATION PER **ASTM F2329**



END DETAIL
JOINING TWO BARRIER SEGMENTS - END A
(TYPE F BARRIERS SHOWN)



SECTION B
(SEE NOTE 2)

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TYPE F TRANSITION TO TYPE 2 BARRIER PLAN

STANDARD PLAN C-60.30-00

SHEET 1 OF 1 SHEET

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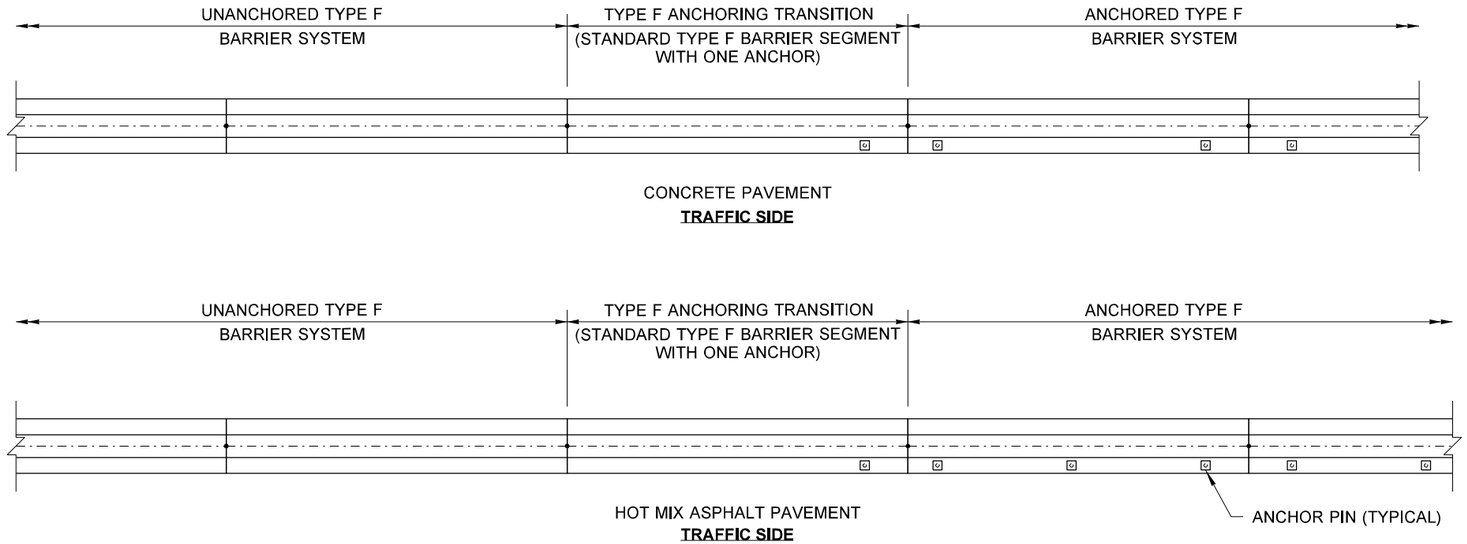
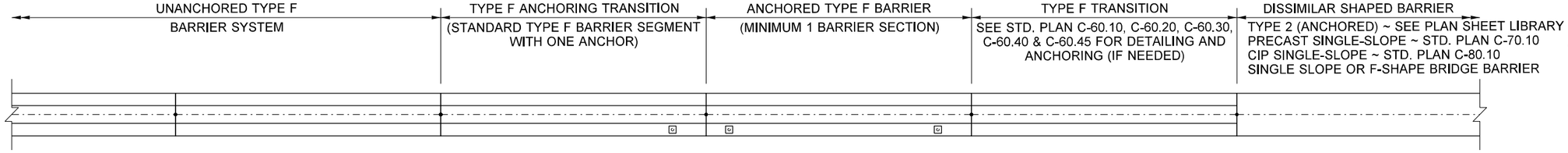


BARRIER ANCHORING TRANSITION: UNANCHORED TYPE F BARRIER TO ANCHORED TYPE BARRIER



BARRIER ANCHORING TRANSITION: UNANCHORED TYPE F BARRIER TO VARIOUS TYPES

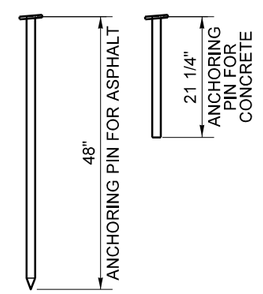
NOTES

1. The intent of this plan is to show the anchoring pin pattern when transitioning from:
   1) Type F unanchored barrier runs to Type F anchored barrier runs

   2) Type F unanchored barrier runs to other types of barrier runs (i.e., Type 2, Type F, Single-Slope).

2. Roadside/Shoulder anchoring patterns shown (barrier subject to impacts on one side only). For barrier located in medians and/or subject to impacts on both sides, anchor both sides of barrier by placing an anchoring pin directly opposite of the anchoring pin(s) shown.

3. See **Standard Plan C-60.10 Concrete Barrier Type F (Precast)** for anchor detailing.



TYPE F ANCHORING PIN DETAIL

FOR DETAILS ~ SEE STANDARD PLAN C-60.10 CONCRETE BARRIER TYPE F (PRECAST)

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PRECAST TYPE F ANCHORING TRANSITION PLAN

STANDARD PLAN C-60.70-00

SHEET 1 OF 1 SHEET

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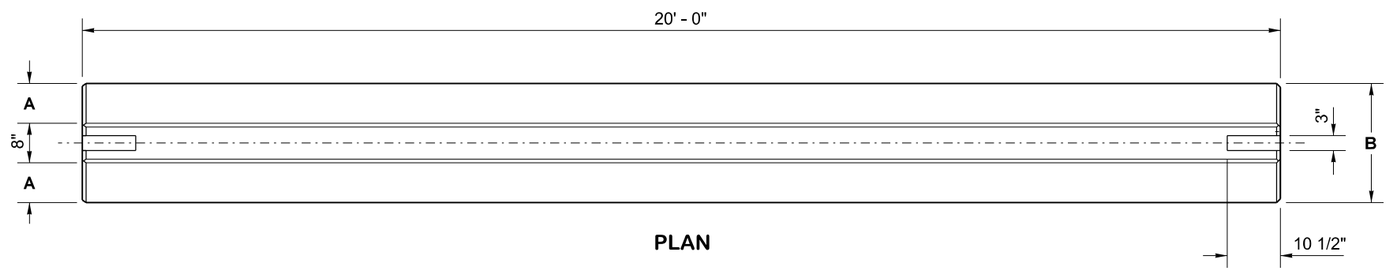
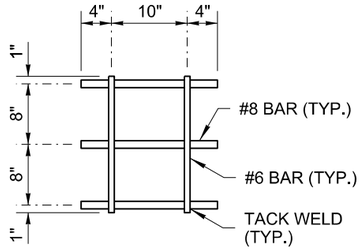
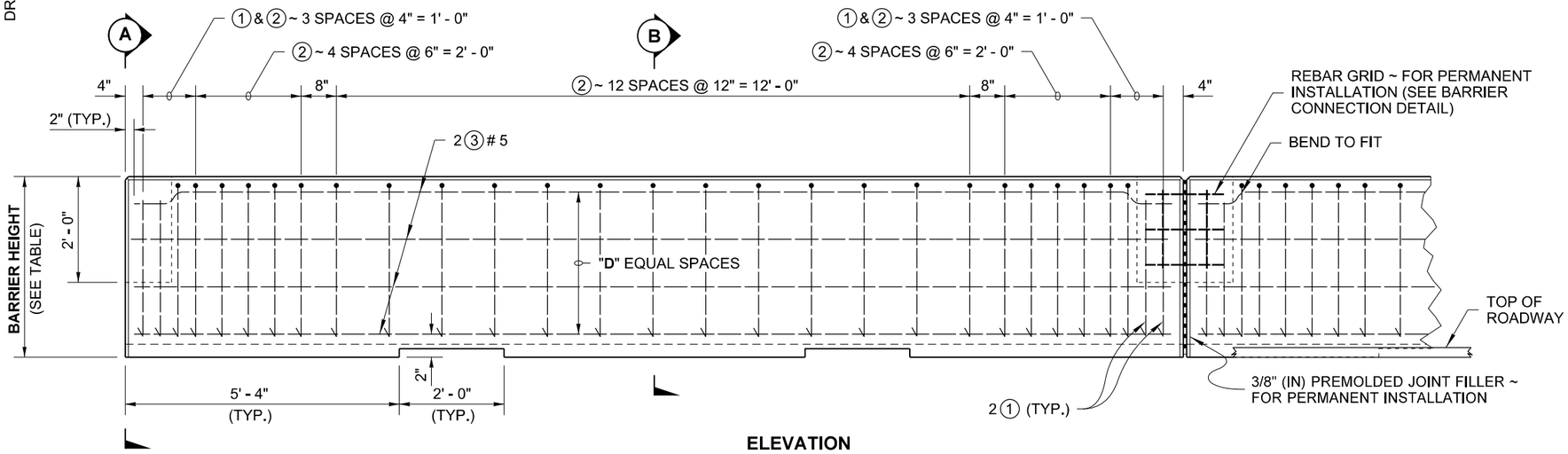


PLAN



REBAR GRID DETAIL

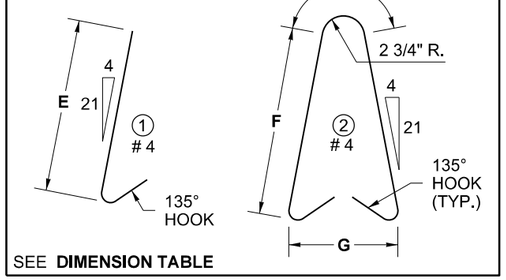


ELEVATION

NOTE:
STEEL WELDED WIRE REINFORCEMENT DEFORMED FOR CONCRETE MAY BE SUBSTITUTED FOR REINFORCING STEEL IN ACCORDANCE WITH **STANDARD SPECIFICATION, SECTION 6-10.3**

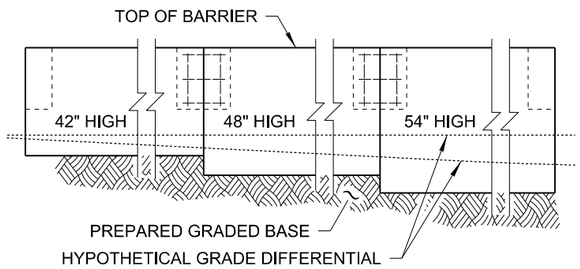
REINFORCING STEEL BENDING DIAGRAM

SEE **STD. SPEC. 9-07.1(2)** FOR BENDING DIAMETERS

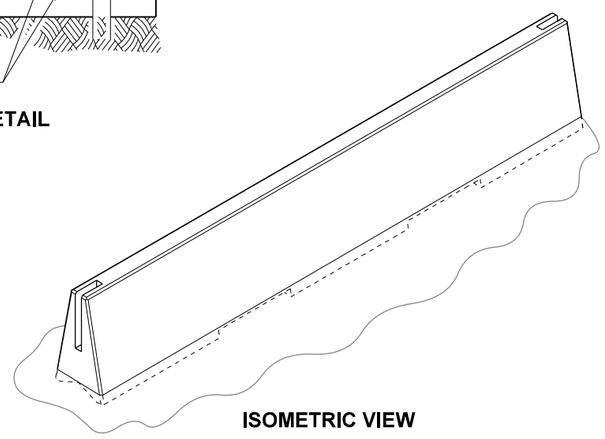


SEE **DIMENSION TABLE**

DIMENSION TABLE							
BARRIER HEIGHT	A	B	D	E	F	G	HORIZONTAL BARS (QTY.)
3' - 6"	8"	2' - 0"	3	2' - 8"	2' - 10"	1' - 7"	8
4' - 0"	9 1/8"	2' - 2 1/4"	4	3' - 2"	3' - 4"	1' - 9"	10
4' - 6"	10 1/4"	2' - 4 1/2"	5	3' - 8"	3' - 10"	1' - 11"	12



BARRIER TRANSITION DETAIL



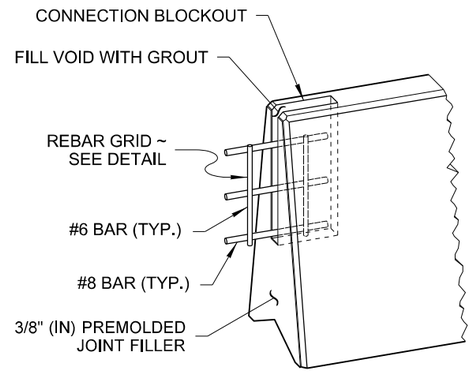
ISOMETRIC VIEW

NOTES

1. INSTALLATION requirements: Embed barrier 3" (in) minimum in asphalt or concrete; Embed barrier 10" (in) minimum in compacted soil. Install 3/8" (in) Premolded Joint Filler between segments; fill the Connection Blockout with grout, centering the Rebar Grid in the blockout before adding grout.

2. Use Cast-In-Place (CIP) single slope barrier (**Standard Plan C-80.10**) for Installation on a horizontal curve with a radius less than 2,000' (ft).

3. See Sheet 2 for barrier with a 2' - 10" reveal installed in asphalt or concrete.
   See Sheet 3 for barrier with a 3' - 6" reveal installed in asphalt or concrete.
   See Sheet 4 for barrier with a 2' -10" reveal installed in compacted soil.
   See Sheet 4 for barrier with a 3' - 6" reveal installed in compacted soil.



BARRIER CONNECTION DETAIL

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
REGISTERED
PROFESSIONAL ENGINEER

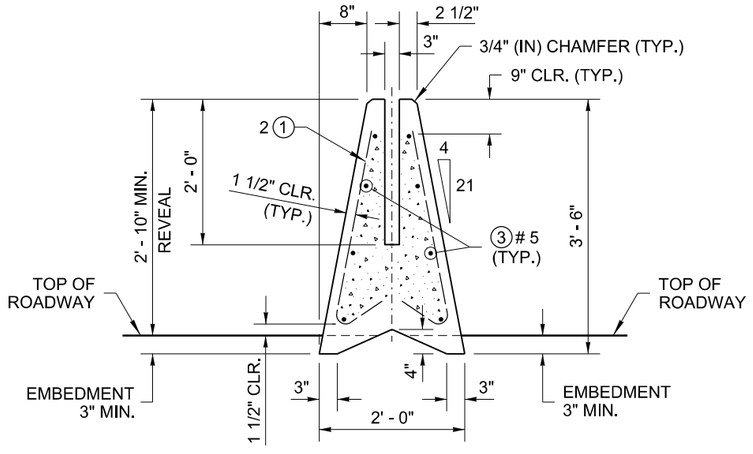
2020.08.27 09:47:47 -07'00'

SINGLE-SLOPE CONCRETE BARRIER (PRECAST)

STANDARD PLAN C-70.10-02

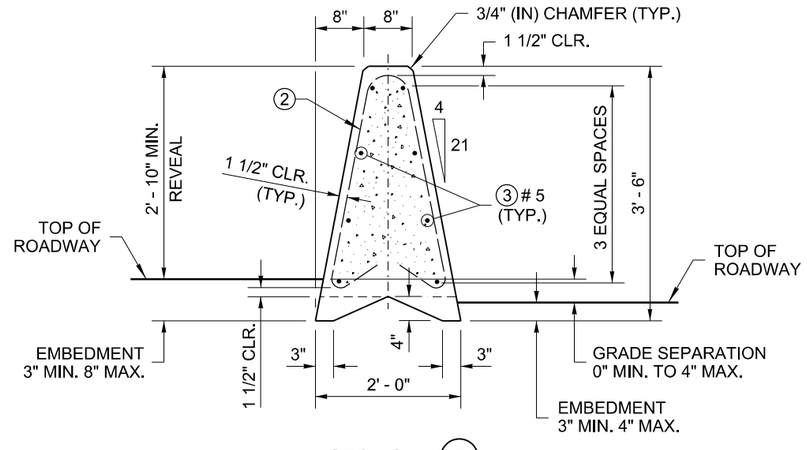
SHEET 1 OF 4 SHEETS

APPROVED FOR PUBLICATION
Date: 2020.09.16 09:55:32 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation



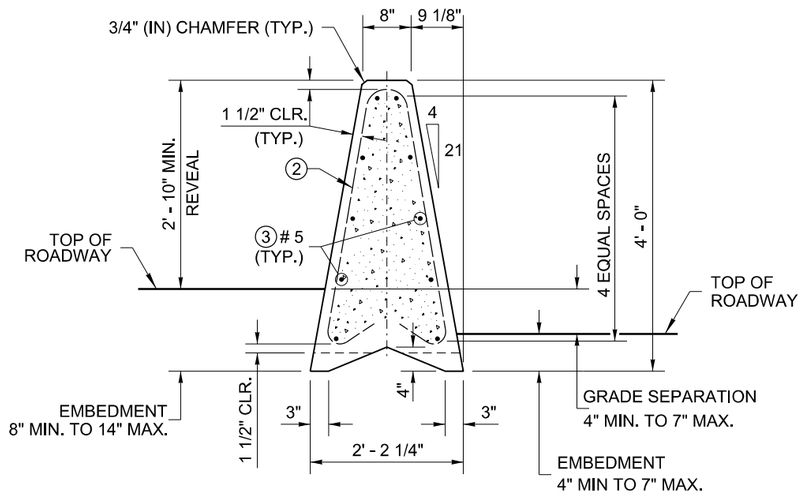
SECTION (A)

3' - 6" BARRIER
SHOWN LEVEL



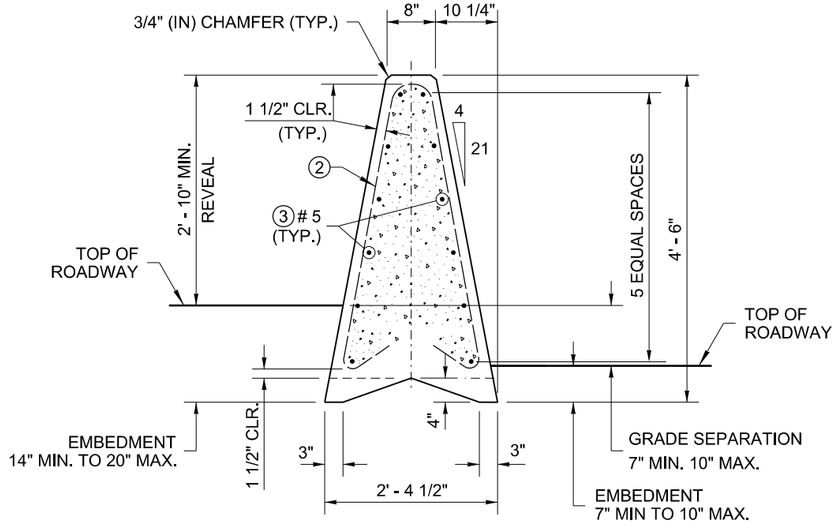
SECTION (B)

3' - 6" BARRIER FOR USE WITH A
0" (IN) TO 4" (IN) MAX. GRADE SEPARATION



SECTION (B)

4' - 0" BARRIER FOR USE WITH A
GREATER THAN 4" (IN) TO 7" (IN) MAX.
GRADE SEPARATION



SECTION (B)

4' - 6" BARRIER FOR USE WITH A
GREATER THAN 7" (IN) TO 10" (IN) MAX.
GRADE SEPARATION

SINGLE SLOPE BARRIER 2' - 10" MINIMUM REVEAL
(EMBEDDED 3" (IN) MINIMUM IN ASPHALT OR CONCRETE)

DRAWN BY: FERN LIDDELL

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
REGISTERED
PROFESSIONAL ENGINEER

2020.08.31 10:43:52 -07'00'

SINGLE-SLOPE CONCRETE BARRIER (PRECAST)

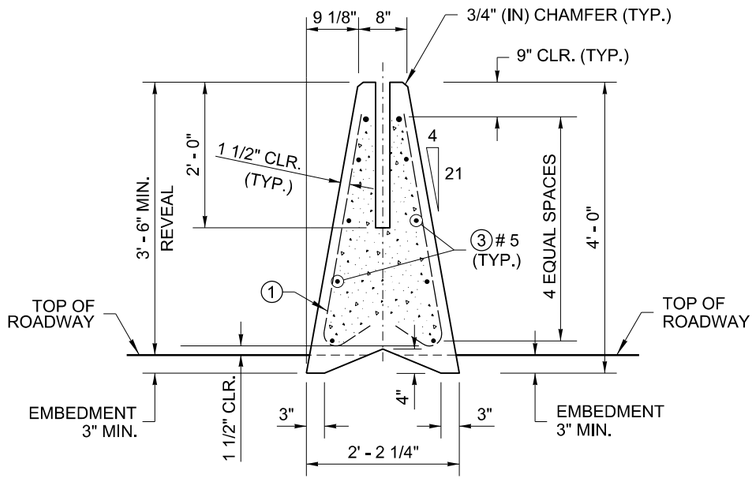
STANDARD PLAN C-70.10-02

SHEET 2 OF 4 SHEETS

APPROVED FOR PUBLICATION
Date: 2020.09.16 10:01:57 -07'00'
STATE DESIGN ENGINEER

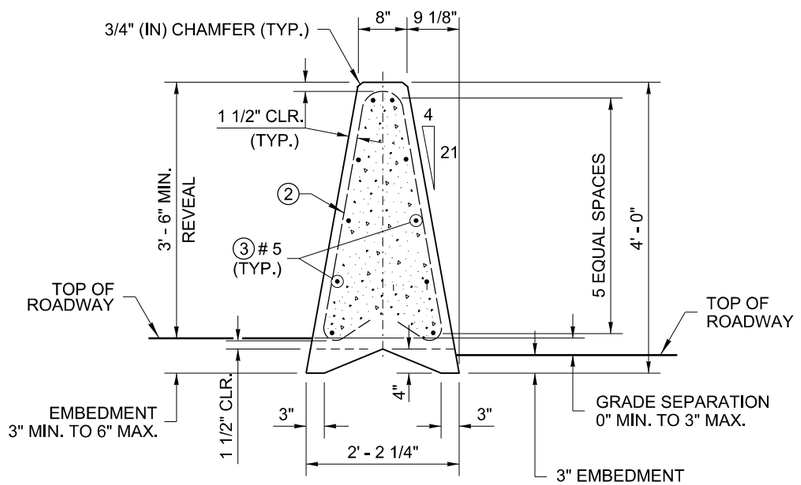
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



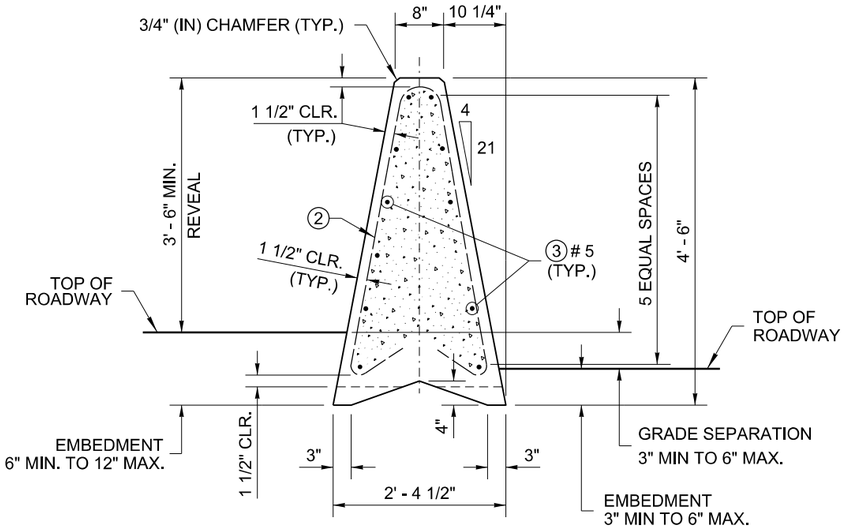
SECTION (A)

4' - 0" BARRIER
SHOWN LEVEL



SECTION (B)

4' - 0" BARRIER FOR USE WITH A
0" (IN) TO 3" (IN) MAX. GRADE SEPARATION



SECTION (B)

4' - 6" BARRIER FOR USE WITH A
GREATER THAN 3" (IN) TO 6" (IN) MAX.
GRADE SEPARATION

HIGH PERFORMANCE SINGLE SLOPE BARRIER - 3' - 6" MINIMUM REVEAL
(EMBEDDED 3" (IN) MINIMUM IN ASPHALT OR CONCRETE)

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
REGISTERED
PROFESSIONAL ENGINEER

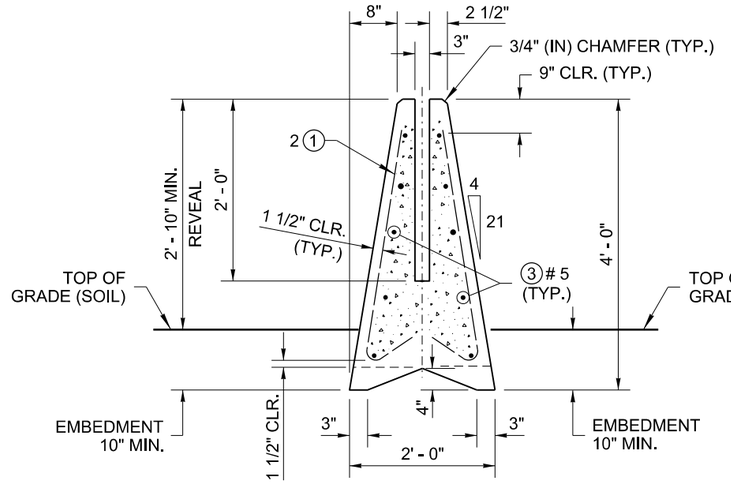
2020.08.31 10:44:11 -07'00'

SINGLE-SLOPE CONCRETE BARRIER (PRECAST)

STANDARD PLAN C-70.10-02

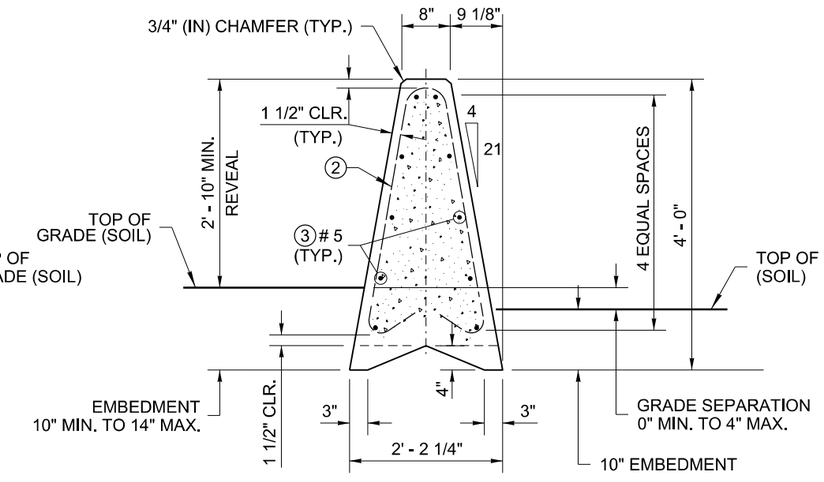
APPROVED FOR PUBLICATION
Date: 2020.09.16 10:02:31 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



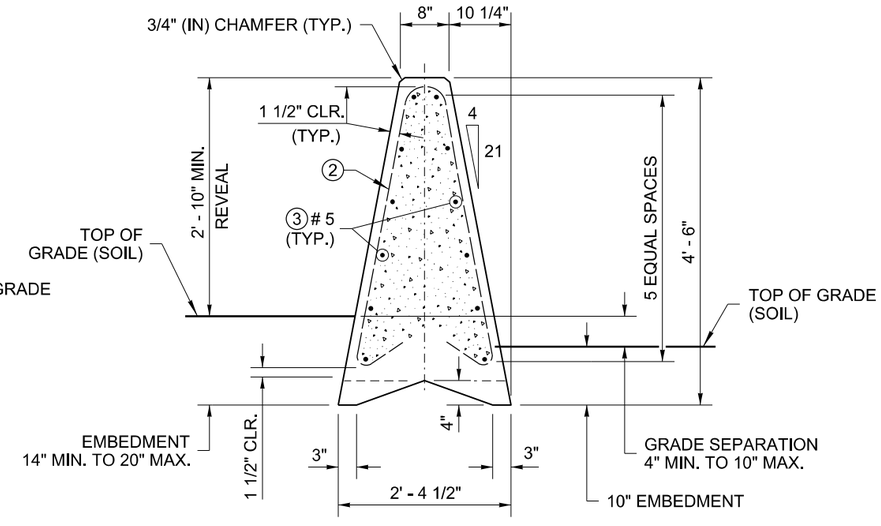
SECTION (A)

4' - 0" BARRIER
SHOWN LEVEL



SECTION (B)

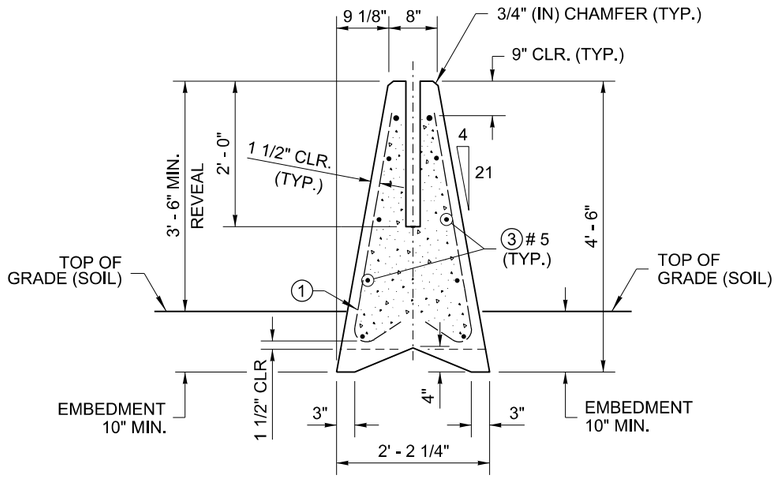
4' - 0" BARRIER FOR USE WITH A
GREATER THAN 0" (IN) TO 4" (IN) MAX.
GRADE SEPARATION



SECTION (B)

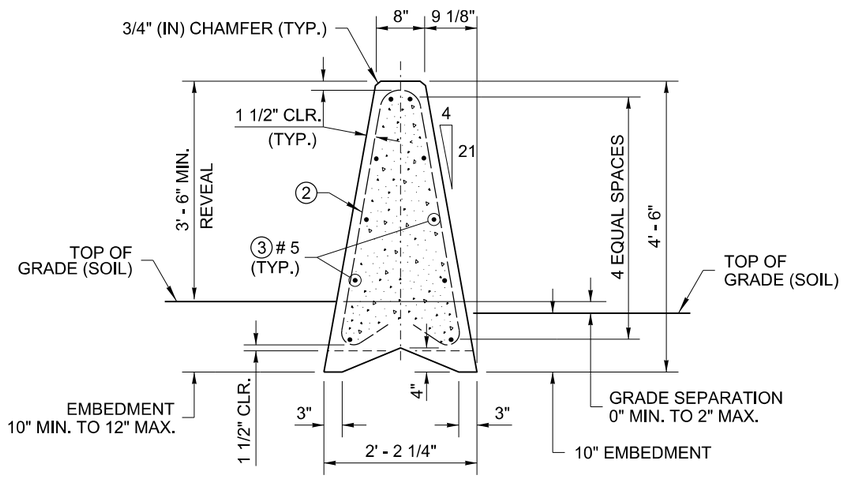
4' - 6" BARRIER FOR USE WITH A
GREATER THAN 4" (IN) TO 10" (IN) MAX.
GRADE SEPARATION

SINGLE SLOPE BARRIER - 2' - 10" MINIMUM REVEAL
(EMBEDDED 10" (IN) MINIMUM IN COMPACTED SOIL)



SECTION (A)

4' - 6" BARRIER
SHOWN LEVEL



SECTION (B)

4' - 6" BARRIER FOR USE WITH A
0" (IN) TO 2" (IN) MAX. GRADE SEPARATION

HIGH PERFORMANCE SINGLE SLOPE BARRIER - 3' - 6" MINIMUM REVEAL
(EMBEDDED 10" (IN) MINIMUM IN COMPACTED SOIL)

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
REGISTERED
PROFESSIONAL ENGINEER

2020.08.31 10:44:34 -07'00'

SINGLE-SLOPE CONCRETE BARRIER (PRECAST)

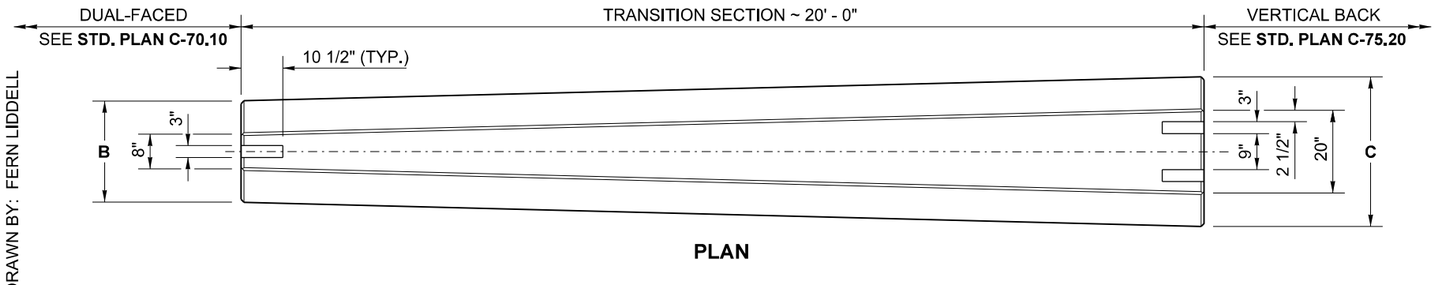
STANDARD PLAN C-70.10-02

SHEET 4 OF 4 SHEETS

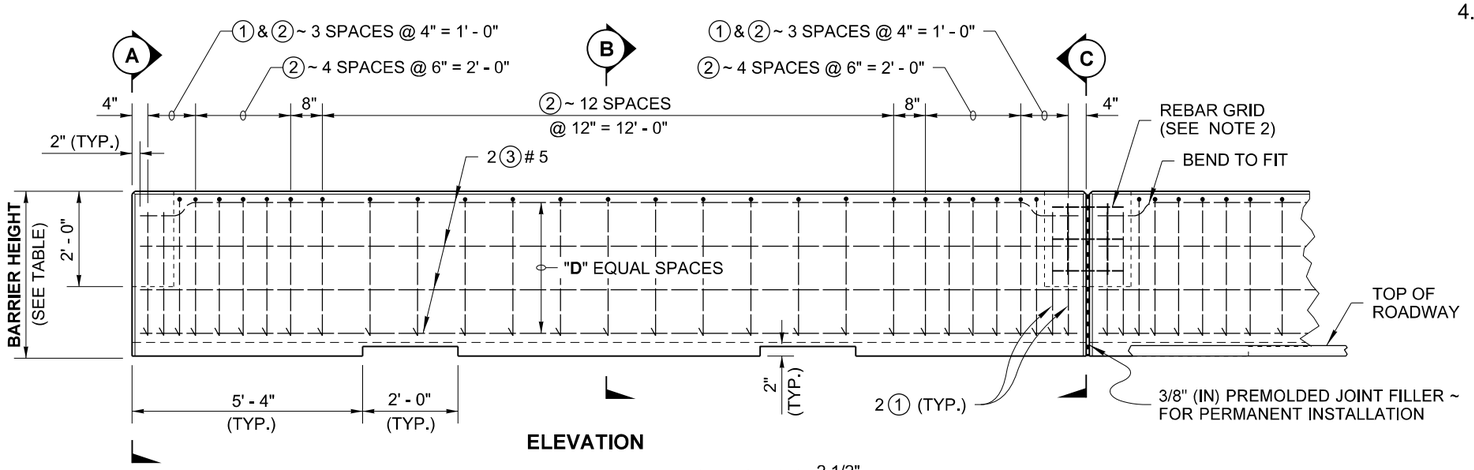
APPROVED FOR PUBLICATION
Date: 2020.09.16 10:03:04 -07'00'
STATE DESIGN ENGINEER

Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



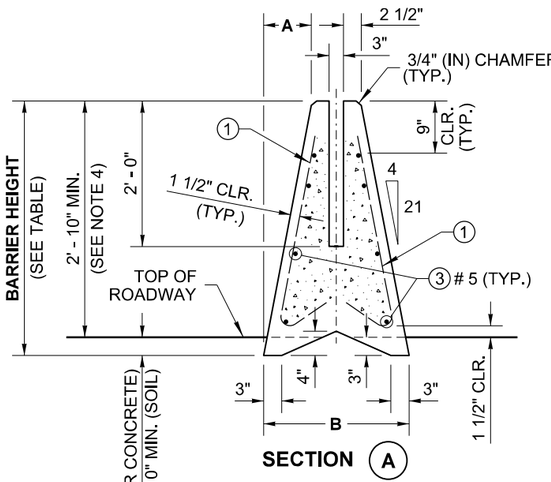
PLAN



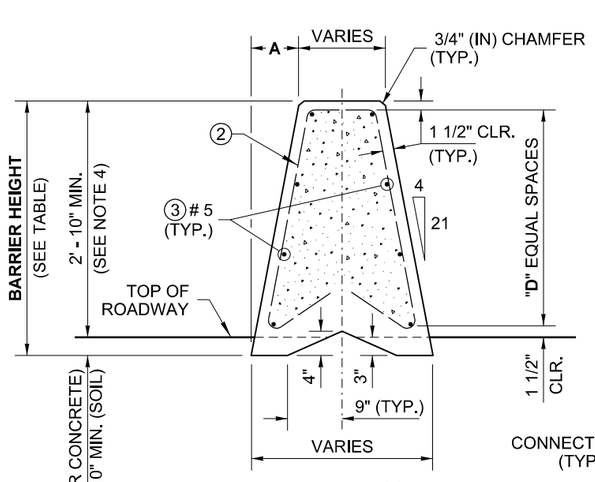
ELEVATION

NOTES

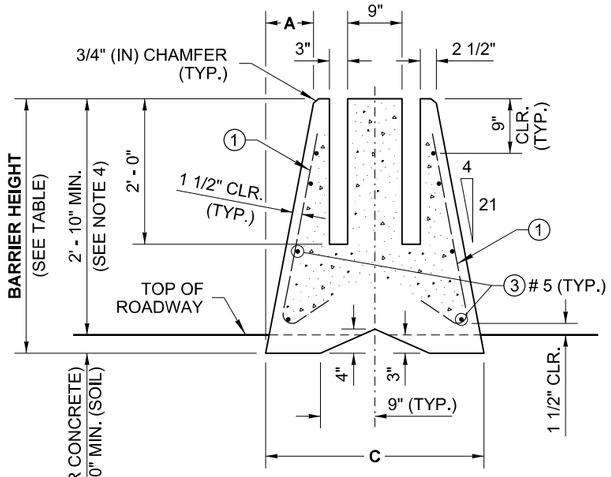
1. PERMANENT INSTALLATION requirements: Embed barrier 3" (in) minimum in asphalt or concrete; Embed barrier 10" (in) minimum in compacted soil. Install 3/8" (in) Premolded Joint Filler between segments; Fill the Connection Blockout with grout, centering the Rebar Grid in the blockout before adding grout.
2. See **Standard Plan C-70.10** for REBAR GRID DETAIL and BARRIER CONNECTION DETAIL.
3. This plan is for transitions to precast concrete barriers only.
4. When **High-Performance Concrete Barrier** is specified in the Contract, use the dimensions given in the H/P row in the DIMENSION TABLE, with a minimum height above roadway of 3' - 6" and a minimum embedment of 3" (in) asphalt or concrete, or 10" (in) minimum in compacted soil.



SECTION (A)



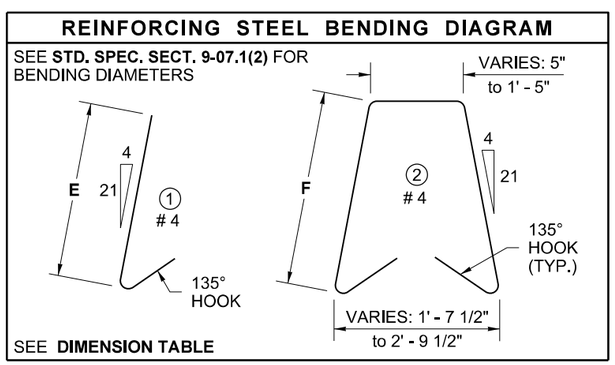
SECTION (B)



SECTION (C)

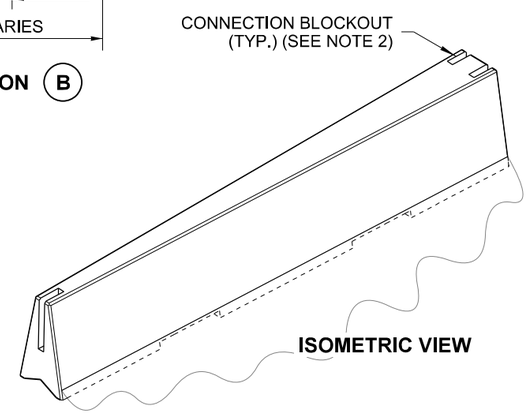
NOTE:
STEEL WELDED WIRE REINFORCEMENT DEFORMED FOR CONCRETE MAY BE SUBSTITUTED FOR REINFORCING STEEL IN ACCORDANCE WITH **STANDARD SPECIFICATION SECTION 6-10.3**

REINFORCING STEEL BENDING DIAGRAM



DIMENSION TABLE (SEE NOTE 4)

	BARRIER HEIGHT	A	B	C	D	E	F	HORIZONTAL BARS (QTY.)
STD.	3' - 6"	8"	2' - 0"	3' - 0"	3	2' - 8"	2' - 9"	8
H/P	4' - 0"	9 1/8"	2' - 2 1/4"	3' - 2 1/4"	4	3' - 2"	3' - 3"	10



ISOMETRIC VIEW

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
REGISTERED
PROFESSIONAL ENGINEER

2020.08.27 09:48:12 -07'00'

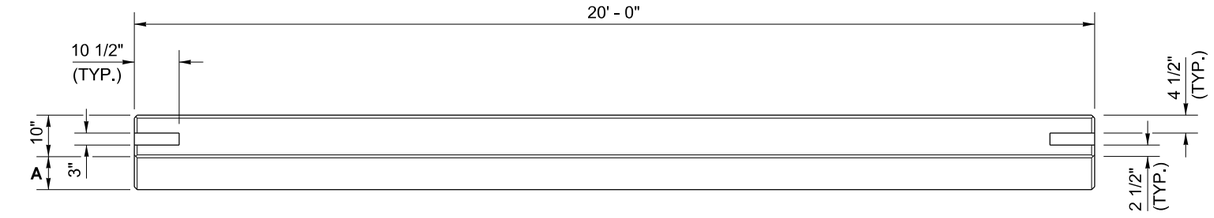
SINGLE-SLOPE CONCRETE BARRIER (PRECAST) TRANSITION SECTION

STANDARD PLAN C-75.10-02

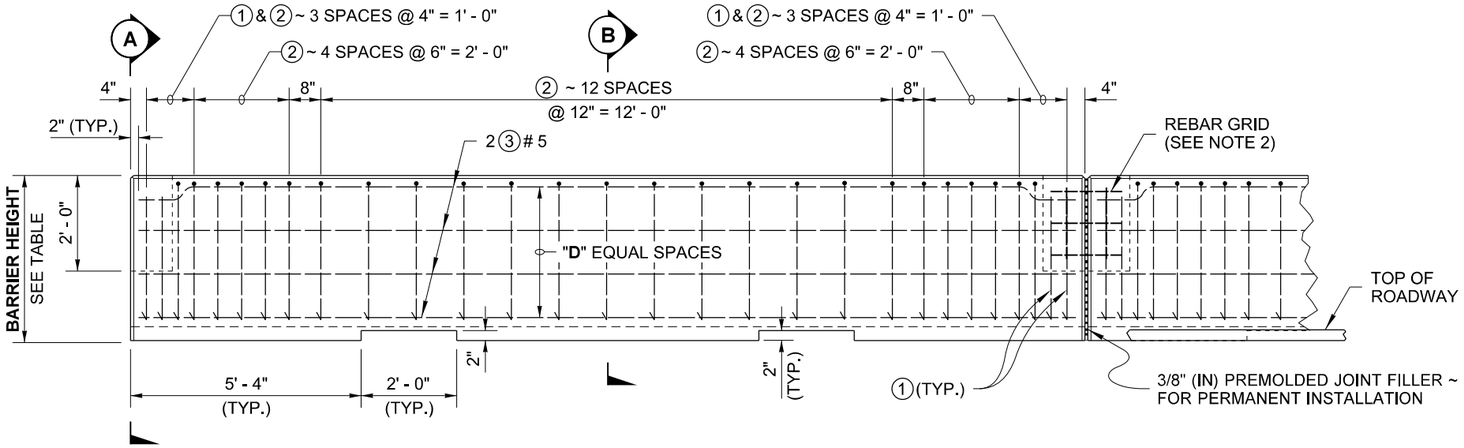
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Date: 2020.09.16 09:56:28 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



PLAN

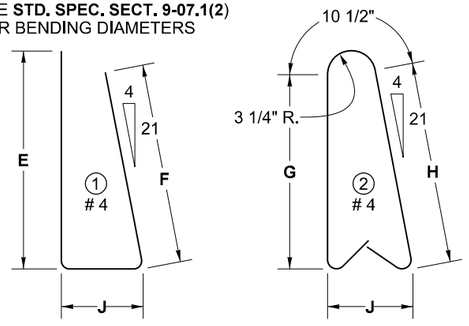


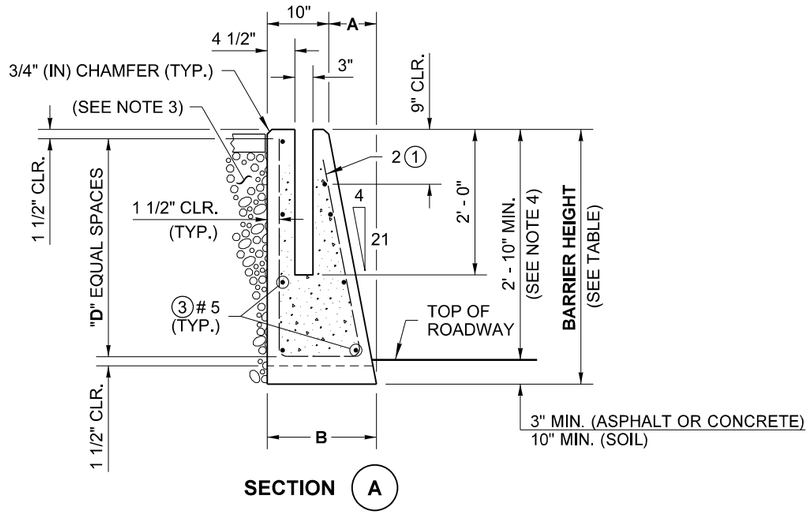
ELEVATION

NOTE:
STEEL WELDED WIRE REINFORCEMENT DEFORMED FOR CONCRETE MAY BE SUBSTITUTED FOR REINFORCING STEEL IN ACCORDANCE WITH **STANDARD SPECIFICATION, SECTION 6-10.3**

REINFORCING STEEL BENDING DIAGRAM

SEE **STD. SPEC. SECT. 9-07.1(2)** FOR BENDING DIAMETERS



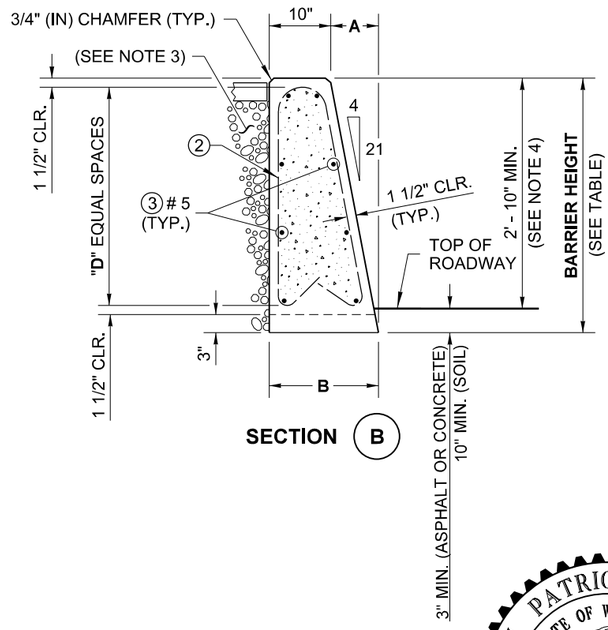


SECTION (A)

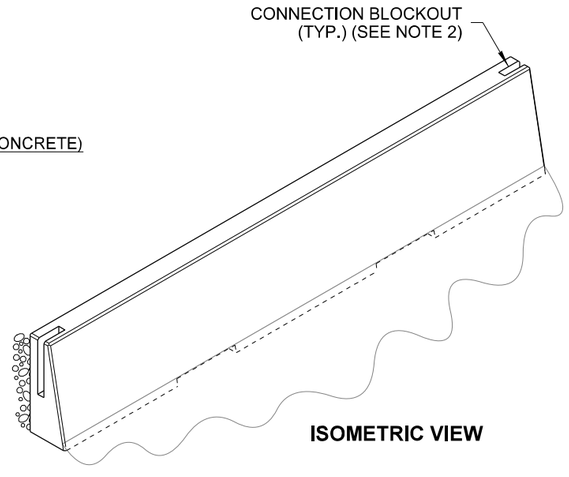
DIMENSION TABLE (SEE NOTE 4)										
	BARRIER HEIGHT	A	B	D	E	F	G	H	J	HORIZONTAL BARS (QTY.)
STD.	3' - 6"	8"	1' - 6"	3	3' - 0"	2' - 8 1/2"	2' - 8"	2' - 9 1/2"	1' - 2"	8
H/P	4' - 0"	9 1/8"	1' - 7 1/8"	4	3' - 6"	3' - 2 1/2"	3' - 2"	3' - 3 1/2"	1' - 3"	10

NOTES

1. PERMANENT INSTALLATION requirements: Embed barrier 3" (in) minimum in asphalt or concrete; Embed barrier 10" (in) minimum in compacted soil; Install 3/8" (in) Premolded Joint Filler between segments; fill the Connection Blockout with grout, centering the Rebar Grid in the blockout before adding grout.
2. See **Standard Plan C-70.10** for REBAR GRID DETAIL and BARRIER CONNECTION DETAIL.
3. Vertical Back Barrier is used only in the configurations shown in **Standard Plans C-85.10** and **C-85.20**, and when placed against a retaining wall.
4. When **High-Performance Concrete Barrier** is specified in the Contract, use the dimensions given in the H/P row in the DIMENSION TABLE, with a minimum height above roadway of 3' - 6" and a minimum embedment of 3" (in) in asphalt or concrete, or 10" (in) minimum embedment in compacted soil.



SECTION (B)



ISOMETRIC VIEW

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
REGISTERED
PROFESSIONAL ENGINEER

2020.08.27 09:48:37 -07'00'

SINGLE-SLOPE CONCRETE BARRIER (PRECAST) VERTICAL BACK

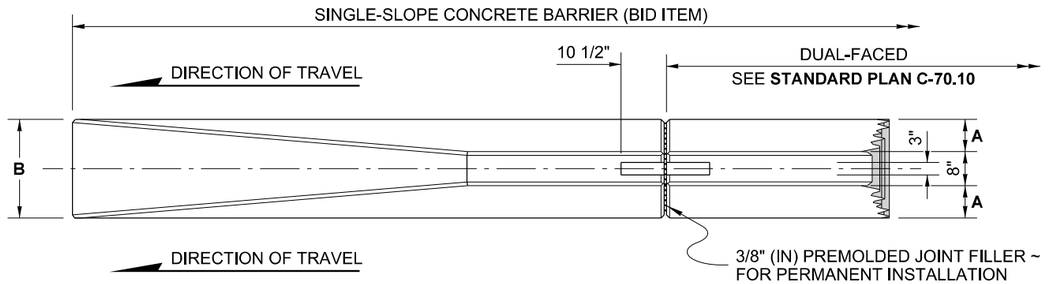
STANDARD PLAN C-75.20-02

SHEET 1 OF 1 SHEET

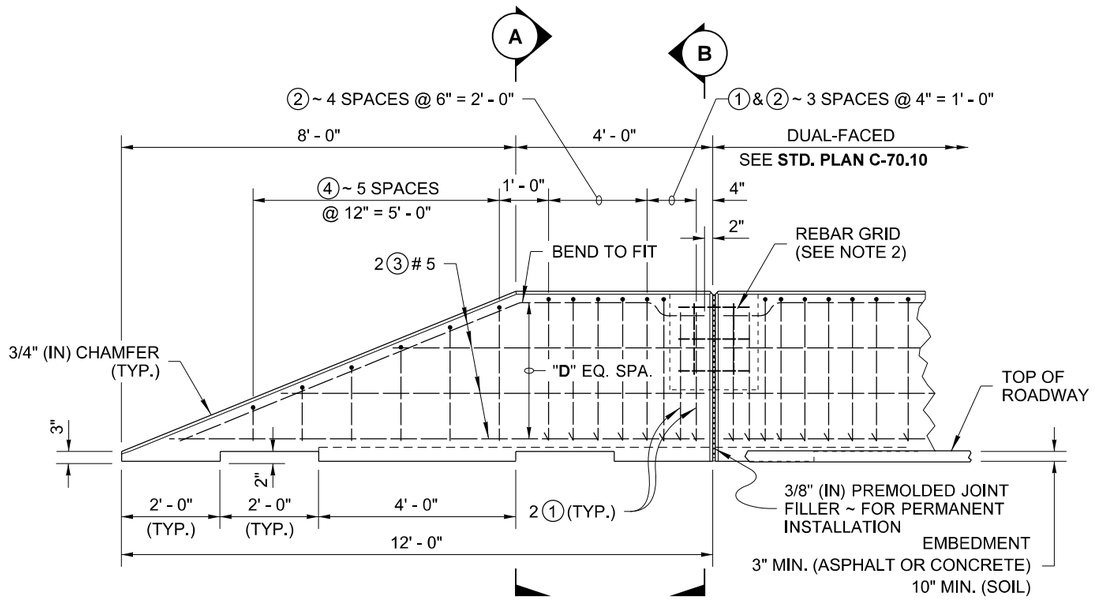
APPROVED FOR PUBLICATION
Date: 2020.09.16 09:57:18 -07'00'
STATE DESIGN ENGINEER

Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



PLAN

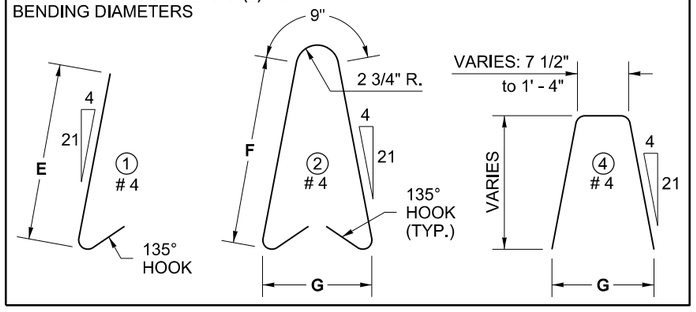


ELEVATION

NOTE:
STEEL WELDED WIRE REINFORCEMENT DEFORMED FOR CONCRETE MAY BE SUBSTITUTED FOR REINFORCING STEEL IN ACCORDANCE WITH **STANDARD SPECIFICATION, SECTION 6-10.3**

REINFORCING STEEL BENDING DIAGRAM

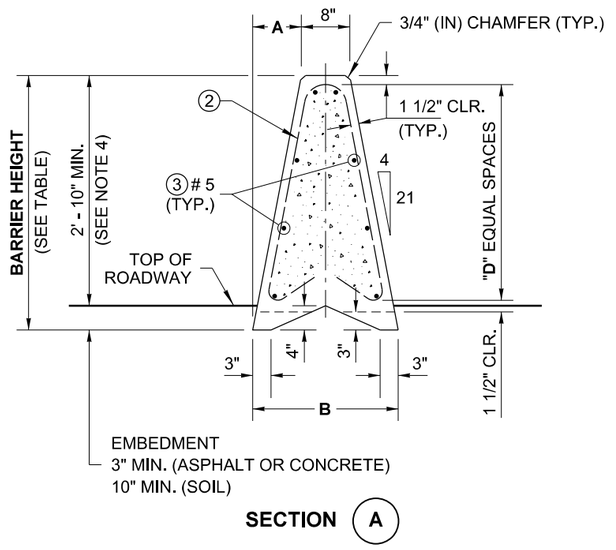
SEE **STD. SPEC. SECT.9-07.1(2)** FOR BENDING DIAMETERS



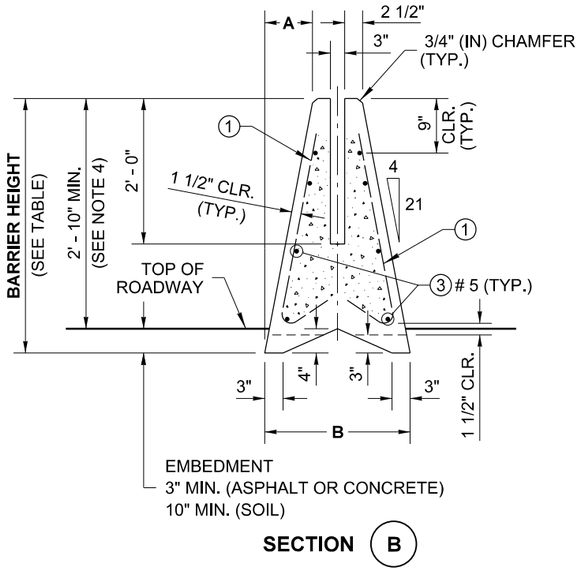
DIMENSION TABLE (SEE NOTE 4)								
	BARRIER HEIGHT	**A**	**B**	**D**	**E**	**F**	**G**	**HORIZONTAL BARS** (QTY.)
STD.	3' - 6"	8"	2' - 0"	3	2' - 8"	2' - 9"	1' - 7"	8
H/P	4' - 0"	9 1/8"	2' - 2 1/4"	4	3' - 2"	3' - 3"	1' - 9"	10

NOTES

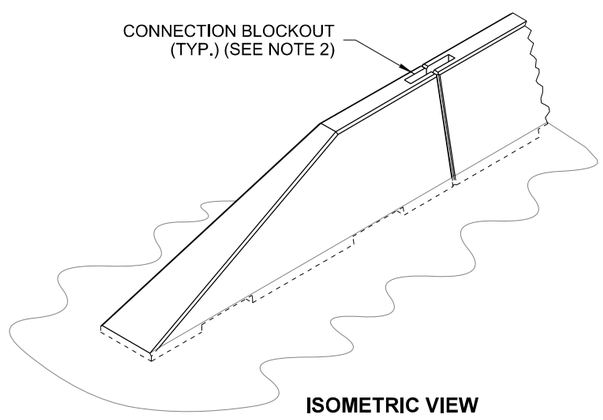
1. PERMANENT INSTALLATION requirements: Embed barrier 3" (in) minimum in asphalt or concrete; Embed barrier 10" (in) minimum in compacted soil; Install 3/8" (in) Premolded Joint Filler between segments; fill the Connection Blockout with grout, centering the Rebar Grid in the blockout before adding grout.
2. See **Standard Plan C-70.10** for REBAR GRID DETAIL and BARRIER CONNECTION DETAIL.
3. The Terminal is used only on the trailing end of a barrier, unless otherwise shown in the Contract.
4. When **High-Performance Concrete Barrier** is specified in the Contract, use the dimensions given in the H/P row in the DIMENSION TABLE, with a minimum height above roadway of 3' - 6" and a minimum embedment of 3" (in) in asphalt or concrete, or 10" (in) minimum embedment in compacted soil.



SECTION (A)



SECTION (B)



ISOMETRIC VIEW

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
REGISTERED
PROFESSIONAL ENGINEER

2020.08.27 09:49:01 -07'00'

SINGLE-SLOPE CONCRETE BARRIER (PRECAST) TERMINAL

STANDARD PLAN C-75.30-02

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Date: 2020.09.16 09:58:07 -07'00'
STATE DESIGN ENGINEER

Washington State Department of Transportation

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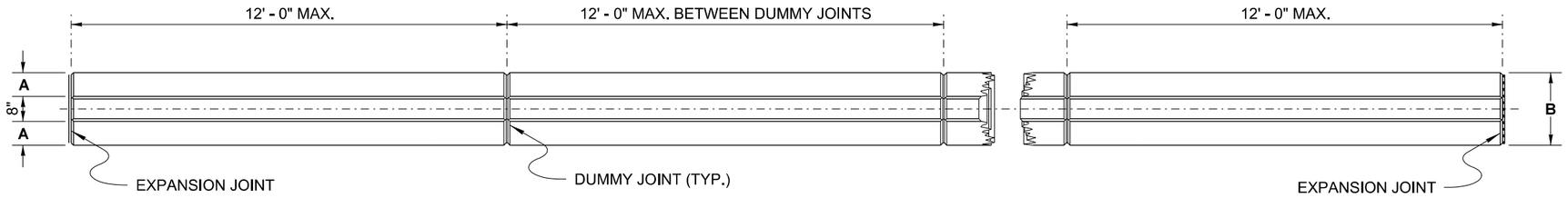
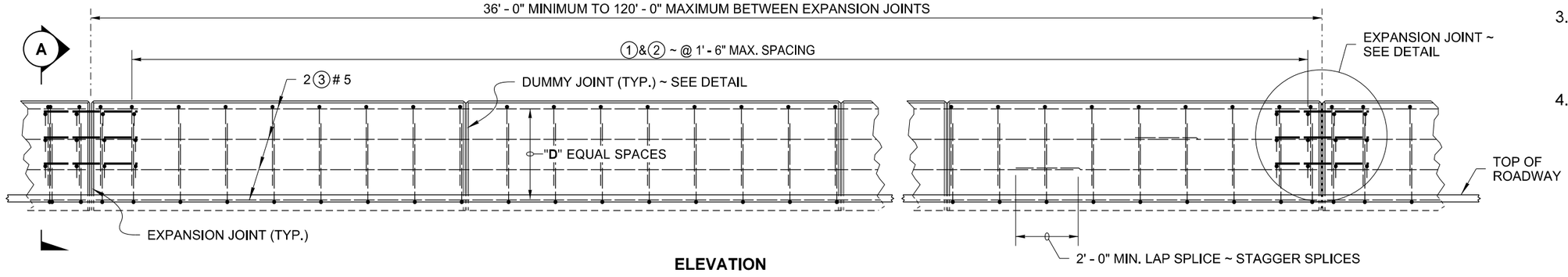


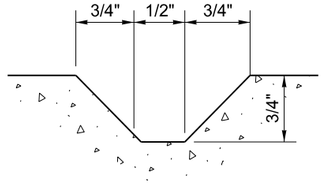
PLAN



ELEVATION

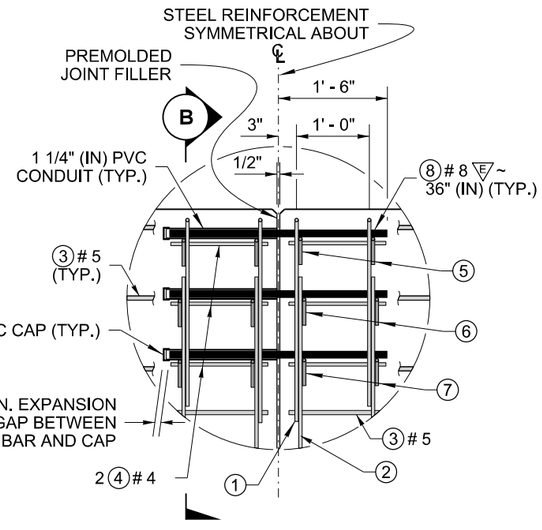
NOTES

1. Reinforcing steel dimensions and clearances are shown for stationary form construction. When slipform construction is used, increase reinforcing steel clearances to the outside surfaces of the barrier to 2 1/2" (in) and adjust the rebar dimensions as required.
2. When connecting between cast-in-place and pre-cast single-slope barrier, provide a Blockout, Rebar Grid, and added rebar, as shown in **Standard Plan C-70.10.**
3. The actual dimensions will vary as the grades change and the barrier transitions in height and width. The dimensions may be interpolated for intermediate barrier heights.
4. For barrier with a 2' - 10" reveal, see **Sheet 2.** For High-Performance Barrier with a 3' - 6" reveal, see **Sheet 3**.

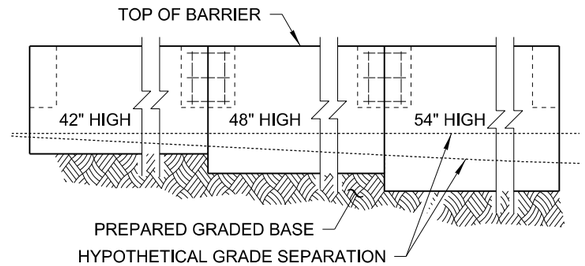


TYPICAL SECTION

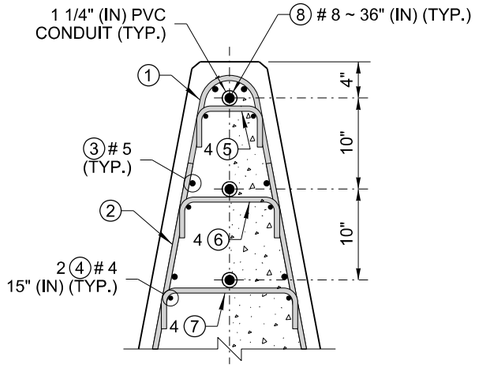
DUMMY JOINT DETAIL



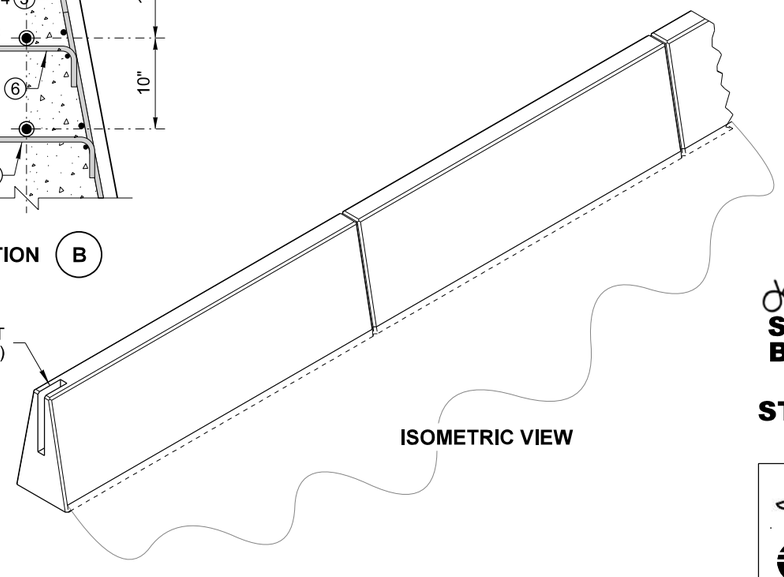
EXPANSION JOINT DETAIL



BARRIER TRANSITION DETAIL



SECTION B

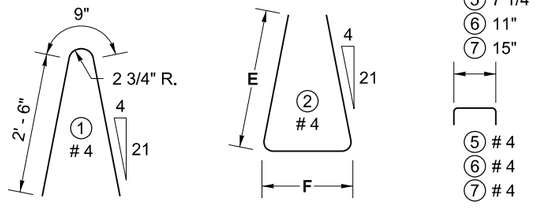


ISOMETRIC VIEW

NOTE:
STEEL WELDED WIRE REINFORCEMENT DEFORMED FOR CONCRETE MAY BE SUBSTITUTED FOR REINFORCING STEEL IN ACCORDANCE WITH **STANDARD SPECIFICATION 6-10.3**

REINFORCING STEEL BENDING DIAGRAM

SEE **STD. SPEC. SECT. 9-07.1(2)** FOR BENDING DIAMETERS



5 7 1/4"
6 11"
7 15"

5 # 4
6 # 4
7 # 4

(SEE NOTE 3)

DIMENSION TABLE (SEE NOTE 3)

BARRIER HEIGHT	A	B	D	E	F	HORIZONTAL BARS (QTY.)
3' - 6"	8"	2' - 0"	3	2' - 6"	1' - 8"	8
4' - 0"	9 1/8"	2' - 2 1/4"	4	3' - 0"	1' - 10"	10
4' - 6"	10 1/4"	2' - 4 1/2"	5	3' - 6 1/2"	2' - 0"	12

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
REGISTERED
PROFESSIONAL ENGINEER

2020.08.27 09:49:25 -07'00'

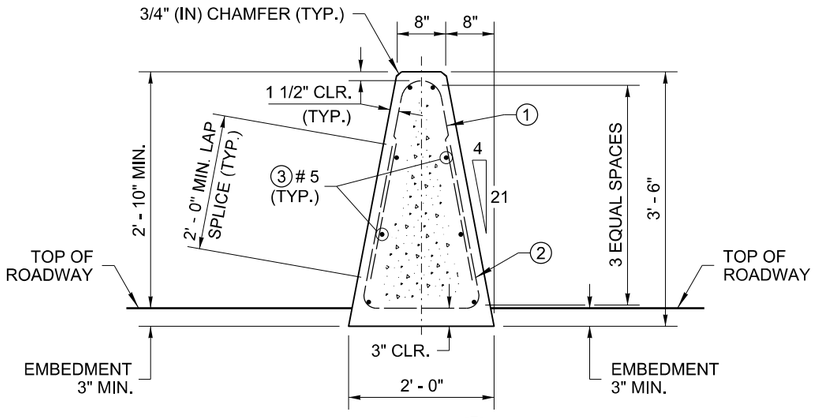
SINGLE-SLOPE CONCRETE BARRIER (CAST-IN-PLACE) DUAL-FACED

STANDARD PLAN C-80.10-02

APPROVED FOR PUBLICATION
Date: 2020.09.16 09:58:58 -07'00'
STATE DESIGN ENGINEER

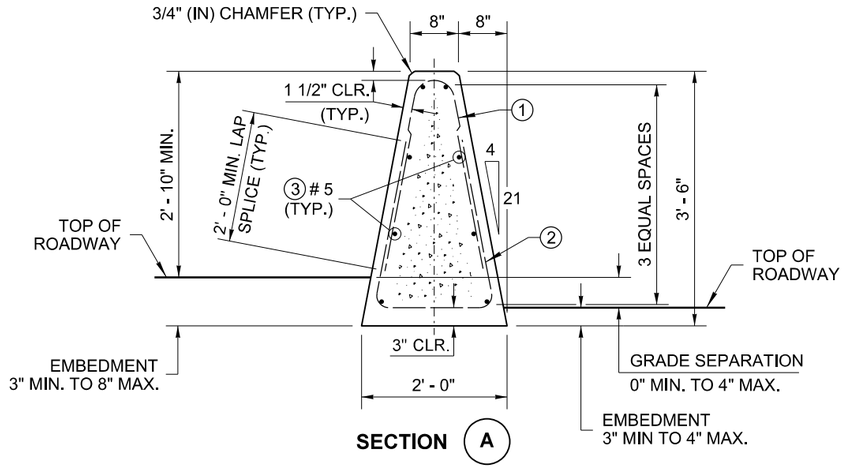
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



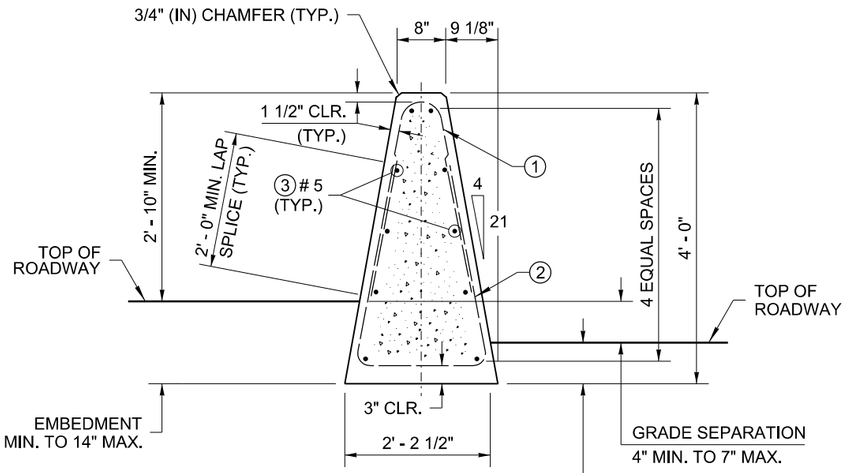
SECTION A

3' - 6" BARRIER
SHOWN LEVEL



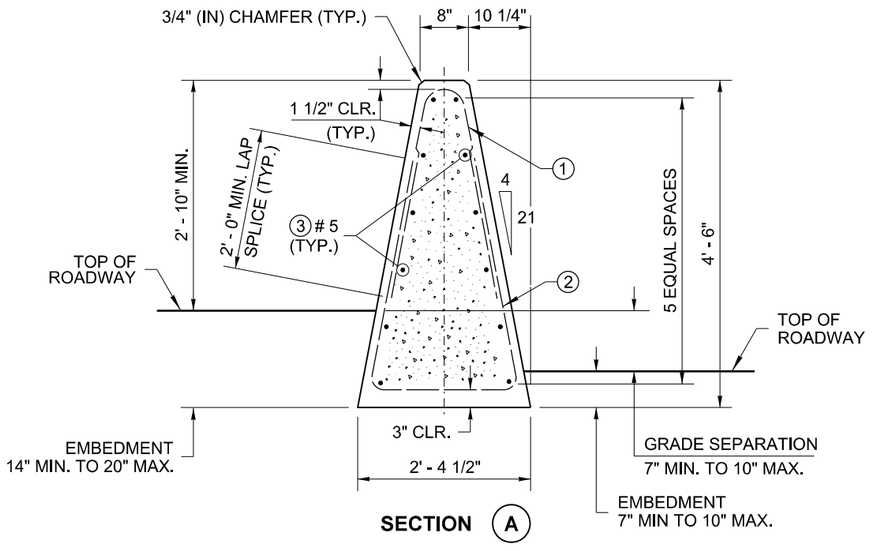
SECTION A

3' - 6" BARRIER FOR USE WITH A
0" (IN) TO 4" (IN) MAX. GRADE SEPARATION
(SEE NOTE 3)



SECTION A

4' - 0" BARRIER FOR USE WITH A
GREATER THAN 4" (IN) TO 7" (IN) MAX.
GRADE SEPARATION
(SEE NOTE 3)



SECTION A

4' - 6" BARRIER FOR USE WITH A
GREATER THAN 7" (IN) TO 10" (IN) MAX.
GRADE SEPARATION
(SEE NOTE 3)

SINGLE SLOPE BARRIER - 2' - 10" MIN. REVEAL
3" (IN) MIN. EMBEDMENT

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
REGISTERED
PROFESSIONAL ENGINEER

2020.08.31 10:40:28 -07'00'

SINGLE-SLOPE CONCRETE BARRIER (CAST-IN-PLACE) DUAL-FACED

STANDARD PLAN C-80.10-02

SHEET 2 OF 3 SHEETS

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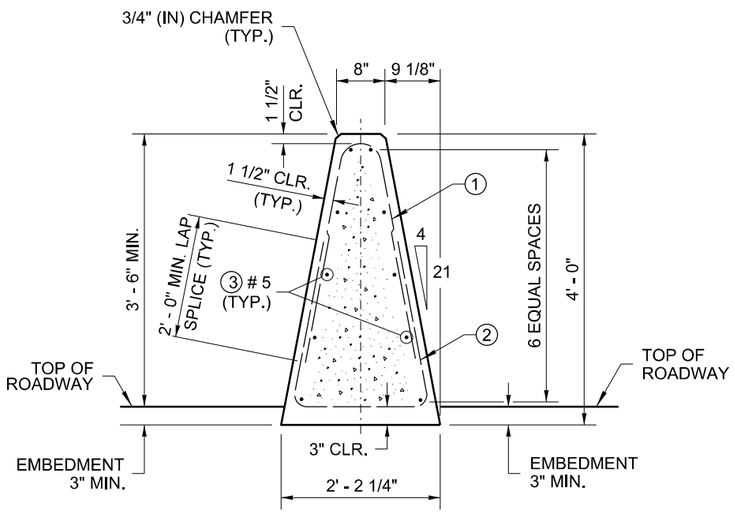
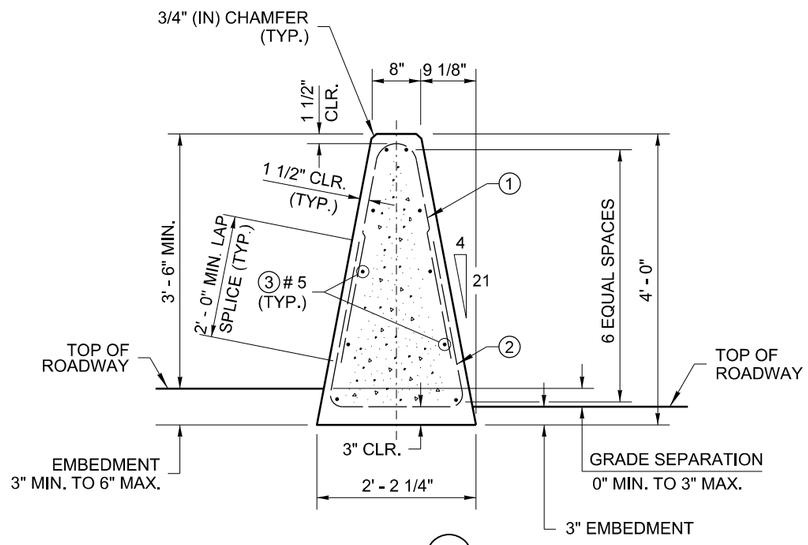


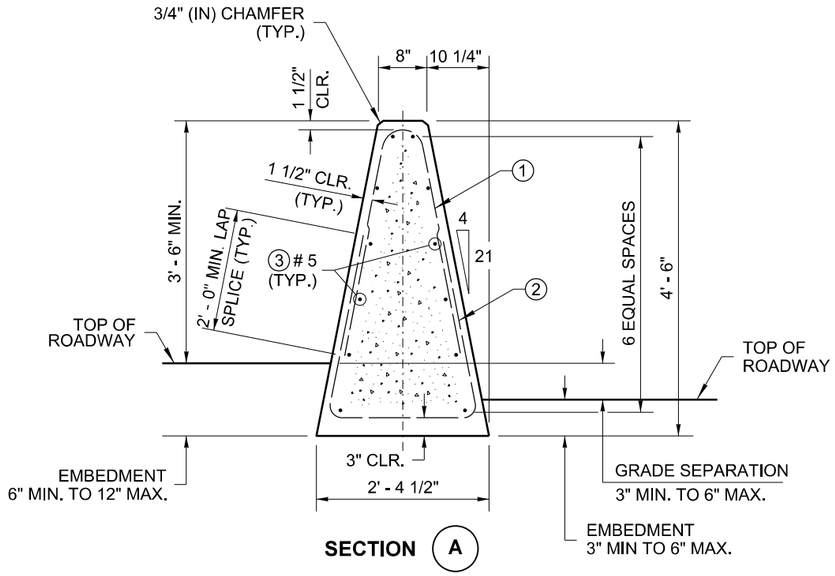
SECTION (A)

4' - 0" BARRIER SHOWN LEVEL



SECTION (A)

4' - 0" BARRIER FOR USE WITH A 0" (IN) TO 3" (IN) MAX. GRADE SEPARATION (SEE NOTE 3)



SECTION (A)

4' - 6" BARRIER FOR USE WITH A GREATER THAN 3" (IN) TO 6" (IN) MAX. GRADE SEPARATION (SEE NOTE 3)

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
REGISTERED
PROFESSIONAL ENGINEER

2020.08.31 10:43:08 -07'00'

SINGLE-SLOPE CONCRETE BARRIER (CAST-IN-PLACE) DUAL-FACED

STANDARD PLAN C-80.10-02

SHEET 3 OF 3 SHEETS

APPROVED FOR PUBLICATION
Date: 2020.09.16 10:00:10 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

HIGH-PERFORMANCE SINGLE SLOPE BARRIER - 3' - 6" MIN. REVEAL
3" (IN) MIN. EMBEDMENT

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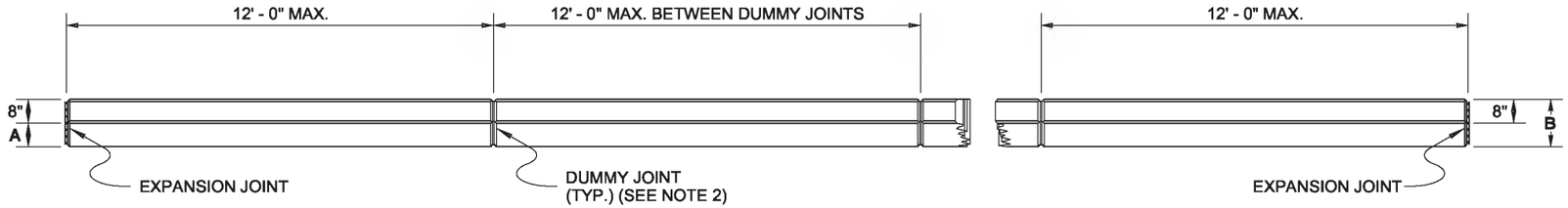
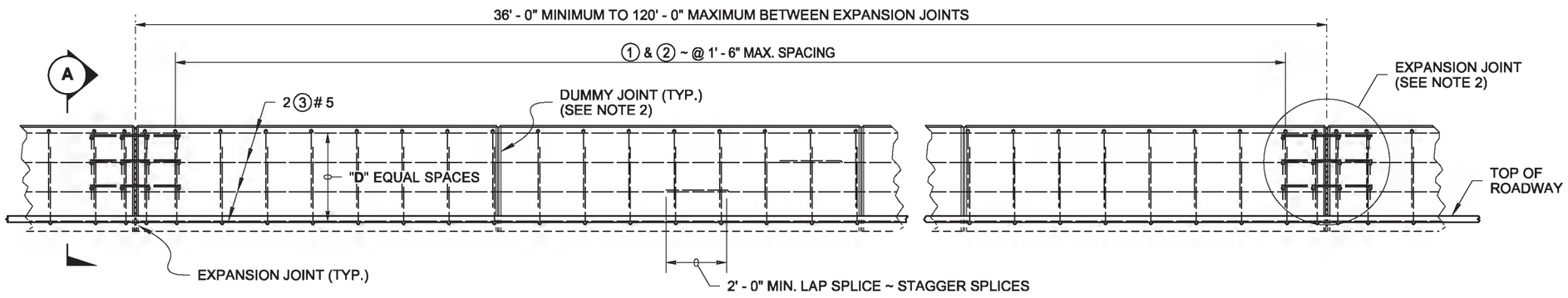
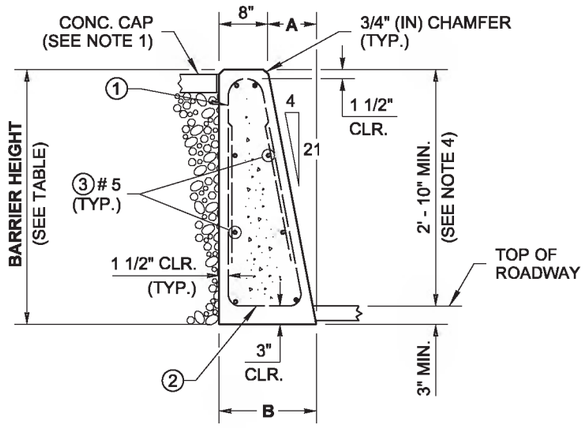
DRAWN BY: LISA CYFORD



PLAN



ELEVATION

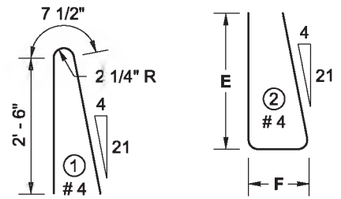


SECTION (A)

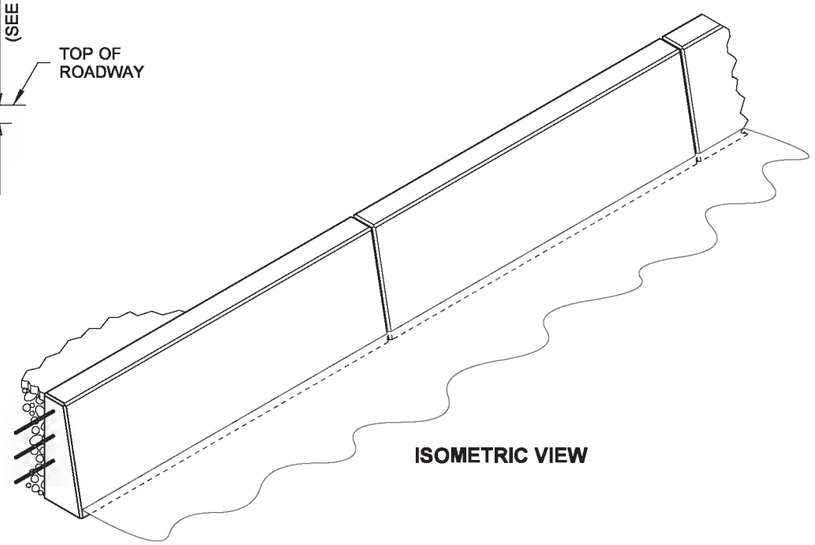
NOTE:
STEEL WELDED WIRE REINFORCEMENT DEFORMED FOR CONCRETE MAY BE SUBSTITUTED FOR REINFORCING STEEL IN ACCORDANCE WITH **STANDARD SPECIFICATION 6-10.3**

REINFORCING STEEL BENDING DIAGRAM

SEE STD. SPEC. 9-07.1(2) FOR BENDING DIAMETERS



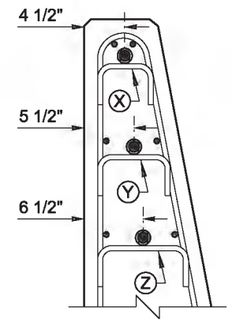
DIMENSION TABLE (SEE NOTE 4)							
	BARRIER HEIGHT	A	B	D	E	F	HORIZONTAL BARS (QTY.)
STD.	3' - 6"	8"	1' - 4"	3	2' - 6"	1' - 0 1/4"	8
H/P	4' - 0"	9 1/8"	1' - 5 1/8"	4	3' - 0"	1' - 1 1/2"	10



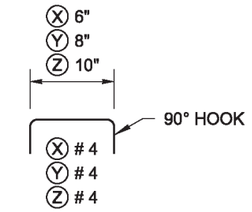
ISOMETRIC VIEW

NOTES

1. The Vertical Back barrier is used only in the configurations shown in **Standard Plans C-85.10** and **C-85.11**, and when placed against a retaining wall.
2. See **Standard Plan C-80.10,** Sheet 1, for EXPANSION JOINT and DUMMY JOINT details. Modify rebar as shown in EXPANSION JOINT MODIFICATION.
3. Reinforcing steel dimensions and clearances are shown for stationary form construction. When slip-form construction is used, increase reinforcing steel clearances to the outside surfaces of the barrier to 2 1/2" (in) and adjust steel dimensions as required.
4. When **High-Performance Concrete Barrier** is specified in the Contract, use the dimensions given in the H/P row in the DIMENSION TABLE, with a minimum height above roadway of 3' - 6" and a minimum embedment of 3" (in).



