<table>
<thead>
<tr>
<th>CELL / MODEL NAME</th>
<th>DESCRIPTION</th>
<th>DATE</th>
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<tbody>
<tr>
<td>OSF-A-1</td>
<td>General plan and elevation</td>
<td>08/21/2013</td>
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<tr>
<td>OSF-A-1-DMS</td>
<td>Alternate general plan and elevation for DMS</td>
<td>08/21/2013</td>
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<tr>
<td>OSF-A-1-VMS</td>
<td>Plan and elevation for front access VMS</td>
<td>08/21/2013</td>
</tr>
<tr>
<td>OSF-A-2</td>
<td>Truss details</td>
<td>06/01/2012</td>
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<tr>
<td>OSF-A-2A</td>
<td>Truss details</td>
<td>06/01/2012</td>
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<tr>
<td>OSF-A-2A-VMS</td>
<td>Truss details for front access VMS</td>
<td>06/01/2012</td>
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<tr>
<td>OSF-A-2-DMS</td>
<td>Alternate truss details for DMS</td>
<td>06/01/2012</td>
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<tr>
<td>OSF-A-2-VMS</td>
<td>Truss details for front access VMS</td>
<td>06/01/2012</td>
</tr>
<tr>
<td>OSF-A-3</td>
<td>Juncture details</td>
<td>06/01/2012</td>
</tr>
<tr>
<td>OSF-A-3-VMS</td>
<td>Juncture details for front access VMS</td>
<td>06/01/2012</td>
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<tr>
<td>OSF-A-4</td>
<td>Type I-F-A truss support</td>
<td>06/01/2012</td>
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<td>OSF-A-4-VMS</td>
<td>Type I-F-A support post for front access VMS</td>
<td>06/01/2012</td>
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<tr>
<td>OSF-A-5</td>
<td>Type II-F-A and III-F-A truss support</td>
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<td>Type III-F-A truss support for DMS</td>
<td>06/01/2012</td>
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<td>OSF-A-6</td>
<td>Aluminum walkway details</td>
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<td>OSF-A-6-DMS</td>
<td>Alternate aluminum walkway details for DMS</td>
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<td>OSF-A-6S</td>
<td>Alternate steel walkway details</td>
<td>06/01/2012</td>
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<tr>
<td>OSF-A-7</td>
<td>Walkway details, aluminum truss and steel post</td>
<td>06/01/2012</td>
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<td>OSF-A-7-DMS</td>
<td>Alternate walkway details for DMS</td>
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<td>OSF-A-7S</td>
<td>Alternate steel walkway details</td>
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<tr>
<td>OSF-A-8</td>
<td>Handrail details, aluminum truss and steel post</td>
<td>06/01/2012</td>
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<tr>
<td>OSF-A-9</td>
<td>Drilled shaft foundation detail</td>
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<tr>
<td>OSF-A-9-VMS</td>
<td>Drilled shaft for front access VMS</td>
<td>08/21/2013</td>
</tr>
<tr>
<td>OSF-A-D</td>
<td>Damping device</td>
<td>06/01/2012</td>
</tr>
</tbody>
</table>
**DESIGN WIND LOADING DIAGRAM**

Parameters shown are basis for I.DOT. Standards. Installations not within dimensional notes shown require special analysis for all components.

**TYPICAL ELEVATION**

Looking to Direction of Traffic

Sign support structures may be subject to damaging vibrations and oscillations when signs are not in place during erection or maintenance of the structure. To avoid these vibrations and oscillations, consideration should be given to attaching temporary stake sign panels to the structure.

After adjustments to level truss and insure adequate vertical clearance, all top and bottom leveling nuts shall be tightened against the base plate with a minimum torque of (20) lbs. Stainless steel sheet metal shall then be pressed around the perimeter of the base plate. Secure to base plate with Stainless steel banding.

Note:

Trusses shall be shipped individually with adequate packaging to prevent detrimental motion during transport. This may require ropes between horizontals and diagonals or energy dissipating (elastic) ties to the vehicle. The contractor is responsible for maintaining the configuration and protection of the trusses.

**MAXIMUM TOTAL DMS SIGN CABINET AREA**

Minimum DMS weight = 5000 LB.

