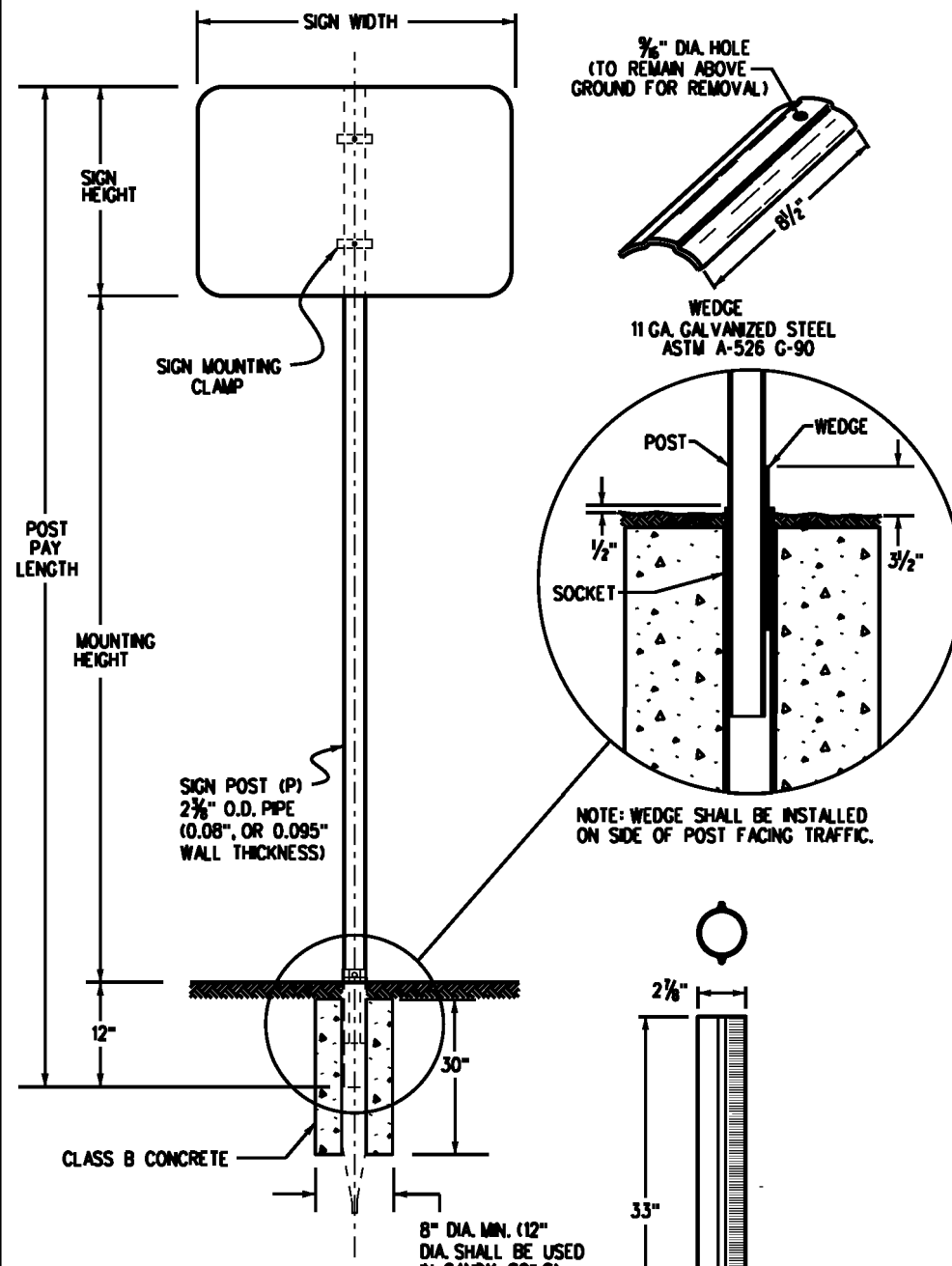


**TUBULAR STEEL POSTS  
(SOCKET SYSTEM) (FOR USE WITH ALL P-POST INSTALLATIONS)  
(SEE SHEET 2 FOR P1 AND P2 POST INSTALLATIONS)**

**SIGNPOST SELECTION GUIDE (90 MPH WIND LOAD DESIGN)  
(FOR SOCKET SYSTEM AND SLIPBASE INSTALLATIONS USING P, P1 OR P2 POSTS)**



		7' MOUNTING HEIGHT												
		SIGN WIDTH (FT)												
		1	2	2.5	3	4	5	6	7	8	9	10	11	12
SIGN HEIGHT (FT)	1	P	P	P	P	P	P1	SIZES NOT USED						
	2	P	P	P	P	P	P1	SIZES NOT USED						
	2.5	P	P	P	P	P1	P1	SIZES NOT USED						
	3	P	P	P	P1	P1	P1	SIZES NOT USED						
	4	P	P1	P1	P1	P1	P1	SIZES NOT USED						
	5	SIZES NOT USED		P1	P1	P1	P1	SIZES NOT USED						
	6	SIZES NOT USED		P1	P1	P1	P2	SIZES NOT USED						
7	SIZES NOT USED		P1	P1	P2	SIZES NOT USED								

SEE CHART NOTE 4.

		8' MOUNTING HEIGHT									
		SIGN WIDTH (FT)									
		1	2	2.5	3	4	5	6	7	8	9
SIGN HEIGHT (FT)	1	P	P	P	P	P	P1	SIZES NOT USED			
	2	P	P	P	P	P1	P1	SIZES NOT USED			
	2.5	P	P	P	P1	P1	P1	SIZES NOT USED			
	3	P	P	P1	P1	P1	P1	SIZES NOT USED			
	4	P	P1	P1	P1	P1	P1	SIZES NOT USED			
	5	SIZES NOT USED		P1	P1	P1	P2	SIZES NOT USED			
	6	SIZES NOT USED		P1	P1	P1	P2	SIZES NOT USED			
7	SIZES NOT USED		P1	P1	P2	P2	SIZES NOT USED				

		9' MOUNTING HEIGHT									
		SIGN WIDTH (FT)									
		1	2	2.5	3	4	5	6	7	8	9
SIGN HEIGHT (FT)	1	P	P	P	P	P	P1	SIZES NOT USED			
	2	P	P	P	P	P1	P1	SIZES NOT USED			
	2.5	P	P	P	P1	P1	P1	SIZES NOT USED			
	3	P	P	P1	P1	P1	P1	SIZES NOT USED			
	4	P	P1	P1	P1	P1	P1	SIZES NOT USED			
	5	SIZES NOT USED		P1	P1	P1	P2	SIZES NOT USED			
	6	SIZES NOT USED		P1	P1	P2	P2	SIZES NOT USED			
7	SIZES NOT USED		P1	P2	P2	P2	SIZES NOT USED				

**CHART NOTES**

1. TYPICAL POST MOUNTING HEIGHTS FROM GROUND TO BOTTOM OF SIGN PANEL ARE 7, 8 OR 9 FEET. OTHER HEIGHTS MAY BE REQUIRED WHEN SIGNS ARE MOUNTED ON STEEPER FILL OR CUT SLOPES.
2. FOR SIGNS MOUNTED ON TWO POSTS, THE MINIMUM DISTANCE BETWEEN POSTS SHALL BE 2 FEET AND THE MAXIMUM DISTANCE SHALL BE 8 FEET. DISTANCE FROM POST TO EDGE OF SIGN PANEL(S) SHALL BE 0 TO 4 INCHES. WHEN BACKING ZEES ARE USED, POSTS SHALL BE INSTALLED WITH A MINIMUM OF 2 INCHES TO THE EDGE OF THE BACKING ZEE.
3. ALL SIGN PANELS GREATER THAN 60 INCHES IN WIDTH MUST BE MOUNTED ON TWO POSTS TO PREVENT TURNING.
4. THE POST SIZES SHOWN ARE THE MINIMUM SIZES REQUIRED. TWO P1 POSTS MAY BE SUBSTITUTED WHERE ONE P2 POST IS INDICATED. P2 POSTS MAY BE SUBSTITUTED FOR P1 POSTS WHEN DIRECTED BY THE ENGINEER. W-SHAPE BEAM MAY BE SUBSTITUTED FOR P2 POSTS WHEN DIRECTED BY THE ENGINEER.
5. USE W-SHAPE BEAMS ONLY FOR SIGN POSTS.

