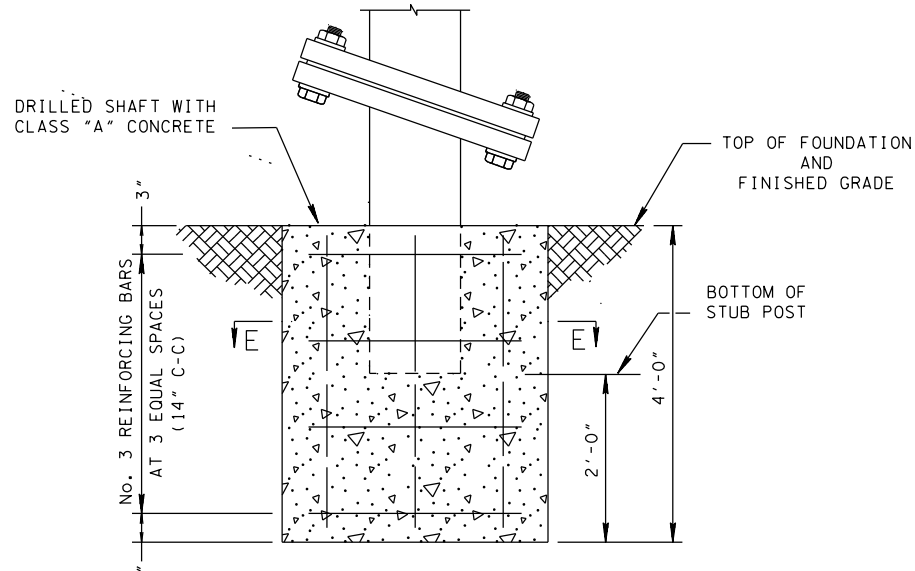


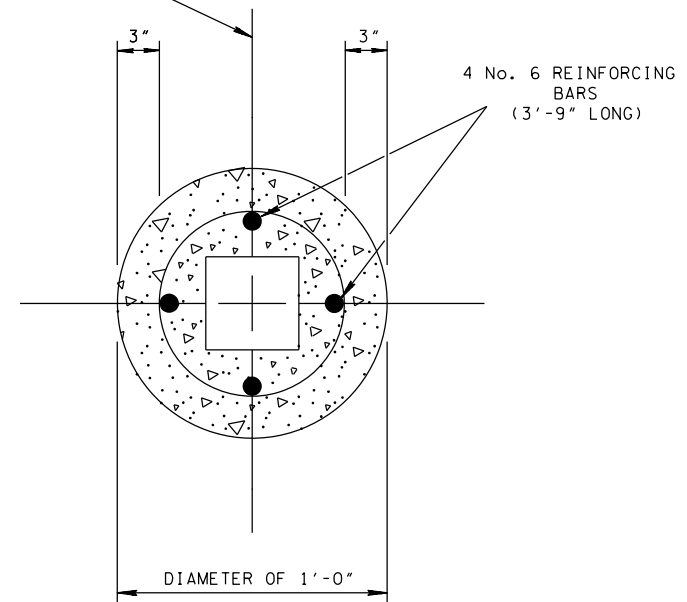
SIGN POST AND STUB POST BASE CONNECTION DETAIL  
ELEVATION VIEW

(FOR SQUARE TUBE SUPPORT POSTS)



FOUNDATION AND FOOTING ELEVATION  
DETAIL FOR SQUARE TUBES

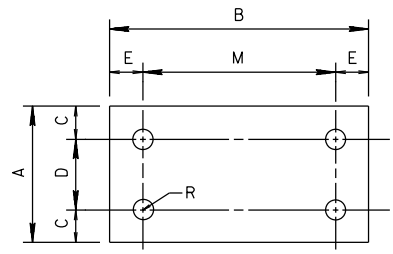
TYPE 4 FOOTING



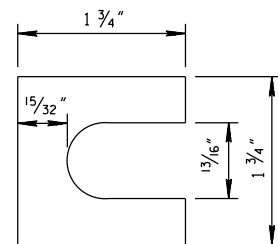
SECTION E-E  
TYPE 4 FOOTING

PROCEDURE FOR ASSEMBLY OF BASE CONNECTION

- ① ASSEMBLE POST TO STUB WITH BOLTS AND ONE BOLT KEEPER PLATE BETWEEN THEM.
- ② SHIM AS REQUIRED TO PLUMB POST.
- ③ TIGHTEN ALL BOLTS THE MAXIMUM POSSIBLE WITH 12" TO 15" WRENCH TO BED WASHERS AND SHIMS AND TO CLEAN BOLT THREADS, THEN LOOSEN.
- ④ RETIGHTEN BOLTS IN A SYSTEMATIC ORDER TO THE PRESCRIBED TORQUE (SEE TABLE).
- ⑤ BURR THREADS AT JUNCTION WITH NUT USING A CENTER PUNCH TO PREVENT NUT LOOSENING.

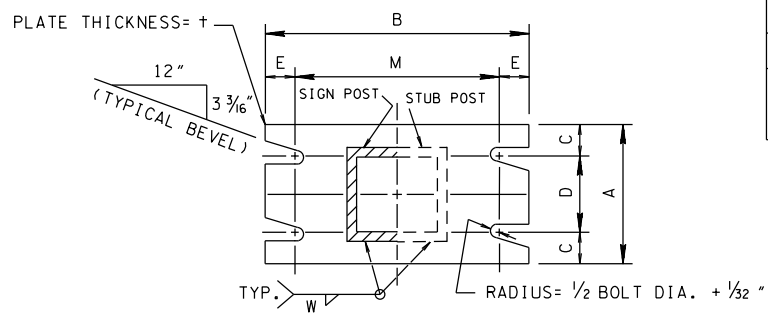


BOLT KEEPER PLATE  
(28 GAUGE GALVANIZED STEEL)



SHIM DETAIL

THE THICKNESS OF SHIMS SHALL NOT BE MORE THAN 0.032" NOR LESS THAN 0.012" AT ANY SINGLE BOLT. SHIMS SHALL BE FABRICATED FROM BRASS SHIM STOCK OR STRIP CONFORMING TO ASTM-B36.



SECTION A-A SECTION B-B  
SEE TABLE FOR DIMENSIONS

SECTIONS SHOWN ARE FOR INSTALLATIONS ON RIGHT SHOULDER AND IN GORE AREAS. PLATE SLOT LEVELS ARE OPPOSITE DIRECTION FROM THAT SHOWN FOR INSTALLATIONS ON LEFT SHOULDER.

GENERAL NOTES

- (A) THE DESIGN CONFORMS WITH THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (CURRENT EDITION).
- (B) THE MATERIALS AND FABRICATION SHALL CONFORM TO THE STANDARD SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION.
- (C) ALL STEEL SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH STANDARD SPECIFICATION ASTM-A123 FOR SIGN SUPPORTS.
- (D) ALL HIGH STRENGTH BOLTS AND WASHERS SHALL CONFORM TO STANDARD SPECIFICATION ASTM-A325 OR SAE GRADE 5.
- (E) ALL HIGH STRENGTH NUTS SHALL BE OF SUCH CAPACITY AS TO DEVELOP THE BOLT STRENGTH.
- (F) TIGHTEN THE HIGH STRENGTH BOLTS IN THE BASE CONNECTION ONLY TO THE TORQUE SHOWN. CAUTION - DO NOT OVERTIGHTEN.
- (G) ALL BOLT, NUTS AND WASHERS OTHER THAN LABELED HIGH STRENGTH SHALL CONFORM TO STANDARD SPECIFICATION ASTM-A307, CLASS A.
- (H) THE WELDING SHALL BE DONE IN ACCORDANCE WITH THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (CURRENT EDITION).
- (I) ALL BOLTS AND NUTS SHALL BE COATED WITH A SUITABLE LUBRICANT.
- (J) THE MATERIAL USED FOR STRUCTURAL SHAPES AND PLATES SHALL BE ASTM-A36 GRADE STEEL.
- (K) ALL HIGH STRENGTH BOLTS, NUTS AND WASHERS MAY BE CADMIUM PLATED IN ACCORDANCE WITH STANDARD SPECIFICATION ASTM-A165 OR GALVANIZED IN ACCORDANCE WITH STANDARD SPECIFICATION ASTM-A153.
- (L) CLASS "A" CONCRETE CONSTRUCTION AND MATERIALS SHALL MEET THE REQUIREMENTS OF THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION, SECTION 604".
- (M) CLASS "A" CONCRETE AND REINFORCING STEEL USED IN CONJUNCTION WITH INSTALLATION OF THE SIGN SUPPORT POSTS TO BE PAID FOR UNDER ITEM NOS. 713-01.01, CLASS "A" CONCRETE (FOUNDATION FOR SIGN SUPPORTS) PER CUBIC YARD, AND 713-01.02, STEEL BAR REINFORCEMENT (FOUNDATION FOR SIGN SUPPORTS) PER POUND.
- (N) CLASS "A" CONCRETE FOOTING SHALL BE PLACED ONLY ON UNDISTURBED MATERIAL OR IN FILL MATERIAL PLACED BY CONTROLLED COMPACTION AT DEPTHS UNAFFECTED BY FROST.
- (O) MATERIALS SURROUNDING FOOTING SHALL BE CAPABLE OF CARRYING A MINIMUM BEARING OF 2,500 POUNDS PER SQUARE FOOT. WHERE SOLID ROCK IS ENCOUNTERED, FOOTING SHALL BE LENGTH SHOWN ON THE SIGN SCHEDULE SHEET OR EXTEND A MINIMUM OF TWO FEET INTO THE ROCK.
- (P) TO BE PAID FOR UNDER ITEM NO. 713-11.21 - P POST SLIP BASE  
713-11.22 - U POST SLIP BASE  
713-11.23 - ROUND POST SLIP BASE

TUBE SIZE	BOLT SIZE AND TORQUE	BASE CONNECTION DIMENSIONS								FOUNDATION DIAMETER OF TYPE 4 FOOTING
		A	B	C	D	E	M	t	W	
2" Ø @ 3.12 #/FT	1/2" Ø x 2" TORQUE= 95 in. lbs.	4 1/2"	6 1/4"	1"	2 1/2"	3/4"	4 3/4"	1/2"	1/4"	1'-0"
2 1/2" Ø @ 3.98 #/FT	1/2" Ø x 2" TORQUE= 95 in. lbs.	4 1/2"	7 1/4"	1"	2 1/2"	3/4"	5 3/4"	1/2"	5/16"	
3" Ø @ 4.83 #/FT	1/2" Ø x 2 1/2" TORQUE= 95 in. lbs.	4 1/2"	8"	1"	2 1/2"	3/4"	6 1/2"	3/4"	5/16"	

□ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

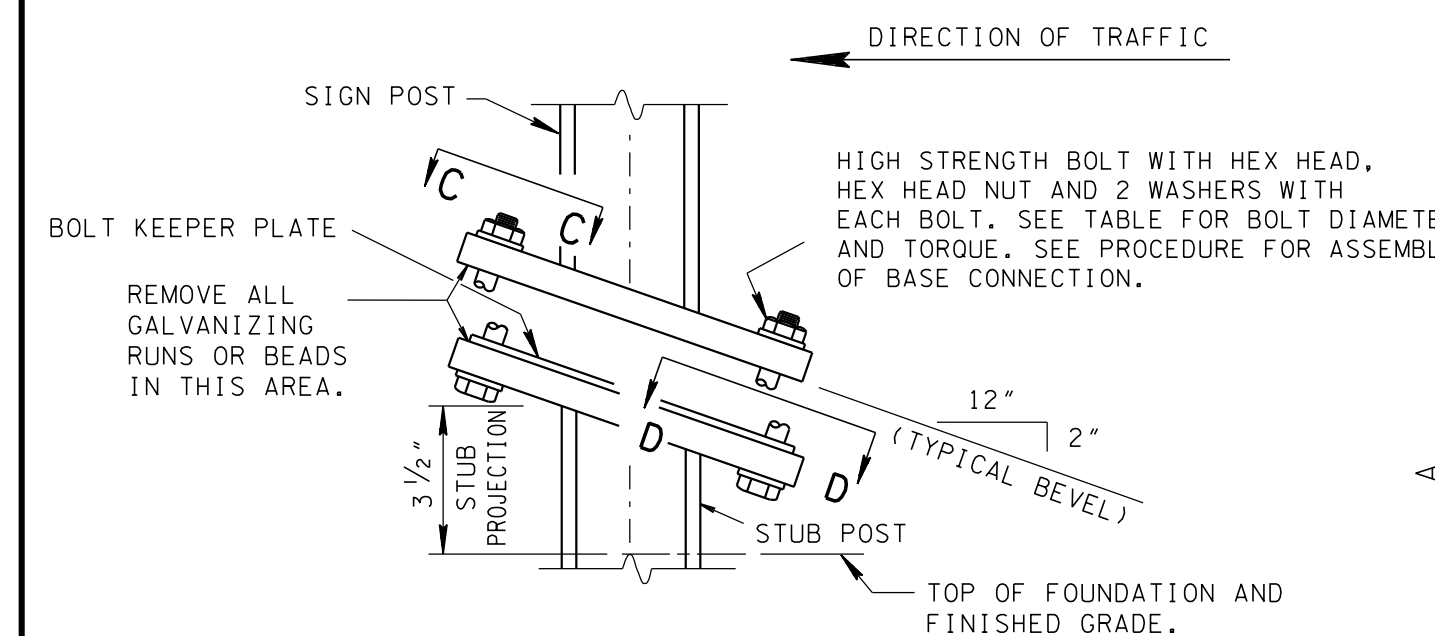
STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION

STANDARD STEEL  
GROUND MOUNTED  
SIGNS, BREAK-AWAY  
TYPE POST FOOTING  
DETAILS, SQUARE TUBES

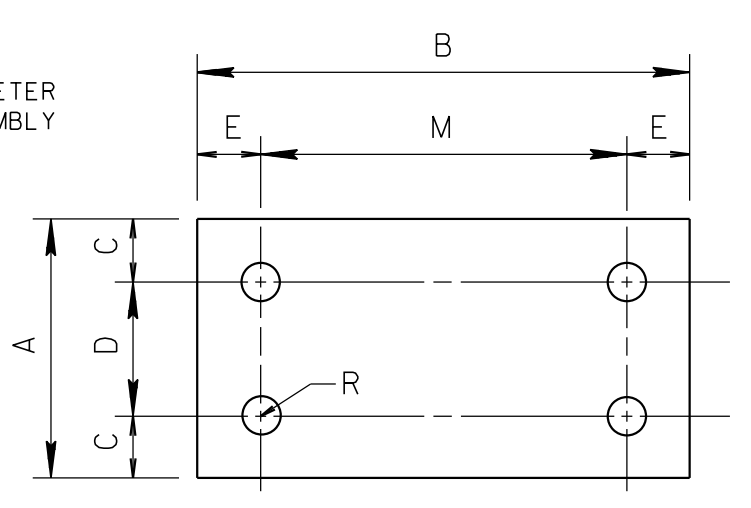
T-S-12

- REV. 10-6-66: BOLT LENGTH AND NOTE.
- REV. 10-27-66: FOUNDATION BEARING REVISED.
- REV. 10-30-66: 3 1/2", 4" & 5" TUBES ELIMINATED.
- REV. 1-19-72: TORQUE FOR DETAIL "A".
- REV. 7-1-72: CHANGED DEPARTMENT NAME.
- REV. 5-1-73: REVISED SHIM NOTE.
- REV. 3-12-74: REVISED GENERAL NOTES.
- REV. 10-3-75: TORQUE ON BOLT AND POST SIZE.
- REV. 1-1-76: CHANGED DWG. NO. FROM RD-S-13 TO T-S-13.
- REV. 7-29-76: NEW AASHTO SPECIFICATION.
- REV. 4-12-77: BOLTS AT FUSE PLATES & ADDED BOLT KEEPER PLATES.
- REV. 6-30-88: ADDED HINGE PLATE.
- REV. 3-14-90: CHANGE SLIP BASE TORQUE IN TABLE.
- REV. 12-7-90: DREW NEW SHEET INCLUDING INFORMATION PREVIOUSLY ON DRAWING NUMBER T-S-13 REGARDING STANDARD STEEL GROUND MOUNTED SIGNS WITH BREAK-AWAY TYPE FOOTINGS USING SQUARE TUBE SUPPORTS.
- REV. 10-26-96: CHANGED PAY ITEM NO. IN GENERAL NOTE (M).
- REV. 5-27-01: CHANGED NOTE UNDER SHIM DETAIL.
- REV. 5-27-03: CORRECTED GENERAL NOTE (B).
- REV. 7-2-15: REVISED TUBE SIZE. ADDED GENERAL NOTE (P).
- REV. 7-10-2017: CHANGED PAY ITEM NO. IN GENERAL NOTE (P).

POST SIZE	BOLT SIZE & TORQUE	BASE CONNECTION DIMENSIONS							FUSE PLATE DIMENSIONS							HINGE PLATE DIMENSIONS							FOUNDATION						
		A	B	C	D	E	M	+	W	F	G	H	J	K	L	N	d <sub>1</sub>	t <sub>1</sub>	BOLT DIA.	S	U	V		X	Y	Z	d <sub>2</sub>	t <sub>4</sub>	BOLT DIA.
S3 X 5.7	1/2" Ø x 2 1/2" TORQUE=95 in. lbs.	3"	6 1/2"	3/4"	1 1/2"	3/4"	5"	5/8"	3/16"	3 1/8"	1 1/2"	1 1/8"	2 5/8"	1 1/2"	9/16"	1/2"	9/16"	1/4"	1/2" Ø	3 3/4"	2 5/8"	1 1/8"	1 1/2"	1 1/2"	9/16"	9/16"	5/16"	1/2" Ø	1' - 3"
S4 X 7.7	3/4" Ø x 2 1/2" TORQUE=142 in. lbs.	3"	7 1/2"	3/4"	1 1/2"	3/4"	6"	5/8"	3/16"	3 1/8"	1 1/2"	1 1/8"	2 5/8"	1 1/2"	9/16"	1/2"	9/16"	1/4"	1/2" Ø	3 3/4"	2 5/8"	1 1/8"	1 1/2"	1 1/2"	9/16"	9/16"	5/16"	1/2" Ø	
S5 X 10.0	5/8" Ø x 2 3/4" TORQUE=226 in. lbs.	3 1/2"	8 1/2"	3/4"	2"	3/4"	7"	5/8"	3/16"	3 5/8"	2"	1 1/8"	3"	1 3/4"	1/8"	1/2"	9/16"	1/4"	1/2" Ø	4 1/4"	3"	1 1/8"	2"	1 3/4"	7/8"	9/16"	5/16"	1/2" Ø	
S6 X 12.5	3/4" Ø x 2 3/4" TORQUE=345 in. lbs.	4"	9 1/2"	3/4"	2 1/2"	3/4"	8"	5/8"	3/16"	3 3/4"	2"	1 1/8"	3 3/8"	1 5/8"	7/8"	5/8"	1/2"	9/16"	3/8"	1/2" Ø	4 1/4"	3 3/8"	1 1/8"	2"	1 5/8"	7/8"	1 1/16"	5/16"	

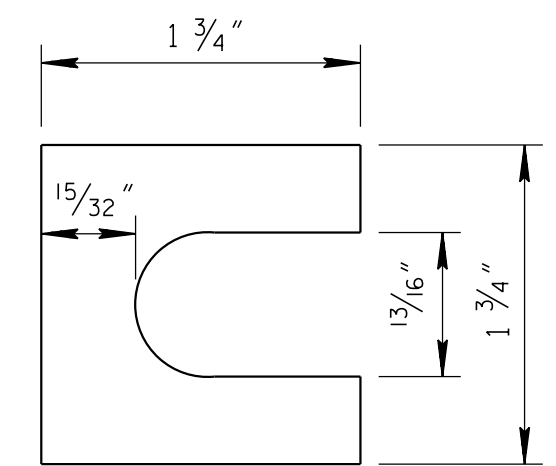


UNI-DIRECTIONAL SLIP BASE POST AND STUB POST BASE CONNECTION DETAIL ELEVATION VIEW (FOR I-BEAM POST SUPPORTS)



BOLT KEEPER PLATE (28 GAUGE GALVANIZED STEEL)

- PROCEDURE FOR ASSEMBLY OF BASE CONNECTION**
- ASSEMBLE POST TO STUB WITH BOLTS AND ONE BOLT KEEPER PLATE BETWEEN THEM.
  - SHIM AS REQUIRED TO PLUMB POST.
  - TIGHTEN ALL BOLTS THE MAXIMUM POSSIBLE WITH 12" TO 15" WRENCH TO BED WASHERS AND SHIMS AND TO CLEAN BOLT THREADS, THEN LOOSEN.
  - RETIGHTEN BOLTS IN A SYSTEMATIC ORDER TO THE PRESCRIBED TORQUE (SEE TABLE).
  - BURR THREADS AT JUNCTION WITH NUT USING A CENTER PUNCH TO PREVENT NUT LOOSENING.