**TOTAL BILL OF MATERIAL**

---

**MATERIALS:**

- Aluminum Alloys as shown throughout plans. All Structural Steel Pipe shall be ASTM A53 Grade B or A501 Grade B or C. All A501 Grade Pipe is substituted for ASTM A53, then the outside diameter shall be as detailed and wall thickness greater than or equal to A53.

- Steel Structural Plates and Shapes shall conform to A572, Grade 50, or ASTM A36, or shall conform to A36, Grade 50, or S235, a variety of Grades.

- Stainless steel for screws, washers and handhole covers shall be ASTM A240, Type 302, or 304, or another alloy suitable for exterior exposure and acceptable to the Engineer.

- The steel pipe and soring rings at the base plate for the column shall have a minimum longitudinal decay (NDE) energy of 15 ft.-lbf at 40°F (Zone 3) before galvanizing.

**DIMENSIONS:**

- DMS Sign Cabinet Area and truss elements not behind sign shall be designed in accordance with current IDOT Standard Specifications, Section 521, Fabrication, and Special Provisions.

**LOADING:**

- 90 M.P.H. WIND VELOCITY

- WIND LOADING: 30 p.s.f. normal to DMS Cabinet Area and truss elements not behind sign.

- WALKWAY LOADING: Dead load plus 500 lbs. concentrated load.

- FIELD STRESSES for DMS - ALUMINUM TRUSS & STEEL POST:

- fy = 60,000 p.s.i. (reinforcement)

**WELDING:** All welds to be continuous unless otherwise shown. All welding to be done in accordance with current AWS D1.1 and D1.6 Structural Welding Codes Steel and Aluminum and the Standard Specifications.

**ANCHOR RODS:** Shall conform to ASTM F1554 Gr. 105.

**GALVANIZING:** All Steel Grating, Plates, Shapes and Pipe shall be Hot Dip Galvanized after fabrication in accordance with AASHTO M111. Painting is not permitted.
Butterfly Length (L) and Basis of Payment

Sign support structures may be subject to damaging vibrations and oscillations when signs are not in place during erection or transport. The contractor is responsible for maintaining the design and configuration of the trusses.

After adjustments to level truss and insuring adequate vertical clearance of the trusses, bolts shall be tightened against the base plates with a minimum torque of 500 ft.-lb. Stainless steel washers shall be placed around the perimeter of the base plates. Secure to base plates with stainless steel banding.

Standard signs are erected at one elevation.

Total truss length to match VMS length.

* Truss shall be isolated individually with adequate provision to prevent detrimental motion during transport. This may require ropes between trusses and diagonals or energy dissipating bushings at the bushing. The contractor is responsible for maintaining the alignment and configuration of the trusses.

** Elevation A and dimension D not used when support structure is required at right side of the road.

** Design wind loading diagram

Parameters shown are solely for I.D.O.T. Standards. Installations not within dimensional limits shown require special analysis for all components.

General Notes

Design:

Construction:
Current list of receiving Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Supplement Specifications and Special Provisions. (“Standard Specifications”)

Loading:
90 M.P.H. Wind Velocity
Minimum Loading: 30 p.s.f. normal to VMS Cabinet Area and truss elements not behind sign
Loading Diagram

Walkway Loading: Dead load plus 500 lbs. concentrated live load.

Field Stresses

Field units
Fy = 50,000 psi (reinforcement)

Welding:
All welds to be continuous unless otherwise shown. All welding to be done in accordance with current AWS D1.1 and D2 Structural Welding Codes (Steel) and Aluminum and the Standard Specifications.

Materials:
Aluminum alloys as shown throughout plans. All Structural Steel Pipe shall be ASTM A53 Grade B or A500 Grade B. If A500 pipe is substituted for A53, the outside diameter shall be as stated and wall thickness greater than or equal to A53. All Structural Steel Plates and shapes shall conform to AASHTO A572 Gr. 36, 50, 60, or 70. Steel (G-M) W14×12, W14×18, or W14×36. Stainless steel anchor plates, dowels, and handhole covers shall be ASTM A440, Types 304 or 304L, or another material suitable for exterior exposure and acceptable to the Engineer.