**GENERAL NOTES**

1. SIGNS BETWEEN 37 IN. AND 60 IN. WIDTH WITH ONE POST INSTALLATION REQUIRE A T OR U SIGN SUPPORT BRACKET IN ADDITION TO THE BACKING ZEE REQUIREMENTS. WHEN DIRECTED BY THE ENGINEER, SIGN PANELS LESS THAN 48 IN. IN WIDTH MAY ATTACHED DIRECTLY TO T OR U BRACKETS WITHOUT ZEES.
2. U-BRACKETS MAY BE USED FOR MULTIPLE SIGN INSTALLATIONS.
3. FOR BACKING ZEE REQUIREMENTS AND DETAILS, SEE STANDARD PLANS S-614-3 AND S-614-4.
4. THE CONTRACTOR SHALL INSTALL THE POSTS PER THE MANUFACTURER'S RECOMMENDATIONS WITHOUT ADDITIONAL COMPENSATION.

**POST NOTES**

THE POST MAY BE PRE-PUNCHED WITH 3/8" DIA HOLES AND THE SIGN MOUNTED DIRECTLY TO THE POST, OR AN APPROVED MOUNTING CLAMP MAY BE USED TO MOUNT THE SIGN TO THE POST. IF THE POST IS PRE-PUNCHED, THE HOLES SHALL BE SPACED THE FOLLOWING DISTANCES FROM THE TOP:

1", 3", 10", 16", 21", 23", 24", 27",  
33", 37", 39", AND 45"

TUBULAR CONCRETE FOOTING  
12 GA. GALVANIZED  
STEEL ASTM - 787

**POST SPECIFICATIONS**

POST SIZE	OUTSIDE DIAMETER	WALL THICKNESS	MATERIAL	** COATING	MAX ALLOW MOMENT	PAID FOR AS:
P	2.375"	.080"	ASTM-513	ASTM A-653 G-210 WITH 3.0 ML POLYMER COATING PER ASTM A123 CLEAR COATING	1.47 KIP FT	STEEL SIGN SUPPORT (2 INCH ROUND)
P1	2.875"	.160"	ASTM-513	GC HOT DIPPED PER ASTM-123	4.02 KIP FT	STEEL SIGN SUPPORT (2 1/2 INCH ROUND NP-40)
P2	2.875"	.276"	ASTM-500	GC HOT DIPPED PER ASTM-123	5.13 KIP FT	STEEL SIGN SUPPORT (2 1/2 INCH ROUND SCH 80)

\*\* COLOR POWDER COATING MAY BE ADDED ACCORDING TO MANUFACTURER SPECIFICATIONS FOR SPECIAL LOCATIONS WHEN SHOWN ON THE PLANS.

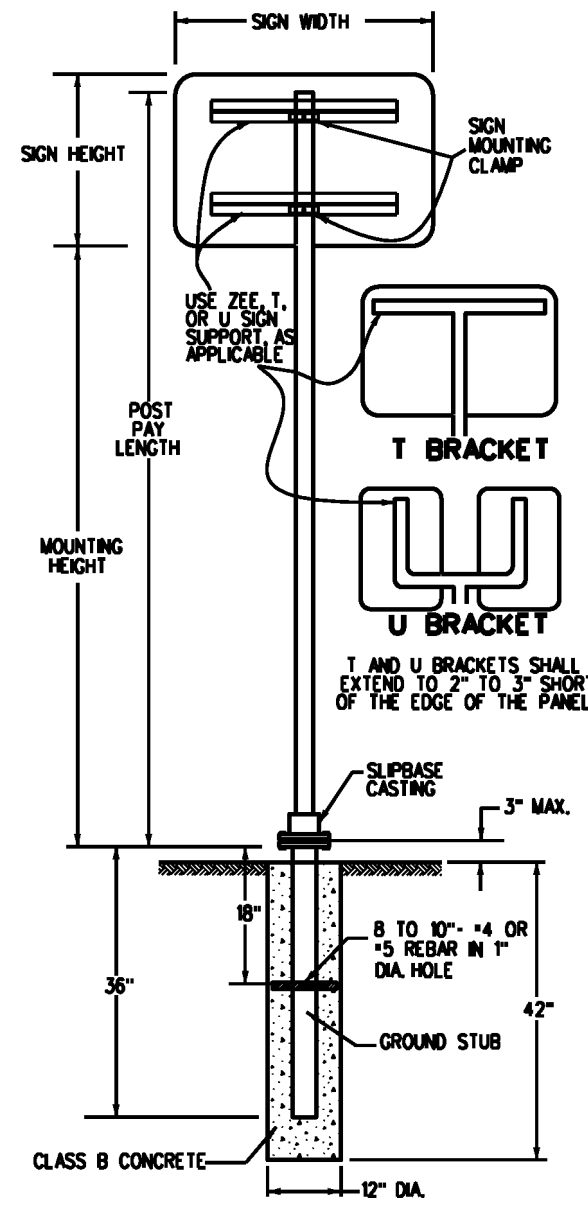
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Creation Date:	07/04/12
Created By:	KEN
Last Modification Date:	12/29/2020
Last Modified By:	McCarthy
CAD Ver.:	MicroStation V8 Scale: Not to Scale Units: English

Sheet Revisions	
Date:	Comments
12/29/20	ADDED 10- FT SIGN WIDTHS TO 7' MOUNTING HEIGHT CHART

Colorado Department of Transportation  
  
 2829 W. Howard Pl.  
 Denver, CO 80204  
 Phone: 303-757-9436  
 FAX: 303-757-9219  
**Traffic & Safety Engineering** **MKB**

**TUBULAR STEEL SIGN  
SUPPORT DETAILS**  
 Issued By: Traffic & Safety Engineering Branch July 31, 2019

STANDARD PLAN NO.  
**S-614-8**  
 Standard Sheet No. 1 of 7  
 Project Sheet Number:

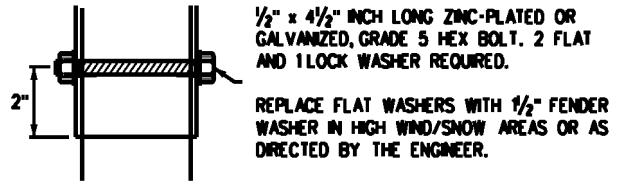


**TUBULAR STEEL POST  
(WITH SLIPBASE)  
(FOR USE WITH ALL P1 AND  
P2 POST INSTALLATIONS)  
(SEE SHEET 1 FOR P-POST INSTALLATIONS)**

**DIMENSIONS FOR MOUNTING CLAMP (ALL DIMENSION ARE IN INCHES)**

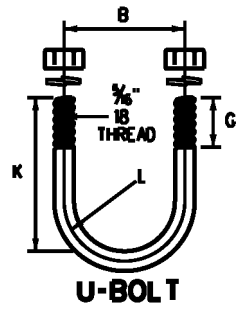
STANDARD PIPE SIZE	A	B	C	D	E	F	G	K	L	R <sub>1</sub>	R <sub>2</sub>
2	3 3/4	2 3/4	1/2	1/8	1/2	3/16	1	2 7/16	1 1/32	1/4	1 1/16
2 1/2	4 1/4	3 1/4	2	1/4	1/2	1/4	1	3 3/16	1 1/32	1/2	1 1/16

