Washington State Department of Transportation

Publications Transmittal

Transmittal Number	Date
PT 18-057	August 6, 2018
Publication Title / Publication Number: *Standard Plans* M 21-01	
Originating Organization: Design Office, Engineering and Regional Operations	

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.
- Remove **pages 3 ~ 13** from your current manual.
- Insert **pages 3 ~ 12**.
- Refer to the ***REMOVE & INSERT INSTRUCTIONS ~ Standard Plans Revision 8-6-2018***

To get the latest information, please sign up for email updates for individual publications at www.wsdot.wa.gov/publications/manuals.

Washington State Department of Transportation
Engineering and Regional Operations
Design Office
PO Box 47329
Olympia, WA 98504-7329

Email: designstandards@wsdot.wa.gov
www.wsdot.wa.gov/design/standards/plans.htm

John Donahue
Approved By

Signature

This page left blank intentionally.

REMOVE AND INSERT INSTRUCTIONS - Standard Plans Revision 8-6-2018

REMOVE				*INSERT*			
A-60.30-00	11/8/07			A-60.30-01	6/28/18		Revised
A-60.40-00	8/31/07			A-60.40-00	8/31/07		Reprinted
B-5.60-02	1/26/17			B-5.60-02	1/26/17		Reprinted
B-10.20-01	2/7/12			B-10.20-02	3/2/18		Revised
B-10.40-01	1/26/17			B-10.40-01	1/26/17		Reprinted
B-10.60-00	6/8/06		Deleted	B-10.70-00	1/26/17		Reprinted
B-10.70-00	1/26/17						
Blank							
B-20.40-03	3/16/12			B-20.40-04	2/27/18		Revised
B-20.60-03	3/15/12			B-20.60-03	3/15/12		Reprinted
B-25.20-01	3/15/12			B-25.20-02	2/27/18		Revised
B-25.60-01	1/26/17			B-25.60-02	2/27/18		Revised
B-30.10-02	1/26/17			B-30.10-03	2/27/18		Revised
B-30.20-03	1/26/17			B-30.15-00	2/27/18		New Plan
B-30.30-02	1/26/17			B-30.20-04	2/27/18		Revised
B-30.40-02	1/26/17			B-30.30-03	2/27/18		Revised
B-30.50-02	1/26/17			B-30.40-03	2/27/18		Revised
B-30.70-03	4/26/12			B-30.50-03	2/27/18		Revised
B-30.80-00	6/8/06			B-30.70-04	2/27/18		Revised
B-30.90-02	1/26/17			B-30.80-01	2/27/18		Revised
				B-30.90-02	1/26/17		Reprinted
				Blank			
B-55.20-01	1/26/17			B-55.20-02	2/27/18		Revised
B-60.20-00	6/8/06			B-60.20-01	6/28/18		Revised
B-60.40-00	6/1/06			B-60.40-01	2/27/18		Revised
B-65.20-01	4/26/12			B-65.20-01	4/26/12		Reprinted
B-70.60-01	1/26/17	Sheet 2 of 2		B-70.60-01	1/26/17	Sheet 2 of 2	Reprinted
B-75.20-01	6/10/08			B-75.20-02	2/27/18		Revised
B-82.20-00	6/1/06		Deleted	Blank			
B-85.10-01	6/10/08			B-85.10-01	6/10/08		Reprinted
B-95.40-00	6/8/06			B-95.40-01	6/28/18		Revised
Blank				Blank			
				Blank			
				C-1	6/28/18		New Plan
				C-2c	6/21/06		Reprinted
				C-4f	7/2/12	Sheet 1 of 4	Reprinted
				C-4f	7/2/12	Sheet 2 of 4	Reprinted
				C-4f	7/2/12	Sheet 3 of 4	Reprinted
				C-4f	7/2/12	Sheet 4 of 4	Reprinted
				C-6a	10/14/09		Reprinted
C-25.26-03	7/14/15			C-25.26-03	7/14/15		Reprinted
C-25.80-04	7/15/16			C-25.30-00	6/28/18		New Plan
				Blank			
				C-25.80-04	7/15/16		Reprinted
C-40.14-02	7/2/12		Deleted	C-40.16-02	7/2/12		Reprinted
C-40.16-02	7/2/12			Blank			

REMOVE AND INSERT INSTRUCTIONS - Standard Plans Revision 8-6-2018

REMOVE				***INSERT***
Blank				
C-1	7/12/16	Sheet 1 of 2		
C-1	7/12/16	Sheet 2 of 2		
C-1c	7/12/16			
C-2	1/6/00			
C-2a	6/21/06			
C-2b	6/21/06			**Details of Plan Contents are available on the Plan Sheet Library Web Site**
C-2c	6/21/06			
C-2d	6/21/06			
C-2e	6/21/06			
C-2f	3/14/97			
C-2g	7/27/01			
C-2h	3/28/97			
C-2i	3/28/97			
C-2j	6/12/98			
C-2k	7/12/16			
C-2n	7/12/16			
C-2o	7/13/01			
C-2p	10/31/03			
C-3	7/2/12			
C-3a	10/4/05			
C-3b	6/27/11	Sheet 1 of 2		
C-3b	6/27/11	Sheet 2 of 2		
C-3c	6/27/11			
C-4b	7/15/16		Deleted	
C-4e	7/15/16		Deleted	
Blank				
C-4f	7/2/12	Sheet 1 of 4		
C-4f	7/2/12	Sheet 2 of 4		
C-4f	7/2/12	Sheet 3 of 4		
C-4f	7/2/12	Sheet 4 of 4		
C-6	7/15/16	Sheet 1 of 2		
C-6	7/15/16	Sheet 2 of 2		
C-6a	10/14/09			
C-6c	7/15/16			
C-6d	7/15/16			
C-6f	7/15/16			
C-10	7/15/16	Sheet 1 of 2		
C-10	7/15/16	Sheet 2 of 2		
C-22.14-04	7/15/16		Deleted	
Blank				
C-90.10-00	7/3/08		Deleted	

REMOVE AND INSERT INSTRUCTIONS - Standard Plans Revision 8-6-2018

REMOVE				***INSERT***			
D-10.45-01	12/2/08	Sheet 2 of 2		D-10.45-01	12/2/08	Sheet 2 of 2	Reprinted
D-15.10-01	12/2/08	Sheet 1 of 2	Deleted	Blank			
D-15.10-01	12/2/08	Sheet 2 of 2	Deleted				
D-15.20-03	5/9/16	Sheet 1 of 2	Deleted				
D-15.20-03	6/1/16	Sheet 2 of 2	Deleted				
D-15.30-01	12/2/08	Sheet 1 of 2	Deleted				
D-15.30-01	12/2/08	Sheet 2 of 2	Deleted				
Blank							
G-22.10-03	7/10/15	Sheet 1 of 3		G-22.10-04	6/28/18	Sheet 1 of 3	Revised
G-22.10-03	7/10/15	Sheet 2 of 3		G-22.10-04	6/28/18	Sheet 2 of 3	Revised
G-22.10-03	7/10/15	Sheet 3 of 3		G-22.10-04	6/28/18	Sheet 3 of 3	Revised
G-24.10-00	11/8/07			G-24.10-00	11/8/07		Reprinted
G-24.20-01	2/7/12			G-24.20-01	2/7/12		Reprinted
G-24.30-01	2/7/12	Sheet 1 of 2		G-24.30-02	6/28/18	Sheet 1 of 2	Revised
G-24.30-01	2/7/12	Sheet 2 of 2		G-24.30-02	6/28/18	Sheet 2 of 2	Revised
G-24.40-06	2/29/16	Sheet 1 of 4		G-24.40-07	6/28/18	Sheet 1 of 6	Revised
G-24.40-06	2/29/16	Sheet 2 of 4		G-24.40-07	6/28/18	Sheet 2 of 6	Revised
G-24.40-06	2/29/16	Sheet 3 of 4		G-24.40-07	6/28/18	Sheet 3 of 6	Revised
G-24.40-06	2/29/16	Sheet 4 of 4		G-24.40-07	6/28/18	Sheet 4 of 6	Revised
G-24.50-04	7/11/17			G-24.40-07	6/28/18	Sheet 5 of 6	Revised
				G-24.40-07	6/28/18	Sheet 6 of 6	Revised
				G-24.50-04	7/11/17		Reprinted
G-24.60-04	6/23/15	Sheet 1 of 2		G-24.60-05	6/28/18	Sheet 1 of 2	Revised
G-24.60-04	6/23/15	Sheet 2 of 2		G-24.60-05	6/28/18	Sheet 2 of 2	Revised
G-30.10-04	6/23/15	Sheet 2 of 2		G-30.10-04	6/23/15	Sheet 2 of 2	Reprinted
G-50.10-02	6/23/15	Sheet 1 of 2		G-50.10-03	6/28/18	Sheet 1 of 2	Revised
G-50.10-02	6/23/15	Sheet 2 of 2		G-50.10-03	6/28/18	Sheet 2 of 2	Revised
G-60.10-03	6/18/15	Sheet 1 of 4		G-60.10-04	6/28/18	Sheet 1 of 4	Revised
G-60.10-03	6/18/15	Sheet 2 of 4		G-60.10-04	6/28/18	Sheet 2 of 4	Revised
G-60.10-03	6/18/15	Sheet 3 of 4		G-60.10-04	6/28/18	Sheet 3 of 4	Revised
G-60.10-03	6/18/15	Sheet 4 of 4		G-60.10-04	6/28/18	Sheet 4 of 4	Revised
G-60.20-02	6/18/15	Sheet 1 of 2		G-60.20-02	6/18/15	Sheet 1 of 2	Reprinted
G-95.10-01	6/2/11	Sheet 1 of 3		G-95.10-02	6/28/18	Sheet 1 of 3	Revised
G-95.10-01	6/2/11	Sheet 2 of 3		G-95.10-02	6/28/18	Sheet 2 of 3	Revised
G-95.10-01	6/2/11	Sheet 3 of 3		G-95.10-02	6/28/18	Sheet 3 of 3	Revised
G-95.20-02	6/2/11	Sheet 1 of 3		G-95.20-03	6/28/18	Sheet 1 of 3	Revised
G-95.20-02	6/2/11	Sheet 2 of 3		G-95.20-03	6/28/18	Sheet 2 of 3	Revised
G-95.20-02	6/2/11	Sheet 3 of 3		G-95.20-03	6/28/18	Sheet 3 of 3	Revised
G-95.30-02	6/2/11	Sheet 1 of 2		G-95.30-03	6/28/18	Sheet 1 of 2	Revised
G-95.30-02	6/2/11	Sheet 2 of 2		G-95.30-03	6/28/18	Sheet 2 of 2	Revised
I-30.60-00	5/29/13			I-30.60-01	3/7/18		Revised
Blank				Blank			

REMOVE AND INSERT INSTRUCTIONS - Standard Plans Revision 8-6-2018

REMOVE			*INSERT*			
			Blank			
			J-12.15-00	6/28/18	Sheet 1 of 2	New Plan
			J-12.15-00	6/28/18	Sheet 2 of 2	New Plan
			J-12.16-00	6/28/18	Sheet 1 of 2	New Plan
			J-12.16-00	6/28/18	Sheet 1 of 2	New Plan
			Blank			
J-26.15-01	5/17/12	Sheet 3 of 3	J-26.15-01	5/17/12	Sheet 3 of 3	Reprinted
J-26.20-00	6/11/14	Sheet 1 of 5	J-26.20-01	6/28/18	Sheet 1 of 5	Revised
J-26.20-00	6/11/14	Sheet 2 of 5	J-26.20-01	6/28/18	Sheet 2 of 5	Revised
J-26.20-00	6/11/14	Sheet 3 of 5	J-26.20-01	6/28/18	Sheet 3 of 5	Revised
J-26.20-00	6/11/14	Sheet 4 of 5	J-26.20-01	6/28/18	Sheet 4 of 5	Revised
J-26.20-00	6/11/14	Sheet 5 of 5	J-26.20-01	6/28/18	Sheet 5 of 5	Revised
J-28.43-00	6/11/14		J-28.43-01	6/28/18		Revised
J-28.45-03	7/21/16	Sheet 1 of 2	J-28.45-03	7/21/16	Sheet 1 of 2	Reprinted
J-75.45-02	6/1/16	Sheet 2 of 2				
J-90.10-02	4/28/16	Sheet 1 of 2				
J-90.10-02	4/28/16	Sheet 2 of 2				
J-90.20-02	4/28/16	Sheet 1 of 2				
J-90.20-02	4/28/16	Sheet 2 of 2				
J-90.21-01	4/28/16	Sheet 1 of 2				
J-90.21-01	4/28/16	Sheet 2 of 2				
Blank						
			J-75.45-02	6/1/16	Sheet 2 of 2	Reprinted
			J-80.10-00	6/28/18		New Plan
			J-80.15-00	6/28/18		New Plan
			J-81.10-00	6/28/18	Sheet 1 of 3	New Plan
			J-81.10-00	6/28/18	Sheet 2 of 3	New Plan
			J-81.10-00	6/28/18	Sheet 3 of 3	New Plan
			Blank			
			J-86.10-00	6/28/18	Sheet 1 of 3	New Plan
			J-86.10-00	6/28/18	Sheet 2 of 3	New Plan
			J-86.10-00	6/28/18	Sheet 3 of 3	New Plan
			Blank			
			J-90.10-03	6/28/18	Sheet 1 of 2	Revised
			J-90.10-03	6/28/18	Sheet 2 of 2	Revised
			J-90.20-03	6/28/18	Sheet 1 of 2	Revised
			J-90.20-03	6/28/18	Sheet 2 of 2	Revised
			J-90.21-02	6/28/18	Sheet 1 of 2	Revised
			J-90.21-02	6/28/18	Sheet 2 of 2	Revised
			J-90.50-00	6/28/18	Sheet 1 of 2	New Plan
			J-90.50-00	6/28/18	Sheet 2 of 2	New Plan
			Blank			
M-11.10-02	7/11/17		M-11.10-02	7/11/17		Reprinted
M-12.10-00	7/11/17		M-12.10-01	6/28/18		Revised

Washington State
Department of Transportation

Standard Plans

M 21-01

August 6, 2018

Engineering and Regional Operations
Development Division, Design Office

Americans with Disabilities Act (ADA) Information

Materials can be provided in alternative formats by calling the ADA Compliance Manager at 360-705-7097. Persons who are deaf or hard of hearing may contact that number via the Washington Relay Service at 7-1-1.

Title VI Notice to the Public

It is Washington State Department of Transportation (WSDOT) policy to ensure no person shall, on the grounds of race, color, national origin, or sex, as provided by Title VI of the Civil Rights Act of 1964, be excluded from participation in, be denied the benefits of, or be otherwise discriminated against under any of its federally funded programs and activities. Any person who believes his/her Title VI protection has been violated may file a complaint with WSDOT's Office of Equal Opportunity (OEO). For Title VI complaint forms and advice, please contact OEO's Title VI Coordinator at 360-705-7082 or 509-324-6018.

To get the latest information on WSDOT publications, sign up for individual email updates at www.wsdot.wa.gov/publications/manuals.

Washington State Department of Transportation
Engineering and Regional Operations
Development Division, Design Office
PO Box 47329
Olympia, WA 98504-7329

Email: designstandards@wsdot.wa.gov
www.wsdot.wa.gov/design/standards/plans.htm

Contents

Plan No.	Plan Title	Publication Approval Date	
Section A	**Roadway Construction**		
A-10.10-00	Survey Stakes	8/7/07	*2 Sheets*
A-10.20-00	Survey Monument Types 1 and 2	10/5/07	
A-10.30-00	Monument Case and Cover	10/5/07	
A-20.10-00	Slope Treatment	8/31/07	
A-30.10-00	Concrete Slope Protection	11/8/07	
A-30.30-01	Wire Mesh Slope Protection	6/16/11	
A-30.35-00	Slope Protection Anchors	10/12/07	
A-40.00-00	Dowel Bar Baskets	8/11/09	
A-40.10-03	Cement Concrete Pavement Joints	12/23/14	
A-40.15-00	PCC Pavement Isolation Joints	8/11/09	*2 Sheets*
A-40.20-04	Bridge Paving Joint Seals	1/18/17	*2 Sheets*
A-40.50-02	Bridge Approach Slab	12/23/14	*2 Sheets*
A-50.10-00	Embankment Widening at Bridge End with Wing Wall	11/17/08	*2 Sheets*
A-50.20-01	Embankment Widening at Bridge End with Curtain Wall	9/22/09	*2 Sheets*
A-50.30-00	Embankment Widening at Bridge End with "L" Shaped Abutment	11/17/08	*2 Sheets*
A-50.40-00	Embankment Widening at Bridge End with Sidewalk	11/17/08	
A-60.10-03	Cement Concrete Pavement Rehabilitation	12/23/14	*2 Sheets*
A-60.20-03	Dowel Bar Retrofit for Cement Concrete Pavement	12/23/14	*2 Sheets*
A-60.30-01	Bridge Deck Transition for HMA Overlay	6/28/18	
A-60.40-00	HMA Overlay Further Deck Preparation	8/31/07	
Section B	**Drainage Structures and Hydraulics**		
B-5.20-02	Catch Basin Type 1	1/26/17	
B-5.40-02	Catch Basin Type 1L	1/26/17	
B-5.60-02	Catch Basin Type 1P (for Parking Lot)	1/26/17	
B-10.20-02	Catch Basin Type 2	3/2/18	
B-10.40-01	Catch Basin Type 2 with Flow Restrictor	1/26/17	
B-10.70-00	Catch Basin ~ PVC	1/26/17	
B-15.20-01	Manhole Type 1	2/7/12	
B-15.40-01	Manhole Type 2	2/7/12	
B-15.60-02	Manhole Type 3	1/26/17	
B-20.20-02	Drywell Type 1 (for Swale)	3/16/12	
B-20.40-04	Drywell Type 2 (with Pipe Inlet)	2/27/18	
B-20.60-03	Drywell Type 3 (with At-Grade Inlet)	3/15/12	
B-25.20-02	Combination Inlet	2/27/18	
B-25.60-02	Concrete Inlet	2/27/18	
B-30.10-03	Rectangular Frame (Reversible)	2/27/18	
B-30.15-00	ADA Grates for Rectangular Frames	2/27/18	
B-30.20-04	Rectangular Solid Metal Cover	2/27/18	
B-30.30-03	Rectangular Vaned Grate	2/27/18	
B-30.40-03	Rectangular Bi-Directional Vaned Grate	2/27/18	
B-30.50-03	Rectangular Herringbone Grate	2/27/18	
B-30.70-04	Circular Frame (Ring) and Cover	2/27/18	
B-30.80-01	Circular Grate	2/27/18	
B-30.90-02	Miscellaneous Details for Drainage Structures	1/26/17	
B-35.20-00	Grate Inlet Type 1 (Cast-In-Place)	6/8/06	
B-35.40-00	Grate Inlet Type 2	6/8/06	*2 Sheets*

Contents

Plan No.	Plan Title	Publication Approval Date	
B-40.20-00	Welded Grates for Grate Inlet	6/1/06	
B-40.40-02	Frame and Dual Vaned Grates for Grate Inlet	1/26/17	
B-45.20-01	Drop Inlet Type 1	7/11/17	
B-45.40-01	Drop Inlet Type 2	7/21/17	
B-50.20-00	Grates for Drop Inlet	6/1/06	
B-55.20-02	Pipe Zone Bedding and Backfill	2/27/18	
B-60.20-01	Connection Details for Dissimilar Culvert Pipe	6/28/18	
B-60.40-01	Coupling Bands for Corrugated Metal Pipe	2/27/18	
B-65.20-01	Animal Underpass	4/26/12	
B-65.40-00	Equipment Underpass	6/1/06	
B-70.20-00	Beveled End Sections (for Culverts 30” Diameter or Less)	6/1/06	
B-70.60-01	Flared End Sections	1/26/17	*2 Sheets*
B-75.20-02	Headwalls for Culvert Pipe and Underpass	2/27/18	
B-75.50-01	Type 1 Safety Bars for Stepped Culvert Pipe or Pipe Arch	6/10/08	
B-75.60-00	Type 2 Safety Bars for Culvert Pipe or Pipe Arch (On Cross Road)	6/8/06	
B-80.20-00	Tapered End Section with Type 3 Safety Bars	6/8/06	
B-80.40-00	Tapered End Section with Type 4 Safety Bars (On Cross Road)	6/1/06	
B-85.10-01	Vertical Connection (for Sanitary Sewer Use)	6/10/08	
B-85.20-00	Side Sewer Connection (for Sanitary Sewer Use)	6/1/06	
B-85.30-00	Standing Side Sewer Connection (for Sanitary Sewer Use)	6/1/06	
B-85.40-00	8 Inch Sewer Clean-Out (for Sanitary Sewer Use)	6/8/06	
B-85.50-01	Drop Connections (for Sanitary Sewer Use)	6/10/08	
B-90.10-00	Hydrant Setting Types A and B	6/8/06	
B-90.20-00	2 Inch Blowoff Assembly	6/8/06	
B-90.30-00	Combination Air Release / Air Vacuum Valve Assembly	6/8/06	
B-90.40-01	Concrete Thrust Block	1/26/17	
B-90.50-00	Concrete Thrust Block for Convex Vertical Bends	6/8/06	
B-95.20-01	Median Barrier Drainage Installation	2/3/09	
B-95.40-01	Inlet Placement at Bridge End	6/28/18	

Section C (Guardrail)

C-1	Raising Beam Guardrail Detail	6/28/18	
C-1a	Beam Guardrail (Thrie Beam)	7/14/15	
C-1b	Beam Guardrail Posts and Blocks	7/14/15	*2 Sheets*
C-1d	Thrie Beam Guardrail Reducer Section	10/31/03	
C-2c	Guardrail Placement Median Bull Nose (Cases 9A, 9B & 9C)	6/21/06	
C-4f	Beam Guardrail Bull Nose Terminal	7/2/12	*4 Sheets*
C-6a	Beam Guardrail Anchor Type 2	10/14/09	
C-7	Beam Guardrail End Sections	6/16/11	
C-7a	Thrie Beam End Sections	6/16/11	
C-20.10-04	Beam Guardrail Type 31	7/21/17	
C-20.11-00	Beam Guardrail Type 31 Components	7/21/17	
C-20.14-03	Beam Guardrail Type 31 Placement (Cases 1-31, 2-31 & 3-31)	6/11/14	
C-20.15-02	Beam Guardrail Type 31 Placement (Cases 4-31 & 5-31)	6/11/14	

Plan No.	Plan Title	Publication Approval Date	
C-20.18-02	Beam Guardrail Type 31 Placement (Cases 10A-31, 10B-31 & 10C-31)	6/11/14	
C-20.19-02	Beam Guardrail Type 31 Placement (Cases 11A-31, 11B-31 & 11C-31)	6/11/14	
C-20.40-06	Beam Guardrail Type 31 Placement 12' - 6", 18' - 9", or 25' - 0" Span	7/21/17	
C-20.41-01	Box Culvert Guardrail Steel Post ~ Type 31	7/14/15	
C-20.42-05	Guardrail Placement Strong Post ~ Type 31 Intersection Design	7/14/15	
C-20.45-01	Beam Guardrail Type 31 - DS (Double sided) (W-Beam)	7/2/12	
C-22.16-06	Beam Guardrail Type 31 ~ Buried Terminal Type 2	7/21/17	
C-22.40-06	Beam Guardrail Type 31 Non-Flared Terminal (All Posted Speeds)	7/21/17	
C-22.45-03	Beam Guardrail Type 31 Non-Flared Terminal (Posted Speed - 45 MPH and Below)	7/21/17	
C-23.60-04	Beam Guardrail (Type 31) Anchor Type 10	7/21/17	*2 Sheets*
C-24.10-01	Guardrail Connection to Bridge Rail or Concrete Barrier	6/11/14	
C-25.20-06	Beam Guardrail (Type 31) Transition Section Type 21	7/14/15	
C-25.22-05	Beam Guardrail (Type 31) Transition Section Type 22	7/14/15	
C-25.26-03	Beam Guardrail (Type 31) Transition Section Type 23	7/14/15	
C-25.30-00	Beam Guardrail (Type 31) Transition Type 24 (Posted Speed 45 MPH and Below)	6/28/18	
C-25.80-04	Beam Guardrail Type 31 to Beam Guardrail Type 1 Adaptor	7/15/16	
C-40.16-02	Barrier Placement ~ Cable to W-Beam Shielding for Redirectional Landform	7/2/12	

Section C (Concrete Barrier)

C-8	Concrete Barrier Type 2	2/10/09	*2 Sheets*
C-8a	Concrete Barrier Type 4 and Transition Section	7/25/97	
C-8b	Concrete Barrier Light Standard Section	2/29/16	2 Sheets
C-8e	Precast Concrete Barrier Anchor ~ Type 3 (Permanent)	2/21/07	
C-8f	Concrete Barrier Transition Type 2 to Bridge F-Shape	6/30/04	
C-70.10-01	Single-Slope Concrete Barrier (Precast)	6/17/14	*3 Sheets*
C-75.10-01	Single-Slope Concrete Barrier (Precast)Transition Section	6/11/14	
C-75.20-01	Single-Slope Concrete Barrier (Precast) Vertical Back	6/11/14	
C-75.30-01	Single-Slope Concrete Barrier (Precast) Terminal	6/11/14	
C-80.10-01	Single-Slope Concrete Barrier (Cast-in-Place) Dual-Faced	6/11/14	*3 Sheets*
C-80.20-01	Single-Slope Concrete Barrier (Cast-in-Place) Terminal	6/11/14	
C-80.30-01	Single-Slope Concrete Barrier (Cast-in-Place) Transition Section	6/11/14	
C-80.40-01	Single-Slope Concrete Barrier (Cast-in-Place) Vertical Back	6/11/14	
C-80.50-00	Concrete Barrier Transition Type 2 to Single-Slope	4/18/12	
C-85.10-00	Single-Slope Concrete Barrier Placement (Split)	4/18/12	
C-85.11-00	Single-Slope Concrete Barrier Placement (Wrap)	4/18/12	
C-85.14-01	Single-Slope Concrete Barrier Light Standard Foundation	6/11/14	
C-85.15-01	Single-Slope Concrete Barrier (42") Light Standard Foundation	6/30/14	

Contents

Plan No.	Plan Title	Publication Approval Date	
C-85.16-01	Single-Slope Concrete Barrier Sign Bridge Foundation	6/17/14	*2 Sheets*
C-85.18-01	Single-Slope Concrete Barrier Transition for Monotube Sign Support	6/11/14	
C-85.20-01	Single-Slope Concrete Barrier Cantilever Sign Structure Foundation	6/11/14	*2 Sheets*

Section C (Miscellaneous)

C-16a	Traffic Barrier Shoulder Widening ~ for Shoulders 8.0' and Wider	7/21/17	
C-40.18-03	Barrier Placement ~ Cable Barrier Shielding for Redirectional Landform	7/21/17	

Section D Retaining, Noise Barrier, and Geosynthetic Walls

D-2.04-00	Noise Barrier Wall Type 2 (CIP Wall on Spread Footing)	11/10/05	*2 Sheets*
D-2.06-01	Noise Barrier Wall Type 3 (…on Offset Spread Footing)	1/6/09	*2 Sheets*
D-2.08-00	Noise Barrier Wall Type 4 (…on Shaft Foundation)	11/10/05	*2 Sheets*
D-2.14-00	Noise Barrier Wall Type 6 (…w/Traffic Barrier on Spread Footing)	11/10/05	
D-2.16-00	Noise Barrier Wall Type 6SS (…w/S. S. Traffic Barrier on Spread Footing)	11/10/05	
D-2.18-00	Noise Barrier Wall Type 7 (…w/Traffic Barrier on Shaft Foundation)	11/10/05	
D-2.20-00	Noise Barrier Wall Type 7SS (…w/S.S. Traffic Barrier on Shaft Foundation)	11/10/05	
D-2.32-00	Noise Barrier Wall Type 9 (Precast Wall on Spread Footing)	11/10/05	*2 Sheets*
D-2.34-01	Noise Barrier Wall Type 10 (…on Offset Spread Footing)	1/6/09	*2 Sheets*
D-2.36-03	Noise Barrier Wall Type 11 (...on Shaft Foundation)	6/11/14	*3 Sheets*
D-2.42-00	Noise Barrier Wall Type 13 (...w/Traffic Barrier on Spread Footing)	11/10/05	
D-2.44-00	Noise Barrier Wall Type 13SS (…w/S. S. Traffic Barrier on Spread Footing)	11/10/05	
D-2.46-01	Noise Barrier Wall Type 14 (…w/Traffic Barrier on Shaft Foundation) (Precast Conc. w/ Traffic Barrier on Shaft Foundation)	6/11/14	*3 Sheets*
D-2.48-00	Noise Barrier Wall Type 14SS (…w/S. S. Traffic Barrier on Shaft Foundation) (Precast Conc. w/ Single Slope Traffic Barrier on Shaft Fdn.)	11/10/05	*2 Sheets*
D-2.60-00	Noise Barrier Wall Type 16 (Masonry on Trench Footing)	11/10/05	*2 Sheets*
D-2-62-00	Noise Barrier Wall Type 17 (Masonry on Spread Footing)	11/10/05	*2 Sheets*
D-2.64-01	Noise Barrier Wall Type 18 (Masonry on Offset Spread Footing)	1/6/09	*2 Sheets*
D-2.66-00	Noise Barrier Wall Type 19 (…on Shaft w/Grade Beam Foundation) (Masonry on Shaft with Grade Beam Foundation)	11/10/05	*2 Sheets*
D-2.68-00	Noise Barrier Wall Type 20 (Masonry on Shaft Foundation)	11/10/05	*2 Sheets*

Plan No.	Plan Title	Publication Approval Date	
D-2.80-00	Noise Barrier Wall Access Door Type 1 (for CIP Wall on Offset Spread Footing)	11/10/05	
D-2.82-00	Noise Barrier Wall Access Door Type 2 (…w/Traffic Barrier)	11/10/05	*2 Sheets*
D-2.84-00	Noise Barrier Wall Access Door Type 3 (for Precast Wall on Shaft Foundation)	11/10/05	
D-2.86-00	Noise Barrier Wall Access Door Type 4 (…w/Traffic Barrier on Shaft Foundation)	11/10/05	*2 Sheets*
D-2.88-00	Noise Barrier Wall Access Door Type 5 (for Masonry Wall)	11/10/05	
D-2.92-00	Noise Barrier Wall Access Door & Frame	11/10/05	*2 Sheets*
D-3.09-00	Permanent Geosynthetic Wall	5/17/12	*4 Sheets*
D-3.10-01	Cast-In-Place Permanent Geosynthetic Wall Fascia and Facing	5/29/13	
D-3.11-03	Precast Permanent Geosynthetic Wall Fascia	6/11/14	*2 Sheets*
D-3.15-02	Permanent Geosynthetic Wall Single Slope Barrier	6/10/13	
D-3.16-02	Permanent Geosynthetic Wall F-Shape Barrier	5/29/13	
D-3.17-02	Permanent Geosynthetic Wall Expansion Joint Details	5/9/16	
D-4	Backfill and Drainage for Retaining Walls	12/11/98	
D-6	Gabions	6/19/98	
D-10.10-01	Reinforced Concrete Retaining Wall Type 1 and 1SW	12/2/08	*2 Sheets*
D-10.15-01	Reinforced Concrete Retaining Wall Type 2 and 2SW	12/2/08	*2 Sheets*
D-10.20-00	Reinforced Concrete Retaining Wall Type 3 and 3SW	7/8/08	*2 Sheets*
D-10.25-00	Reinforced Concrete Retaining Wall Type 4 and 4SW	7/8/08	*2 Sheets*
D-10.30-00	Reinforced Concrete Retaining Wall Type 5	7/8/08	*2 Sheets*
D-10.35-00	Reinforced Concrete Retaining Wall Type 6	7/8/08	*2 Sheets*
D-10.40-01	Reinforced Concrete Retaining Wall Type 7	12/2/08	*2 Sheets*
D-10.45-01	Reinforced Concrete Retaining Wall Type 8	12/2/08	*2 Sheets*

Section E Bridges and Trestles

E-1	Date Numeral Placement on Bridge Traffic Barrier	2/21/07	
E-2	Pile or Frame Detour Bridge with Asphalt Overlay	5/29/98	*2 Sheets*
E-4	Precast Prestressed Concrete Piles	8/27/03	
E-4a	Precast Prestressed Concrete Piles Handling & Capping	8/27/03	

Section F Curbs, Sidewalks, and Driveways

F-10.12-03	Cement Concrete Curbs	6/11/14	
F-10.16-00	Cement Concrete Curb and Gutter Pan	12/20/06	
F-10.18-01	Roundabout Cement Concrete Curbs	7/11/17	
F-10.40-03	Extruded Curb Placement	6/29/16	
F-10.42-00	Extruded Curb	1/23/07	
F-10.62-02	Precast Sloped Mountable Curb	4/22/14	*2 Sheets*
F-10.64-03	Precast Dual Faced Sloped Mountable Curb	4/22/14	
F-30.10-03	Cement Concrete Sidewalk	6/11/14	
F-40.12-03	Parallel Curb Ramp	6/29/16	
F-40.14-03	Combination Curb Ramp	6/29/16	
F-40.15-03	Perpendicular Curb Ramp	6/29/16	
F-40.16-03	Single Direction Curb Ramp	6/29/16	
F-45.10-02	Detectable Warning Surface	7/15/16	
F-80.10-04	Cement Concrete Driveway Entrance Types 1, 2, 3, & 4	7/15/16	*2 Sheets*

Contents

Plan No.	Plan Title	Publication Approval Date	
Section G	**Signs and Sign Supports**		
G-10.10-00	Milepost	9/20/07	
G-20.10-02	Ground-Mounted Sign Placement	6/23/15	
G-22.10-04	Timber Sign Support	6/28/18	*3 Sheets*
G-24.10-00	Steel Sign Support Type AP Installation Details	11/8/07	
G-24.20-01	Steel Sign Support Type AS Installation Details	2/7/12	
G-24.30-02	Steel Sign Support Types PL, PL-T, & PL-U Installation Details	6/28/18	*2 Sheets*
G-24.40-07	Steel Sign Support Types SB-1, SB-2 & SB-3 Installation Details	6/28/18	*6 Sheets*
G-24.50-04	Steel Sign Support Types ST-1 - ST-4 Installation Details	7/11/17	
G-24.60-05	Steel Sign Support Types TP-A and TP-B Installation Details	6/28/18	*2 Sheets*
G-25.10-04	Steel Sign Support Foundation Details	6/10/13	
G-30.10-04	Sign Installation on Signal and Light Standards	6/23/15	*2 Sheets*
G-50.10-03	Sign Bracing	6/28/18	*2 Sheets*
G-60.10-04	Cantilever Sign Structure (Truss-Type)	6/28/18	*4 Sheets*
G-60.20-02	Cantilever Sign Structure (Truss-Type) Foundation Type 1	6/18/15	*2 Sheets*
G-60.30-02	Cantilever Sign Structure (Truss-Type) Fdn. Types 2 & 3	6/18/15	*2 Sheets*
G-70.10-03	Sign Bridge (Truss-Type)	6/18/15	*4 Sheets*
G-70.20-04	Sign Bridge (Truss-Type) Foundation Type1	7/21/17	
G-70.30-04	Sign Bridge (Truss-Type) Foundation Types 2 & 3	7/21/17	
G-90.10-03	Overhead Sign Bracing and Mounting	7/11/17	
G-90.11-00	Overhead Sign Lighting Bracing and Placement	4/28/16	
G-90.20-05	Overhead Sign Mounting (Monotube Structure)	7/11/17	
G-90.30-04	Overhead Sign Mounting (Truss Structure)	7/11/17	
G-90.40-02	Overhead Sign Lighting Details	4/28/16	
G-95.10-02	Maintenance Walkway for Sign Bridges	6/28/18	*3 Sheets*
G-95.20-03	Maintenance Walkway Mounting for Monotube Sign Bridge	6/28/18	*3 Sheets*
G-95.30-03	Maintenance Walkway Mounting for Truss-Type Sign Bridge	6/28/18	*2 Sheets*
Section H	**Roadside and Site Development**		
H-10.10-00	Tree and Shrub Planting Details	7/3/08	
H-10.15-00	Live Stake Installations	7/3/08	
H-30.10-00	Crest Gage	10/12/07	
H-32.10-00	Automated Ground Water Monitoring Well	9/20/07	
H-60.10-01	Bollard Type 1	7/3/08	
H-60.20-01	Bollard Type 2	7/3/08	
H-70.10-01	Mailbox Support Type 1	2/7/12	*2 Sheets*
H-70.20-01	Mailbox Support Type 2	2/16/12	*2 Sheets*
H-70.30-02	Mailbox Support Type 3	2/7/12	*2 Sheets*
Section I	**Site Preservation and Erosion Control**		
I-10.10-01	High Visibility Fence	8/11/09	
I-30.10-02	Silt Fence with Backup Support	3/22/13	
I-30.15-02	Silt Fence	3/22/13	
I-30.16-00	High Visibility Silt Fence with Backup Support	3/22/13	
I-30.17-00	High Visibility Silt Fence	3/22/13	

Plan No.	Plan Title	Publication Approval Date	
I-30.20-00	Erosion Control At Culvert Ends	9/20/07	
I-30.30-01	Wattle Installation On Slope	6/10/13	
I-30.40-01	Compost Sock	6/10/13	
I-30.60-01	Erosion Control Details Coir Log Placement	3/7/18	
I-40.10-00	Temporary Silt Fence for Inlet Protection In Unpaved Areas	9/20/07	
I-40.20-00	Storm Drain Inlet Protection	9/20/07	
I-50.20-01	Check Dams on Channels	6/10/13	
I-60.10-01	Biodegradable Erosion Control Blanket Placement for Slopes	6/10/13	
I-60.20-01	Biodegradable Erosion Control Blanket Placement for Ditches	6/10/13	
I-80.10-02	Miscellaneous Erosion Control Details	7/15/16	

Section J Illumination, Signals, and ITS

J-10	Electrical Conduit Placement	7/18/97	
J-10.10-03	Cabinet Orientation, Conduit Layout and Foundation Detail	6/3/15	*6 Sheets*
J-10.15-01	Cabinet Enclosure on Slope	6/11/14	
J-10.16-00	Service Cabinet Type A (0 - 60 Amp Type 120 Volt Single Phase)	6/3/15	*2 Sheets*
J-10.17-00	Service Cabinet Type B (0 - 60 Amp Type 120/240 Volt Single Phase)	6/3/15	*2 Sheets*
J-10.18-00	Service Cabinet Type C (0 - 60 Amp Type 240/480 Volt Single Phase)	6/3/15	*2 Sheets*
J-10.20-01	Service Cabinet Type B Modified (0 - 200 Amp Type 120/240 Single Phase)	6/1/16	*5 Sheets*
J-10.21-00	Service Cabinet Type D (0 - 200 Amp Type 120/240 Single Phase)	6/3/15	
J-10.22-00	Service Cabinet Type E (0 - 200 Amp Type 240/480 Single Phase)	5/29/13	*2 Sheets*
J-10.25-00	Transformer Cabinet (480v/240V - 240V/120V)	7/11/17	
J-12.15-00	Type 33xL Single-Width Cabinet Housing	6/28/18	*2 Sheets*
J-12.16-00	Type 33xD and 34xLX Double-Width Cabinet Housings	6/28/18	*2 Sheets*
J-15.10-01	Timber Light Standard	6/11/14	
J-15.15-02	Span Wire Installation	7/10/15	
J-20.10-03	Accessible Pedestrian PushButton Post (PPB) and Foundation	6/30/14	
J-20.11-02	Accessible Pedestrian PushButton with Curb Base	6/30/14	*2 Sheets*
J-20.15-03	Accessible Breakaway Pedestrian PushButton (PPB) Post	6/30/14	
J-20.16-02	Pedestrian Signal Standard (Type PS) Details	6/30/14	
J-20.20-02	Pedestrian Signal Standard (Type PS) Electrical Details	5/20/13	
J-20.26-01	Accessible Pedestrian PushButton (PPB) Details	7/12/12	*2 Sheets*
J-21.10-04	Type PS, Type 1, RM & FB Signal Standard Foundation Details	6/30/14	*2 Sheets*
J-21.15-01	Type 1 Signal Standard Details	6/10/13	
J-21.16-01	Flashing Beacon Type 1 Signal Standard Details	6/10/13	
J-21.17-01	Flashing Beacon Type 1 Signal Standard Electrical Details	6/10/13	
J-21.20-01	Type 1 Signal Standard Electrical Details	6/10/13	
J-22.15-02	Ramp Meter Signal Standard Details	7/10/15	*3 Sheets*
J-22.16-03	Ramp Meter Signal Standard Electrical Details	7/10/15	

Contents

Plan No.	Plan Title	Publication Approval Date	
J-26.10-03	Traffic Signal Standard Foundation	7/21/16	
J-26.15-01	Signal Standard Foundation Placements	5/17/12	*3 Sheets*
J-26.20-01	Temporary Signal Standard Adaptor	6/28/18	*5 Sheets*
J-27.10-01	Type 4 and 5 Strain Pole Foundation	7/21/16	
J-27.15-00	Type 4 and 5 Strain Pole Standard	3/15/12	
J-28.10-01	Steel Light Standard	5/11/11	*2 Sheets*
J-28.22-00	Steel Light Standard Placement (Slip Base)	8/7/07	*2 Sheets*
J-28.24-01	Steel Light Standard Placement (Fixed Base)	6/3/15	
J-28.26-01	Steel Light Standard Placement Miscellaneous	12/2/08	
J-28.30-03	Steel Light Standard Foundation Types A & B	6/11/14	*2 Sheets*
J-28.40-02	Steel Light Standard Base Mounting	6/11/14	
J-28.42-01	Steel Light Standard Anchor/Slip Plate for Slip Base	6/11/14	
J-28.43-01	Slip Base Adaptor for 4-Bolt Light Standard Base	6/28/18	
J-28.45-03	Steel Light Standard Elbow Mounting on Bridge & Retaining Wall	7/21/16	*2 Sheets*
J-28.50-03	Steel Light Standard Pole Base and Hand Hole Details	7/21/16	
J-28.60-02	Steel Light Standard Barrier Mounted Base	7/21/16	
J-28.70-03	Steel Light Standard Wiring Details	7/21/17	*2 Sheets*
J-29.10-01	Type CCTV Traffic Signal Standard (Camera Pole) Foundation Details	7/21/16	
J-29.15-01	Type CCTV Traffic Signal Standard (Camera Pole)	7/21/16	*2 Sheets*
J-29.16-01	Type CCTV Traffic Signal Standard (Camera Pole) Elbow Details	7/21/16	
J-30.10-00	High Mast Luminaire Maintenance Pad	6/18/15	*2 sheets*
J-40.05-00	Existing Junction Box Retrofit Grounding Details	7/21/16	
J-40.10-04	Locking Lid Standard Duty Junction Box Types 1 & 2	4/28/16	*2 Sheets*
J-40.20-03	Heavy-Duty Junction Box Types 4, 5 & 6	4/28/16	*2 Sheets*
J-40.30-04	Locking Lid Standard Duty Junction Box Type 8	4/28/16	*2 Sheets*
J-40.35-01	Sign Post-Mounted Junction Box	5/29/13	*3 Sheets*
J-40.36-02	Nema 4X Non-Adjustable Junction Box	7/21/17	*2 Sheets*
J-40.37-02	Nema 3R Adjustable Flush-Mount Junction Box	7/21/17	*3 Sheets*
J-40.38-01	Top Entry Nema 4x Surface-Mount Junction Box	5/20/13	
J-40.39-00	Front Entry Nema 4X Surface-Mount Junction Box	5/20/13	
J-40.40-01	Nema 4X Junction Box in Sidewalk Located on Structure	4/28/16	
J-45.36-00	Nema 3R and 4X Flush-Mount Junction Box - Grounding	7/21/17	
J-50.05-00	Loop Splice Details	7/21/17	
J-50.10-00	Type 1 Induction Loop	6/3/11	
J-50.11-01	Type 2 Induction Loop	7/21/17	*2 Sheets*
J-50.12-01	Type 3 Induction Loop	7/21/17	*3 Sheets*
J-50.15-01	Induction Loop Details	7/21/17	*3 Sheets*
J-50.16-01	Preformed Loop Installation Details for New Bridge Decks	3/22/13	*2 Sheets*
J-50.20-00	Permanent Traffic Recorder Installations	6/3/11	*3 Sheets*
J-50.25-00	Weigh-In Motion Site Installation Details	6/3/11	*2 Sheets*
J-50.30-00	Permanent Traffic Recorder & Weigh-In-Motion Details	6/3/11	*3 Sheets*
J-60.05-01	Typical Grounding Details	7/21/16	*3 Sheets*
J-60.11-00	Conduit Installation in Traffic Barrier on Retaining Wall	5/20/13	*2 Sheets*
J-60.12-00	Conduit Installation in Single-Slope Concrete Barrier (Dual Faced)	5/20/13	
J-60.13-00	Stainless Steel Channel	6/16/10	
J-60.14-00	Stainless Steel Channel Mounting Details on Column or Pole	6/16/10	

Plan No.	Plan Title	Publication Approval Date	
J-75.10-02	Signal Head Mounting Details ~ Pole and Post Top Mountings	7/10/15	
J-75.20-01	Signal Head Mounting Details ~ Mast Arm and Span Wire Mountings	7/10/15	*2 Sheets*
J-75.30-02	Miscellaneous Signal Details	7/10/15	
J-75.40-02	Overhead Sign Electrical Details (Monotube Structure)	6/1/16	*2 Sheets*
J-75.41-01	Signal Bridge Standard Electrical Details	6/29/16	*4 Sheets*
J-75.45-02	Overhead Sign Electrical Details (Truss Structure)	6/1/16	*2 Sheets*
J-80.10-00	Type 332 Signal Cabinet Layout	6/28/18	
J-80.15-00	Type 332 Signal Cabinet Detector Test Panel	6/28/18	
J-81.10-00	Type 334 Ramp Meter/Data Station Cabinet	6/28/18	*3 sheets*
J-86.10-00	Highway Advisory Radio (Har) Transmitter	6/28/18	*3 Sheets*
J-90.10-03	Pull Box	6/28/18	*2 Sheets*
J-90.20-03	Cable Vault	6/28/18	*2 Sheets*
J-90.21-02	Small Cable Vault	6/28/18	*2 Sheets*
J-90.50-00	Vault Installation Details	6/28/18	*2 Sheets*

Section K Work Zone Traffic Control

K-70.20-01	Temporary Channelization	6/1/16	
K-80.10-01	Class A Construction Signing Installation	6/1/16	
K-80.20-00	Type 3 Barricade	12/20/06	*2 Sheets*
K-80.30-00	Alternative Temporary Conc. Barrier (F-Shape)	2/21/07	
K-80.35-00	Temporary Conc. Barrier Anchoring	2/21/07	
K-80.37-00	Temporary Conc. Barrier Anchoring ~ Narrow	2/21/07	

Section L Fence and Glare Screen

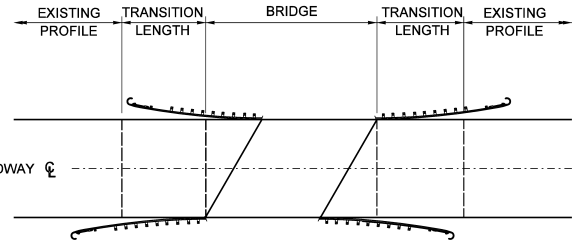
L-10.10-02	Wire Fence Types 1 & 2 and Wire Gates	6/21/12	*2 Sheets*
L-20.10-03	Chain Link Fence Types 3 and 4	7/14/15	*2 Sheets*
L-30.10-02	Chain Link Gate	6/11/14	*2 Sheets*
L-40.10-02	Glare Screen Type 1 Design A	6/21/12	*2 Sheets*
L-40.15-01	Glare Screen Type 1 Design B	6/16/11	
L-40.20-02	Glare Screen Type 2 (Chain Link with Slats)	6/21/12	
L-70.10-01	Access Control Gate	5/21/08	
L-70.20-01	Access Control Double Gate	5/21/08	

Section M Roadway Delineation

M-1.20-03	Ramp Channelization Single Lane	6/24/14
M-1.40-02	Ramp Channelization Two Lane	6/3/11
M-1.60-02	Ramp Channelization Collector-Distributor Road	6/3/11
M-1.80-03	Ramp Channelization Parallel On & Weaving Section	6/3/11
M-2.20-03	Off-Ramp Gore Area Marking Layouts	7/10/15
M-2.21-00	On-Ramp Gore Area Marking Layouts	7/10/15
M-3.10-03	Left Turn Channelization	6/3/11
M-3.20-02	Left Turn Channelization Reduced Tapers	6/3/11
M-3.30-03	Left Turn Channelization Tee Intersection and Back-to-Back Turn Lanes	6/3/11
M-3.40-03	Two-Way Left-Turn and Median Channelization	6/3/11
M-3.50-02	Double Left-Turn Channelization	6/3/11

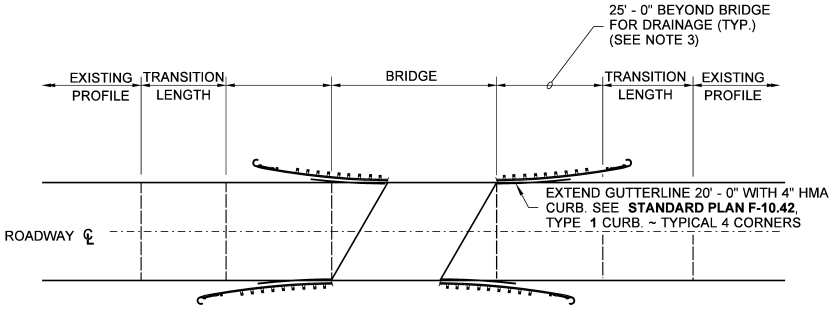
Contents

Plan No.	Plan Title	Publication Approval Date	
M-5.10-02	Right-Turn Channelization	6/3/11	
M-7.50-01	High Occupancy Vehicle (HOV) Lane Symbol Layout	1/30/07	
M-9.50-02	Bicycle Lane Symbol Layout	6/24/14	
M-9.60-00	Shared - Use Path Markings	2/10/09	
M-11.10-02	Railroad Crossing Layout	7/11/17	
M-12.10-01	Roundabout Pavement Markings	6/28/18	
M-15.10-01	Crosswalk Layout	2/6/07	
M-17.10-02	Parking Space Layouts	7/3/08	
M-20.10-02	Longitudinal Marking Patterns	6/3/11	
M-20.20-02	Profiled and Embossed Plastic Lines	4/20/15	
M-20.30-04	Longitudinal Marking Supplement with Raised Pavement Markers	2/29/16	*2 Sheets*
M-20.40-03	Longitudinal Marking Supplement with RPM's ~ Turn Lanes	6/24/14	*2 Sheets*
M-20.50-02	Longitudinal Marking Substitution with RPM's	6/3/11	
M-24.20-02	Symbol Markings ~ Traffic Arrows for High Speed Roadways	4/20/15	*3 Sheets*
M-24.40-02	Symbol Markings ~ Traffic Arrows for Low Speed Roadways	4/20/15	*2 Sheets*
M-24.50-00	Roundabout Traffic Arrows	6/16/11	
M-24.60-04	Symbol Markings Miscellaneous	6/24/14	*2 Sheets*
M-24.65-00	BMP Delineation - Linear Type	7/11/17	
M-24.66-00	BMP Delineation - Underground and Pond Type	7/11/17	
M-40.10-03	Guide Posts and Barrier Delineators	6/24/14	
M-40.20-00	Guide Post Placement Interchanges	10/12/07	
M-40.30-01	Guide Post Placement Grade Intersections	7/11/17	
M-40.40-00	Guide Post Placement Horizontal Curves	9/20/07	
M-40.50-00	Guide Post Placement Bridges	9/20/07	
M-40.60-00	Guide Post Placement Miscellaneous	9/20/07	
M-60.10-01	Shoulder Rumble Strip Type 1 for Divided Highways	6/3/11	*4 Sheets*
M-60.20-02	Shoulder Rumble Strip, Types 2, 3, and 4, for Undivided Highways	6/27/11	*2 Sheets*
M-65.10-02	Centerline Rumble Strip	5/11/11	*2 Sheets*
M-80.10-01	Traffic Letter and Numeral Applications	6/3/11	*2 Sheets*
M-80.20-00	Traffic Letters and Numerals (High Speed Roadways)	6/10/08	
M-80.30-00	Traffic Letters and Numerals (Low Speed Roadways)	6/10/08	



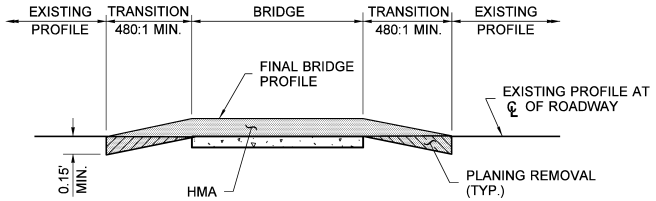
PLAN

RAISING PROFILE AT BRIDGE
TRANSITION FOR SKEWED BRIDGES



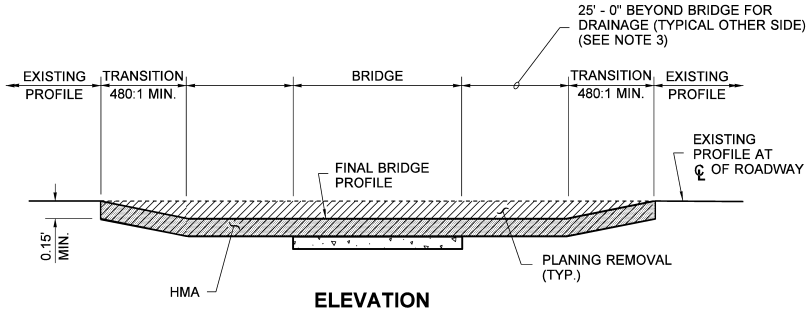
PLAN

LOWERING PROFILE AT BRIDGE
TRANSITION FOR SKEWED BRIDGES



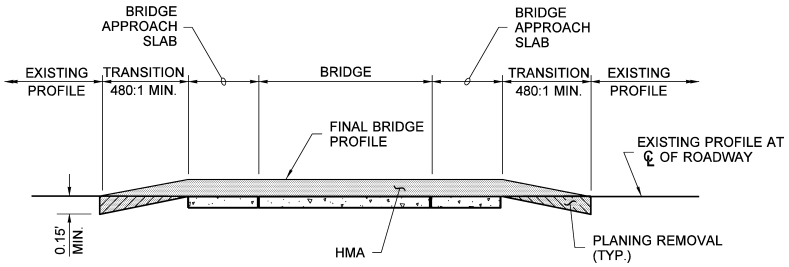
ELEVATION

RAISING PROFILE AT BRIDGE



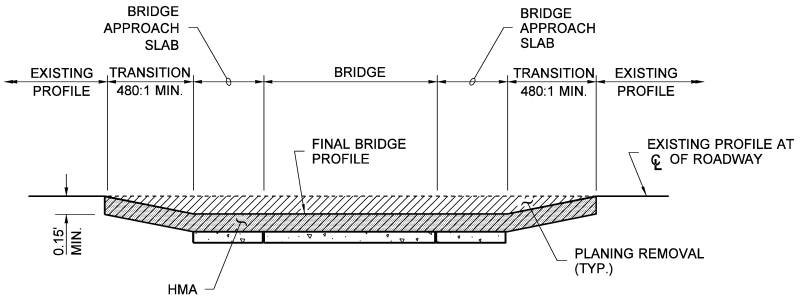
ELEVATION

LOWERING PROFILE AT BRIDGE



ELEVATION

RAISING PROFILE AT BRIDGE
(WITH BRIDGE APPROACH SLAB)



ELEVATION

LOWERING PROFILE AT BRIDGE
(WITH BRIDGE APPROACH SLAB)

NOTES

1. FINAL GRADE TRANSITION: The maximum longitudinal taper slope to transition an increase in roadway grade to the new or existing bridge grade will be at most 1 inch rise to 40 feet run (1V:480H or flatter) (0.2% maximum).
2. HMA removal depth and compacted depth shall be as shown in the plans.
3. When lowering bridge profile, removal of materials below guardrail must be to grade, and allow water to drain towards the ditch line. This work is incidental to other bid items for which payment is made.
4. Where an HMA profile transition ends at existing HMA, the Engineer may adjust the limits of the transition to improve ride.

DRAWN BY: FERN LIDDELL

BIJAN KHALEGHI
STATE OF WASHINGTON
27695
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER

Khaleghi, Bijan
Jun 21 2018 1:50 PM

BRIDGE DECK TRANSITION FOR HMA OVERLAY

STANDARD PLAN A-60.30-01

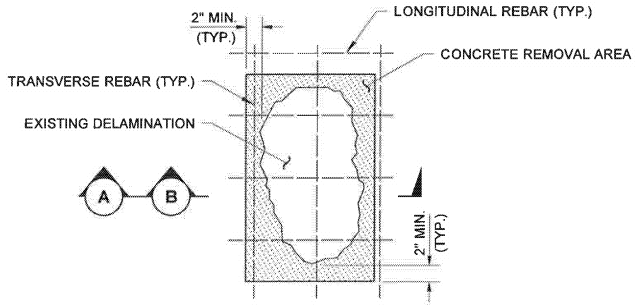
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:44 AM

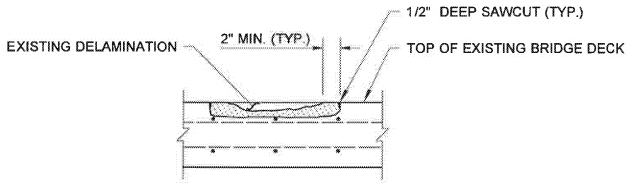
STATE DESIGN ENGINEER

Washington State Department of Transportation

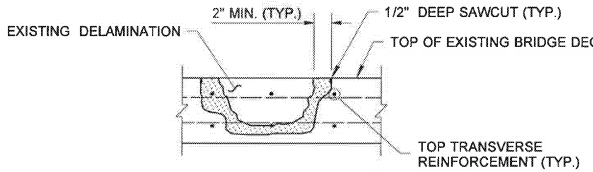
DRAWN BY: FERN LIDDELL



PLAN VIEW
FOR DELAMINATION AND FULL DEPTH REPAIR



DELAMINATION SECTION (A)



FULL DEPTH REPAIR SECTION (B)

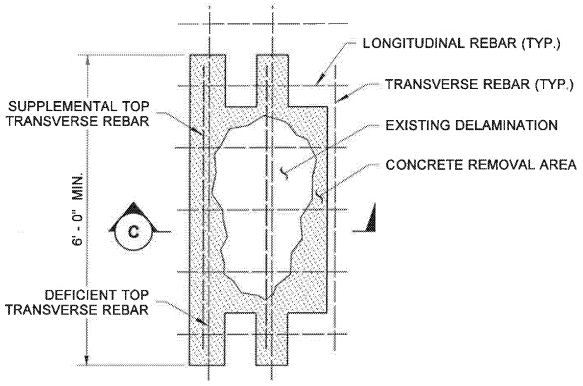
DELAMINATION AND FULL DEPTH REPAIR

NOTES

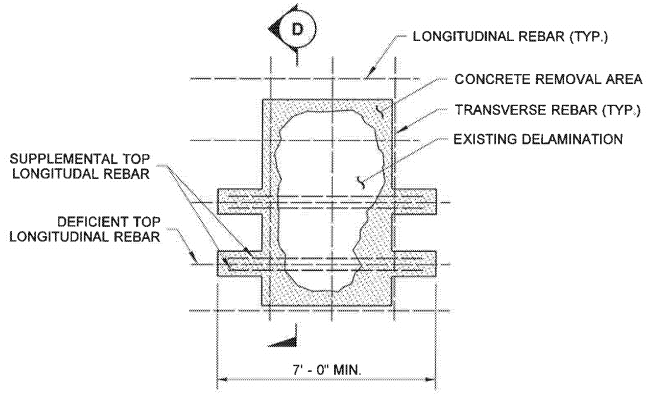
1. If a zone has rebar section loss or full depth repairs, then the concrete deck repair in each zone shall achieve 3,000 PSI before progressing to the adjacent zone.
2. Remove all concrete 3/4" minimum clearance around all exposed reinforcement bars in accordance with Standard Specification 6-09.3(6).
3. For tension zones of continuous structures, when a longitudinal reinforcement bar has greater than 20% section loss (or damage), remove concrete a minimum of 3' - 6" on each side of section loss and place 2 supplemental reinforcement bars, adjacent and parallel to the deficient bar, extending 3' - 0" beyond each side having 20% section loss. Mechanical splices may be used to facilitate placement of #4 reinforcement bars.
4. For typical rebar repairs, when the reinforcement has greater than 20% section loss (or damage), remove concrete a minimum of 2' - 6" on each side of section loss, and replace with new supplemental reinforcement, same diameter as original, adjacent and parallel to the deficient bar, extending 2' - 3" beyond each end of section having 20% section loss.

LEGEND

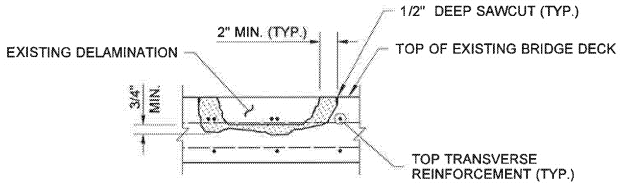
CONCRETE REMOVAL AREA



PLAN VIEW

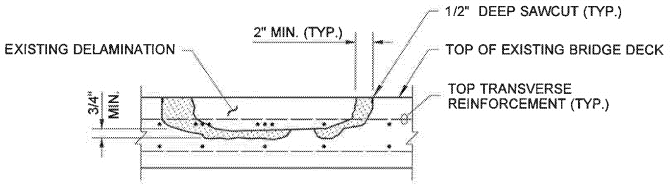


PLAN VIEW



SECTION (C)

TRANSVERSE REBAR REPAIR



SECTION (D)

LONGITUDINAL REBAR REPAIR
(FOR CONTINUOUS STRUCTURES)

BIJAN KHALEGHI
STATE OF WASHINGTON
PROFESSIONAL ENGINEER
8/29/07

EXPIRES AUGUST 23, 2008

HMA OVERLAY FURTHER DECK PREPARATION
STANDARD PLAN A-60.40.00

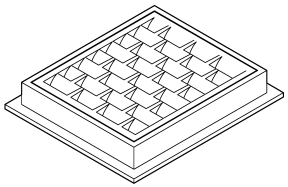
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

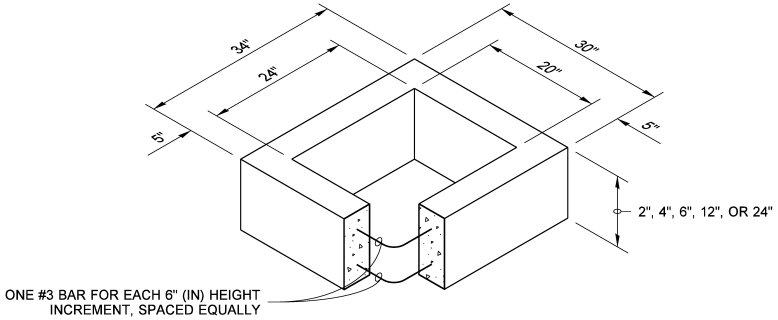
STATE DESIGN ENGINEER — DATE 8/31/07

Washington State Department of Transportation

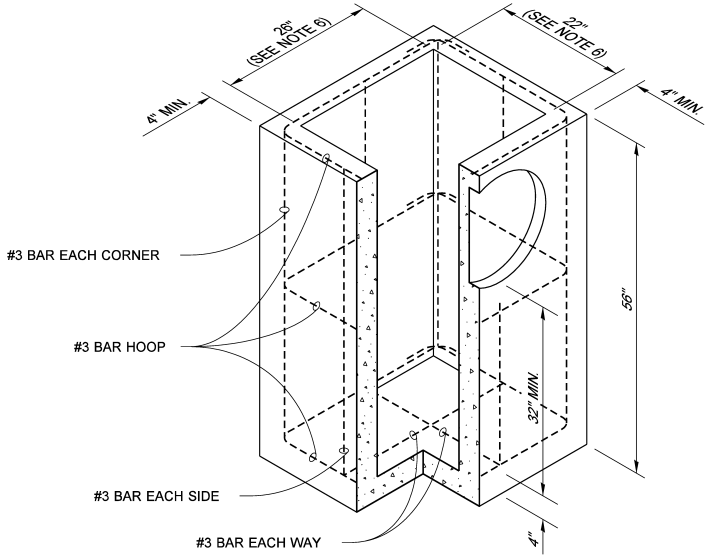
DRAWN BY: LISA CYFORD



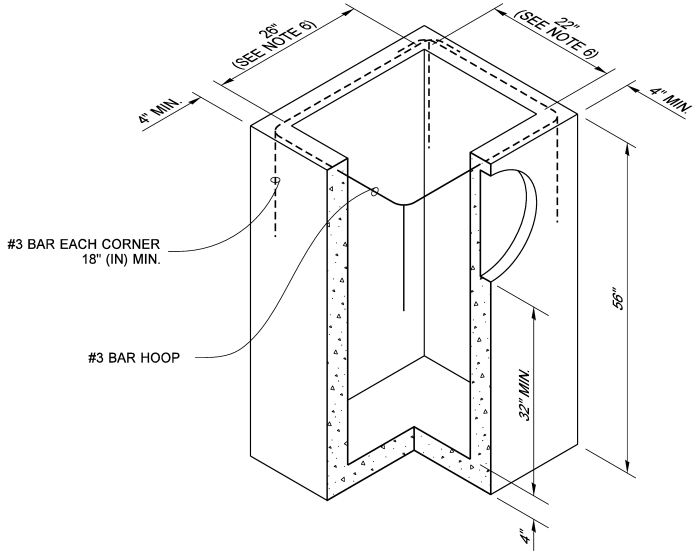
FRAME AND VANED GRATE



RECTANGULAR ADJUSTMENT SECTION



PRECAST BASE SECTION



(SEE NOTE 1)

ALTERNATIVE PRECAST BASE SECTION

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 18" (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.

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Jan 25 2017 2:56 PM

CATCH BASIN TYPE 1P (FOR PARKING LOT)

STANDARD PLAN B-5.60-02

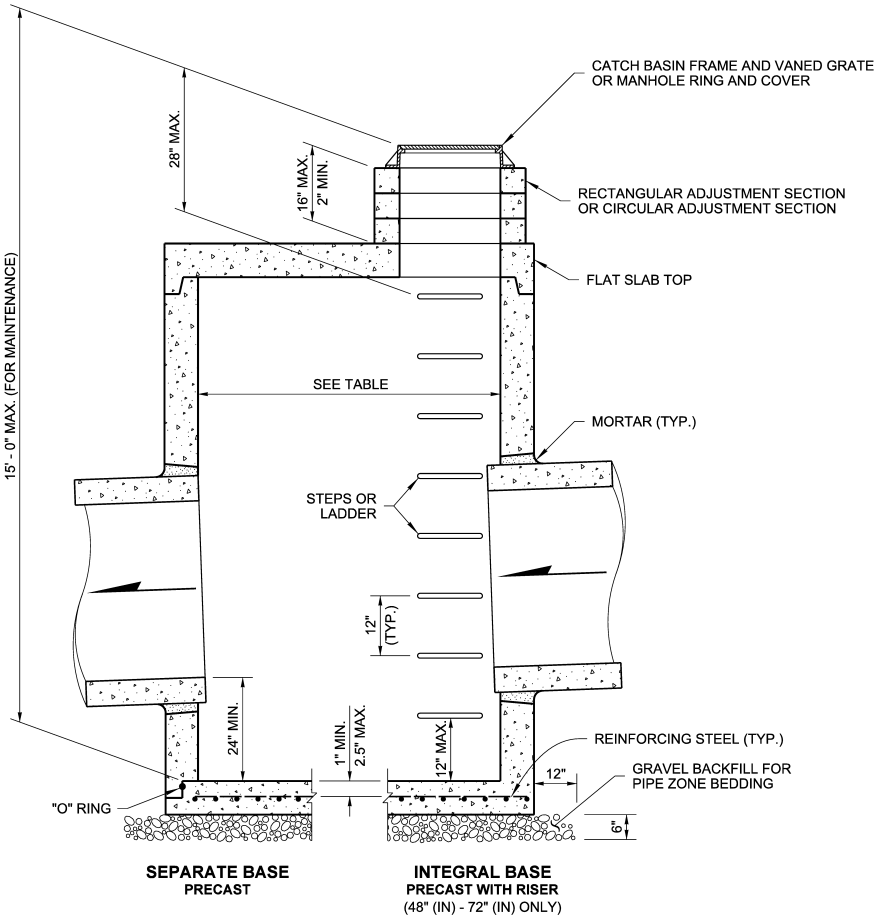
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jan 26 2017 6:49 AM

STATE DESIGN ENGINEER

Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



NOTES

1. No steps are required when height is 4' or less.
2. The bottom of the precast catch basin may be sloped to facilitate cleaning.
3. The rectangular frame and grate may be installed with the flange up or down. The frame may be cast into the adjustment section.
4. 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.**

CATCH BASIN DIMENSIONS

CATCH BASIN DIAMETER	MIN. WALL THICKNESS	MIN. BASE THICKNESS	MAXIMUM KNOCKOUT SIZE	MINIMUM DISTANCE BETWEEN KNOCKOUTS
48"	4"	6"	36"	8"
54"	4.5"	8"	42"	8"
60"	5"	8"	48"	8"
72"	6"	8"	60"	12"
84"	8"	12"	72"	12"
96"	8"	12"	84"	12"
120"	10"	12"	96"	12"
144"	12"	12"	108"	12"

PIPE ALLOWANCES

CATCH BASIN DIAMETER	PIPE MATERIAL WITH MAXIMUM INSIDE DIAMETER				
	CONCRETE	ALL METAL	CPSSP ① PP ④	SOLID WALL PVC ②	PROFILE WALL PVC ③
48"	24"	30"	24"	30"	30"
54"	30"	36"	30"	36"	36"
60"	36"	42"	36"	42"	42"
72"	42"	54"	42"	48"	48"
84"	54"	60"	54"	48"	48"
96"	60"	72"	60"	48"	48"
120"	66"	84"	60"	48"	48"
144"	78"	96"	60"	48"	48"

① Corrugated Polyethylene Storm Sewer Pipe (See **Standard Specification Section 9-05.20)**
② **(See Standard Specification Section 9-05.12(1))**
③ **(See Standard Specification Section 9-05.12(2))**
④ Polypropylene Pipe **(See Standard Specification Section 9-05.24)**

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:49 PM
cosign

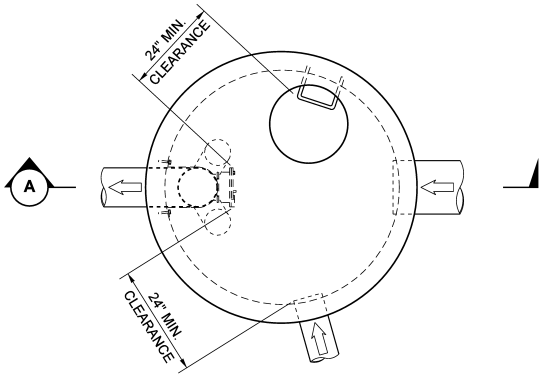
CATCH BASIN TYPE 2

STANDARD PLAN B-10.20-02

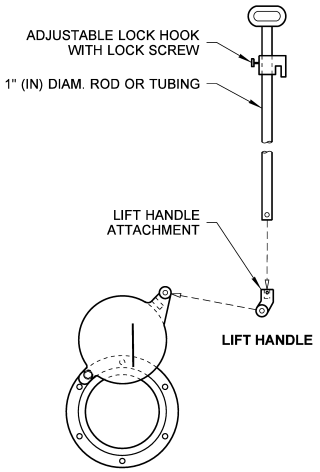
SHEET 1 OF 1 SHEET

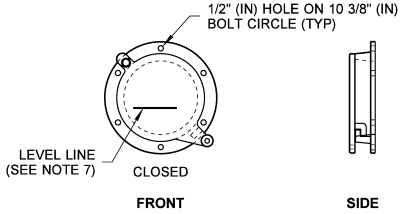
APPROVED FOR PUBLICATION
Carpenter, Jeff
Mar 2 2018 10:01 AM
cosign
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

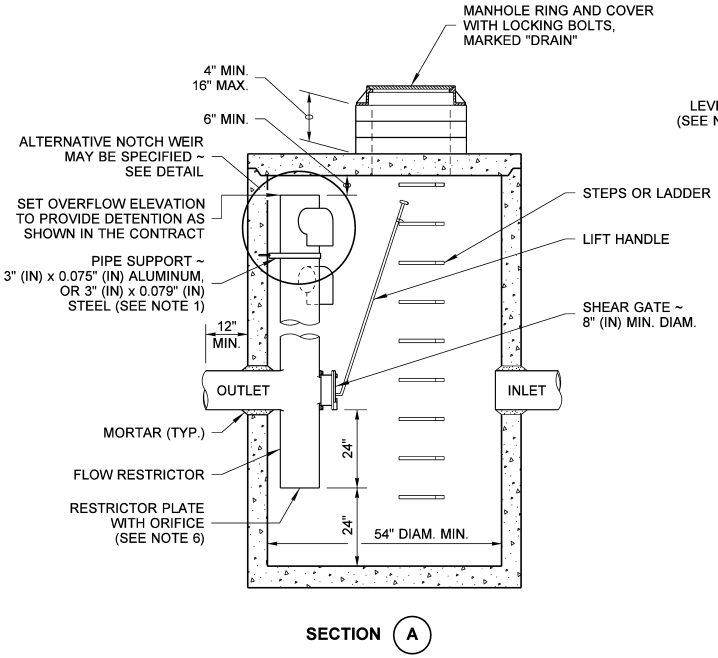


PLAN VIEW

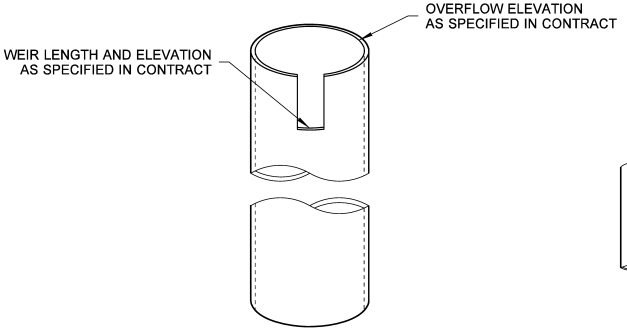




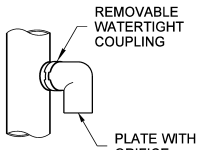
SHEAR GATE DETAILS



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.

JULIE HEILMAN STATE OF WASHINGTON 41819 REGISTERED PROFESSIONAL ENGINEER

Heilman, Julie
Jan 25 2017 2:57 PM

CATCH BASIN TYPE 2 WITH FLOW RESTRICTOR

STANDARD PLAN B-10.40-01

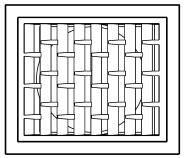
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jan 26 2017 6:49 AM

STATE DESIGN ENGINEER

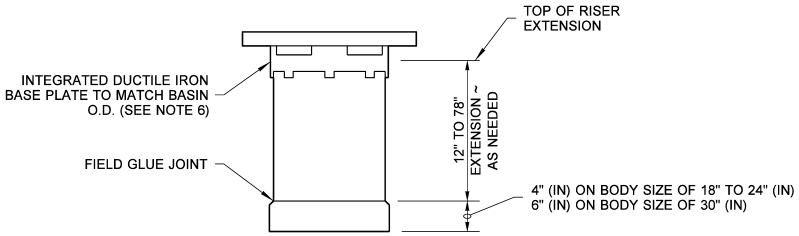
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

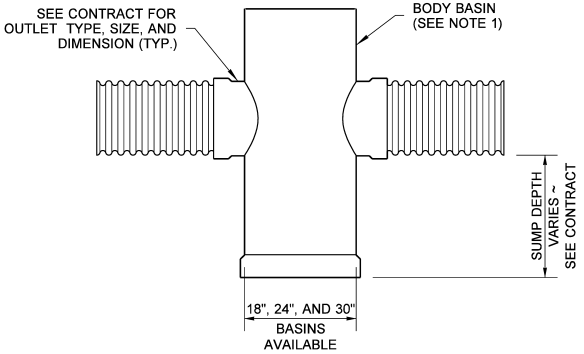


PLAN VIEW

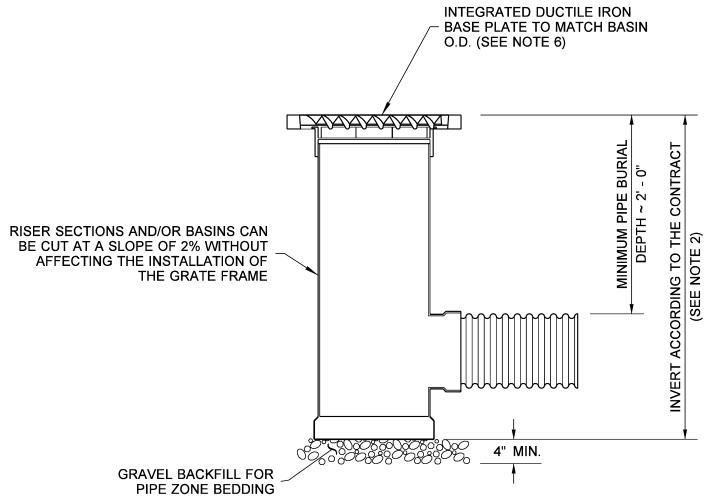
FRAME AND VANED GRATE



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 flexable 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.

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Jan 25 2017 2:57 PM

CATCH BASIN - PVC

STANDARD PLAN B-10.70-00

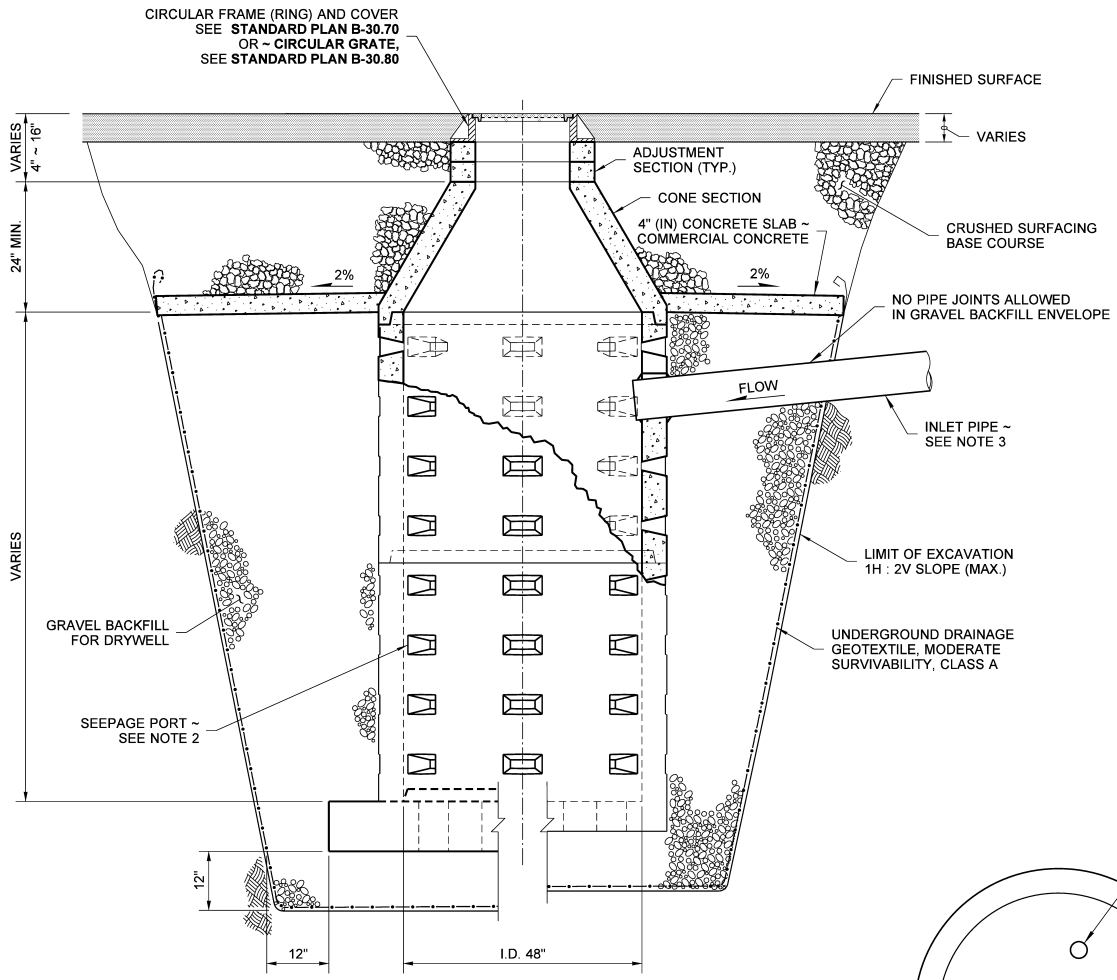
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jan 26 2017 6:50 AM

STATE DESIGN ENGINEER

Washington State Department of Transportation

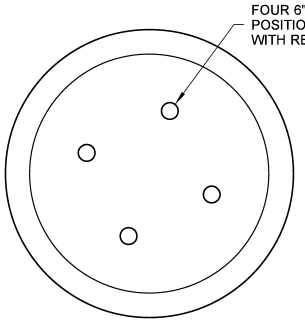
DRAWN BY: FERN LIDDELL



ALTERNATIVE FOOTING
PRECAST

INTEGRAL BASE
PRECAST WITH RISER

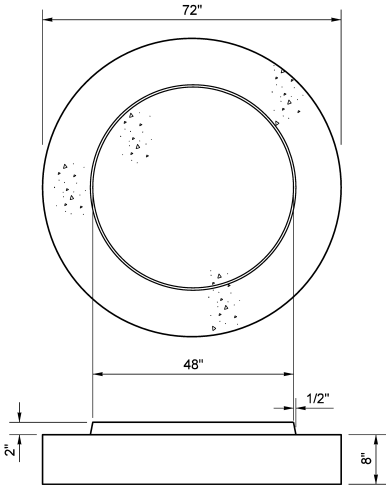
CUTAWAY ELEVATION VIEW



INTEGRAL BASE DETAIL

NOTES

1. Precast concrete cone sections may be eccentric or concentric.
2. Seepage port orientation varies among manufacturers.
3. Connect inlet pipe to structure using precast hole or core drilled hole.
4. For depths over 16' - 2" use 72" x 8" Alternative Precast Footing.
5. When necessary, knockouts on precast cone, drywell base and riser sections shall have a wall thickness of 1 1/2" (in) minimum and 2" (in) maximum.



