

STRUCTURAL STEEL POST FOR GROUND MOUNTED SIGNS																	
POST		BOLT			WASHER			BASE CONNECTION DATA TABLE (IN.)									
DES. NO.	NOM SIZE (IN. X LBS)	DIA	LENGTH	TORQUE	OD	ID	THICK	A	B	C	D	E	F	G	W	R	
		IN.	IN.	IN./LB.	IN.	IN.	IN.										
1	W6x9																
2	W6x15	$\frac{5}{8}$	$2\frac{3}{4}$	345	$1\frac{5}{16}$	$\frac{11}{16}$	$\frac{1}{8}$	5	2	$1\frac{1}{4}$	$2\frac{3}{4}$	$1\frac{1}{8}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$1\frac{11}{32}$	
3	W8x18																
4	W10x22																
5	W10x26	$\frac{3}{4}$	$3\frac{1}{2}$	555	$1\frac{13}{32}$	$\frac{13}{16}$	$\frac{1}{8}$	6	$2\frac{1}{4}$	$1\frac{3}{8}$	$3\frac{1}{2}$	$1\frac{1}{4}$	1	$\frac{3}{4}$	$\frac{5}{16}$	$1\frac{13}{32}$	
6	W12x35																

POST AND FOOTING DATA TABLE													
POST				FOOTING									
POST DES. NO.	NOM. SIZE	WEIGHT		STUB LENGTH	DIA.	LEVEL GROUND		6:1 GRADE		4:1 GRADE		3:1 OR 2:1 GRADE	
		LBS/FT	LBS/IN			DEPTH	C.Y.	DEPTH	C.Y.	DEPTH	C.Y.	DEPTH	C.Y.
1	W6	9.0	0.75	3'-0"	15"	3'-0"	0.14	3'-2"	0.15	3'-3"	0.16	3'-6"	0.17
2	W6	15.0	1.25	4'-0"	24"	4'-0"	0.47	4'-2"	0.50	4'-3"	0.51	4'-6"	0.54
3	W8	18.0	1.50	4'-6"	28"	4'-6"	0.71	4'-8"	0.73	4'-9"	0.74	5'-0"	0.78
4	W10	22.0	1.83	5'-0"	36"	5'-0"	1.31	5'-2"	1.36	5'-3"	1.39	5'-6"	1.45
5	W10	26.0	2.17	5'-0"	36"	5'-0"	1.31	5'-3"	1.37	5'-5"	1.43	5'-9"	1.52
6	W12	35.0	2.92	5'-6"	36"	5'-6"	1.44	5'-9"	1.52	5'-11"	1.56	6'-3"	1.65

GENERAL NOTES:

DESIGN SPECS: AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS - 1985 (EXCEPT 2001 AND LATEST INTERIMS FOR STRUCTURAL STEEL POSTS).

POSTS, PERFORATED FUSE PLATE AND SPLICE PLATE TO BE GALVANIZED AFTER FABRICATION.

METAL PROJECTING BEYOND THE PLANE OF THE PLATE FACE WILL NOT BE ALLOWED.

REMOVE ALL GALVANIZING RUNS OR BEADS IN THE WASHER AREA.

ALL STRUCTURAL STEEL STIFFENER PLATES AND BASE PLATES, FOR GROUND MOUNTED SIGNS SHALL MEET THE REQUIREMENTS OF ASTM A 36 OR AASHTO M 270 GRADE 50, MINIMUM YIELD 50,000 PSI.

IN THE EVENT THE DISTANCE BETWEEN THE TOP OF THE FOOTING AND THE BOTTOM OF THE SIGN IS LESS THAN 7'-9", THE SIGN HEIGHT AND POST LENGTH IS TO BE INCREASED SUFFICIENTLY TO ACCOMMODATE THIS MINIMUM SPACING.

HINGE PLATES NOT REQUIRED ON SINGLE POST SIGNS OR ANY SIGNS USING PIPE POSTS.

NUTS ON HINGE PLATE BOLTS SHALL BE TIGHTENED TO THE REQUIRED MINIMUM BOLT TENSION VALUES SHOWN IN TABLE 1 SEC. 1080 OF THE STANDARD SPECIFICATIONS.

THE NUT SHALL BE FREE RUNNING. IF THE NUT WILL NOT SPIN ON THE BOLT BECAUSE OF GALVANIZING IRREGULARITIES, A LUBRICANT SHALL BE APPLIED.

ALL BREAKAWAY ASSEMBLY BOLTS SHALL BE TIGHTENED IN A SYSTEMATIC MANNER TO THE PRESCRIBED TORQUE SHOWN ON THIS DRAWING.

EACH BREAKAWAY ASSEMBLY BOLT SHALL BE LOOSENED AND RE-TIGHTENED TO THE REQUIRED TORQUE IN THE SAME ORDER AS THE INITIAL TIGHTENING.

THE THREADS SHALL BE BURRED AT THE NUT USING A CENTER PUNCH TO PREVENT NUT FROM LOOSENING.

POST LENGTH QUANTITY SHOWN ON PLANS INCLUDES STUB.

1" X 2 1/2" HIGH STRENGTH BOLTS FOR PIPE POSTS SHALL BE OF THE DESIGNATION AASHTO M 164 OR ASTM A 449. ALL OTHER H.S. BOLTS SHALL BE OF THE DESIGNATION AASHTO M 164.

FURNISH TWO .012" ± AND TWO .0032" ± THICK SHIMS PER POST FROM BRASS SHIM STOCK OR STRIP, DESIGNATION ASTM B 36. SHIM AS REQUIRED TO PLUMB POST.

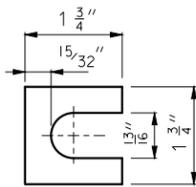
HIGH STRENGTH BOLTS WITH HEX NUT AND THREE WASHERS WITH EACH BOLT ARE TO BE GALVANIZED.

OPTIONAL HOLES (1/16" ROUND FOR "1" SHAPE POSTS AND 3/16" ROUND FOR PIPE POST BASE PLATES) AS SHOWN IN "ELEVATIONS" ARE TO BE USED AS AID FOR GALVANIZING ONLY.

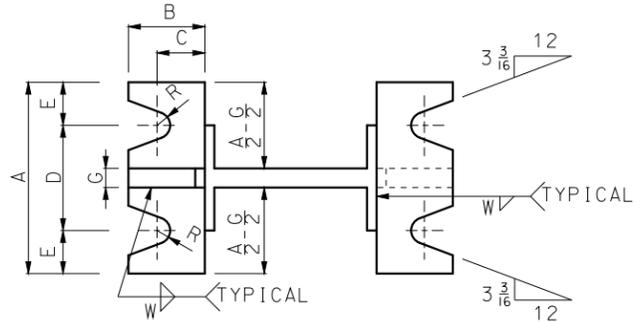
SHEET METAL BOLT RETAINER CUT FROM 30 GAGE GALVANIZED SHEET METAL. PLACE BETWEEN BASE PLATES. SIZE VARIES TO FIT PLATE. BOLT HOLES TO BE 1/16" LARGER THAN REQUIRED BOLT SIZE.



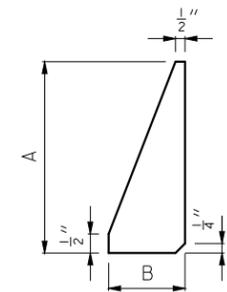
BOLT RETAINER



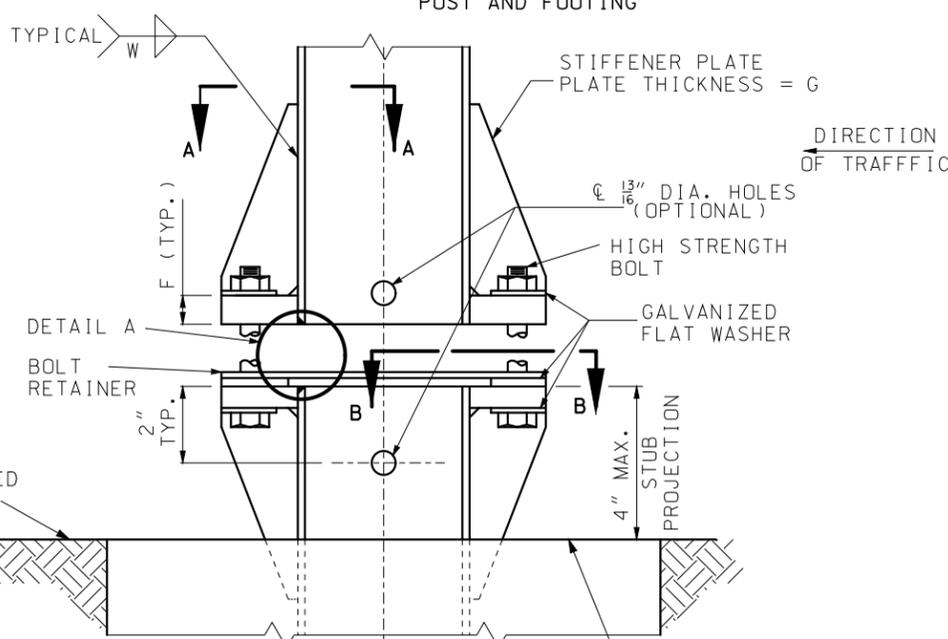
SHIM



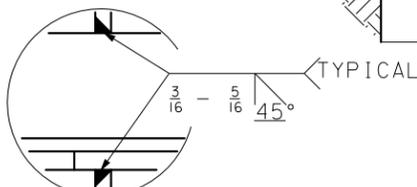
SECTION A-A SECTION B-B  
POST AND FOOTING



STIFFENER PLATE

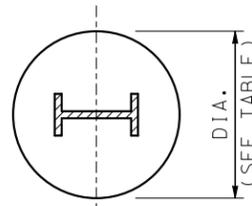


ELEVATION

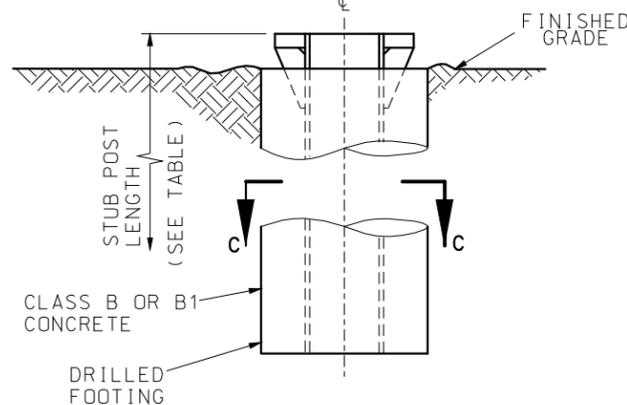


DETAIL A

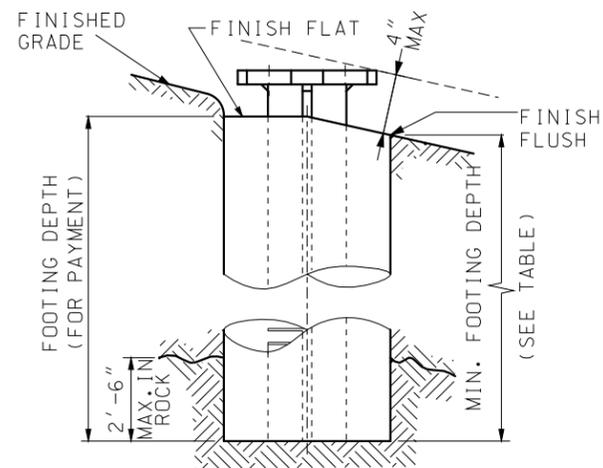
TOP OF FOOTING, FLUSH WITH FINISHED FLAT GRADE. SEE "FOOTING DETAIL" FOR FOOTINGS ON SLOPES.



SECTION C-C



STUB DETAIL



FOOTING DETAIL

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**  
 105 WEST CAPITOL  
 JEFFERSON CITY, MO 65102  
 1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
 EILEEN H. RACKERS  
 NUMBER PE-28336  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**POST INSTALLATION DETAILS**  
 POST AND FOOTING DETAILS  
 WIDE FLANGE (WF) POSTS

DATE EFFECTIVE: 10/01/2016  
 DATE PREPARED: 8/11/2016

**903.03BJ**

SHEET NO.  
 1 OF 15

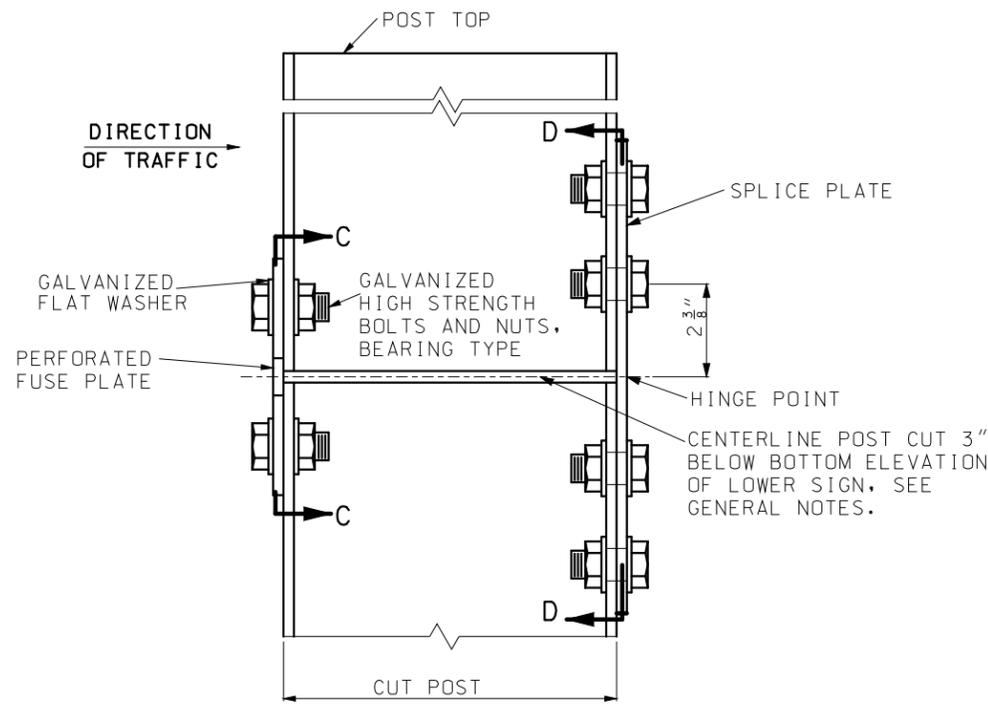
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

WIDE FLANGE STRUCTURAL STEEL POSTS DESIGN DATA							
POST DES. NO.	NOM. SIZE (IN.)	WEIGHT		DEPTH (IN.)	FLANGE		WEB THICK (IN.)
		LB/FT	LB/IN		WIDTH (IN.)	THICK (IN.)	
1	W6	9	0.75	5 <sup>7</sup> / <sub>8</sub>	4	<sup>3</sup> / <sub>16</sub>	<sup>3</sup> / <sub>16</sub>
2	W6	15	1.25	6	6	<sup>1</sup> / <sub>4</sub>	<sup>1</sup> / <sub>4</sub>
3	W8	18	1.50	8 <sup>1</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>	<sup>5</sup> / <sub>16</sub>	<sup>1</sup> / <sub>4</sub>
4	W10	22	1.83	10 <sup>1</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	<sup>3</sup> / <sub>8</sub>	<sup>1</sup> / <sub>4</sub>
5	W10	26	2.17	10 <sup>3</sup> / <sub>8</sub>	5 <sup>3</sup> / <sub>4</sub>	<sup>7</sup> / <sub>16</sub>	<sup>1</sup> / <sub>4</sub>
6	W12	35	2.92	12 <sup>1</sup> / <sub>2</sub>	6 <sup>1</sup> / <sub>2</sub>	<sup>1</sup> / <sub>2</sub>	<sup>5</sup> / <sub>16</sub>