**T AND U BRACKET ATTACHMENT**

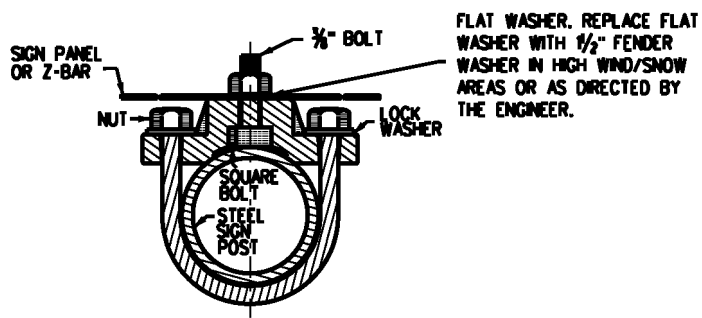


**PIPE CLAMP CASTING**

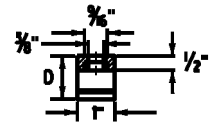
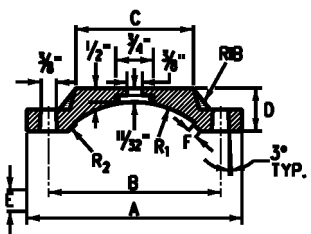
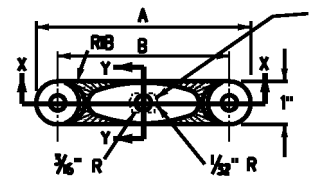
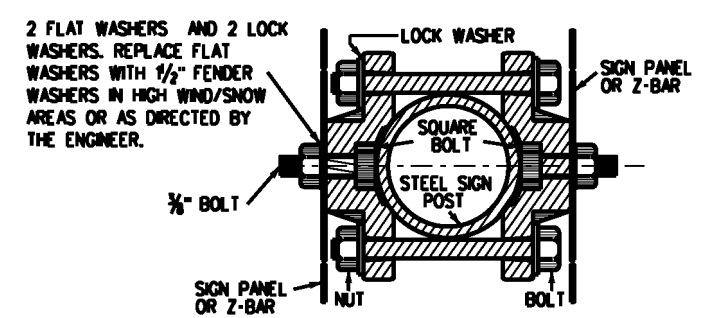
PIPE CLAMP CASTING SHALL BE ASTM B26 OR B108 ALUMINUM ALLOY A44.0-T4 OR 356.0-F. ALL SIGN MOUNTING CLAMP PARTS NOT MADE FROM ALUMINUM SHALL BE GALVANIZED STEEL IN CONFORMANCE WITH ASTM A153 OR STAINLESS STEEL.



**TYPICAL SINGLE BRACKET**



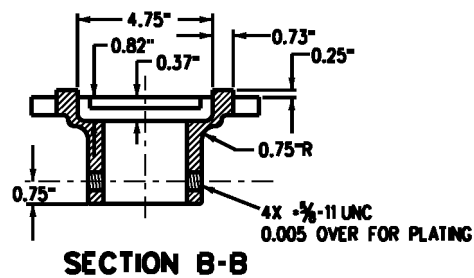
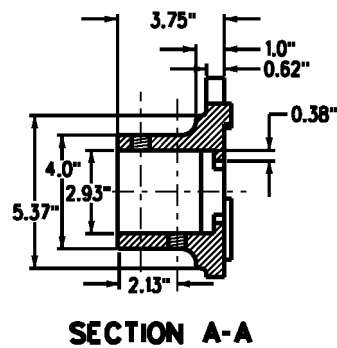
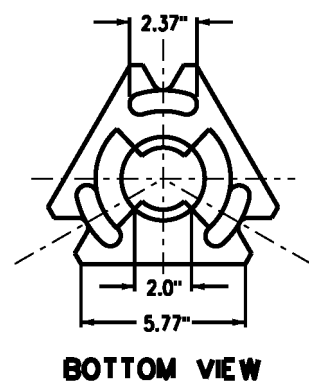
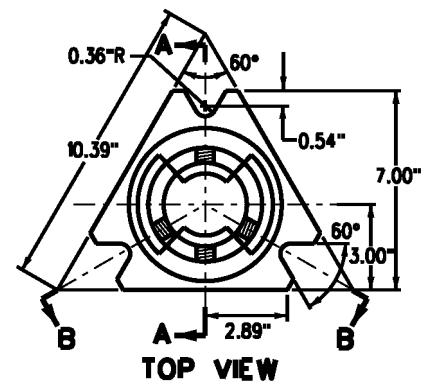
**TYPICAL BACK TO BACK**



**DETAILS FOR SIGN PANEL ATTACHMENT**

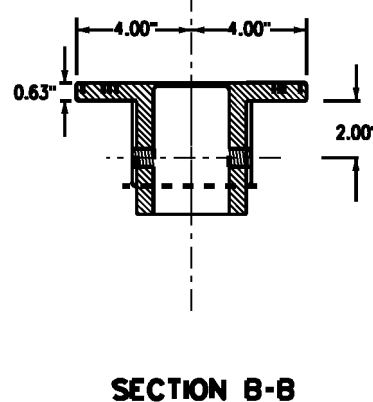
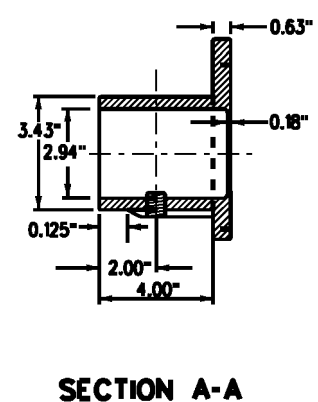
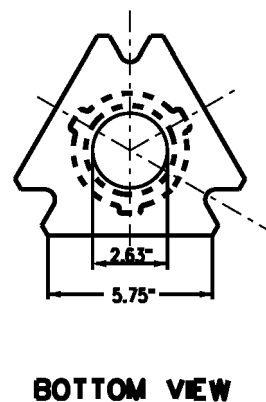
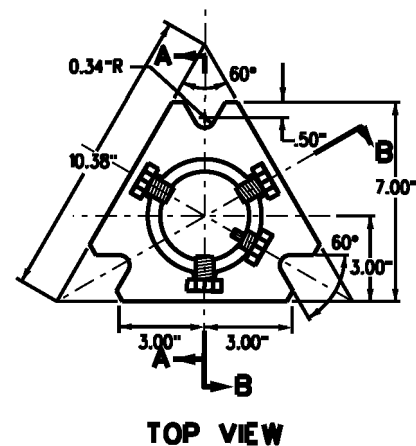
**MOUNTING CLAMP FOR SOCKET OR SLIPBASE**

Computer File Information		Sheet Revisions		Colorado Department of Transportation 2829 W. Howard Pl. Denver, CO 80204 Phone: 303-757-9436 FAX: 303-757-9219 Traffic & Safety Engineering MKB	TUBULAR STEEL SIGN SUPPORT DETAILS Issued By: Traffic & Safety Engineering Branch July 31, 2019	STANDARD PLAN NO.	
Creation Date: 07/04/12		Date: 12/29/20	Comments: BOLT LENGTH IN 'T' AND 'U' BRACKET ATTACHMENT; WASHER REQUIREMENTS IN SIGN PANEL ATTACHMENT			TUBULAR STEEL SIGN SUPPORT DETAILS	S-614-8
Created By: SCL							
Last Modification Date: 12/29/2020							
Last Modified By: DiNardo							
CAD Ver.: MicroStation VB Scale: Not to Scale Units: English							