ALTERNATIVE PRECAST FOOTING DETAIL

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:50 PM

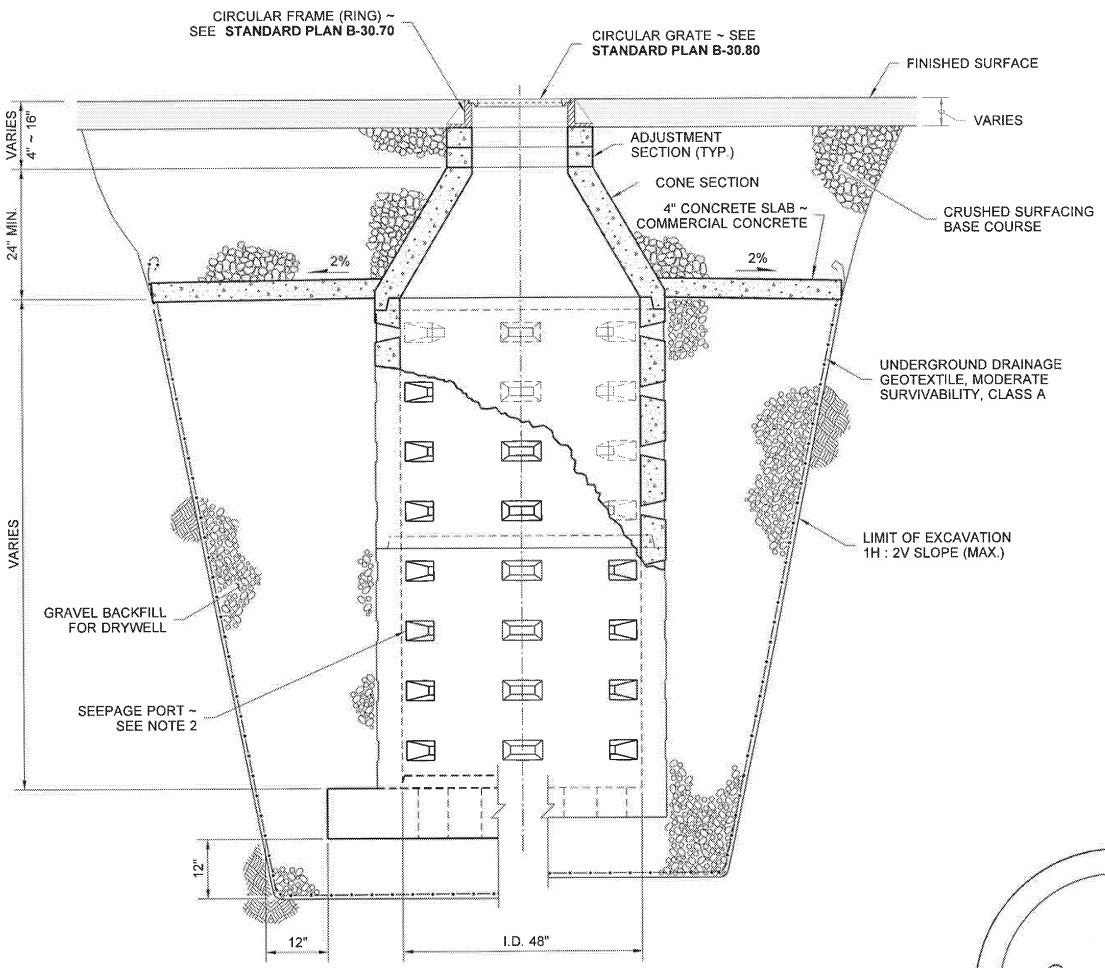
DRYWELL TYPE 2 (WITH PIPE INLET)

STANDARD PLAN B-20.40-04

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Feb 27 2018 7:42 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



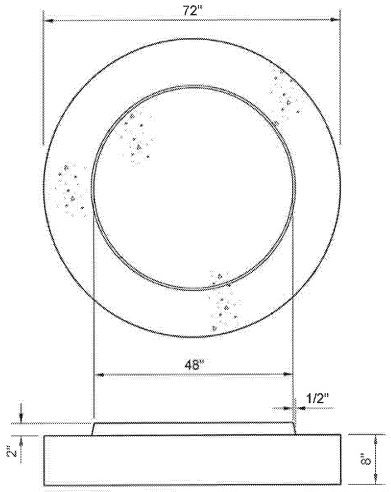
ALTERNATIVE FOOTING
PRECAST

INTEGRAL BASE
PRECAST WITH RISER

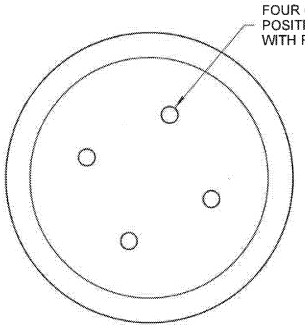
CUTAWAY ELEVATION VIEW

NOTES

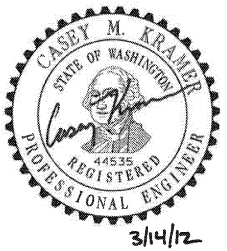
1. Precast concrete cone sections may be eccentric or concentric.
2. Seepage port orientation varies among manufacturers.
3. For depths over 16' - 2" use 72" x 8" Alternative Precast Footing.
4. When necessary, knockouts on precast cone, drywell base and riser sections shall have a wall thickness of 1 1/2" minimum and 2" maximum.



ALTERNATIVE PRECAST FOOTING DETAIL



INTEGRAL BASE DETAIL



DRYWELL TYPE 3 (WITH AT-GRADE INLET)

STANDARD PLAN B-20.60-03

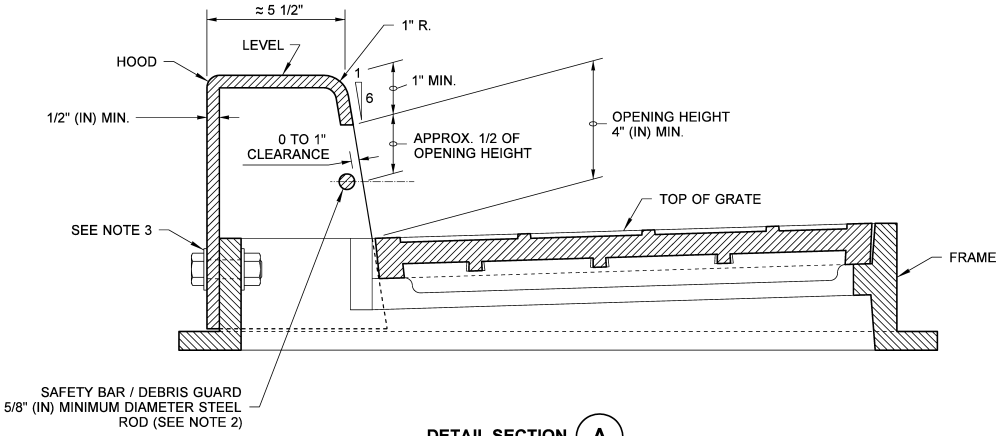
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

STATE DESIGN ENGINEER — DATE 3/15/12

Washington State Department of Transportation

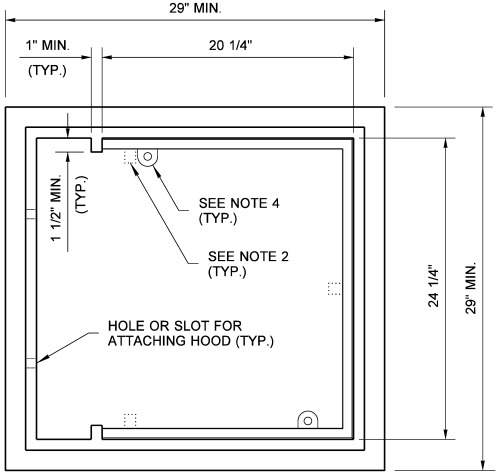
DRAWN BY: FERN LIDDELL



DETAIL SECTION (A)

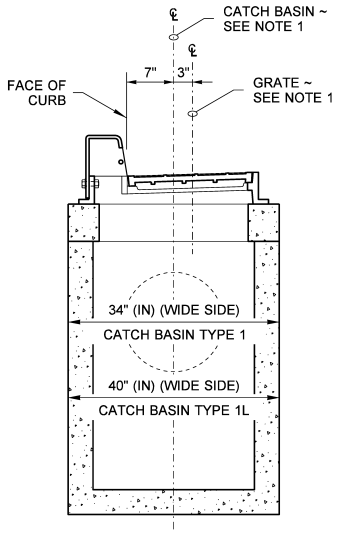
NOTES

1. This inlet requires the precast catch basin unit to be rotated 90 degrees so that the narrow side is parallel to the curb line. When calculating offsets from curb to centerline (CL) of the precast catch basin, please note that the CL of the grate is not the CL of the precast catch basin. See **Section A.**
2. The dimensions of the frame and hood may vary slightly among different manufacturers. The Frame may have cast features intended to support a debris guard. Hood units may be mounted inside or outside of the frame. The methods for fastening the safety bar / debris guard rod to the hood may vary. The hood may include casting lugs. The top of the hood may be cast with a pattern.
3. Attach the hood to the frame with two 3/4" (in) × 2" (in) hex head bolts, nuts, and oversize washers. The washers shall have diameters adequate to ensure full bearing across the slots.
4. Bolt-down capability is required on all frames, grates and covers, unless specified otherwise in the Contract. Provide two 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. See **BOLT-DOWN DETAIL**, **Standard Plan B-30.10.**
5. Only ductile iron Vaned Grates shall be used. See **Standard Plans B-30.30 and B-30.40** for grate details. Refer to **Standard Specification Section 9-05.15(2)** for additional requirements.
6. This plan is intended to show the installation details of a manufactured product. This plan is not intended to show the specific details necessary to fabricate the castings depicted in this drawing.

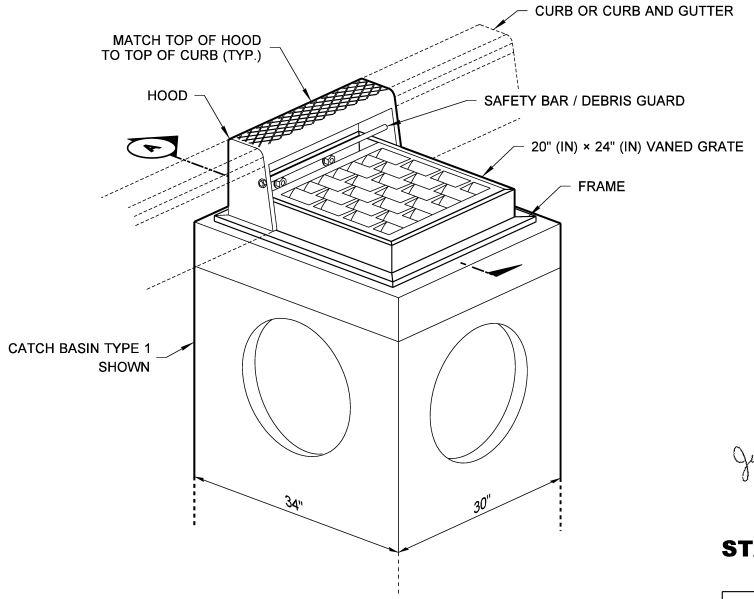


TOP VIEW

FRAME DETAIL



SECTION (A)



ISOMETRIC VIEW

COMBINATION INLET
FRAME, HOOD, AND VANED GRATE

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:51 PM

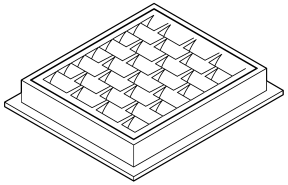
COMBINATION INLET

STANDARD PLAN B-25.20-02

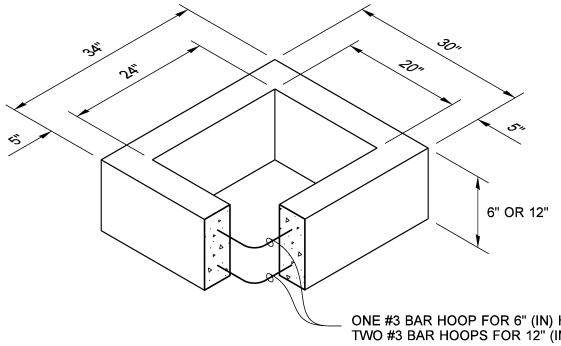
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Feb 27 2018 7:43 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: MARK SUJKA



FRAME AND VANED GRATE



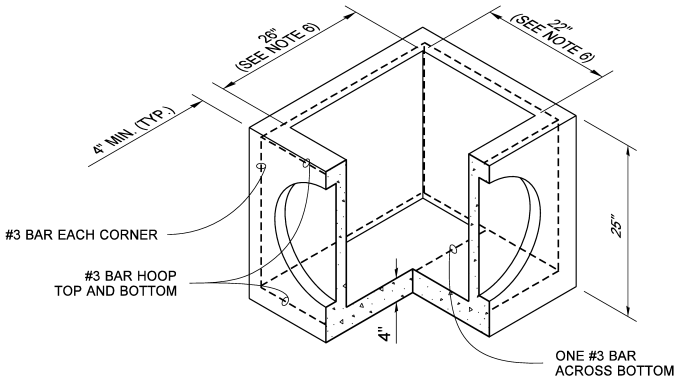
RECTANGULAR ADJUSTMENT SECTION

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"
POLYPROPYLENE (STD. SPEC. SECT. 9-05.24)	12"
SOLID WALL PVC (STD. SPEC. SECT. 9-05.12(1))	15"
PROFILE WALL PVC (STD. SPEC. SECT. 9-05.12(2))	15"

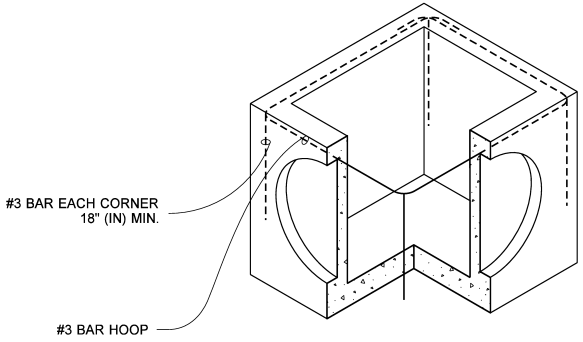
* CORRUGATED POLYETHYLENE STORM SEWER PIPE

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 18" (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 up or down. The frame may be cast into the adjustment section.
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 inlet has been placed.



PRECAST BASE SECTION



SEE NOTE 1

ALTERNATIVE PRECAST BASE SECTION

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

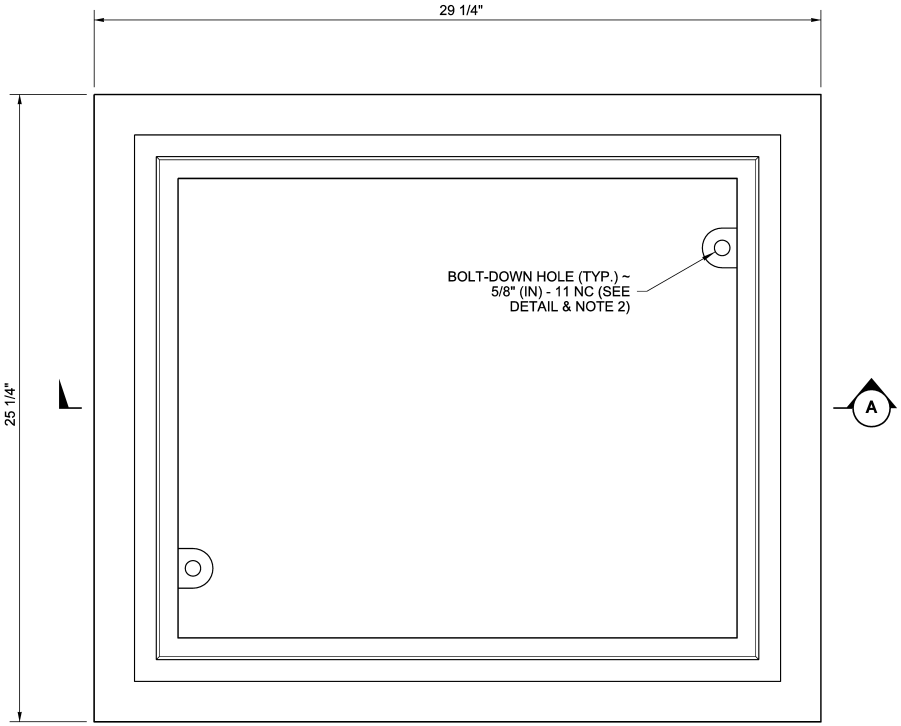
Heilman, Julie
Feb 20 2018 12:51 PM

CONCRETE INLET

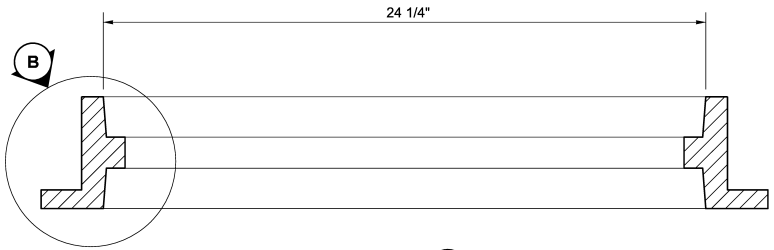
STANDARD PLAN B-25.60-02

SHEET 1 OF 1 SHEET

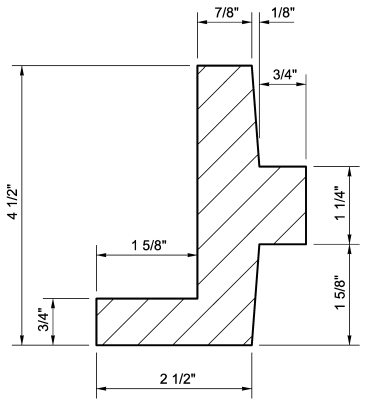
APPROVED FOR PUBLICATION
Carpenter, Jeff
Feb 27 2018 7:43 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation



TOP



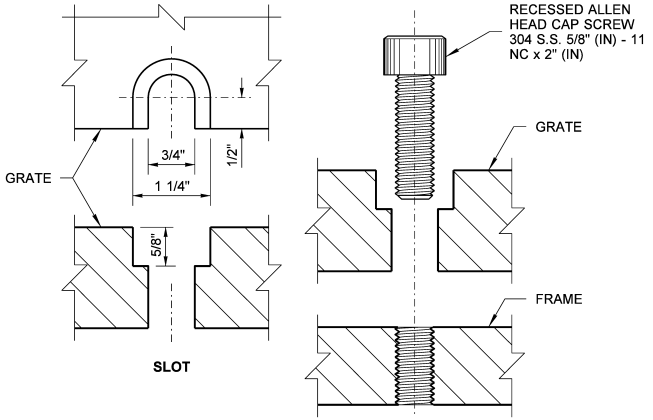
SECTION (A)



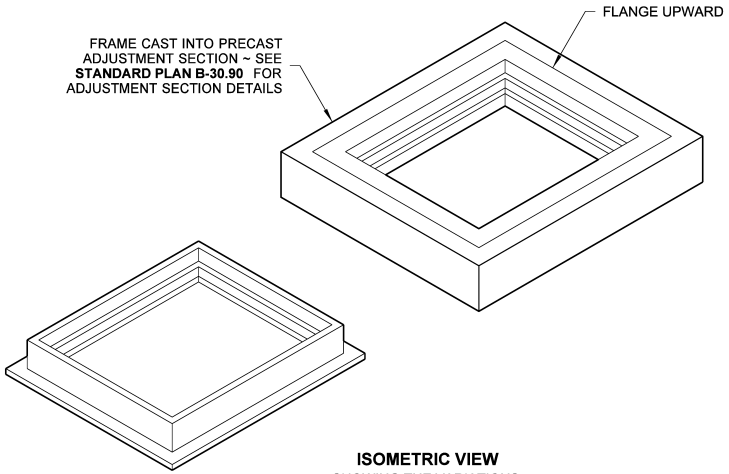
DETAIL (B)

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.



BOLT-DOWN DETAILS
SEE NOTE 2



ISOMETRIC VIEW
SHOWING THE VARIATIONS

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:52 PM

RECTANGULAR FRAME (REVERSIBLE)

STANDARD PLAN B-30.10-03

SHEET 1 OF 1 SHEET

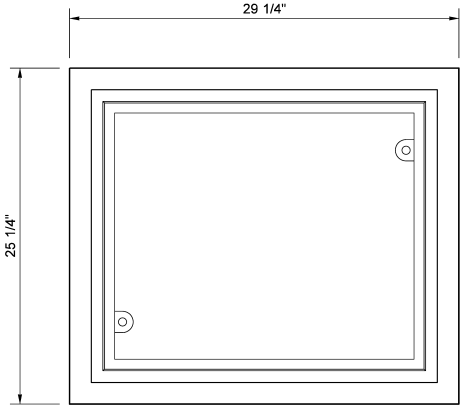
APPROVED FOR PUBLICATION
Carpenter, Jeff
Feb 27 2018 7:55 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

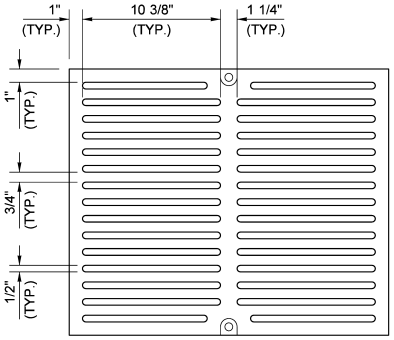
DRAWN BY: BILL BERENS

NOTES

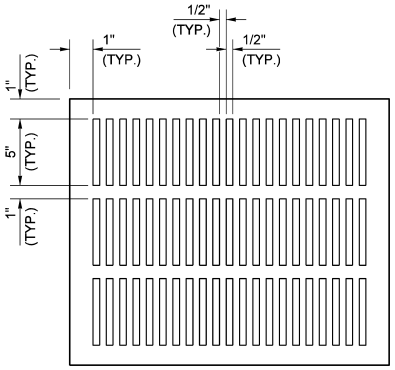
1. Bolt-down capability is required on all frames, grates, and covers, unless specified otherwise in the Contract. Provide 2 holes in the frame that are vertically aligned with the grate or cover slots. The frame shall accept the 304 Stainless Steel (S.S.) 5/8" (in) - 11 NC × 2" (in) Allen head cap screw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



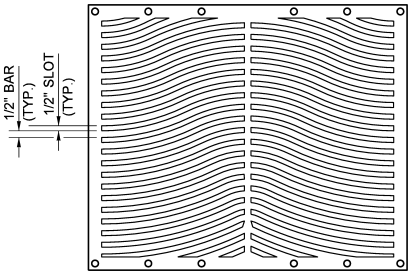
PLAN VIEW
GRATE FRAME
FOR DETAILS NOT SHOWN,
SEE STANDARD PLAN B-30.10



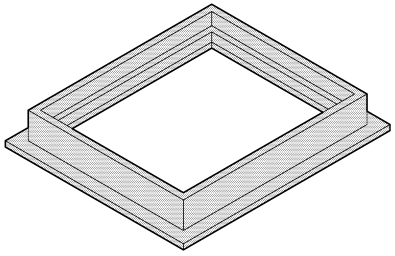
PLAN VIEW
GRATE
ALTERNATIVE 1

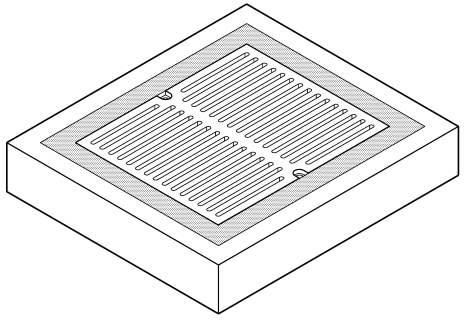


PLAN VIEW
GRATE
ALTERNATIVE 2



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

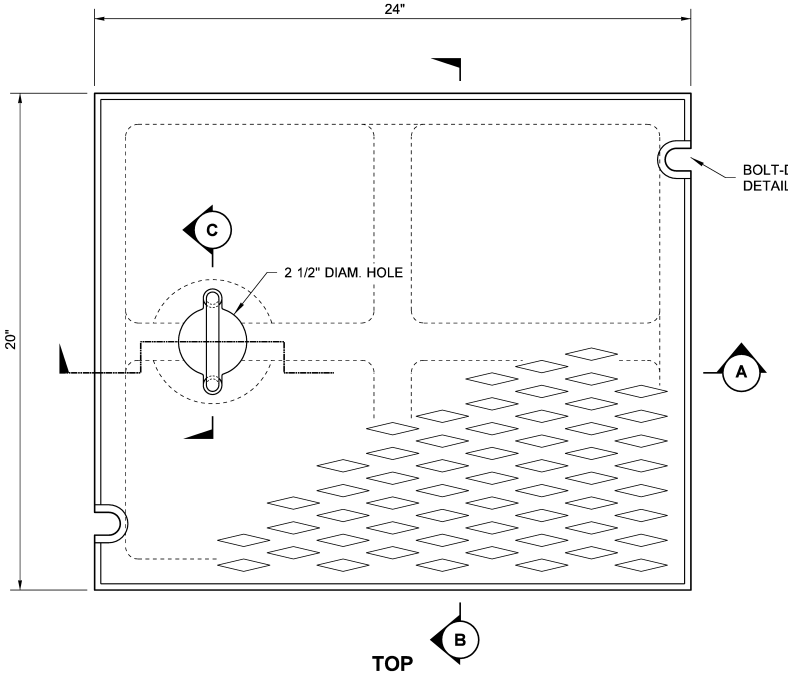
ADA GRATES FOR RECTANGULAR FRAMES

STANDARD PLAN B-30.15-00

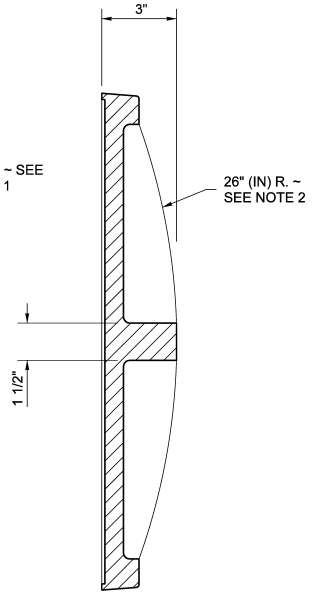
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Feb 27 2018 7:56 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



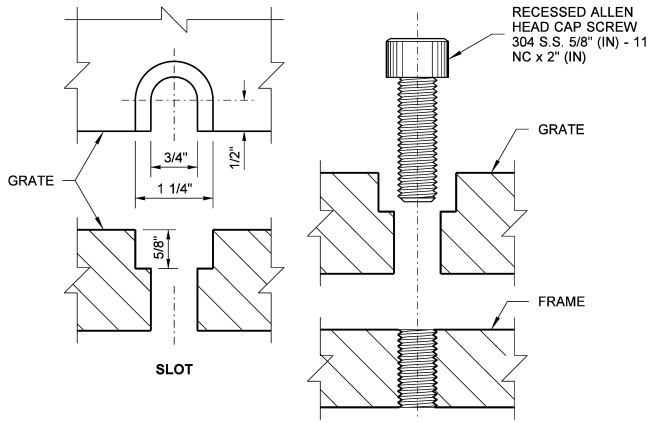
TOP



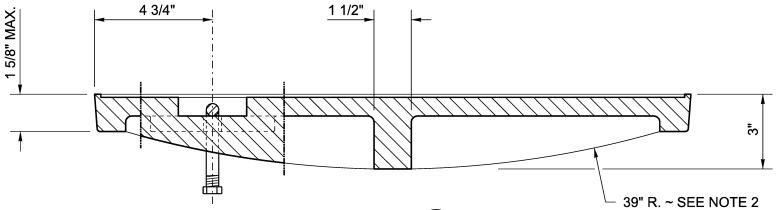
SECTION B

NOTES

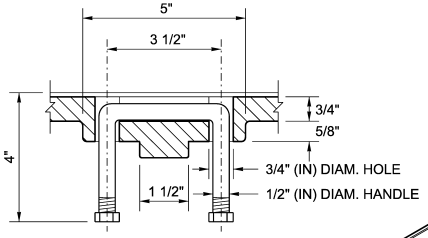
1. Bolt-down capability is required on all frames, grates, and covers, unless specified otherwise in the Contract. Provide 2 holes in the frame that are vertically aligned with the grate or cover slots. The frame shall accept the 304 Stainless Steel (S.S.) 5/8" (in) - 11 NC × 2" (in) allen head cap screw by being tapped, or other approved mechanism. Location of bolt-down holes varies by manufacturer.
2. Alternative reinforcing designs are acceptable in lieu of the rib design.
3. Refer to **Standard Specification Section 9-05.15** and **9-05.15(2)** for additional requirements.
4. For frame details, see **Standard Plan B-30.10.**



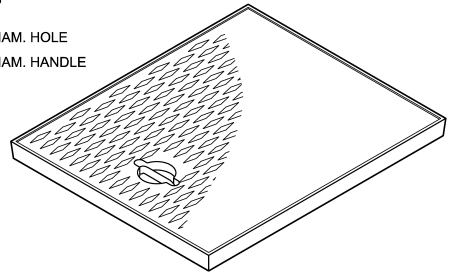
BOLT-DOWN DETAILS
SEE NOTE 1



SECTION A



SECTION C



ISOMETRIC

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:53 PM

RECTANGULAR SOLID METAL COVER

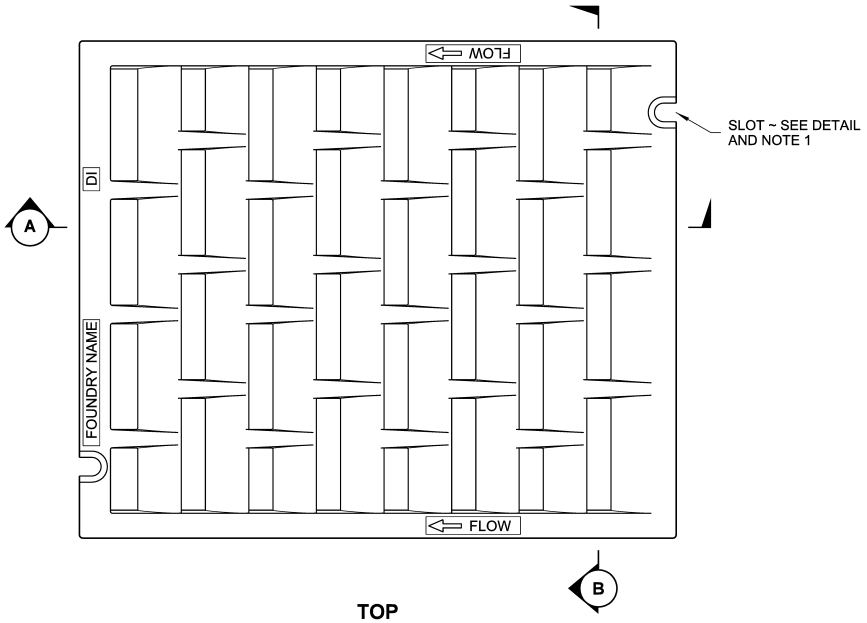
STANDARD PLAN B-30.20-04

SHEET 1 OF 1 SHEET

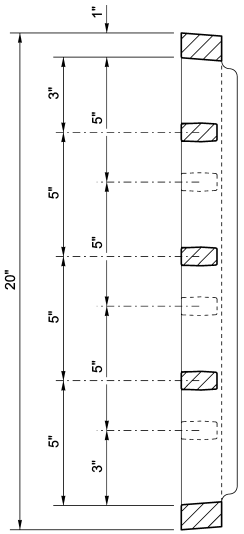
APPROVED FOR PUBLICATION
Carpenter, Jeff
Feb 27 2018 7:57 AM

STATE DESIGN ENGINEER

Washington State Department of Transportation



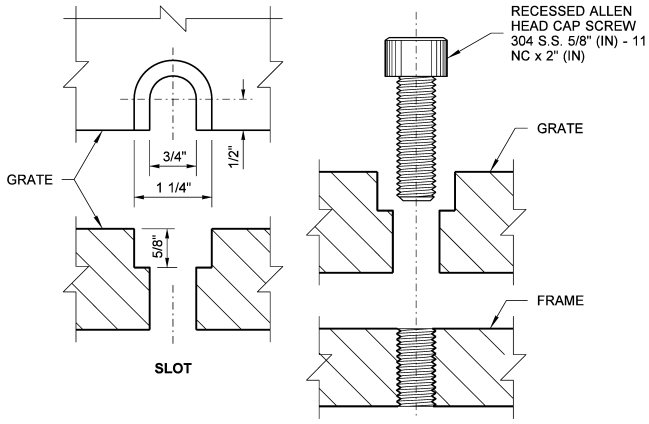
TOP



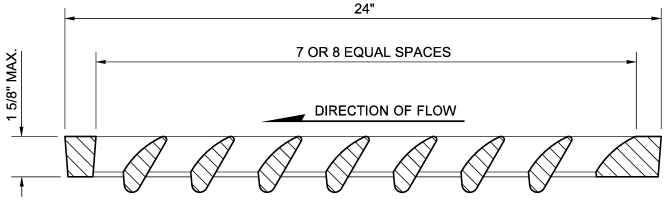
SECTION B

NOTES

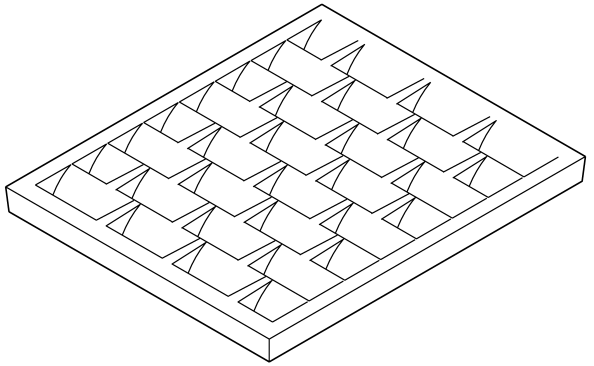
1. Bolt-down capability is required on all frames, grates, and covers, unless specified otherwise in the Contract. Provide 2 holes in the frame that are vertically aligned with the grate or cover slots. The frame shall accept the 304 Stainless Steel (S.S.) 5/8" (in) - 11 NC × 2" (in) allen head cap screw by being tapped, or other approved mechanism. Location of bolt-down holes varies by manufacturer.
2. Refer to **Standard Specification Section 9-05.15** and **9-05.15(2)** for additional requirements.
3. For frame details, see **Standard Plan B-30.10**.



BOLT-DOWN DETAILS
SEE NOTE 1



SECTION A



ISOMETRIC

DRAWN BY: FERN LIDDELL

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:54 PM

RECTANGULAR VANED GRATE

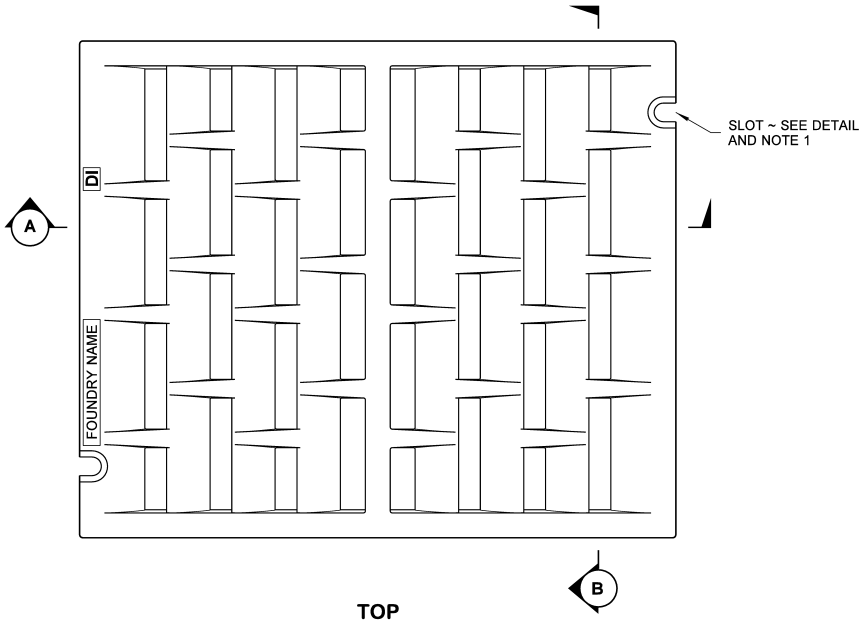
STANDARD PLAN B-30.30-03

SHEET 1 OF 1 SHEET

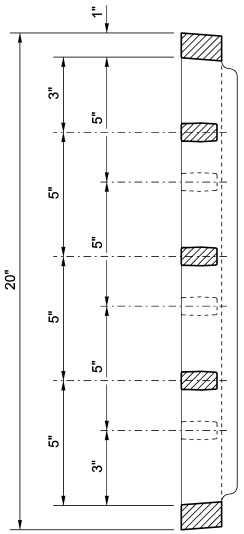
APPROVED FOR PUBLICATION
Carpenter, Jeff
Feb 27 2018 7:58 AM

STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



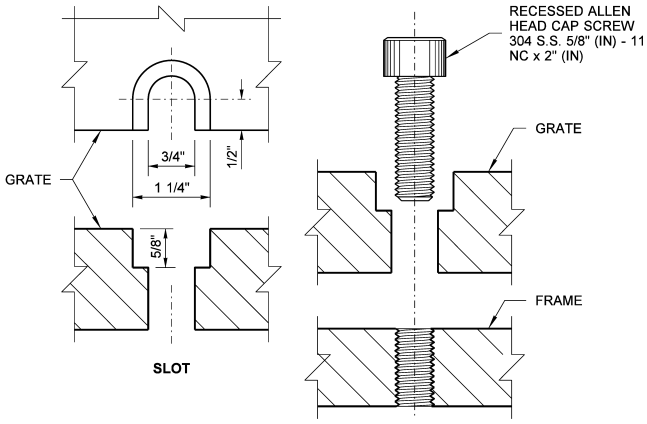
TOP



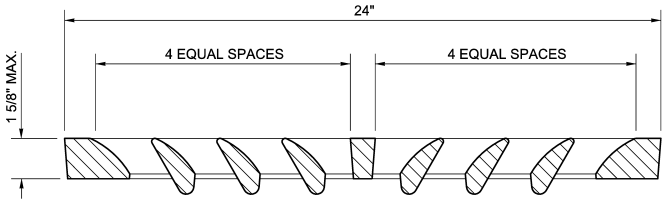
SECTION B

NOTES

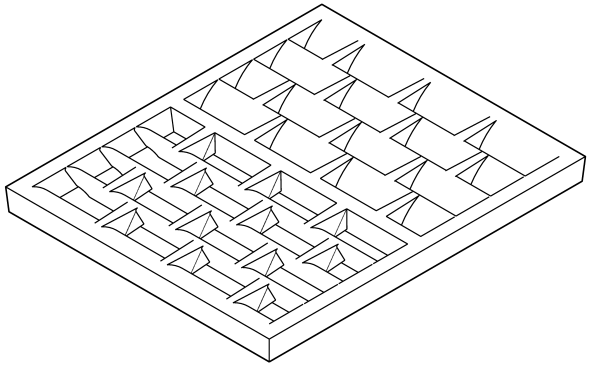
1. Bolt-down capability is required on all frames, grates, and covers, unless specified otherwise in the Contract. Provide 2 holes in the frame that are vertically aligned with the grate or cover slots. The frame shall accept the 304 Stainless Steel (S.S.) 5/8" (in) - 11 NC × 2" (in) allen head cap screw by being tapped, or other approved mechanism. Location of bolt-down holes varies by manufacturer.
2. Refer to **Standard Specification Section 9-05.15,** and **9-05.15(2)** for additional requirements.
3. For frame details, see **Standard Plan B-30.10.**



BOLT-DOWN DETAILS
SEE NOTE 1



SECTION A



ISOMETRIC

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:54 PM

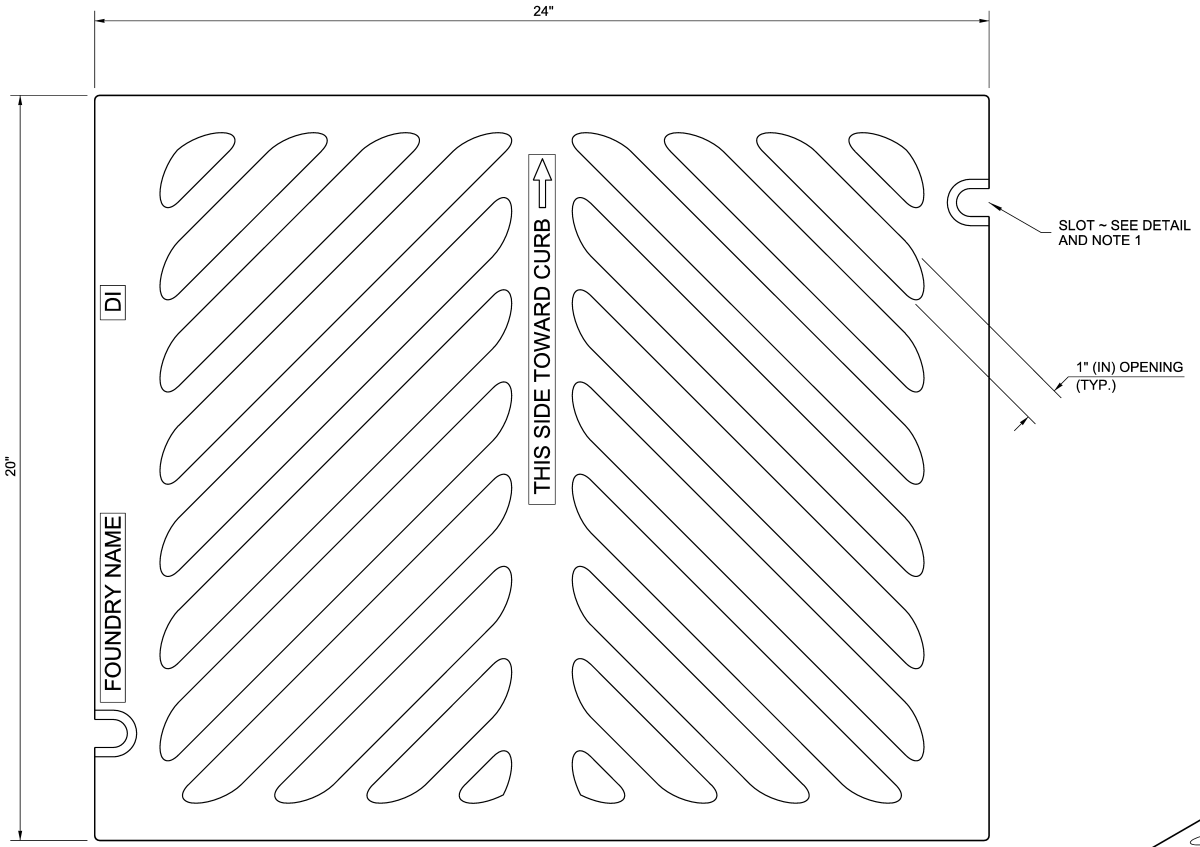
RECTANGULAR BI-DIRECTIONAL VANED GRATE

STANDARD PLAN B-30.40-03

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Feb 27 2018 7:58 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

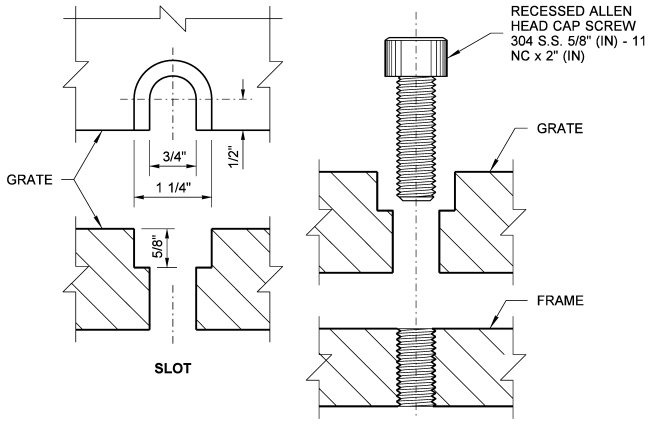
DRAWN BY: FERN LIDDELL



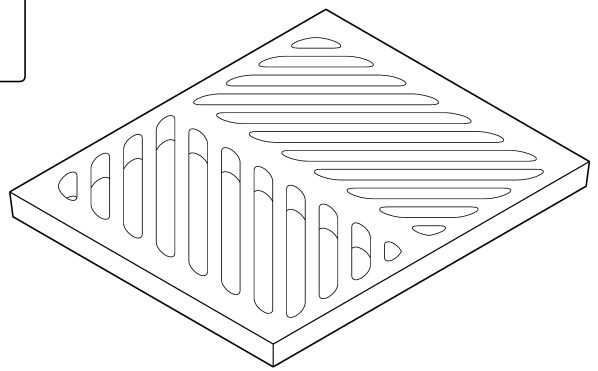
TOP

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. Refer to **Standard Specification section 9-05.15,** and **9-05.15(2)** for additional requirements.
3. For frame details, see **Standard Plan B-30.10**.
4. The thickness of the grate shall not exceed 1 5/8" (in).



BOLT-DOWN DETAILS
SEE NOTE 1



ISOMETRIC

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:55 PM

RECTANGULAR HERRINGBONE GRATE

STANDARD PLAN B-30.50-03

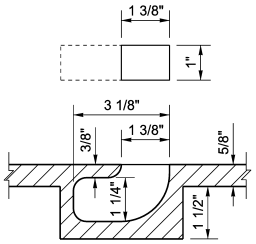
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Feb 27 2018 7:59 AM

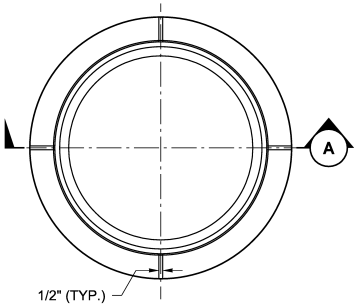
STATE DESIGN ENGINEER

Washington State Department of Transportation

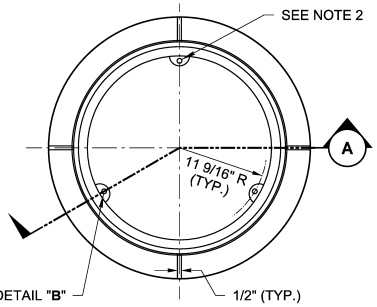
DRAWN BY: FERN LIDDELL



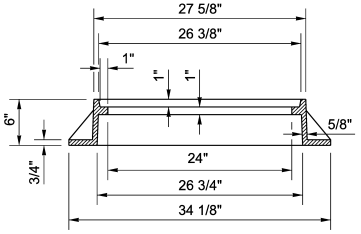
BLIND PICK NOTCH
DETAIL "A"



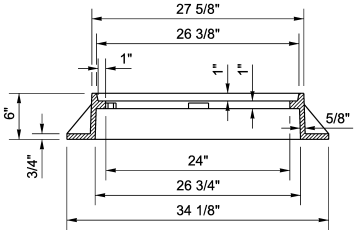
RING PLAN



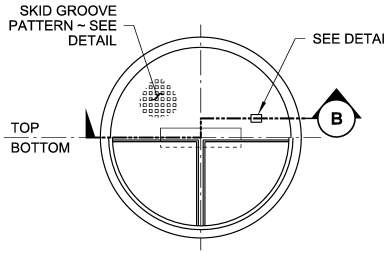
RING PLAN



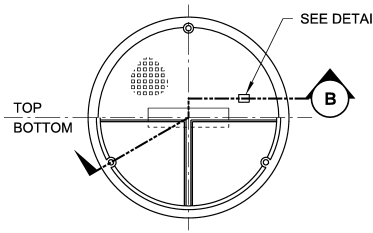
RING SECTION (A)



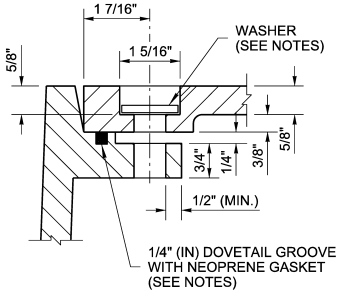
RING SECTION (A)



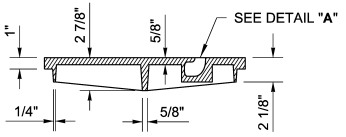
COVER PLAN



COVER PLAN

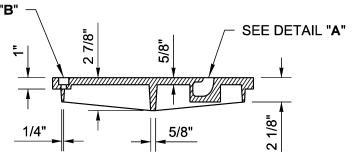


BOLT-DOWN / WATERTIGHT
DETAIL "B"



COVER SECTION (B)
(SEE NOTE 7)

STANDARD
TYPE 1

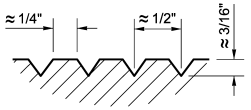


COVER SECTION (B)
(SEE NOTE 7)

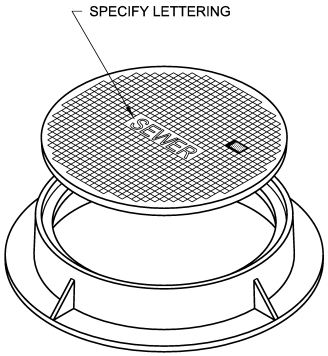
BOLT-DOWN / WATERTIGHT
TYPE 2

NOTES

1. The gasket and groove may be in the seat (frame) or in the underside of the cover. The gasket may be "T" shaped in section. The groove may be cast or machined.
2. Bolt-down capability is required on all frames, grates, and covers, unless specified otherwise in the Contract. Provide 3 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" - 11 NC x 2" (in) allen head cap screw by being tapped, or other approved mechanism. Location of bolt down holes varies by manufacturer.
3. For bolt-down manhole ring and covers that are not designated "Watertight," the neoprene gasket, groove, and washer are not required.
4. Washer shall be neoprene (Detail "B").
5. In lieu of blind pick notch for manhole covers, a single 1" (in) pick hole is acceptable. Hole location and number of holes may vary by manufacturer.
6. Alternative reinforcing designs are acceptable in lieu of the rib design.
7. For clarity, the vertical scale of the Cover Section has been exaggerated, it is 1.5 times the horizontal scale (1H:1.5V).



SKID GROOVE PATTERN
DETAIL



ISOMETRIC VIEW

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:55 PM

CIRCULAR FRAME (RING) AND COVER

STANDARD PLAN B-30.70-04

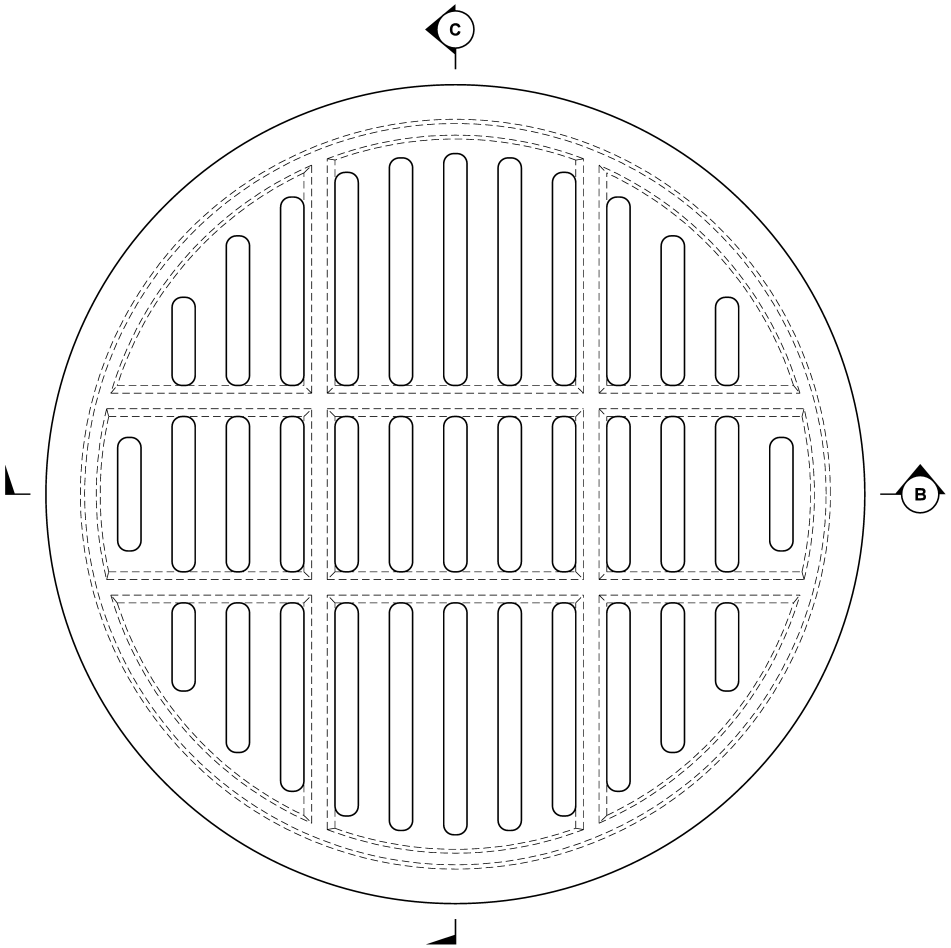
SHEET 1 OF 1 SHEET

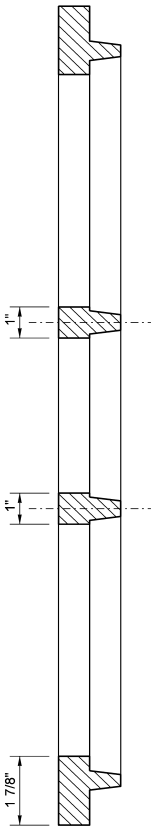
APPROVED FOR PUBLICATION
Carpenter, Jeff
Feb 27 2018 7:59 AM

STATE DESIGN ENGINEER

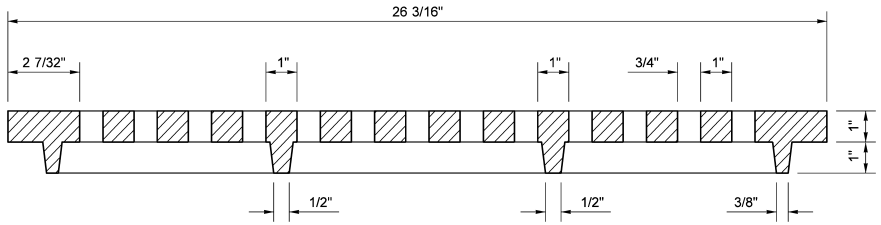
Washington State Department of Transportation

DRAWN BY: FERN LODELL





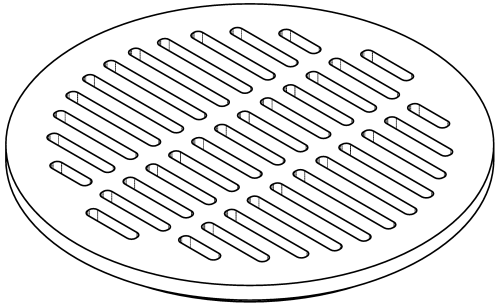
SECTION C



SECTION B

NOTES

1. For use with Circular Frames (rings) detailed in **Standard Plan B-30.70**.
2. Slotted Manhole Covers are intended for use with Drywells only. See **Standard Plans B-20.20** and **B-20.60**.
3. See **Standard Specification Section 9-05.15** for additional requirements.



ISOMETRIC VIEW

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:56 PM

CIRCULAR GRATE

STANDARD PLAN B-30.80-01

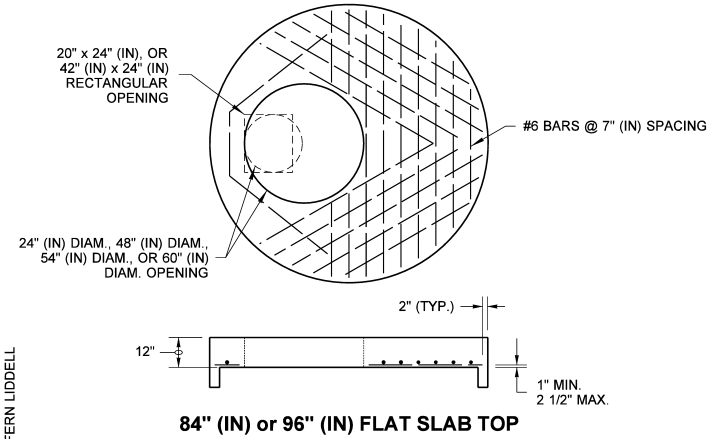
SHEET 1 OF 1 SHEET

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

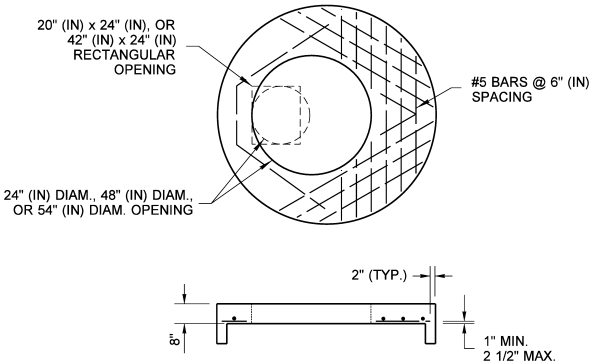
STATE DESIGN ENGINEER

Washington State Department of Transportation

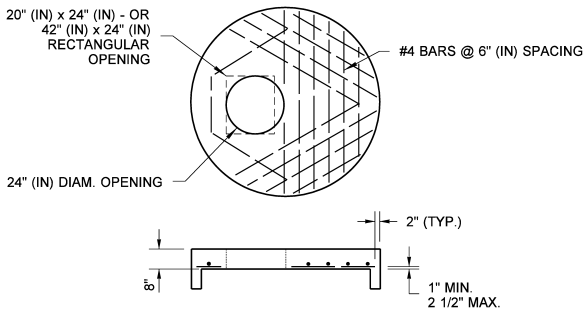
DRAWN BY: FERN LIDDELL



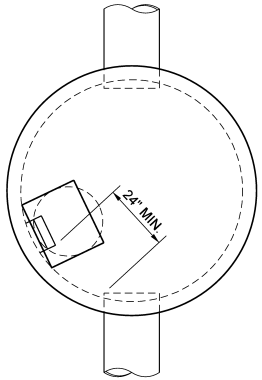
84" (IN) or 96" (IN) FLAT SLAB TOP



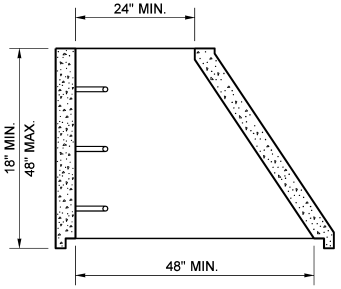
72" (IN) FLAT SLAB TOP



48" (IN), 54", or 60" (IN) FLAT SLAB TOP



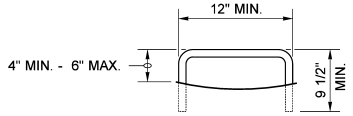
TYPICAL ORIENTATION FOR ACCESS AND STEPS



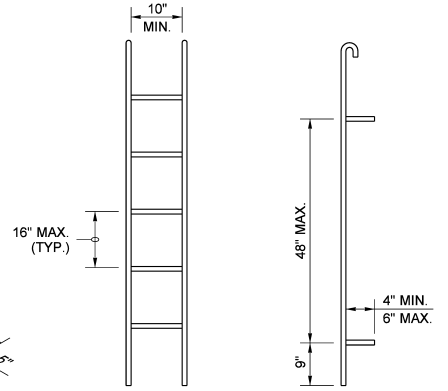
ECCENTRIC CONE SECTION

NOTE

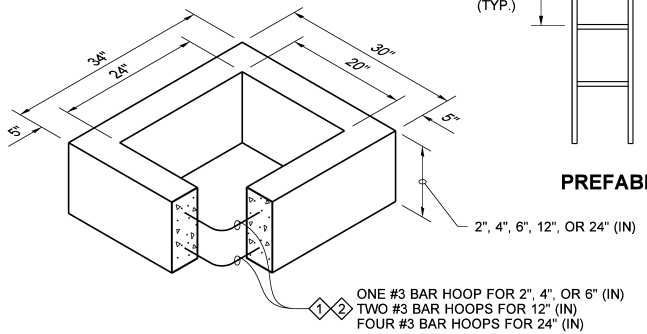
1. Ladder rungs for manholes and catch basins shall meet the requirements of **AASHTO M 199.**



STEP

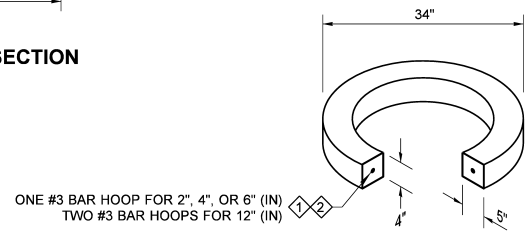


PREFABRICATED LADDER



RECTANGULAR ADJUSTMENT SECTION

1. As an acceptable alternative to rebar, wire mesh having a minimum area of 0.12 square inches per foot may be used for adjustment sections.
2. As an acceptable alternative to conventional steel reinforcment, manufacturers shall use Synthetic Structural Fibers meeting the requirements of **Standard Specification Section 9-05.50(10)**.



CIRCULAR ADJUSTMENT SECTION

For rectangular and circular adjustment sections, approved alternate material compositions are acceptable in lieu of precast concrete designs

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Jan 25 2017 3:01 PM

MISCELLANEOUS DETAILS FOR DRAINAGE STRUCTURES STANDARD PLAN B-30.90-02

SHEET 1 OF 1 SHEET

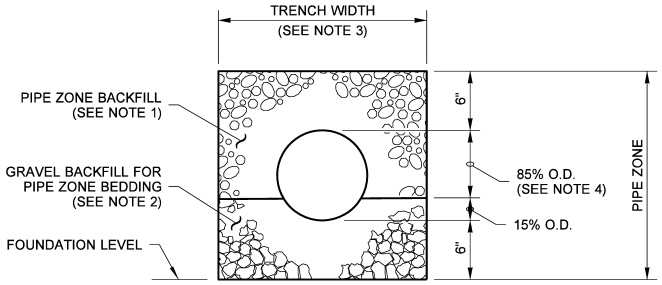
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jan 26 2017 6:52 AM

STATE DESIGN ENGINEER

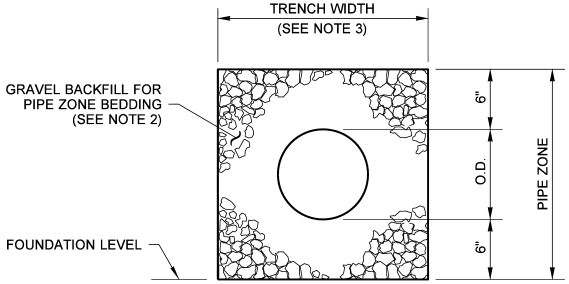
Washington State Department of Transportation

This page left blank intentionally.

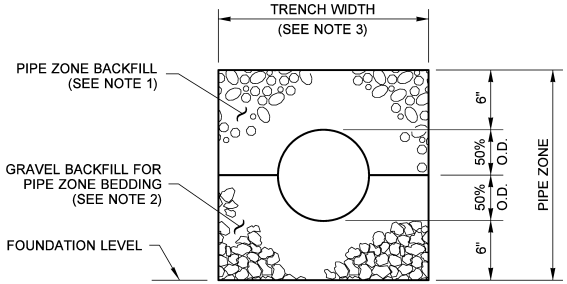
DRAWN BY: FERN LIDDELL



CONCRETE AND DUCTILE IRON PIPE



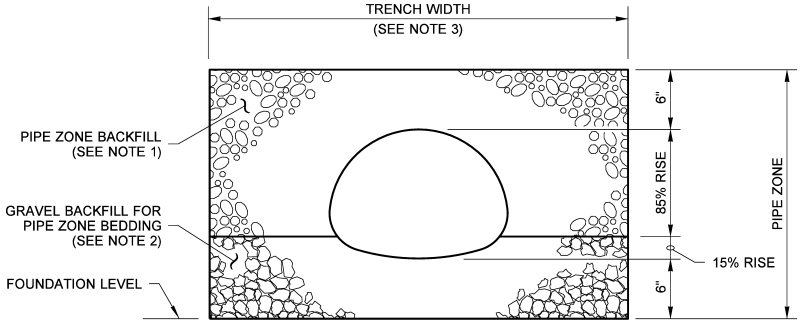
THERMOPLASTIC PIPE



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

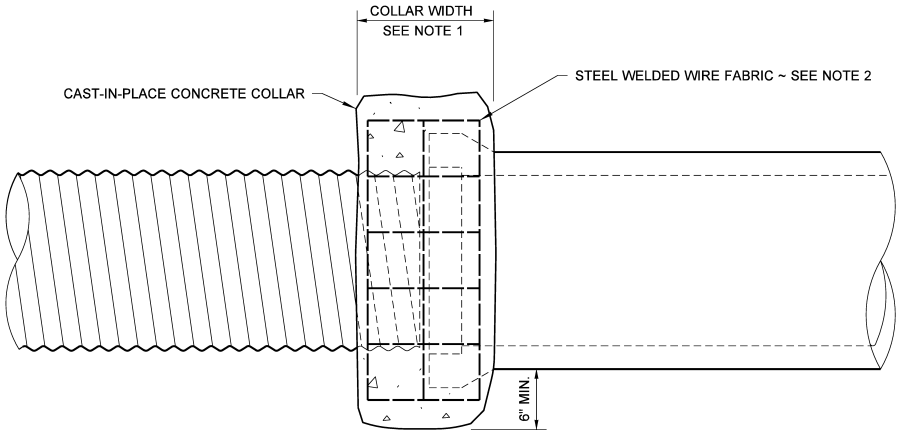
STANDARD PLAN B-55.20-02

SHEET 1 OF 1 SHEET

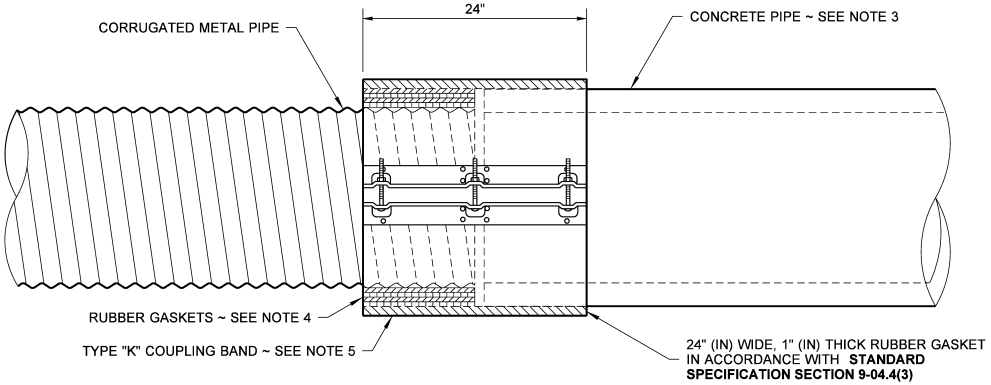
APPROVED FOR PUBLICATION
Carpenter, Jeff
Feb 27 2018 8:01 AM

STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



CONCRETE COLLAR OPTION



COUPLING BAND OPTION

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.

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Jun 11 2018 9:30 AM

CONNECTION DETAILS FOR DISSIMILAR CULVERT PIPE

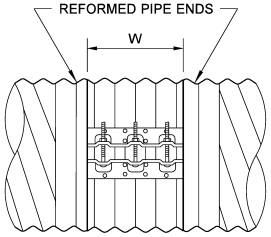
STANDARD PLAN B-60.20-01

SHEET 1 OF 1 SHEET

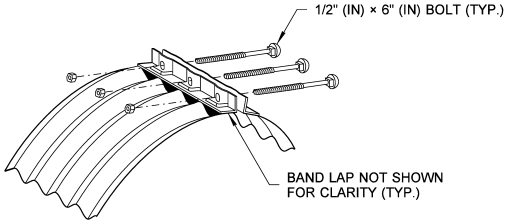
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:44 AM

STATE DESIGN ENGINEER

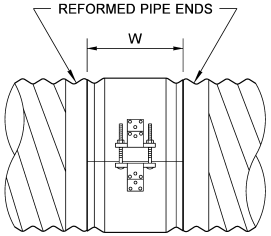
Washington State Department of Transportation



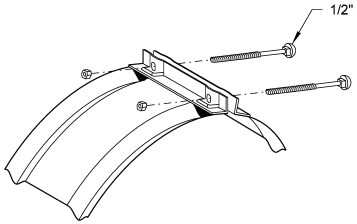
TYPE D
ANNULAR CORRUGATED BAND



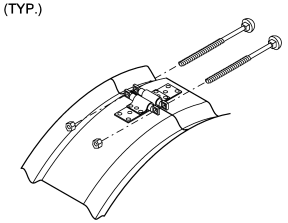
TYPE D
BAND ANGLE CONNECTOR DETAIL



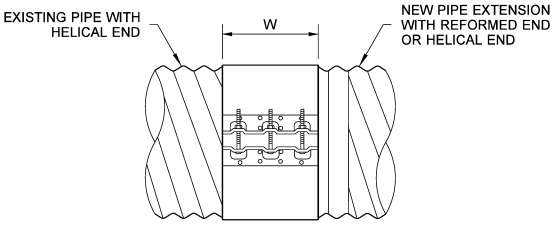
TYPE F
SEMI-CORRUGATED BAND



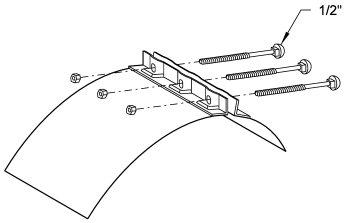
TYPE F
BAND ANGLE CONNECTOR DETAIL



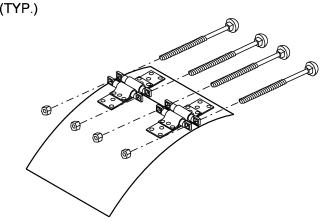
TYPE F
BAR & STRAP CONNECTOR DETAIL



TYPE K
FLAT BAND OR DIMPLE BAND
(FOR PIPE EXTENSIONS ONLY)



TYPE K
BAND ANGLE CONNECTOR DETAIL



TYPE K
DOUBLE BAR & STRAP CONNECTOR DETAIL

COUPLING BAND DIMENSION TABLE
(ALL DIMENSIONS ARE IN INCHES)

BAND TYPE		CORRUGATION PITCH × DEPTH	PIPE DIAM.	MIN. W	GASKET TYPE
STEEL	D	2 2/3 × 1/2 OR 3 × 1 REFORMED TO 2 2/3 × 1/2	12 ~ 84	12	SLEEVE
		3 × 1 REFORMED TO 2 2/3 × 1/2	90 ~ 144	24	SLEEVE
	F	2 2/3 × 1/2 OR 3 × 1 REFORMED TO 2 2/3 × 1/2	12 ~ 84	10 1/2	SLEEVE OR O-RING
	K	2 2/3 × 1/2	12 ~ 48	12	SLEEVE
			54 ~ 84	24	
		* 3 × 1	54 ~ 144	24	
ALUMINUM	D	2 2/3 × 1/2	12 ~ 72	12	SLEEVE
		3 × 1	36 ~ 60	12	
		REFORMED TO 2 2/3 × 1/2	66 ~ 108	24	
	F	2 2/3 x 1/2	12 ~ 48	10 1/2	SLEEVE OR O-RING
	K	2 2/3 x 1/2	12 ~ 48	12	SLEEVE
			54 ~ 84	24	
		* 3 × 1	54 ~ 96	24	

* PIPE ARCH ONLY

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:56 PM

COUPLING BANDS FOR CORRUGATED METAL PIPE

STANDARD PLAN B-60.40-01

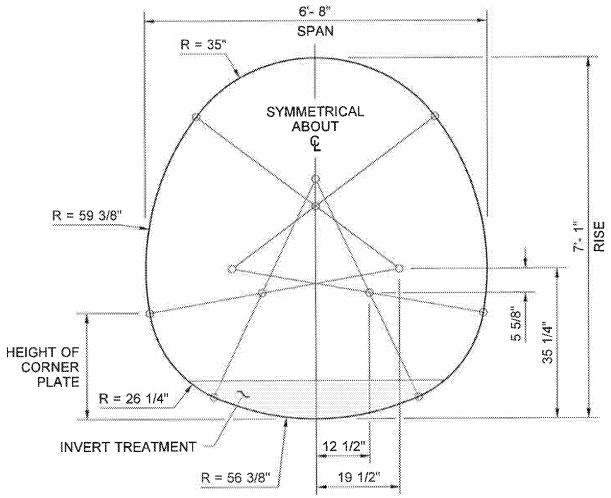
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Feb 27 2018 8:02 AM

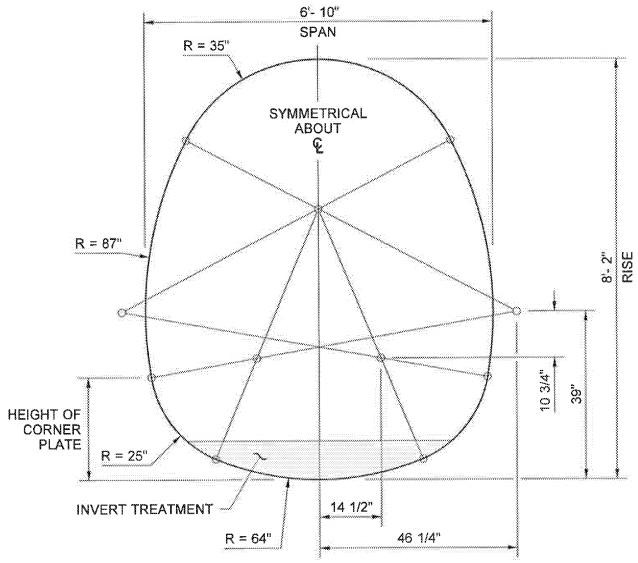
STATE DESIGN ENGINEER

Washington State Department of Transportation

DRAWN BY: BILL BERENS



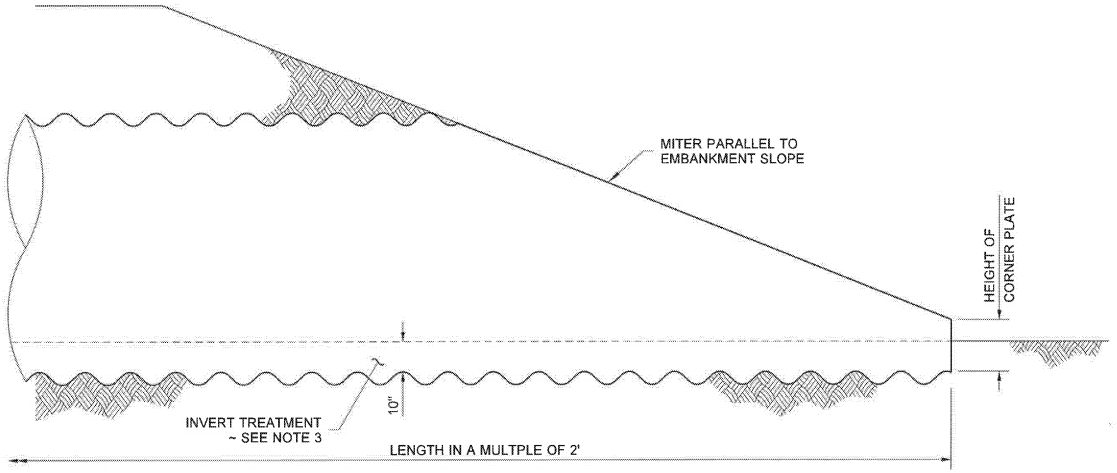
SECTION



SECTION

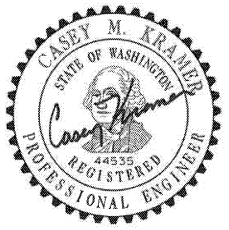
NOTES

1. Span and rise dimensions are nominal and are measured to the inside crests of corrugations.
2. Allowable heights of cover shall be within the limits indicated in the table included hereon. Minimums and maximums are shown.
3. Unless indicated otherwise a 10" depth (over the inside crests of corrugatons) of earth shall be placed in the invert of the Structural Plate Underpass, Design 1, for its full width and length. The earth shall consist of naturally occurring materials available in the vicinity of the structural plate underpass installation. See **Standard Specification 7-03.3(4).**
4. Designed for H-20 live load and maximum allowable soil pressure of 6 Kips per square foot.