Steel pipe and anchoring bolts at the base pads for the columns shall have a minimum longitudinal Charpy-V-notch energy of 17 ft-lb at 20°F (Zone 2) before galvanizing.

Fasteners for Aluminum Trusses:
All bolts noted as “high strength” must satisfy the requirements of ASTM A325, or approved alternate, and must have matching lock nuts. Threads shall be full length. Sockets shall be secured with socket screws. Stainless steel socket screws shall be ASTM A590, Type 304 or 304L, 5/8 to 1/2" diameter. Fasteners shall be of a type approved by the Engineer. Where threaded fasteners are used, high strength bolt installation shall conform to Article 505.04 (f) of the I.D.O.T. Standard Specifications for Road and Bridge Construction. Alternative capacity (PROCAP) testing of bolts will not be required.

U-Bolts and Eyebolts:
U-Bolts and Eyebolts must be produced from ASTM A36 Type 50, 50K, 50L, or 35L. Condition A, cold finished stainless steel, or an equivalent material as approved by the Engineer. All nuts for U-Bolts and Eyebolts shall be lock nuts equivalent to ASTM A325 with lock nuts as listed below or approved alternate. Stainless steel flat washer conforming to ASTM A240, Types 304 or 304L, is required under both head and nut or under both nuts where threaded ends are used. High strength bolt installation shall conform to Article 505.04 (f) of the I.D.O.T. Standard Specifications for Road and Bridge Construction. Alternative capacity (PROCAP) testing of bolts will not be required. U-Bolts and Eyebolts must be galvanized before fabrication in accordance with AASHTO M19. Powder is not permitted.

Anchor Rods:
Shall conform to ASTM F594. Grade 250.

Concrete Surfaces:
All concrete surfaces above an elevation 6" below the lowest final ground line at each foundation shall be cleaned and coated with Concrete Sealer in accordance with the Standard Specifications.

Reinforcement Bars:
Bar diameter shall be as required by the Engineer.

Butterfly Sign Structures – Plan & Elevation

Truss Type

Maximum Total VMS Area

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Bill of Material

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

TOTAL BILL OF MATERIAL

General Notes

Design:

Construction:
Current list of receiving Illinois Department of Transportation Standard Specifications for Road and Bridge Construction, Supplement Specifications and Special Provisions. (“Standard Specifications”)

Loading:
90 M.P.H. Wind Velocity
Minimum Loading: 30 p.s.f. normal to VMS Cabinet Area and truss elements not behind sign
Loading Diagram

Walkway Loading: Dead load plus 500 lbs. concentrated live load.

Field Stresses

Field units
Fy = 50,000 psi (reinforcement)

Welding:
All welds to be continuous unless otherwise shown. All welding to be done in accordance with current AWS D1.1 and D2 Structural Welding Codes (Steel) and Aluminum and the Standard Specifications.

Materials:
Aluminum alloys as shown throughout plans. All Structural Steel Pipe shall be ASTM A53 Grade B or A500 Grade B. If A500 pipe is substituted for A53, the outside diameter shall be as stated and wall thickness greater than or equal to A53. All Structural Steel Plates and shapes shall conform to AASHTO A572 Gr. 36, 50, 60, or 70. Steel (G-M) W14×12, W14×18, or W14×36. Stainless steel anchor plates, dowels, and handhole covers shall be ASTM A440, Types 304 or 304L, or another material suitable for exterior exposure and acceptable to the Engineer.

Steel pipe and anchoring bolts at the base pads for the columns shall have a minimum longitudinal Charpy-V-notch energy of 17 ft-lb at 20°F (Zone 2) before galvanizing.

Fasteners for Aluminum Trusses:
All bolts noted as “high strength” must satisfy the requirements of ASTM A325, or approved alternate, and must have matching lock nuts. Threads shall be full length. Sockets shall be secured with socket screws. Stainless steel socket screws shall be ASTM A590, Type 304 or 304L, 5/8 to 1/2" diameter. Fasteners shall be of a type approved by the Engineer. Where threaded fasteners are used, high strength bolt installation shall conform to Article 505.04 (f) of the I.D.O.T. Standard Specifications for Road and Bridge Construction. Alternative capacity (PROCAP) testing of bolts will not be required.