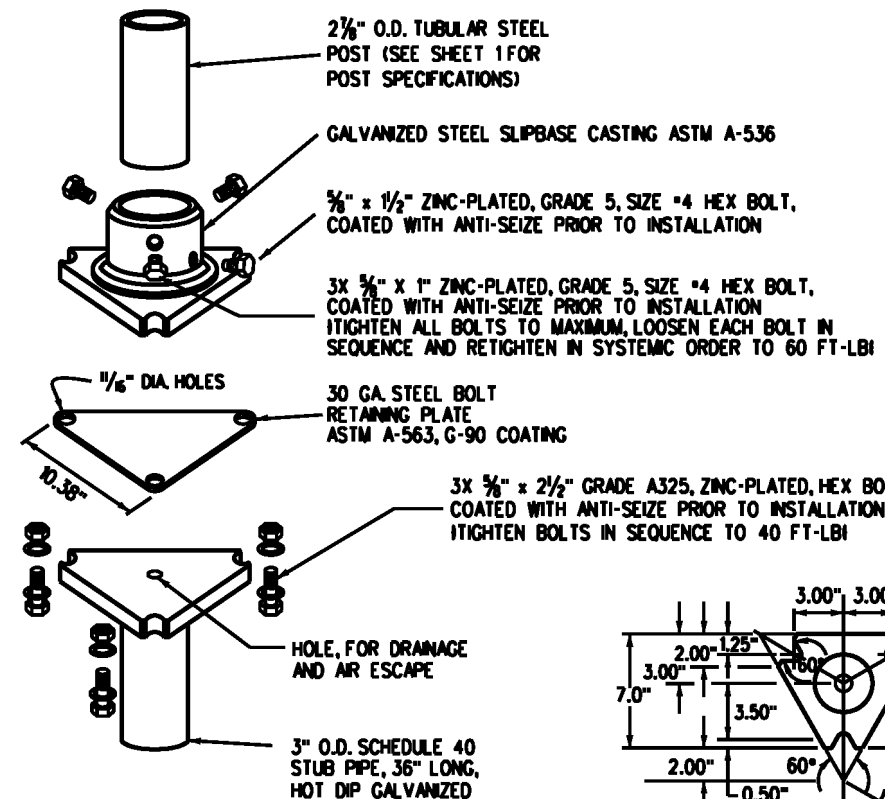
**SLIPBASE CASTING 1**

DIRECTION OF TRAVEL

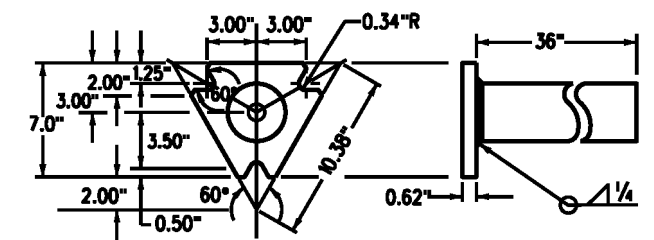


**SLIPBASE CASTING 2**

DIRECTION OF TRAVEL



**TYPICAL ASSEMBLY**



**SLIPBASE STUB BASE**

**SLIPBASE CASTING REQUIREMENTS**

FOR 2-7/8 INCH POSTS (P1 OR P2 POSTS)  
GALVANIZED STEEL SLIPBASE CASTING ASTM-536

**MOUNTING HARDWARE**

- 3 - EACH 3/8" x 2 1/2" INCH LONG HEX BOLT
- 3 - EACH 3/8" x 1" INCH LONG ZINC-PLATED, GRADE 5 SIZE #4 HEX BOLT
- 1 - EACH 3/8" x 1 1/2" INCH LONG ZINC-PLATED, GRADE 5 SIZE #4 HEX BOLT
- 1 - EACH 30 GAUGE STEEL BOLT RETAINING PLATE ASTM A-563, G-90 COATING

**INSTALLATION REQUIREMENTS**

ALL HEX BOLTS SHALL BE COATED WITH ANTI-SEIZE PRIOR TO INSTALLATION

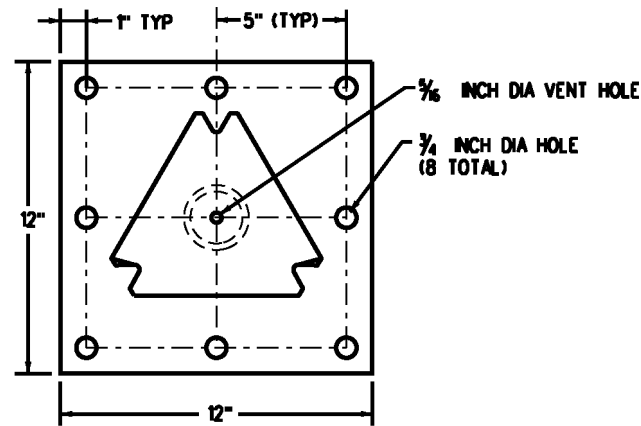
ALL HARDWARE WILL BE GALVANIZED OR ZINC PLATED.

**TUBULAR STEEL SIGN SUPPORT SLIPBASE NOTES**

1. REFER TO SIGNING PLANS FOR SIGN LOCATIONS AND HEIGHT
2. MINIMUM ALLOWABLE TENSION CAPACITY FOR WEDGE ANCHORS - 3000 LBS.
3. MAXIMUM ALLOWABLE MOMENT FOR SIGN BASE - 5.13 kip-ft.
4. PAY ITEM "STEEL SIGN SUPPORT (X-INCH ROUND) (SLIPBASE)" SHALL INCLUDE STUB BASE, CASTING AND NECESSARY HARDWARE (SLIPBASE CASTING MOUNTING HARDWARE AS SHOWN ON STD S-614-8, SHEET 3)
5. PAY ITEM "STEEL SIGN SUPPORT CASTING" SHALL INCLUDE CASTING AND NECESSARY MOUNTING HARDWARE (SLIPBASE CASTING MOUNTING HARDWARE AS SHOWN ON STD S-614-8, SHEET 3)
6. PAY ITEM "STEEL SIGN GROUND STUB BASE (36)" SHALL INCLUDE SLIPBASE STUB BASE

**CAST-IN-PLACE SLIPBASE FOR NEW INSTALLATIONS**

<b>Computer File Information</b>		<b>Sheet Revisions</b>		<b>Colorado Department of Transportation</b>  2829 W. Howard Pl. Denver, CO 80204 Phone: 303-757-9436 FAX: 303-757-9219 <b>Traffic &amp; Safety Engineering</b>	<b>TUBULAR STEEL SIGN SUPPORT DETAILS</b> Issued By: Traffic & Safety Engineering Branch July 31, 2019	<b>STANDARD PLAN NO.</b>	
Creation Date: 07/04/12		Date:	Comments			S-614-8	
Created By: KEN		12/29/20	3/8" x 2 1/2" HEX BOLTS FROM GRADE 5, SIZE #4 TO GRADE A325 IN TYPICAL ASSEMBLY			Standard Sheet No. 3 of 7	
Last Modification Date: 12/29/2020						Project Sheet Number:	
Last Modified By: DiNardo							
CAD Ver.: MicroStation VB Scale: Not to Scale Units: English				<b>MKB</b>			



**SURFACE MOUNT SLIPBASE BASE PLATE FABRICATION REQUIREMENTS**

BASE PLATE - 3/4 INCH ASTM A 36 PLATE STEEL  
 PIPE STUB - 3 INCH NOMINAL SCHEDULE 80, ASTM A-500 GRADE B  
 TOP PLATE - MEET REQUIREMENTS OF STD PLAN NO. S-614-8, SHEET 3