SIDE VIEW ~ PLACEMENT

ALLOWABLE HEIGHTS OF COVER			
SPAN	RISE	12 GAGE THICK CORRUGATED METAL COVER	
		MIN.	MAX.
6' - 8"	7' - 1"	4'	26'
6' - 10"	8' - 2"	5'	25'



4-25-12

ANIMAL UNDERPASS

STANDARD PLAN B-65.20-01

SHEET 1 OF 1 SHEET

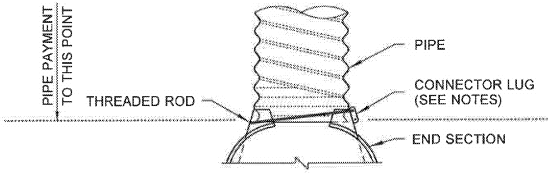
APPROVED FOR PUBLICATION

Perco Bilsto 4/26/12

STATE DESIGN ENGINEER — DATE

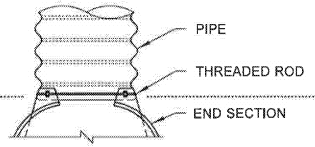
Washington State Department of Transportation

DRAWN BY: BILL BERENS



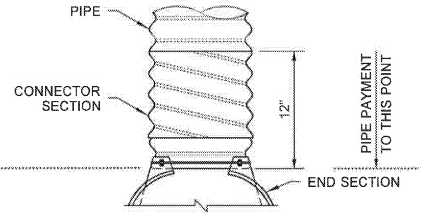
FOR 12" (IN) THRU 24" (IN) PIPE AND 17" (IN) x 13" (IN) THRU 28" (IN) x 20" (IN) PIPE ARCH WITH ANNULAR END CORRUGATIONS

TYPE 1
CONNECTION TO METAL PIPE



FOR 30" (IN) THRU 84" (IN) PIPE AND 35" (IN) x 24" (IN) THRU 83" (IN) x 57" (IN) PIPE ARCH WITH ANNULAR END CORRUGATIONS

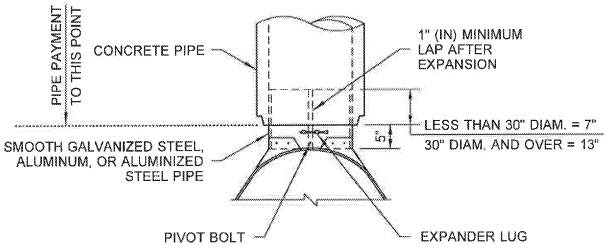
TYPE 2
CONNECTION TO METAL OR CORR. HDPE PIPE



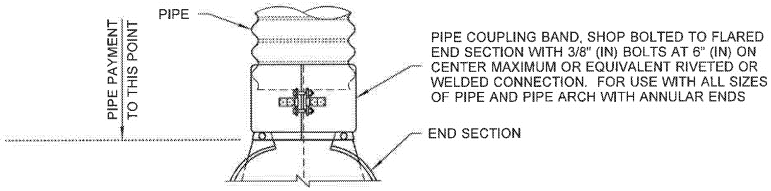
FOR 42" (IN) THRU 84" (IN) PIPE AND 49" (IN) x 33" (IN) THRU 83" (IN) x 57" (IN) PIPE ARCH WITH ANNULAR END CORRUGATIONS, AND ALL HELICAL END CORRUGATED PIPE AND PIPE ARCH

TYPE 3
CONNECTION TO METAL PIPE

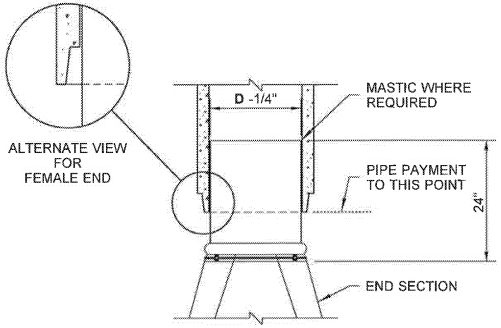
DESIGN A

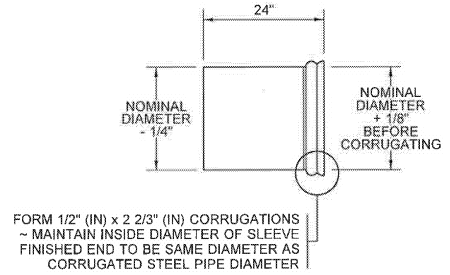


DESIGN B
CONNECTION TO CONCRETE OR HDPE PIPE
INLET END ONLY



DESIGN C
CONNECTION TO METAL OR CONCRETE PIPE
OUTLET ONLY





SMOOTH TAPERED SLEEVE DETAIL
FOR USE WITH CONCRETE OR HDPE PIPE

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Jan 25 2017 3:39 PM

FLARED END SECTIONS

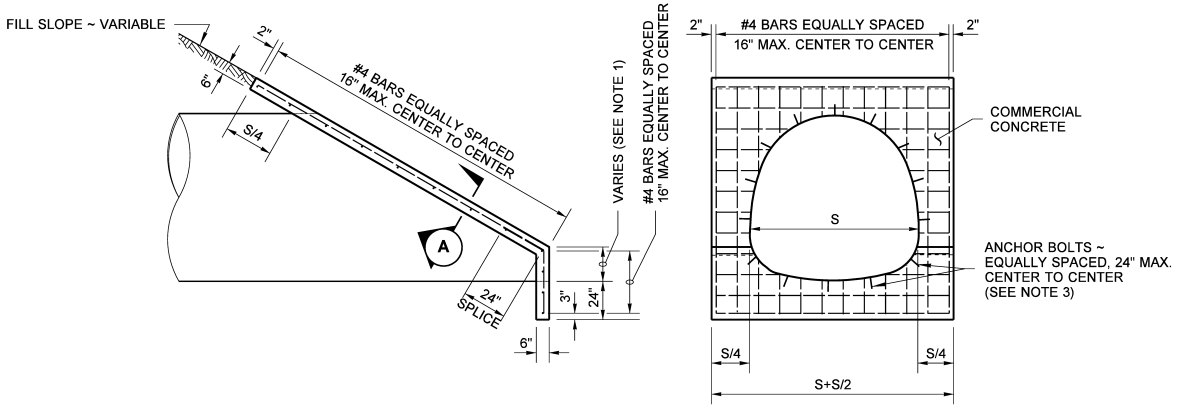
STANDARD PLAN B-70.60-01

SHEET 2 OF 2 SHEETS

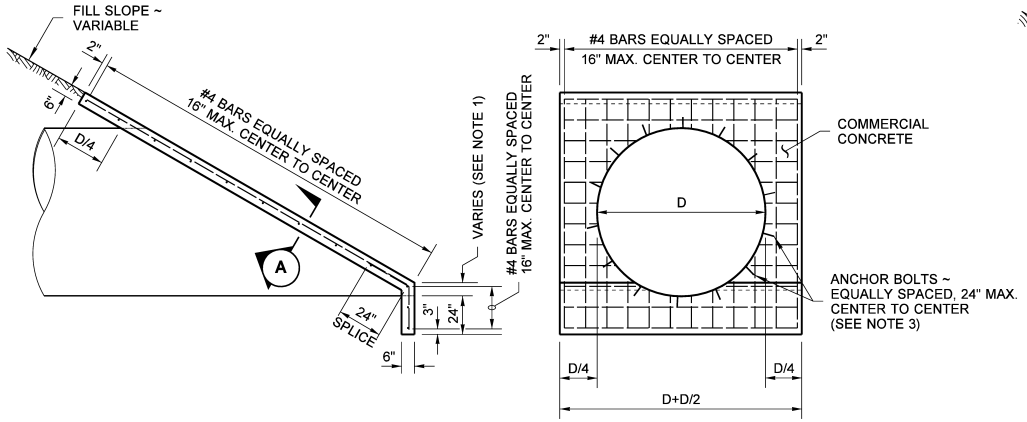
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jan 26 2017 7:10 AM
STATE DESIGN ENGINEER

Washington State Department of Transportation

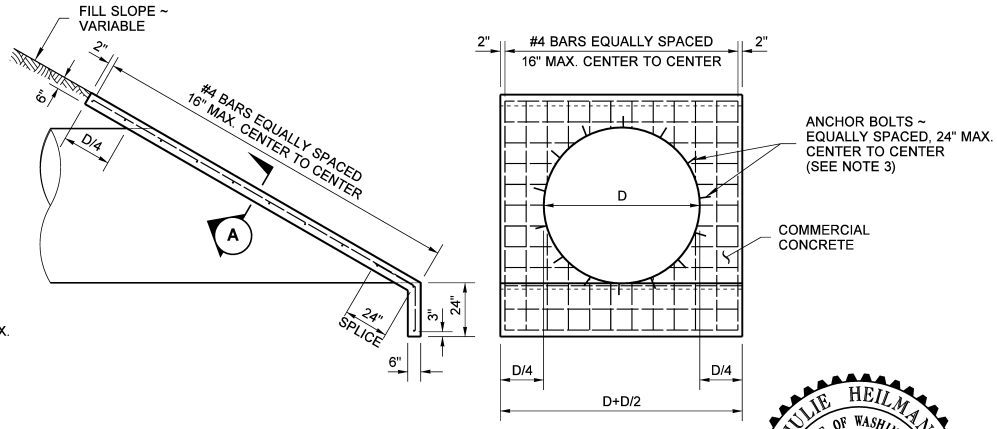
DRAWN BY: LISA CYFORD



STRUCTURAL PLATE PIPE ARCHES AND UNDERPASSES



STEP MITERED PIPE

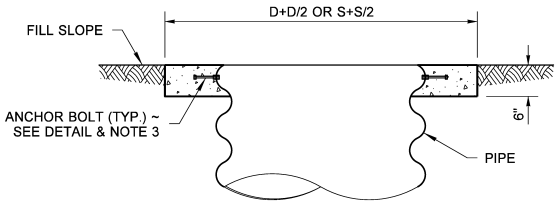


FULL MITERED PIPE

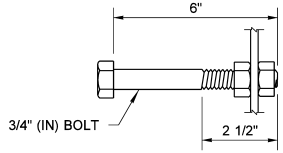
PIPES AND STRUCTURAL PLATE PIPES

NOTES

1. The variable dimension indicated for the height of step for step mitered pipes shall conform to the manufacturers recommendations unless specified differently on the plans or in the Special Provisions.
2. Reinforcing steel shall have 1 1/2" (in) min. clear cover to all concrete surfaces.
3. Headwalls for concrete culvert pipe may omit anchor bolt attachment.
4. When steel pipe safety bars ar used, headwall thickness shall be increased to 8" (in).



SECTION (A)



ANCHOR BOLT DETAIL
SEE STANDARD SPECIFICATION SECTION 9-06.5(1)

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Feb 20 2018 12:57 PM

HEADWALLS FOR CULVERT PIPE AND UNDERPASS

STANDARD PLAN B-75.20-02

SHEET 1 OF 1 SHEET

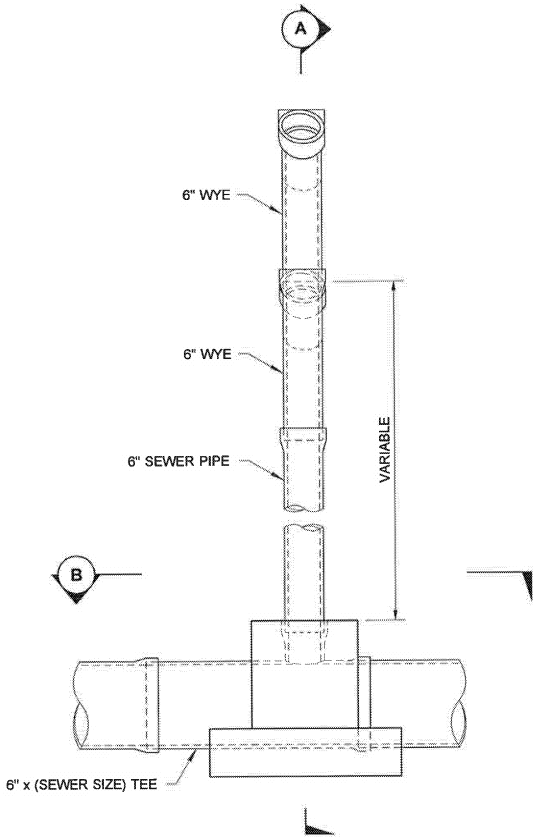
APPROVED FOR PUBLICATION
Carpenter, Jeff
Feb 27 2018 8:03 AM

STATE DESIGN ENGINEER

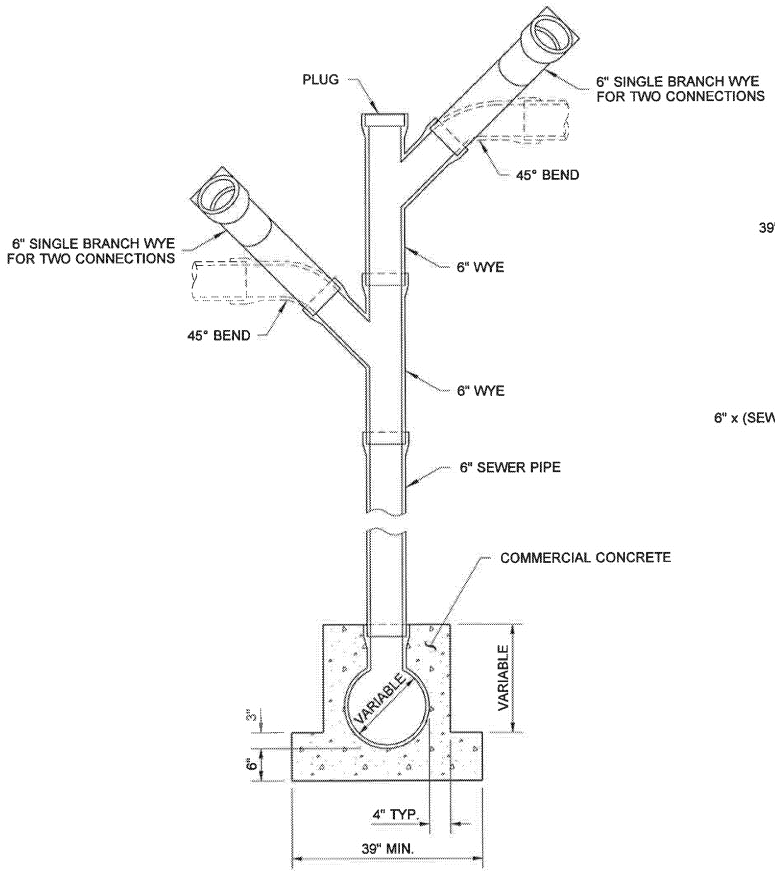
Washington State Department of Transportation

This page left blank intentionally.

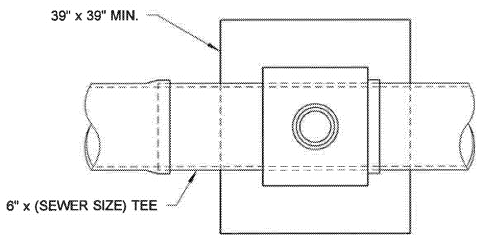
DRAWN BY: LISA CYFORD



ELEVATION

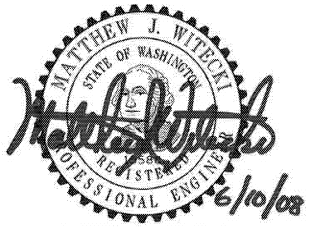


SECTION (A)



SECTION (B)

FOR SANITARY SEWER USE



EXPIRES JULY 1, 2009

VERTICAL CONNECTION

STANDARD PLAN B-85.10-01

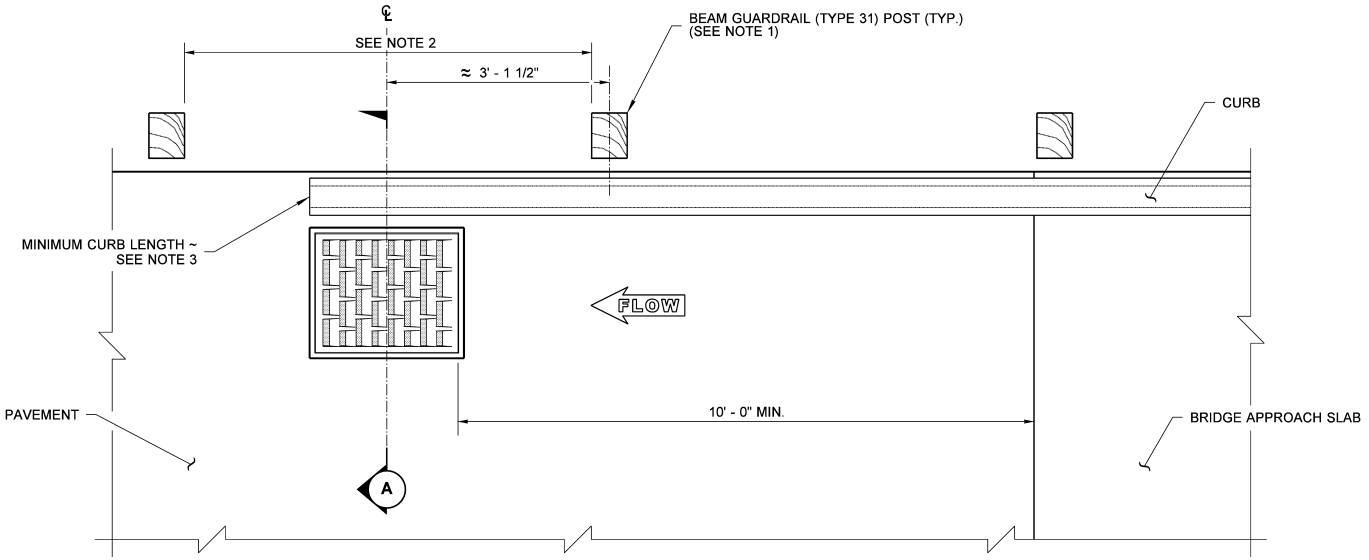
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

STATE DESIGN ENGINEER — DATE 6/10/08

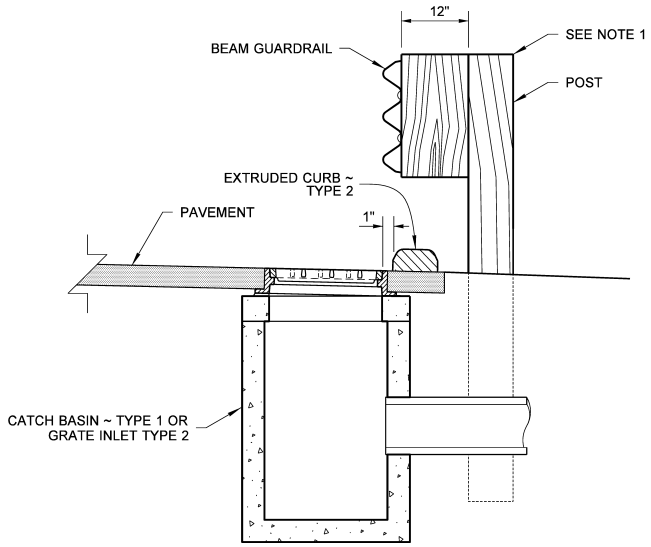
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



BEAM GUARDRAIL BLOCKS AND RAIL ELEMENTS NOT SHOWN FOR CLARITY

PLAN



SECTION A

NOTES

1. The Beam Guardrail Type 31, post type, or Beam Guardrail Type 31 Transition Section may vary from that shown on this plan.
2. The Catch Basin or Grate Inlet shall be centered between the Beam Guardrail Posts.
3. See Contract Plans for length of curb.

JULIE HEILMAN
STATE OF WASHINGTON
41819
REGISTERED
PROFESSIONAL ENGINEER

Heilman, Julie
Jun 11 2018 9:31 AM

INLET PLACEMENT AT BRIDGE END

STANDARD PLAN B-95.40-01

SHEET 1 OF 1 SHEET

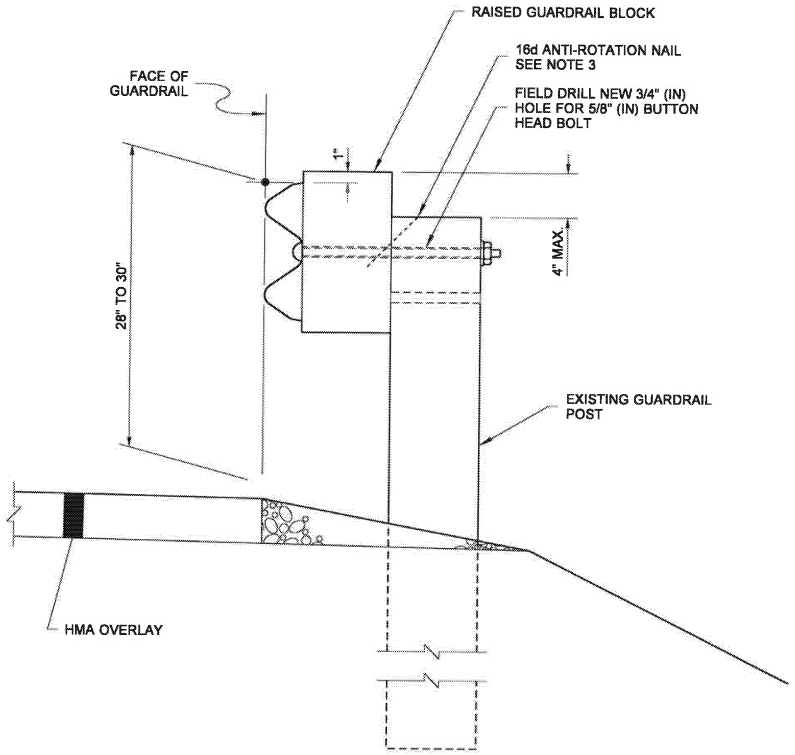
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:44 AM

STATE DESIGN ENGINEER
Washington State Department of Transportation

This page left blank intentionally.

This page left blank intentionally.

DRAWN BY: BILL BERENS



RAISING BEAM GUARDRAIL DETAIL

NOTES

1. When required by the Contract, a Snow Load Post Washer shall be used on the backside of the post (in lieu of the 1 3/4" (in) Post Bolt Washer) and a Snow Load Rail Washer shall be placed on the face side of Beam Guardrail Types 1 and 2. Snow Load Rail Washers shall not be installed on terminals.
2. Rail Washers, also called "Snow Load Rail Washers", are not required on new installation, except as called for in Note 1. Unnecessary Rail washers need not be removed from existing installations, except those on posts 2 through 8 of a BCT installation shall be removed.
3. Timber blocks shall be toe-nailed to the post with a 16d galvanized nail to prevent block rotation.
4. For post and block details, see **Standard Plan C-1b**.
5. Existing posts shall not be raised. Replace posts as necessary to achieve required guardrail height.
6. Holes shall be located on approaching traffic side of web.

JEFFERY K. PETTERSON
STATE OF WASHINGTON
36937
REGISTERED
PROFESSIONAL ENGINEER

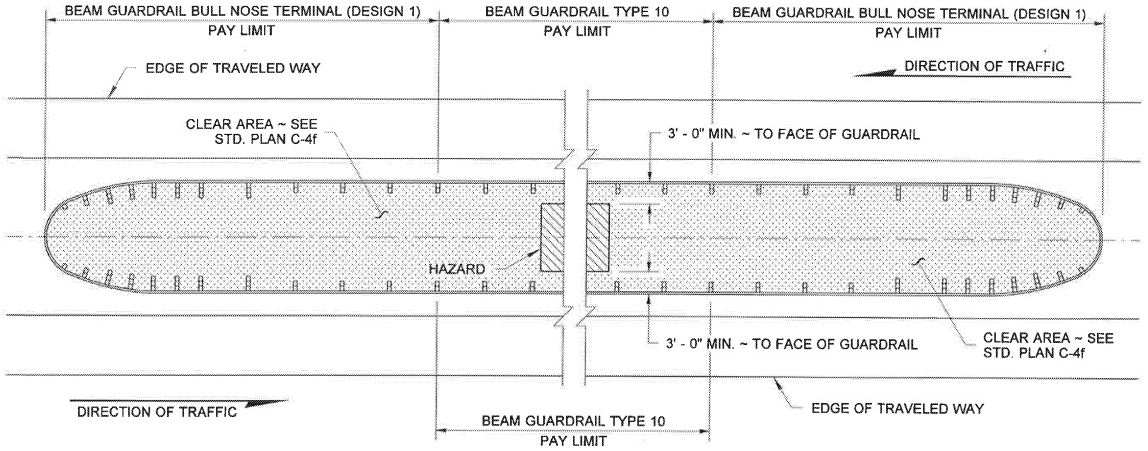
Petterson, Jeff (HQ Design)
Jun 26 2018 9:46 AM

RAISING BEAM GUARDRAIL DETAIL

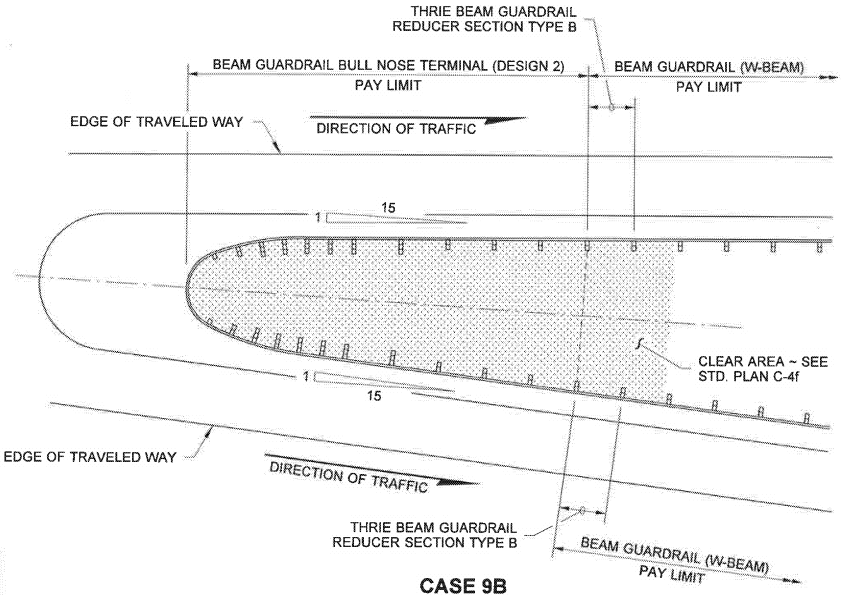
STANDARD PLAN C-1

SHEET 1 OF 1 SHEET

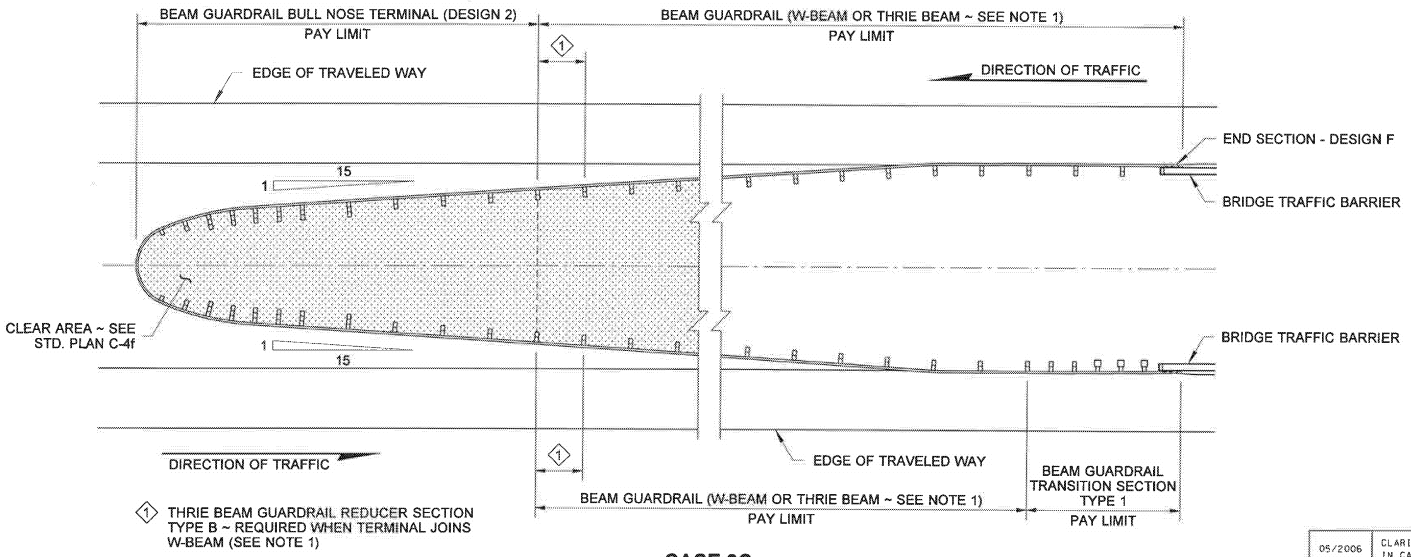
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:43 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation



CASE 9A



CASE 9B



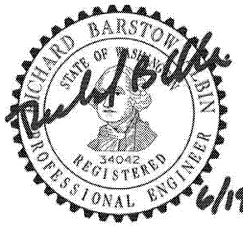
1 THRIE BEAM GUARDRAIL REDUCER SECTION TYPE B ~ REQUIRED WHEN TERMINAL JOINS W-BEAM (SEE NOTE 1)

CASE 9C

NOTE

1. **CASE 9C**: Thrie Beam Guardrail is used when the distance from the end of the Bullnose Terminal to the beginning of the transition of the Bridge Rail is less than 100 feet.

DRAWN BY: BILL BERENS



6/19/2006

EXPIRES JULY 24, 2006

GUARDRAIL PLACEMENT MEDIAN BULL NOSE

STANDARD PLAN C-2c

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

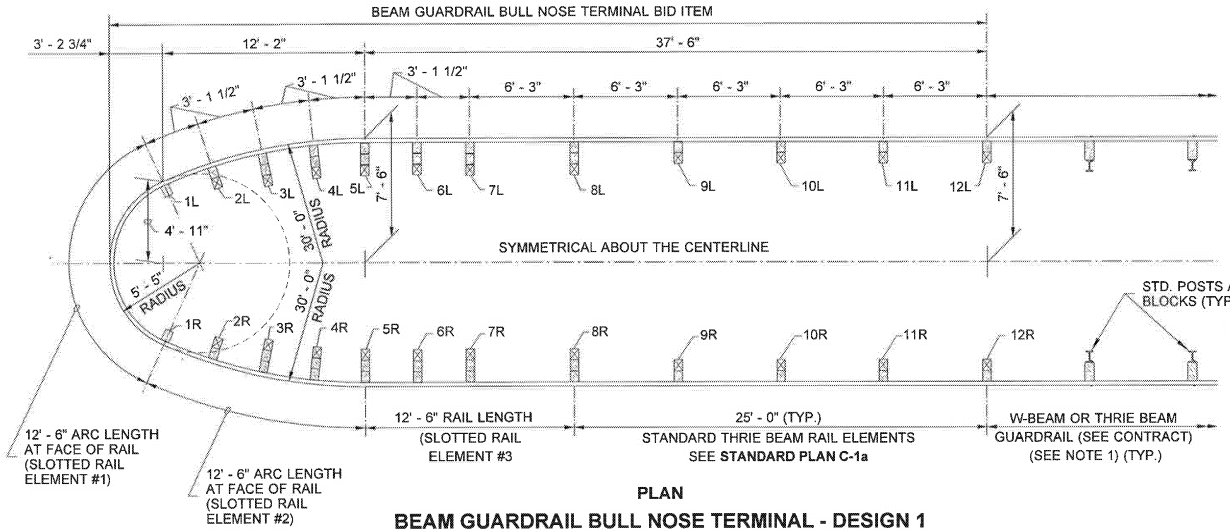
Harold Peterson 6-21-06

STATE DESIGN ENGINEER — DATE

Washington State Department of Transportation

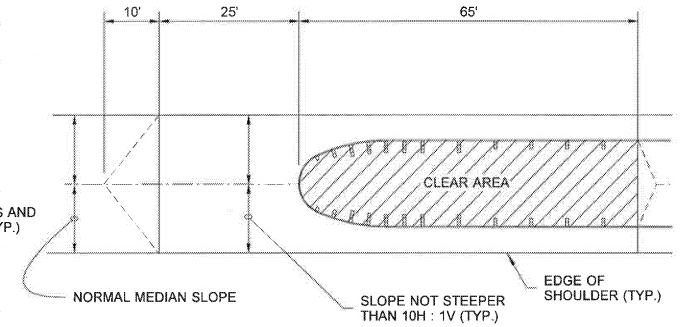
DATE	REVISION	BY
05/2006	CLARIFIED DIMENSION OF CLEARANCE TO HAZARD IN CASE 9A	WJB

DRAWN BY: FERN LIDDELL

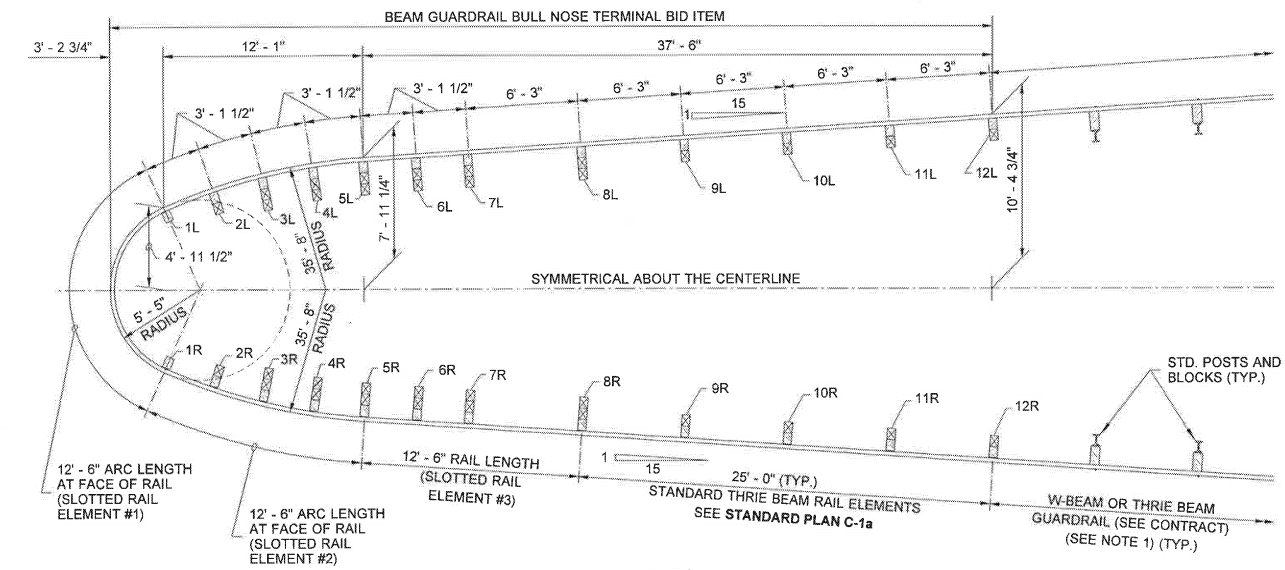


PLAN

BEAM GUARDRAIL BULL NOSE TERMINAL - DESIGN 1



BULL NOSE GRADING PLAN

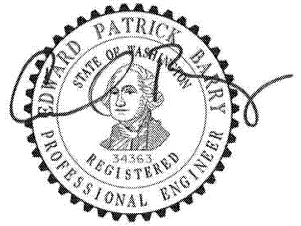


PLAN

BEAM GUARDRAIL BULL NOSE TERMINAL - DESIGN 2

NOTE

1. For W-Beam applications extend the rail from the bullnose terminal by using a "Reducer Element Type C" followed by a standard Post and Block, spaced at 3' - 1 1/2". Continue runs with standard 6' - 3" post spacing. For additional Details see **Standard Plans C-20.10 and C-25.20.**



7-2-2012

BEAM GUARDRAIL BULL NOSE TERMINAL

STANDARD PLAN C-4f

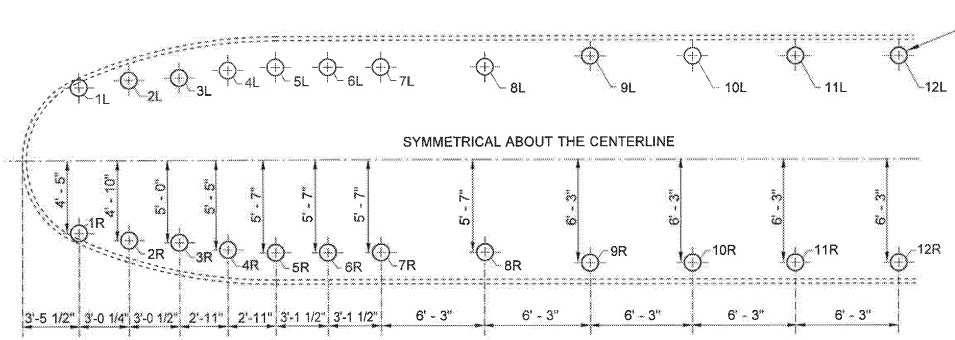
SHEET 1 OF 4 SHEETS

APPROVED FOR PUBLICATION

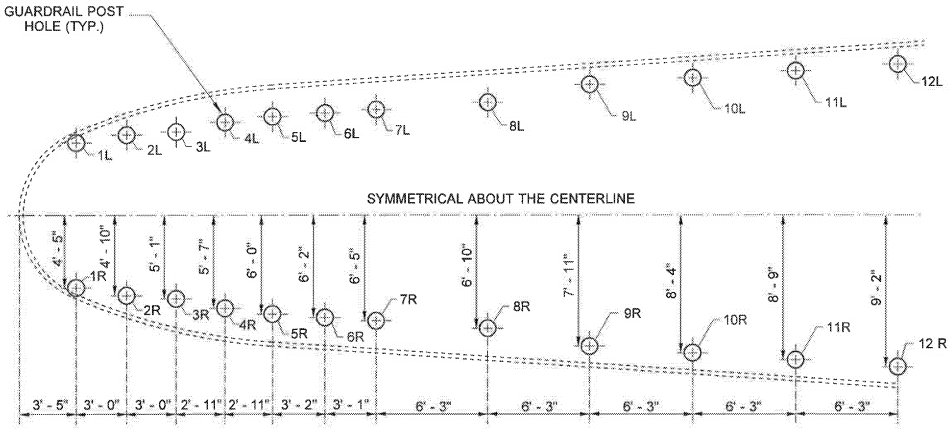
STATE DESIGN ENGINEER — DATE 7/2/12

Washington State Department of Transportation

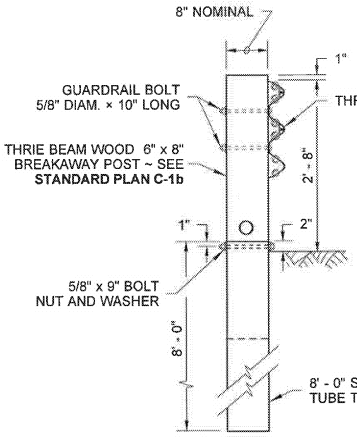
DRAWN BY: FERN LIDDELL



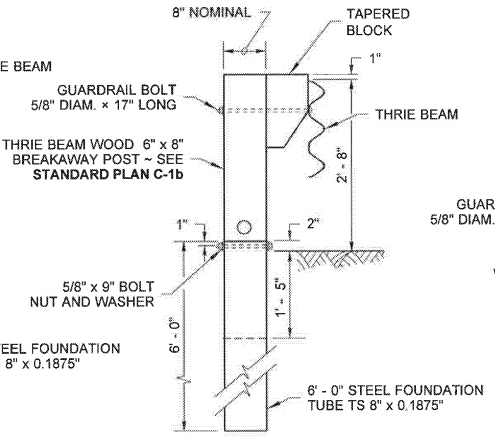
PLAN
GUARDRAIL POST LAYOUT - DESIGN 1



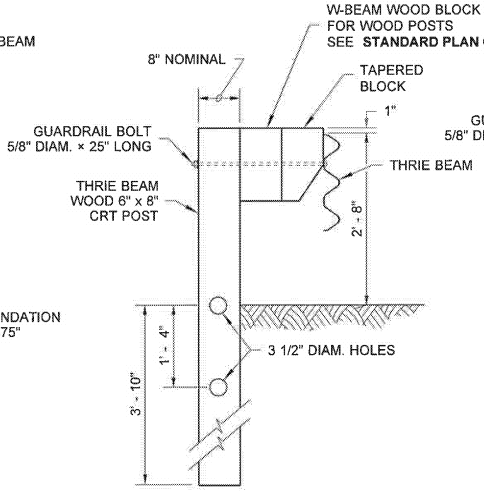
PLAN
GUARDRAIL POST LAYOUT - DESIGN 2



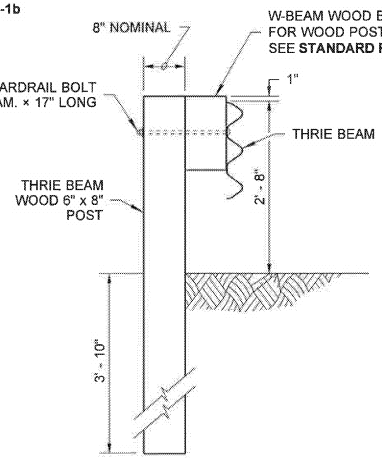
POST
1R & 1L



POST
2R & 2L

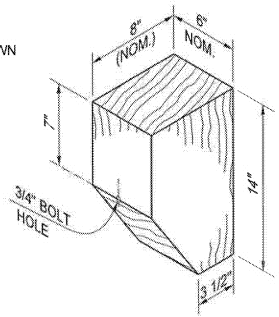


POST
3R TO 8R
3L TO 8L

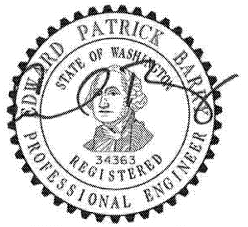


POST
9R TO 12R
9L TO 12L

NOTE : CABLE BEARING
PLATE NOT SHOWN



TAPERED BLOCK



7.2.2012

BEAM GUARDRAIL
BULL NOSE TERMINAL
STANDARD PLAN C-4f

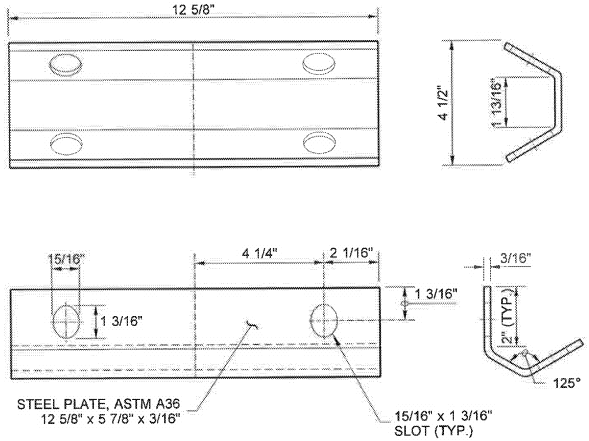
SHEET 2 OF 4 SHEETS

APPROVED FOR PUBLICATION

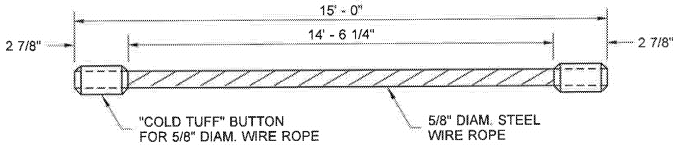
STATE DESIGN ENGINEER — DATE 7/2/12

Washington State Department of Transportation

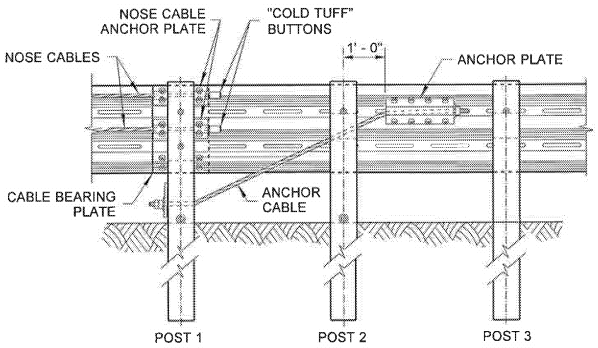
DRAWN BY: FERN LIDDELL



NOSE CABLE ANCHOR PLATE

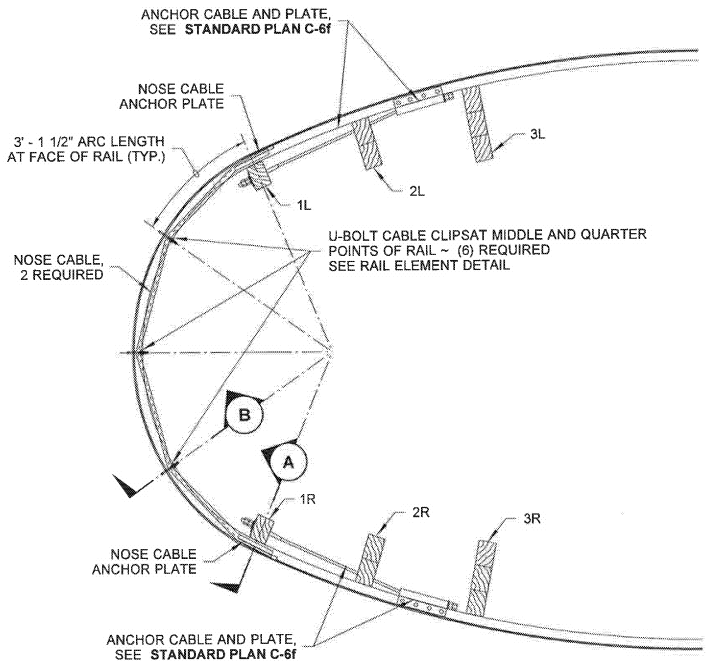


NOSE CABLE

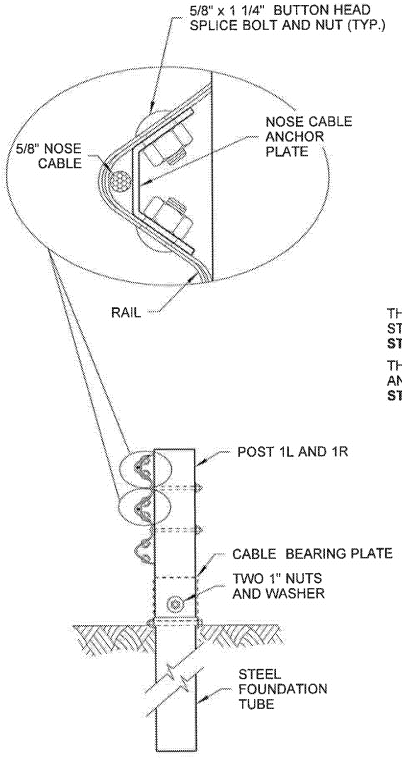


CABLE ANCHOR & BRACKET ASSEMBLY

FOR ANCHOR PLATE, CABLE END PLATE, AND ANCHOR CABLE ~ SEE **STANDARD PLAN C-6f**

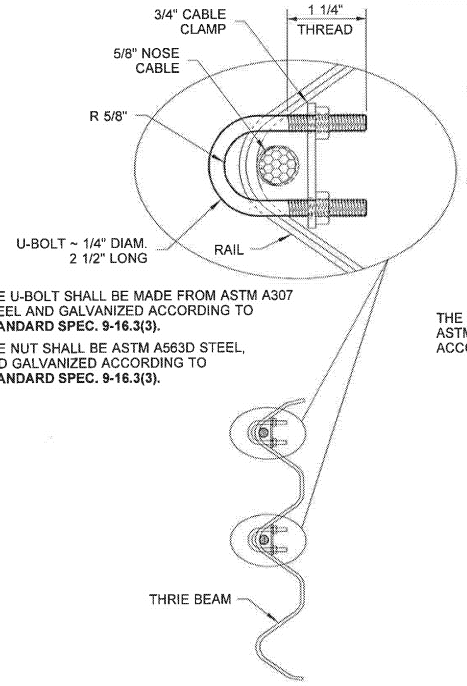


PLAN - THRIE BEAM NOSE



NOSE CABLE ASSEMBLY

SECTION (A)

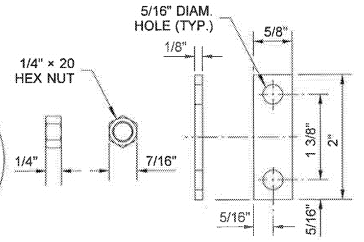


THE U-BOLT SHALL BE MADE FROM ASTM A307 STEEL AND GALVANIZED ACCORDING TO **STANDARD SPEC. 9-16.3(3).**

THE NUT SHALL BE ASTM A563D STEEL, AND GALVANIZED ACCORDING TO **STANDARD SPEC. 9-16.3(3).**

U-BOLT CABLE CLIP ASSEMBLY

SECTION (B)



U-BOLT PLATE WASHER

THE U-BOLT PLATE WASHER SHALL BE MADE FROM ASTM A36 OR A36M PLATE STEEL, AND GALVANIZED ACCORDING TO **STANDARD SPEC. 9-16.3(3).**

EDWARD PATRICK BARRY
STATE OF WASHINGTON
34363
REGISTERED
PROFESSIONAL ENGINEER

7-2-2012

BEAM GUARDRAIL BULL NOSE TERMINAL

STANDARD PLAN C-4f

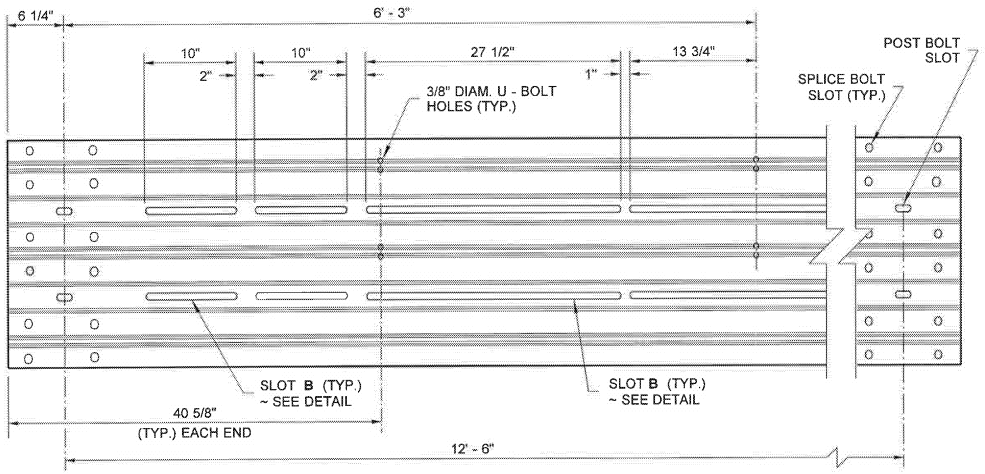
SHEET 3 OF 4 SHEETS

APPROVED FOR PUBLICATION

STATE DESIGN ENGINEER — DATE 7/2/12

Washington State Department of Transportation

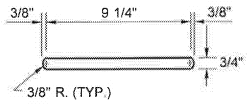
DRAWN BY: FERN LIDDELL



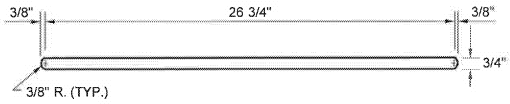
SLOTTED THRIE BEAM RAIL ELEMENT #1

SEE **STANDARD PLAN C-1a** FOR RAIL ELEMENT DETAILS

(RAIL DIMENSIONS SHOWN ARE BEFORE BENDING TO RADIUS SHOWN IN PLAN)



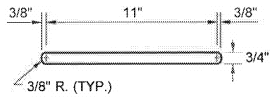
SLOT A DETAIL



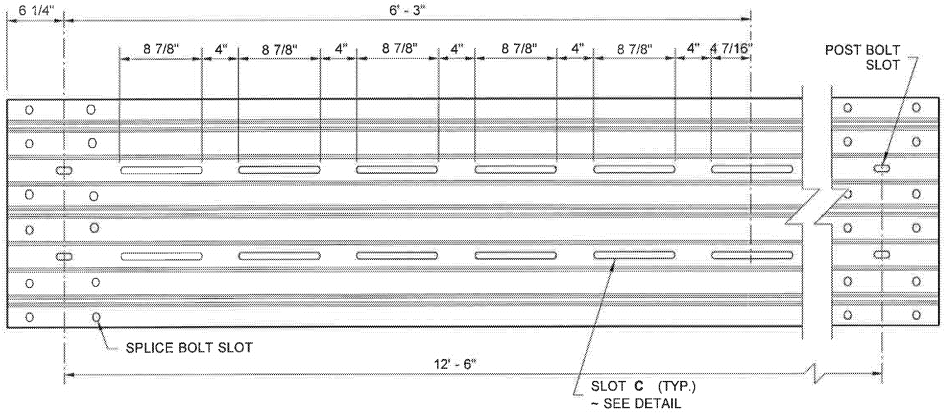
SLOT B DETAIL



SLOT C DETAIL



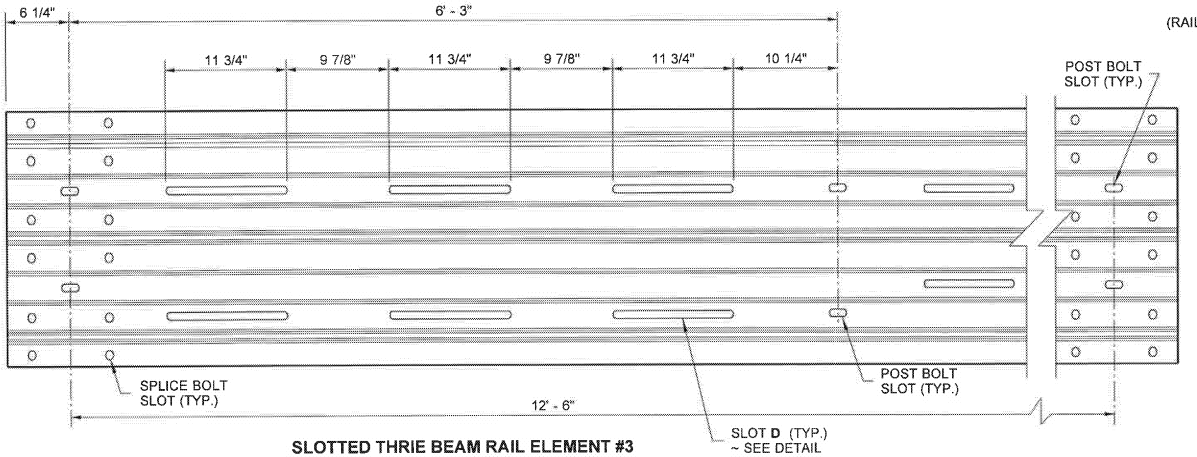
SLOT D DETAIL



SLOTTED THRIE BEAM RAIL ELEMENT #2

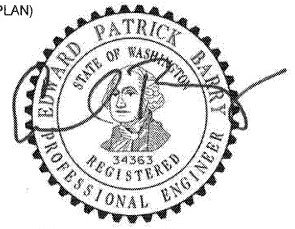
SEE **STANDARD PLAN C-1a** FOR RAIL ELEMENT DETAILS

(RAIL DIMENSIONS SHOWN ARE BEFORE BENDING TO RADIUS SHOWN IN PLAN)



SLOTTED THRIE BEAM RAIL ELEMENT #3

SEE **STANDARD PLAN C-1a** FOR RAIL ELEMENT DETAILS



7-2-2012

BEAM GUARDRAIL BULL NOSE TERMINAL

STANDARD PLAN C-4f

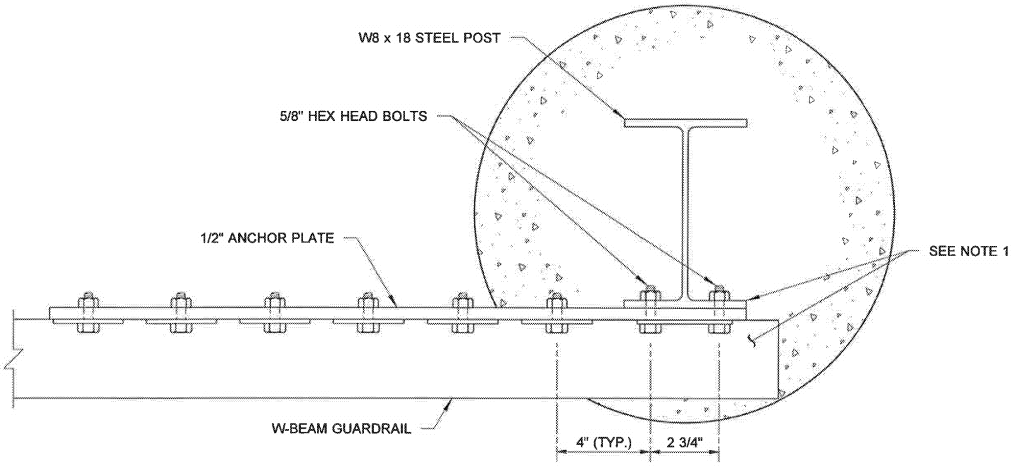
SHEET 4 OF 4 SHEETS

APPROVED FOR PUBLICATION

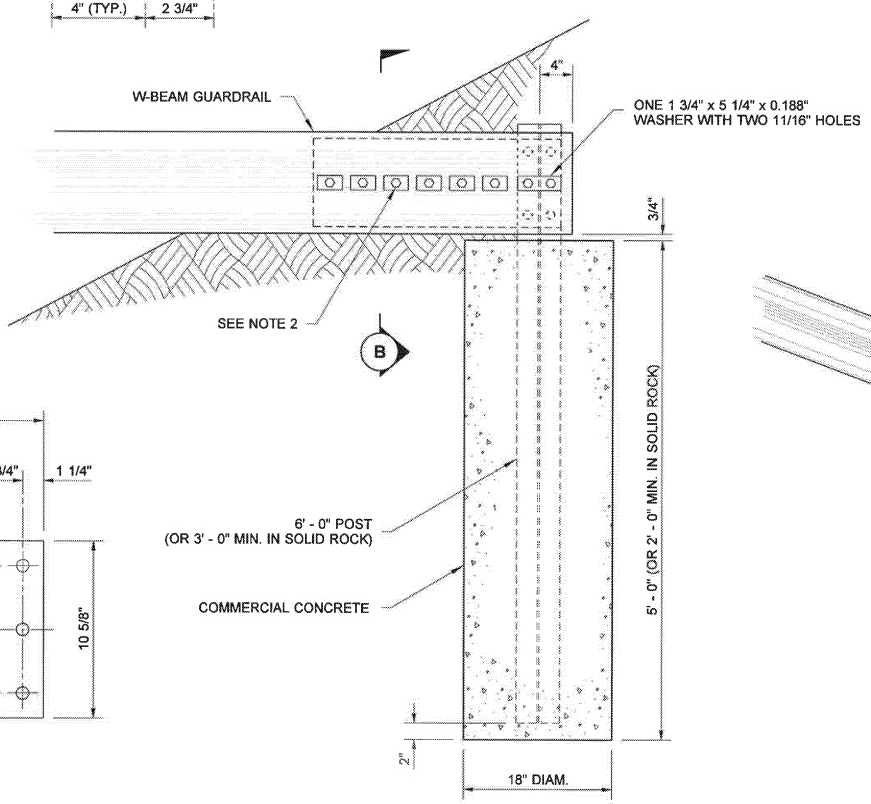
STATE DESIGN ENGINEER — DATE 7/2/12

Washington State Department of Transportation

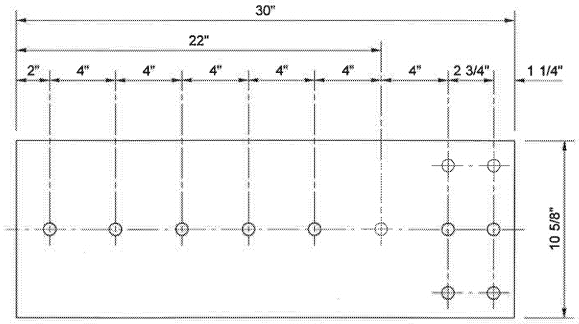
DRAWN BY: BILL BERENS



PLAN



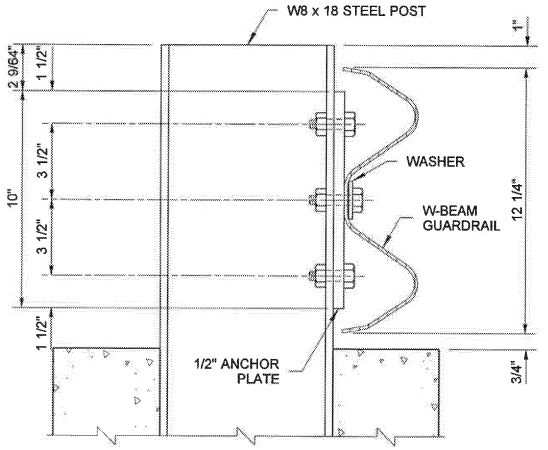
ELEVATION



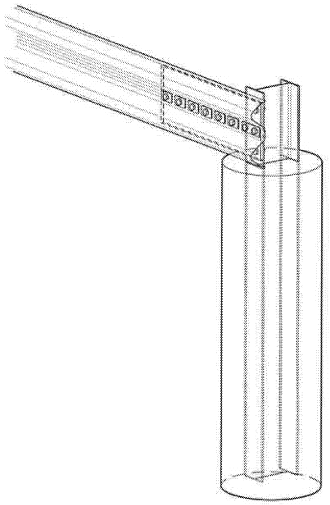
BACKING PLATE

NOTES

1. Rail section and W8 x 18 steel post shall be fabricated to receive 5/8" hex head bolts as shown.
2. All bolts shall be high strength 5/8" hex head bolts with anchor rail washers.



SECTION (B)



ISOMETRIC



10-5-09

BEAM GUARDRAIL ANCHOR TYPE 2

STANDARD PLAN C-6a

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

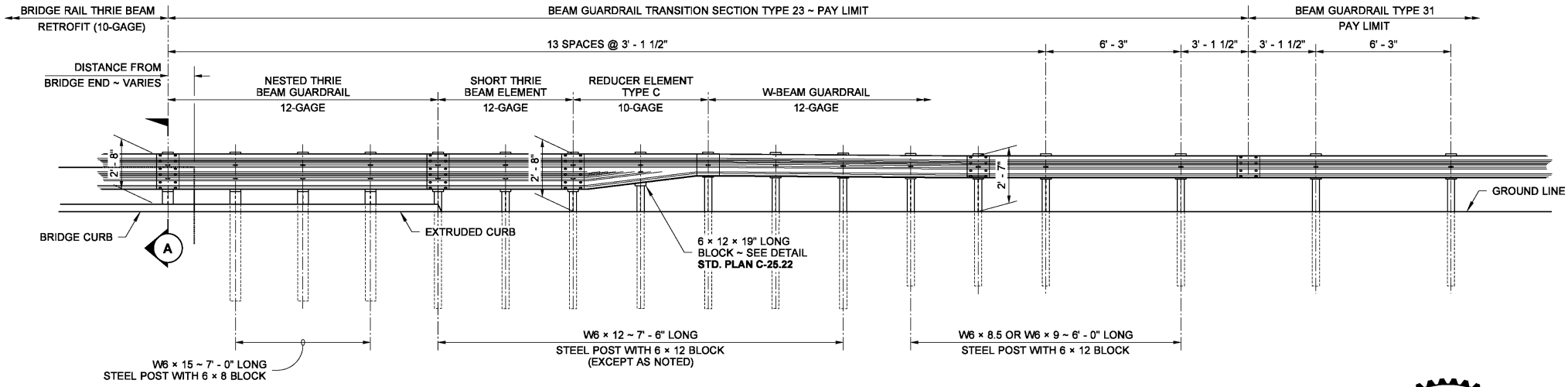
STATE DESIGN ENGINEER — DATE 10/05/09

Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

NOTES

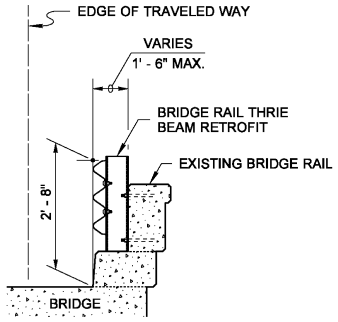
1. See **Standard Plan C-1b, C-20.10,** and **C-25.20** for rail elements and thrie beam block details.
2. When a transition is required on the trailing end of the bridge, use a mirror image of this plan.
3. For additional alternatives not shown, see Contract Plans.



TYPE 23

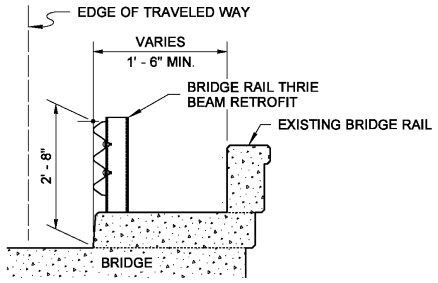
APPROACH END (SHOWN - SEE NOTE 2)

THRIE BEAM INSTALLED AT FACE OF CURB



SECTION (A)

ALTERNATIVE 1



SECTION (A)

ALTERNATIVE 2

EDWARD PATRICK BARRY
STATE OF WASHINGTON
34363
REGISTERED
PROFESSIONAL ENGINEER

Barry, Ed
Jul 14 2015 8:27 AM

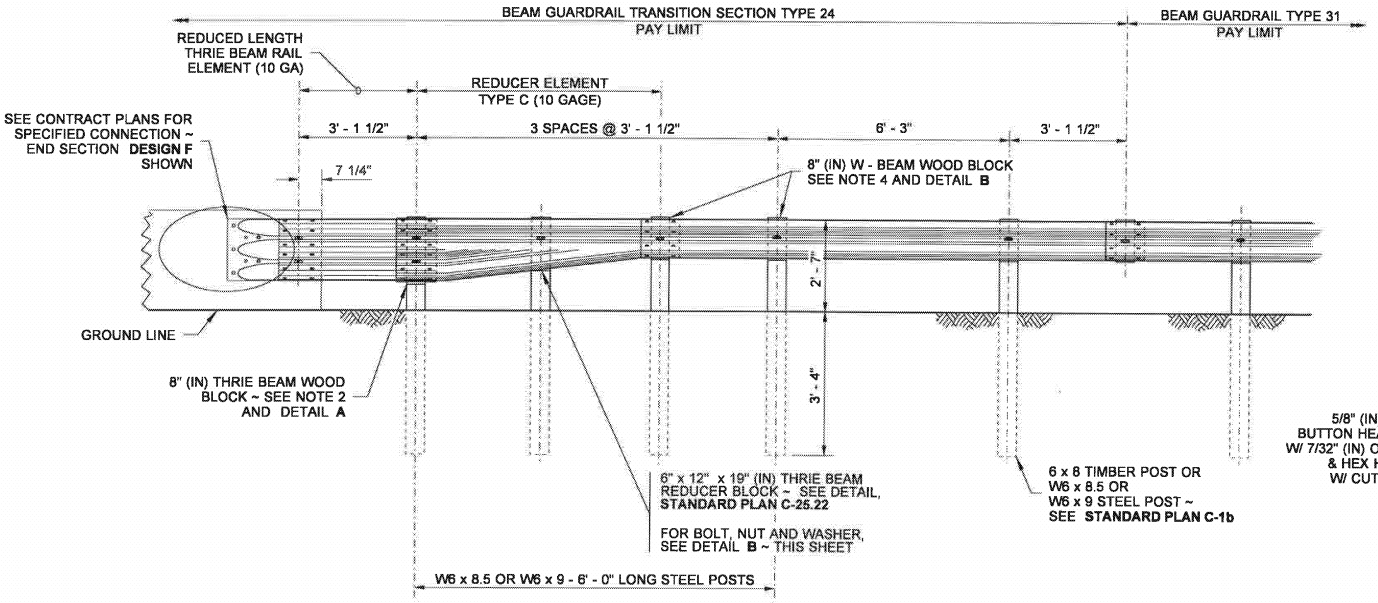
BEAM GUARDRAIL (TYPE 31) TRANSITION SECTION TYPE 23

STANDARD PLAN C-25.26-03

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jul 14 2015 11:25 AM
STATE DESIGN ENGINEER

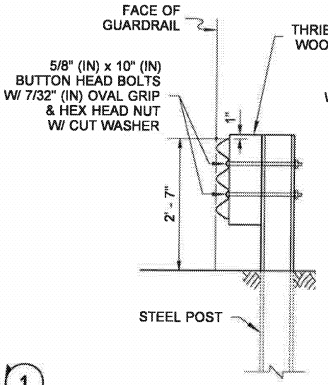
Washington State Department of Transportation



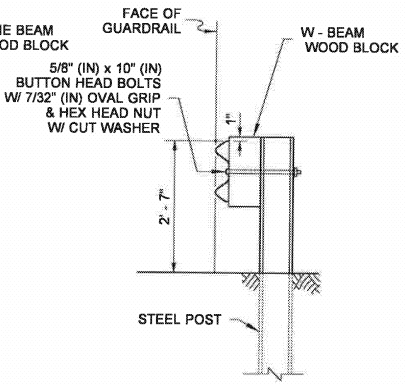
ELEVATION VIEW

NOTES

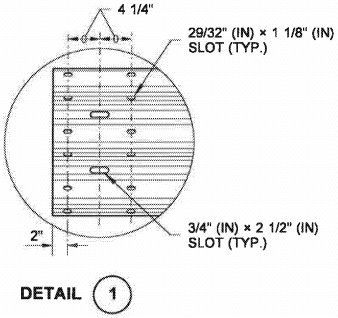
1. This guardrail transition is for connection to a vertical concrete shape, a single slope, or a safety-shape barrier. The toe of the single slope and the safety-shape barrier shall be tapered or the barrier blocked out so that the toe of the barrier does not project beyond the face of the approach guardrail.
2. See **Standard Plan C-1b** for thrie beam wood block detail.
3. See **Standard Plan C-20.10** for typical components (nuts,washers and bolts) at splices.
4. See **Standard Plan C-1b** for W-Beam wood block detail.
5. All rail sections shall be lapped in the direction of traffic.
6. See **Standard Plan C-24.10** for details regarding connection to bridge rail or traffic barrier.



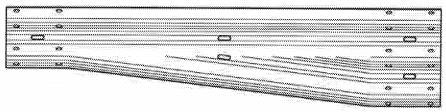
DETAIL A



DETAIL B

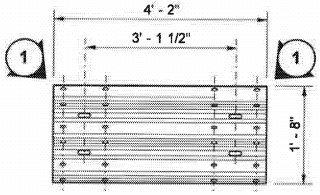


DETAIL (1)

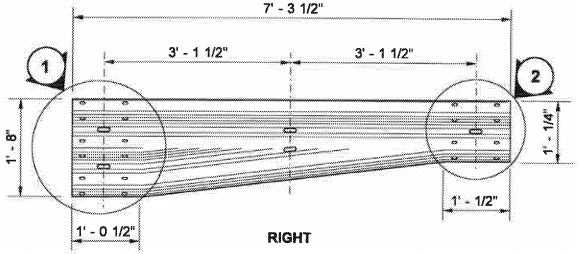


LEFT

(MIRROR OF RIGHT)

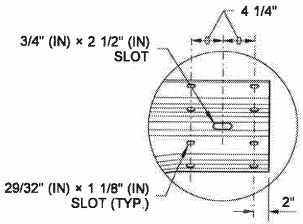


REDUCED LENGTH THRIE-BEAM RAIL ELEMENT 10 GAGE



RIGHT

REDUCER ELEMENT TYPE C



DETAIL (2)

Petterson, Jeff (IIQ Design)
Jun 26 2018 9:48 AM

BEAM GUARDRAIL (TYPE 31) TRANSITION SECTION TYPE 24

(POSTED SPEED 45 MPH AND BELOW)

STANDARD PLAN C-25.30-00

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:43 AM

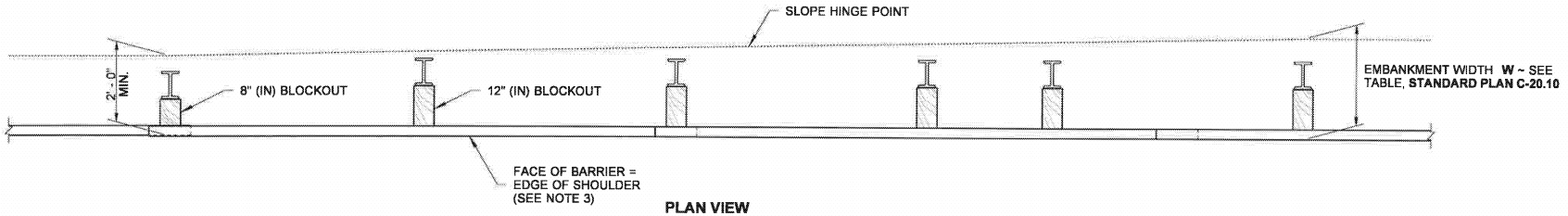
STATE DESIGN ENGINEER

Washington State Department of Transportation

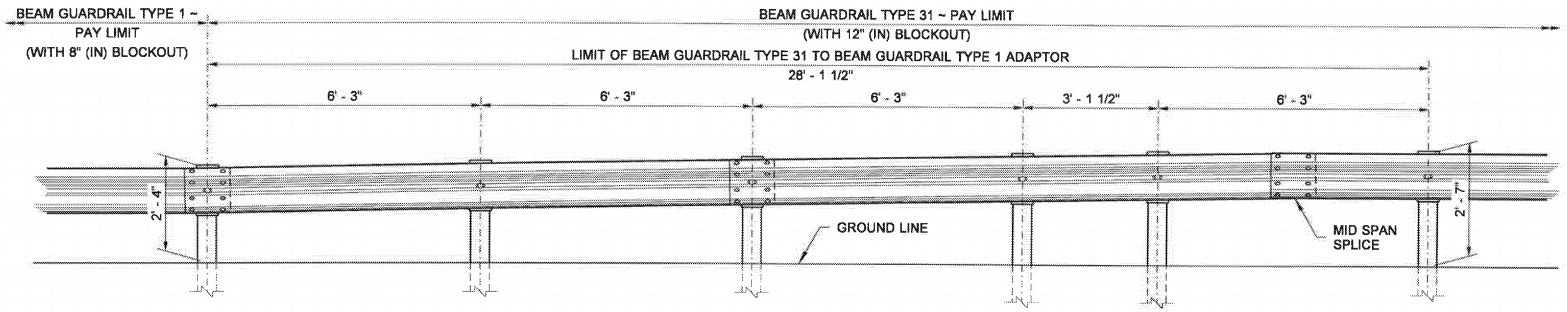
This page left blank intentionally.

NOTES

1. Refer to **Standard Plans C-1** and **C-1b** for component details for Beam Guardrail Type 1 (not shown on this plan).
2. Refer to **Standard Plan C-20.10** for component details for Beam Guardrail Type 31 (not shown on this plan).
3. Accomodating the wider blockout (12" (in) width) used with Type 31 guardrail will require widening the embankment by 4" (in) or narrowing the shoulder by 4" (in).
4. Wood blocks shown. Blocks of alternate material may be used. See **Standard Specification 9-16.3(2).**
5. All posts for any standard barrier run shall be of the same type: timber or steel.



PLAN VIEW



ELEVATION VIEW ~ PROFILE TAPER

JEFFERY K. PETTERSON
STATE OF WASHINGTON
36937
REGISTERED
PROFESSIONAL ENGINEER

Petterson, Jeff (HQ Design)
Jun 30 2016 7:16 AM

BEAM GUARDRAIL TYPE 31 TO BEAM GUARDRAIL TYPE 1 ADAPTOR

STANDARD PLAN C-25.80-04

SHEET 1 OF 1 SHEET

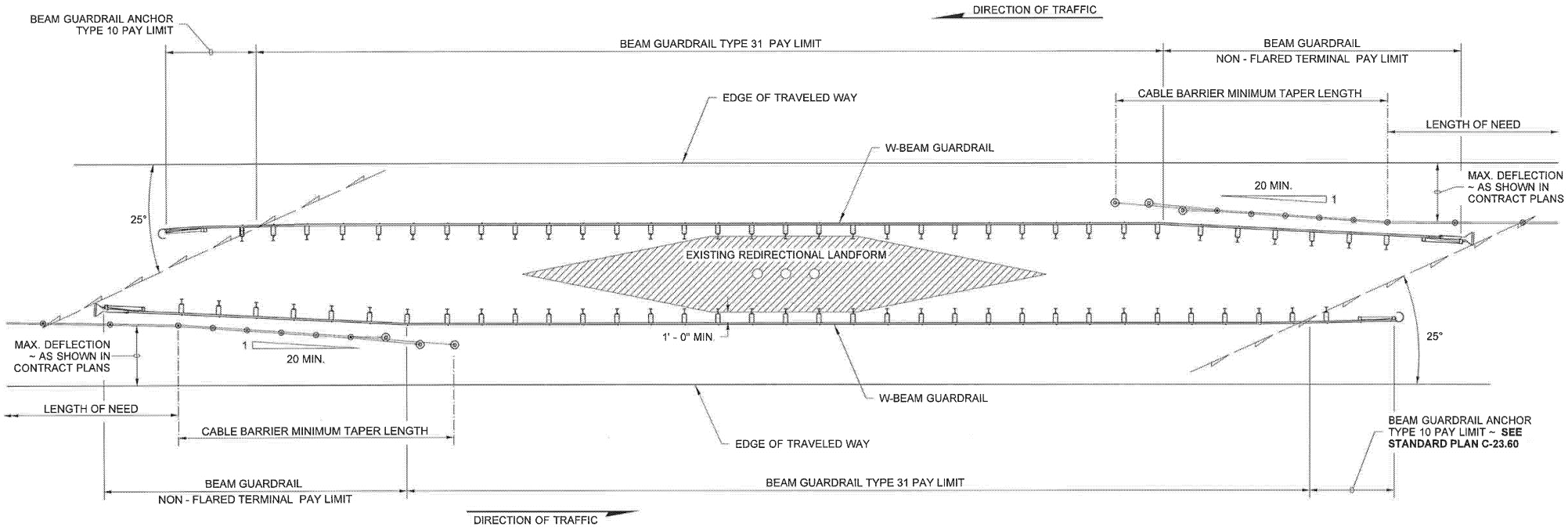
APPROVED FOR PUBLICATION

Carpenter, Jeff
Jul 15 2016 2:26 PM

STATE DESIGN ENGINEER

Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



PLAN VIEW

LEGEND

Design Layout Line

EDWARD PATRICK BARR
STATE OF WASHINGTON
34363
REGISTERED
PROFESSIONAL ENGINEER

7-2-2012

BARRIER PLACEMENT ~ CABLE TO W-BEAM SHIELDING FOR REDIRECTIONAL LANDFORM

STANDARD PLAN C-40.16-02

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

STATE DESIGN ENGINEER — DATE 7/2/12

Washington State Department of Transportation

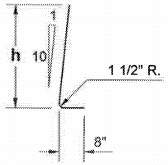
This page left blank intentionally.