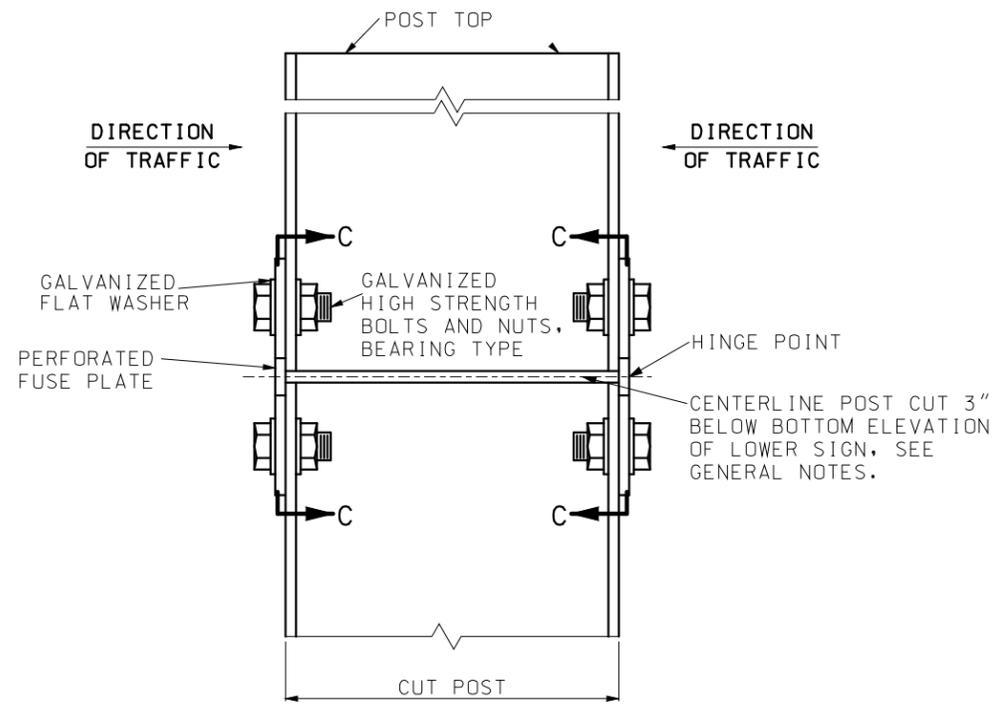
PERFORATED FUSE PLATE DATA TABLE														
POST DESIGN NO.	F (IN.)	G (IN.)	H (IN.)	J (IN.)	K (IN.)	L (IN.)	M (IN.)	N (IN.)	d1 (IN.)	d2 (IN.)	P (IN.)	BOLT DIA. (IN.)	WT. (E.A.) (LBS.)	
1	4 <sup>1</sup> / <sub>4</sub>	1	1 <sup>1</sup> / <sub>8</sub>	4	2 <sup>1</sup> / <sub>4</sub>	<sup>7</sup> / <sub>8</sub>	1	<sup>1</sup> / <sub>2</sub>	<sup>9</sup> / <sub>16</sub>	<sup>3</sup> / <sub>4</sub>	<sup>3</sup> / <sub>16</sub>	<sup>1</sup> / <sub>2</sub>	0.76	
2	5	1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>	6	3 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	<sup>3</sup> / <sub>4</sub>	<sup>11</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>4</sub>	<sup>1</sup> / <sub>4</sub>	<sup>5</sup> / <sub>8</sub>	1.67	
3	5	1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>	<sup>3</sup> / <sub>4</sub>	<sup>11</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>16</sub>	<sup>1</sup> / <sub>4</sub>	<sup>5</sup> / <sub>8</sub>	1.51	
4	6	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	5 <sup>3</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>8</sub>	<sup>13</sup> / <sub>16</sub>	<sup>13</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>8</sub>	<sup>5</sup> / <sub>16</sub>	<sup>3</sup> / <sub>4</sub>	2.52	
5	6	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	5 <sup>3</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	1 <sup>3</sup> / <sub>8</sub>	<sup>13</sup> / <sub>16</sub>	<sup>13</sup> / <sub>16</sub>	1 <sup>1</sup> / <sub>8</sub>	<sup>5</sup> / <sub>16</sub>	<sup>3</sup> / <sub>4</sub>	2.52	
6	6	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	6 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	1 <sup>5</sup> / <sub>8</sub>	<sup>13</sup> / <sub>16</sub>	<sup>13</sup> / <sub>16</sub>	1 <sup>5</sup> / <sub>16</sub>	<sup>3</sup> / <sub>8</sub>	<sup>3</sup> / <sub>4</sub>	3.35	

SPLICE PLATE DATA TABLE												
POST DESIGN NO.	J (IN.)	K (IN.)	L (IN.)	U (IN.)	d1 (IN.)	BOLT DIA. (IN.)	WT. (E.A.) (LBS.)	WASHER				
								OD IN.	ID IN.	THICK IN.		
1	4	2 <sup>1</sup> / <sub>4</sub>	<sup>7</sup> / <sub>8</sub>	<sup>3</sup> / <sub>16</sub>	<sup>9</sup> / <sub>16</sub>	<sup>1</sup> / <sub>2</sub>	2.45	1 <sup>3</sup> / <sub>16</sub>	<sup>5</sup> / <sub>8</sub>	<sup>1</sup> / <sub>8</sub>		
2	6	3 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>4</sub>	<sup>1</sup> / <sub>4</sub>	<sup>11</sup> / <sub>16</sub>	<sup>5</sup> / <sub>8</sub>	4.89	1 <sup>5</sup> / <sub>16</sub>	<sup>11</sup> / <sub>16</sub>	<sup>1</sup> / <sub>8</sub>		
3	5 <sup>1</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>	<sup>5</sup> / <sub>16</sub>	<sup>11</sup> / <sub>16</sub>	<sup>5</sup> / <sub>8</sub>	5.32	1 <sup>5</sup> / <sub>16</sub>	<sup>11</sup> / <sub>16</sub>	<sup>1</sup> / <sub>8</sub>		
4	5 <sup>3</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	<sup>5</sup> / <sub>16</sub>	<sup>13</sup> / <sub>16</sub>	<sup>3</sup> / <sub>4</sub>	5.75	1 <sup>5</sup> / <sub>16</sub>	<sup>13</sup> / <sub>16</sub>	<sup>1</sup> / <sub>8</sub>		
5	5 <sup>3</sup> / <sub>4</sub>	2 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	<sup>7</sup> / <sub>16</sub>	<sup>13</sup> / <sub>16</sub>	<sup>3</sup> / <sub>4</sub>	8.04	1 <sup>5</sup> / <sub>16</sub>	<sup>13</sup> / <sub>16</sub>	<sup>1</sup> / <sub>8</sub>		
6	6 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	<sup>1</sup> / <sub>2</sub>	<sup>13</sup> / <sub>16</sub>	<sup>3</sup> / <sub>4</sub>	10.47	1 <sup>5</sup> / <sub>16</sub>	<sup>13</sup> / <sub>16</sub>	<sup>1</sup> / <sub>8</sub>		

THE WEIGHT OF STRUCTURAL STEEL POSTS SHOWN IN THE CONTRACT HAS BEEN COMPUTED USING THE WEIGHTS SHOWN.

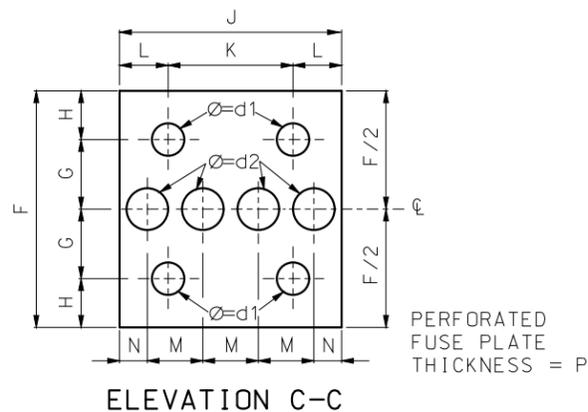


ONE DIRECTION BREAKAWAY



TWO DIRECTION BREAKAWAY

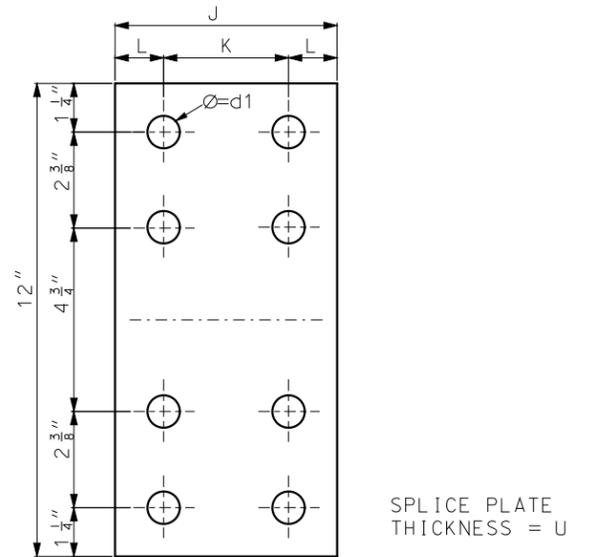
**PERFORATED FUSE PLATE AND SPLICE PLATE DETAIL**



ELEVATION C-C

ALL HOLES SHALL BE DRILLED. ALL PLATE CUTS SHALL PREFERABLY BE SAW CUTS. HOWEVER: FLAME CUTTING WILL BE PERMITTED PROVIDED ALL EDGES ARE GROUND.

PERFORATED FUSE PLATE AND SPLICE PLATE SHALL BE FABRICATED FROM ASTM A 36 STRUCTURAL STEEL.



ELEVATION D-D

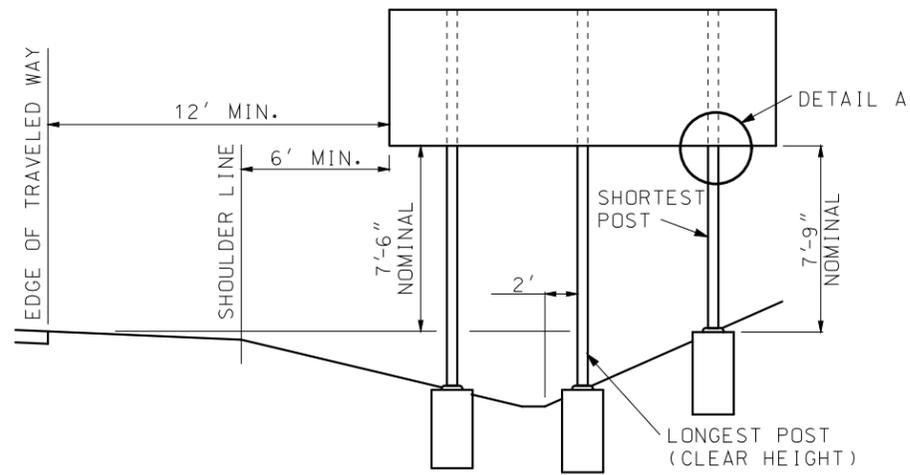
GENERAL NOTES:

REFER TO THE GENERAL NOTES ON SHEET 1.

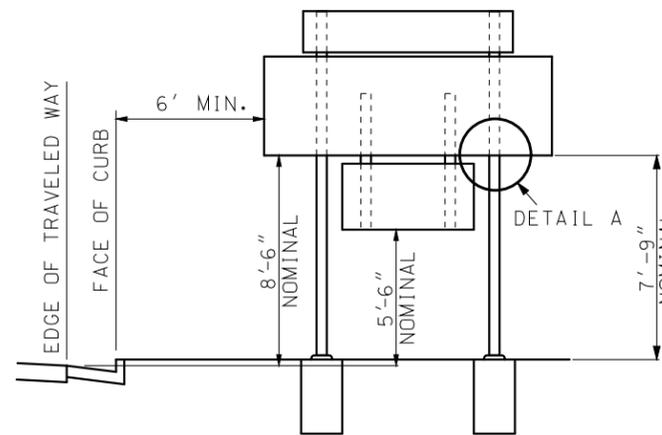
FOR ROADWAYS WHERE TRAFFIC MAY STRIKE THE BACKSIDE OF THE POST, PERFORATED FUSE PLATES SHALL BE INSTALLED ON BOTH SIDES OF THE POST.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<p align="center"><b>POST INSTALLATION DETAILS</b></p> <p align="center">HINGE DETAILS WIDE FLANGE (WF) POSTS</p>	
	DATE EFFECTIVE: 10/01/2016 DATE PREPARED: 8/11/2016	<b>903.03BJ</b> SHEET NO. 2 OF 15

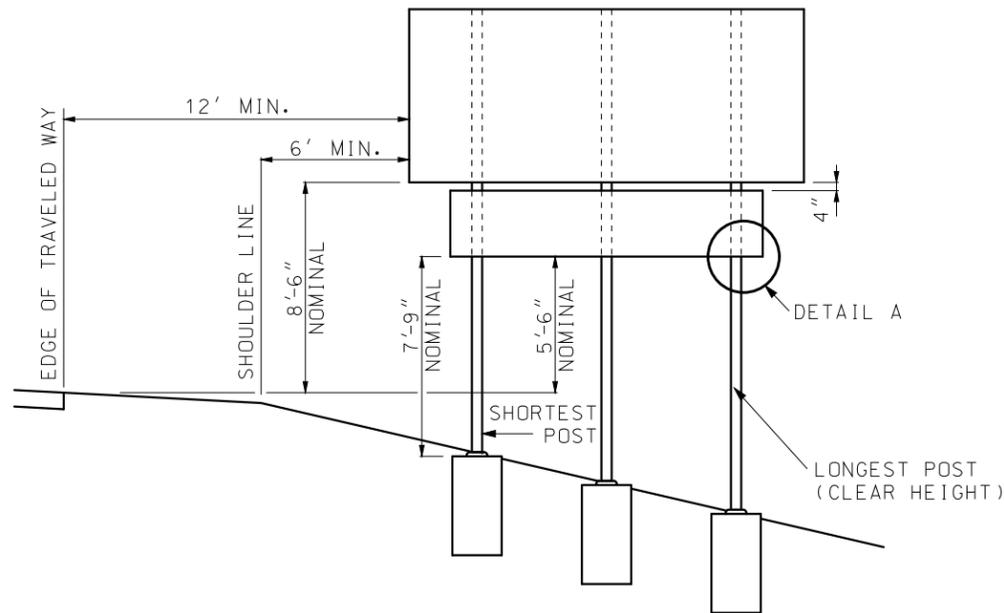
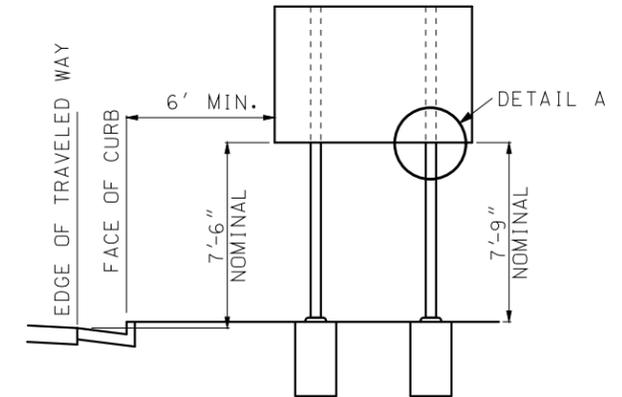
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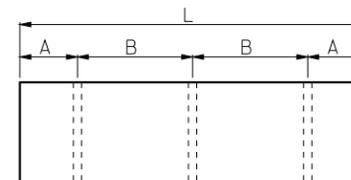
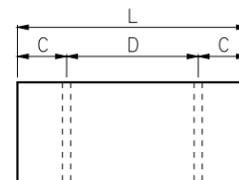
**DITCH SECTION**



**BARRIER CURB SECTIONS**



**FILL SECTION**



$A = 1/6(L)$        $C = 1/5(L)$   
 $B = 1/3(L)$        $D = 3/5(L)$

**POST SPACING**

FOR POST DESIGNS NUMBERS 3, 4, 5 AND 6 HAVING WEIGHTS GREATER THAN 18LBS./FT., POSTS SHALL BE SPACED AT LEAST 7' APART.

FOR POST DESIGNS NUMBERS 1 AND 2, POSTS MAY BE SPACED LESS THAN 7' APART.

DO NOT USE THREE NUMBER 1 OR 2 POSTS FOR L LESS THAN 11'.

FOR L GREATER THAN 11' AND LESS THAN 17', 3 POSTS MAY BE USED DEPENDING ON SOIL CONDITIONS.

FOR L OF 6' TO 17' TYPICALLY USE 2 POSTS.

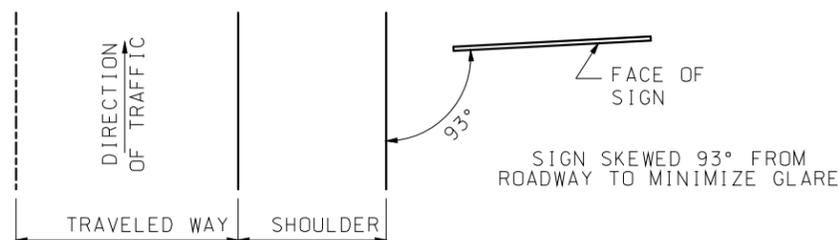
FOR L GREATER THAN 17' TYPICALLY USE 3 POSTS.

**GENERAL NOTES:**

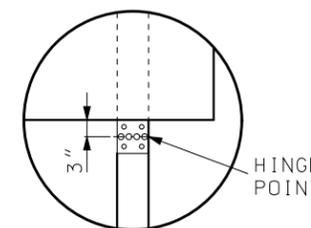
FOR GENERAL NOTES, SEE SHEET 1 OF 15.

VERTICAL CLEARANCE FROM THE ROADWAY SHALL BE MET AND INCREASED ONLY TO MEET THE 7'9" MINIMUM VERTICAL CLEARANCE FROM THE GROUND.

POST SIZE IS DETERMINED USING SIGN HEIGHT, SIGN WIDTH AND CLEAR HEIGHT. THE CLEAR HEIGHT IS EQUAL TO THE LENGTH OF THE LONGEST POST.