MEET ASTM A-123 GALVANIZING AFTER FABRICATION IS COMPLETE

**SURFACE MOUNT SLIPBASE TUBULAR STEEL SIGN BASE REQUIREMENTS**

FOR 2-7/8 INCH POSTS (P1 OR P2 POSTS)  
 FOR CONCRETE SURFACES GREATER THAN 7 INCHES THICK  
 FOR CONCRETE SURFACES GREATER THAN 12 INCHES IN WIDTH

**MOUNTING HARDWARE**

- 8 - EACH 3/8 x 5/2 INCH LONG "MULTIKWIK HUS-EZ" SCREW ANCHORS
- 16 - EACH 3/8 INCH FLAT WASHERS
- 8 - EACH 3/8 INCH LOCK WASHERS
- 8 - EACH 3/8 INCH NUTS

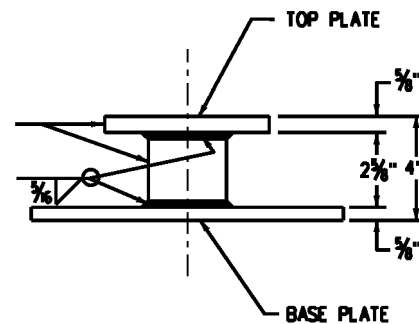
**INSTALLATION REQUIREMENTS:**

DRILL: (8) - 3/8 INCH HOLES 6 INCH DEEP, CLEAN HOLE PRIOR TO INSTALLING ANCHORS

USE ADDITIONAL WASHERS FOR SHIMMING TO LEVEL BASE PLATE.

ALL HARDWARE WILL BE GALVANIZED OR ZINC PLATED.

SLIPBASE WILL MEET REQUIREMENTS OF STD PLAN NO. S-614-8 SLIPBASE STUB POST DETAIL EXCEPT FOR OVERALL HEIGHT



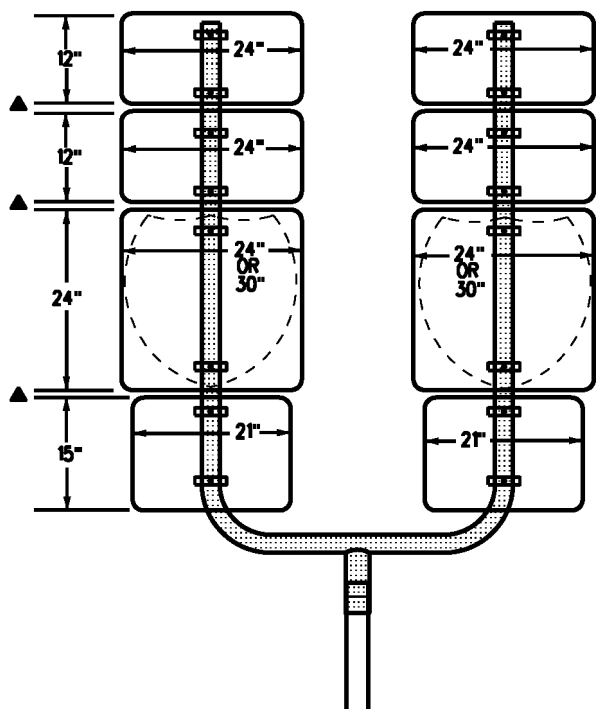
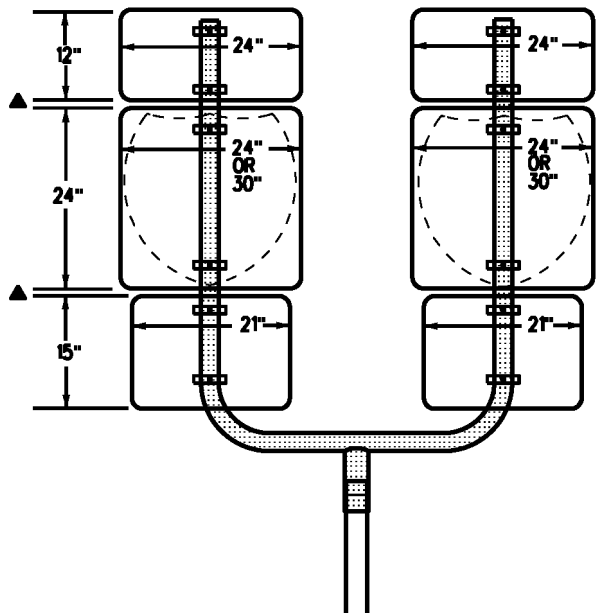
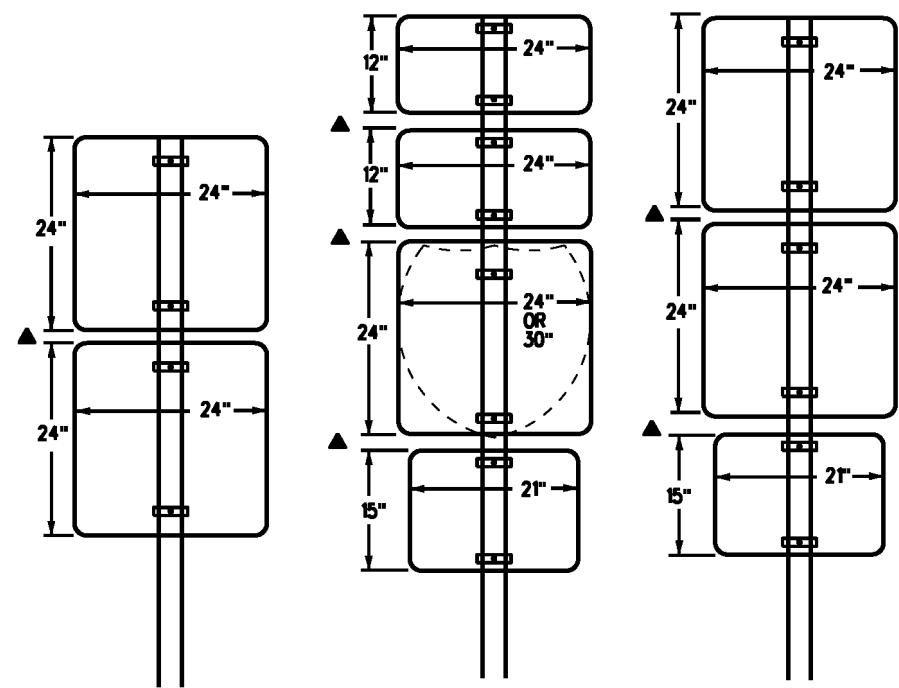
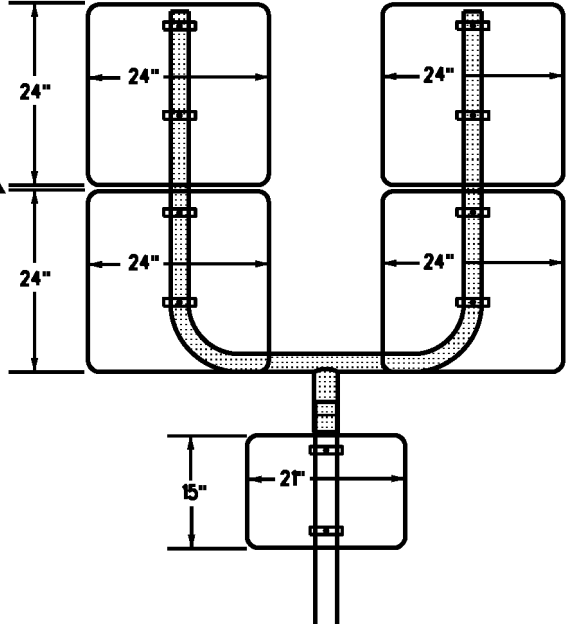
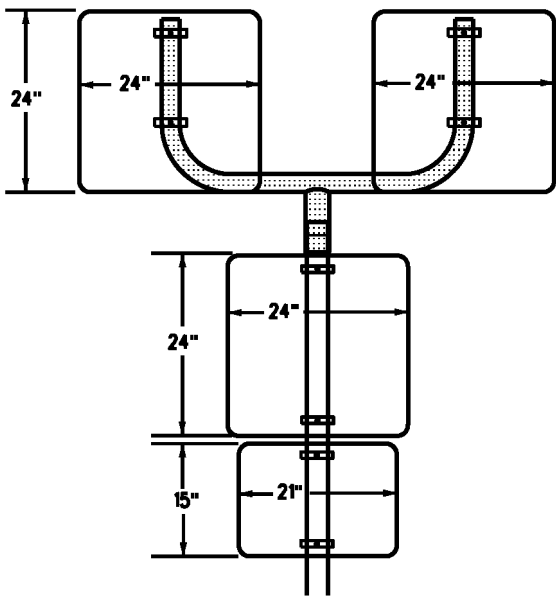
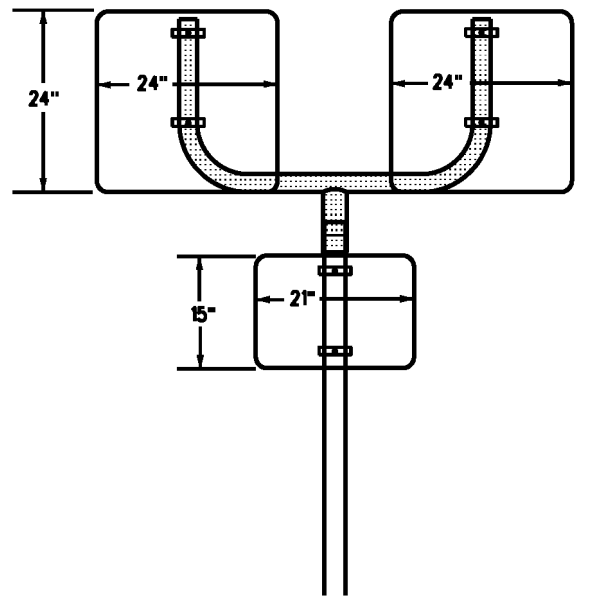
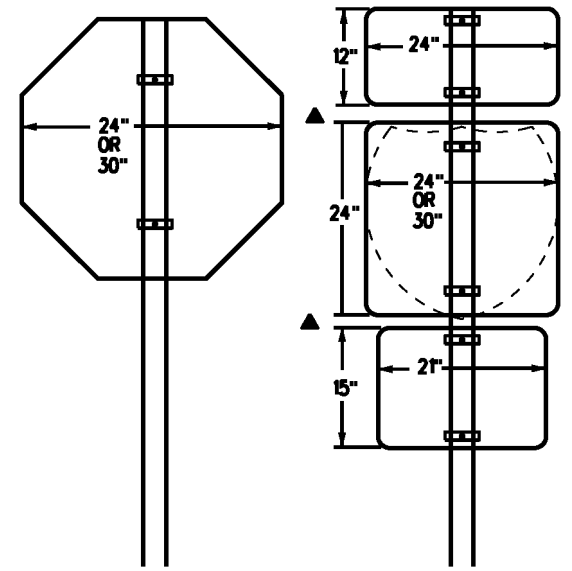
**SURFACE MOUNT SLIPBASE BASE PLATE**