WALL HT H	DIMENSIONS				FOOTING REINFORCEMENT																		STEM REINFORCEMENT				MATERIAL QUANTITY		MAXIMUM SOIL PRESSURE (PSF)			
					BAR (E) #4		BAR (F)			BAR (H)			BAR (K)					BAR (M)						BAR (J)			(G) #4						
	B	C_y	D	A	LENGTH	h	SIZE	SPA.	LENGTH	SIZE	SPA.	LENGTH	SIZE	SPA.	LENGTH	h	b	SIZE	SPA.	LENGTH	h	b	SIZE	SPA.	LENGTH	LENGTH	CONC. CY / LF	STEEL LBS / LF	SERVICE	STRENGTH	EXTREME EVENT 1	EXTREME EVENT 2
5'	6' - 9"	3' - 0"	1' - 0"	1' - 4"	2' - 7"	2' - 0"	#4	1' - 6"	6' - 6"	#4	1' - 6"	6' - 6"	#4	1' - 6"	5' - 2"	4' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3' - 10 1/2"	0.41	23.8	900	1244	1140	1620
6'	6' - 9"	3' - 0"	1' - 0"	1' - 5 1/2"	2' - 7"	2' - 0"	#4	1' - 6"	6' - 6"	#4	1' - 6"	6' - 6"	#4	1' - 6"	6' - 2"	5' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4' - 10 1/2"	0.46	26.3	987	1351	1339	1878
7'	7' - 0"	3' - 3"	1' - 0"	1' - 6 1/2"	2' - 7"	2' - 0"	#4	1' - 0"	6' - 9"	#4	1' - 6"	6' - 9"	#4	1' - 6"	7' - 2"	6' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5' - 10 1/2"	0.53	30.5	1076	1476	1488	2006
8'	7' - 0"	3' - 3"	1' - 0"	1' - 7 1/2"	2' - 7"	2' - 0"	#4	1' - 0"	6' - 9"	#4	1' - 6"	6' - 9"	#4	1' - 0"	8' - 2"	7' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6' - 10 1/2"	0.58	34.7	1225	1687	1741	2332
9'	7' - 3"	3' - 6"	1' - 0"	1' - 9"	2' - 7"	2' - 0"	#4	1' - 0"	7' - 0"	#4	1' - 6"	7' - 0"	#4	1' - 0"	9' - 2"	8' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7' - 10 1/2"	0.65	37.7	1325	1833	1911	2486
10'	7' - 6"	3' - 6"	1' - 0"	1' - 10"	2' - 7"	2' - 0"	#4	8"	7' - 3"	#4	1' - 6"	7' - 3"	#4	1' - 0"	10' - 2"	9' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8' - 10 1/2"	0.73	43.0	1493	2075	2200	2744
11'	7' - 9"	3' - 6"	1' - 0"	1' - 11 1/2"	2' - 7"	2' - 0"	#4	6"	7' - 6"	#4	1' - 6"	7' - 6"	#4	10"	11' - 2"	10' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9' - 10 1/2"	0.81	50.1	1677	2341	2526	3027
12'	8' - 0"	3' - 9"	1' - 0"	2' - 0 1/2"	2' - 7"	2' - 0"	#5	8"	7' - 9"	#4	1' - 6"	7' - 9"	#4	9"	12' - 2"	11' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10' - 11"	0.89	55.1	1797	2522	2739	3221
13'	8' - 3"	3' - 9"	1' - 0"	2' - 1 1/2"	2' - 7"	2' - 0"	#5	7"	8' - 0"	#4	1' - 6"	8' - 0"	#4	8"	13' - 2"	12' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11' - 11"	0.97	62.7	2004	2826	3126	3545
14'	8' - 9"	3' - 9"	1' - 0"	2' - 3"	2' - 7"	2' - 0"	#6	7"	8' - 6"	#4	1' - 6"	8' - 6"	#4	7"	14' - 2"	13' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12' - 11"	1.07	75.0	2190	3089	3470	3706
15'	9' - 0"	3' - 9"	1' - 0"	2' - 4"	2' - 7"	2' - 0"	#6	6"	8' - 9"	#4	1' - 6"	8' - 9"	#4	6"	15' - 2"	14' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13' - 11"	1.17	83.3	2420	3430	3928	4064
16'	9' - 6"	4' - 0"	1' - 3"	2' - 5"	2' - 10"	2' - 3"	#6	6"	9' - 3"	#4	1' - 6"	9' - 3"	#5	10"	16' - 3"	15' - 7"	10"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14' - 8"	1.34	91.3	2532	3588	4115	4129
17'	10' - 0"	4' - 3"	1' - 3"	2' - 6 1/2"	2' - 10"	2' - 3"	#6	6"	9' - 9"	#4	1' - 6"	9' - 9"	#5	9"	17' - 3"	16' - 7"	10"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	15' - 8"	1.45	98.7	2630	3730	4284	4194
18'	10' - 6"	4' - 6"	1' - 3"	2' - 7 1/2"	2' - 10"	2' - 3"	#7	7"	10' - 3"	#4	1' - 0"	10' - 3"	#5	8"	18' - 3"	17' - 7"	10"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16' - 8"	1.57	115.7	2728	3871	4453	4270
19'	11' - 3"	5' - 0"	1' - 6"	2' - 8 1/2"	3' - 1"	2' - 6"	#7	7"	11' - 0"	#4	1' - 0"	11' - 0"	#5	7"	19' - 3"	18' - 7"	10"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	17' - 5"	1.78	121.1	2715	3838	4366	4131
20'	11' - 6"	5' - 0"	1' - 6"	2' - 9 1/2"	3' - 1"	2' - 6"	#7	7"	11' - 3"	#4	1' - 0"	11' - 3"	#5	7"	20' - 3"	19' - 7"	10"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18' - 5"	1.89	130.2	2940	4172	4815	4466
21'	12' - 3"	5' - 6"	1' - 9"	2' - 10 1/2"	3' - 4"	2' - 9"	#7	6"	12' - 0"	#4	9"	12' - 0"	#5	1' - 0"	7' - 9 1/2"	7' - 1 1/2"	10"	#5	1' - 0"	4' - 4 1/2"	3' - 7 1/2"	10"	#5	1' - 0"	19' - 7"	19' - 2 1/2"	2.12	141.8	2930	4143	4734	4358
22'	12' - 9"	5' - 9"	1' - 9"	2' - 11 1/2"	3' - 4"	2' - 9"	#7	6"	12' - 6"	#4	9"	12' - 6"	#5	1' - 0"	8' - 11 1/2"	8' - 3 1/2"	10"	#5	1' - 0"	4' - 4 1/2"	3' - 7 1/2"	10"	#5	1' - 0"	20' - 7"	20' - 2 1/2"	2.26	148.6	3028	4284	4905	4466
23'	13' - 3"	6' - 0"	2' - 0"	3' - 0 1/2"	3' - 7"	3' - 0"	#7	6"	13' - 0"	#4	8"	13' - 0"	#5	10"	8' - 7"	7' - 11"	10"	#5	10"	4' - 7 1/2"	3' - 11"	10"	#5	10"	21' - 4"	20' - 11 1/2"	2.50	162.3	3145	4448	5104	4600
24'	13' - 9"	6' - 3"	2' - 0"	3' - 1 1/2"	3' - 7"	3' - 0"	#7	6"	13' - 6"	#4	8"	13' - 6"	#5	10"	9' - 8 1/2"	9' - 0 1/2"	10"	#5	10"	4' - 7 1/2"	3' - 11"	10"	#5	10"	22' - 4"	21' - 11 1/2"	2.65	172.2	3243	4589	5276	4714
25'	14' - 3"	6' - 6"	2' - 3"	3' - 2 1/2"	3' - 10"	3' - 3"	#7	6"	14' - 0"	#4	8"	14' - 0"	#5	9"	10' - 10"	10' - 2"	10"	#5	9"	4' - 10 1/2"	4' - 1 1/2"	10"	#5	9"	23' - 1"	22' - 8 1/2"	2.91	179.4	3360	4753	5476	4854
26'	15' - 0"	6' - 9"	2' - 6"	3' - 3 1/2"	4' - 1"	3' - 6"	#8	7"	14' - 9"	#4	7"	14' - 9"	#5	9"	11' - 0"	10' - 4"	10"	#5	9"	5' - 1 1/2"	4' - 4 1/2"	10"	#5	9"	23' - 10"	23' - 5 1/2"	3.20	200.1	3445	4856	5603	4917
27'	15' - 6"	7' - 0"	2' - 6"	3' - 4 1/2"	4' - 1"	3' - 6"	#8	7"	15' - 3"	#4	7"	15' - 3"	#5	8"	11' - 1 1/2"	10' - 5 1/2"	10"	#5	8"	5' - 1 1/2"	4' - 4 1/2"	10"	#5	8"	24' - 10"	24' - 5 1/2"	3.37	213.7	3544	4996	5776	5039
28'	16' - 0"	7' - 3"	2' - 9"	3' - 5 1/2"	4' - 4"	3' - 9"	#8	7"	15' - 9"	#4	6"	15' - 9"	#5	7"	12' - 1 1/2"	11' - 6"	10"	#5	7"	5' - 4 1/2"	4' - 7 1/2"	10"	#5	7"	25' - 7"	25' - 3"	3.66	234.3	3661	5161	5977	5186
29'	16' - 6"	7' - 6"	2' - 9"	3' - 7"	4' - 4"	3' - 9"	#8	6"	16' - 3"	#4	6"	16' - 3"	#6	1' - 0"	14' - 0"	13' - 2 1/2"	1' - 0"	#6	1' - 0"	5' - 11"	5' - 0 1/2"	1' - 0"	#6	1' - 0"	26' - 7"	26' - 3"	3.84	245.8	3760	5301	6150	5310
30'	17' - 3"	8' - 0"	3' - 0"	3' - 7 1/2"	4' - 7"	4' - 0"	#8	6"	17' - 0"	#4	6"	17' - 0"	#6	1' - 0"	15' - 1"	14' - 4"	1' - 0"	#6	1' - 0"	6' - 2"	5' - 4"	1' - 0"	#6	1' - 0"	27' - 4"	27' - 0"	4.17	255.9	3770	5303	6116	5291
31'	17' - 9"	8' - 3"	3' - 3"	3' - 8 1/2"	4' - 10"	4' - 3"	#8	6"	17' - 6"	#5	8"	17' - 6"	#6	1' - 0"	16' - 1 1/2"	15' - 4"	1' - 0"	#6	1' - 0"	6' - 5"	5' - 7"	1' - 0"	#6	1' - 0"	28' - 1"	27' - 9"	4.49	269.6	3888	5469	6319	5443
32'	18' - 3"	8' - 6"	3' - 3"	3' - 10"	4' - 10"	4' - 3"	#8	6"	18' - 0"	#5	8"	18' - 0"	#6	1' - 0"	17' - 2 1/2"	16' - 5 1/2"	1' - 0"	#6	1' - 0"	6' - 5"	5' - 7"	1' - 0"	#6	1' - 0"	29' - 1"	28' - 9"	4.69	278.2	3986	5609	6491	5571
33'	18' - 9"	8' - 9"	3' - 6"	3' - 10 1/2"	5' - 1"	4' - 6"	#8	6"	18' - 6"	#5	8"	18' - 6"	#6	10"	18' - 3 1/2"	17' - 6 1/2"	1' - 0"	#6	10"	6' - 8"	5' - 10"	1' - 0"	#6	10"	29' - 10"	29' - 6"	5.03	301.9	4105	5774	6694	5725
34'	19' - 3"	9' - 0"	3' - 9"	3' - 11 1/2"	5' - 4"	4' - 9"	#8	6"	19' - 0"	#5	8"	19' - 0"	#6	10"	17' - 9"	17' - 0"	1' - 0"	#6	10"	6' - 11"	6' - 0 1/2"	1' - 0"	#6	10"	30' - 7"	30' - 3"	5.38	308.1	4223	5940	6898	5879
35'	19' - 9"	9' - 3"	4' - 0"	4' - 0 1/2"	5' - 7"	5' - 0"	#9	7"	19' - 6"	#5	7"	19' - 6"	#6	8"	16' - 7"	15' - 9 1/2"	1' - 0"	#6	8"	7' - 2"	6' - 4"	1' - 0"	#6	8"	31' - 4"	31' - 0"	5.74	353.2	4342	6106	7102	6034

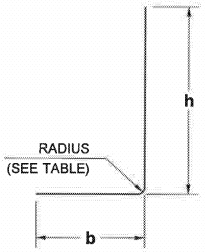
REINFORCEMENT NOTES

(1) IF TRAFFIC BARRIER IS USED, ADD 0.110 CY OF CONCRETE CLASS 4000 FOR BARRIER ALTERNATE 1.
ADD 0.152 CY/LF OF CONCRETE CLASS 4000 FOR BARRIER ALTERNATE 2. SEE STANDARD PLAN D-15.10

(2) ADD 16 LB/LF OF REINFORCING STEEL FOR BARRIER ALTERNATE 1 OR 23 LB/LF OF REINFORCING STEEL FOR BARRIER ALTERNATE 2. SEE STANDARD PLAN D-15.10



BAR (E)
@ 1' - 6" CENTERS



BAR	RADIUS
#4	1 1/2"
#5	1 7/8"
#6	2 1/4"
#7	2 5/8"
#8	3"
#9	4 3/4"
#10	5 3/8"
#11	6"

BARS (K) AND (M)

BAR	MIN. SPLICE
#4	2' - 0"
#5	2' - 0"
#6	2' - 0"
#7	2' - 6"
#8	3' - 3"
#9	4' - 2"
#10	5' - 3"

SLOPING FACE WALL DESIGN WITH A 250 PSF SURCHARGE

BIJAN KHALEGHI
STATE OF WASHINGTON
27695
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER
11/25/08

REINFORCED CONCRETE RETAINING WALL TYPE 8
STANDARD PLAN D-10.45-01

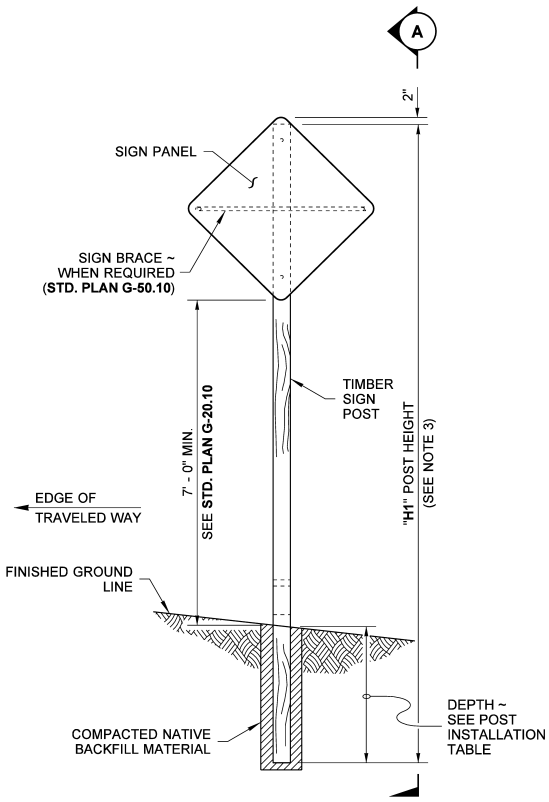
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION
STATE DESIGN ENGINEER — DATE 12/2/08
Washington State Department of Transportation

DRAWN BY: BILL BERENS

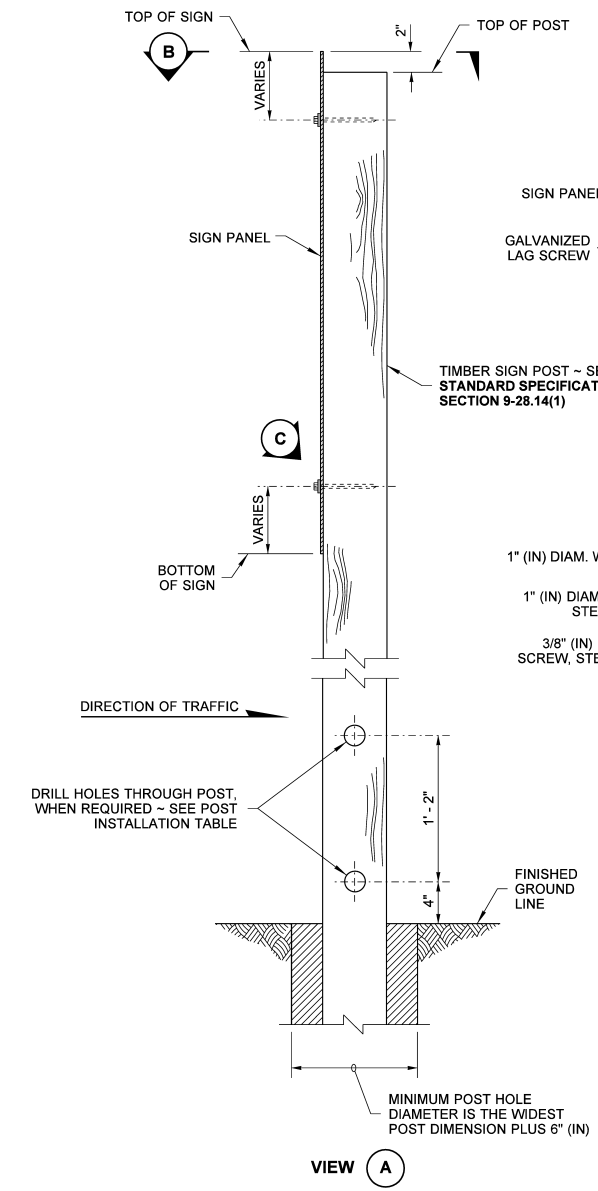
This page left blank intentionally.

DRAWN BY: BILL BERENS

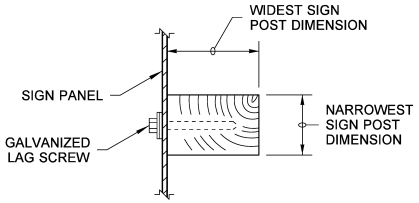


ELEVATION VIEW

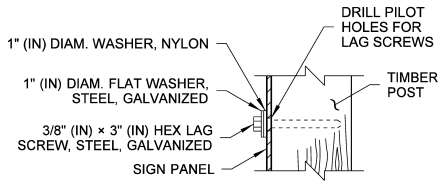
SINGLE-POST INSTALLATION



VIEW A



VIEW B



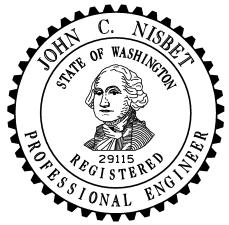
DETAIL C

NOTES

1. Notch is only required with multiple post installations.
2. 6×10, 8×10, and 6×12 Timber Sign Posts cannot be made breakaway and do not have holes or notches. These posts shall not be installed within the Design Clear Zone. They may be installed behind traffic barrier.
3. For "**X**", "**Y**", "**H1**", "**H2**", "**H3**", and "**H4**", refer to the Sign Specification Sheet in the Contract.
4. For 6×6 posts and larger, 7' (ft) minimum spacing is required between posts.
5. All materials shall meet the requirements of **Standard Specification Section 9-28**.

POST INSTALLATION TABLE

POST SIZE (NOM.)	DEPTH	HOLE DIAMETER	NOTCH DEPTH (SEE NOTE 1)
4×4	3' - 0"	NOT REQ'D	NOT REQ'D
4×6	4' - 0"	1 1/2"	1 1/2"
6×6	4' - 0"	2" SEE NOTES 3 & 4	2" SEE NOTES 3 & 4
6×8	5' - 0"	3" SEE NOTES 3 & 4	3" SEE NOTES 3 & 4
6×10	6' - 0"	SEE NOTE 2	SEE NOTE 2
8×10	6' - 0"	SEE NOTE 2	SEE NOTE 2
6×12	7' - 0"	SEE NOTE 2	SEE NOTE 2



Nisbet, John Digitally signed by Nisbet, John Date: 2018.06.27 11:29:46 -07'00'

TIMBER SIGN SUPPORT

STANDARD PLAN G-22.10-04

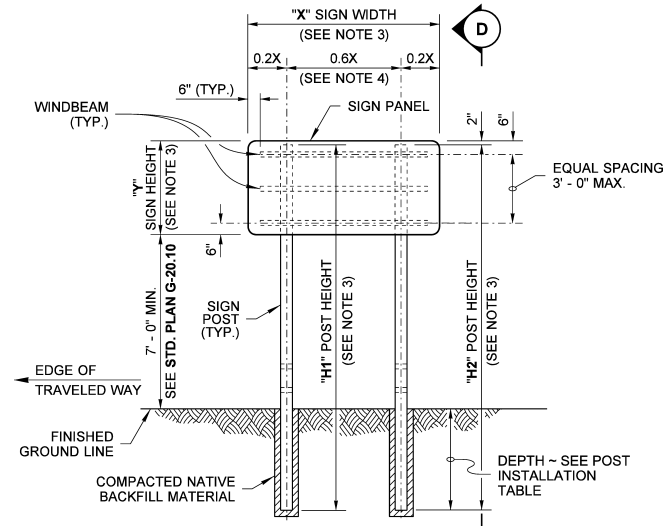
SHEET 1 OF 3 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:42 AM

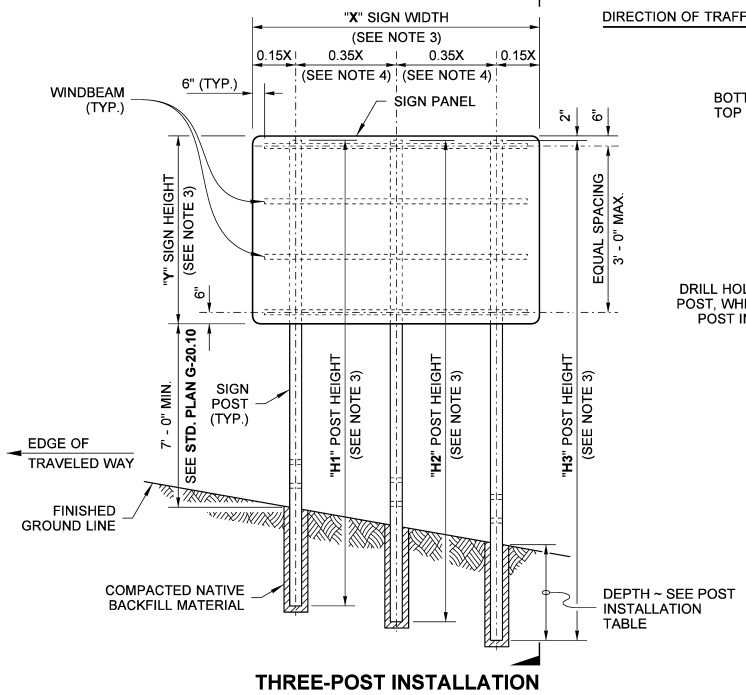
STATE DESIGN ENGINEER

Washington State Department of Transportation

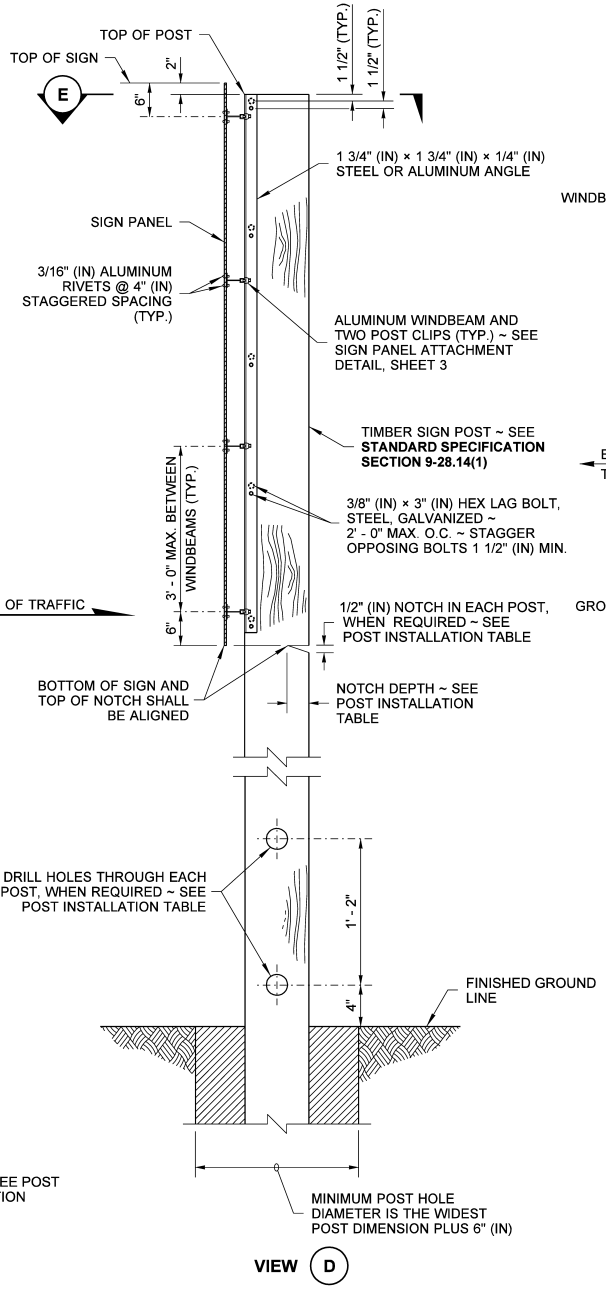
DRAWN BY: BILL BERENS



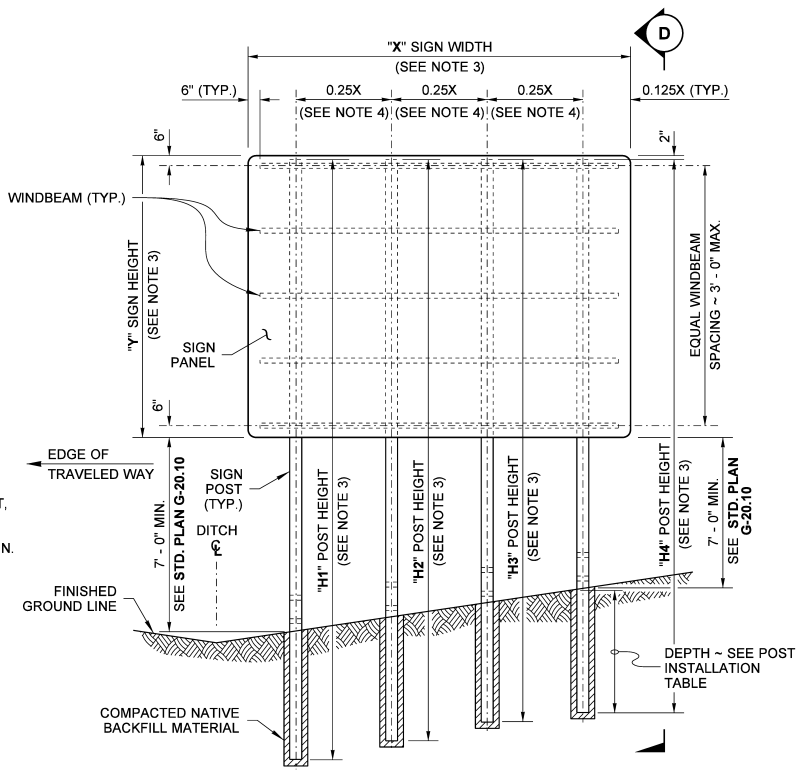
TWO-POST INSTALLATION



THREE-POST INSTALLATION



VIEW D



JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

Nisbet, John
Digitally signed by Nisbet, John
Date: 2018.06.27 11:30:31 -07'00'

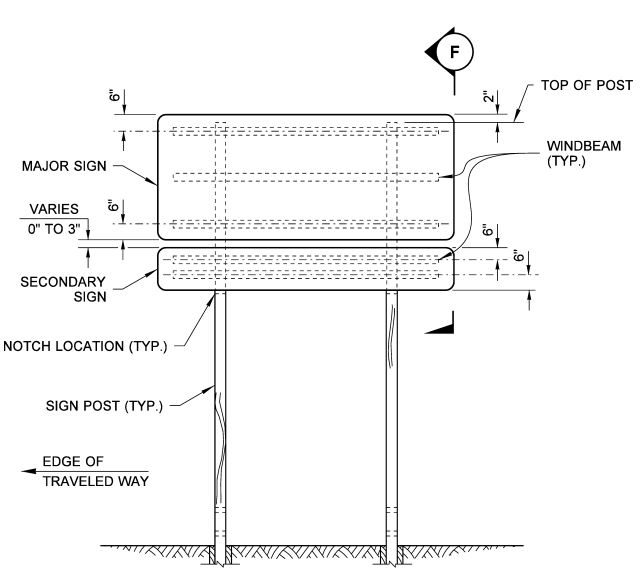
TIMBER SIGN SUPPORT

STANDARD PLAN G-22.10-04

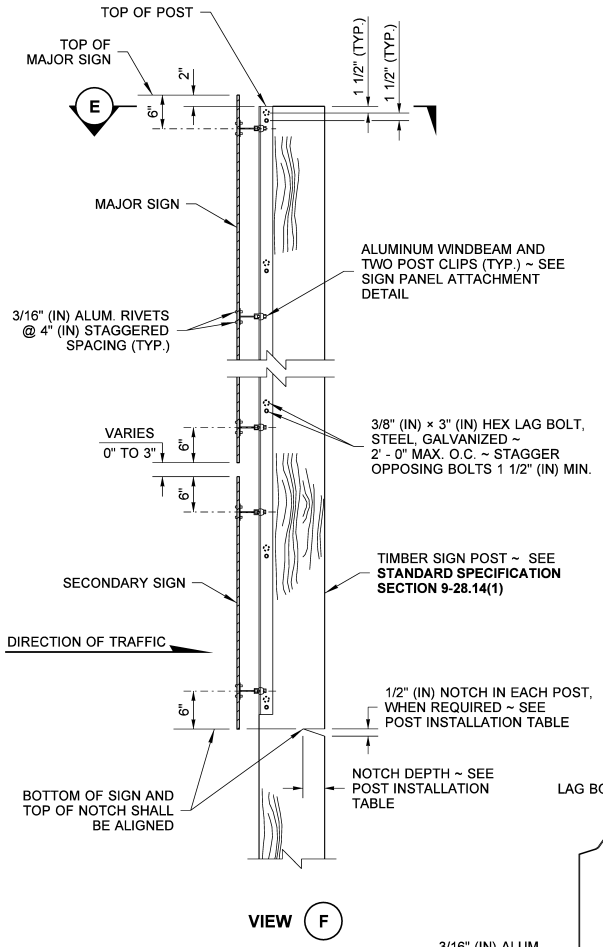
SHEET 2 OF 3 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:42 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

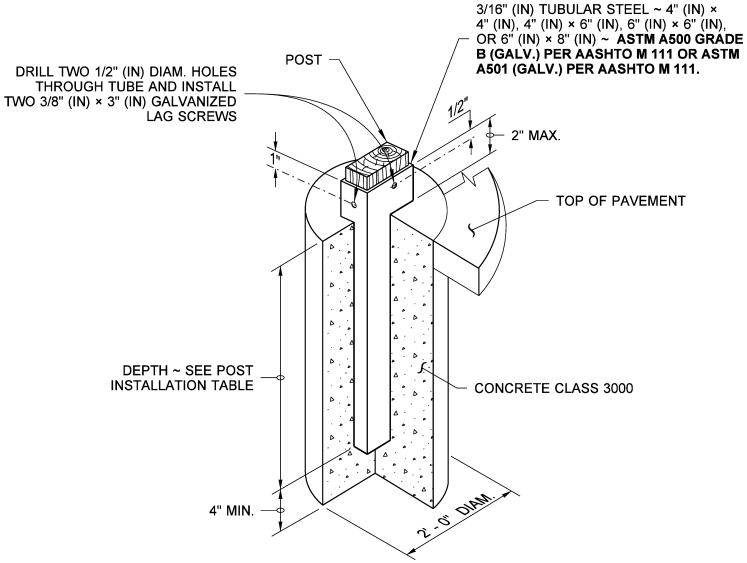
DRAWN BY: BILL BERENS



MAJOR AND SECONDARY SIGN INSTALLATION



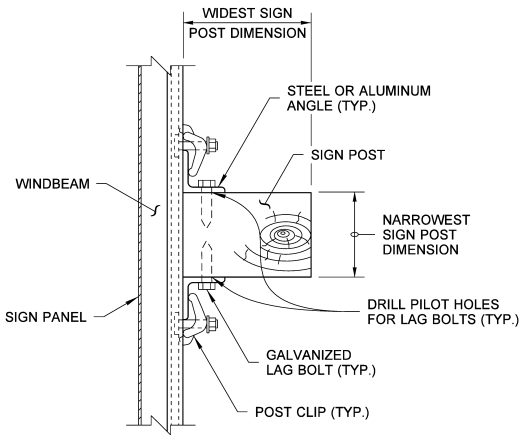
VIEW (F)



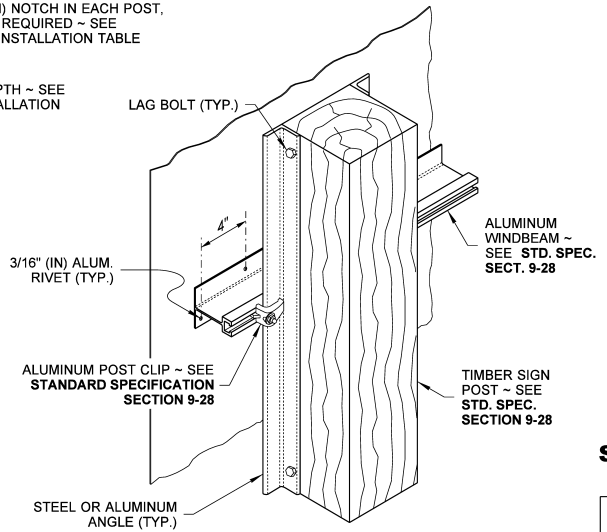
ISOMETRIC VIEW

CONCRETE FOUNDATION SLEEVE DETAIL

TO BE USED WHEN PLACING TIMBER POST IN A PAVED AREA



VIEW (E)



ISOMETRIC VIEW

SIGN PANEL ATTACHMENT DETAIL

JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

Nisbet, John
Digitally signed by Nisbet, John
Date: 2018.06.27 11:32:12 -07'00'

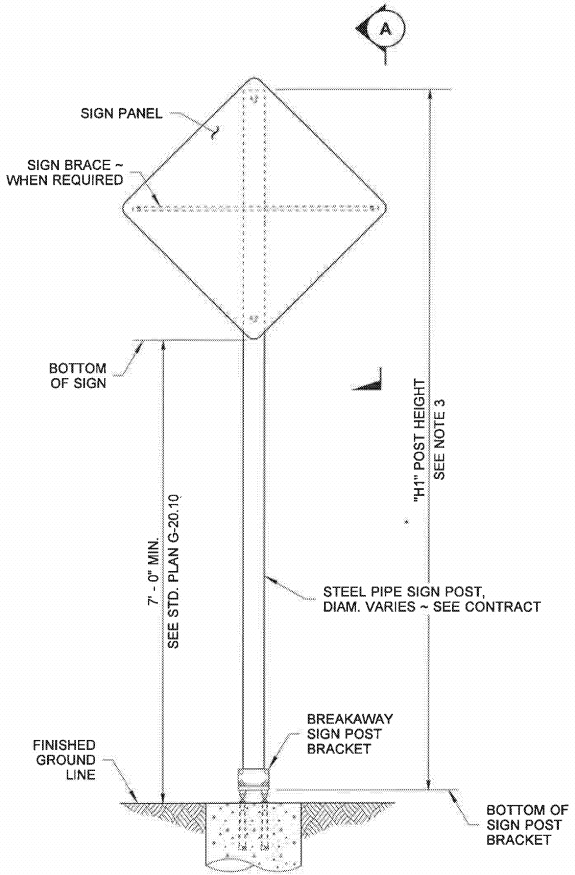
TIMBER SIGN SUPPORT

STANDARD PLAN G-22.10-04

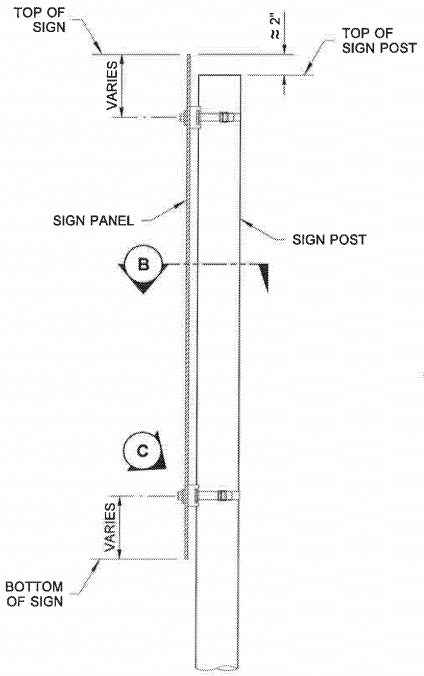
SHEET 3 OF 3 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:42 AM
cosign
STATE DESIGN ENGINEER
Washington State Department of Transportation

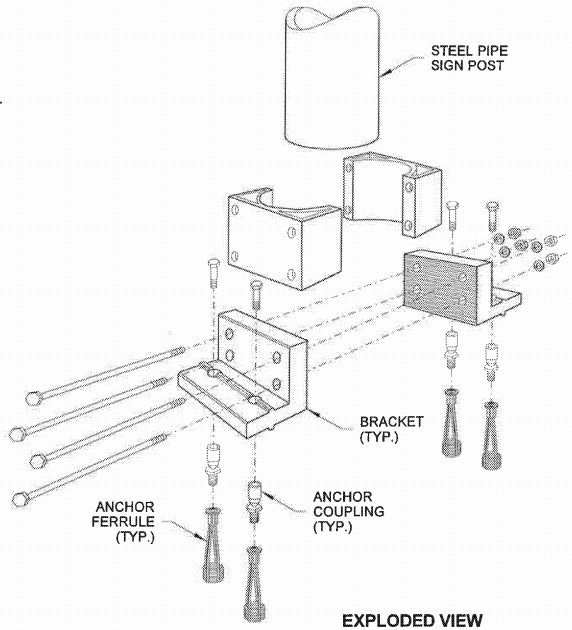
DRAWN BY: LISA CYFORD



ELEVATION



VIEW (A)

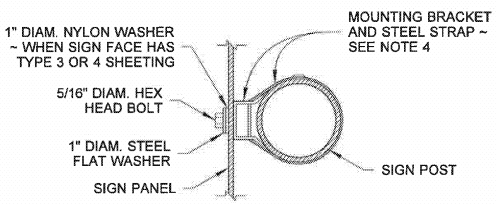


EXPLODED VIEW

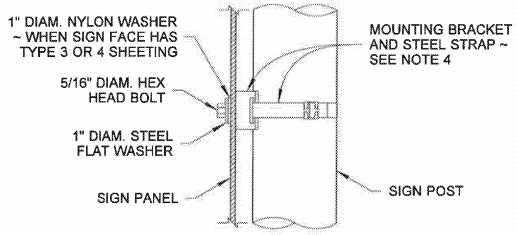
BREAKAWAY SIGN BRACKET ASSEMBLY

NOTES

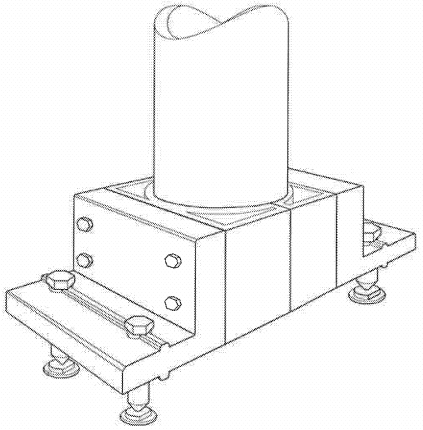
1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.
2. For Steel Sign Support Foundation, see Standard Plan G-25.10.
3. For "H1" refer to the Sign Specification Sheet in the Contract.
4. Mounting brackets with steel straps shall be the stainless steel one bolt, flared leg bracket and 3/4" wide, 0.030" thick strap "Band-it" products or an approved equal.



SECTION (B)

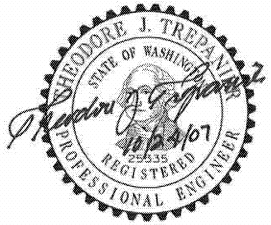


DETAIL (C)



PERSPECTIVE VIEW

BREAKAWAY SIGN BRACKET ASSEMBLY



EXPIRES AUGUST 9, 2009

STEEL SIGN SUPPORT TYPE AP INSTALLATION DETAILS STANDARD PLAN G-24.10-00

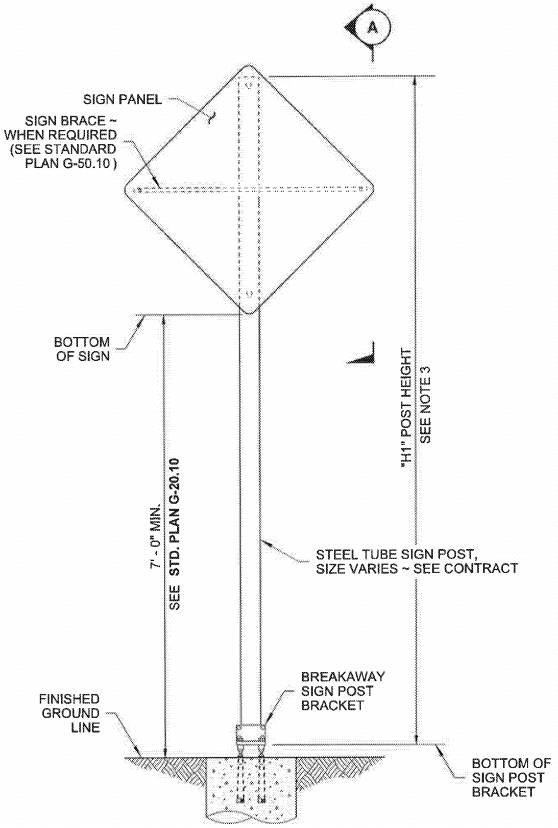
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

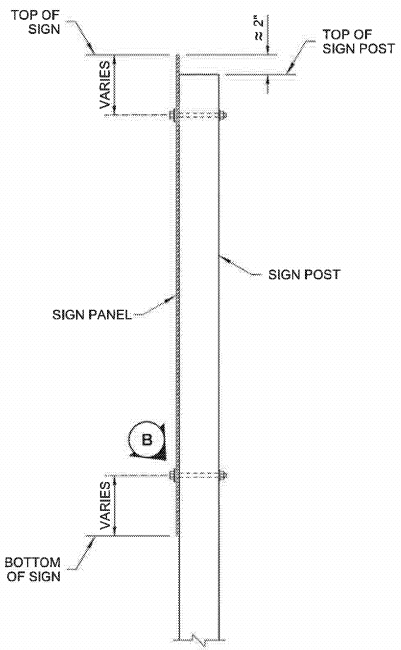
STATE DESIGN ENGINEER — DATE 11/8/07

Washington State Department of Transportation

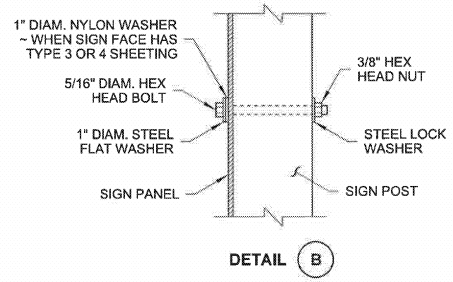
DRAWN BY: LISA CYFORD



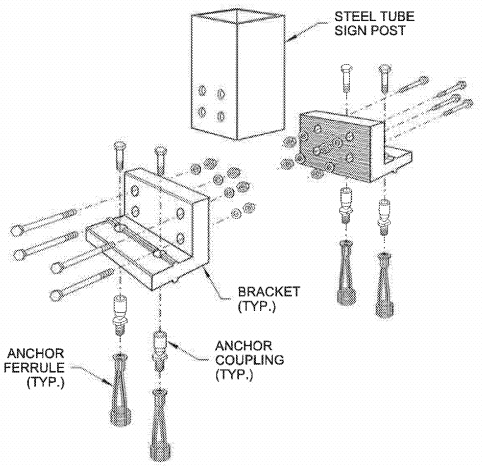
ELEVATION



VIEW (A)

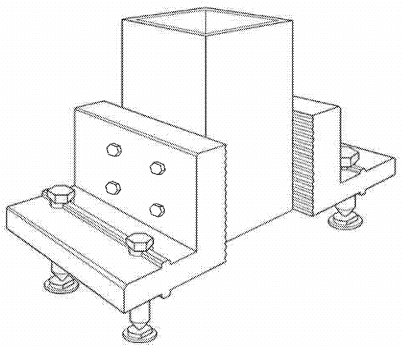


DETAIL (B)



EXPLODED VIEW

BREAKAWAY SIGN BRACKET ASSEMBLY

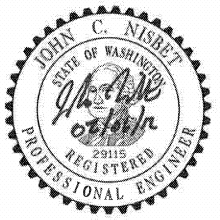


PERSPECTIVE VIEW

BREAKAWAY SIGN BRACKET ASSEMBLY

NOTES

1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.
2. For Steel Sign Support Foundations, see **Standard Plan G-25.10.**
3. For "H1" refer to the Sign Specification Sheet in the Contract.



STEEL SIGN SUPPORT TYPE AS INSTALLATION DETAILS STANDARD PLAN G-24.20-01

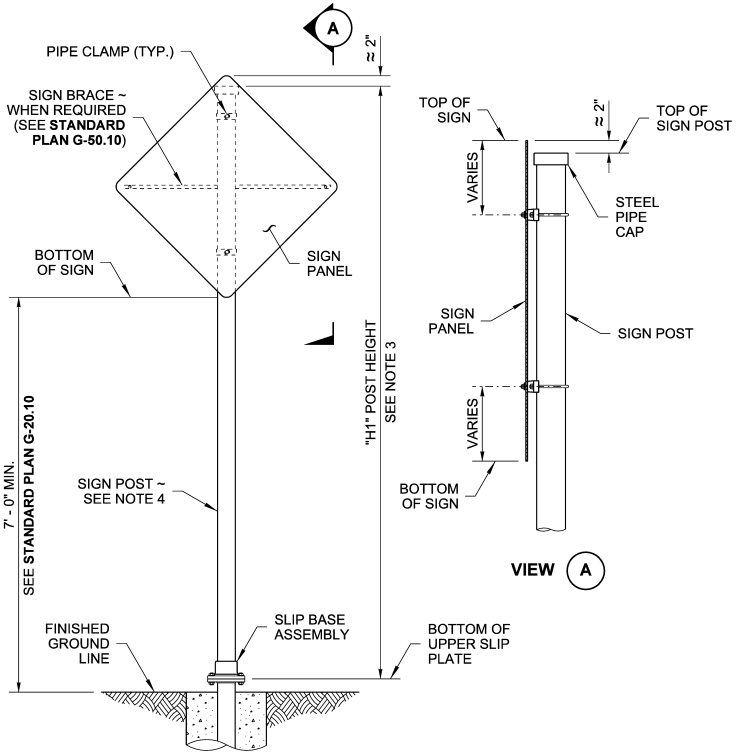
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION

STATE DESIGN ENGINEER — DATE 2/2/12

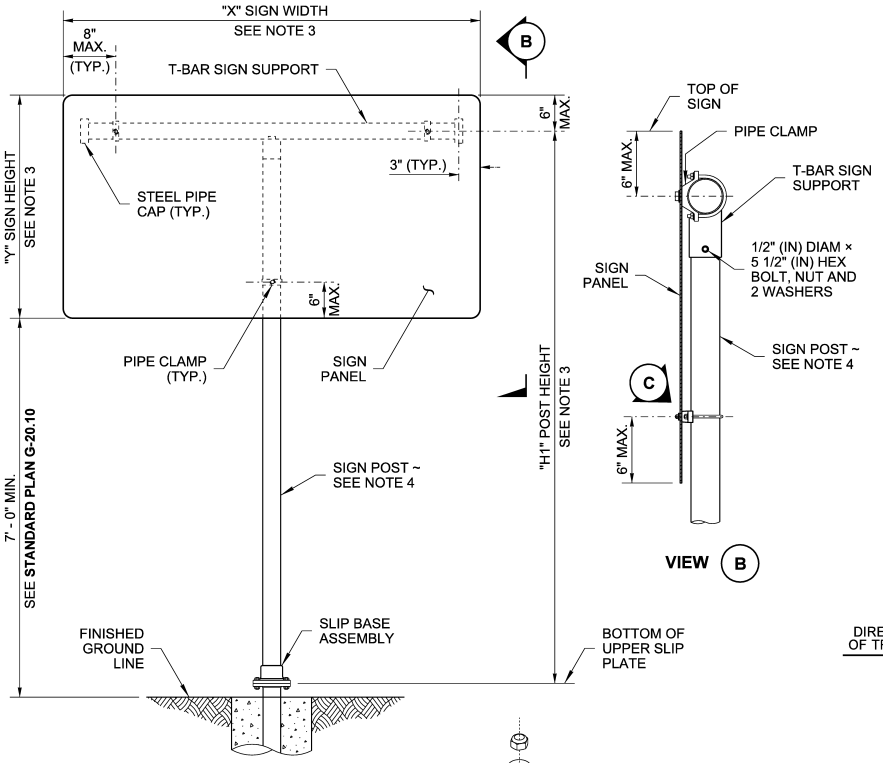
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



VIEW (A)

ELEVATION
TYPE PL SIGN SUPPORT

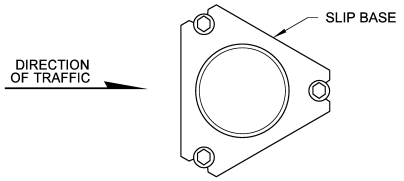


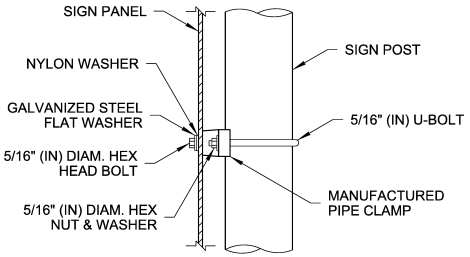
VIEW (B)

ELEVATION
TYPE PL-T SIGN SUPPORT

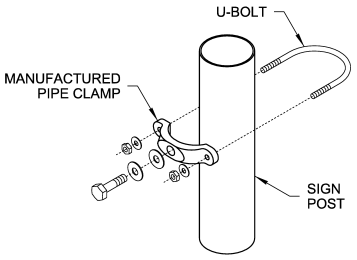
NOTES

1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are only shown on this plan to illustrate how the parts are assembled.
2. For Steel Sign Support Foundations, see **Standard Plan G-25.10.**
3. For "X", "Y", "H1", and "H2", refer to the Sign Specification Sheet in the Contract.
4. Sign posts shall be 2 1/2" (in) nominal I.D. galvanized Schedule 80 steel pipe.
5. Do not tighten any slip plate bolt to the recommended torque before pretightening the other bolts. Progressively tighten the three slip plate bolts in 10 ft-lbs increments, alternately, to a final torque of 38 ft-lbs on each bolt.



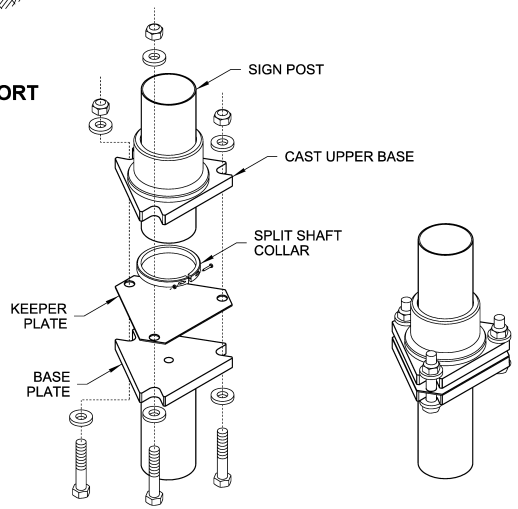


DETAIL (C)



EXPLODED VIEW

PIPE CLAMP AND U-BOLT



EXPLODED VIEW

ISOMETRIC VIEW

TYPE PL SIGN SUPPORT

JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

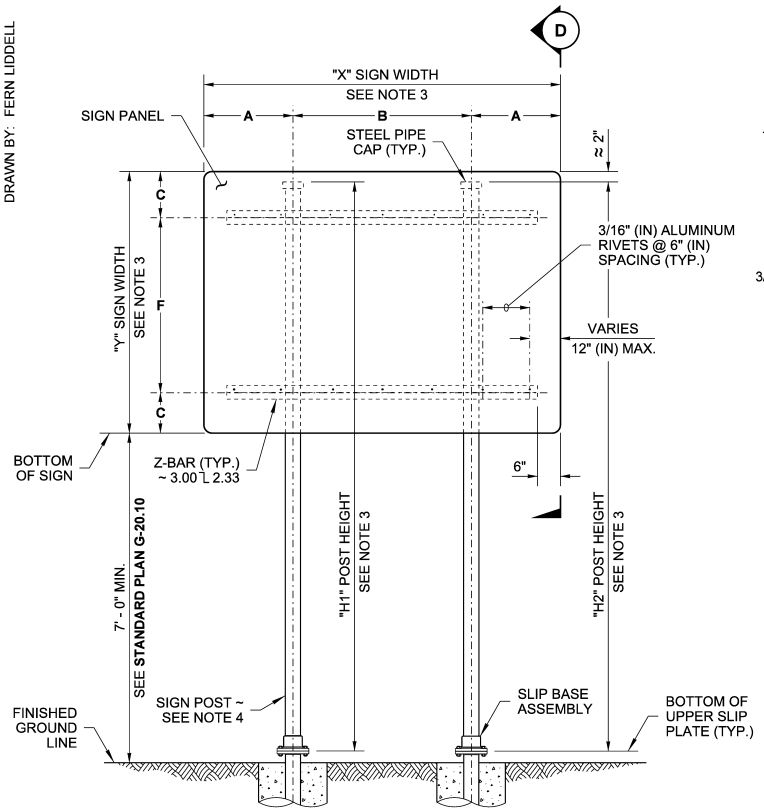
Nisbet, John
Digitally signed by Nisbet, John
Date: 2018.06.27 11:33:50 -07'00'

STEEL SIGN SUPPORT TYPES PL, PL-T, & PL-U INSTALLATION DETAILS STANDARD PLAN G-24.30-02

SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:41 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

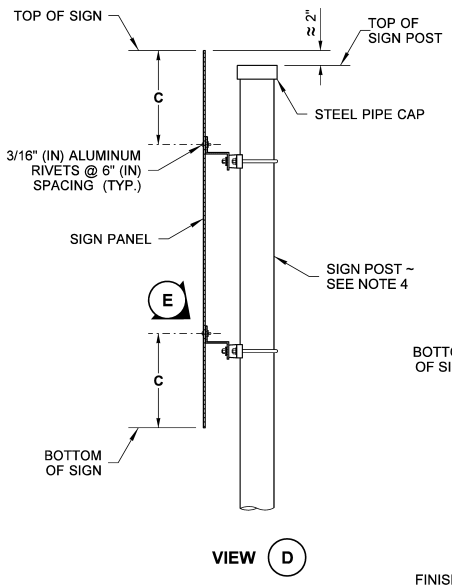


ELEVATION
TYPE PL SIGN SUPPORT
DUAL POST INSTALLATION

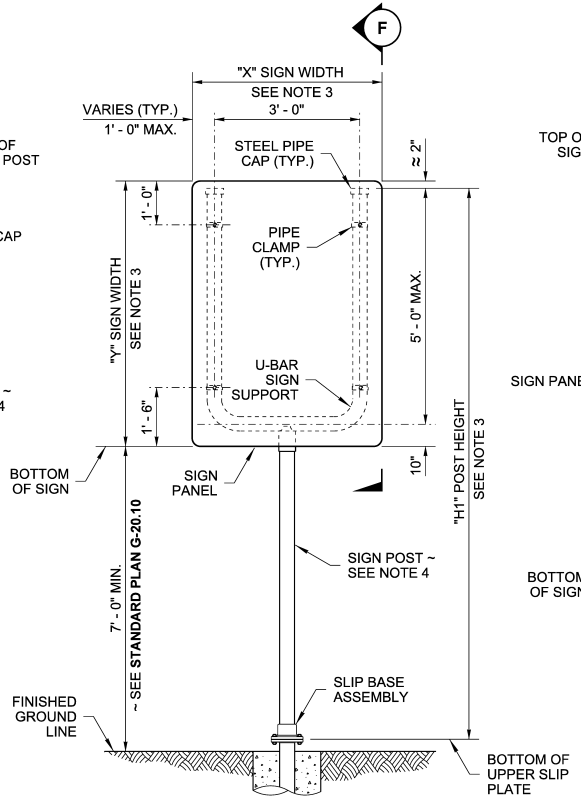
	"X" SIGN WIDTH		
	6' - 0"	8' - 0"	10' - 0"
A	1' - 0"	2' - 0"	3' - 0"
B	3' - 0"	4' - 0"	4' - 0"

	"Y" SIGN HEIGHT		
	6' - 0"	8' - 0"	10' - 0"
C	1' - 0"	2' - 0"	3' - 0"
F	4' - 0"	4' - 0"	4' - 0"

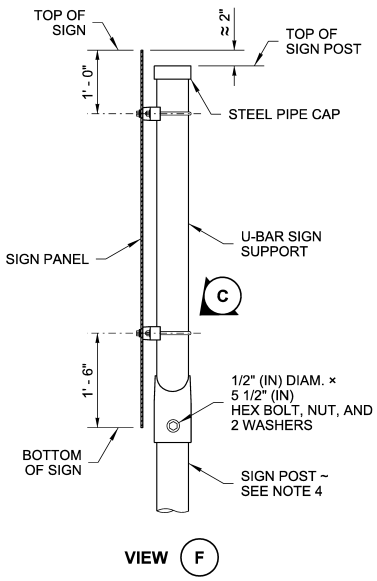
A, **B**, **C**, & **F**, MAY BE INTERPOLATED FOR INTERMEDIATE SIGN SIZES



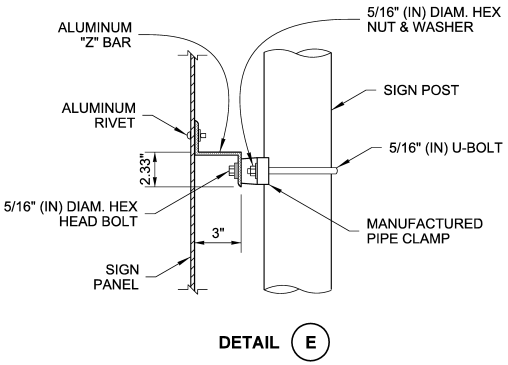
VIEW (D)



ELEVATION
TYPE PL-U SIGN SUPPORT



VIEW (F)



DETAIL (E)

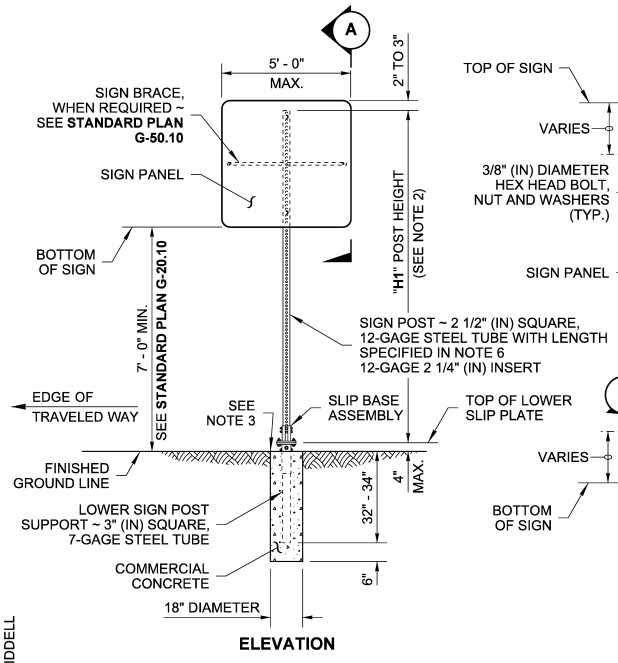
JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

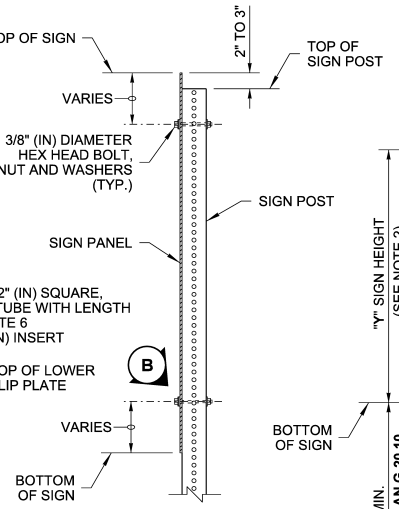
Nisbet, John
Digitally signed by Nisbet, John
Date: 2018.06.27 11:34:16 -07'00'

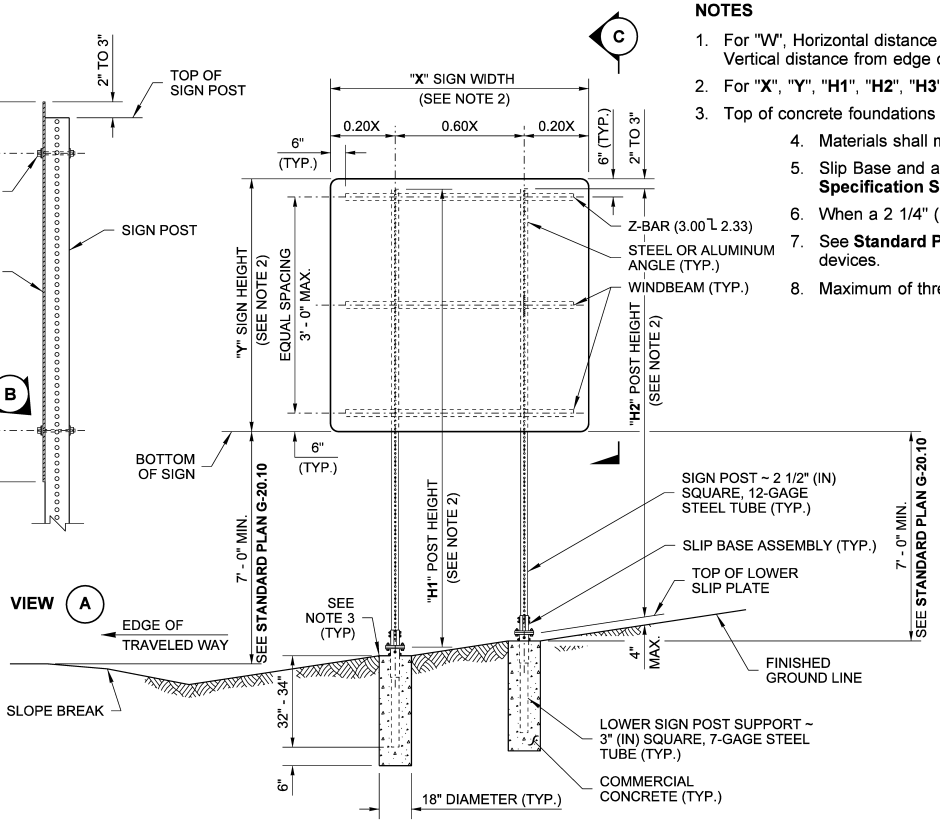
STEEL SIGN SUPPORT TYPES PL, PL-T, & PL-U INSTALLATION DETAILS STANDARD PLAN G-24.30-02

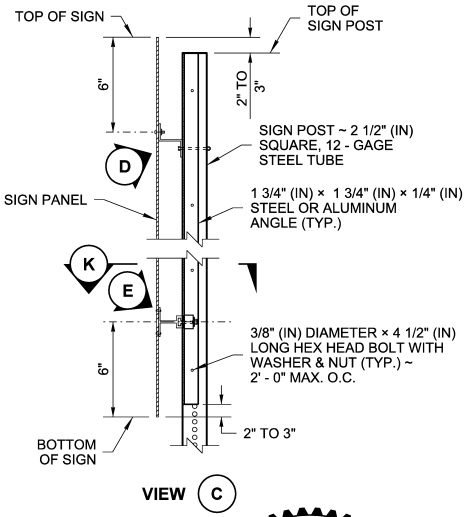
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:41 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation







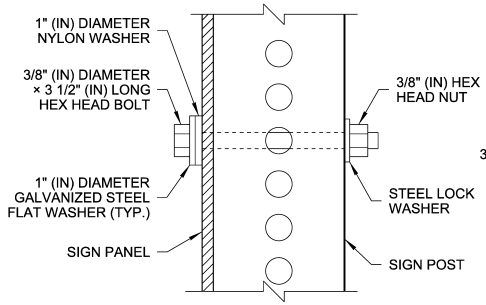


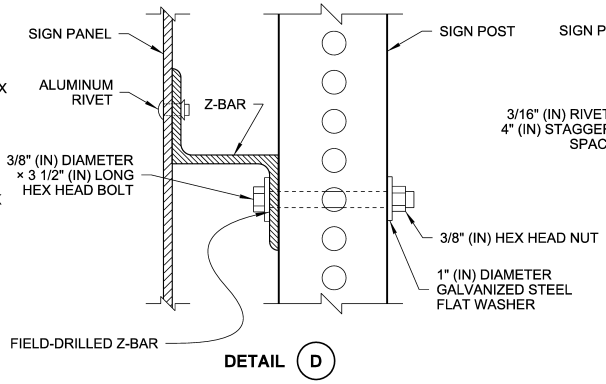
DRAWN BY: FERN LIDDELL

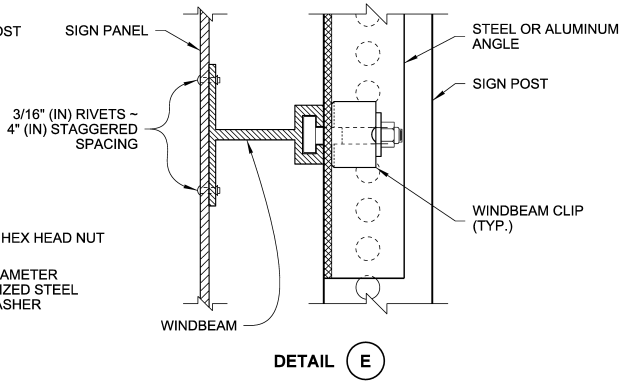
WINDLOAD FOR SQUARE TUBE POSTS AT 90 MPH				
POSTS		MAXIMUM XYZ		
		1-POST	2-POST	3-POST
2 1/2" PSST	12-GAGE	172	344 *	516 *
2 1/2" PSST with 2 1/4" insert	12-GAGE	309 *	618 *	927 *
(SEE NOTE 6)				
* SLIP BASE REQUIRED (UNLESS BEHIND BARRIER)				

NOTES

1. For "W", Horizontal distance from edge of traveled way to center of nearest post, and "V", Vertical distance from edge of traveled way to bottom of sign, see **Standard Plan G-20.10**.
2. For "**X**", "**Y**", "**H1**", "**H2**", "**H3**", and "**H4**", refer to the Sign Specification Sheet in the Contract.
3. Top of concrete foundations shall be smooth, dense and uniform to finished groundline.
4. Materials shall meet the requirements of **Standard Specification Section 9-28**.
5. Slip Base and all other materials shall meet the requirements of **Standard Specification Section 9-06**.
6. When a 2 1/4" (in) insert is used, the insert shall be a minimum of 7 feet.
7. See **Standard Plan J-40.35** and Contract Plans for installations with electrical devices.
8. Maximum of three (3) slip bases in 7' (ft) span.







STEEL SIGN SUPPORT TYPES SB-1, SB-2 & SB-3 ~ 8" (IN)

JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

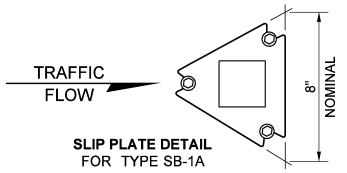
Nisbet, John Digitally signed by Nisbet, John Date: 2018.06.27 11:36:56 -07'00'

STEEL SIGN SUPPORT TYPES SB-1, SB-2 & SB-3 INSTALLATION DETAILS STANDARD PLAN G-24.40-07

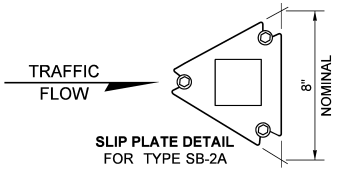
SHEET 1 OF 6 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:39 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



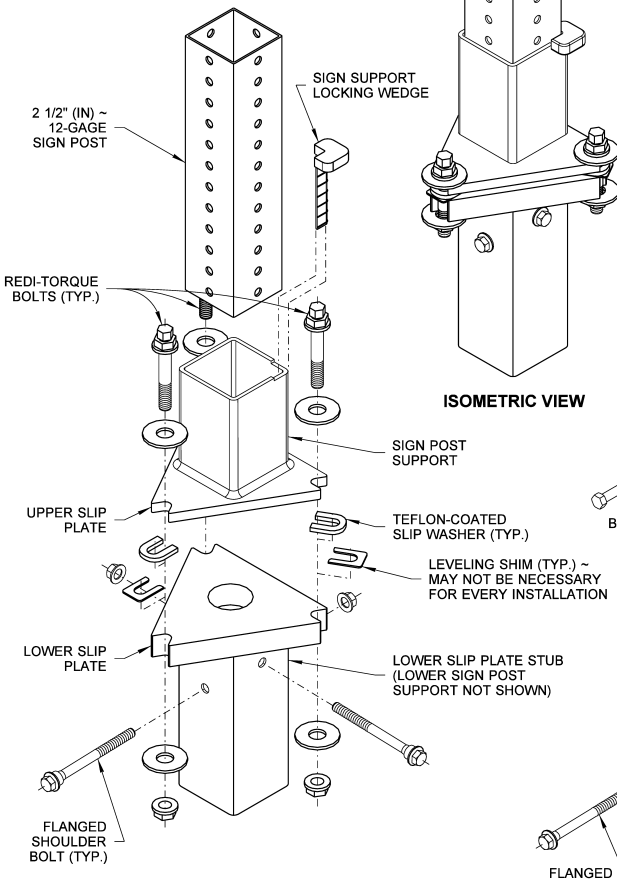
SLIP PLATE DETAIL
FOR TYPE SB-1A



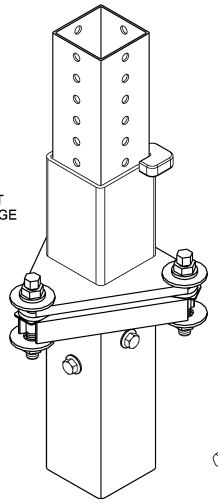
SLIP PLATE DETAIL
FOR TYPE SB-2A

ASSEMBLY NOTES

1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are shown on this plan only to illustrate how the parts are assembled.
2. Do not tighten any single Slip Plate Bolt to the recommended torque before pretightening the other bolts. Progressively tighten the three Slip Plate Bolts in 10 ft-lb increments, alternately, to a final torque of 40 ft-lbs on each.
3. Slip Base assembly and all other materails shall meet the requirements of **Standard Specification Sections 9-06** and **9-28**.

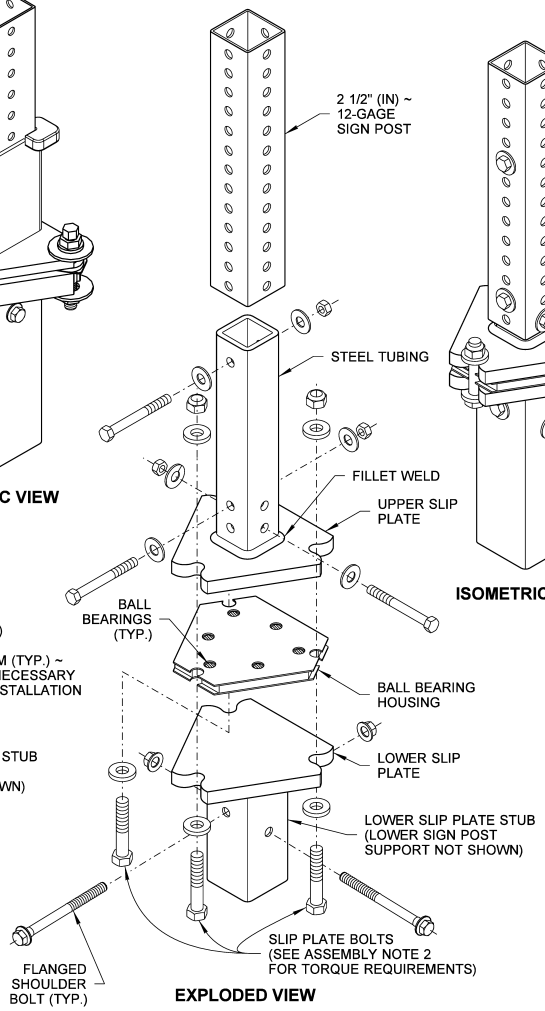


EXPLODED VIEW

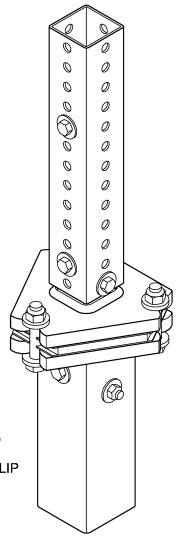


ISOMETRIC VIEW

TYPE SB-1A
SLIP BASE ASSEMBLY

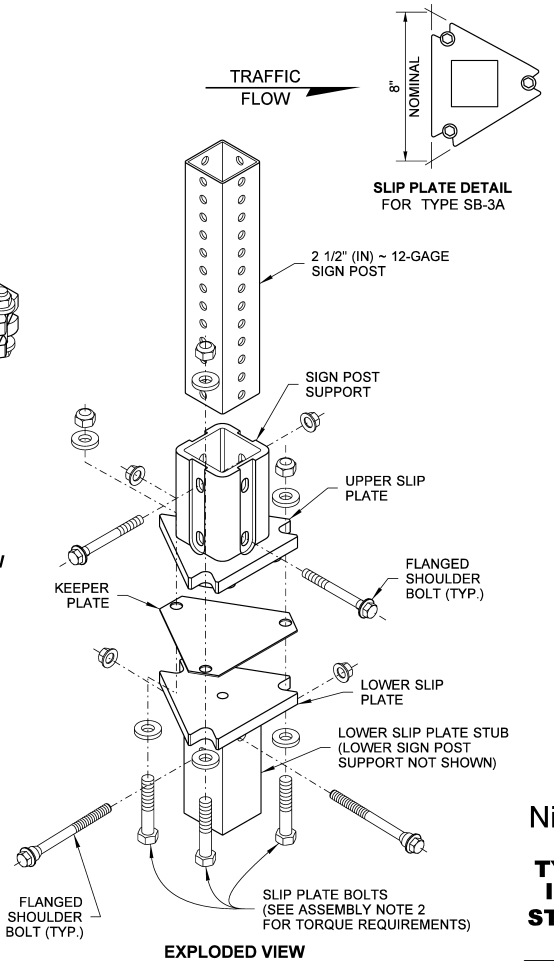


EXPLODED VIEW



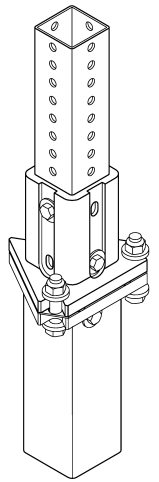
ISOMETRIC VIEW

TYPE SB-2A
SLIP BASE ASSEMBLY



SLIP PLATE DETAIL
FOR TYPE SB-3A

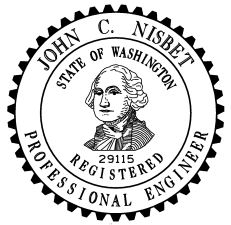
EXPLODED VIEW



ISOMETRIC VIEW

TYPE SB-3A
SLIP BASE ASSEMBLY

STEEL SIGN SUPPORT TYPES SB-1A, SB-2A & SB-3A ~ 8" (IN)



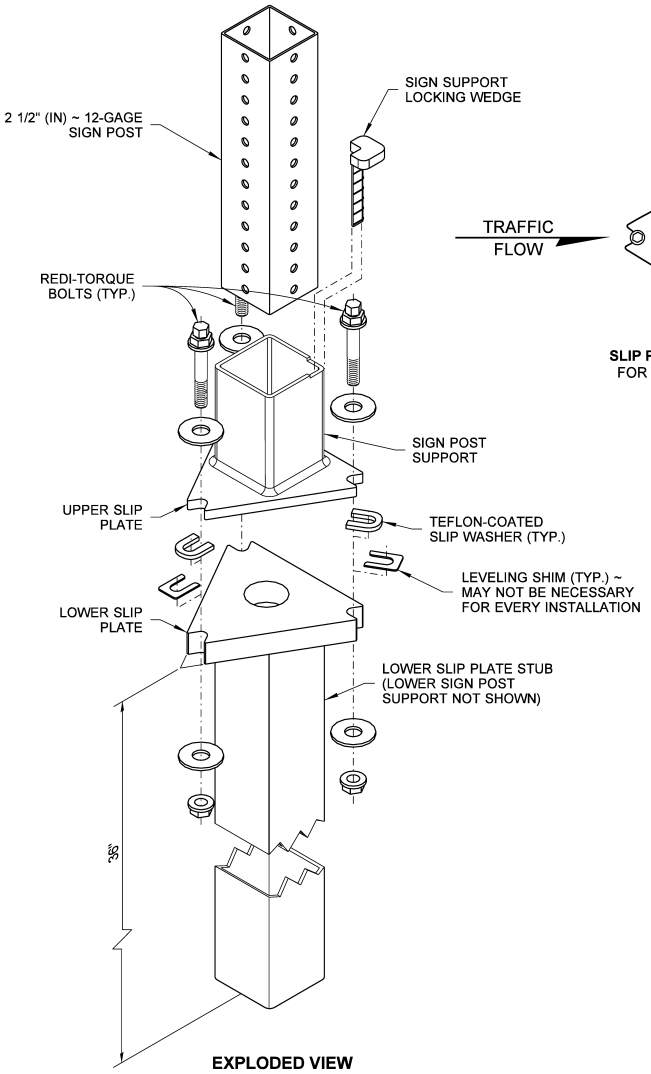
Nisbet, John Digitally signed by Nisbet, John
Date: 2018.06.27 11:37:29 -07'00'

STEEL SIGN SUPPORT TYPES SB-1, SB-2 & SB-3 INSTALLATION DETAILS STANDARD PLAN G-24.40-07

SHEET 2 OF 6 SHEETS

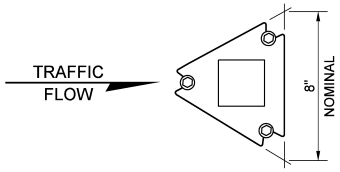
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:40 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

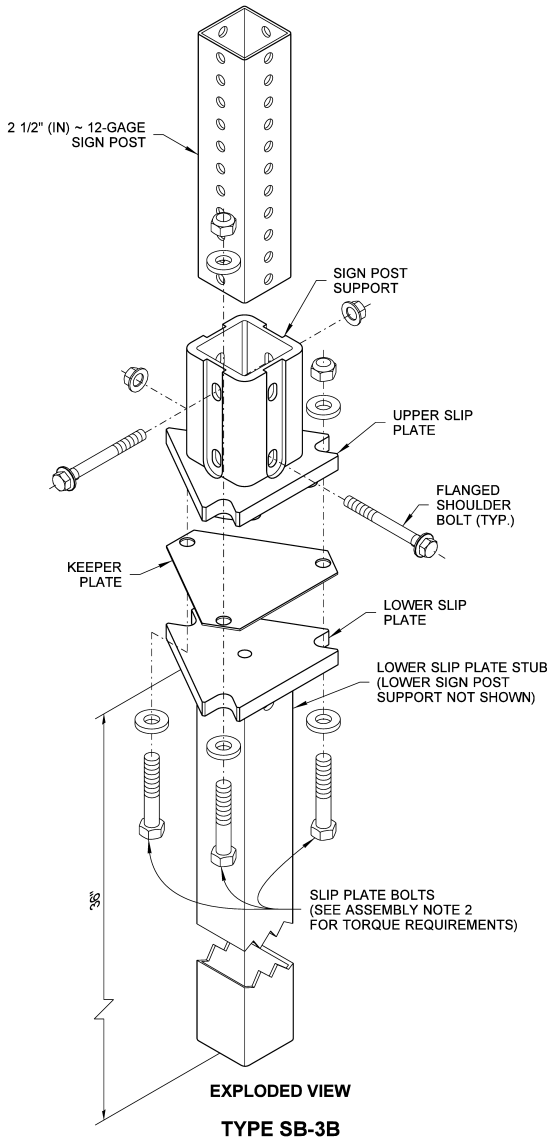


EXPLODED VIEW

TYPE SB-1B
SLIP BASE ASSEMBLY



SLIP PLATE DETAIL
FOR TYPE SB-1B

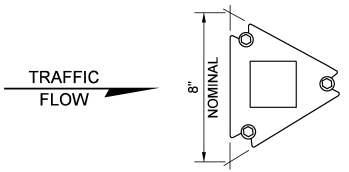


EXPLODED VIEW

TYPE SB-3B
SLIP BASE ASSEMBLY

ASSEMBLY NOTES

1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are shown on this plan only to illustrate how the parts are assembled.
2. Do not tighten any single Slip Plate Bolt to the recommended torque before pretightening the other bolts. Progressively tighten the three Slip Plate Bolts in 10 ft-lb increments, alternately, to a final torque of 40 ft-lbs on each.
3. Slip Base assembly and all other materails shall meet the requirements of **Standard Specification Sections 9-06** and **9-28**.



SLIP PLATE DETAIL
FOR TYPE SB-3B

JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

Nisbet, John Digitally signed by Nisbet, John
Date: 2018.06.27 11:37:51 -07'00'

STEEL SIGN SUPPORT TYPES SB-1, SB-2 & SB-3 INSTALLATION DETAILS

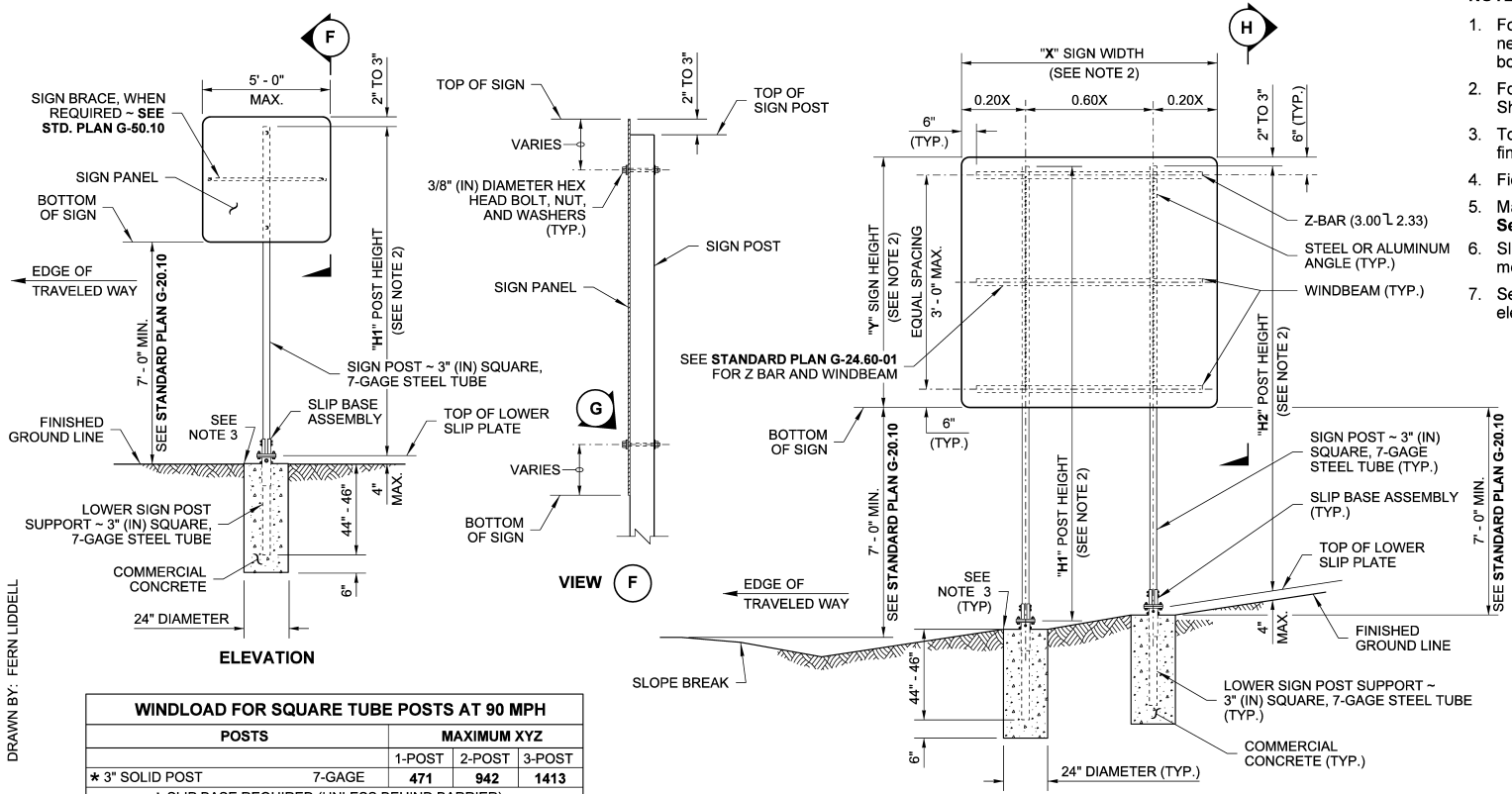
STANDARD PLAN G-24.40-07

SHEET 3 OF 6 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:40 AM

STATE DESIGN ENGINEER
Washington State Department of Transportation

STEEL SIGN SUPPORT TYPES SB-1B, & SB-3B ~ 8" (IN)
(UNIBASE)



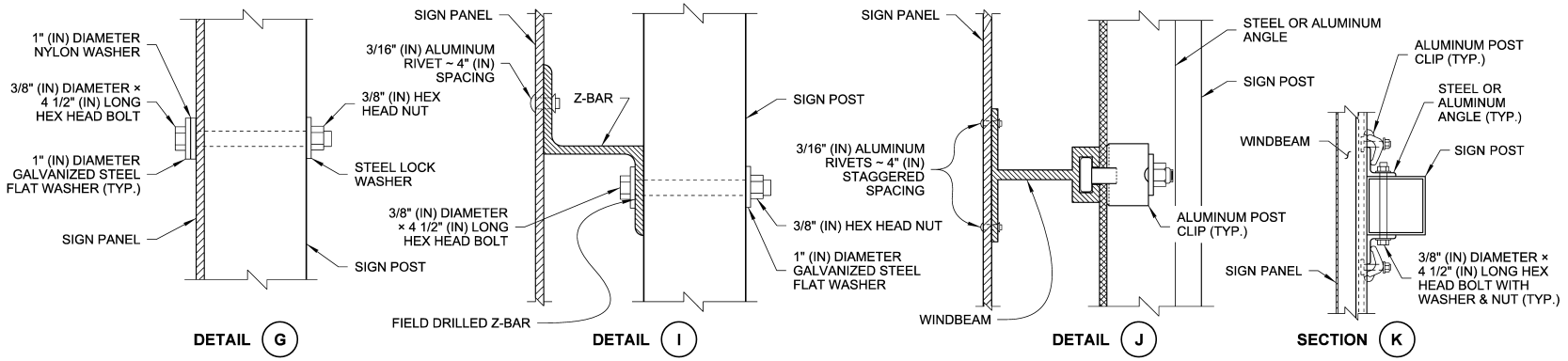
DRAWN BY: FERN LIDDELL

WINDLOAD FOR SQUARE TUBE POSTS AT 90 MPH

POSTS		MAXIMUM XYZ		
		1-POST	2-POST	3-POST
* 3" SOLID POST	7-GAGE	**471**	**942**	**1413**
* SLIP BASE REQUIRED (UNLESS BEHIND BARRIER)				
(MAXIMUM 3 SLIP BASES ALLOWED IN 7' SPAN)				

NOTES

1. For "**W**", Horizontal distance from edge of traveled way to center of nearest post, and "**V**", Vertical distance from edge of traveled way to bottom of sign, see **Standard Plan G-20.10**.
2. For "**X**", "**Y**", "**H1**", "**H2**", "**H3**", and "**H4**", refer to the Sign Specification Sheet in the Contract.
3. Top of concrete foundation shall be smooth, dense, and uniform to finished ground line.
4. Field drill posts to accept angle and cold galvanized holes.
5. Materials shall meet the requirements of **Standard Specification Section 9-28**.
6. Slip Base assembly and all other materials shall meet the requirements of **Standard Specification Sections 9-06** and **9-28**.
7. See **Standard Plan J-40.35** and Contract Plans for installations with electrical devices.