U-Bolts and Eyebolts:
U-Bolts and Eyebolts must be produced from ASTM A36 Type 50, 50K, 50L, or 35L. Condition A, cold finished stainless steel, or an equivalent material as approved by the Engineer. All nuts for U-Bolts and Eyebolts shall be lock nuts equivalent to ASTM A325 with lock nuts as listed below or approved alternate. Stainless steel flat washer conforming to ASTM A240, Types 304 or 304L, is required under both head and nut or under both nuts where threaded ends are used. High strength bolt installation shall conform to Article 505.04 (f) of the I.D.O.T. Standard Specifications for Road and Bridge Construction. Alternative capacity (PROCAP) testing of bolts will not be required. U-Bolts and Eyebolts must be galvanized before fabrication in accordance with AASHTO M19. Powder is not permitted.

Anchor Rods:
Shall conform to ASTM F594. Grade 250.

Concrete Surfaces:
All concrete surfaces above an elevation 6" below the lowest final ground line at each foundation shall be cleaned and coated with Concrete Sealer in accordance with the Standard Specifications.

Reinforcement Bars:
Bar diameter shall be as required by the Engineer.
Horizontal Diagonal
Hidden lines show alternating direction of wind bracing in plane of lower chords.

Interior Diagonal
Lower Chord - all vertical panel points (Upper Chord - end and each side of splice only)

Horizontal Diagonal
Hidden lines show alternating direction of wind bracing in plane of lower chords.

Interior Diagonal
Lower Chord - all vertical panel points (Upper Chord - end and each side of splice only)

Note:
There are twice as many horizontal diagonals as there are vertical diagonals.

Horizontal
Diagram (Weakly Not Shown)

PLAN

TYPICAL TRUSS UNIT

For Section B-B and Section C-C, see Base Sheet OSF-A-3.

TRUSS UNIT TABLE

<table>
<thead>
<tr>
<th>Structure Type</th>
<th>Dimension &quot;a&quot;</th>
<th>Dimension &quot;b&quot;</th>
<th>Dimension &quot;s&quot;</th>
<th>Panel Spacing (P)*</th>
<th>Number of Panels Unit 1</th>
<th>Panel Length (P1)*</th>
<th>Number of Panels Unit 2</th>
<th>Panel Length (P2)*</th>
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<tbody>
<tr>
<td>I-F-A</td>
<td>24&quot;</td>
<td>54&quot;</td>
<td>9&quot;</td>
<td>36&quot; min. to 48&quot; max</td>
<td>5&quot;</td>
<td>2&quot;</td>
<td>3&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>II-F-A</td>
<td>36&quot;</td>
<td>66&quot;</td>
<td>9&quot;</td>
<td>42&quot; min. to 54&quot; max</td>
<td>5&quot;</td>
<td>2&quot;</td>
<td>3&quot;</td>
<td>2&quot;</td>
</tr>
<tr>
<td>III-F-A</td>
<td>48&quot;</td>
<td>84&quot;</td>
<td>9&quot;</td>
<td>48&quot; min. to 60&quot; max</td>
<td>3&quot;</td>
<td>3&quot;</td>
<td>3&quot;</td>
<td>3&quot;</td>
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</tbody>
</table>

*P = O.D. Wall

For Section B-B and Section C-C, see Base Sheet OSF-A-3.

Horizontal Diagonal

For Section B-B and Section C-C, see Base Sheet OSF-A-3.

Interior Diagonal (Each End)

REVISED

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BUTTERFLY SIGN STRUCTURES
TRUSS DETAILS - ALUMINUM TRUSS & STEEL POST