SECTION



REINFORCING STEEL BENDING DIAGRAM

EXPANSION JOINT MODIFICATION

(SEE NOTE 2)

EDWARD PATRICK BARRY
STATE OF WASHINGTON
34363
REGISTERED
PROFESSIONAL ENGINEER

Barry, Ed
May 19 2014 8:33 AM

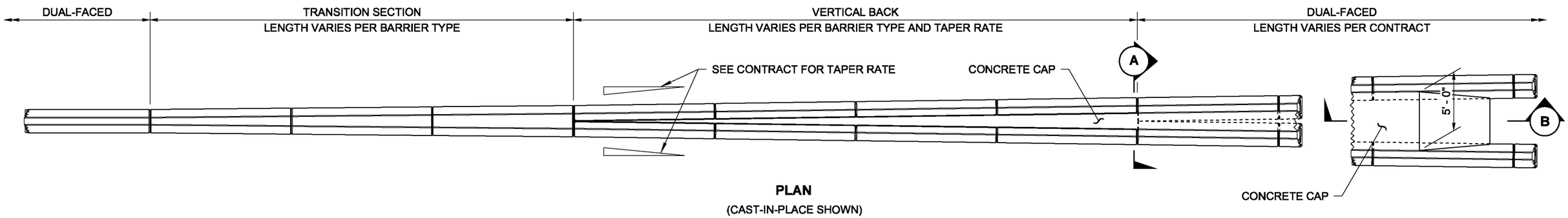
SINGLE-SLOPE CONCRETE BARRIER (CAST-IN-PLACE) VERTICAL BACK

STANDARD PLAN C-80.40-01

SHEET 1 OF 1 SHEET

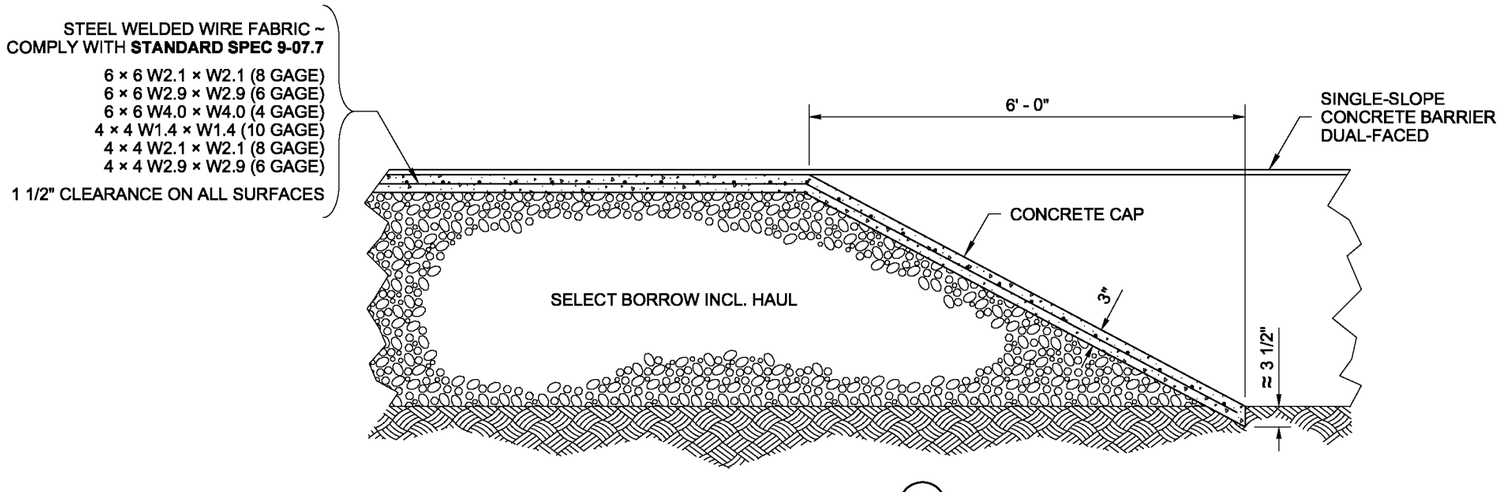
APPROVED FOR PUBLICATION
Bakotich, Pasco
Jun 11 2014 1:19 PM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: LISA CYFORD

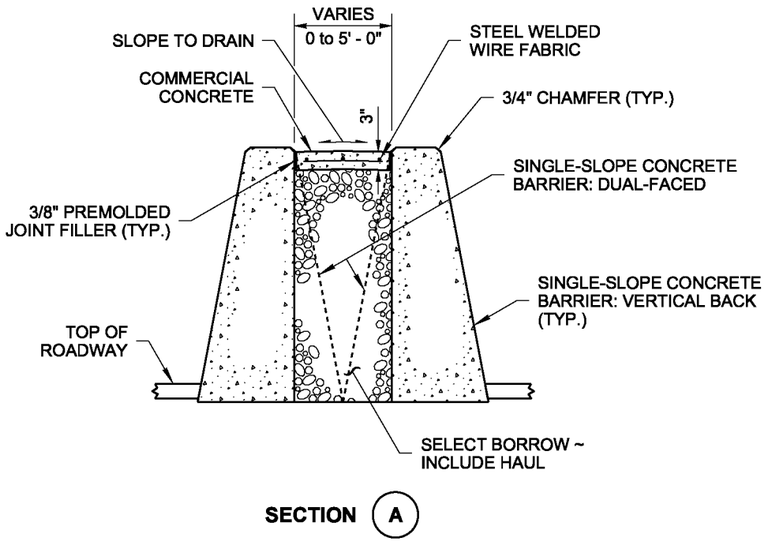


PLAN

(CAST-IN-PLACE SHOWN)



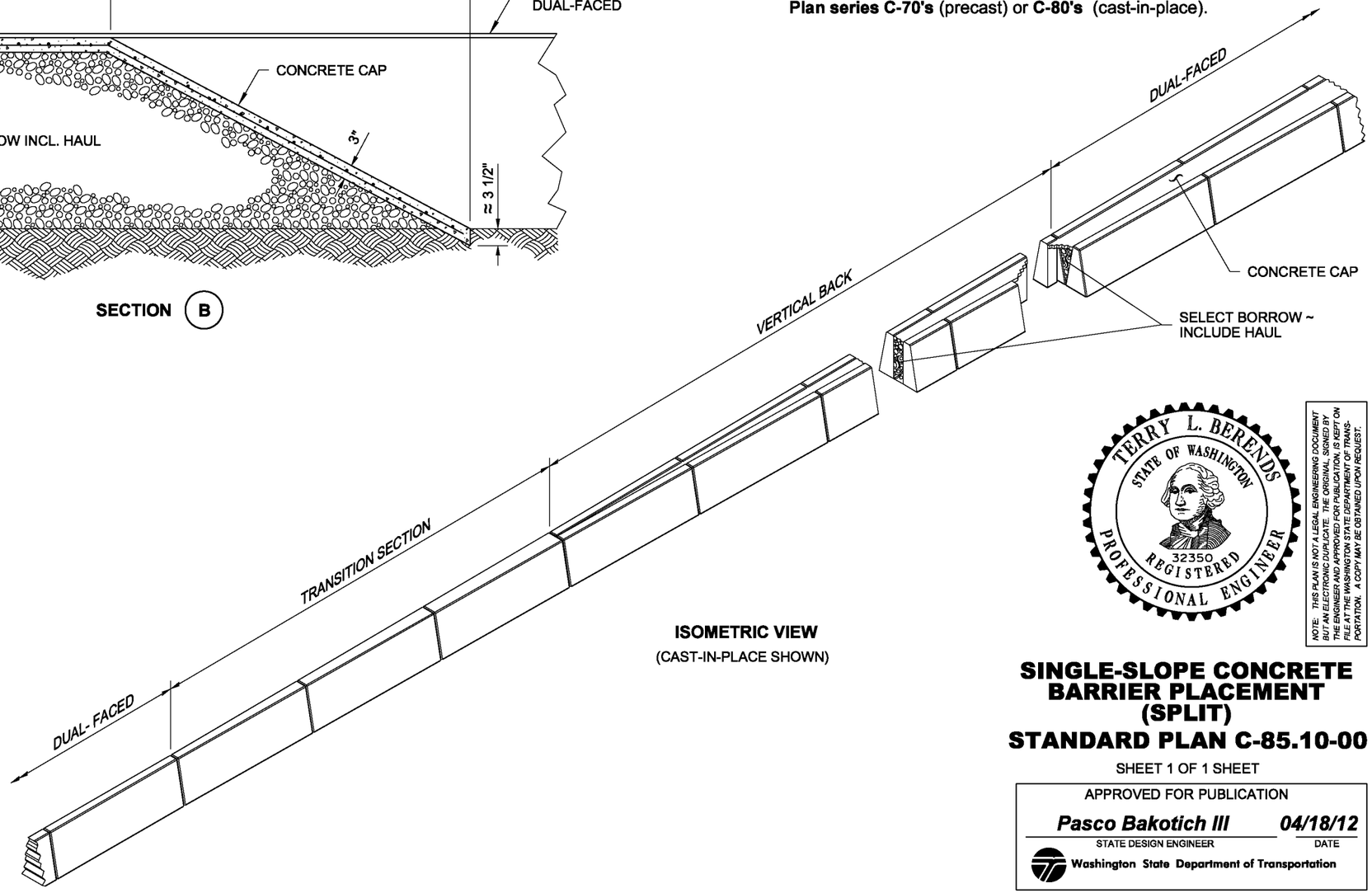
SECTION (B)



SECTION (A)

NOTES

1. Use the barrier type, precast or cast-in-place, as specified in the Contract.
2. For Single-Slope Concrete Barrier details, see **Standard Plan series C-70's** (precast) or **C-80's** (cast-in-place).



ISOMETRIC VIEW

(CAST-IN-PLACE SHOWN)

TERRY L. BERENDS
STATE OF WASHINGTON
32350
REGISTERED
PROFESSIONAL ENGINEER

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

SINGLE-SLOPE CONCRETE BARRIER PLACEMENT (SPLIT)

STANDARD PLAN C-85.10-00

SHEET 1 OF 1 SHEET

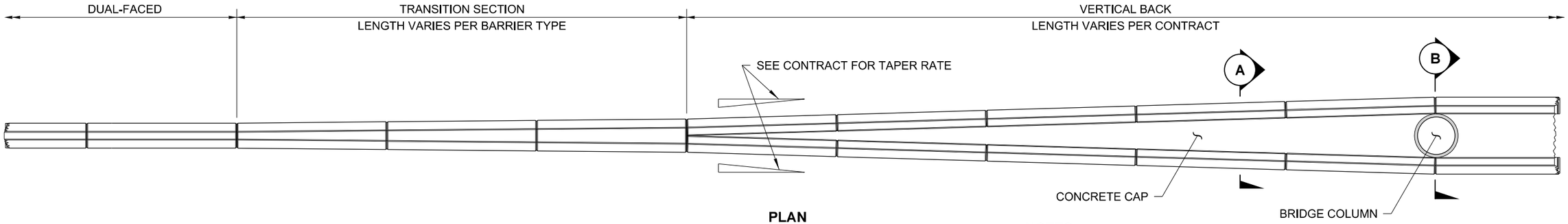
APPROVED FOR PUBLICATION

Pasco Bakotich III — STATE DESIGN ENGINEER

04/18/12 — DATE

Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

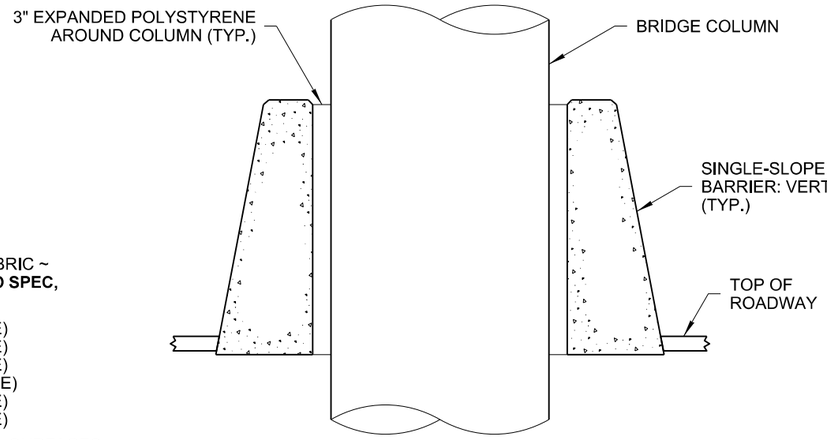


PLAN

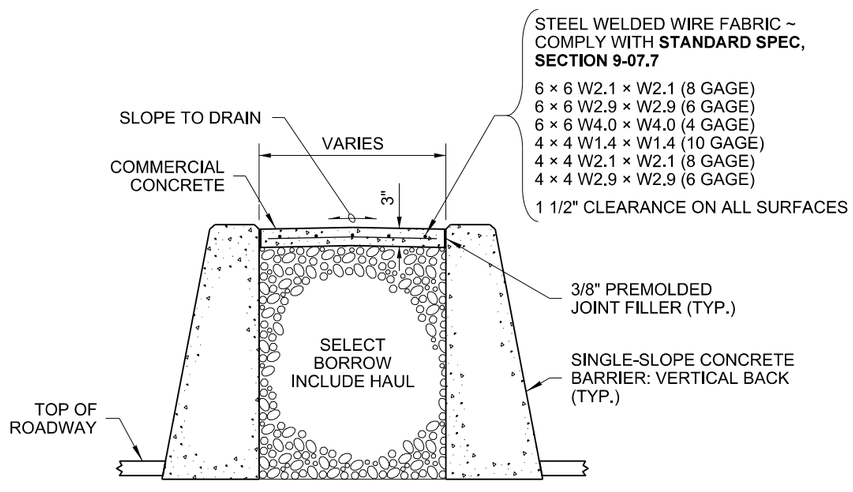
(CAST-IN-PLACE SHOWN)

NOTES

1. Existing barrier in front of bridge piers following this plan placement may remain in place for preservation (P1, P2 and P3) projects. Contact the HQ Bridge traffic barrier specialist before using this barrier placement plan for projects involving new or reconstructed bridges.
2. Use the barrier type, precast or cast-in-place, as specified in the Contract.
3. For Single-Slope Concrete Barrier details, see **Standard Plan series C-70's** (precast) or **C-80's** (cast-in-place).



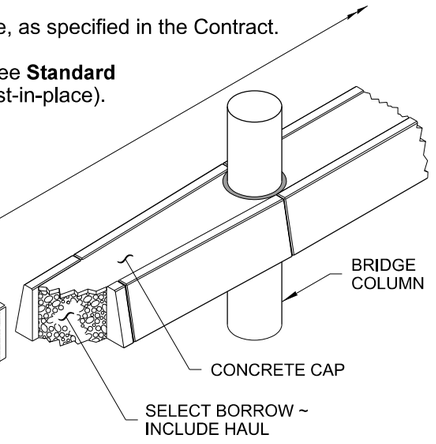
SECTION (B)

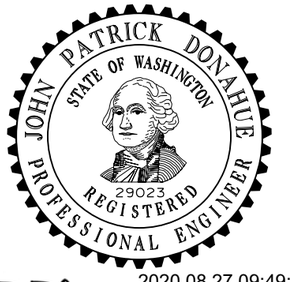


SECTION (A)

ISOMETRIC VIEW

(CAST-IN-PLACE SHOWN)





2020.08.27 09:49:47 -07'00'

SINGLE-SLOPE CONCRETE BARRIER PLACEMENT (WRAP)

STANDARD PLAN C-85.11-01

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Date: 2020.09.16 10:04:15 -07'00'

STATE DESIGN ENGINEER

Washington State Department of Transportation

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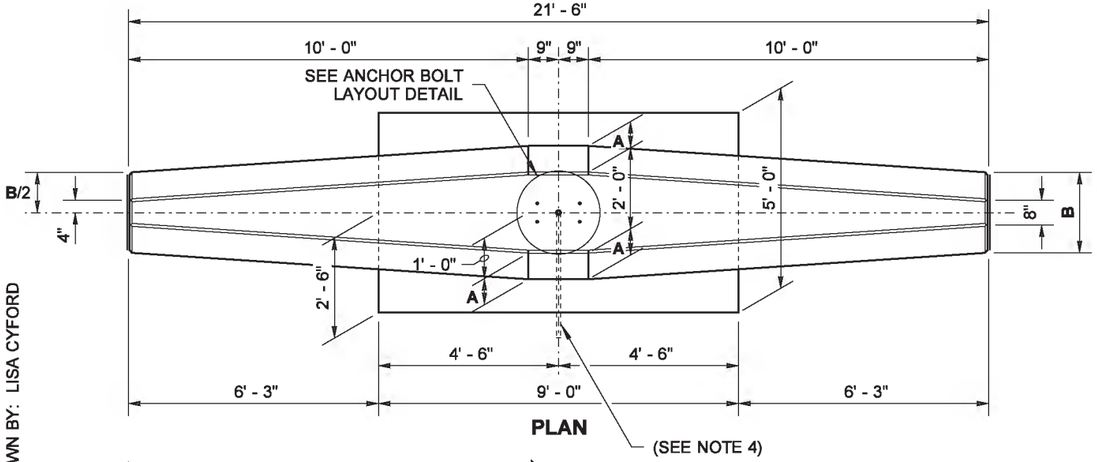
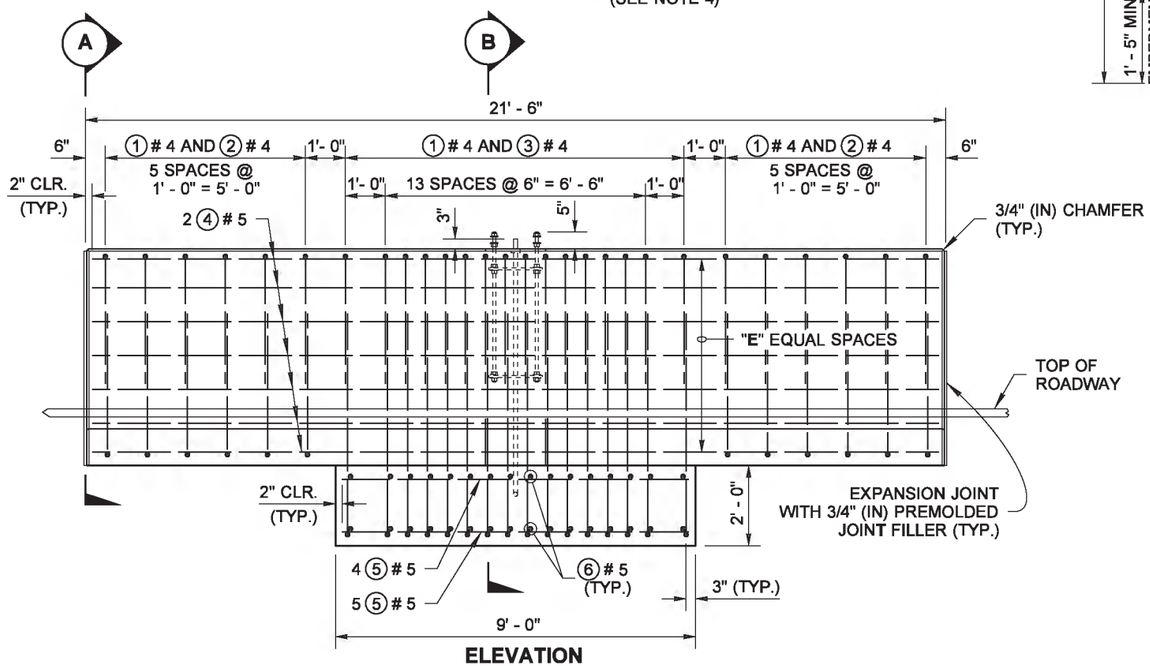
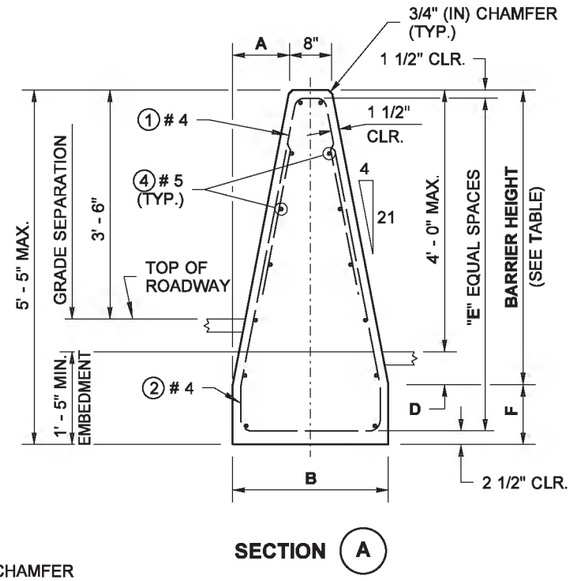
DRAWN BY: LISA CYFORD



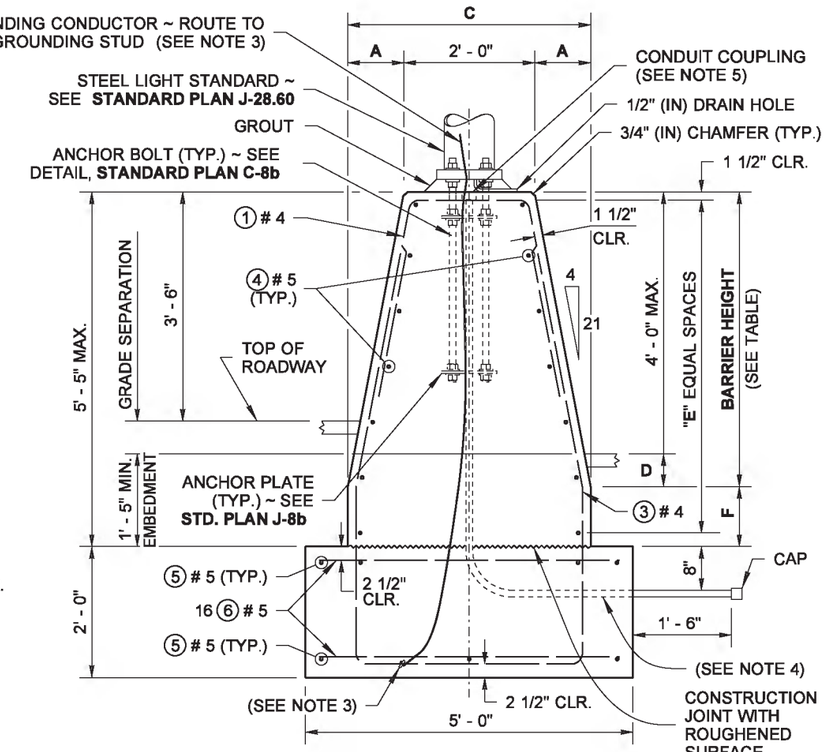
PLAN



ELEVATION



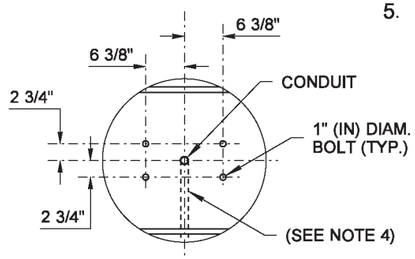
SECTION (A)



SECTION (B)

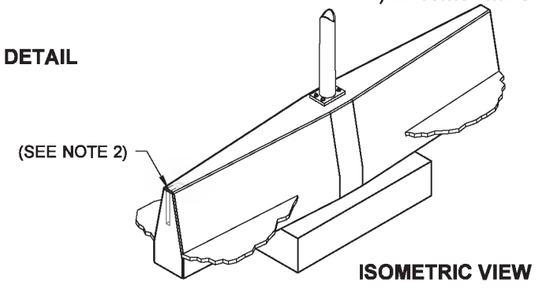
NOTES

1. This Barrier/Foundation combination has been designed in accordance with AASHTO LRFD Test Level 4 requirements. The horizontal vehicle impact force at the top of the barrier is taken at 54 kips for Strength and Extreme Limit States, and 10 kips for footing stability (overturning and sliding) in the Service Limit State.
2. When connecting between cast-in-place and precast Single-Slope Barrier, provide a Connection Blockout and Rebar Grid as shown on **Standard Plan C-70.10.**
3. Grounding conductor shall be non-insulated #4 AWG stranded copper; provide 3' - 0" min. slack. Clamp steel reinforcing bar with connector suitable for use embedded in concrete.
4. See the Contract Plans for conduit placement.
5. Install Conduit Coupling flush with top of foundation. Do not glue PVC stubout.
6. This plan shall be used for 40' (ft) and 50' (ft) Light Standards with 16' (ft) max. length double mast arms.
7. Concrete shall be Class 4000.
8. The factored soil bearing resistance shall equal or exceed the following:
   i) Service limit state = 6 ksf
   ii) Strength limit state = 24 ksf
   iii) Extreme limit state = 48 ksf



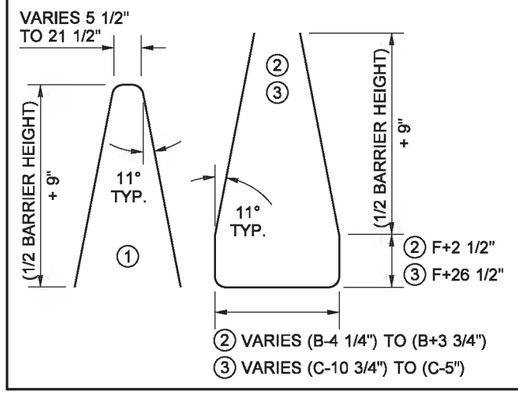
PLAN VIEW

ANCHOR BOLT LAYOUT DETAIL



ISOMETRIC VIEW

ALL DIMENSIONS ARE OUT TO OUT
ALL BENDS ARE 2" (IN) RADIUS



BAR LIST

MARK NO.	LOCATION	SIZE	QUANTITY
①	BARRIER ~ TOP VERTICAL	# 4	28
②	BARRIER ~ BOTTOM VERTICAL	# 4	12
③	FND. & BARRIER ~ VERTICAL	# 4	16
④	BARRIER ~ HORIZONTAL	# 5	"Q"
⑤	FOUNDATION	# 5	9
⑥	FOUNDATION	# 5	32

TABLE

GRADE SEPARATION	BARRIER HEIGHT	A	B	C	D	E	F	Q
0 TO 3"	4' - 0"	9 1/8"	2' - 2 1/4"	3' - 6 1/4"	VARIES 6" TO 9"	6	1' - 2"	14
UP TO 6" MAX.	4' - 6"	10 1/4"	2' - 4 1/2"	3' - 8 1/2"	VARIES 6" TO 9"	6	11"	14

RICHARD P. ZELDENRUST
STATE OF WASHINGTON
25470
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER

Zeldenrust, Richard
Jun 30 2014 7:44 AM

SINGLE-SLOPE CONCRETE BARRIER (42") LIGHT STANDARD FOUNDATION

STANDARD PLAN C-85.15-01

SHEET 1 OF 1 SHEET

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Bakotich, Pasco
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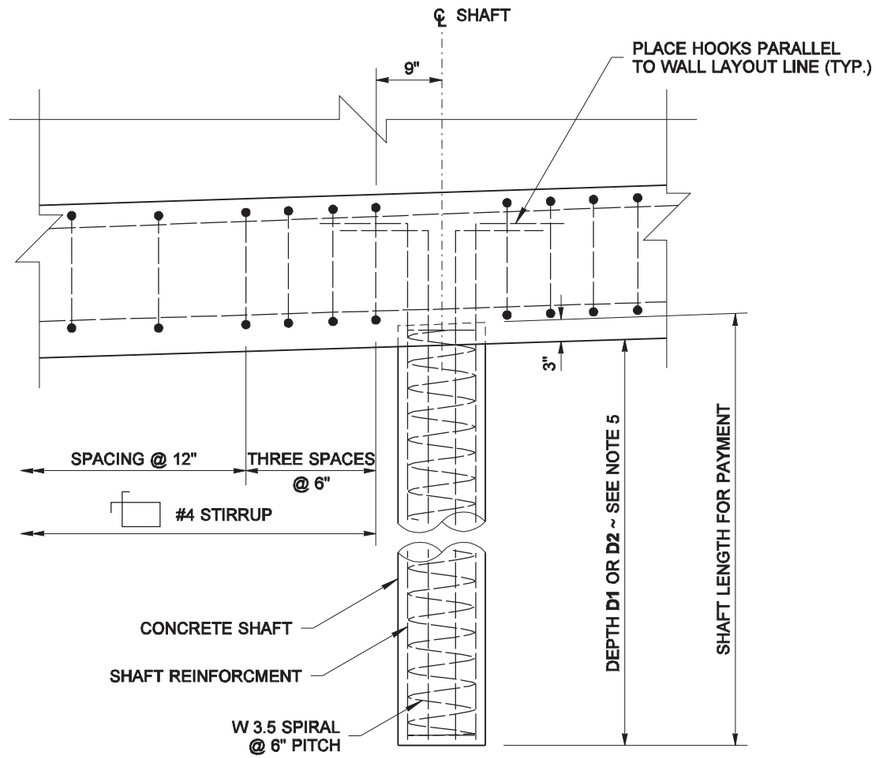
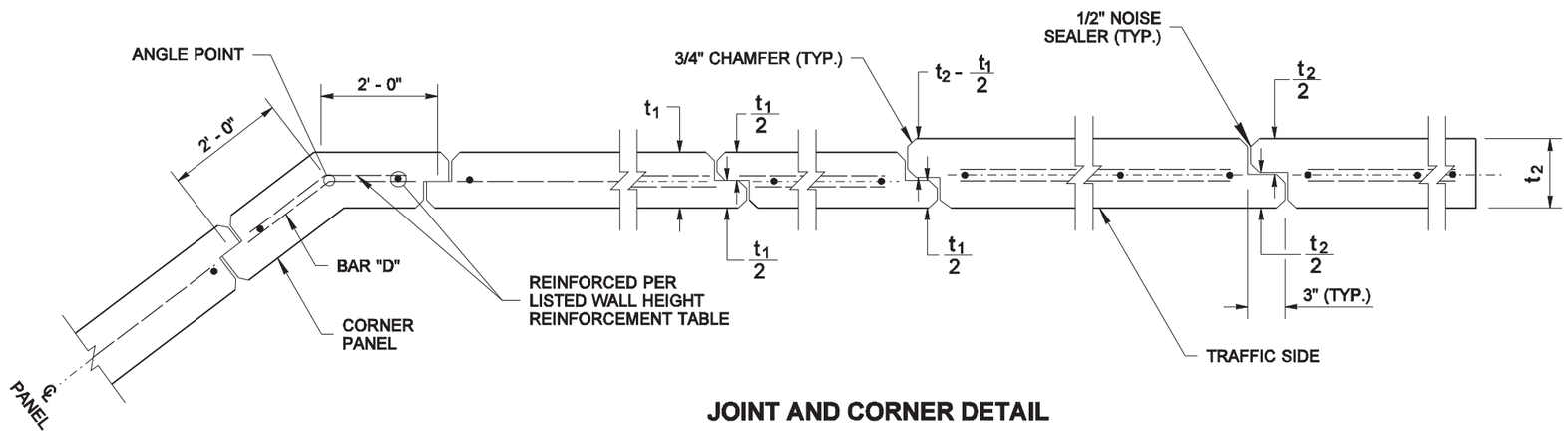
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: ADAM COCHRAN



DETAIL "B"



JOINT AND CORNER DETAIL

CAST-IN-PLACE CONCRETE WALL ON SHAFT FOUNDATION

BIJAN KHALEGHI
STATE OF WASHINGTON
27695
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PROFESSIONAL ENGINEER

EXPIRES AUGUST 23, 2006

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NOISE BARRIER WALL TYPE 4

STANDARD PLAN D-2.08-00

SHEET 2 OF 2 SHEETS

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Harold J. Peterfeso — STATE DESIGN ENGINEER — *11-10-05* — DATE

Washington State Department of Transportation

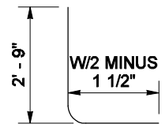
DRAWN BY: ADAM COCHRAN

WALL HT H	TYPE 9A W	BARS "A"&"F"	t	BAR "B"	SPIRAL BAR "G"	BARS "D"&"H"	TYPE 9B W	BARS "A"&"F"	t	BAR "B"	SPIRAL BAR "G"	BARS "D"&"H"	TYPE 9C W	BARS "A"&"F"	t	BAR "B"	SPIRAL BAR "G"	BARS "D"&"H"	TYPE 9D W	BARS "A"&"F"	t	BAR "B"	SPIRAL BAR "G"	BARS D & H	WALL HT H
6' - 0"	2' - 0"	3 ~ #4	5"	#4 @ 18"	W2.0 @ 2"	#3 @ 15"	2' - 3"	3 ~ #4	5"	#4 @ 18"	W2.0 @ 2"	#3 @ 12"	2' - 0"	3 ~ #4	5"	#4 @ 18"	W2.0 @ 2"	#3 @ 15"	2' - 6"	3 ~ #4	5"	#4 @ 18"	W2.0 @ 2"	#3 @ 11"	6' - 0"
8' - 0"	2' - 3"	3 ~ #4	5"	#4 @ 18"	W2.0 @ 2"	#3 @ 12"	2' - 9"	3 ~ #4	5"	#4 @ 18"	W3.0 @ 2"	#4 @ 15"	2' - 6"	3 ~ #4	5"	#4 @ 18"	W2.0 @ 2"	#3 @ 10"	3' - 3"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 2"	#4 @ 12"	8' - 0"
10' - 0"	2' - 6"	3 ~ #4	5"	#4 @ 18"	W2.0 @ 2"	#3 @ 9"	3' - 3"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 2"	#4 @ 10"	2' - 9"	3 ~ #4	5"	#4 @ 18"	W3.0 @ 2"	#4 @ 12"	3' - 6"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 2"	#4 @ 10"	10' - 0"
12' - 0"	3' - 0"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 2"	#4 @ 12"	3' - 9"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 2"	#4 @ 10"	3' - 3"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 2"	#4 @ 10"	4' - 3"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 1 3/4"	#5 @ 12"	12' - 0"
14' - 0"	3' - 3"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 2"	#4 @ 10"	4' - 3"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 1 3/4"	#5 @ 11"	3' - 9"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 2"	#4 @ 9"	4' - 9"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 1 3/4"	#5 @ 8"	14' - 0"
16' - 0"	3' - 9"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 2"	#4 @ 9"	4' - 9"	5 ~ #4	5"	#4 @ 18"	W4.0 @ 2"	#6 @ 12"	4' - 3"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 1 3/4"	#5 @ 11"	5' - 6"	5 ~ #4	5"	#4 @ 18"	W4.0 @ 2"	#6 @ 9"	16' - 0"
18' - 0"	4' - 0"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 1 3/4"	#5 @ 11"	5' - 3"	5 ~ #4	5"	#4 @ 18"	W4.0 @ 2"	#6 @ 9"	4' - 6"	5 ~ #4	5"	#4 @ 18"	W4.0 @ 2"	#6 @ 12"	6' - 0"	5 ~ #4	6"	#4 @ 18"	W4.0 @ 2"	#6 @ 9"	18' - 0"
20' - 0"	5' - 0"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 1 1/2"	#5 @ 9"	6' - 0"	5 ~ #4	6"	#4 @ 18"	W4.0 @ 2"	#6 @ 9"	5' - 3"	5 ~ #4	5"	#4 @ 18"	W4.0 @ 2"	#6 @ 10"	6' - 6"	6 ~ #4	6"	#4 @ 12"	W4.0 @ 1 3/4"	#6 @ 7"	20' - 0"
22' - 0"	5' - 6"	5 ~ #4	5"	#4 @ 18"	W3.0 @ 1 1/2"	#5 @ 7"	6' - 3"	5 ~ #4	6"	#4 @ 12"	W4.0 @ 1 3/4"	#6 @ 8"	5' - 9"	5 ~ #4	6"	#4 @ 18"	W4.0 @ 2"	#6 @ 9"	7' - 0"	6 ~ #4	7"	#4 @ 12"	W4.0 @ 1 3/4"	#6 @ 7"	22' - 0"
24' - 0"	6' - 0"	5 ~ #4	5"	#4 @ 15"	W3.0 @ 1 1/2"	#5 @ 6"	6' - 9"	5 ~ #4	7"	#4 @ 11"	W4.0 @ 1 3/4"	#6 @ 8"	6' - 3"	5 ~ #4	6"	#4 @ 12"	W4.0 @ 1 3/4"	#6 @ 8"	7' - 6"	6 ~ #4	7"	#4 @ 15"	W4.0 @ 1 1/2"	#6 @ 6"	24' - 0"

t = WALL THICKNESS

WIND EXPOSURE & VELOCITY		
NOISE BARRIER TYPE	WIND EXPOSURE	WIND VELOCITY (MPH)
9A	B1	80
9B	B1	90
9C	B2	80
9D	B2	90

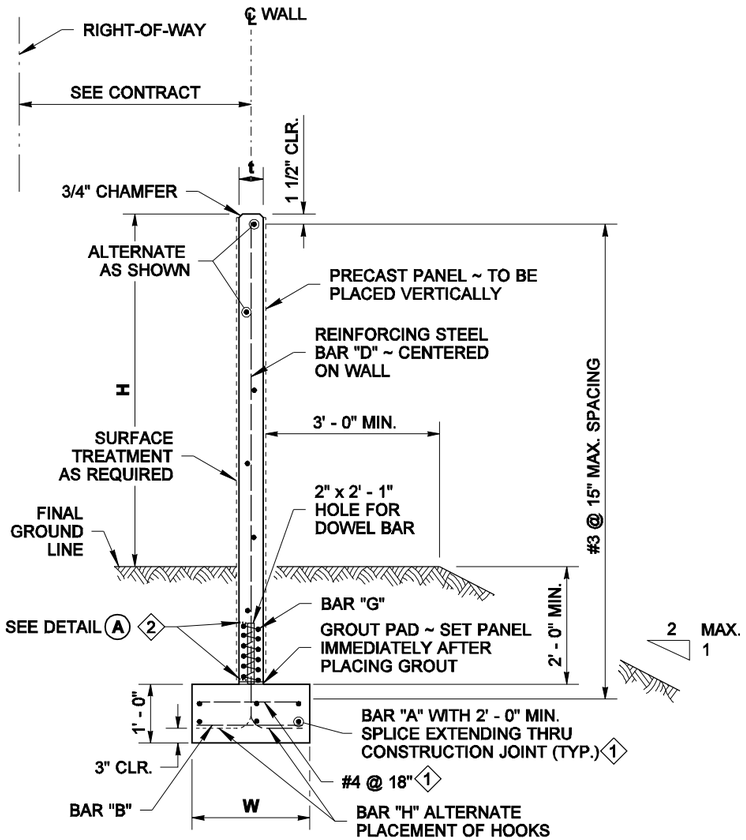
BENDING DIAGRAM



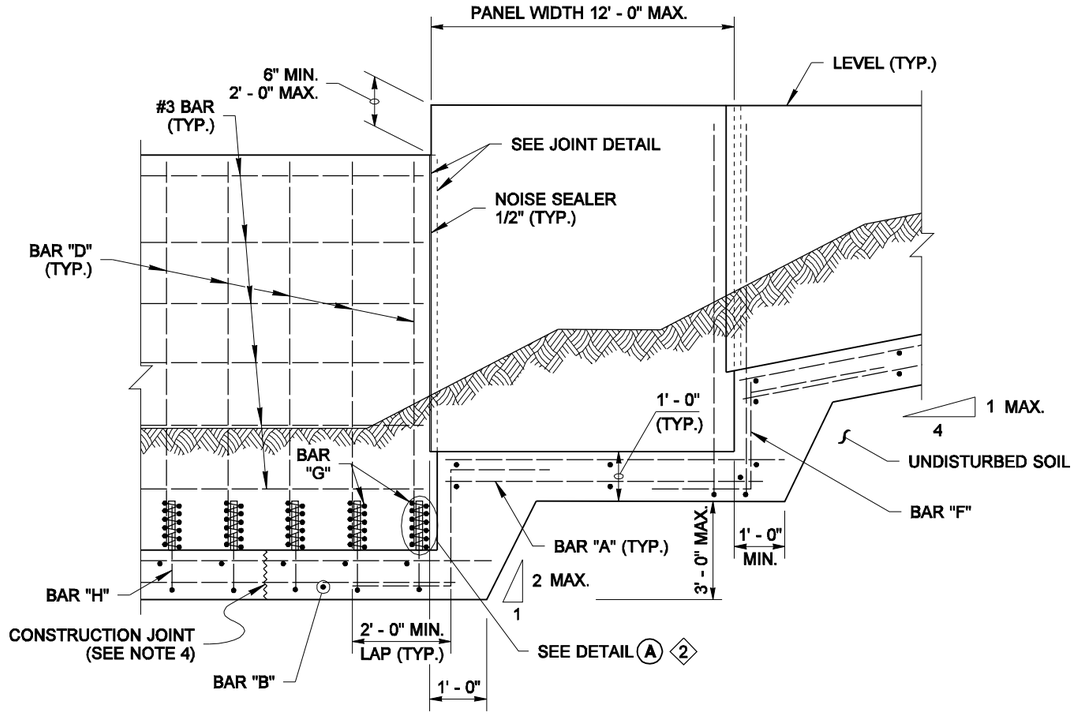
BAR "H"

NOTES

1. Wall to be designated Noise Barrier Wall Type 9A, 9B, 9C or 9D. The Contract specifies actual wall designation.
2. For intermediate wall heights, use the next higher H.
3. Panels shall have at least 3' - 0" of level ground on each side.
4. Construction joints in the footing shall be spaced at 120 feet maximum.
5. All joints shall be in full contact and sealed.



TYPICAL SECTION



ELEVATION

1 REQUIRED FOR WALL HEIGHT 24' - 0" ~ TYPE 9C, WALLS 22' - 0" & 24' - 0" ~ TYPE 9B & WALLS 20' - 0", 22' - 0" & 24' - 0" ~ TYPE 9D.

PRECAST CONCRETE WALL ON SPREAD FOOTING

BIJAN KHALEGHI
STATE OF WASHINGTON
27695
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES AUGUST 23, 2006

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NOISE BARRIER WALL TYPE 9

STANDARD PLAN D-2.32-00

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11-10-05 — DATE

Washington State Department of Transportation

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WIND EXPOSURE & VELOCITY		
NOISE BARRIER TYPE	WIND EXPOSURE	WIND VELOCITY (MPH)
16A	B1	80
16B	B1	90
16C	B2	80
16D	B2	90

SOIL TYPE	
SOIL TYPE	ANGLE OF INTERNAL FRICTION ϕ (DEGREES)
D1	32
D2	38

CMU = CONCRETE MASONRY UNIT

WALL HT H	TYPE 16A					
	CMU WIDTH	X	DEPTH D1	DEPTH D2	BAR "C"	BAR "D"
6' - 0"	8"	—	3' - 3"	3' - 0"	—	#6 @ 48"
8' - 0"	8"	—	3' - 6"	3' - 4"	—	#6 @ 48"
10' - 0"	8"	—	3' - 10"	3' - 6"	—	#6 @ 48"
12' - 0"	8"	—	4' - 7"	3' - 8"	—	#6 @ 48"
14' - 0"	8"	—	4' - 4"	3' - 10"	—	#6 @ 32"
16' - 0"	8"	—	4' - 7"	4' - 1"	—	#6 @ 24"
18' - 0"	10"	5' - 4"	4' - 10"	4' - 3"	#6 @ 48"	#6 @ 48"
20' - 0"	10"	6' - 0"	5' - 3"	4' - 9"	#6 @ 32"	#6 @ 32"
22' - 0"	10"	6' - 8"	5' - 6"	5' - 0"	#6 @ 24"	#6 @ 24"
24' - 0"	10"	7' - 4"	5' - 9"	5' - 3"	#6 @ 18"	#6 @ 18"

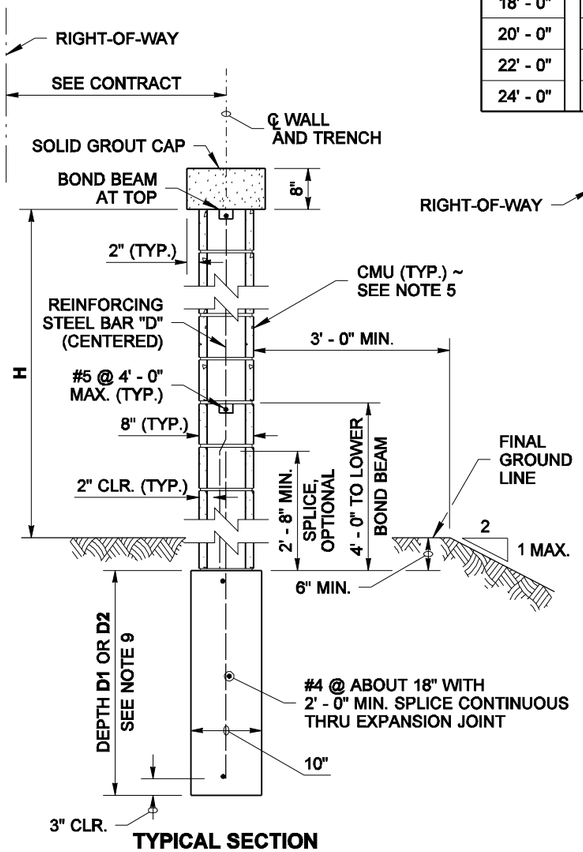
WALL HT H	TYPE 16C					
	CMU WIDTH	X	DEPTH D1	DEPTH D2	BAR "C"	BAR "D"
6' - 0"	8"	—	3' - 6"	3' - 3"	—	#6 @ 48"
8' - 0"	8"	—	3' - 9"	3' - 5"	—	#6 @ 48"
10' - 0"	8"	—	4' - 7"	3' - 8"	—	#6 @ 48"
12' - 0"	8"	—	4' - 4"	3' - 11"	—	#6 @ 32"
14' - 0"	8"	—	4' - 8"	4' - 2"	—	#6 @ 24"
16' - 0"	10"	4' - 0"	4' - 11"	4' - 5"	#6 @ 40"	#6 @ 40"
18' - 0"	10"	4' - 8"	5' - 3"	4' - 8"	#6 @ 32"	#6 @ 32"
20' - 0"	10"	5' - 4"	5' - 6"	5' - 0"	#6 @ 24"	#6 @ 24"
22' - 0"	10"	6' - 0"	5' - 9"	5' - 3"	#6 @ 16"	#6 @ 16"
24' - 0"	10"	7' - 8"	6' - 0"	5' - 6"	#7 @ 16"	#7 @ 16"

WALL HT H	TYPE 16B					
	CMU WIDTH	X	DEPTH D1	DEPTH D2	BAR "C"	BAR "D"
6' - 0"	8"	—	3' - 8"	3' - 4"	—	#6 @ 48"
8' - 0"	8"	—	4' - 0"	3' - 8"	—	#6 @ 48"
10' - 0"	8"	—	4' - 4"	3' - 10"	—	#6 @ 48"
12' - 0"	8"	—	4' - 8"	4' - 2"	—	#6 @ 40"
14' - 0"	10"	4' - 0"	4' - 11"	4' - 5"	#6 @ 40"	#6 @ 40"
16' - 0"	10"	4' - 8"	5' - 3"	4' - 8"	#6 @ 32"	#6 @ 32"
18' - 0"	10"	5' - 4"	5' - 6"	5' - 0"	#6 @ 24"	#6 @ 24"
20' - 0"	10"	6' - 0"	4' - 9"	5' - 3"	#7 @ 24"	#7 @ 24"
22' - 0"	10"	8' - 0"	6' - 0"	5' - 6"	#7 @ 16"	#7 @ 16"
24' - 0"	10"	10' - 0"	6' - 3"	5' - 9"	#8 @ 16"	#8 @ 16"

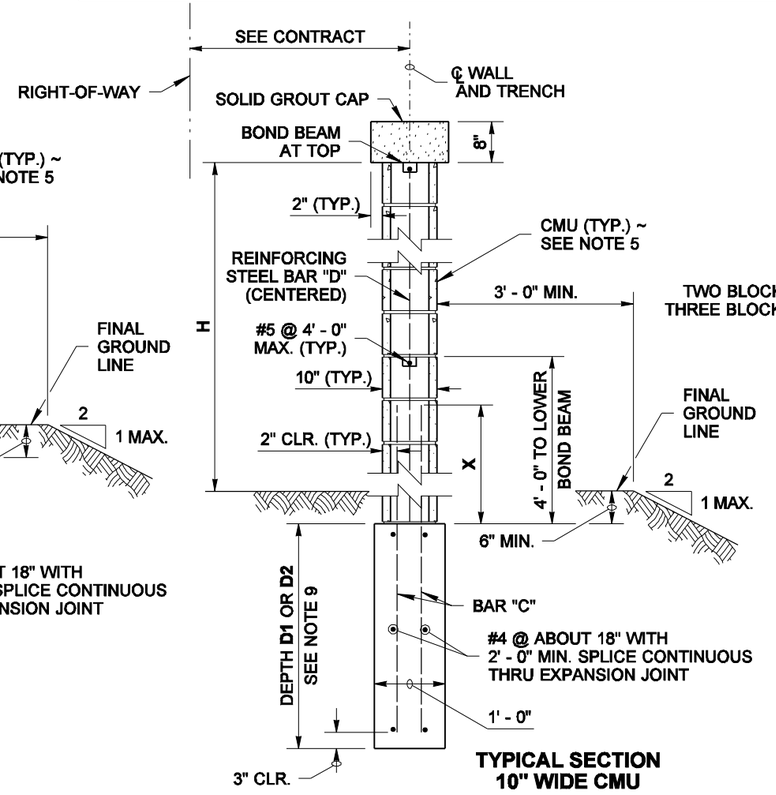
WALL HT H	TYPE 16D					
	CMU WIDTH	X	DEPTH D1	DEPTH D2	BAR "C"	BAR "D"
6' - 0"	8"	—	3' - 10"	3' - 5"	—	#6 @ 48"
8' - 0"	8"	—	4' - 2"	3' - 9"	—	#6 @ 48"
10' - 0"	8"	—	4' - 5"	4' - 0"	—	#6 @ 32"
12' - 0"	10"	4' - 0"	4' - 10"	4' - 4"	#6 @ 48"	#6 @ 48"
14' - 0"	10"	4' - 0"	5' - 3"	4' - 7"	#6 @ 32"	#6 @ 32"
16' - 0"	10"	4' - 8"	5' - 7"	4' - 11"	#6 @ 24"	#6 @ 24"
18' - 0"	10"	5' - 4"	5' - 10"	5' - 1"	#6 @ 18"	#6 @ 18"
20' - 0"	10"	7' - 4"	6' - 0"	5' - 6"	#7 @ 18"	#7 @ 18"
22' - 0"	10"	9' - 8"	6' - 6"	5' - 9"	#8 @ 18"	#8 @ 18"
24' - 0"	10"	12' - 0"	6' - 9"	6' - 0"	#9 @ 18"	#9 @ 18"

NOTES

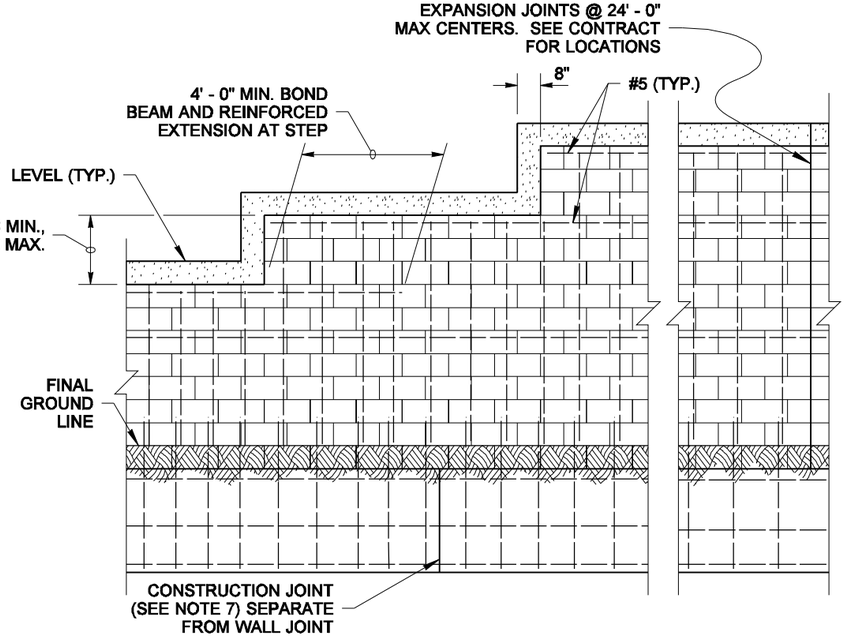
1. Wall to be designated Noise Barrier Wall Type 16A, 16B, 16C or 16D. The Contract specifies actual wall designations.
2. For intermediate wall heights, use the next higher H.
3. All masonry shall be hollow unit and installed as running bond.
4. All masonry is to be specially inspected.
5. All Concrete Masonry Unit (CMU) cells that have vertical steel reinforcing bars or bond beam units shall be filled with grout.
6. Panels shall have at least 3 feet of level ground on each side.
7. Construction joints in the trench footing shall be spaced at 120 feet maximum.
8. See "Masonry Wall Finishes and Details" sheet for masonry block finishes, special shapes, sizes and layouts.
9. The Contract specifies actual foundation requirements D1 or D2.



TYPICAL SECTION
8" WIDE CMU



TYPICAL SECTION
10" WIDE CMU



ELEVATION

MASONRY WALL ON TRENCH FOOTING

BIJAN KHALEGHI
STATE OF WASHINGTON
27695
REGISTERED
PROFESSIONAL ENGINEER
EXPIRES AUGUST 23, 2006

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NOISE BARRIER WALL TYPE 16

STANDARD PLAN D-2.60-00

SHEET 1 OF 2 SHEETS

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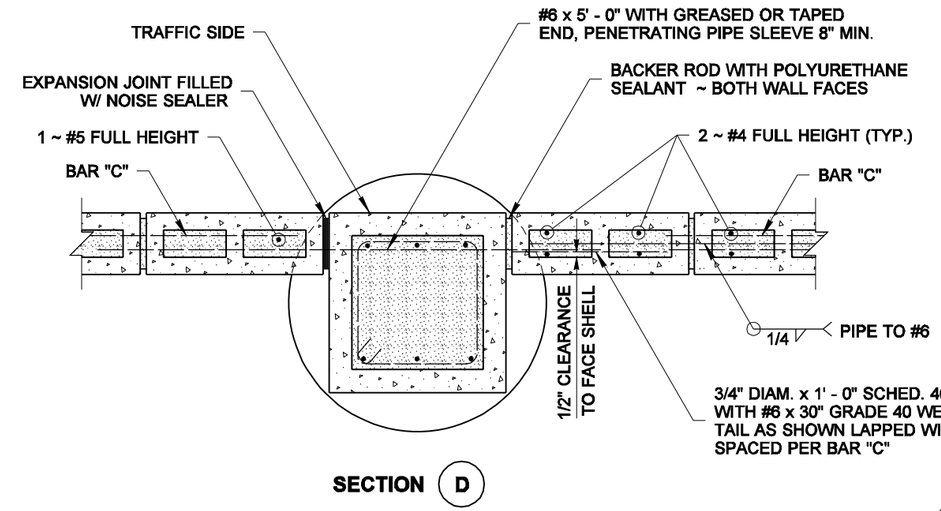
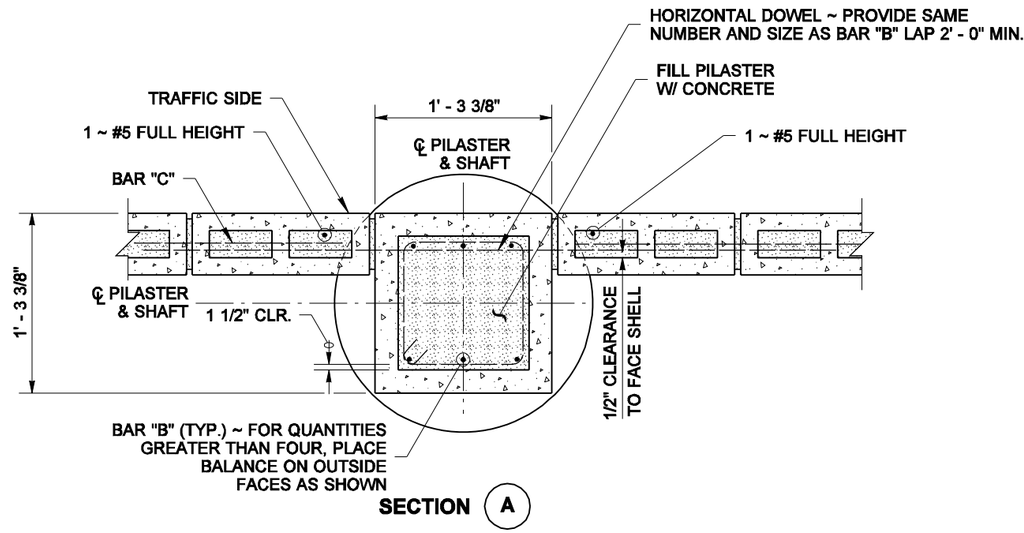
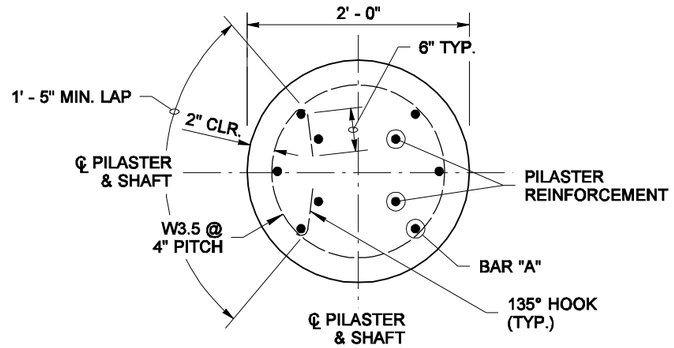


SECTION (D)

TYPICAL EXPANSION JOINT

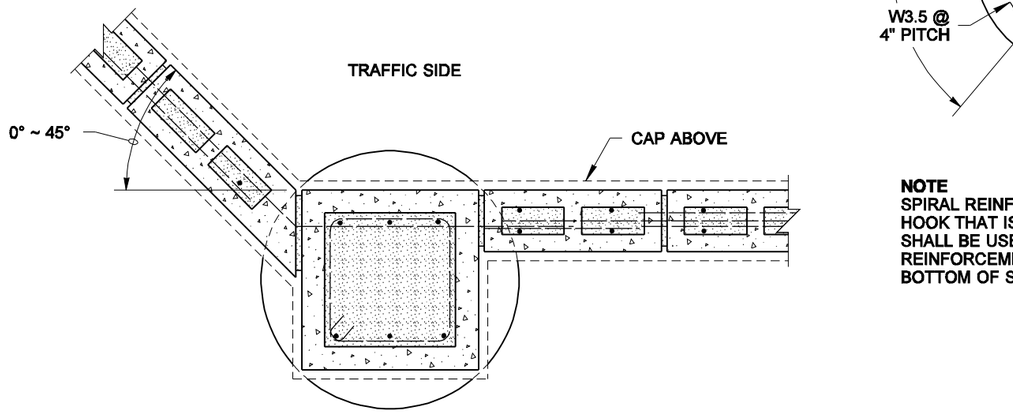


SECTION (A)

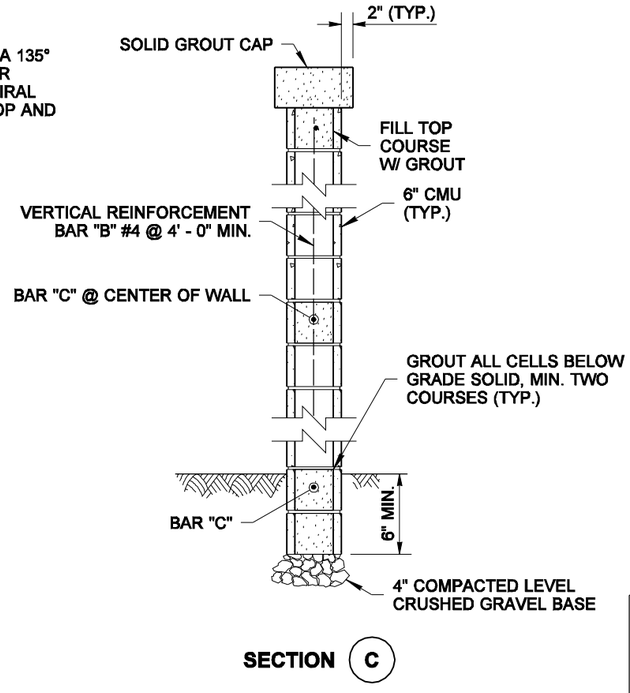


SECTION (B)

NOTE
SPIRAL REINFORCEMENT SHALL BE LAPPED 17" MIN. A 135° HOOK THAT IS HOOKED AROUND A LONGITUDINAL BAR SHALL BE USED TO TERMINATE THE ENDS OF THE SPIRAL REINFORCEMENT AT LAPPED SPLICES AND AT THE TOP AND BOTTOM OF SHAFT.



ANGLE POINT PLAN



SECTION (C)

MASONRY WALL ON SHAFT FOUNDATION

BIJAN KHALEGHI
STATE OF WASHINGTON
27695
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PROFESSIONAL ENGINEER

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NOISE BARRIER WALL TYPE 20

STANDARD PLAN D-2.68-00

SHEET 2 OF 2 SHEETS

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11-10-05 — DATE

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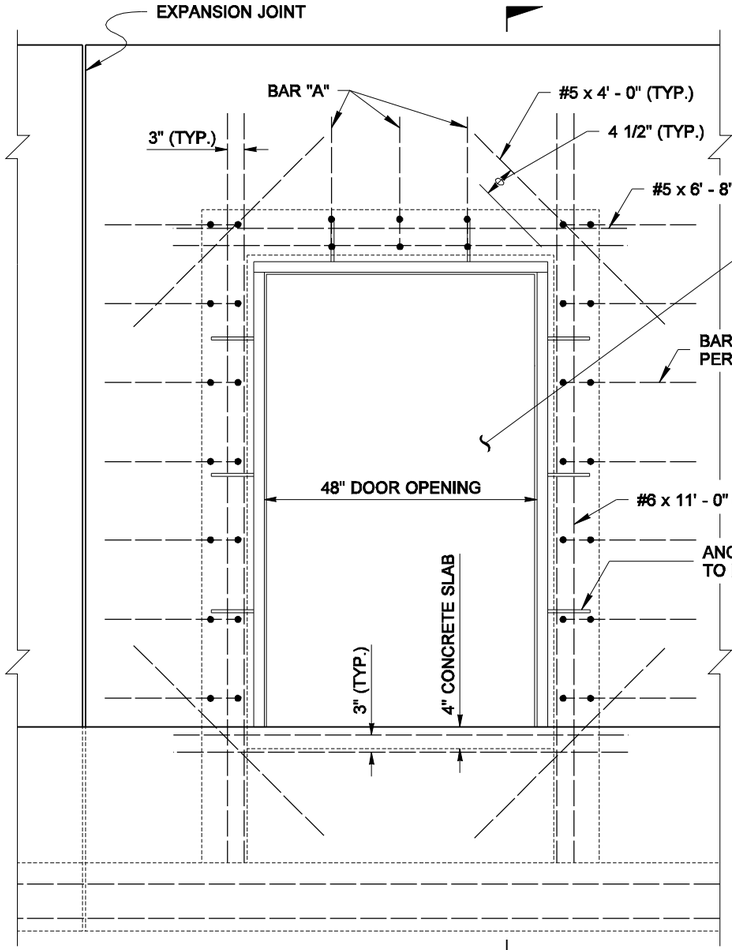
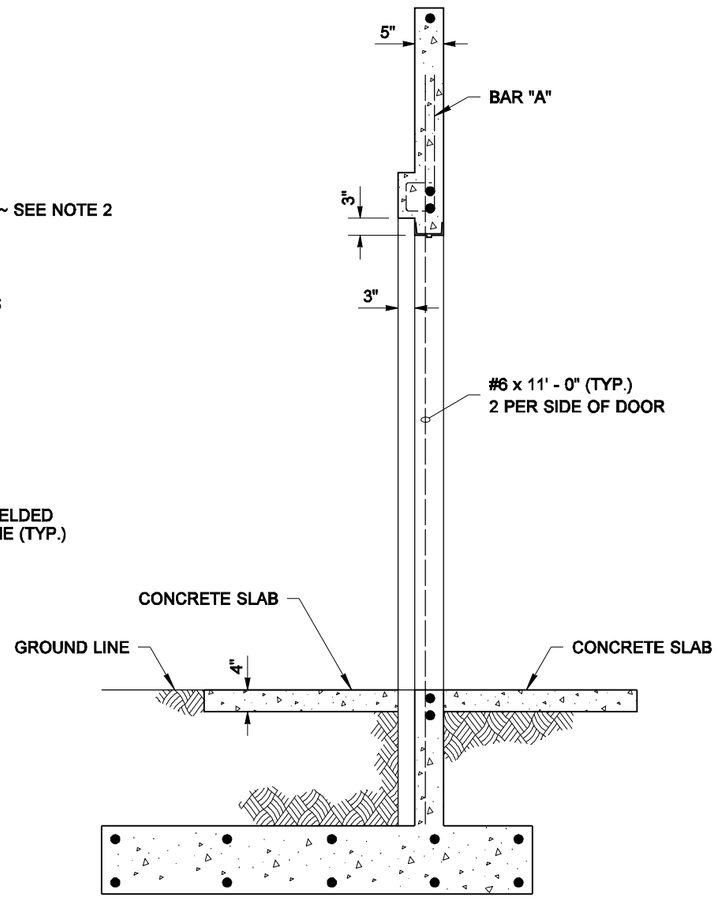
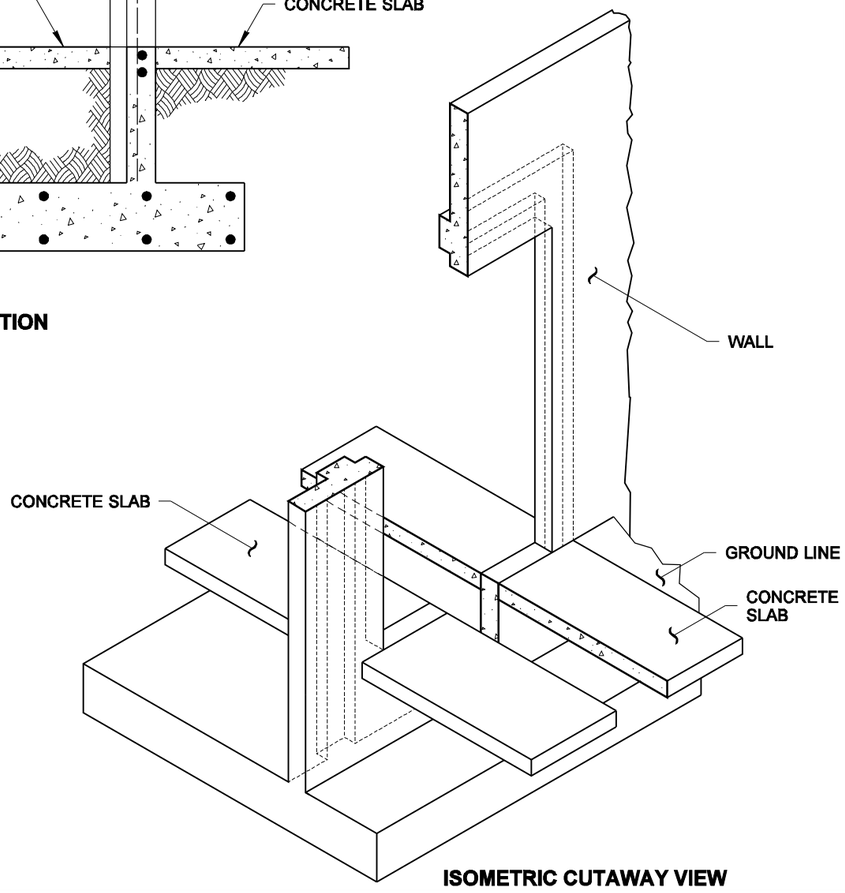


FRONT VIEW

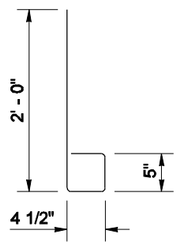


A SECTION



ISOMETRIC CUTAWAY VIEW

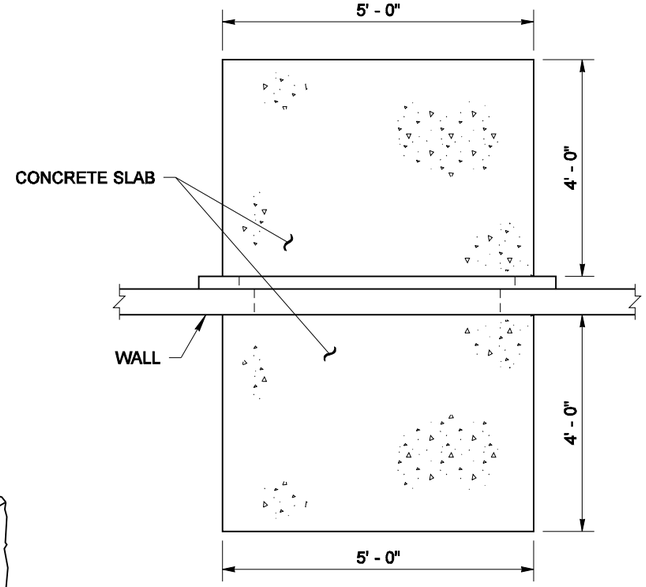
BENDING DIAGRAM



BAR "A"

NOTES

1. All rebar shall have a minimum 1 1/2" cover.
2. See Standard Plan D-2.92 for door and frame details.
3. See Standard Plan D-2.06 for wall reinforcement not shown.



PLAN VIEW

CONCRETE SLAB DETAIL

FOR CAST-IN-PLACE WALL ON OFFSET SPREAD FOOTING

BIJAN KHALEGHI
STATE OF WASHINGTON
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NOISE BARRIER WALL ACCESS DOOR TYPE 1

STANDARD PLAN D-2.80-00

SHEET 1 OF 1 SHEET

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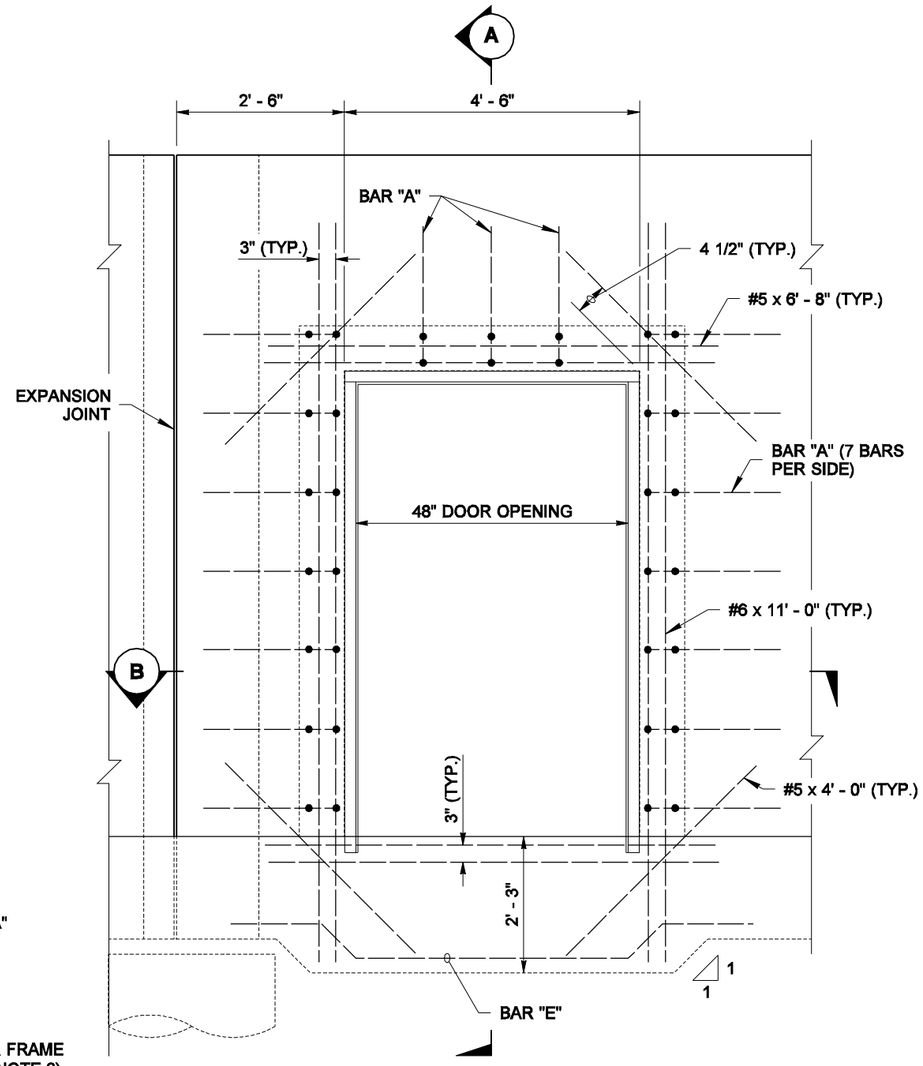
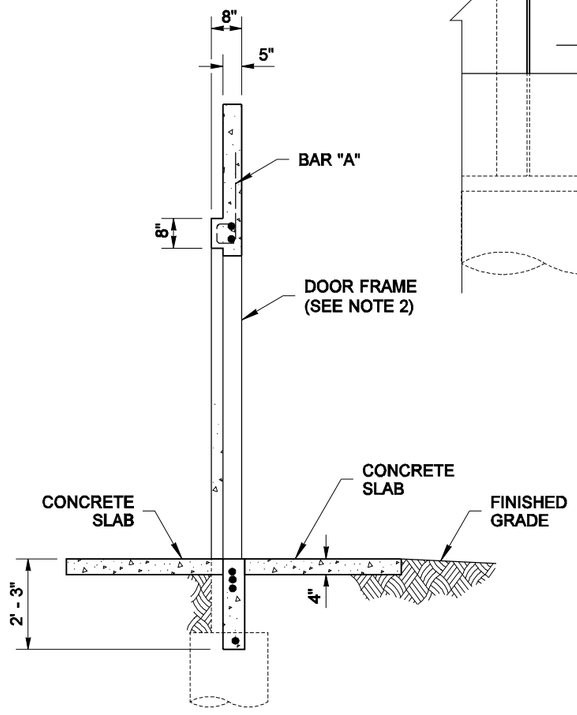


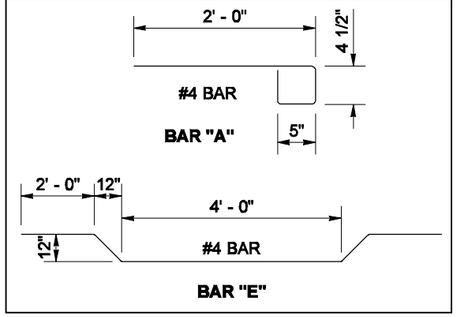
CONCRETE SLAB NOT SHOWN

DOOR DETAIL
(SEE NOTE 2)



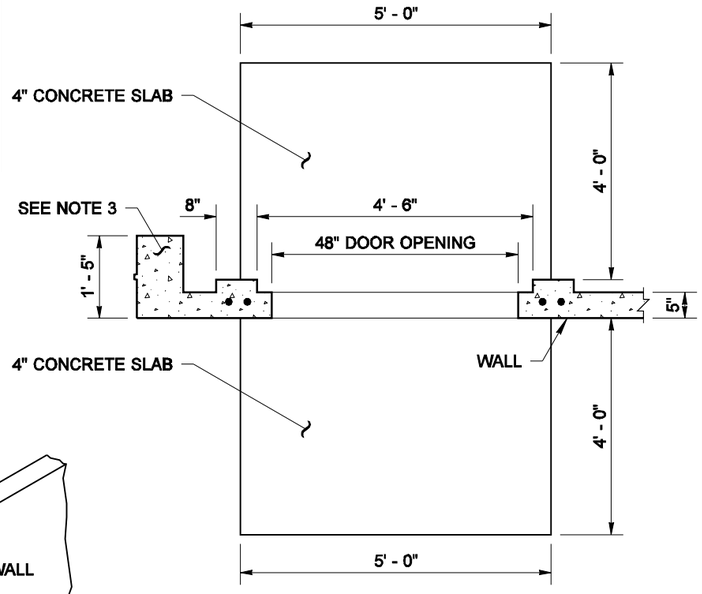
SECTION (A)

BENDING DIAGRAM

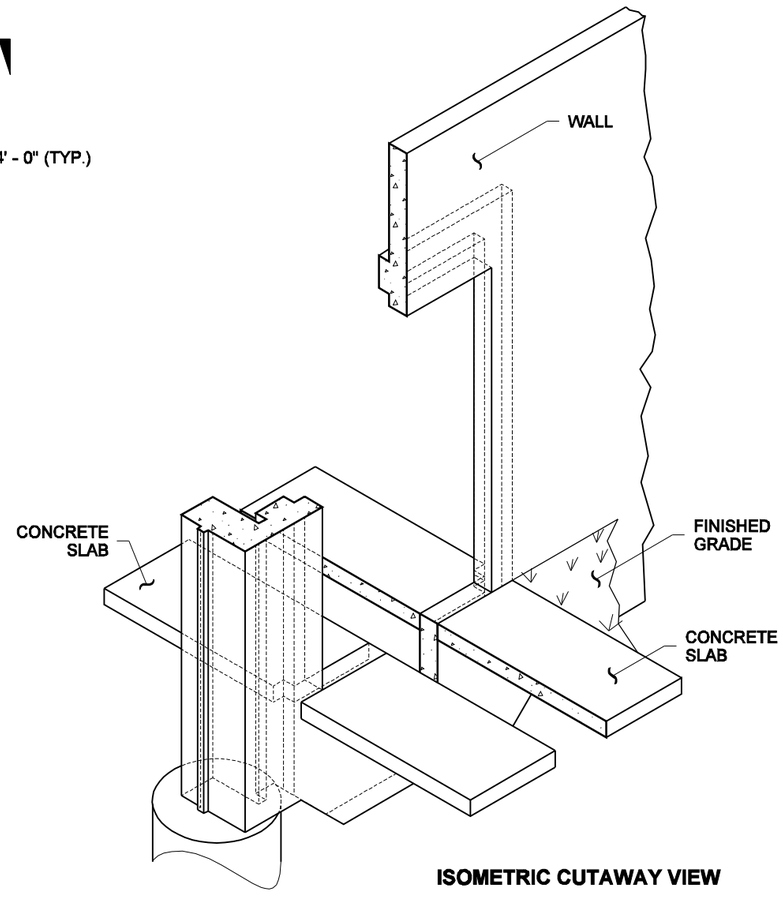


NOTES

1. All rebar shall have a minimum 1 1/2" cover.
2. See Standard Plan D-2.92 for door and frame details.
3. See Standard Plan D-2.36 for wall reinforcement not shown.