STEEL SIGN SUPPORT TYPES SB-1, SB-2 & SB-3 ~ 10" (IN)

JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

Nisbet, John
Digitally signed by Nisbet, John
Date: 2018.06.27 11:38:14 -07'00'

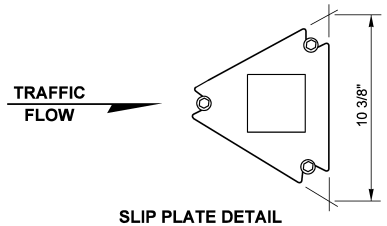
STEEL SIGN SUPPORT TYPES SB-1, SB-2 & SB-3 INSTALLATION DETAILS

STANDARD PLAN G-24.40-07

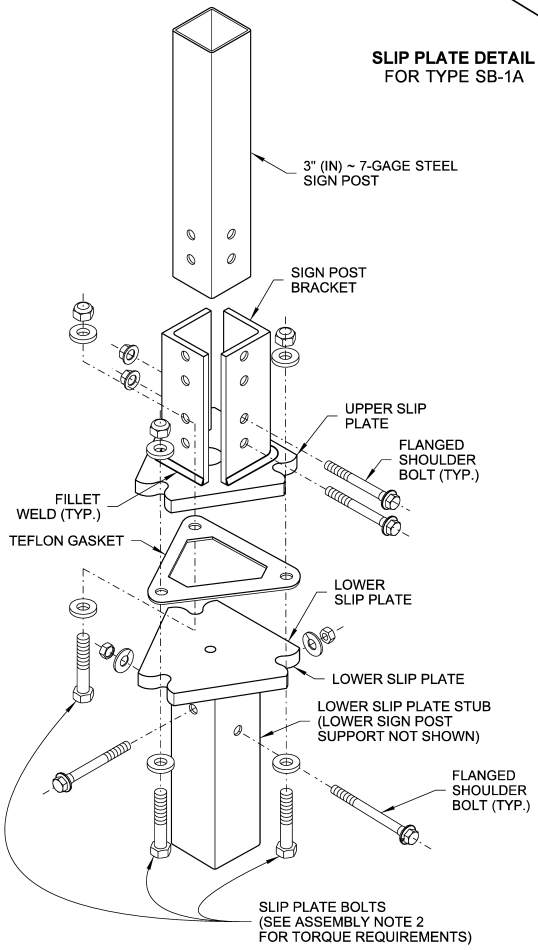
SHEET 4 OF 6 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:40 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

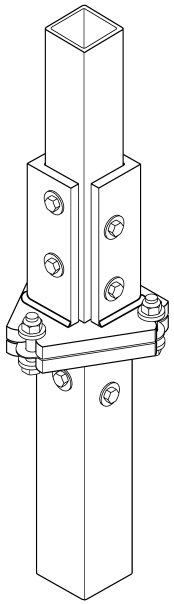
DRAWN BY: FERN LIDDELL



SLIP PLATE DETAIL
FOR TYPE SB-1A

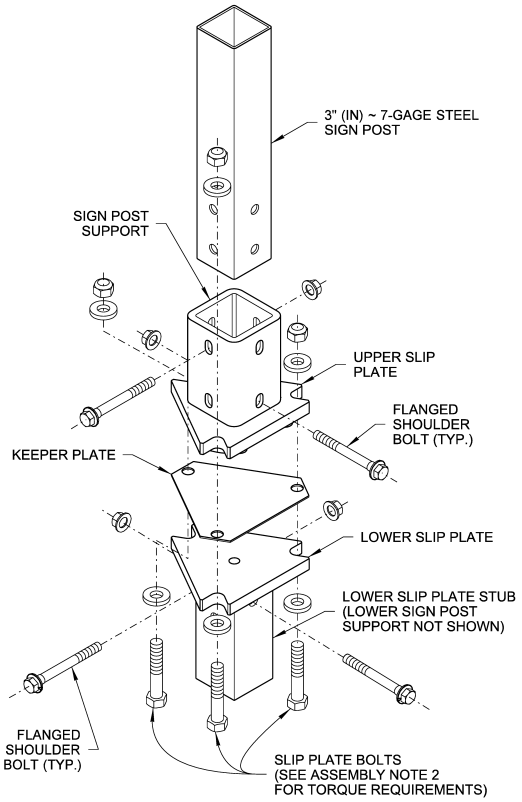


EXPLODED VIEW

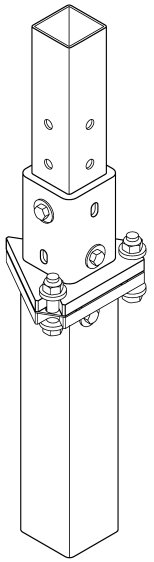


ISOMETRIC VIEW

TYPE SB-1A
SLIP BASE ASSEMBLY



EXPLODED VIEW

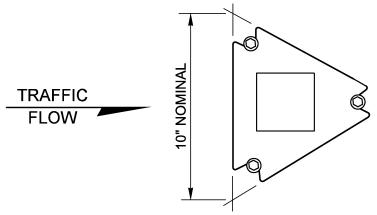


ISOMETRIC VIEW

TYPE SB-3A
SLIP BASE ASSEMBLY

ASSEMBLY NOTES

1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are shown on this plan only to illustrate how the parts are assembled.
2. Do not tighten any single Slip Plate Bolt to the recommended torque before pretightening the other bolts. Progressively tighten the three Slip Plate Bolts in 10 ft-lb increments, alternately, to a final torque of 40 ft-lbs on each.
3. Use only Slip Base manufacturer supplied hardware that meets the requirements of **Standard Specification Sections 9-06** and **9-28**.



SLIP PLATE DETAIL
FOR TYPE SB-3A

JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

Nisbet, John Digitally signed by Nisbet, John
Date: 2018.06.27 11:38:43 -07'00'

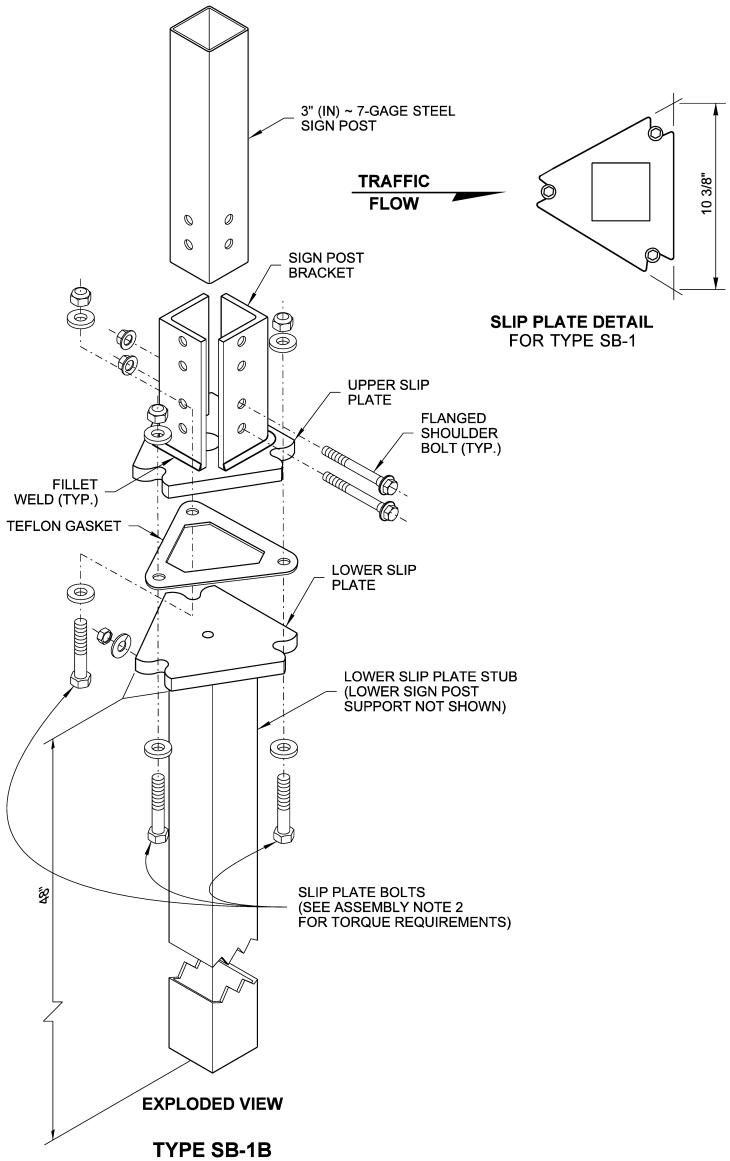
STEEL SIGN SUPPORT TYPES SB-1, SB-2 & SB-3 INSTALLATION DETAILS

STANDARD PLAN G-24.40-07

SHEET 5 OF 6 SHEETS

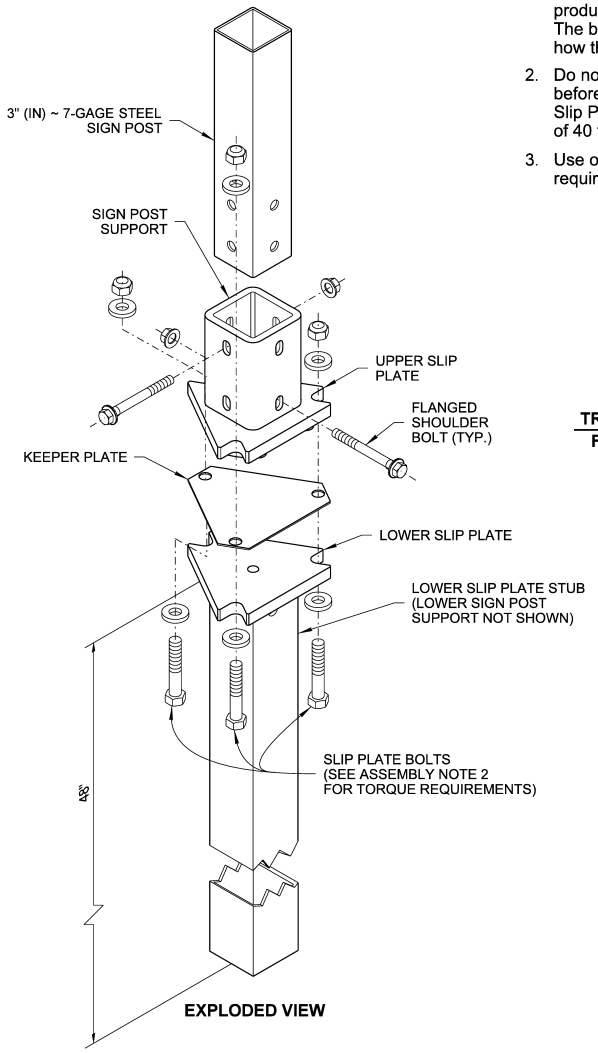
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:40 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

STEEL SIGN SUPPORT TYPES SB-1A & SB-3A ~ 10" (IN)



TYPE SB-1B
SLIP BASE ASSEMBLY

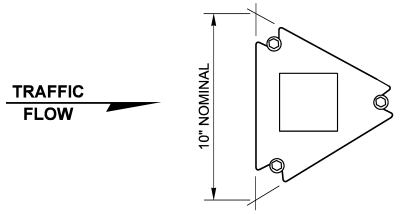
SLIP PLATE DETAIL
FOR TYPE SB-1



TYPE SB-3B
SLIP BASE ASSEMBLY

ASSEMBLY NOTES

1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are shown on this plan only to illustrate how the parts are assembled.
2. Do not tighten any single Slip Plate Bolt to the recommended torque before pretightening the other bolts. Progressively tighten the three Slip Plate Bolts in 10 ft-lb increments, alternately, to a final torque of 40 ft-lbs on each.
3. Use only Slip Base manufacturer supplied hardware that meets the requirements of **Standard Specification Sections 9-06** and **9-28**.



SLIP PLATE DETAIL
FOR TYPE SB-3

DRAWN BY: FERN LIDDELL

JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

Nisbet, John
Digitally signed by Nisbet, John
Date: 2018.06.27 11:39:09 -07'00'

STEEL SIGN SUPPORT TYPES SB-1, SB-2 & SB-3 INSTALLATION DETAILS

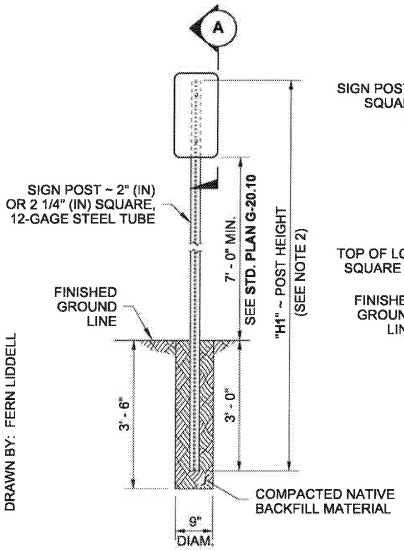
STANDARD PLAN G-24.40-07

SHEET 6 OF 6 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:40 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

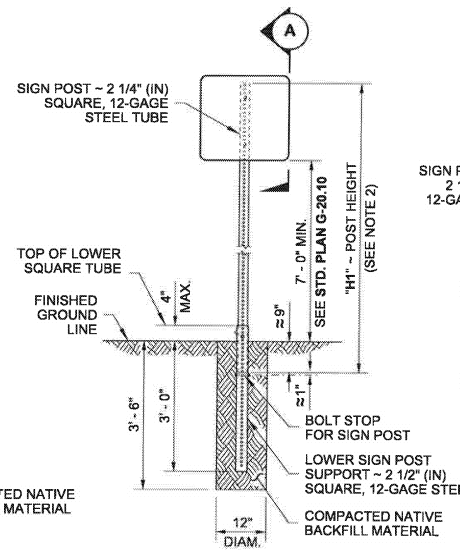
STEEL SIGN SUPPORT TYPE SB-1B & SB-3B ~ 10" (IN)
(UNIBASE)

DRAWN BY: FERN LIDDELL



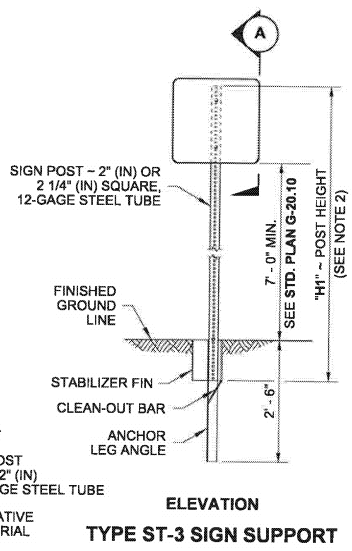
ELEVATION

TYPE ST-1 SIGN SUPPORT



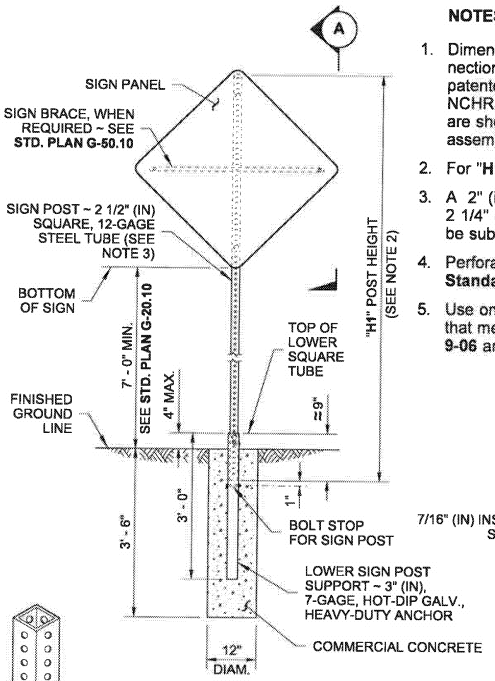
ELEVATION

TYPE ST-2 SIGN SUPPORT



ELEVATION

TYPE ST-3 SIGN SUPPORT

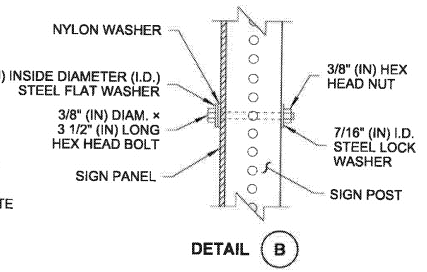


ELEVATION

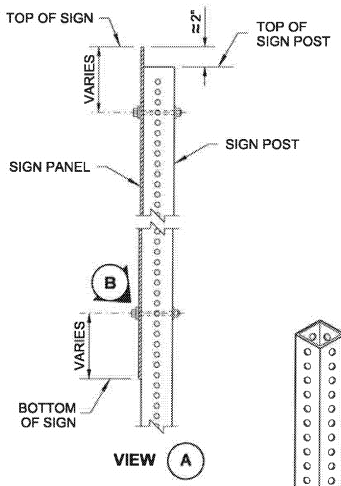
TYPE ST-4 SIGN SUPPORT

NOTES

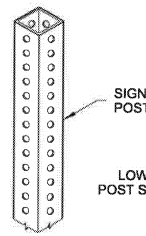
1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are shown on this plan only to illustrate how the parts are assembled.
2. For "**H1**", refer to the Sign Specification Sheet in the Contract.
3. A 2" (in) post with a 2 1/4" (in) PSST anchor or a 2 1/4" (in) post with a 2 1/2" (in) PSST anchor may be substituted. See Contract Plans.
4. Perforated square steel post shall meet the requirements of **Standard Specification 9-06**.
5. Use only base connection manufacturer supplied hardware that meets the requirements of **Standard Specifications 9-06** and **9-28**.



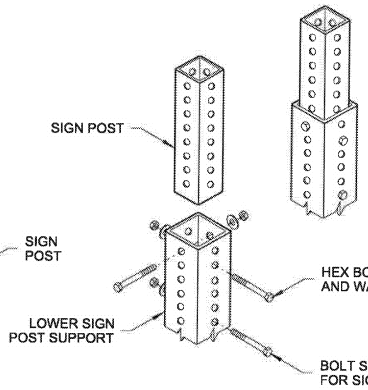
DETAIL B



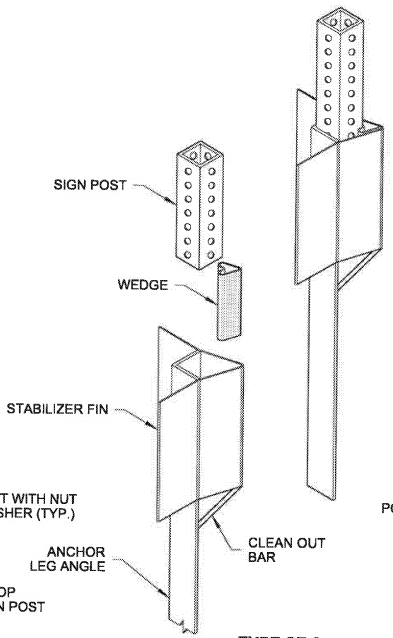
VIEW A



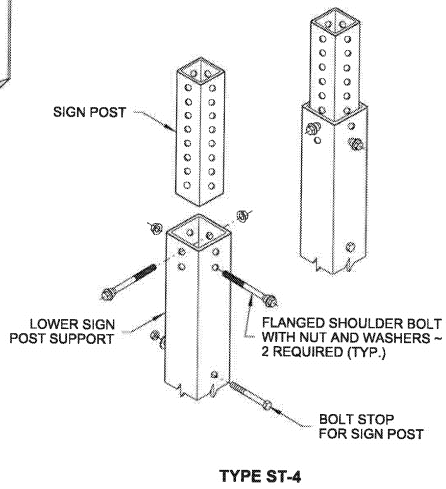
TYPE ST-1



TYPE ST-2



TYPE ST-3



TYPE ST-4

JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

Nisbet, John
Jun 27 2017 3:24 PM

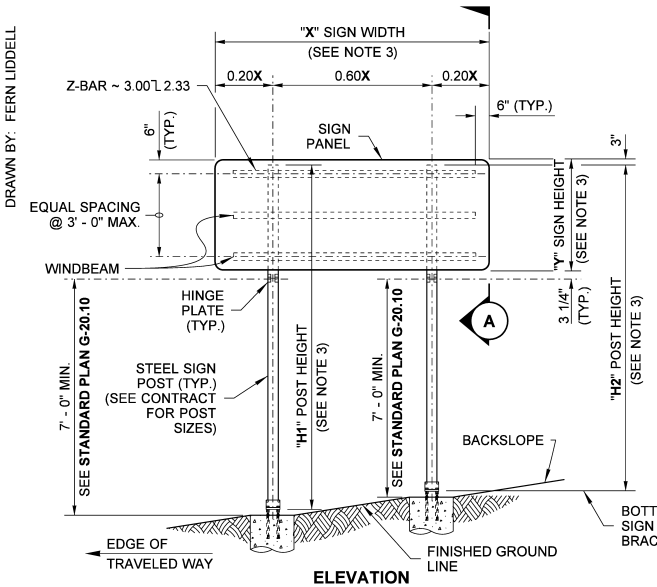
STEEL SIGN SUPPORT TYPES ST-1 - ST-4 INSTALLATION DETAILS

STANDARD PLAN G-24.50-04

SHEET 1 OF 1 SHEET

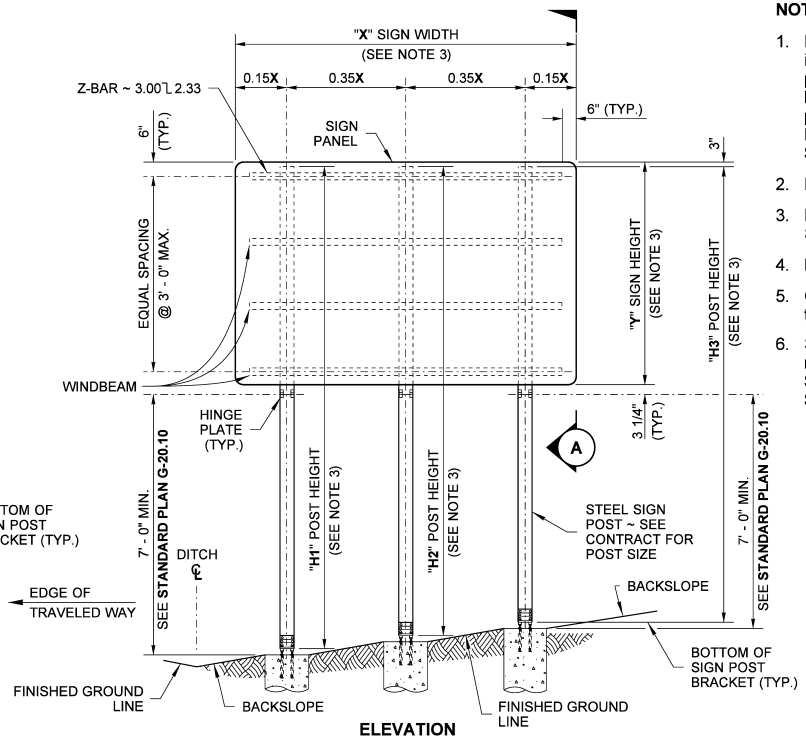
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jul 11 2017 1:21 PM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



ELEVATION

TYPE TP-A OR TP-B SIGN SUPPORT

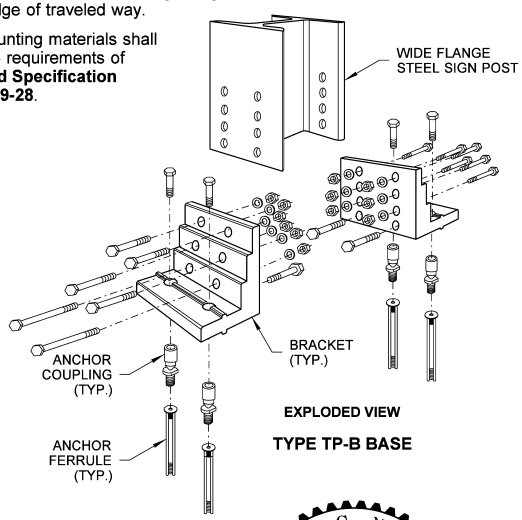


ELEVATION

TYPE TP-A OR TP-B SIGN SUPPORT

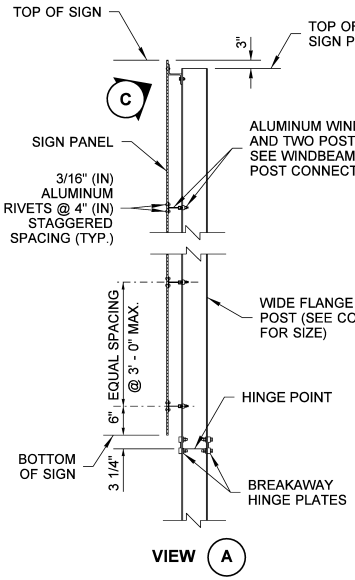
NOTES

1. Dimensions for the parts used to assemble the base connections are intentionally not shown. Base connections are patented, manufactured products that are in compliance with NCHRP 350 crash test criteria. The base connection details are shown on this plan only to illustrate how the parts are assembled. Use only base connection manufacturer supplied hardware that meets the requirements of **Standard Specification Section 9-06**.
2. For Steel Sign Support Foundations, see **Standard Plan G-25.10.**
3. For "**X**", "**Y**", "**H1**", "**H2**", and "**H3**", refer to the Sign Specification Sheet in the Contract.
4. Maximum of 34 lbs/ft in a 7' (ft) wheel path.
5. On fill slopes, the maximum sign height is 9' (ft) for posts closest to the edge of traveled way.
6. Sign mounting materials shall meet the requirements of **Standard Specification Section 9-28**.

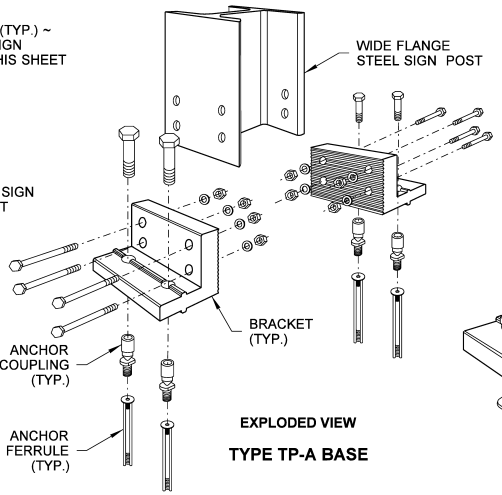


EXPLODED VIEW

TYPE TP-B BASE

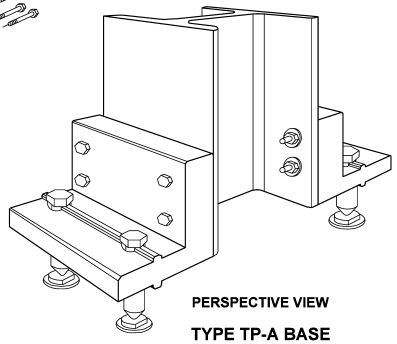


VIEW A



EXPLODED VIEW

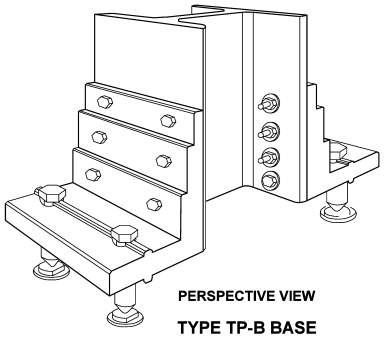
TYPE TP-A BASE



PERSPECTIVE VIEW

TYPE TP-A BASE

(W6×9)



PERSPECTIVE VIEW

TYPE TP-B BASE

(W6×12 OR LARGER)

JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

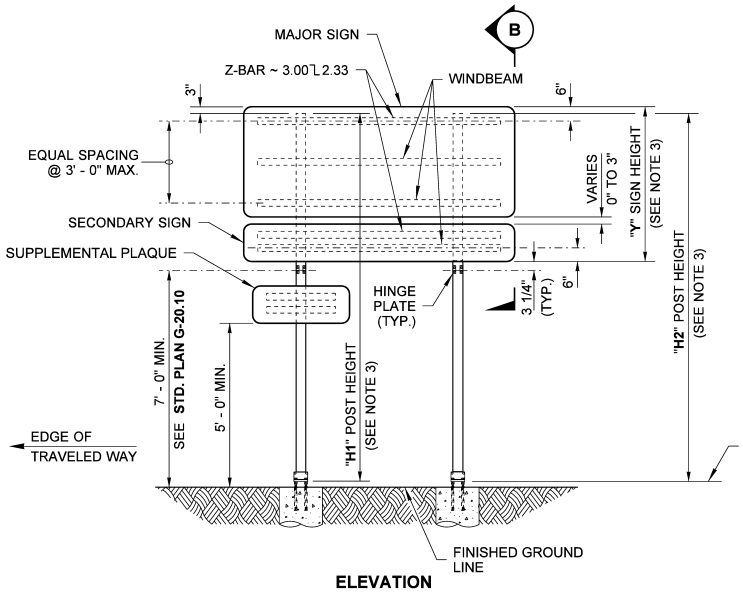
Nisbet, John Digitally signed by Nisbet, John
Date: 2018.06.27 11:40:10 -07'00'

STEEL SIGN SUPPORT TYPES TP-A AND TP-B INSTALLATION DETAILS STANDARD PLAN G-24.60-05

SHEET 1 OF 2 SHEETS

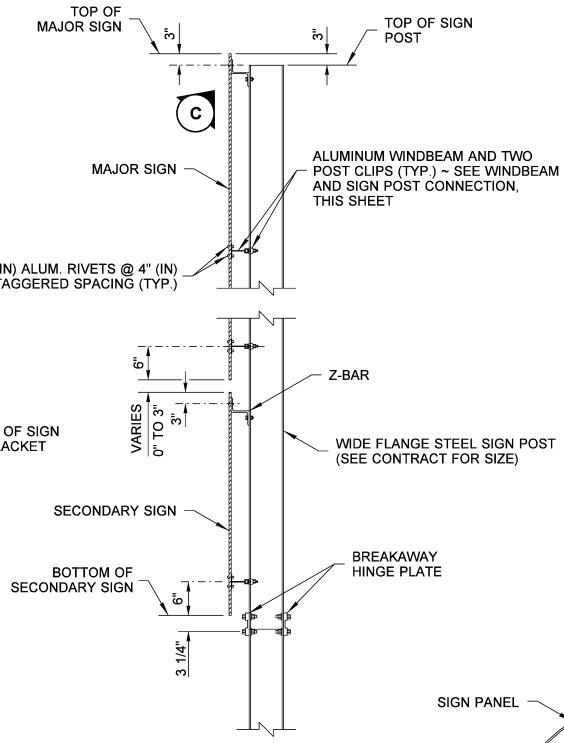
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:39 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

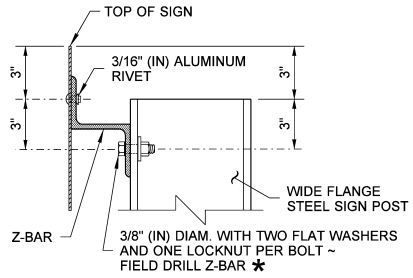


ELEVATION

MAJOR AND SECONDARY SIGN SUPPORT INSTALLATION

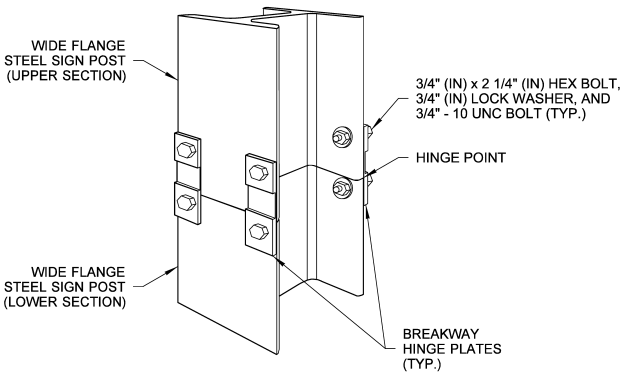


VIEW B



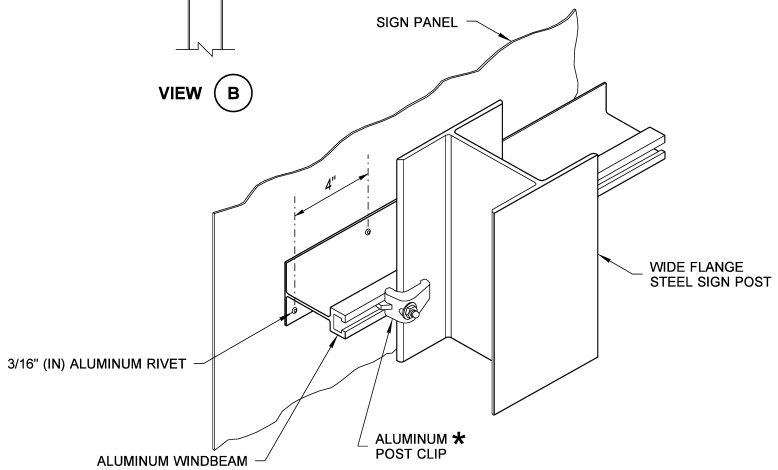
DETAIL C

* (BOLT ON ONE SIDE OF EACH WIDE FLANGE STEEL SIGN POST)



PERSPECTIVE VIEW

BREAKAWAY HINGE PLATE CONNECTION



ISOMETRIC VIEW

WINDBEAM AND SIGN POST CONNECTION

* (ATTACH POST CLIPS ON BOTH SIDES OF WIDE FLANGE STEEL SIGN POST)

JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

Nisbet, John
Digitally signed by Nisbet, John
Date: 2018.06.27 11:40:37 -07'00'

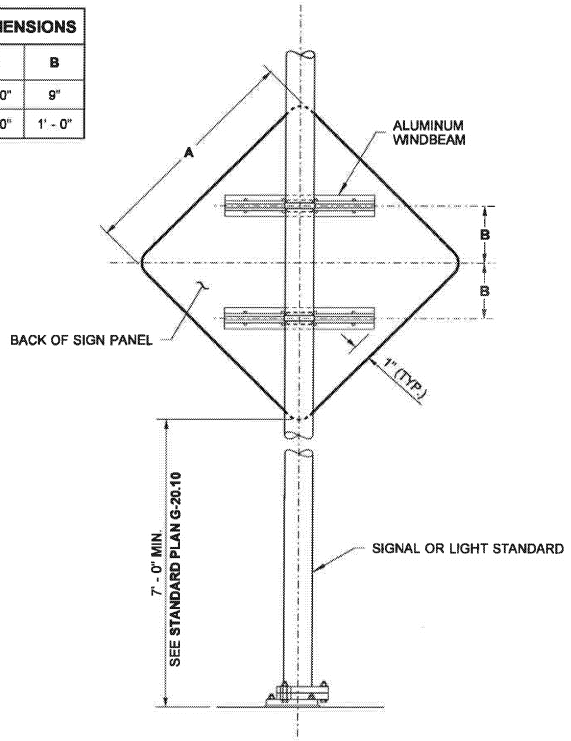
STEEL SIGN SUPPORT TYPES TP-A AND TP-B INSTALLATION DETAILS STANDARD PLAN G-24.60-05

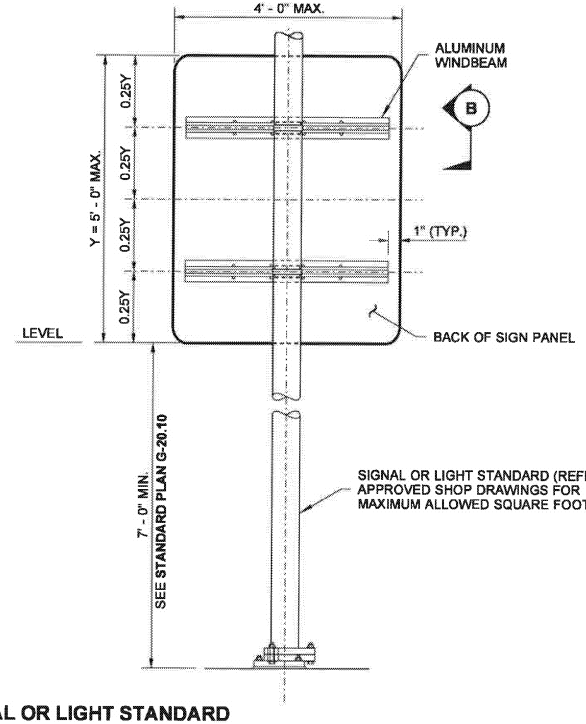
SHEET 2 OF 2 SHEETS

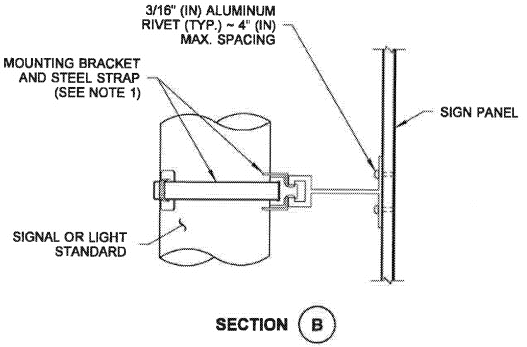
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:39 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

DIMENSIONS	
A	B
3' - 0"	9"
4' - 0"	1' - 0"







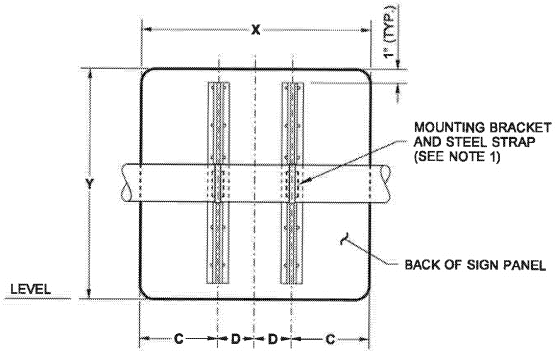
SECTION (B)

SIGN INSTALLATION ON SIGNAL OR LIGHT STANDARD

DIMENSIONS			
X	Y	C	D
3' - 0"	2' - 6"	1' - 0"	6"
3' - 0"	3' - 0"	1' - 0"	6"
3' - 0"	4' - 0"	1' - 3"	9"
4' - 0"	2' - 6"	1' - 3"	9"

NOTE:

Any Lane Use Sign greater than 7.5 sq ft. requires a Special Design Mast Arm and Signal Pole.



MAST ARM-MOUNTED LANE USE SIGNS

JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

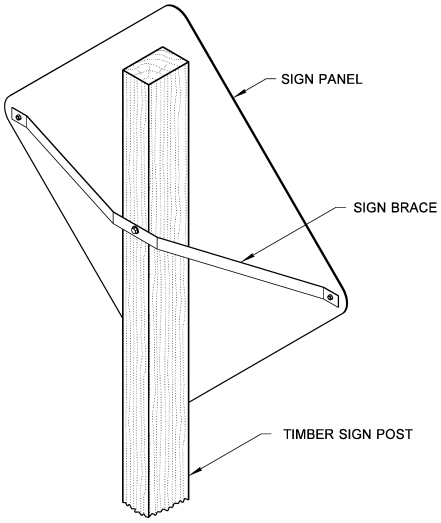
Nisbet, John
Jun 22 2015 9:50 AM

SIGN INSTALLATION ON SIGNAL AND LIGHT STANDARDS STANDARD PLAN G-30.10-04

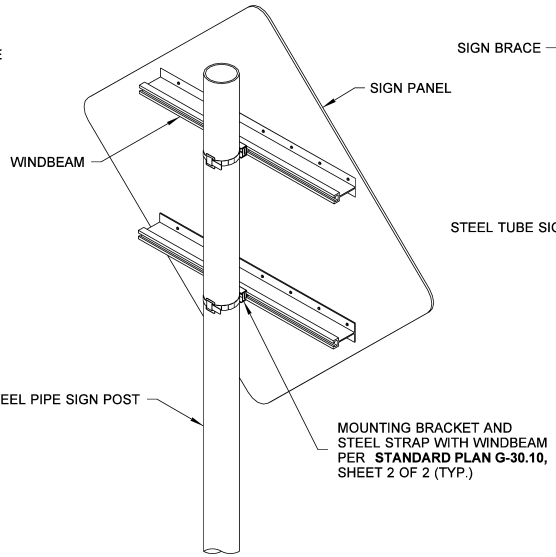
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 23 2015 7:31 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

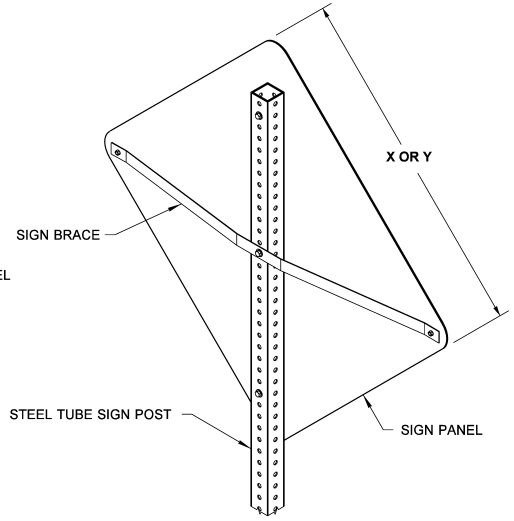
DRAWN BY: FERN LIDDELL



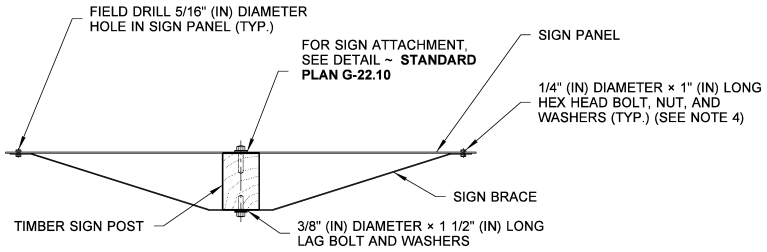
SIGN BRACE ON TIMBER POST



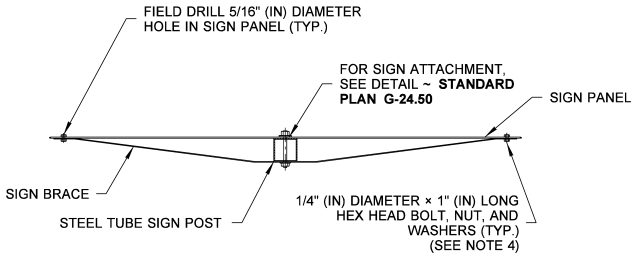
SIGN BRACE ON STEEL PIPE



SIGN BRACE ON STEEL TUBE



PLAN



PLAN

NOTES

1. Mounting brackets with steel straps shall be a stainless steel band and buckle system product or an approved equal. Mounting brackets shall be one bolt, flared leg; steel straps shall be 3/4" (in) wide and 0.030" (in) thick.
2. Sign braces are required for sign widths of 48" (in) or greater. For sign widths of 36" (in) or less, sign braces are only required when specified in the contract.
3. Sign braces are typically necessary on large sign panels that are exposed to high winds, traffic generated wind buffeting, or when snow thrown from plows might impact the sign.
4. A nylon washer shall be placed between the sign and the steel washer when the sign face has Type III, IV, VII or IX sheeting.
5. Signs 48" (in) or greater can be pinned together, back to back.
6. For signs installed back to back on a single post, no bracing is required.

JOHN C. NISBET
STATE OF WASHINGTON
29115
REGISTERED
PROFESSIONAL ENGINEER

Nisbet, John
Digitally signed by Nisbet, John
Date: 2018.06.27 11:42:32 -07'00'

SIGN BRACING

STANDARD PLAN G-50.10-03

SHEET 1 OF 2 SHEETS

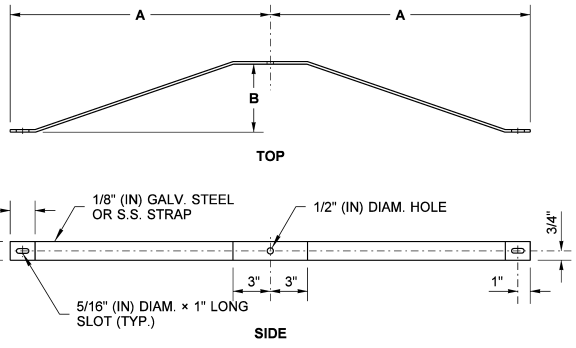
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:37 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

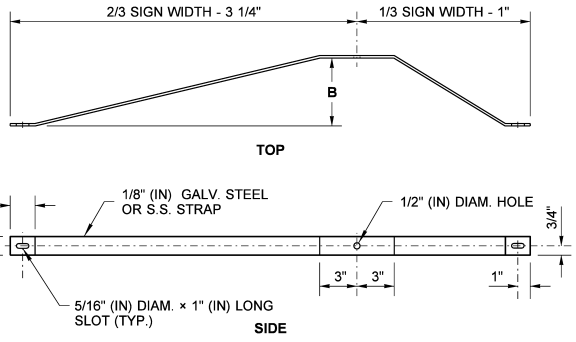
SIGN BRACE DIMENSIONS				
	SIGN TYPE			
	YIELD	DIAMOND-SHAPED	OTHERS	
A	1/3 SIGN WIDTH - 1 3/4"	1/2 SIGN WIDTH - 2 1/4"	1/2 SIGN WIDTH - 1"	
	SIGN POST TYPE			
	4×6 OR 6×6 TIMBER POST	6×8 TIMBER POST	3" DIAM. STEEL PIPE	2 1/2" SQUARE TUBE
B	5 1/2"	7 1/2"	4 3/4"	2 1/2"

NOTE

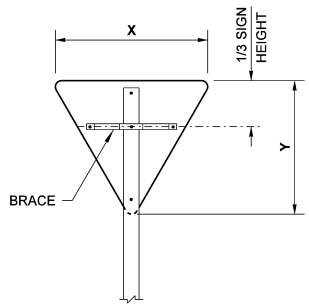
1. For sign installations on round steel posts, see **Standard Plan G-30.10, sheet 2 of 2**.



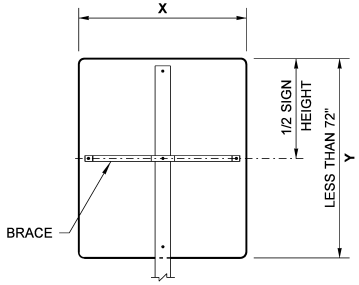
SIGN BRACE DETAIL



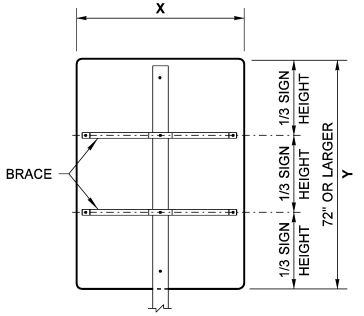
NO PASSING ZONE SIGN BRACE DETAIL



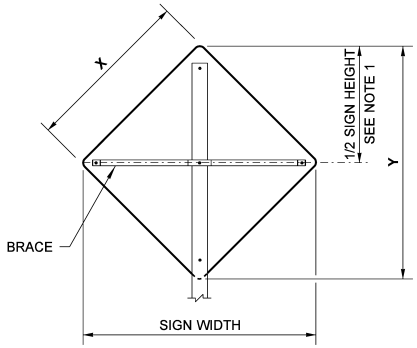
YIELD SIGN



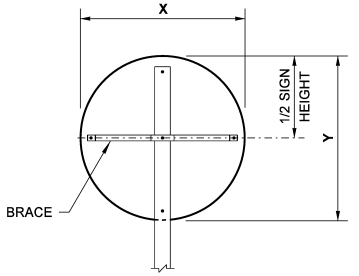
SMALL RECTANGULAR SIGN



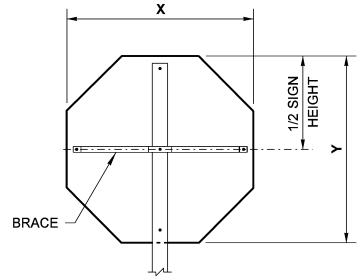
LARGE RECTANGULAR SIGN



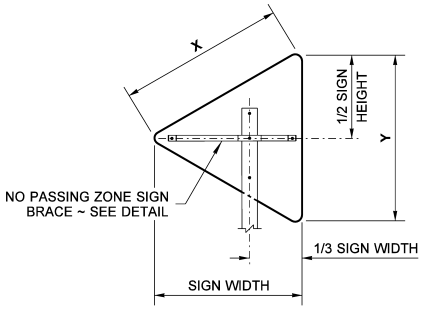
DIAMOND-SHAPED SIGN



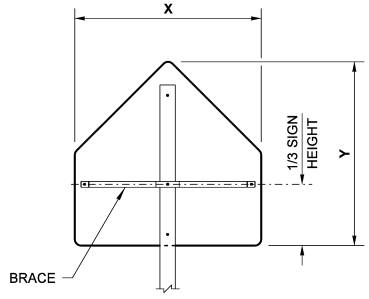
RAILROAD WARNING SIGN



STOP SIGN

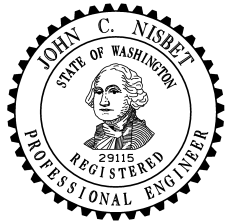


NO PASSING ZONE SIGN



SCHOOL ZONE SIGN

SIGN BRACE PLACEMENT



Nisbet, John
Digitally signed by Nisbet, John
Date: 2018.06.27 11:42:51 -07'00'

SIGN BRACING

STANDARD PLAN G-50.10-03

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:38 AM

STATE DESIGN ENGINEER

Washington State Department of Transportation

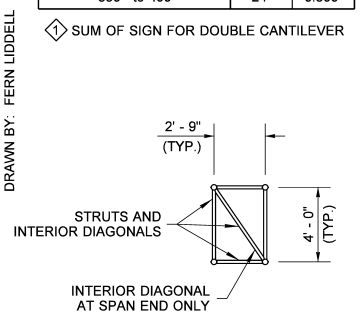
DRAWN BY: FERN LIDDELL

POST SELECTION		
TOTAL SIGN AREA ◇1 Σ (X TIMES Y) (FT^2)	POST SIZE	
	O.D.	WALL
50 OR LESS	18"	0.438"
50+ to 100	18"	0.438"
100+ to 150	24"	0.375"
150+ to 200	24"	0.375"
200+ to 250	24"	0.375"
250+ to 300	24"	0.375"
300+ to 350	24"	0.438"
350+ to 400	24"	0.500"

SINGLE OR DOUBLE CANTILEVER

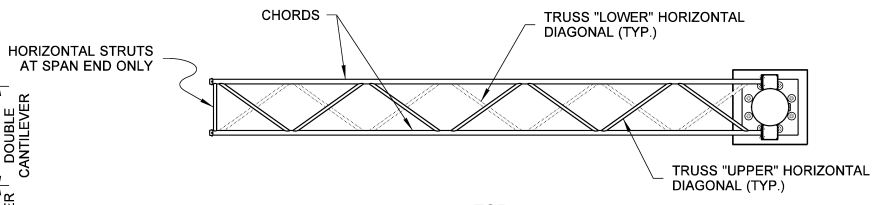
DOUBLE CANTILEVER ONLY

◇1 SUM OF SIGN FOR DOUBLE CANTILEVER

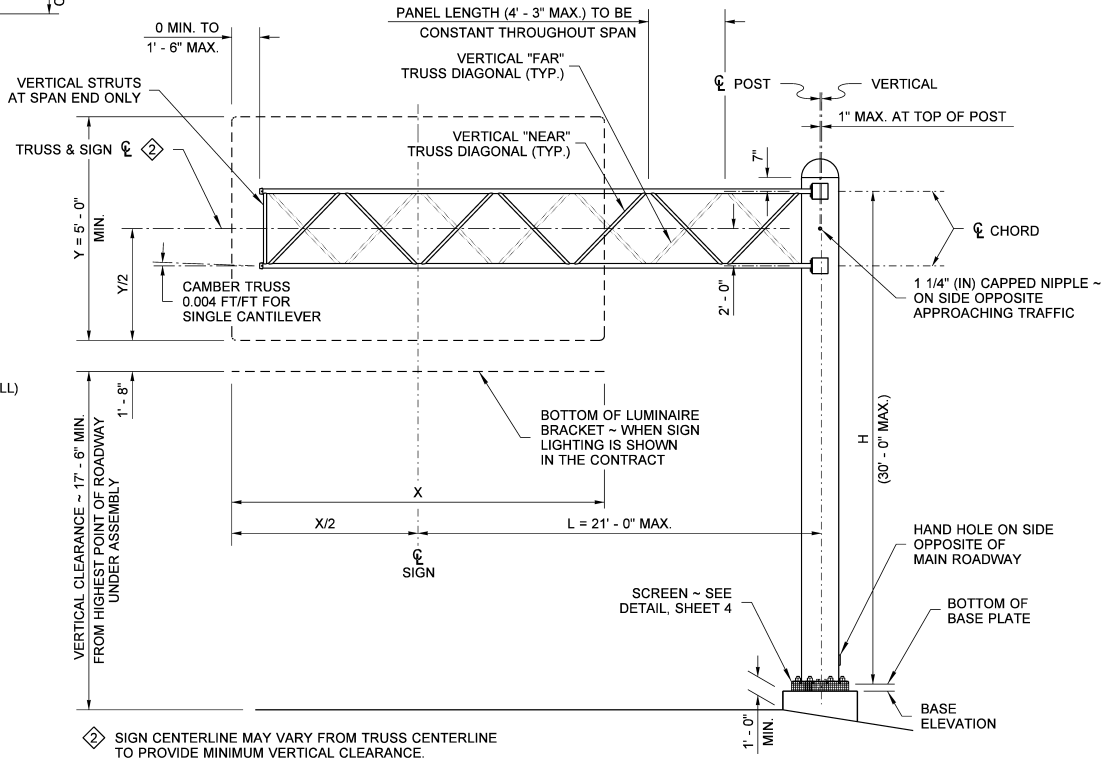


END

ALL TRUSS DIAGONALS AND STRUTS SHALL BE 1 1/2" (IN) PIPE (0.145" (IN) WALL)



TOP



◇2 SIGN CENTERLINE MAY VARY FROM TRUSS CENTERLINE TO PROVIDE MINIMUM VERTICAL CLEARANCE.

ELEVATION

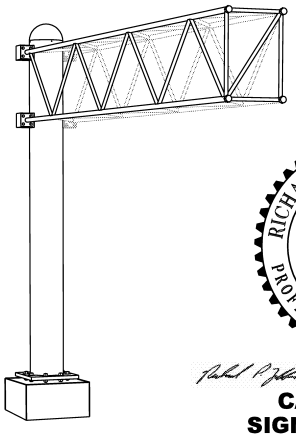
SINGLE CANTILEVER SIGN STRUCTURE

MATERIAL SPECIFICATIONS	
PIPE (CHORDS, DIAGONALS, STRUTS AND POSTS)	ASTM A 36 OR ASTM A 53 GRADE B, TYPE E OR S, OR A 500 GRADE B
PLATES	ASTM A 36
SHAPES	ASTM A 36 ASTM A 992
BOLTS, NUTS, & WASHERS	STD. SPEC. SECT. 9-06.5(3)
PIPE, PLATE & SHAPE GALVANIZING	AASHTO M 111
FASTENER GALVANIZING	ASTM F2329

CHORD SELECTION		
SIGN AREA (X TIMES Y) (FT^2)	CHORD SIZE	
	NOM. DIAM.	WALL
50 OR LESS	2"	0.154"
50+ TO 100	2"	0.218"
100+ TO 150	2 1/2"	0.203"
150+ TO 200	3"	0.216"

NOTES

1. Vertical and horizontal clearance requirements shall be as shown on the Contract Plans.
2. No post splices permitted in lower third of height, nor closer than 3' - 0" to bottom chord, except as otherwise noted. No chord shop splices permitted in first two-thirds of the span, except as otherwise noted. A maximum of two splices are permitted in the post. For post or chord shop splice details, see **Standard Plan G-70.10**.
3. The back-up plates or rings for all full penetration welds shall be welded continuously to the joined pieces. This can be done by either a continuous fillet weld on the back side of the piece, or by a continuous weld in the root of the full penetration weld.
4. All bolt holes shall be drilled, and the diameter shall be 1/16" (in) larger than the nominal bolt diameter, except as noted.
5. The design and analysis of the structures has been done in accordance with AASHTO Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals Dated 2001, using 90 MPH wind velocity and fatigue category - I.
6. Adjust post alignment in plane normal to roadway centerline by means of leveling nuts located below base plate to maintain upward slope in cantilever arm(s). Tighten anchor nuts above base plate in accordance with **Standard Specification Section 6-03.3(33).**
7. Variable Message Signs (VMS) exceeding 700 lbs. and/or 200 sq. ft. shall not be installed on cantilever structure.
8. For electrical requirements, see **Standard Plan J-75.45.**



PERSPECTIVE

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

Zeldenrust, Richard
Jun 19 2018 2:25 PM

CANTILEVER SIGN STRUCTURE (TRUSS TYPE)

STANDARD PLAN G-60.10-04

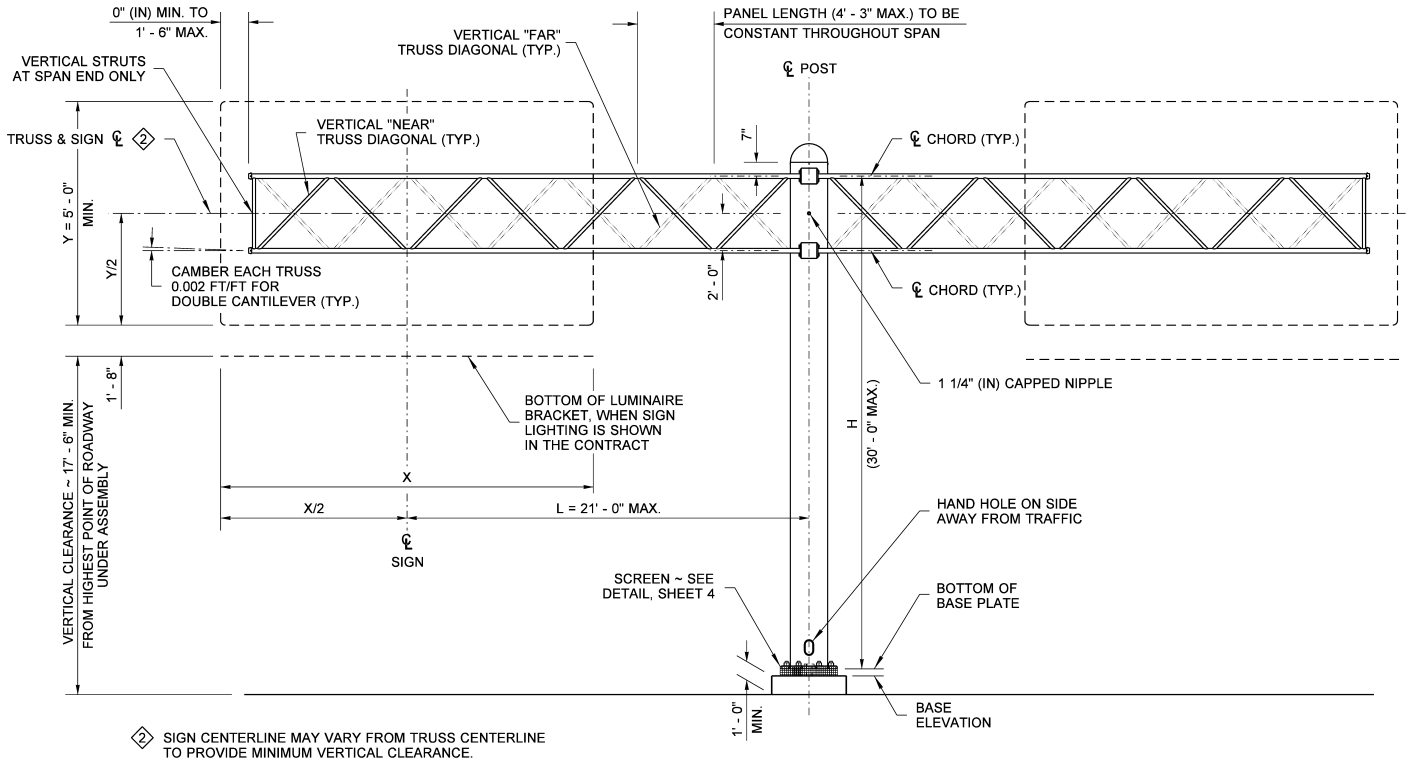
SHEET 1 OF 4 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:36 AM

STATE DESIGN ENGINEER

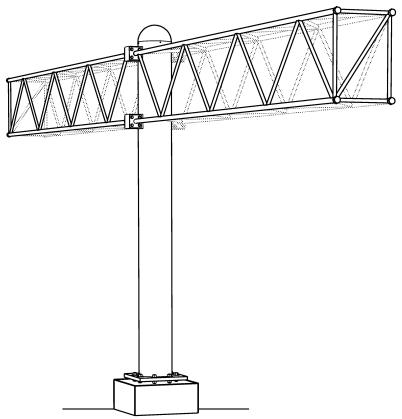
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL



ELEVATION

DOUBLE CANTILEVER SIGN STRUCTURE



PERSPECTIVE



Zeldenrust, Richard
Jun 19 2018 2:26 PM

CANTILEVER SIGN STRUCTURE (TRUSS TYPE) STANDARD PLAN G-60.10-04

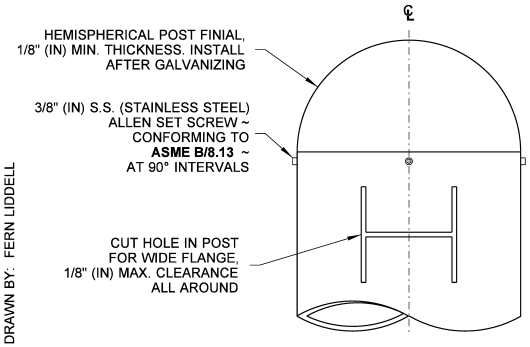
SHEET 2 OF 4 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:36 AM

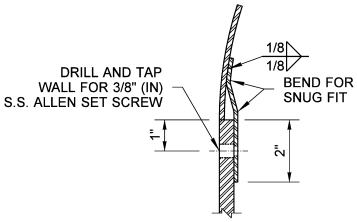
STATE DESIGN ENGINEER

Washington State Department of Transportation

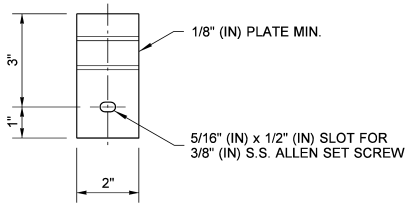
DRAWN BY: FERN LIDDELL



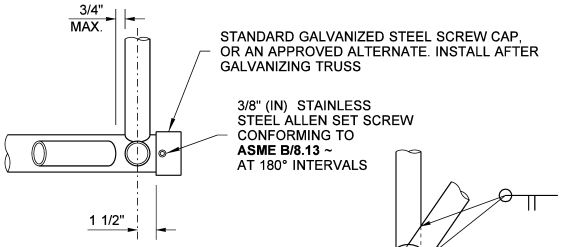
ELEVATION
ROTATED 90° TO SHOW CUTOUT



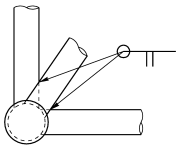
SECTION THROUGH FINIAL AND POST



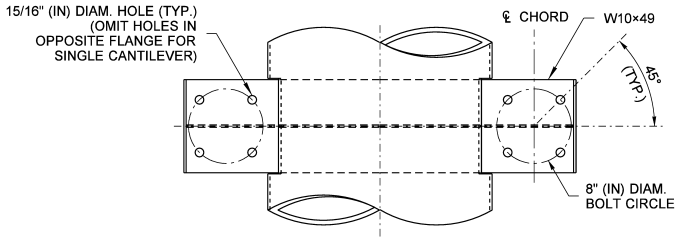
FINIAL BRACKET



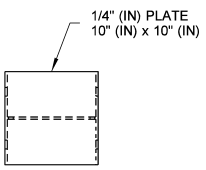
SPAN END ~ SIDE



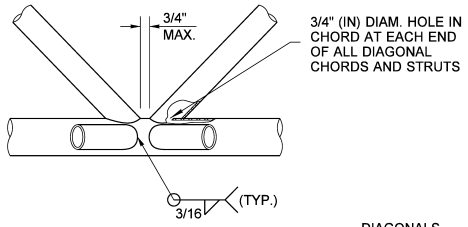
SPAN END ~ END
OPPOSITE HAND SHOWN FOR CLARITY



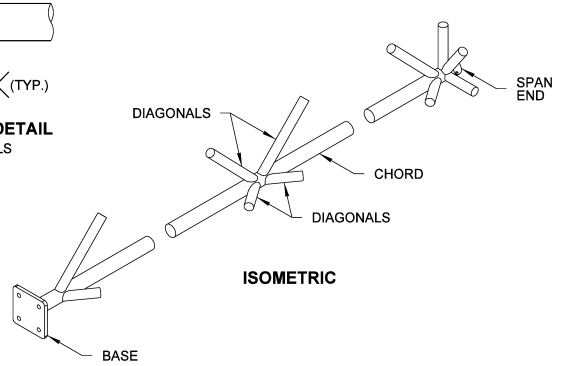
ELEVATION



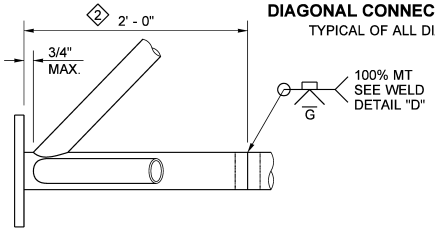
END OF CHORD



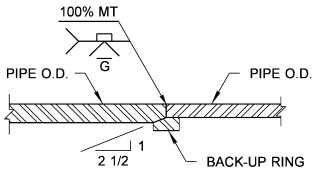
DIAGONAL CONNECTION DETAIL
TYPICAL OF ALL DIAGONALS



ISOMETRIC

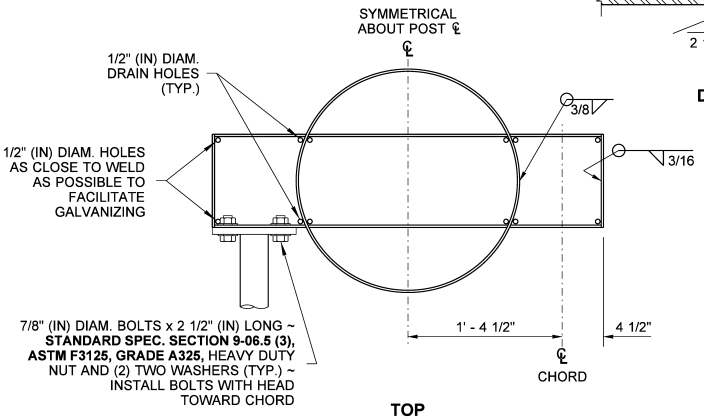


BASE ~ SIDE



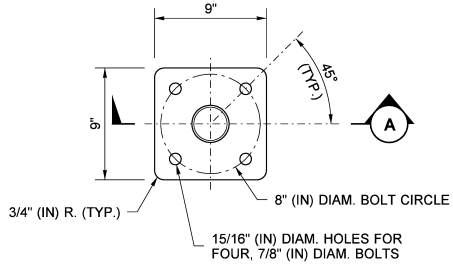
DETAIL "D"

② 3" (IN) DIAM. PIPE (t = 0.300) SPLICE WITH 3" (IN) DIAM. PIPE (t = 0.216) (SEE CHORD SELECTION TABLE)
2 1/2" (IN) DIAM. PIPE (t = 0.276) SPLICE WITH 2 1/2" (IN) DIAM. PIPE (t = 0.203) (SEE CHORD SELECTION TABLE)

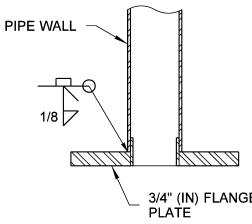


TOP

CHORD TO POST CONNECTION DETAIL



BASE ~ TOP



SECTION (A)

TYPICAL TRUSS DETAILS
(ENDS OF DIAGONALS SHALL BE CUT TO FIT NEATLY AGAINST CHORDS)

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

Zeldenrust, Richard
Jun 19 2018 2:29 PM

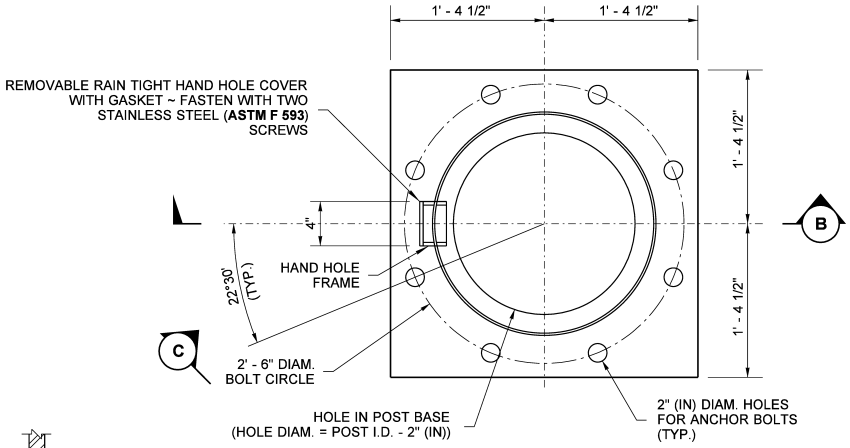
CANTILEVER SIGN STRUCTURE (TRUSS TYPE) STANDARD PLAN G-60.10-04

SHEET 3 OF 4 SHEETS

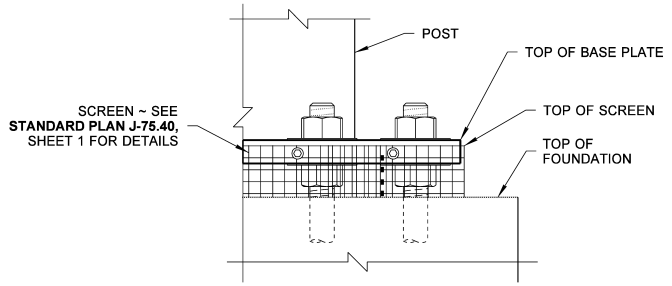
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:36 AM

STATE DESIGN ENGINEER
Washington State Department of Transportation

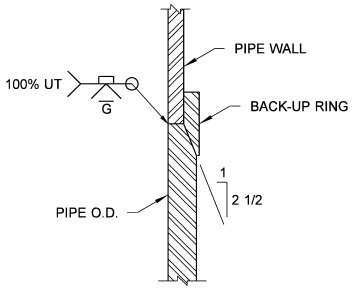
DRAWN BY: FERN LIDDELL



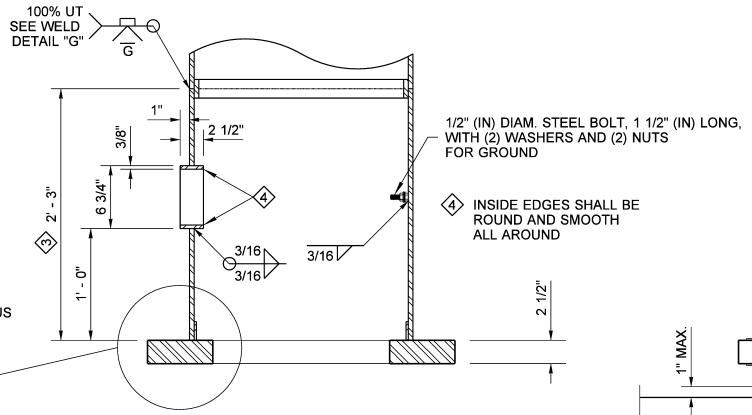
TOP



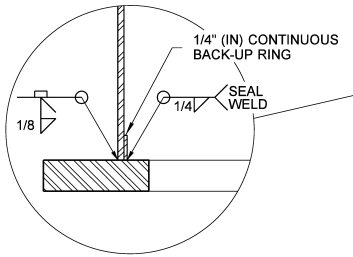
SCREEN DETAIL



DETAIL "G"

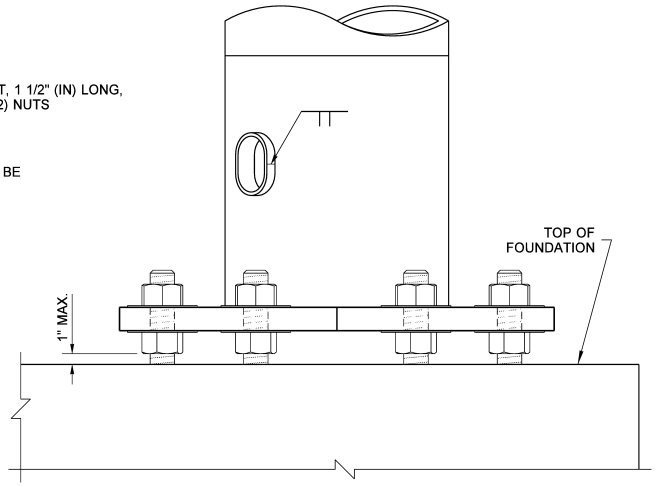


SECTION B



BASE WELD DETAIL

3 24" (IN) O.D. PIPE (t = 0.969) SPLICE WITH 24" (IN) O.D. UPPER POST (SEE POST SELECTION TABLE)
18" (IN) O.D. PIPE (t = 0.750) SPLICE WITH 18" (IN) O.D. UPPER POST (SEE POST SELECTION TABLE)



VIEW C

POST BASE DETAILS



Zeldenrust, Richard
Jun 19 2018 2:29 PM

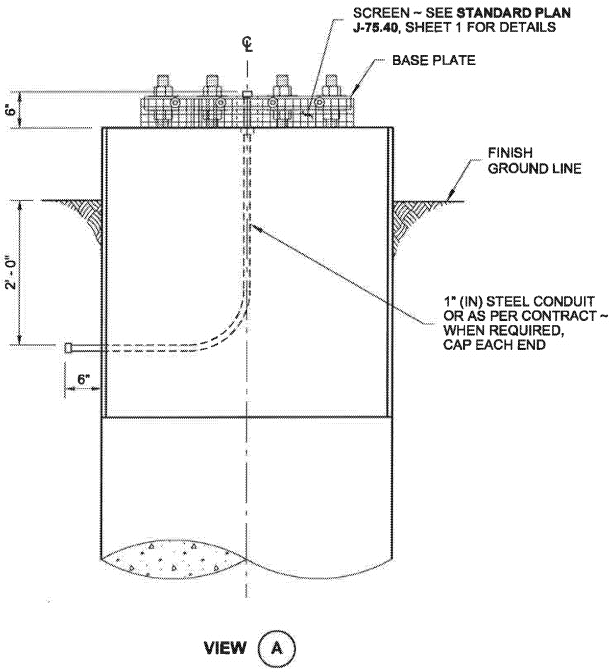
CANTILEVER SIGN STRUCTURE (TRUSS TYPE) STANDARD PLAN G-60.10-04

SHEET 4 OF 4 SHEETS

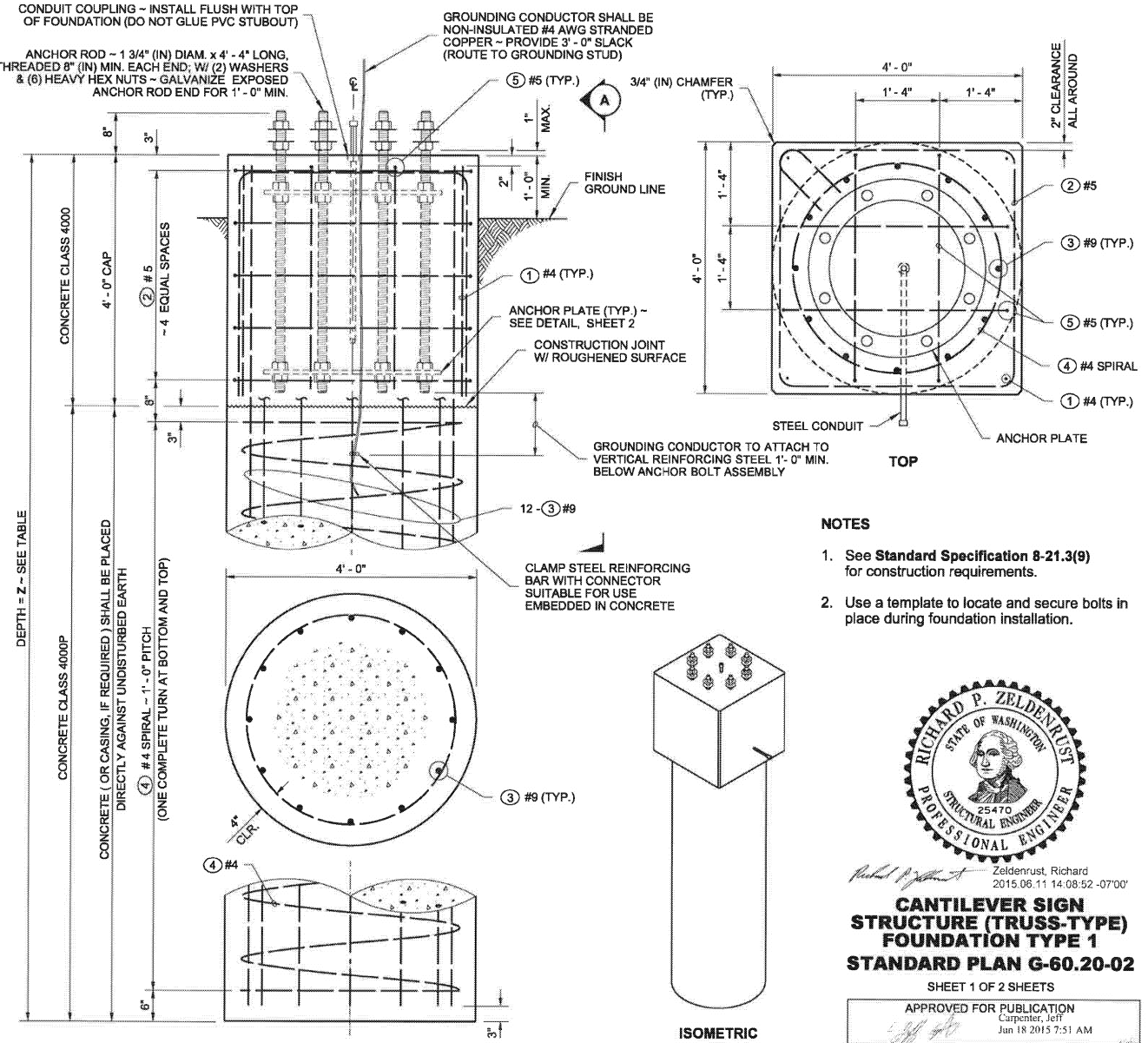
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:37 AM

STATE DESIGN ENGINEER

Washington State Department of Transportation



VIEW (A)



SIDE

TOP

ISOMETRIC

VALUES OF Z			
FOUNDATION TYPE	TOTAL SIGN AREA		ALLOWABLE LATERAL BEARING PRESSURE (PSF)
	200 SF OR LESS	200 SF ~ 400 SF	
	Z	Z	
1	13' - 0"	18' - 0"	1500 AND UP
	16' - 0"	22' - 0"	1000 ~ 1499

NOTES

1. See **Standard Specification 8-21.3(9)** for construction requirements.
2. Use a template to locate and secure bolts in place during foundation installation.

Zeldenrust, Richard
2015.06.11 14:08:52 -07'00'

CANTILEVER SIGN STRUCTURE (TRUSS-TYPE) FOUNDATION TYPE 1

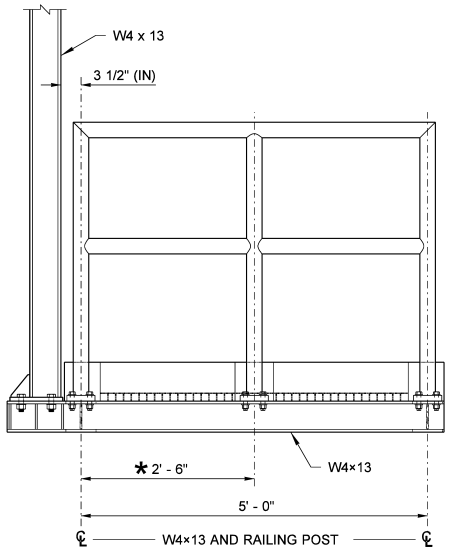
STANDARD PLAN G-60.20-02

SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 18 2015 7:51 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

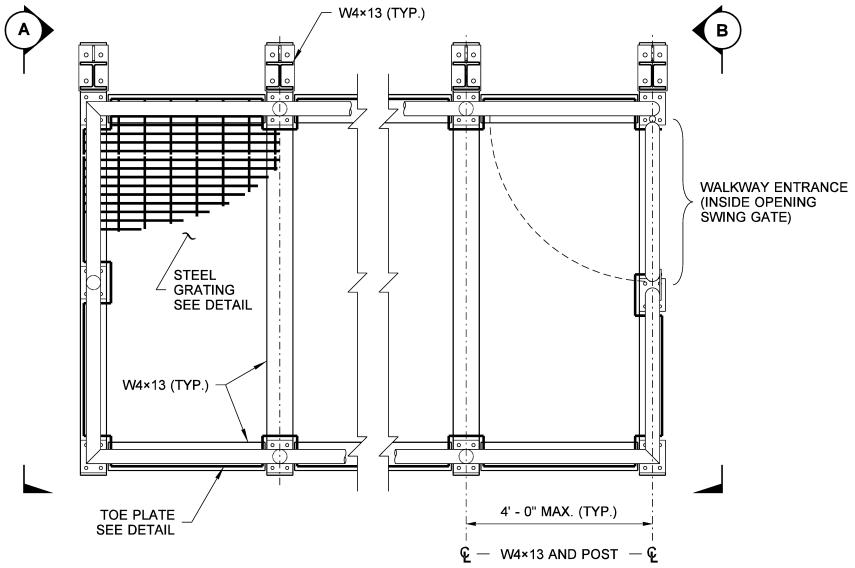
DRAWN BY: BILL BERENS



END VIEW (A)

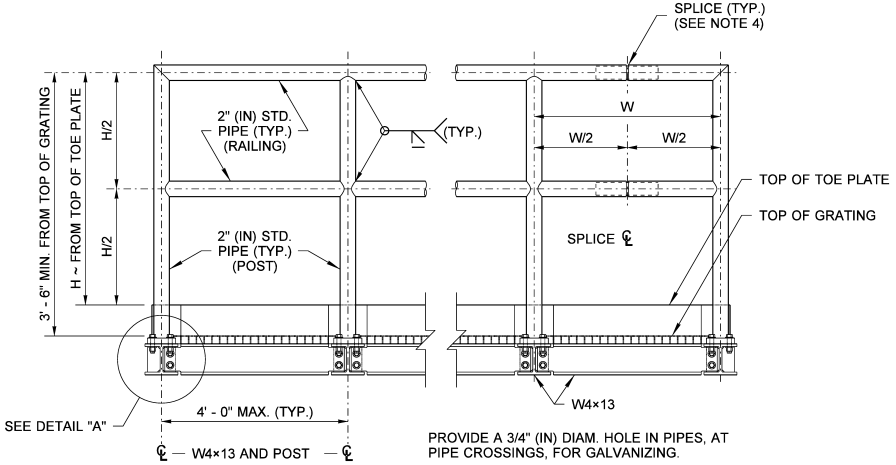
* MODIFY DIMENSION AS REQUIRED FOR PROPER FIT-UP WITH THE VMS DOOR OPENING.