**TUBULAR STEEL SIGN SUPPORT SURFACE MOUNT SLIPBASE NOTES**

1. REFER TO SIGNING PLANS FOR SIGN LOCATIONS AND HEIGHT
2. REFER TO STD PLAN NO. S-614-8, SHEET 3 FOR SLIPBASE CASTING INFORMATION
3. MINIMUM ALLOWABLE TENSION CAPACITY FOR WEDGE ANCHORS - 3000 LBS.
4. MAXIMUM ALLOWABLE MOMENT FOR SIGN BASE - 5.13 kip-ft.
5. PAY ITEM "STEEL SIGN SURFACE MOUNT BASE PLATE (SLIPBASE)" SHALL INCLUDE BASE PLATE, CASTING AND ALL NECESSARY HARDWARE (SLIPBASE CASTING MOUNTING HARDWARE AS SHOWN ON STD S-614-8, SHEET 3 AND SURFACE MOUNT SLIPBASE MOUNTING HARDWARE AS SHOWN ON STD 6-14-8, SHEET 4)
6. PAY ITEM "STEEL SIGN SURFACE MOUNT BASE PLATE" SHALL INCLUDE BASE PLATE AND NECESSARY HARDWARE (SURFACE MOUNT SLIPBASE MOUNTING HARDWARE AS SHOWN ON STD S-614-8, SHEET 4)

**SURFACE MOUNT SLIPBASE FOR RETROFIT INSTALLATIONS**

<b>Computer File Information</b>		<b>Sheet Revisions</b>		<b>Colorado Department of Transportation</b>  2829 W. Howard Pl. Denver, CO 80204 Phone: 303-757-9436 FAX: 303-757-9219 <b>Traffic &amp; Safety Engineering</b>	<b>TUBULAR STEEL SIGN SUPPORT DETAILS</b> Issued By: Traffic & Safety Engineering Branch July 31, 2019	<b>STANDARD PLAN NO.</b>	
Creation Date: 04/12/18		Date:	Comments			S-614-8	
Created By: DiNardo						Standard Sheet No. 4 of 7	
Last Modification Date: 07/31/19						Project Sheet Number:	
Last Modified By: AVU							
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English				<b>MKB</b>			



**CLASS I SIGN COMBINATIONS (DIRECT ATTACHMENT)**

**CLASS I SIGN COMBINATIONS USING U-BRACKETS**

▲ SEE NOTE 6 ON SHEET 5

Computer File Information	
Creation Date:	07/04/12
Created By:	KEN
Last Modification Date:	
Last Modified By:	
CAD Ver.:	MicroStation VB
Scale:	Not to Scale
Units:	English

Sheet Revisions	
Date:	Comments

Colorado Department of Transportation

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Denver, CO 80204  
Phone: 303-757-9436  
FAX: 303-757-9219

