

# ORIGINATION FORM

Proposed Revisions to a Design Standards Index  
(Please provide all information – Incomplete forms will be returned)

## Contact Information:

Date: July 5, 2017  
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## Design Standards:

Index Number: **11860**  
Sheet Number (s): 1, 3 and 5 of 9  
Index Title: Single Column Ground Sign

## Summary of the changes:

Sheet 1: Changed Notes 3 and 4.  
Sheet 3: Updated the COLUMN (POST) and FORNDATION TABLE. Sheet 4: Changed Note 3.D.  
Sheet 5: Deleted the CONCRETE/STUB DETAIL; Added DETIAL 'B' Optional Slotted Holes; Changed the Soil Plate Dimension in the ALUMINUM SOIL PLATE DETAIL; Changed the hole diameter to 8" and soil plate width to 7" for DRIVEN POST DETAIL; Added Plan View to the DRIVEN POST DETAIL.

## Commentary / Background:

This originated from a request from Ed Peterson (D5 Maintenance). Ed stated that the concrete stub option was typically not repairable because the stub usually becomes damaged. The request for the smaller hole and soil plate will reduce the cost of drilling for maintenance operations due to the equipment needs and availability.

## Other Affected Offices / Documents: (Provide name of responsible personnel)

- | Yes                      | No                                  |                             |
|--------------------------|-------------------------------------|-----------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Other Design Standards –    |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Plans Preparation Manual –  |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Basis of Estimates Manual – |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Standard Specifications –   |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Approved Product List –     |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Construction –              |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Maintenance –               |

## Origination Package Includes: (Email or hand deliver package to Derwood Sheppard)

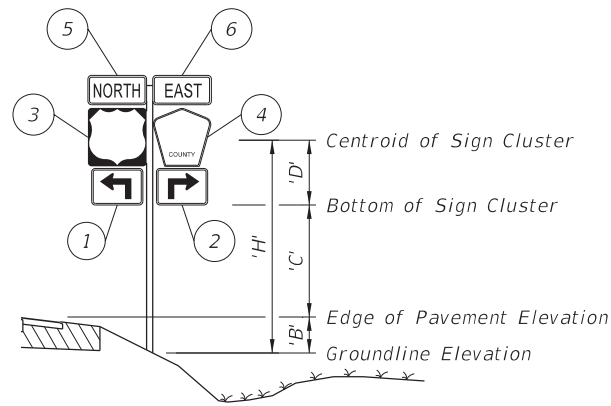
- | Yes                                 | N/A                                 |                         |
|-------------------------------------|-------------------------------------|-------------------------|
| <input checked="" type="checkbox"/> | <input type="checkbox"/>            | Redline Mark-ups        |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Proposed IDS            |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Revised IDS             |
| <input type="checkbox"/>            | <input checked="" type="checkbox"/> | Other Support Documents |

## Implementation:

- Design Bulletin (DSR)    DCE Memo    Program Mgmt. Bulletin    Design Standards e-Booklet (Next Release)

Contact the Roadway Design Office for assistance in completing this form

STEP 1: Calculate the area and the centroid for an individual sign or a sign cluster. Note that the centroid and areas have been calculated for frequently used signs. These are shown on Sheets 6, 7, 8 and 9.



Size H x V	Centroid			'A <sub>n</sub> ' (in. <sup>2</sup> )	'X <sub>n</sub> ' x 'A <sub>n</sub> ' (in. <sup>3</sup> )	'Y <sub>n</sub> ' x 'A <sub>n</sub> ' (in. <sup>3</sup> )
	Local 'Y <sub>n</sub> ' (in.)	Global 'X <sub>n</sub> ' (in.)	Global 'Y <sub>n</sub> ' (in.)			
(1) 21 x 15	7.5	-10.5-1.5-1.5 = -13.5	7.5	315	-4,252.5	2,362.5
(2) 21 x 15	7.5	10.5+1.5+1.5 = 13.5	7.5	315	+4,252.5	2,362.5
(3) 24 x 24	12	-12-1.5 = -13.5	15+1+12 = 28	576	-7,776	16,128
(4) 24 x 24	12	12+1.5 = 13.5	15+1+12 = 28	436	5,886	12,208
(5) 24 x 12	6	-12-1.5 = -13.5	15+1+24+1+6 = 47	288	-3,888	13,536
(6) 24 x 12	6	12+1.5 = 13.5	15+1+24+1+6 = 47	288	3,888	13,536
TOTALS				2,218	-1,890	60,133

$\Sigma ('A_n') = 2,218 \text{ in.}^2 = 15.4 \text{ ft.}^2$      
 $\Sigma ('X_n' \times 'A_n') = -1,890 \text{ in.}^3 = -1.09 \text{ ft.}^3$      
 $\Sigma ('Y_n' \times 'A_n') = 60,133 \text{ in.}^3 = 34.8 \text{ ft.}^3$   
 $'X'_c = \frac{\Sigma ('X_n' \times 'A_n')}{\Sigma 'A_n'} = -0.1 \text{ ft.}$      
 $'Y'_c = \frac{\Sigma ('Y_n' \times 'A_n')}{\Sigma 'A_n'} = 2.26 \text{ ft.}$

STEP 2: Determine the height 'H' from groundline to the centroid of the individual sign or sign cluster.

Assume: 'B' = 1 ft., 'C' = 7 ft.

Calculated:  $X'_c = -0.1 \text{ ft.}$ ,  $Y'_c = 'D' 2.26 \text{ ft.}$

Since  $X'_c = -0.1 < 6"$ , it is not a cantilever sign, only dark-bold lines in the table will be referenced to.

$'H' = 'B' + 'C' + 'D' = 10.26 \text{ ft.} \implies$  **USE 11 ft.**       $\Sigma ('A_n') = 15.4 \text{ ft.}^2 \implies$  **USE 16 ft.<sup>2</sup>**

STEP 3: Refer to the Aluminum Column (Post) Selection Tables and find the intersection point. See Sheet 3.

ALUMINUM COLUMN (POST) SELECTION TABLE

TOTAL PANEL AREA (SF)	'H' (FT)												
	8 ft	9 ft	10 ft	11 ft	12 ft	13 ft	14 ft	15 ft	16 ft	17 ft	18 ft	19 ft	20 ft
3 sf	2	2.5	2.5	2.5	3	3	3	3	3.5	3.5	3.5	3.5	3.5
4 sf	2.5	2.5	3	3	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5
5 sf	2.5	3	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4
6 sf	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4
7 sf	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4
8 sf	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4
9 sf	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4	4
10 sf	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4	4.5	4.5
11 sf	3.5	3.5	3.5	3.5	4	4	4	4	4	4	4	4.5	4.5
12 sf	3.5	3.5	3.5	4	4	4	4	4	4	4	4	4.5	4.5
13 sf	3.5	3.5	4	4	4	4	4	4	4	4	4.5	4.5	4.5
14 sf	3.5	3.5	4	4	4	4	4	4	4.5	4.5	4.5	5	5
15 sf	3.5	4	4	4	4	4	4	4	4.5	4.5	4.5	5	5
16 sf	3.5	4	4	4	4	4	4	4	4.5	4.5	5	5	6
17 sf	4	4	4	4	4	4	4	4.5	4.5	4.5	5	5	6
18 sf	4	4	4	4	4	4	4.5	4.5	4.5	5	5	5	6
19 sf	4	4	4	4	4	4	4.5	4.5	4.5	5	5	6	6
20 sf	4	4	4	4	4	4.5	4.5	4.5	5	5	5	6	6
21 sf	4	4	4	4	4	4.5	4.5	5	5	5	6	6	6
22 sf	4	4	4	4	4.5	4.5	4.5	5	5	6	6	6	6
23 sf	4	4	4	4	4.5	4.5	5	5	5	6	6	6	6
24 sf	4	4	4	4.5	4.5	4.5	5	5	6	6	6	6	6
25 sf	4	4	4.5	4.5	5	5	5	6	6	6	6	6	8
26 sf	4	4.5	4.5	4.5	5	5	5	6	6	6	6	8	8
27 sf	4	4.5	4.5	4.5	5	5	6	6	6	6	6	8	8
28 sf	4	4.5	4.5	5	5	5	6	6	6	6	6	8	8
29 sf	4.5	4.5	4.5	5	5	6	6	6	6	6	8	8	8
30 sf	4.5	4.5	5	5	5	6	6	6	6	6	8	8	8

For 'H' = 11 ft., Area = 16 ft.<sup>2</sup>

- Refer to the Aluminum Column (Post) Selection Table, as copied from Sheet 3 and shown here.

- To determine the required post size, find the intersection of the row labeled "16 SF" and the column labeled "11 FT". For the example the intersection value is "4" (4" OD).

- In the Column (Post) and Foundation Table, the value "4" concludes that the design requires a 4.0" diameter and 1/4" thick Aluminum Column (Post) and a 2.0' diameter and 3.5' deep Concrete Foundation and 3.0' Stub.