MATERIAL SPECIFICATIONS	
PIPE	ASTM A 36 OR ASTM A 53 GRADE B, TYPE E OR S, OR ASTM A 500 GRADE B
PLATES AND SHAPES	ASTM A 36
STRUCTURAL TUBING	ASTM A 500 GRADE B
GALVANIZING FOR PIPE PLATES, SHAPES AND STEEL GRATING	AASHTO M 111
HIGH STRENGTH BOLTS, NUTS, & WASHERS; INCL. MOUNTING BEAM BOLTS	STD SPEC. SECT. 9-06.5(3)
ALL OTHER BOLTS	STD SPEC. SECT. 9-06.5(1)
FASTENER GALVANIZING	ASTM F2329
STEEL GRATING	ASTM A 36



PLAN

MAINTENANCE WALKWAY

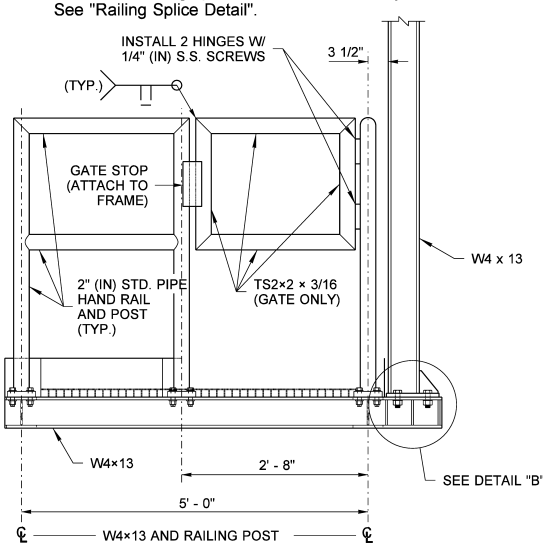


ELEVATION

MAINTENANCE WALKWAY

NOTES

1. Not intended for use in front of static signs.
2. For mounting the maintenance walkway to a monotube sign bridge, see **Standard Plan G-95.20**.
3. For mounting the maintenance walkway to a truss-type sign bridge, see **Standard Plan G-95.30**.
4. Location of railing splices to be determined by fabricator. See "Railing Splice Detail".



MAINTENANCE WALKWAY GATE

END VIEW (B)

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

Zeldenrust, Richard
Jun 19 2018 2:30 PM

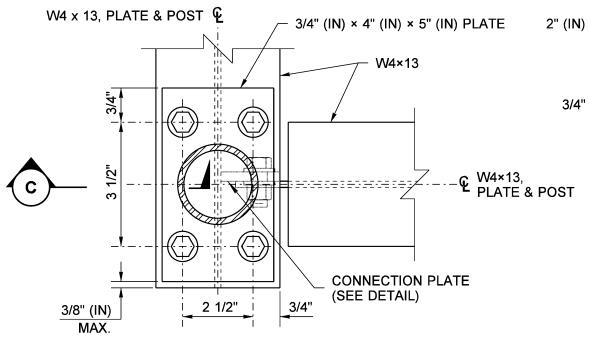
MAINTENANCE WALKWAY FOR SIGN BRIDGES

STANDARD PLAN G-95.10-02

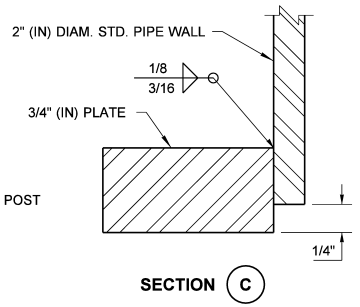
SHEET 1 OF 3 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:35 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

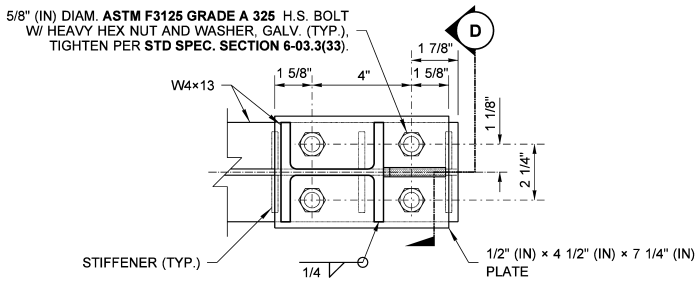
DRAWN BY: BILL BERENS



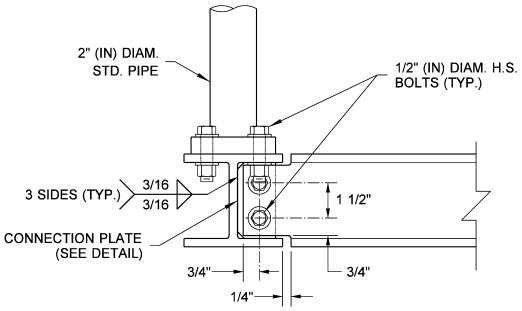
PLAN



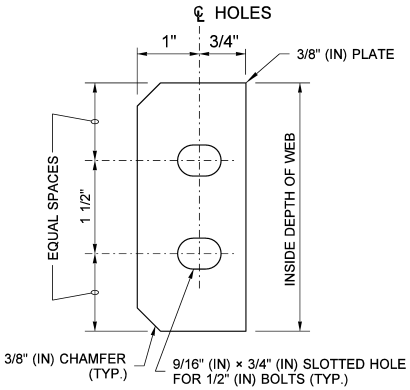
SECTION C



PLAN

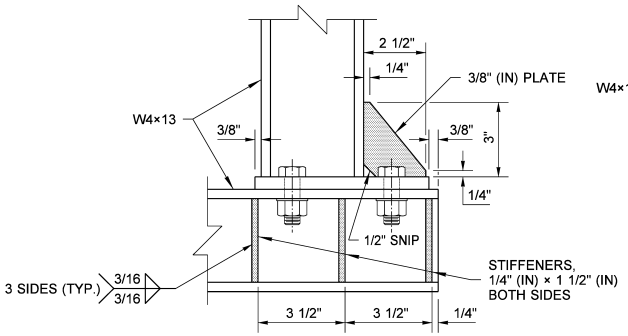


ELEVATION

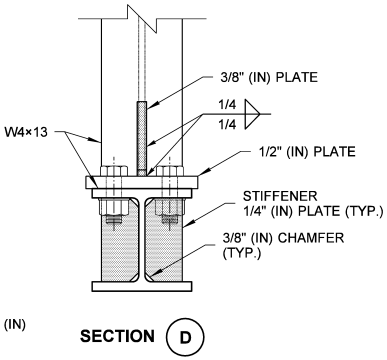


CONNECTION PLATE DETAIL

DETAIL "A"

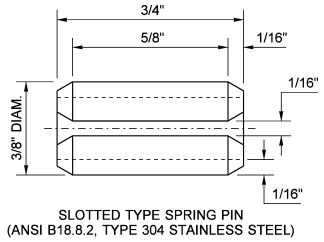


ELEVATION



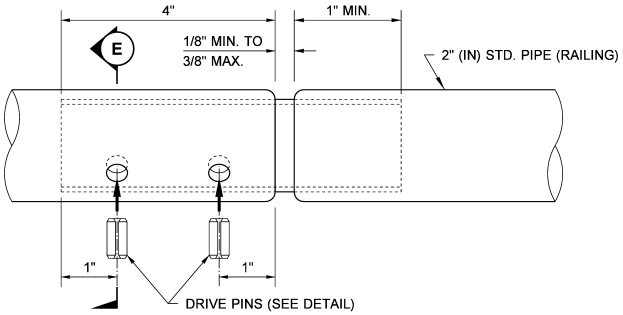
SECTION D

DETAIL "B"

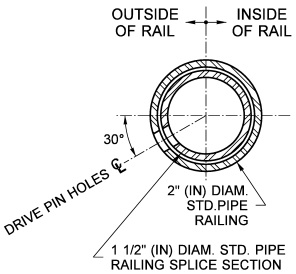


SLOTTED TYPE SPRING PIN
(ANSI B18.8.2, TYPE 304 STAINLESS STEEL)

DRIVE PIN DETAIL



ELEVATION



SECTION E

RAILING SPLICE DETAIL

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

Zeldenrust, Richard
Jun 19 2018 2:30 PM

COSIGN

MAINTENANCE WALKWAY FOR SIGN BRIDGES

STANDARD PLAN G-95.10-02

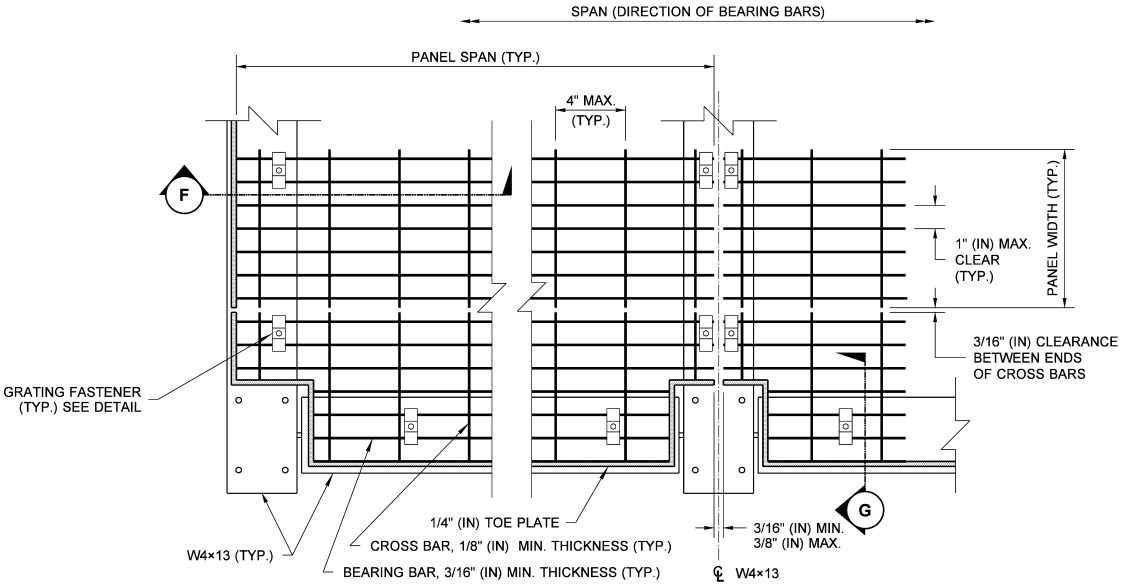
SHEET 2 OF 3 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:36 AM

STATE DESIGN ENGINEER

Washington State Department of Transportation

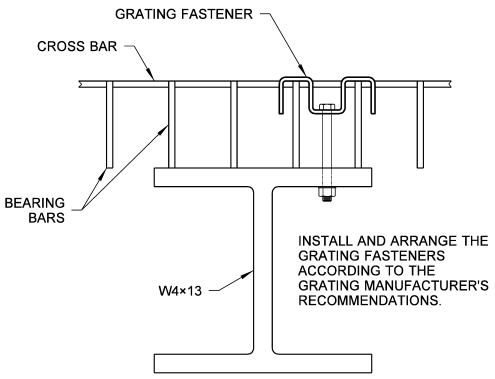
DRAWN BY: BILL BERENS



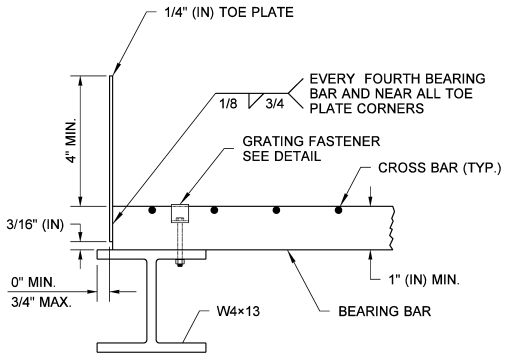
PLAN

STEEL GRATING DETAIL

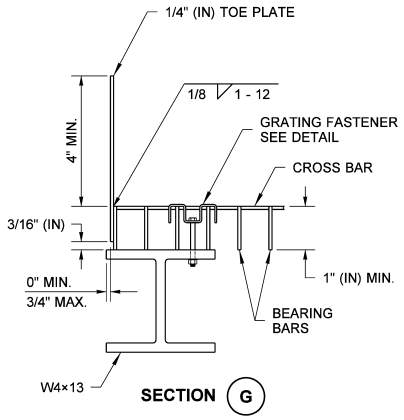
(RAILING NOT SHOWN FOR CLARITY)



GRATING FASTENER DETAIL



SECTION (F)



SECTION (G)

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

Zeldenrust, Richard
Jun 19 2018 2:31 PM

MAINTENANCE WALKWAY FOR SIGN BRIDGES

STANDARD PLAN G-95.10-02

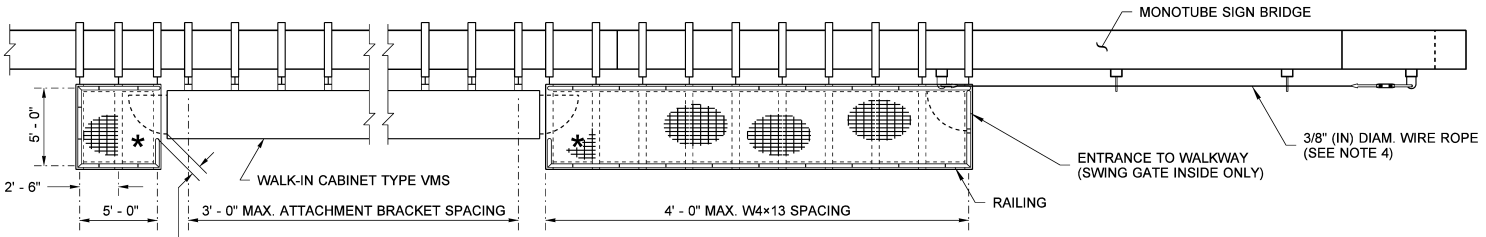
SHEET 3 OF 3 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:36 AM

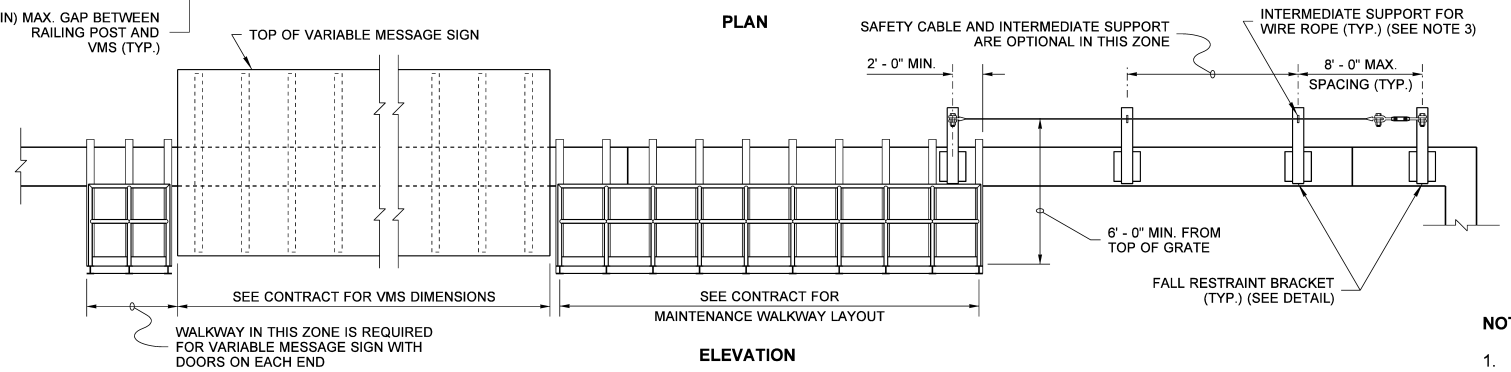
STATE DESIGN ENGINEER

Washington State Department of Transportation

DRAWN BY: BILL BERENS



PLAN



ELEVATION

MAINTENANCE WALKWAY INSTALLED ON MONOTUBE SIGN BRIDGE

(WALKWAYS MAY BE USED WITH OTHER LAYOUTS THAN THAT SHOWN ABOVE)

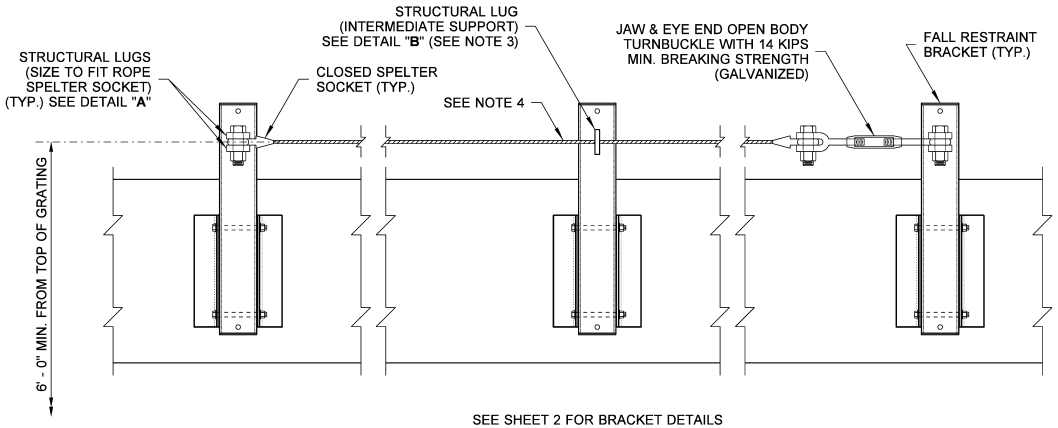
MATERIAL SPECIFICATIONS	
PIPE	ASTM A 36 OR ASTM A 53 GRADE B, TYPE E OR S, OR ASTM A 500 GRADE B
PLATES AND SHAPES	ASTM A 36
STRUCTURAL TUBING	ASTM A 500 GRADE B
GALVANIZING FOR PIPE PLATES, SHAPES AND STEEL GRATING	AASHTO M 111
HIGH STRENGTH BOLTS, NUTS, & WASHERS; INCL. MOUNTING BEAM BOLTS	STD SPEC. 9-06.5(3)
ALL OTHER BOLTS	STD SPEC. 9-06.5(1)
FASTENER GALVANIZING	ASTM F2329
STEEL GRATING	ASTM A 36
WIRE ROPE	ASTM A 603 W/ CLASS A WEIGHT ZINC COATED WIRES THROUGHOUT ◇1

◇1 ALLOWABLE ALTERNATE MATERIAL: FEDERAL STANDARD RR-W-410F TYPE 6 CLASS 3 GALVANIZED.

NOTES

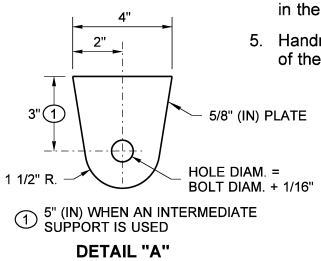
1. Not intended for use in front of static signs.
2. For maintenance walkway, railing, grating, and toe plate details, **See Standard Plan G-95.10**.
3. Use two lanyards through intermediate wire rope support.
4. 3/8" (in) diameter wire rope with 14 kips min. breaking strength. The wire rope shall be installed with 450 lbs. of tension, and with 6" (in) of take up adjustment available in the turnbuckle.
5. Handrail fit-up with VMS door opening is the responsibility of the contractor.

✱ = SEE NOTE 5

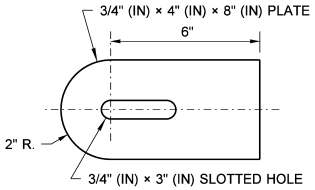


SEE SHEET 2 FOR BRACKET DETAILS

FALL RESTRAINT



DETAIL "A"



DETAIL "B"

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

Zeldenrust, Richard
Jun 19 2018 2:31 PM

MAINTENANCE WALKWAY MOUNTING FOR MONOTUBE SIGN BRIDGE STANDARD PLAN G-95.20-03

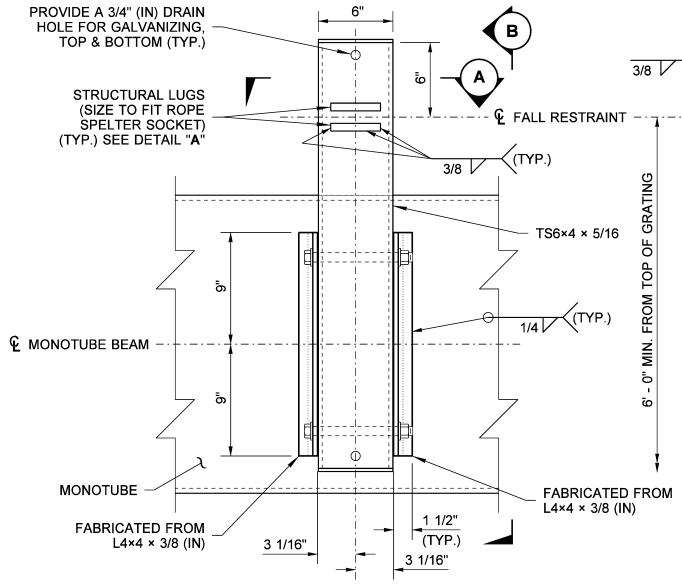
SHEET 1 OF 3 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:35 AM

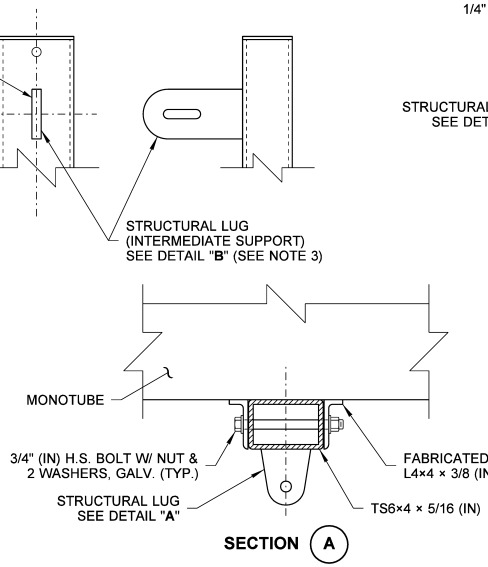
STATE DESIGN ENGINEER

Washington State Department of Transportation

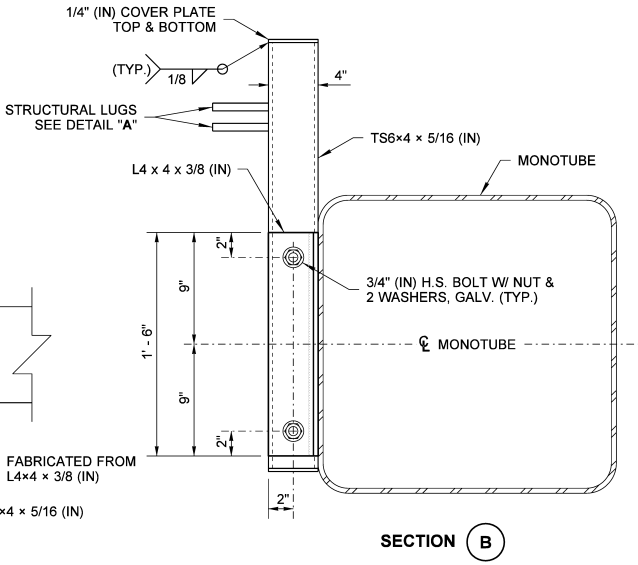
DRAWN BY: BILL BERENS



ELEVATION VIEW

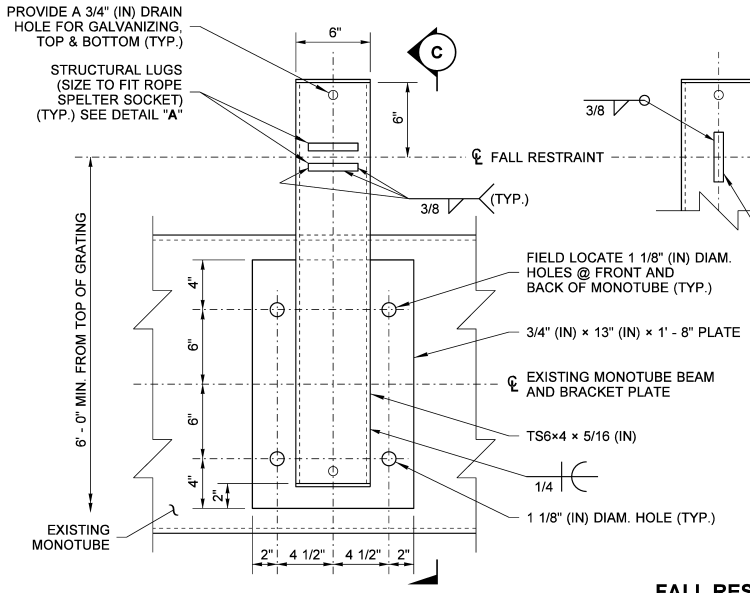


SECTION A

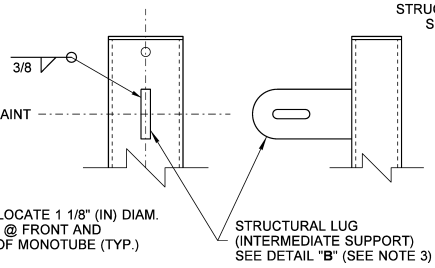


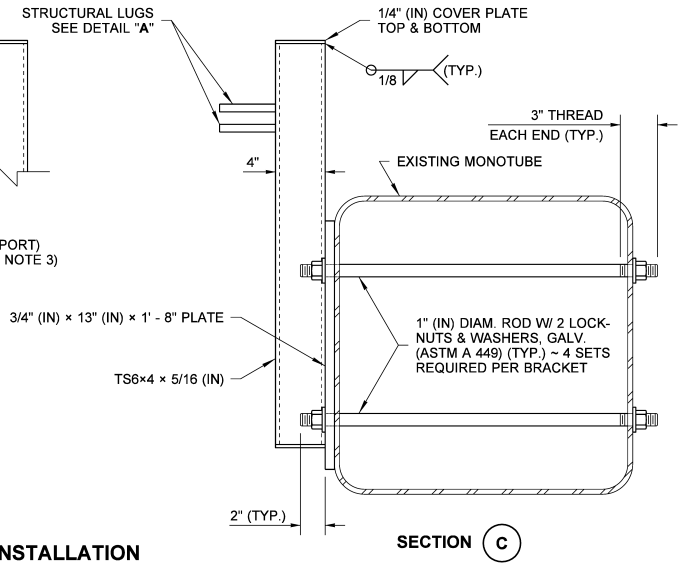
SECTION B

FALL RESTRAINT BRACKET INSTALLATION ON NEW MONOTUBE SIGN BRIDGE



ELEVATION VIEW





SECTION C

FALL RESTRAINT BRACKET INSTALLATION ON EXISTING MONOTUBE SIGN BRIDGE



Zeldenrust, Richard
Jun 19 2018 2:32 PM

MAINTENANCE WALKWAY MOUNTING FOR MONOTUBE SIGN BRIDGE STANDARD PLAN G-95.20-03

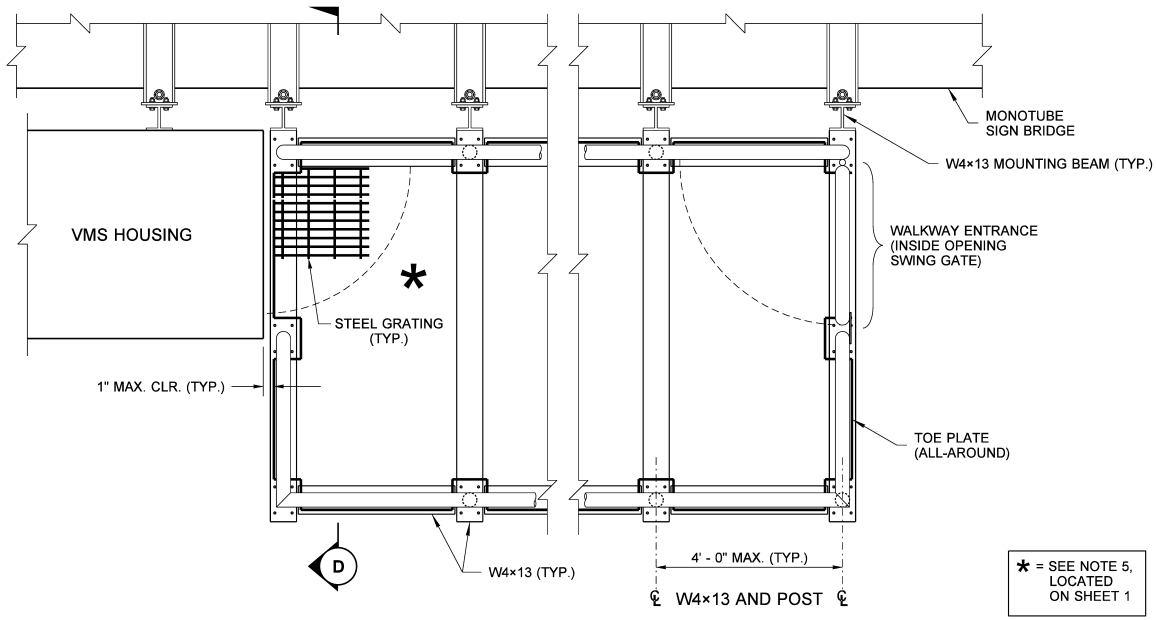
SHEET 2 OF 3 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:35 AM

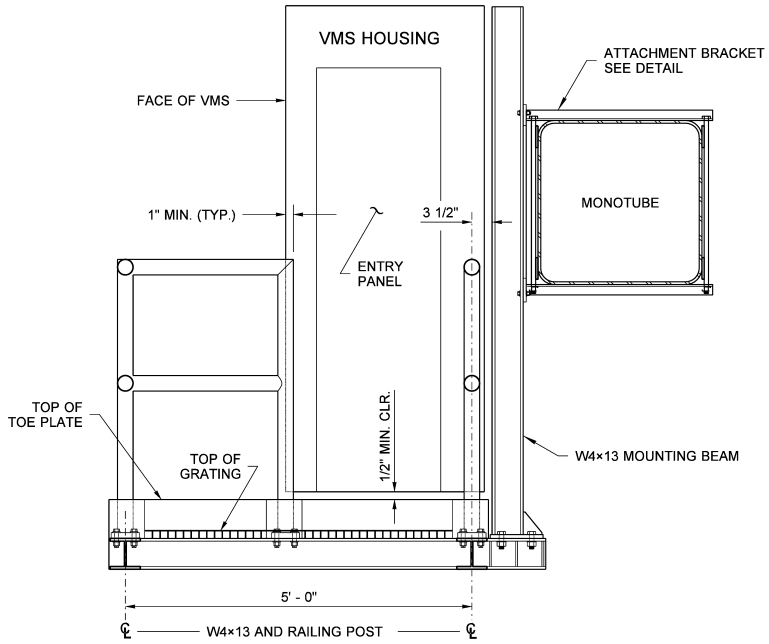
STATE DESIGN ENGINEER

Washington State Department of Transportation

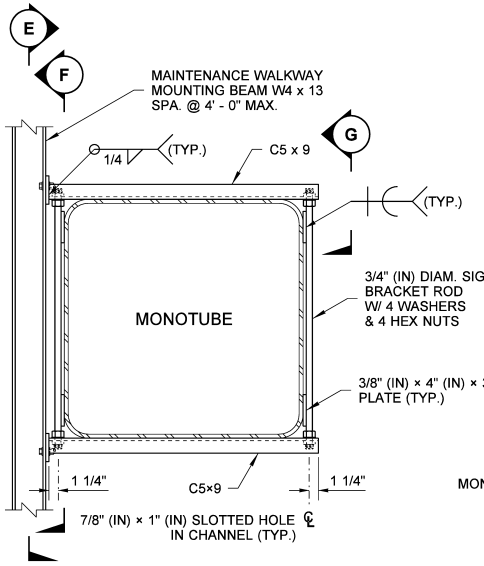
DRAWN BY: BILL BERENS



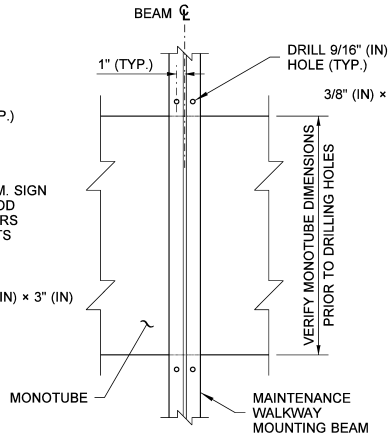
MAINTENANCE WALKWAY
PARTIAL PLAN



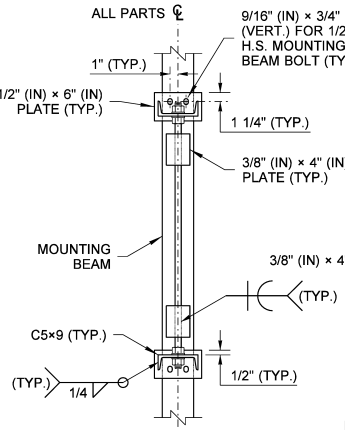
SECTION D



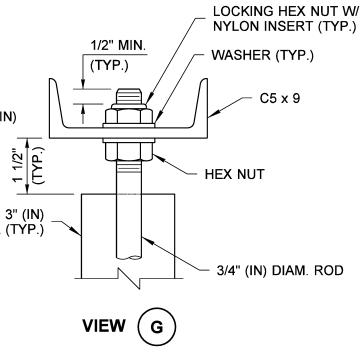
ATTACHMENT BRACKET DETAIL



SECTION E



SECTION F



VIEW G

BRACKET NOTES

PAINT ENTIRE ATTACHMENT BRACKET TO MATCH EXISTING STRUCTURE EXCEPT FOR MOUNTING BEAM.

SIGN, LIGHT, BEAM LENGTHS, SIZE AND SPACING SHALL BE DETERMINED FROM THE CONTRACT PLANS OR WSDOT STANDARD PLANS.

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

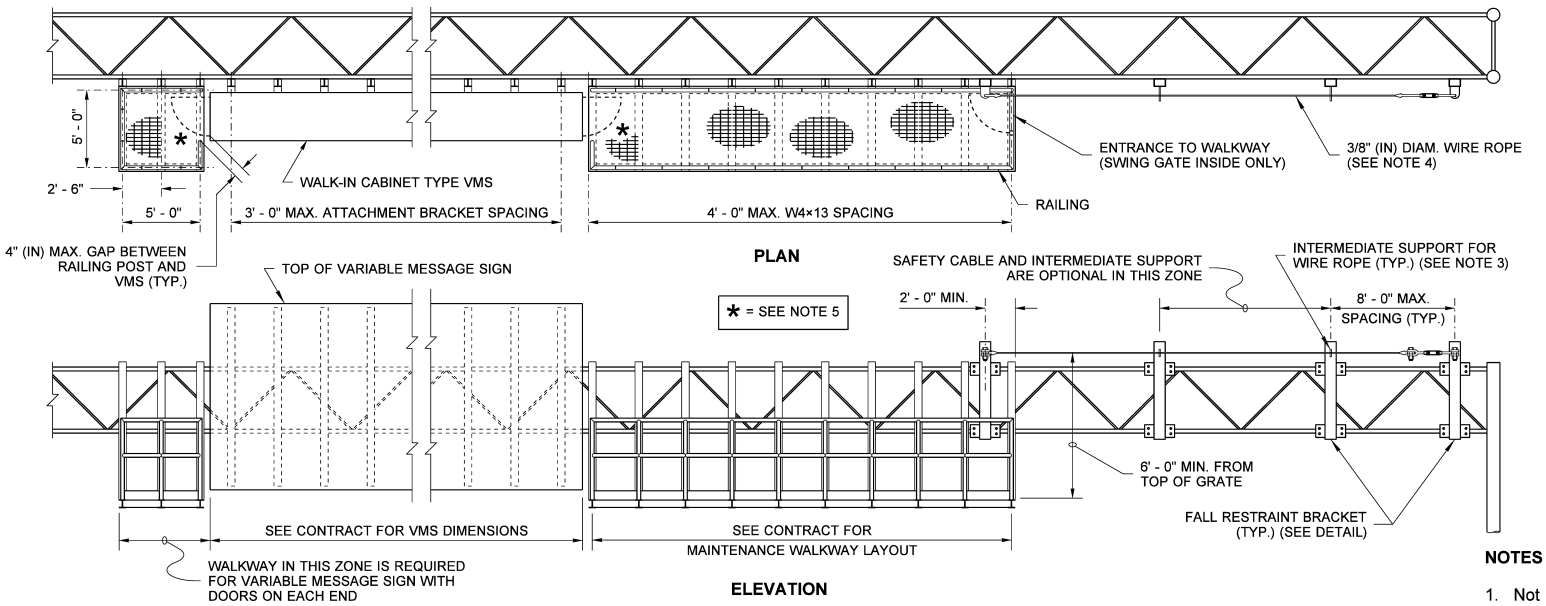
Zeldenrust, Richard
Jun 19 2018 2:32 PM

MAINTENANCE WALKWAY MOUNTING FOR MONOTUBE SIGN BRIDGE STANDARD PLAN G-95.20-03

SHEET 3 OF 3 SHEETS

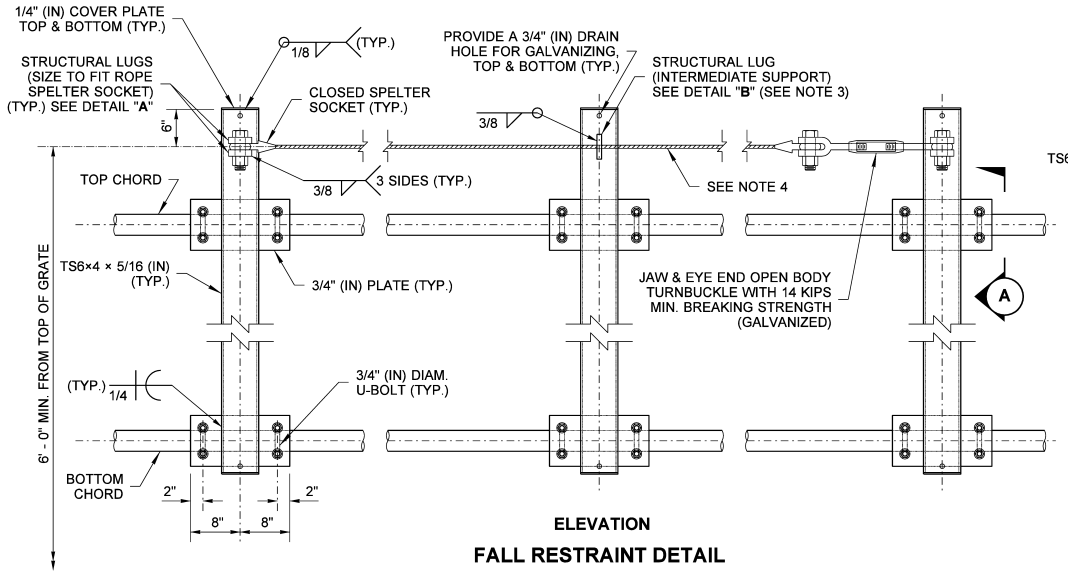
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:35 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: BILL BERENS

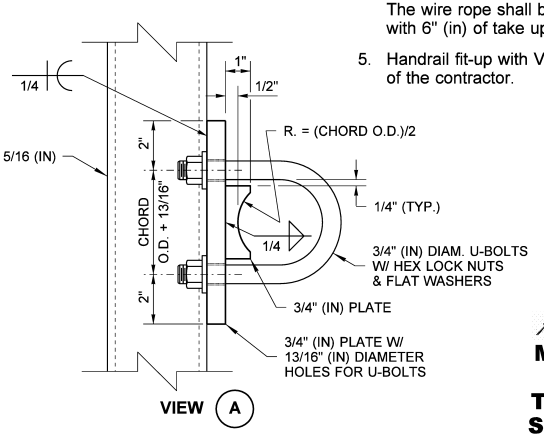


MAINTENANCE WALKWAY INSTALLED ON TRUSS-TYPE SIGN BRIDGE

(WALKWAYS MAY BE USED WITH OTHER LAYOUTS THAN THAT SHOWN ABOVE)



FALL RESTRAINT DETAIL



MATERIAL SPECIFICATIONS	
PIPE	ASTM A 36 OR ASTM A 53 GRADE B, TYPE E OR S, OR ASTM A 500 GRADE B
PLATES AND SHAPES	ASTM A 36
STRUCTURAL TUBING	ASTM A 500 GRADE B
GALVANIZING FOR PIPE PLATES, SHAPES AND STEEL GRATING	AASHTO M 111
HIGH STRENGTH BOLTS, NUTS, & WASHERS; INCL. MOUNTING BEAM BOLTS	STD SPEC. 9-06.5(3)
ALL OTHER BOLTS	STD SPEC. 9-06.5(1)
FASTENER GALVANIZING	ASTM F2329
STEEL GRATING	ASTM A 36
WIRE ROPE	ASTM A 603 W/ CLASS A WEIGHT ZINC COATED WIRES THROUGHOUT ◇1

◇1 ALLOWABLE ALTERNATE MATERIAL: FEDERAL STANDARD RR-W-410F TYPE 6 CLASS 3 GALVANIZED.

NOTES

1. Not intended for use in front of static signs.
2. For maintenance walkway, railing, grating and toe plate details, see **Standard Plan G-95.10**.
3. Use two lanyards through intermediate wire rope support.
4. 3/8" (in) diameter wire rope with 14 kips min. breaking strength. The wire rope shall be installed with 450 lbs. of tension, and with 6" (in) of take up adjustment available in the turnbuckle.
5. Handrail fit-up with VMS door openings is the responsibility of the contractor.

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

Zeldenrust, Richard
Jun 19 2018 2:33 PM

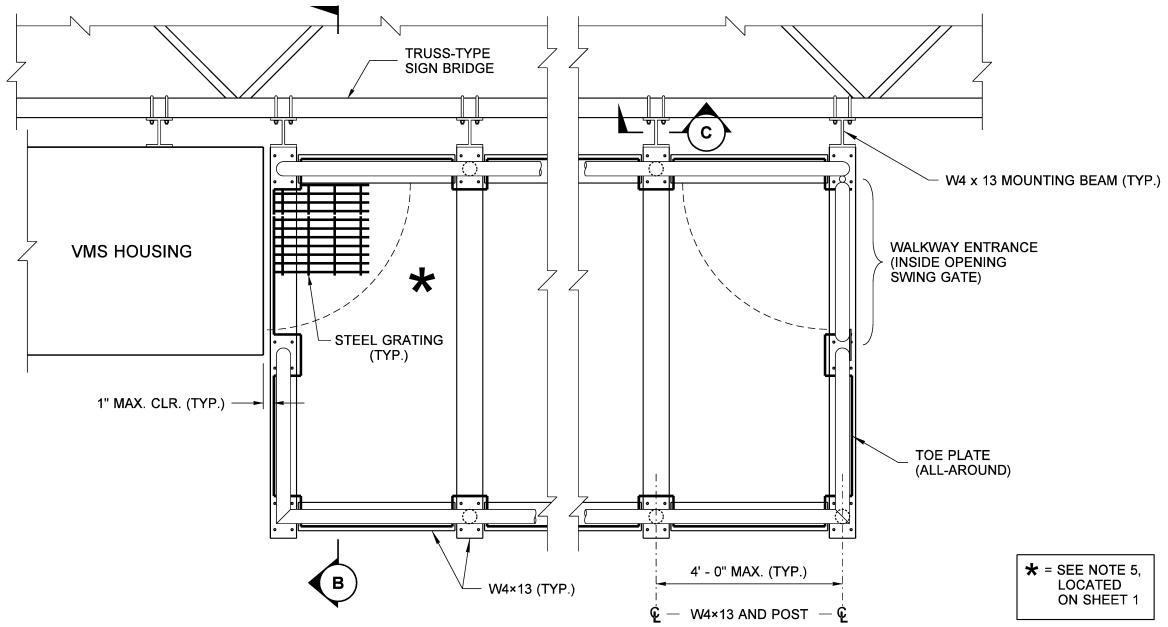
MAINTENANCE WALKWAY MOUNTING FOR TRUSS-TYPE SIGN BRIDGE STANDARD PLAN G-95.30-03

SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:34 AM
STATE DESIGN ENGINEER

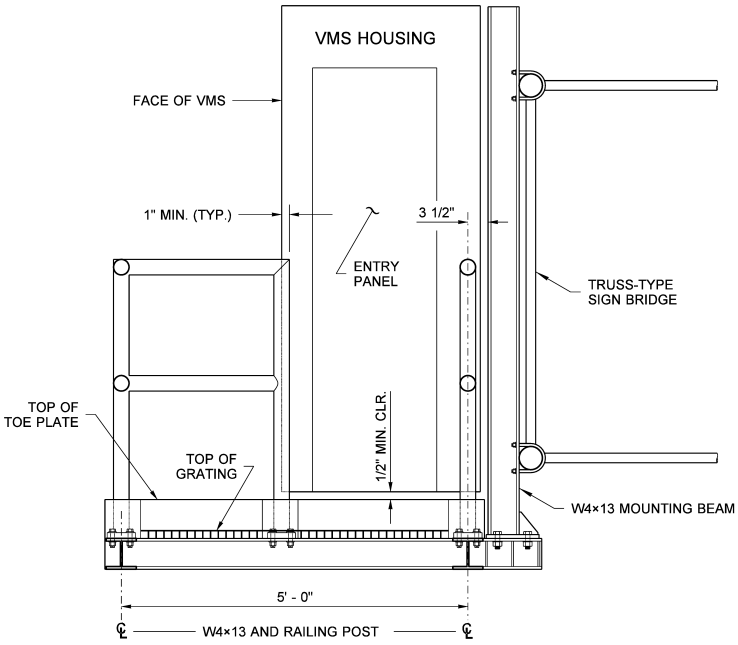
Washington State Department of Transportation

DRAWN BY: BILL BERENS

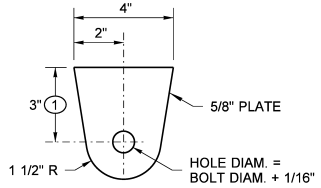


* = SEE NOTE 5, LOCATED ON SHEET 1

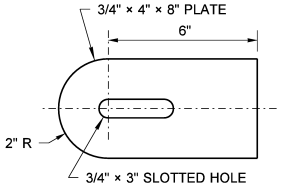
MAINTENANCE WALKWAY
PARTIAL PLAN



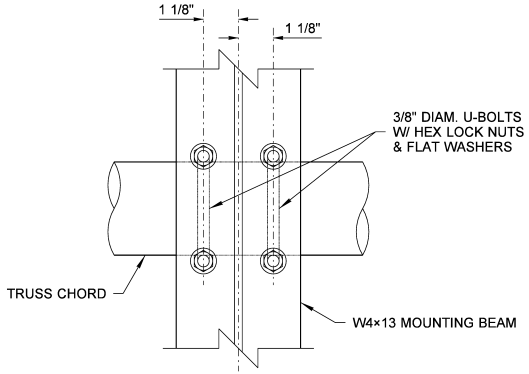
SECTION (B)



DETAIL "A"



DETAIL "B"



SECTION (C)

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

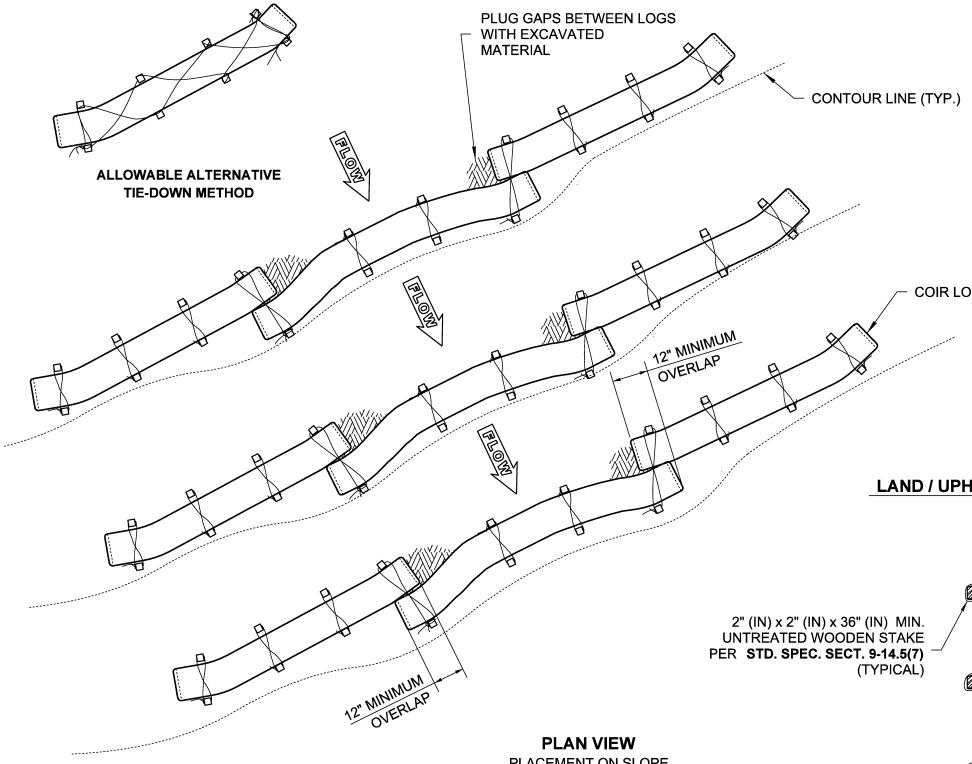
Zeldenrust, Richard
Jun 19 2018 2:33 PM

MAINTENANCE WALKWAY MOUNTING FOR TRUSS-TYPE SIGN BRIDGE STANDARD PLAN G-95.30-03

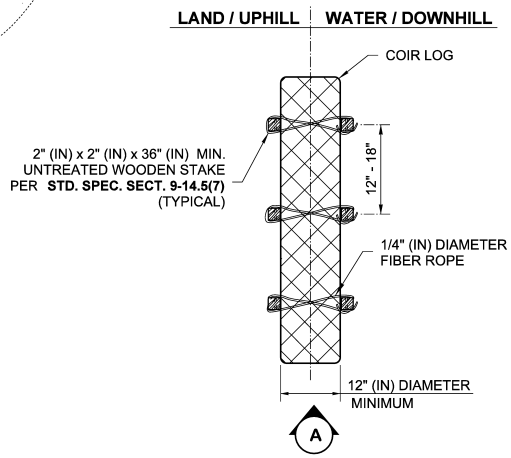
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:34 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

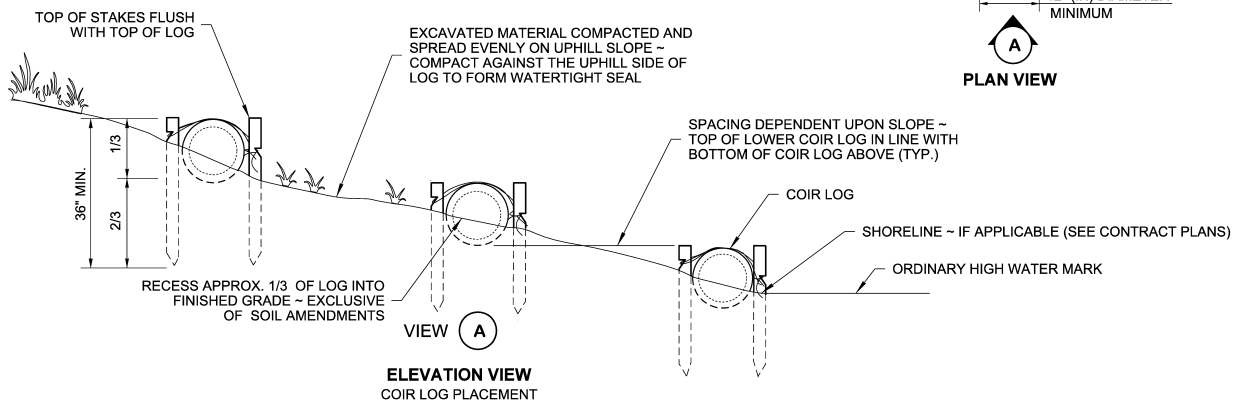
DRAWN BY: FERN LIDDELL



PLAN VIEW
PLACEMENT ON SLOPE



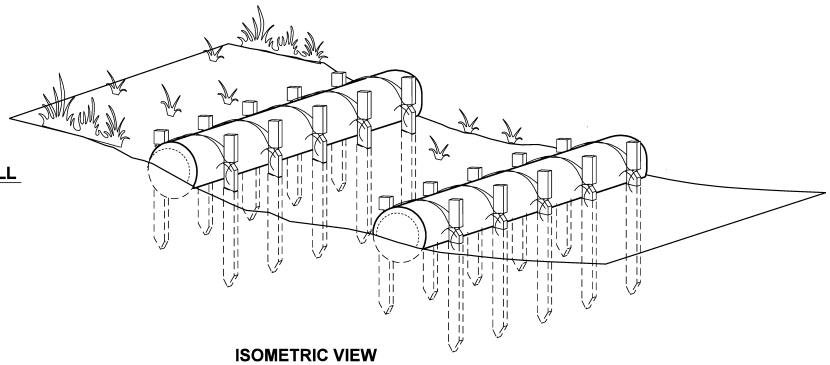
PLAN VIEW



ELEVATION VIEW
COIR LOG PLACEMENT

NOTES

1. Coir logs shall be installed starting at the bottom of the slope and working uphill.
2. Excavated material shall be spread evenly along the uphill slope and compacted by hand tamping or other methods approved by the Engineer.
3. Overlap Coir log ends by 12" (in) to prevent water from moving between logs.
4. Always install Coir log perpendicular to slope along contour lines. Ends shall angle uphill to prevent flow around the Coir log.
5. Use an adequate number of stakes to ensure logs are secure.
6. Coir logs shall be in accordance with **Standard Specification Section 9-14.5(7)**, and be installed in accordance with **Standard Specification Section 8-01.3(6)A.**
7. Perform maintenance in accordance with **Standard Specification Section 8-01.3(15).**



ISOMETRIC VIEW

STATE OF WASHINGTON
JULI DEE HARTWIG
NO. 1422 EXP. 06/21/2019
LANDSCAPE ARCHITECT

Hartwig, Juli
Feb 27 2018 2:27 PM

EROSION CONTROL DETAILS
COIR LOG PLACEMENT

STANDARD PLAN I-30.60-01

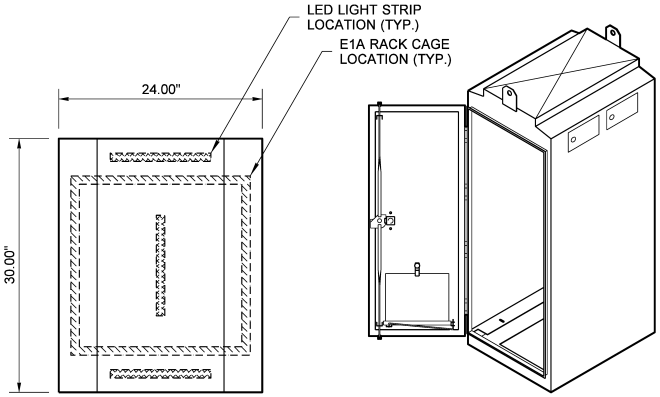
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Mar 7 2018 7:02 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

This page left blank intentionally.

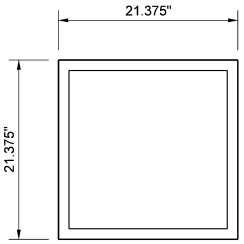
This page left blank intentionally.

DRAWN BY: BILL BERENS

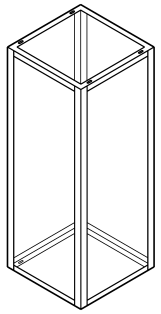


PLAN VIEW

ISOMETRIC VIEW



PLAN VIEW

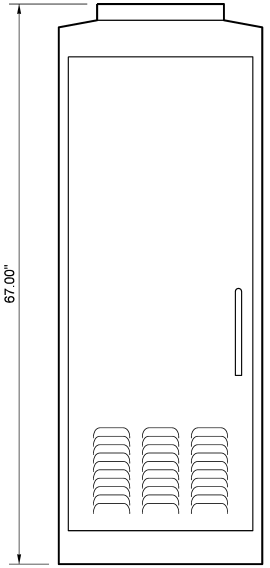


ISOMETRIC VIEW

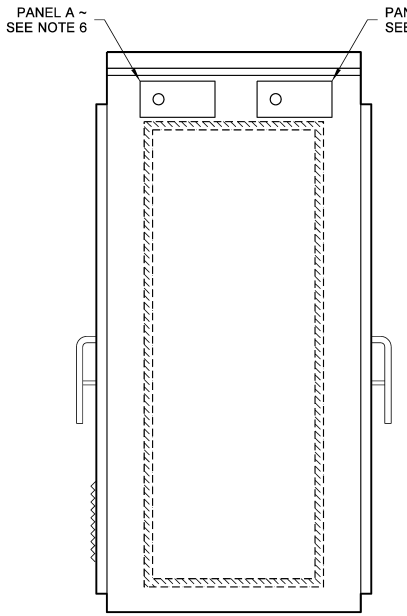
NOTES

1. Cabinet construction shall meet the requirements of **Standard Specification Section 9-29.13(10)**. Aluminum cabinets shall have mill finish.
2. Cabinet construction shall conform to the requirements of Chapter 6, Section 2, of the **California Department of Transportation (CalTrans) Transportation Electrical Equipment Specifications (TEES)** as currently published, including all errata, with modifications as described in **Standard Specification Section 9-29.13(10)**.
3. The Housing and Cage numbers refer to the designations shown in the **TEES**. Cabinet Housing #2 (ALT) and Cage #2 (ALT) are modified versions of Cabinet Housing #2 and Cage #2, respectively, using the shorter vertical dimensions shown. All other dimensions and features are the same.
4. Housing #1B shall always use Cage #1. Housing #2 shall always use Cage #2. Housing #2 (ALT) shall always use Cage #2 (ALT).
5. Cage mounting points are designated by rack units (U), which are numbered starting from the bottom of the cage.
6. Install the following in PANEL A location for the applicable cabinet type:
   - Type 331L and 334L Cabinets: Do not install PANEL A.
   - Type 332L Cabinets: Install Generator Transfer Switch.
7. Install the following in PANEL B location for the applicable cabinet type:
   - Type 331L Cabinets: Install Generator Transfer Switch when specified in the contract.
   - Type 332L and 334L Cabinets: Install Police Panel.
8. All cabinet locks shall accept Best 6-pin or 7-pin cores, with the exception of the Police Panel. The Police Panel shall use a standard Police Panel Lock and Keys.

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

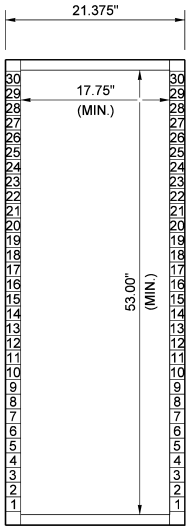


EXTERIOR FRONT VIEW

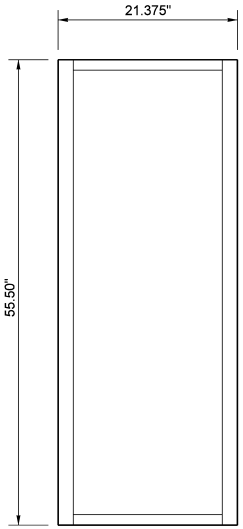


EXTERIOR SIDE VIEW

CABINET HOUSING #1B

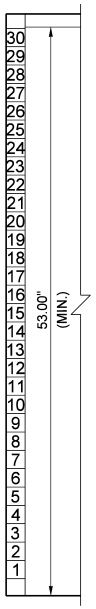


FRONT VIEW

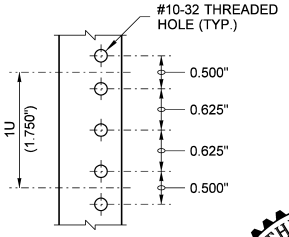


SIDE VIEW

CAGE #1
(EIA RACK)



RACK UNIT
NUMBERING EXAMPLE
SEE NOTE 5



RACK UNIT (U)
STANDARD DIMENSIONS

MATTHEW J. NEELEY
STATE OF WASHINGTON
46597
REGISTERED
PROFESSIONAL ENGINEER

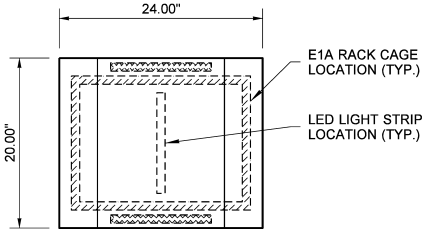
Neeley, Matthew
Jun 18 2018 8:10 AM

TYPE 33xL SINGLE-WIDTH CABINET HOUSING STANDARD PLAN J-12.15-00

SHEET 1 OF 2 SHEETS

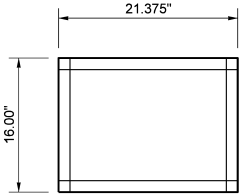
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:33 AM

STATE DESIGN ENGINEER
Washington State Department of Transportation

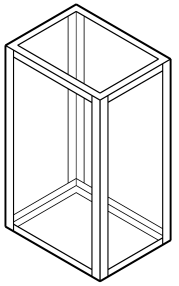


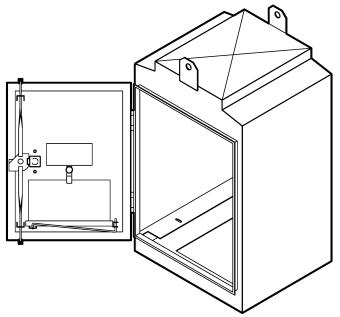
PLAN VIEW

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



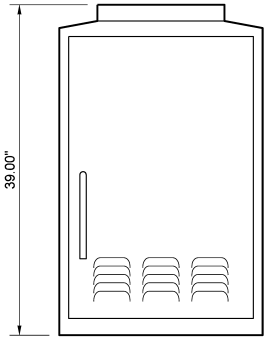
PLAN VIEW



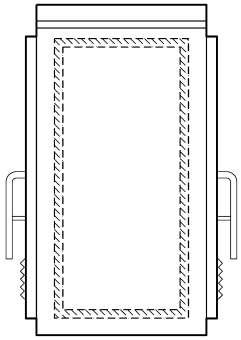


ISOMETRIC VIEWS
(HOUSING #2 (ALT) AND CAGE #2 (ALT) SHOWN

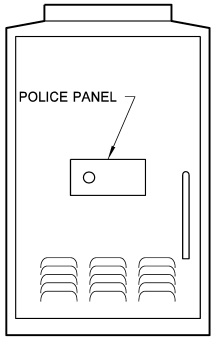
DRAWN BY: BILL BERENS



EXTERIOR FRONT VIEW

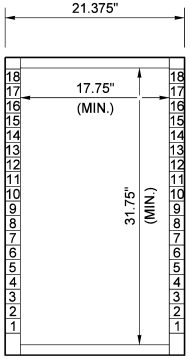


EXTERIOR SIDE VIEW

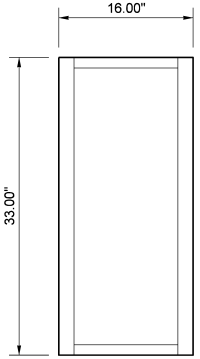


EXTERIOR REAR VIEW

CABINET HOUSING #2 (ALT)

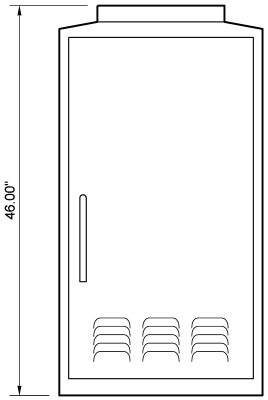


FRONT VIEW

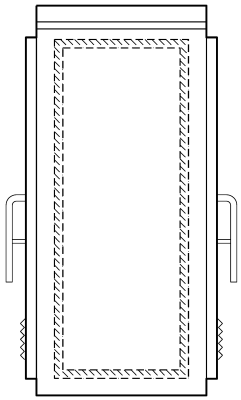


SIDE VIEW

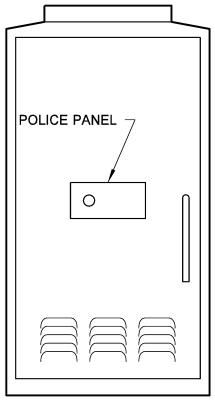
CAGE #2 (ALT)
(EIA RACK)



EXTERIOR FRONT VIEW

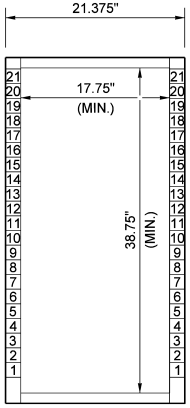


EXTERIOR SIDE VIEW

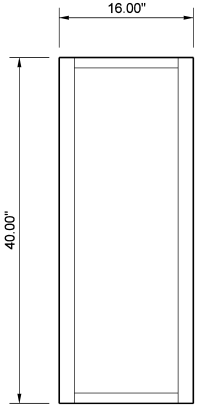


EXTERIOR REAR VIEW

CABINET HOUSING #2



FRONT VIEW



SIDE VIEW

CAGE #2
(EIA RACK)



Neeley, Matthew
Jun 18 2018 8:11 AM

TYPE 33xL SINGLE-WIDTH CABINET HOUSING STANDARD PLAN J-12.15-00

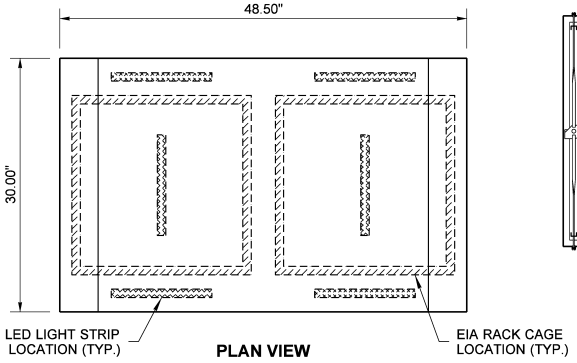
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:34 AM

STATE DESIGN ENGINEER

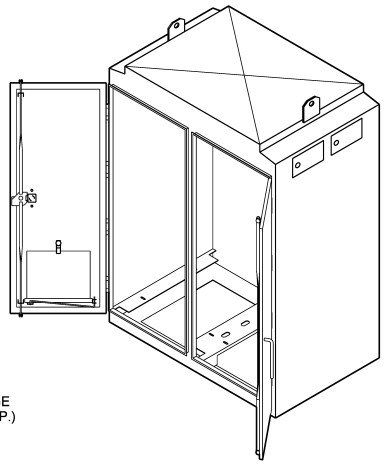
Washington State Department of Transportation

DRAWN BY: BILL BERENS

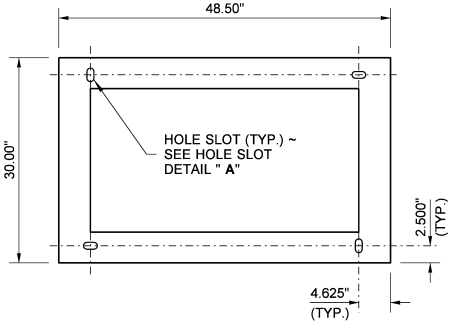


PLAN VIEW

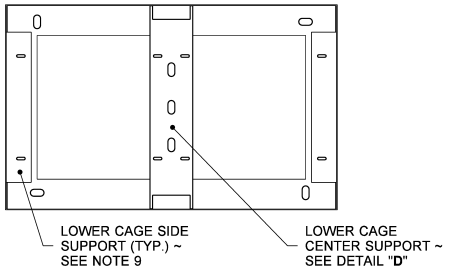
NOTE: DIMENSIONS NOT SHOWN SHALL BE IN ACCORDANCE WITH THE TEES



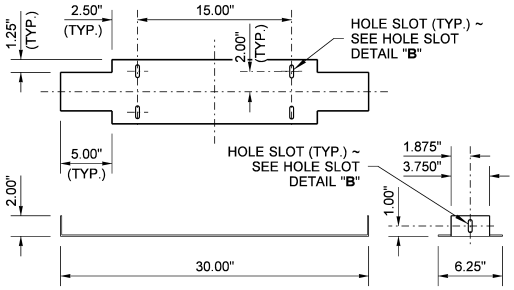
ISOMETRIC VIEW



CABINET BASE DETAIL

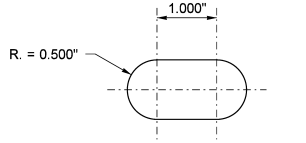


LOWER CAGE SUPPORT DETAIL

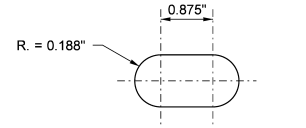


DETAIL C

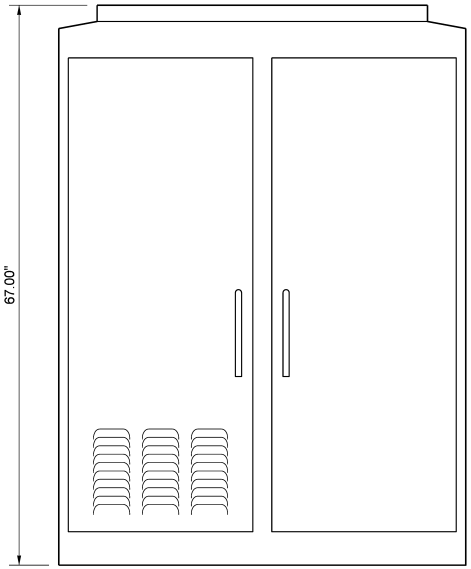
UPPER CAGE CENTER SUPPORT



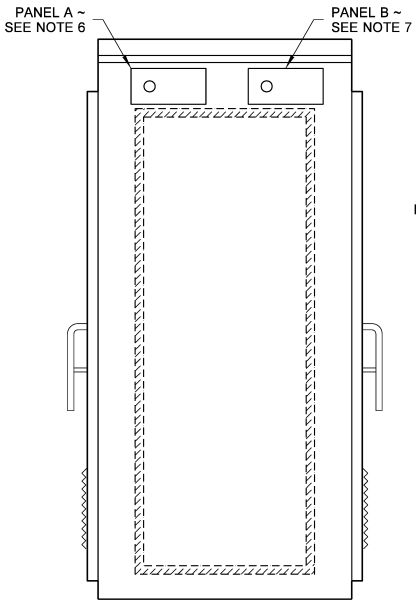
HOLE SLOT DETAIL A



HOLE SLOT DETAIL B

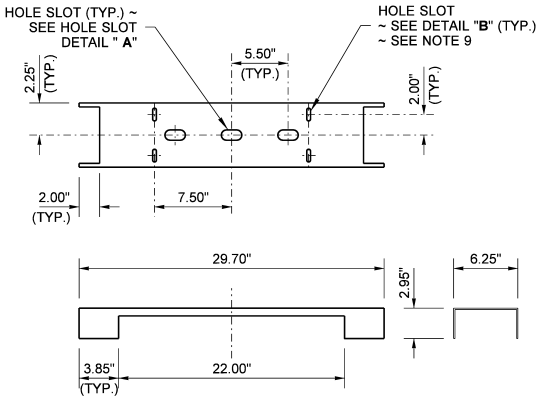


EXTERIOR FRONT VIEW



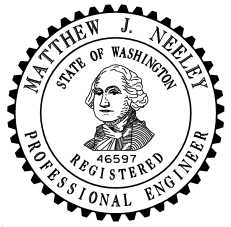
EXTERIOR SIDE VIEW

CABINET HOUSING #1X



DETAIL D

LOWER CAGE CENTER SUPPORT



Neeley, Matthew
Jun 18 2018 8:14 AM

TYPE 33xD AND 34xLX DOUBLE-WIDTH CABINET HOUSINGS STANDARD PLAN J-12.16-00

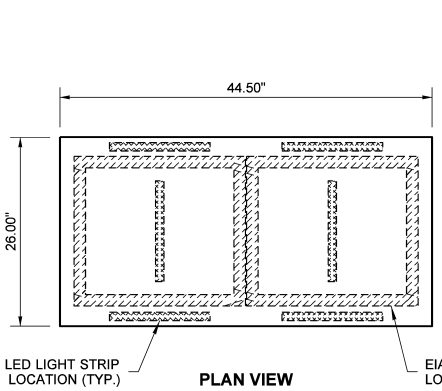
SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:33 AM

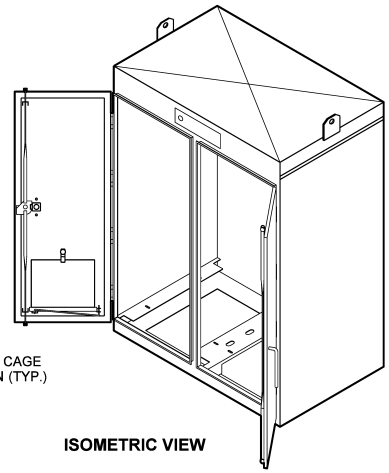
STATE DESIGN ENGINEER

Washington State Department of Transportation

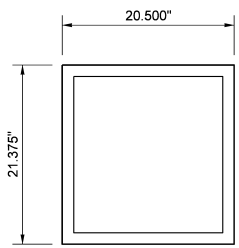
DRAWN BY: BILL BERENS



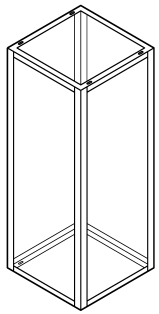
PLAN VIEW



ISOMETRIC VIEW



PLAN VIEW

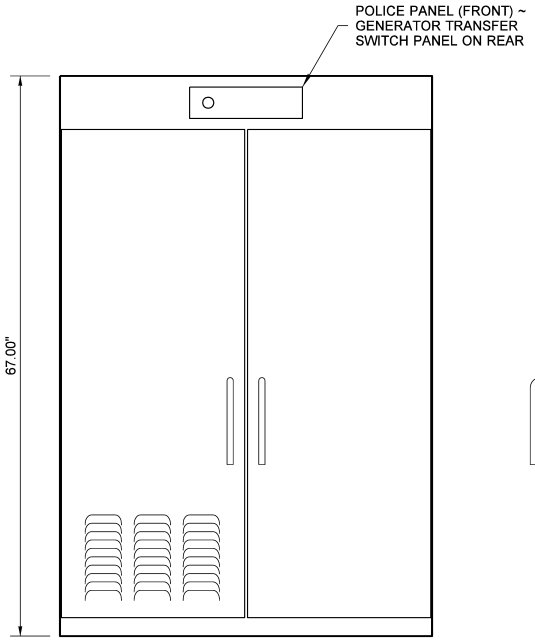


ISOMETRIC VIEW

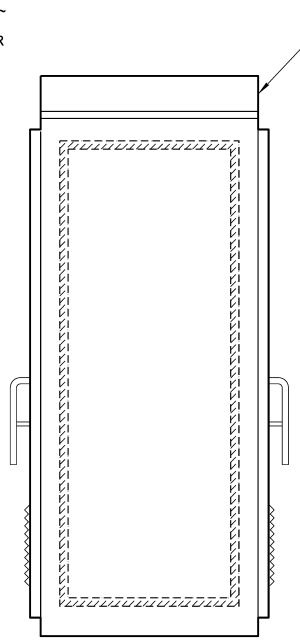
NOTES

1. Cabinet construction shall meet the requirements of **Standard Specification Section 9-29.13(10)**. Aluminum cabinets shall have mill finish.
2. Cabinet construction shall conform to the requirements of Chapter 6, Section 2, of the **California Department of Transportation (CalTrans) Transportation Electrical Equipment Specifications (TEES)** as currently published, including all errata, with modifications as described in **Standard Specification Section 9-29.13(10)**.
3. The Housing and Cage numbers refer to the designations shown in the **TEES**. Cabinet Housing #1X is a double-width version of Cabinet Housing #1 with overall dimensions as shown.
4. Housing #1X shall always use two of Cage #1 - see **Standard Plan J-12.15**. Housing #3 shall always use two ITS Cages.
5. Cage mounting points are designated by rack units (U), which are numbered starting from the bottom of the cage - see **Standard Plan J-12.15**.
6. Install the following in PANEL A location for the applicable cabinet type:
   - Type 331D and 334D Cabinets: Do not install PANEL A.
   - Type 332D Cabinets: Install Generator Transfer Switch.
7. Install the following in PANEL B location for the applicable cabinet type:
   - Type 331D Cabinets: Install Generator Transfer Switch when specified in the contract.
   - Type 332D and 334D Cabinets: Install Police Panel.
8. All cabinet locks shall accept Best 6-pin or 7-pin cores, with the exception of the Police Panel. The Police Panel shall use a standard Police Panel Lock and Keys.
9. Cage side supports for Cabinet Housing #1X shall be as shown in the **TEES** for Cabinet Housing #1B. Cage upper and lower center supports shall be as shown here, and installed in the same manner as shown in the **TEES** for the Cabinet Housing #3 center cage supports.

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

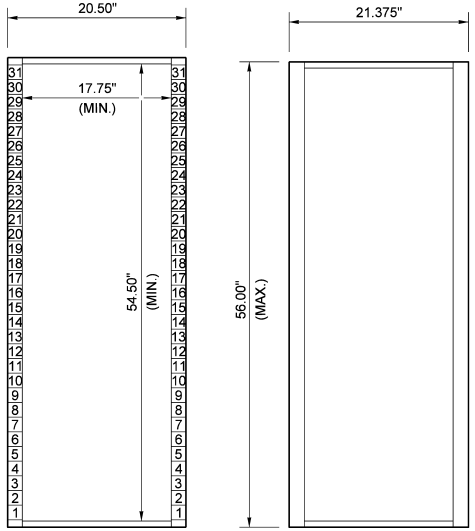


EXTERIOR FRONT VIEW



EXTERIOR SIDE VIEW

CABINET HOUSING #3



FRONT VIEW

SIDE VIEW

ITS CAGE (EIA RACK)

MATTHEW J. NEELEY
STATE OF WASHINGTON
46597
REGISTERED PROFESSIONAL ENGINEER

Neeley, Matthew
Jun 18 2018 8:14 AM

TYPE 33xD AND 34xLX DOUBLE-WIDTH CABINET HOUSINGS STANDARD PLAN J-12.16-00

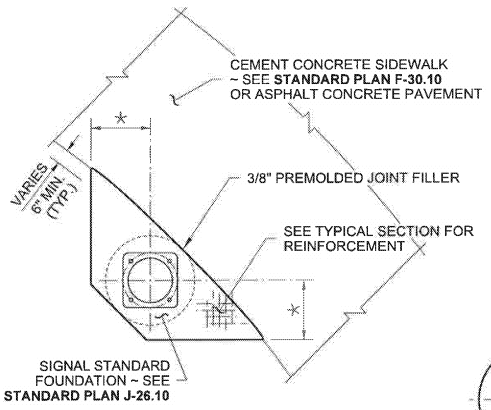
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:33 AM

STATE DESIGN ENGINEER

Washington State Department of Transportation

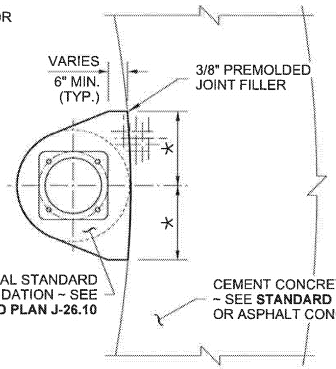
This page left blank intentionally.



