Aluminum column
(only use Type I columns
with Type I bridge beams)

Bridge barrier railing

Prestressed concrete I-beam
(Type varies)

Deck overhang varies

Deck fascia

Type I sign

SEE DETAIL D

SEE DETAIL A

SEE DETAIL B

SEE DETAIL C

Deck overhang varies

MAX

L4x4x3/8 Each side

WT7x17 (Bottom chord)

WT7x17 (Top chord)

NOTE:
DIAGONAL BRACES NEEDED
FOR 20° - 40° SKEW.

SECTION THRU BRIDGE (Ø = 0°)

IN NO CASE SHALL THE SIGN OR SIGN CONNECTION BE BELOW THE BOTTOM OF THE BEAM.
### Maximum Cantilever Length

<table>
<thead>
<tr>
<th>Beam Type</th>
<th>C (For $L \leq 22$ feet)</th>
<th>2 Columns</th>
<th>3 Columns</th>
<th>4 Columns</th>
</tr>
</thead>
<tbody>
<tr>
<td>28&quot; (Type I)</td>
<td>3'-0&quot;</td>
<td>5'-0&quot;</td>
<td>5'-6&quot;</td>
<td></td>
</tr>
<tr>
<td>36&quot; (Type I)</td>
<td>5'-0&quot;</td>
<td>6'-0&quot;</td>
<td>7'-0&quot;</td>
<td></td>
</tr>
<tr>
<td>45&quot; (Type III)</td>
<td>6'-6&quot;</td>
<td>8'-6&quot;</td>
<td>9'-6&quot;</td>
<td></td>
</tr>
<tr>
<td>54&quot; (Type V)</td>
<td>7'-6&quot;</td>
<td>10'-0&quot;</td>
<td>12'-0&quot;</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Beam Type</th>
<th>C (For $22 &lt; L \leq 40$ feet)</th>
<th>2 Columns</th>
<th>3 Columns</th>
<th>4 Columns</th>
</tr>
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<tbody>
<tr>
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<td>3'-0&quot;</td>
<td>4'-6&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36&quot; (Type I)</td>
<td>4'-6&quot;</td>
<td>6'-0&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45&quot; (Type III)</td>
<td>5'-3&quot;</td>
<td>7'-6&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>54&quot; (Type V)</td>
<td>6'-3&quot;</td>
<td>8'-6&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cantilever length (C) (see table)

1'-8" Min (May be reduced to 4" to obtain larger skew angle)

- **Deck overhang varies**
- **Sign height (H)**
- **Cantilever length (C)**
- **Max. 6"**
- **3/4" Dia. high-strength bolts spa @ 5'-0" Max**
- **13/16" Dia. holes for 3/4" dia. galv. high-strength bolts (Typ.) (5'-0" Max spacing)**
- **L4x4x3/8**
- **Each side (Typ.)**
- **1/4" Filler plate**
- **1/4" Filler plate**

**SECTION THRU BRIDGE ($\theta > 0^\circ$)**

- **Bridge deck**
- **Bridge barrier railing**
- **Decks overhang varies**
- **Prestressed concrete I-beam (Type varies)**
- **Aluminum Column (only use Type II columns with Type I bridge beams)**
- **Deck fascia**
- **B**
- **A**

---

**NOT TO SCALE**

**Michigan Department of Transportation**

**NOT TO SCALE**

**Scale: 1" = 1 foot**

**54" (Type IV)**

**45" (Type III)**

**36" (Type II)**

**28" (Type I)**

**Bridge barrier railing**

**Deck fascia**

**3/4" Dia. high-strength bolts spa @ 5'-0" Max**

**13/16" Dia. holes for 3/4" dia. galv. high-strength bolts (Typ.) (5'-0" Max spacing)**

**L4x4x3/8**

**Each side (Typ.)**

**1/4" Filler plate**

**1/4" Filler plate**

**SECTION THRU BRIDGE ($\theta > 0^\circ$)**

- **Bridge deck**
- **Bridge barrier railing**
- **Decks overhang varies**
- **Prestressed concrete I-beam (Type varies)**
- **Aluminum Column (only use Type II columns with Type I bridge beams)**
- **Deck fascia**
- **B**
- **A**

---

**NOT TO SCALE**

**Michigan Department of Transportation**

**NOT TO SCALE**

**Scale: 1" = 1 foot**

**54" (Type IV)**

**45" (Type III)**

**36" (Type II)**

**28" (Type I)**

**Bridge barrier railing**

**Deck fascia**

**3/4" Dia. high-strength bolts spa @ 5'-0" Max**

**13/16" Dia. holes for 3/4" dia. galv. high-strength bolts (Typ.) (5'-0" Max spacing)**

**L4x4x3/8**

**Each side (Typ.)**

**1/4" Filler plate**

**1/4" Filler plate**

**SECTION THRU BRIDGE ($\theta > 0^\circ$)**

- **Bridge deck**
- **Bridge barrier railing**
- **Decks overhang varies**
- **Prestressed concrete I-beam (Type varies)**
- **Aluminum Column (only use Type II columns with Type I bridge beams)**
- **Deck fascia**
- **B**
- **A**