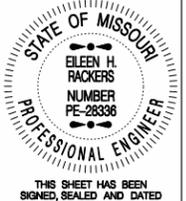


**SIGN ORIENTATION**



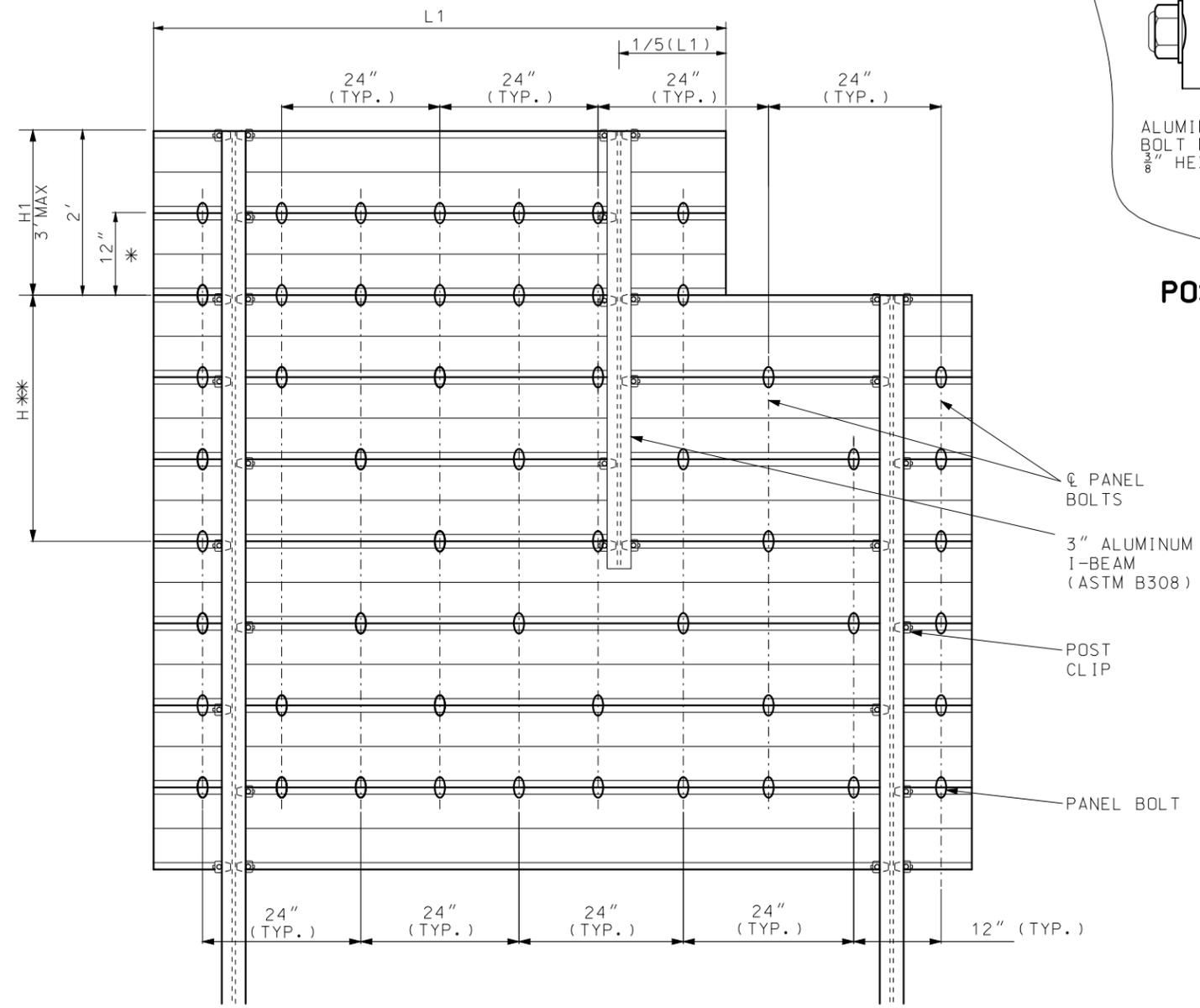
**DETAIL A**

NOTE: SEE SHEET 2 FOR FUSE PLATE DETAILS.

 <b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
	<b>POST INSTALLATION DETAILS</b> TYPICAL SECTION, MOUNTING HEIGHT AND POST SPACING WIDE FLANGE (WF) POSTS
DATE EFFECTIVE: 10/01/2016 DATE PREPARED: 8/11/2016	<b>903.03BJ</b>
SHEET NO. 3 OF 15	

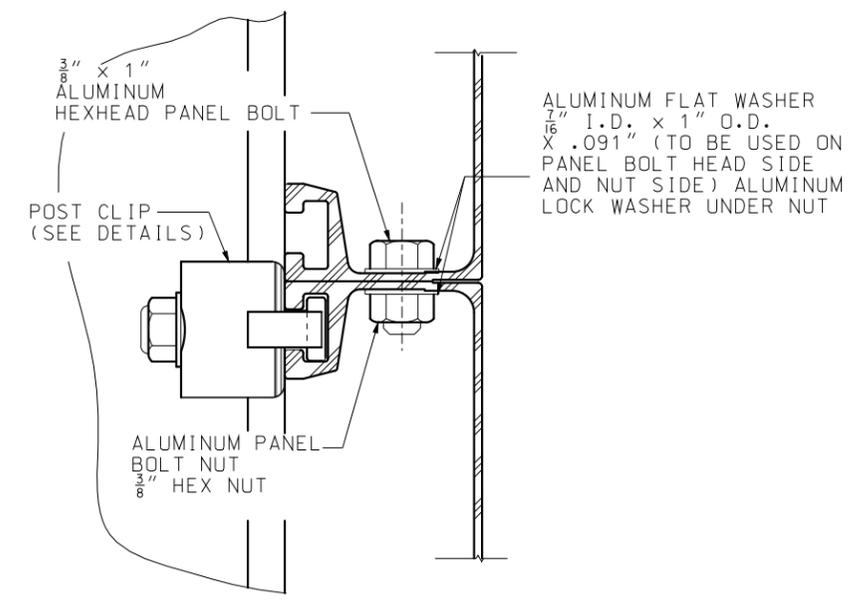
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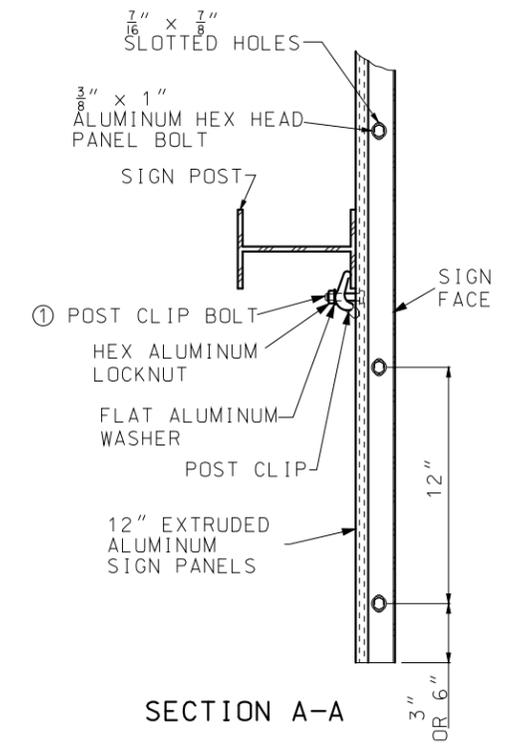


**PANEL BOLT LOCATION**

\* EXTRUDED ALUMINUM PANEL. SEE OTHER DRAWINGS.  
 \*\* H = H1 + 12". H APPLIES TO SIGNS SUSPENDED ABOVE OR BELOW THE PRIMARY SIGN IF SECONDARY SIGN IS NOT ATTACHED TO THE MAIN SIGN POSTS.



**POST CLIP DETAIL**



**SECTION A-A**

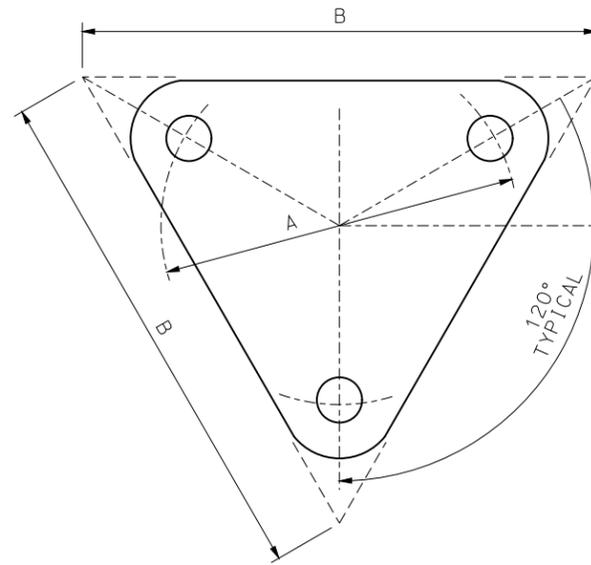
① SIGNS SHALL BE FIELD ATTACHED TO POSTS WITH POST CLIPS AND BOLTS, SEE POST CLIP DETAIL. THE SHANK OF THE POST CLIP BOLT SHALL FIT TIGHTLY AGAINST THE POST FLANGE AFTER THE LOCKNUTS ARE TORQUED. LOCKNUTS ON THE POST CLIP BOLTS SHALL BE TORQUED TO 225 INCH-POUNDS WHEN USING DRY, CLEAN, UNLUBRICATED THREADS.

GENERAL NOTE:  
 FOR GENERAL NOTES, SEE SHEET 1 OF 15.

	<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>SIGN MOUNTING DETAILS</b> WIDE FLANGE (WF) POSTS
DATE EFFECTIVE: 10/01/2016 DATE PREPARED: 8/11/2016	<b>903.03BJ</b>	SHEET NO. 4 OF 15

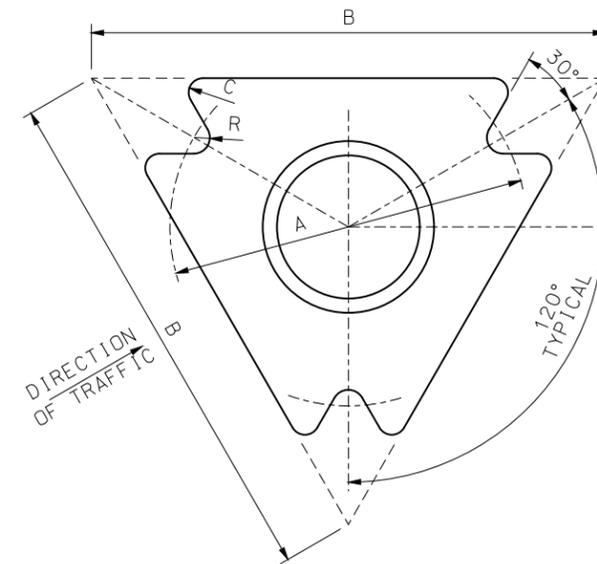
ROUND PIPE POST FOR GROUND MOUNTED SIGNS												
POST NOM SIZE (IN. - ID)	BOLT			WASHER			BASE CONNECTION DATA TABLE (IN.)					
	DIA IN.	LENGTH IN.	TORQUE IN./LB.	OD IN.	ID IN.	THICK IN.	A	B	C	R	T	W
2 1/2	1/2	3 1/2	140	1 1/16	1 7/32	1/8	6 1/4	9	1/4	9/32	1	1/4
3	5/8	3 3/4	345	1 5/16	1 1/16	1/8	7 3/16	10	1/4	3/8	1	5/16

ROUND PIPE POST AND FOOTING DATA TABLE						
NOM. SIZE (IN.)	WEIGHT		STUB LENGTH	FOOTING		CONCRETE C.Y.
	LBS/FT	LBS/IN		DIA.	DEPTH	
2 1/2	5.79	0.48	4' - 3 1/2"	12"	4'-6"	0.13
3	7.58	0.63	4' - 3 1/2"	12"	4'-6"	0.13
4	10.79	0.90	5' - 3 1/2"	18"	5'-6"	0.36

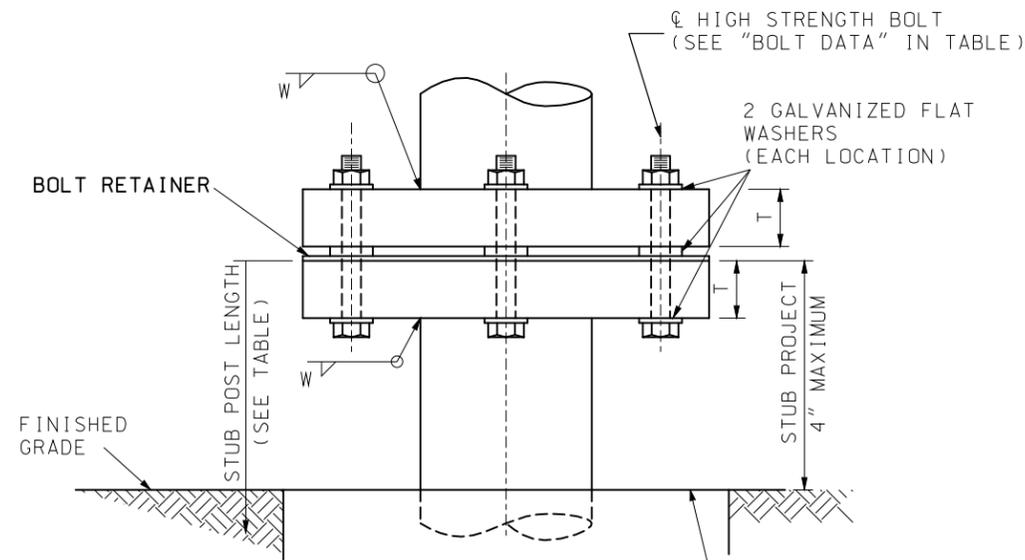


BOLT RETAINER

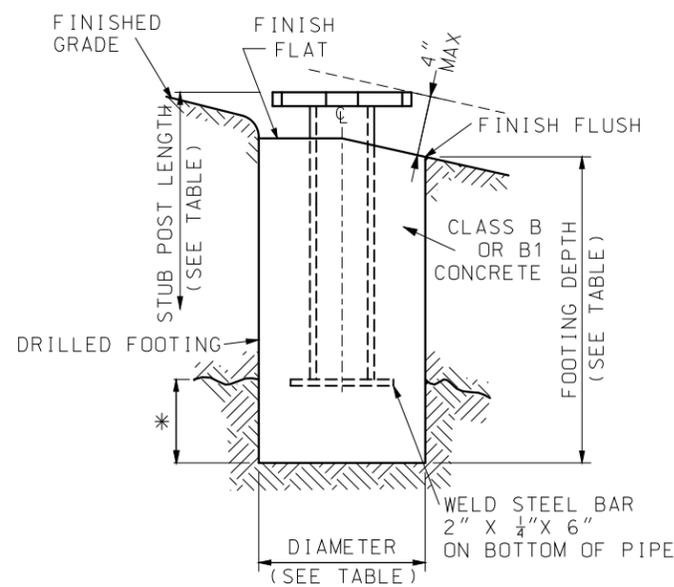
SHEET METAL BOLT RETAINER CUT FROM 30 GAUGE GALVANIZED SHEET METAL. PLACE BETWEEN BASE PLATES. SIZE VARIES TO FIT PLATE. BOLT HOLES SHALL BE 1/16" LARGER THAN REQUIRED BOLT SIZE.



PLAN VIEW



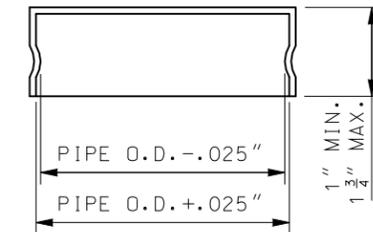
ELEVATION  
(STEEL PIPE POST BASE CONNECTION)  
MULTI-DIRECTION SLIP BASE



FOOTING DETAIL

\* PIPE 3" DIA. AND UNDER:  
2' MAXIMUM IN ROCK,  
PIPE OVER 3" DIA.:  
3' MAXIMUM IN ROCK

ROLLED CRIMP TO ENGAGE PIPE O.D.