SECTION (B)



ISOMETRIC CUTAWAY VIEW

FOR PRECAST WALL ON SHAFT FOUNDATION

BIJAN KHALEGHI
STATE OF WASHINGTON
27695
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES AUGUST 23, 2006

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NOISE BARRIER WALL ACCESS DOOR TYPE 3

STANDARD PLAN D-2.84-00

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Harold J. Peterfeso — STATE DESIGN ENGINEER

11-10-05 — DATE

Washington State Department of Transportation

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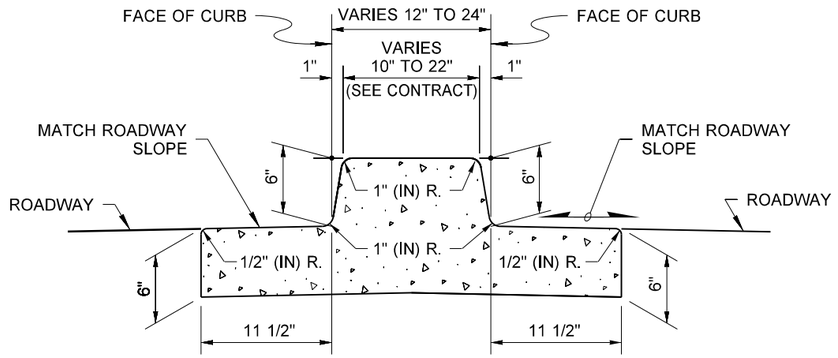
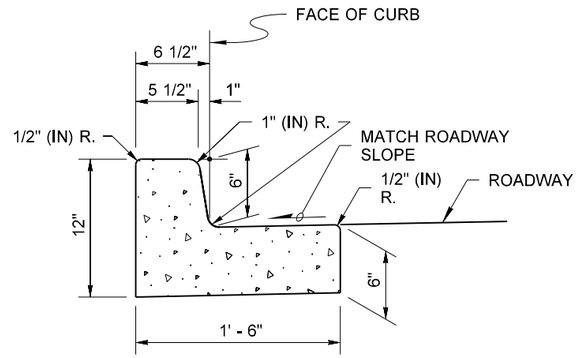
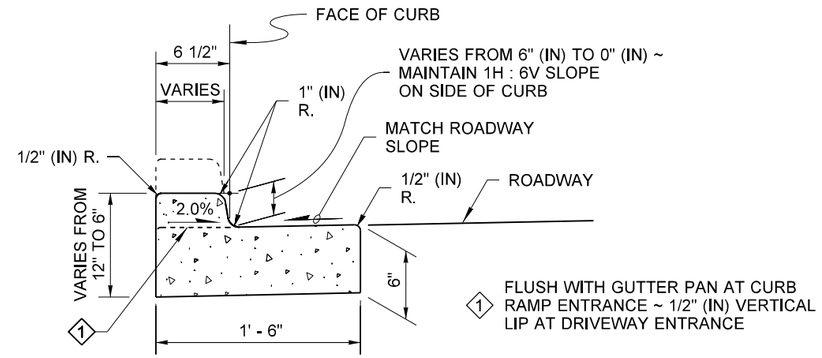


DUAL-FACED CEMENT CONCRETE TRAFFIC CURB AND GUTTER



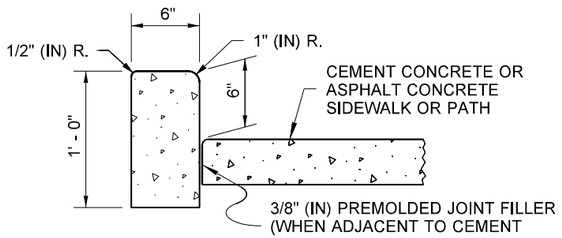
CEMENT CONCRETE TRAFFIC CURB AND GUTTER



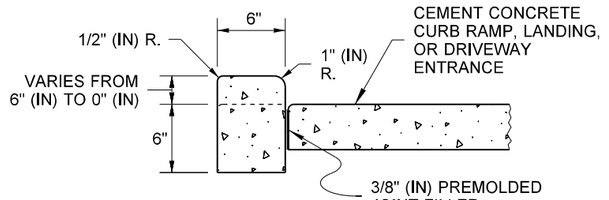
DEPRESSED CURB AND GUTTER SECTION

AT CURB RAMPS AND DRIVEWAY ENTRANCES

DRAWN BY: FERN LIDDELL



CEMENT CONCRETE PEDESTRIAN CURB

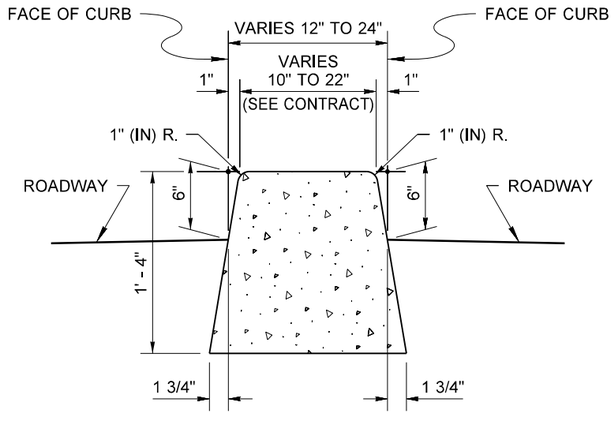


CEMENT CONCRETE PEDESTRIAN CURB

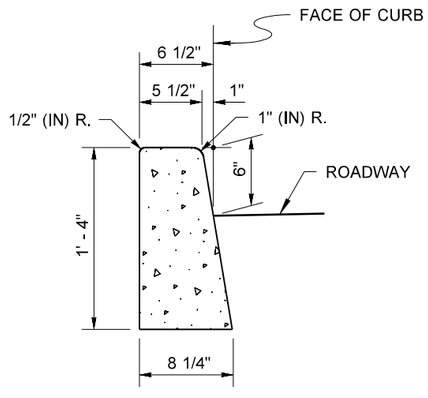
AT CURB RAMPS, LANDINGS, AND DRIVEWAY ENTRANCES

NOTE

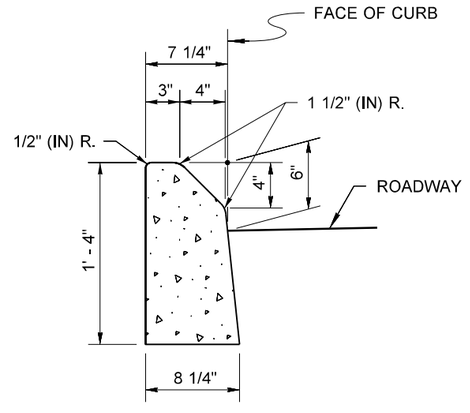
1. See **Standard Plan F-30.10** for Curb Expansion and Contraction Joint spacing. See **Standard Specification, Sections 8-04 and 9-04** for additional requirements.



DUAL-FACED CEMENT CONCRETE TRAFFIC CURB



CEMENT CONCRETE TRAFFIC CURB



MOUNTABLE CEMENT CONCRETE TRAFFIC CURB

Michael S Fleming

Digitally signed by Michael S Fleming
Date: 2020.09.24 07:39:38 -07'00'

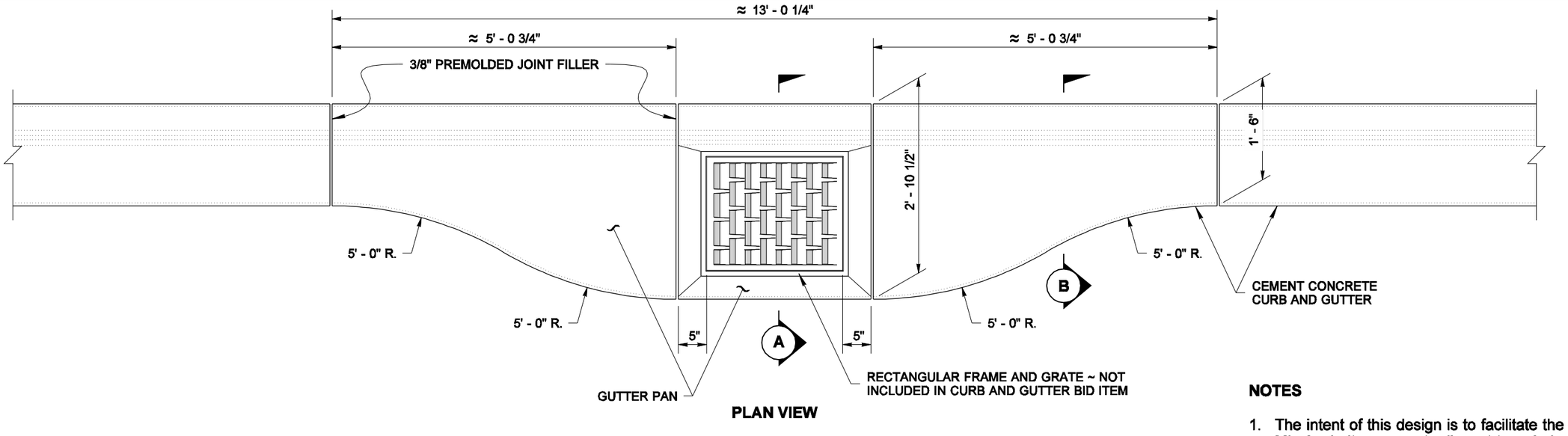
CEMENT CONCRETE CURBS

STANDARD PLAN F-10.12-04

SHEET 1 OF 1 SHEET

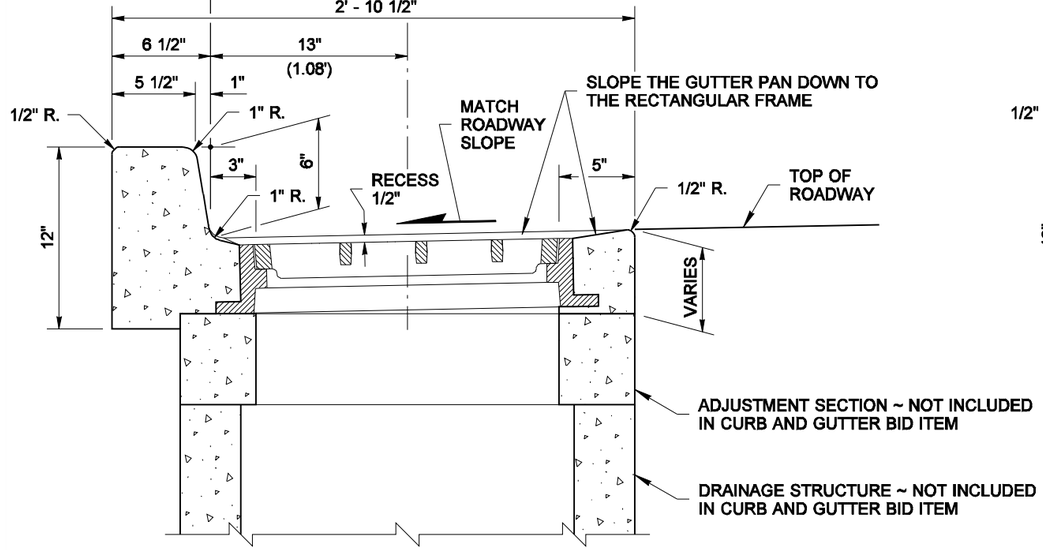
APPROVED FOR PUBLICATION
Date: 2020.09.24 07:57:43 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: MARK SUJKA

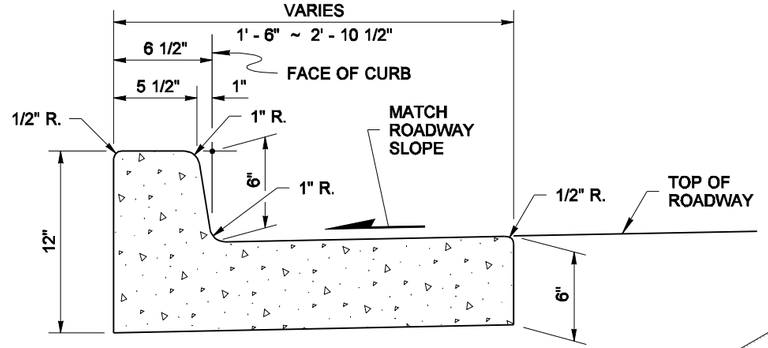


PLAN VIEW

CATCH BASIN GUTTER PAN



SECTION (A)



SECTION (B)

ISOMETRIC VIEW

NOTES

1. The intent of this design is to facilitate the compaction of Hot Mix Asphalt pavement adjacent to a drainage structure.
2. The centerline of the drainage structure may differ from the centerline of the frame and grate.

EXPIRES JULY 27, 2007

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CEMENT CONCRETE CURB AND GUTTER PAN

STANDARD PLAN F-10.16-00

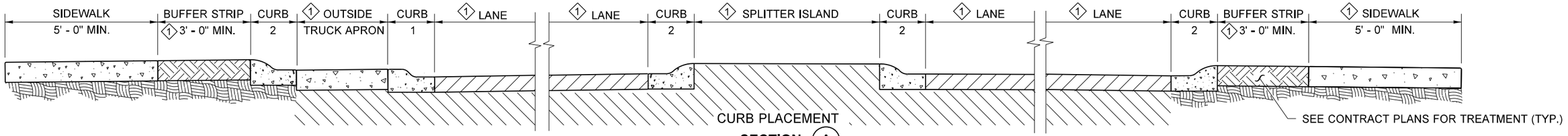
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Kevin J. Dayton — *12-20-06*

STATE DESIGN ENGINEER — DATE

Washington State Department of Transportation



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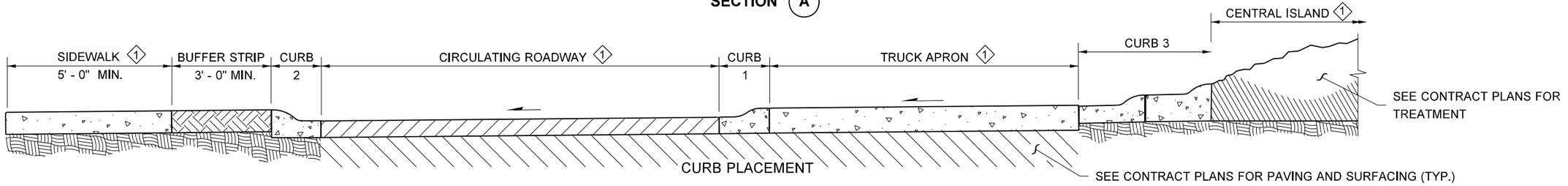
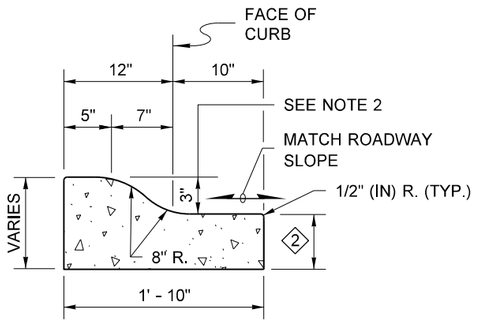
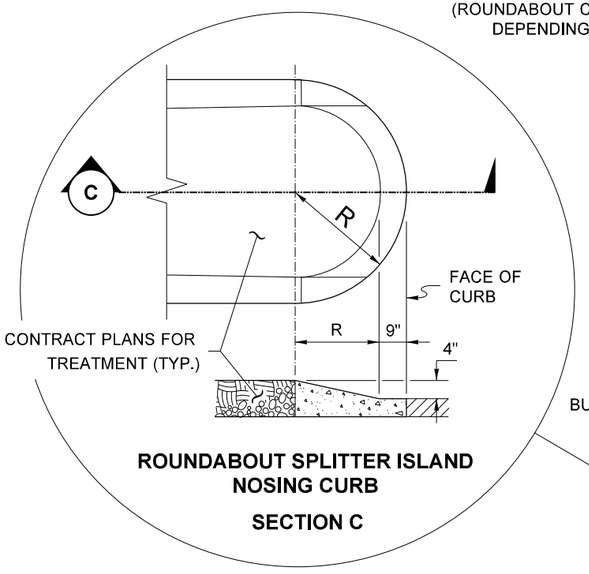


SECTION (B)

(ROUNDABOUT CONFIGURATION WILL VARY DEPENDING ON CONTRACT PLANS)



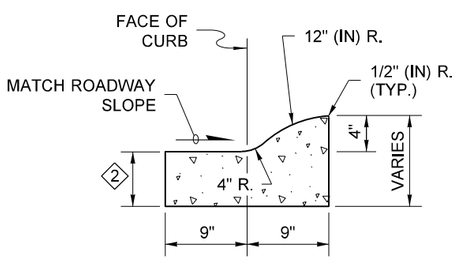
CURB 1
ROUNDABOUT TRUCK APRON
CEMENT CONCRETE CURB & GUTTER
(ROLLED CURB)



ROUNDABOUT SPLITTER ISLAND NOSING CURB

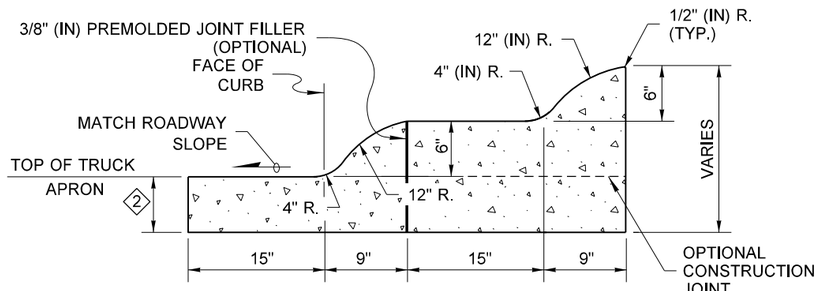
SECTION C

DETAIL
(SEE CONTRACT PLANS FOR **R**)

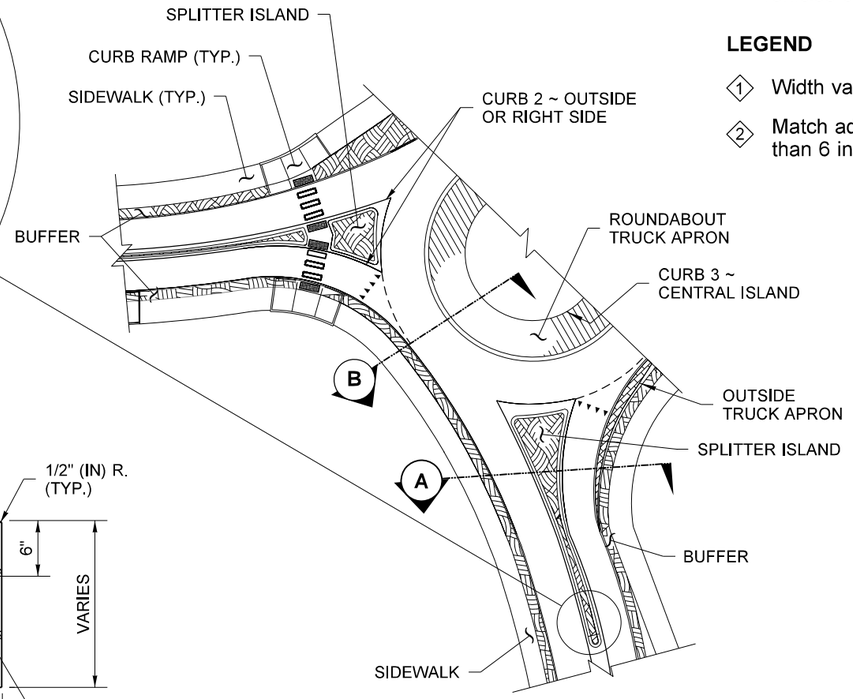


CURB 2
(OUTSIDE, RIGHT SIDE OR SPLITTER ISLAND)

ROUNDABOUT CEMENT CONCRETE CURB AND GUTTER
(ROLLED CURB)



CURB 3
ROUNDABOUT CENTRAL ISLAND
CEMENT CONCRETE CURB
(ROLLED CURB)



PARTIAL PLAN

NOTES

1. Construct curb joints at cement concrete pavement transverse joint locations. If all adjacent pavement is HMA, see **Standard Plan F-30.10** for Curb Expansion and Contraction Joint Spacing.
2. A 2 inch vertical curb may be used where low clearance vehicles or trucks are present.

LEGEND

1 Width varies ~ See Contract Plans.

2 Match adjacent pavement thickness but not less than 6 inches.

BRIAN J. WALSH
STATE OF WASHINGTON
36103
REGISTERED
PROFESSIONAL ENGINEER

Walsh, Brian
Sep 23 2020 1:20 PM
cosign

ROUNDABOUT CEMENT CONCRETE CURBS

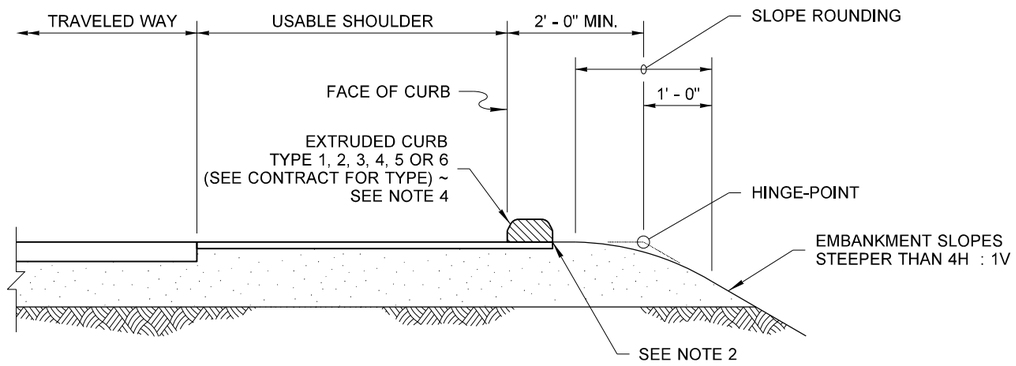
STANDARD PLAN F-10.18-02

SHEET 1 OF 1 SHEET

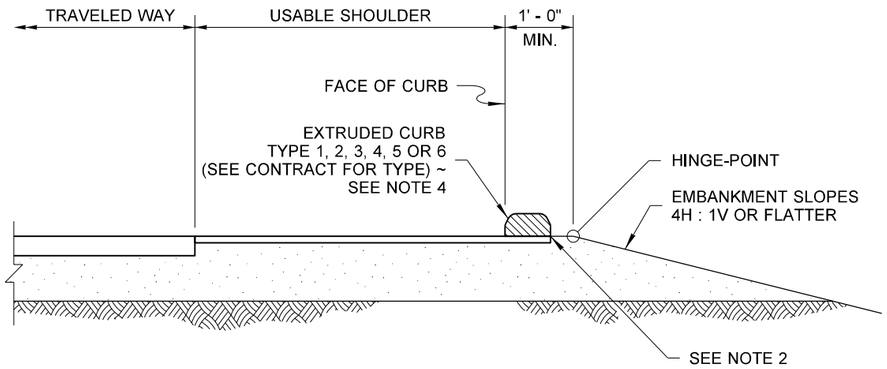
APPROVED FOR PUBLICATION
Date: 2020.09.24 07:58:20 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

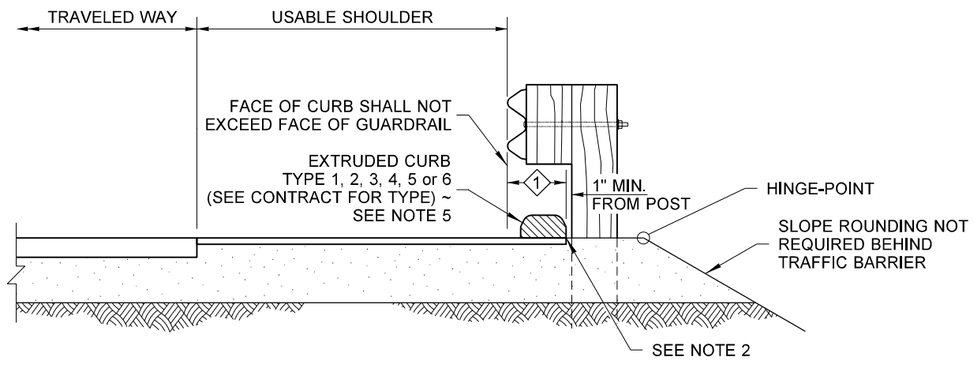
DRAWN BY: FERN LIDDELL



EXTRUDED CURB WITH SLOPE ROUNDING



EXTRUDED CURB WITHOUT SLOPE ROUNDING



EXTRUDED CURB UNDER TYPE 1 BEAM GUARDRAIL
(SEE NOTE 6)

1 PERMISSABLE CURB PLACEMENT AREA

NOTES

1. The installation of curb in areas with existing guardrail could require the removal and resetting of the guardrail or its components.
2. Extend shoulder pavement to provide a base for the extruded curb.
3. See Contract for exception to distances shown.
4. Type 3 and 6 curbs are not used on roadways with a posted speed greater than 40 mph.
5. Type 3 and 6 curbs are not used under Type 1 beam guardrail on roadways with a posted speed greater than 50 mph.
6. For extruded curb placement at Beam Guardrail Type 31, See **Standard Plan C-20.10.**
7. For extruded curb details, See **Standard Plan F-10.42.**

R. SCOTT ZELLER
STATE OF WASHINGTON
28680
REGISTERED
PROFESSIONAL ENGINEER

Digitally signed by R. Scott Zeller
Date: 2020.09.22 13:27:46 -07'00'

EXTRUDED CURB PLACEMENT

STANDARD PLAN F-10.40-04

SHEET 1 OF 1 SHEET

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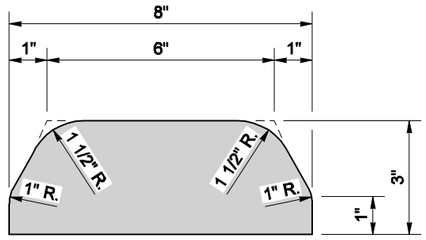
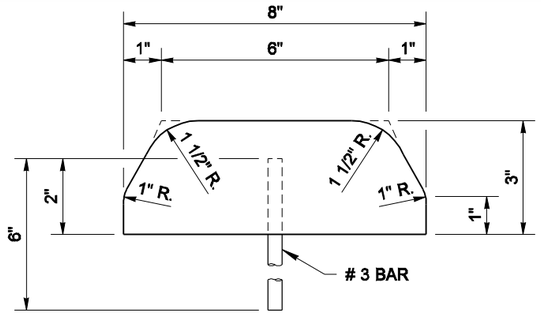
Date: 2020.09.24 07:59:04 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

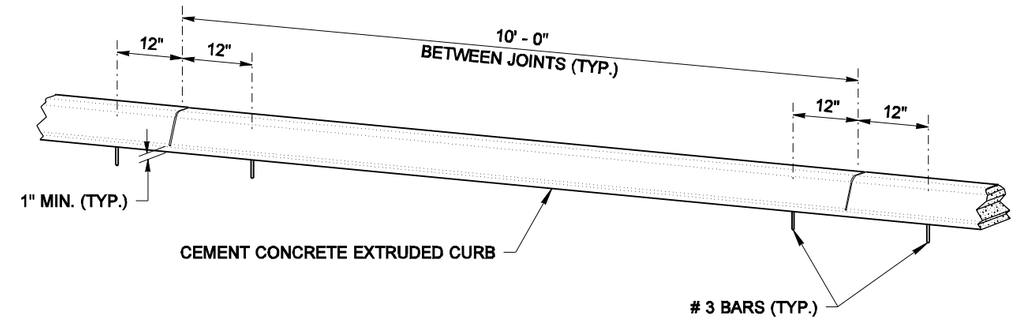
DRAWN BY: BILL BERENS



TYPE 1
(HOT MIX ASPHALT)



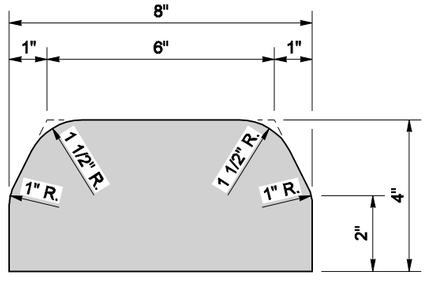
TYPE 4
(CEMENT CONCRETE)



SPACING OF ANCHOR BARS
(FOR TYPES 4, 5, AND 6)

NOTE

JOINTS MAY BE FORMED DURING INSTALLATION USING A RIGID DIVIDER OR SAWCUT AFTER CONCRETE CURES TO MINIMUM STRENGTH.



TYPE 2
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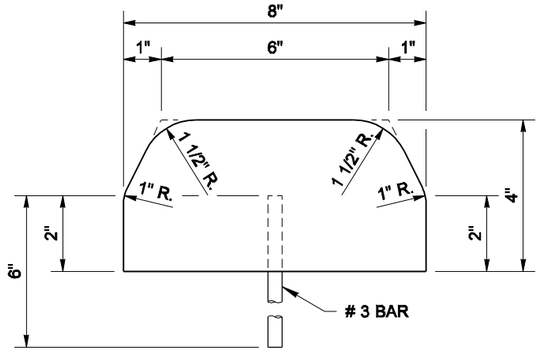
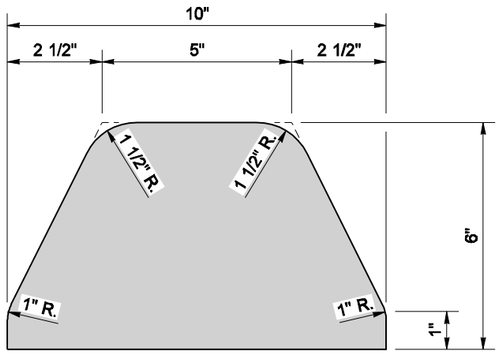
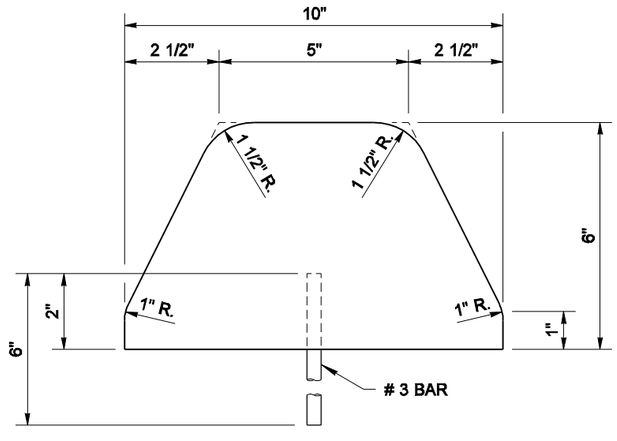


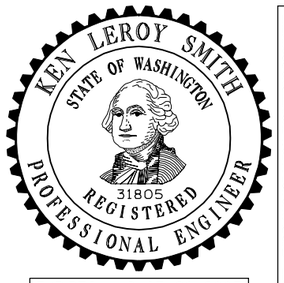
TYPE 5
(CEMENT CONCRETE)



TYPE 3
(HOT MIX ASPHALT)



TYPE 6
(CEMENT CONCRETE)



EXPIRES AUGUST 26, 2007

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EXTRUDED CURB

STANDARD PLAN F-10.42-00

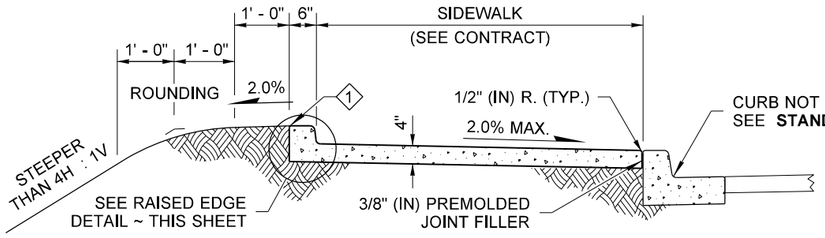
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

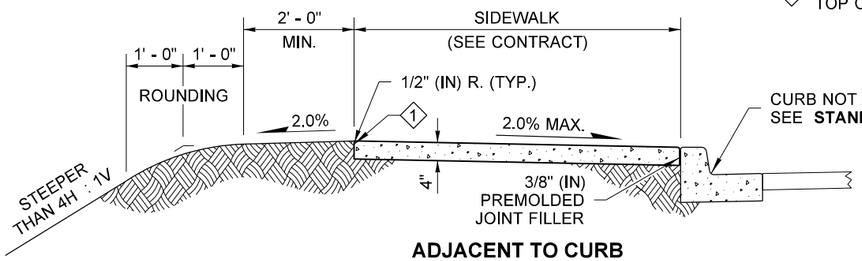
Ken L. Smith — STATE DESIGN ENGINEER

01-23-07 — DATE

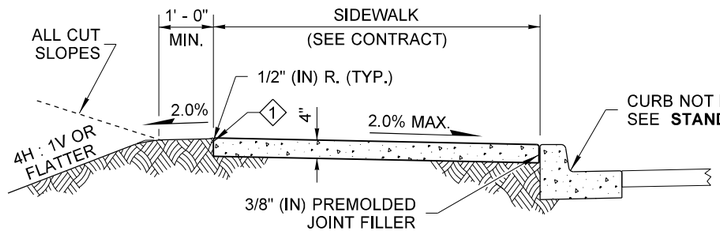
Washington State Department of Transportation



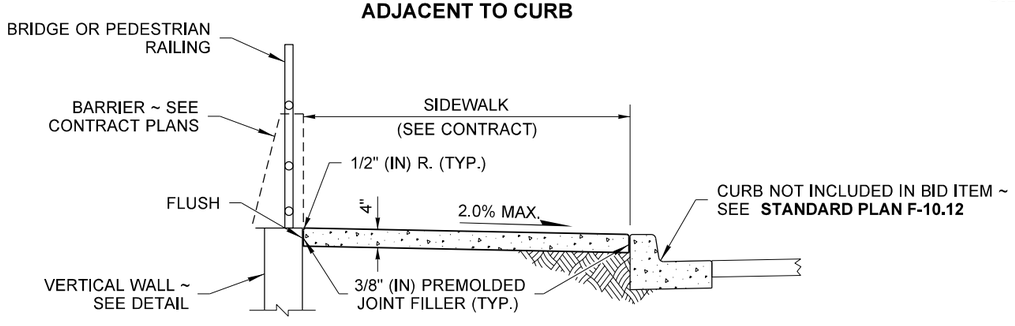
WITH RAISED EDGE



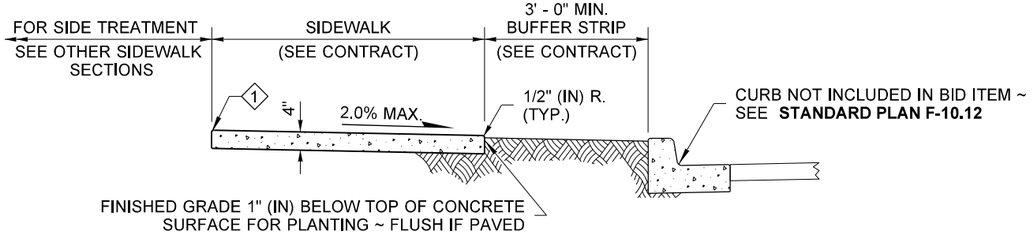
ADJACENT TO CURB
(STEEP FILL SLOPES)



ADJACENT TO CURB

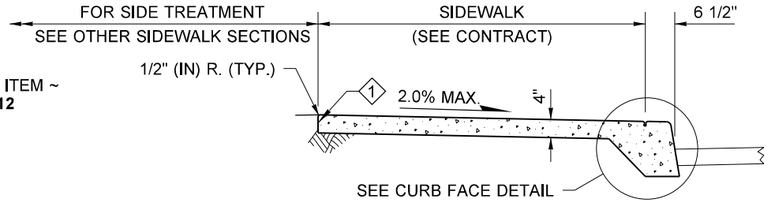


ADJACENT TO CURB AND RAILING OR WALL



ADJACENT TO BUFFER STRIP

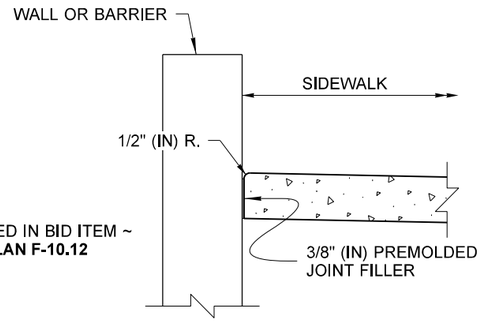
1 FINISHED GRADE 1" (IN) BELOW TOP OF CONCRETE SURFACE



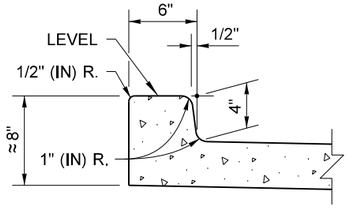
MONOLITHIC CEMENT CONCRETE CURB AND SIDEWALK

NOTE

1. Gratings, Access Covers, Junction Boxes, Cable Vaults, Pull Boxes and other appurtenances within the sidewalk must have slip resistant surfaces, be flush with surface, and match grade of the sidewalk.

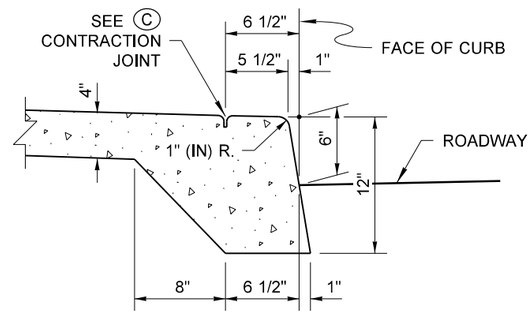


SIDEWALK ADJACENT TO WALL DETAIL



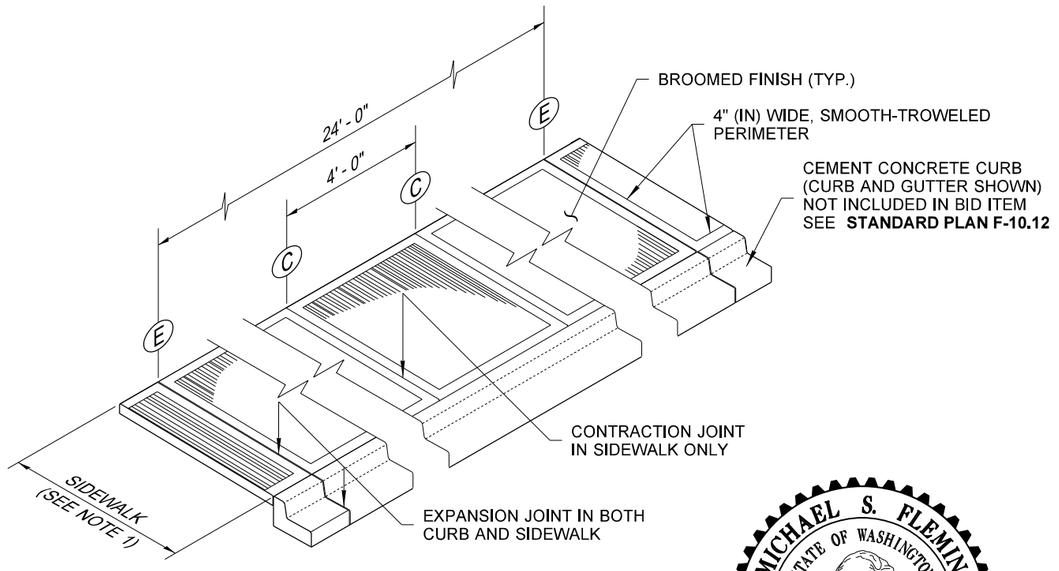
RAISED EDGE DETAIL

EXTEND SIDEWALK TRANSVERSE
JOINTS TO INCLUDE RAISED EDGE



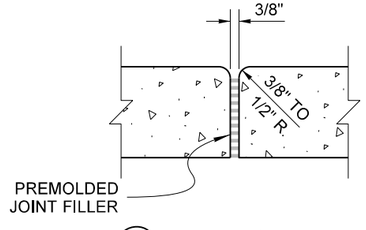
CURB FACE DETAIL

EXTEND SIDEWALK TRANSVERSE EXPANSION
JOINTS TO INCLUDE CURB (FULL DEPTH)

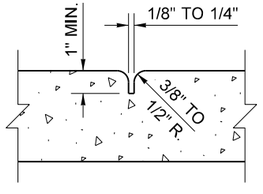


ISOMETRIC VIEW

JOINT AND FINISH DETAIL



(E) EXPANSION JOINT



(C) CONTRACTION JOINT

DRAWN BY: LISA CYFORD

Michael S Fleming
Digitally signed by Michael S Fleming
Date: 2020.09.24 07:40:16 -07'00'

CEMENT CONCRETE SIDEWALK

STANDARD PLAN F-30.10-04

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Date: 2020.09.25 15:43:50 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

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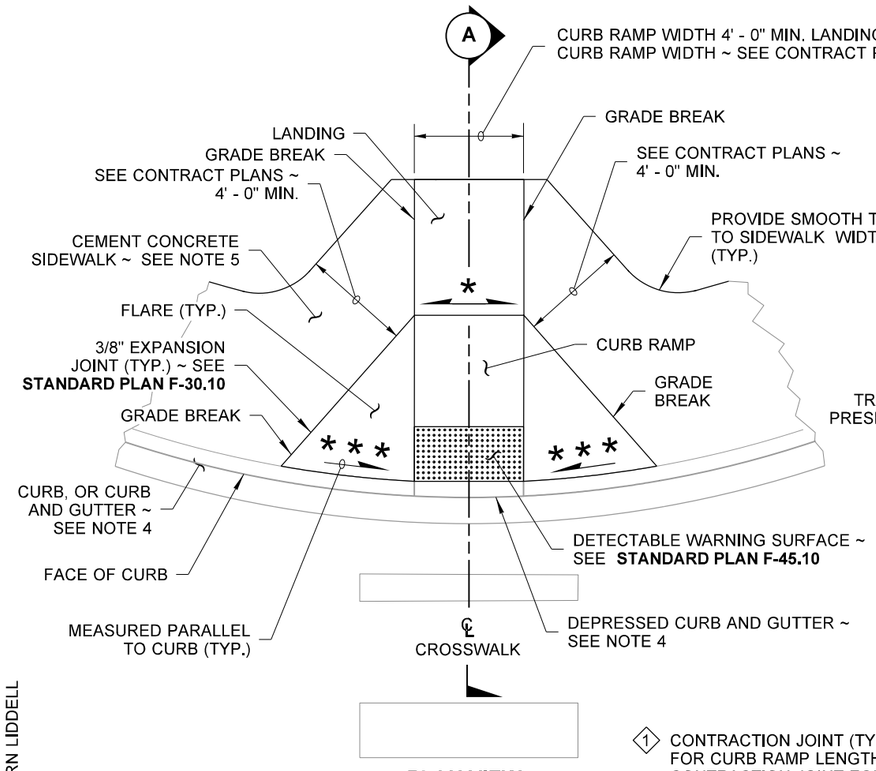
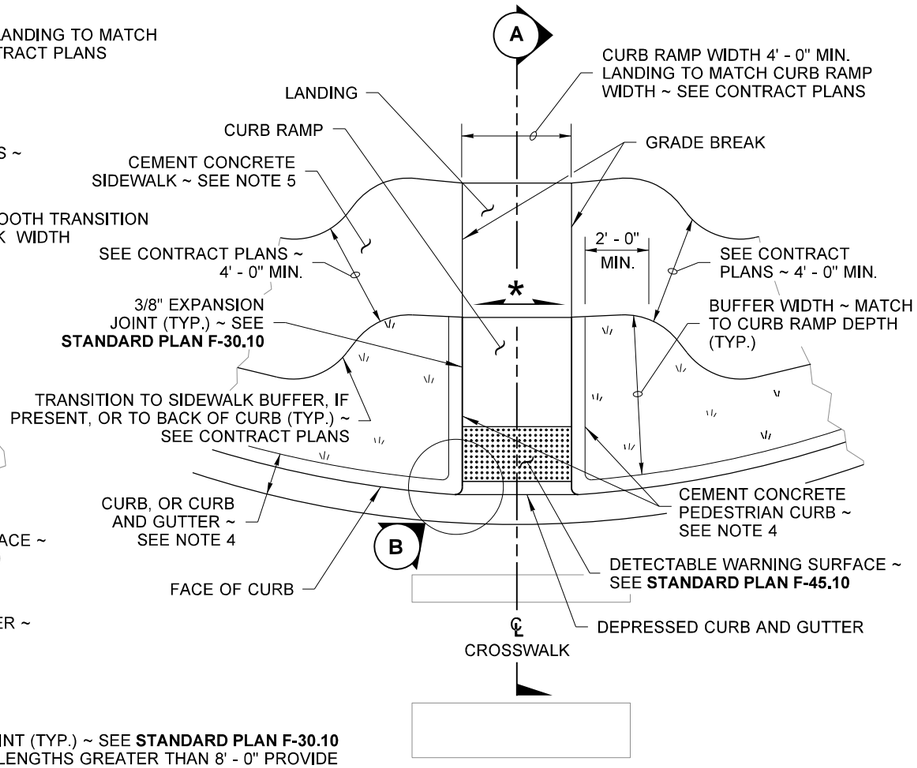


PLAN VIEW

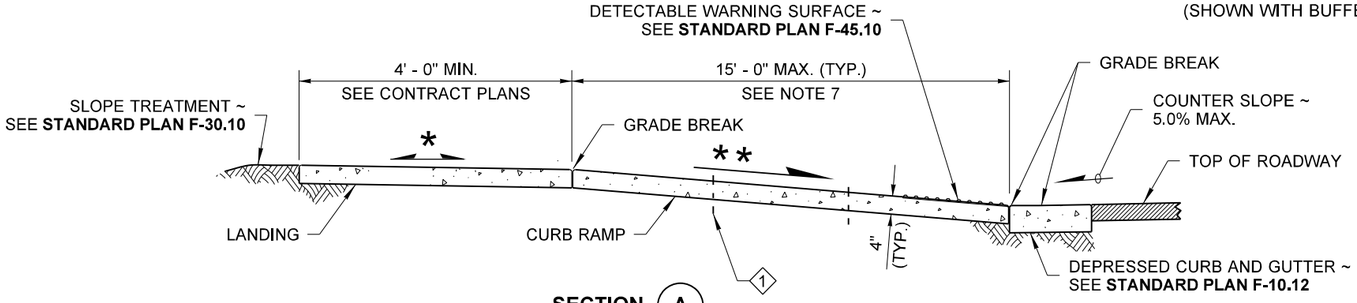
TYPE PERPENDICULAR A



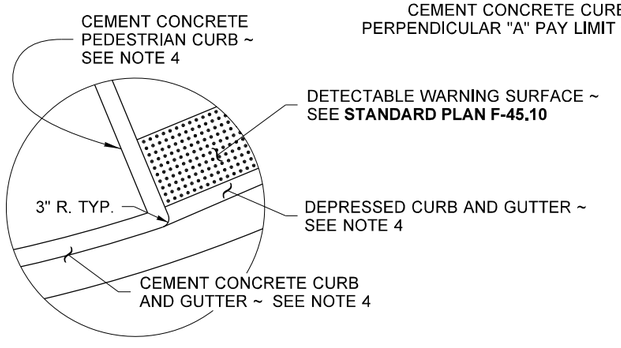
PLAN VIEW

TYPE PERPENDICULAR B
(SHOWN WITH BUFFER)

① CONTRACTION JOINT (TYP.) ~ SEE **STANDARD PLAN F-30.10** FOR CURB RAMP LENGTHS GREATER THAN 8' - 0" PROVIDE CONTRACTION JOINT EQUALLY SPACED 4' - 0" MIN. OC.

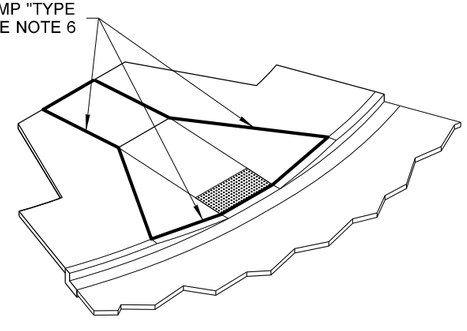


SECTION A



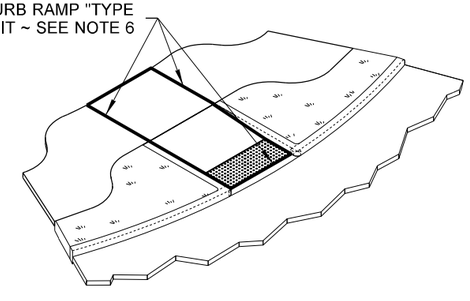
CURB RADIUS DETAIL B

CEMENT CONCRETE CURB RAMP "TYPE PERPENDICULAR "A" PAY LIMIT ~ SEE NOTE 6



ISOMETRIC VIEW
TYPE PERPENDICULAR A PAY LIMIT

CEMENT CONCRETE CURB RAMP "TYPE PERPENDICULAR "B" PAY LIMIT ~ SEE NOTE 6



ISOMETRIC VIEW
TYPE PERPENDICULAR B PAY LIMIT

NOTES

1. At marked crosswalks, the connection between the curb ramp and the roadway must be contained within the width of the crosswalk markings.
2. Where "GRADE BREAK" is called out, the entire length of the grade break between the two adjacent surface planes shall be flush.
3. Do not place Gratings, Junction Boxes, Access Covers, or other appurtenances on any part of the Curb Ramp or Landing, or in front of the Curb Ramp where it connects to the roadway.
4. See Contract Plans for the curb design specified. See **Standard Plan F-10.12** for Curb, Curb and Gutter, Depressed Curb and Gutter, and Pedestrian Curb details.
5. See **Standard Plan F-30.10** for Cement Concrete Sidewalk Details. See Contract Plans for width and placement of sidewalk.
6. The Bid Item "Cement Concrete Curb Ramp Type __" does not include the adjacent Curb, Curb and Gutter, Depressed Curb and Gutter, Pedestrian Curb, or Sidewalks.
7. The Curb Ramp length is not required to exceed 15 feet (unless shown otherwise in the Contract Plans). When applying the 15-foot max. length, the running slope of the Curb Ramp is allowed to exceed 8.3%. Use a single constant slope from bottom of ramp to top of ramp to match into the landing over a horizontal distance of 15 feet. Do not include the abutting landing in the 15-foot max. measurement.
8. Curb Ramps and Landings shall receive a broom finish. See **Standard Specifications 8-14.**
9. Pedestrian Curb may be omitted if the ground surface at the back of the Curb Ramp and/or Landing will be at the same elevation as the Curb Ramp or Landing and there will not be material to retain.

LEGEND

⟷	SLOPE IN EITHER DIRECTION
*	1.5% OR FLATTER RECOMMENDED FOR DESIGN/FORMWORK (2% MAX.)
* *	7.5% OR FLATTER RECOMMENDED FOR DESIGN/FORMWORK (8.3% MAX.)
* * *	9.5% OR FLATTER RECOMMENDED FOR DESIGN/FORMWORK (10% MAX.)

R. SCOTT ZELLER · STATE OF WASHINGTON · 28680 · REGISTERED PROFESSIONAL ENGINEER

Digitally signed by R. Scott Zeller
Date: 2020.09.22 13:23:53 -07'00'

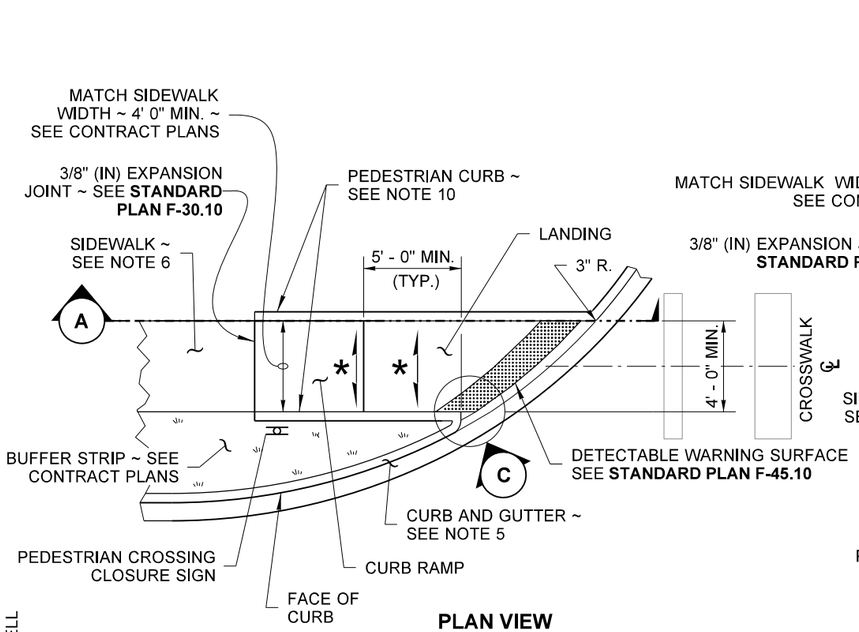
PERPENDICULAR CURB RAMP

STANDARD PLAN F-40.15-04

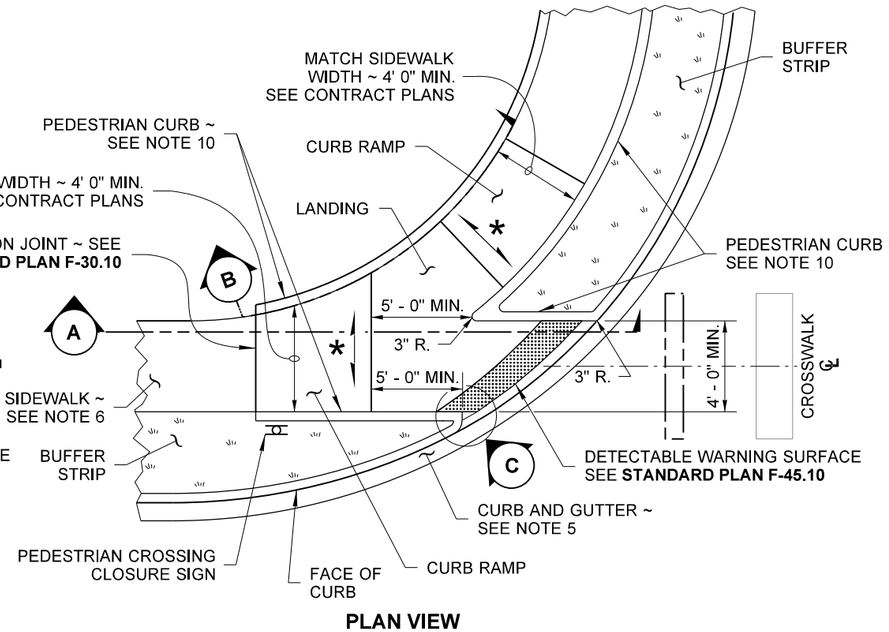
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Date: 2020.09.25 14:44:37 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: F
ERN LIDDELL

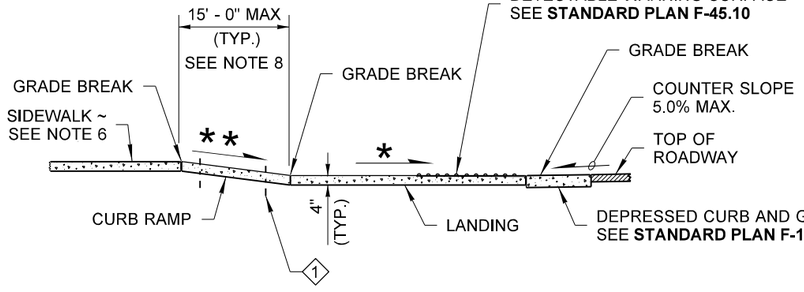


PLAN VIEW
TYPE SINGLE DIRECTION A



PLAN VIEW
TYPE SINGLE DIRECTION B

DRAWN BY: FERN LIDDELL



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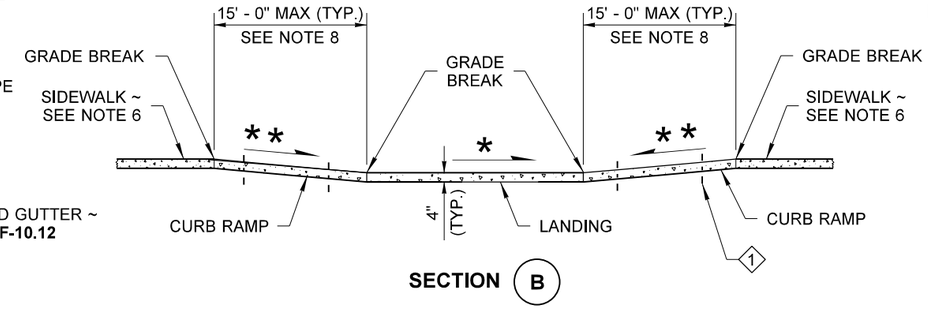
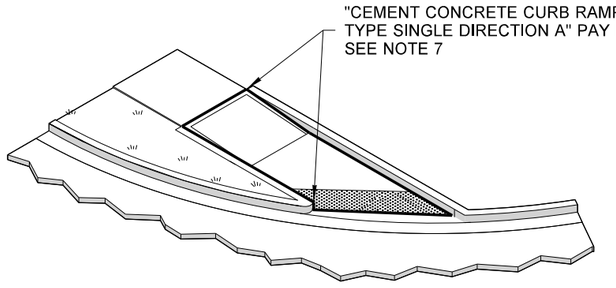


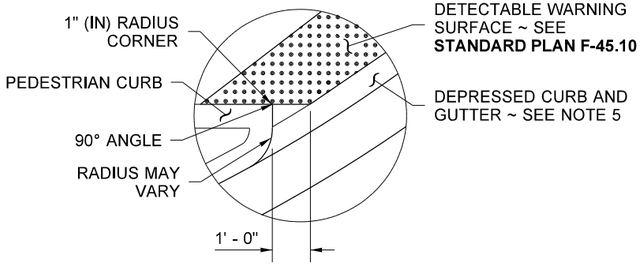
SECTION (B)

1 CONTRACTION JOINT (TYP.) ~ SEE **STANDARD PLAN F-30.10** FOR CURB RAMP LENGTHS GREATER THAN 8' - 0" PROVIDE CONTRACTION JOINT EQUALLY SPACED 4' - 0" MIN. OC.

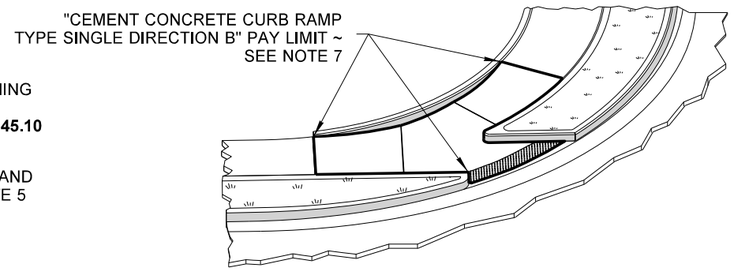
(ALONG INSIDE RADIUS AT BACK OF WALKWAY)



ISOMETRIC VIEW
TYPE SINGLE DIRECTION A
PAY LIMIT



DETAIL (C)



ISOMETRIC VIEW
TYPE SINGLE DIRECTION B
PAY LIMIT

NOTES

1. This plan is to be used where pedestrian crossing in one direction is not permitted.
2. At marked crosswalks, the connection between the Landing and the roadway must be contained within the width of the crosswalk markings.
3. Where "GRADE BREAK" is called out, the entire length of the grade break between the two adjacent surface planes shall be flush.
4. Do not place Gratings, Junction Boxes, Access Covers, or other appurtenances on any part of the Curb Ramp or Landing or in the Depressed Curb and Gutter where the Landing connects to the roadway.
5. See Contract Plans for the curb design specified. See **Standard Plan F-10.12** for Curb, Curb and Gutter, Depressed Curb, Gutter and Pedestrian Curb details.
6. See **Standard Plan F-30.10** for Cement Concrete Sidewalk Details. See Contract Plans for width and placement of sidewalk.
7. The Bid Item "Cement Concrete Curb Ramp Type __" does not include the adjacent Curb, Curb and Gutter, Depressed Curb and Gutter, Pedestrian Curb, or Sidewalks.
8. The Curb Ramp length is not required to exceed 15 feet (unless shown otherwise in the Contract Plans). When applying the 15-foot max. length (measured from back of sidewalk) the running slope of the curb ramp is allowed to exceed 8.3%. Use a single constant slope from bottom of ramp to top of ramp to match into the sidewalk over a horizontal distance of 15 feet.
9. Curb Ramps and Landings shall receive a broom finish. See **Standard Specifications 8-14.**
10. Pedestrian Curb may be omitted if the ground surface at the back of the Curb Ramp and/or Landing will be at the same elevation as the Curb Ramp or Landing and there will not be material to retain.

LEGEND

- SLOPE IN EITHER DIRECTION
- * 1.5 OR FLATTER RECOMMENDED FOR DESIGN/FORMWORK (2% MAX.)
- * * 7.5% OR FLATTER RECOMMENDED FOR DESIGN/FORMWORK (8.3% MAX.) SEE NOTE 7

R. SCOTT ZELLER
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28680
REGISTERED
PROFESSIONAL ENGINEER

SINGLE DIRECTION CURB RAMP

STANDARD PLAN F-40.16-03

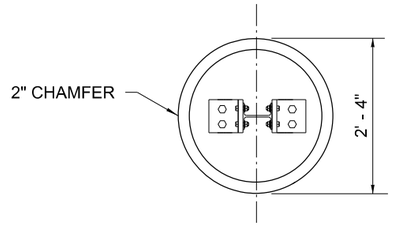
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

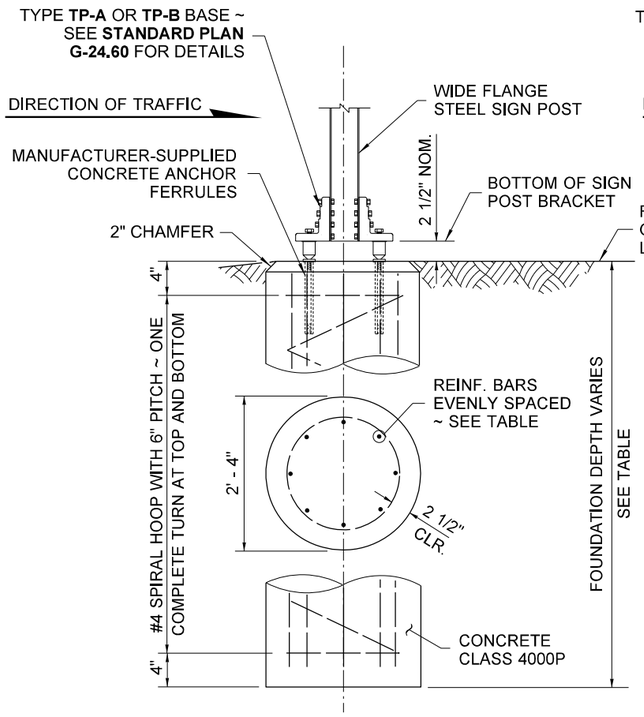
STATE DESIGN ENGINEER

Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

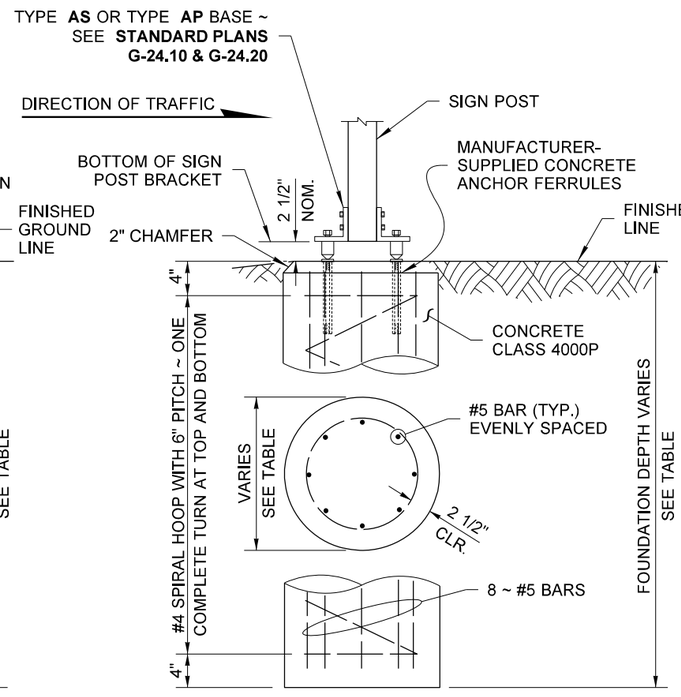


PLAN VIEW



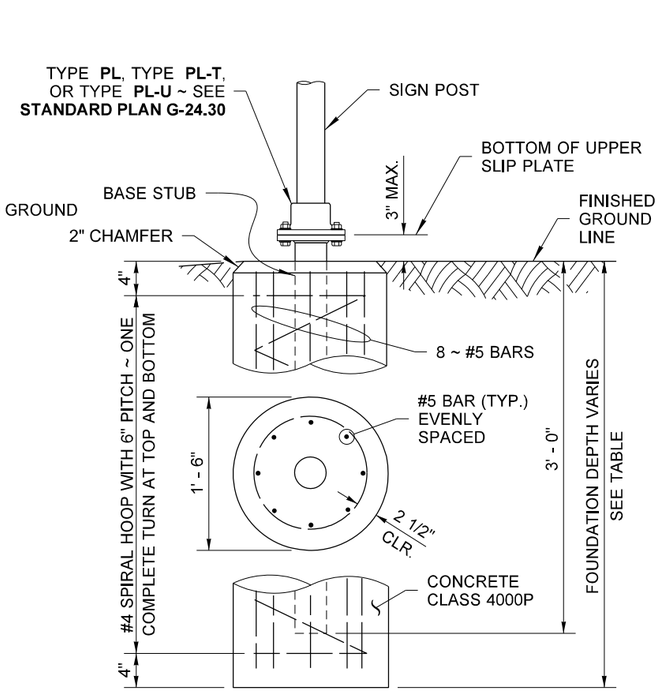
ELEVATION VIEW

TYPE TP-A & TYPE TP-B FOUNDATION



ELEVATION VIEW

TYPE AS & TYPE AP FOUNDATION



ELEVATION VIEW

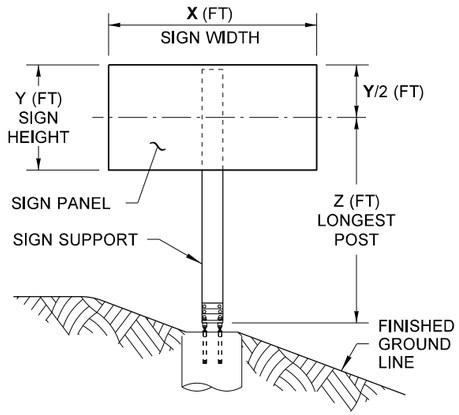
TYPE PL, TYPE PL-T & TYPE PL-U FOUNDATION

KEY NOTES

1. Foundation depths based on allowable lateral bearing pressure in excess of 2500 PSF.
2. Two-Post installation.

NOTES

1. Install conduit for post-mounted Junction Box in the concrete foundation, when required. See **Standard Plan J-40.35, Sheet 2.**
2. For single post square steel tube post installations use Type **AS** 4- inch square steel tube posts.



XYZ CALCULATION

XYZ (FT^3) = X × Y × Z
USED TO DETERMINE POST SIZE ~ SEE FOUNDATION TABLES

TYPE TP-A & TP-B FOUNDATION TABLE
SEE NOTE 1

POST SIZE		MAX. XYZ		VERTICAL REBAR	FDN. DEPTH ⟨1⟩
ASTM A 36	ASTM A 992	2 POST	3 POST		
W6 x 12	W6 x 9	1570	2355	8 ~ # 5	4' - 0"
W6 x 16	W6 x 12	2340	3510	8 ~ # 5	5' - 0"
W8 x 21	W8 x 18	4120	6180	8 ~ # 6	7' - 0"
W10 x 26	W10 x 22	6320	9480	8 ~ # 7	8' - 0"
W12 x 30	W12 x 26	8700	----	8 ~ # 7	9' - 0"

TYPE AS FOUNDATION TABLE

POST SIZE	MAX. XYZ	FDN. DIAM.	FDN. DEPTH ⟨1⟩
4" SQ.	250	18"	4' - 0"

TYPE AP FOUNDATION TABLE

POST SIZE	MAX. XYZ	FDN. DIAM.	FDN. DEPTH ⟨1⟩
3" O.D.	225	18"	3' - 6"
3 1/2" O.D.	250	18"	4' - 0"
4" O.D.	275	24"	4' - 0"
4 1/2" O.D.	300	24"	4' - 0"

TYPE PL, TYPE PL-T & TYPE PL-U FOUNDATION TABLE

MAX. XYZ	FDN. DEPTH ⟨1⟩
225	3' - 6"
265	4' - 0"
300	4' - 6"
600 ⟨2⟩	4' - 6"

RICHARD P. ZELDENRUST
STATE OF WASHINGTON
25470
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER

Zeldenrust, Richard
Aug 18 2020 1:12 PM
cosign

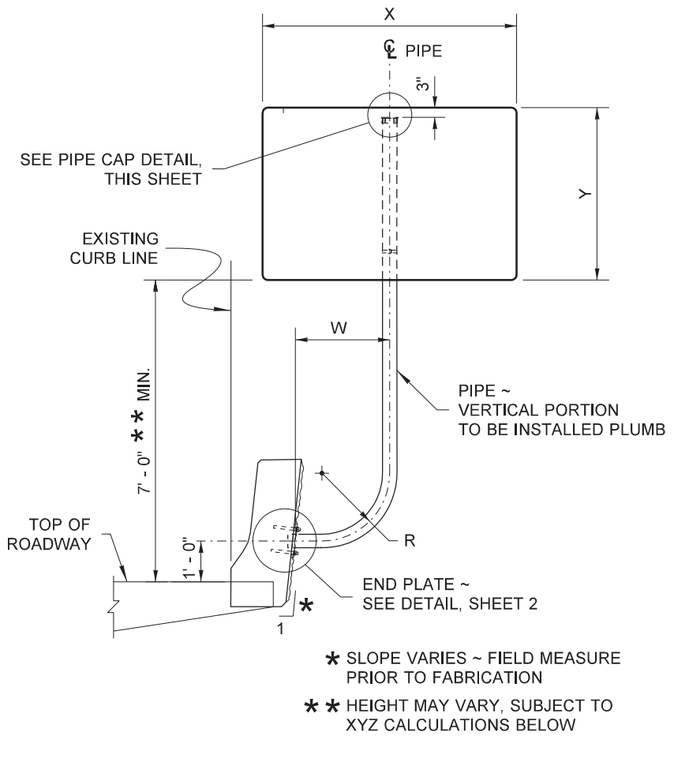
STEEL SIGN SUPPORT FOUNDATION DETAILS

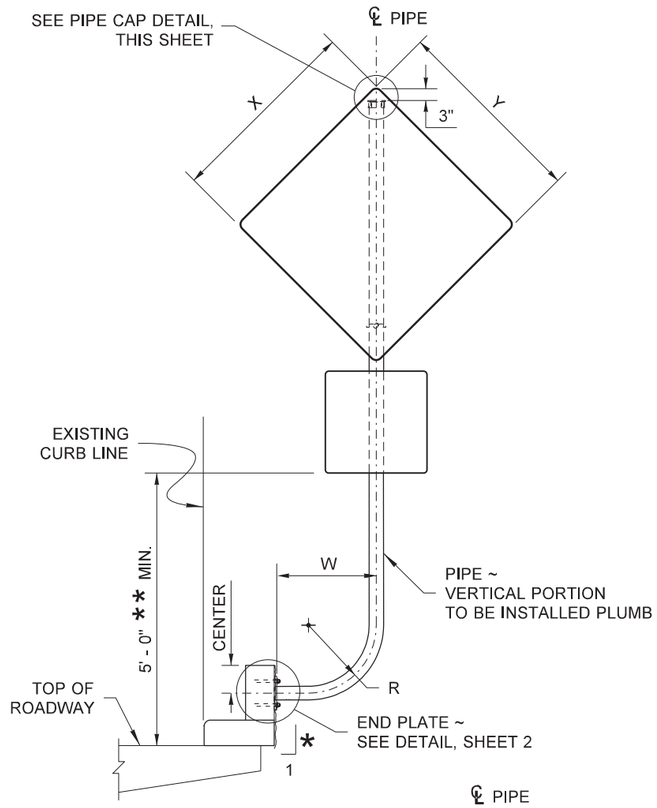
STANDARD PLAN G-25.10-05

SHEET 1 OF 1 SHEET

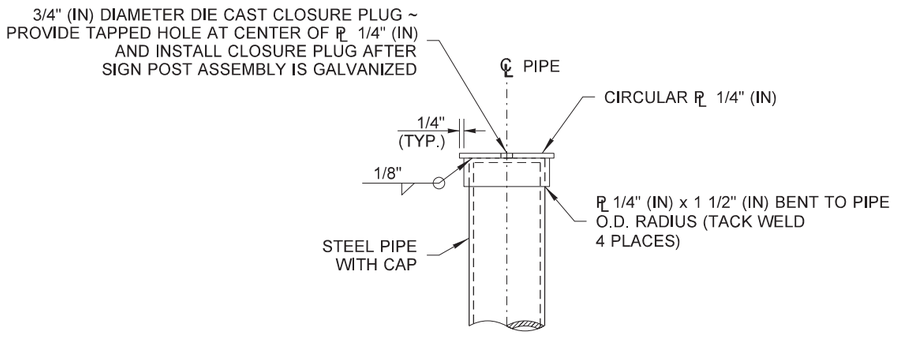
APPROVED FOR PUBLICATION
Date: 2020.09.16 10:05:06 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

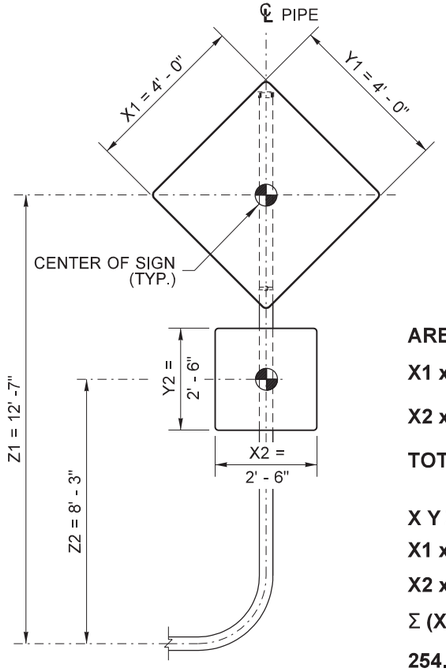




BARRIER MOUNTED ELBOW SIGN SUPPORT



PIPE CAP DETAIL



SAMPLE DESIGN CHECK CALCULATIONS

(OTHER SIGN CONFIGURATIONS OK)

AREA CALCULATIONS

X1 x Y1 = 4' x 4' = 16 FT^2

X2 x Y2 = 2.5' x 2.5' = 6.3 FT^2

TOTAL AREA = 16' + 6.3' = 22.3 FT^2

X Y Z CALCULATIONS

X1 x Y1 x Z1 = 4' x 4' x 12.6' = 203.2 FT^3

X2 x Y2 x Z2 = 2.5' x 2.5' x 8.25' = 51.6FT^3

Σ (XYZ) = 203.2 + 51.6 = 254.8 FT^3

254.8 FT^3 < 260 FT^3 THEREFORE USE 5" STD. PIPE

NOTES

1. All material and workmanship shall be in accordance with the current requirements of the Washington State Department Of Transportation **Standard Specifications for Road, Bridge, Municipal Construction and Amendments.**
2. Sign support components have been designed to meet the requirements of **AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals**, dated 2015 and interim's, using basic wind speed of 115 mph, and 50 year design life.
3. All non-stainless steel parts shall be galvanized in accordance with **AASHTO M111** after fabrication. Bolts and hardware shall be galvanized in accordance with **AASHTO M232**.
4. Size of fillet weld shall be 1/4" (in) minimum except where noted.
5. For sign bracing details, see **Standard Plan G-30.10 or G-50.10**.
6. Rotate sign on post to be normal to traffic.
7. No resin bonded anchors shall be nearer than 1' - 6" from a vertical expansion joint and all resin bonded anchors shall clear any embedded electrical conduit.
8. Sign support shall be installed on cast-in-place concrete barriers rigidly connected to bridge or retaining wall.
9. Anchors shall be bolted into reinforced concrete only with a nominal thickness no less than 9" (in). Base plate shall be installed such that full bearing contact is achieved.
10. Drilling through reinforcing steel is not allowed. If steel is hit while drilling, the location shall be moved and the hole abandoned. Fill hole with grout conforming to **Standard Specification, Section 6.02.3(20).**

PART	MATERIAL SPECIFICATION
PLATES AND BARS	ASTM A36 OR ASTM 572
PIPES	ASTM A53 GRADE B TYPE E OR S, OR EQUIVALENT HSS ASTM A500 ROUND GRADE B
RESIN BONDED ANCHORS	ASTM F1554 GRADE 55 GALV.
NUTS	ASTM A563 GRADE A
WASHERS	ASTM F436 TYPE 1
EPOXY RESIN	STD. SPEC. SECT. 9-26.1 (TYPE IV)

PIPE SIZE	X Y Z	W
4" STD.	< 160 FT^3	< 2' - 6"
4" X-S	< 220 FT^3	< 2' - 6"
5" STD.	< 260 FT^3	< 3' - 6"

RICHARD P. ZELDENRUST
STATE OF WASHINGTON
25470
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER

Zeldenrust, Richard
Jul 19 2019 7:37 AM
cosign

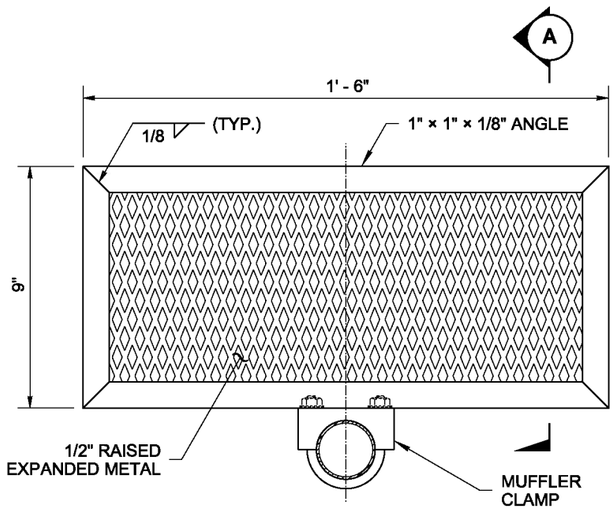
BARRIER MOUNTED ELBOW SIGN SUPPORT

STANDARD PLAN G-26.10-00

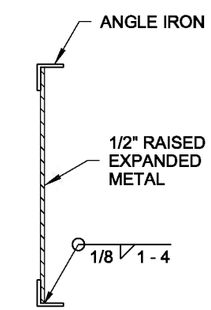
SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION
Roark, Steve
Jul 31 2019 12:17 PM
cosign
STATE DESIGN ENGINEER

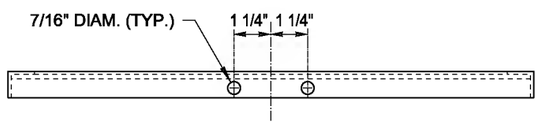
Washington State Department of Transportation



FRONT VIEW

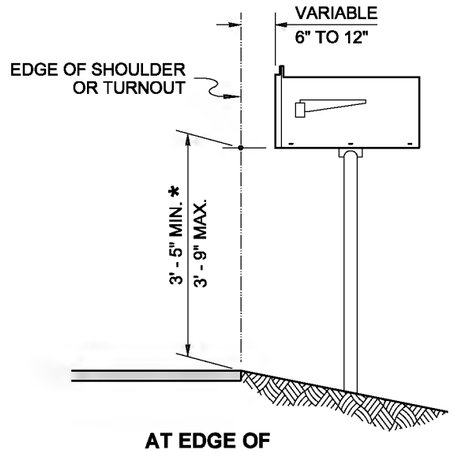


SECTION A

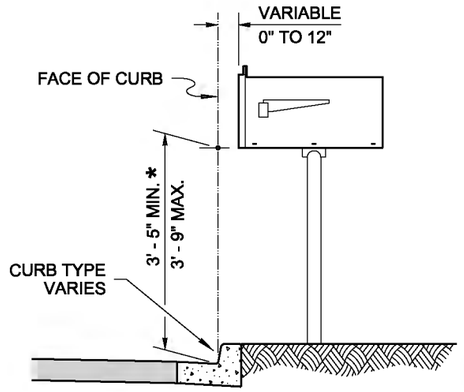


BOTTOM VIEW

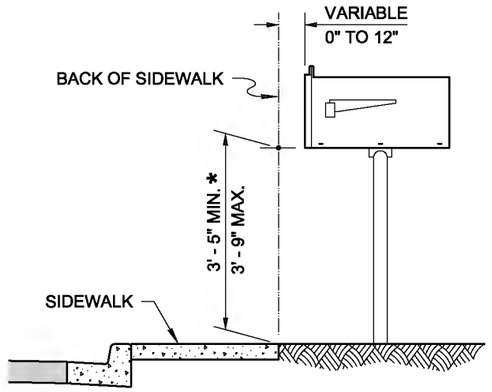
SNOW GUARD DETAIL



AT EDGE OF SHOULDER



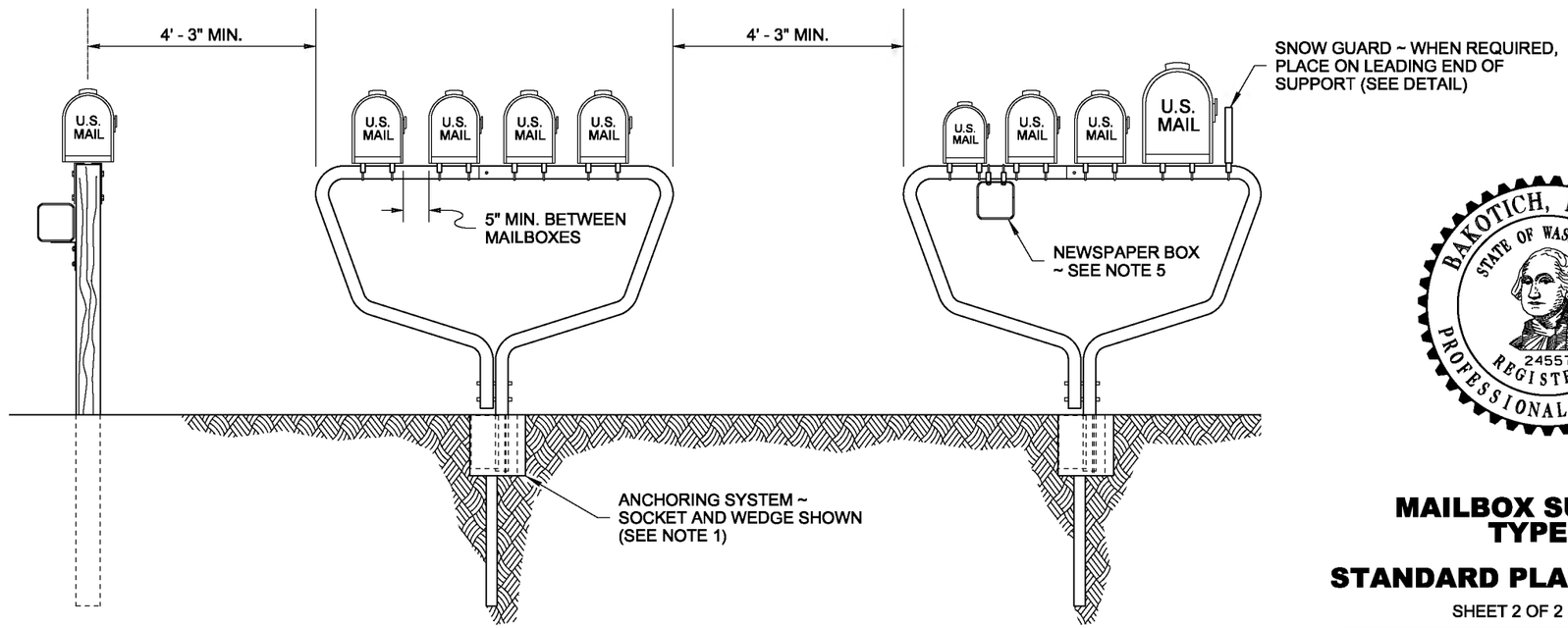
BEHIND CURB



BEHIND SIDEWALK

* UNLESS OTHERWISE SHOWN IN THE PLANS

MAILBOX PLACEMENT SECTIONS



MAILBOX SUPPORT TYPE 1
(WOOD POST SHOWN)

FOR DETAILS,
SEE **STANDARD PLAN I-70.10**

MAILBOX SUPPORTS TYPE 2

SPACING DETAIL

DRAWN BY: MARK SUJKA

BAKOTICH, PASCO III
STATE OF WASHINGTON
24557
REGISTERED
PROFESSIONAL ENGINEER

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MAILBOX SUPPORT TYPE 2

STANDARD PLAN H-70.20-01

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION

Pasco Bakotich III — STATE DESIGN ENGINEER

02-16-12 — DATE

Washington State Department of Transportation

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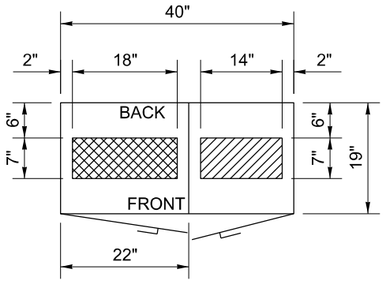
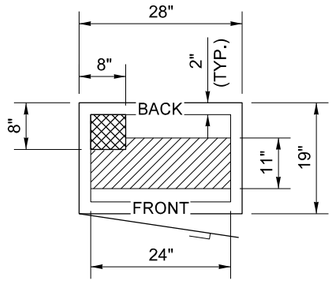
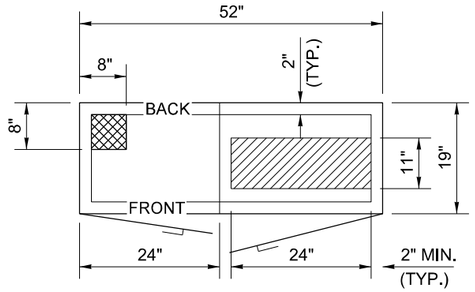
DRAWN BY: BILL BERENS



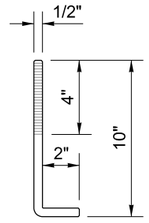
TYPE B MODIFIED SERVICE CABINET



TYPE D SERVICE CABINET



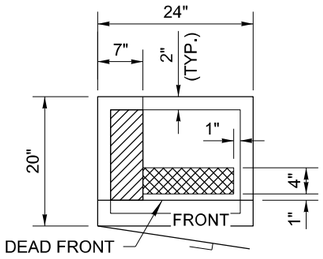
TYPE E SERVICE CABINET



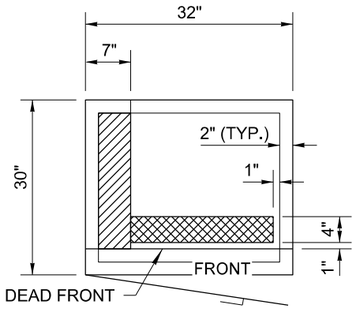
ANCHOR BOLT
(SEE NOTE 1)

CONDUIT PLACEMENT LOCATION AREA

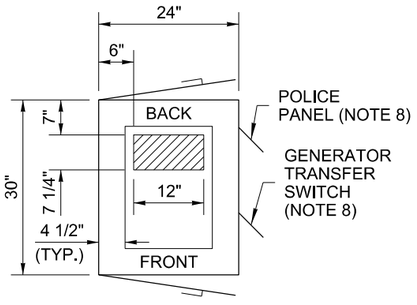
SERVICE: UTILITY CONDUIT AREA
TRANSFORMER: HIGH VOLTAGE CONDUIT AREA



XFMR-S (TRANSFORMER - SMALL) (UP TO 12.5 KVA)



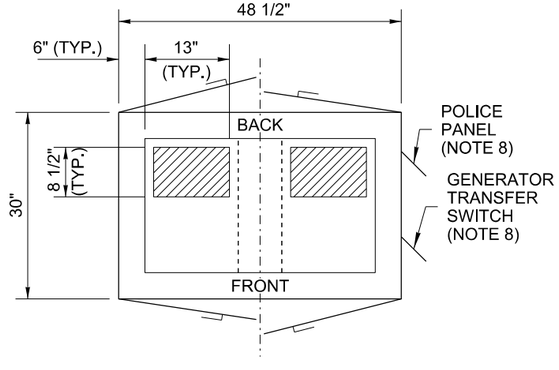
XFMR-L (TRANSFORMER - LARGE) (12.6 TO 37.5 KVA)



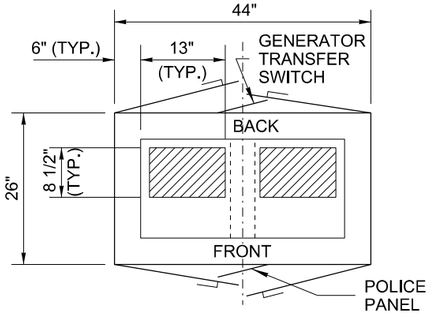
TYPE 33x CABINET

CABINET REFERENCE TABLE			
SERVICE CABINETS	**SIZE W × D (IN)**	**CAPACITY CONDUIT DIAMETER (IN)**	**STANDARD PLAN**
TYPE B MOD.	40" x 19"	12"	J-10.20
TYPE D	28" x 19"	24"	J-10.21
TYPE E	52" x 19"	48"	J-10.22
TRANSFORMER CABINETS	**SIZE W × D (IN)**		
XFMR-S (UP TO 12.5 KVA)	24" × 20"	12"	J-10.25
XFMR-L (12.6 TO 37.5 KVA)	32" × 30"	15"	J-10.25
SIGNAL AND ITS CABINETS	**SIZE W × D (IN)**		
TYPE 33x	24" × 30"	12"	J-12.15
TYPE 33xD	48.5" × 30"	24" (1)	J-12.16
TYPE 342LX	44" × 26"	24" (1)	J-12.16
NEMA P44	44" × 26"	15"	N/A

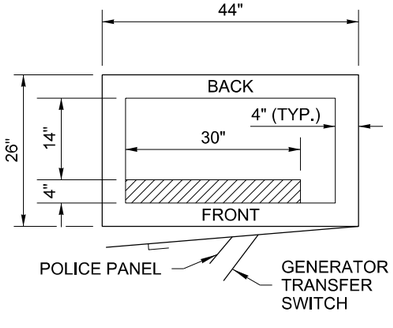
(1) 12" (IN) OF CONDUIT IN EACH LOCATION SHOWN



TYPE 33xD CABINET



TYPE 342LX CABINET



NEMA P44 CABINET

PLAN VIEWS
CABINET ORIENTATION, FOOTPRINT, AND CONDUIT PLACEMENT LOCATIONS

GENERAL NOTES

1. Each pad mounted cabinet shall be attached to the foundation with four 1/2" (in.) x 10" (in.) x 2" (in.) x 4" (in.) anchor bolts (see Anchor Bolt Detail this Sheet). Bolts, washers, and nuts shall be hot-dip galvanized in accordance with **AASHTO M232** and meet the requirements of Standard Specification 9-06.5(1). Stainless steel epoxy anchors may be used as an alternative, and shall be 1/2" (in.) diameter x 9" (in.) or 5/8" (in.) diameter x 8" (in.). Epoxy anchors shall use Type 304 stainless steel hardware: ASTM F593 all threaded rod, ASTM A240 washers, and ASTM F594 nuts. Anchor bolts shall extend 1 1/2" (in.) min. to 2" (in.) max. above the concrete pad.
2. All reinforcing steel shall be embedded 2" (in.) below the surface of concrete.
3. A 1/2" (in.) bead of silicone is required between each cabinet and the concrete foundation.
4. Concrete shall be Class 3000, in accordance with **Standard Specification 8-20.3(4)**. All concrete corners shall have a 1" (in.) chamfer, unless abutting sidewalk, where it shall be square and seaparated from the sidewalk with joint filler.
5. Foundations installed in, or adjacent to, sidewalks shall be constructed with the top flush with the sidewalk surface and grade, not including concrete risers for cabinets.
6. Foundations require additional level clear space to achieve a minimum of 4 feet of level clear space between the face of any cabinet or cabinet riser and the edge of the level clear space. Clear space beyond the edge of the concrete pad shall be made up of crushed surfacing meeting the requirements of **Standard Specification 9-03.9(1)**. Special design may be required where slopes are 3H : 1V or steeper. As an alternative, the concrete pad may be extended out to provide the required clear space.
7. Verify overall pad and concrete riser dimensions with the Engineer prior to placing concrete.
8. Not all Type 33x and 33xD cabinets have a police panel and/or a generator transfer switch (GTS) panel. See Contract for specific cabinet requirements.