---

**NOT TO SCALE**

**Michigan Department of Transportation**

**NOT TO SCALE**

**Scale: 1" = 1 foot**

**54" (Type IV)**

**45" (Type III)**

**36" (Type II)**

**28" (Type I)**

**Bridge barrier railing**

**Deck fascia**

**3/4" Dia. high-strength bolts spa @ 5'-0" Max**

**13/16" Dia. holes for 3/4" dia. galv. high-strength bolts (Typ.) (5'-0" Max spacing)**

**L4x4x3/8**

**Each side (Typ.)**

**1/4" Filler plate**

**1/4" Filler plate**

**SECTION THRU BRIDGE ($\theta > 0^\circ$)**

- **Bridge deck**
- **Bridge barrier railing**
- **Decks overhang varies**
- **Prestressed concrete I-beam (Type varies)**
- **Aluminum Column (only use Type II columns with Type I bridge beams)**
- **Deck fascia**
- **B**
- **A**

---

**NOT TO SCALE**

**Michigan Department of Transportation**

**NOT TO SCALE**

**Scale: 1" = 1 foot**

**54" (Type IV)**

**45" (Type III)**

**36" (Type II)**

**28" (Type I)**

**Bridge barrier railing**

**Deck fascia**

**3/4" Dia. high-strength bolts spa @ 5'-0" Max**

**13/16" Dia. holes for 3/4" dia. galv. high-strength bolts (Typ.) (5'-0" Max spacing)**

**L4x4x3/8**

**Each side (Typ.)**

**1/4" Filler plate**

**1/4" Filler plate**

**SECTION THRU BRIDGE ($\theta > 0^\circ$)**

- **Bridge deck**
- **Bridge barrier railing**
- **Decks overhang varies**
- **Prestressed concrete I-beam (Type varies)**
- **Aluminum Column (only use Type II columns with Type I bridge beams)**
- **Deck fascia**
- **B**
- **A**
NOTE:
HORIZONTAL BRACES ARE NEEDED FOR SKEW'S FROM 20° - 40° WITH 2 THRU 4 COLUMNS.

PLAN VIEW (TOP CHORDS)

SEE DETAIL F

SEE DETAIL H

SEE DETAIL E

F = 1'-8" (May be reduced to 4" to obtain larger skew angle)

1 1/2"

13/16" Dia. holes for 3/4" dia galv. high-strength bolt (Typ.)

1 1/2"

DETAIL H

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN
09/15/11 F.H.W.O. APPROVAL
08/11/11 PLAN DATE
SIGN-810-A SHEET 3 OF 11
NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN

SECTION A-A

11/16" Dia. holes for 5/8" dia. stainless steel bolt (Typ.) **

SECTION B-B

11/16" Dia. holes for 5/8" dia. stainless steel bolt (Typ.) **

** BOLT DETAIL

Steel w/ alun. column
Flat washer 5.5
5/8" Dia. h.s. bolt 5.5
1/8" Elastomeric or equivalent
pad to cover entire surface area between steel and aluminum sections.

NOT TO SCALE

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BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN

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

09/15/11  08/11/11
F.H.W.D. APPROVAL  PLAN DATE

SIGN-810-A  SHEET 5 OF 11
FLANGE DIMENSIONS

<table>
<thead>
<tr>
<th>PRESTRESSED I-BEAM DEPTH</th>
<th>A</th>
<th>B</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>28&quot; (Type I)</td>
<td>4&quot;</td>
<td>3 1/16&quot;</td>
<td>2 13/16&quot;</td>
<td>2 13/16&quot;</td>
</tr>
<tr>
<td>36&quot; (Type II)</td>
<td>4&quot;</td>
<td>4 1/2&quot;</td>
<td>2 13/16&quot;</td>
<td>2 13/16&quot;</td>
</tr>
<tr>
<td>45&quot; (Type III)</td>
<td>4 1/2&quot;</td>
<td>6 1/8&quot;</td>
<td>3 3/16&quot;</td>
<td>3 3/16&quot;</td>
</tr>
<tr>
<td>54&quot; (Type IV)</td>
<td>5 1/2&quot;</td>
<td>7 1/4&quot;</td>
<td>3 7/8&quot;</td>
<td>3 7/8&quot;</td>
</tr>
</tbody>
</table>

**NOTES:**
- NO T (Type IV)
- NOT (Type III)
- 36" (Type II)
- 28" (Type I)

I-BEAM DEPTH

PRESTRESSED

BEAM WIDTH

Beam web width

1 1/2" 3" 1 1/2"

13/16" Dia. holes for 3/4" dia. galv. high-strength bolt (Typ.)

13/16" Dia. holes in plate for adhesive anchor 3/4" dia. stainless steel bolt (Typ.)