FRICTION CAP

GENERAL NOTE:

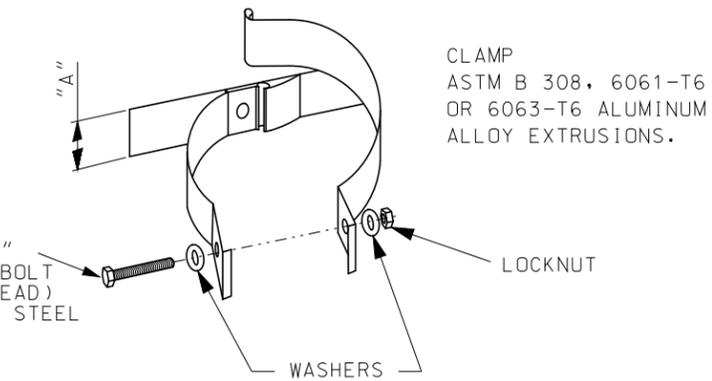
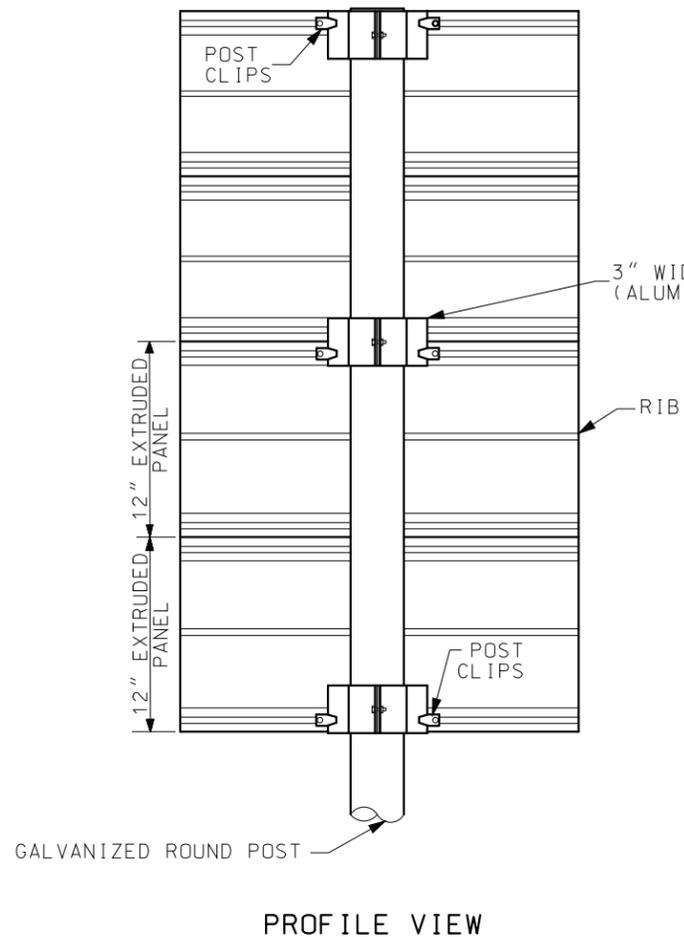
FOR GENERAL NOTES, SEE SHEET 1 OF 15.

FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE STANDARD PLANS SHEET 10 OF 15.

		<b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b> 105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)	
		<b>POST INSTALLATION DETAILS</b> PIPE POST	
DATE EFFECTIVE:	10/01/2016	<b>903.03BJ</b>	SHEET NO.
DATE PREPARED:	8/11/2016		5 OF 15

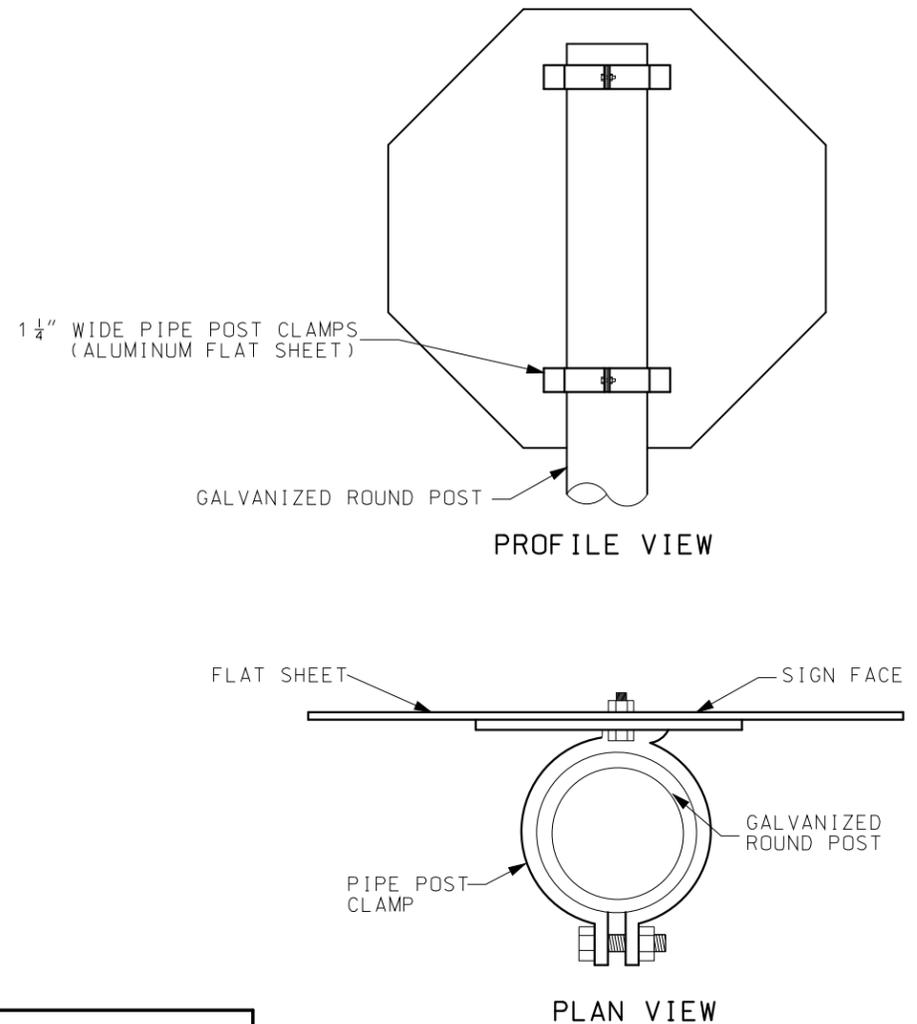
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

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**CLAMP TYPE SIGN SUPPORT  
FOR PIPE POST**

WIDTH OF PIPE POST CLAMP	
SIGN TYPE	MINIMUM "A"
FLAT	1 1/4"
STRUCTURAL	3"



**MOUNTING DETAILS  
FOR FLAT SHEET ON PIPE POST**

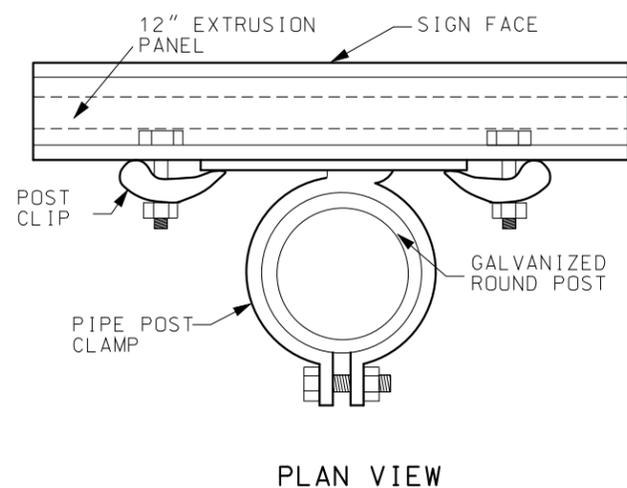
GENERAL NOTES:  
FOR GENERAL NOTES, SHEET 1 OF 15.  
FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 15

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105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
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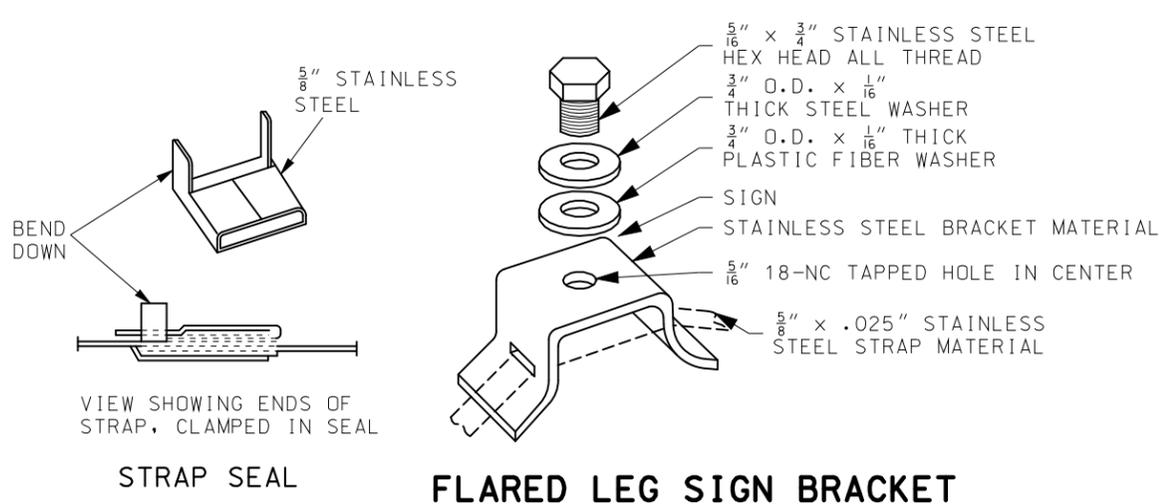
STATE OF MISSOURI  
EILEEN H. RACKERS  
NUMBER PE-28336  
PROFESSIONAL ENGINEER  
THIS SHEET HAS BEEN  
SIGNED, SEALED AND DATED  
ELECTRONICALLY.

**SIGN MOUNTING DETAILS  
PIPE POST**

DATE EFFECTIVE: 10/01/2016  
DATE PREPARED: 8/11/2016  
**903.03BJ**  
SHEET NO. 6 OF 15



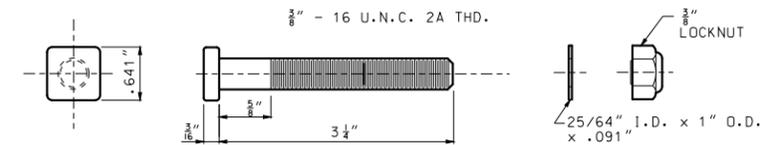
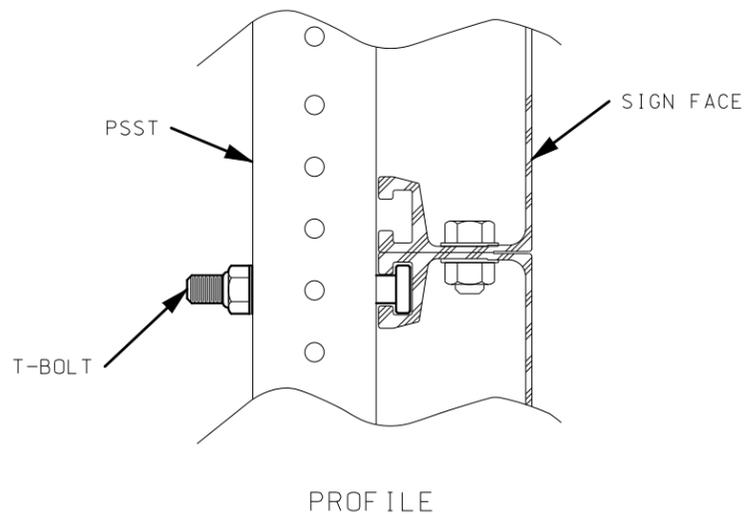
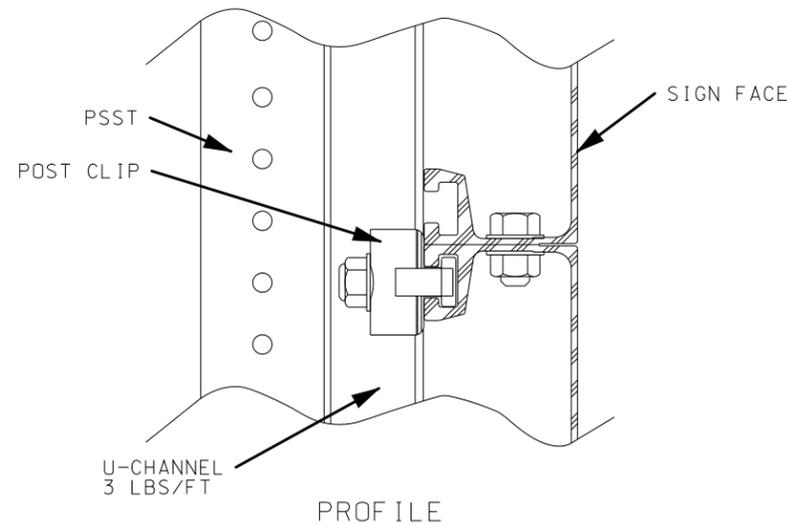
**MOUNTING DETAILS FOR EXTRUDED PANELS  
ON PIPE POST**



**MOUNTING DETAILS FOR FLAT SHEET SIGNS  
ON ROUND STRUCTURES >4" PIPE POST**



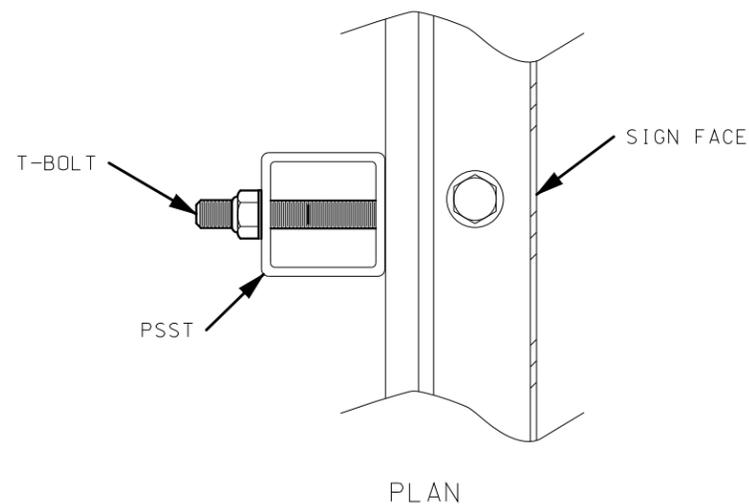
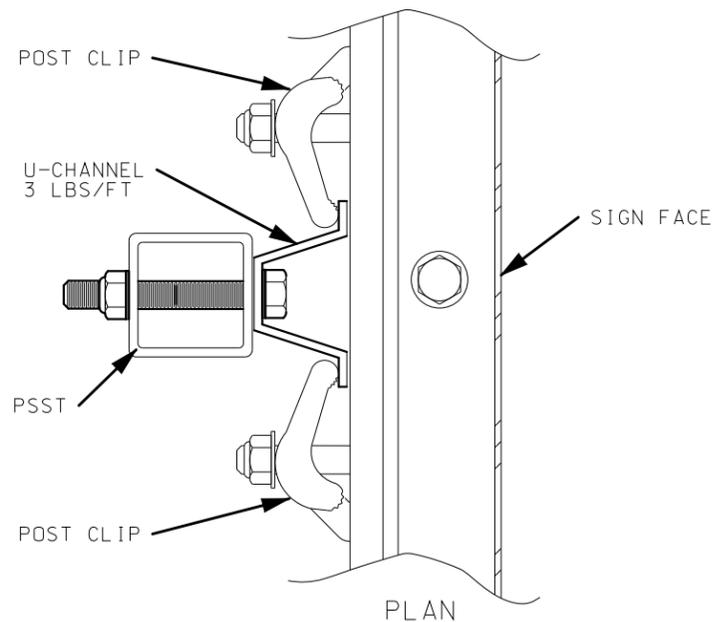
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



NOTE:  
SQUARE BOLT HEAD SHOWN MAY BE REPLACED WITH  
RECTANGULAR BOLT HEAD WITH THE NARROW DIMENSION  
EQUAL TO .641".

- BOLT - 1 1/4" x ALUMINUM
- BOLT - 3/4" x ALUMINUM
- HEX LOCKNUT - ALUMINUM
- WASHER - ALUMINUM

### T-BOLT DETAIL



- NOTES:
- ALUMINUM BOLTS SHALL BE ASTM B 211, 2024-T4 OR 6061-T6
  - ALUMINUM FLAT WASHERS SHALL BE ASTM B 209, ALCLAD 2024-T4 OR 2024-T4
  - ALUMINUM LOCK NUTS (NYLON INSERT) SHALL BE ASTM B 211 OR 2017-T4

POST CLIP METHOD

T-BOLT METHOD

## EXTRUDED PANEL MOUNTING DETAIL

NUMBER OF BOLTS TO ATTACH STEEL CHANNEL TO PSST POST	
SIGN HEIGHT	NO. OF BOLTS PER PSST POST USED
1'	2
2'	3
3'	4
4'	5
5'	6
6'	7
7'	8

#### GENERAL NOTES:

FOR THE GENERAL NOTES, SEE SHEET 1 OF 15.

FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 15.

FOR POST CLIP DETAILS, SEE SHEET ? OF 15.