DUAL PEDESTRIAN PUSH BUTTON

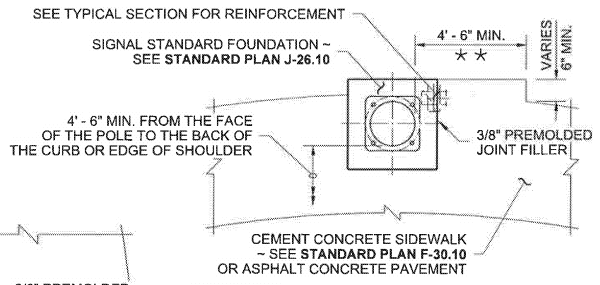
NOTE

* = 2' - 0" FOR 3' - 0" DIAM. FOUNDATION
2' - 6" FOR 4' - 0" DIAM. FOUNDATION
2' - 6" FOR 3' - 0" SQUARE FOUNDATION



SINGLE PEDESTRIAN PUSH BUTTON

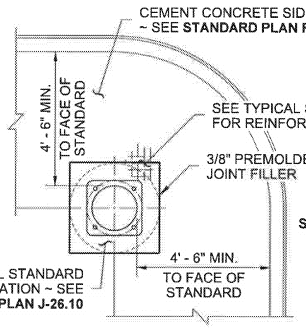
FOUNDATION OUTSIDE THE SIDEWALK SECTION

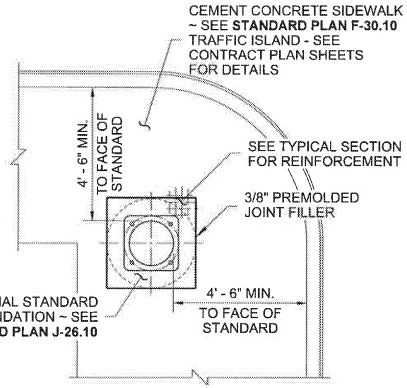


NOTE

* * = APPLIES TO THE SIDE OF THE FOUNDATION WHEN PEDESTRIAN PUSH BUTTON IS TO BE INSTALLED.

FOUNDATION PARTIALLY WITHIN SIDEWALK SECTION





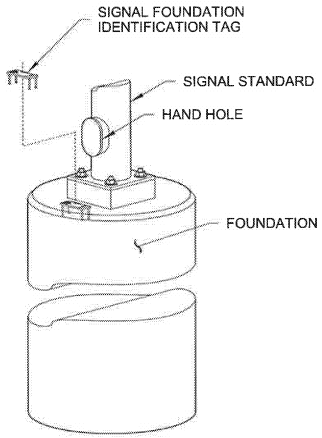
FOUNDATION WITHIN SIDEWALK OR TRAFFIC ISLAND SECTION

NOTE

REFER TO CONTRACT DOCUMENTS FOR PROJECT SPECIFIC INTERSECTION LAYOUTS & TRAFFIC ISLAND MATERIAL TYPE

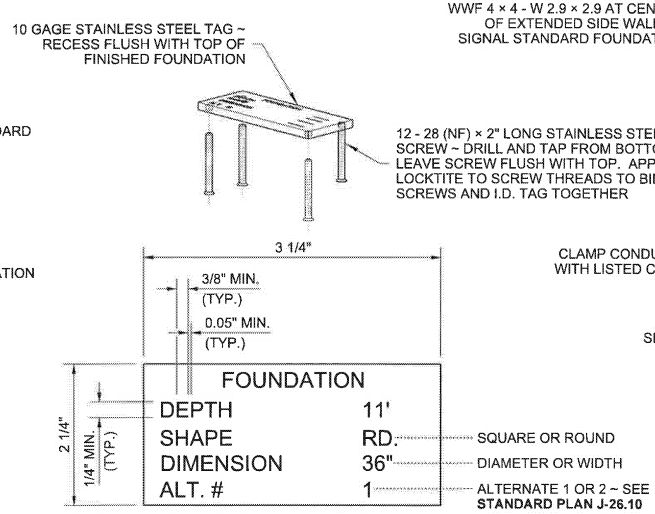
FOUNDATION PARTIALLY WITHIN SIDEWALK SECTION

DRAWN BY: LISA CYFORD



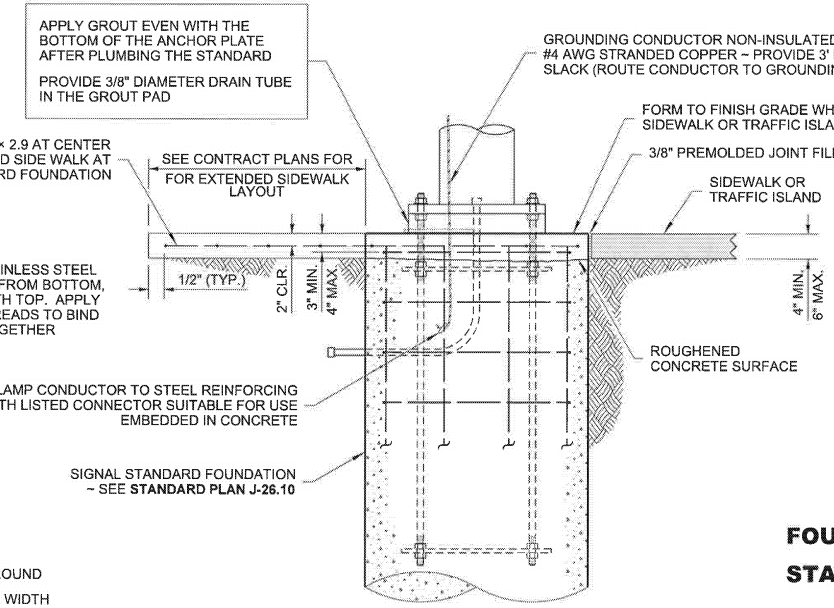
OBLIQUE VIEW

REINFORCING AND ANCHOR BOLTS NOT SHOWN FOR CLARITY (GROUT PAD OPTION SHOWN)



SIGNAL FOUNDATION IDENTIFICATION TAG DETAIL

TEXT SHALL BE ENGRAVED 0.014" DEEP



NOTE

FOUNDATION REINFORCING ONLY PARTIALLY SHOWN FOR CLARITY. ~ SEE **STANDARD PLAN J-26.10** FOR DETAILS NOT SHOWN.

TYPICAL SECTION

THEODORE JOSEPH BAILEY
STATE OF WASHINGTON
REGISTERED
PROFESSIONAL ENGINEER

5/15/2012

SIGNAL STANDARD FOUNDATION PLACEMENTS

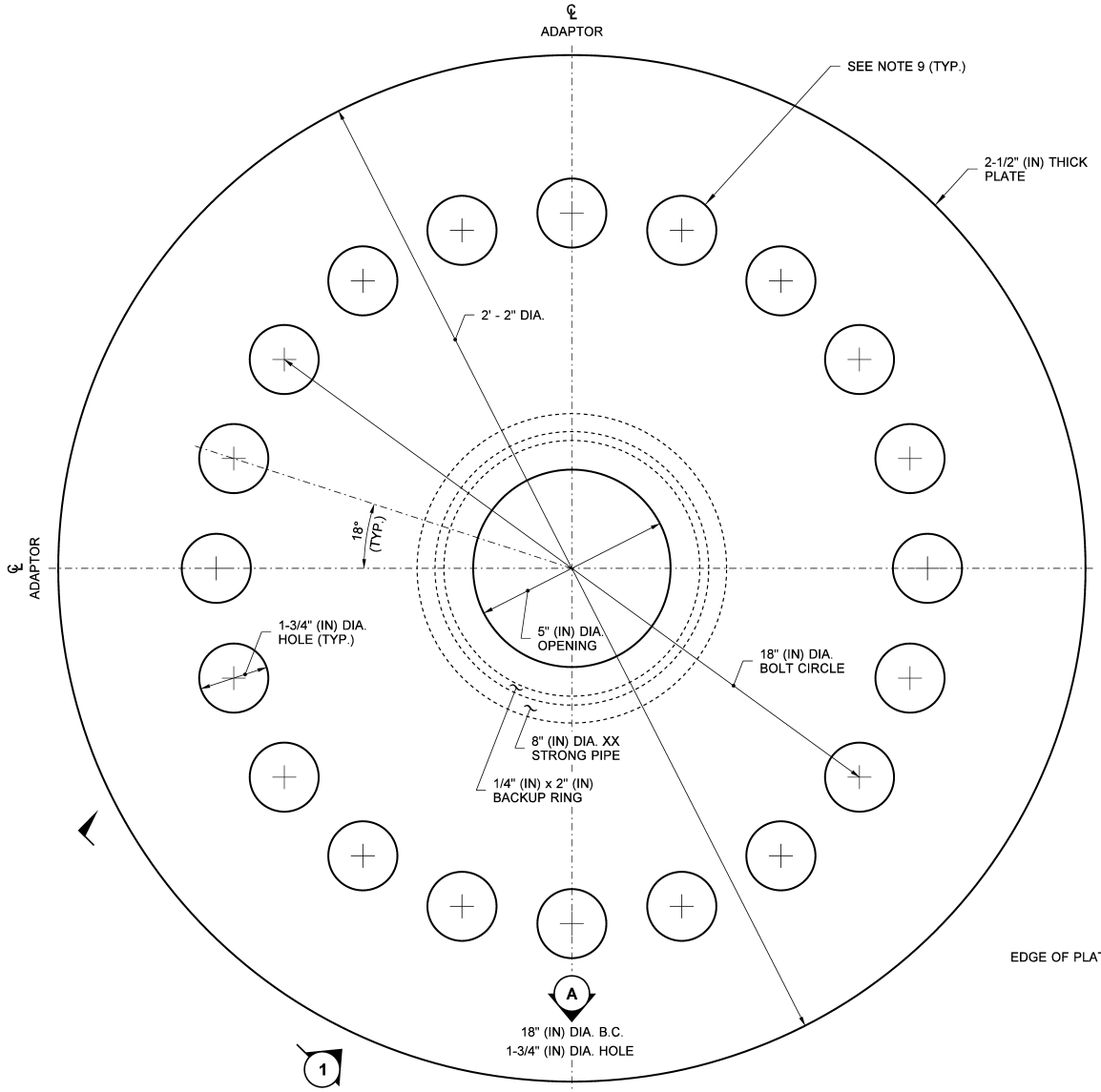
STANDARD PLAN J-26.15-01

SHEET 3 OF 3 SHEETS

APPROVED FOR PUBLICATION

STATE DESIGN ENGINEER — DATE 5/17/12

Washington State Department of Transportation



TOP VIEW
ADAPTOR 1 TOP PLATE

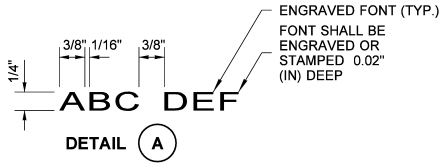
DRAWN BY: COLBY FLETCHER

NOTES

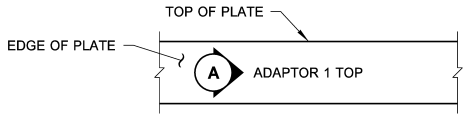
1. All material and workmanship shall be in accordance with the requirements of the Washington State Department of Transportation **Standard Specifications for Road, Bridge, and Municipal Construction.**
2. The analysis and design for Adaptors 1 and 2 have been done in accordance with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals - Fifth Edition - Dated 2009, and Interims, using basic wind speed of 90 MPH and 50 years of design life.
3. Adaptors' parameters are based on field data and existing signal standard anchor bolts and bolt circles. Adaptor 1 shall be used for 15' (ft) thru 45' (ft) mast arm signal standards and Adaptor 2 for 46' (ft) thru 65' (ft).
4. **Adaptors shall only be used for temporary installation of knocked down signal standards.**
5. Materials specifications:

All structural steel, except as otherwise noted	**ASTM A572 GR. 50 OR ASTM A588**
Pipes	**ASTM A53 GR. B OR A500 GR. B**
Connecting/clamping bolts	**ASTM F3125 GRADE A325**
Nuts	**ASTM A563 GRADE DH**
Washers	**AASHTO M 293 (ASTM F436)**

6. All bolts, rods, and related hardware shall be galvanized after fabrication per ASTM F2329.
7. Steel surfaces shall be galvanized after fabrication in accordance with AASHTO M 111.
8. Install and secure adaptor to existing support anchor bolts. Then install signal standard on adaptor top plate. Rake to be plumb after all load has been placed.
9. All holes in top and bottom plates of Adaptor 1 and Adaptor 2 are thru holes. See engraved or stamped text for bolt hole diameter.



DETAIL (A)



SECTION (1)

ADAPTOR 1 TOP SHOWN
(ADAPTOR 1 BOTTOM, ADAPTOR 2 TOP, AND ADAPTOR 2 BOTTOM SIMILAR)

ALL FONTS MARKED (A) SHALL BE ENGRAVED OR STAMPED

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

Zeldenrust, Richard
Jun 26 2018 10:32 AM

TEMPORARY SIGNAL STANDARD ADAPTOR

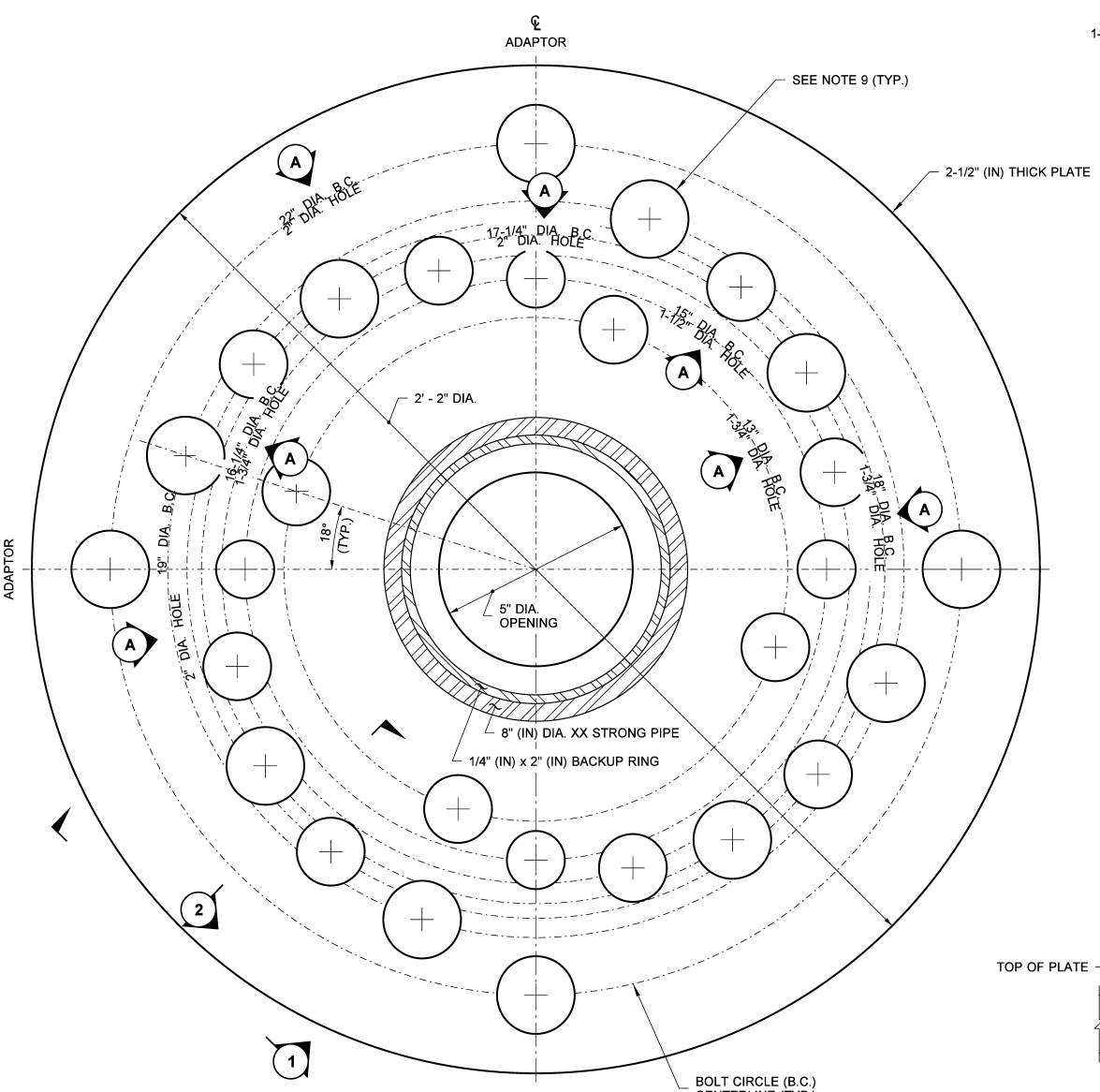
STANDARD PLAN J-26.20-01

SHEET 1 OF 5 SHEETS

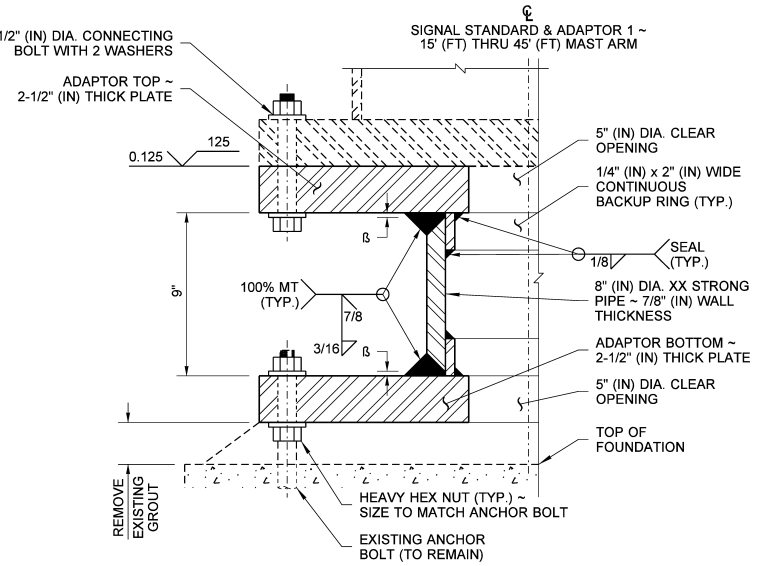
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:32 AM

STATE DESIGN ENGINEER

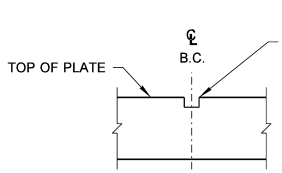
Washington State Department of Transportation



TOP VIEW
ADAPTOR 1 BOTTOM PLATE



TYPICAL SECTION
ß - 3/16" (IN) MAX. GAP BEFORE WELDING



SECTION (2)

ONE BOLT CIRCLE CENTERLINE SHOWN
(ALL BOLT CIRCLE CENTERLINES SIMILAR)

DRAWN BY: COLBY FLETCHER

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

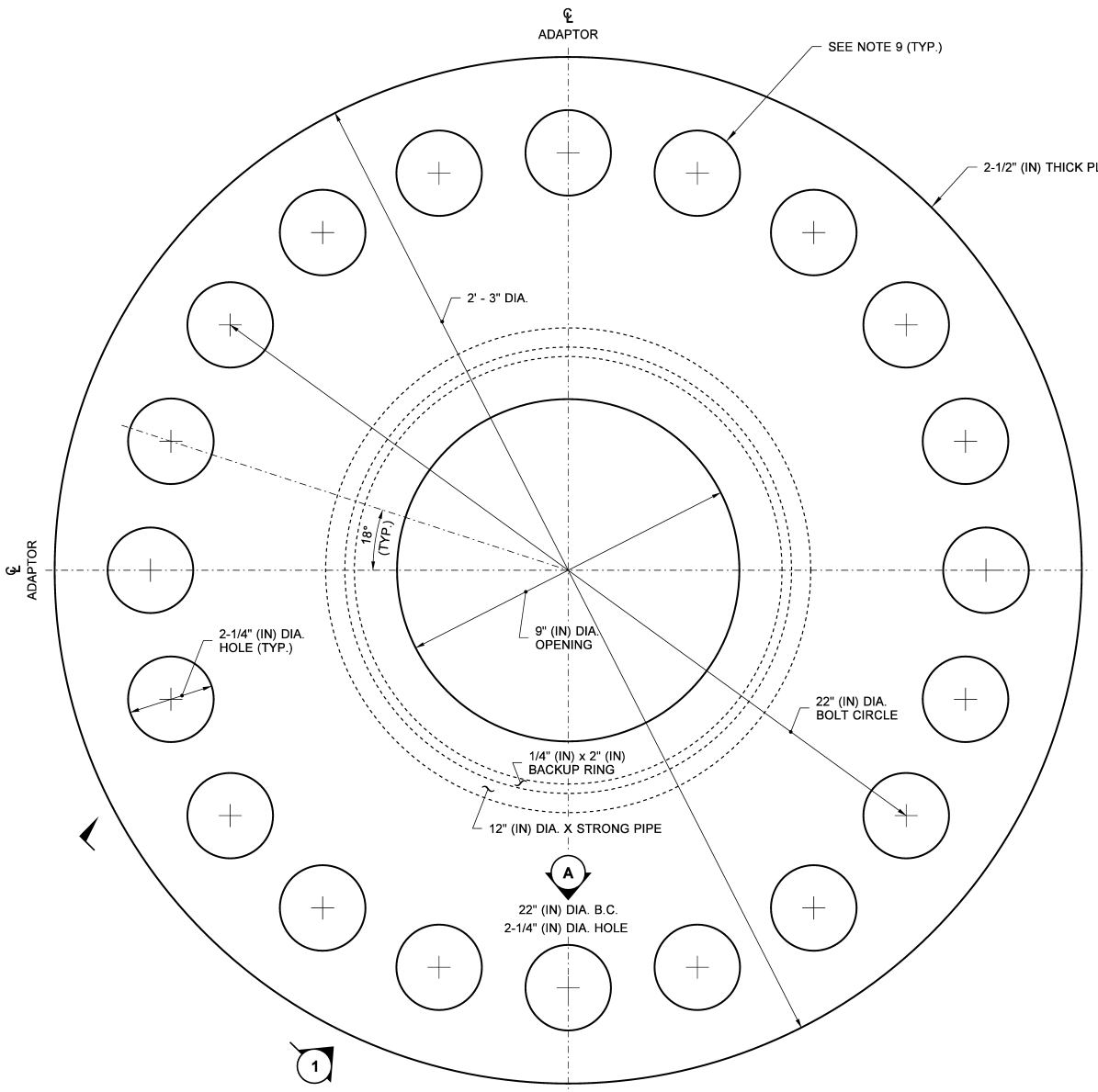
Zeldenrust, Richard
Jun 26 2018 3:55 PM

TEMPORARY SIGNAL STANDARD ADAPTOR

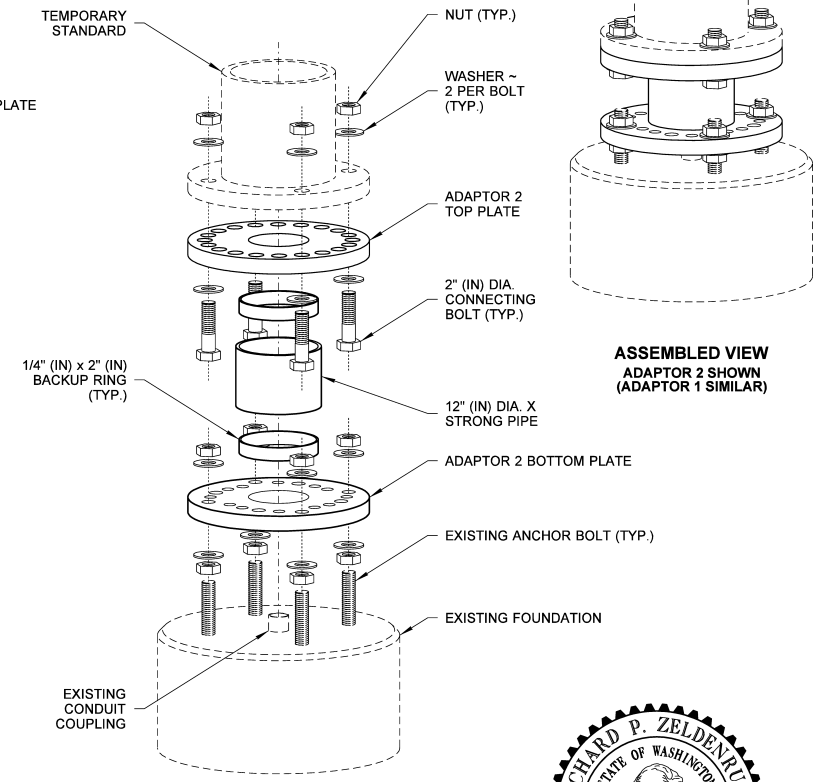
STANDARD PLAN J-26.20-01

SHEET 2 OF 5 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:32 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation



TOP VIEW
ADAPTOR 2 TOP PLATE



EXPLODED VIEW
ADAPTOR 2 SHOWN
(ADAPTOR 1 SIMILAR)

ASSEMBLED VIEW
ADAPTOR 2 SHOWN
(ADAPTOR 1 SIMILAR)

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

Zeldenrust, Richard
Jun 26 2018 3:56 PM

TEMPORARY SIGNAL STANDARD ADAPTOR

STANDARD PLAN J-26.20-01

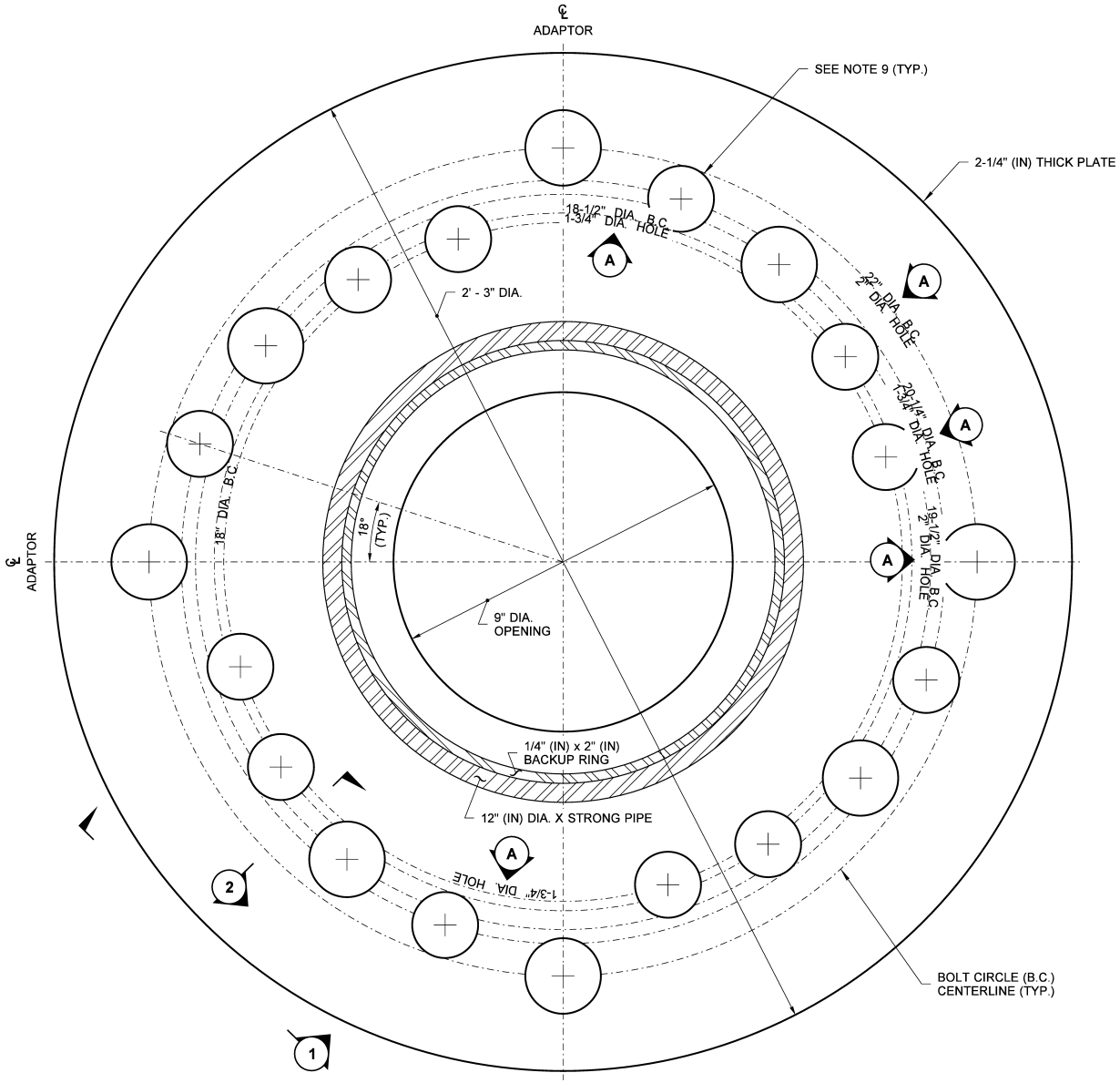
SHEET 3 OF 5 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:32 AM

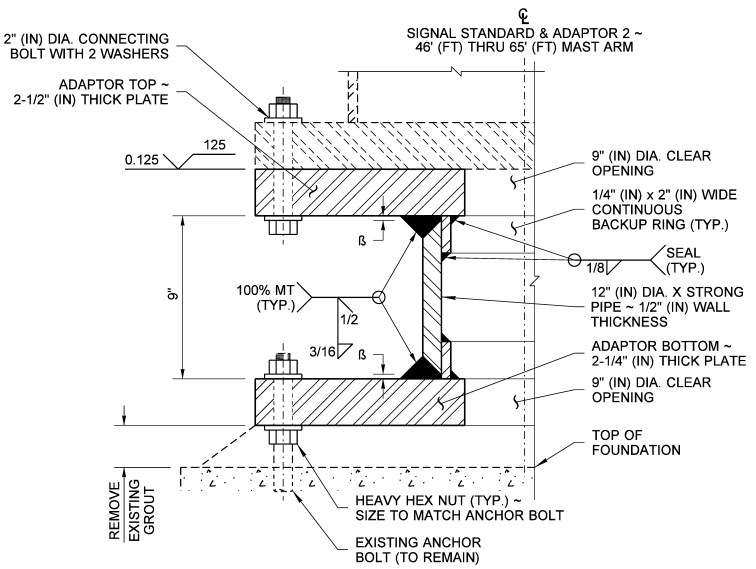
STATE DESIGN ENGINEER

Washington State Department of Transportation

DRAWN BY: COLBY FLETCHER



TOP VIEW
ADAPTOR 2 BOTTOM PLATE



TYPICAL SECTION
ß - 3/16" (IN) MAX. GAP BEFORE WELDING

DRAWN BY: COLBY FLETCHER

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

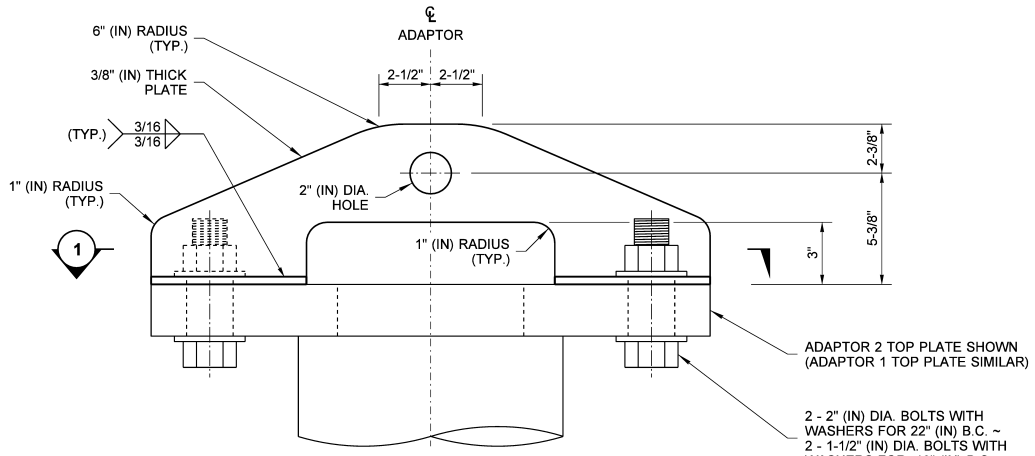
Zeldenrust, Richard
Jun 26 2018 3:56 PM

TEMPORARY SIGNAL STANDARD ADAPTOR

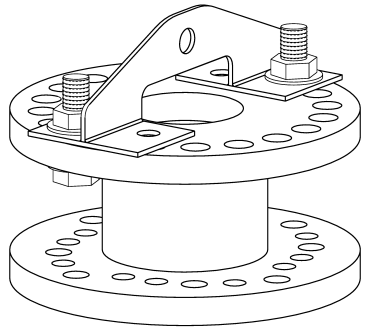
STANDARD PLAN J-26.20-01

SHEET 4 OF 5 SHEETS

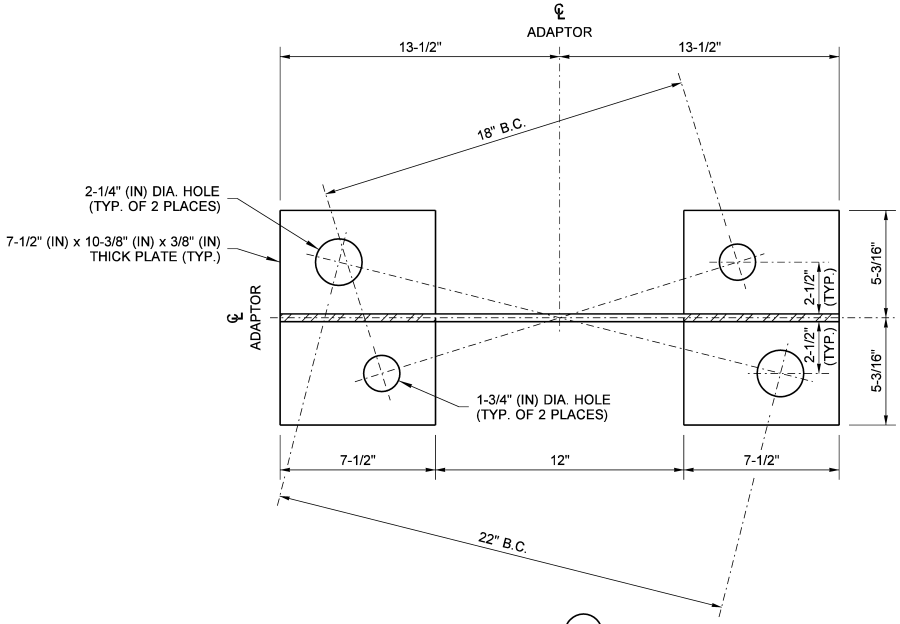
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:32 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation



ELEVATION VIEW
ADAPTOR LIFTING TOOL
REMOVE ALL BURRS AND SHARP EDGES



ASSEMBLED VIEW
ADAPTOR LIFTING TOOL
WITH ADAPTOR 2 SHOWN
(ADAPTOR 1 SIMILAR)



SECTION (1)

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

Zeldenrust, Richard
Jun 26 2018 3:56 PM
cosign

TEMPORARY SIGNAL STANDARD ADAPTOR

STANDARD PLAN J-26.20-01

SHEET 5 OF 5 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:32 AM
cosign
STATE DESIGN ENGINEER
Washington State Department of Transportation

BASE TABLE				
ADAPTOR TYPE	ANCHOR BOLT (IN) ⟨1⟩	BOLT CIRCLE DIAMETER (IN) "BC" ⟨2⟩	EXISTING BASE TYPE	LUMINAIRE HEIGHT (± 2' - 6")
A-1	1"	11"	WELDED PLATE	⟨3⟩
A-2	1"	12 1/4"	CAST ALUMINUM	⟨3⟩
A-3	1"	12 3/4"	STEEL TRANSFORMER	⟨3⟩
A-4	1 1/8"	14 1/8"	2-PC. ALUM. CLAMP	⟨4⟩
A-5	1 1/4"	14 1/8"	2-PC. ALUM. CLAMP	40'

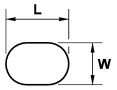
⟨1⟩ USE MATCHING DIAMETER FOR THREADED STUDS.

⟨2⟩ CONTRACTOR SHALL VERIFY BOLT CIRCLE "BC" IN THE FIELD BEFORE ORDERING. IF "BC" OR ANCHOR BOLT SIZES DIFFER FROM THOSE LISTED, CONTACT HQ BRIDGE AND STRUCTURES OFFICE.

⟨3⟩ 40' (FT) LUMINAIRE W/ 1 x 16' (FT) (MAX.) MAST ARM OR 35' (FT) LUMINAIRE W/ 2 x 16' (FT) MAST ARMS.

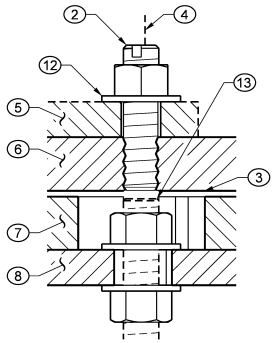
⟨4⟩ 50' (FT) LUMINAIRE W/ 1 x 16' (FT) (MAX.) MAST ARM OR 40' (FT) LUMINAIRE W/ 2 x 16' (FT) MAST ARMS - TOTAL WEIGHT 1000 LBS (MAX.).

DRAWN BY: COLBY FLETCHER



ANCHOR PLATE SLOT DETAIL

ANCHOR PLATE SLOT TABLE		
ANCHOR BOLT DIAMETER (IN)	SIZE W (IN)	SIZE L (IN)
1"	1 1/4"	2"
1 1/8"	1 1/4"	2"
1 1/4"	1 1/2"	2 1/4"



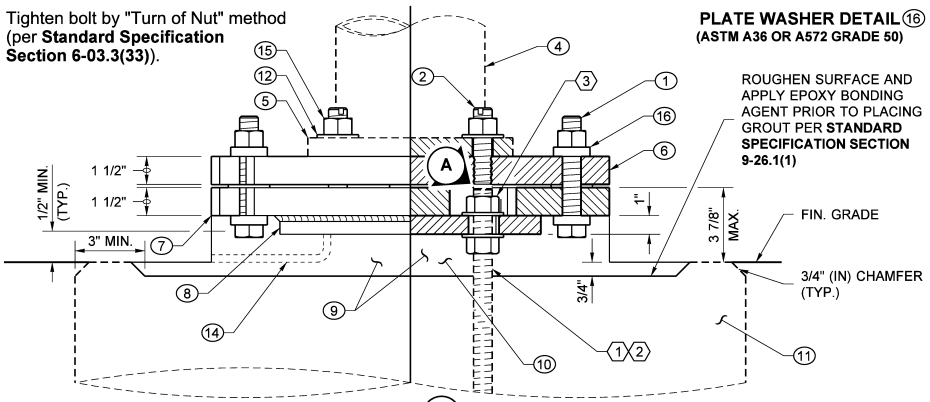
DETAIL (A)
(TYP. OF FOUR PLACES)

CONSTRUCTION NOTES

⟨1⟩ Wire brush existing threads.

⟨2⟩ Apply two coats of galvanizing paint (per **Standard Specification Section 9-08.1(2)B**).

⟨3⟩ Tighten bolt by "Turn of Nut" method (per **Standard Specification Section 6-03.3(33)**).



SECTION (1)

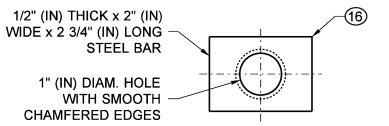
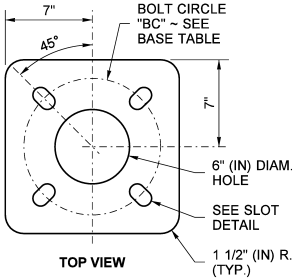


PLATE WASHER DETAIL (16)
(ASTM A36 OR A572 GRADE 50)



TOP VIEW

ANCHOR PLATE (8)

KEY

(1) CLAMPING BOLTS, 7/8" (IN) DIAM. HEX HEAD BOLT AND NUT, TWO PLATE WASHERS, ONE HARDENED ROUND WASHER, 87 FT-LBS TORQUE (THREE CLAMPING BOLT ASSEMBLIES PER SLIP BASE) (**PER ASTM F3125 GRADE A325**)

(2) THREADED SLOTTED STUD ~ SEE BASE TABLE FOR DIAMETER, HARDENED WASHER, AND HEAVY HEX NUT (FOUR PER BASE PLATE). INSERT STUD AND CENTER PUNCH AT BOTTOM PERIPHERY TO LOCK TAPPED STUD IN PLACE PRIOR TO GALVANIZING (**PER ASTM F1554 GRADE 105**)

(3) KEEPER PLATE ~ 0.0149" (IN) 28 GAGE PLATE (**PER ASTM A653 COATING DESIGNATION G90**)

(4) POLE WALL (EXISTING)

(5) POLE BASE PLATE (EXISTING)

(6) TOP SLIP PLATE (**PER ASTM A572 GR. 50 OR A588**)

(7) BOTTOM SLIP PLATE (**PER ASTM A572 GR. 50 OR A588**)

(8) ANCHOR PLATE (**PER ASTM A572 GR. 50 OR A588**)

(9) REMOVE GROUT (EXISTING WITH DRAIN)

(10) NEW GROUT PAD WITH DRAIN

(11) FOUNDATION (EXISTING)

(12) HARDENED WASHER (**PER ASTM F436**)

(13) ANCHOR BOLT (EXISTING) ~ TRIM TO CLEAR SLIP PLATE BY 1/8" (IN) MIN.

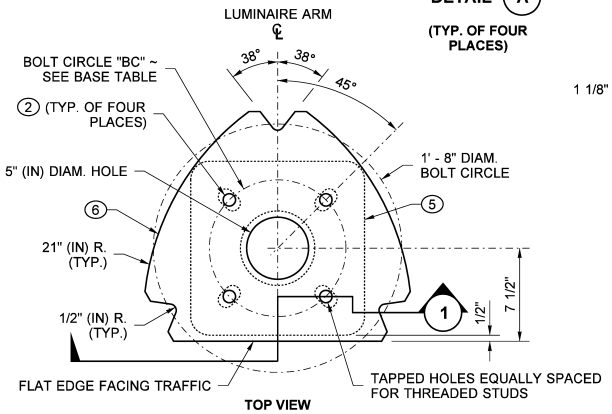
(14) 3/8" (IN) DIAM DRAIN TUBE (PER **STANDARD SPECIFICATION SECTION 9-29.2(3)**)

(15) HEAVY HEX NUT (TYP.) (**PER ASTM A563 GRADE DH**)

(16) PLATE WASHER (**ASTM A36**)

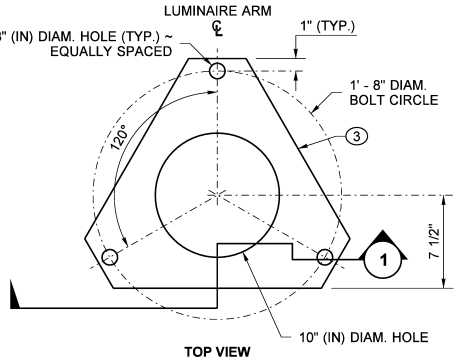
NOTES

1. The purpose of this plan is to provide the details for retrofitting a 4-bolt frangible base with a slip base assembly.
2. Existing anchor bolts shall be inspected for corrosion, thread damage, and galvanizing. To minimize galvanic corrosion between dissimilar metals, ensure galvanizing remains intact while installing aluminum luminaire.
3. After bolting the bottom slip plate assembly to the foundation, fill the slotted bolt holes with mastic per **Standard Specification Section 9-08.7**.
4. Grade around the foundation to ensure the stub height does not exceed 3 7/8" (in). For grading requirements, see **Standard Plan J-28.22**.
5. Removal of the frangible base from the existing base plate is required.
6. Misaligned anchor bolts shall be removed and replaced.
7. This adaptor shall be used only on luminaire poles that contain a handhole. Replace standards and foundation when the handhole is located in the frangible base.
8. Galvanize the anchor plate, bottom slip plate, and top slip plate after fabrication according to **ASTM A123**.
9. Galvanize all hardware according to **ASTM F2329**.



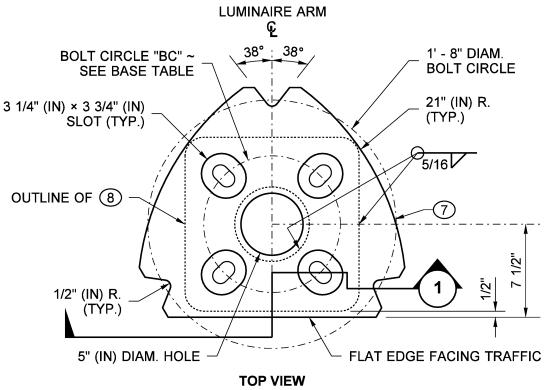
TOP VIEW

TOP SLIP PLATE (6)



TOP VIEW

KEEPER PLATE (3)



TOP VIEW

BOTTOM SLIP PLATE (7)



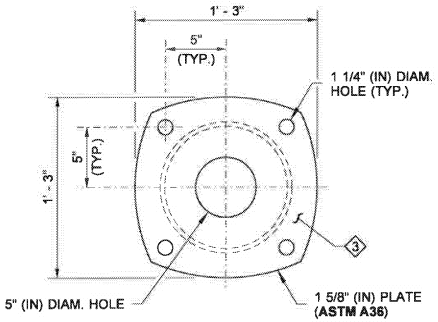
Zeldenrust, Richard
Jun 26 2018 3:57 PM

SLIP BASE ADAPTOR FOR 4-BOLT LIGHT STANDARD BASE STANDARD PLAN J-28.43-01

SHEET 1 OF 1 SHEET

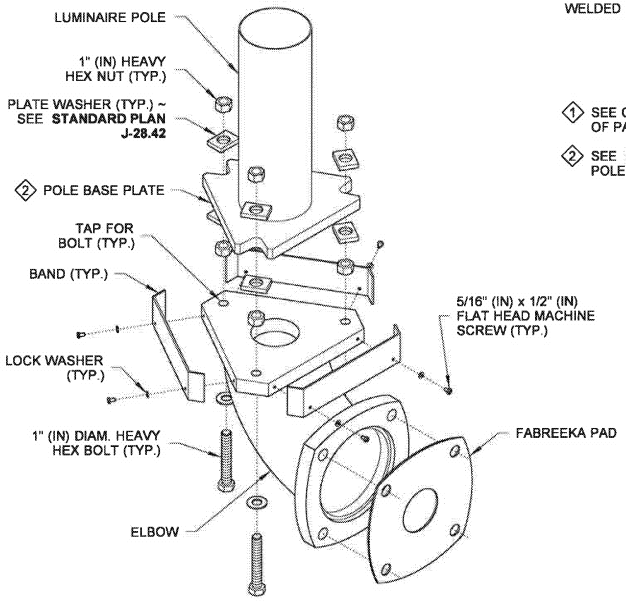
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:31 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

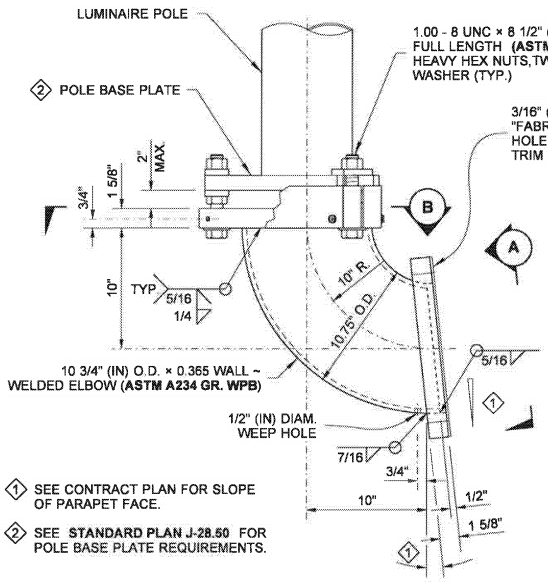


VIEW (A)

③ THE FACE SHALL BE PLANE AFTER FABRICATION, TO PROVIDE A SEAL BETWEEN THE BARRIER AND THE ELBOW.



EXPLODED ISOMETRIC VIEW

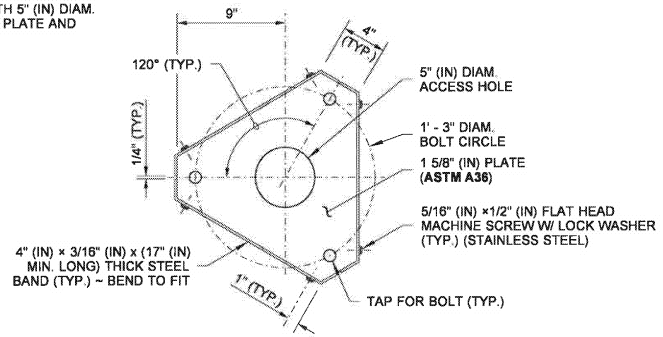


① SEE CONTRACT PLAN FOR SLOPE OF PARAPET FACE.

② SEE **STANDARD PLAN J-28.50** FOR POLE BASE PLATE REQUIREMENTS.

STEEL LIGHT STANDARD ELBOW DETAIL

FOR LUMINAIRE POLES WITH SINGLE MAST ARM 12' - 0" OR LESS AND DOUBLE MAST ARMS 8' - 0" OR LESS, MOUNTED ON BRIDGE OR RETAINING WALLS.



SECTION (B)

NOTES

1. Galvanize the Elbow Assembly after fabrication according to **AASHTO M 111**. All bolts, rods and related hardware shall be galvanized after fabrication per **ASTM F2329**.
2. See **Standard Plan J-28.50** for Pole Base and Hand Hole details.
3. The presence of pedestrian railing shall be verified prior to light standard fabrication. When pedestrian railing is present or to be installed, locate hand hole as detailed in the Bridge Pedestrian Barrier details.
4. See **Standard Plan J-28.70** for further wiring details.

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

Zeldenrust, Richard
Jul 20 2016 8:28 AM

STEEL LIGHT STANDARD ELBOW MOUNTING ON BRIDGE & RETAINING WALL

STANDARD PLAN J-28.45-03

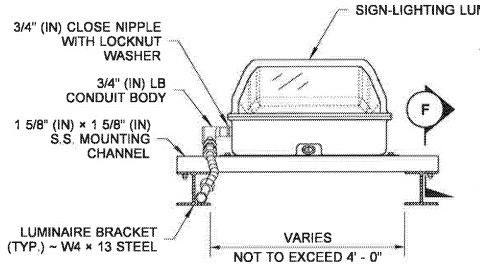
SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION

Carpenter, Jeff
Jul 21 2016 8:28 AM

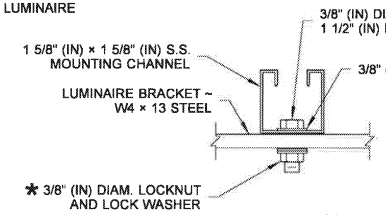
STATE DESIGN ENGINEER

Washington State Department of Transportation

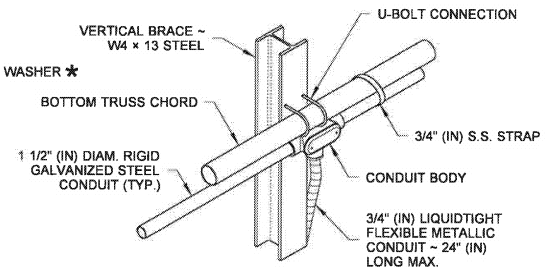


SECTION (E)

SIGN-LIGHTING FIXTURE WITH RETROFIT

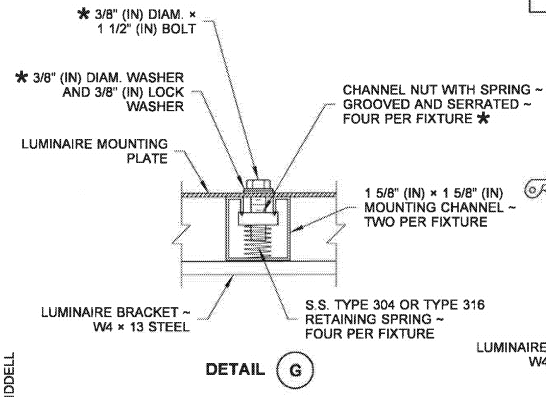


SECTION (F)

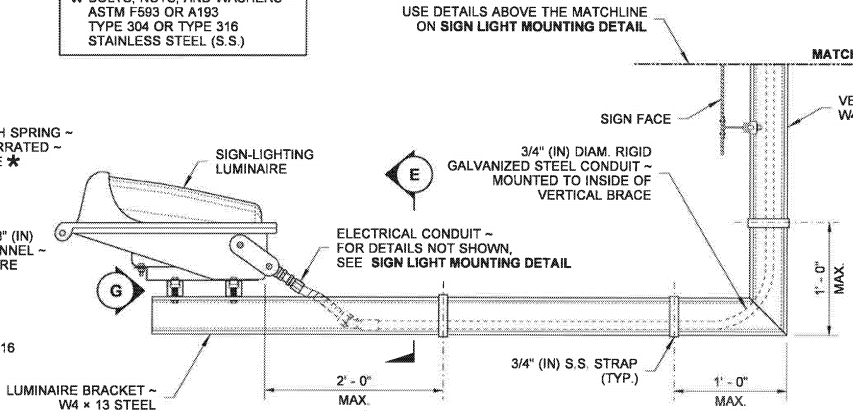


DETAIL (J)

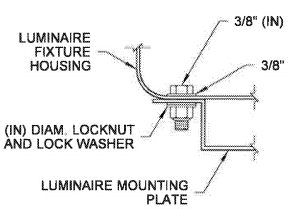
✱ BOLTS, NUTS, AND WASHERS ~ ASTM F593 OR A193 TYPE 304 OR TYPE 316 STAINLESS STEEL (S.S.)



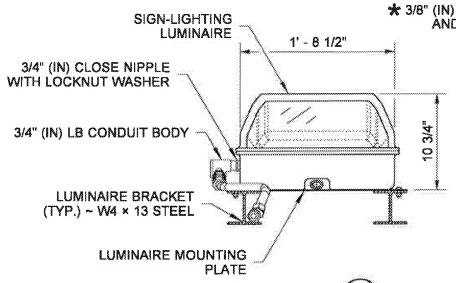
DETAIL (G)



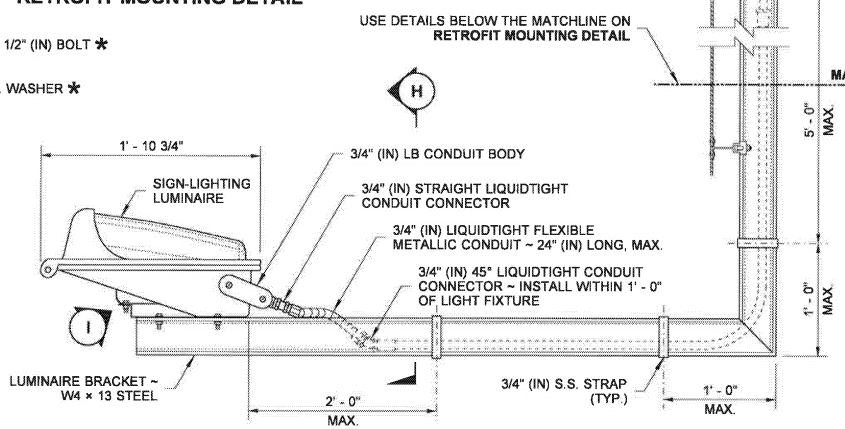
RETROFIT MOUNTING DETAIL



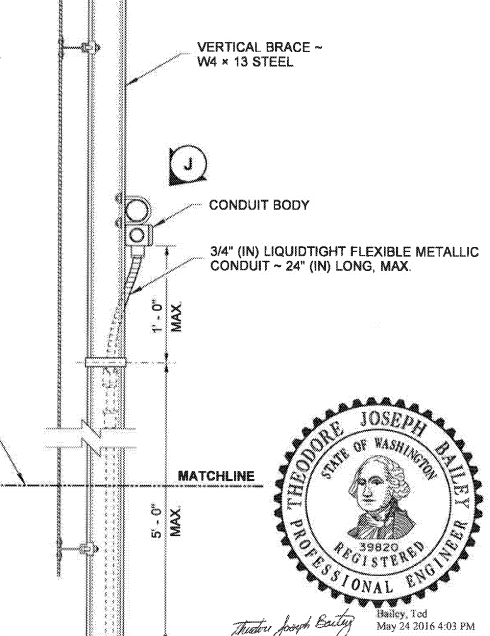
DETAIL (I)



SECTION (H)



SIGN LIGHT MOUNTING DETAIL



DRAWN BY: FERN LIDDELL

THEODORE JOSEPH BAILEY STATE OF WASHINGTON 39820 REGISTERED PROFESSIONAL ENGINEER

Bailey, Ted
May 24 2016 4:03 PM

OVERHEAD SIGN ELECTRICAL DETAILS (TRUSS STRUCTURE) STANDARD PLAN J-75.45-02

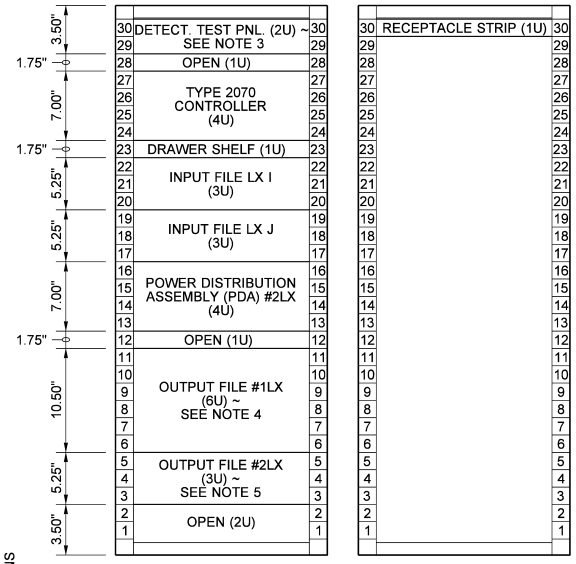
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION

Carpenter, Jeff
Jun 1 2016 4:38 PM

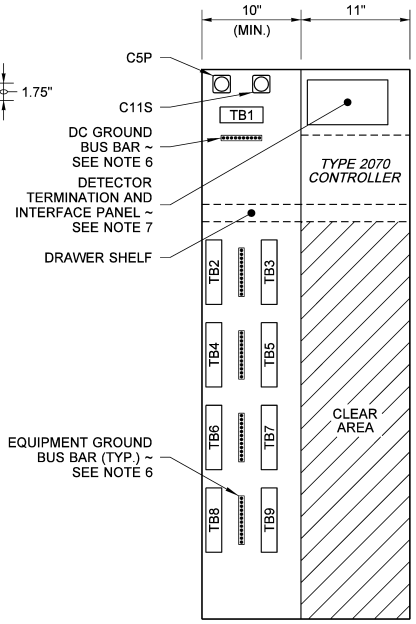
STATE DESIGN ENGINEER

Washington State Department of Transportation

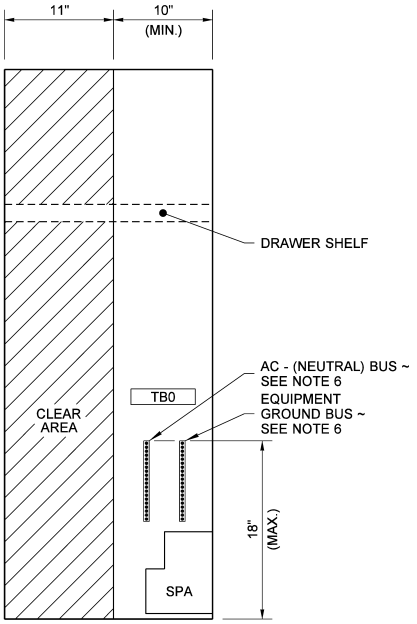


FRONT VIEW

REAR VIEW

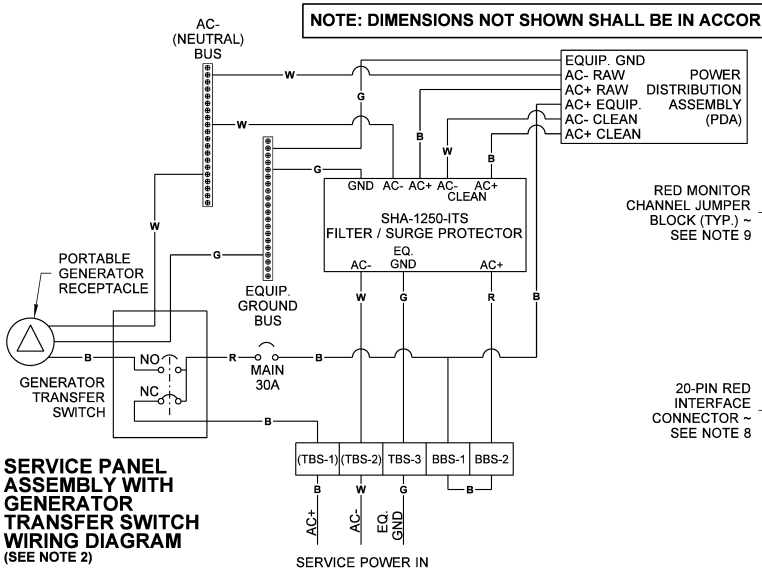


INPUT PANEL #1 LAYOUT

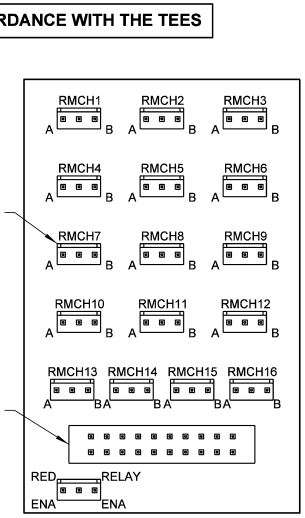


SERVICE PANEL #1 LAYOUT

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)

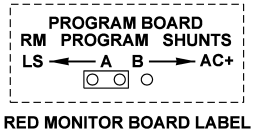
RED MONITOR CONNECTOR PIN ASSIGNMENTS

P1 CONNECTOR *			RED INTERFACE CONNECTOR (20-PIN)	
PIN	CONNECT TO	FUNCTION	PIN	FUNCTION
1	FT3-125	Ø1 RED	1	CHANNEL 15 RED
2	FT3-128	Ø2 RED	2	CHANNEL 16 RED
3	FT2-116	Ø3 RED	3	CHANNEL 14 RED
4	FT1-101	Ø4 RED	4	N/A
5	FT3-131	Ø5 RED	5	CHANNEL 13 RED
6	FT3-134	Ø6 RED	6	SPECIAL FUNCTION #2
7	FT2-122	Ø7 RED	7	CHANNEL 12 RED
8	FT1-107	Ø8 RED	8	SPECIAL FUNCTION #1
9	FT6-A121	OLA RED	9	CHANNEL 10 RED
10	FT6-A124	OLB RED	10	CHANNEL 11 RED
11	FT5-A114	OLC RED	11	CHANNEL 9 RED
12	FT4-A101	OLD RED	12	CHANNEL 8 RED
13	NC	N/A	13	CHANNEL 7 RED
14	AC+	AC+	14	CHANNEL 6 RED
			15	CHANNEL 5 RED
			16	CHANNEL 4 RED
P2 CONNECTOR *			17	CHANNEL 3 RED
1	FT2-113	PED2 RED	18	CHANNEL 2 RED
2	FT1-104	PED4 RED	19	CHANNEL 1 RED
3	FT2-119	PED6 RED	20	RED ENABLE
4	FT1-110	PED8 RED		
P3 CONNECTOR *				
1	02-1	+24V RM COIL		
2	02-6	DC GND		

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

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.



RED MONITOR BOARD LABEL
(SEE NOTE 10)



Neeley, Matthew
Jun 18 2018 8:15 AM

TYPE 332 SIGNAL CABINET LAYOUT

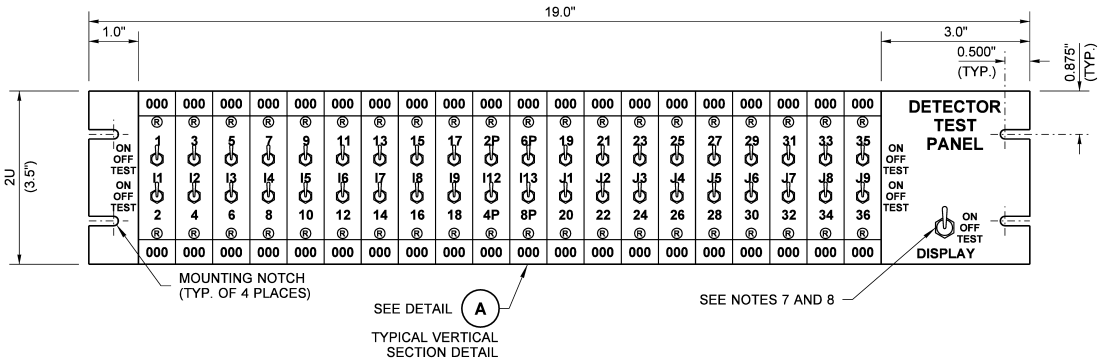
STANDARD PLAN J-80.10-00

SHEET 1 OF 1 SHEET

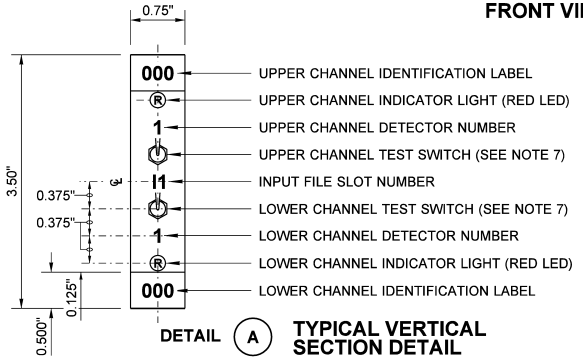
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:30 AM

STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: BILL BERENS

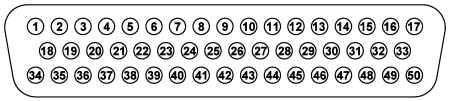


DETECTOR TEST PANEL FRONT VIEW



DETAIL A **TYPICAL VERTICAL SECTION DETAIL**

DRAWN BY: BILL BERENS



DD50 D-SUB CONNECTOR PINS
PLUG (MALE) CONNECTOR SHOWN ~
MIRROR FOR SOCKET (FEMALE) CONNECTOR ~
SEE NOTE 2

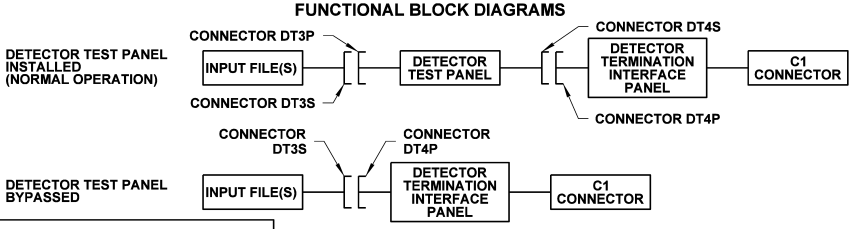
NOTES

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						CONNECTOR DT3P						CONNECTOR DT4S						CONNECTOR DT4P					
PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION
1	I-1F	DET. 1	26	J-3F	DET. 23	1	I1U - IN		26	J3U - IN		1	I1U - OUT		26	J3U - OUT		1	C1 - 56	DET. 1	26	C1 - 64	DET. 23
2	I-2F	DET. 3	27	J-4F	DET. 25	2	I2U - IN		27	J4U - IN		2	I2U - OUT		27	J4U - OUT		2	C1 - 39	DET. 3	27	C1 - 48	DET. 25
3	I-3F	DET. 5	28	J-5F	DET. 27	3	I3U - IN		28	J5U - IN		3	I3U - OUT		28	J5U - OUT		3	C1 - 63	DET. 5	28	C1 - 57	DET. 27
4	I-4F	DET. 7	29	J-2W	DET. 22	4	I4U - IN		29	J2L - IN		4	I4U - OUT		29	J2L - OUT		4	C1 - 47	DET. 7	29	C1 - 44	DET. 22
5	I-1W	DET. 2	30	J-3W	DET. 24	5	I1L - IN		30	J3L - IN		5	I1L - OUT		30	J3L - OUT		5	C1 - 56	DET. 2	30	C1 - 77	DET. 24
6	I-2W	DET. 4	31	J-4W	DET. 26	6	I2L - IN		31	J4L - IN		6	I2L - OUT		31	J4L - OUT		6	C1 - 43	DET. 4	31	C1 - 48	DET. 26
7	I-3W	DET. 6	32	J-5W	DET. 28	7	I3L - IN		32	J5L - IN		7	I3L - OUT		32	J5L - OUT		7	C1 - 76	DET. 6	32	C1 - 57	DET. 28
8	I-4W	DET. 8	33	J-6F	DET. 29	8	I4L - IN		33	J6U - IN		8	I4L - OUT		33	J6U - OUT		8	C1 - 47	DET. 8	33	C1 - 42	DET. 29
9	I-5F	DET. 9	34	J-7F	DET. 31	9	I5U - IN		34	J7U - IN		9	I5U - OUT		34	J7U - OUT		9	C1 - 58	DET. 9	34	C1 - 66	DET. 31
10	I-6F	DET. 11	35	J-8F	DET. 33	10	I6U - IN		35	J8U - IN		10	I6U - OUT		35	J8U - OUT		10	C1 - 41	DET. 11	35	C1 - 50	DET. 33
11	I-7F	DET. 13	36	J-9F	DET. 35	11	I7U - IN		36	J9U - IN		11	I7U - OUT		36	J9U - OUT		11	C1 - 65	DET. 13	36	C1 - 59	DET. 35
12	I-8F	DET. 15	37	J-6W	DET. 30	12	I8U - IN		37	J6L - IN		12	I8U - OUT		37	J6L - OUT		12	C1 - 49	DET. 15	37	C1 - 46	DET. 30
13	I-5W	DET. 10	38	J-7W	DET. 32	13	I5L - IN		38	J7L - IN		13	I5L - OUT		38	J7L - OUT		13	C1 - 58	DET. 10	38	C1 - 79	DET. 32
14	I-6W	DET. 12	39	J-8W	DET. 34	14	I6L - IN		39	J8L - IN		14	I6L - OUT		39	J8L - OUT		14	C1 - 45	DET. 12	39	C1 - 50	DET. 34
15	I-7W	DET. 14	40	J-9W	DET. 36	15	I7L - IN		40	J9L - IN		15	I7L - OUT		40	J9L - OUT		15	C1 - 78	DET. 14	40	C1 - 61	DET. 36
16	I-8W	DET. 16	41	NC	NA	16	I8L - IN		41	NC	NA	16	I8L - OUT		41	NC	NA	16	C1 - 49	DET. 16	41	NC	NA
17	I-9F	DET. 17	42	NC	NA	17	I9U - IN		42	NC	NA	17	I9U - OUT		42	NC	NA	17	C1 - 60	DET. 17	42	NC	NA
18	I-12F	Ø2 PED	43	NC	NA	18	I12U - IN		43	NC	NA	18	I12U - OUT		43	NC	NA	18	C1 - 67	Ø2 PED	43	NC	NA
19	I-13F	Ø6 PED	44	NC	NA	19	I13U - IN		44	NC	NA	19	I13U - OUT		44	NC	NA	19	C1 - 68	Ø6 PED	44	NC	NA
20	J-1F	DET. 19	45	NC	NA	20	J1U - IN		45	NC	NA	20	J1U - OUT		45	NC	NA	20	C1 - 55	DET. 19	45	NC	NA
21	I-9W	DET. 18	46	NC	NA	21	I9L - IN		46	NC	NA	21	I9L - OUT		46	NC	NA	21	C1 - 62	DET. 18	46	NC	NA
22	I-12W	Ø4 PED	47	NC	NA	22	I12L - IN		47	NC	NA	22	I12L - OUT		47	NC	NA	22	C1 - 69	Ø4 PED	47	NC	NA
23	I-13W	Ø8 PED	48	NC	NA	23	I13L - IN		48	NC	NA	23	I13L - OUT		48	NC	NA	23	C1 - 70	Ø8 PED	48	NC	NA
24	J-1W	DET. 20	49	I15-1	POWER	24	J1L - IN		49	+24 VDC	POWER	24	J1L - OUT		49	NC	NA	24	C1 - 55	DET. 20	49	NC	NA
25	J-2F	DET. 21	50	I15-2	GROUND	25	J2U - IN		50	LOGIC GND	GROUND	25	J2U - OUT		50	NC	NA	25	C1 - 40	DET. 21	50	NC	NA

PIN TABLE EXAMPLES:

J1F: Input File J, Slot 1, Terminal F

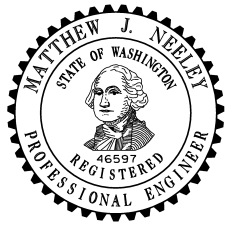
DET. 14: Detector #14

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

C1 - 58: C1 Connector, Pin 58

N/A: Not Applicable

NC: Not Connected



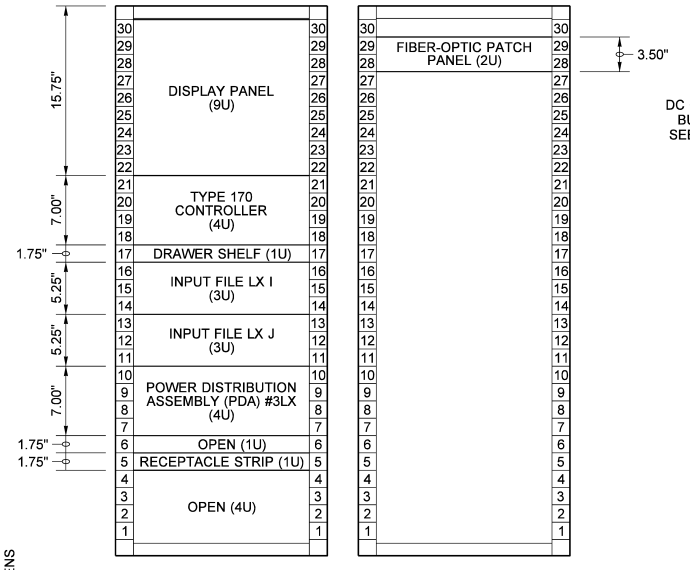
Neeley, Matthew
Jun 18 2018 8:15 AM

TYPE 332 SIGNAL CABINET DETECTOR TEST PANEL

STANDARD PLAN J-80.15-00

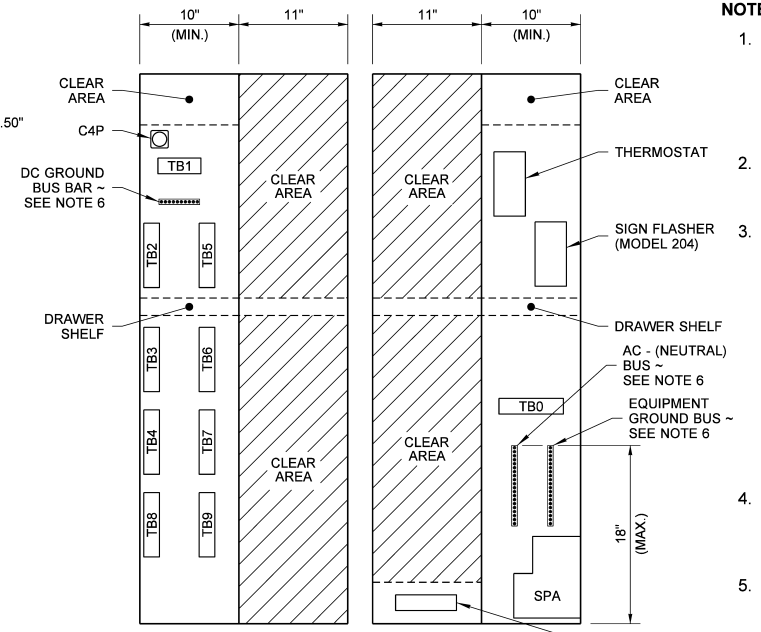
SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:30 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation



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:

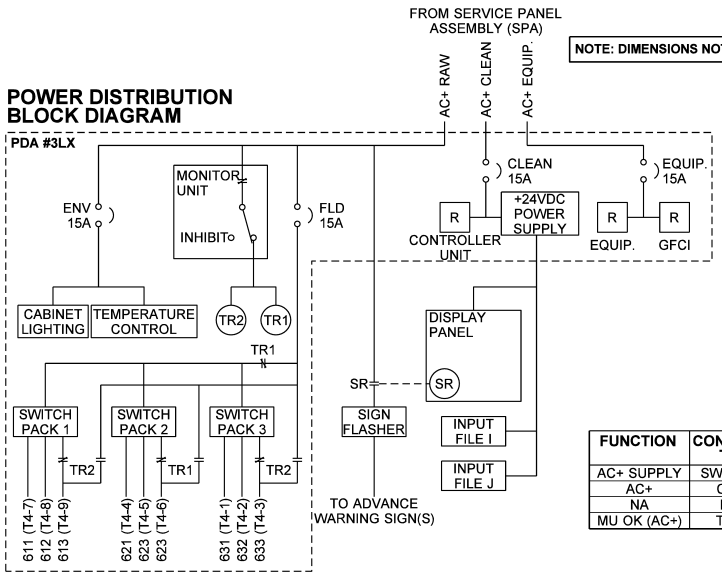
From	To	Function
T2-8	T4-6	TR1 Output to Field Green 2
T2-6	MU-3	Energizes TR1 and TR2 when MU is normal
T1-1, T1-2	SR-3	Field Output - Sign On
T1-3, T4-4	SR-4	Field Output - Sign Off

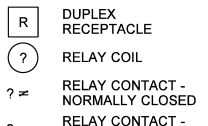
4. Input Panel #1D shall meet the requirements of Input Panel #1 in the TEES, with the modifications shown here. Do Not include ground bus bars between terminal blocks TB2 through TB9. Relabel the C5 connector as C4P. The C4 connector cable shall be 4 feet in length.
5. Service Panel #1D shall meet the 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.

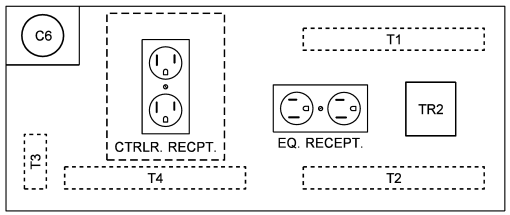
DRAWN BY: BILL BERENS

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

POWER DISTRIBUTION BLOCK DIAGRAM







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



Neeley, Matthew
Jun 18 2018 8:16 AM

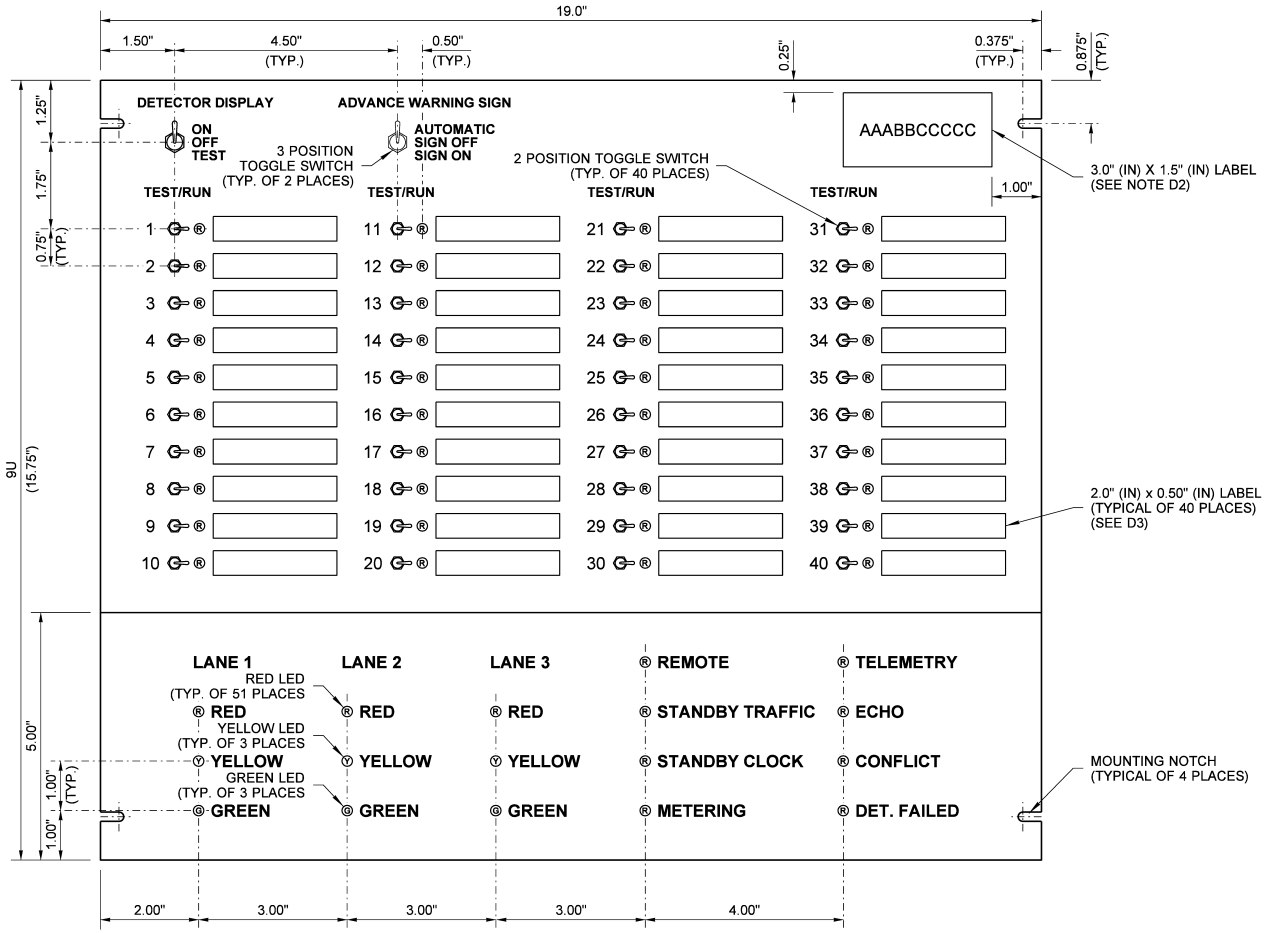
TYPE 334 RAMP METER/ DATA STATION CABINET STANDARD PLAN J-81.10-00

SHEET 1 OF 3 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:29 AM

STATE DESIGN ENGINEER

Washington State Department of Transportation



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).