CHANGED NOTES

GENERAL NOTES:

1. Shop Drawings: This Index is considered fully detailed. Submit Shop Drawings for minor modifications not detailed in the Plans.

2. Aluminum Sign, Wind Beams and Column (Post) Materials:  
a. Aluminum Plates: ASTM B209, Alloy 6061-T6  
b. Aluminum Bars and Extruded Shapes: ASTM B221, Alloy 6061-T6  
c. Aluminum Structural Shapes: ASTM B308 Alloy 6061-T6  
d. Cast Aluminum: ASTM B26 Alloy A356-T6  
e. Aluminum Weld Material: ER 5556 or 5356

3. Sign Mounting Bolts (Screws), Nuts and Washers:  
a. Aluminum Button Head and Flat Head Bolts (Screws): ASTM F468 Alloy 2024-T4  
b. Aluminum Hex Nuts: ASTM F467 Alloy 6061-T6 or 6262-T9  
c. Aluminum Washers: ASTM B221, Alloy 7075-T6

4. Stainless Steel Bolts, Nuts and Washers may be used in lieu of the Aluminum button head bolts and flat head Screws as follows:  
a. Stainless Steel Bolts (Screws): ASTM F 593 Alloy Group 2, Condition A, CW1 or SH1  
b. Stainless Steel Nuts: ASTM F594

5. Sign Column (Post) Bolts, Nuts and Washers:  
a. Galvanized U-Bolt (Column): ASTM A449 or ASTM A193 B7 according to ASTM F2329 with nuts and washers  
b. Aluminum Bolts (Sleeve): ASTM F468, Alloy 6061-T6 or 2024-T4 with Hex Nuts F467 6061-T6 or 6262-T9 and Washers B221, Alclad 2024-T4  
c. Galvanized High Strength Hex Head Bolts (BaseBolts): ASTM F3125, Grade A325, Type 1  
d. Galvanized Hex Nuts: ASTM A563 Grade DH  
e. Galvanized Washers: ASTM F436  
f. Galvanized Bolts (Sleeve): ASTM A307 with Galvanized Hex Nuts and Washers

6. Coatings:  
a. Aluminum Fasteners: Anodic coating (0.0002 inches min.) and chromate sealed  
b. High Strength Steel Bolts Nuts and Washers: ASTM F2329  
c. All other steel items (excluding stainless steel): Hot-dip Galvanize - ASTM A123  
d. Repair damaged galvanizing in accordance with Specification Section 562

7. BREAKAWAY SUPPORTS REQUIREMENTS: Install non-frangible aluminum column (post) (larger than 3 1/2") with breakaway supports as shown on Sheet 5. Signs shielded by barrier wall or guardrail do not require breakaway support.

STEP 4: For sign assemblies with signs oriented in two directions, only the sign with the largest area should be analyzed to determine the Column (Post) requirements.

GUIDE TO USE THIS STANDARD

700-010 INDEX AND EXAMPLE

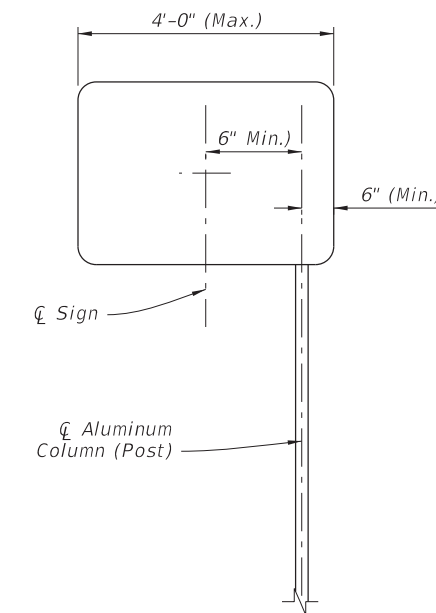
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LAST REVISION 11/01/16	REVISION 11/01/17	DESCRIP	FDOT FY 2017-18 DESIGN STANDARDS	SINGLE COLUMN GROUND SIGNS	INDEX NO. 11860	SHEET NO. 1 of 9
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		ALUMINUM COLUMN (POST) SELECTION TABLE (O.D. in.)												
		'H' (FT)												
		8 ft	9 ft	10 ft	11 ft	12 ft	13 ft	14 ft	15 ft	16 ft	17 ft	18 ft	19 ft	20 ft
TOTAL PANEL AREA (SF)	3 sf	2	2.5	2.5	2.5	3	3	3	3	3.5	3.5	3.5	3.5	3.5
	4 sf	2.5	2.5	3	3	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5
	5 sf	2.5	3	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4
	6 sf	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4
	7 sf	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4
	8 sf	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4
	9 sf	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4	4
	10 sf	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4	4.5	4.5
	11 sf	3.5	3.5	3.5	3.5	4	4	4	4	4	4	4.5	4.5	4.5
	12 sf	3.5	3.5	3.5	4	4	4	4	4	4	4	4.5	4.5	4.5
	13 sf	3.5	3.5	4	4	4	4	4	4	4	4	4.5	4.5	4.5
	14 sf	3.5	3.5	4	4	4	4	4	4	4	4.5	4.5	4.5	5
	15 sf	3.5	4	4	4	4	4	4	4	4.5	4.5	4.5	5	5
	16 sf	3.5	4	4	4	4	4	4	4	4.5	4.5	5	5	5
	17 sf	4	4	4	4	4	4	4	4.5	4.5	4.5	5	5	6
	18 sf	4	4	4	4	4	4	4.5	4.5	4.5	5	5	5	6
	19 sf	4	4	4	4	4	4	4.5	4.5	4.5	5	5	6	6
	20 sf	4	4	4	4	4	4.5	4.5	4.5	5	5	5	6	6
	21 sf	4	4	4	4	4	4.5	4.5	5	5	5	6	6	6
	22 sf	4	4	4	4	4.5	4.5	4.5	5	5	6	6	6	6
	23 sf	4	4	4	4	4.5	4.5	5	5	5	6	6	6	6
	24 sf	4	4	4	4.5	4.5	4.5	5	5	6	6	6	6	6
	25 sf	4	4	4	4.5	4.5	5	5	5	6	6	6	6	8
	26 sf	4	4.5	4.5	4.5	5	5	5	6	6	6	6	6	8
	27 sf	4	4.5	4.5	4.5	5	5	6	6	6	6	6	6	8
	28 sf	4	4.5	4.5	5	5	5	6	6	6	6	6	6	8
	29 sf	4.5	4.5	4.5	5	5	6	6	6	6	6	6	8	8
	30 sf	4.5	4.5	5	5	5	6	6	6	6	6	6	8	8

COLUMN (POST) AND FOUNDATION TABLE						
Column (Post) Size		Foundation Alternatives				
		Driven Post *		Concrete (Class I)		
Outside Diameter (in)	Wall Thk. (in)	Embedment Depth (ft)		Diameter (ft)	Embedment Depth (ft)	Stub Length (ft)
		without Soil Plate	with Soil Plate			
2.0	1/8	4.5	2.5	2.0	2.0	2.0
2.5	1/8	5.0	3.0	2.0	2.5	2.0
3.0	1/8	5.0	3.5	2.0	2.5	2.5
3.5	3/16	6.0	4.5	2.0	3.0	3.0
4.0	1/4	---	---	2.0	3.5	3.0
5.0	1/4	---	---	2.0	4.0	3.0
6.0	1/4	---	---	2.0	4.5	3.0
8.0	5/16	---	---	2.0	5.5	3.0

\* INSTALLING FRANGIBLE COLUMN SUPPORTS:  
Columns (posts) 3 1/2" O.D. and less are frangible. Frangible columns may be installed by driving the post or the posts may be set in preformed holes. Backfill preformed holes with suitable material tamped in layers not thicker than 6" (to provide adequate compaction) or filled with flowable fill or bagged concrete.



CANTILEVER SIGN

- NOTE:
1. For cantilever sign installations see Index 17302.
  2. For cantilever signs with widths greater than 4' see Index 11861.
  3. Use of driven post for cantilever sign in not permitted.

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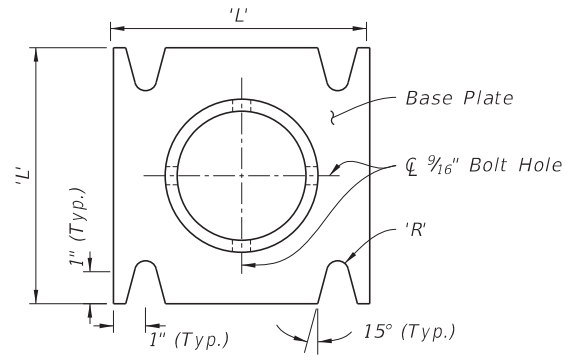
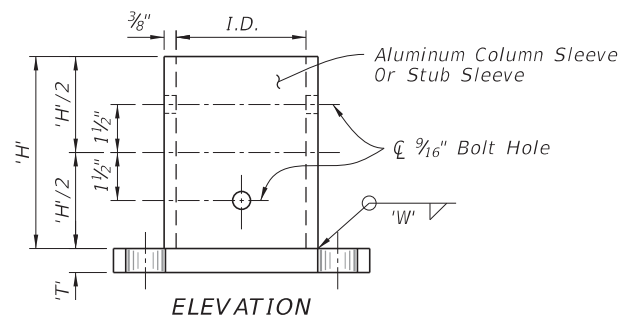
LAST REVISION	DESCR	11/01/17
11/01/16		

FDOT  
FY 2017-18  
DESIGN STANDARDS

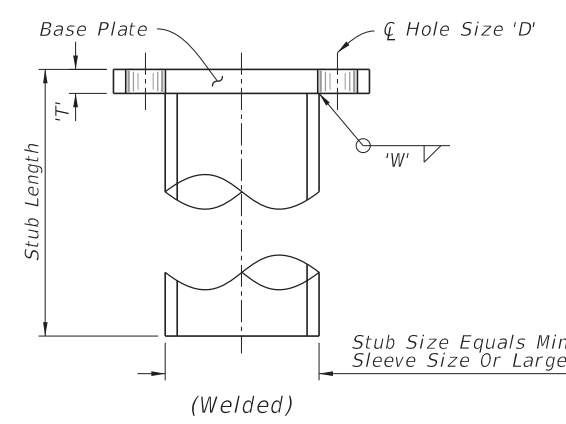
SINGLE COLUMN GROUND SIGNS

700-010  
COLUMN AND FOUNDATION TABLES

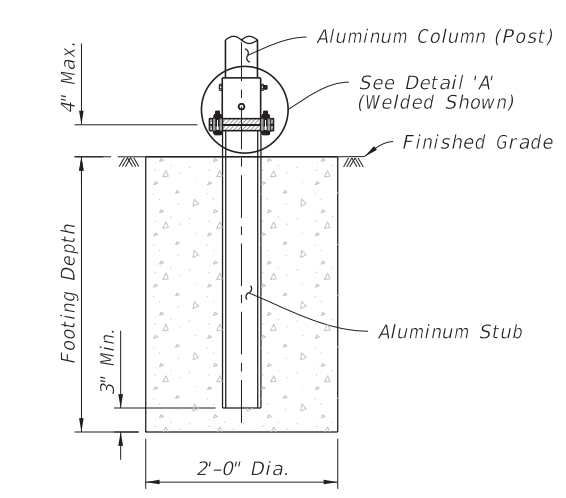
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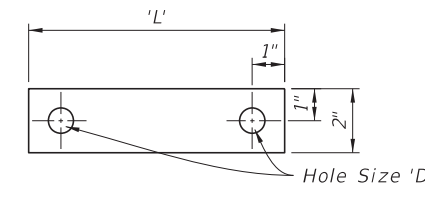
**STUB/SLEEVE & BASE PLATE DETAILS**  
(Welded Or Sandcast)



**STUB DETAIL**

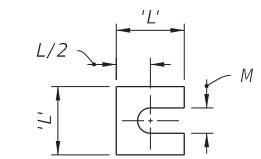


**SLIP BASE AND FOUNDATION DETAIL**  
(Non-Frangible Column, Typ.)



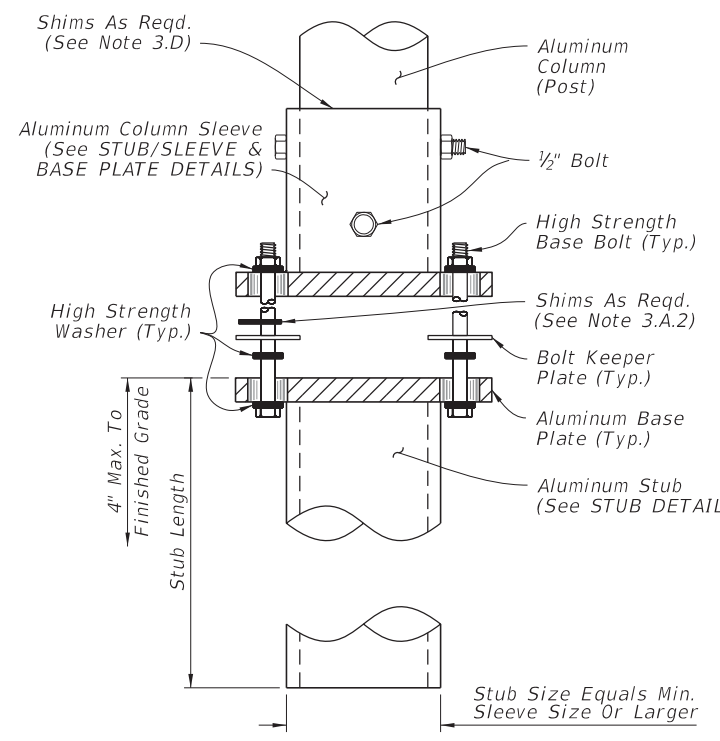
28 Ga. Thick Aluminum Strip  
2 Req'd. Per Base

**BOLT KEEPER PLATE DETAIL**

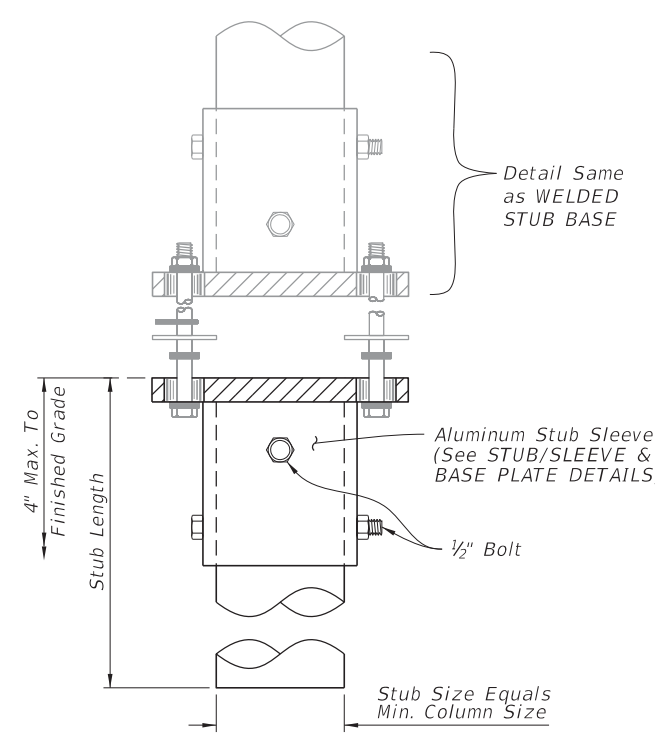


Provide 2-0.0149" Thick (28 gauge)  
and 2-0.0329" Thick (21 gauge)  
Brass Shims Per Post

**SHIM DETAIL**

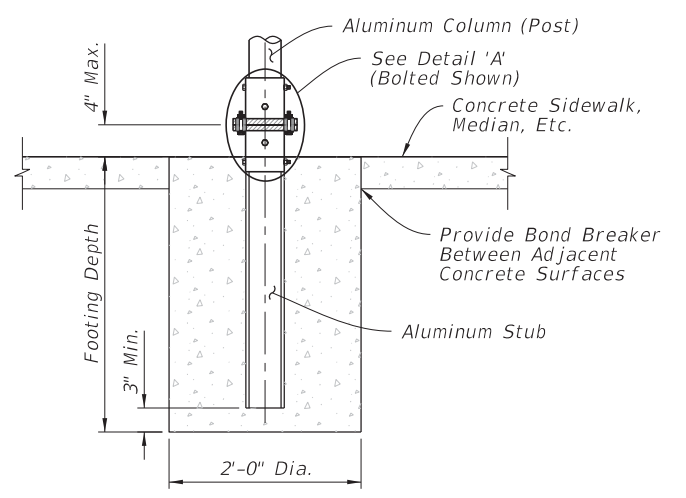


**WELDED STUB BASE**



**BOLTED STUB/SLEEVE BASE**

**DETAIL 'A'**



**SLIP BASE AND FOUNDATION DETAIL IN CONCRETE**  
(Non-Frangible Column In Crossovers, Medians & Sidewalks)

**NOTES:**

- Foundation Notes for Frangible Slip Base:**
  - Place Stub into concrete to diameter and depth shown in POST AND FOUNDATION TABLE using Class 1 Concrete.
- Slip Base Fabrication Notes:**
  - The difference between the O.D. of the post and I.D. of the Sleeve must be 1/16" or less.
  - Either a Welded Stub Base or Bolted Stub/Sleeve Base may be used to fabricate the Slip Base.
  - For cast base plates bolted to foundation stubs, use a foundation stub the same size as the sign column (Post).
- Slip-Base Assembly Instructions:**
  - Assemble Slip Base connections in the following manner:
    - Insert Post into Sleeve and connect using 2 ~ 1/2" diameter Sleeve Bolts.
    - Assemble top base plate to bottom Base Plate using Base Bolts (High strength) with 3 washers per bolt. (See Detail 'A'):
      - Place one washer on each Base Bolt between the bottom Base Plate and the Base Bolt head.
      - Place the next washer between the Bottom Base Plate and the Bolt Keeper Plate.
      - Use brass shims to plumb the post.
      - Add the top base plate section.
      - Place the third washer between the Top Base Plate and the Nut.
  - Orient the Bolt Keeper Plates in the Direction of Traffic.
  - Tighten Base Bolts as follows:
    - Tighten Base Bolts to the maximum possible with a 12" to 15" wrench (this will bed the washers and shims and clear the bolt threads).
    - Loosen each Base Bolt one turn.
    - Under the supervision of the Engineer, use a calibrated wrench to tighten bolts to the torque prescribed in the SLIP BASE DETAILS Table. Over tightened Base Bolts are not permitted.
    - Distort bolt threads at the junction with nuts to prevent loosening. Repair damaged galvanizing.
  - Obtain a tight sleeve connection by placing 4 galvanized steel shims between the column (post) and sleeve. Space the shims evenly around the perimeter of the column (1 between each bolt hole, 4 total). Use shims that are 1" shorter than the height of the sleeve.

**CHANGED NOTE**

Column (Post) Size		SLIP BASE DETAILS												
Outside Dia.	Wall Thickness	Sleeve I.D. (Max.)	Sleeve Height 'H'	Weld 'W'	Base Plate		Radius 'R'	Base Bolt		Base Plate Torque		Hole Size 'D'	SHIM	
					'L'	'T'		Size	Length	ft.-lbs	in.-lbs		L	M
4"	1/4"	4 1/16"	6"	5/8"	8"	3/4"	1 1/32"	5/8"	3"	29	345	1 1/16"	1 3/8"	1 1/16"
4 1/2"	1/4"	4 9/16"	6"	5/8"	8"	7/8"	1 1/32"	5/8"	3 1/4"	29	345	1 1/16"	1 3/8"	1 1/16"
5"	1/4"	5 1/16"	7"	5/8"	8"	7/8"	1 1/32"	5/8"	3 1/4"	29	345	1 1/16"	1 3/8"	1 1/16"
6"	1/4"	6 1/16"	8"	3/4"	9"	1"	1 3/32"	3/4"	3 1/2"	46	554	1 3/16"	1 3/4"	1 3/16"
8"	5/16"	8 1/16"	10"	3/4"	11"	1"	1 5/32"	7/8"	3 3/4"	53	640	1 5/16"	2 3/8"	1 1/16"

11/17/34 AM  
4/14/2017

11/01/17

LAST REVISION	DESCRIPTION:
11/01/16	

**FDOT** FY 2017-18  
DESIGN STANDARDS

SINGLE COLUMN GROUND SIGNS

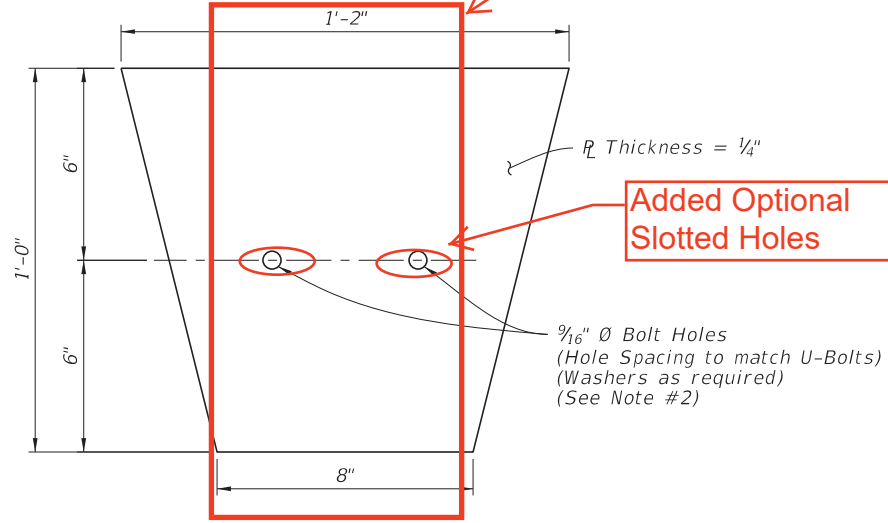
SLIP B700-010 FOUNDATION DETAILS

INDEX NO.	SHEET NO.
11860	4 of 9

**NOTES:**

**Deleted Notes**

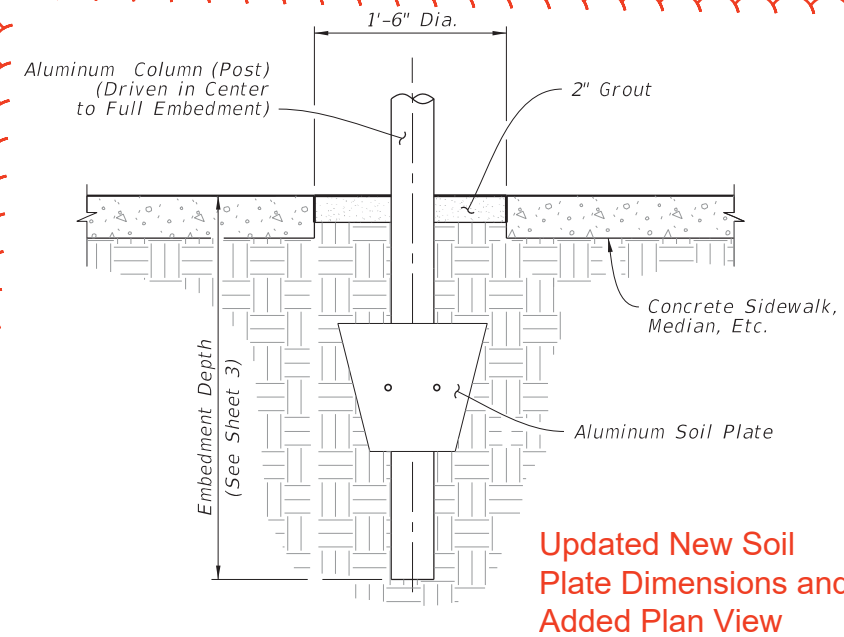
1. Align Soil Plate bottom at  $\frac{2}{3}$  of embedment depth.
2. Slot up to 1" long is allowed to accommodate various Column (Post) sizes.
3. Rectangular soil plate of size 1'-2" x 1'-0" may be used as an alternative.
4. Embedment Depth is 2'-6" for 2.0" and 2.5" Column (Post) Stubs and 3'-6" for 3.0" and 3.5" Column (Post) Stubs.
5. Concrete foundation may be Class Non Structural if poured monolithically with sidewalk or separator.



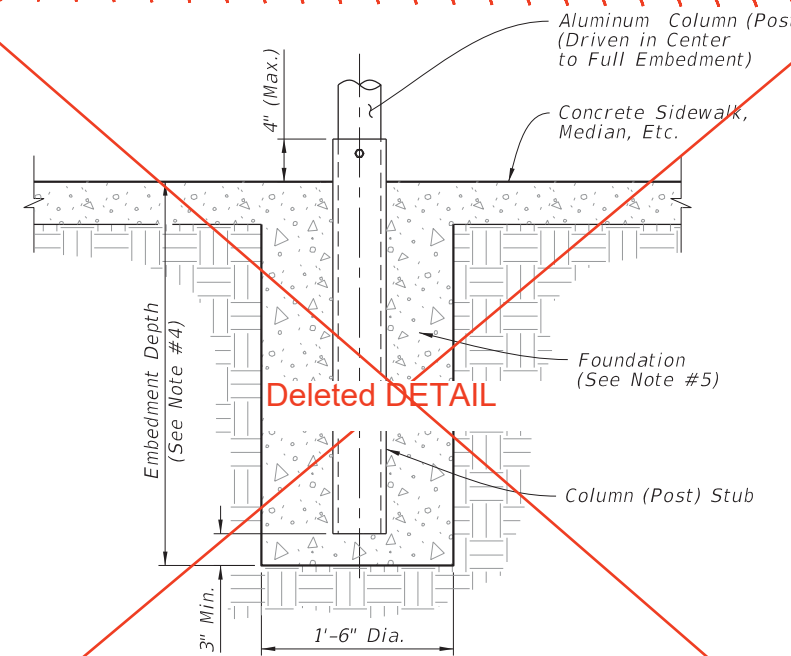
ALUMINUM SOIL PLATE DETAIL

Added DETAIL "B"  
(Optional Slotted Holes)

Changed Soil Plate  
Dimensions to 7" x 1'-6"



DRIVEN POST DETAIL  
(Frangible Post In Crossovers, Medians & Sidewalks)



CONCRETE/STUB DETAIL  
(Frangible Post In Crossovers, Medians & Sidewalks)

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DRIVE 700-010 AND SOIL PLATE DETAIL

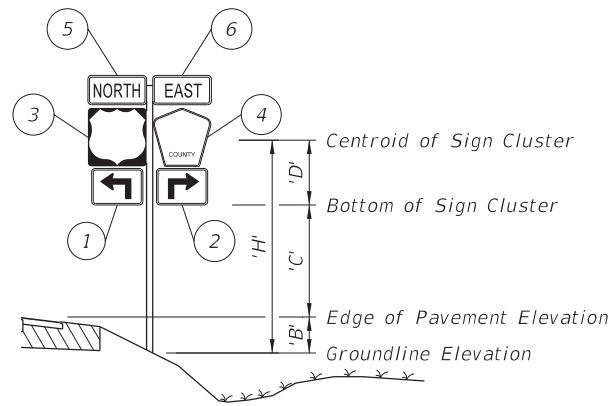
LAST REVISION	DESCRIPTION:
11/01/16	11/01/17

FDOT  
FY 2017-18  
DESIGN STANDARDS

SINGLE COLUMN GROUND SIGNS

INDEX NO.	SHEET NO.
11860	5 of 9

STEP 1: Calculate the area and the centroid for an individual sign or a sign cluster. Note that the centroid and areas have been calculated for frequently used signs. These are shown on Sheets 6, 7, 8 and 9.



Size H x V	Centroid			'A <sub>n</sub> ' (in. <sup>2</sup> )	'X <sub>n</sub> ' x 'A <sub>n</sub> ' (in. <sup>3</sup> )	'Y <sub>n</sub> ' x 'A <sub>n</sub> ' (in. <sup>3</sup> )
	Local 'Y <sub>n</sub> ' (in.)	Global 'X <sub>n</sub> ' (in.)	Global 'Y <sub>n</sub> ' (in.)			
(1) 21 x 15	7.5	-10.5-1.5-1.5 = -13.5	7.5	315	-4,252.5	2,362.5
(2) 21 x 15	7.5	10.5+1.5+1.5 = 13.5	7.5	315	+4,252.5	2,362.5
(3) 24 x 24	12	-12-1.5 = -13.5	15+1+12 = 28	576	-7,776	16,128
(4) 24 x 24	12	12+1.5 = 13.5	15+1+12 = 28	436	5,886	12,208
(5) 24 x 12	6	-12-1.5 = -13.5	15+1+24+1+6 = 47	288	-3,888	13,536
(6) 24 x 12	6	12+1.5 = 13.5	15+1+24+1+6 = 47	288	3,888	13,536
TOTALS				2,218	-1,890	60,133

$$\Sigma ('A_n') = 2,218 \text{ in.}^2 = 15.4 \text{ ft.}^2 \quad \Sigma ('X_n' \times 'A_n') = -1,890 \text{ in.}^3 = -1.09 \text{ ft.}^3 \quad \Sigma ('Y_n' \times 'A_n') = 60,133 \text{ in.}^3 = 34.8 \text{ ft.}^3$$

$$'X_c' = \frac{\Sigma ('X_n' \times 'A_n')}{\Sigma 'A_n'} = -0.1 \text{ ft.} \quad 'Y_c' = \frac{\Sigma ('Y_n' \times 'A_n')}{\Sigma 'A_n'} = 2.26 \text{ ft.}$$

STEP 2: Determine the height 'H' from groundline to the centroid of the individual sign or sign cluster.

Assume: 'B' = 1 ft., 'C' = 7 ft.

Calculated: X<sub>c</sub> = -0.1 ft., Y<sub>c</sub> = 'D' 2.26 ft.

Since X<sub>c</sub> = -0.1 < 6", it is not a cantilever sign, only dark-bold lines in the table will be referenced to.

'H' = 'B' + 'C' + 'D' = 10.26 ft. ==> **USE 11 ft.**     $\Sigma ('A_n') = 15.4 \text{ ft.}^2$  ==> **USE 16 ft.<sup>2</sup>**

STEP 3: Refer to the Aluminum Column (Post) Selection Tables and find the intersection point. See Sheet 3.

TOTAL PANEL AREA (SF)	'H' (FT)												
	8 ft	9 ft	10 ft	11 ft	12 ft	13 ft	14 ft	15 ft	16 ft	17 ft	18 ft	19 ft	20 ft
3 sf	2	2.5	2.5	2.5	3	3	3	3	3.5	3.5	3.5	3.5	3.5
4 sf	2.5	2.5	3	3	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5
5 sf	2.5	3	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4
6 sf	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4
7 sf	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4
8 sf	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4
9 sf	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4	4
10 sf	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4	4.5	4.5
11 sf	3.5	3.5	3.5	3.5	4	4	4	4	4	4	4	4.5	4.5
12 sf	3.5	3.5	3.5	4	4	4	4	4	4	4	4	4.5	4.5
13 sf	3.5	3.5	4	4	4	4	4	4	4	4	4.5	4.5	5
14 sf	3.5	3.5	4	4	4	4	4	4	4.5	4.5	4.5	5	5
15 sf	3.5	4	4	4	4	4	4	4.5	4.5	4.5	5	5	5
16 sf	3.5	4	4	4	4	4	4	4.5	4.5	5	5	5	6
17 sf	4	4	4	4	4	4	4.5	4.5	4.5	5	5	6	6
18 sf	4	4	4	4	4	4.5	4.5	4.5	5	5	5	6	6
19 sf	4	4	4	4	4	4.5	4.5	4.5	5	5	6	6	6
20 sf	4	4	4	4	4.5	4.5	4.5	5	5	5	6	6	6
21 sf	4	4	4	4	4.5	4.5	5	5	5	5	6	6	6
22 sf	4	4	4	4.5	4.5	4.5	5	5	6	6	6	6	6
23 sf	4	4	4	4.5	4.5	5	5	5	6	6	6	6	6
24 sf	4	4	4	4.5	4.5	4.5	5	5	6	6	6	6	6
25 sf	4	4	4.5	4.5	5	5	5	6	6	6	6	6	8
26 sf	4	4.5	4.5	4.5	5	5	5	6	6	6	6	8	8
27 sf	4	4.5	4.5	4.5	5	5	6	6	6	6	6	8	8
28 sf	4	4.5	4.5	5	5	5	6	6	6	6	6	8	8
29 sf	4.5	4.5	4.5	5	5	6	6	6	6	6	8	8	8
30 sf	4.5	4.5	5	5	5	6	6	6	6	6	8	8	8

For 'H' = 11 ft., Area = 16 ft.<sup>2</sup>

- Refer to the Aluminum Column (Post) Selection Table, as copied from Sheet 3 and shown here.

- To determine the required post size, find the intersection of the row labeled "16 SF" and the column labeled "11 FT". For the example the intersection value is "4" (4" OD).

- In the Column (Post) and Foundation Table, the value "4" concludes that the design requires a 4.0" diameter and 1/4" thick Aluminum Column (Post) and a 2.0' diameter and 3.5' deep Concrete Foundation and 3.0' Stub.

STEP 4: For sign assemblies with signs oriented in two directions, only the sign with the largest area should be analyzed to determine the Column (Post) requirements.

GUIDE TO USE THIS INDEX

SHEET NO.	CONTENTS
1	General Notes and Example
2	Centroid and Height
3	Column and Foundation Tables
4	Slip Base and Foundation Details
5	Driven Post and Soil Plate Details
6	Connection and Wind Beam
7, 8 & 9	Frequently Used Sign Clusters

GENERAL NOTES:

- Shop Drawings: This Index is considered fully detailed. Submit Shop Drawings for minor modifications not detailed in the Plans.
- Aluminum Sign, Wind Beams and Column (Post) Materials:
  - Aluminum Plates: ASTM B209, Alloy 6061-T6
  - Aluminum Bars and Extruded Shapes: ASTM B221, Alloy 6061-T6
  - Aluminum Structural Shapes: ASTM B308 Alloy 6061-T6
  - Cast Aluminum: ASTM B26 Alloy A356-T6
  - Aluminum Weld Material: ER 5556 or 5356
- Sign Mounting Bolts, Nuts and Washers:
  - Aluminum Button Head and Flat Head Bolts: ASTM F468 Alloy 2024-T4
  - Aluminum Hex Nuts: ASTM F467 Alloy 6061-T6 or 6262-T9
  - Aluminum Washers: ASTM B221, Alloy 7075-T6
- Stainless Steel Bolts, Nuts and Washers may be used in lieu of the Aluminum button head and flat head bolts as follows:
  - Stainless Steel Bolts: ASTM F 593 Alloy Group 2, Condition A, CW1 or SH1
  - Stainless Steel Nuts: ASTM F594
- Sign Column (Post) Bolts, Nuts and Washers:
  - Galvanized U-Bolt (Column): ASTM A449 or ASTM A193 B7 according to ASTM F2329 with nuts and washers
  - Aluminum Bolts (Sleeve): ASTM F468, Alloy 6061-T6 or 2024-T4 with Hex Nuts F467 6061-T6 or 6262-T9 and Washers B221, Alclad 2024-T4
  - Galvanized High Strength Hex Head Bolts (BaseBolts): ASTM F3125, Grade A325, Type 1
  - Galvanized Hex Nuts: ASTM A563 Grade DH
  - Galvanized Washers: ASTM F436
  - Galvanized Bolts (Sleeve): ASTM A307 with Galvanized Hex Nuts and Washers
- Coatings:
  - Aluminum Fasteners: Anodic coating (0.0002 inches min.) and chromate sealed
  - High Strength Steel Bolts Nuts and Washers: ASTM F2329
  - All other steel items (excluding stainless steel): Hot-dip Galvanize - ASTM A123
  - Repair damaged galvanizing in accordance with Specification Section 562
- BREAKAWAY SUPPORTS REQUIREMENTS: Install non-frangible aluminum column (post) (larger than 3 1/2") with breakaway supports as shown on Sheet 5. Signs shielded by barrier wall or guardrail do not require breakaway support.

NOTES AND EXAMPLE

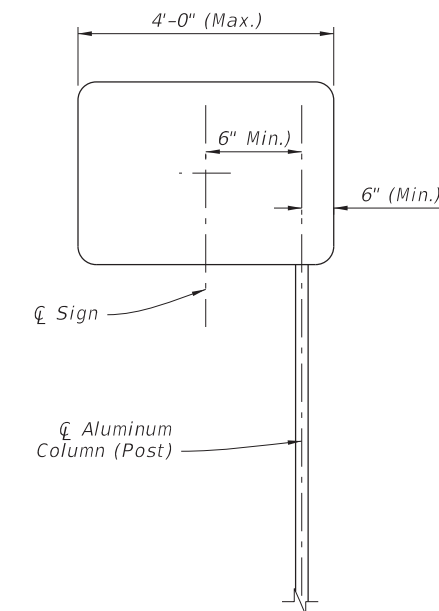
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LAST REVISION 11/01/17	DESCRIPTION:	FDOT	FY 2018-19 STANDARD PLANS	SINGLE COLUMN GROUND SIGNS	INDEX 700-010	SHEET 1 of 9
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		ALUMINUM COLUMN (POST) SELECTION TABLE (O.D. in.)												
		'H' (FT)												
		8 ft	9 ft	10 ft	11 ft	12 ft	13 ft	14 ft	15 ft	16 ft	17 ft	18 ft	19 ft	20 ft
TOTAL PANEL AREA (SF)	3 sf	2	2.5	2.5	2.5	3	3	3	3	3.5	3.5	3.5	3.5	3.5
	4 sf	2.5	2.5	3	3	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5
	5 sf	2.5	3	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4
	6 sf	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4
	7 sf	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4
	8 sf	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4
	9 sf	3.5	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4	4
	10 sf	3.5	3.5	3.5	3.5	3.5	4	4	4	4	4	4	4.5	4.5
	11 sf	3.5	3.5	3.5	3.5	4	4	4	4	4	4	4.5	4.5	4.5
	12 sf	3.5	3.5	3.5	4	4	4	4	4	4	4	4.5	4.5	4.5
	13 sf	3.5	3.5	4	4	4	4	4	4	4	4	4.5	4.5	4.5
	14 sf	3.5	3.5	4	4	4	4	4	4	4	4.5	4.5	4.5	5
	15 sf	3.5	4	4	4	4	4	4	4	4.5	4.5	4.5	5	5
	16 sf	3.5	4	4	4	4	4	4	4	4.5	4.5	5	5	5
	17 sf	4	4	4	4	4	4	4	4.5	4.5	4.5	5	5	6
	18 sf	4	4	4	4	4	4	4.5	4.5	4.5	5	5	5	6
	19 sf	4	4	4	4	4	4	4.5	4.5	4.5	5	5	6	6
	20 sf	4	4	4	4	4	4.5	4.5	4.5	5	5	5	6	6
	21 sf	4	4	4	4	4.5	4.5	5	5	5	5	6	6	6
	22 sf	4	4	4	4.5	4.5	4.5	5	5	5	6	6	6	6
	23 sf	4	4	4	4.5	4.5	4.5	5	5	5	6	6	6	6
	24 sf	4	4	4.5	4.5	4.5	5	5	5	6	6	6	6	6
	25 sf	4	4	4.5	4.5	5	5	5	5	6	6	6	6	8
	26 sf	4	4.5	4.5	4.5	5	5	5	5	6	6	6	6	8
	27 sf	4	4.5	4.5	4.5	5	5	5	6	6	6	6	6	8
	28 sf	4	4.5	4.5	5	5	5	5	6	6	6	6	6	8
	29 sf	4.5	4.5	4.5	5	5	5	6	6	6	6	6	8	8
	30 sf	4.5	4.5	5	5	5	5	6	6	6	6	6	8	8

COLUMN (POST) AND FOUNDATION TABLE						
Column (Post) Size		Foundation Alternatives				
		Driven Post *		Concrete (Class I)		
Outside Diameter (in)	Wall Thk. (in)	Embedment Depth (ft)		Diameter (ft)	Embedment Depth (ft)	Stub Length (ft)
		without Soil Plate	with Soil Plate			
2.0	1/8	4.5	2.5	---	---	---
2.5	1/8	5.0	3.0	---	---	---
3.0	1/8	5.0	3.5	---	---	---
3.5	3/16	6.0	4.5	---	---	---
4.0	1/4	---	---	2.0	3.5	3.0
4.5	1/4	---	---	2.0	4.0	3.0
5.0	1/4	---	---	2.0	4.5	3.0
6.0	1/4	---	---	2.0	5.0	3.0
8.0	5/16	---	---	2.0	5.5	3.0

**\* INSTALLING FRANGIBLE COLUMN SUPPORTS:**  
Columns (posts) 3 1/2" O.D. and less are frangible. Frangible columns may be installed by driving the post or the posts may be set in preformed holes. Backfill preformed holes with suitable material tamped in layers not thicker than 6" (to provide adequate compaction) or filled with flowable fill or bagged concrete.

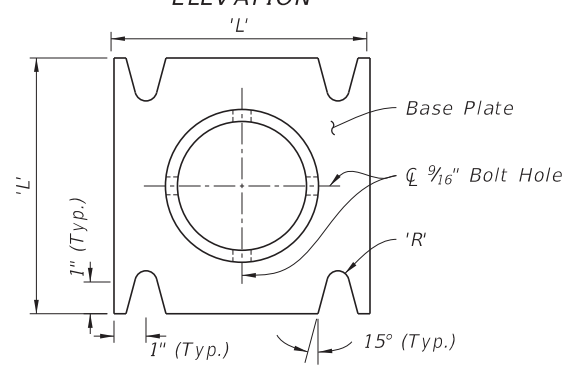
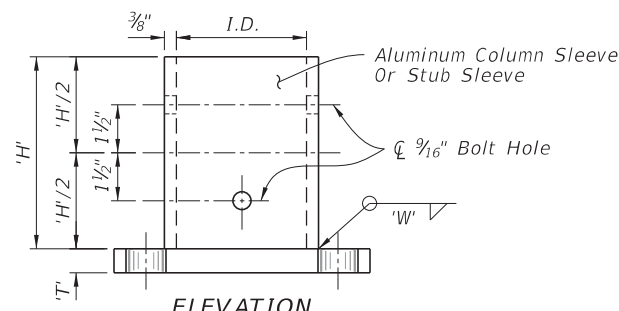


**CANTILEVER SIGN**

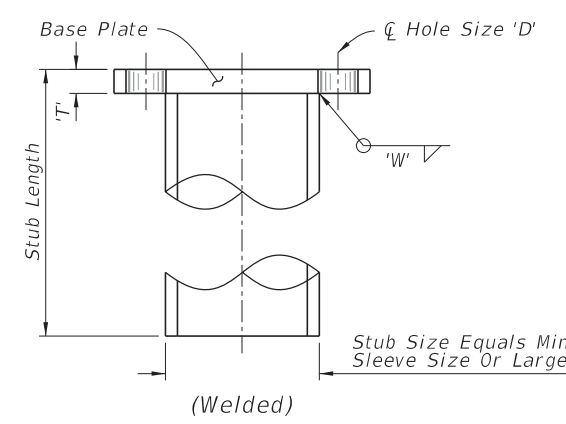
- NOTE:**
1. For cantilever sign installations see Index 700-101.
  2. For cantilever signs with widths greater than 4' see Index 700-011.
  3. Use of driven post for cantilever sign in not permitted.

**COLUMN AND FOUNDATION TABLES**

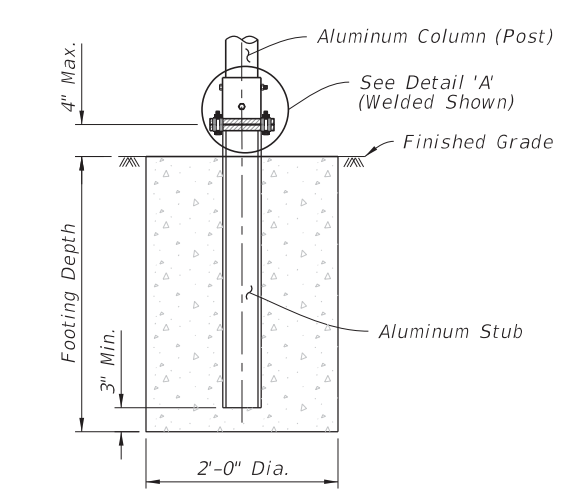
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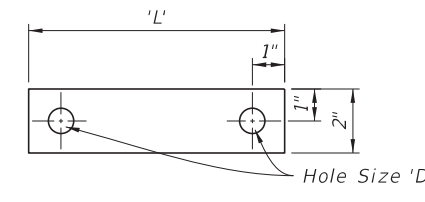
**STUB/SLEEVE & BASE PLATE DETAILS**  
(Welded Or Sandcast)



**STUB DETAIL**

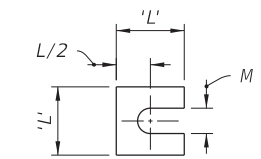


**SLIP BASE AND FOUNDATION DETAIL**  
(Non-Frangible Column, Typ.)



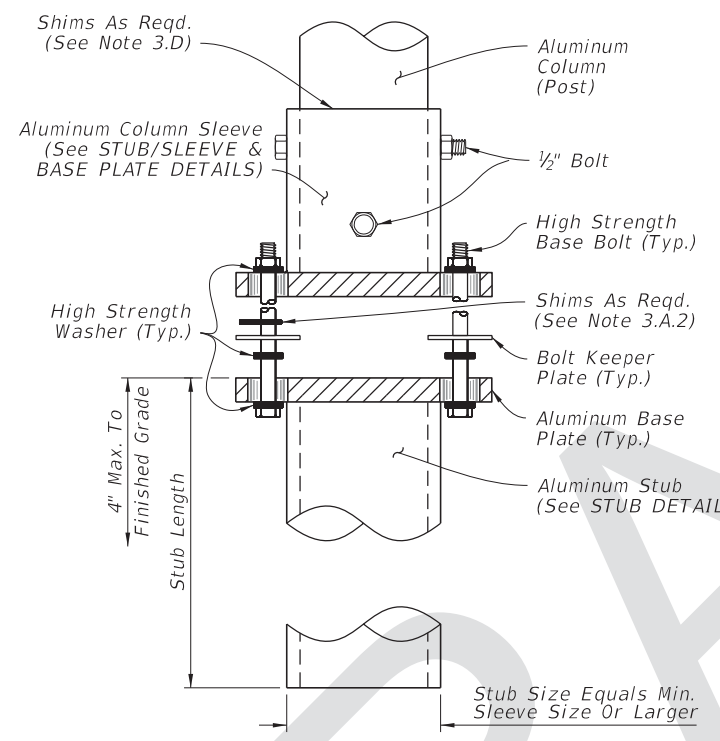
28 Ga. Thick Aluminum Strip  
2 Reqd. Per Base

**BOLT KEEPER PLATE DETAIL**

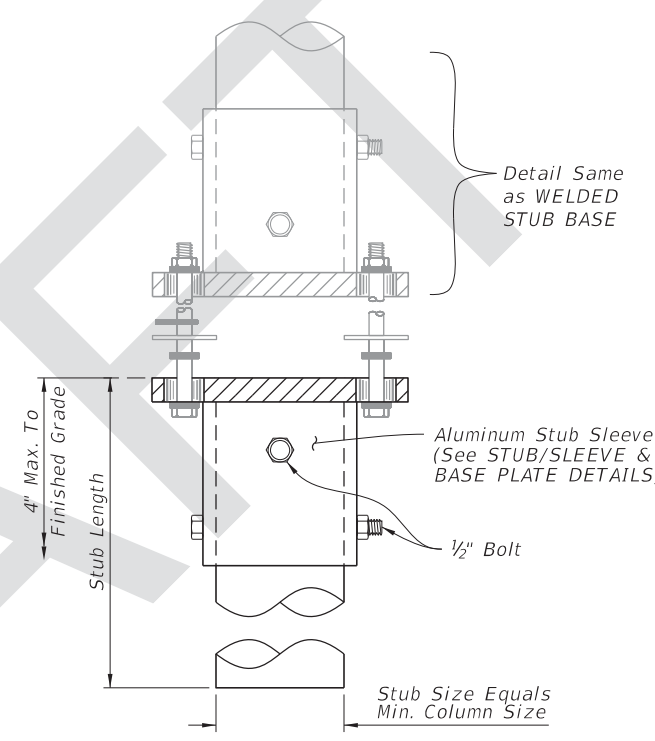


Provide 2-0.0149" Thick (28 gauge)  
and 2-0.0329" Thick (21 gauge)  
Brass Shims Per Post

**SHIM DETAIL**

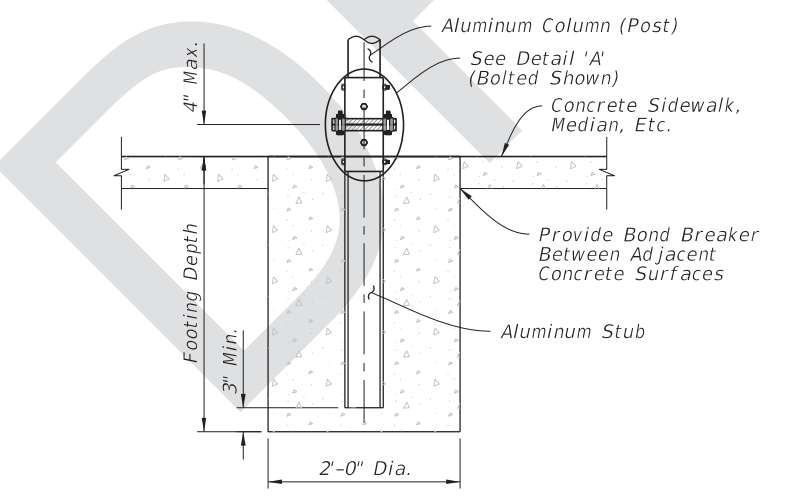


**WELDED STUB BASE**



**BOLTED STUB/SLEEVE BASE**

**DETAIL 'A'**



**SLIP BASE AND FOUNDATION DETAIL IN CONCRETE**  
(Non-Frangible Column In Crossovers, Medians & Sidewalks)

**NOTES:**

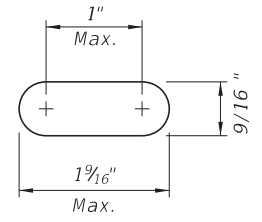
- Foundation Notes for Frangible Slip Base:**
  - Place Stub into concrete to diameter and depth shown in POST AND FOUNDATION TABLE using Class 1 Concrete.
- Slip Base Fabrication Notes:**
  - The difference between the O.D. of the post and I.D. of the Sleeve must be 1/16" or less.
  - Either a Welded Stub Base or Bolted Stub/Sleeve Base may be used to fabricate the Slip Base.
  - For cast base plates bolted to foundation stubs, use a foundation stub the same size as the sign column (Post).
- Slip-Base Assembly Instructions:**
  - Assemble Slip Base connections in the following manner:
    - Insert Post into Sleeve and connect using 2 ~ 1/2" diameter Sleeve Bolts.
    - Assemble top base plate to bottom Base Plate using Base Bolts (High strength) with 3 washers per bolt. (See Detail 'A'):
      - Place one washer on each Base Bolt between the bottom Base Plate and the Base Bolt head.
      - Place the next washer between the Bottom Base Plate and the Bolt Keeper Plate.
      - Use brass shims to plumb the post.
      - Add the top base plate section.
      - Place the third washer between the Top Base Plate and the Nut.
  - Orient the Bolt Keeper Plates in the Direction of Traffic.
  - Tighten Base Bolts as follows:
    - Tighten Base Bolts to the maximum possible with a 12" to 15" wrench (this will bed the washers and shims and clear the bolt threads).
    - Loosen each Base Bolt one turn.
    - Under the supervision of the Engineer, use a calibrated wrench to tighten bolts to the torque prescribed in the SLIP BASE DETAILS Table. Over tightened Base Bolts are not permitted.
    - Distort bolt threads at the junction with nuts to prevent loosening. Repair damaged galvanizing.
  - Obtain a tight sleeve connection by placing 4 galvanized steel shims between the column (post) and sleeve. Space the shims evenly around the perimeter of the column (1 between each bolt hole, 4 total). Use shims that are 1" shorter than the height of the sleeve.

Column (Post) Size		SLIP BASE DETAILS												
Outside Dia.	Wall Thickness	Sleeve I.D. (Max.)	Sleeve Height 'H'	Weld 'W'	Base Plate		Radius 'R'	Base Bolt Size	Base Bolt Length	Base Plate Torque ft-lbs	Base Plate Torque in.-lbs	Hole Size 'D'	SHIM	
					'L'	'T'							L	M
4"	1/4"	4 1/16"	6"	5/8"	8"	3/4"	1 1/32"	5/8"	3"	29	345	1 1/16"	1 3/8"	1 1/16"
4 1/2"	1/4"	4 9/16"	6"	5/8"	8"	7/8"	1 1/32"	5/8"	3 1/4"	29	345	1 1/16"	1 3/8"	1 1/16"
5"	1/4"	5 1/16"	7"	5/8"	8"	7/8"	1 1/32"	5/8"	3 1/4"	29	345	1 1/16"	1 3/8"	1 1/16"
6"	1/4"	6 1/16"	8"	3/4"	9"	1"	1 3/32"	3/4"	3 1/2"	46	554	1 3/16"	1 3/4"	1 3/16"
8"	5/16"	8 1/16"	10"	3/4"	11"	1"	1 5/32"	7/8"	3 3/4"	53	640	1 5/16"	2 3/8"	1 1/16"

**SLIP BASE AND FOUNDATION DETAILS**

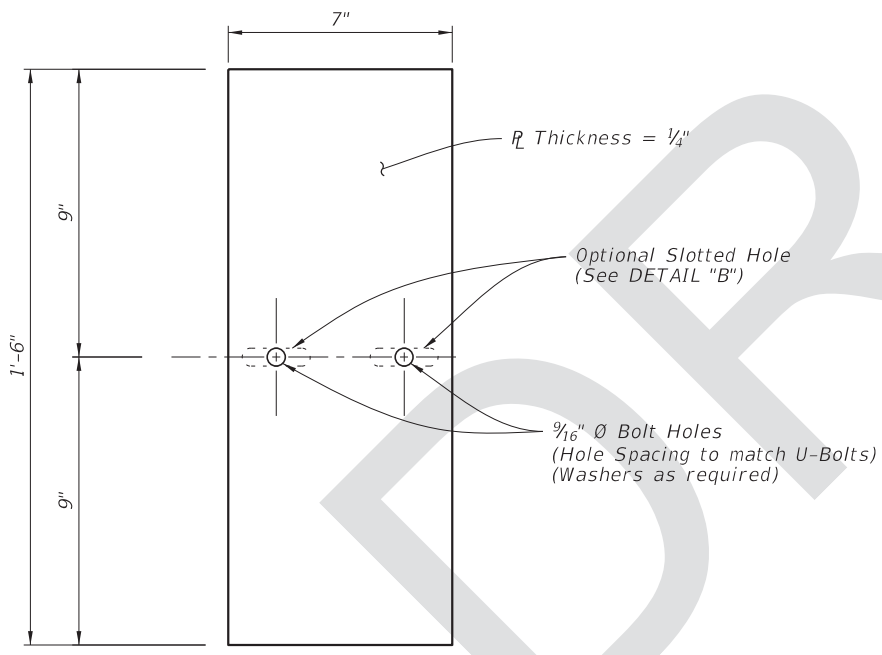
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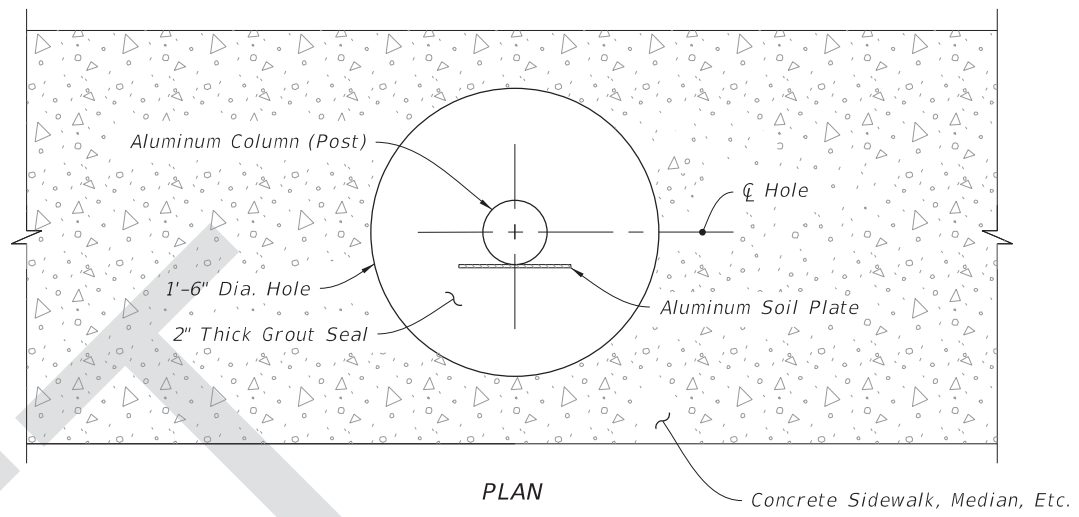


Optional Slotted Holes

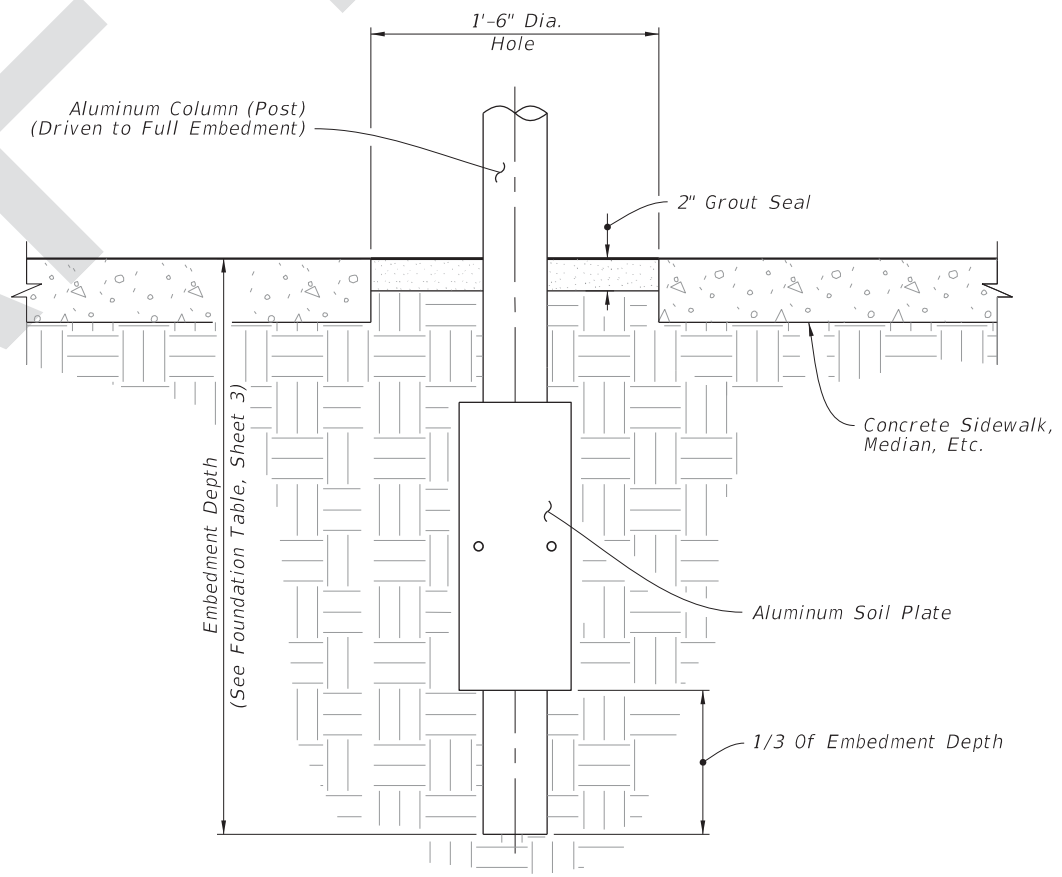
DETAIL "B"



ALUMINUM SOIL PLATE DETAIL



PLAN



ELEVATION

DRIVEN POST DETAIL

(Frangible Post In Crossovers, Medians & Sidewalks)

DRIVEN POST AND SOIL PLATE DETAIL

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LAST REVISION 11/01/17	REVISION	DESCRIPTION:		FY 2018-19 STANDARD PLANS	SINGLE COLUMN GROUND SIGNS	INDEX 700-010	SHEET 5 of 9
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