FILE NAME
USER NAME

PLOT SCALE
PLOT DATE
REVISION
REVISED

TOTAL SHEETS
SHEET NO. OF SHEETS

FILE NAME
USER NAME

DESIGNED
CHECKED
CHECKED
DRAWN
CHECKED
DRAWN

STATE OF ILLINOIS
DEPARTMENT OF TRANSPORTATION

BUTTERFLY SIGN STRUCTURES
TRUSS DETAILS - ALUMINUM TRUSS & STEEL POST
**SHOP CAMBER TABLE**

<table>
<thead>
<tr>
<th>Unit Length</th>
<th>Shop Camber at End</th>
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</thead>
<tbody>
<tr>
<td>15'</td>
<td>1&quot;</td>
</tr>
<tr>
<td>16'</td>
<td>1&quot;</td>
</tr>
<tr>
<td>18'</td>
<td>1'</td>
</tr>
<tr>
<td>20'</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>22'</td>
<td>1/2&quot;</td>
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<tr>
<td>24'</td>
<td>1/4&quot;</td>
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<tr>
<td>26'</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>28'</td>
<td>1/8&quot;</td>
</tr>
<tr>
<td>30'</td>
<td>1/8&quot;</td>
</tr>
</tbody>
</table>

**Typical Load Deflection (See measured without dead load at end of each chord)**

- **Elevation Y**: 
  - 90° (For Fabrication Only)

**Type Truss**

- Bolt diameter.

**Bolts Dia.**

- ‡" larger than

**Weld Sizes**

- W
  - Š"
  - "

**Post End Joint Detail**

1. Splicing Flanges shall be attached to each truss unit with the truss shop assembled to camber shown. Truss units shall be in proper alignment and flange surfaces shall be shop bolted into full contact before welding. Sufficient external welds or tack shall be made to secure flanges until remaining welds are made after dwassembly. Adjacent flanges shall be "match marked" to insure proper field assembly.

**TRUSS INTERIOR JOINT DETAIL**

- Toe edge of diagonal member shall be cut back to facilitate throat thickness per AWS D1.1, Fig 5.2.

**NOTE 1**

- To fit O.D. of Chord with maximum gap of 1/4".

**NOTE 2**

- Contractor may alternatively use standard aluminum drive-fit cap to close ends. 1/4" drain hole in end plate / drive-fit cap.

**ISOMETRIC VIEW**

**TYPICAL TRUSS UNIT**

ASTM B221 Alloy 6061 Tanger 76

**DETAIL A**

- Interior Diagonal
- Vertical
- Horizontal

**SPLICING FLANGE**

ASTM B221, Alloy 6061-7T6
or ASTM B221, Alloy 6061-T651

**SECTION B-B**

- High strength bolts with locknuts or if members interfere threaded studs with two locknuts. Use stainless steel washers under head and nut. See Table.

**STATE OF ILLINOIS**

**DEPARTMENT OF TRANSPORTATION**

**ALUMINUM TRUSS & STEEL POST**

**BUTTERFLY SIGN STRUCTURES - TRUSS DETAILS**
ISOMETRIC VIEW
TYPICAL TRUSS UNIT
ASTM B221, Alloy 6061-T6

**To fit O.D. of Chord with maximum gap of 1/4".

** Contractor may alternatively use stainless aluminum drive-fit cap to close ends.

** Weld Sizes

SPLICING FLANGE
ASTM A567, Alloy 6061-T6
or ASTM B221, Alloy 6061-T651

Typical both ends

See Table & Note 1

Splicing Flanges shall be attached to each truss unit with the truss shop assembled to customer shown. Truss units shall be in proper alignment and flange surfaces shall be shop bolted into full contact before welding. Sufficient external wedges or blocks shall be made to secure flanges until welding is made after disassembly. Adjacent flanges shall be "match marked" to assure proper field assembly.

<table>
<thead>
<tr>
<th>Truss Type</th>
<th>Bolt Diameter</th>
<th>Weld Sizes</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4&quot;-A</td>
<td>5/32&quot;</td>
<td>1 1/8&quot;</td>
<td>1/4&quot;</td>
<td>1/4&quot;</td>
</tr>
</tbody>
</table>

** POST END JOINT DETAIL

** (Lower Chord Only)

** Bolt diameter.

---

** Typical both ends of each chord

** Drill 6 holes

---

** Roadway

*** Note 1

See Table.

---

** Contractor may alternatively use stainless aluminum drive-fit cap to close ends.

---

** Drill 6 holes

---

** Roadway
in plane of lower chords.

Hidden lines show alternating Horizontal Diagonal. Interior Diagonal.