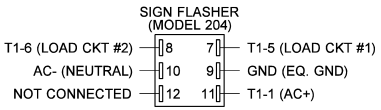
D6. The Sign Relay shall be DPDT, wired as shown, with a contact rating not less than 10 amps continuous duty. The relay shall operate on ground output from the controller, and draw less than 75 milliamps when energized. AC wiring between the relay and the PDA shall be #14 AWG.

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

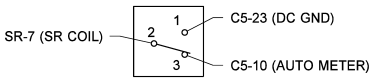
FUNCTION	CONNECT TO	SIGN RELAY (SR)	CONNECT TO	FUNCTION
SIGN CTRL	SS-2	7 6	NC	NA
NA	NC	8 5	NC	NA
AC+	T2-7	1 4	T1-3	SIGN OFF
+24 VDC	C5 - 24	2 3	T1-1	SIGN ON

SHOWN DE-ENERGIZED (NOT METERING)

SIGN RELAY DETAIL
(SEE NOTE D6)

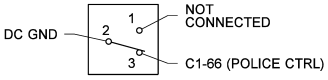


SIGN FLASHER DETAIL
(SEE NOTE 5)



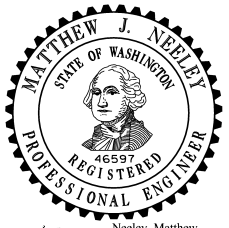
SHOWN IN AUTOMATIC MODE

SIGN SWITCH (SS) DETAIL
(SEE NOTE 7)



SHOWN IN POLICE CONTROL MODE (ON)

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



Neeley, Matthew
Jun 18 2018 8:17 AM

TYPE 334 RAMP METER/ DATA STATION CABINET STANDARD PLAN J-81.10-00

SHEET 2 OF 3 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:29 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

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	POLICE CTRL	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

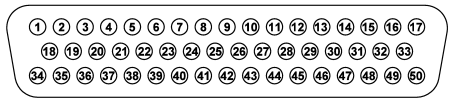
C4, C5, AND C6 CONNECTOR PIN ASSIGNMENTS

C4 CONNECTOR PINS (TO CURRENT MONITOR)			C5 CONNECTOR PINS (TO DISPLAY PANEL)			C6 CONNECTOR PINS (TO PDA #3LX)		
PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION	PIN	CONNECT TO	FUNCTION
1	C1-63	CM2-RED	1	C1-83	DP-REMOTE	1	C1-2	SWPK1-RED
2	C1-64	CM2-YEL	2	C1-84	DP-NA	2	C1-3	SWPK1-GRN
3	C1-65	CM2-GRN	3	C1-85	DP-STANDBY TRAFFIC	3	C1-4	SWPK2-RED
4	C1-77	CM1-RED	4	C1-86	DP-STANDBY CLOCK	4	C1-5	SWPK2-YEL
5	C1-78	CM1-YEL	5	C1-87	DP-TELEMETRY	5	C1-6	SWPK2-GRN
6	C1-79	CM1-GRN	6	C1-88	DP-ECHO	6	C1-7	SWPK3-RED
7	C1-80	CM3-RED	7	C1-89	DP-CONFLICT	7	C1-8	SWPK3-YEL
8	C1-81	CM3-YEL	8	C1-90	DP-DET. FAILED	8	C1-9	SWPK3-GRN
9	C1-82	CM3-GRN	9	C1-91	DP-RED LANE 1	9	C1-37	SWPK1-YEL
10	C1-36	NA	10	C1-93	DP-METERING, SS-3	10	C1-103	WATCHDOG MU
11	NC	NA	11	C1-94	DP-RED LANE 2	11	NC	
12	NC	NA	12	C1-95	DP-YELLOW LANE 2	12	NC	
13	NC	NA	13	C1-96	DP-GREEN LANE 2	13	NC	
14	NC	NA	14	C1-97	DP-YELLOW LANE 1	14	NC	
15	NC	NA	15	C1-98	DP-GREEN LANE 1	15	NC	
16	NC	NA	16	C1-99	DP-RED LANE 3	16	NC	
17	C1-70	NA	17	C1-100	DP-YELLOW LANE 3	17	NC	
18	C1-71	NA	18	C1-101	DP-GREEN LANE 3	18	NC	
19	C1-72	NA	19	NC	NA	19	NC	
20	NC	NA	20	NC	NA	20	NC	
21	C5-19	NA	21	NC	NA	21	NC	
22	C5-20	NA	22	NC	NA	22	NC	
23	DC GND	DC GND	23	DC GND	DC GND TO SS-1	23	DC GND	DC GND
24	TB1-1B	+24 VDC	24	TB1-2B	+24 VDC	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

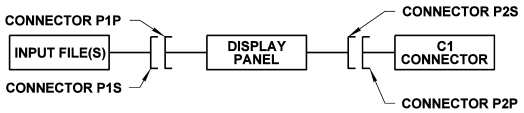
DRAWN BY: BILL BERENS



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

MATTHEW J. NEELEY
STATE OF WASHINGTON
46597
REGISTERED
PROFESSIONAL ENGINEER

Neeley, Matthew
Jun 18 2018 8:17 AM

TYPE 334 RAMP METER/ DATA STATION CABINET STANDARD PLAN J-81.10-00

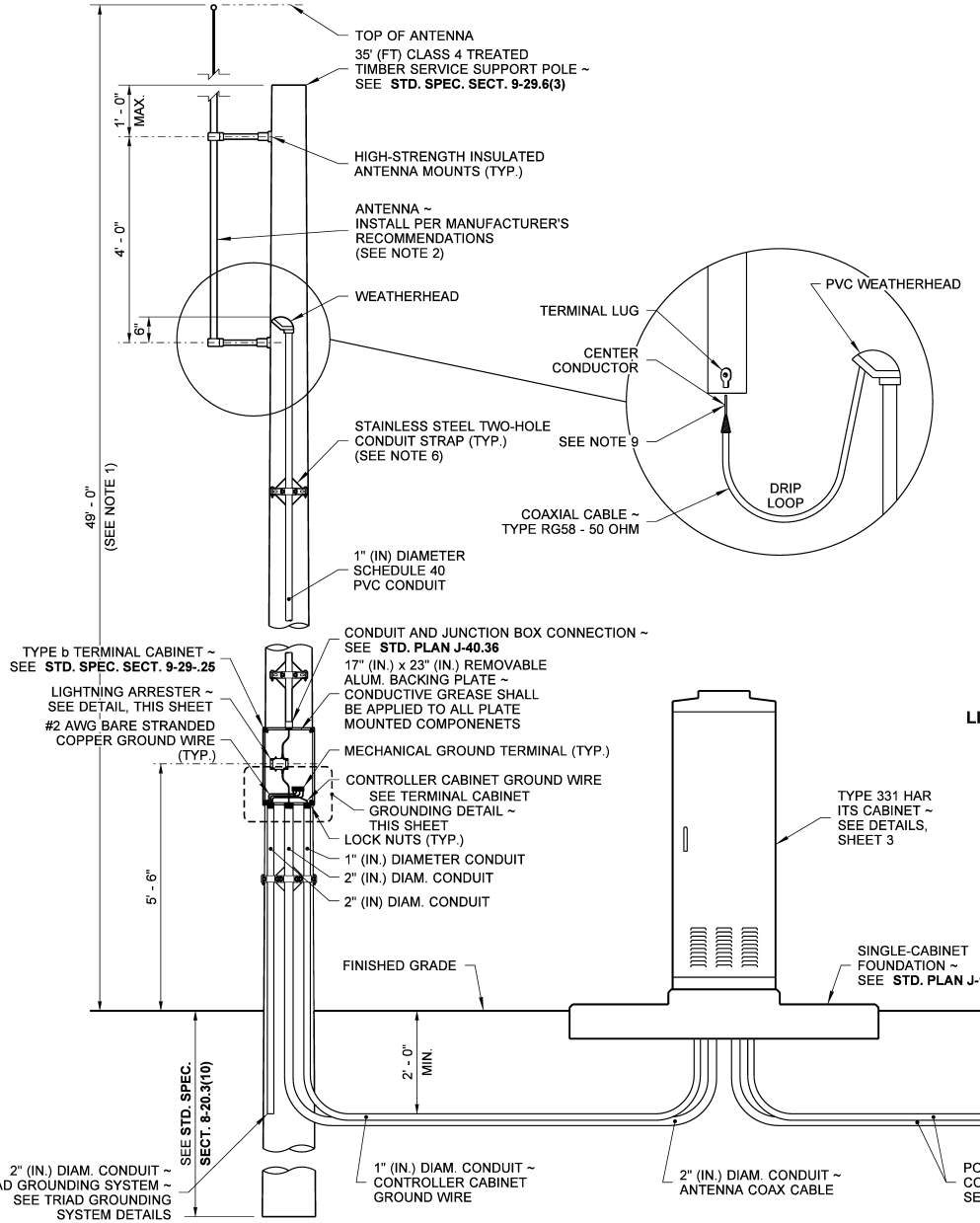
SHEET 3 OF 3 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:29 AM

STATE DESIGN ENGINEER
Washington State Department of Transportation

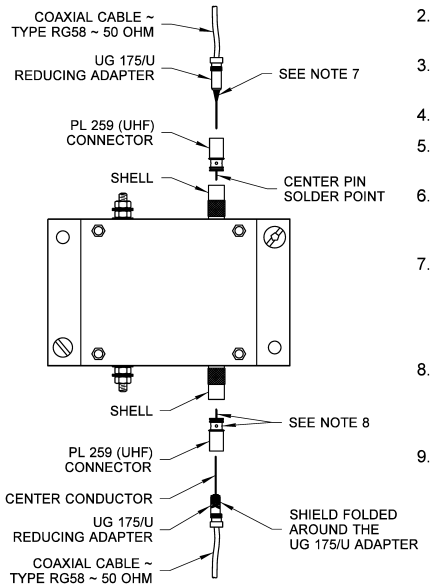
This page left blank intentionally.

DRAWN BY: BILL BERENS

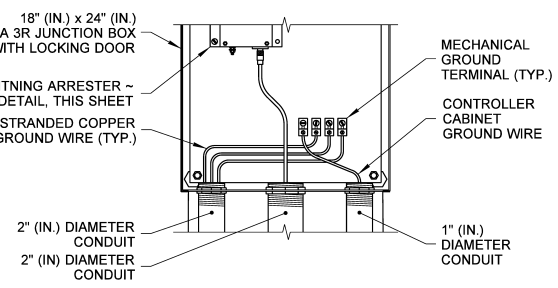


ELEVATION VIEW

HIGHWAY ADVISORY RADIO TRANSMITTER DETAILS



LIGHTNING ARRESTER CONNECTION DETAIL



TERMINAL CABINET GROUNDING DETAIL

NOTES

1. Under **FCC Rules & Regulations 90.242**, the antenna is limited to a maximum height of 15 meters (49.2 feet). Mount the antenna to the pole with a bracket and high-strength insulated antenna mounts with stainless steel hardware.
2. The antenna shall be center or base loaded vertical featuring a low-loss, embedded weatherproof loading coil.
3. The amplitude modulated transmitter must be FCC type approved. See Contract for the transmitter frequency.
4. The voice storage unit shall be as specified in the Contract.
5. See **Standard Plan J-60.14** for details on mounting a NEMA junction box to a timber pole.
6. All HAR 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.
7. The shield shall be tightly wrapped around the center conductor when attaching the PL 259 connector to the UG 175/U adapter. The shield wrapping on the center conductor may **ONLY** come in contact with the center pin at the solder point. The shield **MUST NOT** come in contact with the PL 259 shell.
8. The shield shall be soldered through all of the holes on the PL 259 connector, and the center conductor shall be soldered at the tip of the connector. The shield and center conductor **MUST NOT** be shorted together.
9. The shield shall be tightly wrapped around the center conductor. Crimp and solder the center conductor and shield to the terminal lug and attach securely to the antenna. Seal the entire connection assembly, including the antenna connection point, with butyl tape or heat shrink.

MATTHEW J. NEELEY — STATE OF WASHINGTON — 46597 — REGISTERED PROFESSIONAL ENGINEER

Neeley, Matthew
Jun 8 2018 10:46 AM

HIGHWAY ADVISORY RADIO (HAR) TRANSMITTER

STANDARD PLAN J-86.10-00

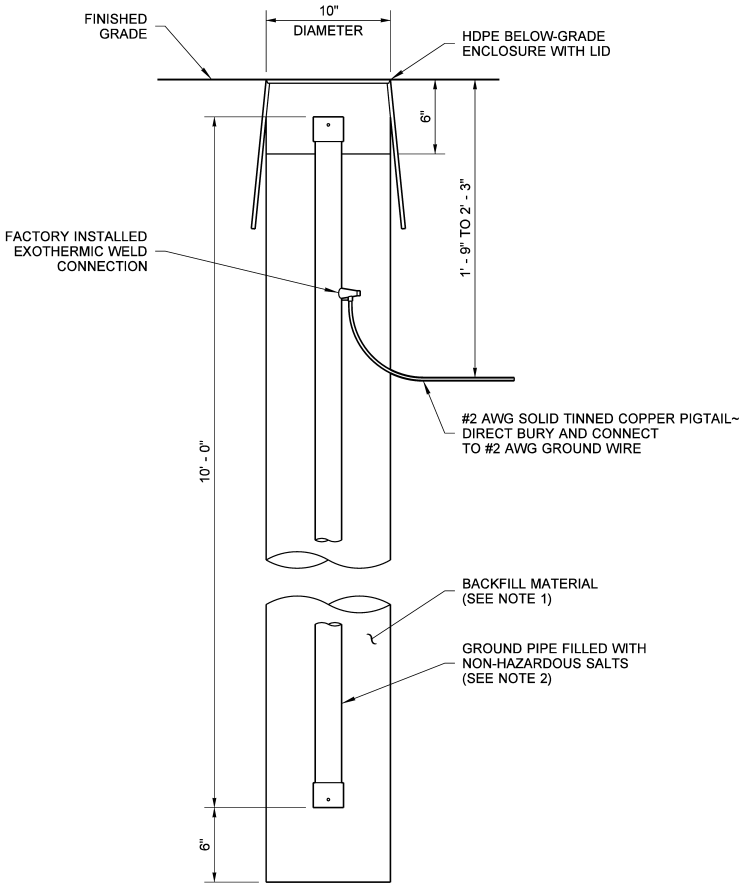
SHEET 1 OF 3 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:28 AM

STATE DESIGN ENGINEER

Washington State Department of Transportation

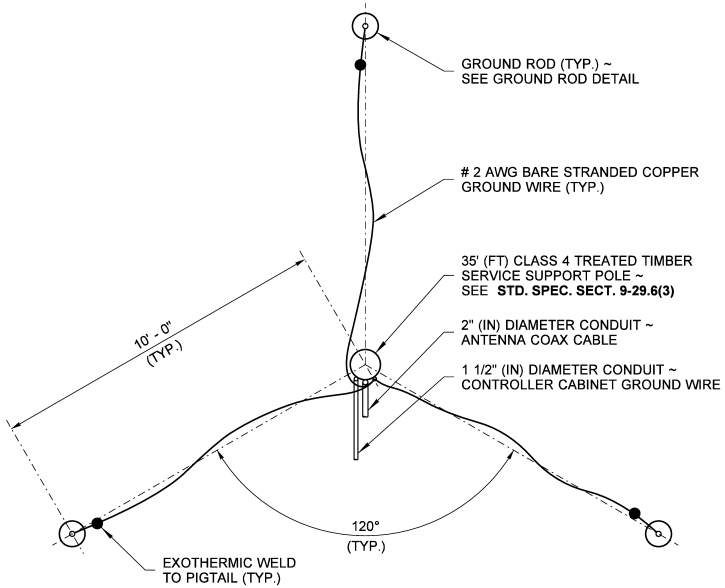
DRAWN BY: BILL BERENS



ELEVATION VIEW
GROUND ROD DETAIL

CONSTRUCTION NOTES

1. Backfill material shall meet **ANSI/NSF Environmental Standard 60**. Follow manufacturer's mixing recommendations.
2. Ground Pipe and types of non-hazardous salts will vary per manufacturer. See the WSDOT Qualified Products List (QPL) for approved manufacturers and follow guidance provided.



PLAN VIEW
GROUND ROD LAYOUT

MATTHEW J. NEELEY
STATE OF WASHINGTON
46597
REGISTERED
PROFESSIONAL ENGINEER

Neeley, Matthew
Jun 8 2018 10:46 AM

HIGHWAY ADVISORY RADIO (HAR) TRANSMITTER

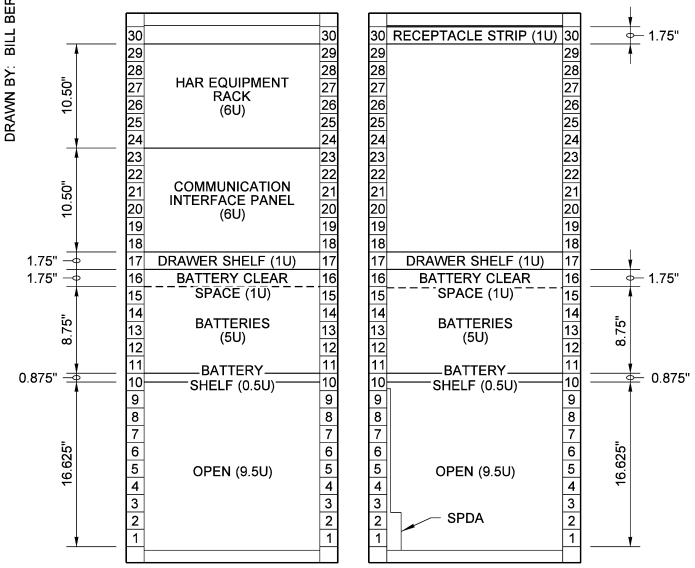
STANDARD PLAN J-86.10-00

SHEET 2 OF 3 SHEETS

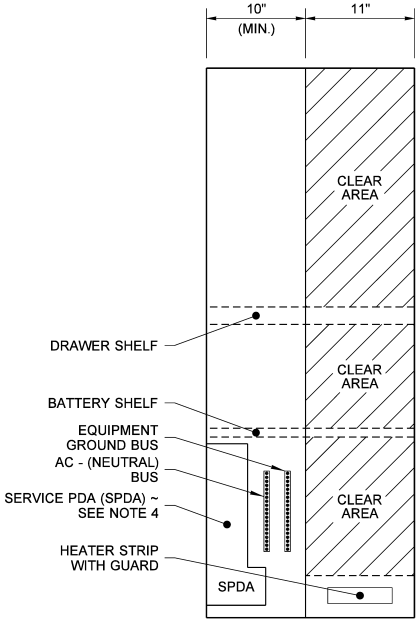
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:28 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

TRIAD GROUNDING SYSTEM DETAILS

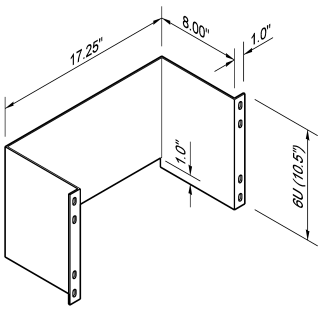
DRAWN BY: BILL BERENS



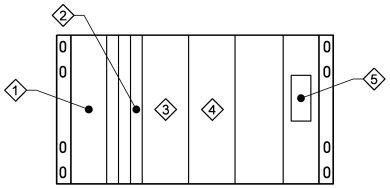
FRONT VIEW **REAR VIEW**



SERVICE PANEL ITS LAYOUT



COMMUNICATION INTERFACE PANEL
ISOMETRIC VIEW



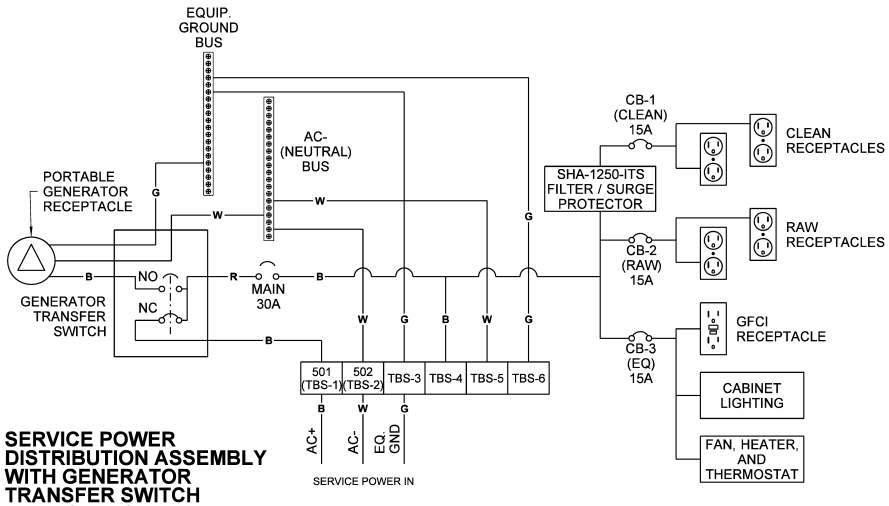
HAR EQUIPMENT RACK LAYOUT
FRONT VIEW

CABINET NOTES

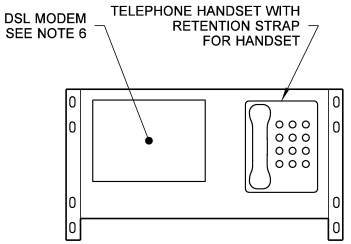
1. The cabinet is a Type 331, with housing and rack as shown in **Standard Plan J-12.15**.
2. The service panel shall be installed on the left side of the cabinet as viewed from the rear.
3. Service PDA (SPDA) shall be as shown in the **TEES**, with the modifications shown here.
4. The battery shelf shall not obstruct any outlets on the SPDA.
5. The Receptacle Strip shall be plugged into a clean receptacle on the SPDA.
6. DSL Modem may be set on the drawer shelf if it is not designed for wall mounting.
7. Bus bars shall be capable of being used without lugs on wiring.

KEY NOTES

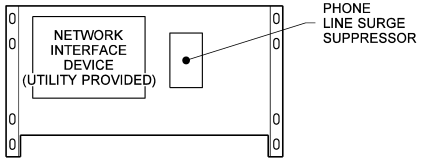
1. POWER MODULE
2. INTERFACE MODULE
3. DIGITAL COMMUNICATION CONTROLLER MODULE
4. AM TRANSMITTER MODULE
5. MODULATION PICK-OFF



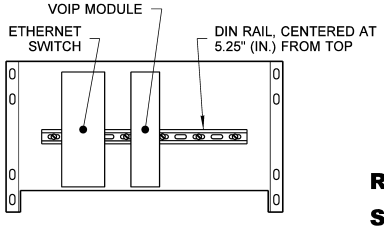
SERVICE POWER DISTRIBUTION ASSEMBLY WITH GENERATOR TRANSFER SWITCH WIRING DIAGRAM
SEE NOTE 3



COMMUNICATION INTERFACE PANEL
FRONT VIEW



COMMUNICATION INTERFACE PANEL
REAR VIEW ~ PHONE/DSL



COMMUNICATION INTERFACE PANEL
REAR VIEW ~ FIBER



Neeley, Matthew
Jun 8 2018 10:46 AM

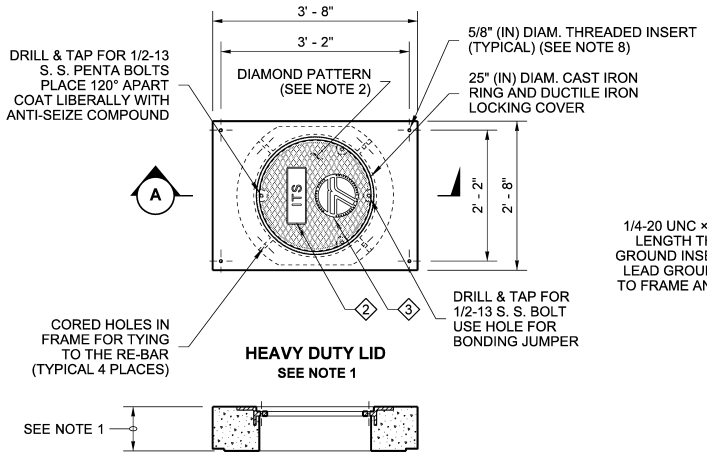
HIGHWAY ADVISORY RADIO (HAR) TRANSMITTER

STANDARD PLAN J-86.10-00

SHEET 3 OF 3 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:28 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

This page left blank intentionally.

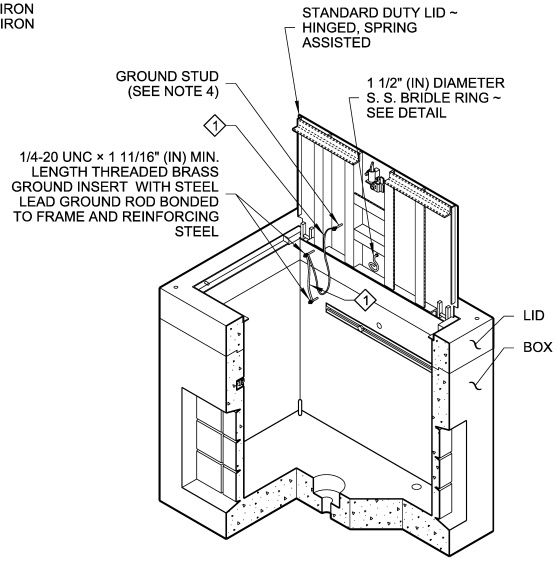


HEAVY DUTY LID
SEE NOTE 1

SECTION (A)
(LID NOT SHOWN)

1. EQUIPMENT BONDING JUMPER (SEE NOTE 5)
2. SYSTEM IDENTIFICATION (SEE NOTE 6)
3. AGENCY LOGO (SEE DETAIL, SHEET 2)

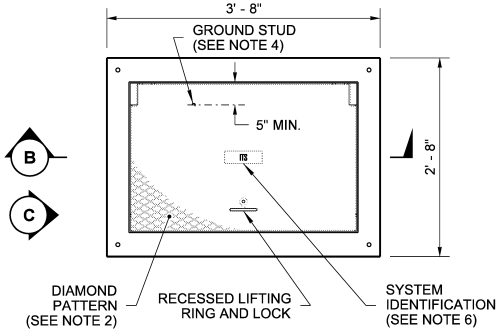
DRAWN BY: LISA CYFORD



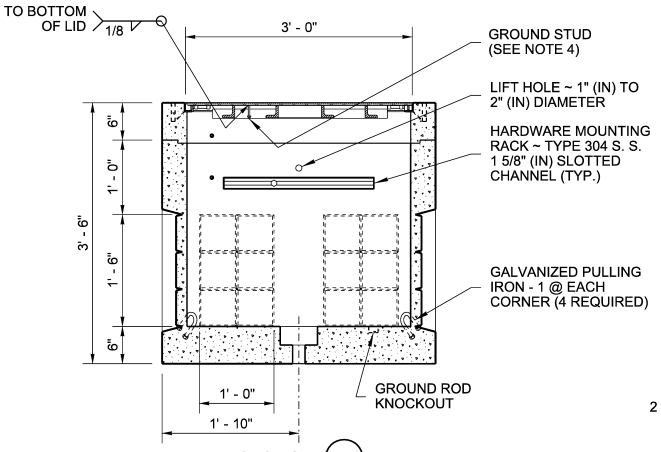
ISOMETRIC CUTAWAY

NOTES

1. The Heavy Duty Lid thickness varies by installation type:
   a.) 9" (in) for all new installations
   b.) 6" (in) for existing boxes with no roadway overlay
   c.) Such that it is flush with the surface of the new overlay, when a new overlay is specified
2. Minimum lid thickness shown. The diamond pattern shall be a minimum of 3/32" (in) thick.
3. Slip-resistant lids shall be identified with a permanent marking on the underside of the lid, indicating the type of surface treatment (see Contract Documents for details) and the year of manufacture. The marking shall use 1/8" (in) thick lines formed with a weld bead, and shall be placed prior to galvanizing.
4. For Standard Duty Lids, attach a 1/4-20 UNC × 1" (in) S. S. ground stud, coated with anti-sieze compound. For Heavy Duty Lids, install a 1/2-13 UNC × 1 1/4" (in) S. S. bolt in a 5/8" (in) diameter cored hole in the ductile iron lid gusset as a ground stud. All ground studs shall include (3) S. S. nuts and (2) S. S. flat washers. See **Standard Plan J-90.50** for grounding and bonding details.
5. The bonding jumper between the lid and frame shall be #8 AWG (min.) x 4' (ft) tinned braided copper.
6. System identification letters shall use 1/8" (in) wide lines. Cover marking for steel lids shall be formed by casting or with a mild steel weld bead. Cover marking for ductile iron lids shall be recessed. See **COVER MARKING DETAIL** and **Standard Specification section 9-29.2(4)** for additional details. Ductile iron lids shall also provide a minimum 1 1/2" (in) wide x 3 1/2" high x 3/16" (in) thick, flat area for lifting purposes.
7. Cement concrete shall be Class 4000.
8. Plastic plugs shall be put into the lid inserts after fabrication and the lid installation.
9. Conduit Capacity = 40 inches (sum total of all conduit diameters).
10. This drawing depicts a typical Pull Box assembly. Reinforcing not shown. Each manufacturer's Pull Box assembly will vary. Refer to the approved manufacturer's shop drawings for all dimensions and the actual arrangement.
11. The lid is an assembly consisting of the metal lid and frame, reinforcing steel, brass ground inserts, and concrete.
12. #3 reinforcing bar shall be capable of being bent out of the way and restored, to allow for conduit installation.

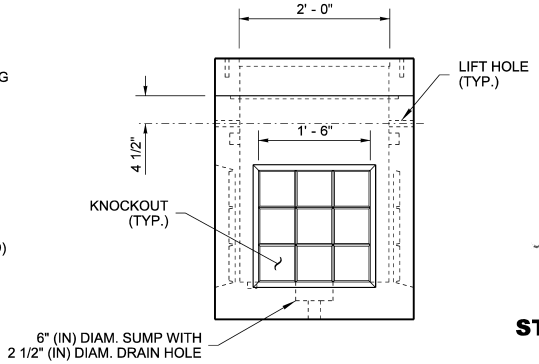


TOP



SECTION (B)

PULL BOX ASSEMBLY
(SHOWN WITH STANDARD DUTY LID)



VIEW (C)

MATTHEW J. NEELEY
STATE OF WASHINGTON
46597
REGISTERED
PROFESSIONAL ENGINEER

Neeley, Matthew
Jun 25 2018 12:52 PM

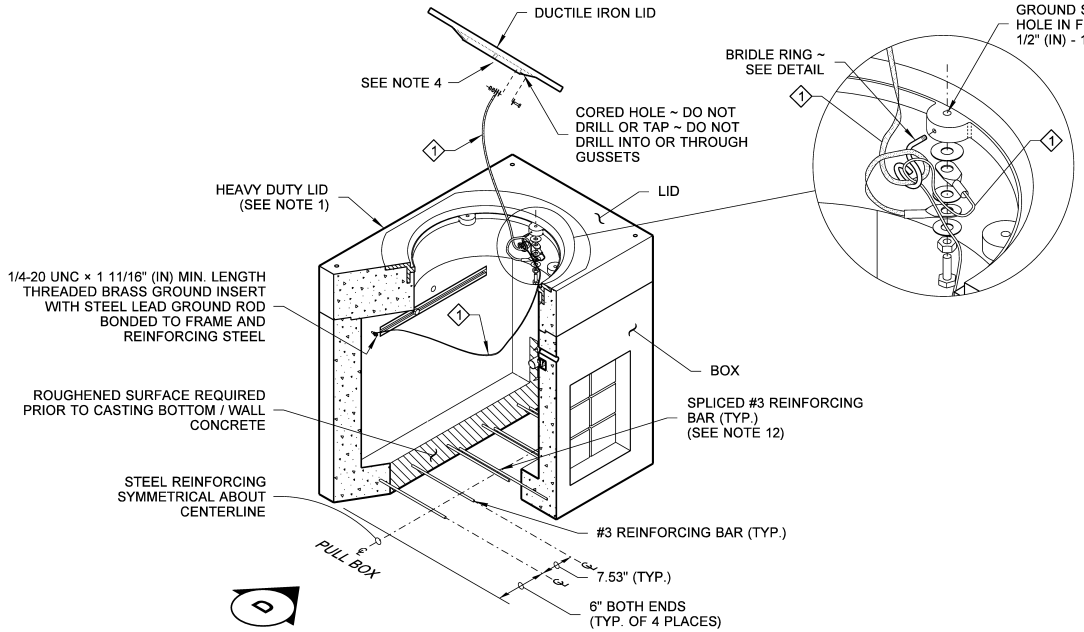
PULL BOX

STANDARD PLAN J-90.10-03

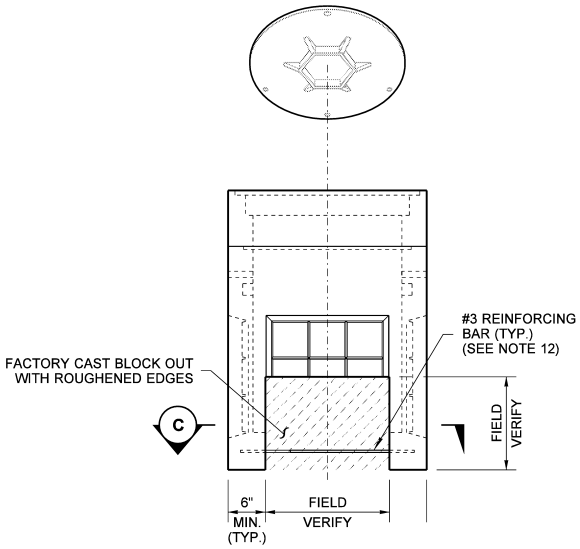
SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:27 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

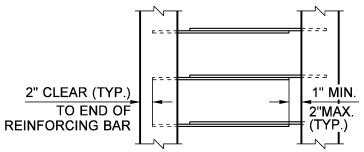
DRAWN BY: LISA CYFORD



ISOMETRIC CUTAWAY



VIEW D



SECTION C

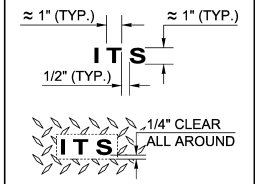
OPEN BOTTOM PULL BOX ASSEMBLY

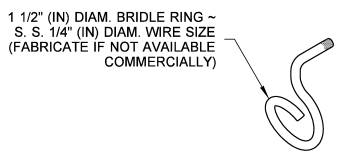
(SHOWN WITH HEAVY DUTY LID)

SEE **PULL BOX**, SHEET 1, FOR DIMENSIONS NOT SHOWN

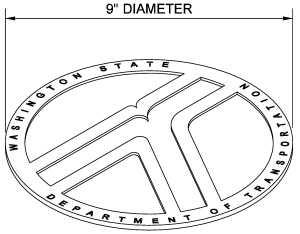
* BOLTS, NUTS AND WASHERS ~ **ASTM F593 OR A193, TYPE 304 OR TYPE 316** STAINLESS STEEL (S.S.)

COVER MARKING DETAIL





BRIDLE RING DETAIL



LOGO DETAIL

MATTHEW J. NEELEY STATE OF WASHINGTON 46597 REGISTERED PROFESSIONAL ENGINEER

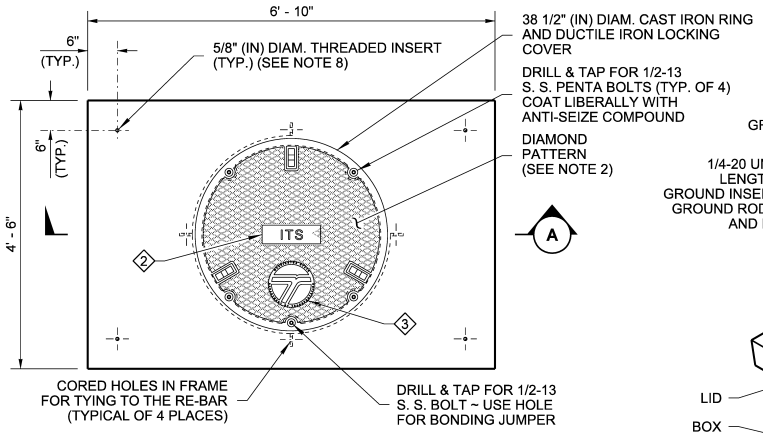
Neeley, Matthew
Jun 25 2018 12:52 PM
cosign

PULL BOX

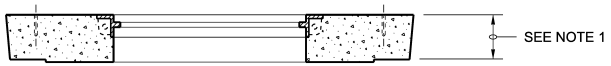
STANDARD PLAN J-90.10-03

SHEET 2 OF 2 SHEETS

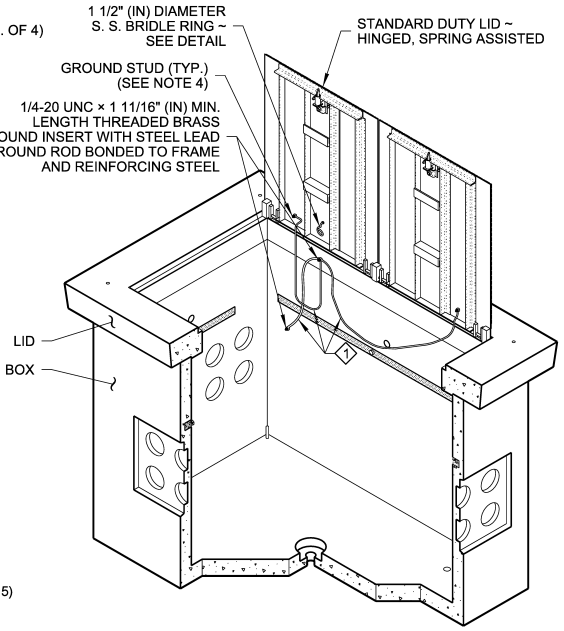
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:27 AM
cosign
STATE DESIGN ENGINEER
Washington State Department of Transportation



HEAVY DUTY LID
SEE NOTE 1



SECTION (A)
(DUCTILE IRON COVER NOT SHOWN)



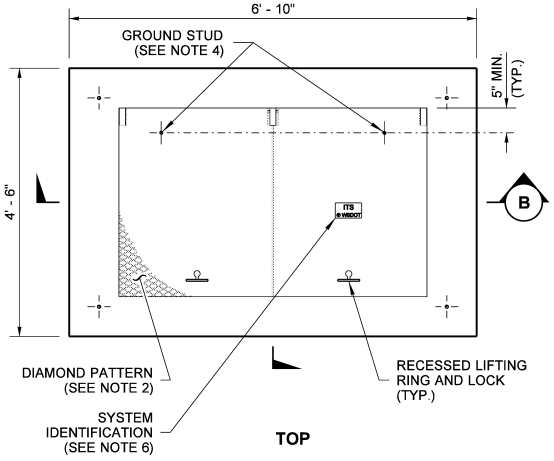
ISOMETRIC CUTAWAY

1. EQUIPMENT BONDING JUMPER (SEE NOTE 5)
2. SYSTEM IDENTIFICATION (SEE NOTE 6)
3. AGENCY LOGO (SEE DETAIL, SHEET 2)

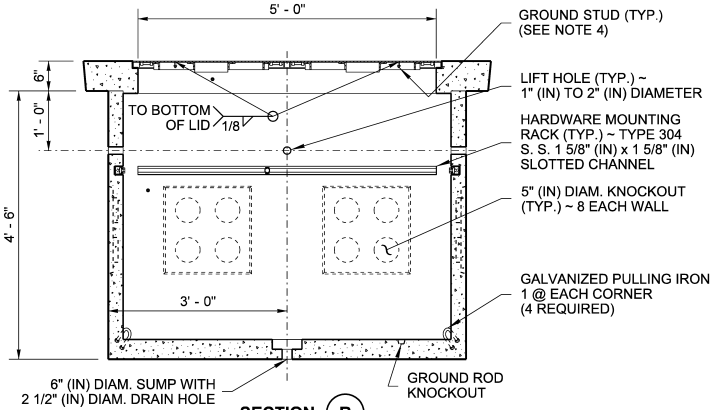
DRAWN BY: LISA CYFORD

NOTES

1. The Heavy Duty Lid thickness varies by installation type:
   a.) 9" (in) for all new installations
   b.) 6" (in) for existing boxes with no roadway overlay
   c.) Such that it is flush with the surface of the new overlay, when a new overlay is specified
2. Minimum lid thickness shown. The diamond pattern shall be a minimum of 3/32" (in) thick.
3. Slip-resistant lids shall be identified with a permanent marking on the underside of the lid, indicating the type of surface treatment (see Contract Documents for details) and the year of manufacture. The marking shall use 1/8" (in) thick lines formed with a weld bead, and shall be placed prior to galvanizing.
4. For Standard Duty Lids, attach a 1/4-20 UNC × 1" (in) S. S. ground stud, coated with anti-sieze compound. For Heavy Duty Lids, install a 1/2-13 UNC × 1 1/4" (in) S. S. bolt in a 5/8" (in) diameter cored hole in the ductile iron lid gusset as a ground stud. All ground studs shall include (3) S. S. nuts and (2) S. S. flat washers. See **Standard Plan J-90.50** for grounding and bonding details.
5. The bonding jumper between the lid and frame shall be #8 AWG (min.) x 4' (ft) tinned braided copper.
6. System identification letters shall use 1/8" (in) wide lines. Cover markings for steel lids shall be formed by casting or with a mild steel weld bead. Cover marking for ductile iron lids shall be recessed. See **COVER MARKING DETAIL** and **Standard Specification section 9-29.2(4)** for additional details. Ductile iron lids shall also provide a minimum 1 1/2" (in) wide x 3 1/2" high x 3/16" (in) thick flat area for lifting purposes.
7. Cement concrete shall be Class 4000.
8. Plastic plugs shall be put into the lid inserts after fabrication and the lid installation.
9. Conduit Capacity = 60 inches (sum total of all conduit diameters).
10. This drawing depicts a typical assembly. Reinforcing not shown. Each manufacturer's assembly will vary. Refer to the approved manufacturer's shop drawings for all dimensions and the actual arrangement.
11. The lid is an assembly consisting of the metal lid(s) and frame, reinforcing steel, brass ground inserts, and concrete.
12. #3 reinforcing bar shall be capable of being bent out of the way and restored, to allow for conduit installation.

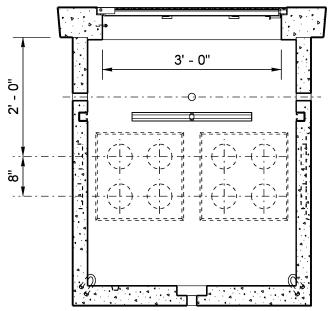


TOP



SECTION (B)

CABLE VAULT
(SHOWN WITH STANDARD DUTY LID)



VIEW (C)



Neeley, Matthew
Jun 25 2018 12:53 PM

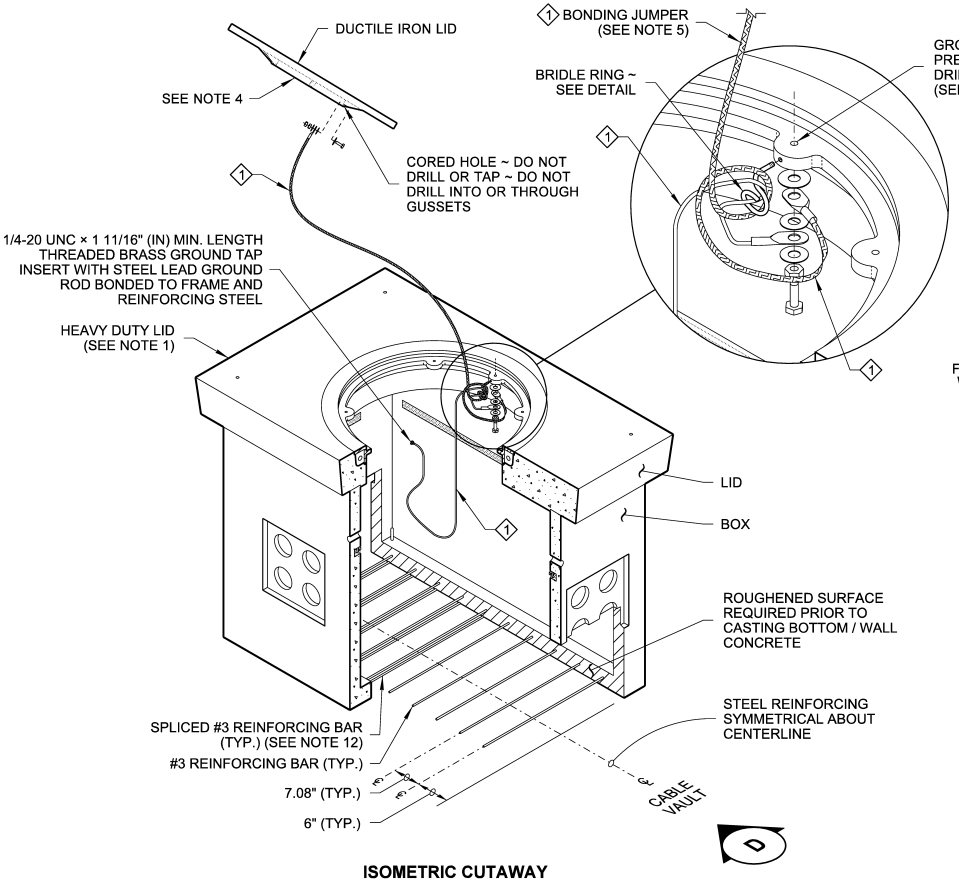
CABLE VAULT

STANDARD PLAN J-90.20-03

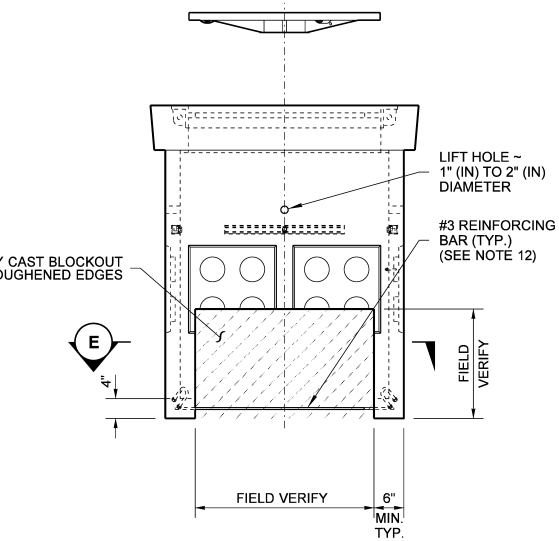
SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:20 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

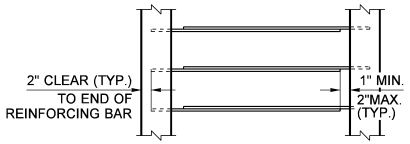
DRAWN BY: LISA CYFORD



ISOMETRIC CUTAWAY



VIEW D



SECTION E

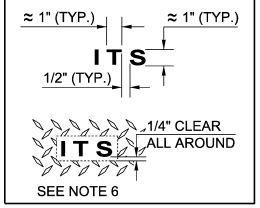
* BOLTS, NUTS AND WASHERS ~ **ASTM F593 OR A193, TYPE 304 OR TYPE 316** STAINLESS STEEL (S.S.)

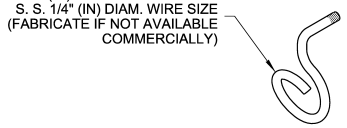
OPEN BOTTOM CABLE VAULT

(SHOWN WITH HEAVY DUTY LID)

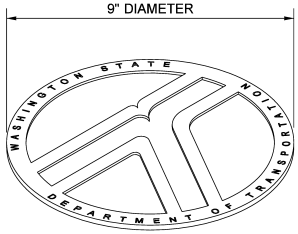
SEE **CABLE VAULT**, SHEET 1, FOR DIMENSIONS NOT SHOWN

COVER MARKING DETAIL





BRIDLE RING DETAIL



LOGO DETAIL

MATTHEW J. NEELEY STATE OF WASHINGTON 46597 REGISTERED PROFESSIONAL ENGINEER

Neeley, Matthew
Jun 25 2018 12:53 PM

CABLE VAULT

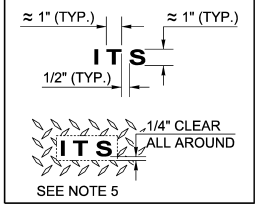
STANDARD PLAN J-90.20-03

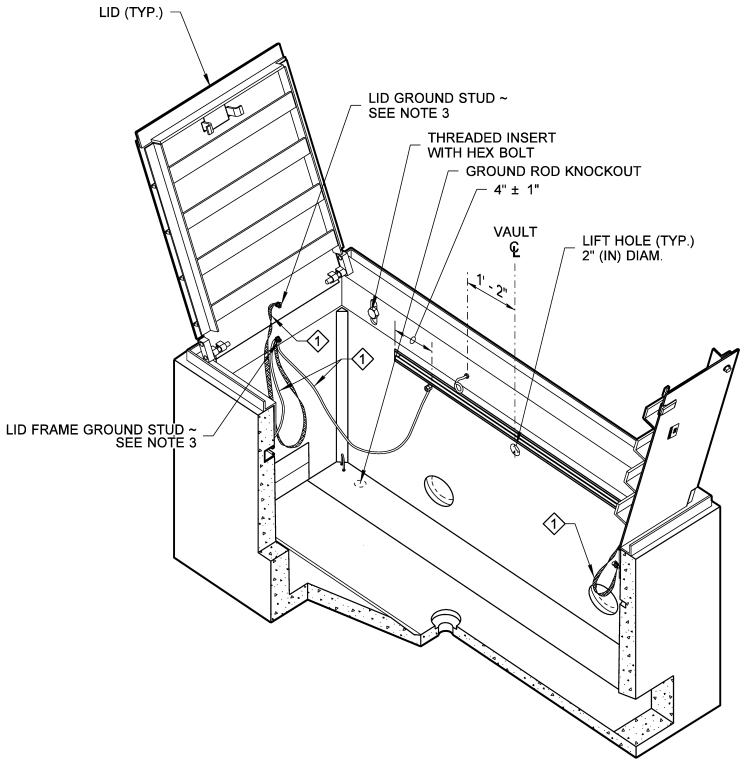
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:21 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

DRAWN BY: FERN LIDDELL

COVER MARKING DETAIL





ISOMETRIC CUTAWAY ASSEMBLY

NOTES

1. The diamond pattern shall be a minimum of 3/32" (in) thick.
2. Slip-resistant lids shall be identified with a permanent marking on the underside of the lid, indicating the type of surface treatment (see Contract Documents for details) and the year of manufacture. The marking shall use 1/8" (in) thick lines formed with a weld bead, and shall be placed prior to galvanizing.
3. A 1/4 - 20 UNC x 1" (in) ground stud with three nuts and two flat washers shall be welded to each lid and coated with anti-seize compound. A 1/4 - 20 UNC x 1" (in) ground stud with three nuts and four washers shall be welded to the frame and coated with anti-seize compound. See **Standard Plan J-90.50** for grounding and bonding details.
4. The bonding jumper between the lid and the frame shall be #8 AWG (min.) x 4' (ft) tinned braided copper.
5. The system identification letters shall be 1/8" (in) line thickness formed with a mild steel weld bead. See **COVER MARKING DETAIL**, **See Standard Specification Section 9-29.2(4)**.
6. Cement concrete shall be Class 4000.
7. Conduit Capacity = 40 inches (sum total of all conduit diameters).
8. Typical Small Cable Vault features and arrangement shown. Reinforcing not shown. Dimensions and arrangements will vary slightly by manufacturer. See Approved shop drawings.
9. Small Cable Vaults for WSDOT Projects shall only be installed with the lid frame bearing on the concrete portion of cable vault.

* BOLTS, NUTS AND WASHERS ~
ASTM F593 OR A193,
TYPE 304 OR TYPE 316
STAINLESS STEEL (S.S.)

1 EQUIPMENT BONDING JUMPER (SEE NOTE 4)



Neeley, Matthew
Jun 25 2018 12:54 PM

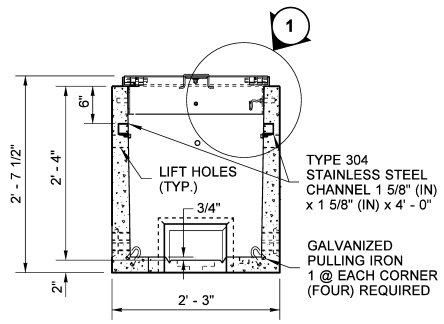
SMALL CABLE VAULT

STANDARD PLAN J-90.21-02

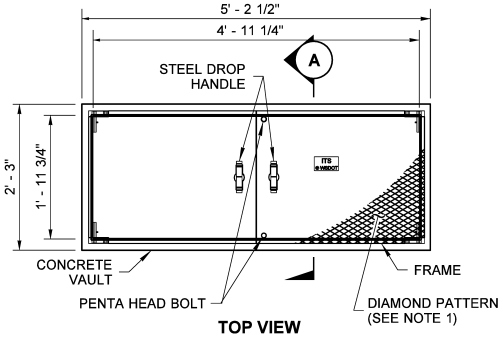
SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:18 AM
STATE DESIGN ENGINEER
Washington State Department of Transportation

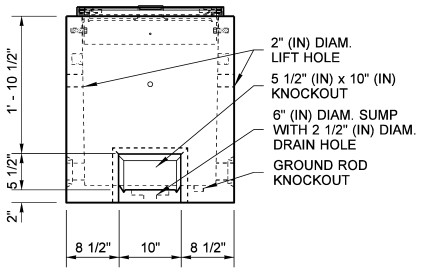
DRAWN BY: FERN LIDDELL



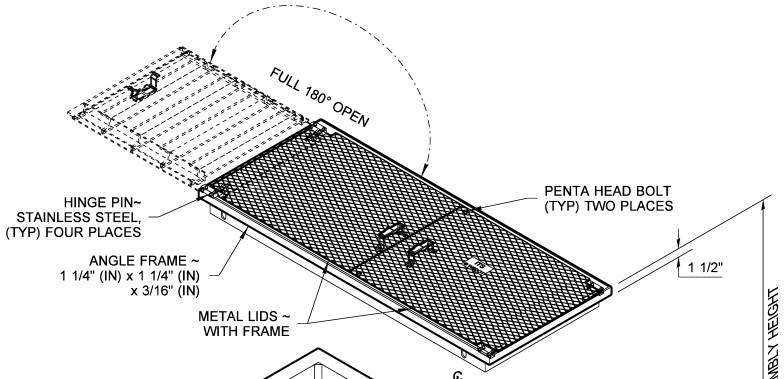
SECTION (A)

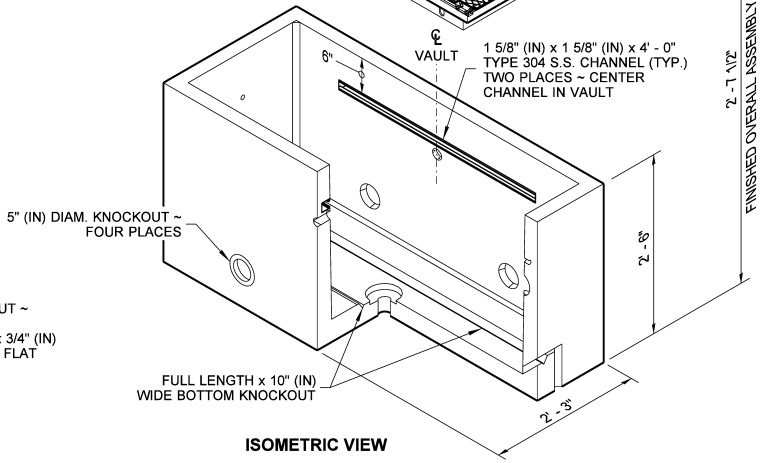


TOP VIEW



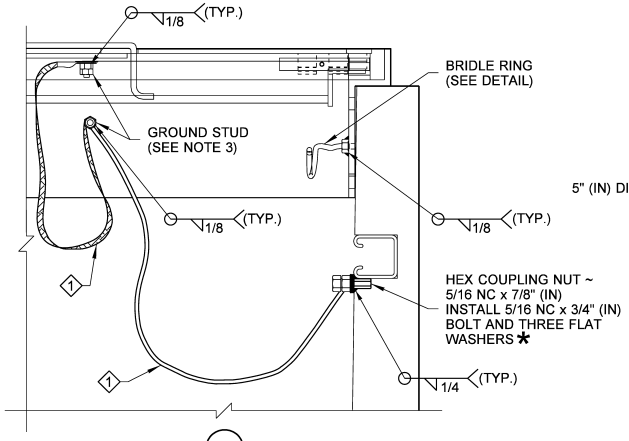
END VIEW



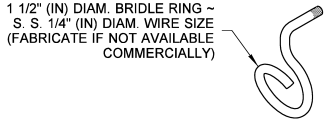


ISOMETRIC VIEW

SEE ISOMETRIC CUTAWAY ASSEMBLY ~ SHEET 1, FOR DIMENSIONS NOT SHOWN



DETAIL (1)



BRIDLE RING DETAIL



Neeley, Matthew
Jun 25 2018 12:54 PM

SMALL CABLE VAULT

STANDARD PLAN J-90.21-02

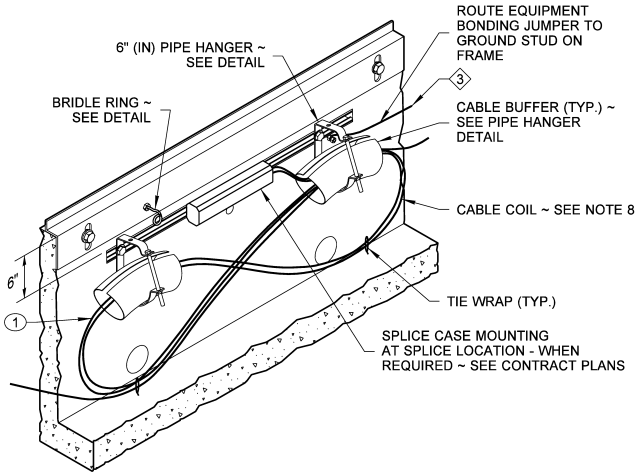
SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:18 AM

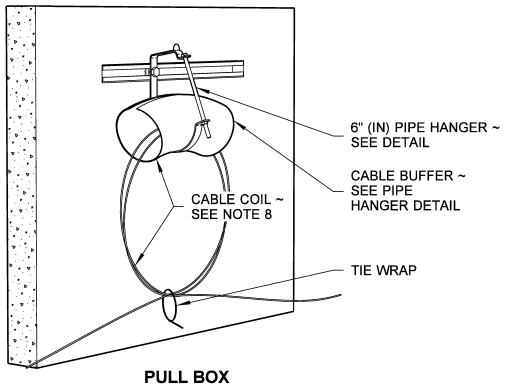
STATE DESIGN ENGINEER

Washington State Department of Transportation

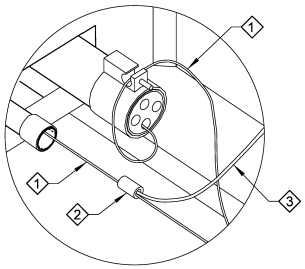
DRAWN BY: BILL BERENS



CABLE VAULT
INTERNAL ISOMETRIC VIEW



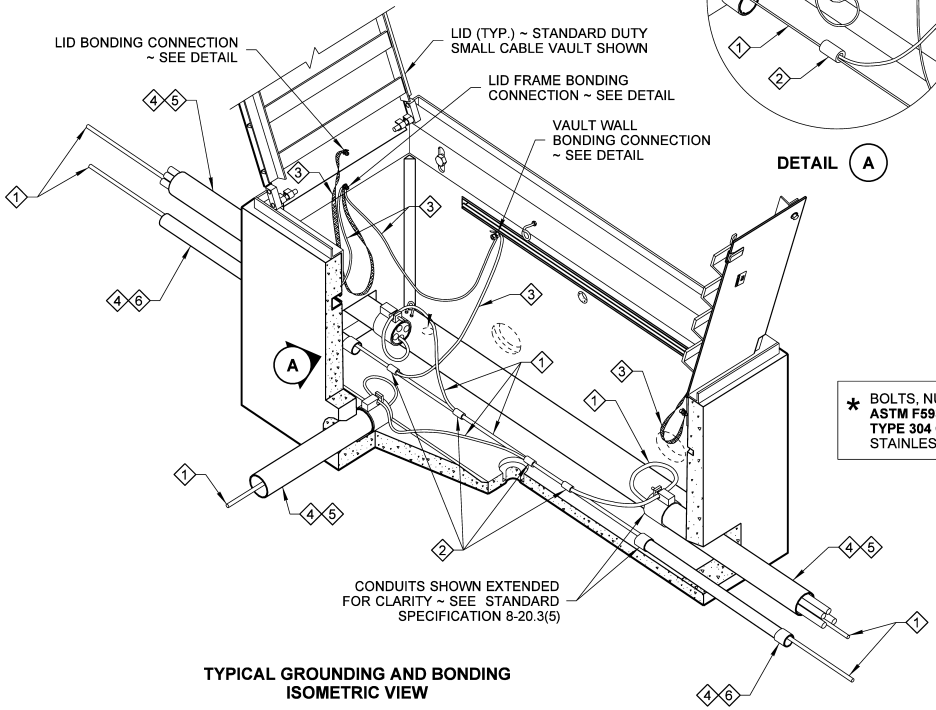
PULL BOX
INTERNAL OBLIQUE VIEW



DETAIL (A)

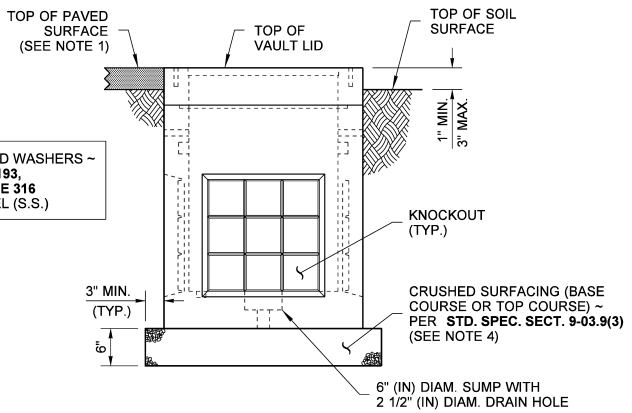
KEY NOTES

1. EQUIPMENT GROUNDING CONDUCTOR
2. COPPER SOLDERLESS CRIMP CONNECTOR
3. EQUIPMENT BONDING JUMPER (SEE NOTES 6 & 7)
4. SEE CONTRACT FOR CONDUIT SIZE AND NUMBER
5. RMC SHOWN ~ SEE CONTRACT FOR CONDUIT TYPE
6. PVC OR HDPE (PVC SHOWN) ~ SEE CONTRACT FOR CONDUIT TYPE



TYPICAL GROUNDING AND BONDING
ISOMETRIC VIEW

* BOLTS, NUTS AND WASHERS ~ **ASTM F593 OR A193, TYPE 304 OR TYPE 316** STAINLESS STEEL (S.S.)



TYPICAL VAULT PLACEMENT
END VIEW

NOTES

1. Vaults (including Pull Boxes) installed within the traveled way or paved shoulder must use Heavy Duty Lids. Small Cable Vaults (**Standard Plan J-90.21**) shall not be installed in the traveled way or paved shoulder.
2. Vaults installed in sidewalks, walkways, and shared-use paths shall have a slip-resistant coating on the lid and shall be installed with the surface flush with and matched to the grade of the sidewalk, walkway, and shared-use paths.
3. Small Cable Vaults for WSDOT Projects shall only be installed with the lid frame bearing on the concrete portion of cable vault.
4. Vault shall be installed on 6" (in) crushed surfacing pad in accordance with **Standard Specification Section 8-20.3(6)**.
5. Conduit Capacities (sum total conduit of all conduit diameters):
   - Pull Box and Small Cable Vault = 40" (in)
   - Cable Vault = 60" (in)
6. The bonding jumper shall be #8 AWG min. x 1' (ft) of tinned braided copper between the lid and the frame, and shall be #8 AWG min. from the frame to the hex coupling nut. See Contract Plans and **Standard Plan J-60.05** for bonding jumper requirements.
7. Connect the equipment grounding conductor(s) to the vault wall bonding connection with a #8 AWG (min.) equipment bonding jumper. For RMC conduits, the conduit end bushing shall be bonded between the equipment ground conductor and the vault wall bonding connection.
8. Each cable shall be coiled such that the cable's minimum bending radius limitations are not compromised. For coils in pull boxes, form a figure 8 loop first, then fold it in half (cable should twist slightly, not bend) to form a single loop.
9. Knockouts shall be restored with grout after conduit installation ~ see **Standard Specification section 8-20.3(6)**. For open bottom vaults, field bend #3 reinforcing bars to allow conduit into vault, then field bend back into place. Restored #3 bars shall be wire tied in two places, and the vault floor and wall completed with commercial concrete.

MATTHEW J. NEELEY
STATE OF WASHINGTON
46597
REGISTERED
PROFESSIONAL ENGINEER

Neeley, Matthew
Jun 25 2018 12:55 PM

VAULT INSTALLATION DETAILS

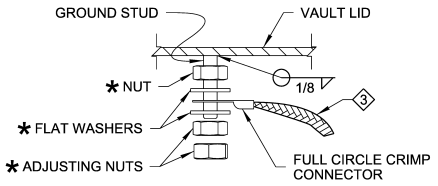
STANDARD PLAN J-90.50-00

SHEET 1 OF 2 SHEETS

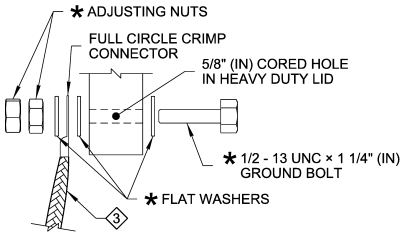
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:17 AM

STATE DESIGN ENGINEER
Washington State Department of Transportation

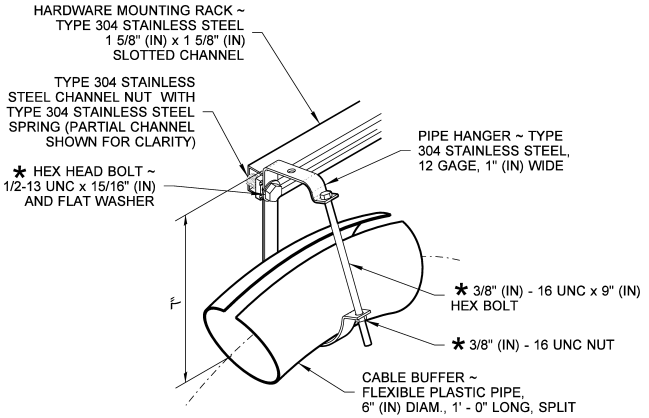
DRAWN BY: BILL BERENS



STANDARD DUTY LID BONDING CONNECTION DETAIL

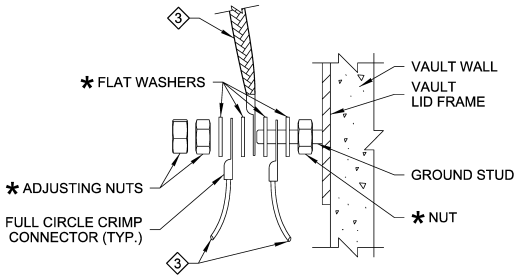


HEAVY DUTY LID BONDING CONNECTION DETAIL

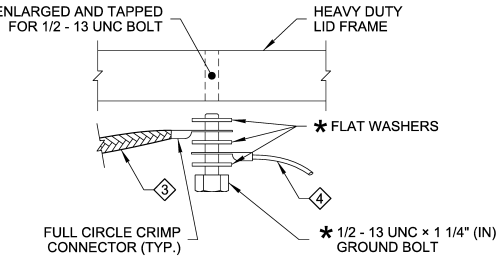


PIPE HANGER DETAIL

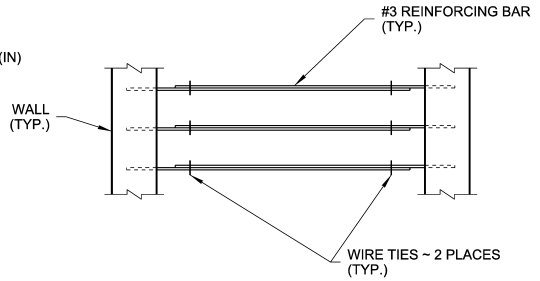
FABRICATE IF NOT AVAILABLE COMMERCIALLY



STANDARD DUTY LID FRAME BONDING CONNECTION DETAIL



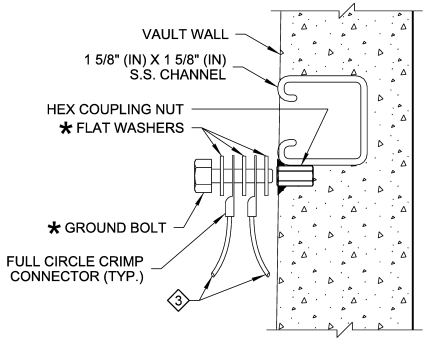
HEAVY DUTY LID FRAME BONDING CONNECTION DETAIL



OPEN BOTTOM VAULT FINISHING DETAIL

(SEE NOTE 9)

* BOLTS, NUTS AND WASHERS ~ **ASTM F593 OR A193, TYPE 304 OR TYPE 316** STAINLESS STEEL (S.S.)



VAULT WALL BONDING CONNECTION DETAIL

KEY NOTES

1. EQUIPMENT GROUNDING CONDUCTOR
2. COPPER SOLDERLESS CRIMP CONNECTOR
3. EQUIPMENT BONDING JUMPER (SEE NOTES 6 & 7)
4. SEE CONTRACT FOR CONDUIT SIZE AND NUMBER
5. RMC SHOWN ~ SEE CONTRACT FOR CONDUIT TYPE
6. PVC OR HDPE (PVC SHOWN) ~ SEE CONTRACT FOR CONDUIT TYPE

MATTHEW J. NEELEY · STATE OF WASHINGTON · 46597 · REGISTERED PROFESSIONAL ENGINEER

Neeley, Matthew
Jun 25 2018 12:55 PM

VAULT INSTALLATION DETAILS

STANDARD PLAN J-90.50-00

SHEET 2 OF 2 SHEETS

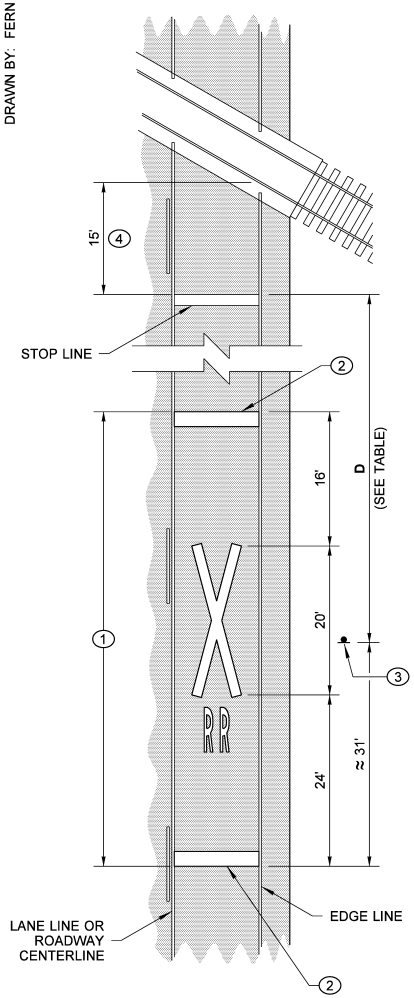
APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:16 AM

STATE DESIGN ENGINEER

Washington State Department of Transportation

This page left blank intentionally.

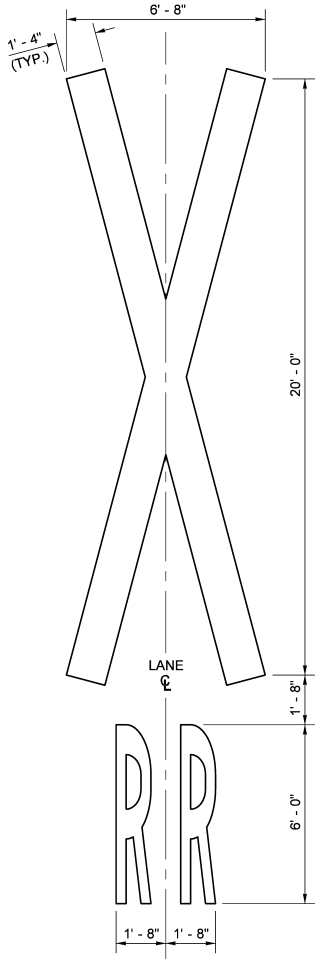
DRAWN BY: FERN LIDDELL



LAYOUT

① TOTAL MARKING AREA
(PER 12' (FT) WIDE LANE)
= 109.75 SQ.FT.

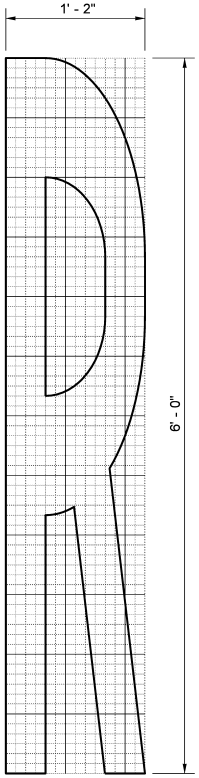
STANDARD SYMBOL



SYMBOL DETAIL

NOTE

See contract for location and material requirements.



GRID IS 1" (IN) SQUARE

"R" DETAIL

MPH	D*
25	50 Ft.
30	100 Ft.
35	150 Ft.
40	225 Ft.
45	300 Ft.
50	375 Ft.
55	450 Ft.
60	550 Ft.
65	650 Ft.

* DIMENSIONS SHOWN ARE APPROXIMATE SEE CONTRACT

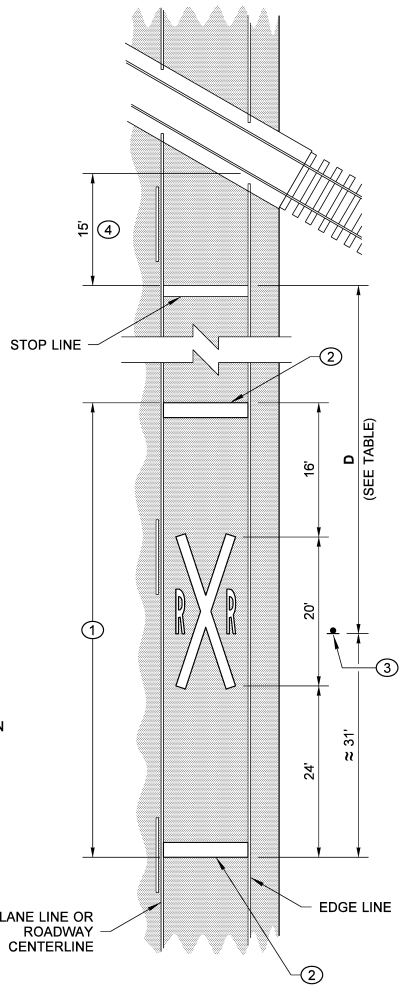
KEY NOTES

① Bid Item "Railroad Crossing Symbol" includes "X" symbol, letters, and two 24" (in) white transverse lines.

② 24" (in) white transverse line.

③ W-10-1 Advance Warning sign (not included in RR crossing Symbol Bid Item).

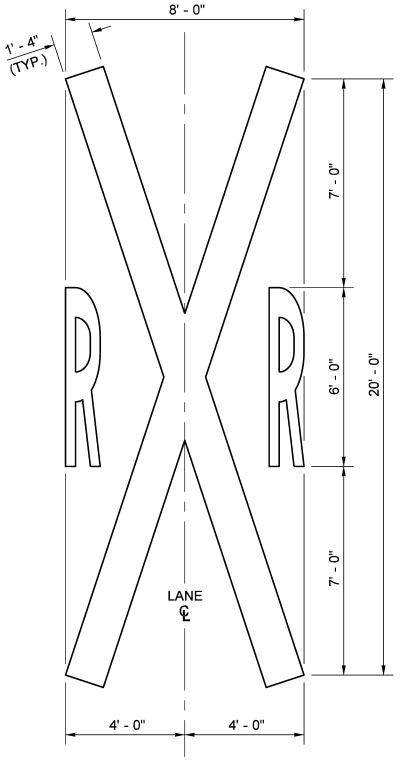
④ Place Stop Line 15' (ft) from RR gate, if present.



LAYOUT

① TOTAL MARKING AREA
(PER 12' (FT) WIDE LANE)
= 111.59 SQ.FT.

ALTERNATIVE SYMBOL



SYMBOL DETAIL

BRIAN J. WALSH
STATE OF WASHINGTON
36103
REGISTERED
PROFESSIONAL ENGINEER

Walsh, Brian
May 19 2017 9:20 AM

RAILROAD CROSSING LAYOUT

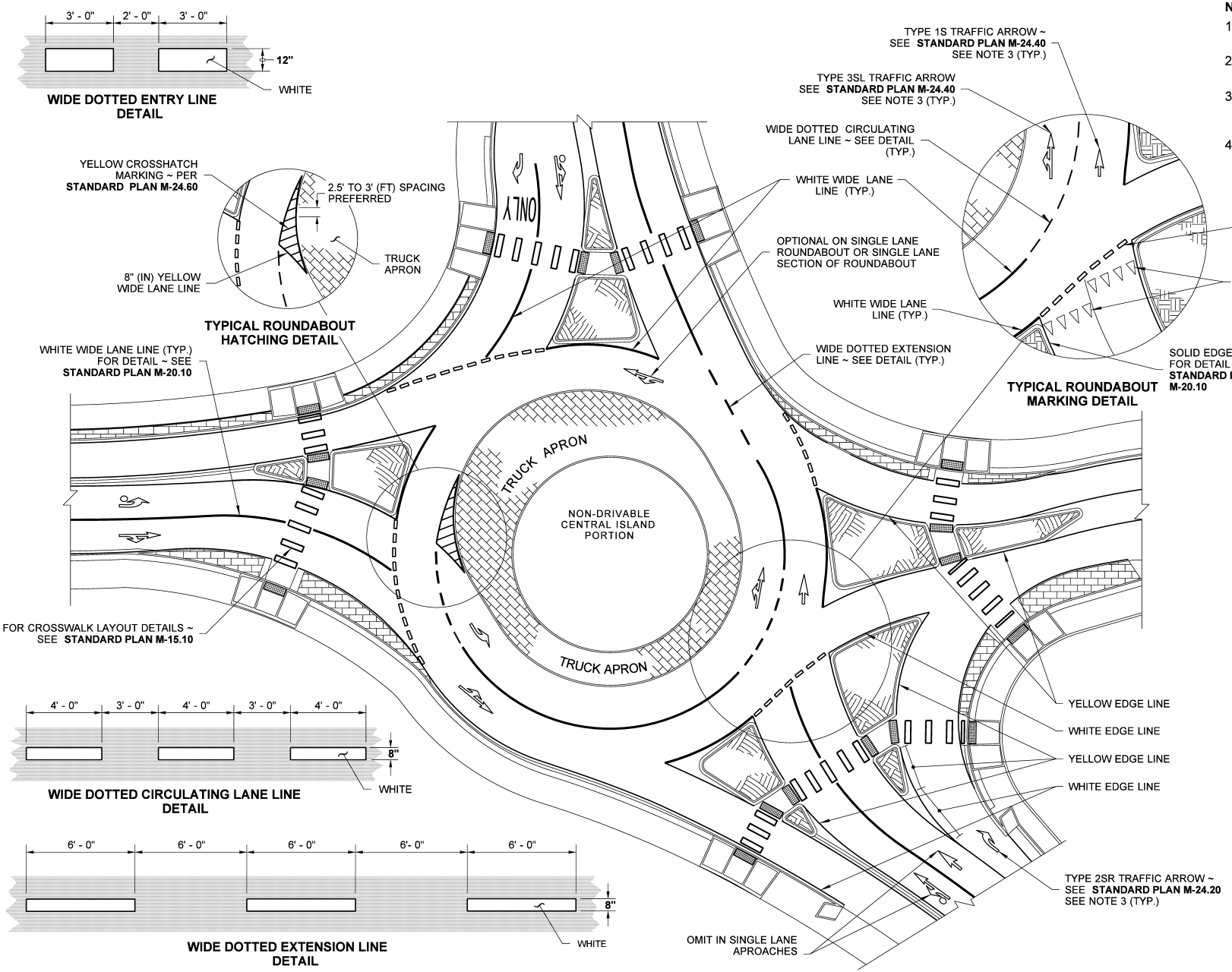
STANDARD PLAN M-11.10-02

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jul 11 2017 1:18 PM

STATE DESIGN ENGINEER

Washington State Department of Transportation



DRAWN BY: FERN LIDDELL

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.

BRIAN J. WALSH
STATE OF WASHINGTON
36103
REGISTERED
PROFESSIONAL ENGINEER

Walsh, Brian
Jun 27 2018 9:29 AM

ROUNDABOUT PAVEMENT MARKINGS

STANDARD PLAN M-12.10-01

SHEET 1 OF 1 SHEET

APPROVED FOR PUBLICATION
Carpenter, Jeff
Jun 28 2018 10:15 AM

STATE DESIGN ENGINEER

Washington State Department of Transportation