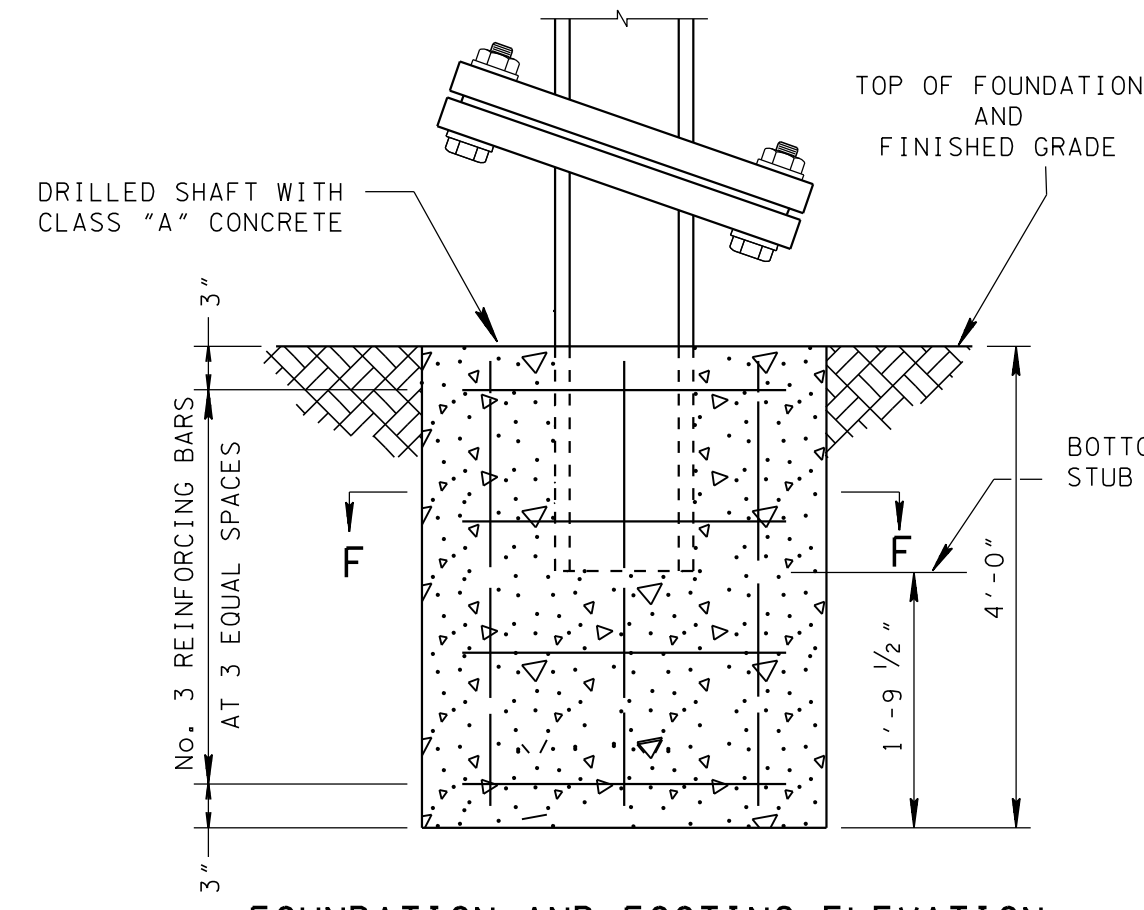


SHIM DETAIL

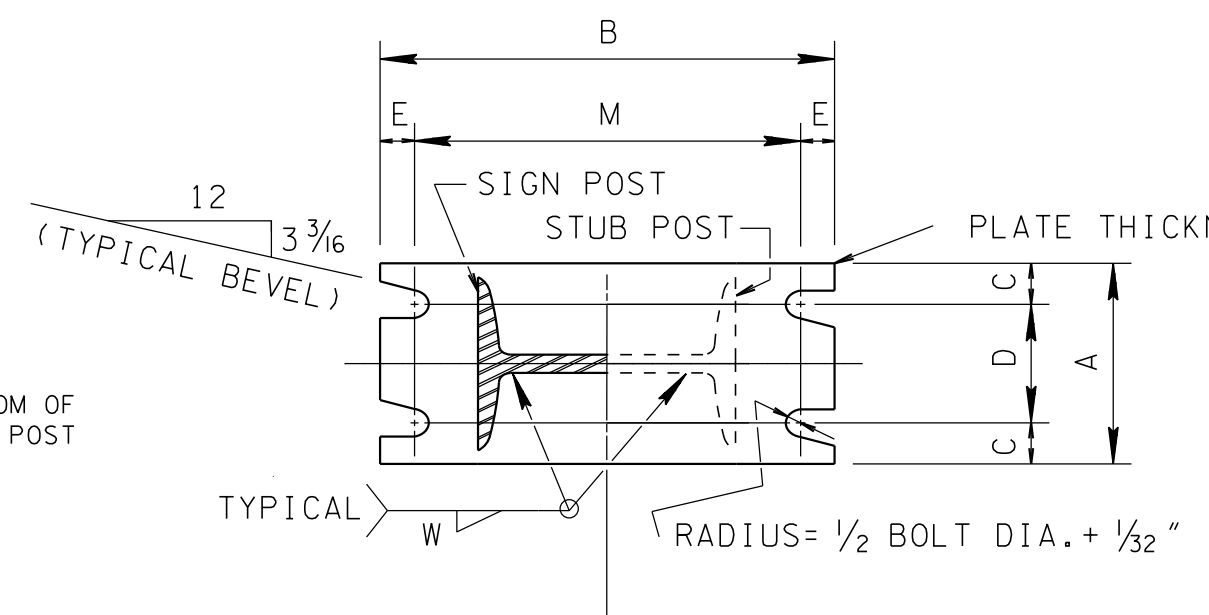
THE THICKNESS OF SHIMS SHALL NOT BE MORE THAN 0.032" NOR LESS THAN 0.012" AT ANY SINGLE BOLT. SHIMS SHALL BE FABRICATED FROM BRASS SHIM STOCK OR STRIP CONFORMING TO ASTM-B36.

- GENERAL NOTES**
- THE DESIGN CONFORMS WITH THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (CURRENT EDITION).
  - THE MATERIALS AND FABRICATION SHALL CONFORM TO THE STANDARD SPECIFICATIONS OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION.
  - ALL STEEL SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH STANDARD SPECIFICATION ASTM-A123 FOR SIGN SUPPORTS.
  - ALL HIGH STRENGTH BOLTS AND WASHERS SHALL CONFORM TO STANDARD SPECIFICATION ASTM-A325 OR SAE GRADE 5.
  - ALL HIGH STRENGTH NUTS SHALL BE OF SUCH CAPACITY AS TO DEVELOP THE BOLT STRENGTH.
  - TIGHTEN THE HIGH STRENGTH BOLTS IN THE BASE CONNECTION ONLY TO THE TORQUE SHOWN. CAUTION - DO NOT OVERTIGHTEN.
  - ALL BOLT, NUTS AND WASHERS OTHER THAN LABELED HIGH STRENGTH SHALL CONFORM TO STANDARD SPECIFICATION ASTM-A307, CLASS A.
  - THE WELDING SHALL BE DONE IN ACCORDANCE WITH THE AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (CURRENT EDITION).
  - ALL BOLTS AND NUTS SHALL BE COATED WITH A SUITABLE LUBRICANT.
  - THE MATERIAL USED FOR STRUCTURAL SHAPES AND PLATES SHALL BE ASTM-A36 GRADE STEEL.
  - ALL HIGH STRENGTH BOLTS, NUTS AND WASHERS MAY BE CADMIUM PLATED IN ACCORDANCE WITH STANDARD SPECIFICATION ASTM-A165 OR GALVANIZED IN ACCORDANCE WITH STANDARD SPECIFICATION ASTM-A153.
  - FLANGE HOLES FOR HINGE AND FUSE PLATES SHALL BE DRILLED OR SUB-PUNCHED AND REAMED.
  - CLASS "A" CONCRETE CONSTRUCTION AND MATERIALS SHALL MEET THE REQUIREMENTS OF THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION, SECTION 604".
  - CLASS "A" CONCRETE AND REINFORCING STEEL USED IN CONJUNCTION WITH INSTALLATION OF THE SIGN SUPPORT POSTS IS TO BE PAID FOR UNDER ITEM NO. 713-01.01, CLASS "A" CONCRETE (FOUNDATION FOR SIGN SUPPORTS) PER CUBIC YARD, AND 713-01.02, STEEL BAR REINFORCEMENT (FOUNDATION FOR SIGN SUPPORTS) PER POUND.
  - CLASS "A" CONCRETE FOOTING SHALL BE PLACED ONLY ON UNDISTURBED MATERIAL OR IN FILL MATERIAL PLACED BY CONTROLLED COMPACTION AT DEPTHS UNAFFECTED BY FROST.
  - MATERIALS SURROUNDING FOOTING SHALL BE CAPABLE OF CARRYING A MINIMUM BEARING OF 2,500 POUNDS PER SQUARE FOOT. WHERE SOLID ROCK IS ENCOUNTERED, FOOTING SHALL BE LENGTH SHOWN ON THE SIGN SCHEDULE SHEET OR EXTEND A MINIMUM OF TWO FEET INTO THE ROCK.
  - PRE-APPROVED BREAKAWAY SYSTEMS ARE LISTED ON OPL COST OF BREAKAWAY DEVICE TO BE INCLUDED IN THE PRICE OF THE SIGN.
- ITEM NO. 713-06 STEEL I-BEAMS & WF-BEAMS (BREAKAWAY) SIGN SUPPORT LB.

- REV. 10-6-66: BOLT LENGTH AND NOTE.
- REV. 10-27-66: FOUNDATION BEARING REVISED.
- REV. 10-30-66: 3 1/2", 4" & 5" TUBES ELIMINATED.
- REV. 1-19-72: TORQUE FOR DETAIL "A".
- REV. 7-1-72: CHANGED DEPARTMENT NAME.
- REV. 5-1-73: REVISED SHIM NOTE.
- REV. 3-12-74: REVISED GENERAL NOTES.
- REV. 10-3-75: TORQUE ON BOLTS AND POST SIZE.
- REV. 1-1-76: CHANGED DWG. NO. FROM RD-S-13 TO T-S-13.
- REV. 7-29-76: NEW AASHTO SPECIFICATION.
- REV. 4-12-77: BOLTS AT FUSE PLATES & ADDED BOLT KEEPER PLATES.
- REV. 6-30-88: ADDED HINGE PLATE.
- REV. 3-14-90: CHANGED SLIP BASE TORQUE IN TABLE.
- REV. 12-7-90: REDREW AND RENAMED DRAWING, PLACED MATERIAL AND INFORMATION REGARDING STANDARD STEEL GROUND MOUNTED SIGNS WITH BREAK-AWAY TYPE FOOTINGS USING SQUARE TUBES ON DRAWING NO. T-S-12. ELIMINATED S7 x 15.3 SUPPORT POST SIZE FROM THE TABLE.
- REV. 10-26-96: CHANGED PAY ITEM NO. IN GENERAL NOTE (N).
- REV. 5-27-01: CHANGED NOTE UNDER SHIM DETAIL.
- REV. 7-20-12: REVISED DIMENSION K AND Y FOR S5X10.0.
- REV. 10-21-19: REVISED TITLE AND ADDED NOTE (C).



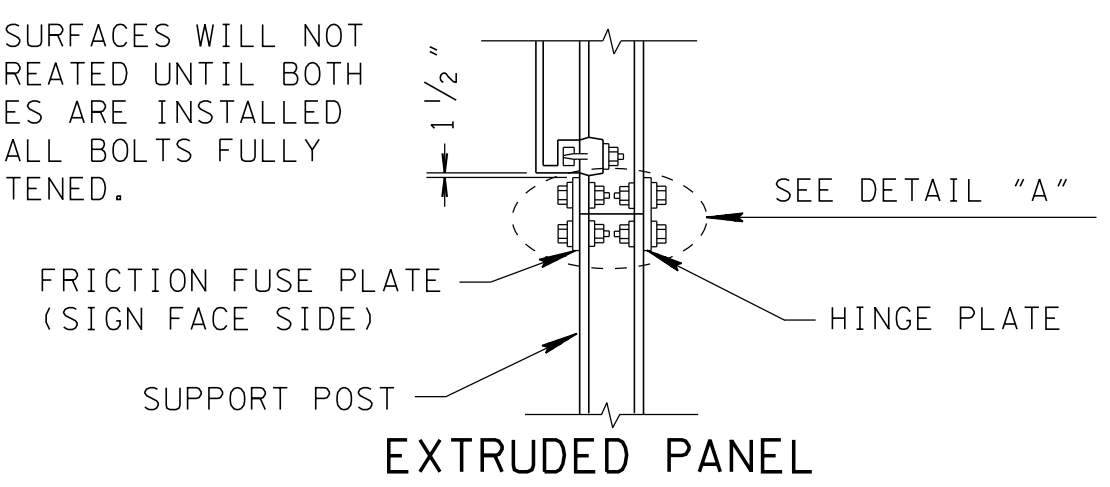
FOUNDATION AND FOOTING ELEVATION DETAIL FOR I-BEAM POST SUPPORTS TYPE 5 FOOTING



SECTION C-C SECTION D-D (SEE TABLE FOR DIMENSIONS)

SECTIONS SHOWN ARE FOR INSTALLATIONS ON RIGHT SHOULDER AND IN GORE AREAS. PLATE SLOT BEVELS ARE OPPOSITE HAND FROM THAT SHOWN FOR INSTALLATIONS ON LEFT SHOULDER.

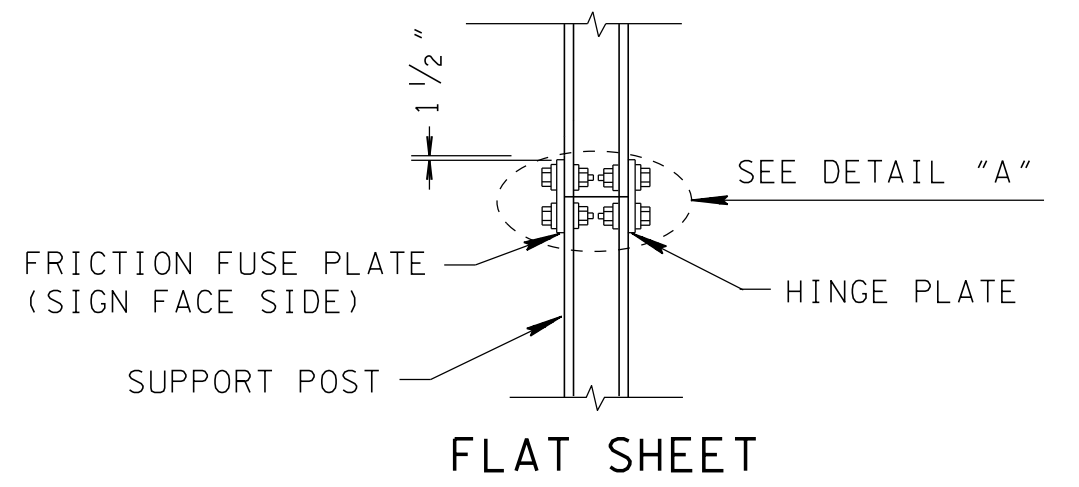
**NOTE:** CUT SURFACES WILL NOT BE TREATED UNTIL BOTH PLATES ARE INSTALLED AND ALL BOLTS FULLY TIGHTENED.