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CABINET ORIENTATION CONDUIT LAYOUT AND FOUNDATION DETAIL
STANDARD PLAN J-10.10-04

SHEET 1 OF 6 SHEETS

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Washington State Department of Transportation

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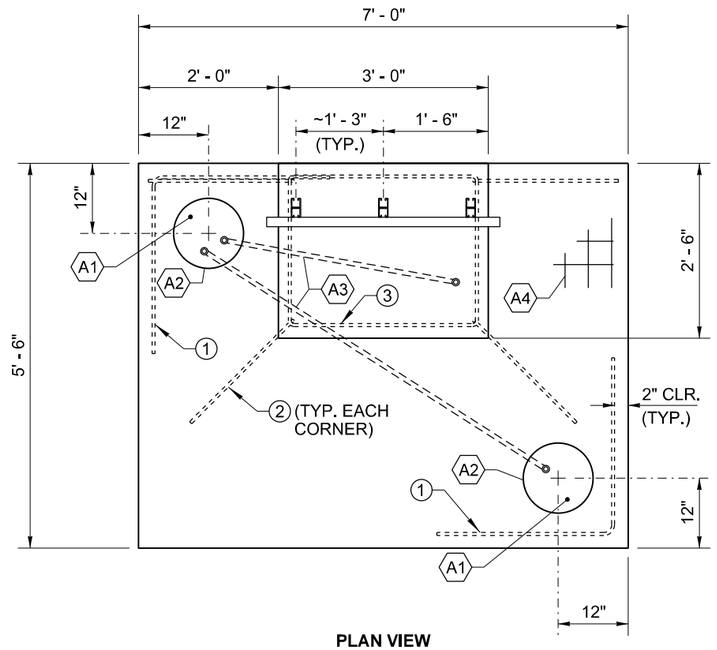
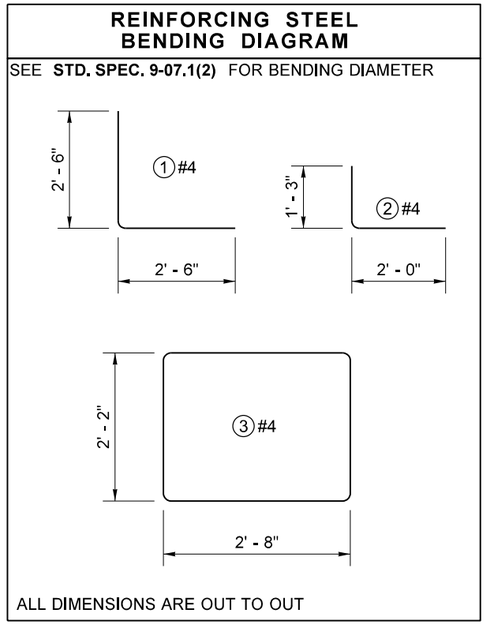
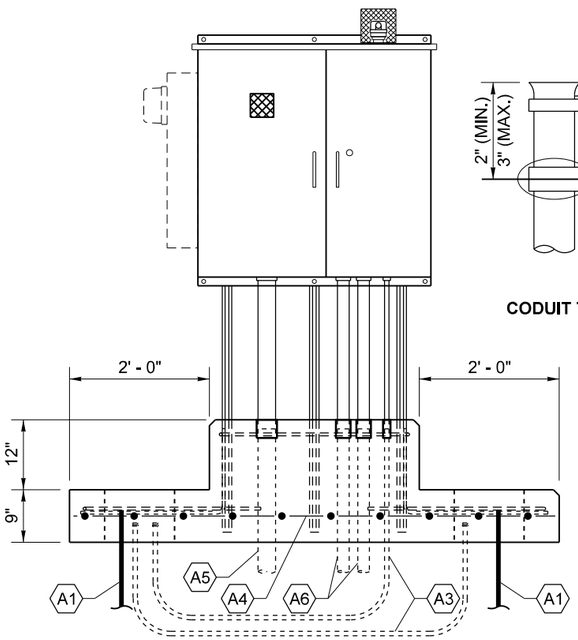


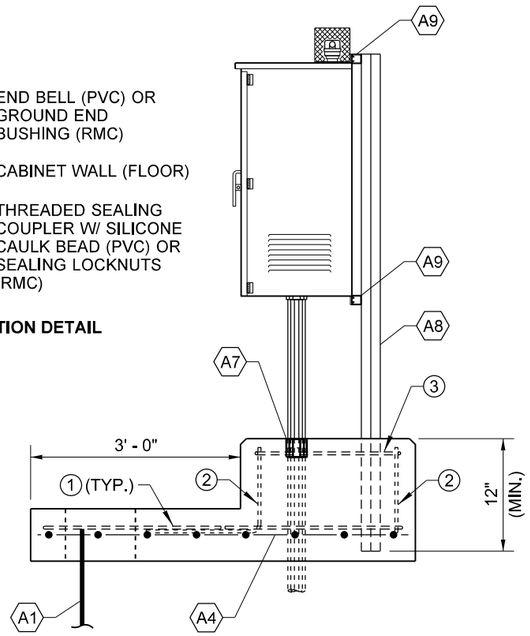
PLAN VIEW





CODUIT TERMINATION DETAIL

FRONT ELEVATION VIEW



RIGHT SIDE ELEVATION VIEW

STRUT MOUNT SERVICE CABINET
(TYPE B MODIFIED SERVICE CABINET SHOWN)

NOTES - SINGLE STRUT MOUNT CABINET (SHEET 2 OF 6)

A1. Drive gound rods before placing concrete. Ground rods shall be a minimum of 6 feet apart. **See Standard Plan J-60.05** for additional details.

A2. Welded Wire Fabirc (WWF) shall be 4.0 (in.) x 4.0 (in.) ~ W4.0 x W4.0 ~ meeting the requirements of **Standard Specification 9-07.7**. As an alternative, a grid of #3 rebar may be used, with bars spaced at 1'- 0" centers laterally and longitudinally.

A3. Install conduit couplings on all conduits. Couplers shall be installed with the top of the coupler flush with the top of concrete. For PVC conduits, the conduit segment above the coupler shall not be glued to the coupler.

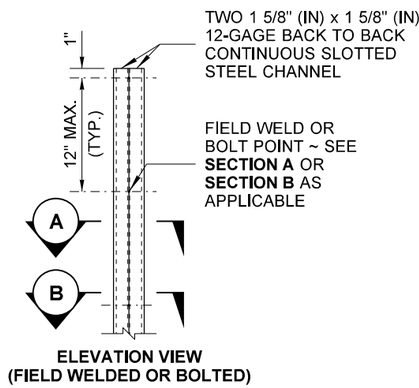
A4. Vertical steel supports shall be two continuous 1 5/8" (in.) x 1 5/8" (in.) 12-gage slotted steel channels installed back-to-back (3 pairs required) ~ see Strut Mount Support Details this sheet for connection details. As an alternative, continuous 1 5/8" (in.) x 3 1/4" (in.) 12-gage slotted steel channel may be used in place of each channel pair. Channels shall be embedded a minimum of 12" (in.) into the concrete foundation. Supports shall be evenly spaced, with the center support centered in the concrete riser, and the outer supports tied to the riser rebar hoop.

A5. Horizontal steel supports shall be continuous 1 5/8" (in.) x 1 5/8" (in.) 12-gage slotted steel channels (two required).

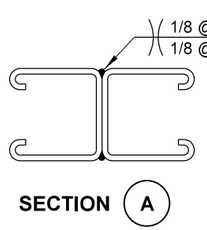
A6. Cabinet height shall be determined by the required height of the utility meter - verify height with serving utilty (typically 5 to 6 feet).

A7. Serving utility may require meter socket to be installed on the outside of the cabinet. Utility feeder conduit shall still terminate in the utility section of the cabinet unless otherwise required by the utility.

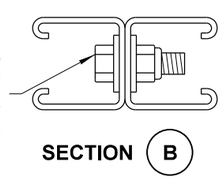
A8. Additional gravel pad not shown. Gravel pad shall extend two feet in front of the concrete pad for the full width of the concrete pad. If the utility meter socket is installed on the outside of the service cabinet, gravel pad shall also extend three feet from the utility side of the cabinet pad. Final gravel area shall be a rectangle.



ELEVATION VIEW
(FIELD WELDED OR BOLTED)



SECTION A
(WELDED CONNECTION)



SECTION B
(BOLTED CONNECTION)

STRUT MOUNT SUPPORT DETAILS
(SEE NOTE A4)

KEY NOTES - SHEET 2 OF 6

- A1 Ground rod ~ See Note A1, this sheet.
- A2 Ground rod well (Ground tile) - 12" diameter concrete
- A3 Service ground electrode conduits.
- A4 Welded wire fabric ~ See Note A2, this sheet.
- A5 Utility entrance conduit. Conduit shall terminate in the utility section of the service cabinet.
- A6 Conduits to field equipment. Conduits shall terminate in the customer section of the service cabinet.
- A7 Conduit couplers ~ See Note A3, this sheet.
- A8 Vertical support steel channel ~ See Note A4, this sheet.
- A9 Horizontal support steel channel ~ See Note A5, this sheet.

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CABINET ORIENTATION CONDUIT LAYOUT AND FOUNDATION DETAIL
STANDARD PLAN J-10.10-04

SHEET 2 OF 6 SHEETS

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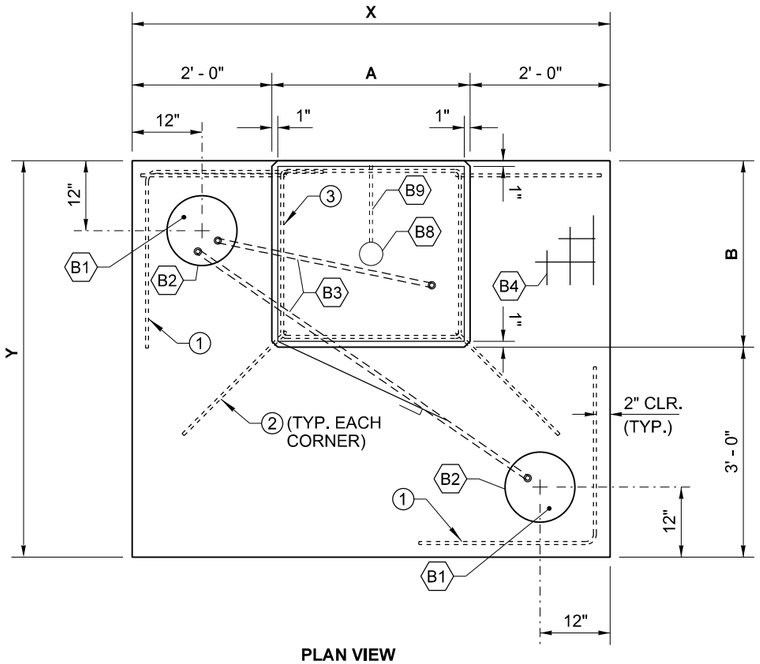
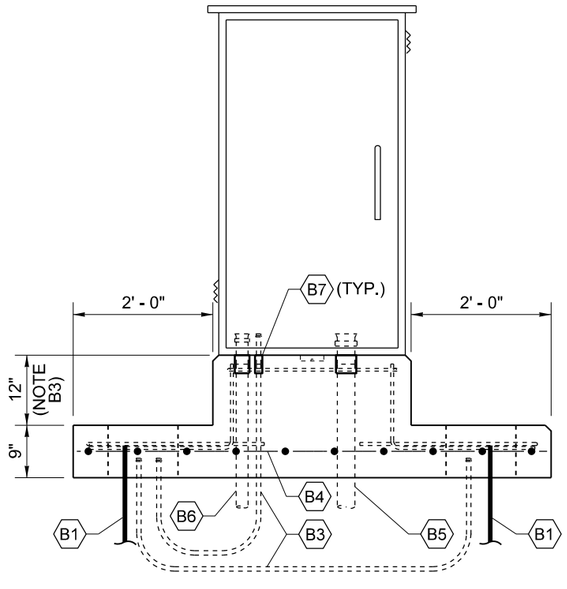
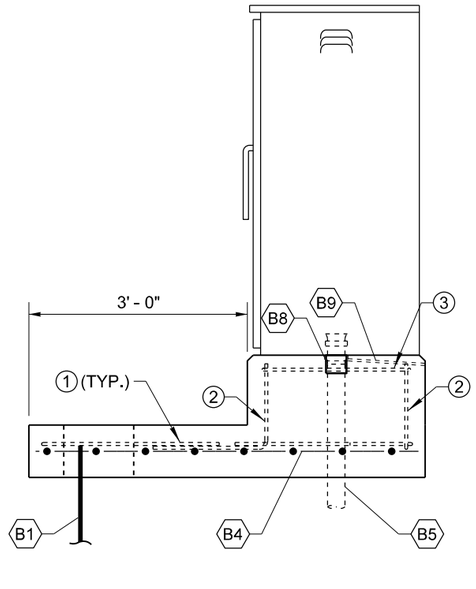


PLAN VIEW



FRONT ELEVATION VIEW



RIGHT SIDE ELEVATION VIEW

SINGLE PAD MOUNT
SERVICE OR TRANSFORMER CABINET
(XFMR-L CABINET SHOWN)

KEY NOTES - SHEET 3 OF 6

- (B1) Ground rod ~ See Note B1, this sheet.
- (B2) Ground rod well (Ground tile) - 12" diameter concrete
- (B3) Service ground electrode conduits.
- (B4) Welded wire fabric ~ See Note B2, this sheet.
- (B5) Utility entrance (service cabinet) or input power (transformer cabinet) conduit. Conduit shall terminate in the utility or high-voltage section of the cabinet (as applicable).
- (B6) Conduits to field equipment. Conduits shall terminate in the customer section (service cabinet) or low-voltage (transformer cabinet) of the cabinet.
- (B7) Conduit couplers ~ See Note B4, this sheet.
- (B8) 4" (in.) diam. x 1/2" (in.) deep sump.Slope foundation within cabinet footprint toward sump.
- (B9) 3/8" (in.) diam. polyethylene or copper tubing for drain. Tubing shall be straight, but slope downward a minimum of 1" (in.).

NOTES - SINGLE PAD MOUNT SERVICE OR TRANSFORMER CABINET (SHEET 3 OF 6)

B1. Drive gound rods before placing concrete. Ground rods shall be a minimum of 6 feet apart. See **Standard Plan J-60.05** for additional details.

B2. Welded Wire Fabirc (WWF) shall be 4.0 (in.) x 4.0 (in.) ~ W4.0 x W4.0 ~ meeting the requirements of **Standard Specification 9-07.7**. As an alternative, a grid of #3 rebar may be used, with bars spaced at 1'-0" centers laterally and longitudinally.

B3. Omit concrete riser and bar #3 for Type D and Type E service cabinets.

B4. Install conduit couplings on all conduits. Couplers shall be installed with the top of the coupler flush with the top of concrete. For PVC conduits, the conduit segment above the coupler shall not be glued to the coupler.

B5. Conduits shall extend a minimum of 2" (in.) and a maximum of 3" (in.) into the cabinet, as measured from the concrete surface to the top of the end bell (PVC) or ground bushing (RMC).

B6. Serving utility may require meter socket to be installed on the outside of the cabinet. Utility feeder conduit shall still terminate in the utility section of the cabinet unless otherwise required by the utility.

B7. Additional gravel pad not shown. Gravel pad shall extend two feet in front of the concrete pad for the full width of the concrete pad. If the utility meter socket is installed on the outside of the service cabinet, gravel pad shall also extend three feet from the side of the cabinet pad where the meter is installed. Final gravel area shall be a rectangle.

B8. See **Standard Plan J-10.14** for additional details when service or transformer cabinet is installed in fence line.

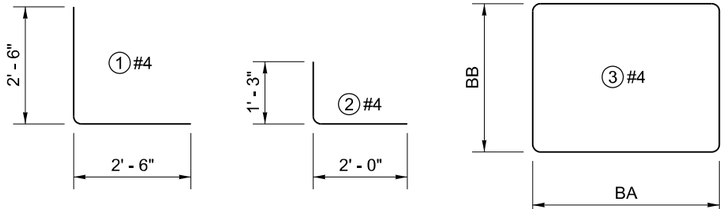
FOUNDATION SIZE REFERENCE TABLE

SERVICE CABINETS	PAD WIDTH (X)	PAD DEPTH (Y)	RISER WIDTH (A)	RISER DEPTH (B)	HOOP (3) WIDTH (BA)	HOOP (3) DEPTH (BB)
TYPE D	6' - 4"	3' - 8"	N/A	N/A	N/A	N/A
TYPE E	8' - 4"	3' - 8"	N/A	N/A	N/A	N/A
TRANSFORMER CABINETS	**PAD WIDTH (X)**	**PAD DEPTH (Y)**	**RISER WIDTH (A)**	**RISER DEPTH (B)**	**HOOP (3) WIDTH (BA)**	**HOOP (3) DEPTH (BB)**
XFMR-S (UP TO 12.5 KVA)	6' - 2"	4' - 11"	2' - 2"	1' - 11"	1' - 10"	1' - 7"
XFMR-L (12.6 TO 37.5 KVA)	6' - 10"	5' - 8"	2' - 10"	2' - 8"	2' - 6"	2' - 4"

REINFORCING STEEL BENDING DIAGRAM

SEE **STD. SPEC. 9-07.1(2)** FOR BENDING DIAM.

ALL DIMENSIONS ARE OUT TO OUT



NOTE: BAR 3 DIMENSIONS ARE ALWAYS FOUR INCHES SMALLER THAN THEIR ASSOCIATED CONCRETE RISER DIMENSIONS.

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CABINET ORIENTATION CONDUIT LAYOUT AND FOUNDATION DETAIL

STANDARD PLAN J-10.10-04

SHEET 3 OF 6 SHEETS

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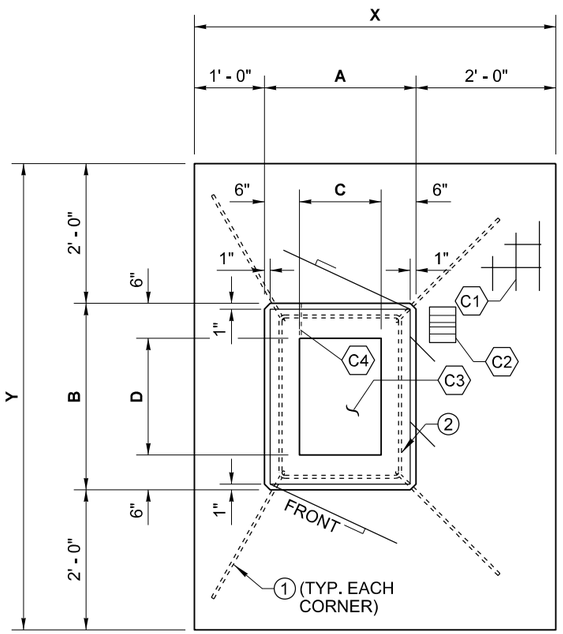


PLAN VIEW

KEY NOTES - SHEET 4 OF 6

(C1) Welded wire fabric ~ See Note C1, this sheet.

(C2) Generator Tie-Down Anchor ~ See Note C2, this sheet.

(C3) Cabinet Well ~ See Note C3, this sheet.

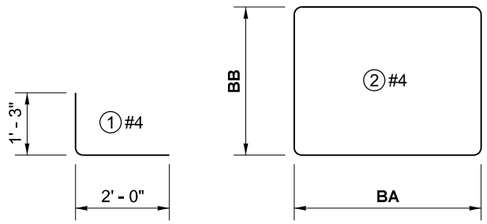
(C4) 3/8" (in.) diam. polyethylene or copper tubing for drain. Tubing shall be straight, but slope downward a minimum of 1" (in.)

(C5) Conduits ~ See Contract Plans for number, type, and function.

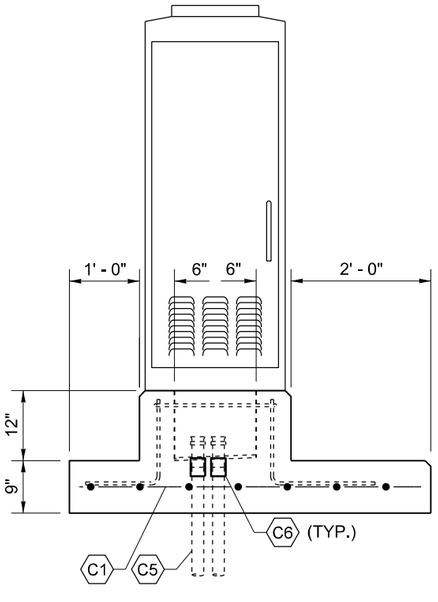
(C6) Conduit couplers ~ See Note C4, this sheet.

REINFORCING STEEL BENDING DIAGRAM

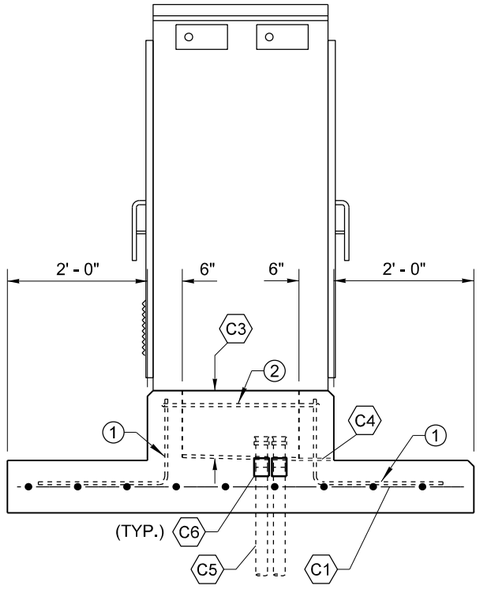
SEE STD. SPEC. 9-07.1(2) FOR BENDING DIAM.



NOTE:
ALL DIMENSIONS ARE OUT TO OUT.
BAR 3 DIMENSIONS ARE ALWAYS FOUR INCHES SMALLER THAN THEIR ASSOCIATED CONCRETE RISER DIMENSIONS.

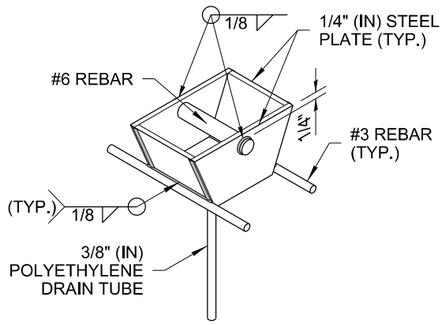


FRONT ELEVATION VIEW

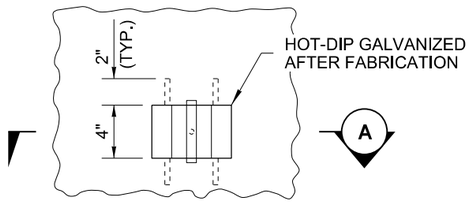


RIGHT SIDE ELEVATION VIEW

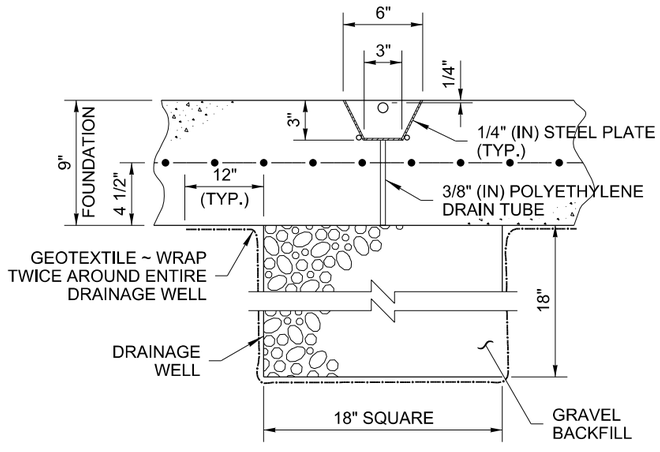
SINGLE PAD MOUNT TRAFFIC SIGNAL OR ITS CABINET
(TYPE 33x CABINET SHOWN)



ISOMETRIC VIEW



PLAN VIEW



ELEVATION VIEW

SECTION (A)

GENERATOR TIE-DOWN ANCHOR
(FABRICATE IF NOT AVAILABLE COMMERCIALLY)

NOTES - SINGLE PAD MOUNT TRAFFIC SIGNAL OR ITS CABINET (SHEET 4 OF 6)

C1. Welded Wire Fabirc (WWF) shall be 4.0 (in.) x 4.0 ~ W4.0 (in.) x W4.0 ~ meeting the requirements of **Standard Specification 9-07.7**. As an alternative, a grid of #3 rebar may be used, with bars spaced at 1'- 0" centers laterally and longitudinally.

C2. Generator Tie-Down Anchors are only required for cabinets with Generator Transfer Switches (GTS). Anchor shall along the side of the cabinet near the back corner of the cabinet riser as shown.

C3. Cabinet well shall be a nominal 10" (in.) deep, sloping towards the corner where the drain tube is installed. Well dimensions are 12" (in.) smaller than the riser length and width dimensions (**A** and **B**). See Cabinet Well Reference Table, this sheet.

C4. Install conduit couplings on all conduits. Couplers shall be installed with the top of the coupler flush with the top of concrete. For PVC conduits, the conduit segment above the coupler shall not be glued to the coupler.

C5. Conduits shall extend a minimum of 2" (in.) and a maximum of 3" (in.) into the cabinet, as measured from the concrete surface to the top of the end bell (PVC) or ground bushing (RMC).

C6. Additional gravel pad not shown. Gravel pad shall extend two feet beyond the front, right, and back of the cabinet pad where the pad is two feet wide. Final gravel area shall be a rectangle.

CABINET WELL REFERENCE TABLE

SIGNAL AND ITS CABINETS	WELL WIDTH (C)	WELL LENGTH (D)
TYPE 33x	1' - 2"	1' - 8"
TYPE 33xD	3' - 2"	1' - 8"
TYPE 342LX / NEMA P44	2' - 10"	1' - 4"

FOUNDATION SIZE REFERENCE TABLE

SIGNAL AND ITS CABINETS	PAD WIDTH (X)	PAD DEPTH (Y)	RISER WIDTH (A)	RISER DEPTH (B)	HOOP (2) WIDTH (BA)	HOOP (2) DEPTH (BB)
TYPE 33x	5' - 2"	6' - 8"	2' - 2"	2' - 8"	1' - 10"	2' - 4"
TYPE 33xD	6' - 3"	6' - 8"	4 - 3"	2' - 8"	3' - 11"	2' - 4"
TYPE 342LX / NEMA P44	5' - 10"	6' - 4"	3' - 10"	2' - 4"	3' - 6"	2' - 0"

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CABINET ORIENTATION CONDUIT LAYOUT AND FOUNDATION DETAIL

STANDARD PLAN J-10.10-04

SHEET 4 OF 6 SHEETS

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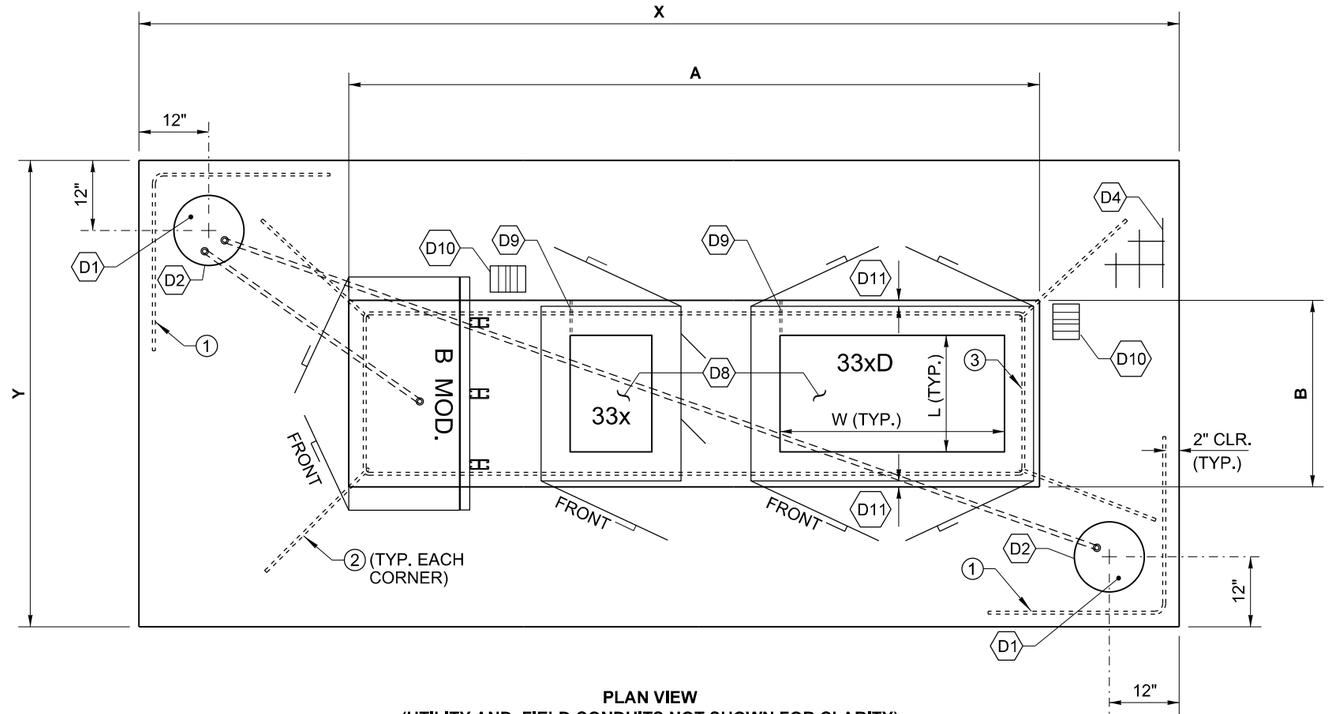
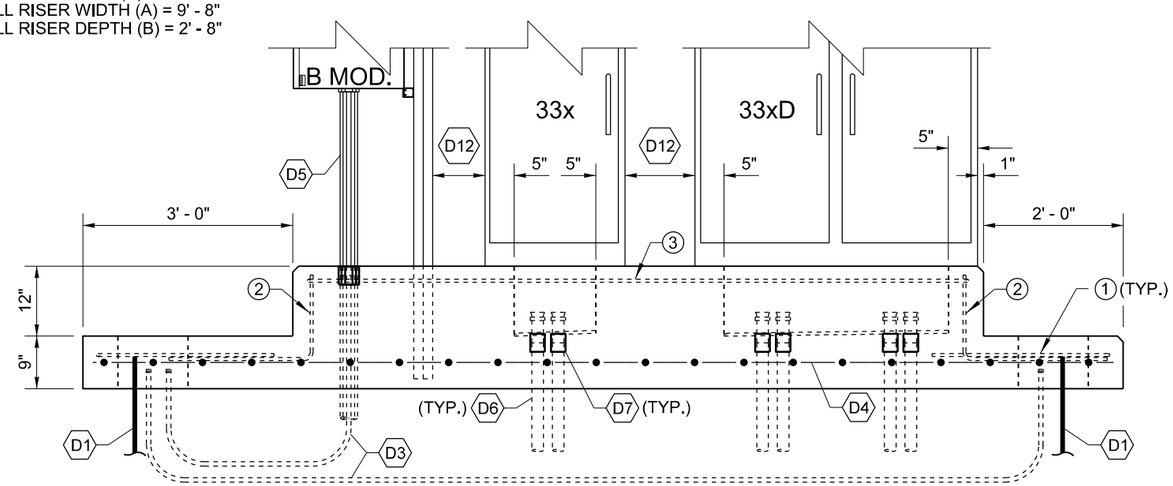


PLAN VIEW
(UTILITY AND FIELD CONDUITS NOT SHOWN FOR CLARITY)

FOR THE EXAMPLE PAD SHOWN HERE:

- SPACE BETWEEN TYPE B MOD. CABINET AND 33x CABINET IS 6" (IN.)
- SPACE BETWEEN 33x AND 33xD CABINET IS 1' - 0"
- OVERALL PAD WIDTH (X) = 14' - 8"
- OVERALL PAD DEPTH (Y) = 6' - 8"
- OVERALL RISER WIDTH (A) = 9' - 8"
- OVERALL RISER DEPTH (B) = 2' - 8"

FOUNDATION PAD DIMENSIONS X, Y, A, AND B SHOULD BE PROVIDED IN THE CONTRACT PLANS.



FRONT ELEVATION VIEW

TYPE A (NARROW) MULTI-CABINET FOUNDATION PAD
(TYPE B MODIFIED SERVICE CABINET, TYPE 33x CABINET, AND TYPE 33xD CABINET SHOWN)

NOTES - TYPE A (NARROW) AND TYPE B (WIDE) MULTI-CABINET FOUNDATION PAD (SHEETS 5 AND 6 OF 6)

D1. Drive gound rods before placing concrete. Ground rods shall be a minimum of 6 feet apart. See **Standard Plan J-60.05** for additional details.

D2. Welded Wire Fabirc (WWF) shall be 4.0 (in.) x 4.0 (in.) ~ W4.0 x W4.0 ~ meeting the requirements of **Standard Specification 9-07.7**. As an alternative, a grid of #3 rebar may be used, with bars spaced at 1'-0" centers laterally and longitudinally.

D3. See Sheet 3 for reinforcing steel bending diagrams.

D4. Concrete riser shall not include Type D or Type E Service Cabinets.

D5. Install conduit couplings on all conduits. Couplers shall be installed with the top of the coupler flush with the top of concrete. For PVC conduits, the conduit segment above the coupler shall not be glued to the coupler.

D6. Conduits shall extend a minimum of 2" (in.) and a maximum of 3" (in.) into the cabinet, as measured from the concrete surface to the top of the end bell (PVC) or ground bushing (RMC).

D7. Serving utility may require meter socket to be installed on the outside of the cabinet. Utility feeder conduit shall still terminate in the utility section of the cabinet unless otherwise required by the utility.

D8. Additional gravel pad not shown. Gravel pad shall extend two feet in front of the concrete pad for the full width of the concrete pad. If the utility meter socket is installed on the outside of the service cabinet, gravel pad shall also extend three feet from the side of the cabinet pad where the meter is installed. Final gravel area shall be a rectangle.

D9. Cabinet wells shall be provided for all Type 33x, Type 33xD, Type 342LX, and NEMA P44 Cabinets. See Note C3 on sheet 4 for Cabinet Well dimensions.

D10. At least one Generator Tie-Down Anchor shall be provided for each multi-cabinet pad foundation. A second Anchor shall be provided if there is a second cabinet with a Generator Transfer Switch (GTS). If a service or transformer cabinet is present, install one Anchor at either of the locations shown, closest to the cabinet with the GTS. If there is no service or transformer cabinet, install Anchors only at the ends of the cabinet riser.

KEY NOTES - SHEET 5 OF 6

D1 Ground rod ~ See Note D1, this sheet.

D2 Ground rod well (Ground tile) - 12" diameter concrete

D3 Service ground electrode conduits.

D4 Welded wire fabric ~ See Note D2, this sheet.

D5 Utility entrance (service cabinet) or input power (transformer cabinet) conduit. Conduit shall terminate in the utility or high voltage section of the cabinet (as applicable).

D6 Conduits to field equipment. Conduits shall terminate in the customer section (service cabinet) or low-voltage (transformer cabinet) of the cabinet.

D7 Conduit couplers ~ See Note D5, this sheet.

D8 Cabinet Well ~ See Note D9, this sheet.

D9 3/8" (in.) diam. polyethylene or copper tubing for drain. Tubing shall be straight, but slope downward a minimum of 1" (in.)

D10 Generator Tie-Down Anchor ~ See Note D10, this sheet.

D11 Riser lip shall be 1" (in.) from the base edge of the largest cabinet to the face of the concrete riser. Smaller cabinets shall be positioned so that the front riser lip is 1" (in.) wide.

D12 For a Type A (Narrow) Pad, cabinet spacing shall be as follows:
a. 12" (in.) between cabinets where at least one cabinet has a police panel or GTS door.
b. 6" (in.) between cabinets where no police panel or GTS door is present.

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CABINET ORIENTATION CONDUIT LAYOUT AND FOUNDATION DETAIL
STANDARD PLAN J-10.10-04

SHEET 5 OF 6 SHEETS

APPROVED FOR PUBLICATION
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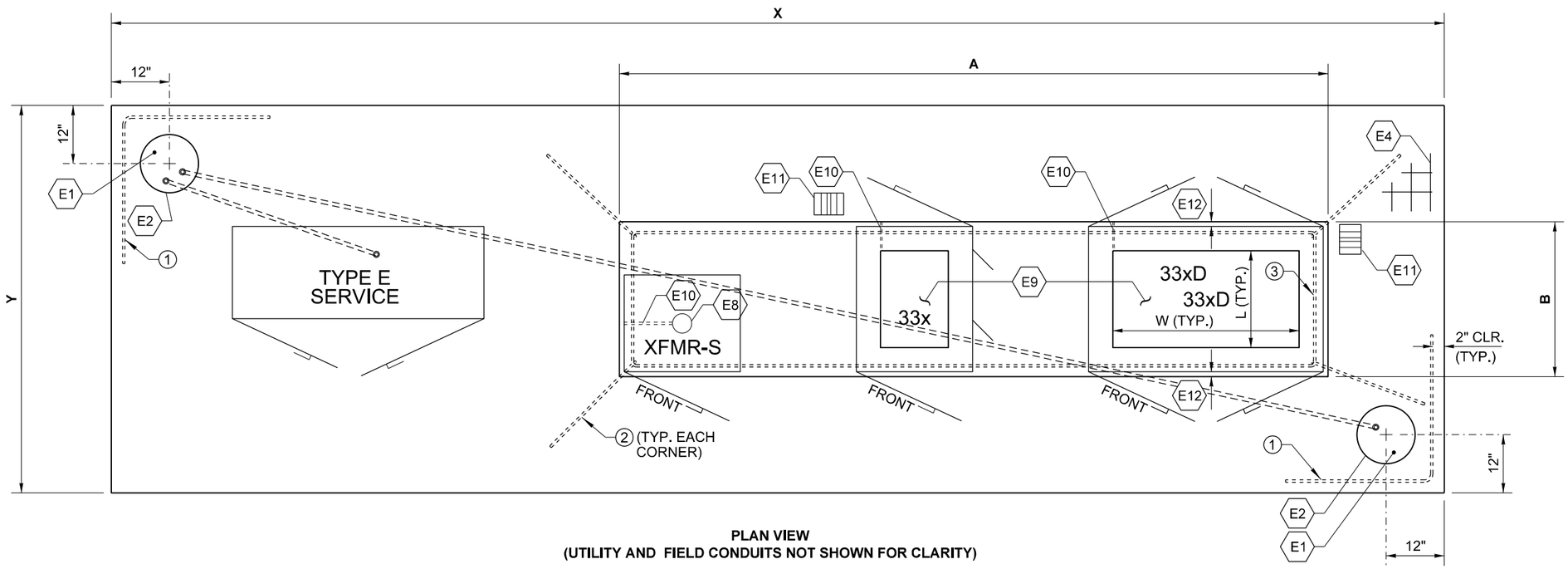


PLAN VIEW
(UTILITY AND FIELD CONDUITS NOT SHOWN FOR CLARITY)

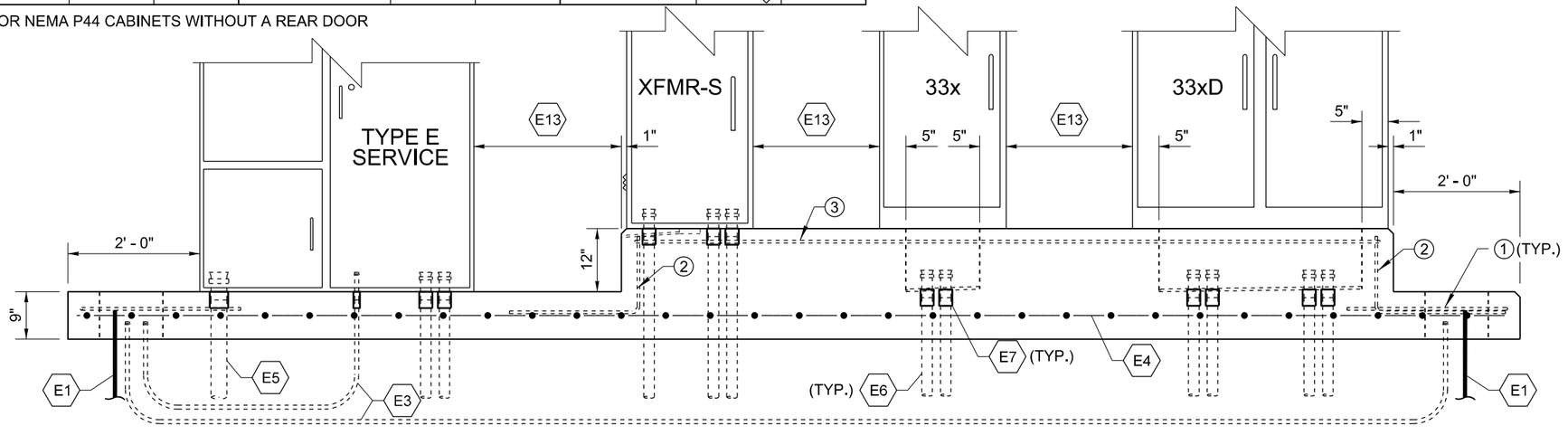
CABINET CLEARANCE REFERENCE TABLE								
SERVICE CABINETS	**LEFT SIDE**	**RIGHT SIDE**	**TRANSFORMER CABINETS**	**LEFT SIDE**	**RIGHT SIDE**	**SIGNAL AND ITS CABINETS**	**LEFT SIDE**	**RIGHT SIDE**
TYPE B MOD.	1' - 10"	1' - 6"	XFMR-S (UP TO 12.5 KVA)	2' - 0"	6"	TYPE 33x	2' - 0"	2' - 0"
TYPE D	2' - 4"	6"				TYPE 33xD	2' - 0"	2' - 0"
TYPE E	2' - 0"	2' - 4"	XFMR-L (12.6 TO 37.5 KVA)	3' - 8"	6"	TYPE 342LX	1' - 10"	1' - 10"
						NEMA P44	3' - 8" 1	3' - 8"

1 6" FOR NEMA P44 CABINETS WITHOUT A REAR DOOR

FOR THE EXAMPLE PAD SHOWN HERE:

- SPACE BETWEEN TYPE E CABINET AND FACE OF CONCRETE RISER IS 2' - 4"
- SPACE BETWEEN XFMR-S CABINET AND 33x CABINET IS 2' - 0"
- SPACE BETWEEN 33x AND 33xD CABINET IS 2' - 0"
- OVERALL PAD WIDTH (X) = 22' - 11"
- OVERALL PAD DEPTH (Y) = 6' - 8"
- OVERALL RISER WIDTH (A) = 12' - 3"
- OVERALL RISER DEPTH (B) = 2' - 8"

FOUNDATION PAD DIMENSIONS X, Y, A, AND B SHOULD BE PROVIDED IN THE CONTRACT PLANS.



FRONT ELEVATION VIEW

TYPE B (WIDE) MULTI-CABINET FOUNDATION PAD

(TYPE E SERVICE CABINET, XFMR-S CABINET, TYPE 33x CABINET, AND TYPE 33xD CABINET SHOWN)

KEY NOTES - SHEET 6 OF 6

- E1 Ground rod ~ See Note D1, Sheet 5 of 6.
- E2 Ground rod well (Ground tile) - 12" diameter concrete
- E3 Service ground electrode conduits.
- E4 Welded wire fabric ~ See Note D2, Sheet 5 of 6.
- E5 Utility entrance (service cabinet) or input power (transformer cabinet) conduit. Conduit shall terminate in the utility or high voltage section of the cabinet (as applicable).
- E6 Conduits to field equipment. Conduits shall terminate in the customer section (service cabinet) or low-voltage (transformer cabinet) of the cabinet.
- E7 Conduit couplers ~ See Note D5, Sheet 5 of 6.
- E8 4" (in.) diam. x 1/2" (in.) deep sump. Slope foundation within cabinet footprint toward sump.
- E9 Cabinet Well ~ See Note D9, Sheet 5 of 6.
- E10 3/8" (in.) diam. polyethylene or copper tubing for drain. Tubing shall be straight, but slope downward a minimum of 1" (in.)
- E11 Generator Tie-Down Anchor ~ See Note D10, Sheet 5 of 6.
- E12 Riser lip shall be 1" (in.) from the base edge of the largest cabinet to the face of the concrete riser. Smaller cabinets shall be positioned so that the front riser lip is 1" (in.) wide.
- E13 For a **Type B** (Wide) Pad, spacing between the cabinets shall match the widest door of the two adjacent cabinets. For **Type D** and **Type E** Service Cabinets, the clearance is to the face of the adjacent concrete riser (when present). See left and right clearance table this sheet.

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CABINET ORIENTATION CONDUIT LAYOUT AND FOUNDATION DETAIL

STANDARD PLAN J-10.10-04

SHEET 6 OF 6 SHEETS

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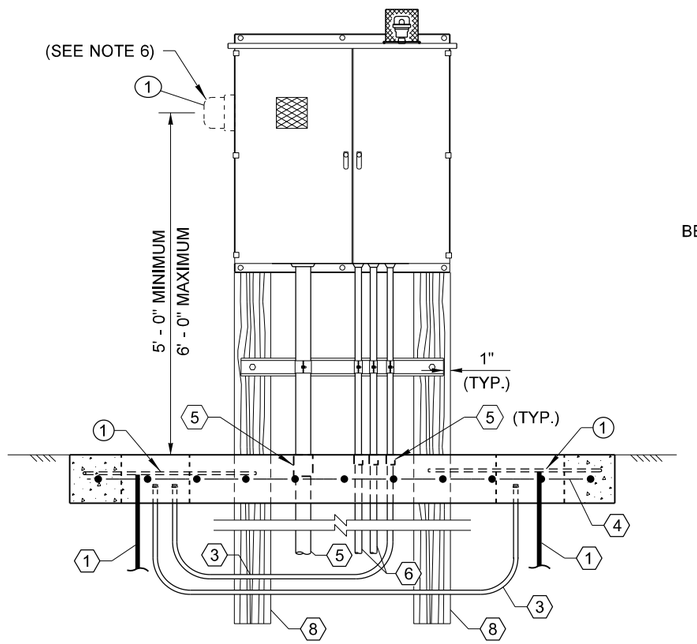
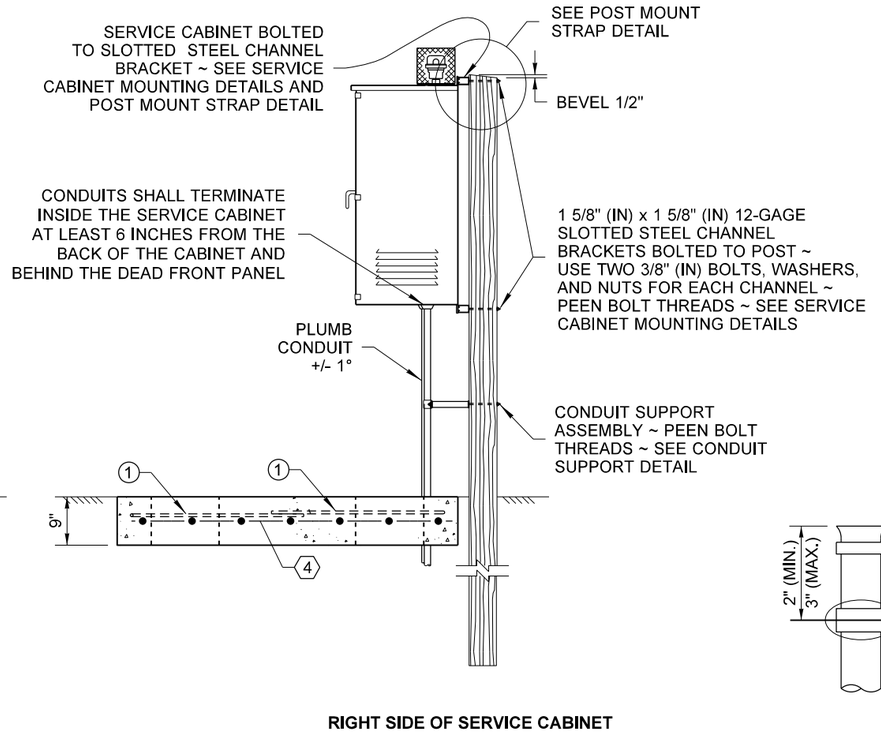


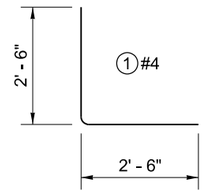
FRONT OF SERVICE CABINET
TWO POST MOUNT



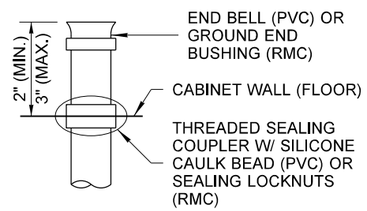
RIGHT SIDE OF SERVICE CABINET

REINFORCING STEEL BENDING DIAGRAM

SEE **STD. SPEC. SECTN. 9-07.1(2)** FOR BENDING DIAMETER



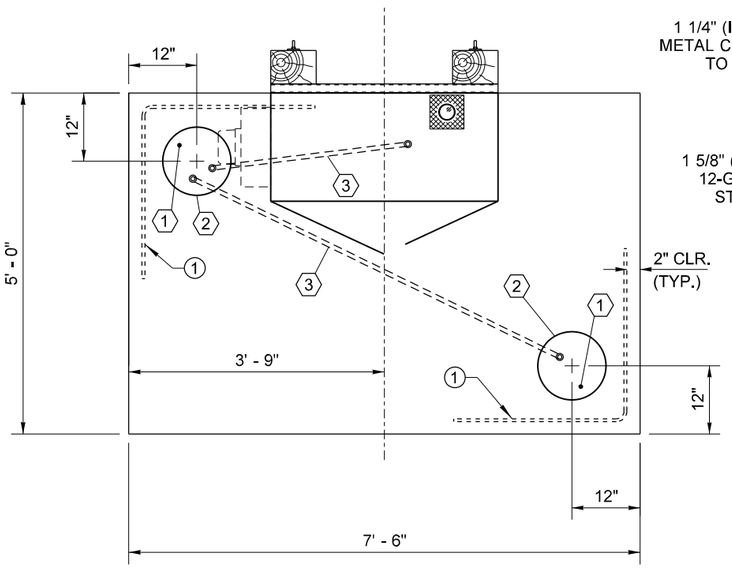
ALL DIMENSIONS ARE OUT TO OUT



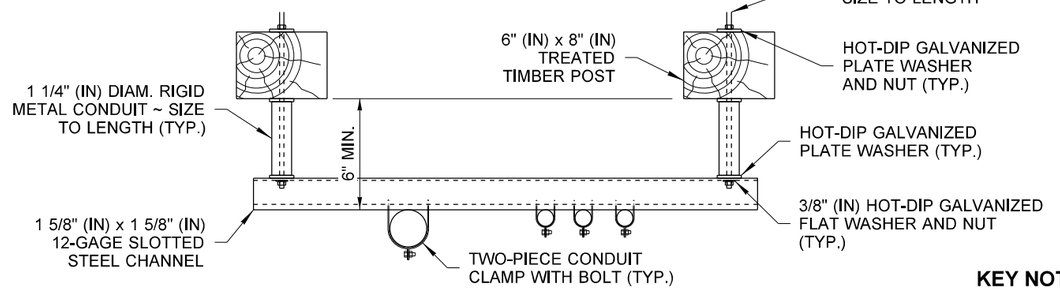
CODUIT TERMINATION DETAIL

NOTES

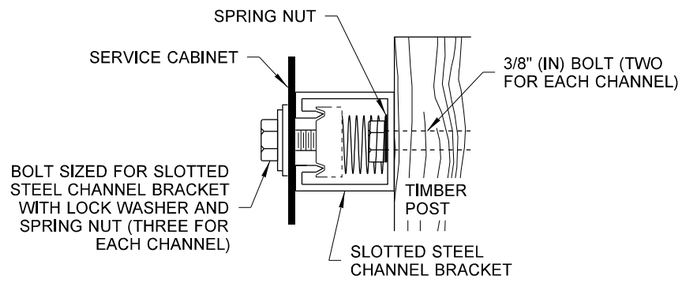
1. Drive gound rods before placing concrete. Ground rods shall be a minimum of 6 feet apart. See **Standard Plan J-60.05** for additional details.
2. Welded wire fabirc (WWF) shall be 4.0 x 4.0 ~ W4.0 x W4.0 ~ meeting the requirements of **Standard Specification, Section 9-07.7**. As an alternative, a grid of #3 rebar may be used, with bars spaced at 1'-0" centers laterally and longitudinally.
3. Install conduit couplings on all conduits. Couplers shall be installed with the top of the coupler flush with the top of concrete. For PVC conduits, the conduit segment above the coupler shall not be glued to the coupler.
4. Horizontal steel supports shall be continuous 1 5/8" (in.) x 1 5/8" (in.) 12-gage slotted steel channels (two required).
5. Cabinet height shall be determined by the required height of the utility meter - verify height with serving utilty (typically 5 to 6 feet).
6. Serving utility may require meter socket to be installed on the outside of the cabinet. Utility feeder conduit shall still terminate in the utility section of the cabinet unless otherwise required by the utility.
7. Additional gravel pad not shown. Gravel pad shall extend two feet in front of the concrete pad for the full width of the concrete pad. If the utility meter socket is installed on the outside of the service cabinet, gravel pad shall also extend three feet from the utility side of the cabinet pad. Final gravel area shall be a rectangle.



PLAN VIEW
TWO POST MOUNT



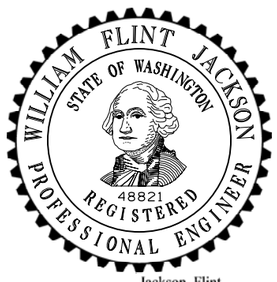
CONDUIT SUPPORT DETAIL
(TWO POST MOUNT)



CABINET BRACKET MOUNTING DETAIL

KEY NOTES

1. Ground rod ~ See Note 1.
2. Ground rod well (Ground tile) ~ 12" diameter concrete
3. Service ground electrode conduits.
4. Welded wire fabric ~ See Note 2.
5. Utility entrance conduit. Conduit shall terminate in the utility section of the service cabinet.
6. Conduits to field equipment. Conduits shall terminate in the customer section of the service cabinet.
7. Conduit couplers ~ See Note 3.
8. 6 x 8 x 10 ft long treated timber post



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SERVICE CABINET INSTALLATION - WOOD POST STANDARD PLAN J-10.12-00

SHEET 1 OF 1 SHEET

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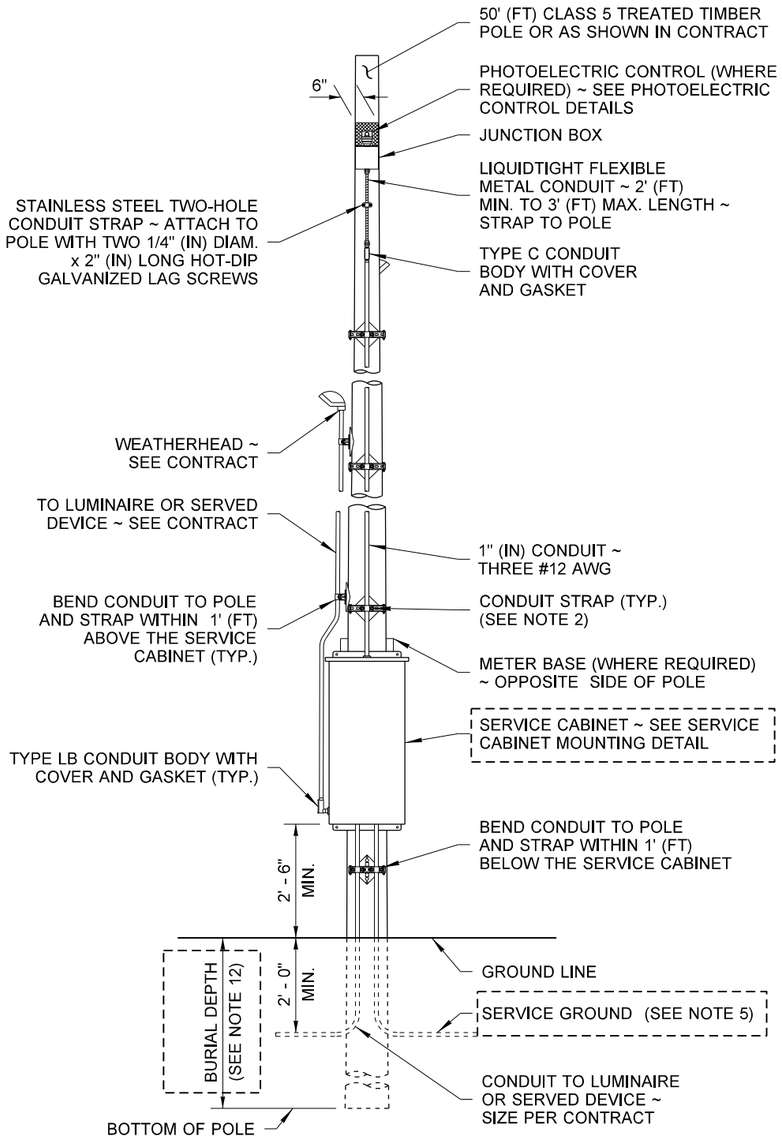
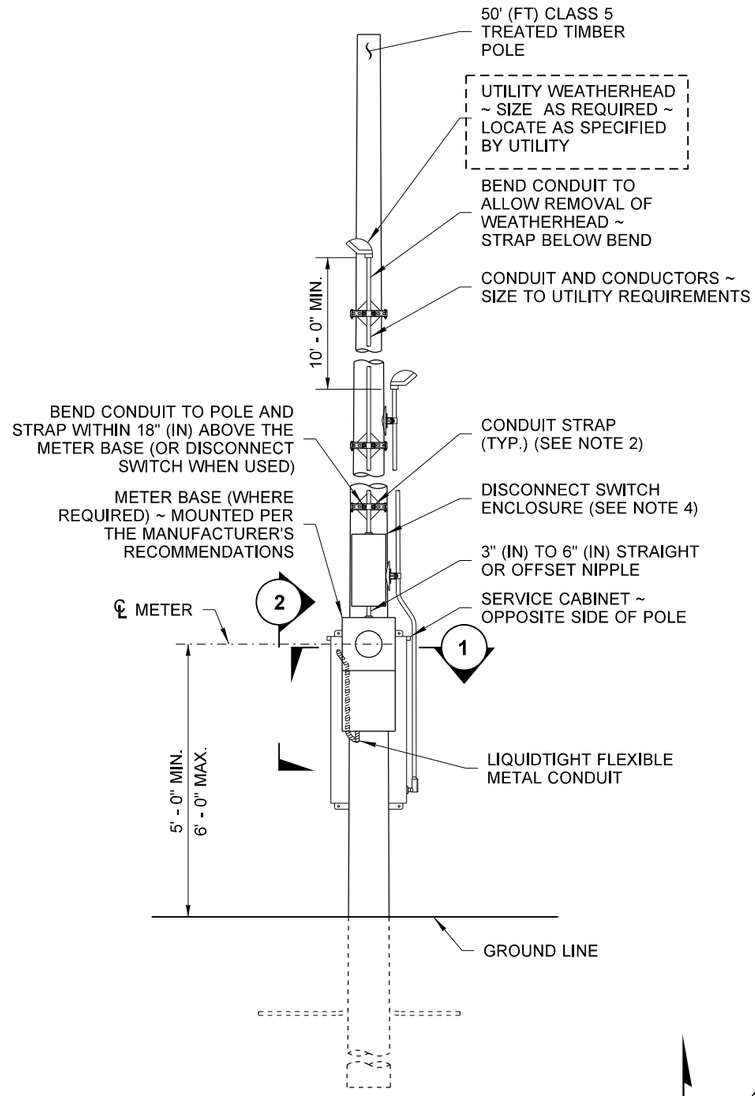
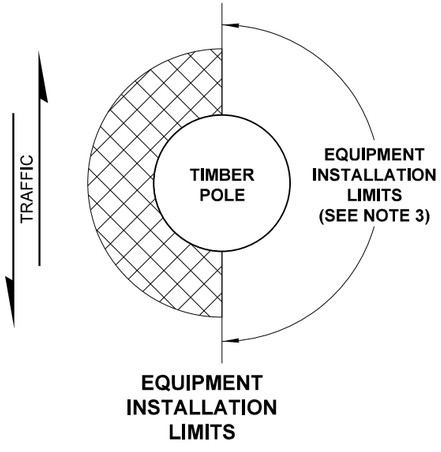


ELEVATION VIEW
SERVICE CABINET SIDE



ELEVATION VIEW
METER PANEL SIDE



EQUIPMENT INSTALLATION LIMITS

NOTES

1. Metering arrangements may vary with different serving utilities. The Contractor shall verify the requirements of the utility prior to installing the service equipment.
2. All service pole conduits shall be secured to the pole with two-hole conduit straps spaced at 5' (ft) maximum centers. See **Standard Plans J-60.13 and J-60.14** for steel channel support and mounting details. Where required by the Utility, an alternative-use hot-dip galvanized standoff bracket may be used. See ALTERNATE STANDOFF BRACKET DETAIL.
3. No equipment shall be installed on the half of the pole facing the roadway with the exception of the meter socket. Meter may only be installed facing the roadway if required by the utility.
4. Where required by the serving utility, a service disconnect switch or breaker shall be installed above the meter socket in a separate rain-tight enclosure.
5. See **Standard Plan J-60.05** for grounding details.
6. Photoelectric Control Enclosure shall be fabricated from either:
   a. 5/8" (IN) expanded steel mesh with welded seams and mounting flanges, hot-dip galvanized after fabrication. ~OR~
   b. Type 5052 - H32 aluminum, with 5/8" (IN) x 5/8" (IN) openings equivalent to 5/8" (IN) expanded steel mesh.

   Enclosure shall be removable from the outside of the junction box.
7. The photoelectric control unit shall be centered in the photoelectric control enclosure to permit 360 degree rotation of the photoelectric control unit without removal of the photoelectric control unit or the photoelectric control enclosure.
8. All nuts, bolts, screws, and washers used for mounting the photoelectric control enclosure, conduit body covers, and junction box cover shall be **ASTM F593** or **A193 Type 304** or **Type 316** stainless steel.
9. Slotted steel channel and mounting hardware components shall be stainless steel. Conduit clamps shall be hot-dip galvanized steel or stainless steel.
10. Install conduit couplings on all conduits.
11. Conduit shall enter the cabinet behind the dead front, but clear of the lighting contactor(s).
12. Pole burial depth shall meet the requirements of **Standard Specification Section 8-20.3(13)A**.
13. See **Standard Plan J-60.13** for additional channel steel mounting details.

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SERVICE CABINET INSTALLATION TIMBER POLE STANDARD PLAN J-10.14-00

SHEET 1 OF 2 SHEETS

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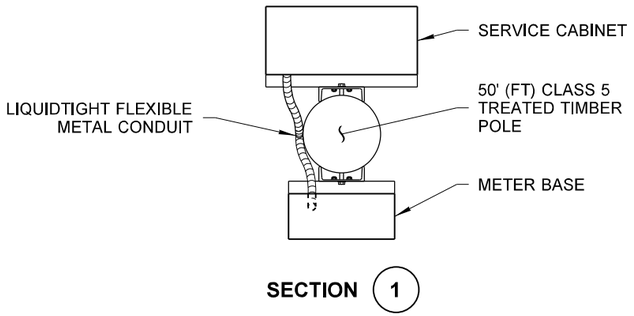
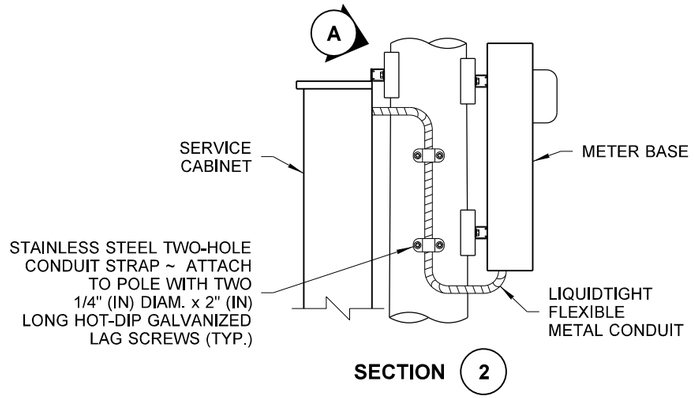


SECTION 1



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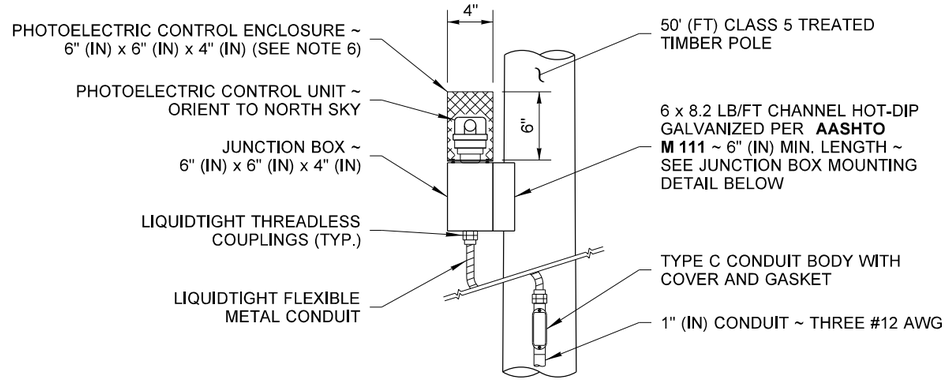
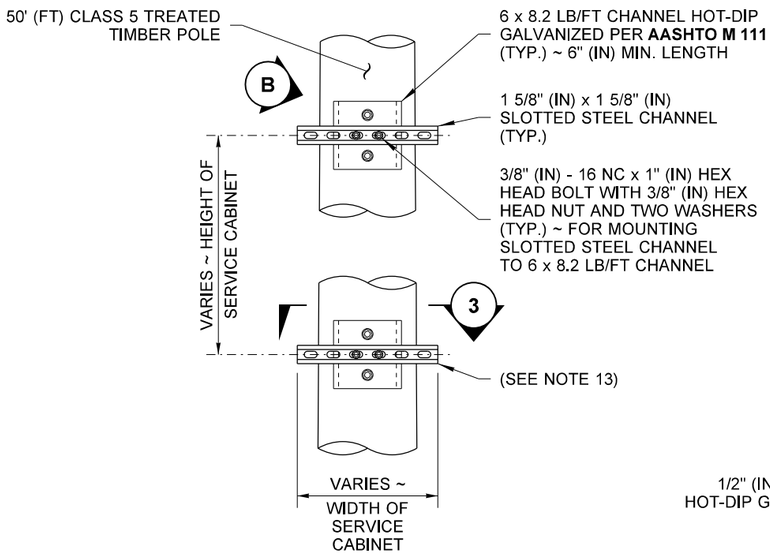
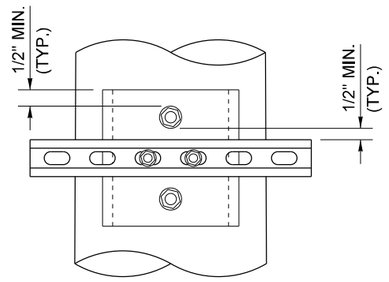


PHOTOELECTRIC CONTROL DETAILS

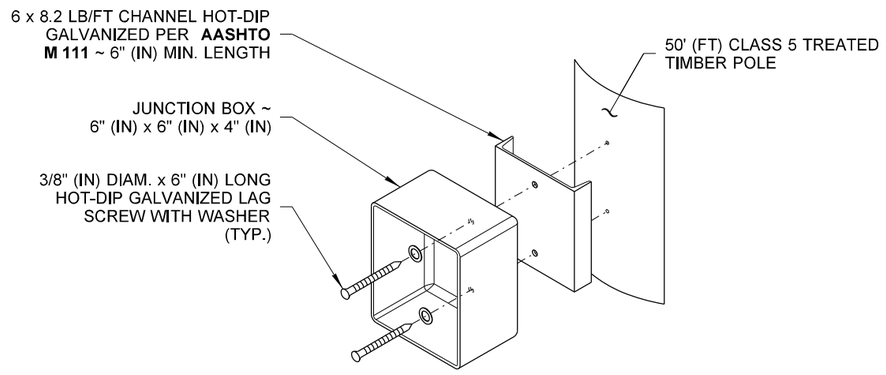


DETAIL A

SERVICE CABINET MOUNTING DETAILS

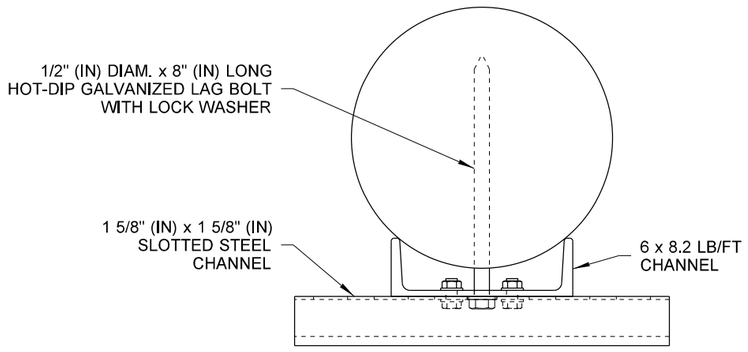


DETAIL B



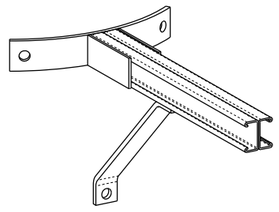
ISOMETRIC VIEW

JUNCTION BOX MOUNTING DETAIL



SECTION 3

MOUNTING BRACKET DETAILS



PERSPECTIVE VIEW

ALTERNATE STANDOFF BRACKET DETAIL
(SEE NOTE 2)

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SERVICE CABINET INSTALLATION TIMBER POLE STANDARD PLAN J-10.14-00

SHEET 2 OF 2 SHEETS

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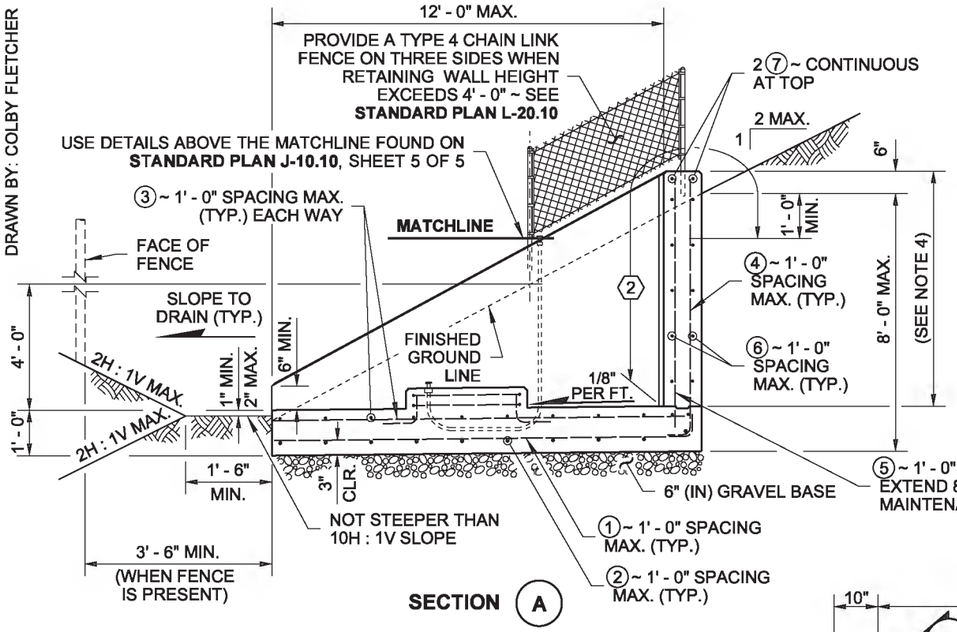
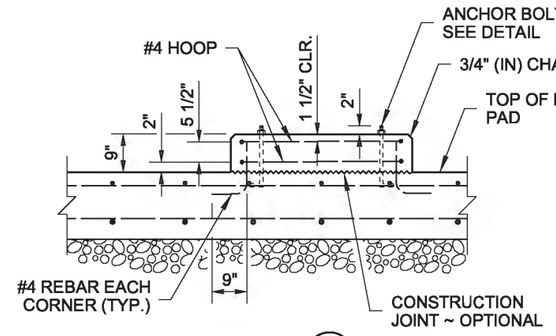


SECTION (A)

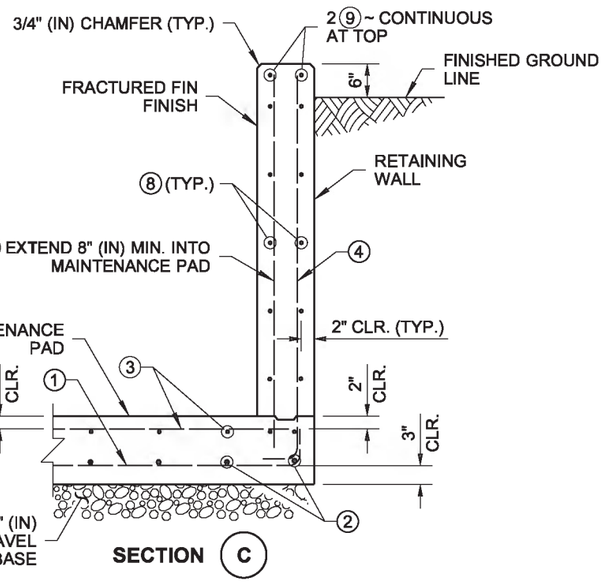


SECTION (B)

9" (IN) RAISED CABINET PAD SHOWN ~ 3 1/2" (IN) RAISED CABINET PAD IS SIMILAR, WITH ONE #4 TOP HOOP

NOTES

1. Contractor shall orient the maintenance pad to align with the direction of natural grade as shown. Obtain Engineer's approval of maintenance pad orientation prior to proceeding with construction.
2. The maintenance pad and retaining walls have been designed to meet the requirements of the AASHTO LRFD Bridge Design Specifications, 6th Edition, 2012.
3. Concrete for walls and bases shall be class 4000.
4. Height of wall varies to match slope of existing grade. Contractor shall field-determine wall height and each maintenance pad location and obtain approval from the Engineer prior to proceeding with construction.
5. 3/4" (in) chamfer for all exposed corners.
6. For grounding details not shown, see **Standard Plan J-60.05.**
7. For cabinet and conduit details not shown, see **Standard Plan J-10.10.**
8. The cabinets shall be attached to the foundation with 4 each: 1/2" (in) × 12" (in) × 2" (in) × 4" (in) anchor bolts (see Detail on this Sheet), washers, and nuts conforming to **Standard Specification 9-06.5(1)** and galvanized after fabrication in accordance with AASHTO M 232. Locate anchor bolts per cabinet manufacturer. Stainless steel epoxy anchors may be used as an alternative, and shall be 1/2" (in) diameter x 9" (in), or 5/8" (in) diameter x 8" (in). All threaded rod (conforming to ASTM F593), washers (conforming to ASTM A240), and nuts (conforming to ASTM F594), shall be Type 304 stainless steel. Bolts shall extend 1 1/2" (in) min to 2" (in) max above the concrete pad.



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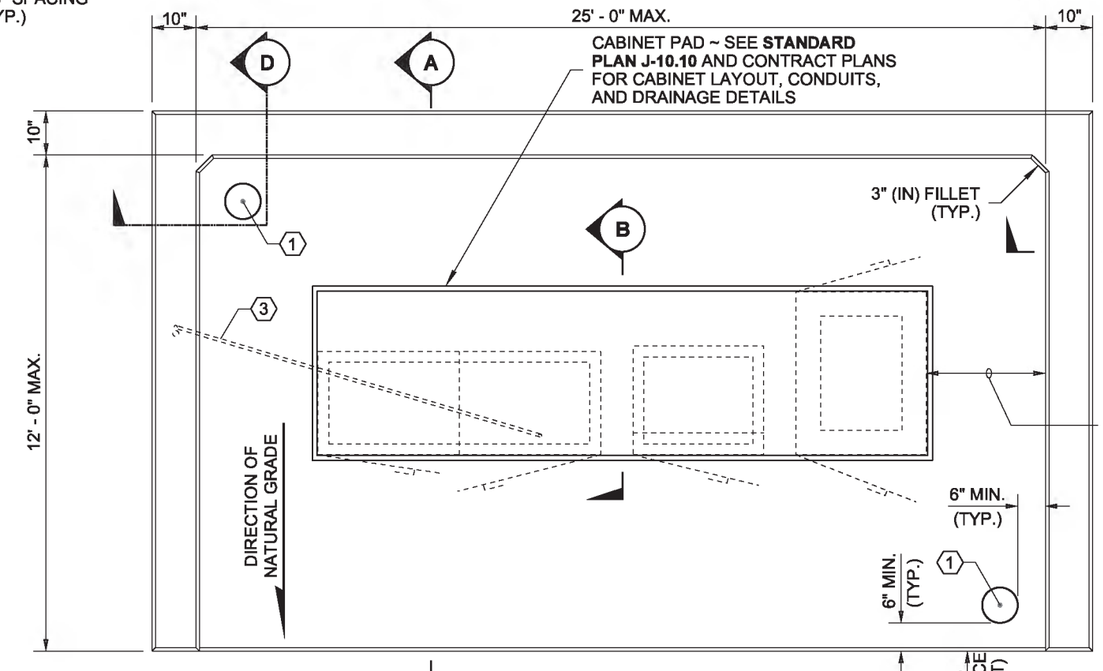
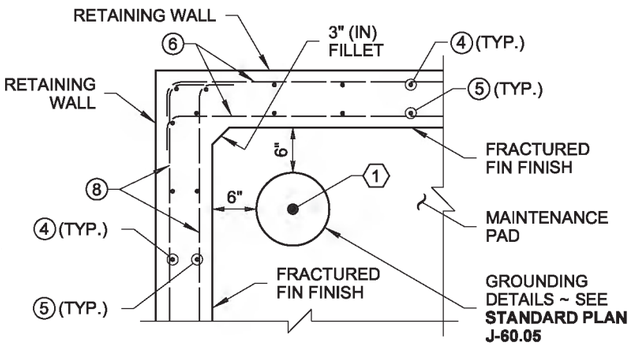
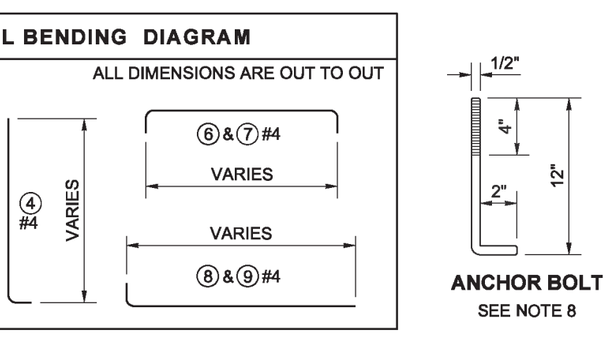


PLAN VIEW

CABINETS SHOWN FOR DISPLAY PURPOSES ONLY (SEE CONTRACT FOR CABINET LAYOUT)



SECTION (D)



ANCHOR BOLT

SEE NOTE 8

① Drive ground rods before placing concrete. Move rod(s) and drain tile(s) with cover(s) as required to achieve full ground penetration. Maintain a 6' - 0" minimum clearance between ground rods as detailed on **Standard Plan J-60.05.**

② Limits of pigmented sealer. Typical for all retaining walls.

③ Delete conduit and conductor when fence is not present.