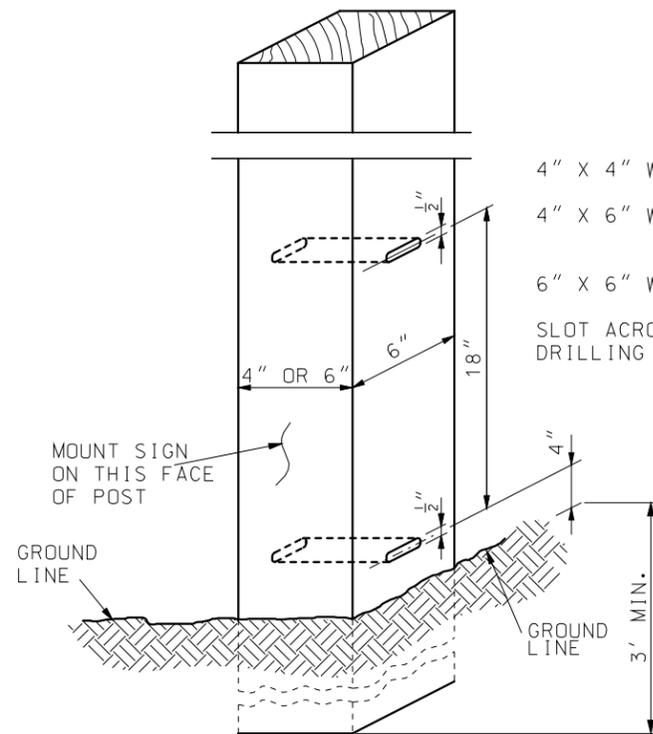
ALTERNATE PSST MOUNTING HARDWARE USE SHALL BE ON APPROVED LIST.

<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b></p> <p>105 WEST CAPITOL JEFFERSON CITY, MO 65102 1-888-ASK-MODOT (1-888-275-6636)</p>	<h3>SIGN MOUNTING DETAILS</h3> <p>PERFORATED SQUARE STEEL TUBE (PSST)</p>	
	<p>DATE EFFECTIVE: 10/01/2016</p> <p>DATE PREPARED: 8/11/2016</p>	<h2>903.03BJ</h2>

STATE OF MISSOURI  
EILEEN H. RACKERS  
NUMBER PE-28336  
PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN  
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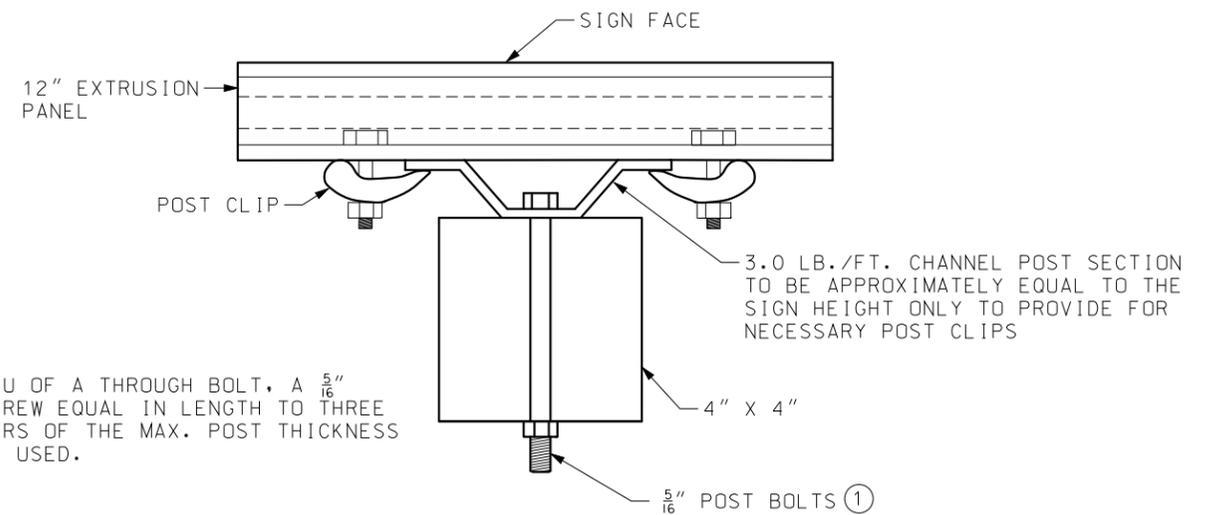
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



**WOOD POST DETAIL**

4" X 4" WOOD POST - NO SLOTS OR HOLES REQUIRED  
 4" X 6" WOOD POST - 1 1/2" X 1/2" SLOT ON 6" SIDE OR 1 1/2" DIA. HOLE ON 6" SIDE  
 6" X 6" WOOD POST - 2" X 1/2" SLOT OR 2" DIA. HOLE  
 SLOT ACROSS NEUTRAL AXIS FORMED BY SUCCESSIVE DRILLING WITH 1/2" BIT.

NUMBER OF BOLTS TO ATTACH STEEL CHANNEL TO WOOD POST	
SIGN HEIGHT	NO. OF BOLTS PER WOOD POST USED
1'	2
2'	3
3'	4
4'	5
5'	6
6'	7
7'	8

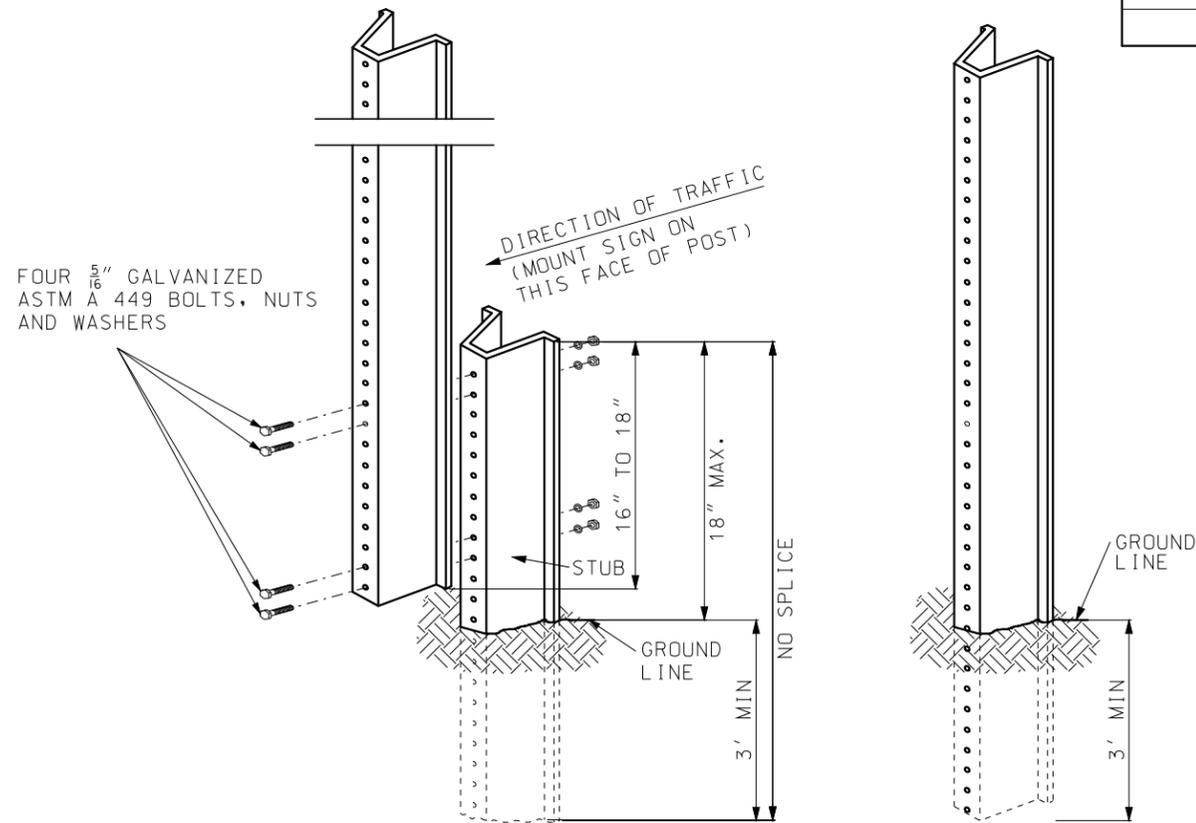


**PLAN VIEW**  
**MOUNTING DETAILS FOR EXTRUDED PANELS ON WOOD POST**

**GENERAL NOTES:**

- FOR GENERAL NOTES, SEE SHEET 1 OF 15.
- ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 3 FEET INTO THE GROUND.
- USE OF SPLICE IS OPTIONAL.
- SPLICE OVERLAP SHALL BE POSITION ENTIRELY BETWEEN GROUND LINE AND 18" ABOVE GROUND LINE.
- ONLY ONE SPLICE WILL BE ALLOWED PER POST.
- FOR POST SIZING SEE ENGINEERING POLICY GUIDE.
- FOR MOUNTING HEIGHT AND OFFSET DETAILS, SEE SHEET 10 OF 15.

AT THE ENGINEER DISCRETION A FLUORESCENT PAINT SHALL BE APPLIED HEAVILY TO BOTH SIDES OF U-CHANNEL POST STUB FOR A LENGTH OF AT LEAST 6 INCHES BELOW THE TOP OF STUB.



**U-CHANNEL POST DETAIL  
 OPTIONAL INSTALLATION**

SIGN AREA (SQ.FT.)	POST TYPE	
	U-CHANNEL	WOOD
≤ 10	1 - 3.0 LB./FT.*	1 - 4" X 4"*
> 10 ≤ 16	2 - 3.0 LB./FT.	2 - 4" X 4"* 1 - 4" X 6"*
> 16 ≤ 24	2 - 3.0 LB./FT.	2 - 4" X 6"
> 24 ≤ 30	3 - 3.0 LB./FT.	2 - 4" X 6"
> 30 ≤ 50	N/A	2 - 6" X 6"

\* SIGNS GREATER THAN 4 FEET IN WIDTH REQUIRE TWO POSTS, EXCEPT DIAMOND SHAPED WARNING SIGNS, YIELD SIGNS, AND ONE WAY SIGNS.

**POST SIZE REQUIREMENTS**

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

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 JEFFERSON CITY, MO 65102  
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STATE OF MISSOURI  
 EILEEN H. RACKERS  
 NUMBER PE-28336  
 PROFESSIONAL ENGINEER

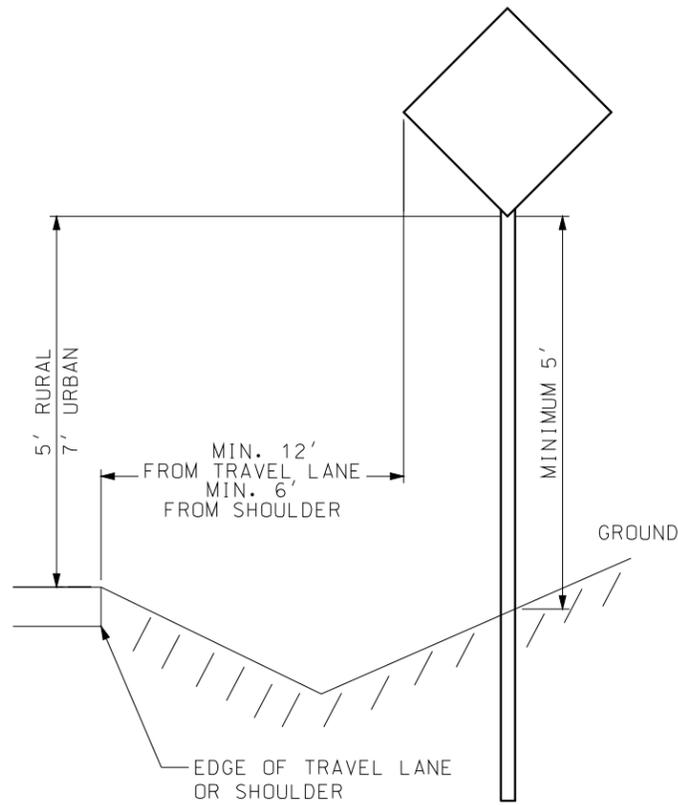
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**SIGN MOUNTING DETAILS**  
 WOOD AND U-CHANNEL POST

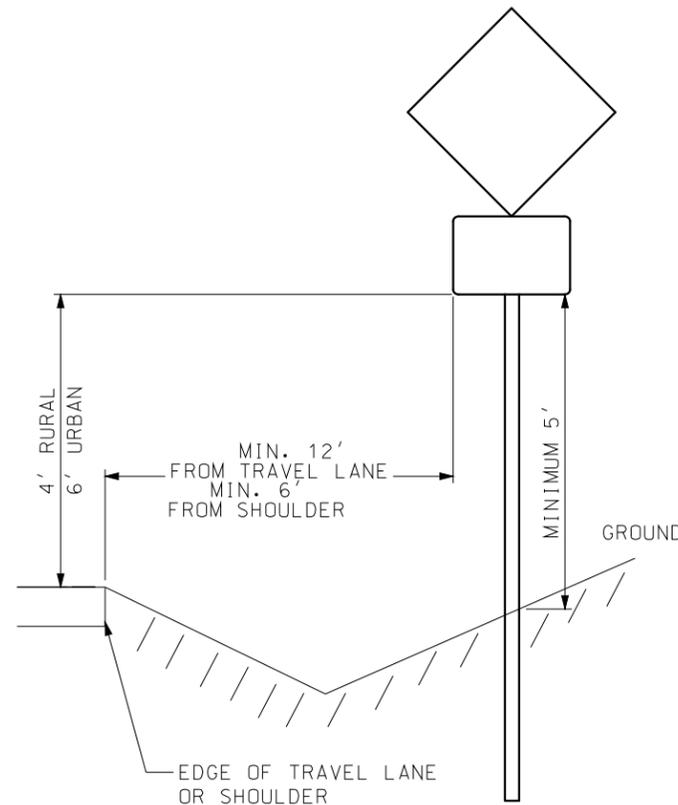
DATE EFFECTIVE: 10/01/2016  
 DATE PREPARED: 8/11/2016

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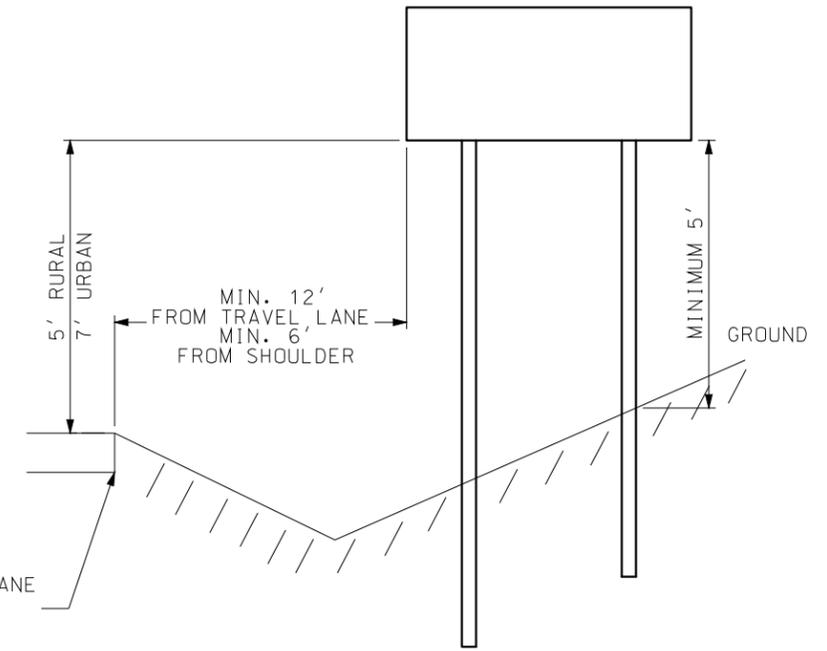
SHEET NO.  
 9 OF 15



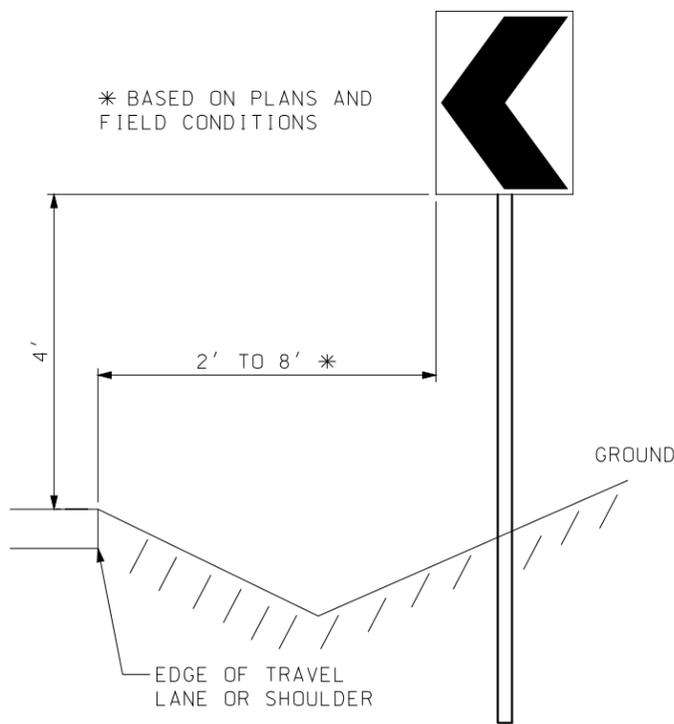
ONE POST - SINGLE SIGN



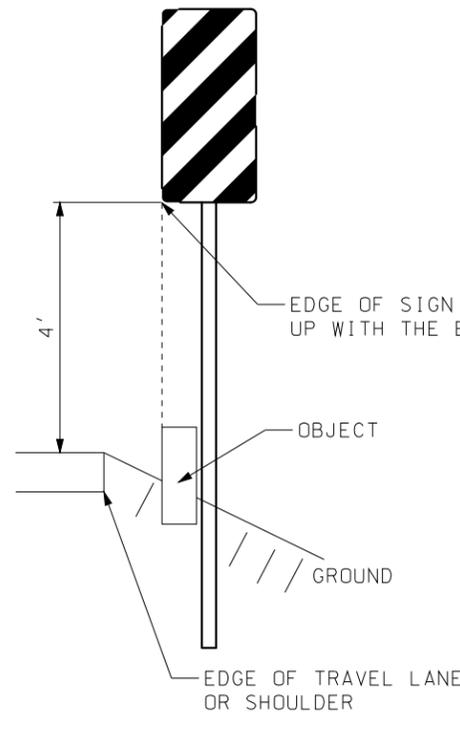
ONE POST - SINGLE SIGN WITH SUPPLEMENTAL PLAGUE



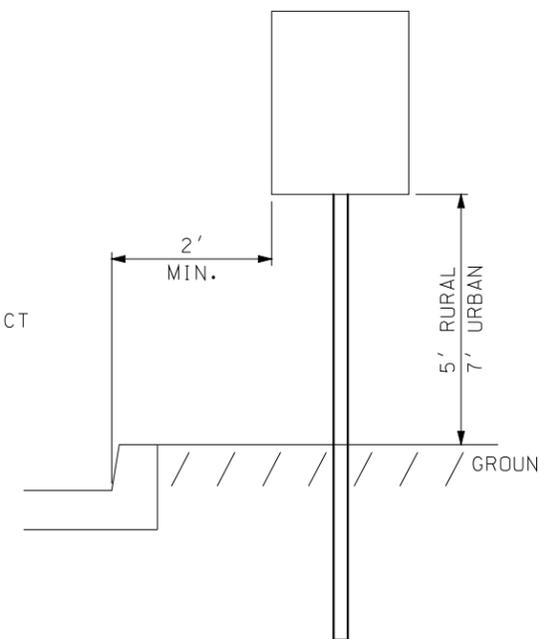
TWO POST



CHEVRON SIGN



TYPE III OBJECT MARKER



ADJACENT TO CURB

GENERAL NOTES:

SIGN MOUNTING BOLTS SHALL BE INSTALLED WITH A NYLON WASHER AGAINST THE SIGN FACE WITH A STEEL WASHER BETWEEN THE NYLON WASHER AND BOLT HEAD.