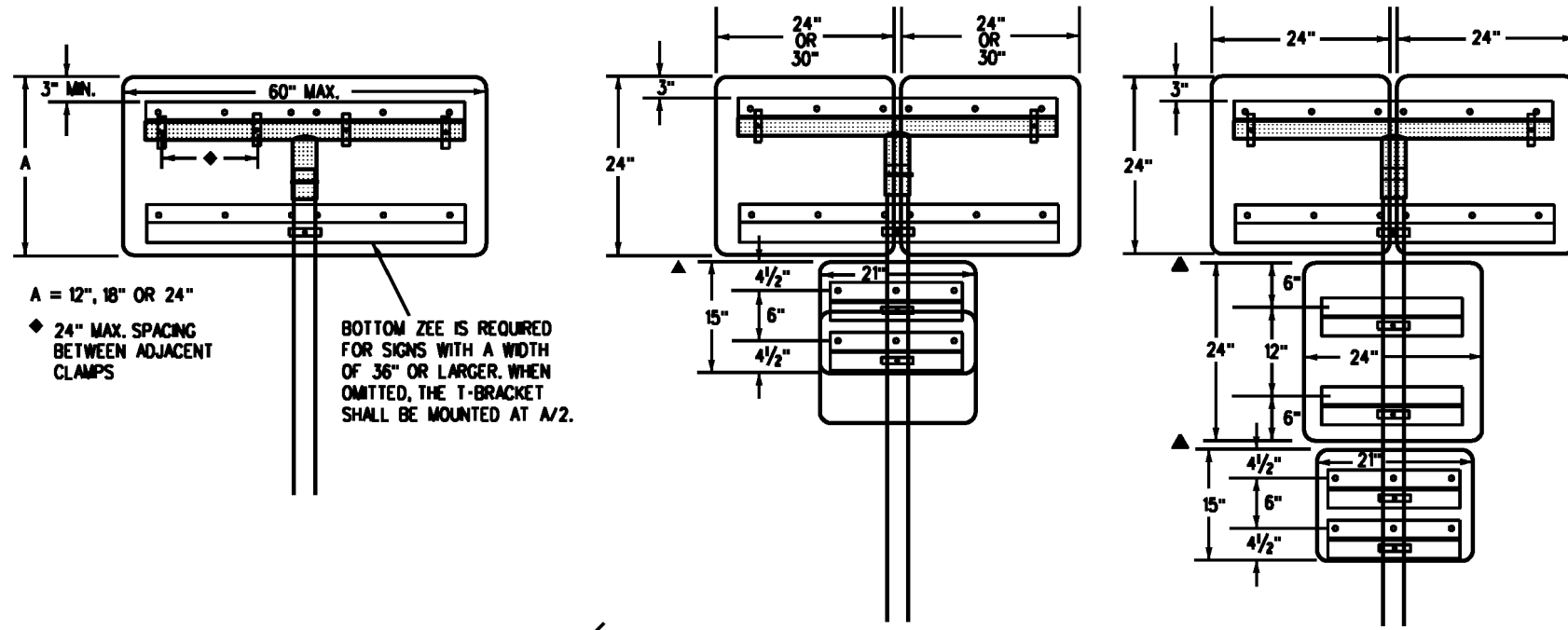
Traffic & Safety Engineering

MKB

TUBULAR STEEL SIGN  
SUPPORT DETAILS

Issued By: Traffic & Safety Engineering Branch July 31, 2019

STANDARD PLAN NO.
S-614-8
Standard Sheet No. 5 of 7
Project Sheet Number:



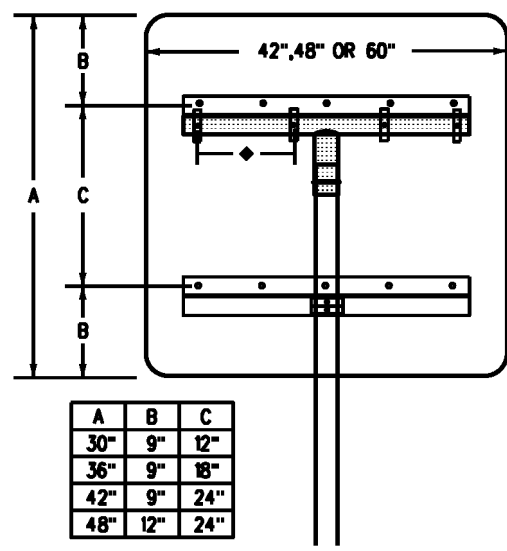
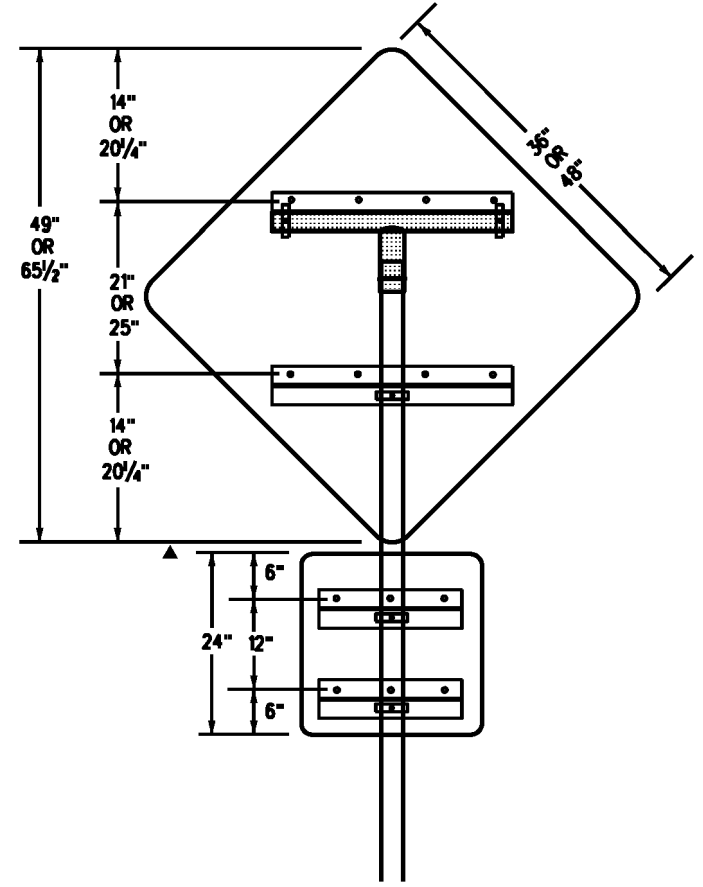
A = 12", 18" OR 24"  
 ♦ 24" MAX. SPACING BETWEEN ADJACENT CLAMPS

BOTTOM ZEE IS REQUIRED FOR SIGNS WITH A WIDTH OF 36" OR LARGER. WHEN OMITTED, THE T-BRACKET SHALL BE MOUNTED AT A/2.

PANEL WIDTHS	ZEE LENGTH
21"	15"
24"	18"
30"	24"
36"	30"
42"	36"
45"	39"
48"	42"
54"	48"
60"	54"
36" DIAMOND	22"
48" DIAMOND	36"
24" & 24"	43"
24" & 30"	49"
30" & 30"	55"
36" & 36"	67"
45" & 36"	76"
24" & 24" & 24"	68"
24" & 24" & 30"	74"
24" & 30" & 24"	74"
30" & 24" & 30"	80"
24" & 30" & 30"	80"
30" & 30" & 30"	86"

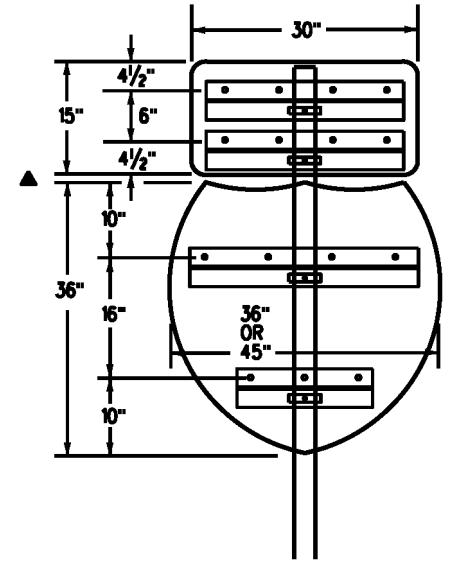
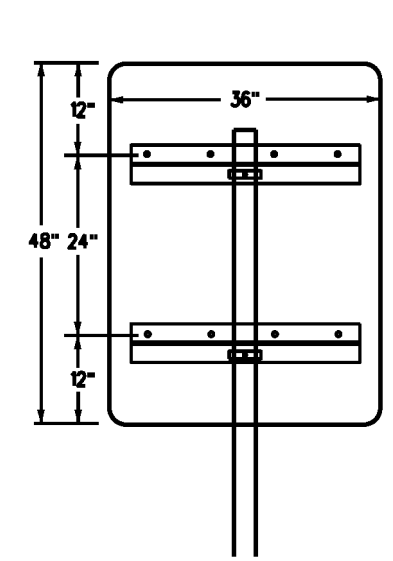
**NOTES**