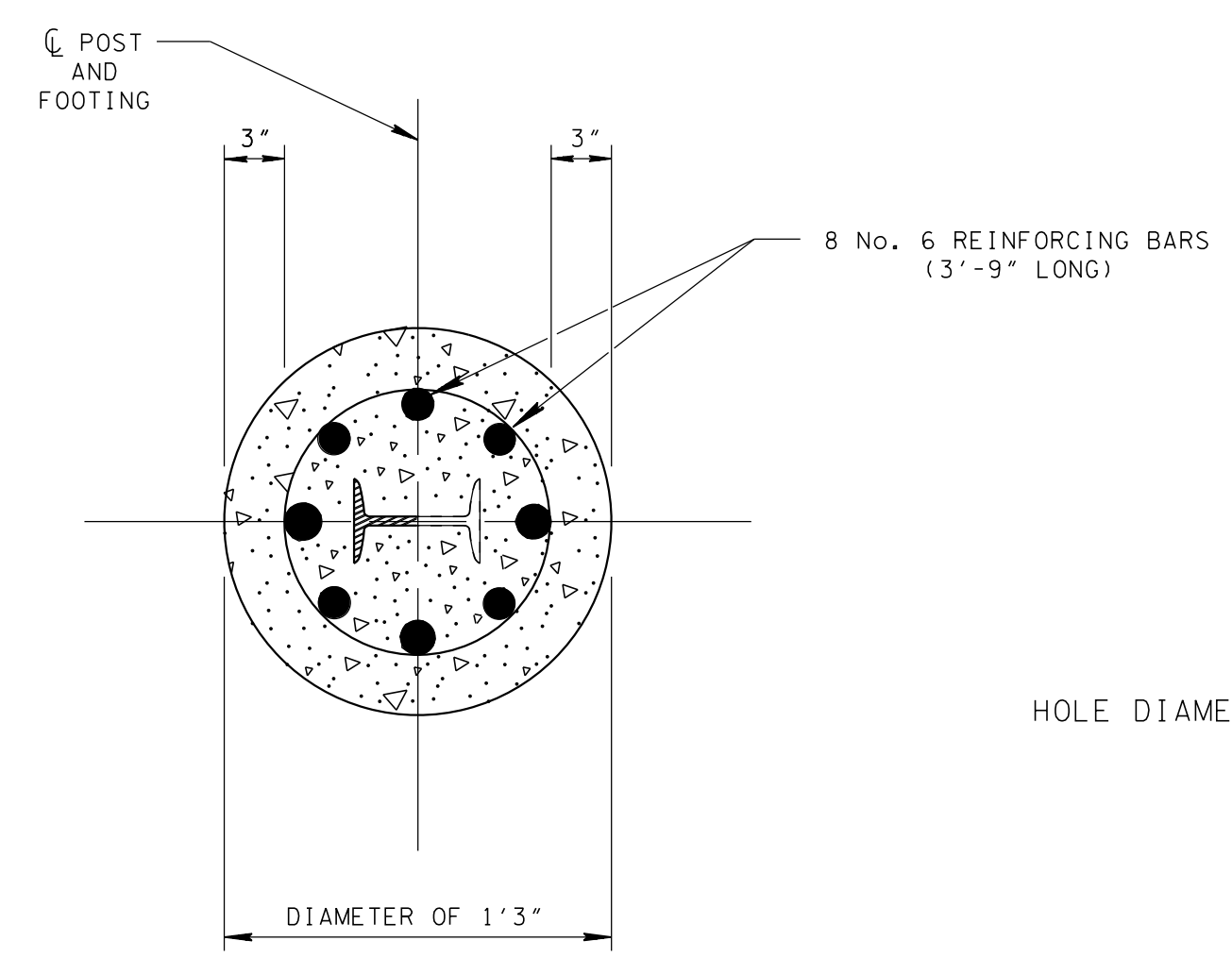
**-NOTES-** THE HOLES FOR THE HINGE AND FUSE PLATE SHALL BE DRILLED BEFORE THE SAW CUTTING AND GALVANIZING OF THE POST. THE POST SHALL BE SAW CUT COMPLETELY THRU BEFORE OR AFTER GALVANIZING. IF THE POST IS CUT AFTER GALVANIZING THEN THE CUT SURFACE SHALL BE TREATED WITH AN APPROVED ZINC SOLDER MEETING THE FEDERAL SPECIFICATION O-G-93 (STICK ONLY).

USE HIGH STRENGTH BOLTS WITH HEX HEAD, HEX HEAD NUT AND ONE FLAT WASHER UNDER EACH BOLT HEAD AND BEVEL OR FLAT WASHER (WHERE REQUIRED) UNDER NUT.

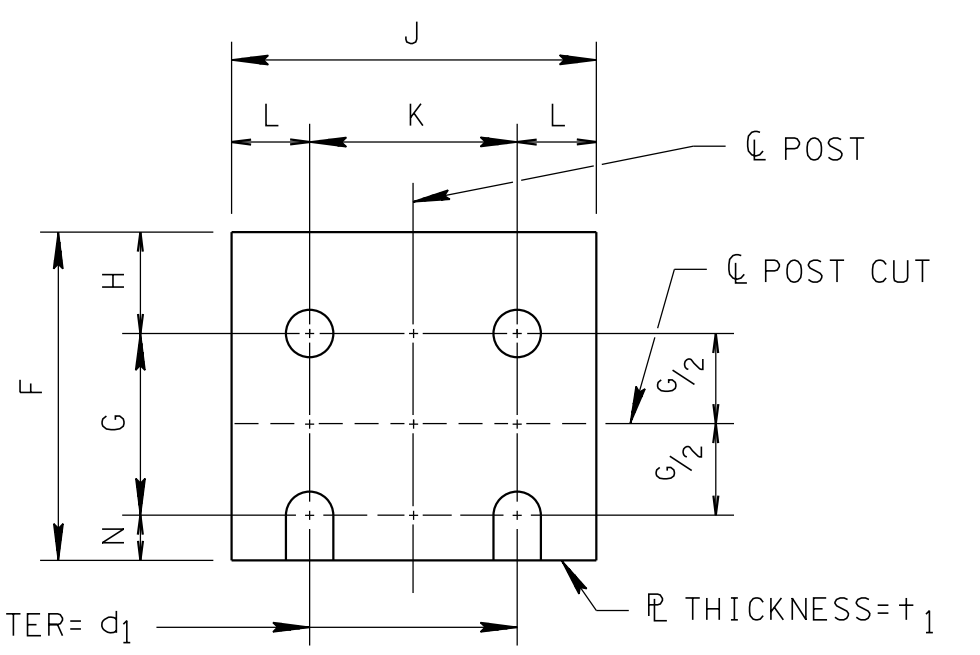
TYPICAL SIDE VIEW



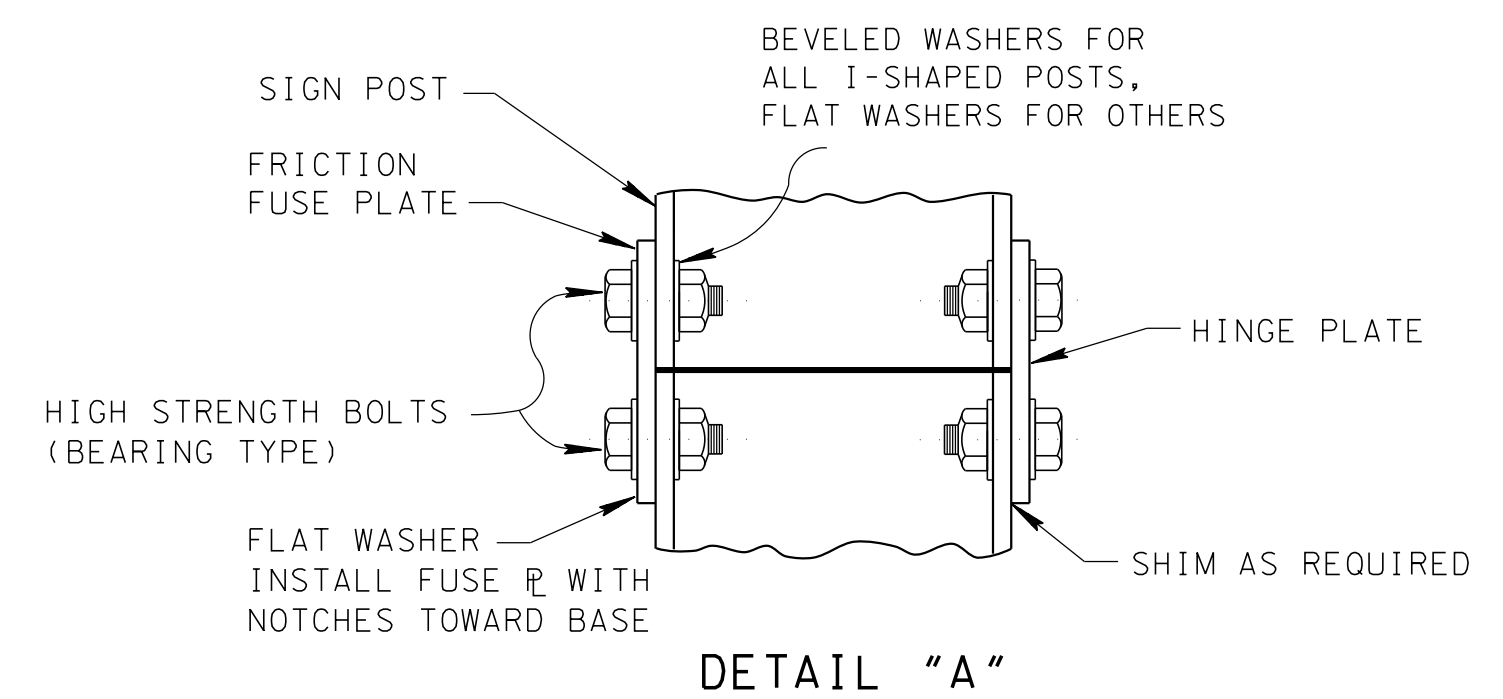
FLAT SHEET



SECTION F-F TYPE 5 FOOTING



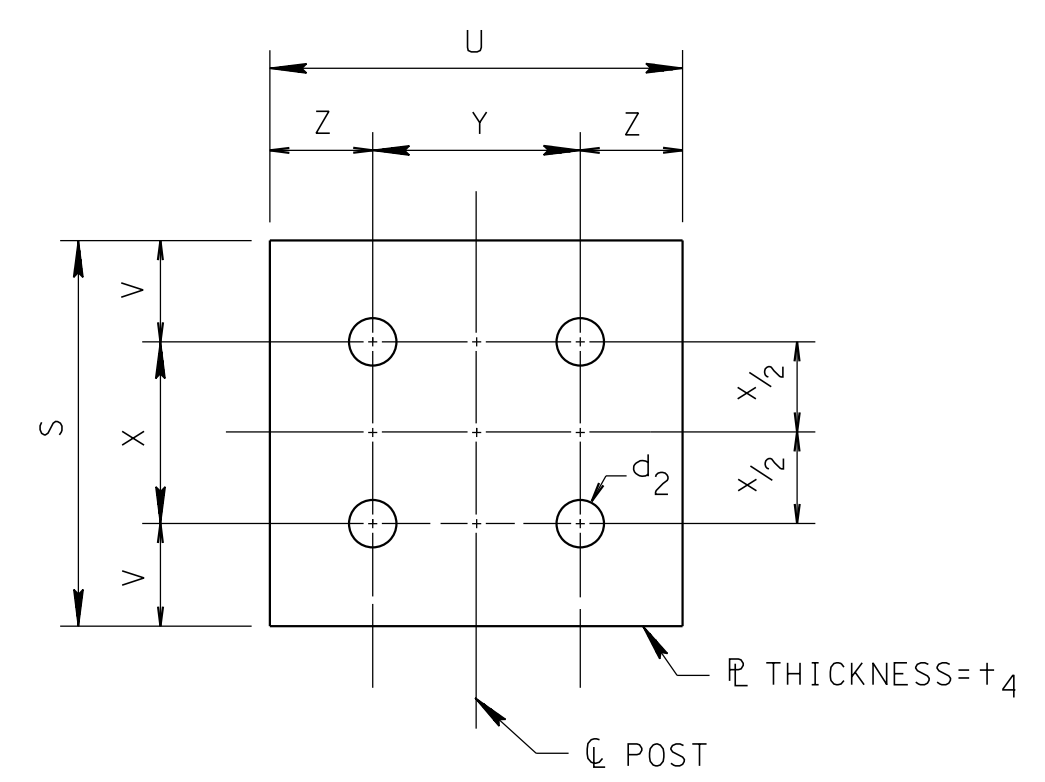
FUSE PLATE DETAIL (SEE TABLE FOR DIMENSIONS)