A LOCKNUT SHALL BE USED TO FASTEN THE SIGN TO THE POST.

VERTICAL CLEARANCE FROM THE ROADWAY SHALL BE MET AND INCREASED ONLY TO MEET THE 5' MINIMUM VERTICAL CLEARANCE FROM THE GROUND.

HORIZONTAL OFFSET MAY BE ADJUSTED BASED ON FIELD CONDITIONS.

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STATE OF MISSOURI  
 EILEEN H. RACKERS  
 NUMBER PE-28336  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

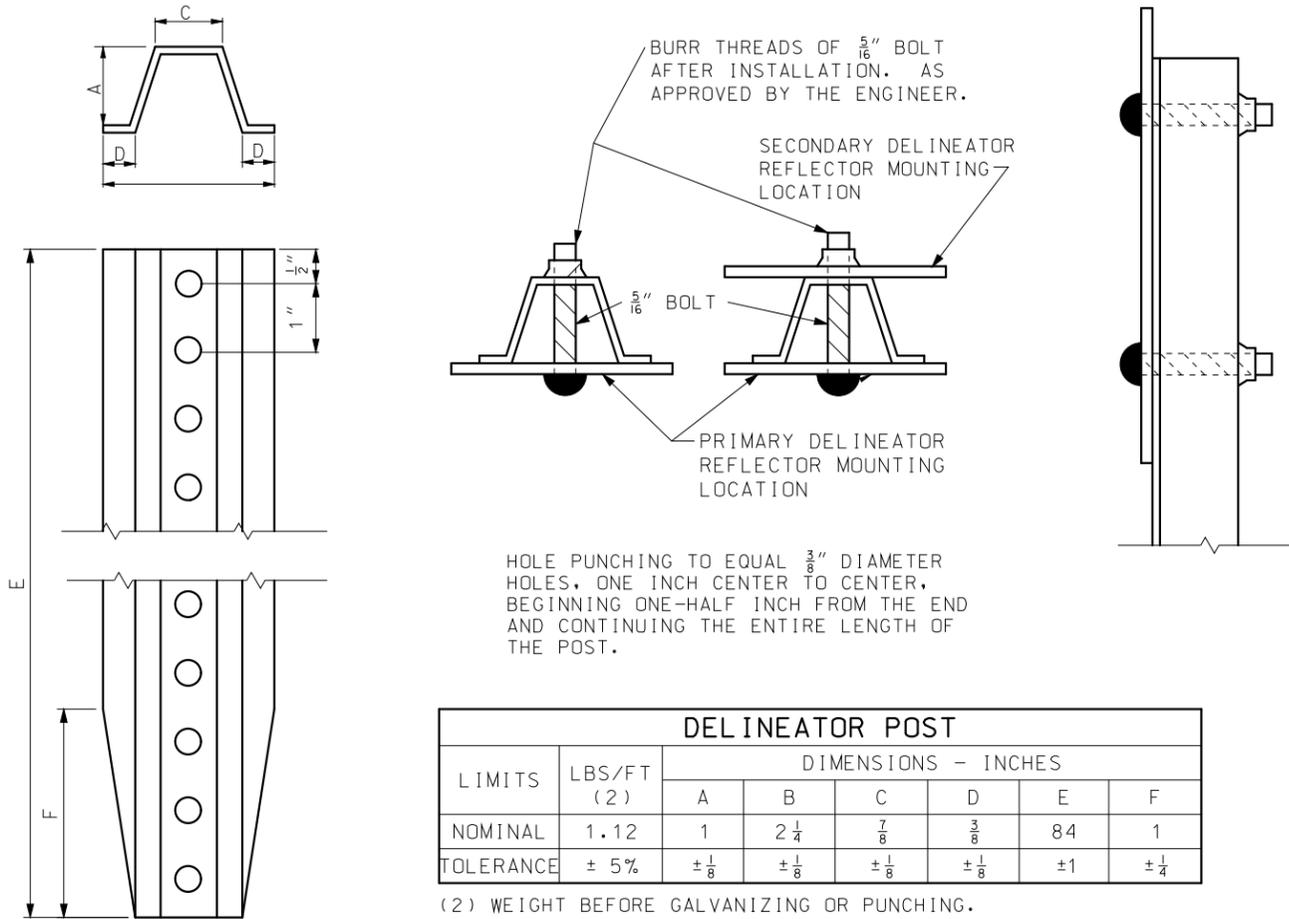
**SIGN MOUNTING DETAILS**  
 MOUNTING HEIGHT & OFFSET  
 PIPE POSTS, PSST, WOOD  
 & U-CHANNEL POSTS

DATE EFFECTIVE:	10/01/2016	<b>903.03BJ</b>	SHEET NO. 10 OF 15
DATE PREPARED:	8/12/2016		

MOUNTING HEIGHT DETAILS

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

**GROUND MOUNT U-CHANNEL**

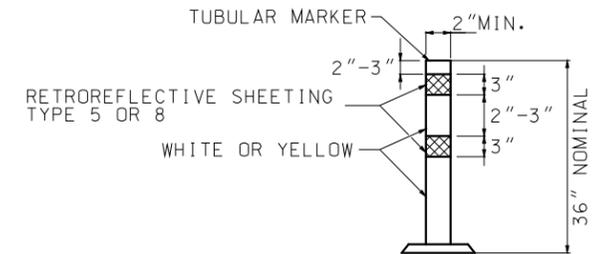


LIMITS		DEL INEATOR POST						
LIMITS	LBS/FT (2)	DIMENSIONS - INCHES						
NOMINAL	1.12	A	B	C	D	E	F	
TOLERANCE	± 5%	± 1/8	± 1/8	± 1/8	± 1/8	± 1	± 1/4	

(2) WEIGHT BEFORE GALVANIZING OR PUNCHING.

THE CHANNEL POST FOR DELINEATORS SHALL BE MANUFACTURED FROM DUCTILE ASTM A 36 OR ASTM A 1011 GR 60.

**SURFACE MOUNTED TUBULAR DELINEATOR**



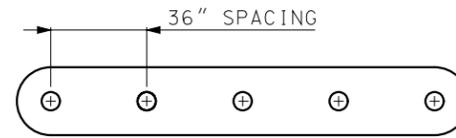
**TUBULAR MARKER DETAIL**

A PERMANENT INSTALLATION METHOD, IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, SHALL BE USED TO INSTALL THE TUBULAR MARKER TO THE ISLAND SURFACE.

COLOR OF TUBULAR MARKER AND REFLECTIVE SHEETING SHALL MATCH THE COLOR OF THE CLOSEST PAVEMENT MARKING OR CURB MARKING.

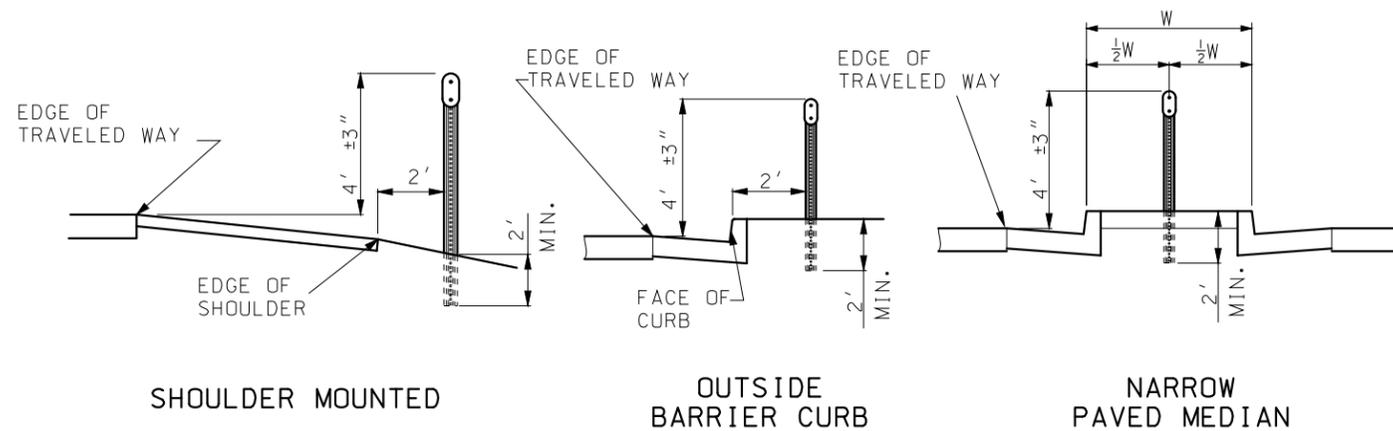
**DEL INEATOR PLACEMENT FOR ISLANDS**

DEL INEATOR PLACEMENT LOCATED AT THE RADIUS POINTS

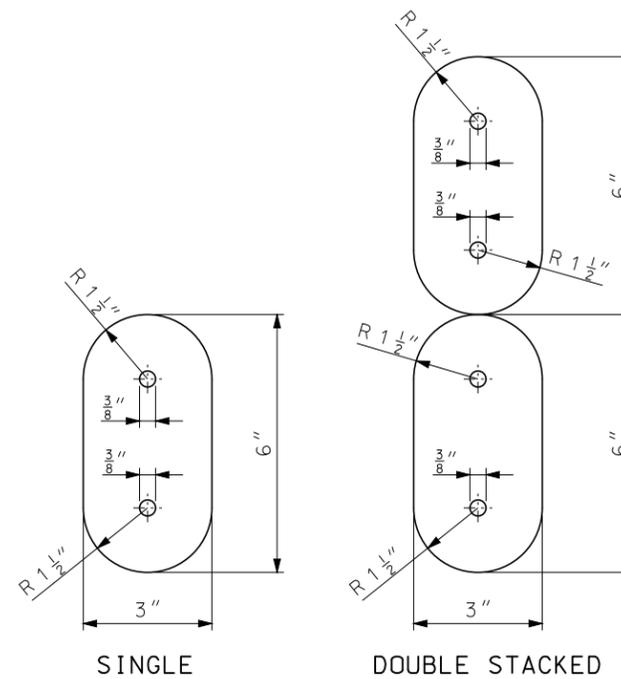


**DEL INEATOR PLACEMENT FOR MEDIAN STRIPS**

**DEL INEATOR POST AND FASTENER DETAILS**



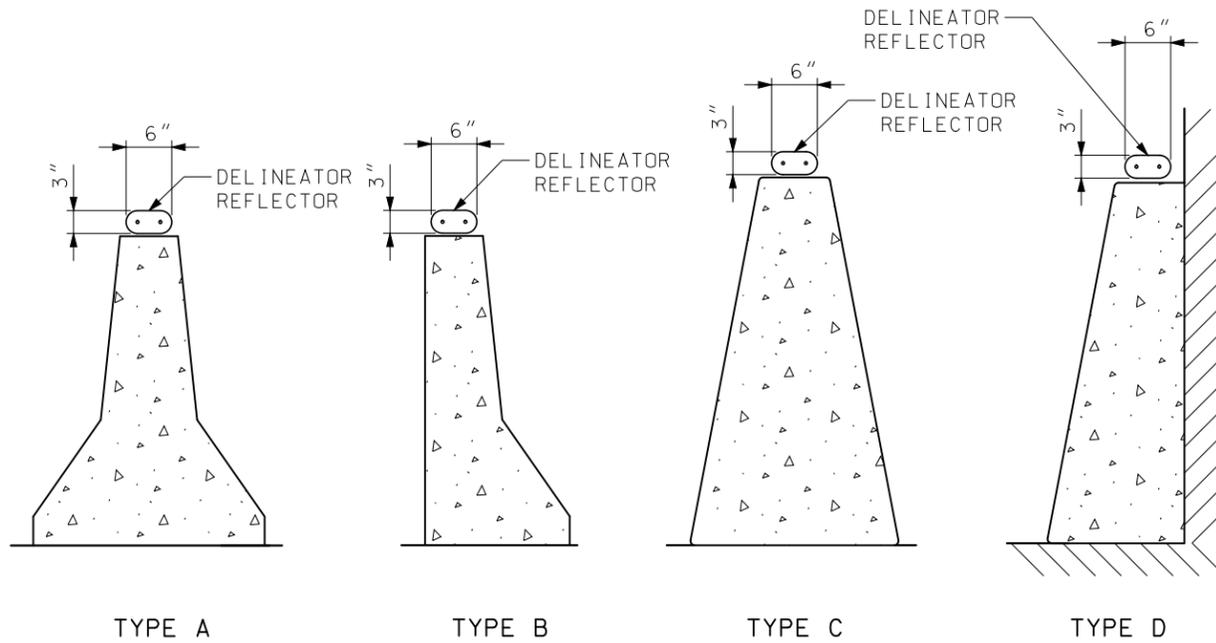
**DEL INEATOR MOUNTING DETAILS**



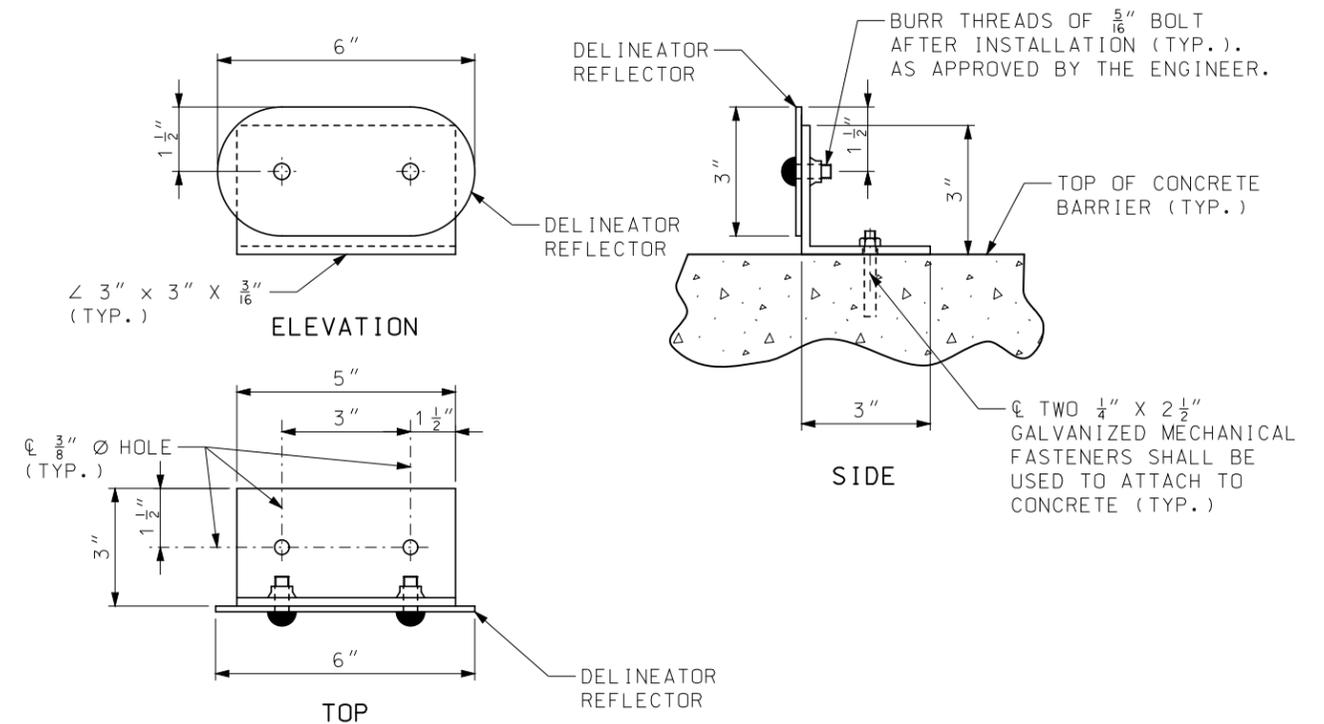
**CHANNEL POST DEL INEATOR REFLECTOR**

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		<b>SIGN MOUNTING DETAILS</b> DEL INEATORS
DATE EFFECTIVE: 10/01/2016 DATE PREPARED: 8/11/2016	<b>903.03BJ</b>	SHEET NO. 11 OF 15