1. Z-BAR LENGTH SHALL BE 3 IN. (• 1/2 IN.) SHORT OF THE EDGE OF THE SIGN OR ROW OF SIGNS ON BOTH SIDES. THE ACCOMPANYING TABLE GIVES THE Z-BAR LENGTH FOR MOST TYPICAL PANEL COMBINATIONS.
2. FIRST AND LAST HOLES SHALL BE 2 IN. FROM EDGE OF Z-BAR. THE HOLES IN BETWEEN SHALL BE 6 IN. TO 8 IN. APART.
3. T AND U BRACKETS SHALL TERMINATE 2 IN. TO 3 IN. FROM EDGE OF SIGN PANEL. WHEN A ZEE IS CONNECTED TO A T-BRACKET, THEY SHALL BE THE SAME LENGTH EXCEPT WHEN THE ZEE MUST EXTEND BEYOND THE MAXIMUM LENGTH OF A T-BRACKET.
4. TWO MOUNTING CLAMPS ARE REQUIRED ON ZEES WHERE THERE IS ONLY ONE ZEE FOR THE PANEL AND THE ZEE IS ATTACHED TO ONLY ONE POST.
5. ZEES SHALL BE ATTACHED TO T-BRACKETS AND U-BRACKETS WITH U-BOLTS OR MOUNTING CLAMPS.
- ▲ 6. VERTICAL SPACING BETWEEN SIGN PANELS SHALL BE 1 IN. TO 1 IN. TYPICAL.
7. IN SPECIAL CASES U-BRACKETS MAY BE USED TO MOUNT SIGNS THAT FACE DIFFERENT DIRECTIONS. THE ENGINEER SHALL DETERMINE THE ORIENTATION OF THE SIGN PANELS AND VERIFY THAT THE MAXIMUM ALLOWABLE WIND LOADS FOR THE POST ARE NOT EXCEEDED.



A	B	C
30"	9"	12"
36"	9"	18"
42"	9"	24"
48"	12"	24"

♦ 24" MAX. SPACING BETWEEN ADJACENT CLAMPS



**CLASS II SIGN COMBINATIONS USING T-BRACKETS WITH Z-BAR**

**SINGLE POST CLASS II SIGNS USING Z-BAR**

Computer File Information
Creation Date: 07/04/12
Created By: KEN
Last Modification Date: 07/31/19
Last Modified By: AVU
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English

Sheet Revisions
Date: Comments

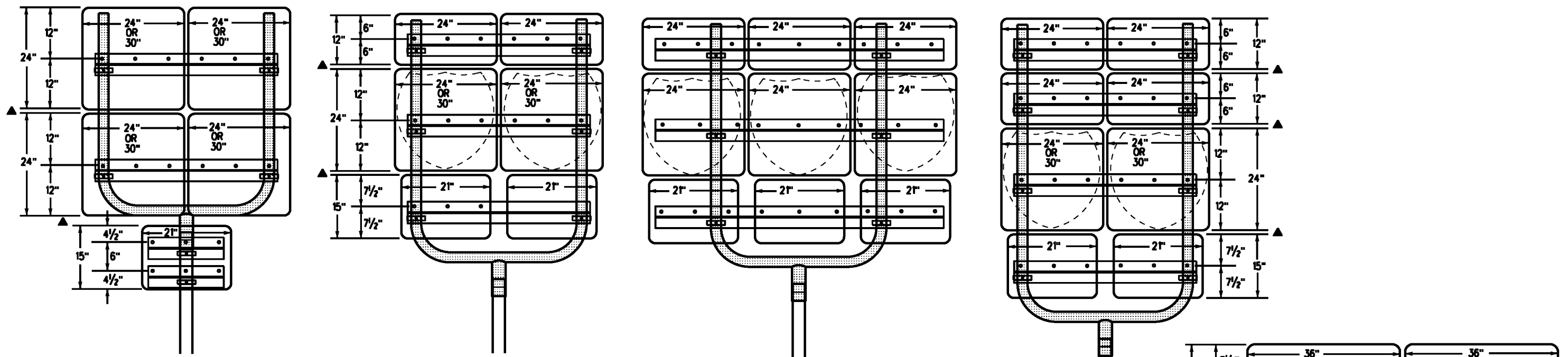
Colorado Department of Transportation  
 2829 W. Howard Pl.  
 Denver, CO 80204  
 Phone: 303-757-9436  
 FAX: 303-757-9219

Traffic & Safety Engineering MKB

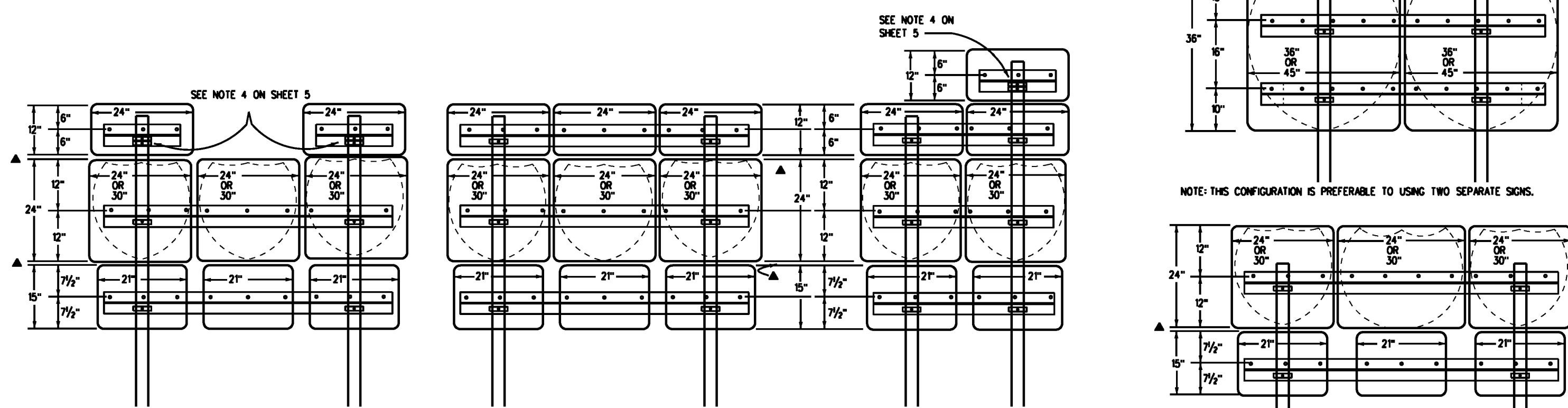
**TUBULAR STEEL SIGN SUPPORT DETAILS**

Issued By: Traffic & Safety Engineering Branch July 31, 2019

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S-614-8
Standard Sheet No. 6 of 7
Project Sheet Number:



**CLASS II SIGN COMBINATIONS USING U-BRACKETS**



**CLASS II SIGN COMBINATIONS USING TWO POSTS**

NOTE: THIS CONFIGURATION IS PREFERABLE TO USING TWO SEPARATE SIGNS.

Computer File Information	
Creation Date:	07/04/12
Created By:	KEN
Last Modification Date:	
Last Modified By:	
CAD Ver.:	MicroStation VB
Scale:	Not to Scale
Units:	English

Sheet Revisions	
Date:	Comments

Colorado Department of Transportation

2829 W. Howard Pl.  
Denver, CO 80204  
Phone: 303-757-9436  
FAX: 303-757-9219

Traffic & Safety Engineering

MKB

**TUBULAR STEEL SIGN  
SUPPORT DETAILS**

Issued By: Traffic & Safety Engineering Branch July 31, 2019

STANDARD PLAN NO.  
S-614-8

Standard Sheet No. 7 of 7

Project Sheet Number: