

Table 1.

CANTILEVER LENGTH IN FEET "C" (MAX. 18'-0")			
COLUMN	NO HANGER	HANGER	DIAPHRAGM*
W6 X 7.85	C < 5	C ≥ 5	C ≥ 12
W5 X 5.37	C < 7	C ≥ 7	C ≥ 12

\*SEE DIAPHRAGM DETAIL SHEET #2

**COLUMN HANGER AND SELECTION PROCEDURE:**

**A. COLUMN**

- Determine "B" using the longest required column. (B = 0")
- $L_b = 1/2$  of the distance between the top of the sign and the top clip angle bolt.  
 $L = 1/2 [(H + B) - 2.0]$
- Determine the sign area. (sq. ft.)
- Use Table 2 on sheet 3, determine the size and number of columns required.

**B. HANGER**

- Calculate cantilever "C". (Refer to Sign-840 series)
- Use inset Table 1 to determine if hangers are required.

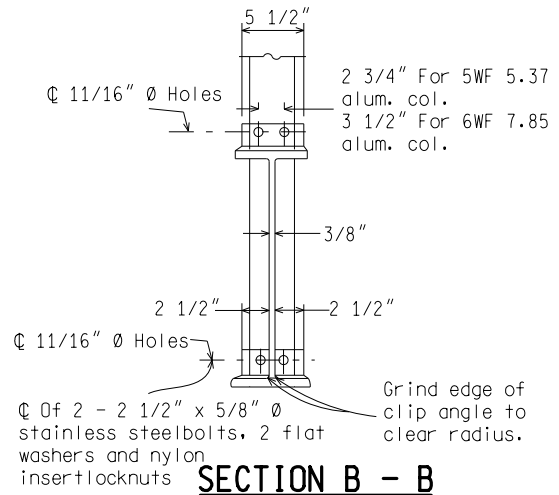
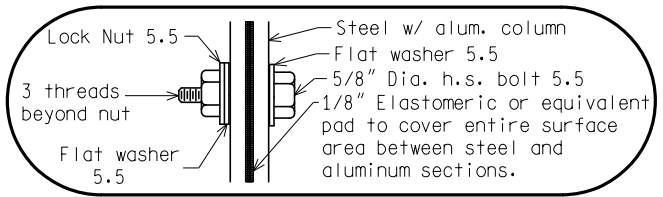
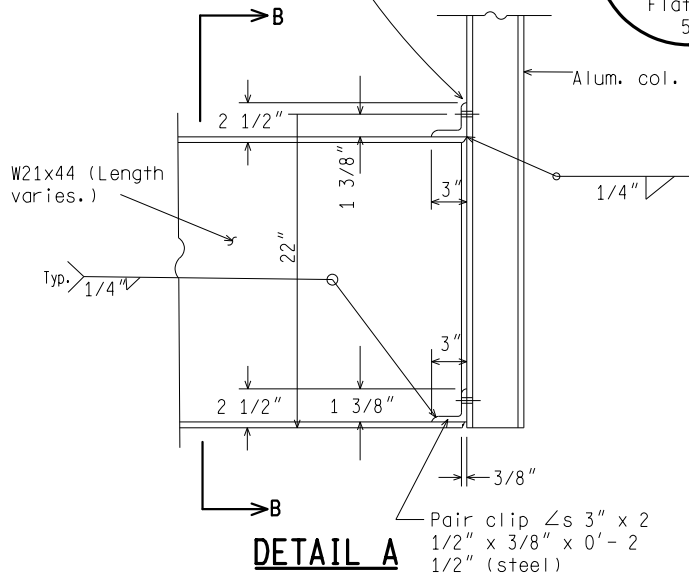
**NOTES:**

- Type "E" connection denotes a two-bracket sign connection.
- Type "F" connection denotes a three - bracket sign connection.

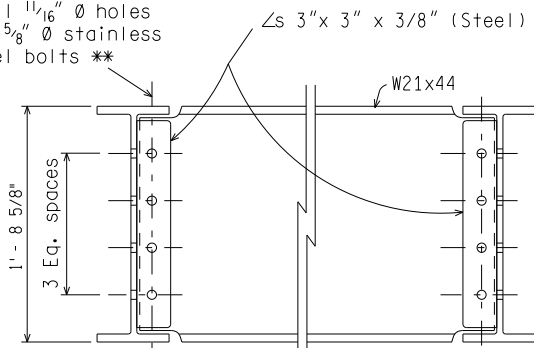
**TO BE USED FOR MAINTENANCE PURPOSES FOR EXISTING BRIDGE CONNECTIONS ONLY.**

<p>PREPARED BY DESIGN DIVISION</p> <p>DRAWN BY: <u>DHD</u></p> <p>CHECKED BY: <u>AJU</u></p>	<p>DEPARTMENT DIRECTOR Kirk T. Steudle</p> <p>APPROVED BY: _____ DIRECTOR, BUREAU OF FIELD SERVICES</p>	<p>MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR</p> <p><b>BOLTED BRIDGE CONNECTION OLD TYPE E &amp; F (<math>\theta \geq 10^\circ</math>)</b></p>		
	<p>APPROVED BY: _____ (SPECIAL DETAIL) DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT</p>	<p>(SPECIAL DETAIL) F.H.W.A. APPROVAL</p>	<p>04/16/13 PLAN DATE</p>	<p>SIGN-831-A</p>

3" x 2 1/2" x 3/8" x 0'-5 1/2" Angle (steel) place 1/8" elastomeric (or equivalent) pad to cover entire surface area between steel & aluminum sections. (Typ.)

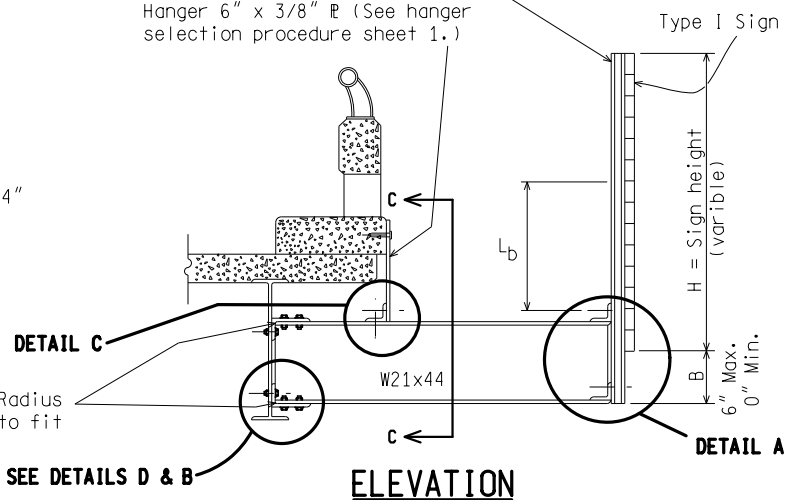
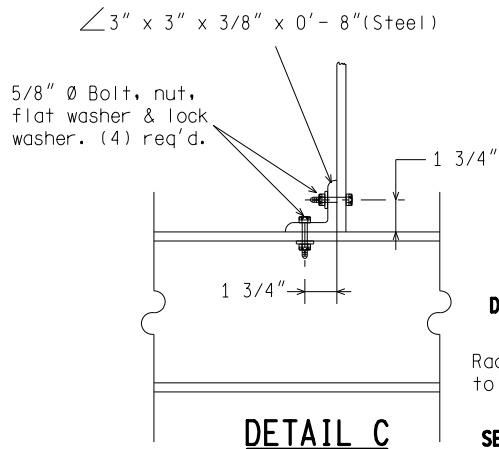


Drill 11/16"  $\emptyset$  holes for 5/8"  $\emptyset$  stainless steel bolts \*\*



Alum. col. (See column selection procedure sheet 1.)

Hanger 6" x 3/8"  $\square$  (See hanger selection procedure sheet 1.)