Note: (Upper Chord - end and each side of splices only) (Lower Chord - all vertical panel points) Horizontals chord at end) ~ lower chord)

Vertical Diagonal. Vertical diagonals Interior Diagonal (Each End)

TRUSS UNIT TABLE

<table>
<thead>
<tr>
<th>Structure Number</th>
<th>Station</th>
<th>Truss Type</th>
<th>L_1</th>
<th>L_2</th>
<th>Number of Panels Unit 1</th>
<th>Panel Length (P)_1*</th>
<th>Number of Panels Unit 2</th>
<th>Panel Length (P)_2*</th>
</tr>
</thead>
</table>

For Section B-B and Section C-C, see Base Sheet OSF-A-3-DMS.

For sign and walkway brackets, see Base Sheets OSF-A-6-DMS and OSF-A-7-DMS.
**Plan:**

- 2" x 3" #8 holes in grating for 3" x 4" stainless steel in-holes.
- Two stainless steel washers and nuts required per hole.
- Hypotenuse and angle connections required at horizontal only.

**Collateral Chord:**

- For Section B-B and Section C-C, see Base Sheet OSF-A-3-VMS.

**Diagonal Specifications:**

- Interior Diagonal (Each End)
  - Each end of sign.
  - L = -1'
  - Wall = 16''
- Vertical Diagonal (Each End)
  - Each end of sign.
  - L = -1'
  - Wall = 54''

**Typical Truss Unit:**

- DRIVING HOLES IN GRATING MAY BE DONE IN SHOP OR FIELD, BASED ON CONTRACTOR'S PREFERENCE AND SUBJECT TO ENGINEER'S REVIEW AND APPROVAL.

**Truss Unit Table:**

<table>
<thead>
<tr>
<th>Structure Number</th>
<th>Station</th>
<th>Type</th>
<th>L1</th>
<th>L2</th>
<th>Panel Length (P1)</th>
<th>Panel Length (P2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OSF-A-2-VMS</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Specifications for Standard Aluminum Grating:**

- With bearing bars (BB) shall be 3/4" x 3/4" x 3/16" minimum.
- These bars shall be 3/4" x 3/4" x 3/16" minimum.

**State of Illinois Department of Transportation**

**Butterfly Sign Structures - Truss Details for Front Access VMS - Aluminum Truss & Steel Post**

<table>
<thead>
<tr>
<th>Sheet</th>
<th>Design</th>
<th>County</th>
<th>SPEED LIMIT</th>
<th>DIMENSION</th>
<th>LIFT</th>
<th>PANEL LENGTH</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td>24&quot;</td>
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<td>34&quot;</td>
<td>6&quot;</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>5&quot;</td>
<td>25&quot;</td>
<td>5&quot;</td>
</tr>
</tbody>
</table>
Section B-B

Bolts, washers (including contoured washers), and locknuts shall be stainless steel.

Section C-C

DETAIL B

(For details not shown, see Detail C)

DETAIL D

DETAIL C

Plan View - Top of Column

(See Detail D)

Detail A

(Two locations)

Contoured Washers

Bolt Size

Bolt Spacing

2" and 6" - (Four locations)

6" - (Three locations)

DETAIL OF STAINLESS STEEL SLEEVE

Need to post after galvanizing.

Prepares post surface to insure tight, uniform fit and allow welding.

After tightening lower connection bolts, fill gap with non-hardening, silicone caulk suitable for exterior exposure and acceptable to the Engineer. Cost is included in Overhead Sign Structure Butterfly.

Upper and lower connection bolts in color and bolts at lower chord connection must be high strength with matching locknuts. Connection bolts shall have two stainless steel flat washers each.

SECTION THRU POST ABOVE LOWER ChORDS

OsF-a-3

Butterfly Sign Structures - Juncture Details

Aluminum, Truss & Steel Post

State of Illinois

Department of Transportation

Cut Lines
ANCHOR ROD DETAIL

Anchor rods shall conform to ASTM A554 Grade 304. Galvanize the upper 18'' minimum*** and associated AASHTO M291, Grade A, C or DH heavy hex nuts and hardened washers per AASHTO M232. No welding shall be permitted on rods.