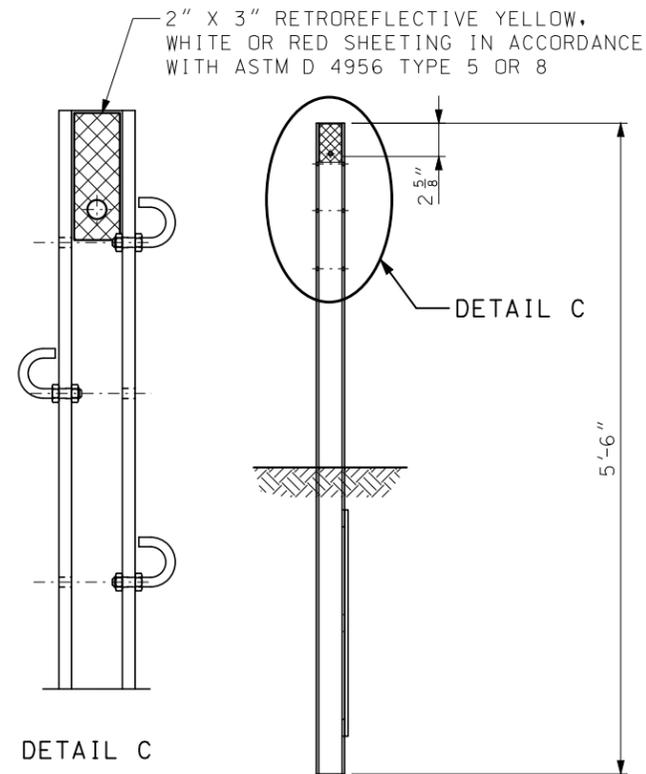
IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.



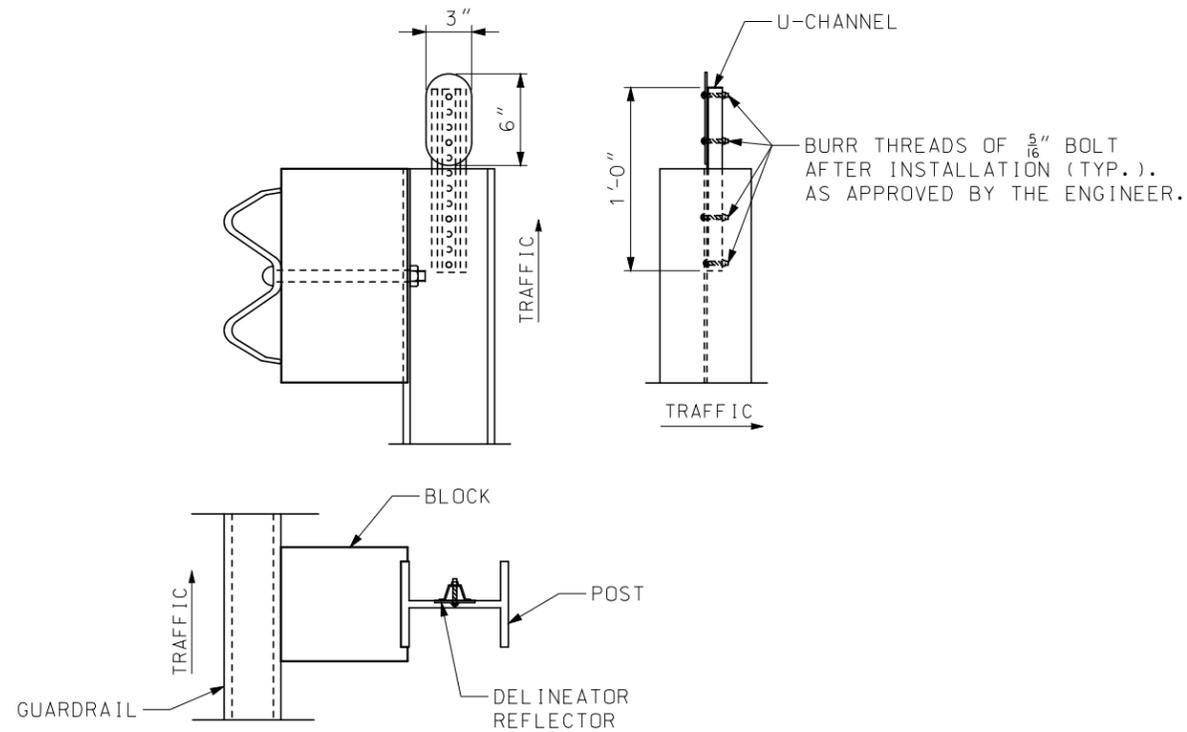
**DELINEATORS ON CONCRETE TRAFFIC BARRIER**  
FOR CONCRETE BARRIER DETAILS, SEE STD PLANS 617.10.



**DELINEATOR CONNECTION ON CONCRETE TRAFFIC BARRIER DETAIL**



**DELINEATORS ON THREE-STRAND MEDIAN GUARD CABLE**  
FOR THREE-STRAND GUARD CABLE DETAILS SEE STD PLANS 606.41.



**DELINEATORS ON NEW GUARDRAIL**  
FOR GUARDRAIL DETAILS, SEE STD PLANS 606.00 AND 606.50.

**GENERAL NOTES:**  
FOR GENERAL NOTES, SEE SHEET 1 OF 15.  
RETROREFLECTIVE YELLOW, WHITE OR RED SHEETING IN ACCORDANCE WITH ASTM D 4956 TYPE 5 OR 8 SHALL BE APPLIED TO ONLY ONE SIDE OF THE CHANNEL POST DELINEATOR MOUNTED TOWARDS THE CHANNEL POST.  
REFLECTIVE SHEETING SHALL FOLLOW GUIDELINES OUTLINED IN SEC 1042.2.7 FOR CORRECT APPLICATION OF SHEETING TO DELINEATOR BODY. THE COLOR OF THE SHEETING SHALL MATCH THE CLOSEST ADJACENT PAVEMENT MARKING. A DELINEATOR WITH RED SHEETING SHALL BE APPLIED TO THE BACK SIDE OF THE CHANNEL POST WHEN THE DELINEATION IS PLACED ALONG AN INTERCHANGE RAMP AND COULD BE VIEWED BY WRONG WAY TRAFFIC.

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	<b>SIGN MOUNTING DETAILS</b> <b>DELINEATORS</b>
DATE EFFECTIVE: 10/01/2016 DATE PREPARED: 8/11/2016	<b>903.03BJ</b> SHEET NO. 12 OF 15

IF A SEAL IS PRESENT ON THIS SHEET IT HAS BEEN ELECTRONICALLY SEALED AND DATED.

$X = 3 \times S$  100' MAXIMUM  
 $Y = 2 \times S$  100' MAXIMUM

**TYPICAL DIAMOND EXIT RAMP**

**TYPICAL DIAMOND ENTRANCE RAMP  
TYPICAL INTERCHANGE**

DELINEATOR SPACING ON HORIZONTAL CURVES				
RADIUS OF CURVE (FEET)	SPACING ON CURVE (FEET)	SPACING IN ADVANCE & BEYOND CURVE (FEET)		
		1ST	2ND	3RD
50	20	40	65	100
150	30	60	90	100
200	35	70	100	100
250	40	85	100	100
300	50	95	100	100
400	55	100	100	100
500	65	100	100	100
600	70	100	100	100
700	75	100	100	100
800	80	100	100	100
900	85	100	100	100
1000	90	100	100	100

"S" SPACING ON CURVE =  $3R-50$  OR MAY BE INTERPOLATED FROM TABLE. MINIMUM SPACING = 20 FEET.

SPACING OF FIRST DELINEATOR—IN ADVANCE OF AND BEYOND CURVE =  $2 \times S$ , THE SECOND =  $3 \times S$ , AND THE THIRD =  $6 \times S$ , BUT NOT TO EXCEED 100 FEET. MAXIMUM SPACING = 100 FEET.

DELINEATORS SHALL BE INSTALLED FACING APPROACHING TRAFFIC. YELLOW DELINEATORS SHOULD BEGIN EVEN WITH THE GORE EXIT SIGN AND END 60 FEET FROM THE GORE POINT. WHITE DELINEATORS SHOULD EXTEND BEYOND THE FIRST YELLOW DELINEATOR. RED DELINEATORS SHOULD BE PLACED ON THE BACK SIDE OF EITHER THE WHITE OR YELLOW DELINEATOR POSTS WHEN APPLICABLE. RED DELIEATORS ARE TYPICALLY INSTALLED WHERE VEHICLES MAY ACCIDENTALLY TRAVEL DOWN THE RAMP BACKWARDS AND MOUNTED FACING AWAY FROM NORMAL TRAFFIC FLOW.

CHANNEL POST DELINEATORS SHALL BE OMITTED ON SECTIONS WHERE GUARD-RAIL IS PRESENT. THESE PORTIONS SHALL BE DELINEATED UTILIZING THE GUARDRAIL DELINEATORS. IN AREAS WHERE RED DELINEATORS ARE INDICATED, RED RETROREFLECTIVE SHEETING WILL BE PLACED ON THE BACK SIDE OF THE GUARDRAIL DELINEATOR.

REFLECTIVE SHEETING SHALL BE IN ACCORDANCE WITH SEC 1042.2.7.3.

**LEGEND**

- WHITE DELINEATOR
- ▲ YELLOW DELINEATOR
- WHITE DOUBLE STACKED DELINEATOR
- RED DELINEATOR

**GENERAL NOTES:**

FOR GENERAL NOTES, SEE SHEET 1 OF 15.

- (1) USE YELLOW DOUBLE STACKED DELINEATORS FOR LEFT HAND ACCEL/DECEL LANES.
- (2) DELETE IF EMERGENCY REFERENCE MARKERS ARE USED.
- (3) EXTENT OF DELINEATION ON ROUTES WITH EMERGENCY REFERENCE MARKERS.
- (4) ON ROUTES WITHOUT EMERGENCY REFERENCE MARKERS DELINEATORS SHALL BE INSTALLED BETWEEN INTERCHANGES EVERY 528'.

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**SIGN MOUNTING DETAILS**

INTERCHANGE DELINEATION

STATE OF MISSOURI

EILEEN H. RACKERS

NUMBER PE-28336

PROFESSIONAL ENGINEER

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

DATE EFFECTIVE: 10/01/2016

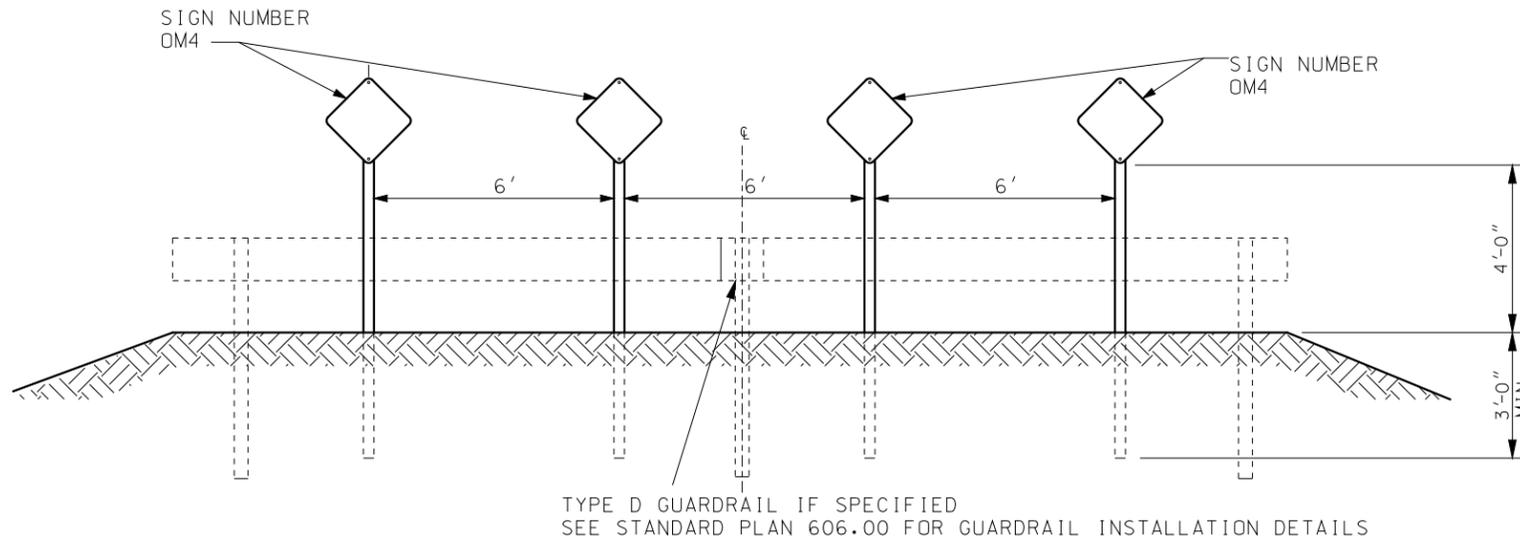
DATE PREPARED: 8/11/2016

**903.03BJ**

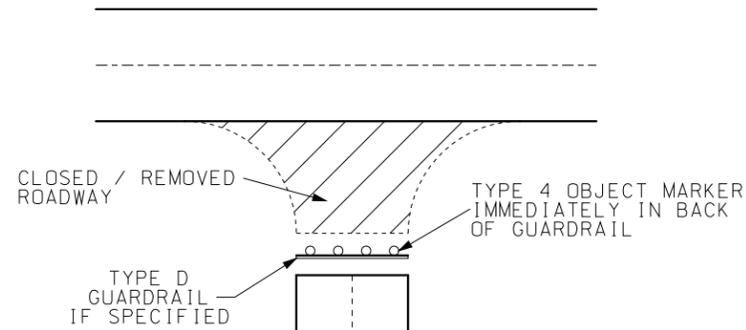
SHEET NO.