DETAIL "A"

**FABRICATOR NOTE:** IMPORTANT- ALL FRICTION FUSE AND HINGE BOLTS SHALL BE TIGHTENED IN THE SHOP FOLLOWING A METHOD APPROVED BY THE ENGINEER. TIGHTENING SHALL BE TO SUCH A DEGREE AS TO OBTAIN THE FOLLOWING MINIMUM RESIDUAL TENSION IN EACH BOLT:

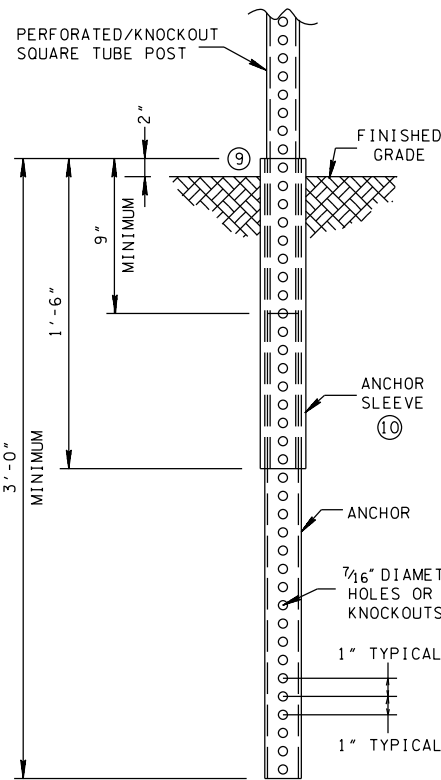
BOLT SIZE	MIN. RESIDUAL BOLT TENSION
1/2" Ø	12,050 LBS.
5/8" Ø	19,200 LBS.
3/4" Ø	28,400 LBS.



HINGE PLATE DETAIL (SEE TABLE FOR DIMENSIONS)

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

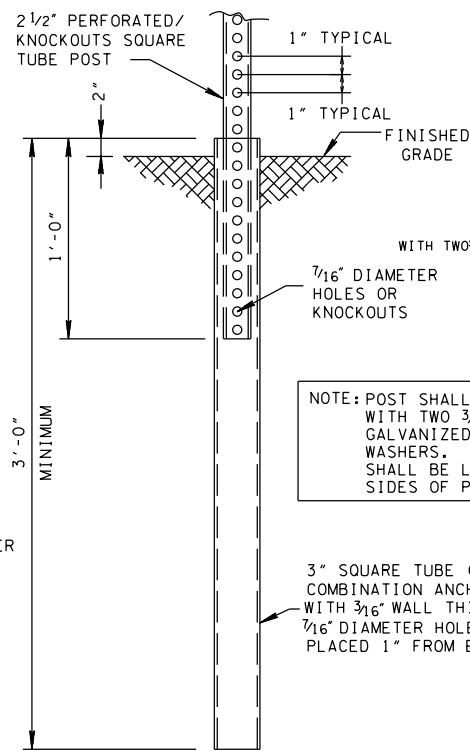




POST SLEEVE INSTALLATION  
DETAIL

FOR 1 1/2", 1 3/4" AND  
2" SUPPORT POSTS

(SEE TABLE FOR SIZE OF  
ANCHOR/ANCHOR SLEEVE)



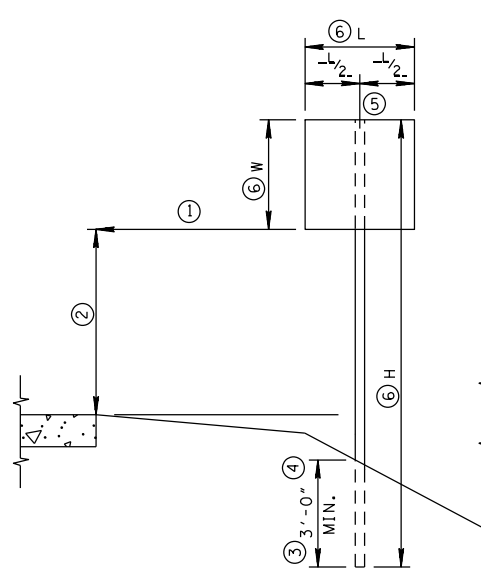
POST SLEEVE INSTALLATION  
DETAIL

FOR 2 1/2" SUPPORT POST (3.141 LB/FT)

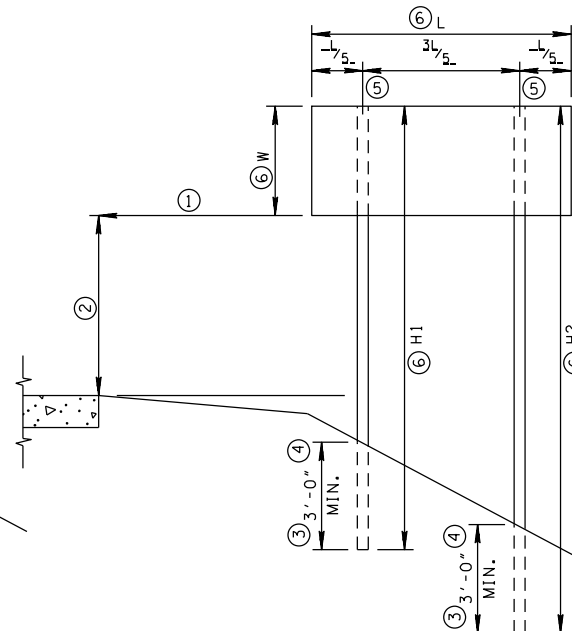
(SEE TABLE FOR SIZE OF COMBINATION  
ANCHOR/ANCHOR SLEEVE)

NOTE: POST SHALL BE FASTENED TO ANCHOR WITH TWO 3/8" DRIVE RIVETS OR GALVANIZED BOLTS WITH FLAT WASHERS. RIVETS OR BOLTS SHALL BE LOCATED ON ADJACENT SIDES OF POST.

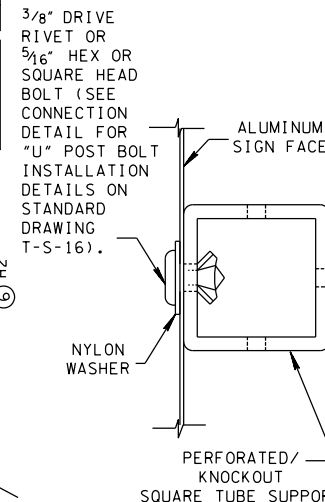
WITH TWO 3/8" DRIVE RIVETS OR GALVANIZE  
7/16" DIAMETER HOLES OR KNOCKOUTS  
3" SQUARE TUBE (6.86 LB/FT) COMBINATION ANCHOR/ANCHOR SLEEVE WITH 3/16" WALL THICKNESS AND 7/16" DIAMETER HOLES OR KNOCKOUTS PLACED 1" FROM END OF ANCHOR



SHOULDER INSTALLATION FOR ONE PERFORATED/KNOCKOUT SQUARE TUBE SUPPORT



SHOULDER INSTALLATION FOR TWO PERFORATED/KNOCKOUT SQUARE TUBE SUPPORTS

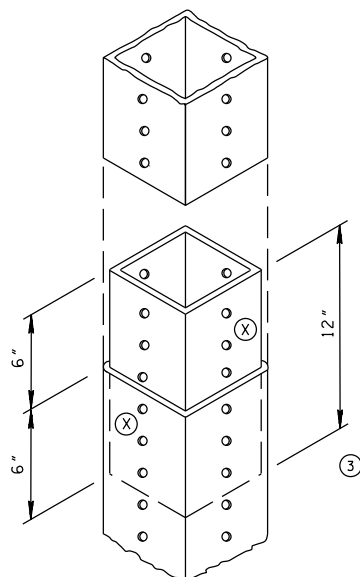


CONNECTION DETAIL FOR PERFORATED/KNOCKOUT SQUARE TUBE POST

LEGEND	
W	HEIGHT OF SIGN FACE
L	LENGTH OF SIGN FACE
H	HEIGHT OF SIGN SUPPORT

POST (SIZE AND WEIGHT)	ANCHOR (SIZE AND WEIGHT)	ANCHOR SLEEVE (SIZE AND WEIGHT)
1 1/2" SQUARE (1.702 LB/FT) 12 GAGE	1 3/4" SQUARE (2.060 LB/FT) 12 GAGE	2" SQUARE (2.416 LB/FT) 12 GAGE
1 3/4" SQUARE (2.060 LB/FT) 12 GAGE	2" SQUARE (2.416 LB/FT) 12 GAGE	2 1/4" SQUARE (2.773 LB/FT) 12 GAGE
1 3/4" SQUARE (1.882 LB/FT) 14 GAGE	2" SQUARE (2.416 LB/FT) 12 GAGE	
2" SQUARE (2.416 LB/FT) 12 GAGE	2 1/4" SQUARE (2.773 LB/FT) 12 GAGE	2 1/2" SQUARE (3.141 LB/FT) 12 GAGE
2" SQUARE (2.1639 LB/FT) 14 GAGE	2 1/4" SQUARE (2.773 LB/FT) 12 GAGE	

NOTE: ALL POSTS SHOWN IN ABOVE TABLE SHALL BE FABRICATED FROM 12 GAGE (OR WHERE DESIGNATED USS 14 GAGE) MATERIAL (60,000 POUNDS PER SQUARE INCH MINIMUM YIELD STRENGTH). ANCHORS AND ANCHOR SLEEVES (IF REQUIRED) SHALL BE FABRICATED FROM 12 GAGE MATERIAL OR GREATER. THE WEIGHT PER FOOT SHOWN IN THE TABLE ABOVE SHALL BE THE MINIMUM ACCEPTABLE.



PERMISSIBLE FIELD SPLICE

NOTE: A MAXIMUM OF ONE SPLICE IS ALLOWED PER POST. CONNECTION SHALL BE MADE WITH TWO 3/8" DRIVE RIVETS WITH FLAT WASHERS. DRIVE RIVETS TO BE LOCATED ON ADJACENT SIDES OF POST AS INDICATED BY (X) IN ORDER TO PROVIDE A TIGHT CONNECTION.