Provide 4-1/2'' cover. Outside corners = 2'' radius. Provide 4-1/2'' covers in for 1/2'' = 20 round head hot dip galvanized or stainless steel machine screws. (See cover details.)

Butt welded joint in post is only allowed for post heights 30' to 50' ft. in length. If used, weld procedure must be preapproved by Engineer and joint shall receive 100% RT or UT tension criteria at Contractor's expense.

Provide 8'' x 41/2'' cover. Outside corners = 11/2'' radius. Provide 8'' x 41/2'' covers in for 5/8'' = 20 round head hot dip galvanized or stainless steel machine screws. (See cover details.)

** Butt welded joint in post is only allowed for post heights 30' to 50' ft. in length. If used, weld procedure must be preapproved by Engineer and joint shall receive 100% RT or UT tension criteria at Contractor's expense.

Foundation

Top of


For Foundation Details

Utilize positioning aids and temporary nuts methods to maintain anchor bolt alignment during concrete placement. Plugs, extra nuts, and other positioning aids become Contractor's property. Cost included in Drilled Shaft Concrete Foundations.

Anchor rod may be butt-welded top and bottom or bottom only. In lieu of fabricated handhole plates as shown, tap-off from 2'' plate (rolling or bottom only). In lieu of fabricated handhole plates as shown, tap-off from 2'' plate (rolling or bottom only). In lieu of fabricated handhole plates as shown, tap-off from 2'' plate (rolling or bottom only). In lieu of fabricated handhole plates as shown, tap-off from 2'' plate (rolling or bottom only). In lieu of fabricated handhole plates as shown, tap-off from 2'' plate (rolling or bottom only). In lieu of fabricated handhole plates as shown, tap-off from 2'' plate (rolling or bottom only).
**SECTION A-A**

**WALKWAY AND HANDRAIL SKETCH**

Sign panel

Truss grating Splice**

---

**BRACKET TABLE**

<table>
<thead>
<tr>
<th>Bracket Table</th>
<th>Number of Brackets Required</th>
</tr>
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<tbody>
<tr>
<td>WF(A-N)4x1.79</td>
<td>2</td>
</tr>
<tr>
<td>WF(A-N)4x3.06</td>
<td>4</td>
</tr>
</tbody>
</table>

---

**Notes:**
- Space walkway brackets WF(A-N)4x3.06 and sign brackets WF(A-N)4x1.79 for efficiency and with limits shown.

---

For details of sign placement, sign/walkway brackets, truss and walkway gratings, grating splices and Section B-B, see Base Sheet OSF-A-7.

---

For details of handrail, handrail joint, safety chain and Details F and G, see Base Sheet OSF-A-8.
**Truss grating Splice**

**Design Length (L)**

**Truss Grating Length (TGL)**

Less Than or Equal To Sign Width

Number of Brackets Required

<table>
<thead>
<tr>
<th>BRACKET TABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>14'-0''</td>
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<tr>
<td>20'-0''</td>
</tr>
<tr>
<td>26'-0''</td>
</tr>
<tr>
<td>32'-0''</td>
</tr>
</tbody>
</table>

Greater Than 8'-0''

WF(A-N)4x3.06

ASTM B308, Alloy 6061-T6

**Sign Cabinet**

Dynamic Message Sign cabinet

**WALKWAY AND HANDRAIL SKETCH**

Dashed plan beneath truss varies. Walkway may be located at right or left end of truss.

*Grading splices and handrail joints are to be placed as needed.

**Grating Tie-downs**

**Design Length (L)**

**Column and Cabinet**

**TYPICAL FRONT ELEVATION**

With handrail omitted for clarity.

**For section B-B see base sheet OSF-A-7-DMS**

**For Handrail Splice Details, see Base Sheet OSF-A-8-DMS**

**For Section B-B and Grating Splice Details, see Base Sheet OSF-A-7-DMS**

**WALKWAY LOCATION**

Left or Right End of Truss

Maximun DMS weight = 5000 lbs.

Walkway and truss grating width dimensions are nominal and may vary based on available standard widths.