13 OF 15

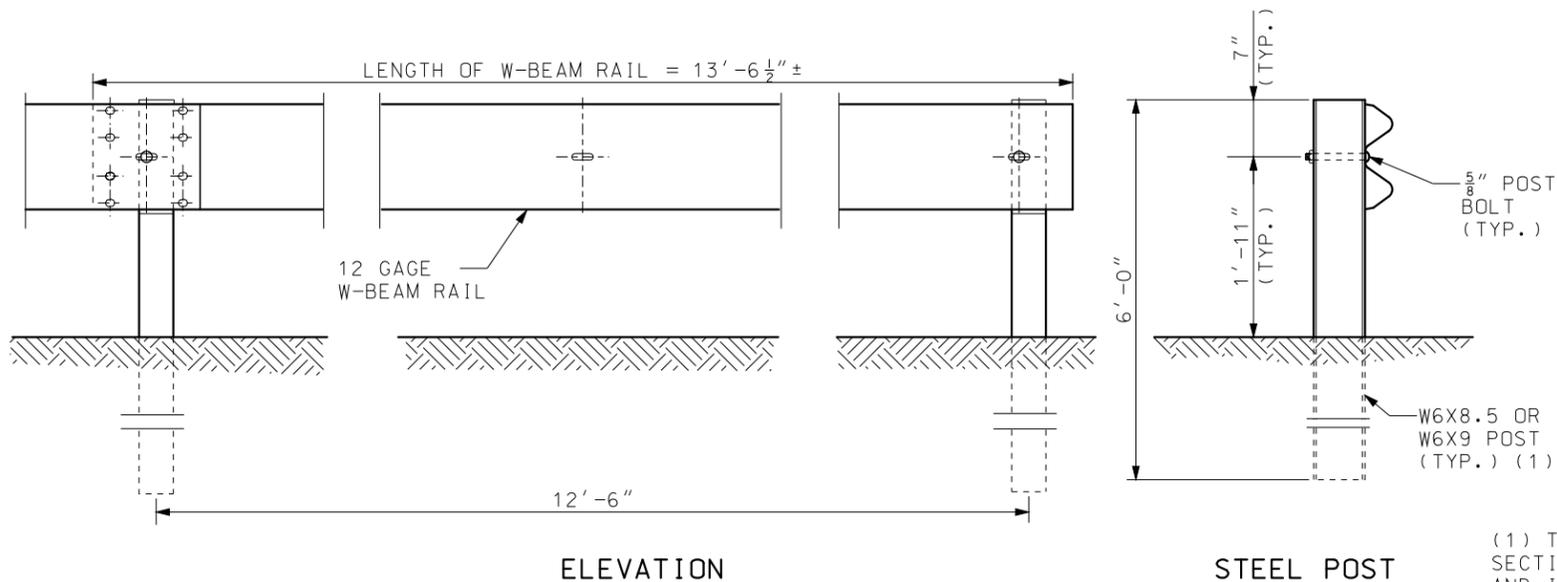
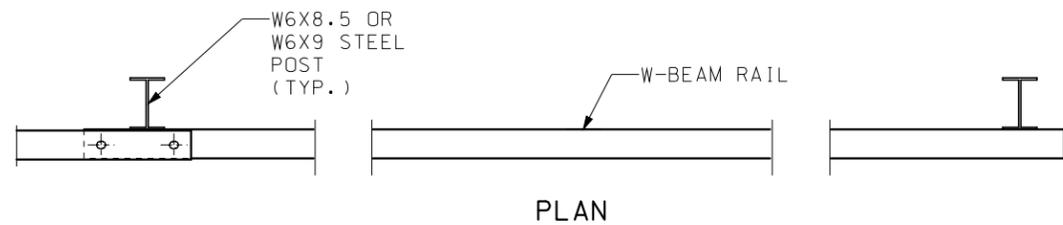
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### TYPE 4 OBJECT MARKER INSTALLATION

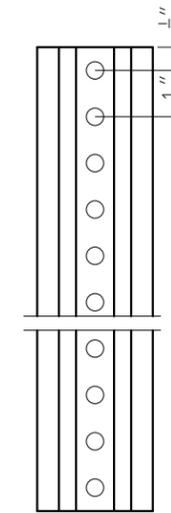


### TYPICAL ROAD CLOSURE



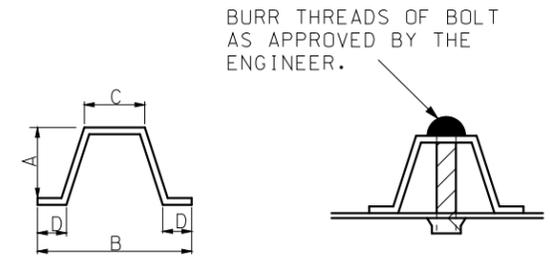
### TYPE D GUARDRAIL

(1) THE CONTRACTOR MAY FURNISH EQUIVALENT SECTIONS FABRICATED FROM MATERIAL MEETING AND IN ACCORDANCE WITH SEC 1040.



STEEL OBJECT MARKER POST					
LIMITS	LBS/FT (2)	DIMENSIONS - INCHES			
		A	B	C	D
MIN.	2.40	1 1/4	2 1/2	1	1/2
MAX.	2.80	1 5/8	3 1/4	1 3/8	3/4

(2) WEIGHT BEFORE GALVANIZING OR PUNCHING. LIMITS SHOWN ARE ABSOLUTE. NO FURTHER WEIGHT, DIMENSIONAL OR COMMERCIAL TOLERANCE WILL BE ACCEPTABLE.



HOLE PUNCHING TO EQUAL 3/8" DIAMETER HOLES, ONE INCH CENTER TO CENTER, BEGINNING ONE-HALF INCH FROM THE END AND CONTINUING THE ENTIRE LENGTH OF THE POST.

### OBJECT MARKER POST AND FASTENER DETAILS

GENERAL NOTES:

FOR GENERAL NOTES, SEE SHEET 1 OF 15.

TYPE D GUARDRAIL IS ACCESS RESTRAINT AND VISUAL TARGET VALUE ONLY. IT HAS NO REDIRECTIVE CAPABILITY.

**MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION**

105 WEST CAPITOL  
JEFFERSON CITY, MO 65102  
1-888-ASK-MODOT (1-888-275-6636)

STATE OF MISSOURI  
EILEEN H. RACKERS  
NUMBER PE-28336  
PROFESSIONAL ENGINEER

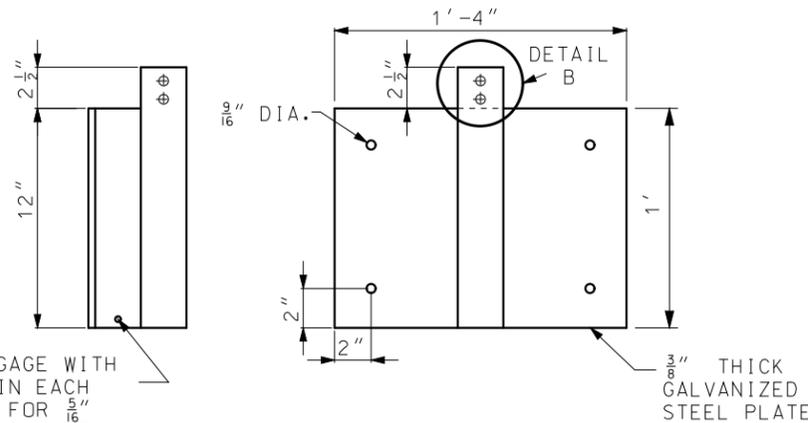
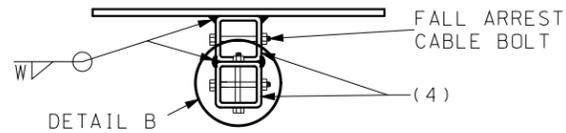
THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

### SIGN MOUNTING DETAILS OBJECT MARKERS FOR ROAD CLOSURE

DATE EFFECTIVE: 10/01/2016  
DATE PREPARED: 8/11/2016

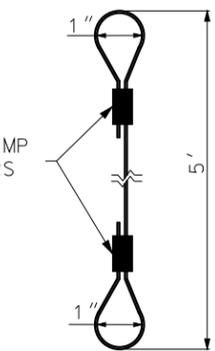
903.03BJ

SHEET NO.  
14 OF 15

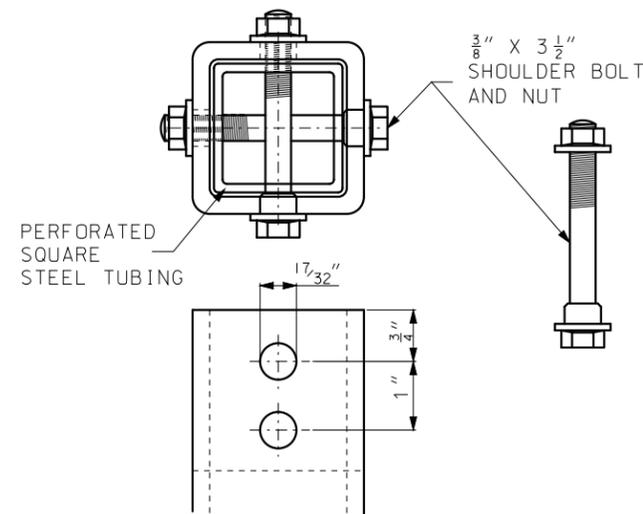


2 1/2" X 2 1/2" 7 GAGE WITH 5/16" DIA HOLE IN EACH SIDE OF TUBE FOR 5/16" THROUGH BOLT TO RETAIN FALL ARREST CABLE

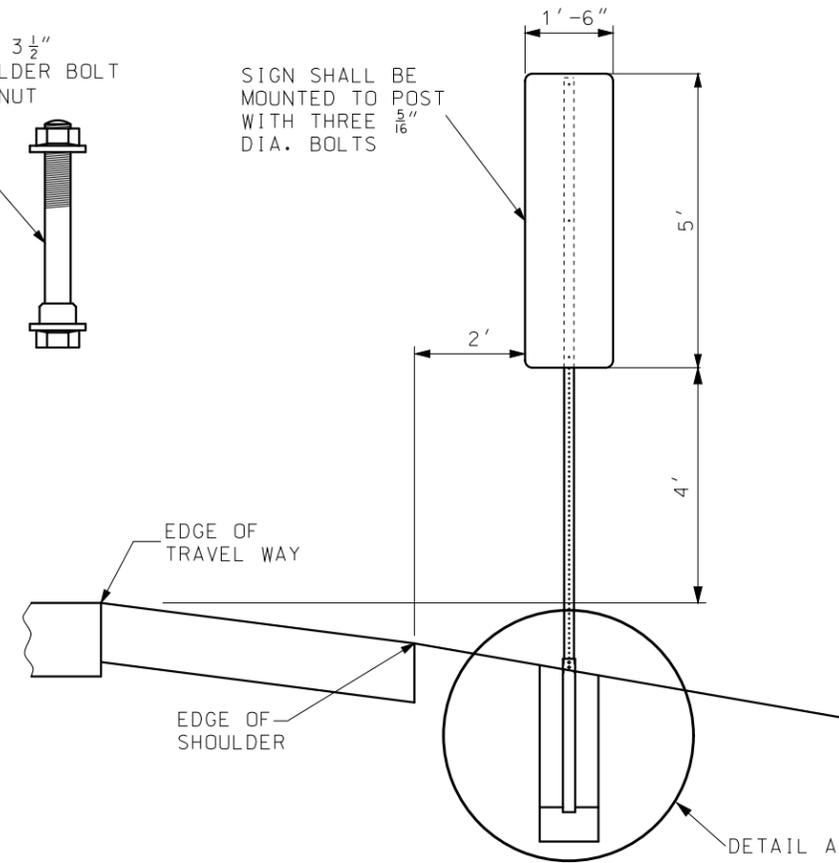
**MOUNTING PLATE DETAIL**



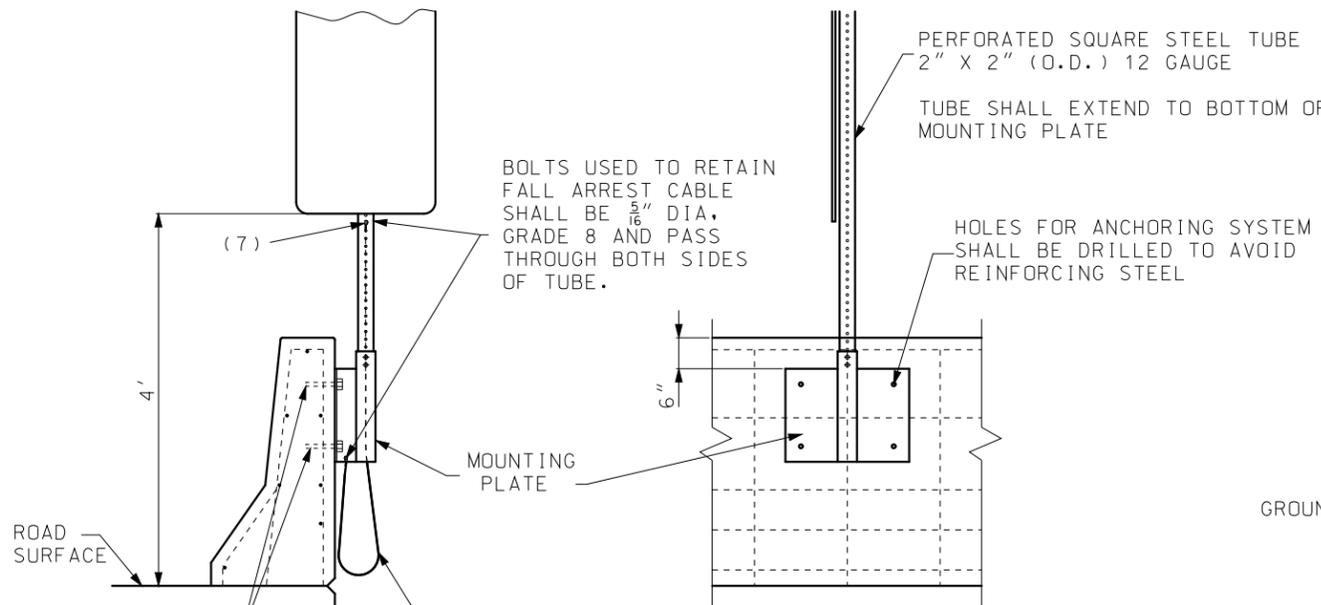
**FALL ARREST CABLE DETAIL**



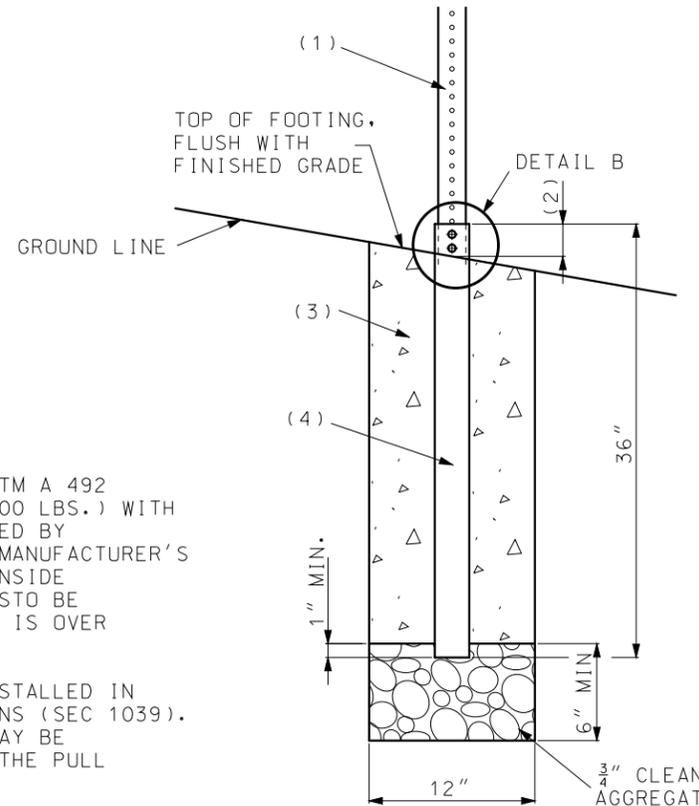
**DETAIL B SHOULDER BOLT**



**GROUND INSTALLATION**



**BARRIER WALL INSTALLATION**



**DETAIL A**

GENERAL NOTES:  
 FOR GENERAL NOTES, SEE SHEET 1 OF 15.  
 PERFORATED SQUARE STEEL TUBE SHALL BE SECURED TO FOUNDATION TUBE OR BARRIER WALL MOUNTING PLATE WITH A SHOULDER BOLT PER PERFORATED SQUARE STEEL TUBE MANUFACTURER'S SPECIFICATION.

- (1) PERFORATED SQUARE STEEL TUBE 2" X 2" (O.D.) 12 GAUGE. TUBE SHALL EXTEND A MINIMUM OF 6" BELOW THE TOP OF THE FOUNDATION TUBE.
- (2) TUBE TO EXTEND ABOVE FOUNDATION ONLY ENOUGH TO ALLOW BOLT TO BE INSERTED 2 1/2" MAXIMUM.
- (3) CONCRETE MIX TO HOLD FOUNDATION TUBE PLUMB WITHOUT BRACING SHALL HAVE A MINIMUM OF 5.5 SACKS OF CEMENT PER CUBIC YARD AND A MAXIMUM SLUMP OF 2 1/2".
- (4) 2 1/2" X 2 1/2" (O.D.) SQUARE TUBE GALVANIZED 7 GAGE WITH TWO 1 7/32" DIAMETER HOLES IN EACH FACE 3/4" BELOW TOP OF TUBE.
- (5) 1/8" X 5' LONG STAINLESS STEEL CABLE (ASTM A 492 TYPE 304 MINIMUM BREAKING STRENGTH 200 LBS.) WITH A 1" DIA. LOOP AT EACH END LOOPS FORMED BY MECHANICAL CRIMP TYPE CONNECTION PER MANUFACTURER'S SPECIFICATIONS. CABLE IS TO BE RUN INSIDE PERFORATED SQUARE STEEL TUBE. CABLE IS TO BE USED ONLY WHEN SIGN MOUNTING LOCATION IS OVER ANOTHER TRAVELWAY.
- (6) 1/2" DIAMETER RESIN ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD SPECIFICATIONS (SEC 1039). AN APPROVED MECHANICAL TYPE ANCHOR MAY BE USED IF THE DEVICE EQUALS OR EXCEEDS THE PULL TEST REQUIREMENTS OF SEC. 1039.
- (7) FALL ARREST CABLE TO BE SECURED TO NEXT FULL HOLE BELOW SIGN

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 EILEEN H. RACKERS  
 NUMBER PE-28336  
 PROFESSIONAL ENGINEER  
 THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

**SIGN MOUNTING DETAILS**  
 EMERGENCY REFERENCE MARKERS

DATE EFFECTIVE: 10/01/2016  
 DATE PREPARED: 8/11/2016

**903.03BJ**

SHEET NO. 15 OF 15

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