L4x4x3/8 Each side

**See Page 5 of 11 for bolt details**

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN

09/15/11 08/11/11 SIGN-810-A SHEET 6 OF 11

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.
**ADHESIVE ANCHOR MINIMUM EFFECTIVE ULTIMATE STRENGTHS**

<table>
<thead>
<tr>
<th>BEAM TYPE</th>
<th>INSTALLED IN BEAM FLANGE</th>
<th>INSTALLED IN DECK FASCIA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TENSION (LBS)</td>
<td>SHEAR (LBS)</td>
</tr>
<tr>
<td>I</td>
<td>10465</td>
<td>7200</td>
</tr>
<tr>
<td>II</td>
<td>14825</td>
<td>8350</td>
</tr>
<tr>
<td>III</td>
<td>17440</td>
<td>10800</td>
</tr>
<tr>
<td>IV</td>
<td>17440</td>
<td>12240</td>
</tr>
</tbody>
</table>

* EFFECTIVE ULTIMATE STRENGTH IS EQUAL TO THE ULTIMATE STRENGTH MODIFIED BY THE APPROPRIATE EDGE DISTANCE AND ANCHOR SPACING REDUCTION FACTORS RECOMMENDED BY THE MANUFACTURER.

** See Page 5 of 11 for bolt details
### ALUMINUM COLUMNS

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>N/A</td>
</tr>
<tr>
<td>Type II</td>
<td>WF6 x 7.85</td>
</tr>
<tr>
<td>Type III</td>
<td>WF8 x 10.72</td>
</tr>
</tbody>
</table>


**Detail F**

- 13/16" Dia. holes in angle for adhesive anchor 3/4" dia. stainless steel bolt (Typ.)
- Deck fascia

---

**Column Selection Chart**

- Type II (4 Columns)
- Type II (3 Columns)
- Type II (2 Columns)
- Type III (4 Columns)
- Type III (3 Columns)

**Note:**
- Only use Type II columns with Type I bridge beams

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**Michigan Department of Transportation**

**Bureau of Highway Development Standard Plan**

**F.H.W.P. Approval**

**SIGN-810-A**

**Sheet 8 of 11**
DETAIL G

NOTE:
SIGN HEIGHT IS MEASURED WHERE THE SIGN IS THE TALLEST INCLUDING ANY EXIT NUMBER PANELS.

ELEVATION OF SIGN

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN

09/15/11 08/11/11 SIGN-810-A SHEET 9 OF 11

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

1. Field verify bridge dimensions prior to fabrication.

2. Welding shall be in accordance with the Standard Specifications for Construction.

3. All structural steel members shall be hot-dip galvanized in accordance with the Standard Specifications for Construction.

4. All aluminum members shall be ASTM B 308 Aluminum Alloy 6061-T6 and shall conform to ASTM B 221.

5. Structural steel members shall conform to AASHTO M 270 Grade 36.

6. All high-strength bolts, nuts and washers shall be in accordance with Subsection 906.07 and installed according to Subsection 707.03.0.7 of the Standard Specifications except for stainless steel bolts, nuts and washers.

7. Stainless steel bolts and washers shall conform to ASTM A 320, Class I, Grade B8. Nuts shall be self-locking nylon insert type and must conform to ASTM A 320, Grade BF. Stainless steel nuts and washers shall always accompany stainless steel bolts. Stainless steel bolts, nuts and washers shall be used at connections with aluminum members. All other connections shall utilize galvanized high strength bolts, nuts and washers unless otherwise specified.

8. \( \theta \) = Angle between sign and bridge fascia. Angle is a function of permissible cantilever length \( C \) and sign length.

9. All concrete anchors shall be chosen from the Qualified Product List in the current MDOT Materials Source Guide. All concrete anchors shall be installed according to the manufacturer's recommendations and subject to the requirements of Section 712.03.0 of the Standard Specifications except that all field testing must demonstrate the anchor can develop 70 percent of the minimum Effective Ultimate Strength shown in the plans with less than 1/16 inch slip. Field testing up to 90 percent of the bolts' Yield Strength is waived. Extreme caution shall be exercised when drilling holes for concrete anchors. Existing bridge plans shall be reviewed to determine the prestressing strand locations and to evaluate the risk of damaging prestressing strands associated with installing concrete anchors.

10. The bottom edge of the sign shall be horizontal when erected.

11. If replacing an existing sign support, existing holes in concrete shall not be reused and shall be filled with a non-shrink grout in accordance with Section 702.02.B of the Standard Specifications for Constructions.

12. Inspection of proposed locations shall be performed to determine viability of connection to existing bridge.


14. Removal of existing bridge sign connections shall be according to Subsection 810.03.T of the Standard Specifications.

15. See Section 712 of the Standard Specifications for bridge sign connections to existing bridges.

16. The design of this sign connection is based on the assumption that the deck concrete has a minimum Compressive Strength of 3000 psi and prestressed beam concrete has a minimum Compressive Strength of 5000 psi. If it is suspected that the concrete is of lesser strength or is in poor condition, this sign connection shall not be used.

17. Sign panel connections to aluminum columns shall have the same bolt arrangement as shown for sign panel connections to aluminum columns for cantilever and trusses (see typical plan Sign-700 Series).
18. All members are steel except aluminum columns.

19. The design of this bridge sign connection is according to the AASHTO Standard Specifications For Structural Supports For Highway Signs, Luminaires And Traffic Signals, current Edition.

20. This typical is to be used only for Type I, Type II, Type III and Type IV prestressed concrete I-beam bridges.