FOOTNOTES

- ① FOR STANDARDIZATION OF LOCATION AND LATERAL CLEARANCE SEE SUBSECTIONS 2A-21 (PAGE 2A-8) AND 2A-24 (PAGE 2A-10 AND 2A-11) OF THE CURRENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- ② FOR HEIGHT SEE SUBSECTION 2A-23 (PAGE 2A-9 AND 2A-10) OF THE CURRENT EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- ③ WHEN TYPE 4 FOOTING IS REQUIRED AS SHOWN ON SIGN SCHEDULE THE MINIMUM DEPTH OF SUPPORT POST WILL BE 2'-0". SEE T-S-12 FOR DETAILS.
- ④ IF ROCK IS ENCOUNTERED DURING THE INSTALLATION OF SUPPORT POSTS, THE HOLES FOR THE SUPPORTS SHALL BE DRILLED TO PROVIDE THE MINIMUM 3'-0" DEPTH IN GROUND.
- ⑤ THE SUPPORT POST SHALL BE EITHER FLUSH OR HALF-INCH DOWN FROM THE TOP OF THE SIGN FACE.
- ⑥ SEE SIGN SCHEDULE SHEET IN THE PLANS FOR DIMENSIONS L, H, H1, H2, AND W.
- ⑦ A 3" SQUARE TUBE COMBINATION ANCHOR/ANCHOR SLEEVE SHALL BE REQUIRED WHEN A 2 1/2" SUPPORT POST IS USED.
- ⑧ THE SUPPORT POST MUST BE PLACED 12" IN LIEU OF 6" INSIDE THE COMBINATION ANCHOR/ANCHOR SLEEVE WHEN 2 1/2" SUPPORT POST IS USED.
- ⑨ THE POST IS TO BE FASTENED TO THE ANCHOR/ANCHOR SLEEVE WITH ONE 1 1/2" CORNER BOLT LOCATED IN THE CORNER AWAY FROM THE DIRECTION OF TRAFFIC.
- ⑩ THE ANCHOR SLEEVE IS NOT REQUIRED WHEN USING A 14 GAGE POST. THE ANCHOR WILL SERVE AS A COMBINATION ANCHOR/ANCHOR SLEEVE.

GENERAL NOTES

- (A) PERFORATED/KNOCKOUT POSTS SHALL BE SQUARE TUBE FORMED FROM USS GAGE (12 GAGE) ASTM A-446 COLD ROLLED CARBON STEEL OR A-1011 HOT ROLLED CARBON SHEET STEEL. THE MINIMUM YIELD (Fy) IS TO BE 60,000 POUNDS PER SQUARE INCH, OR USS 14 GAGE HAVING A MINIMUM YIELD STRENGTH OF 60,000 POUNDS PER INCH. THE SQUARE TUBES SHALL BE WELDED DIRECTLY IN THE CORNERS BY HIGH FREQUENCY RESISTANCE WELDING OR EQUAL. THE SUPPORT POSTS ARE TO BE EXTERNALLY SCARFED TO AGREE WITH STANDARD CORNER RADIUS OF 3/32" ± 1/64".
- (B) PERFORATED/KNOCKOUT POSTS SHALL BE GALVANIZED TO CONFORM TO ASTM-525, DESIGNATION C-90 OR ITS CORROSION-RESISTANCE EQUIVALENT, WHEN TESTED IN ACCORDANCE WITH ASTM B-117 STANDARDS.
- (C) ALL HARDWARE SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-307, CLASS A.
- (D) ALL HARDWARE SHALL BE GALVANIZED TO CONFORM TO THE REQUIREMENTS OF FEDERAL SPECIFICATION QQ-Z-325, TYPE 1, CLASS 3 OR CADMIUM PLATED TO CONFORM TO THE REQUIREMENTS OF FEDERAL SPECIFICATION QQ-P-416, TYPE III, CLASS 3.
- (E) THE WEIGHT IN POUNDS OF THE POST, ANCHOR, ANCHOR SLEEVE AND COMBINATION ANCHOR/SLEEVE SHALL BE COMPUTED FOR PAYMENT UNDER ITEM NO. 713-11.02, PERFORATED/KNOCKOUT SQUARE TUBE POSTS. NO MEASUREMENT FOR PAYMENT WILL BE MADE FOR HARDWARE USED IN SIGN CONSTRUCTION. COST OF NECESSARY HARDWARE WILL BE INCLUDED IN THE PRICE BID FOR ITEM NO. 713-11.02.
- (F) THE SIGN FACE IS TO BE CONNECTED TO THE SUPPORT WITH 3/8" DRIVE RIVETS AND NYLON WASHER (SEE CONNECTION DETAIL FOR PERFORATED/KNOCKOUT SQUARE TUBE POST ON THIS SHEET). ALTERNATE CONNECTION WILL BE WITH 5/16" HEX OR SQUARE HEAD BOLT WITH NYLON WASHER, FLAT WASHER AND HEX OR SQUARE TAMPER-PROOF NUT (SEE CONNECTION DETAIL FOR "U" POST ON STANDARD DRAWING T-S-16).
- (G) CLASS "A" CONCRETE CONSTRUCTION AND MATERIALS SHALL MEET THE REQUIREMENTS OF THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION, SECTION 604."
- (H) CLASS "A" CONCRETE AND REINFORCING STEEL USED IN CONJUNCTION WITH INSTALLATION OF THE SIGN SUPPORT POSTS IS TO BE PAID FOR UNDER ITEM NO. 713-01.01, CLASS "A" CONCRETE (FOUNDATION FOR SIGN SUPPORTS) PER CUBIC YARD, AND 713-01.02, STEEL BAR REINFORCEMENT (FOUNDATION FOR SIGN SUPPORTS) PER POUND.
- (I) CLASS "A" CONCRETE FOOTING SHALL BE PLACED ONLY ON UNDISTURBED MATERIAL OR IN FILL MATERIAL PLACED BY CONTROLLED COMPACTION AT DEPTHS UNAFFECTED BY FROST.
- (J) MATERIALS SURROUNDING FOOTING SHALL BE CAPABLE OF CARRYING A MINIMUM BEARING OF 2500 POUNDS PER SQUARE FOOT. WHERE SOLID ROCK IS ENCOUNTERED, FOOTING SHALL BE FOUR FEET AS SHOWN IN DETAILS OR EXTEND A MINIMUM OF TWO FEET INTO THE ROCK.
- (K) THE ANCHOR SHALL BE DRIVEN BEFORE THE ANCHOR SLEEVE OR THE ANCHOR/ANCHOR SLEEVE SHALL BE DRIVEN TOGETHER.
- (L) TO BE PAID UNDER ITEM NO. 713-16.20 THRU 39.

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION

STANDARD GROUND MOUNTED SIGN USING PERFORATED/KNOCKOUT SQUARE TUBE

5-14-74 T-S-17

REV. 6-12-74: CHANGED TYPE OF STEEL FOR PERFORATED POSTS FROM ASTM A-366 TO ASTM A-446.

REV. 7-9-74: POST INSTALLATION DETAIL AND CONNECTION DETAIL ADDED. CORNER BOLT SIZE CHANGED.

REV. 8-19-74: NOTE ADDED REGARDING POST INSTALLATION. FOOTING DETAILS ADDED.

REV. 1-1-76: CHANGED DRAWING NO. FROM RD-S-17 TO T-S-17.

REV. 7-29-76: HARDWARE FINISH, FIELD SPLICE AND MISCELLANEOUS.

REV. 7-17-81: CHANGED ITEM NO. TO AGREE WITH NEW SPECIFICATION BOOK.

REV. 3-1-88: KNOCKOUT ALTERNATE ADDED.

REV. 11-22-90: REDREW AND REORGANIZED SHEET. ELIMINATED SHOULDER INSTALLATION USING THREE SUPPORTS.

REV. 12-7-90: CHANGED CONNECTION DETAIL FOR PERFORATED/KNOCKOUT SQUARE TUBE POST AND GENERAL NOTE (F).

REV. 7-29-91: CHANGED POST, ANCHOR AND ANCHOR SLEEVE TABLE. ADDED FOOTNOTE (I). CHANGED GENERAL NOTE (A).

REV. 1-19-92: CHANGED POST, ANCHOR AND ANCHOR SLEEVE TABLE. MODIFIED VARIOUS NOTES ON DRAWING INCLUDING GENERAL NOTE (A).

REV. 10-26-93: CHANGED WORDING OF GENERAL NOTE (E).

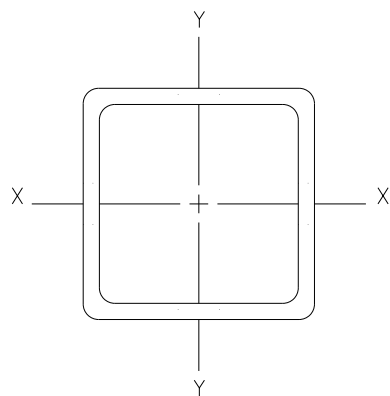
REV. 2-14-96: CHANGED WORDING OF GENERAL NOTE (A).

REV. 10-26-96: CHANGED PAY ITEM NO. IN GENERAL NOTE (H).

REV. 7-19-13: REMOVED 2 1/2", 10 AND 12 GAUGE POST FY FOR 12GAUGE CHANGED TO 60 KSI. REMOVED TYPE 4 FOOTING.

REV. 7-2-15: REVISED FOOTNOTES (3) ADDED GENERAL NOTES (L).

REV. 7-11-17: ADDED (3.141 LB/FT) AND (6.86 LB/FT) TO POST SLEEVE INSTALLATION DETAIL.



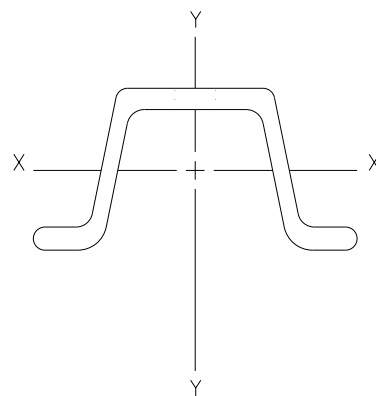
**PERFORATED / KNOCKOUT SQUARE TUBE**  
 MATERIAL: ASTM A-446 (GRADE A) OR A-1011 GRADE 50  
 $F_y=60,000$  PSI MIN.

STEEL "U"-POST SHALL BE MANUFACTURED FROM STEEL CONFORMING TO THE MATERIAL REQUIREMENTS OF ASTM A-499 AND GALVANIZED CONFORMING TO ASTM A-123.

PERFORATED/KNOCKOUT POSTS SHALL BE SQUARE TUBE FORMED 10 OR 12 GAUGES, ASTM A1011 GRADE 50 STEEL. THE SQUARE TUBES SHALL BE WELDED DIRECTLY IN THE CORNER BY HIGH FREQUENCY RESISTANCE WELDING OR EQUAL. THE POSTS SHALL BE EXTERNALLY SCARFED TO AGREE WITH STANDARD CORNER RADII OF  $\frac{5}{32} \pm \frac{1}{64}$  INCHES.

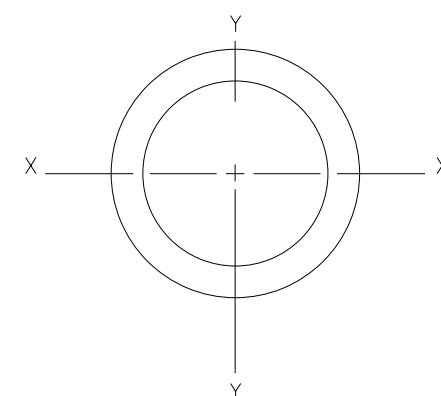
PERFORATED/KNOCKOUT POSTS SHALL BE SQUARE TUBE FORMED FROM USS GAGE (12 GAGE) ASTM A-446 COLD ROLLED CARBON STEEL OR A-1011 HOT ROLLED CARBON SHEET STEEL. THE MINIMUM YIELD ( $F_y$ ) IS TO BE 60,000 POUNDS PER SQUARE INCH. OR USS 14 GAGE HAVING A MINIMUM YIELD STRENGTH OF 60,000 POUNDS PER INCH. THE SQUARE TUBES SHALL BE WELDED DIRECTLY IN THE CORNERS BY HIGH FREQUENCY RESISTANCE WELDING OR EQUAL. THE SUPPORT POSTS ARE TO BE EXTERNALLY SCARFED TO AGREE WITH STANDARD CORNER RADII OF  $\frac{5}{32} \pm \frac{1}{64}$ .