RICHARD P. ZELDENRUST — STATE OF WASHINGTON — 25470 — STRUCTURAL ENGINEER — PROFESSIONAL ENGINEER

Zeldenrust, Richard
Jun 10 2014 10:44 AM

CABINET ENCLOSURE ON SLOPE

STANDARD PLAN J-10.15-01

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Bakotich, Pasco
Jun 11 2014 1:29 PM
STATE DESIGN ENGINEER

Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

KEY

(1) METER BASE PER SERVING UTILITY REQUIREMENTS ~ SEE STANDARD PLAN J-10.30.

(2) MAIN BREAKER (SPST - SIZE PER BREAKER SCHEDULE)

(3) PHOTOELECTRIC CONTROL BREAKER (SPST ~ 15 AMP ~ 120/240 VOLT)

(4) TEST SWITCH (SPDT ~ SNAP ACTION ~ POSITIVE CLOSE ~ 15 AMP ~ 120/277 VOLT ~ "T" RATED)

(5) PHOTOELECTRIC CONTROL UNIT ~ SEE **STANDARD SPECIFICATION 9-29.11(2)**

(6) BRANCH BREAKER ~ SEE BREAKER SCHEDULE (SPST ~ 120/240 VOLT)

(7) SPARE BRANCH BREAKER (SPST ~ 20 AMP ~ 120/240 VOLT)

(8) CONTACTOR ~ SEE BREAKER SCHEDULE

(9) ISOLATED NEUTRAL BUSS ~ 8 LUG COPPER

(10) DEAD FRONT ~ INSTALL SCREWS WITH WASHERS AT EACH CORNER ~ DEAD FRONT PANEL BOLTS SHALL NOT EXTEND INTO VERTICAL LIMITS OF THE BREAKER ARRAY(S)

(11) CABINET MAIN BONDING JUMPER ASSEMBLY ~ BUSS SHALL BE 8 LUG TINNED COPPER ~ SEE **STANDARD PLAN J-10.20** FOR CABINET MAIN BONDING JUMPER ASSEMBLY DETAILS

(12) METAL WIRING DIAGRAM HOLDER

(13) 1/4" (IN) DIAMETER DRAIN HOLE ~ DRILL BEFORE GALVANIZING

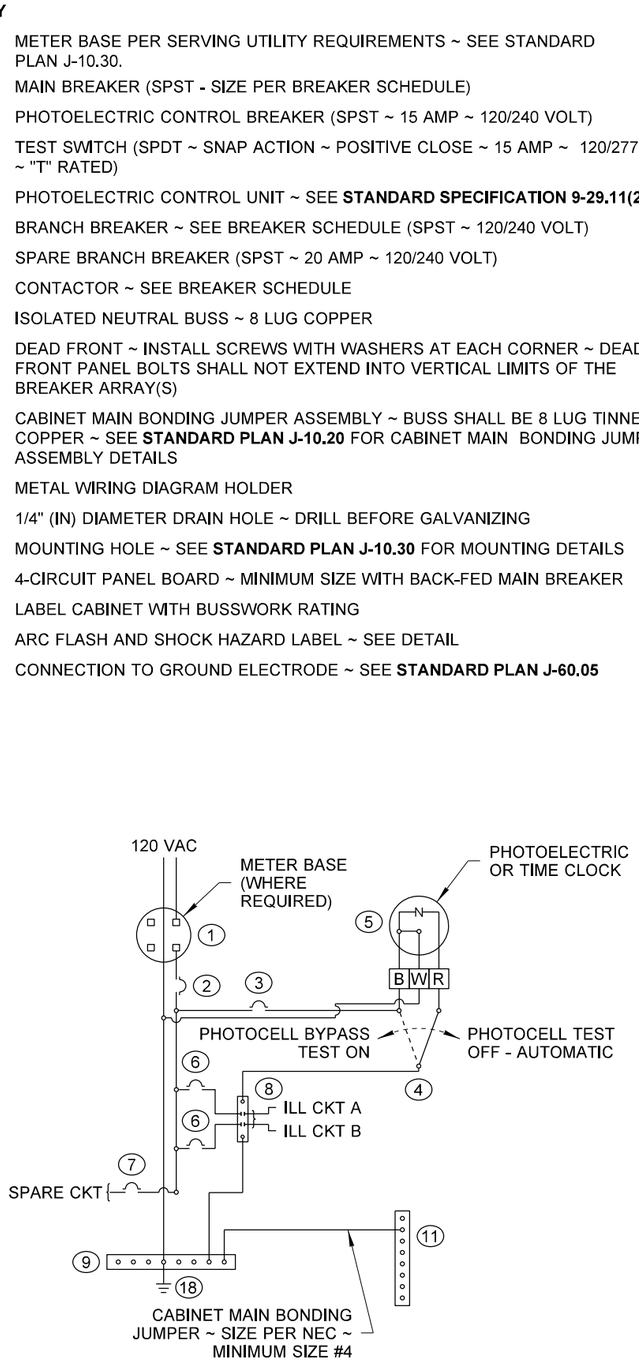
(14) MOUNTING HOLE ~ SEE **STANDARD PLAN J-10.30** FOR MOUNTING DETAILS

(15) 4-CIRCUIT PANEL BOARD ~ MINIMUM SIZE WITH BACK-FED MAIN BREAKER

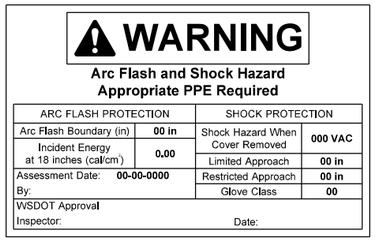
(16) LABEL CABINET WITH BUSSWORK RATING

(17) ARC FLASH AND SHOCK HAZARD LABEL ~ SEE DETAIL

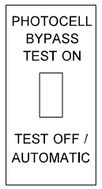
(18) CONNECTION TO GROUND ELECTRODE ~ SEE **STANDARD PLAN J-60.05**



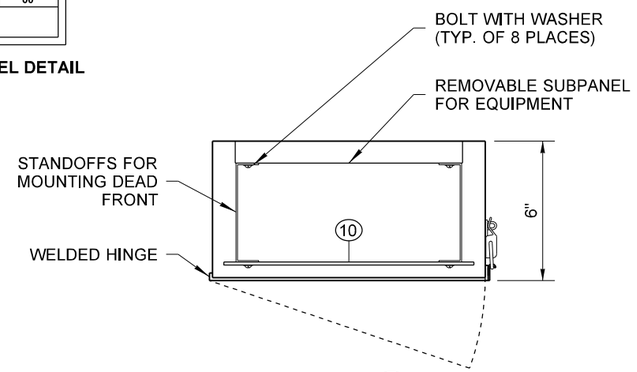
TYPE A WIRING DIAGRAM ~ 120 VOLT



ARC FLASH AND SHOCK HAZARD LABEL DETAIL
(17)



TEST SWITCH LABEL DETAIL
(4)



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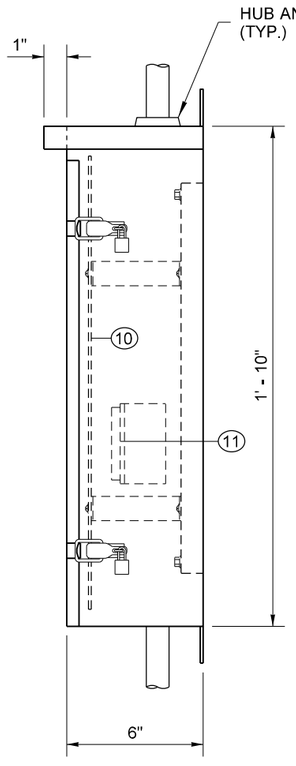
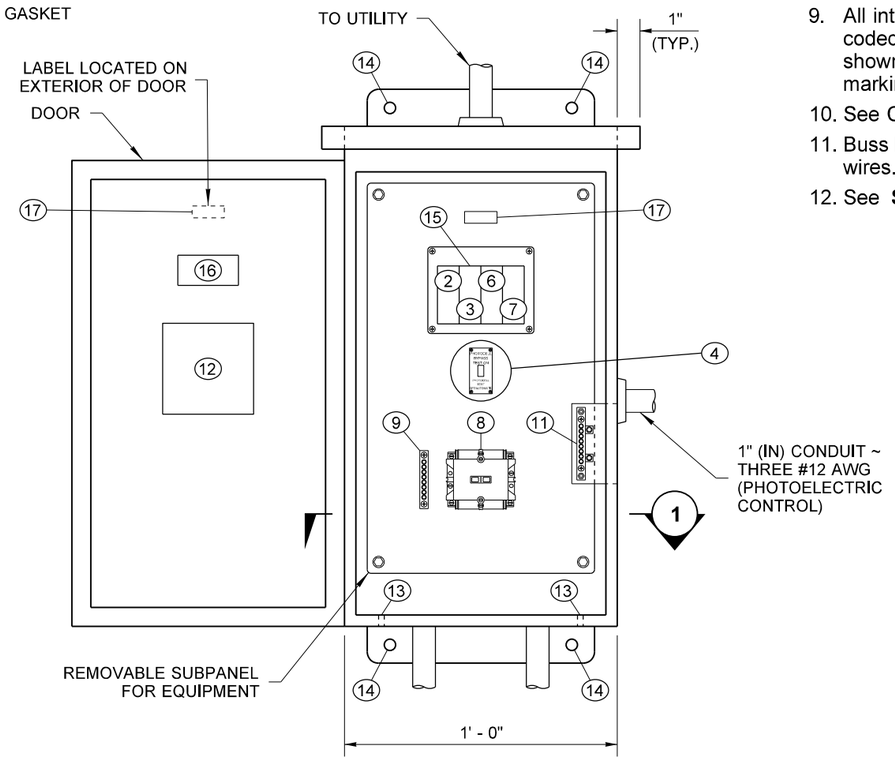


SIDE VIEW



ELEVATION VIEW

TYPE A SERVICE CABINET
(60 AMP TYPE 120 1Ø SERVICE CABINET)

NOTES

1. See **Standard Specification Section 9-29.24** (Service Cabinets).
2. Cabinet shall be rated NEMA 3R.
3. Dimensions shown are minimum and shall be adjusted to accommodate the various sizes of equipment installed. A 1% tolerance is allowed for all dimensions.
4. Door shall be pad-lockable and gasketed.
5. Hinges shall have stainless steel or brass pins. See **Standard Plan J-10.20** for door hinge details.
6. When using alternate door hinge, remove hinge pin prior to welding the hinge to the cabinet and prior to hot-dip galvanizing. After galvanizing, replace pin with a brass pin or solder in place. See **Standard Plan J-10.20** for alternate door hinge details.
7. Equipment identified by Key Numbers 2, 3, 4, 6, 7, and 8 shall have an appropriately engraved phenolic name plate attached with screws or rivets. The name plate for Key Number 4 shall read as follows: "PHOTOCELL BYPASS TEST ON" AND "PHOTOCELL TEST OFF - AUTOMATIC." See Test Switch Label Detail.
8. All busswork shall be high grade copper and shall have a minimum rating of 250 amps. All breakers shall bolt on to the busswork. Jumpering of breakers shall not be allowed. Busswork shall accommodate all future equipment as shown in the Breaker Schedule.
9. All internal wire runs shall be identified with "TO - FROM" coded tags labeled with the code letters and/or numbers shown on the Schedules. Approved PVC or polyolefin wire marking sleeves shall be used.
10. See Contract for Breaker and Contactor Schedule.
11. Buss bars shall be sized to accommodate up to #4 AWG wires.
12. See **Standard Plan J-10.30** for pole installation details.

Jackson, Flint
Aug 24 2020 9:39 AM

SERVICE CABINET TYPE A (0 - 60 AMP TYPE 120 VOLT SINGLE PHASE)

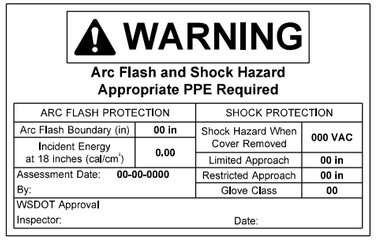
STANDARD PLAN J-10.16-01

SHEET 1 OF 1 SHEET

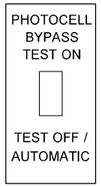
APPROVED FOR PUBLICATION
Roark, Steve Digitally signed by Roark, Steve Date: 2020.09.16 10:14:58 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

KEY

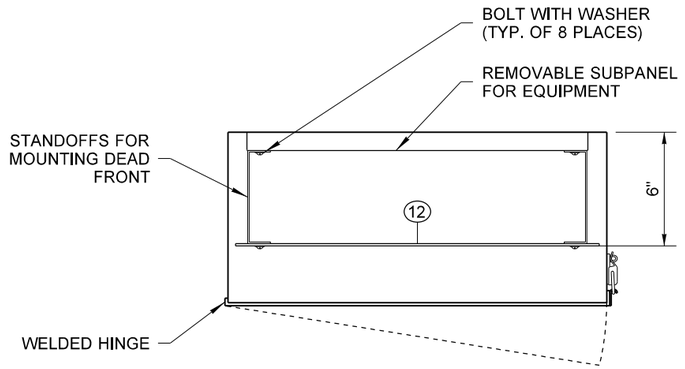
1. METER BASE PER SERVING UTILITY REQUIREMENTS ~ SEE STANDARD PLAN J-10.30.
2. MAIN BREAKER (DPST ~ SIZE PER BREAKER SCHEDULE)
3. PHOTOELECTRIC CONTROL BREAKER (SPST ~ 15 AMP ~ 120/240 VOLT)
4. TEST SWITCH (SPDT ~ SNAP ACTION ~ POSITIVE CLOSE ~ 15 AMP ~ 120/277 VOLT ~ "T" RATED)
5. PHOTOELECTRIC CONTROL UNIT ~ SEE **STANDARD SPECIFICATION 9-29.11(2)**
6. BRANCH BREAKER ~ SEE BREAKER SCHEDULE (DPST ~ 120/240 VOLT)
7. SPARE BREAKER ~ SEE BREAKER SCHEDULE (SPST ~ 20 AMP ~ 120/240 VOLT)
8. CONTACTOR ~ SEE BREAKER SCHEDULE
9. RECEPTACLE BREAKER (SPST ~ 20 AMP ~ 120/240 VOLT)
10. RECEPTACLE ~ GROUNDED (GFCI ~ 20 AMP ~ 125 VOLT)
11. ISOLATED NEUTRAL BUSS ~ 12 LUG COPPER
12. DEAD FRONT ~ INSTALL SCREWS WITH WASHERS AT EACH CORNER ~ DEAD FRONT PANEL BOLTS SHALL NOT EXTEND INTO VERTICAL LIMITS OF THE BREAKER ARRAY(S)
13. CABINET MAIN BONDING JUMPER ASSEMBLY ~ BUSS SHALL BE 12 LUG TINNED COPPER ~ SEE **STANDARD PLAN J-10.20** FOR CABINET MAIN BONDING JUMPER ASSEMBLY DETAILS
14. METAL WIRING DIAGRAM HOLDER
15. 1/4" (IN) DIAMETER DRAIN HOLE ~ DRILL BEFORE GALVANIZING
16. MOUNTING HOLE ~ SEE **STANDARD PLAN J-10.??** FOR MOUNTING DETAILS
17. 12-CIRCUIT PANEL BOARD ~ MINIMUM SIZE WITH BACK-FED MAIN BREAKER
18. LABEL CABINET WITH BUSSWORK RATING
19. ARC FLASH AND SHOCK HAZARD LABEL ~ SEE DETAIL
20. CONNECTION TO GROUND ELECTRODE ~ SEE **STANDARD PLAN J-60.05**
21. BOLT-IN TYPE 2 SURGE PROTECTION DEVICE ~ 2 POLE 20 KA



ARC FLASH AND SHOCK HAZARD LABEL DETAIL
(19)



TEST SWITCH LABEL DETAIL
(4)



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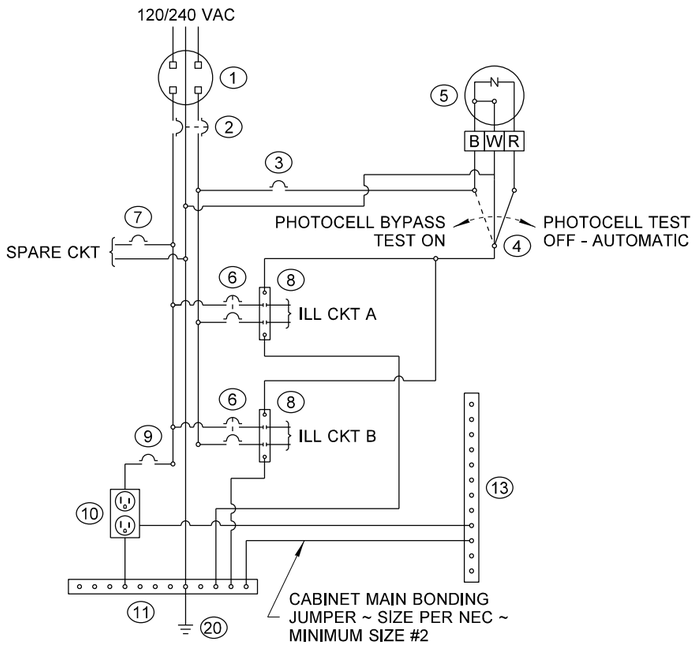
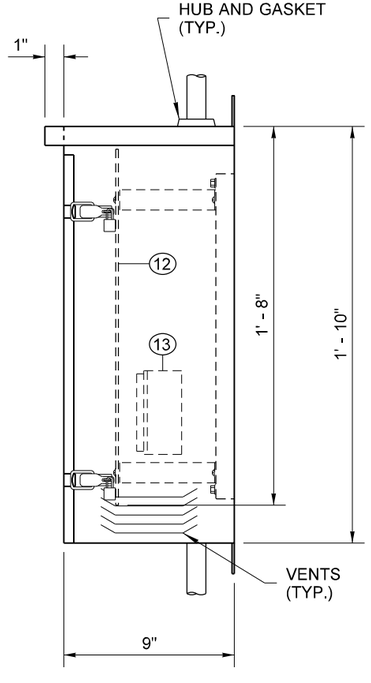
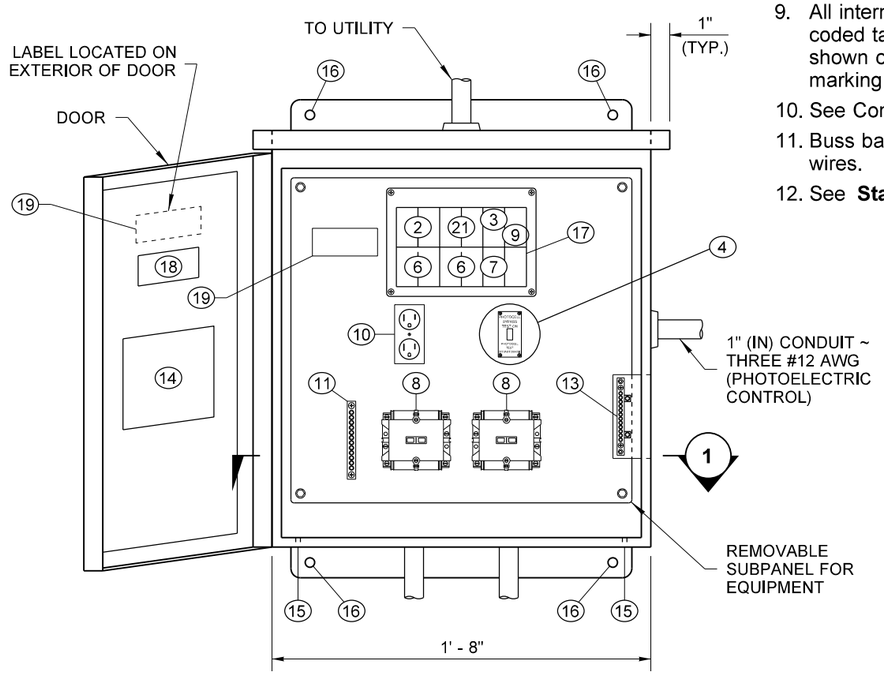


TYPE B WIRING DIAGRAM ~ 240 VOLT



SIDE VIEW

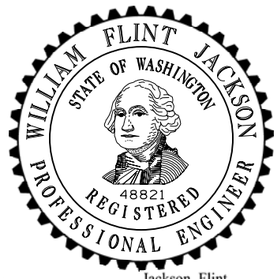


ELEVATION VIEW

TYPE B SERVICE CABINET
(200 AMP TYPE 120/240 1Ø SERVICE CABINET)

NOTES

1. See **Standard Specification Section 9-29.24** (Service Cabinets).
2. Cabinet shall be rated NEMA 3R and shall include two rain-tight vents.
3. Dimensions shown are minimum and shall be adjusted to accommodate the various sizes of equipment installed. A 1% tolerance is allowed for all dimensions.
4. Door shall be pad-lockable and gasketed.
5. Hinges shall have stainless steel or brass pins. See **Standard Plan J-10.20** for door hinge details.
6. When using alternate door hinge, remove hinge pin prior to welding the hinge to the cabinet and prior to hot-dip galvanizing. After galvanizing, replace pin with a brass pin or solder in place. See **Standard Plan J-10.20** for alternate door hinge details.
7. Equipment identified by Key Numbers 2, 3, 4, 6, 7, 8, and 9 shall have an appropriately engraved phenolic name plate attached with screws or rivets. The name plate for Key Number 4 shall read as follows: "PHOTOCELL BYPASS TEST ON" AND "PHOTOCELL TEST OFF - AUTOMATIC." See service cabinet detail.
8. All busswork shall be high grade copper and shall have a minimum rating of 250 amps. All breakers shall bolt on to the busswork. Jumpering of breakers shall not be allowed. Busswork shall accommodate all future equipment as shown in the Breaker Schedule.
9. All internal wire runs shall be identified with "TO - FROM" coded tags labeled with the code letters and/or numbers shown on the Schedules. Approved PVC or polyolefin wire marking sleeves shall be used.
10. See Contract for Breaker and Contactor Schedule.
11. Buss bars shall be sized to accommodate up to #4 AWG wires.
12. See **Standard Plan J-10.30** for pole installation details.



Jackson, Flint
Aug 24 2020 9:39 AM

SERVICE CABINET TYPE B (0 - 60 AMP TYPE 120/240 VOLT SINGLE PHASE) STANDARD PLAN J-10.17-01

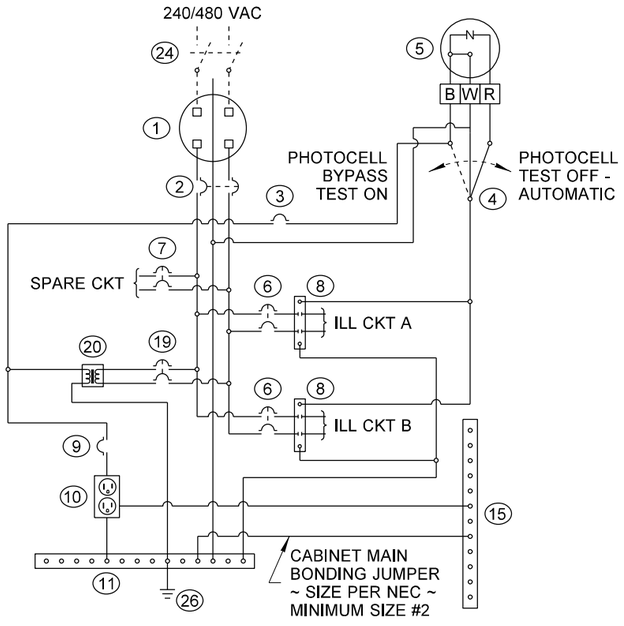
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Date: 2020.09.16 10:15:47 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

KEY

1. METER BASE PER SERVING UTILITY REQUIREMENTS ~ SEE **STANDARD PLAN J-10.30**.
2. MAIN BREAKER (DPST ~ SIZE PER BREAKER SCHEDULE)
3. PHOTOELECTRIC CONTROL BREAKER (SPST ~ 15 AMP ~ 120/240 VOLT)
4. TEST SWITCH (SPDT ~ SNAP ACTION ~ POSITIVE CLOSE ~ 15 AMP ~ 120/277 VOLT ~ "T" RATED)
5. PHOTOELECTRIC CONTROL UNIT ~ SEE **STANDARD SPECIFICATION 9-29.11(2)**
6. BRANCH BREAKER (DPST ~ SIZE PER BREAKER SCHEDULE)
7. SPARE BREAKER ~ SEE BREAKER SCHEDULE (DPST ~ 20 AMP ~ 240/480 VOLT)
8. CONTACTOR ~ SEE BREAKER SCHEDULE
9. RECEPTACLE BREAKER (SPST ~ 20 AMP ~ 120/240 VOLT)
10. RECEPTACLE ~ GROUNDED (GFCI ~ 20 AMP ~ 125 VOLT)
11. ISOLATED NEUTRAL BUSS ~ 14 LUG COPPER
12. MOUNTING HOLE ~ SEE **STANDARD PLAN J-10.20** FOR MOUNTING DETAILS
13. 1/4" (IN) DIAMETER DRAIN HOLE ~ DRILL BEFORE GALVANIZING
14. HINGED DEAD FRONT WITH 1/4 TURN FASTENERS OR SLIDE LATCH ~ DEAD FRONT PANEL BOLTS SHALL NOT EXTEND INTO VERTICAL LIMITS OF THE BREAKER ARRAY(S)
15. CABINET MAIN BONDING JUMPER ASSEMBLY ~ BUSS SHALL BE 12 LUG TINNED COPPER ~ SEE **STANDARD PLAN J-10.20** FOR CABINET MAIN BONDING JUMPER ASSEMBLY DETAILS
16. METAL WIRING DIAGRAM HOLDER
17. REMOVABLE SUBPANEL FOR EQUIPMENT
18. SCREENED VENTS ~ TWO REQUIRED (ONE EACH SIDE) ~ LOUVERED PLATES
19. TRANSFORMER BREAKER (DPST ~ 15 AMP ~ 480 VOLT)
20. DRY TRANSFORMER (480/120 VOLT) ~ 3 KVA ~ COPPER BUSSED AND COPPER WOUND
21. 16-CIRCUIT PANEL BOARD ~ MINIMUM SIZE WITH BACK FED MAIN BREAKER
22. LABEL CABINET WITH BUSSWORK RATING
23. 6-CIRCUIT PANEL BOARD ~ MINIMUM SIZE
24. UTILITY DISCONNECT SWITCH ENCLOSURE WITH COVER ~ OMIT IF UTILITY DOES NOT REQUIRE THE DISCONNECT SWITCH
25. ARC FLASH AND SHOCK HAZARD LABEL ~ SEE DETAIL
26. CONNECTION TO GROUND ELECTRODE ~ SEE **STANDARD PLAN J-60.05**
27. BOLT-IN TYPE 2 SURGE PROTECTION DEVICE ~ 2 POLE 20 KA



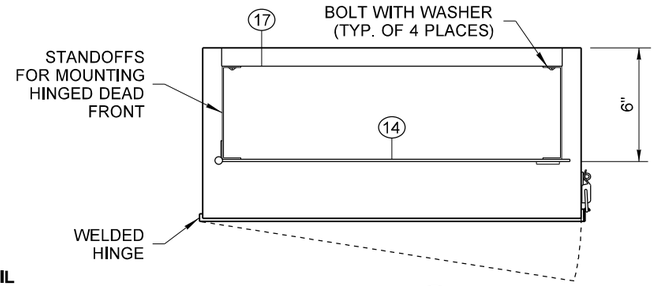
WIRING DIAGRAM

WARNING

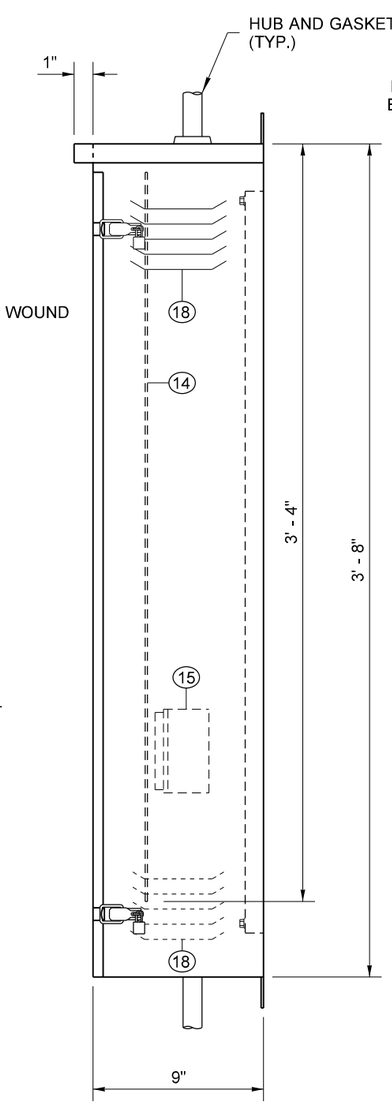
Arc Flash and Shock Hazard
Appropriate PPE Required

ARC FLASH PROTECTION		SHOCK PROTECTION	
Arc Flash Boundary (in)	00 in	Shock Hazard When Cover Removed	000 VAC
Incident Energy at 18 inches (cal/cm)	0,00	Limited Approach	00 in
Assessment Date: 00-00-0000		Restricted Approach	00 in
By:		Glove Class	00
WSDOT Approval			
Inspector:	Date:		

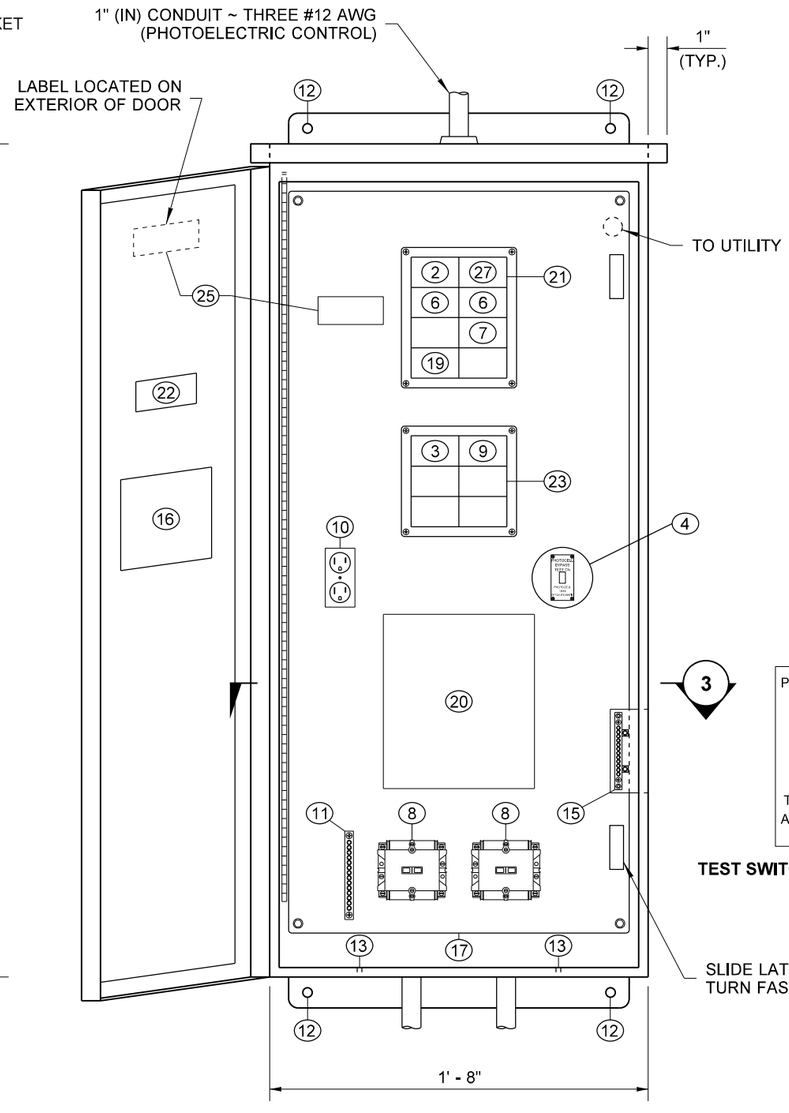
ARC FLASH AND SHOCK HAZARD LABEL DETAIL
(25)



SECTION (3)



SIDE VIEW



ELEVATION VIEW
((14) NOT SHOWN FOR CLARITY)

TEST SWITCH LABEL DETAIL
(4)

SLIDE LATCH OR 1/4 TURN FASTENER (TYP.)

TYPE C SERVICE CABINET

NOTES

1. See **Standard Specification Section 9-29.24** (Service Cabinets).
2. Cabinet shall be rated NEMA 3R and shall include two rain-tight vents.
3. Dimensions shown are minimum and shall be adjusted to accommodate the various sizes of equipment installed. A 1% tolerance is allowed for all dimensions.
4. Door shall be pad-lockable and gasketed.
5. Hinges shall have stainless steel or brass pins. See **Standard Plan J-10.20** for door hinge details.
6. When using alternate door hinge, remove hinge pin prior to welding the hinge to the cabinet and prior to hot-dip galvanizing. After galvanizing, replace pin with a brass pin or solder in place. See **Standard Plan J-10.20** for alternate door hinge details.
7. Equipment identified by Key Numbers 2, 3, 4, 6, 7, 8, and 9 shall have an appropriately engraved phenolic name plate attached with screws or rivets. The name plate for Key Number 4 shall read as follows: "PHOTOCELL BYPASS TEST ON" AND "PHOTOCELL TEST OFF - AUTOMATIC." See Test Switch Label Detail.
8. All busswork shall be high grade copper and shall have a minimum rating of 250 amps. All breakers shall bolt on to the busswork. Jumpering of breakers shall not be allowed. Busswork shall accommodate all future equipment as shown in the Breaker Schedule.
9. All internal wire runs shall be identified with "TO - FROM" coded tags labeled with the code letters and/or numbers shown on the Schedules. Approved PVC or polyolefin wire marking sleeves shall be used.
10. See Contract for Breaker and Contactor Schedule.
11. Buss bars shall be sized to accommodate up to #4 AWG wires.
12. See **Standard Plan J-10.30** for pole installation details.

DRAWN BY: FERN LIDDELL

WILLIAM FLINT JACKSON
STATE OF WASHINGTON
48821
REGISTERED
PROFESSIONAL ENGINEER

Jackson, Flint
Aug 24 2020 9:40 AM

cosign

SERVICE CABINET TYPE C (0 - 60 AMP TYPE 240/480 VOLT SINGLE PHASE) STANDARD PLAN J-10.18-01

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Date: 2020.09.16 10:16:30 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

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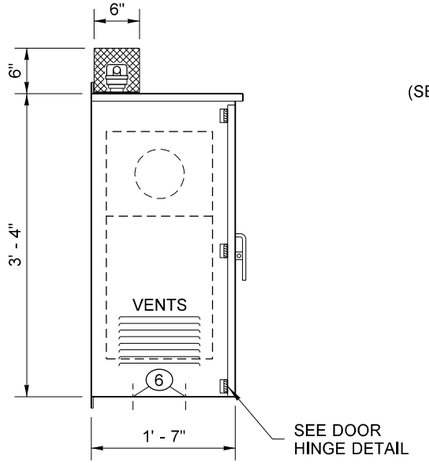
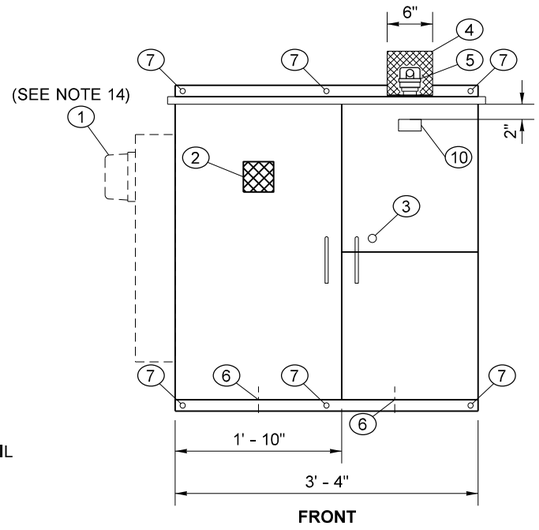
DRAWN BY: FERN LIDDELL

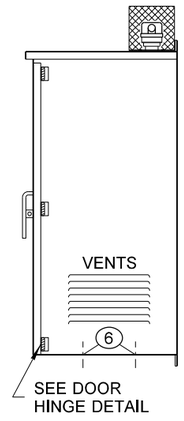


LEFT SIDE
(UTILITY SIDE)

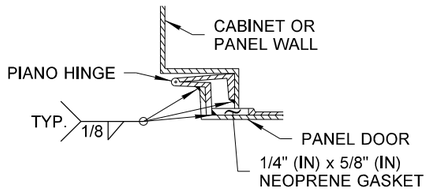


FRONT

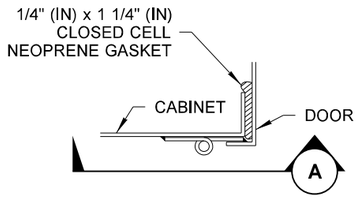
SERVICE CABINET DETAIL



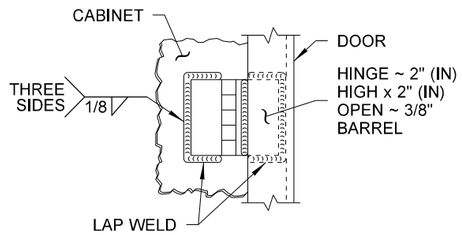
RIGHT SIDE
(CUSTOMER SIDE)



DOOR HINGE DETAIL



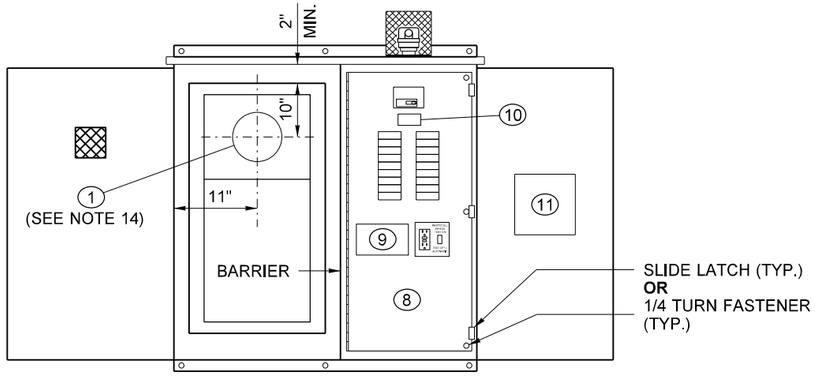
DOOR HINGE DETAIL
ALTERNATE TYPE B MODIFIED
CABINET (SEE NOTE 5)



SECTION A

KEY

1. METER SOCKET/BASE PANEL PER UTILITY REQUIREMENTS ~ UTILITY MAY REQUIRE METER TO BE INSTALLED ON THE OUTSIDE OF THE CABINET INSTEAD OF INSIDE THE UTILITY SIDE OF THE CABINET
2. UTILITY SIDE DOOR ~ HINGED FRONT FACING DOOR WITH 4" (IN) x 4" (IN) MINIMUM POLISHED WIRE GLASS WINDOW
3. CUSTOMER SIDE DOOR WITH BEST CX 6-PIN LOCK CORE
4. PHOTOCELL ENCLOSURE ~ SEE PHOTOCELL MOUNTING DETAIL ~ ENCLOSURE SHALL BE FABRICATED FROM EITHER:
   - A. 5/8" (IN) EXPANDED STEEL MESH WITH WELDED SEAMS AND MOUNTING FLANGES ~ HOT-DIP GALVANIZED AFTER FABRICATION ~ OR ~
   - B. TYPE 5052 - H32 ALUMINUM WITH 5/8" (IN) x 5/8" (IN) OPENINGS EQUIVALENT TO 5/8" (IN) EXPANDED STEEL MESH
5. PHOTOELECTRIC CONTROL ~ SEE **STANDARD SPECIFICATION, SECTION 9-29.11(2).**
6. 1/4" (IN) DIAMETER DRAIN HOLE ~ DRILL BEFORE GALVANIZING
7. MOUNTING HOLE ~ SEE SERVICE CABINET MOUNTING DETAILS
8. HINGED DEAD FRONT WITH 1/4 TURN FASTENERS OR SLIDE LATCHES ~ DEAD FRONT PANEL BOLTS SHALL NOT EXTEND INTO VERTICAL LIMITS OF THE BREAKER ARRAY(S)
9. ARC FLASH AND SHOCK HAZARD LABEL ~ SEE DETAIL
10. CABINET BUSSWORK RATING LABEL
11. METAL WIRING DIAGRAM HOLDER



FRONT
(SHOWN WITH DOORS OPEN AND DEAD FRONT CLOSED)

SERVICE CABINET INTERIOR

NOTES

1. See **Standard Specification Section 9-29.24** (Service Cabinets).
2. Cabinet shall be rated NEMA 3R and shall include two rain-tight vents.
3. Dimensions shown are minimum and shall be adjusted to accommodate the various sizes of equipment installed. A 1% tolerance is allowed for all dimensions.
4. Doors shall be pad-lockable and gasketed. Customer side door shall include a Best CX 6-pin Construction core lock.
5. Hinges shall have stainless steel or brass pins - see door hinge details. When using alternate door hinge, remove hinge pin prior to welding hinge to cabinet and prior to hot-dip galvanizing. After galvanizing, replace pin with brass pin and solder in place.
6. Equipment identified by Key Numbers 14, 16, 17, 18, 19, 20, 21, 22, and 25 shall have an appropriately engraved phenolic name plate attached with screws or rivets. The name plate for Key Number 21 (Test Switch only) shall read as follows: "PHOTOCELL BYPASS TEST ON" AND "PHOTOCELL TEST OFF - AUTOMATIC." See service cabinet detail.
7. All busswork shall be high grade copper and shall have a minimum rating of 250 amps. All breakers shall bolt on to the busswork. Jumpering of breakers shall not be allowed. Busswork shall accommodate all future equipment as shown in the Breaker Schedule.
8. All nuts, bolts, and washers used for mounting the photocell enclosure shall be stainless steel.
9. The photocell unit shall be centered in the photocell enclosure to permit 360 degree rotation of the photocell without removal of the photocell unit or the photocell enclosure.
10. All internal wire runs shall be identified with "TO - FROM" coded tags labeled with the code letters and/or numbers shown on the Schedules. Approved PVC or polyolefin wire marking sleeves shall be used.
11. See Contract for Breaker and Contactor Schedule.
12. Buss bars shall be sized to accommodate up to #4 AWG wires.
13. The meter base portion of this service was designed to meet metering portion of **EUSERC Drawing 309** requirements.
14. Metering arrangements vary with different serving Utilities. The Utility may require meter base mounting in the enclosure, on the side, or on the back of the enclosure. The Utility may require the dimension between the door and the front of the safety socket box to be less than the 11" (in) shown in the Left Side - Safety Socket Box Mounting Detail. The Contractor shall verify the serving Utility's requirements prior to fabrication and installation of the service equipment.
15. Verify the meter setback position with the utility and adjust the meter socket backplate to the required position. For cabinets with separate metering, remove the meter socket or install shunts in the meter socket.

⚠ WARNING
Arc Flash and Shock Hazard
Appropriate PPE Required

ARC FLASH PROTECTION		SHOCK PROTECTION	
Arc Flash Boundary (in)	00 in	Shock Hazard When Cover Removed	000 VAC
Incident Energy at 18 inches (cal/cm)	0.00	Limited Approach	00 in
Assessment Date: 00-00-0000		Restricted Approach	00 in
By:		Glove Class	00
WSDOT Approval			
Inspector:	Date:		

ARC FLASH AND SHOCK HAZARD LABEL DETAIL
(19)

WILLIAM FLINT JACKSON
STATE OF WASHINGTON
48821
REGISTERED
PROFESSIONAL ENGINEER

Jackson, Flint
Aug 24 2020 9:40 AM

SERVICE CABINET TYPE B MODIFIED (0 - 200 AMP TYPE 120/240 VOLT SINGLE PHASE) STANDARD PLAN J-10.20-03

SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION
Date: 2020.09.16 10:17:16 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

KEY (CONTINUED)

(12) ALUMINUM BACKPLATE FOR METER SOCKET/BASE

(13) 15" (IN) WIDE BY 36" (IN) TALL ALUMINUM BACKPLATE FOR CUSTOMER SIDE EQUIPMENT

(14) MAIN BREAKER ~ DPST ~ SIZE PER BREAKER SCHEDULE

(15) 18-CIRCUIT PANEL BOARD ~ MINIMUM SIZE WITH SEPARATE MAIN BREAKER

(16) BOLT-IN TYPE 2 SURGE PROTECTION DEVICE ~ 2 POLE 20 KA

(17) DPST BRANCH BREAKER ~ SEE BREAKER SCHEDULE

(18) SPARE BRANCH BREAKER ~ 20 AMP DPST ~ OMIT IF BREAKER ARRAY IS FULL (SEE BREAKER SCHEDULE)

(19) SPST BRANCH BREAKER ~ SEE BREAKER SCHEDULE

(20) RECEPTACLE BREAKER ~ SPST 20 AMP

(21) PHOTOCELL BREAKER ~ SPST 15 AMP

(22) 2 GANG BOX WITH:
- A. RECEPTACLE (GROUNDED) ~ 125 VOLT 20 AMP GFCI
- B. TEST SWITCH ~ 120/277 VOLT 15 AMP SPDT SNAP ACTION - POSITIVE CLOSE - "T" RATED

BOX MAY INCLUDE A COVER PLATE, OR MAY BE COVERED BY DEAD FRONT PANEL ~ GANG BOX SHALL BE WIRED TO THE CABINET BONDING JUMBER (KEY NUMBER 24)

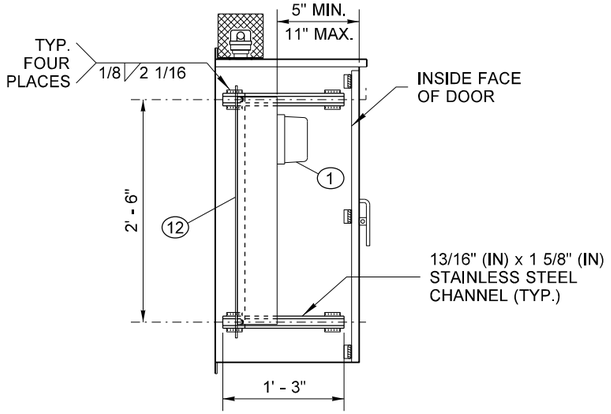
(23) ISOLATED NEUTRAL BUSS ~ 14 LUG COPPER (SEE NOTE 12)

(24) CABINET MAIN BONDING JUMPER ASSEMBLY ~ BUSS SHALL BE 14 LUG TINNED COPPER (SEE NOTE 12) ~ SEE CABINET MAIN BONDING JUMPER ASSEMBLY DETAIL

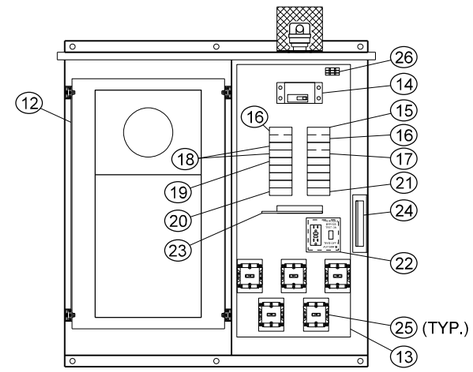
(25) CONTACTOR (BEHIND DEAD FRONT) ~ SEE BREAKER SCHEDULE

(26) THREE POSITION DIN RAIL MOUNTED TERMINAL BLOCK ~ TERMINAL BLOCK SECTIONS SHALL BE BLACK, WHITE, AND RED AS SHOWN IN CABINET WIRING DIAGRAM.

(27) CONNECTION TO GROUND ELECTRODE ~ SEE **STANDARD PLAN J-60.05**

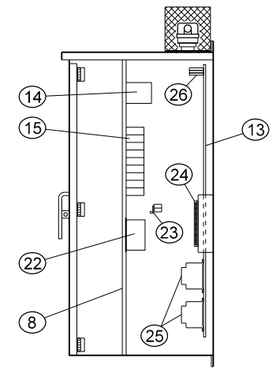


INTERIOR END VIEW UTILITY SIDE

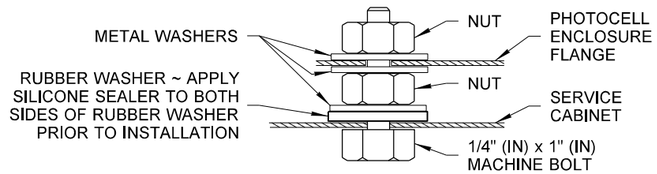


FRONT (SHOWN WITH DEAD FRONT REMOVED)

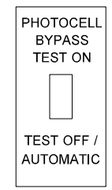
SERVICE CABINET INTERIOR DETAIL



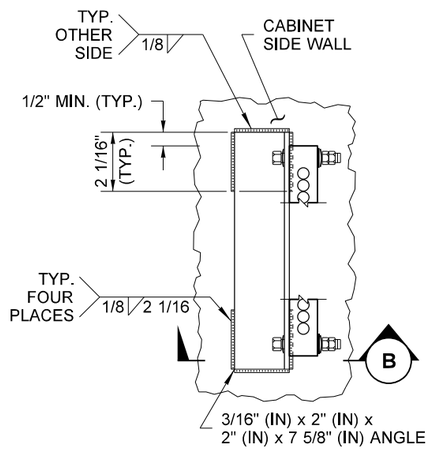
INTERIOR END VIEW CUSTOMER SIDE (SUPPORT FRAMES FOR EQUIPMENT NOT SHOWN)



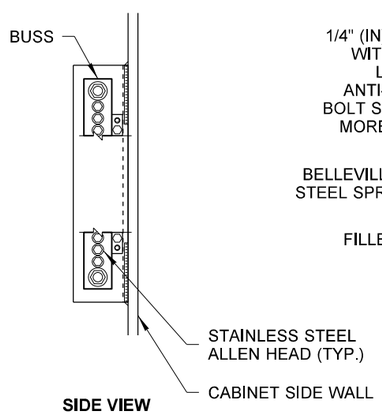
PHOTOCELL ENCLOSURE MOUNTING DETAIL



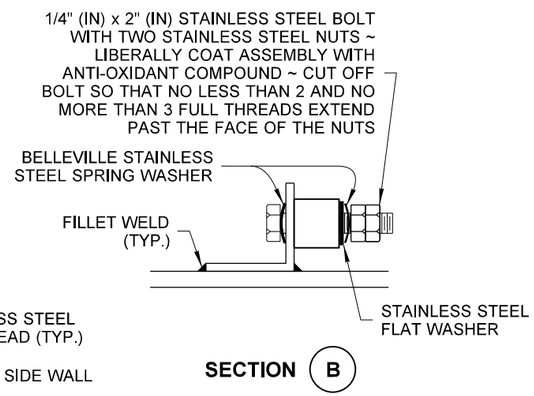
TEST SWITCH LABEL DETAIL
(22)



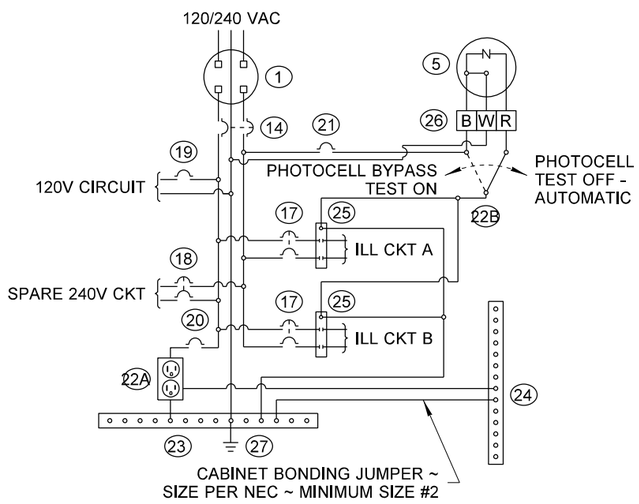
ELEVATION VIEW



SIDE VIEW



CABINET MAIN BONDING JUMPER ASSEMBLY DETAIL



WIRING DIAGRAM

WILLIAM FLINT JACKSON
STATE OF WASHINGTON
48821
REGISTERED
PROFESSIONAL ENGINEER

Jackson, Flint
Aug 24 2020 9:40 AM

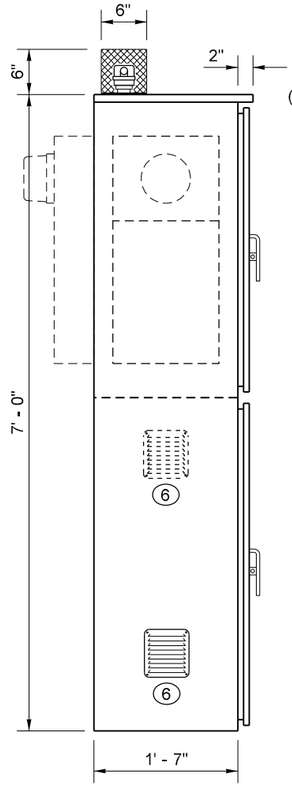
SERVICE CABINET TYPE B MODIFIED (0 - 200 AMP TYPE 120/240 VOLT SINGLE PHASE) STANDARD PLAN J-10.20-03

SHEET 2 OF 2 SHEETS

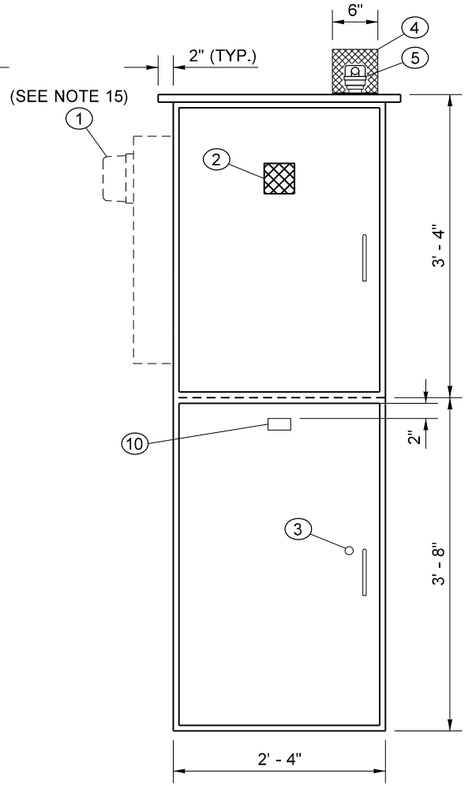
APPROVED FOR PUBLICATION
Date: 2020.09.16 10:17:40 -07'00'
STATE DESIGN ENGINEER

Washington State Department of Transportation

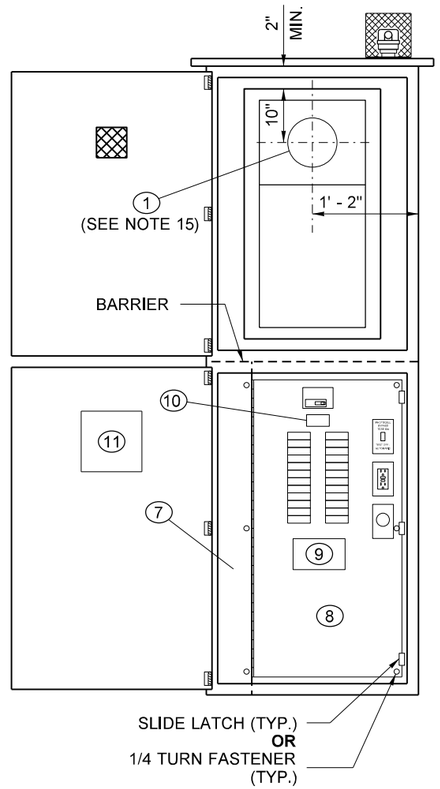
DRAWN BY: FERN LIDDELL



LEFT SIDE



FRONT



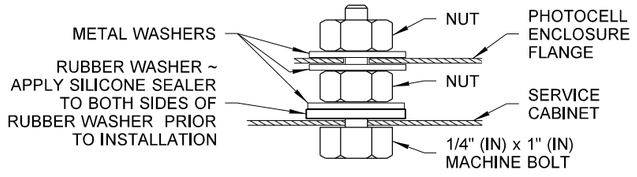
SERVICE CABINET DETAIL

KEY

1. METER SOCKET/BASE PANEL PER UTILITY REQUIREMENTS ~ UTILITY MAY REQUIRE METER TO BE INSTALLED ON THE OUTSIDE OF THE CABINET INSTEAD OF INSIDE THE UTILITY SECTION OF THE CABINET
2. UTILITY SECTION DOOR ~ HINGED FRONT FACING DOOR WITH 4" (IN) x 4" (IN) MINIMUM POLISHED WIRE GLASS WINDOW
3. CUSTOMER SECTION DOOR WITH BEST CX 6-PIN LOCK CORE
4. PHOTOCELL ENCLOSURE ~ SEE PHOTOCELL MOUNTING DETAIL ~ ENCLOSURE SHALL BE FABRICATED FROM EITHER:
   - A. 5/8" (IN) EXPANDED STEEL MESH WITH WELDED SEAMS AND MOUNTING FLANGES ~ HOT-DIP GALVANIZED AFTER FABRICATION ~ OR ~
   - B. TYPE 5052 - H32 ALUMINUM WITH 5/8" (IN) x 5/8" (IN) OPENINGS EQUIVALENT TO 5/8" (IN) EXPANDED STEEL MESH
5. PHOTOELECTRIC CONTROL ~ SEE **STANDARD SPECIFICATION, SECTION 9-29.11(2).**
6. SCREENED VENTS ~ TWO REQUIRED, ONE EACH SIDE ~ LOUVERED PLATES
7. 6" (IN) x 6" (IN) MIN. UTILITY WIREWAY ~ BACK LEFT CORNER OF CUSTOMER SECTION ~ SHALL REQUIRE TOOLS TO OPEN ~ LABEL WITH "UTILITY WIREWAY"
8. HINGED DEAD FRONT WITH 1/4 TURN FASTENERS OR SLIDE LATCHES ~ DEAD FRONT PANEL BOLTS SHALL NOT EXTEND INTO VERTICAL LIMITS OF THE BREAKER ARRAY(S)
9. ARC FLASH AND SHOCK HAZARD LABEL ~ SEE DETAIL
10. CABINET BUSSWORK RATING LABEL
11. METAL WIRING DIAGRAM HOLDER

FRONT
(SHOWN WITH DOORS OPEN AND DEAD FRONT CLOSED)

SERVICE CABINET INTERIOR



PHOTOCELL ENCLOSURE MOUNTING DETAIL

NOTES

1. See **Standard Specification Section 9-29.24** (Service Cabinets).
2. Cabinet shall be rated NEMA 3R and shall include two rain-tight vents.
3. Dimensions shown are minimum and shall be adjusted to accommodate the various sizes of equipment installed. A 1% tolerance is allowed for all dimensions.
4. Doors shall be pad-lockable and gasketed. Customer side door shall include a Best CX 6-pin Construction core lock.
5. Hinges shall have stainless steel or brass pins.
6. Equipment identified by Key Numbers 14, 16, 17, 18, 19, 20, 21, 22, 23, and 28 shall have an appropriately engraved phenolic name plate attached with screws or rivets. The name plate for Key Number 21 (Test Switch only) shall read as follows:
   "PHOTOCELL BYPASS TEST ON" AND "PHOTOCELL TEST OFF - AUTOMATIC."
   See service cabinet detail.
7. All busswork shall be high grade copper and shall have a minimum rating of 250 amps. All breakers shall bolt on to the busswork. Jumpering of breakers shall not be allowed. Busswork shall accommodate all future equipment as shown in the Breaker Schedule.
8. All nuts, bolts, and washers used for mounting the photocell enclosure shall be stainless steel.
9. The photocell unit shall be centered in the photocell enclosure to permit 360 degree rotation of the photocell without removal of the photocell unit or the photocell enclosure.
10. All internal wire runs shall be identified with "TO - FROM" coded tags labeled with the code letters and/or numbers shown on the Schedules. Approved PVC or polyolefin wire marking sleeves shall be used.
11. Key items 23, 24, and 25 shall be connected to the cabinet main bonding jumper assembly by appropriately sized wire.
12. See Contract for Breaker and Contactor Schedule.
13. Buss bars shall be sized to accommodate up to #4 AWG wires.
14. The meter base portion of this service was designed to meet metering portion of **EUSERC Drawing 309** requirements.
15. Metering arrangements vary with different serving Utilities. The Utility may require meter base mounting in the enclosure, on the side, or on the back of the enclosure. The Utility may require the dimension between the door and the front of the safety socket box to be less than the 11" (in) shown in the Left Side - Safety Socket Box Mounting Detail. The Contractor shall verify the serving Utility's requirements prior to fabrication and installation of the service equipment.
16. Verify the meter setback position with the utility and adjust the meter socket backplate to the required position. For cabinets with separate metering, remove the meter socket or install shunts in the meter socket.

⚠ WARNING

Arc Flash and Shock Hazard
Appropriate PPE Required

ARC FLASH PROTECTION		SHOCK PROTECTION	
Arc Flash Boundary (in)	00 in	Shock Hazard When Cover Removed	000 VAC
Incident Energy at 18 inches (cal/cm²)	0.00	Limited Approach	00 in
Assessment Date: 00-00-0000		Restricted Approach	00 in
By:		Glove Class	00
WSDOT Approval			
Inspector:	Date:		

ARC FLASH AND SHOCK HAZARD LABEL DETAIL
(9)

WILLIAM FLINT JACKSON
STATE OF WASHINGTON
48821
REGISTERED
PROFESSIONAL ENGINEER

Jackson, Flint
Aug 24 2020 9:41 AM

SERVICE CABINET TYPE D (0 - 200 AMP TYPE 120/240 VOLT SINGLE PHASE) STANDARD PLAN J-10.21-01

SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION
Date: 2020.09.16 10:18:27 -07'00'
STATE DESIGN ENGINEER

Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

KEY (CONTINUED)

(12) ALUMINUM BACKPLATE FOR METER SOCKET/BASE

(13) 18" (IN) WIDE BY 40" (IN) TALL ALUMINUM BACKPLATE FOR CUSTOMER SECTION EQUIPMENT

(14) MAIN BREAKER ~ DPST ~ SIZE PER BREAKER SCHEDULE

(15) 24-CIRCUIT PANEL BOARD ~ MINIMUM SIZE WITH SEPARATE MAIN BREAKER

(16) BOLT-IN TYPE 2 SURGE PROTECTION DEVICE ~ 2 POLE 20 KA

(17) DPST BRANCH BREAKER ~ SEE BREAKER SCHEDULE

(18) SPARE BRANCH BREAKER ~ 20 AMP DPST ~ OMIT IF BREAKER ARRAY IS FULL (SEE BREAKER SCHEDULE)

(19) PHOTOCELL BREAKER ~ SPST 15 AMP

(20) RECEPTACLE BREAKER ~ SPST 20 AMP

(21) HEATER BREAKER ~ SPST 15 AMP

(22) SPST BRANCH BREAKER ~ SEE BREAKER SCHEDULE

(23) SINGLE GANG BOX WITH TEST SWITCH ~ 120/277 VOLT 15 AMP SPDT SNAP ACTION - POSITIVE CLOSE - "T" RATED

(24) SINGLE GANG BOX WITH RECEPTACLE (GROUNDED) ~ 125 VOLT 20 AMP GFCI

(25) SINGLE GANG BOX WITH THERMOSTAT CONTROL ~ 40° F CLOSURE - 3 DIFFERENTIAL

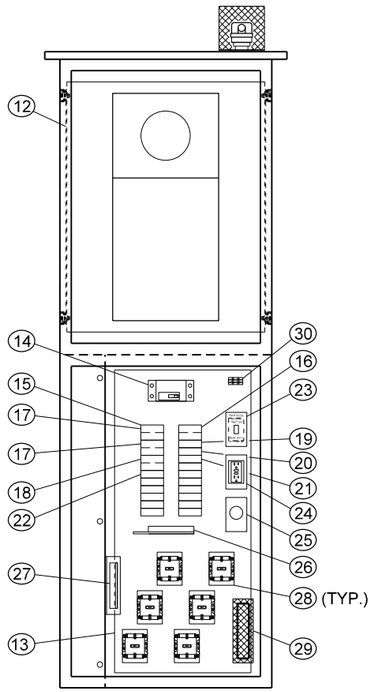
(26) ISOLATED NEUTRAL BUSS ~ 14 LUG COPPER (SEE NOTE 12)

(27) CABINET MAIN BONDING JUMPER ASSEMBLY ~ BUSS SHALL BE 14 LUG TINNED COPPER (SEE NOTE 12) ~ SEE CABINET MAIN BONDING JUMPER ASSEMBLY DETAIL

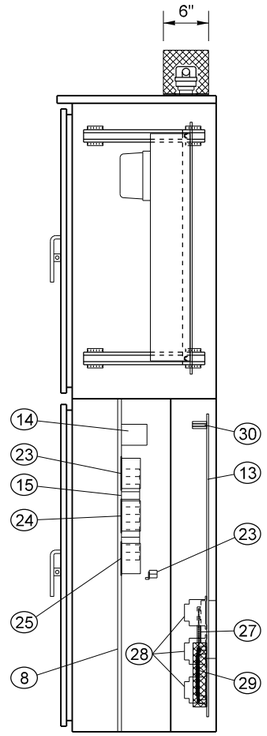
(28) CONTACTOR (BEHIND DEAD FRONT) ~ SEE BREAKER SCHEDULE

(29) STRIP HEATER (100 WATT NOMINAL) WITH EXPANDED STEEL MESH ENCLOSURE FOR TOUCH PROTECTION

(30) THREE POSITION DIN RAIL MOUNTED TERMINAL BLOCK ~ TERMINAL BLOCK SECTIONS SHALL BE BLACK, WHITE, AND RED AS SHOWN IN CABINET WIRING DIAGRAM.

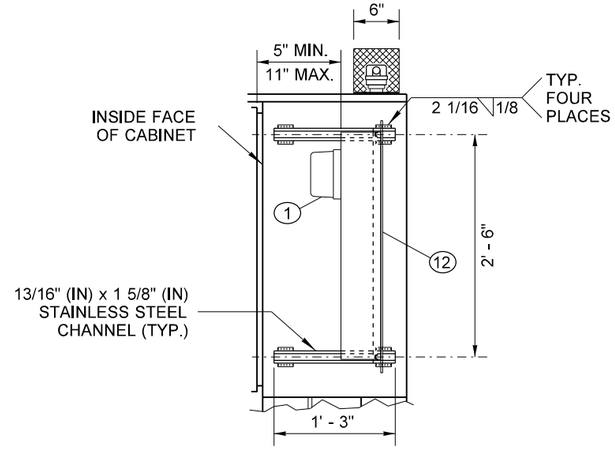


FRONT
(SHOWN WITH DEAD FRONT REMOVED)

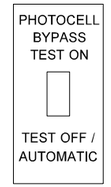


INTERIOR END VIEW
(SUPPORT FRAMES FOR EQUIPMENT NOT SHOWN)

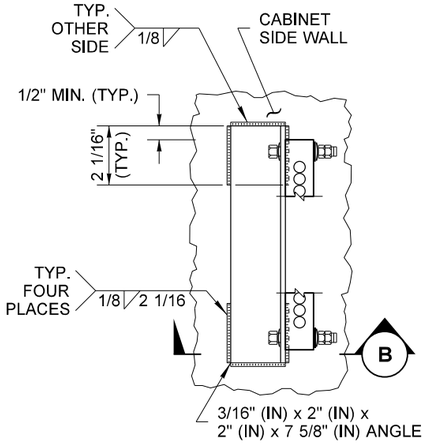
SERVICE CABINET INTERIOR DETAIL



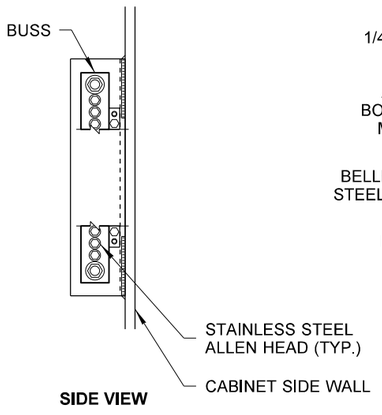
UTILITY SECTION DETAIL



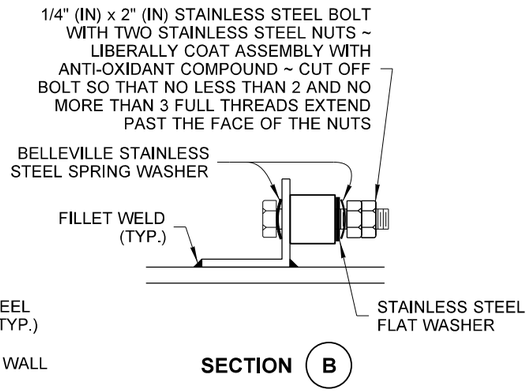
TEST SWITCH LABEL DETAIL
(23)



ELEVATION VIEW

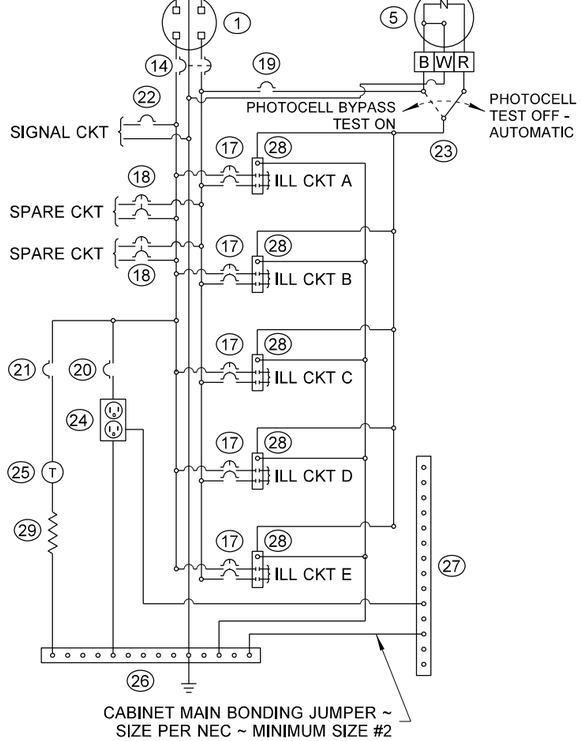


SIDE VIEW



SECTION (B)

CABINET MAIN BONDING JUMPER ASSEMBLY DETAIL



WIRING SCHEMATIC

WILLIAM FLINT JACKSON
STATE OF WASHINGTON
48821
REGISTERED
PROFESSIONAL ENGINEER

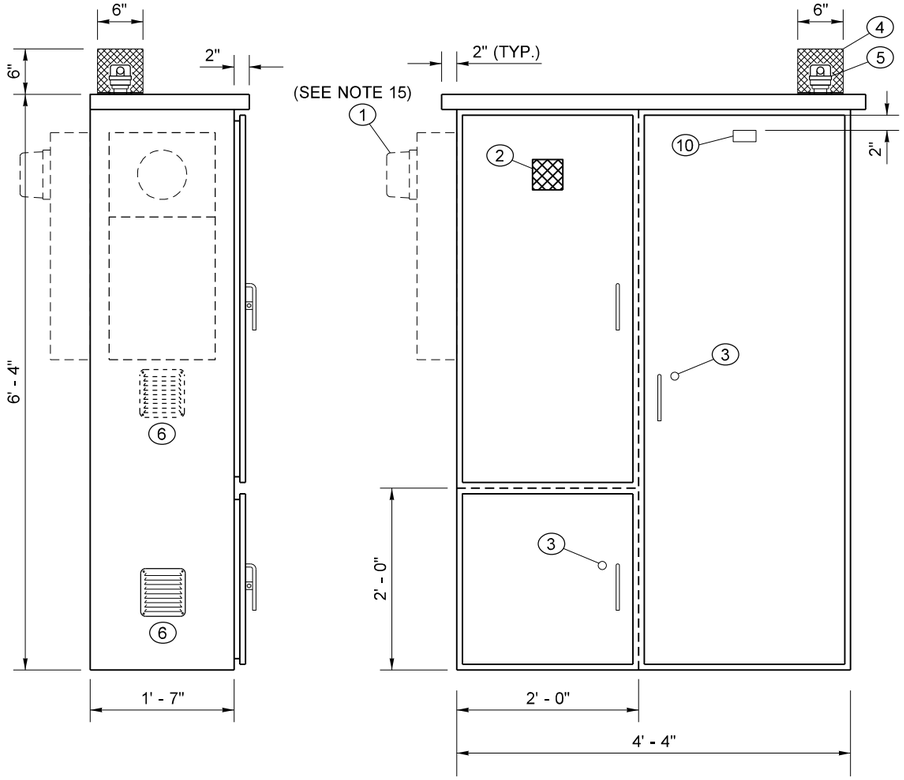
Jackson, Flint
Aug 24 2020 9:41 AM

SERVICE CABINET TYPE D (0 - 200 AMP TYPE 120/240 VOLT SINGLE PHASE) STANDARD PLAN J-10.21-01

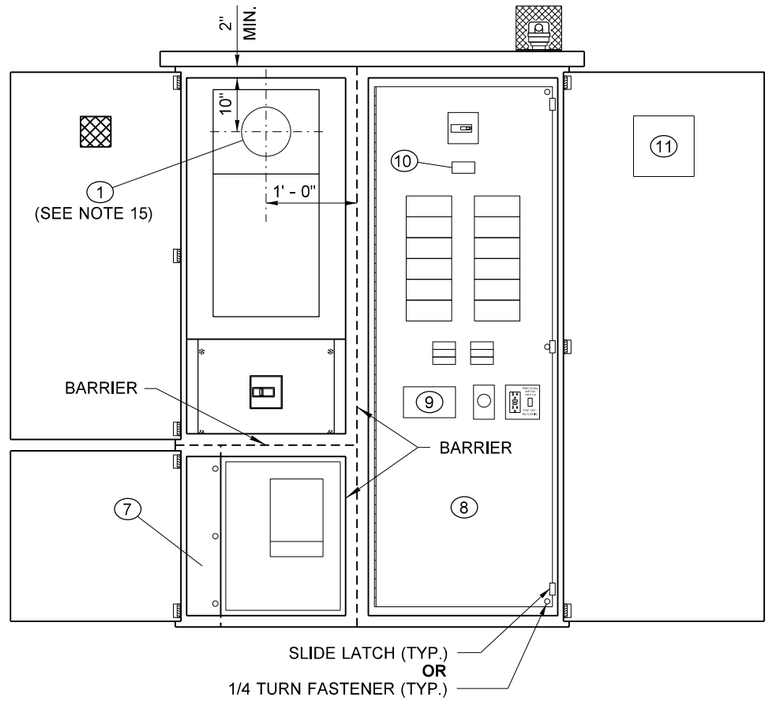
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION
Date: 2020.09.16 10:18:55 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



SERVICE CABINET DETAIL

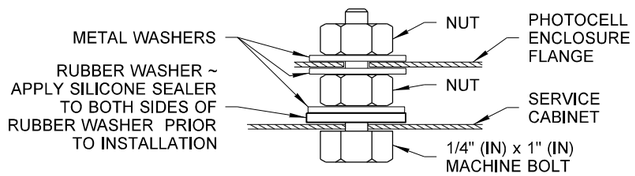


FRONT
(SHOWN WITH DOORS OPEN AND DEAD FRONT CLOSED)

SERVICE CABINET INTERIOR

KEY

1. METER SOCKET/BASE PANEL PER UTILITY REQUIREMENTS ~ UTILITY MAY REQUIRE METER TO BE INSTALLED ON THE OUTSIDE OF THE CABINET INSTEAD OF INSIDE THE UTILITY SECTION OF THE CABINET
2. UTILITY SECTION DOOR ~ HINGED FRONT FACING DOOR WITH 4" (IN) x 4" (IN) MINIMUM POLISHED WIRE GLASS WINDOW
3. CUSTOMER SECTION DOOR WITH BEST CX 6-PIN LOCK CORE
4. PHOTOCELL ENCLOSURE ~ SEE PHOTOCELL MOUNTING DETAIL ~ ENCLOSURE SHALL BE FABRICATED FROM EITHER:
   A. 5/8" (IN) EXPANDED STEEL MESH WITH WELDED SEAMS AND MOUNTING FLANGES ~ HOT-DIP GALVANIZED AFTER FABRICATION ~ OR ~
   B. TYPE 5052 - H32 ALUMINUM WITH 5/8" (IN) x 5/8" (IN) OPENINGS EQUIVALENT TO 5/8" (IN) EXPANDED STEEL MESH
5. PHOTOELECTRIC CONTROL ~ SEE **STANDARD SPECIFICATION, SECTION 9-29.11(2).**
6. SCREENED VENTS ~ TWO REQUIRED, ONE EACH SIDE ~ LOUVERED PLATES
7. 6" (IN) x 6" (IN) MIN. UTILITY WIREWAY ~ BACK LEFT CORNER OF CUSTOMER SECTION ~ SHALL REQUIRE TOOLS TO OPEN ~ LABEL WITH "UTILITY WIREWAY"
8. HINGED DEAD FRONT WITH 1/4 TURN FASTENERS OR SLIDE LATCHES ~ DEAD FRONT PANEL BOLTS SHALL NOT EXTEND INTO VERTICAL LIMITS OF THE BREAKER ARRAY(S)
9. ARC FLASH AND SHOCK HAZARD LABEL ~ SEE DETAIL
10. CABINET BUSSWORK RATING LABEL
11. METAL WIRING DIAGRAM HOLDER



PHOTOCELL ENCLOSURE MOUNTING DETAIL

WARNING

Arc Flash and Shock Hazard
Appropriate PPE Required

ARC FLASH PROTECTION		SHOCK PROTECTION	
Arc Flash Boundary (in)	00 in	Shock Hazard When Cover Removed	000 VAC
Incident Energy at 18 inches (cal/cm²)	0.00	Limited Approach	00 in
Assessment Date: 00-00-0000		Restricted Approach	00 in
By:		Glove Class	00
WSDOT Approval			
Inspector:	Date:		

ARC FLASH AND SHOCK HAZARD LABEL DETAIL
(9)

NOTES

1. See **Standard Specification Section 9-29.24** (Service Cabinets).
2. Cabinet shall be rated NEMA 3R and shall include two rain-tight vents.
3. Dimensions shown are minimum and shall be adjusted to accommodate the various sizes of equipment installed. A 1% tolerance is allowed for all dimensions.
4. Doors shall be pad-lockable and gasketed. Customer section doors shall include Best CX 6-pin Construction core locks.
5. Hinges shall have stainless steel or brass pins.
6. Equipment identified by Key Numbers 14, 16, 17, 18, 19, 20, 21, 22, 23, and 28 shall have an appropriately engraved phenolic name plate attached with screws or rivets. The name plate for Key Number 21 (Test Switch only) shall read as follows:
   "PHOTOCELL BYPASS TEST ON" AND "PHOTOCELL TEST OFF - AUTOMATIC."
   See service cabinet detail.
7. All busswork shall be high grade copper and shall have a minimum rating of 250 amps. All breakers shall bolt on to the busswork. Jumpering of breakers shall not be allowed. Busswork shall accommodate all future equipment as shown in the Breaker Schedule.
8. All nuts, bolts, and washers used for mounting the photocell enclosure shall be stainless steel.
9. The photocell unit shall be centered in the photocell enclosure to permit 360 degree rotation of the photocell without removal of the photocell unit or the photocell enclosure.
10. All internal wire runs shall be identified with "TO - FROM" coded tags labeled with the code letters and/or numbers shown on the Schedules. Approved PVC or polyolefin wire marking sleeves shall be used.

NOTES (CONTINUED)

11. Key items 23, 24, and 25 shall be connected to the cabinet main bonding jumper assembly by appropriately sized wire.
12. See Contract for Breaker and Contactor Schedule.
13. Buss bars shall be sized to accommodate up to #4 AWG wires.
14. The meter base portion of this service was designed to meet metering portion of **EUSERC Drawing 309** requirements.
15. Metering arrangements vary with different serving Utilities. The Utility may require meter base mounting in the enclosure, on the side, or on the back of the enclosure. The Utility may require the dimension between the door and the front of the safety socket box to be less than the 11" (in) shown in the Left Side - Safety Socket Box Mounting Detail. The Contractor shall verify the serving Utility's requirements prior to fabrication and installation of the service equipment.
16. Verify the meter setback position with the utility and adjust the meter socket backplate to the required position. For cabinets with separate metering, remove the meter socket or install shunts in the meter socket.
17. The requirement for a disconnect switch ahead of the meter varies with different serving Utilities. Verify with the serving Utility that a disconnect switch is required before installing the disconnect switch.

Jackson, Flint
Aug 24 2020 9:41 AM

SERVICE CABINET TYPE E (0 - 200 AMP TYPE 480 VOLT SINGLE PHASE) STANDARD PLAN J-10.22-01

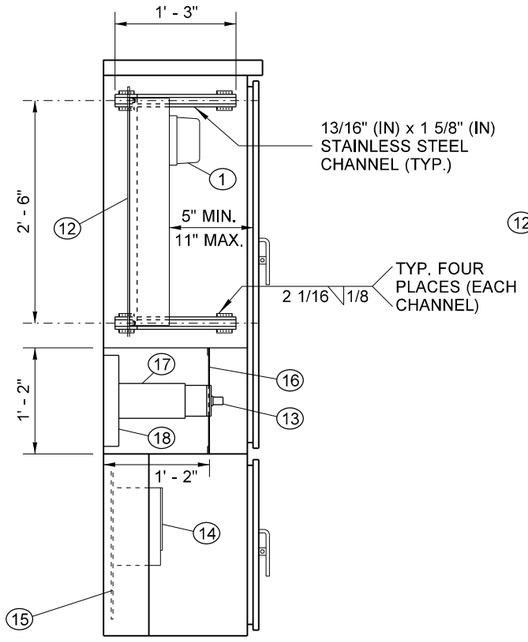
SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION
Date: 2020.09.16 10:19:45 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

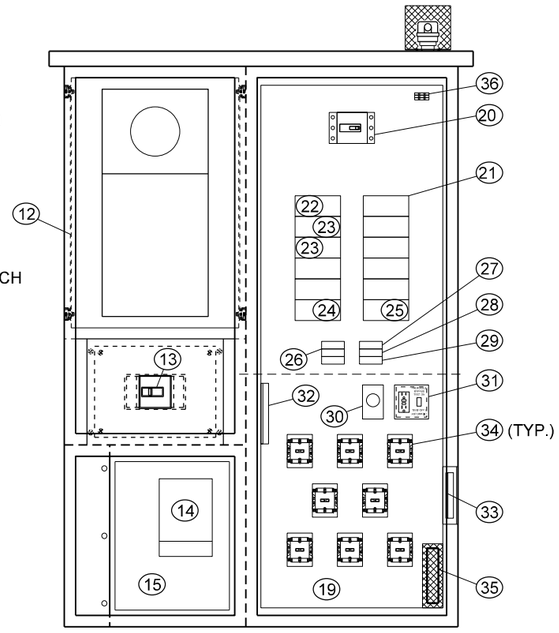
DRAWN BY: FERN LIDDELL

KEY (CONTINUED)

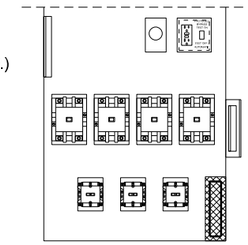
(12) ALUMINUM BACKPLATE FOR METER SOCKET/BASE
(13) MOLDED CASE UTILITY DISCONNECT SWITCH (SEE NOTE 17)
(14) 3 KVA 480/120V INTERNAL TRANSFORMER
(15) ALUMINUM BACKPLATE FOR INTERNAL TRANSFORMER
(16) DEAD FRONT PANEL FOR DISCONNECT SWITCH (SEE NOTE 17)
(17) STANDOFF BRACKET FOR DISCONNECT SWITCH (SEE NOTE 17)
(18) REMOVABLE EQUIPMENT MOUNTING PAN FOR DISCONNECT SWITCH (SEE NOTE 17)
(19) 24" (IN) WIDE BY 69" (IN) TALL ALUMINUM BACKPLATE FOR CUSTOMER SECTION EQUIPMENT
(20) MAIN BREAKER ~ DPST ~ SIZE PER BREAKER SCHEDULE
(21) 24-CIRCUIT 480V PANEL BOARD ~ MINIMUM SIZE WITH SEPARATE MAIN BREAKER
(22) BOLT-IN TYPE 2 SURGE PROTECTION DEVICE ~ 2 POLE 20 KA
(23) DPST BRANCH BREAKER ~ SEE BREAKER SCHEDULE
(24) SPARE BRANCH BREAKER ~ 20 AMP DPST ~ OMIT IF BREAKER ARRAY IS FULL (SEE BREAKER SCHEDULE)
(25) INTERNAL TRANSFORMER BRANCH BREAKER ~ 15 AMP DPST ~ LABEL WITH "XFMR"
(26) 6-CIRCUIT 120V PANEL BOARD ~ MINIMUM SIZE
(27) PHOTOCELL BREAKER ~ SPST 15 AMP
(28) RECEPTACLE BREAKER ~ SPST 20 AMP
(29) HEATER BREAKER ~ SPST 15 AMP
(30) SINGLE GANG BOX WITH THERMOSTAT CONTROL ~ 40° F CLOSURE - 3 DIFFERENTIAL
(31) 2 GANG BOX WITH:
A. RECEPTACLE (GROUNDED) ~ 125 VOLT 20 AMP GFCI
B. TEST SWITCH ~ 120/277 VOLT 15 AMP SPDT SNAP ACTION - POSITIVE CLOSE - "T" RATED
BOX MAY INCLUDE A COVER PLATE, OR MAY BE COVERED BY DEAD FRONT PANEL ~ GANG BOX SHALL BE WIRED TO THE CABINET BONDING JUMBER (KEY NUMBER ??)
(32) ISOLATED NEUTRAL BUSS ~ 14 LUG COPPER (SEE NOTE 13)
(33) CABINET MAIN BONDING JUMPER ASSEMBLY ~ BUSS SHALL BE 14 LUG TINNED COPPER (SEE NOTE 13) ~ SEE CABINET MAIN BONDING JUMPER ASSEMBLY DETAIL
(34) CONTACTOR (BEHIND DEAD FRONT) ~ SEE BREAKER SCHEDULE
(35) STRIP HEATER (100 WATT NOMINAL) WITH EXPANDED STEEL MESH ENCLOSURE FOR TOUCH PROTECTION
(36) THREE POSITION DIN RAIL MOUNTED TERMINAL BLOCK ~ TERMINAL BLOCK SECTIONS SHALL BE BLACK, WHITE, AND RED AS SHOWN IN CABINET WIRING DIAGRAM.