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NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION  
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN

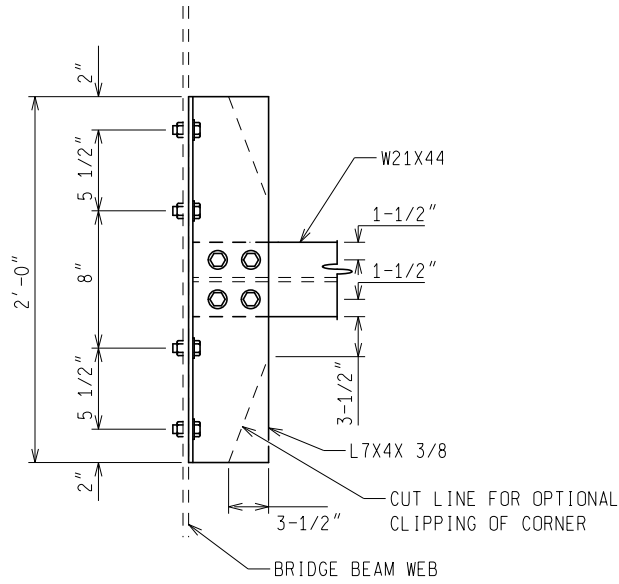
(SPECIAL DETAIL)  
F.H.W.A. APPROVAL

04/16/13  
PLAN DATE

SIGN-831-A

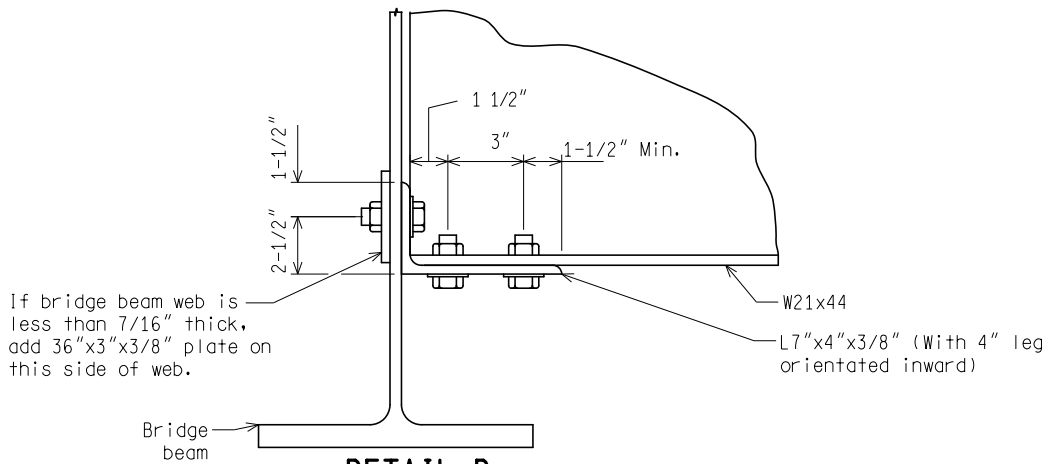
SHEET  
2 OF 4

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



**DETAIL B**

If beam web is less than 7/16" thick add 3/8" x 3" x 2'-0" steel R on inside face.



**DETAIL D**

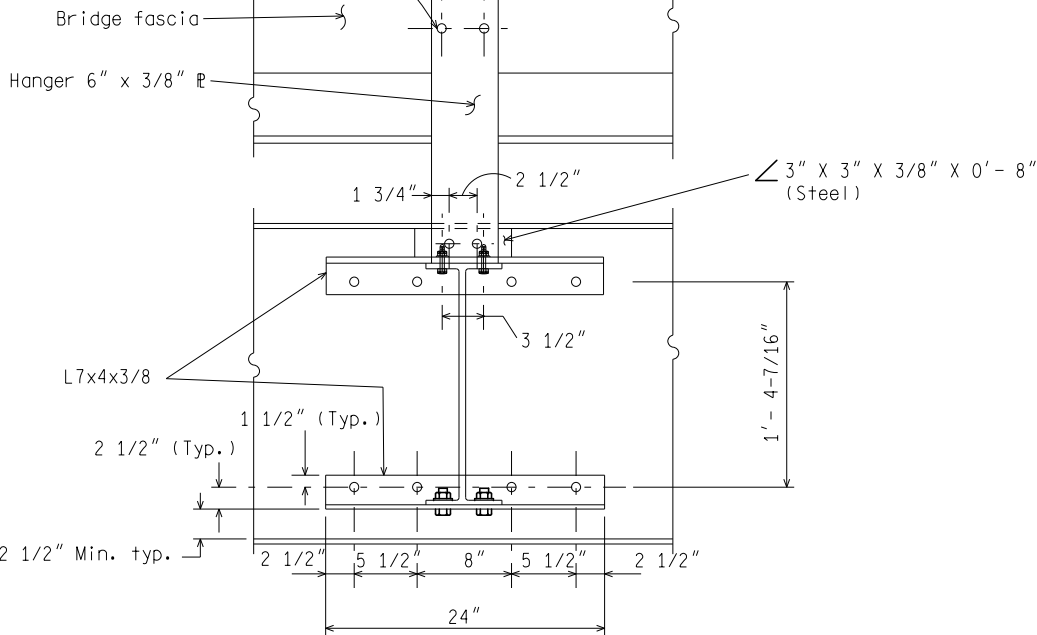
(SHOWING ANGLES "IN" ORIENTATION)