PERFORATED/KNOCKOUT POSTS SHALL BE GALVANIZED TO CONFORM TO ASTM-525, DESIGNATION C-90 OR ITS CORROSION-RESISTANCE EQUIVALENT, WHEN TESTED IN ACCORDANCE WITH ASTM B-117 STANDARDS.  
 (TO BE PAID UNDER ITEM NO. 713-11.02)



**U-POST**

MATERIAL: ASTM A-499 GRADE 50  
 $F_y=50,000$  PSI MIN.  
 (TO BE PAID UNDER ITEM NO. 713-11.01)



**ROUND POST**

MATERIAL: ASTM A-500 GRADE C  
 $F_y=50,000$  PSI MIN.  
 SCHEDULE 80

ONLY SYSTEMS LISTED ON THE TDOT OPL SHALL BE USED.

BWG 10 SCHEDULE 80 PIPE SPECIFICATIONS (SIGN POST):  
 2.875" OUTSIDE DIAMETER  
 0.276" NOMINAL WALL THICKNESS  
 STEEL TUBING PER ASTM A500 GRADE C  
 OTHER SEAMLESS OR ELECTRIC-RESISTANCE WELDED STEEL TUBING OR PIPE WITH EQUIV. OUTSIDE DIA. AND WALL THICKNESS MAY BE USED IF THEY MEET THE FOLLOWING:  
 46,000 PSI MINIMUM YIELD STRENGTH, 62,000 PSI MINIMUM TENSILE STRENGTH  
 WALL THICKNESS (UNCOATED) SHALL BE WITHIN THE RANGE OF 0.248" TO 0.304"  
 OUTSIDE DIAMETER (UNCOATED) SHALL BE WITHIN THE RANGE OF 2.855" TO 2.895"  
 GALVANIZATION PER ASTM A123

(TO BE PAID UNDER ITEM NO. 713-11.03)

- REV. 06-01-76: ADDED WEIGHTS.
- REV. 08-13-76: REVISED WEIGHTS ALUMINUM.
- REV. 09-22-77: ADDED "MU"-POST; REVISED PROPERTIES OF RIBBED "U"-POST.
- REV. 07-01-78: REQUIREMENTS OF MATERIAL FOR STEEL "U"-POST.
- REV. 03-01-88: KNOCKOUT ALTERNATE ADDED.
- REV. 10-26-90: REDREW AND REORGANIZED SHEET. DELETED ALUMINUM "U"-POST AND "MU"-POST FROM SHEET. CHANGED SHEET NAME ACCORDINGLY. NUMBERED FOOTNOTES AND ADDED FOOTNOTE NO. ②.
- REV. 7-29-91: ADDED P7 AND P8 PERFORATED/KNOCKOUT TUBE POST. ADDED FOOTNOTE NOS. ⑤ AND ⑥.

□ REV. 7-19-15:  $F_y$  FOR 12 GAUGE P POST CHANGED TO 60K Psi. ADDED P9 POST REVISED FOOTNOTES. CHANGE TITLE. ADDED ROUND POST INFORMATION.

REV. 7-11-17: REMOVED OLD FOOT NOTES FROM P5 AND P9

REV. 6-12-20: FOOT NOTE 7 ADDED

MEMBER DESIGNATION	MINIMUM SECTION PROPERTIES	WT LBS/FT
P1	A = 0.380 IN. <sup>2</sup> Sxx= 0.172 IN. <sup>3</sup> Ixx= 0.129 IN. <sup>4</sup>	1.102 1 1/2" ∅
P2	A = 0.485 IN. <sup>2</sup> Sxx= 0.264 IN. <sup>3</sup> Ixx= 0.231 IN. <sup>4</sup>	2.060 1 3/4" ∅
P3	A = 0.590 IN. <sup>2</sup> Sxx= 0.372 IN. <sup>3</sup> Ixx= 0.372 IN. <sup>4</sup>	2.416 2" ∅
P4	A = 0.695 IN. <sup>2</sup> Sxx= 0.499 IN. <sup>3</sup> Ixx= 0.561 IN. <sup>4</sup>	2.773 2 1/4" ∅
P5	A = 0.803 IN. <sup>2</sup> Sxx= 0.643 IN. <sup>3</sup> Ixx= 0.804 IN. <sup>4</sup>	3.141 2 1/2" ∅
P6	A = 1.010 IN. <sup>2</sup> Sxx= 0.783 IN. <sup>3</sup> Ixx= 0.979 IN. <sup>4</sup>	4.006 2 1/2" ∅
④ P7	A = 0.392 IN. <sup>2</sup> Sxx= 0.230 IN. <sup>3</sup> Ixx= 0.201 IN. <sup>4</sup>	1.882 1 3/4" ∅
④ P8	A = 0.474 IN. <sup>2</sup> Sxx= 0.296 IN. <sup>3</sup> Ixx= 0.296 IN. <sup>4</sup>	2.164 2" ∅
P9	A = 0.841 IN. <sup>2</sup> Sxx= 0.533 IN. <sup>3</sup> Ixx= 0.605 IN. <sup>4</sup>	3.430 2 3/16" ∅

MEMBER DESIGNATION	MINIMUM SECTION PROPERTIES	WT LBS/FT
U1	A = 0.590 IN. <sup>2</sup> Sxx= 0.225 IN. <sup>3</sup> Ixx= 0.179 IN. <sup>4</sup>	2.00
U2	A = 0.645 IN. <sup>2</sup> Sxx= 0.254 IN. <sup>3</sup> Ixx= 0.201 IN. <sup>4</sup>	2.25
U3	A = 0.748 IN. <sup>2</sup> Sxx= 0.289 IN. <sup>3</sup> Ixx= 0.233 IN. <sup>4</sup>	2.50
U4	A = 0.819 IN. <sup>2</sup> Sxx= 0.329 IN. <sup>3</sup> Ixx= 0.277 IN. <sup>4</sup>	2.75
U5	A = 0.817 IN. <sup>2</sup> Sxx= 0.363 IN. <sup>3</sup> Ixx= 0.331 IN. <sup>4</sup>	2.75
U6	A = 0.918 IN. <sup>2</sup> Sxx= 0.403 IN. <sup>3</sup> Ixx= 0.372 IN. <sup>4</sup>	3.00
U7	A = 1.195 IN. <sup>2</sup> Sxx= 0.511 IN. <sup>3</sup> Ixx= 0.460 IN. <sup>4</sup>	4.00

MEMBER DESIGNATION	MINIMUM SECTION PROPERTIES	WT LBS/FT
R1 2 1/2" ∅	A = 1.154 IN. <sup>2</sup> Sxx= 0.754 IN. <sup>3</sup> Ixx= 1.08 IN. <sup>4</sup>	3.92

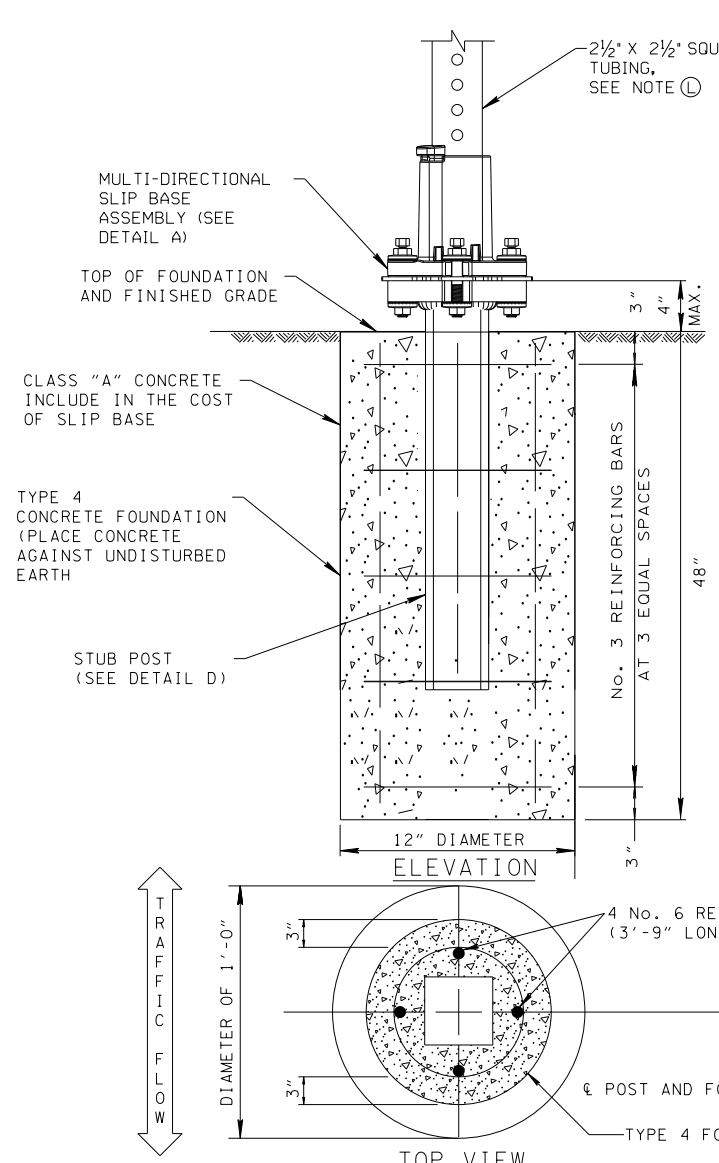
**FOOTNOTES**

- ① SEE GENERAL NOTES (A) AND (B) ON STANDARD DRAWING T-S-17 FOR MANUFACTURING REQUIREMENTS FOR STEEL AND GALVANIZING.
- ② STEEL "U"-POST SHALL BE MANUFACTURED FROM STEEL CONFORMING TO THE MATERIAL REQUIREMENTS OF ASTM A-499 AND GALVANIZED CONFORMING TO ASTM A-123.
- ③ P1 THRU P5 MEMBER DESIGNATIONS ARE TO BE 12 GAGE.
- ④ THE CONTRACTOR MAY SUBSTITUTE P2 FOR P7 AND P3 FOR P8. QUANTITIES ARE COMPUTED ON PLANS BASED ON USING P7 OR P8. NO INCREASE IN QUANTITIES WILL BE ALLOWED WHEN USING THE ABOVE SUBSTITUTIONS.
- ⑤ P7, P8 AND P9 MEMBER DESIGNATIONS ARE TO BE 14 GAGE.
- ⑥ P6 IS TO BE 10 GAUGE.
- ⑦ SIGN POSTS MAY BE SUBSTITUTED WITH AN EQUIVILANT POST SHAPE. FIELD ENGINEER SHALL CONFIRM BREAKAWAY HARDWARE TYPE AND FOUNDATION DESIGN REQUIREMENTS FOR THE SUBSTITUTED POST SIZE AND SHAPE.

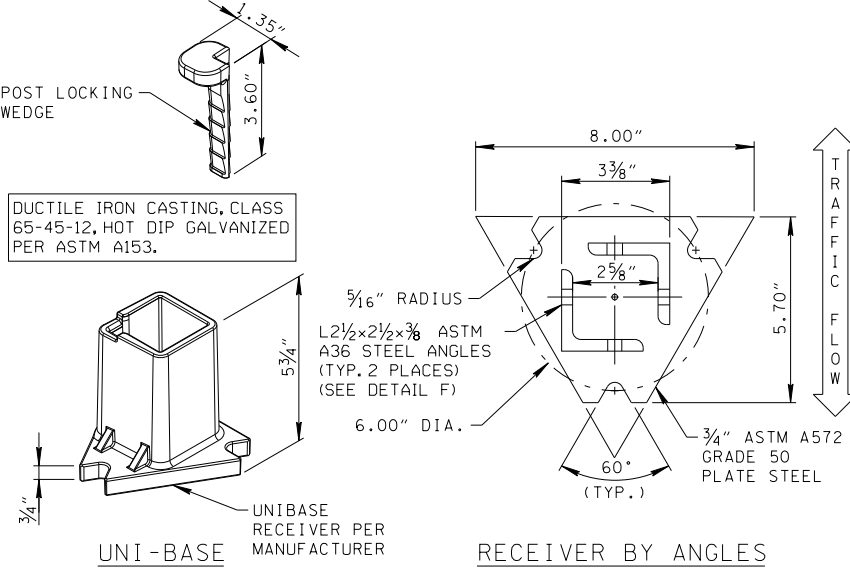
□ MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE  
 DEPARTMENT OF TRANSPORTATION

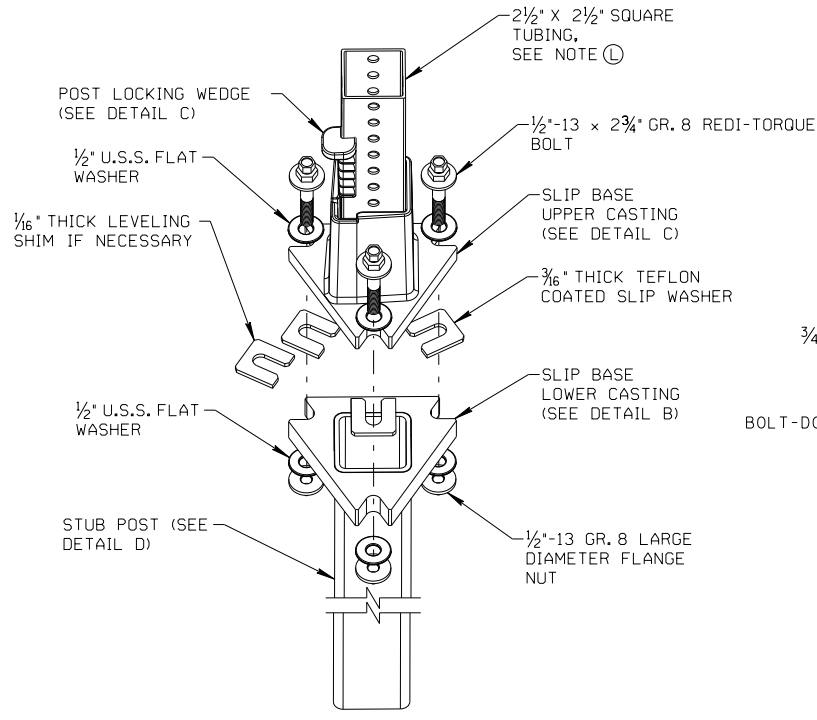
STANDARD STEEL  
 SIGN  
 SUPPORTS



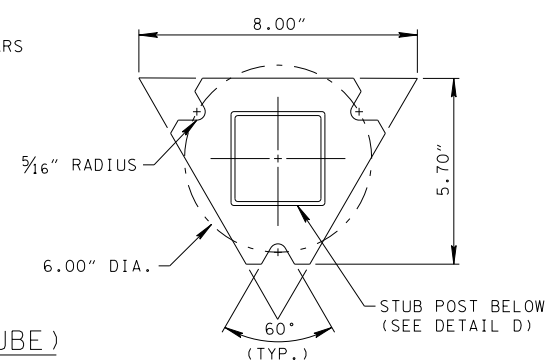
SLIP BASE SIGN SUPPORT FOR P-POST (SQUARE TUBE)



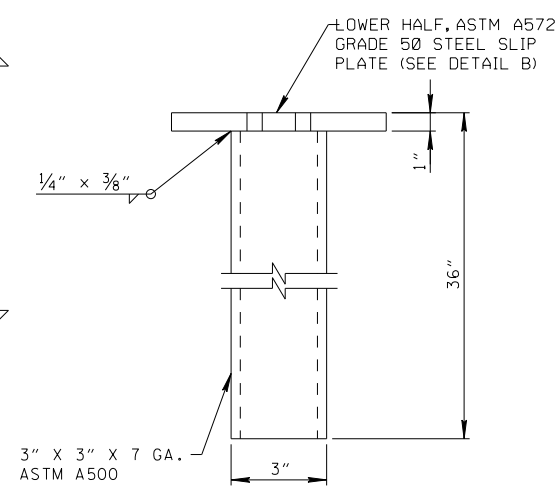
SLIP BASE UPPER CASTING OPTIONS



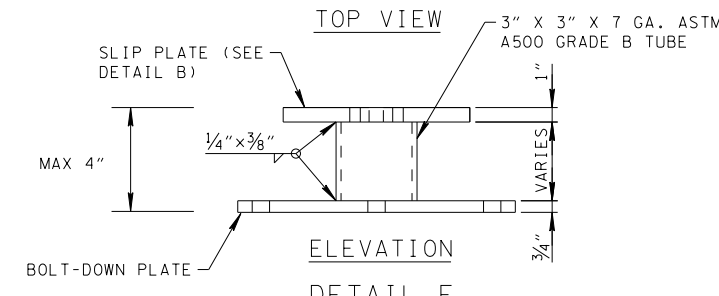
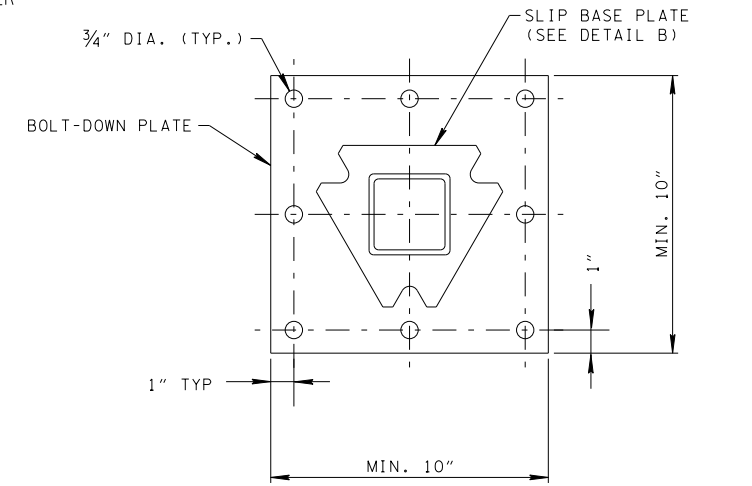
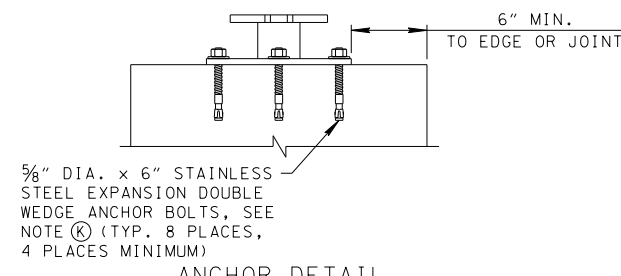
DETAIL A TRIANGULAR SLIP BASE



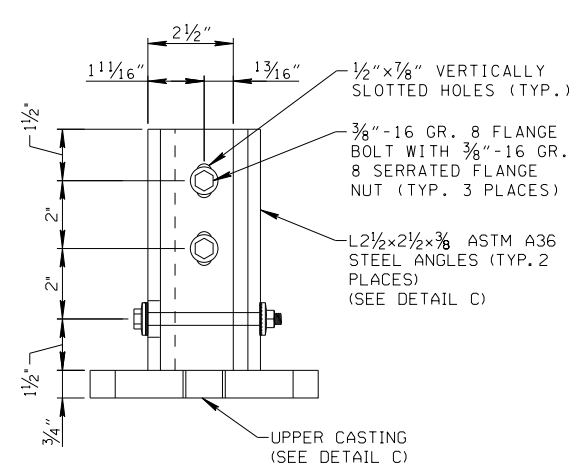
DETAIL B SLIP BASE LOWER HALF



DETAIL D SLIP BASE LOWER HALF



BOLT-DOWN ANCHOR INTO EXISTING CONCRETE



DETAIL F

GENERAL NOTES

- (A) MULTI DIRECTIONAL SLIP BASE BREAKAWAY SIGN SUPPORTS MAY BE USED ON ONLY HIGH SPEED HIGHWAYS AND ALL INTERSECTIONS LOCATED WITHIN THE CLEAR ZONE OF A ROADWAY AND NOT PROTECTED BY AN APPROVED BARRIER SYSTEM.
- (B) NO MORE THAN THREE MULTI-DIRECTIONAL SLIP BASES MAY BE INSTALLED WITHIN A SEVEN FOOT SPAN.
- (C) MULTI-DIRECTIONAL BREAKAWAY SYSTEMS (T-S-23A, T-S-23B, and T-S-23C) SHALL BE USED AT LOCATIONS WHERE THE POSSIBILITY EXISTS OF THE SIGN BEING HIT FROM ANY DIRECTION. ALL SQUARE TUBE SIGNS LOCATED IN ISLANDS, AT INTERSECTIONS, OR LOCATED ALONG THE OUTSIDE OF A HORIZONTAL CURVE SHALL BE EQUIPPED WITH A BREAKAWAY SYSTEM, REGARDLESS OF THE NUMBER OF POSTS OR SPACING.
- (D) ALL SIGN PANELS PLACED PARALLEL TO THE DIRECTION OF TRAFFIC FLOW (SUCH AS ONE-WAY SIGNS ON A DIVIDED HIGHWAY) SHALL BE MOUNTED ON A MULTI-DIRECTIONAL BREAKAWAY SYSTEM.
- (E) BASE POST STUB HEIGHT SHALL BE 4 INCHES OR LESS ABOVE FINISHED GROUND SURFACE.
- (F) ALL FINISHED COMPONENTS OF THE SLIP BASE SYSTEM SHALL BE PERMANENTLY MARKED TO INDICATE THE MANUFACTURER, METHOD, DESIGN, AND LOCATION OF MARKING SHALL BE AS APPROVED BY THE ENGINEER.
- (G) INTERMIXING OF U-CHANNEL POSTS WITH PERFORATED SQUARE TUBE POSTS AT ANY SIGN INSTALLATION LOCATION WILL NOT BE ALLOWED.
- (H) ONLY SYSTEMS LISTED ON THE TDOT OPL SHALL BE USED.
- (I) ALL STEEL SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH SPECIFICATION ASTM-A123.
- (J) CLASS "A" CONCRETE CONSTRUCTION AND MATERIALS SHALL MEET THE REQUIREMENTS OF THE "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION, SECTION 604."
- (K) ANCHORS MAY BE EXPANSION TYPE AS SHOWN OR ADHESIVE TYPE LISTED ON THE OPL MEETING THE STRENGTH REQUIREMENTS. EXPANSION ANCHORS SHALL CONSIST OF 5/8" INCH DIAMETER STUD BOLT WITH UNC-SERIES BOLT THREADS ON THE UPPER END WITH HEAVY HEX NUT PER ASTM A563, AND HARDENED WASHER PER ASTM F436. THE STUD BOLT SHALL HAVE A MINIMUM YIELD STRENGTH OF 50 KSI AND ULTIMATE TENSILE STRENGTH OF 75 KSI.
- (L) SEE T-S-19 FOR P-POST DETAILS.
- (M) TO BE PAID FOR UNDER ITEM NO. 713-11.21 P POST SLIP BASE PER EACH (INCLUDES COST OF SLIP BASE AND STUB).

MINOR REVISION -- FHWA APPROVAL NOT REQUIRED.

STATE OF TENNESSEE  
DEPARTMENT OF TRANSPORTATION

MULTI-DIRECTIONAL  
SLIP BASE BREAKAWAY  
P-POST  
SIGN SUPPORT

09-01-12 T-S-23A

NOT TO SCALE