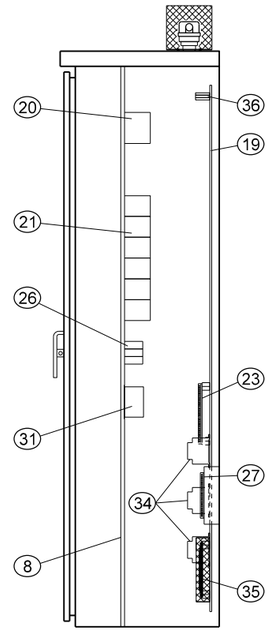
LEFT END VIEW
UTILITY AND TRANSFORMER SECTIONS
(SUPPORT FRAMES FOR EQUIPMENT NOT SHOWN)



FRONT
(SHOWN WITH DEAD FRONT REMOVED)

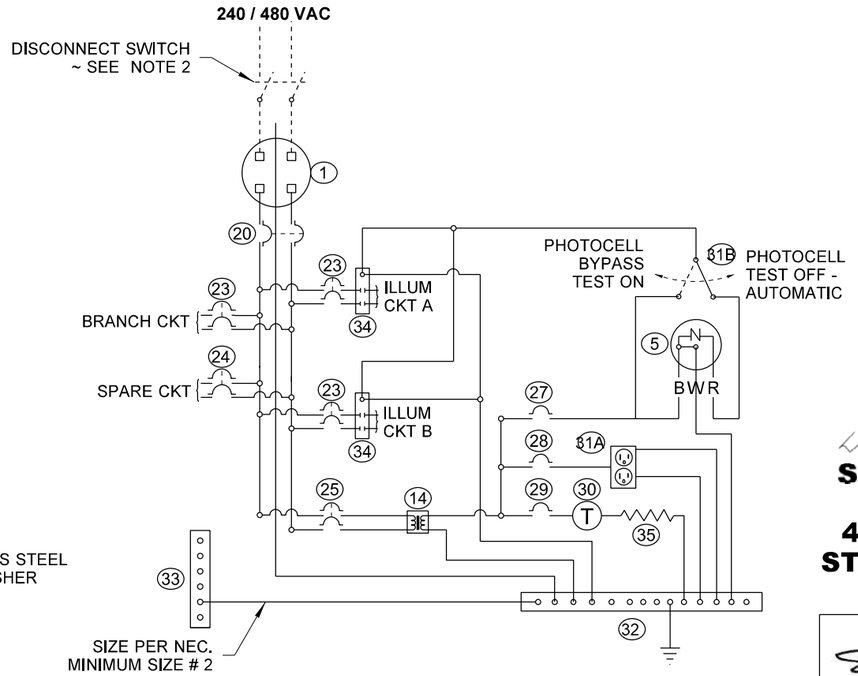


ALTERNATIVE CONTACTOR ARRANGEMENT WITH 100A CONTACTORS (4 MAX.)

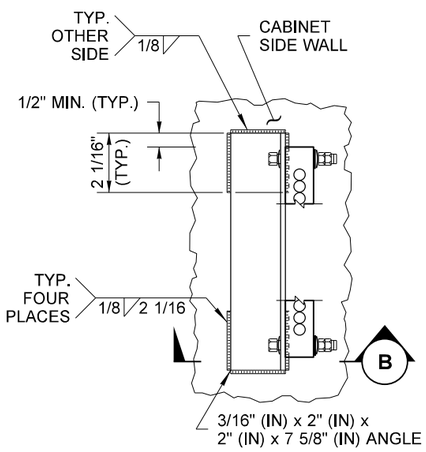


RIGHT END VIEW
CUSTOMER SECTION
(SUPPORT FRAMES FOR EQUIPMENT NOT SHOWN)

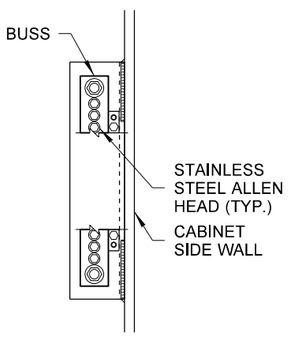
SERVICE CABINET INTERIOR DETAIL



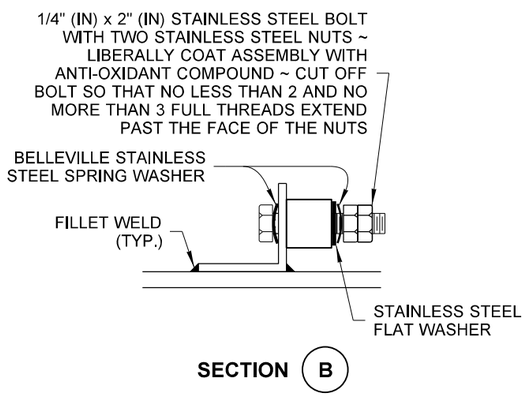
WIRING DIAGRAM



ELEVATION VIEW

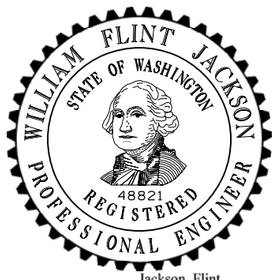


SIDE VIEW



SECTION (B)

CABINET MAIN BONDING JUMPER ASSEMBLY DETAIL



Jackson, Flint
Aug 24 2020 9:41 AM

SERVICE CABINET TYPE E (0 - 200 AMP TYPE 480 VOLT SINGLE PHASE) STANDARD PLAN J-10.22-01

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION
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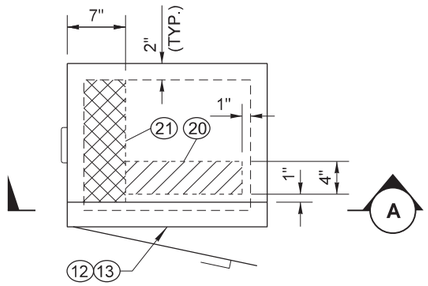
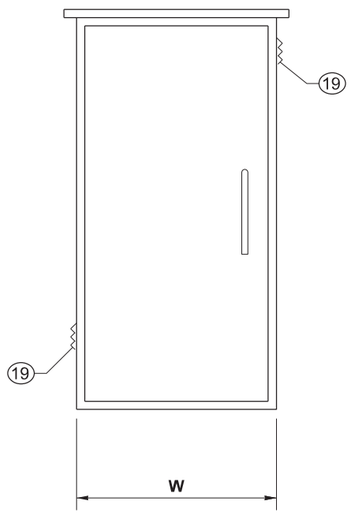
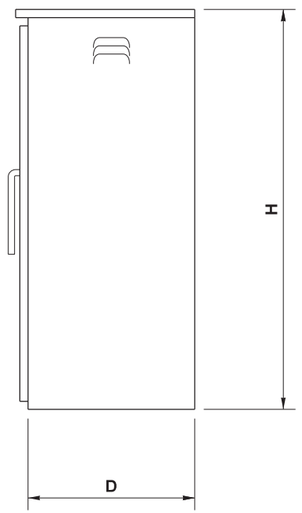


PLAN VIEW

TRANSFORMER SIZE (KVA)	CABINET DIMENSIONS		
	H	W	D
UP TO 12.5	48"	24"	20"
12.6 TO 37.5	60"	32"	30"

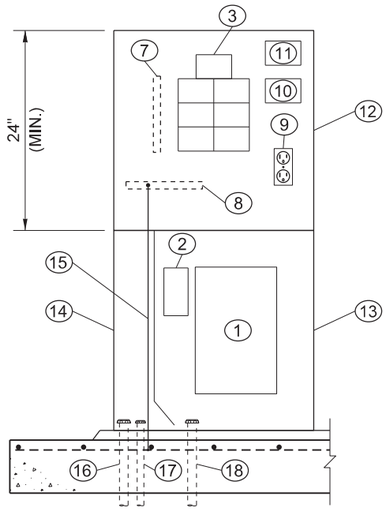


ELEVATION VIEW



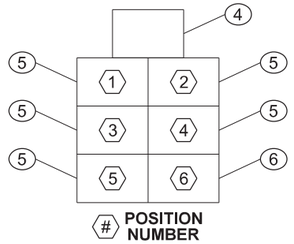
SIDE VIEW

TRANSFORMER CABINET HOUSING

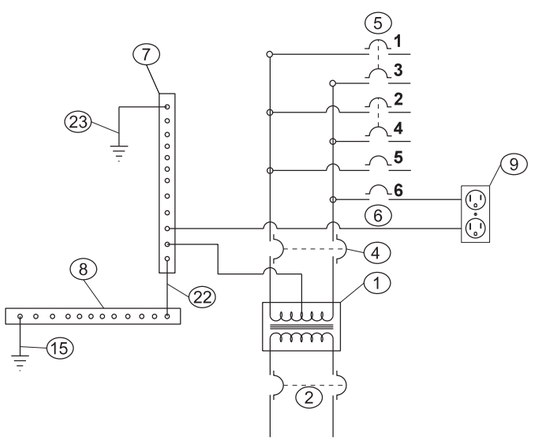


SECTION (A)

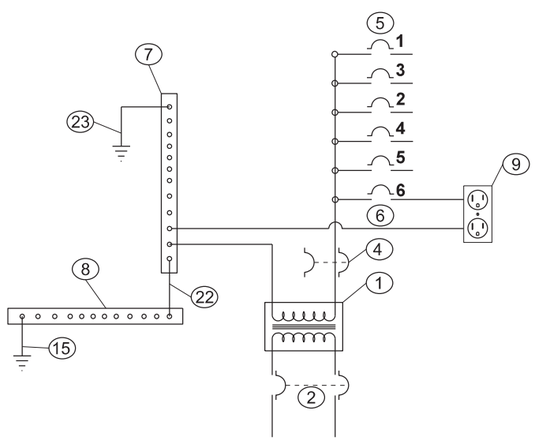
TRANSFORMER CABINET DETAILS



BREAKER PANEL DETAIL



480V OR 240V INPUT - 240V/120V OUTPUT



480V OR 240V INPUT - 120V OUTPUT

WIRING SCHEMATICS

NOTES

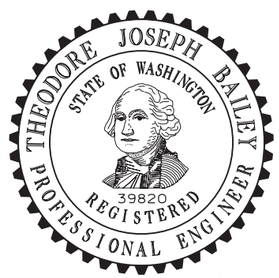
1. Cabinet construction shall meet the requirements of **Standard Specification 9-29.25**. Aluminum cabinets shall have mill finish.
2. Busswork shall be rated for 100 Amps minimum.
3. Transformer size, input voltage, and output voltage shall be as shown in the Contract Plans.
4. Secondary branch breakers shall be bolt in type. See Contract Plans for breaker schedule.
5. Secondary branch breakers may be either single or double pole breakers. Only two double pole breakers may be used.
6. Cabinet anchor bolt pattern is determined by the cabinet manufacturer. All anchor bolts shall either be hot dip galvanized or stainless steel cinch bolts. Bolts shall extend a minimum of 1.5 inches above the concrete pad. See **Standard Plan J-10.10** for Foundation details.
7. Transformers 7.5 KVA and larger shall be supplied with two full capacity taps, one at 5%, and one at 10% below normal capacity.
8. Engraved phenolic nameplate shall read "SUPPLIED FROM SERVICE CABINET S?? ????". See Contract Plans for service cabinet S number. Nameplate shall be attached with screws or rivets.
9. Cabinet shall be oriented such that it opens away from traffic.
10. Available fault current label shall meet the requirements of **National Electrical Code Article 110.24.**

KEY

1. TRANSFORMER
2. PRIMARY MAIN BREAKER ~ DPST
3. SECONDARY MAIN BREAKER AND 6 CIRCUIT BREAKER PANEL ~ SEE BREAKER PANEL DETAIL
4. SECONDARY MAIN BREAKER ~ DPST; ONE POLE UN-USED FOR 120V ONLY SECONDARY
5. SECONDARY BREAKER(S) - SPST OR DPST (DPST BREAKERS USE TWO POSITIONS)
6. RECEPTACLE BREAKER ~ SPST 20 AMP
7. ISOLATED NEUTRAL BUSS ~ 12 LUG TINNED COPPER
8. GROUND BUSS ~ 12 LUG COPPER
9. RECEPTACLE (GROUNDED) ~ GFCI 20 AMP
10. ENGRAVED PHENOLIC LABEL PLATE (SEE NOTE 8)
11. AVAILABLE FAULT CURRENT LABEL (SEE NOTE 10)
12. UPPER SECTION HINGED DEAD FRONT ~ ONLY BREAKERS AND RECEPTACLE FRONT ACCESSIBLE WHEN CLOSED
13. LOWER SECTION HINGED DEAD FRONT ~ ONLY MAIN BREAKER ACCESSIBLE WHEN CLOSED
14. ENCLOSED LOW VOLTAGE WIREWAY
15. SUPPLEMENTAL GROUND ~ CONNECT GROUND BUSS TO PAD FOUNDATION REBAR
16. LOW VOLTAGE POWER CONDUIT(S) TO LOADS
17. GROUND ELECTRODE CONDUIT ~ SEE STANDARD PLAN J-60.05, SHEET 3 (SUPPLEMENTAL GROUND)
18. HIGH VOLTAGE INPUT POWER CONDUIT
19. SCREENED VENT LOUVERS ~ MINIMUM 2 REQUIRED (1 EACH SIDE)
20. HIGH VOLTAGE INPUT CONDUIT RESERVE AREA

KEY CONT.

21. LOW VOLTAGE AND GROUND CONDUIT RESERVE AREA
22. CABINET BONDING JUMPER AND LUG
23. GROUND ELECTRODE ~ SEE STANDARD PLAN J-60.05, SHEET 3



Bailey, Ted
Apr 18 2017 3:11 PM
cosign

TRANSFORMER CABINET (480V/240V - 240V/120V)

STANDARD PLAN J-10.25-00

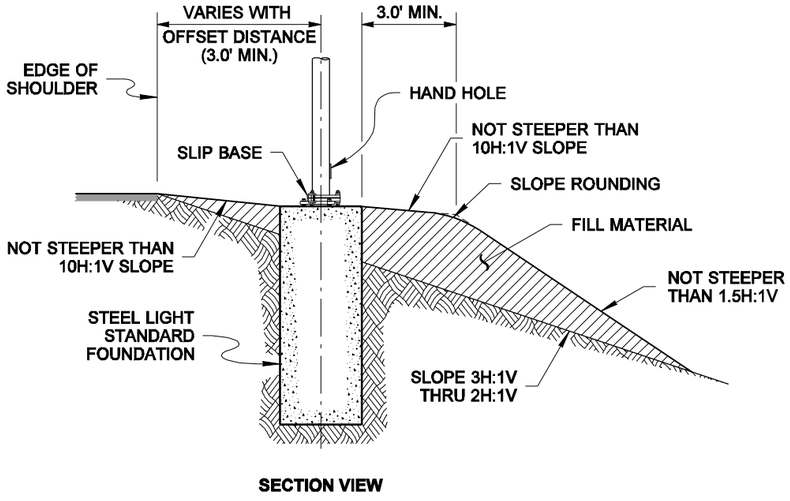
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jul 11 2017 1:19 PM
cosign

STATE DESIGN ENGINEER

Washington State Department of Transportation

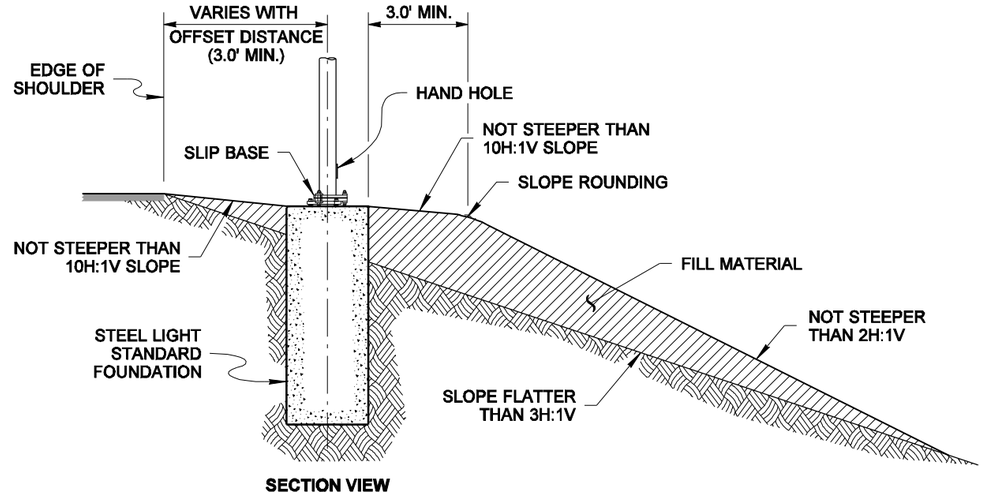
DRAWN BY: BILL BERENS



SECTION VIEW

CASE A

SLOPES 3H:1V THRU 2H:1V (MAX.)

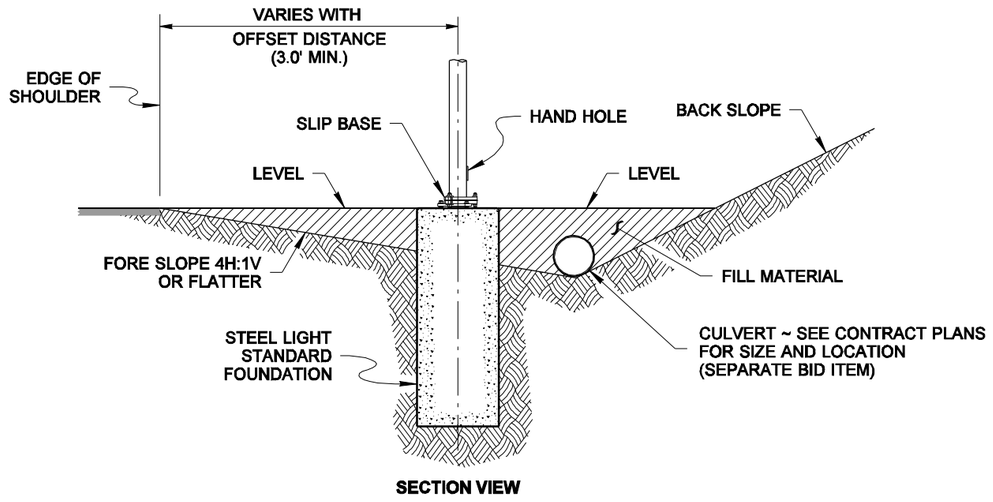


SECTION VIEW

CASE B

SLOPES FLATTER THAN 3H:1V

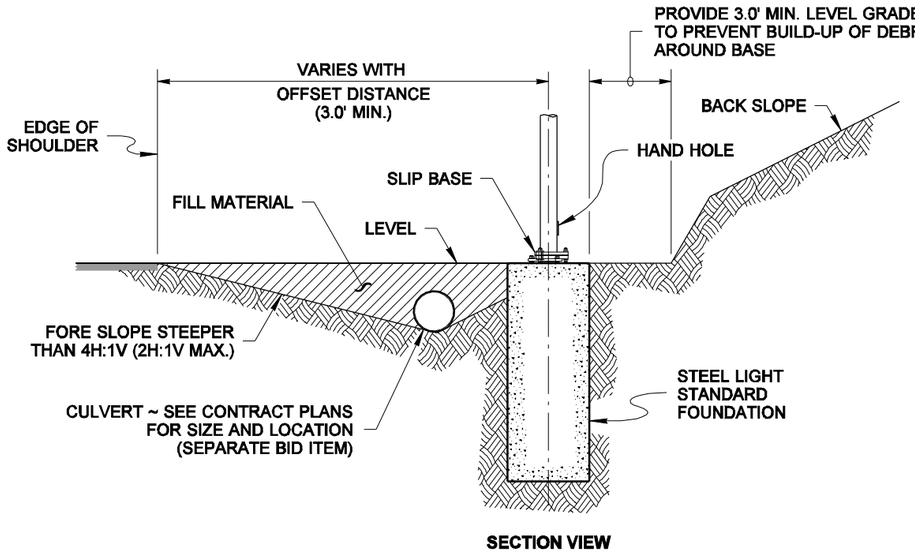
EMBANKMENTS



SECTION VIEW

CASE C

FORE SLOPES 4H:1V OR FLATTER



SECTION VIEW

CASE D

FORE SLOPES STEEPER THAN 4H:1V (2H:1V MAX.)

DITCH SECTIONS

THEODORE J. TREPANIER
STATE OF WASHINGTON
25335
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES AUGUST 9, 2007

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

STEEL LIGHT STANDARD PLACEMENT (SLIP BASE)

STANDARD PLAN J-28.22-00

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION

Pasco Bakotich III — STATE DESIGN ENGINEER

08-07-07 — DATE

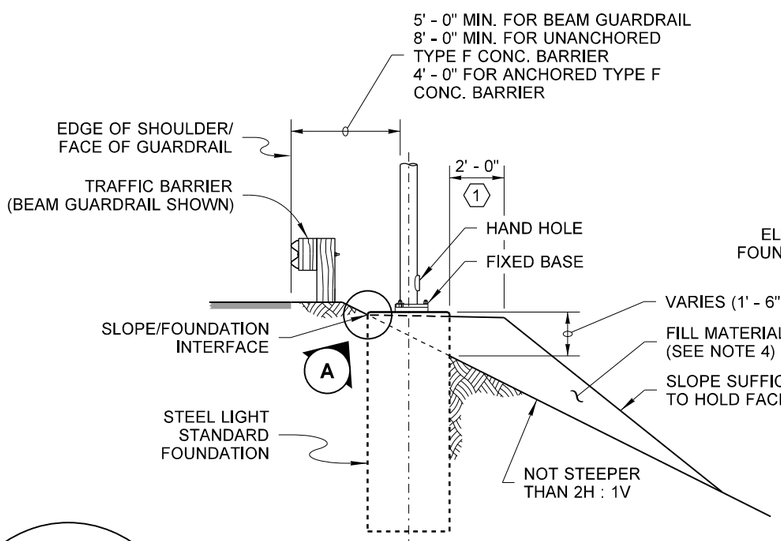
Washington State Department of Transportation

DRAWN BY: COLBY FLETCHER

MAXIMUM CONCRETE EXPOSURE TABLE (CASE F ONLY)	
SLOPE	**HEIGHT (SEE NOTE 3)**
1.75H : 1V	1' - 8 1/2"
1.50H : 1V	2' - 0"
1.25H : 1V	2' - 4 3/4"

NOTES

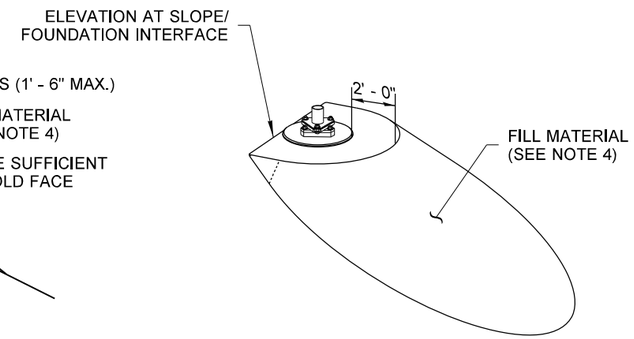
1. See **Standard Plan J-28.30** for foundation details and construction methods.
2. See **Standard Plan J-28.50** for pole base and hand hole details.
3. Values listed in the Table were determined using a 3' - 0" diameter foundation. For design parameters between the values listed, exposure requirements may be interpolated between the values provided.
4. Fill material for Maintenance Pad shall be granular material. Alternately, Crushed Surfacing (Base Course or Top Course) per **Standard Specification, Section 9-03.9(3)** may be used.



SECTION VIEW

CASE E

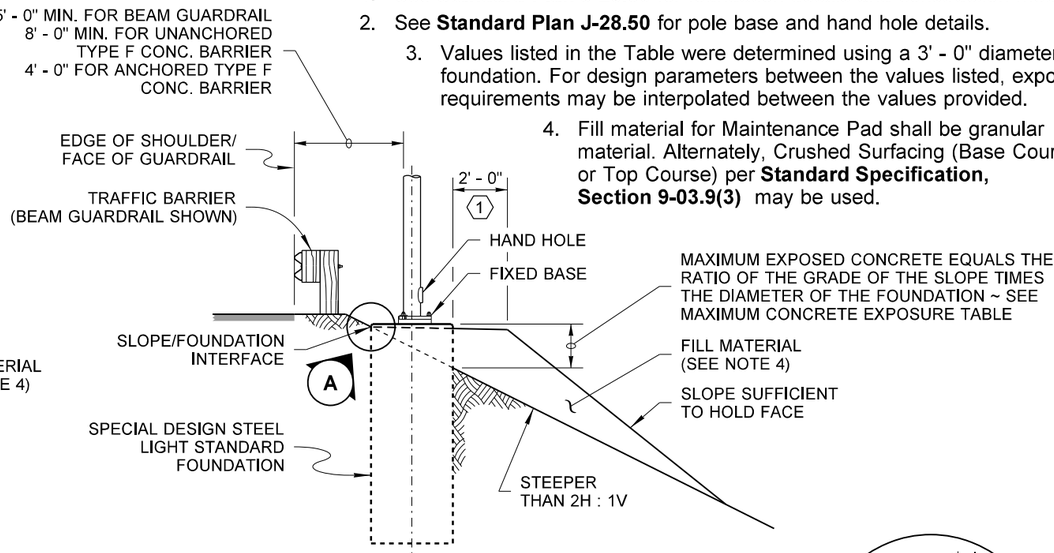
SLOPES 2H : 1V OR FLATTER BEHIND TRAFFIC BARRIER



PERSPECTIVE VIEW

CASE E & CASE F

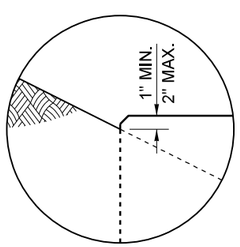
MAINTENANCE PAD

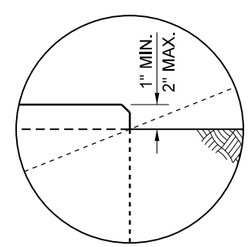


SECTION VIEW

CASE F

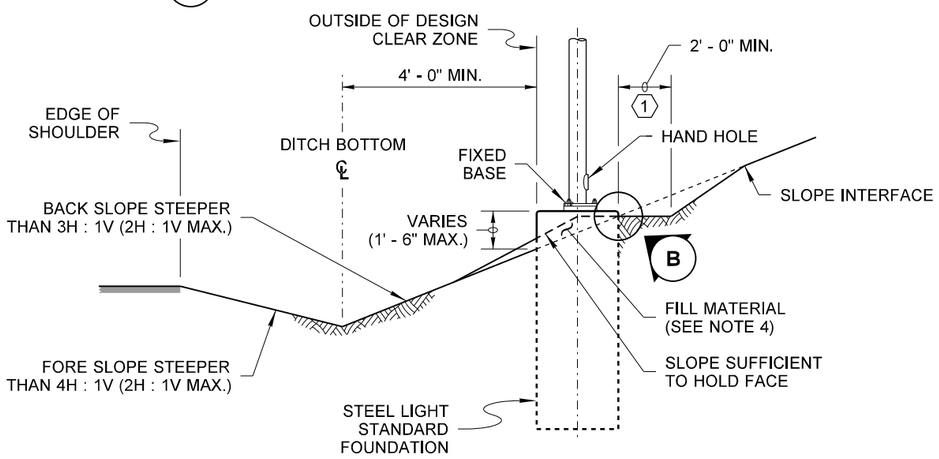
SLOPES STEEPER THAN 2H : 1V BEHIND TRAFFIC BARRIER (SPECIAL DESIGN FOUNDATION)





EMBANKMENTS

DETAIL A

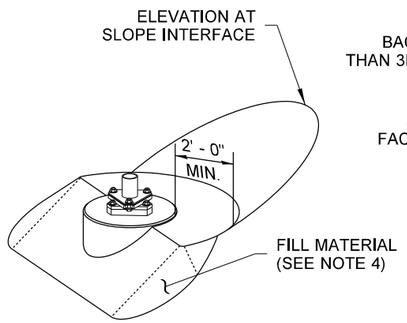


SECTION VIEW

CASE G

ROADSIDE DITCH WITH FORE SLOPE STEEPER THAN 4H : 1V (2H : 1V MAX.)

1 MAINTENANCE PAD ~ SLOPE TO DRAIN AWAY FROM THE FOUNDATION ~ NOT STEEPER THAN 5%



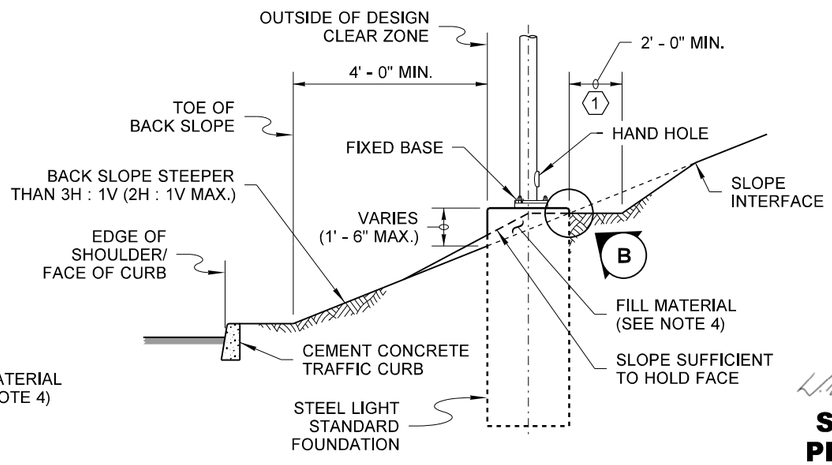
PERSPECTIVE VIEW

CASE G & CASE H

MAINTENANCE PAD

BACK SLOPES

DETAIL B



SECTION VIEW

CASE H

CUT SECTION WITH BACK SLOPE STEEPER THAN 3H : 1V (2H : 1V MAX.)

WILLIAM FLINT JACKSON
STATE OF WASHINGTON
48821
REGISTERED
PROFESSIONAL ENGINEER

Jackson, Flint
Aug 27 2020 12:01 PM
cosign

STEEL LIGHT STANDARD PLACEMENT (FIXED BASE)

STANDARD PLAN J-28.24-02

SHEET 1 OF 1 SHEET

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STATE DESIGN ENGINEER
Washington State Department of Transportation

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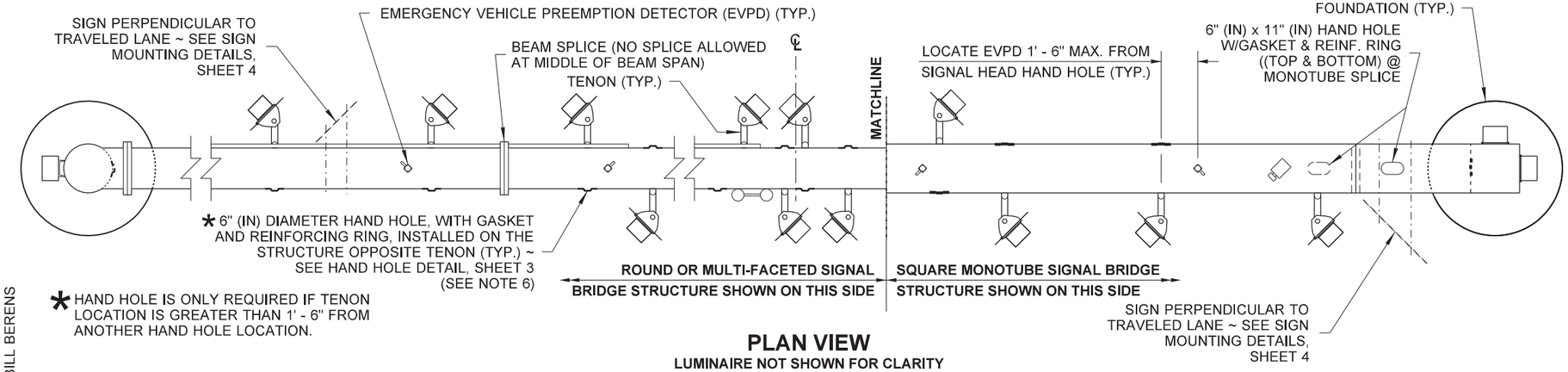
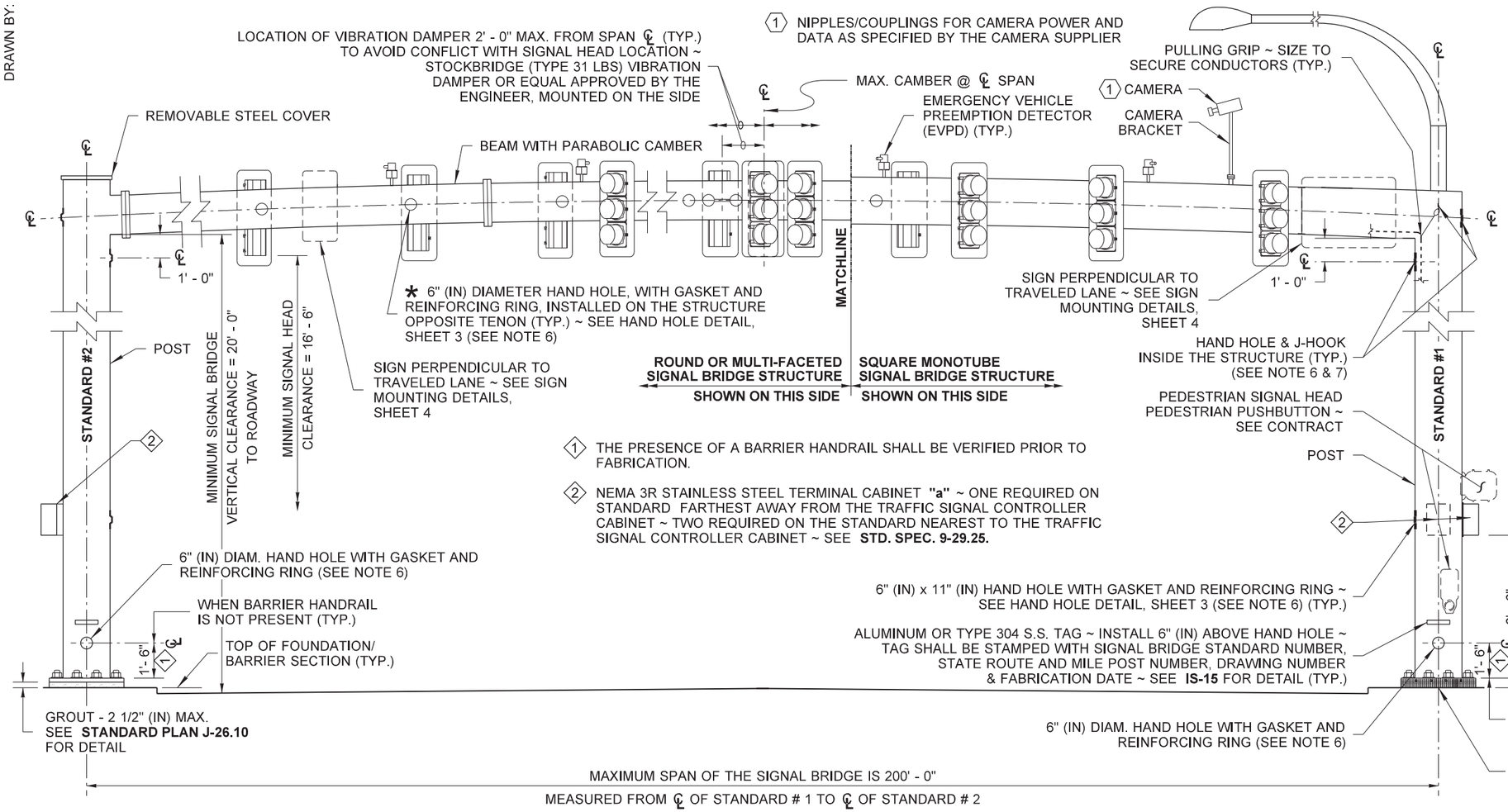


PLAN VIEW

LUMINAIRE NOT SHOWN FOR CLARITY



ELEVATION VIEW

DESIGN CRITERIA

SIGNAL BRIDGE SHALL BE DESIGNED AND ANALYZED IN ACCORDANCE WITH **AASHTO STANDARD SPECIFICATION FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRE AND TRAFFIC SIGNAL - FIFTH EDITION - DATED 2009** AND INTERIMS. USING BASIC WIND SPEED OF **90 MPH** AND **50 YEARS** OF DESIGN LIFE. FATIGUE DESIGN OF THE STRUCTURE CONFORMS TO **FATIGUE CATEGORY I** OF THE SPECIFIED AASHTO STANDARD SPECIFICATION.

NOTES

1. Sign bridge, sign support structure and signal bridge foundation shall be designed by the Engineer of Record for all installations (at grade, mounted on a bridge structure or on a wall structure).
2. Typical view shown. See Contract Plans for quantities and locations of signal heads, EVP detectors, cameras, and signs.
3. Route signal cable(s) from terminal cabinet along inside bottom of the Signal Bridge to the Tenon(s) connector(s) at hand hole(s). Provide sufficient slack wire to allow the conductor or cable to be pulled a minimum of 18" (in) outside the Signal Bridge at the nearest hand hole to the equipment connection point.
4. All conductors shall be labeled in accordance with **Standard Specification 8-20.3(8)**. Labels shall be provided at the terminal cabinet (at the terminal board and conduits), equipment terminals, and at the hand hole nearest equipment connection point.
5. All RMC conduits embedded in foundation shall be terminated with a grounding end bushing and bonded to the structure grounding terminal. All PVC conduits embedded in foundations shall be terminated with end bell bushing.
6. Hand holes shall be designed by the Engineer of Record and installed at the time of fabrication.
7. Install hand hole on outside of the post at beam level when foundation is cast at grade. Install hand hole on traffic side of post when signal bridge is mounted on bridge, retaining wall or other structure.
8. Equipment grounding conductor shall be non-insulated # 4 AWG copper with 3' (ft) minimum slack. Clamp to horizontal steel reinforcing with a listed connector suitable for use embedded in concrete. For details, see Elevation View Signal Bridge Hand Hole Placement on Standard, Sheet 2. Or see Foundation Detail in Bridge Deck or Bridge Deck Island, Sheet 2.
9. Equipment grounding conductor shall be non-insulated #4 AWG copper with 3' (ft) minimum slack. Clamp to vertical steel reinforcing with a listed connector suitable for use embedded in concrete. For Detail, see Partial Foundation Detail, Sheet 2.
10. Variable Message Signs (VMS) shall not be installed on signal bridge.
11. No sign larger than 12' (ft) long x 4' (ft) tall shall be installed on signal bridge.

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SIGNAL BRIDGE STANDARD ELECTRICAL DETAILS

STANDARD PLAN J-75.41-01

SHEET 1 OF 4 SHEETS

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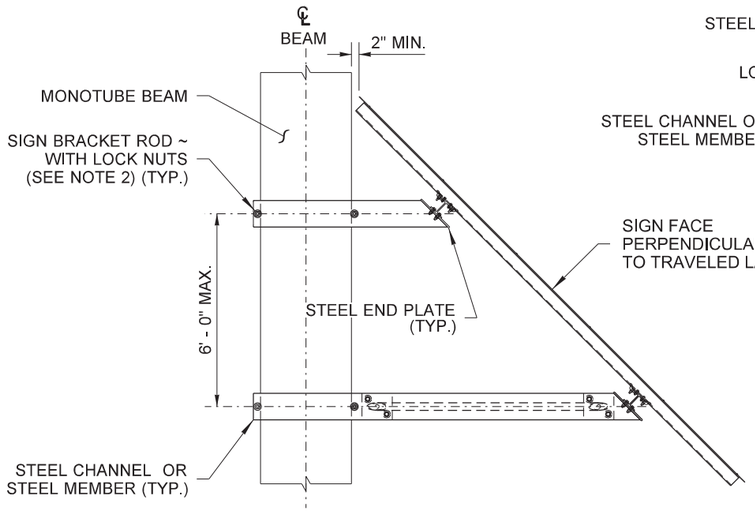
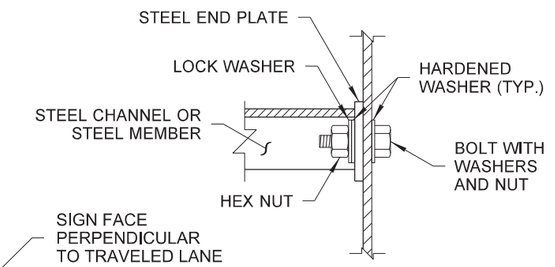
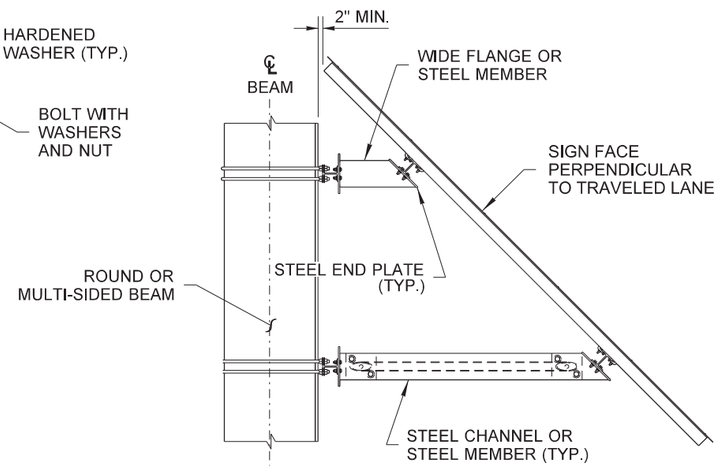


PLAN VIEW



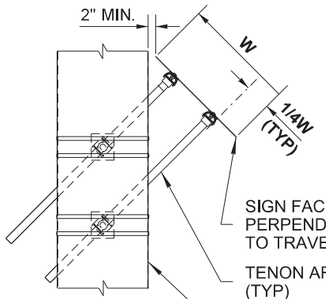
BOLT DETAIL



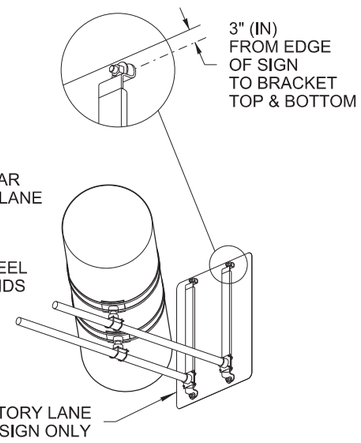
PLAN VIEW

SIGN MOUNTING NOTES

1. All Locknuts shall conform to **Standard Specification Section 9-28.11** as supplemented in the **Special Provisions**.
2. Hot dip galvinize all non-stainless parts.
3. For sign lighting details, See **Standard Plans J-75.40** (for Monotube) and **J-75.45** (for Round or Multi-sided) structures.
4. Each sign shall be supported by a minimum of two support structures.
5. This details conceptual sign support and bracing. Engineer of Record shall design and analyze sign support in accordance with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signal - Latest edition.

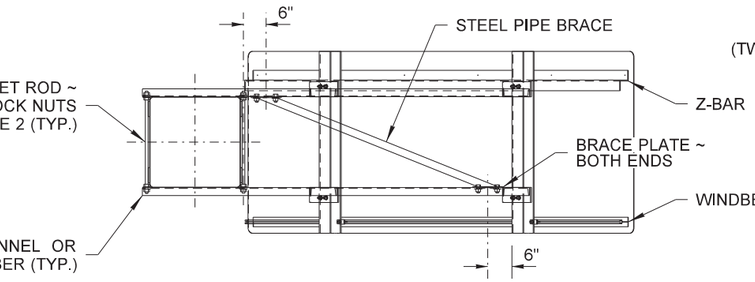


PLAN VIEW

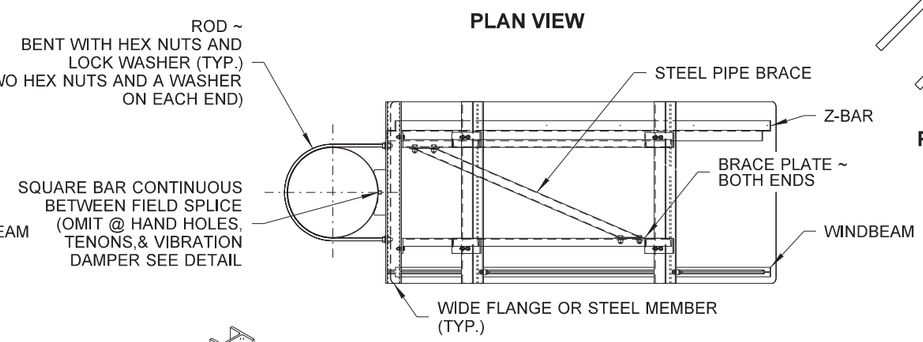


OBLIQUE VIEW
(VIEW IS FROM BELOW LOOKING UP)

ROUND OR MULTI-SIDED SIGNAL BRIDGE SIGN MOUNTING DETAILS FOR SMALL SIGN
(FOR SIGNS - 36" (IN) x 36" (IN) OR LESS)



ELEVATION VIEW



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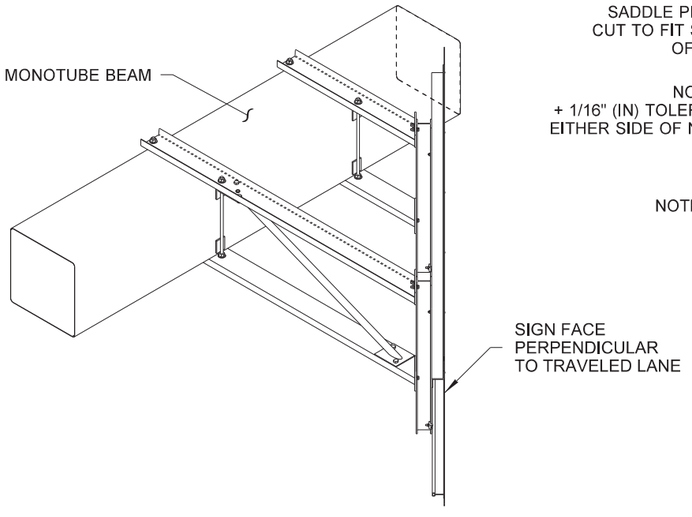
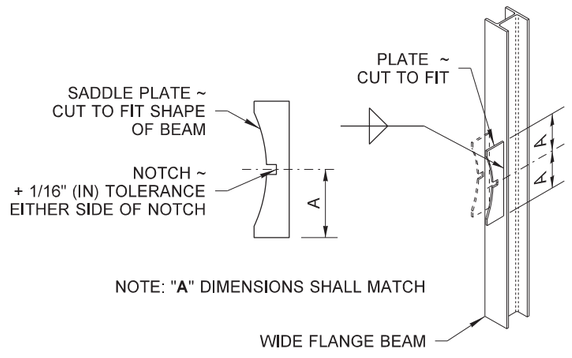


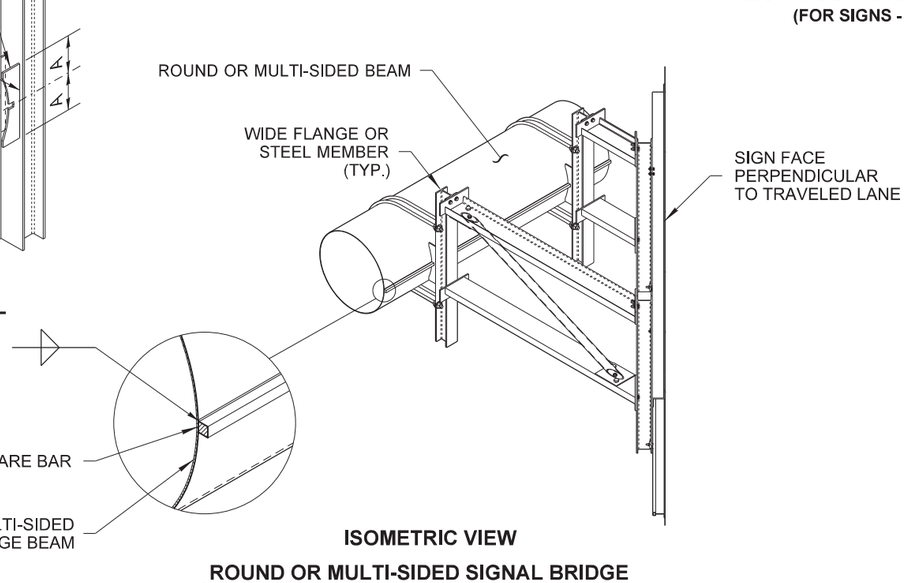
ISOMETRIC VIEW

MONOTUBE SIGNAL BRIDGE SIGN MOUNTING DETAILS (SKEWED SIGN DETAIL)

FOR DETAILS NOT SHOWN SEE STANDARD PLAN G-90.20



STIFFENER PLATE DETAIL



ISOMETRIC VIEW

ROUND OR MULTI-SIDED SIGNAL BRIDGE SIGN MOUNTING DETAILS FOR LARGE SIGN
(FOR SIGNS - 4' (FT) x 12' (FT) OR LESS)

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SIGNAL BRIDGE STANDARD ELECTRICAL DETAILS

STANDARD PLAN J-75.41-01

SHEET 4 OF 4 SHEETS

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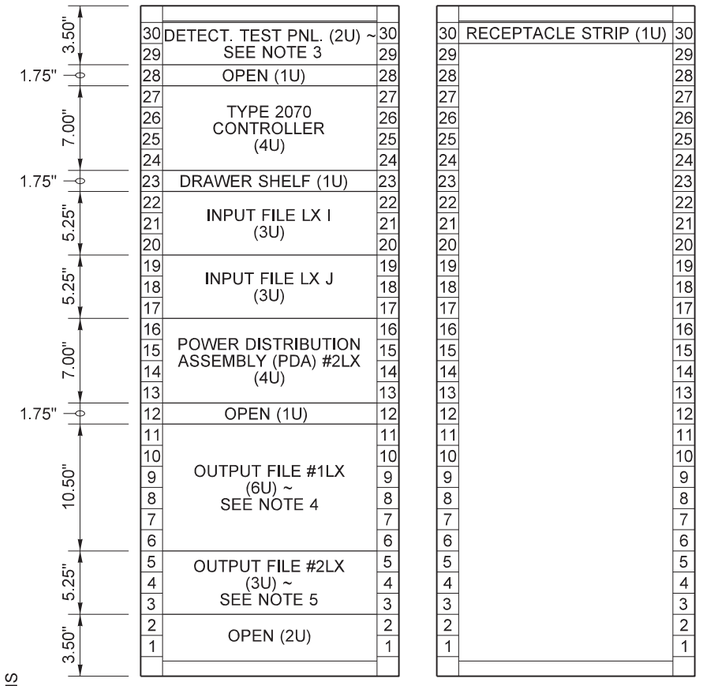

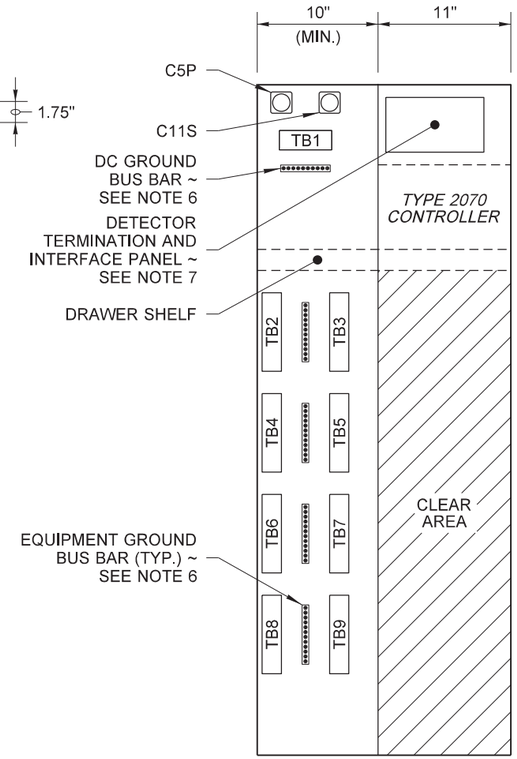

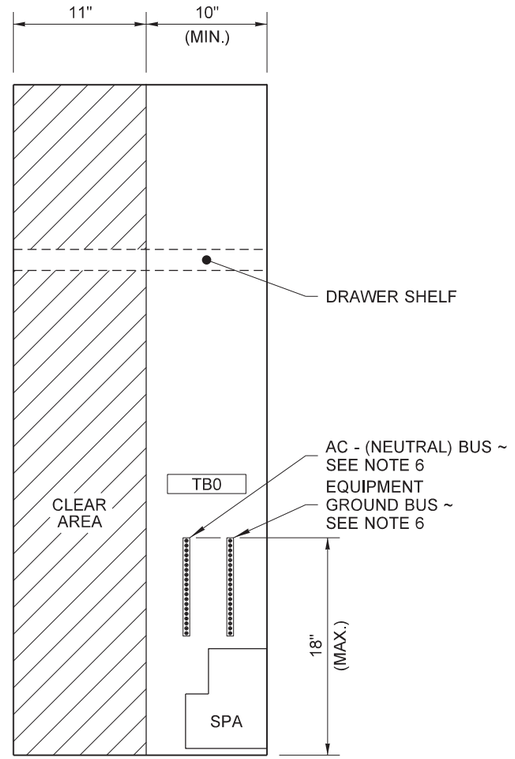

NOTES

1. Equipment shall meet the requirementsof and be constructed in accordance with the **California Department of Transportation (CalTrans) Transportation Electrical Equipment Specs. (TEES)** as currently published, including all errata, with modifications as shown here and described in **Standard Specification section 9-29.13(10)**.
2. The Generator Transfer Switch shall be wired into the Service Panel Assembly as shown.
3. See **Standard Plan J-80.15** for Detector Test Panel details.
4. Output File #1LX shall include a Red Monitor Program Board and OL Monitor Cable terminal. The Red Monitor Program Board shall use the general layout and be labeled as shown here.
5. Output File #2LX shall only be provided when specified in the Contract.
6. Bus Bars shall be capable of being used without installing lugs on field wires.
7. The Detector Termination and Interface Panel shall be located on the Input Panel side of the cabinet and above the controller as shown for accessibility. To accomodate installation, Input Panel #1 may be expanded to 21 inches in width, with clear area maintained as shown, or a separate mounting panel may be installed and bolted to both the cabinet rack and Input Panel #1.
8. A 20-wire ribbon cable, 36 inches in length, shall be installed between the Red Interface Connectors on the Red Monitor Program Board and the front of the installed Conflict Monitor. Terminate the cable with compatible 2-row, 20-pin IDC connectors.
9. Jumpers may be oriented horizontally or vertically.
10. The Red Monitor Program Board shall have the label shown printed on the back of Output File #1LX, directly above the cutout for the board.

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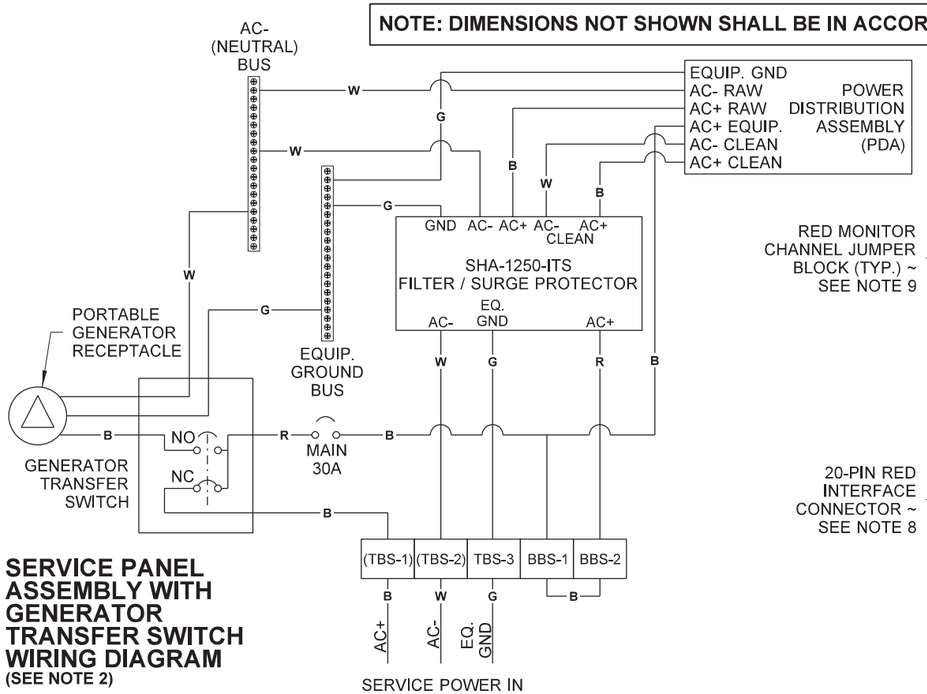
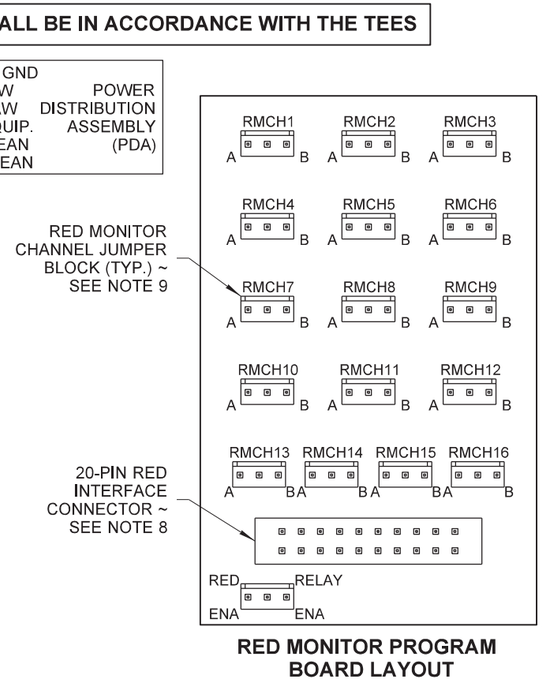
FRONT VIEW **REAR VIEW** **INPUT PANEL #1 LAYOUT** **SERVICE PANEL #1 LAYOUT**

NOTE: DIMENSIONS NOT SHOWN SHALL BE IN ACCORDANCE WITH THE TEES



SERVICE PANEL ASSEMBLY WITH GENERATOR TRANSFER SWITCH WIRING DIAGRAM
(SEE NOTE 2)



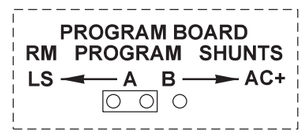
RED MONITOR PROGRAM BOARD LAYOUT (FRONT VIEW)

RED MONITOR CONNECTOR PIN ASSIGNMENTS

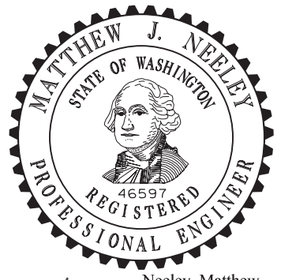
P1 CONNECTOR *		
PIN	CONNECT TO	FUNCTION
1	FT3-125	Ø1 RED
2	FT3-128	Ø2 RED
3	FT2-116	Ø3 RED
4	FT1-101	Ø4 RED
5	FT3-131	Ø5 RED
6	FT3-134	Ø6 RED
7	FT2-122	Ø7 RED
8	FT1-107	Ø8 RED
9	FT6-A121	OLA RED
10	FT6-A124	OLB RED
11	FT5-A114	OLC RED
12	FT4-A101	OLD RED
13	NC	N/A
14	AC+	AC+
P2 CONNECTOR *		
1	FT2-113	PED2 RED
2	FT1-104	PED4 RED
3	FT2-119	PED6 RED
4	FT1-110	PED8 RED
P3 CONNECTOR *		
1	02-1	+24V RM COIL
2	02-6	DC GND

RED INTERFACE CONNECTOR (20-PIN)	
PIN	FUNCTION
1	CHANNEL 15 RED
2	CHANNEL 16 RED
3	CHANNEL 14 RED
4	N/A
5	CHANNEL 13 RED
6	SPECIAL FUNCTION #2
7	CHANNEL 12 RED
8	SPECIAL FUNCTION #1
9	CHANNEL 10 RED
10	CHANNEL 11 RED
11	CHANNEL 9 RED
12	CHANNEL 8 RED
13	CHANNEL 7 RED
14	CHANNEL 6 RED
15	CHANNEL 5 RED
16	CHANNEL 4 RED
17	CHANNEL 3 RED
18	CHANNEL 2 RED
19	CHANNEL 1 RED
20	RED ENABLE

*** NOTE: CONNECTORS P1, P2, AND P3 MOUNTED ON BACK OF BOARD**



RED MONITOR BOARD LABEL
(SEE NOTE 10)



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TYPE 332 SIGNAL CABINET LAYOUT

STANDARD PLAN J-80.10-00

SHEET 1 OF 1 SHEET

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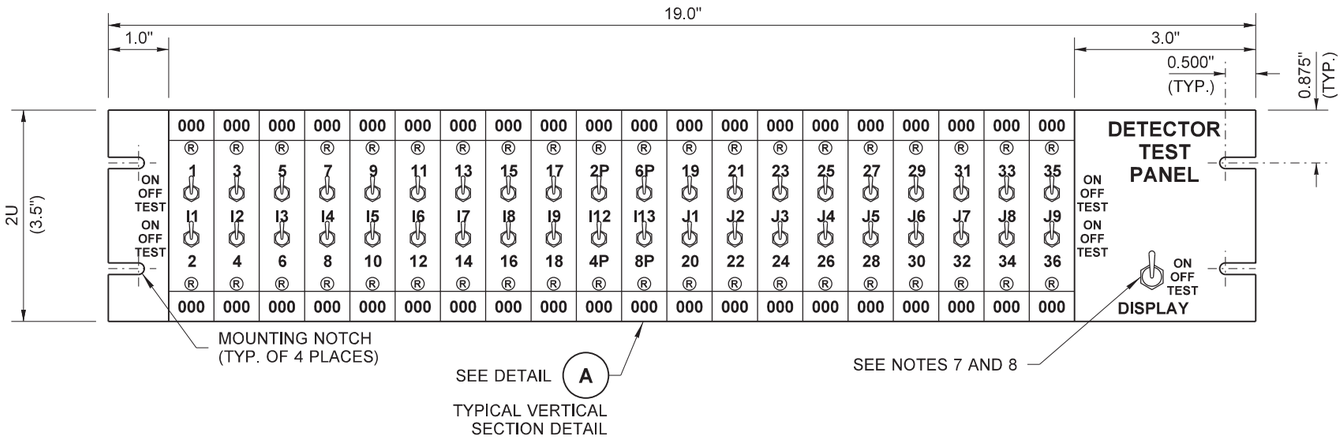
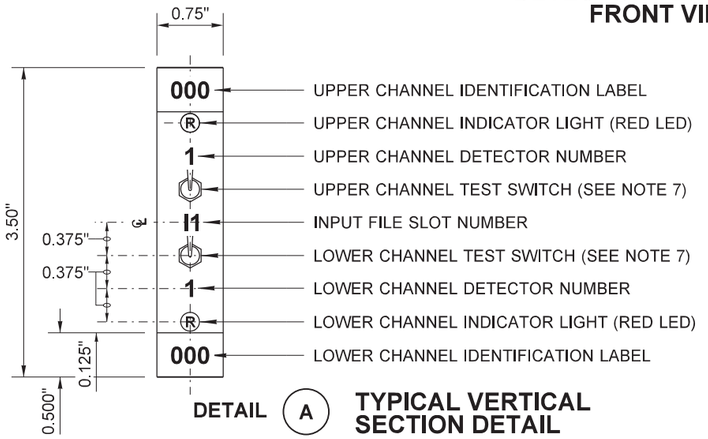
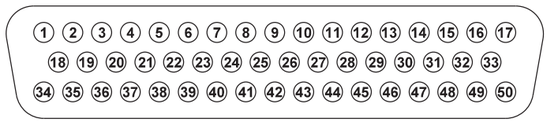


DETECTOR TEST PANEL FRONT VIEW



DETAIL (A) **TYPICAL VERTICAL SECTION DETAIL**



DD50 D-SUB CONNECTOR PINS

PLUG (MALE) CONNECTOR SHOWN ~
MIRROR FOR SOCKET (FEMALE) CONNECTOR ~
SEE NOTE 2

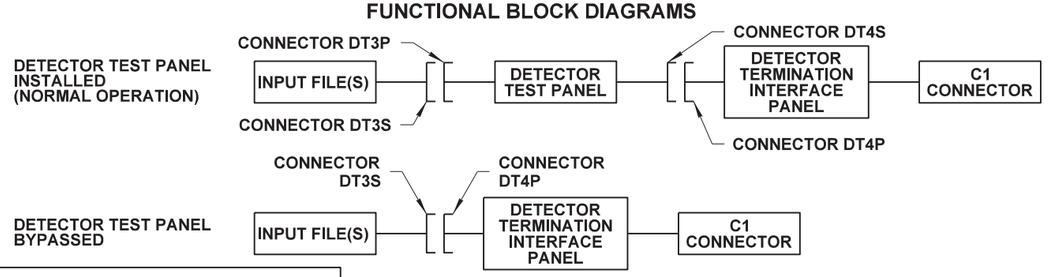
NOTES

1. Upper and lower channel identification labels shall match the detector channels shown in the Contract Plans.
2. Connectors **DT3S**, **DT3P**, **DT4S**, and **DT4P** are **Type DD50 D-Sub** connectors with pin layouts and assignments as shown. The suffix "**S**" indicates a socket (female connector) and the suffix "**P**" indicates a plug (male connector).
3. **Detector Termination Interface Panel** terminals not shown due to variations in arrangement and numbering between manufacturers.
4. Connectors **DT3P** and **DT4S** shall be installed in one of the following arrangements:

   a) Mounted to the back of the **Detector Test Panel**. Connectors shall use a spring latch (bail) to secure the connection.

   b) Mounted on a cable, within six inches of the back of the **Detector Test Panel**. Connectors shall use thumb-screws to secure the connection.
5. Connectors **DT3S** and **DT4P** shall be designed such that they can be connected directly, bypassing the **Detector Test Panel**.
6. The **Detector Termination Interface Panel** shall be installed electrically between the **Detector Test Panel** and the **C1** connector. A second additional terminal block may be installed electrically between the **Input File(s)** and the **Detector Test Panel**.
7. Test switches shall be three position switches with the "**Test**" position being a momentary contact with spring return to the "**OFF**" position. Test switch position functions shall be as described in **Standard Specification section 9-29.13(10)**.
8. Location of the **Display On/Off** switch is approximate. This switch shall be located to the right of all of the individual channel test switches and clear of the mounting rack.

FUNCTIONAL BLOCK DIAGRAMS



CONNECTOR PIN ASSIGNMENTS (SEE NOTE 3)

CONNECTOR DT3S

PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION
1	I-1F	DET. 1	26	J-3F	DET. 23
2	I-2F	DET. 3	27	J-4F	DET. 25
3	I-3F	DET. 5	28	J-5F	DET. 27
4	I-4F	DET. 7	29	J-2W	DET. 22
5	I-1W	DET. 2	30	J-3W	DET. 24
6	I-2W	DET. 4	31	J-4W	DET. 26
7	I-3W	DET. 6	32	J-5W	DET. 28
8	I-4W	DET. 8	33	J-6F	DET. 29
9	I-5F	DET. 9	34	J-7F	DET. 31
10	I-6F	DET. 11	35	J-8F	DET. 33
11	I-7F	DET. 13	36	J-9F	DET. 35
12	I-8F	DET. 15	37	J-6W	DET. 30
13	I-5W	DET. 10	38	J-7W	DET. 32
14	I-6W	DET. 12	39	J-8W	DET. 34
15	I-7W	DET. 14	40	J-9W	DET. 36
16	I-8W	DET. 16	41	NC	NA
17	I-9F	DET. 17	42	NC	NA
18	I-12F	Ø2 PED	43	NC	NA
19	I-13F	Ø6 PED	44	NC	NA
20	J-1F	DET. 19	45	NC	NA
21	I-9W	DET. 18	46	NC	NA
22	I-12W	Ø4 PED	47	NC	NA
23	I-13W	Ø8 PED	48	NC	NA
24	J-1W	DET. 20	49	I15-1	POWER
25	J-2F	DET. 21	50	I15-2	GROUND

CONNECTOR DT3P

PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION
1	I1U - IN		26	J3U - IN	
2	I2U - IN		27	J4U - IN	
3	I3U - IN		28	J5U - IN	
4	I4U - IN		29	J2L - IN	
5	I1L - IN		30	J3L - IN	
6	I2L - IN		31	J4L - IN	
7	I3L - IN		32	J5L - IN	
8	I4L - IN		33	J6U - IN	
9	I5U - IN		34	J7U - IN	
10	I6U - IN		35	J8U - IN	
11	I7U - IN		36	J9U - IN	
12	I8U - IN		37	J6L - IN	
13	I5L - IN		38	J7L - IN	
14	I6L - IN		39	J8L - IN	
15	I7L - IN		40	J9L - IN	
16	I8L - IN		41	NC	NA
17	I9U - IN		42	NC	NA
18	I12U - IN		43	NC	NA
19	I13U - IN		44	NC	NA
20	J1U - IN		45	NC	NA
21	I9L - IN		46	NC	NA
22	I12L - IN		47	NC	NA
23	I13L - IN		48	NC	NA
24	J1L - IN		49	+24 VDC	POWER
25	J2U - IN		50	LOGIC GND	GROUND

CONNECTOR DT4S

PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION
1	I1U - OUT		26	J3U - OUT	
2	I2U - OUT		27	J4U - OUT	
3	I3U - OUT		28	J5U - OUT	
4	I4U - OUT		29	J2L - OUT	
5	I1L - OUT		30	J3L - OUT	
6	I2L - OUT		31	J4L - OUT	
7	I3L - OUT		32	J5L - OUT	
8	I4L - OUT		33	J6U - OUT	
9	I5U - OUT		34	J7U - OUT	
10	I6U - OUT		35	J8U - OUT	
11	I7U - OUT		36	J9U - OUT	
12	I8U - OUT		37	J6L - OUT	
13	I5L - OUT		38	J7L - OUT	
14	I6L - OUT		39	J8L - OUT	
15	I7L - OUT		40	J9L - OUT	
16	I8L - OUT		41	NC	NA
17	I9U - OUT		42	NC	NA
18	I12U - OUT		43	NC	NA
19	I13U - OUT		44	NC	NA
20	J1U - OUT		45	NC	NA
21	I9L - OUT		46	NC	NA
22	I12L - OUT		47	NC	NA
23	I13L - OUT		48	NC	NA
24	J1L - OUT		49	NC	NA
25	J2U - OUT		50	NC	NA

CONNECTOR DT4P

PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION
1	C1 - 56	DET. 1	26	C1 - 64	DET. 23
2	C1 - 39	DET. 3	27	C1 - 48	DET. 25
3	C1 - 63	DET. 5	28	C1 - 57	DET. 27
4	C1 - 47	DET. 7	29	C1 - 44	DET. 22
5	C1 - 56	DET. 2	30	C1 - 77	DET. 24
6	C1 - 43	DET. 4	31	C1 - 48	DET. 26
7	C1 - 76	DET. 6	32	C1 - 57	DET. 28
8	C1 - 47	DET. 8	33	C1 - 42	DET. 29
9	C1 - 58	DET. 9	34	C1 - 66	DET. 31
10	C1 - 41	DET. 11	35	C1 - 50	DET. 33
11	C1 - 65	DET. 13	36	C1 - 59	DET. 35
12	C1 - 49	DET. 15	37	C1 - 46	DET. 30
13	C1 - 58	DET. 10	38	C1 - 79	DET. 32
14	C1 - 45	DET. 12	39	C1 - 50	DET. 34
15	C1 - 78	DET. 14	40	C1 - 61	DET. 36
16	C1 - 49	DET. 16	41	NC	NA
17	C1 - 60	DET. 17	42	NC	NA
18	C1 - 67	Ø2 PED	43	NC	NA
19	C1 - 68	Ø6 PED	44	NC	NA
20	C1 - 55	DET. 19	45	NC	NA
21	C1 - 62	DET. 18	46	NC	NA
22	C1 - 69	Ø4 PED	47	NC	NA
23	C1 - 70	Ø8 PED	48	NC	NA
24	C1 - 55	DET. 20	49	NC	NA
25	C1 - 40	DET. 21	50	NC	NA

PIN TABLE EXAMPLES:

J1F: Input File J, Slot 1, Terminal F

DET. 14: Detector #14

I9U - IN: Detector Test Panel Position I9, Upper Channel, Input Terminal

C1 - 58: C1 Connector, Pin 58

N/A: Not Applicable

NC: Not Connected

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Jun 18 2018 8:15 AM

TYPE 332 SIGNAL CABINET DETECTOR TEST PANEL

STANDARD PLAN J-80.15-00

SHEET 1 OF 1 SHEET

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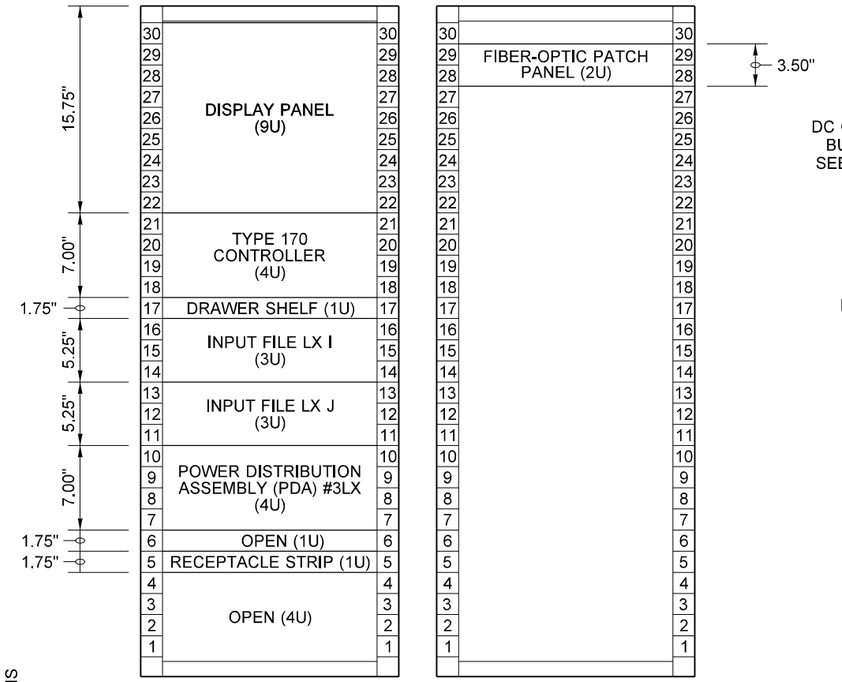
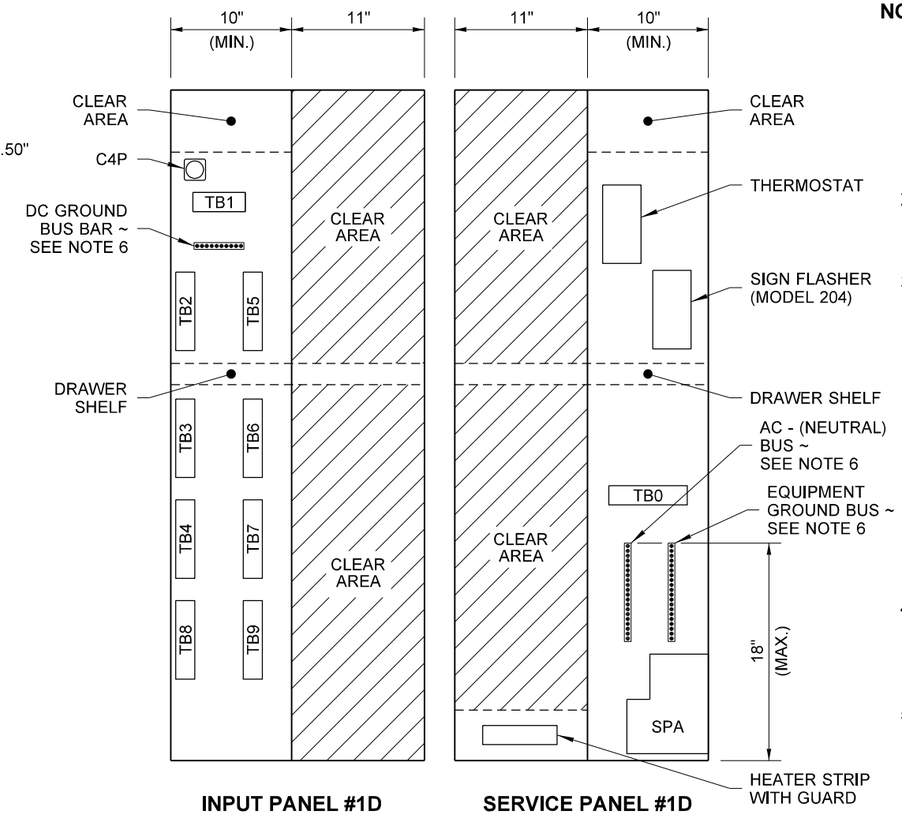


FRONT VIEW

REAR VIEW



INPUT PANEL #1D LAYOUT
(SEE NOTE 4)

SERVICE PANEL #1D LAYOUT
(SEE NOTE 5)

NOTES

1. Equipment shall meet the requirements of and be constructed in accordance with the **California Department of Transportation (CalTrans) Transportation Electrical Equipment Specifications (TEES)** as currently published, including all errata, with modifications as shown here and described in **Standard Specification Section 9-29.13(10)**.Pre-Terminated Fiber-optic Patch Panel field installed separately.
2. The following Input File Terminal Blocks shall be wired in parallel:
   - I15 to J15
   - I16 to J16
3. Power Distribution Assembly (PDA) #3LX shall be modified as follows:
   a.) The C6P connector shall be included and wired as referenced in **TEES Drawing A6-15, Note 9**.
   b.) A second Model 430 Transfer Relay (TR2) shall be installed on the rear of the PDA and wired as shown.
   c.) The following terminals shall be wired together as follows:

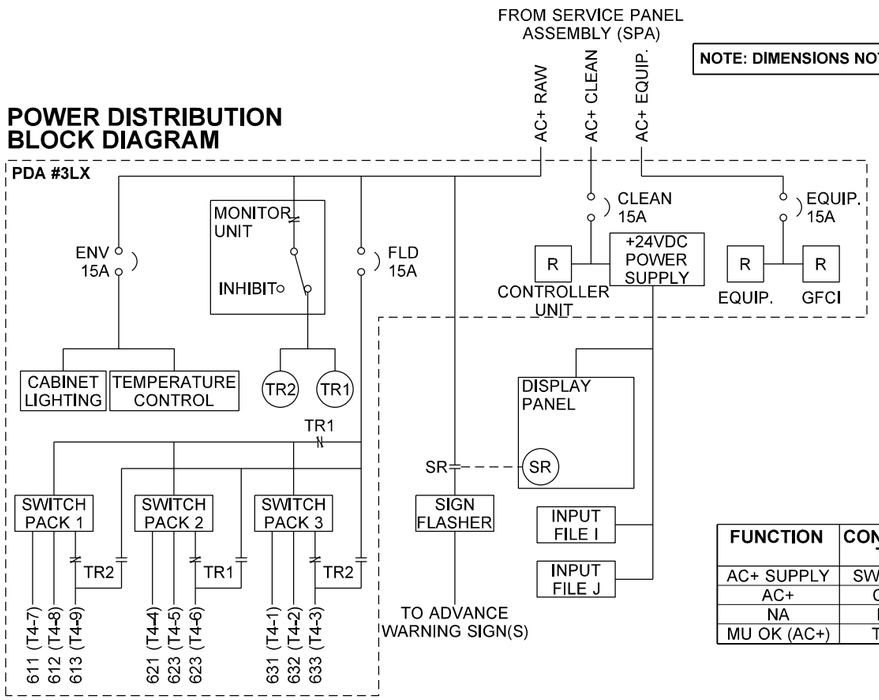
From	To	Function
T2-8	T4-6	TR1 Output to Field Green 2
T2-6	MU-3	Energizes TR1 and TR2 when MU is normal
T1-1, T1-2	SR-3	Field Output - Sign On
T1-3, T1-4	SR-4	Field Output - Sign Off

4. Input Panel #1D shall meet the requirements of Input Panel #1 in the TEES, with the modifications shown here. Do Not include ground bus bars between terminal blocks TB2 through TB9. Relabel the C5 connector as C4P. The C4 connector cable shall be 4 feet in length.
5. Service Panel #1D shall meet the requirements of Service Panel #1 in the TEES, with the modifications shown here. The model 204 flasher shall include a socket and retaining strap, providing a snug fit and allowing the flasher to be removed, without tools, by pulling upwards.
6. Bus Bars shall be capable of being used without installing lugs on field wires.
7. The Sign Switch shall be a 3-position, stationary type toggle switch with a 10 amp contact rating.
8. The Police Control Switch shall be a 2-position, stationary type toggle switch with a 10 amp contact rating.

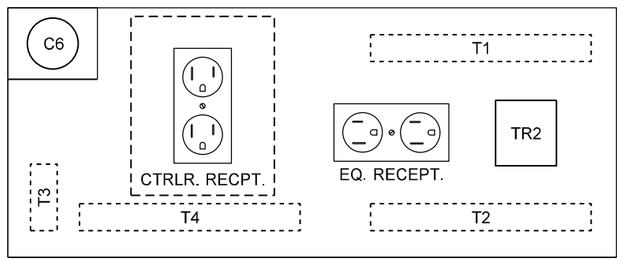
DRAWN BY: BIL BERENS

NOTE: DIMENSIONS NOT SHOWN SHALL BE IN ACCORDANCE WITH THE TEES

POWER DISTRIBUTION BLOCK DIAGRAM



R	DUPLEX RECEPTACLE
?	RELAY COIL
? ≠	RELAY CONTACT - NORMALLY CLOSED
? =	RELAY CONTACT - NORMALLY OPEN



PDA #3LX REAR VIEW
(SEE NOTE 3)

TRANSFER RELAY 1 (TR1)

FUNCTION	CONNECT TO			CONNECT TO	FUNCTION
AC+ SUPPLY	SWPK1-1	7	8	SWPK2-7	GRN-2
AC+	CB3	5	6	T4-6	GRN2 O/P
NA	NC	3	4	TR1-5	AC+
MU OK (AC+)	T2-6	1	2	T2-2	AC-

SHOWN DE-ENERGIZED

TRANSFER RELAY 2 (TR2)

FUNCTION	CONNECT TO			CONNECT TO	FUNCTION
GRN-3	SWPK3-7	7	8	SWPK1-7	GRN-1
GRN3 O/P	T4-3	5	6	T4-9	GRN1 O/P
AC+	CB3	3	4	TR2-3	AC+
MU OK (AC+)	T2-6	1	2	T2-2	AC-

SHOWN DE-ENERGIZED

TRANSFER RELAY DETAILS

WILLIAM FLINT JACKSON
STATE OF WASHINGTON
48821
REGISTERED
PROFESSIONAL ENGINEER

Jackson, Flint
Aug 24 2020 9:43 AM
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TYPE 334 RAMP METER/ DATA STATION CABINET STANDARD PLAN J-81.10-01

SHEET 1 OF 3 SHEETS

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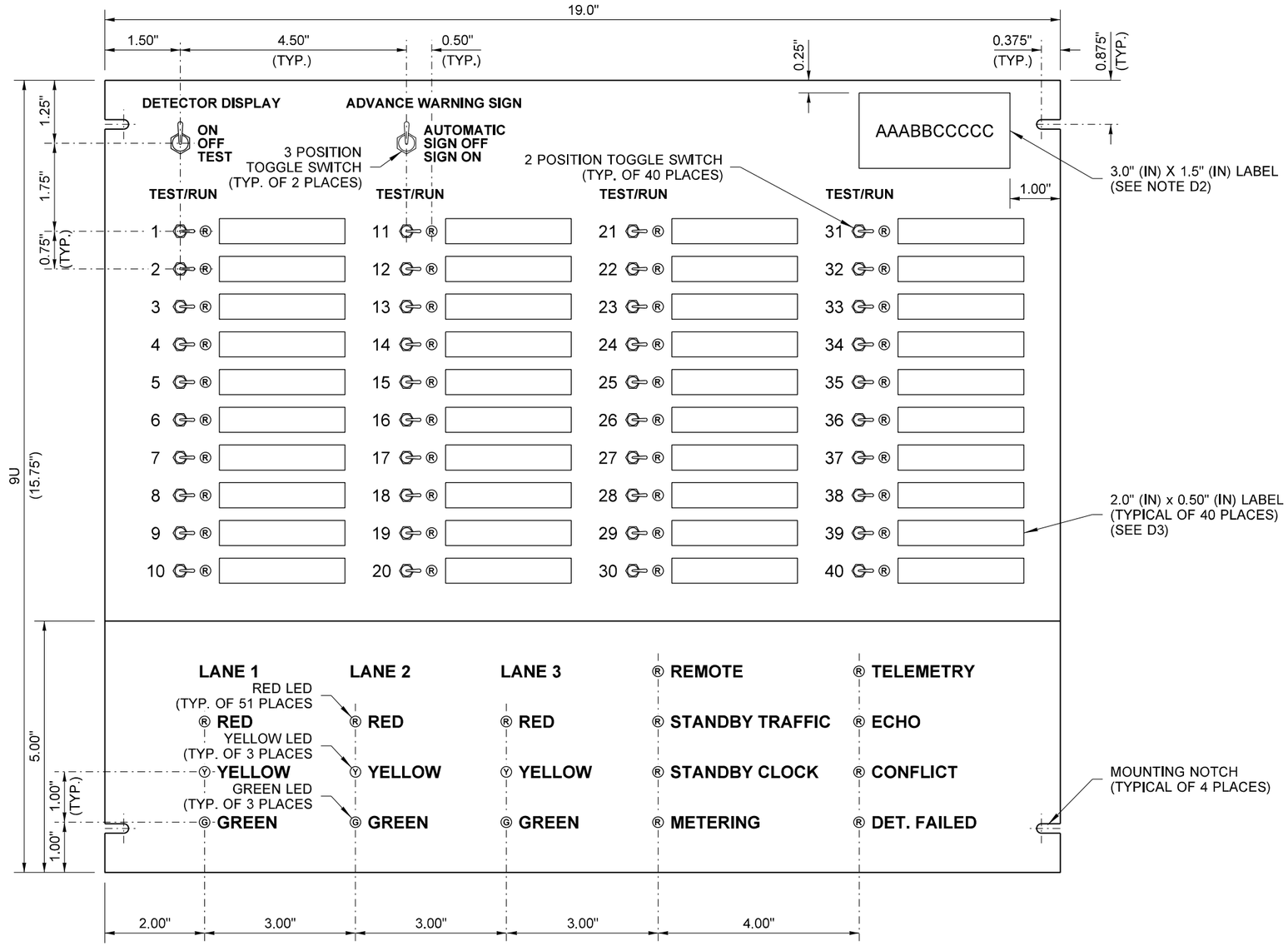


DISPLAY PANEL DETAIL

DRAWN BY: BILL BERENS

DISPLAY PANEL NOTES

D1. The Display Panel shall be 0.125" (in) thick aluminum with a brushed finish. All text on the Display Panel shall be a minimum of 0.25" (in).

D2. The Cabinet Name Plate shall be a phenolic label, with white minimum 0.375" (in) text on a black background, permanently affixed to the panel. See Contract Plans for cabinet identification number.

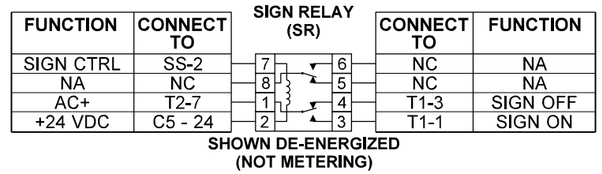
D3. The Detector Labels shall have 0.5" (in) black text on a white background. The labels may either be phenolic or industrial grade outdoor vinyl, and shall be permanently affixed to the panel.

D4. All other text shall be black and screened directly onto the panel.

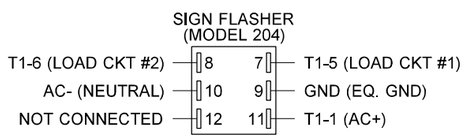
D5. The Sign Relay socket and connectors **P1P**, **P2S**, and **C5P** shall be installed on the back of the panel. Connectors **P1P/S** and **P2P/S** are Type **DD50 D-Sub** connectors with pin assignments as shown on sheet 3. The suffix "**S**" indicates a socket (female connector) and the suffix "**P**" indicates a plug (male connector).

D6. The Sign Relay shall be DPDT, wired as shown, with a contact rating not less than 10 amps continuous duty. The relay shall operate on ground output from the controller, and draw less than 75 milliamps when energized. AC wiring between the relay and the PDA shall be #14 AWG.

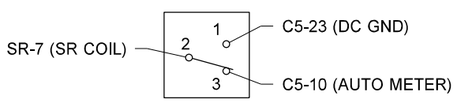
D7. See **Standard Specification Section 9-29.13(11)** for additional requirements.



SIGN RELAY DETAIL
(SEE NOTE D6)

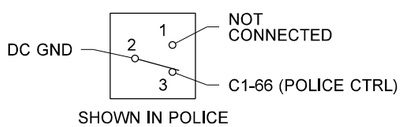


SIGN FLASHER DETAIL
(SEE NOTE 5)



SHOWN IN AUTOMATIC MODE

SIGN SWITCH (SS) DETAIL
(SEE NOTE 7)



SHOWN IN POLICE CONTROL MODE (ON)

POLICE CONTROL (PC) SWITCH DETAIL
(SEE NOTE 8)

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C1 CONNECTOR PIN ASSIGNMENTS

PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION
1	DC GND	DC GND	27	NC	NA	53	P2-15	DET. 15	79	P2-37/C4-6	DET. 37/CM1-G
2	C6-1	SWPK 1 RED	28	NC	NA	54	P2-16	DET. 16	80	P2-38/C4-7	DET. 38/CM3-R
3	C6-2	SWPK 1 GRN	29	NC	NA	55	P2-17	DET. 17	81	P2-39/C4-8	DET. 39/CM3-Y
4	C6-3	SWPK 2 RED	30	NC	NA	56	P2-18	DET. 18	82	P2-40/C4-9	DET. 40/CM3-G
5	C6-4	SWPK 2 YEL	31	NC	NA	57	P2-19	DET. 19	83	C5-1	DP REMOTE
6	C6-5	SWPK 2 GRN	32	NC	NA	58	P2-20	DET. 20	84	C5-2	NA
7	C6-6	SWPK 3 RED	33	NC	NA	59	P2-21	DET. 21	85	C5-3	DP TRAFFIC
8	C6-7	SWPK 3 YEL	34	NC	NA	60	P2-22	DET. 22	86	C5-4	DP CLOCK
9	C6-8	SWPK 3 GRN	35	NC	NA	61	P2-23	DET. 23	87	C5-5	DP TELEMETRY
10	NC	NA	36	NC	NA	62	P2-24	DET. 24	88	C5-6	DP ECHO
11	NC	NA	37	C6-9	SWPK 1 YEL	63	C4-1	CM2-RED	89	C5-7	DP CONFLICT
12	NC	NA	38	NC	NA	64	C4-2	CM2-YEL	90	C5-8	DP DET FAILED
13	NC	NA	39	P2-1	DET. 1	65	C4-3	CM2-GRN	91	C5-9	DP RED L1
14	IFI-15-4	INPUT GND	40	P2-2	DET. 2	66	PC-3/ J13F/W	POLICE CTRL/ EVP	92	DC GND	OUTPUT GND
15	NC	NA	41	P2-3	DET. 3	67	P2-25	DET. 25	93	C5-10	SIGN-AUTO/DP METER
16	NC	NA	42	P2-4	DET. 4	68	P2-26	DET. 26	94	C5-11	DP RED L2
17	NC	NA	43	P2-5	DET. 5	69	P2-27	DET. 27	95	C5-12	DP YEL L2
18	NC	NA	44	P2-6	DET. 6	70	P2-28	DET. 28	96	C5-13	DP GRN L2
19	NC	NA	45	P2-7	DET. 7	71	P2-29	DET. 29	97	C5-14	DP YEL L1
20	NC	NA	46	P2-8	DET. 8	72	P2-30	DET. 30	98	C5-15	DP GRN L1
21	NC	NA	47	P2-9	DET. 9	73	P2-31	DET. 31	99	C5-16	DP RED L3
22	NC	NA	48	P2-10	DET. 10	74	P2-32	DET. 32	100	C5-17	DP YEL L3
23	NC	NA	49	P2-11	DET. 11	75	P2-33	DET. 33	101	C5-18	DP GRN L3
24	NC	NA	50	P2-12	DET. 12	76	P2-34	DET. 34	102	IFI-15-3	DET RESET
25	NC	NA	51	P2-13	DET. 13	77	P2-35/C4-4	DET. 35/CM1-R	103	C6-10	WATCHDOG
26	NC	NA	52	P2-14	DET. 14	78	P2-36/C4-5	DET. 36/CM1-Y	104	DC GND	INPUT GND

C4, C5, AND C6 CONNECTOR PIN ASSIGNMENTS

C4 CONNECTOR PINS (TO CURRENT MONITOR)

PIN	CONNECT TO	FUNCTION
1	C1-63	CM2-RED
2	C1-64	CM2-YEL
3	C1-65	CM2-GRN
4	C1-77	CM1-RED
5	C1-78	CM1-YEL
6	C1-79	CM1-GRN
7	C1-80	CM3-RED
8	C1-81	CM3-YEL
9	C1-82	CM3-GRN
10	C1-36	NA
11	NC	NA
12	NC	NA
13	NC	NA
14	NC	NA
15	NC	NA
16	NC	NA
17	C1-70	NA
18	C1-71	NA
19	C1-72	NA
20	NC	NA
21	C5-19	NA
22	C5-20	NA
23	DC GND	DC GND
24	TB1-1B	+24 VDC

C5 CONNECTOR PINS (TO DISPLAY PANEL)

PIN	CONNECT TO	FUNCTION
1	C1-83	DP-REMOTE
2	C1-84	DP-NA
3	C1-85	DP-STANDBY TRAFFIC
4	C1-86	DP-STANDBY CLOCK
5	C1-87	DP-TELEMETRY
6	C1-88	DP-ECHO
7	C1-89	DP-CONFLICT
8	C1-90	DP-DET. FAILED
9	C1-91	DP-RED LANE 1
10	C1-93	DP-METERING, SS-3
11	C1-94	DP-RED LANE 2
12	C1-95	DP-YELLOW LANE 2
13	C1-96	DP-GREEN LANE 2
14	C1-97	DP-YELLOW LANE 1
15	C1-98	DP-GREEN LANE 1
16	C1-99	DP-RED LANE 3
17	C1-100	DP-YELLOW LANE 3
18	C1-101	DP-GREEN LANE 3
19	NC	NA
20	NC	NA
21	NC	NA
22	NC	NA
23	DC GND	DC GND TO SS-1
24	TB1-2B	+24 VDC

C6 CONNECTOR PINS (TO PDA #3LX)

PIN	CONNECT TO	FUNCTION
1	C1-2	SWPK1-RED
2	C1-3	SWPK1-GRN
3	C1-4	SWPK2-RED
4	C1-5	SWPK2-YEL
5	C1-6	SWPK2-GRN
6	C1-7	SWPK3-RED
7	C1-8	SWPK3-YEL
8	C1-9	SWPK3-GRN
9	C1-37	SWPK1-YEL
10	C1-103	WATCHDOG MU
11	NC	
12	NC	
13	NC	
14	NC	
15	NC	
16	NC	
17	NC	
18	NC	
19	NC	
20	NC	
21	NC	
22	NC	
23	DC GND	DC GND
24	TB1-3B	+24 VDC

LEGEND

C1 : C1 Connector
C4 : C4 Connector
C5 : C5 Connector
C6 : C6 Connector
CM : Current Monitor
DET : Detector
DP : Display Panel
IFI : Input File I
IFJ : Input File J
L# : Lane (#)
MU : Monitor Unit
NA : Not Assigned
NC : Not Connected
P2 : P2 Connector
PC : Police Control Switch
SS : Sign Switch
SWPK : Switch Pack
TR : Transfer Relay

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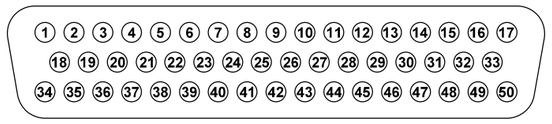
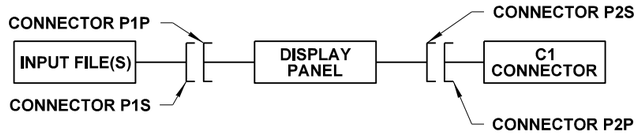


DD50 D-SUB CONNECTOR PINS

PLUG (MALE) CONNECTOR SHOWN ~
MIRROR FOR SOCKET (FEMALE) CONNECTOR ~

DISPLAY PANEL INPUTS FUNCTIONAL BLOCK DIAGRAM



NOTE: CONNECTORS P1P AND P2S SHALL BE MOUNTED TO THE BACK OF THE DISPLAY PANEL, AND SHALL BE SECURED USING A SPRING LATCH (BAIL) TYPE CONNECTION.

P1 AND P2 CONNECTOR PIN ASSIGNMENTS

CONNECTOR P1S

PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION
1	I-1F	DET. 1	26	I-13W	DET. 26
2	I-1W	DET. 2	27	I-14F	DET. 27
3	I-2F	DET. 3	28	I-14W	DET. 28
4	I-2W	DET. 4	29	J-1F	DET. 29
5	I-3F	DET. 5	30	J-1W	DET. 30
6	I-3W	DET. 6	31	J-2F	DET. 31
7	I-4F	DET. 7	32	J-2W	DET. 32
8	I-4W	DET. 8	33	J-3F	DET. 33
9	I-5F	DET. 9	34	J-3W	DET. 34
10	I-5W	DET. 10	35	J-4F	DET. 35
11	I-6F	DET. 11	36	J-4W	DET. 36
12	I-6W	DET. 12	37	J-5F	DET. 37
13	I-7F	DET. 13	38	J-5W	DET. 38
14	I-7W	DET. 14	39	J-6F	DET. 39
15	I-8F	DET. 15	40	J-6W	DET. 40
16	I-8W	DET. 16	41	NC	NA
17	I-9F	DET. 17	42	NC	NA
18	I-9W	DET. 18	43	NC	NA
19	I-10F	DET. 19	44	NC	NA
20	I-10W	DET. 20	45	NC	NA
21	I-11F	DET. 21	46	NC	NA
22	I-11W	DET. 22	47	NC	NA
23	I-12F	DET. 23	48	NC	NA
24	I-12W	DET. 24	49	I-15-1	POWER
25	I-13F	DET. 25	50	I-15-2	GROUND

CONNECTOR P1P

PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION
1	DP1	DET. 1-IN	26	DP26	DET. 26-IN
2	DP2	DET. 2-IN	27	DP27	DET. 27-IN
3	DP3	DET. 3-IN	28	DP28	DET. 28-IN
4	DP4	DET. 4-IN	29	DP29	DET. 29-IN
5	DP5	DET. 5-IN	30	DP30	DET. 30-IN
6	DP6	DET. 6-IN	31	DP31	DET. 31-IN
7	DP7	DET. 7-IN	32	DP32	DET. 32-IN
8	DP8	DET. 8-IN	33	DP33	DET. 33-IN
9	DP9	DET. 9-IN	34	DP34	DET. 34-IN
10	DP10	DET. 10-IN	35	DP35	DET. 35-IN
11	DP11	DET. 11-IN	36	DP36	DET. 36-IN
12	DP12	DET. 12-IN	37	DP37	DET. 37-IN
13	DP13	DET. 13-IN	38	DP38	DET. 38-IN
14	DP14	DET. 14-IN	39	DP39	DET. 39-IN
15	DP15	DET. 15-IN	40	DP40	DET. 40-IN
16	DP16	DET. 16-IN	41	NC	NA
17	DP17	DET. 17-IN	42	NC	NA
18	DP18	DET. 18-IN	43	NC	NA
19	DP19	DET. 19-IN	44	NC	NA
20	DP20	DET. 20-IN	45	NC	NA
21	DP21	DET. 21-IN	46	NC	NA
22	DP22	DET. 22-IN	47	NC	NA
23	DP23	DET. 23-IN	48	NC	NA
24	DP24	DET. 24-IN	49	+24 VDC	POWER
25	DP25	DET. 25-IN	50	LOGIC GND	GROUND

CONNECTOR P2S

PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION
1	DP41	DET. 1-OUT	26	DP66	DET. 26-OUT
2	DP42	DET. 2-OUT	27	DP67	DET. 27-OUT
3	DP43	DET. 3-OUT	28	DP68	DET. 28-OUT
4	DP44	DET. 4-OUT	29	DP69	DET. 29-OUT
5	DP45	DET. 5-OUT	30	DP70	DET. 30-OUT
6	DP46	DET. 6-OUT	31	DP71	DET. 31-OUT
7	DP47	DET. 7-OUT	32	DP72	DET. 32-OUT
8	DP48	DET. 8-OUT	33	DP73	DET. 33-OUT
9	DP49	DET. 9-OUT	34	DP74	DET. 34-OUT
10	DP50	DET. 10-OUT	35	DP75	DET. 35-OUT
11	DP51	DET. 11-OUT	36	DP76	DET. 36-OUT
12	DP52	DET. 12-OUT	37	DP77	DET. 37-OUT
13	DP53	DET. 13-OUT	38	DP78	DET. 38-OUT
14	DP54	DET. 14-OUT	39	DP79	DET. 39-OUT
15	DP55	DET. 15-OUT	40	DP80	DET. 40-OUT
16	DP56	DET. 16-OUT	41	NC	NA
17	DP57	DET. 17-OUT	42	NC	NA
18	DP58	DET. 18-OUT	43	NC	NA
19	DP59	DET. 19-OUT	44	NC	NA
20	DP60	DET. 20-OUT	45	NC	NA
21	DP61	DET. 21-OUT	46	NC	NA
22	DP62	DET. 22-OUT	47	NC	NA
23	DP63	DET. 23-OUT	48	NC	NA
24	DP64	DET. 24-OUT	49	NC	NA
25	DP65	DET. 25-OUT	50	NC	NA

CONNECTOR P2P

PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION
1	C1 - 39	DET. 1	26	C1 - 68	DET. 26
2	C1 - 40	DET. 2	27	C1 - 69	DET. 27
3	C1 - 41	DET. 3	28	C1 - 70	DET. 28
4	C1 - 42	DET. 4	29	C1 - 71	DET. 29
5	C1 - 43	DET. 5	30	C1 - 72	DET. 30
6	C1 - 44	DET. 6	31	C1 - 73	DET. 31
7	C1 - 45	DET. 7	32	C1 - 74	DET. 32
8	C1 - 46	DET. 8	33	C1 - 75	DET. 33
9	C1 - 47	DET. 9	34	C1 - 76	DET. 34
10	C1 - 48	DET. 10	35	C1 - 77	DET. 35
11	C1 - 49	DET. 11	36	C1 - 78	DET. 36
12	C1 - 50	DET. 12	37	C1 - 79	DET. 37
13	C1 - 51	DET. 13	38	C1 - 80	DET. 38
14	C1 - 52	DET. 14	39	C1 - 81	DET. 39
15	C1 - 53	DET. 15	40	C1 - 82	DET. 40
16	C1 - 54	DET. 16	41	NC	NA
17	C1 - 55	DET. 17	42	NC	NA
18	C1 - 56	DET. 18	43	NC	NA
19	C1 - 57	DET. 19	44	NC	NA
20	C1 - 58	DET. 20	45	NC	NA
21	C1 - 59	DET. 21	46	NC	NA
22	C1 - 60	DET. 22	47	NC	NA
23	C1 - 61	DET. 23	48	NC	NA
24	C1 - 62	DET. 24	49	NC	NA
25	C1 - 67	DET. 25	50	NC	NA

PIN TABLE EXAMPLES:

J-1F: Input File J, Slot 1, Terminal F

DP: Display Panel

DET. 7-IN: Display Panel, Detector 7 Position Input Terminal

C1 - 58: C1 Connector, Pin 58

WILLIAM FLINT JACKSON
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PROFESSIONAL ENGINEER

Jackson, Flint
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TYPE 334 RAMP METER/ DATA STATION CABINET STANDARD PLAN J-81.10-01

SHEET 3 OF 3 SHEETS

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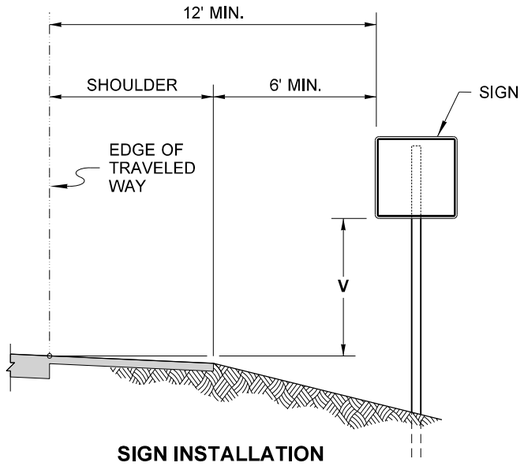
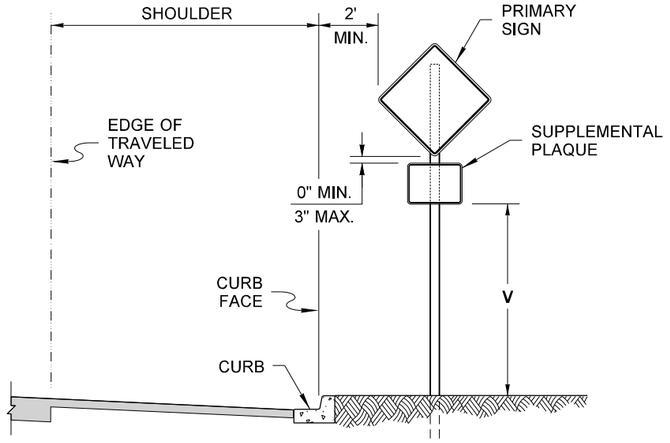
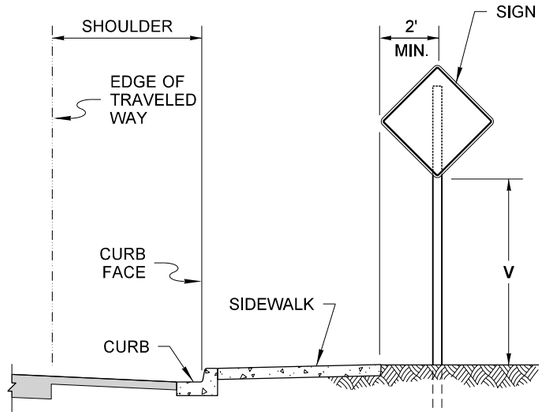


SIGN INSTALLATION (FILL SECTION)



SIGN INSTALLATION (CURB SECTION)



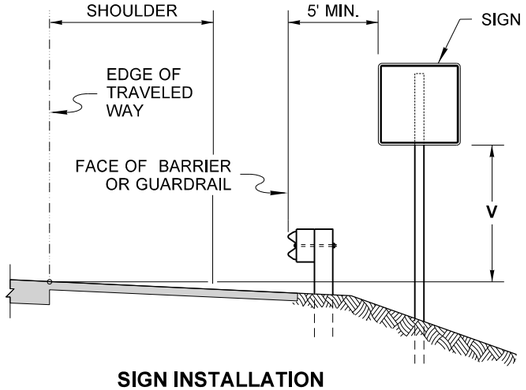
SIGN INSTALLATION (SIDEWALK AND CURB SECTION)

NOTES

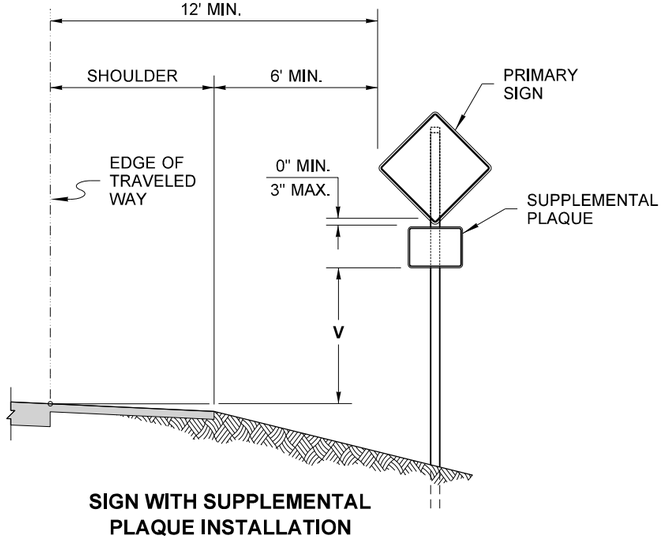
1. For sign installation details, see **Standard Plan G - series.**
2. Where it is impractical to locate a sign with the lateral offset, a minimum of 2'(ft) offset may be used. A 1'(ft) lateral offset may be used in business, commercial or residential areas.
3. The "**V**" height for signs, with an area of more than 50 square feet and two or more sign supports, is 7 feet in both rural and urban areas.

HEIGHT V		
	TO BOTTOM OF SIGN (NO SUPPLEMENTAL PLAQUE)	**TO BOTTOM OF SUPPLEMENTAL PLAQUE** (WHEN REQUIRED)
RURAL	5' MINIMUM	4' MINIMUM
URBAN	7' MINIMUM	6' MINIMUM

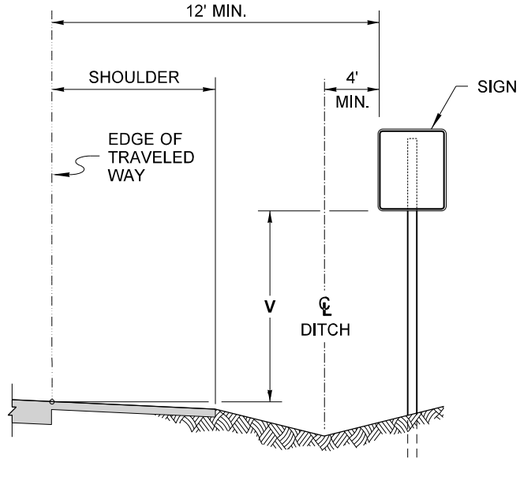
DRAWN BY: FERN LIDDELL



SIGN INSTALLATION (BEHIND TRAFFIC BARRIER)



SIGN WITH SUPPLEMENTAL PLAQUE INSTALLATION (FILL SECTION)



SIGN INSTALLATION (DITCH SECTION)

BRIAN J. WALSH
STATE OF WASHINGTON
36103
REGISTERED
PROFESSIONAL ENGINEER

2020.09.23 13:48:58 -07'00'

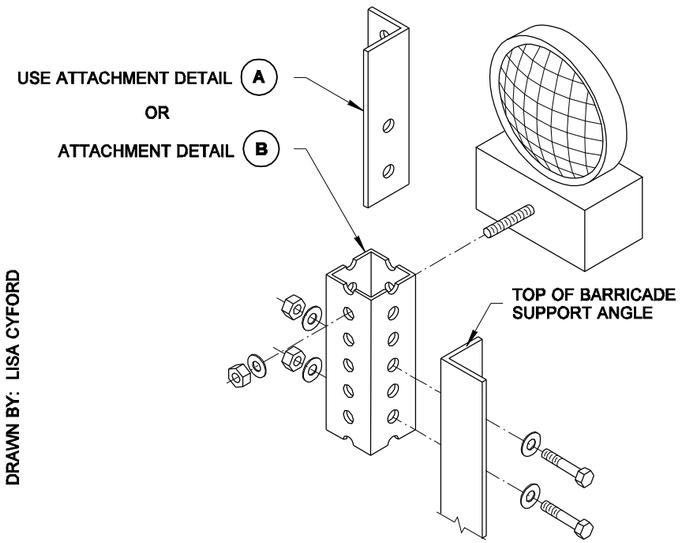
CLASS A CONSTRUCTION SIGNING INSTALLATION

STANDARD PLAN K-80.10-02

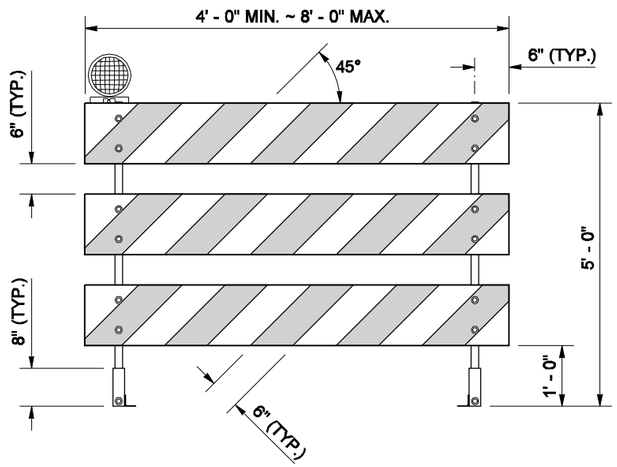
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Date: 2020.09.25 14:46:01 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

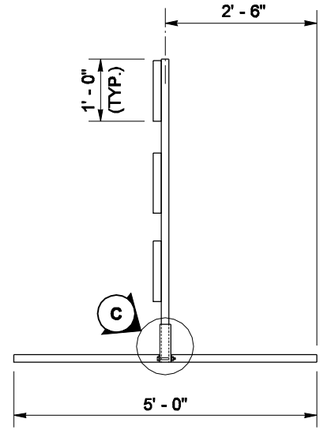
DRAWN BY: LISA CYFORD



WARNING LIGHT ATTACHMENT DETAIL



ELEVATION

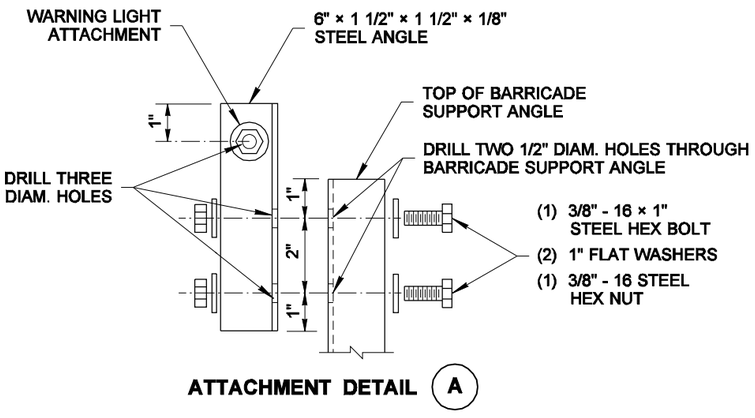


SIDE

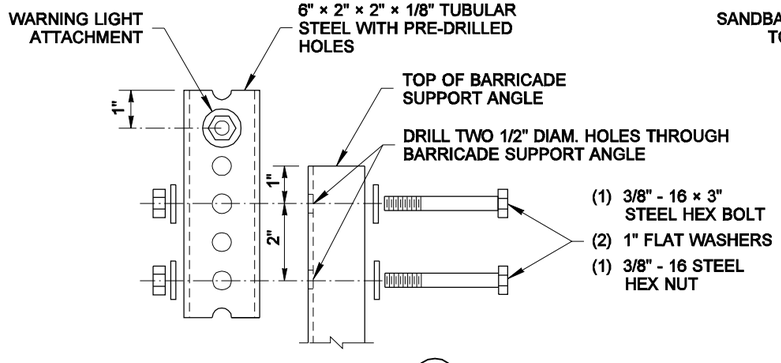
TYPE 3 BARRICADE

NOTES

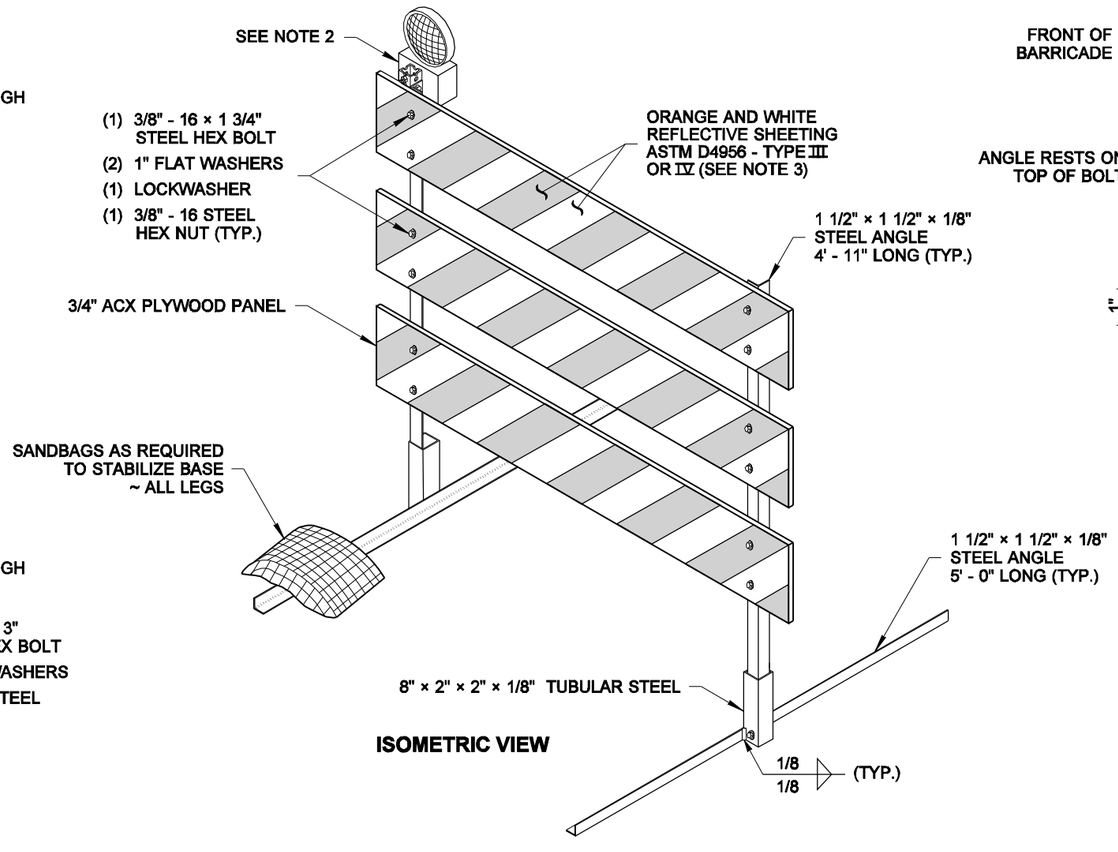
1. All fasteners may be zinc plated, galvanized or stainless steel. All steel angle and tubular steel shall be hot-rolled, high carbon steel, painted or galvanized.
2. Install one lightweight Type A Low-Intensity flashing warning light on the traffic side of the barricade. Install two Type A Low-Intensity flashing warning lights per barricade when the barricades are used to close a roadway. Attach the light to the barricade according to the light manufacturer's recommendations or use the details shown on this plan.
3. Stripes on barricade rails shall be alternating orange and white retroreflective stripes (sloping downward at an angle of 45 degrees in the direction traffic is to pass).
4. The Type 3 barricade design shown on this plan meets the crash test requirements of NCHRP 350. Alternative designs may be approved if they conform to the NCHRP 350 crash test criteria and the MUTCD.
5. When a sign is mounted on the barricade, it shall be securely bolted to at least two plywood panels. The top of the sign shall not be higher than the top panel of the barricade.
6. When sandbags are used in freezing weather, Urea fertilizer shall be mixed with the sand in a quantity to prevent the sand from freezing.



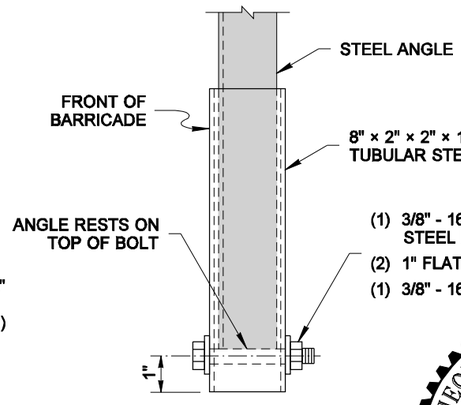
ATTACHMENT DETAIL A



ATTACHMENT DETAIL B



ISOMETRIC VIEW



DETAIL C

THEODORE J. TREPANIER
STATE OF WASHINGTON
25335
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES AUGUST 9, 2007

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

TYPE 3 BARRICADE

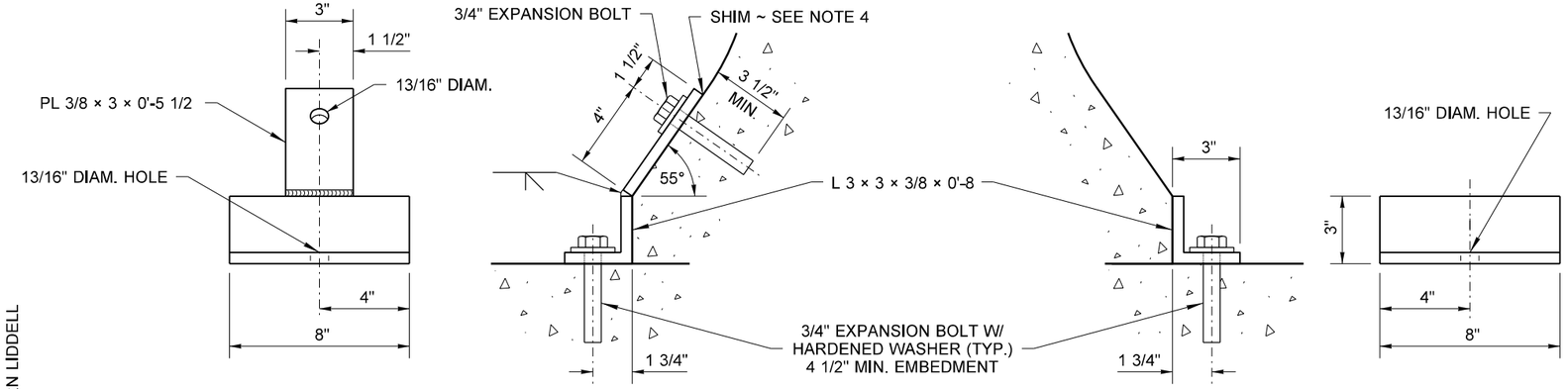
STANDARD PLAN K-80.20-00

SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION

Kevin J. Dayton — STATE DESIGN ENGINEER — *12-20-06* — DATE

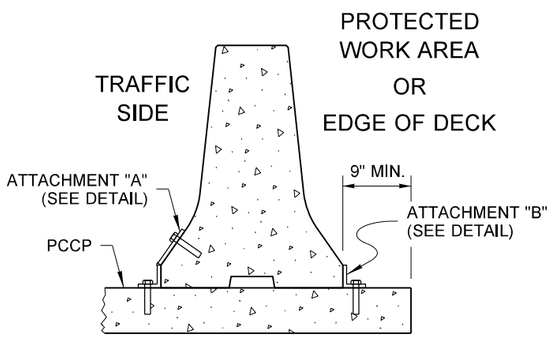
Washington State Department of Transportation

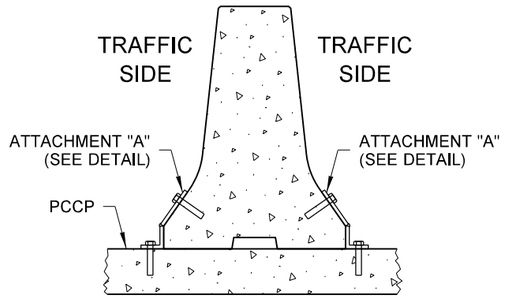


ATTACHMENT "A" DETAIL

ATTACHMENT "B" DETAIL

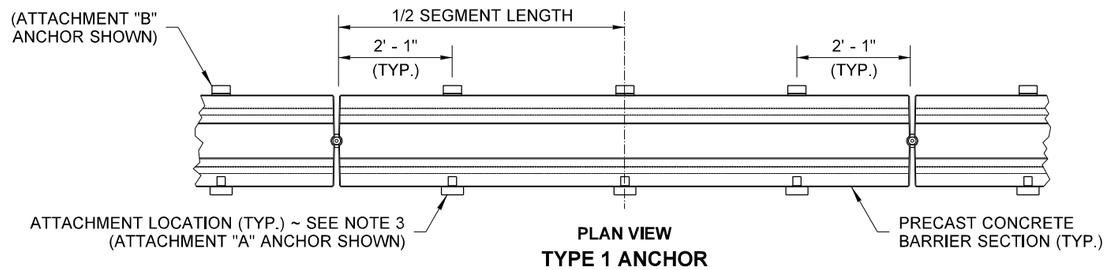
DRAWN BY: FERN LIDDELL





SECTION VIEWS

TYPE 1 ANCHOR
ATTACHMENT LOCATIONS



PLAN VIEW

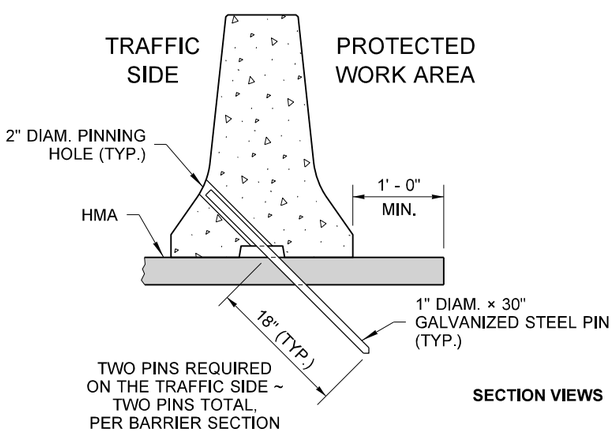
TYPE 1 ANCHOR
ATTACHMENT LOCATIONS

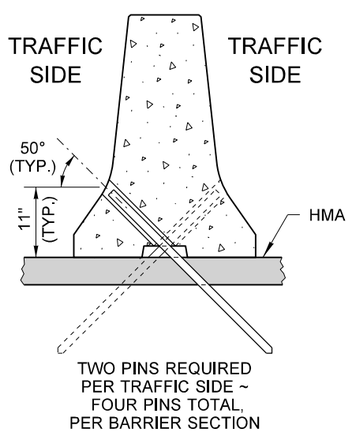
TYPE 1 ANCHOR

TEMPORARY INSTALLATION OF PRECAST
CONCRETE BARRIER TYPE 2 ON CEMENT CONCRETE PAVEMENT OR
BRIDGE DECK, AND TEMPORARY INSTALLATION OF PRECAST
CONCRETE BARRIER TYPE F (**STANDARD PLAN C-60.10**)
ON BRIDGE DECK

NOTES

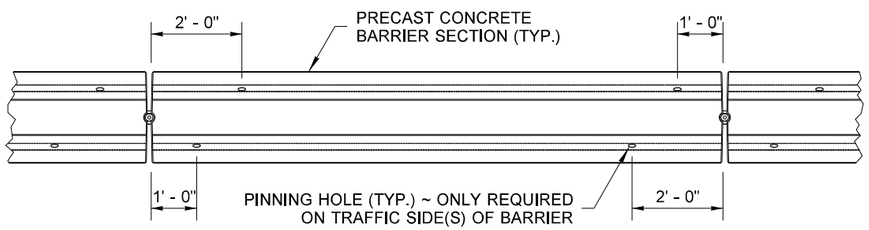
1. The intended use of this plan is for the temporary installation of the Type 2 Concrete Barrier on cement concrete pavement, bridge decks, or hot mix asphalt pavement, and Type F Concrete Barrier on Bridge decks.
2. Use Type 1 Anchors when the concrete pavement or bridge deck is 6" or thicker with 2' wide concrete barrier only. Use Type 2 Anchors (**Standard Plan K-80.37**) with narrow base barrier.
3. Adjust the location of the Type 1 Anchors to avoid the main reinforcing in the deck when drilling holes.
4. Use shims to properly fit the Type 1 Anchors to the barrier and roadway surfaces.
5. Upon removal of the Type 1 Anchors, clean the bolt holes and fill them with grout according to **Standard Specification, Section 6.02.3(20)**.
6. Remove the Type 3 Anchors by first driving the steel pins down through the barrier further into the pavement to allow lifting the barrier without interference, then remove the pins from the pavement.
7. After removing the Type 3 Anchors, clean the pin holes and fill them with sealant according to **Standard Specification, Section 9-04.2.**





SECTION VIEWS

TYPE 3 ANCHOR
PIN LOCATIONS



PLAN VIEW

TYPE 3 ANCHOR
PIN LOCATIONS

TYPE 3 ANCHOR

TEMPORARY INSTALLATION OF PRECAST
CONCRETE BARRIER TYPE 2 ON HOT MIX ASPHALT PAVEMENT

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
REGISTERED PROFESSIONAL ENGINEER

2020.09.10
10:04:22 -07'00'

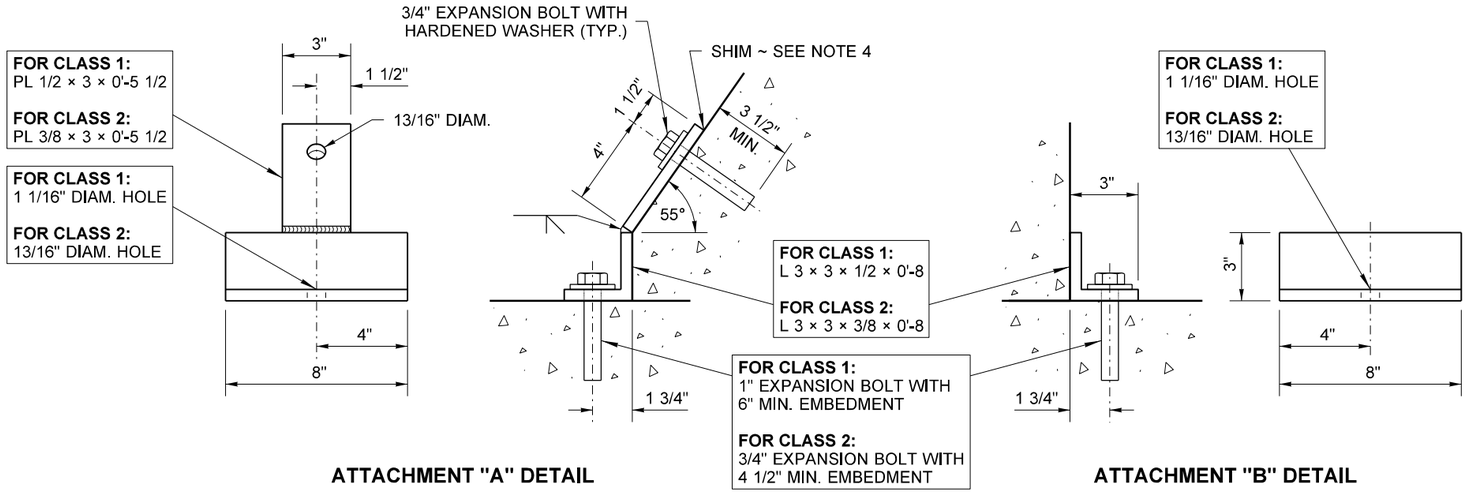
TEMPORARY CONCRETE BARRIER ANCHORING

STANDARD PLAN K-80.35-01

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Roark, Steve Digitally signed by Roark, Steve
Date: 2020.09.16 10:23:50 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

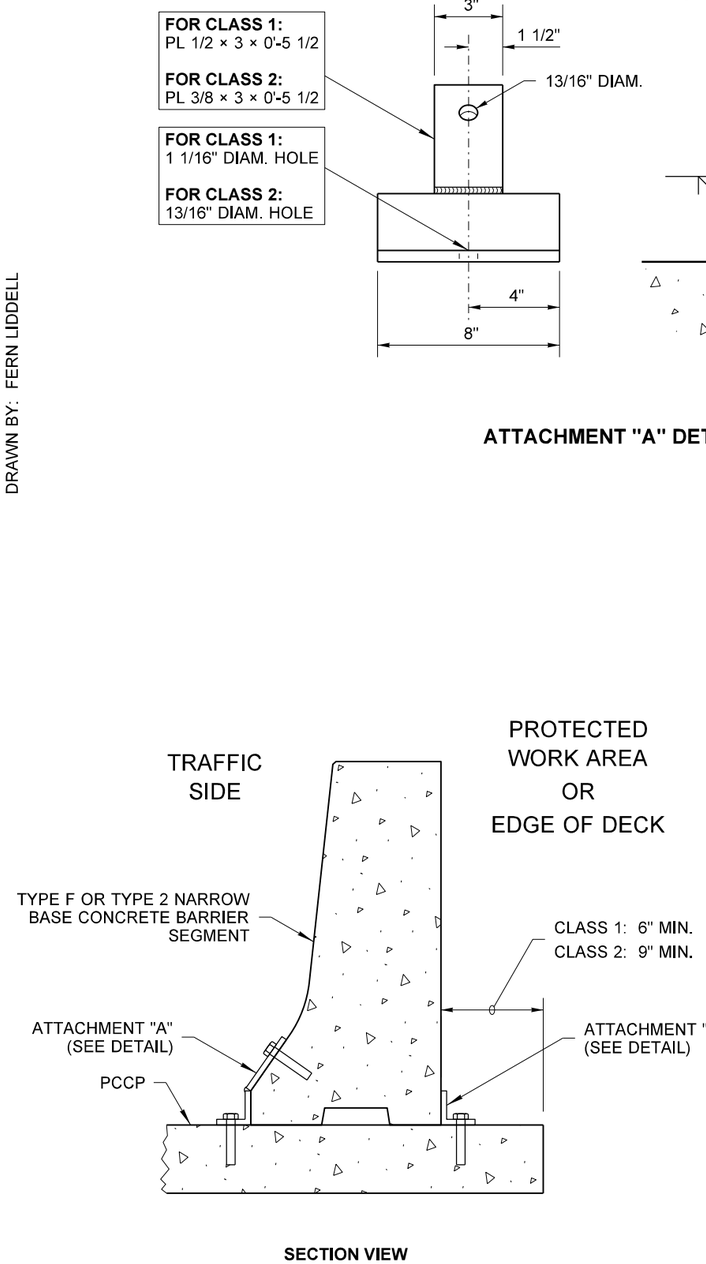


ATTACHMENT "A" DETAIL

ATTACHMENT "B" DETAIL

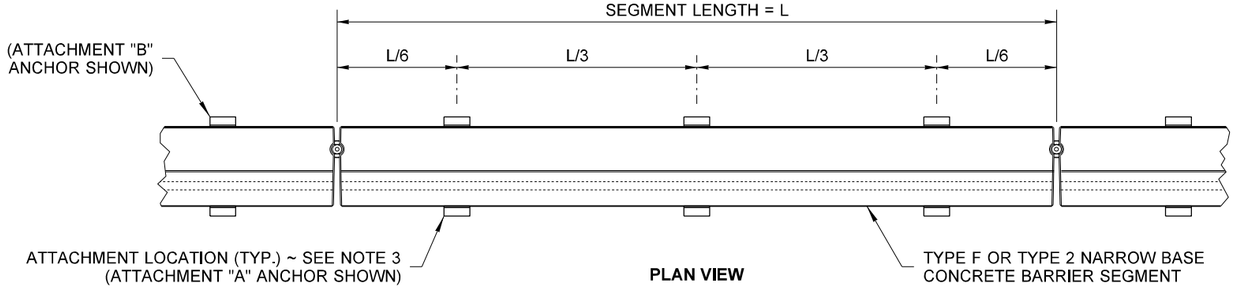
NOTES

1. The intended use of this plan is for the temporary installation of Type F Narrow Base concrete barrier (see **Standard Plan C-60.10**) or Type 2 Narrow Base concrete barrier on cement concrete pavement or bridge deck.
2. Use Class 1 when the concrete pavement or bridge deck is 9" or thicker; use Class 2 when it is 6" or thicker.
3. Adjust the location of the anchors to avoid the main reinforcing in the deck when drilling holes.
4. Use shims to properly fit the anchors to the barrier and roadway surfaces.
5. Upon removal of the anchors, clean the bolt holes and fill them with grout according to **Standard Specification, Section 6.02.3(20).**



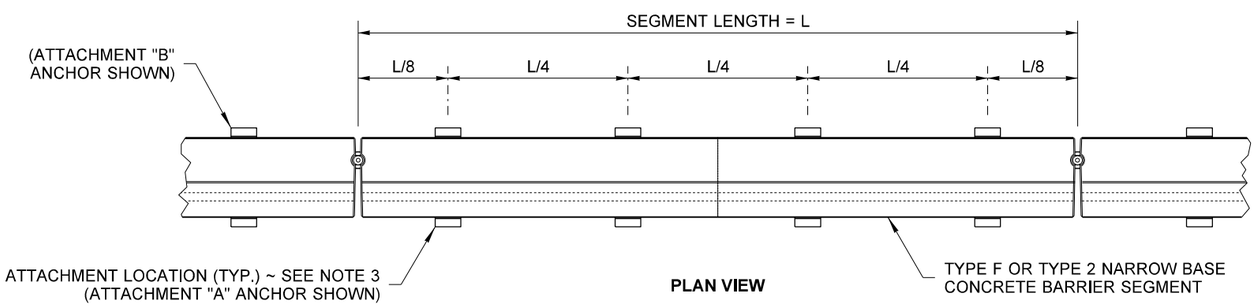
SECTION VIEW

TYPE 2 ANCHOR: CLASS 1 & 2
ATTACHMENT LOCATIONS



PLAN VIEW

TYPE 2 ANCHOR: CLASS 1
ATTACHMENT LOCATIONS



PLAN VIEW

TYPE 2 ANCHOR: CLASS 2
ATTACHMENT LOCATIONS

JOHN PATRICK DONAHUE
STATE OF WASHINGTON
29023
REGISTERED PROFESSIONAL ENGINEER

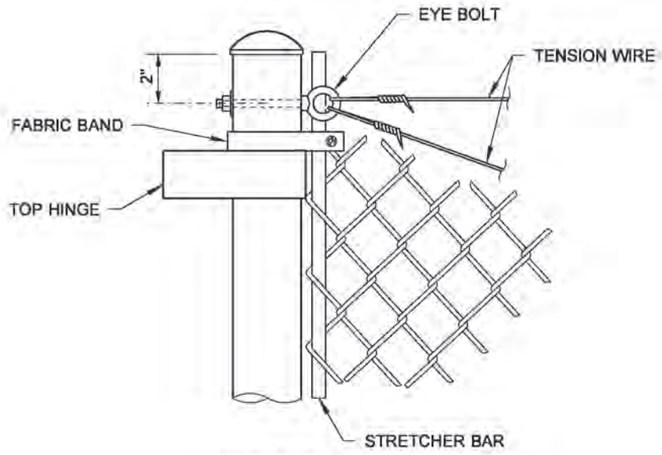
2020.09.10 10:04:56 -07'00'

TEMPORARY CONCRETE BARRIER ANCHORING - NARROW
STANDARD PLAN K-80.37-01

SHEET 1 OF 1 SHEET

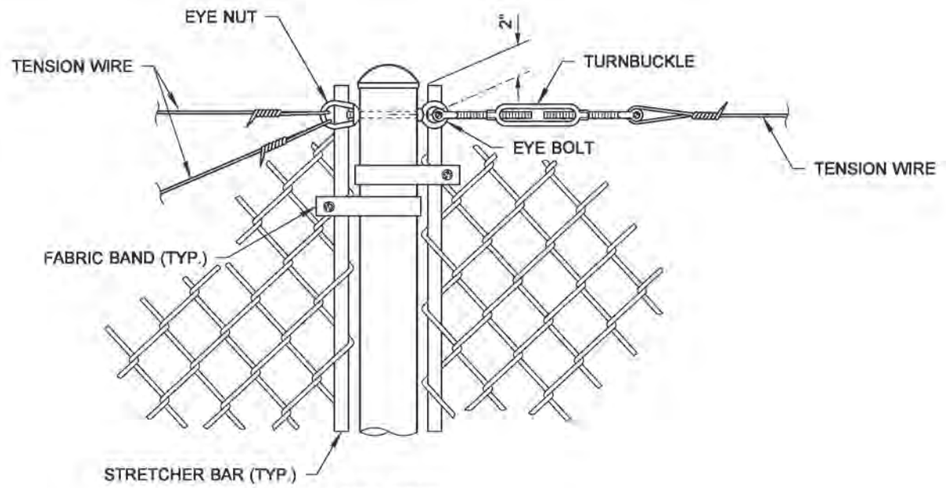
APPROVED FOR PUBLICATION
Roark, Steve Digitally signed by Roark, Steve Date: 2020.09.16 10:24:32 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: BILL BERENS



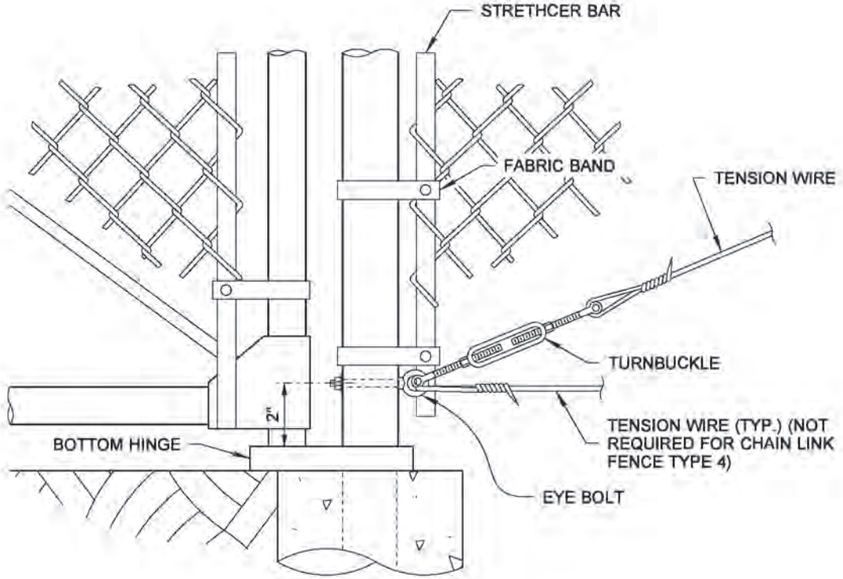
GATE POST

DETAIL (A)



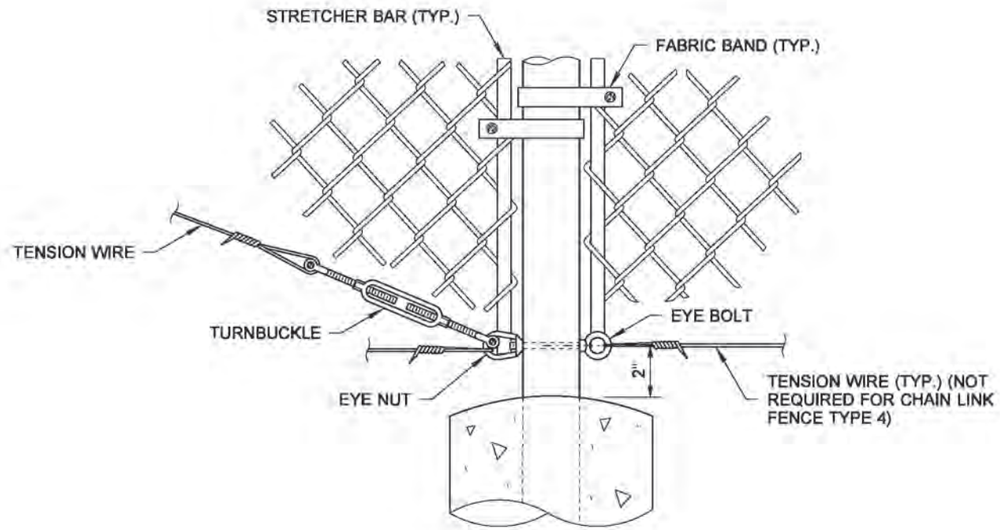
PULL POST

DETAIL (B)



GATE POST

DETAIL (C)



PULL POST

DETAIL (D)

EDWARD PATRICK BARRY
STATE OF WASHINGTON
34363
REGISTERED
PROFESSIONAL ENGINEER

Barry, Ed
May 6 2014 3:58 PM

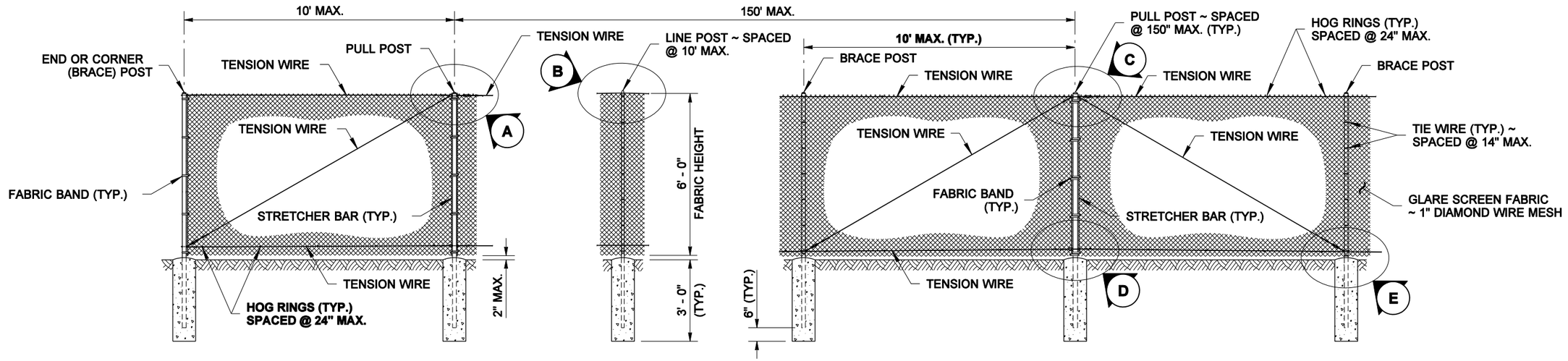
CHAIN LINK GATE

STANDARD PLAN L-30.10-02

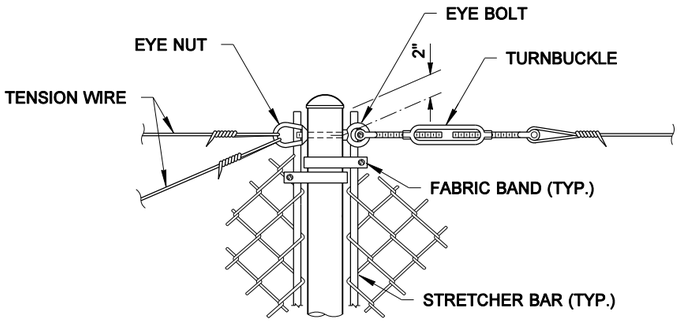
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION
Bakotich, Pasco
Jun 11 2014 1:41 PM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: BILL BERENS

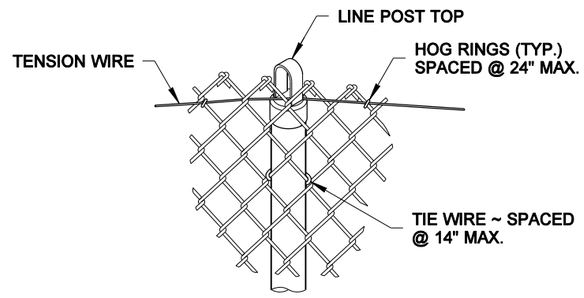


ELEVATION VIEW



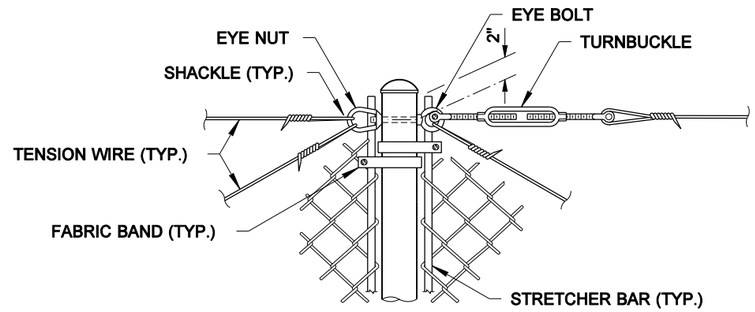
PULL POST

DETAIL A



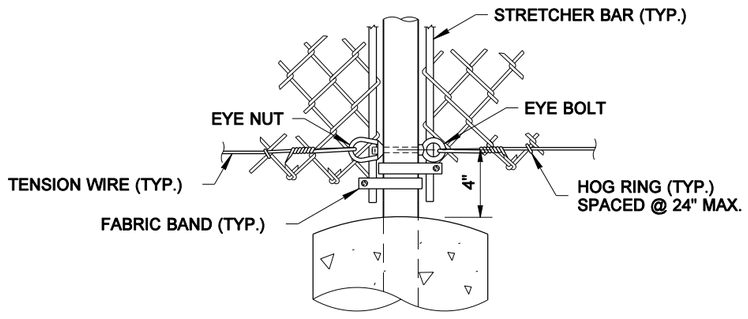
LINE POST

DETAIL B



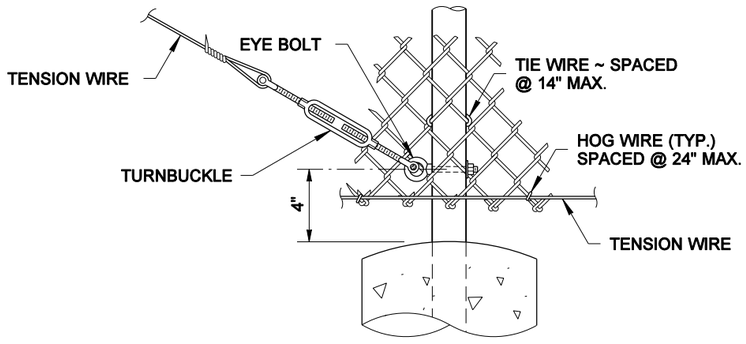
PULL POST (WITHIN RUN)

DETAIL C



PULL POST

DETAIL D



BRACE POST

DETAIL E

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GLARE SCREEN TYPE 1 DESIGN B

STANDARD PLAN L-40.15-01

SHEET 1 OF 1 SHEET

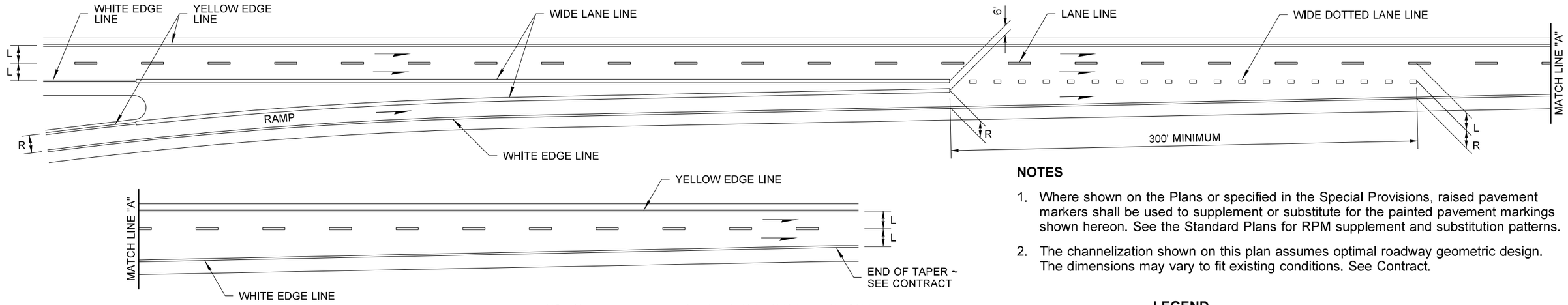
APPROVED FOR PUBLICATION

Pasco Bakotich III — STATE DESIGN ENGINEER

06-16-11 — DATE

Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



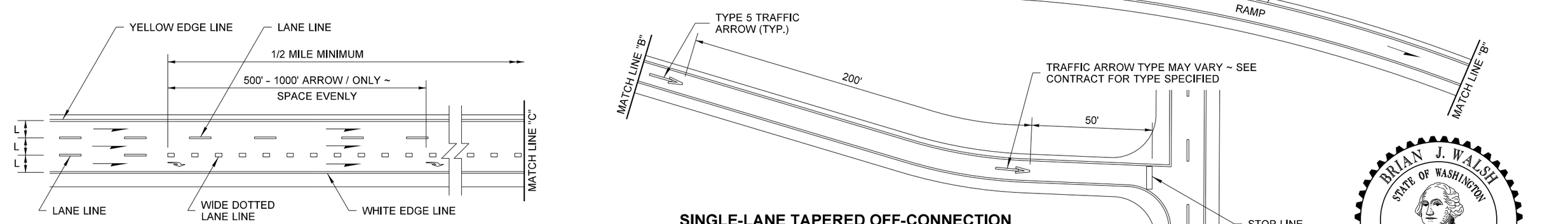
SINGLE-LANE TAPERED ON-CONNECTION

NOTES

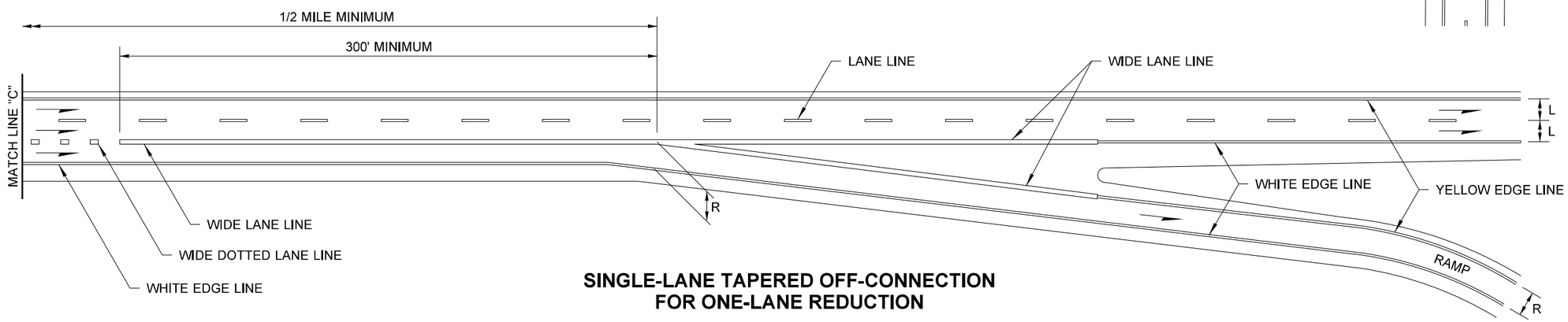
1. Where shown on the Plans or specified in the Special Provisions, raised pavement markers shall be used to supplement or substitute for the painted pavement markings shown hereon. See the Standard Plans for RPM supplement and substitution patterns.
2. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.

LEGEND

R = RAMP LANE WIDTH
L = LANE WIDTH



SINGLE-LANE TAPERED OFF-CONNECTION



SINGLE-LANE TAPERED OFF-CONNECTION FOR ONE-LANE REDUCTION

BRIAN J. WALSH
STATE OF WASHINGTON
36103
REGISTERED
PROFESSIONAL ENGINEER

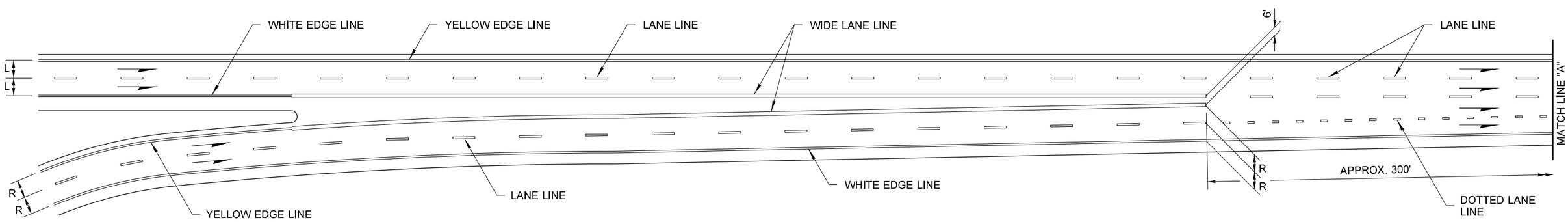
Walsh, Brian
Sep 23 2020 1:50 PM
cosign

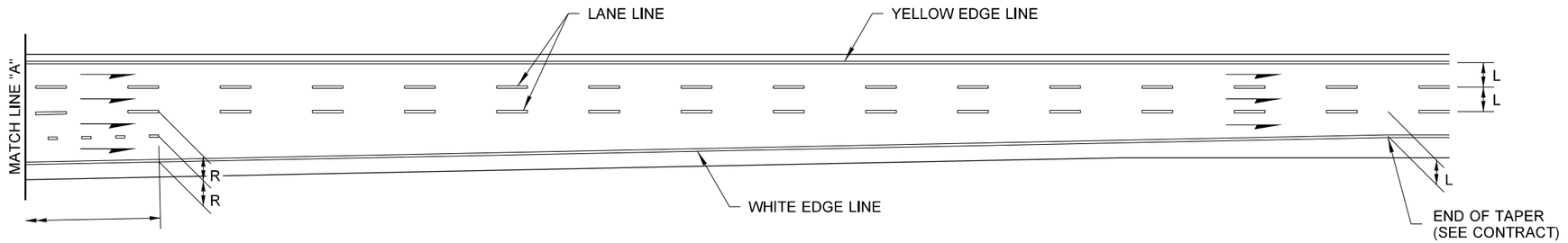
RAMP CHANNELIZATION SINGLE LANE

STANDARD PLAN M-1.20-04

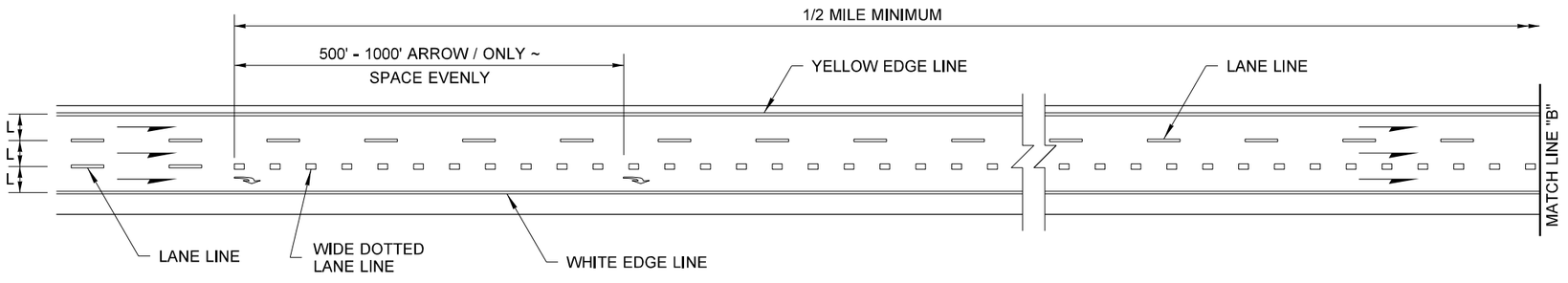
SHEET 1 OF 1 SHEET

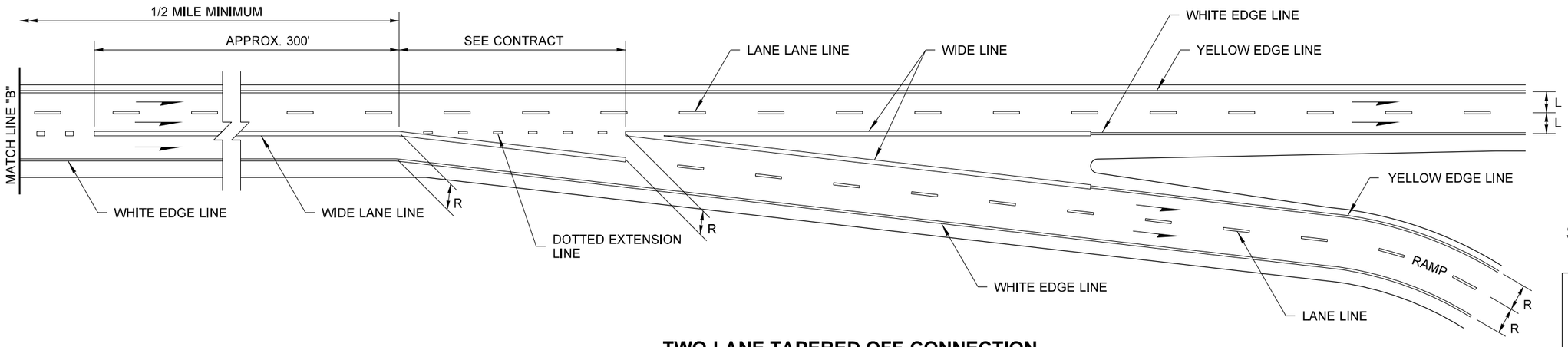
APPROVED FOR PUBLICATION
Date: 2020.09.25 14:46:56 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation





TWO-LANE TAPERED ON-CONNECTION





TWO-LANE TAPERED OFF-CONNECTION

NOTES

1. Where shown on the plans or specified in the Special Provisions, raised pavement markers shall be used to supplement or substitute for the painted pavement markings shown hereon. See the **Standard Plans** for RPM supplement and substitution patterns.

2. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.

LEGEND

R = RAMP LANE WIDTH

L = LANE WIDTH

BRIAN J. WALSH
STATE OF WASHINGTON
36103
REGISTERED
PROFESSIONAL ENGINEER

Walsh, Brian
Sep 23 2020 1:52 PM

cosign

RAMP CHANNELIZATION TWO LANE

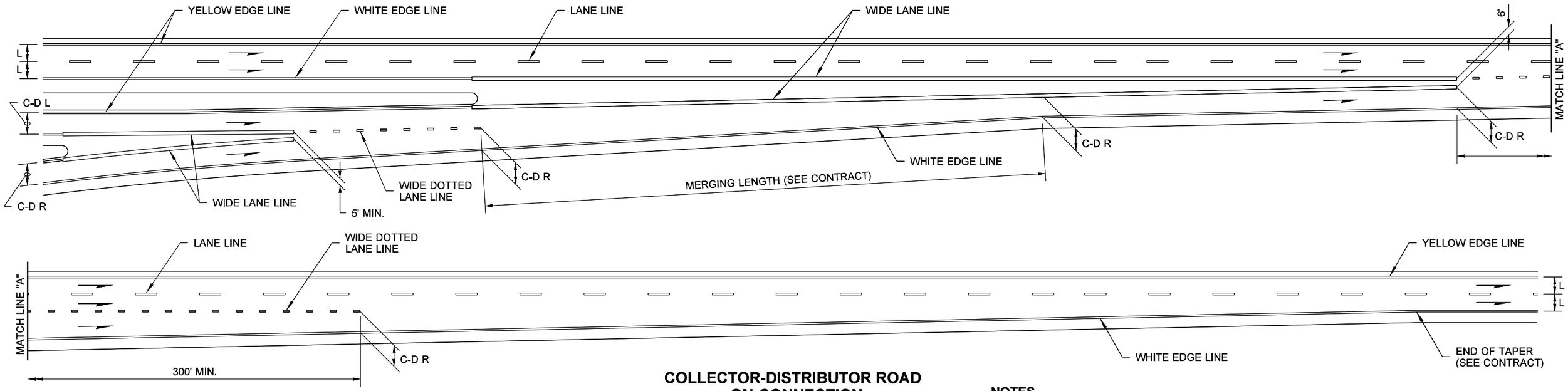
STANDARD PLAN M-1.40-03

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Date: 2020.09.25 14:50:15 -07'00'
STATE DESIGN ENGINEER

Washington State Department of Transportation

DRAWN BY: FERNLIDDELL



COLLECTOR-DISTRIBUTOR ROAD ON-CONNECTION

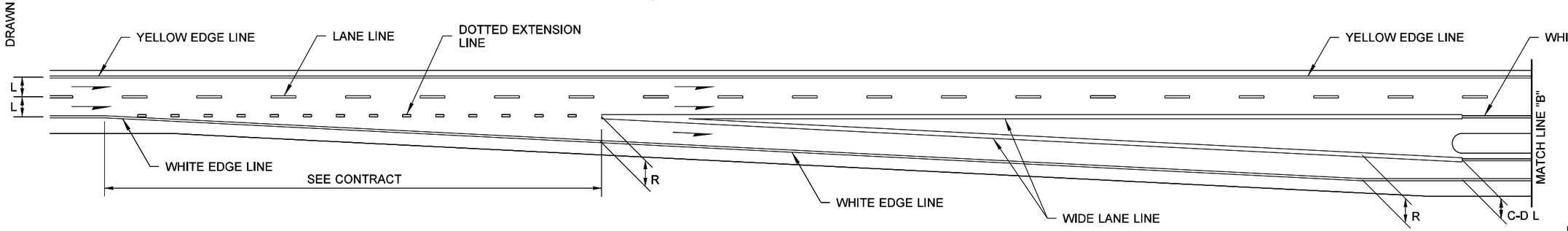
LEGEND

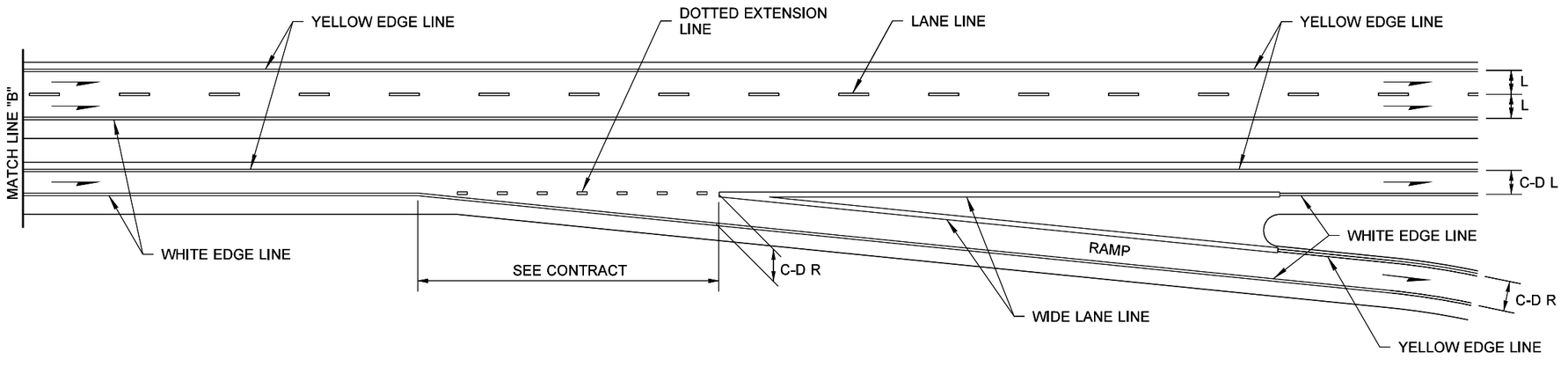
C-D R = COLLECTOR DISTRIBUTOR RAMP LANE WIDTH

C-D L = COLLECTOR DISTRIBUTOR LANE WIDTH

R = RAMP LANE WIDTH

L = LANE WIDTH





COLLECTOR-DISTRIBUTOR ROAD OFF-CONNECTION

NOTES

1. Where shown on the plans or specified in the Special Provisions, raised pavement markers shall be used to supplement or substitute for the painted pavement markings shown hereon. See the **Standard Plans** for RPM supplement and substitution patterns.
2. The channelization shown on this plan assumes optimal geometric design. The dimensions may vary to fit existing conditions. See Contract.

BRIAN J. WALSH
STATE OF WASHINGTON
36103
REGISTERED
PROFESSIONAL ENGINEER

Walsh, Brian
Sep 23 2020 1:53 PM

RAMP CHANNELIZATION COLLECTOR-DISTRIBUTOR ROAD STANDARD PLAN M-1.60-03

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Date: 2020.09.25 14:51:11 -07'00'
STATE DESIGN ENGINEER

Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

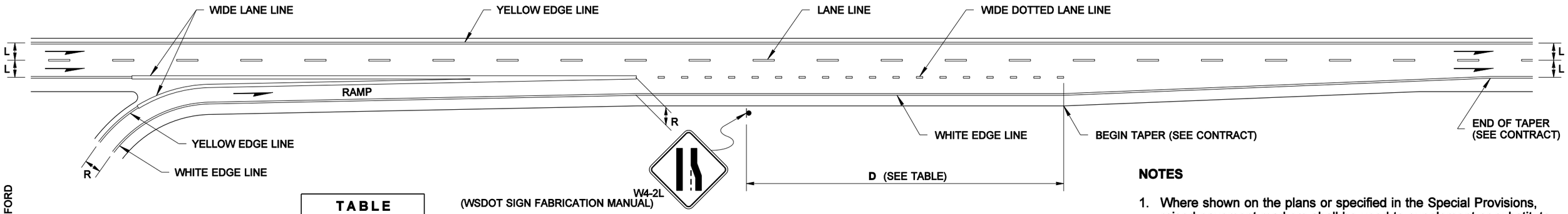


TABLE	
POSTED MAIN LINE SPEED	D
35 MPH	565'
40 MPH	670'
45 MPH	775'
50 MPH	885'
55 MPH	990'
60 MPH	1100'
65 MPH	1200'
70 MPH	1250'

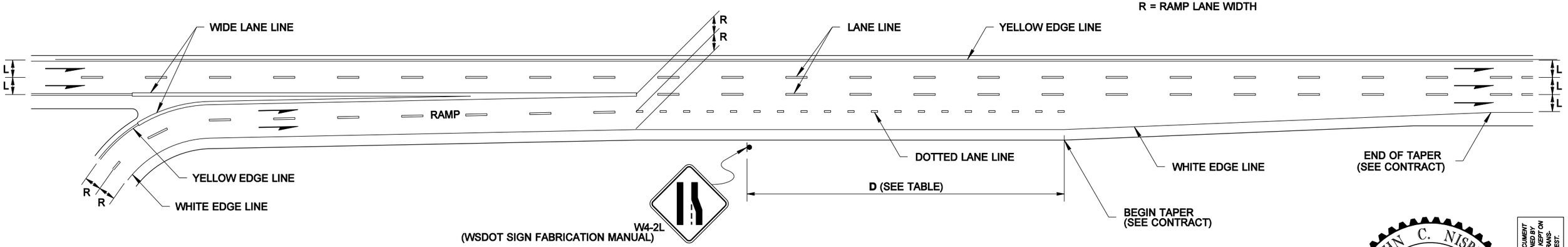
SINGLE-LANE, PARALLEL TYPE ~ ON-CONNECTION

NOTES

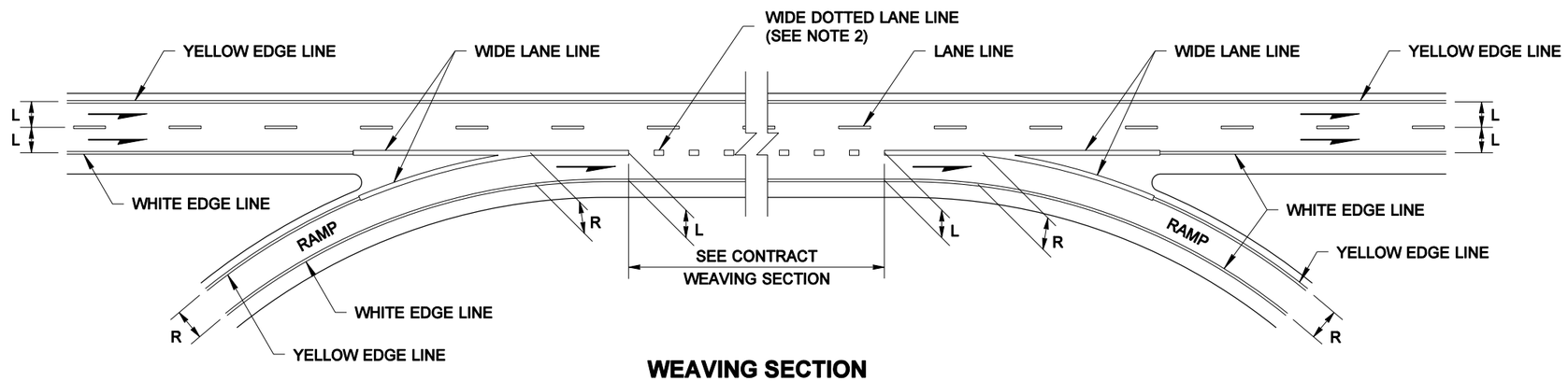
1. Where shown on the plans or specified in the Special Provisions, raised pavement markers shall be used to supplement or substitute for the painted pavement markings shown hereon. See the Standard Plans for RPM supplement and substitution patterns.
2. When weaving section is more than 3/4 of a mile in length, use lane line.
3. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.

LEGEND

L = LANE WIDTH
R = RAMP LANE WIDTH



DOUBLE-LANE, PARALLEL TYPE ~ ON-CONNECTION



WEAVING SECTION

DRAWN BY: LISA CYFORD

JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

RAMP CHANNELIZATION PARALLEL ON & WEAVING SECTION

STANDARD PLAN M-1.80-03

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Pasco Bakotich III — STATE DESIGN ENGINEER
06-03-11 — DATE

Washington State Department of Transportation

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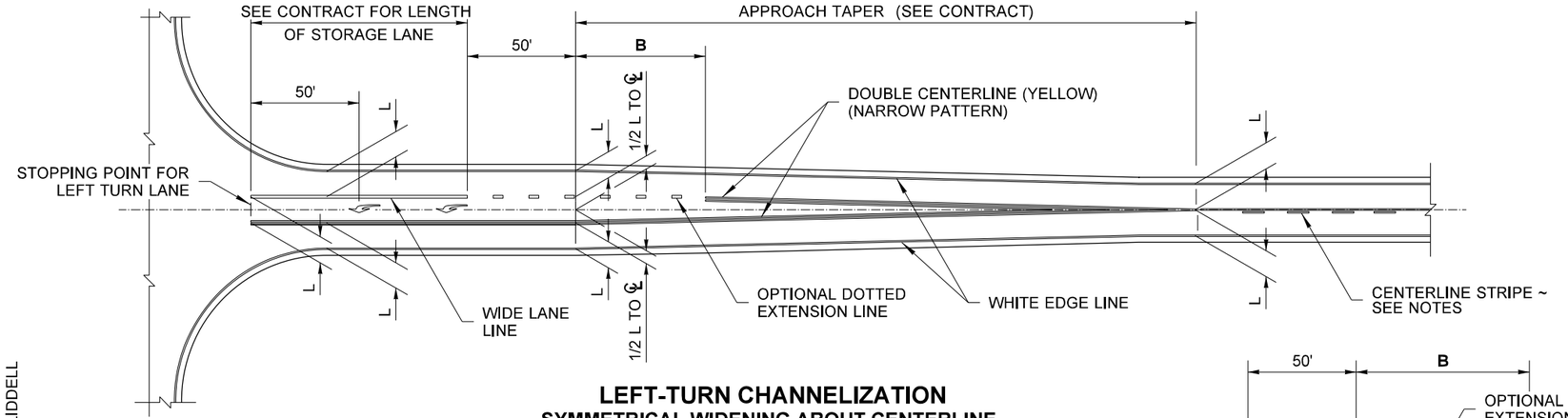
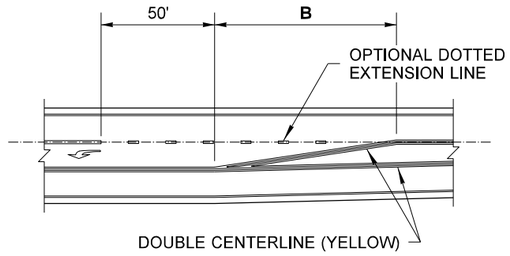
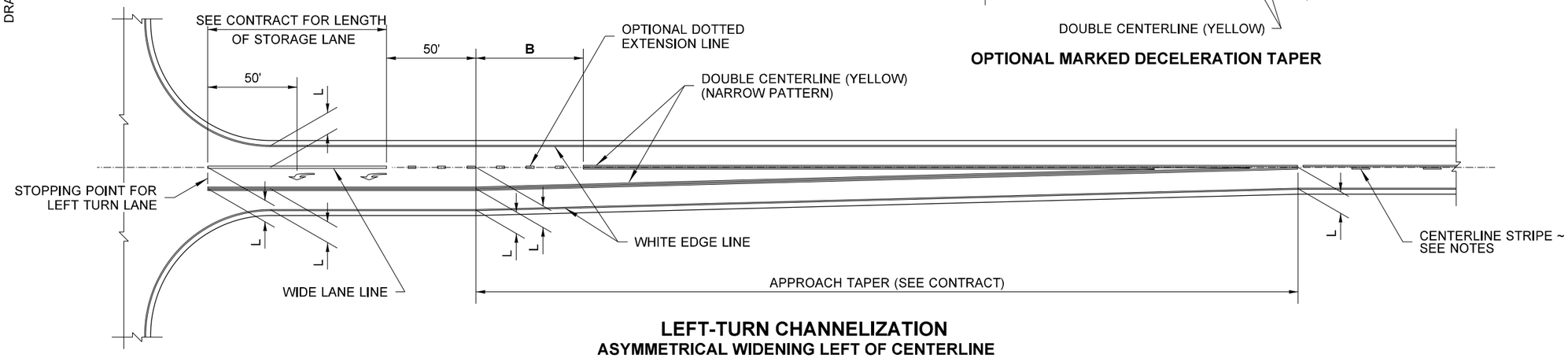


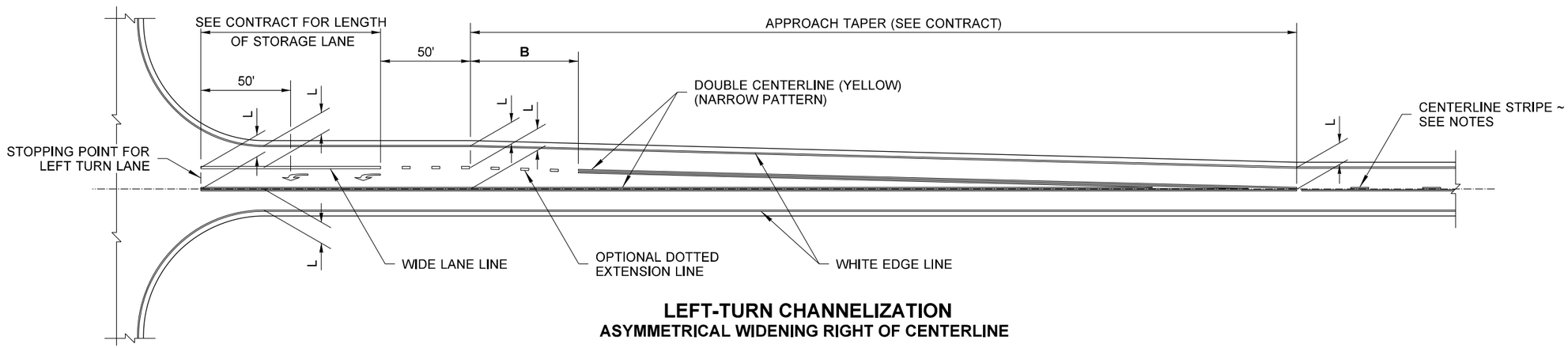
LEFT-TURN CHANNELIZATION
SYMMETRICAL WIDENING ABOUT CENTERLINE



OPTIONAL MARKED DECELERATION TAPER



LEFT-TURN CHANNELIZATION
ASYMMETRICAL WIDENING LEFT OF CENTERLINE



LEFT-TURN CHANNELIZATION
ASYMMETRICAL WIDENING RIGHT OF CENTERLINE

NOTES

1. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.
2. The channelization shown on this plan is for a two-lane highway. The channelization plan may be used on four-lane undivided highways, with the appropriate considerations.
3. Centerline striping on the approach to raised channelization shall be No Pass in accordance with MUTCD figure 3B-15. Centerline striping on the departure from raised channelization shall be determined by an engineering study.
4. Centerline striping on the approach to and departure from painted channelization shall be determined by an engineering study.
5. Centerline striping on four-lane undivided highways shall be a double centerline.
6. The two Type 2L (SL) Traffic Arrows shown in the left-turn storage lane are optional, but recommended. Arrows may be added for longer storage lanes or deleted for shorter storage lanes. See Contract Plans.

LEGEND

L = Lane Width. See Contract for specified lane widths.

Type 2L (SL) Traffic Arrow

POSTED SPEED	DIMENSION B
60 MPH	60'
55 MPH	55'
50 MPH	50'
45 MPH	45'
40 MPH	40'
35 MPH	35'
30 MPH	30'
25 MPH	25'
20 MPH	20'

DRAWN BY: FERN LIDDELL

BRIAN J. WALSH
STATE OF WASHINGTON
36103
REGISTERED
PROFESSIONAL ENGINEER

Walsh, Brian
Sep 23 2020 1:54 PM

cosign

LEFT TURN CHANNELIZATION

STANDARD PLAN M-3.10-04

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
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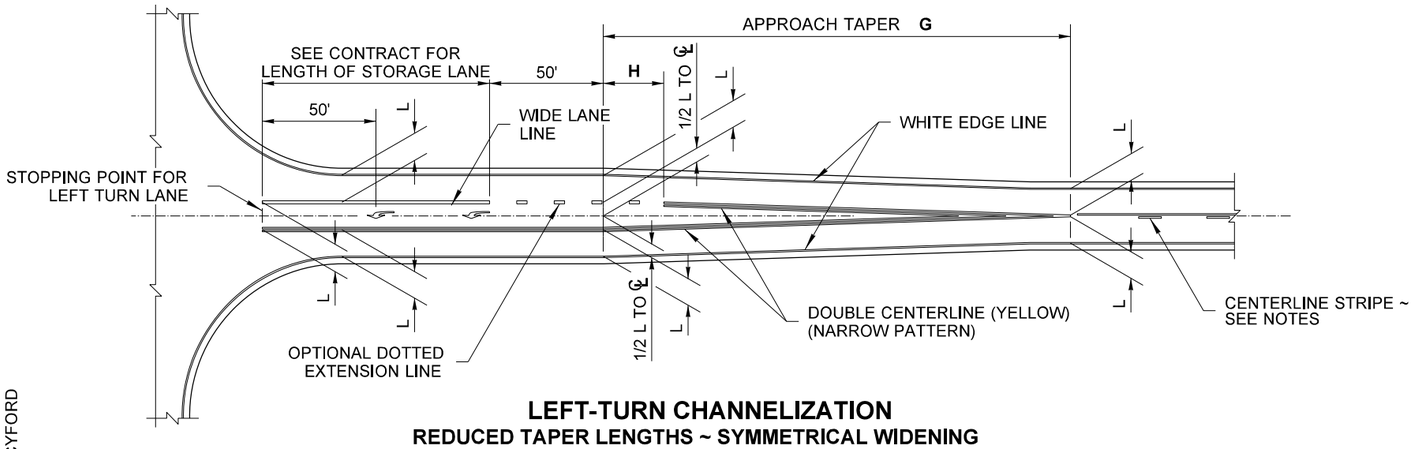
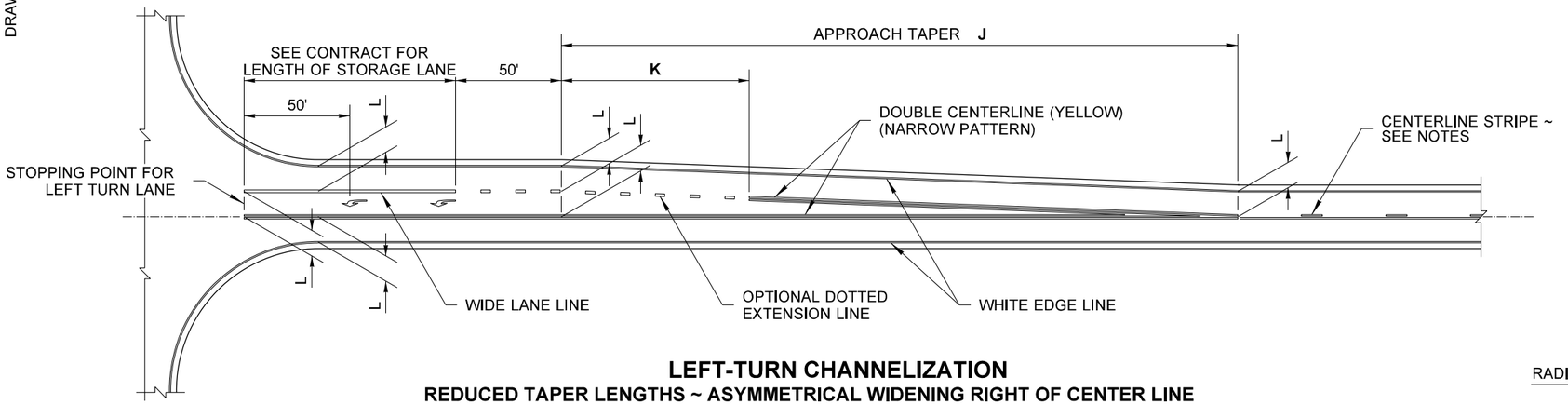
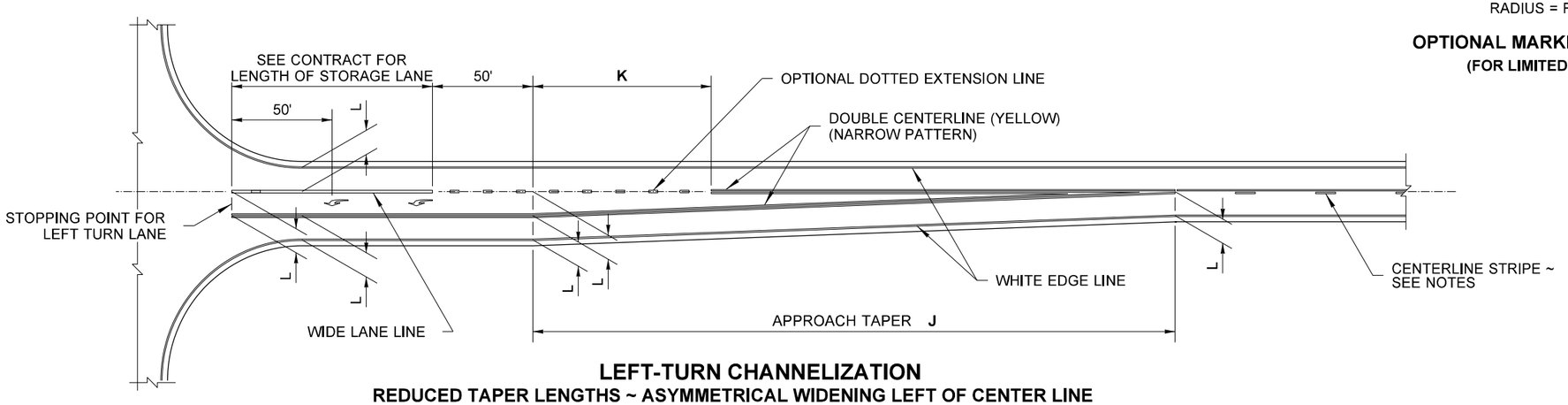
STATE DESIGN ENGINEER
Washington State Department of Transportation



LEFT-TURN CHANNELIZATION
REDUCED TAPER LENGTHS ~ SYMMETRICAL WIDENING
(FOR LIMITED USE IN URBAN AREAS WITH POSTED SPEEDS OF 40 MPH OR LESS)



LEFT-TURN CHANNELIZATION
REDUCED TAPER LENGTHS ~ ASYMMETRICAL WIDENING RIGHT OF CENTER LINE
(FOR LIMITED USE IN URBAN AREAS WITH POSTED SPEEDS OF 40 MPH OR LESS)



LEFT-TURN CHANNELIZATION
REDUCED TAPER LENGTHS ~ ASYMMETRICAL WIDENING LEFT OF CENTER LINE
(FOR LIMITED USE IN URBAN AREAS WITH POSTED SPEEDS OF 40 MPH OR LESS)

DRAWN BY: LISA CYFORD

NOTES

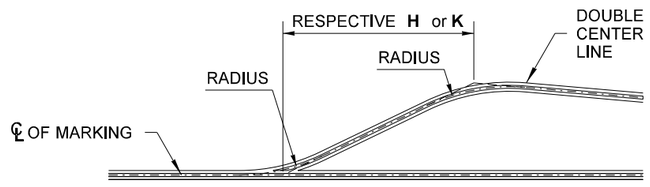
1. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.
2. The channelization shown on this plan is for a two-lane highway. The channelization plan may be used on four-lane undivided highways with the appropriate considerations.
3. Centerline striping on the approach to raised channelization shall be No Pass in accordance with MUTCD figure 3B-15. Centerline striping on the departure from raised channelization shall be determined by an engineering study.
4. Centerline striping on the approach to and departure from painted channelization shall be determined by an engineering study.
5. Centerline striping on four lane undivided highways shall be a double centerline.
6. The two Type 2L (SL) Traffic Arrows shown in the left-turn storage lane are optional, but recommended. Arrows may be added for longer storage lanes or deleted for shorter storage lanes. See Contract Plans.

LEGEND

L = Lane Width. See Contract for specified lane widths.

Type 2L (SL) Traffic Arrow

POSTED SPEED	DIMENSION H	DIMENSION K
40 MPH	27'	53'
35 MPH	20'	41'
30 MPH	15'	30'
25 MPH	10'	21'
20 MPH	7'	13'



RADIUS = RESPECTIVE **H** or **K**

OPTIONAL MARKED DECELERATION TAPER
(FOR LIMITED USE IN URBAN AREAS)

BRIAN J. WALSH
STATE OF WASHINGTON
36103
REGISTERED
PROFESSIONAL ENGINEER

Walsh, Brian
Sep 23 2020 1:56 PM

cosign

LEFT-TURN CHANNELIZATION REDUCED TAPERS STANDARD PLAN M-3.20-03

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
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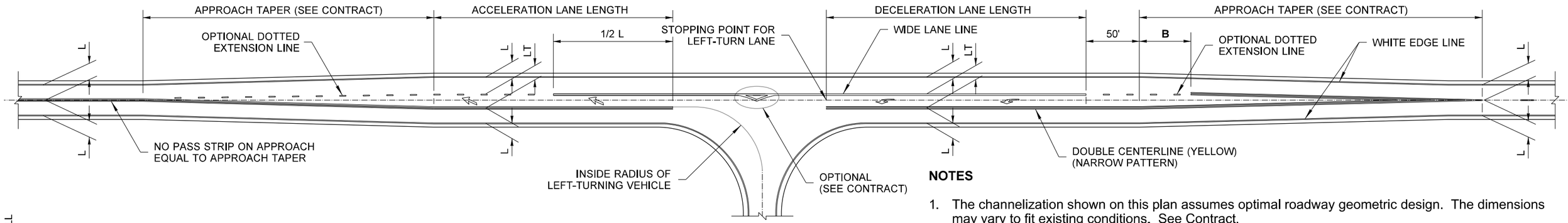
STATE DESIGN ENGINEER
Washington State Department of Transportation



LEFT-TURN CHANNELIZATION
TEE INTERSECTION WITH ACCELERATION LANE

DRAWN BY: FERN LIDDELL

NOTES

1. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.
2. The channelization shown on this plan is for a two-lane highway. The channelization plan may be used on four-lane undivided highways with the appropriate considerations.
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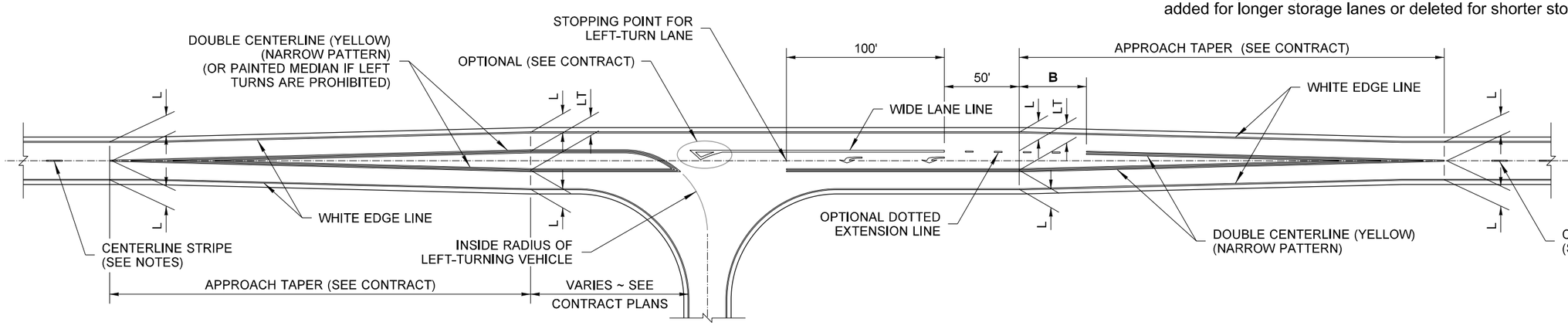
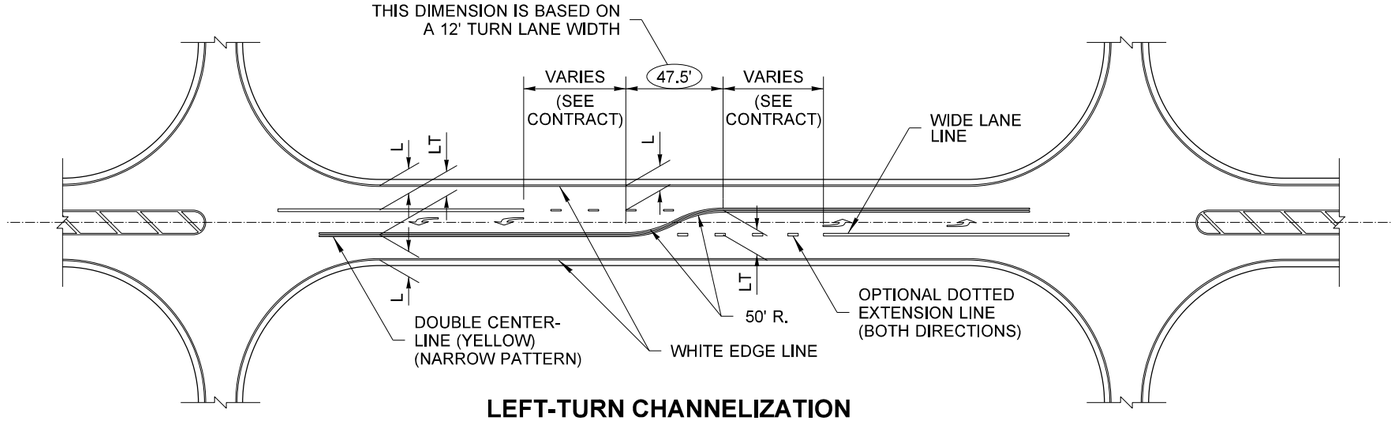
5. Centerline striping on four-lane undivided highways shall be a double centerline.
6. The two Type 2L (SL) Traffic Arrows shown in the left-turn storage lane are optional. Arrows may be added for longer storage lanes or deleted for shorter storage lanes. See Contract Plans.



LEFT-TURN CHANNELIZATION
TEE INTERSECTION



LEFT-TURN CHANNELIZATION
BACK-TO-BACK LEFT-TURN LANES

POSTED SPEED	DIMENSION B
60 MPH	60'
55 MPH	55'
50 MPH	50'
45 MPH	45'
40 MPH	40'
35 MPH	35'
30 MPH	30'
25 MPH	25'
20 MPH	20'

LEGEND

L = Lane width. See Contract

LT = Left-Turn lane width. See Contract

Type 2L (SL) Traffic Arrow

Type 6R (SR) Traffic Arrow

BRIAN J. WALSH
STATE OF WASHINGTON
36103
REGISTERED
PROFESSIONAL ENGINEER

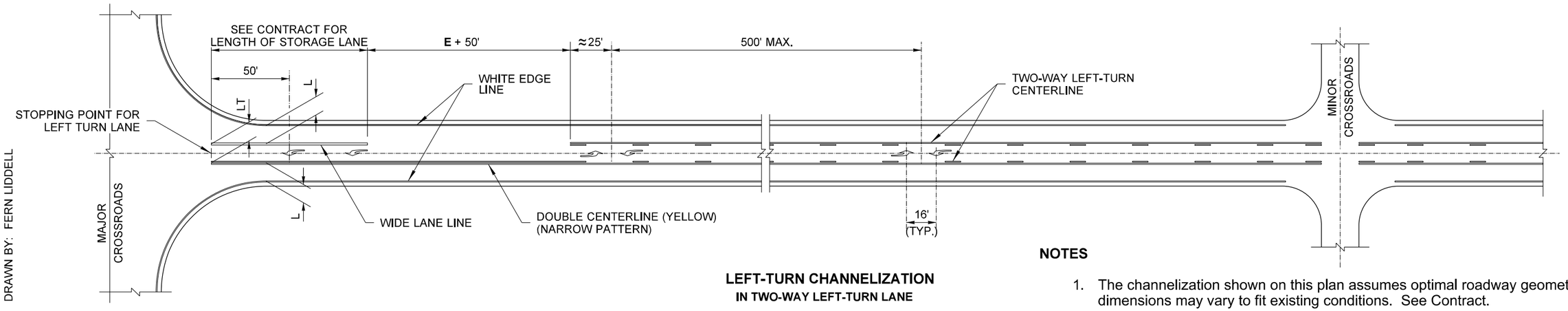
Walsh, Brian
Sep 23 2020 1:57 PM

LEFT-TURN CHANNELIZATION TEE INTERSECTION AND BACK-TO-BACK TURN LANES STANDARD PLAN M-3.30-04

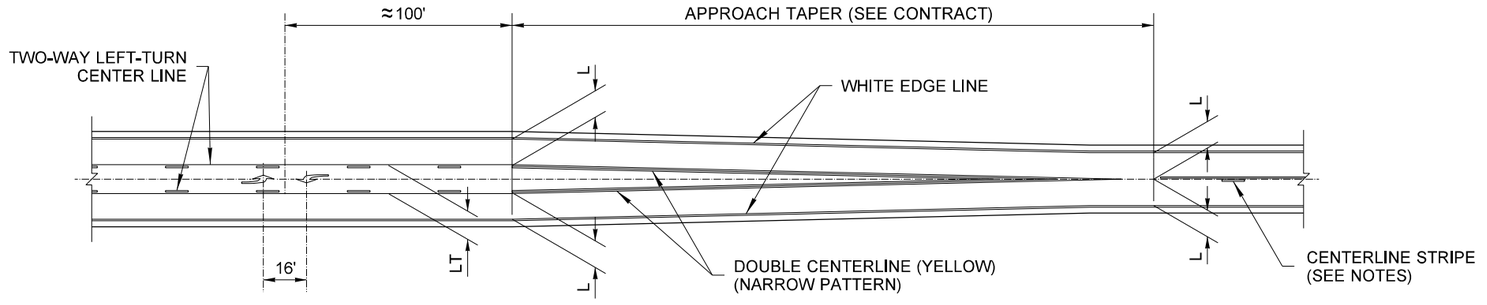
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Date: 2020.09.25 14:53:40 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation

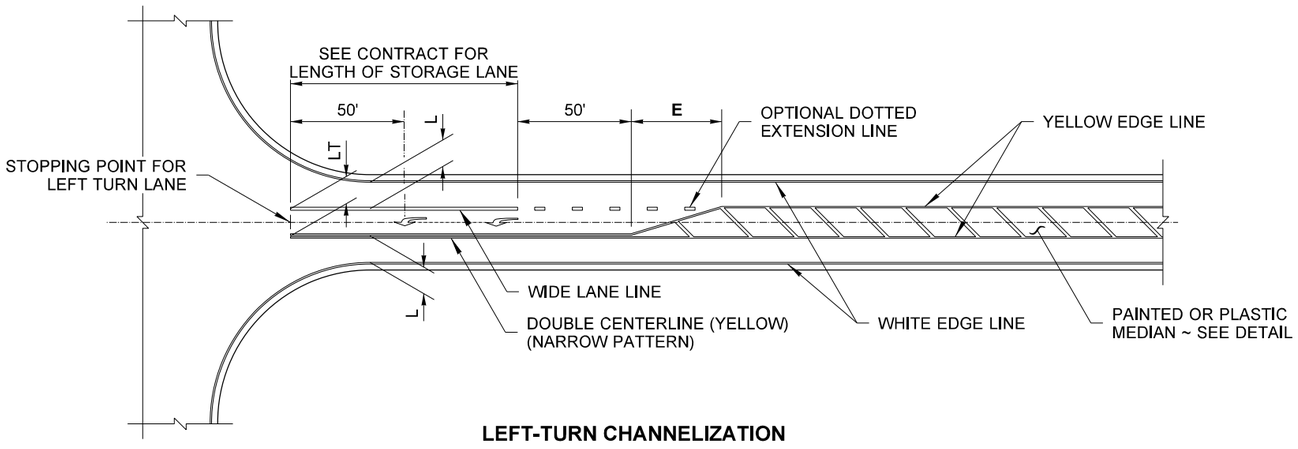
DRAWN BY: FERN LIDDELL



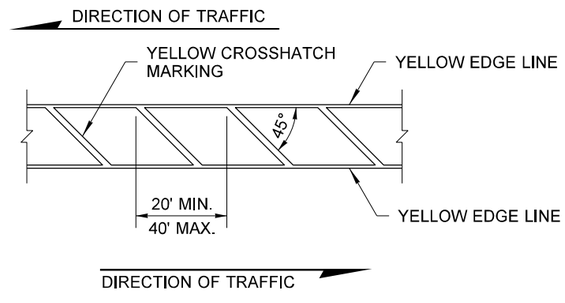
LEFT-TURN CHANNELIZATION
IN TWO-WAY LEFT-TURN LANE



TWO-WAY LEFT-TURN LANE
TRANSITION



LEFT-TURN CHANNELIZATION
IN PAINTED MEDIAN



PAINTED OR PLASTIC MEDIAN
COMPOSED OF LONGITUDINAL MARKINGS

NOTES

1. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.
2. The channelization shown on this plan is for a two-lane highway. The channelization plan may be used on four-lane undivided highways with the appropriate considerations.
3. Centerline striping on the approach to raised channelization shall be No Pass in accordance with MUTCD figure 3B-15. Centerline striping on the departure from raised channelization shall be determined by an engineering study.
4. Centerline srtiping on the approach to and departure from painted channelization shall be determined by an engineering study.
5. Centerline striping on four-lane undivided highways shall be a double centerline.
6. The two Type 2L (SL) Traffic Arrows shown in the left-turn storage lane are optional, but recommended. Arrows may be added for longer storage lanes or deleted for shorter storage lanes. See Contract Plans.

POSTED SPEED	DIMENSION E ①
60 MPH	180'
55 MPH	180'
50 MPH	180'
45 MPH	180'
40 MPH	120'
35 MPH	120'
30 MPH	120'
25 MPH	120'
20 MPH	120'

① Can be reduced to a minimum of 50' to increase storage capacity.

LEGEND

L = Lane Width. See Contract for specified lane widths.
L T = Left -Turn Lane width. See Contract
Type 2L (SL) Traffic Arrow

BRIAN J. WALSH
STATE OF WASHINGTON
36103
REGISTERED
PROFESSIONAL ENGINEER

Walsh, Brian
Sep 23 2020 2:03 PM
cosign

TWO-WAY LEFT-TURN AND MEDIAN CHANNELIZATION STANDARD PLAN M-3.40-04

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
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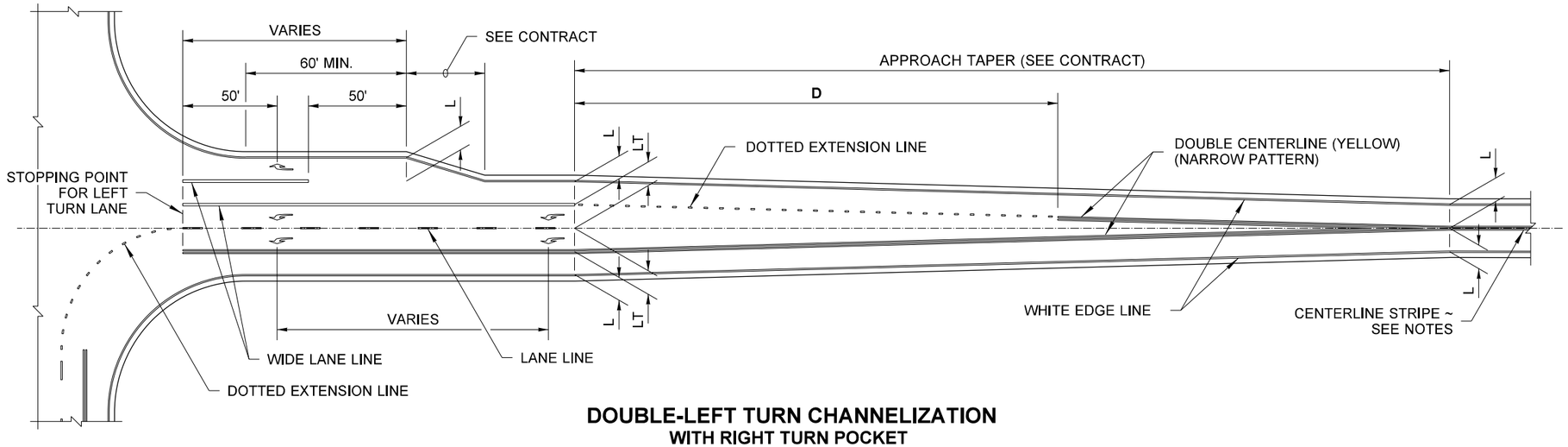
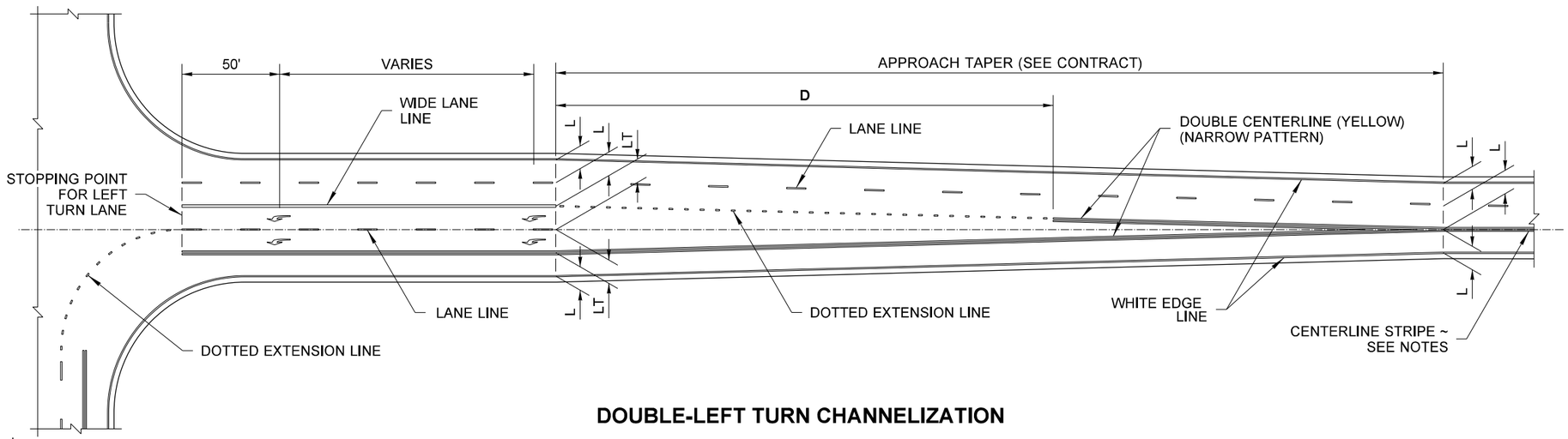
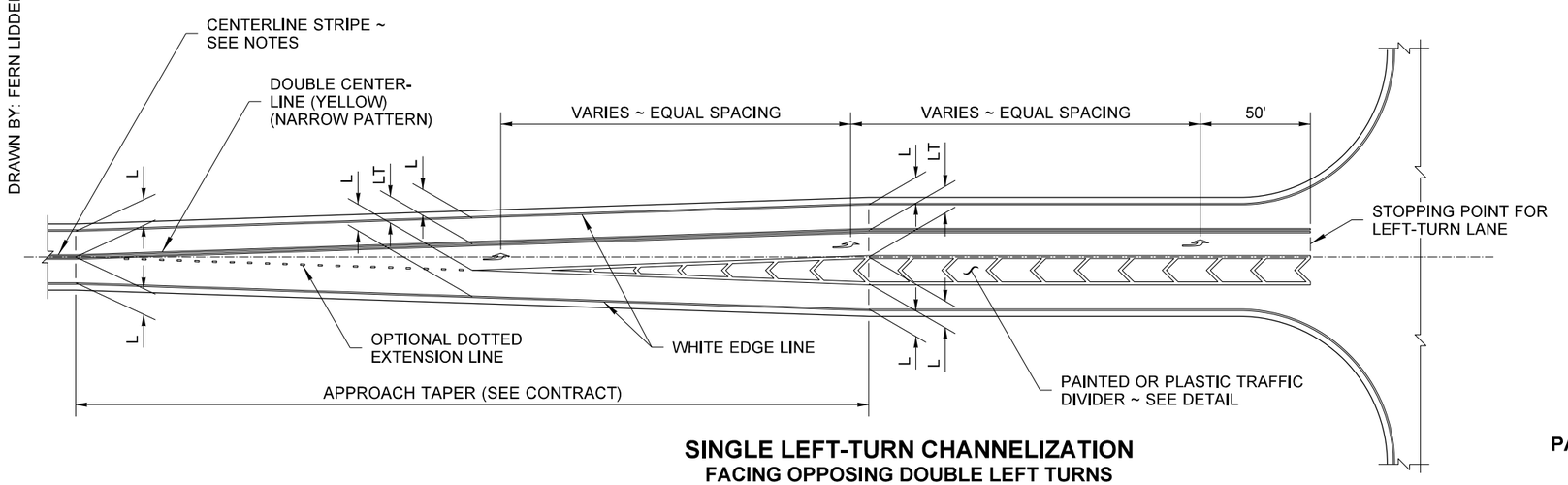
STATE DESIGN ENGINEER
Washington State Department of Transportation



DOUBLE-LEFT TURN CHANNELIZATION
WITH RIGHT TURN POCKET



DOUBLE-LEFT TURN CHANNELIZATION



SINGLE LEFT-TURN CHANNELIZATION
FACING OPPOSING DOUBLE LEFT TURNS

DRAWN BY: FERN LIDDELL

NOTES

1. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.
2. The channelization shown on this plan is for a two lane highway. The channelization plan may be used on four lane undivided highways with the appropriate consideratiions.
3. Centerline striping on the approach to raised channelization shall be No Pass in accordance with MUTCD Figure 3B-15. Centerline striping on the departure from raised channelization shall be determined by an engineering study.
4. Centerline striping on the approach to and departure from painted channelization shall be determined by an engineering study.
5. Centerline striping on four lane undivided highways shall be double centerline.
6. All turn traffic arrows are optional, but recommended. Arrows may be added for longer storage lanes or deleted for shorter storage lanes. See Contract Plans.

LEGEND

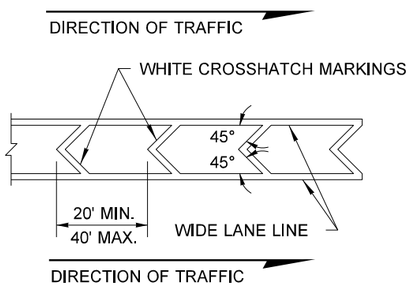
L = Lane width. See Contract

LT = Left-Turn lane width. See Contract

Type 2L (SL) Traffic Arrow

Type 2R (SR) Traffic Arrow

POSTED SPEED	D
60 MPH	420'
55 MPH	385'
50 MPH	350'
45 MPH	315'
40 MPH	280'
35 MPH	245'
30 MPH	210'
25 MPH	175'
20 MPH	140'



PAINTED OR PLASTIC TRAFFIC DIVIDER
COMPOSED OF LONGITUDINAL MARKINGS

BRIAN J. WALSH
STATE OF WASHINGTON
36103
REGISTERED
PROFESSIONAL ENGINEER

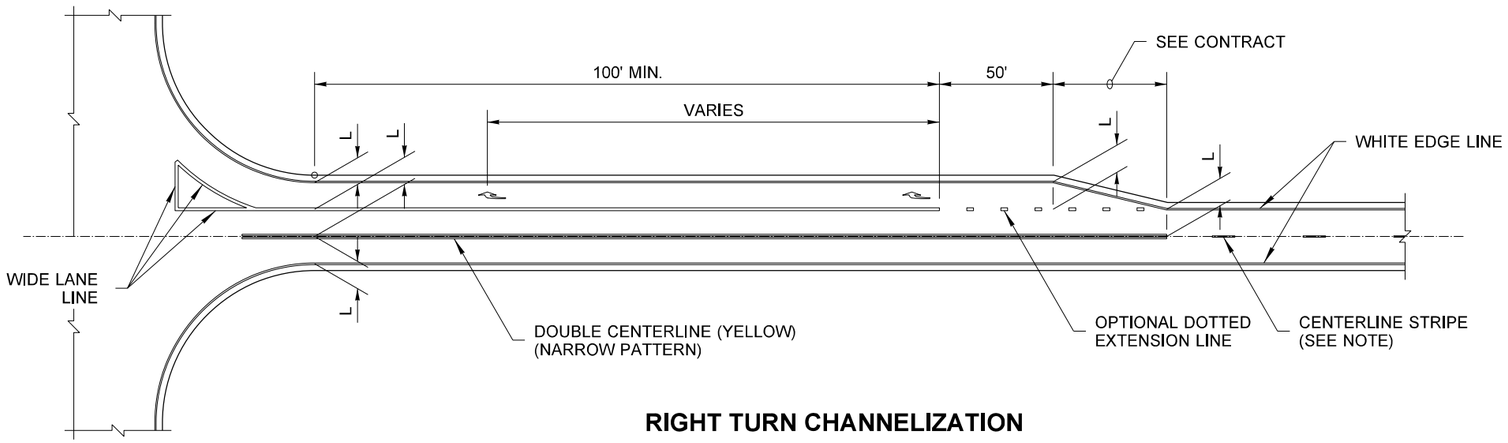
Walsh, Brian
Sep 23 2020 3:44 PM
cosign

DOUBLE LEFT TURN CHANNELIZATION

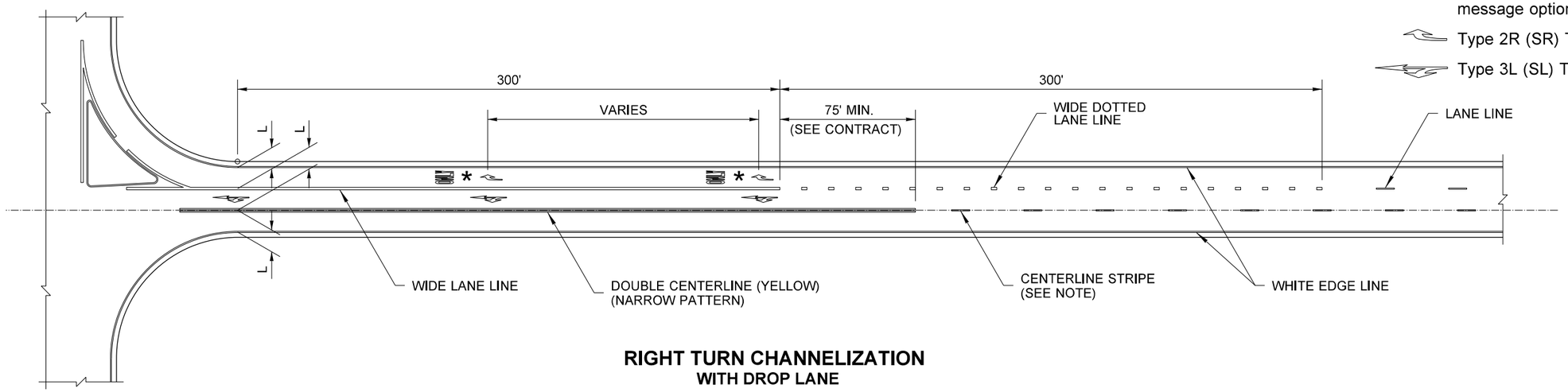
STANDARD PLAN M-3.50-03

SHEET 1 OF 1 SHEET

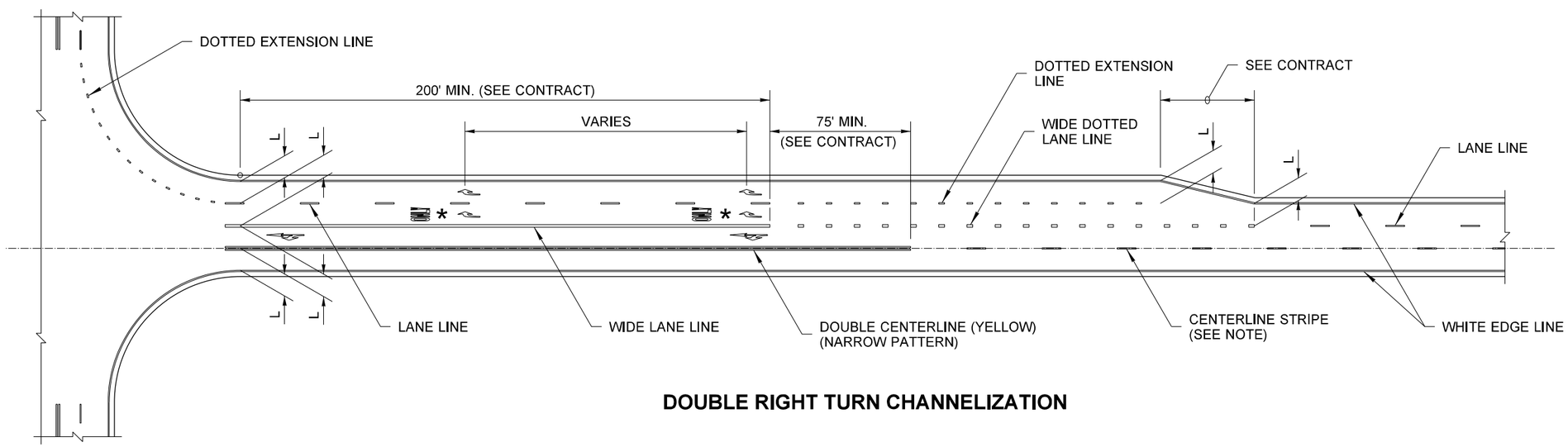
APPROVED FOR PUBLICATION
Date: 2020.09.25 14:56:07 -07'00'
STATE DESIGN ENGINEER
Washington State Department of Transportation



RIGHT TURN CHANNELIZATION



RIGHT TURN CHANNELIZATION
WITH DROP LANE



DOUBLE RIGHT TURN CHANNELIZATION

NOTES

1. The channelization shown on this plan assumes optimal roadway geometric design. The dimensions may vary to fit existing conditions. See Contract.
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4. Centerline striping on the approach to and departure from painted channelization shall be determined by an engineering study.
5. Centerline striping on four-lane undivided highways shall be a double center line.
6. All Traffic Arrows not required are optional, but recommended. Arrows may be added for longer storage lanes, or deleted for shorter storage lanes. See Contract Plans.

LEGEND

L = Lane Width. See Contract for specified lane widths.

* = Denotes required traffic arrow. Accompanying ONLY word message optional. See **Standard Plan M-80.10** for spacing.

Type 2R (SR) Traffic Arrow

Type 3L (SL) Traffic Arrow

DRAWN BY: FERN LIDDELL

BRIAN J. WALSH
STATE OF WASHINGTON
36103
REGISTERED
PROFESSIONAL ENGINEER

Walsh, Brian
Sep 23 2020 3:45 PM
cosign

RIGHT TURN CHANNELIZATION

STANDARD PLAN M-5.10-03

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
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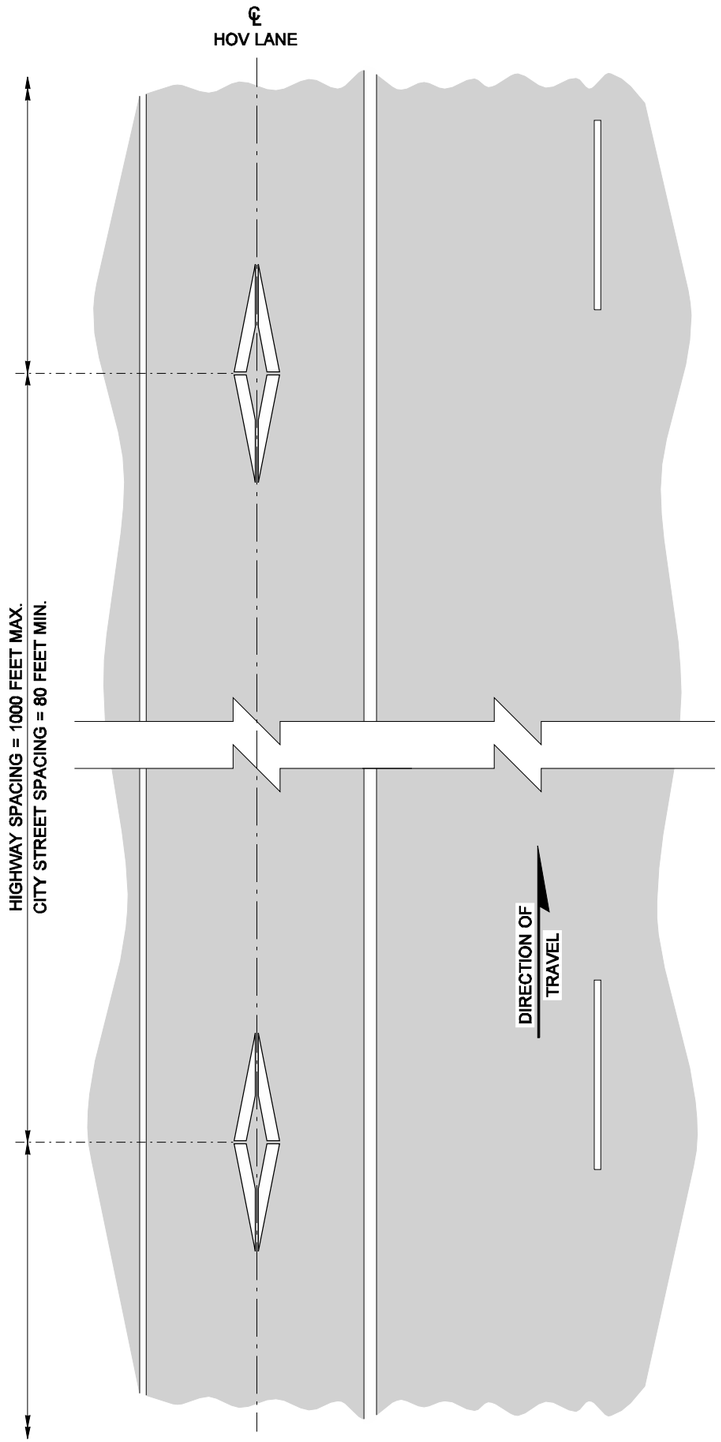
STATE DESIGN ENGINEER
Washington State Department of Transportation

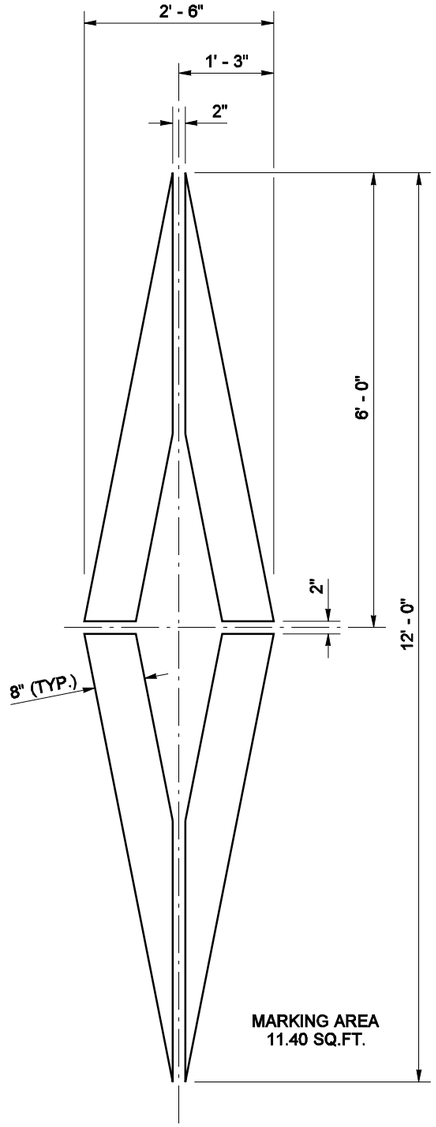
DRAWN BY: MARK SUJKA



LAYOUT

NOTE

When Specified in the Contract Plans, the HOV Symbol Marking shall be installed with an offset of 1 foot max. from the lane centerline.



HOV LANE SYMBOL

THEODORE J. TREPANIER
STATE OF WASHINGTON
25335
REGISTERED
PROFESSIONAL ENGINEER

EXPIRES AUGUST 9, 2007

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

HIGH OCCUPANCY VEHICLE (HOV) LANE SYMBOL LAYOUT

STANDARD PLAN M-7.50-01

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

Ken L. Smith — STATE DESIGN ENGINEER

01-30-07 — DATE

Washington State Department of Transportation

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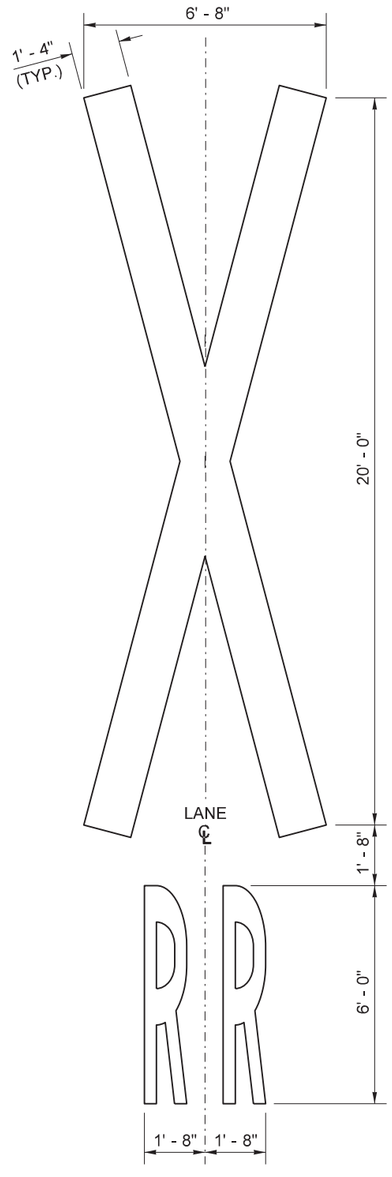
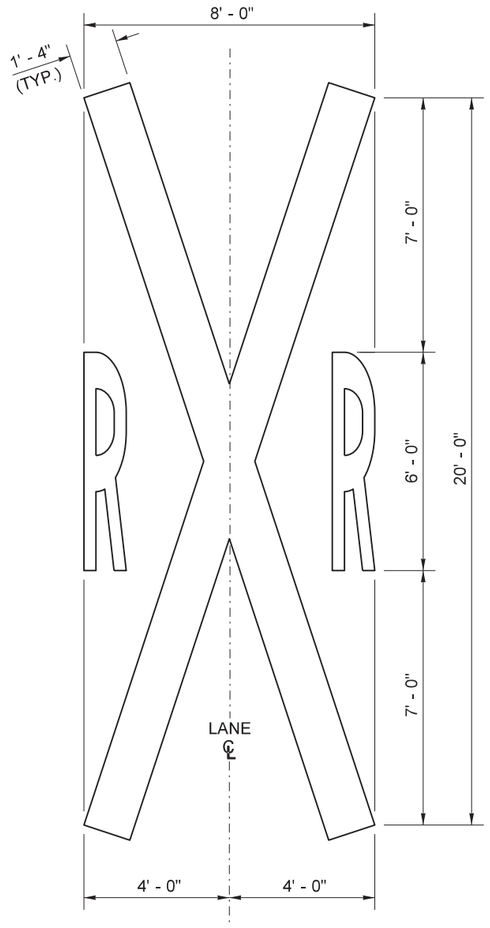
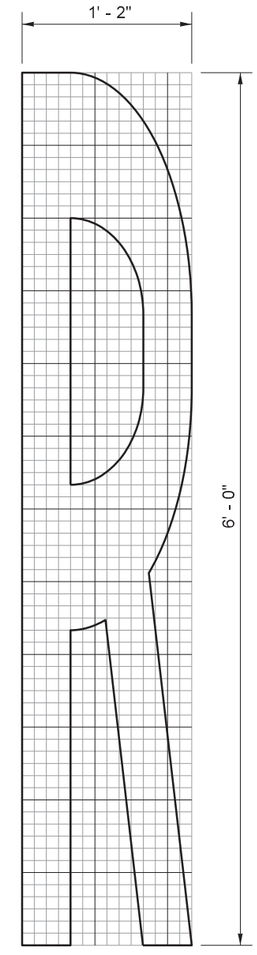


SYMBOL DETAIL



ALTERNATIVE SYMBOL DETAIL



GRID IS 1" (IN) SQUARE

"R" DETAIL

STANDARD SYMBOL DETAILS

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RAILROAD CROSSING LAYOUT

STANDARD PLAN M-11.10-03

SHEET 2 OF 2 SHEETS

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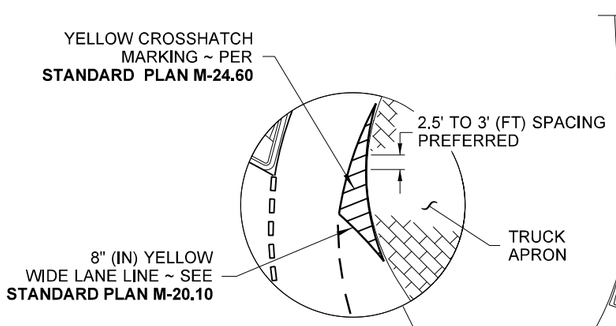
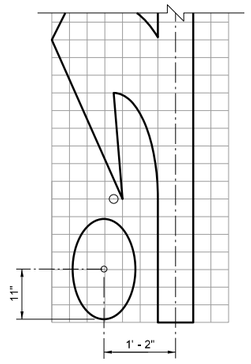


TYPICAL ROUNDABOUT HATCHING DETAIL

TYPICAL ROUNDABOUT MARKING DETAIL

NOTES

1. These details can vary greatly according to the Contract plans.
2. The need for Advance Roundabout Traffic Arrows is based upon posted speed of approach roadway.
3. Place Arrows in the circulating lanes as close as possible to the center of the lane to avoid having them in the wheel paths.
4. Local agencies (on non-state route intersections) may elect to use Yield Line Symbol Type 2 (sharks teeth) prior to the Wide Dotted Entry Line. See **Standard Plan M-24.60** for details.
5. Check with Region Traffic office regarding RPM and Guidepost placement and use.



ROUNDABOUT CIRCLE MARKING DETAIL
WITH TYPE 3SL TRAFFIC ARROW ~
SEE **STANDARD PLAN M-24.40**

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ROUNDABOUT PAVEMENT MARKINGS

STANDARD PLAN M-12.10-02

SHEET 1 OF 1 SHEET

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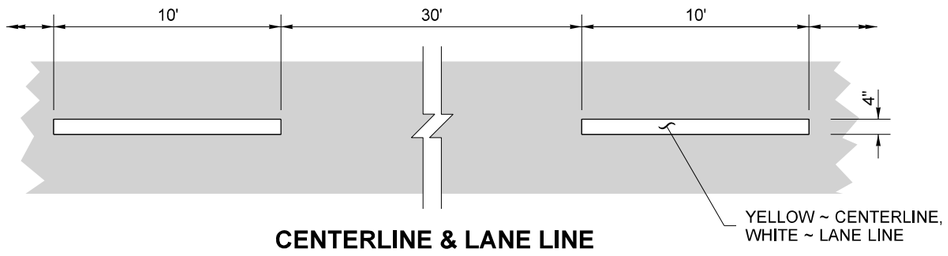
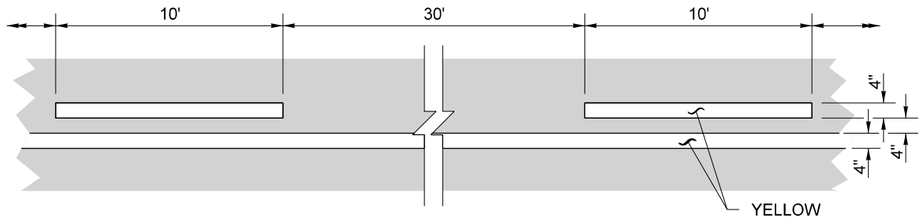
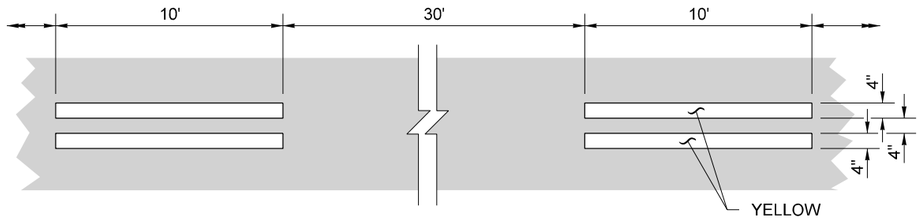


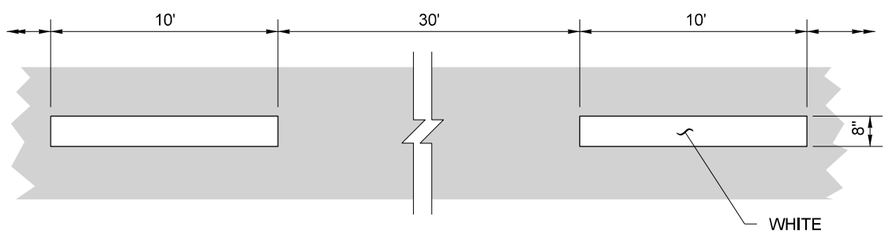
CENTERLINE & LANE LINE



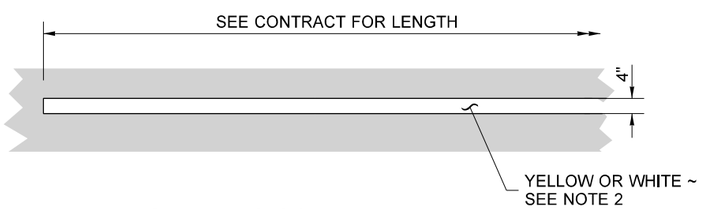
NO-PASS LINE & TWO-WAY LEFT-TURN CENTERLINE



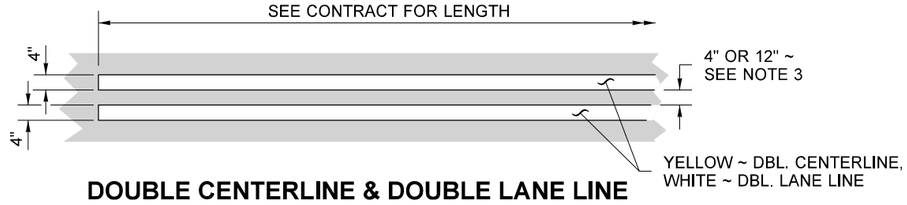
REVERSIBLE LANE LINE



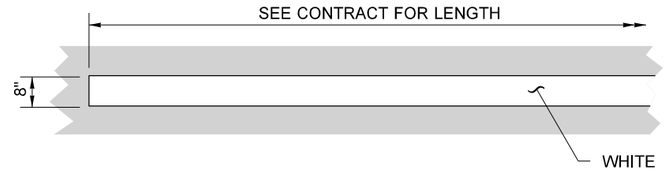
WIDE BROKEN LANE LINE



EDGE LINE & SOLID LANE LINE

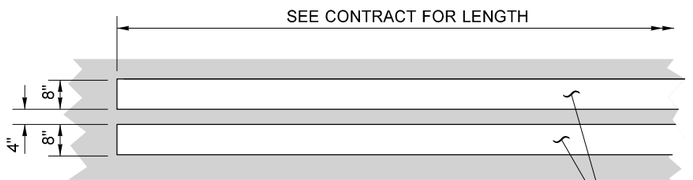


DOUBLE CENTERLINE & DOUBLE LANE LINE

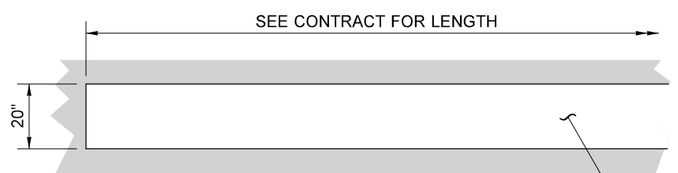


WIDE EDGE LINE & WIDE SOLID LANE LINE

OPTION TO USE AS CIRCULATORY ON ROUNDABOUT APPLICATIONS



DOUBLE WIDE LANE LINE



BARRIER CENTERLINE

NOTES

1. Dotted Extension Line shall be the same color as the line it is extending.
2. Edge Line shall be white on the right edge of traveled way, and yellow on the left edge of traveled way (on one-way roadways). Solid Lane Line shall be white.
3. The distance between the lines of the Double Centerline shall be 12" everywhere, except 4" for left-turn channelization and narrow roadways with lane widths of 10 feet or less. Local Agencies (on non-state routes) may specify a 4" distance for all locations.

   The distance between the lines of the Double Lane Line shall be 4".

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LONGITUDINAL MARKING PATTERNS

STANDARD PLAN M-20.10-03

SHEET 1 OF 2 SHEETS

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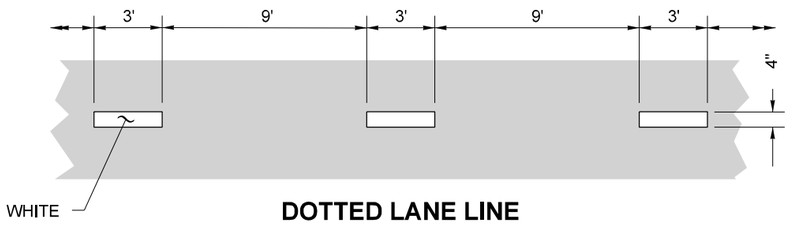
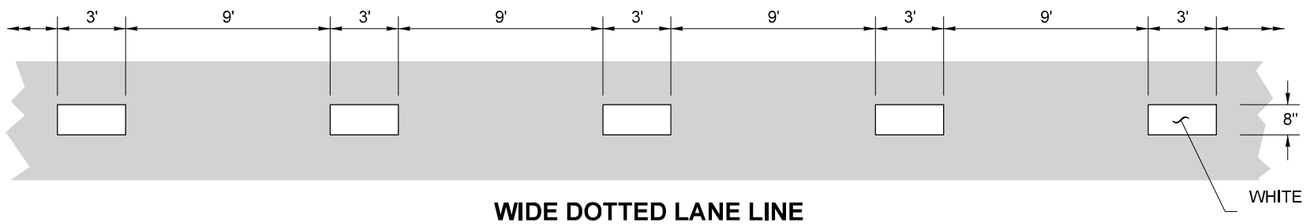
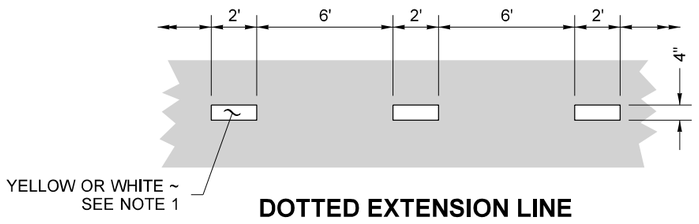


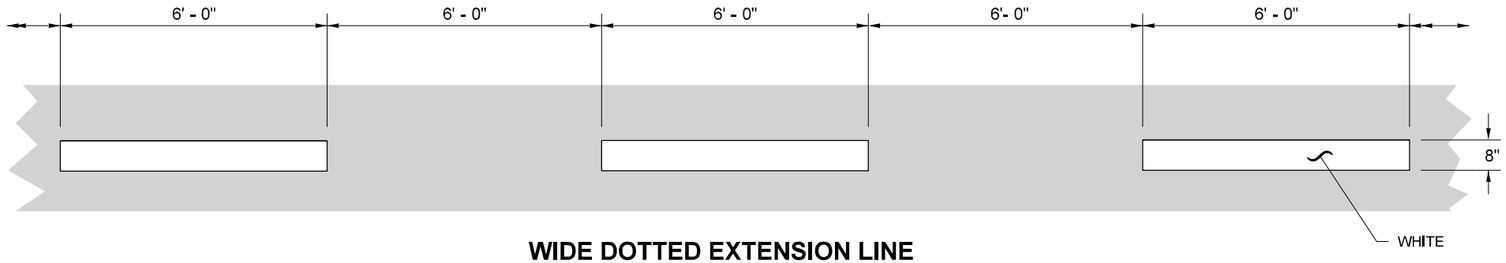
DOTTED LANE LINE



WIDE DOTTED LANE LINE



DOTTED EXTENSION LINE



WIDE DOTTED EXTENSION LINE

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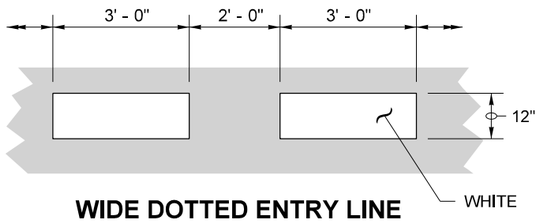
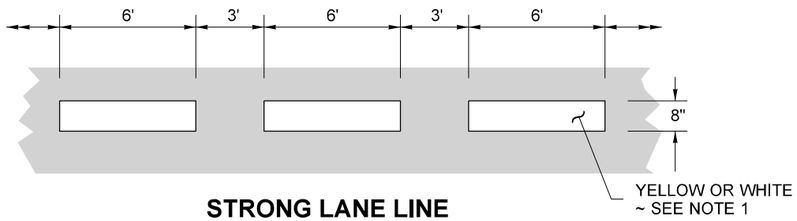
Roundabout Specific Lines

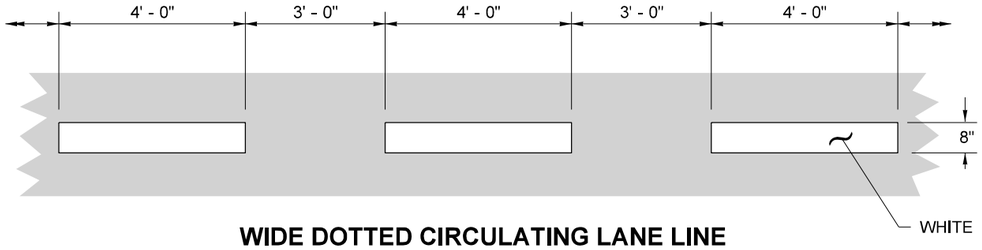


WIDE DOTTED ENTRY LINE



STRONG LANE LINE

OPTION TO USE AS CIRCULATORY ON ROUNDABOUT APPLICATIONS



WIDE DOTTED CIRCULATING LANE LINE

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LONGITUDINAL MARKING PATTERNS

STANDARD PLAN M-20.10-03

SHEET 2 OF 2 SHEETS

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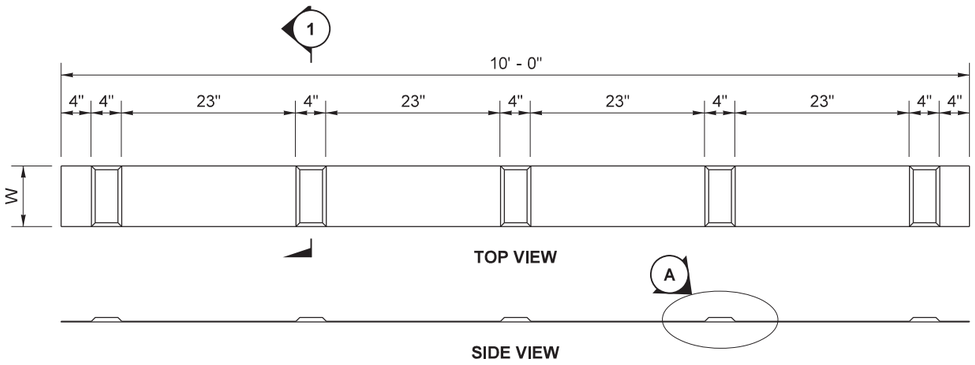
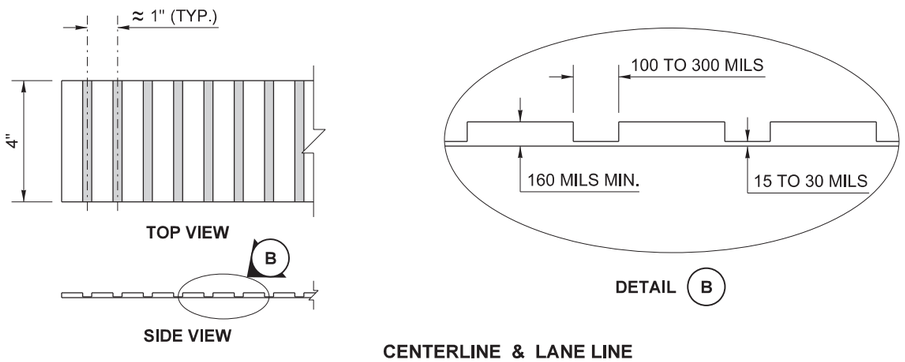
GENERAL NOTE

See **Standard Plan M-20.10** for pattern and color requirements.



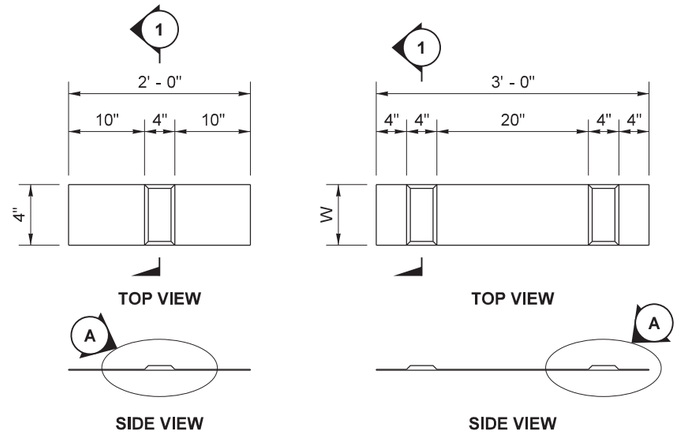
PROFILED PLASTIC
(BROKEN LINE)

FOR:
CENTERLINE & LANE LINE ~ W = 4"
NO-PASS LINE & TWO-WAY LEFT-TURN CENTERLINE ~ W = 4"
REVERSIBLE LANE LINE ~ W = 4"
WIDE BROKEN LANE LINE ~ W = 8"



EMBOSSED PLASTIC
(SOLID OR BROKEN LINE)

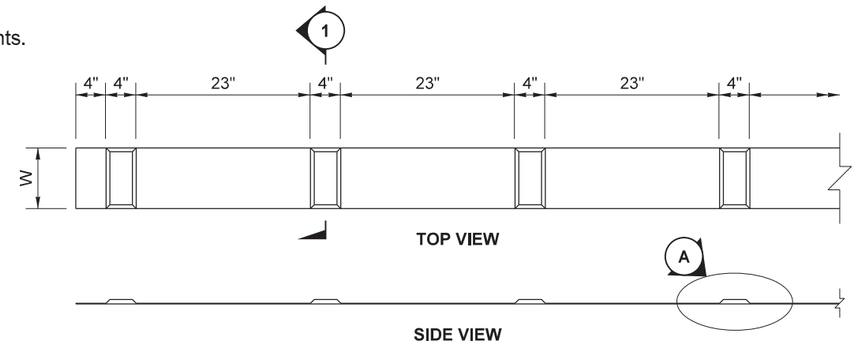
FOR:
CENTERLINE & LANE LINE
NO-PASS LINE & TWO-WAY LEFT-TURN CENTERLINE
REVERSIBLE LANE LINE
DOUBLE CENTERLINE & DOUBLE LANE LINE
EDGE LINE & SOLID LANE LINE



DOTTED EXTENSION LINE

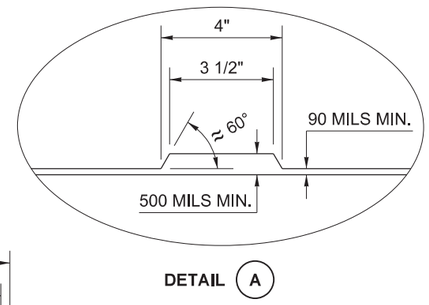
DOTTED LANE LINE ~ W = 4"
WIDE DOTTED LANE LINE ~ W = 8"

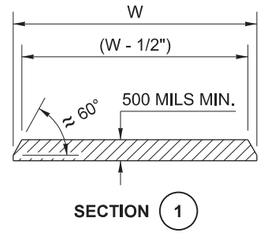
PROFILED PLASTIC
(BROKEN LINE)

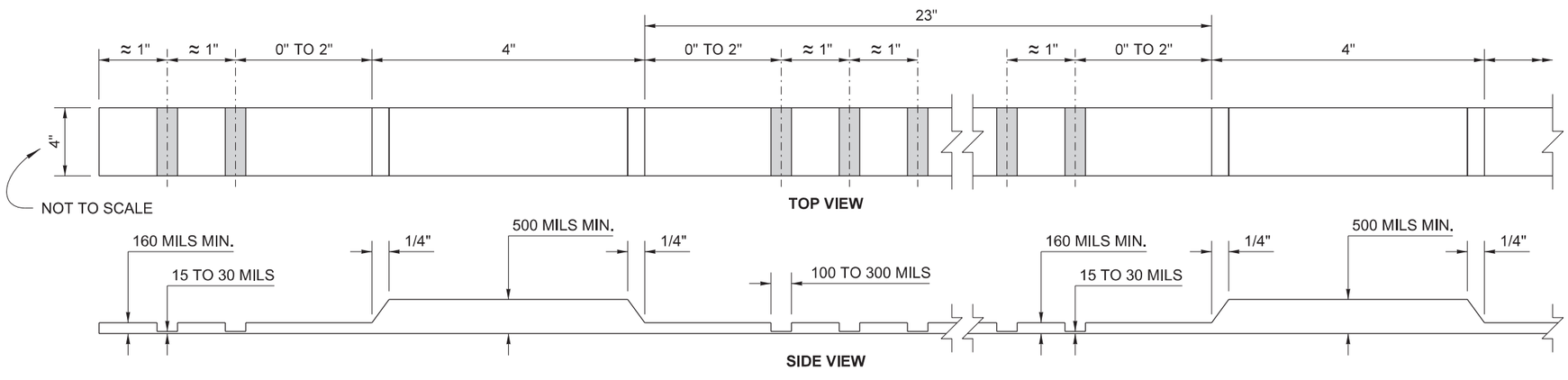


PROFILED PLASTIC
(SOLID LINE)

FOR:
NO-PASS LINE ~ W = 4"
TWO-WAY LEFT-TURN CENTERLINE ~ W = 4"
DOUBLE CENTERLINE & DOUBLE LANE LINE ~ W = 4"
EDGE LINE & SOLID LANE LINE ~ W = 4"
WIDE LANE LINE & WIDE LINE ~ W = 8"
DOUBLE WIDE LANE LINE ~ W = 8"
BARRIER CENTERLINE ~ W = 20"







PROFILED EMBOSSED PLASTIC
(SOLID OR BROKEN LINE)

FOR:
CENTERLINE & LANE LINE
NO-PASS LINE
TWO-WAY LEFT-TURN CENTERLINE
REVERSIBLE LANE LINE
DOUBLE CENTERLINE & DOUBLE LANE LINE
EDGE LINE & SOLID LANE LINE

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PROFILED AND EMBOSSED PLASTIC LINES

STANDARD PLAN M-20.20-02

SHEET 1 OF 1 SHEET

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