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN	(SPECIAL DETAIL) F.H.W.A. APPROVAL	04/16/13 PLAN DATE	SIGN-831-A	SHEET 3 OF 4
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3/4 Ø Stainless steel (ASTM 300 Series) expansion anchor bolt with one flat washer and nylon insert locknut, centered in 13/16" Ø holes in hanger

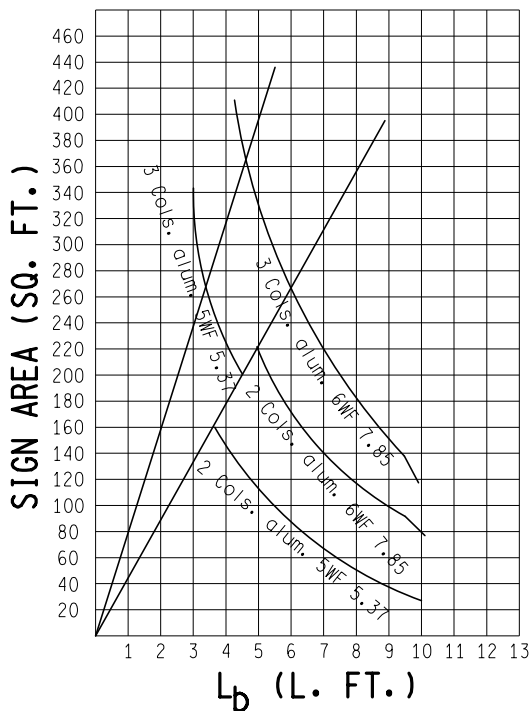


**NOTE:**  
EXPANSION ANCHORS SHALL BE DRILLED IN SOUND CONCRETE.

Drill 11/16" Ø holes to template for 2 1/2" x 5/8" Ø bolts, nuts, flat washers & lock washers.

**SECTION C - C**

Table 2.



NOTES:

1. All bolts shall be galvanized high strength bolts (ASTM A-325). All bolts, nuts, and washers shall be hot dip galvanized according to ASTM A-153. nuts shall be tapped 0.015" oversize.
2. All alum. components shall be 6061 - T6 alum. alloy. All steel components shall be A-36 and shall be hot-dip galvanized according to ASTM A-123.
3. Sign location may be shifted to avoid joints or stiffeners.
4. Sign connection to mounting support columns shall have the same bolt arrangement as shown for connections for sign to mounting supports for cantilevers and trusses. (Typical plan VIII-700, Sign Connection Details)
5. Bottom edge of sign shall be horizontal when erected and shall be a minimum of 1' - 6" above the lower bridge beam flange at all points.
6. Expansion anchors shall be chosen from the current qualified products list.
7. Expansion anchors shall be installed as per manufactures recommendations.
8.  $\theta$  = angle between sign & bridge fascia. Angle is a function of "permissible cantilever" "C" and sign length "L". See Sign-840 series.

**TO BE USED FOR MAINTENENCE PURPOSES FOR EXISTING BRIDGE CONNECTIONS ONLY.**

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