**TYPICAL TRUSS ELEVATION**

**WALKWAY SUPPORT ONLY**

Support Truss

**NOTE**

Maximum DMS weight = 5000 lbs.

6'-0'' maximum cabinet depth includes depth of cabinet plus connection to WF6x5.40.

For Section A-A and Grating Splice Details, see Base Sheet OSF-A-7-DMS.

For Handrail Splice Details, see Base Sheet OSF-A-8-DMS.

Walkway and truss grating width dimensions are nominal and may vary based on available standard widths.

**SECTION A-A**

Handrail and walkway shall span a minimum of three brackets between splices or gap joints. Brackets placed as close to panel points as practical.

**Grading splices and handrail joints are to be placed as needed.**

**Truss grating to facilitate inspection shall run full length (center to center of support frames) 3'-0'' on overhead trusses. Cost of truss grating is included in Butterfly Sign Structure.**

**TDL = L1 for L1 = (F / 2) (F / 2)**

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BUTTERFLY SIGN STRUCTURES - ALTERNATE

ALUMINUM WALKWAY DETAILS FOR DMS
**Walkway Details - Aluminum Truss & Steel Post**

- **Sign Width**: Greater Than or Equal To
- **Walkway**
- **Less Than**
- **Required**
- **Sign Panel**
- **Truss Grating Length (TGL)**
- **Lighting Fixtures**: (If Required)
- **Handrail**
- **Column**
- **End Distance**
- **Design Length (L)**
- **Detail F**
- **Detail G**

### BRACKET TABLE

<table>
<thead>
<tr>
<th>TGL = L - (Foot G.L. + 6&quot;)</th>
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<tbody>
<tr>
<td>W + D</td>
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<tr>
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<td>20-0&quot;</td>
</tr>
<tr>
<td>26-0&quot;</td>
</tr>
<tr>
<td>32-0&quot;</td>
</tr>
</tbody>
</table>

**Notes:**
- Splice walkway brackets WF(A-N)4x3.06 and sign brackets WF(A-N)4x1.79 for efficiency and within limits shown.
- **f**: maximum 12", minimum 4" for each side of nearest bracket.
- **g**: maximum 12", minimum 4" for each end of walkway to nearest bracket.
- **h**: maximum 12", minimum 4" sign panel or walkway support brackets.

**Handrail and walkway grating shall span a minimum of three brackets between splices.**

- **Widths and Depths** based on available standard dimensions.
- **Lighting fixtures** are optional, based on lengths needed and material availability.

**For details of handrail, handrail joint, safety chains and Details F and G, see Base Sheet OSF-A-7S.**
**SECTION B-B**

- Bracket and grating dimensions are nominal and will vary based on actual DMS cabinet dimensions plus manufacturer's mounting device.

**DETAIL W** (Walkway grating)

- Drilling holes in walkway grate shall be made with one stainless steel washer and one stainless steel flat washer under stainless steel bolt.

**SECTION D-D**

- If Handrail Joint present, weld angle to WF6x5.40 and extension bars. See Details on Base Sheet OSF-A-8-DMS.

**DETAIL T** (Continuous Truss grating)

- Aluminum grating with modified "t" sections for main bearing bars shall meet the following requirements:
  - Main bearing bars (MBS) shall be \( \frac{3}{8}'' \) x \( \frac{3}{4}'' \) on \( 4'' \) centers and conform to ASTM B221 Alloy 6063-T6.
  - Cross bars (CBS) shall be \( \frac{3}{8}'' \) x \( \frac{1}{2}'' \) on \( 4'' \) centers and conform to ASTM B221 Alloy 6063-T6.

**SPECIFICATIONS FOR STANDARD ALUMINUM GRATING**

- Main bearing bars shall be \( \frac{3}{8}'' \) x \( \frac{3}{4}'' \) on \( 1'-2'' \) standard Aluminum Grating.

**SECTION T-T**

- Stainless Steel shim(s). If needed, place on top of horizontal and diagonal grating. Closeup to match tube (approximately) 60°

- Stainless Steel shim(s) 2 If needed, place on top of horizontal and diagonal grating. Closeup to match tube (approximately) 60°
The foundation dimensions shown in the Foundation Design Table are based on the presence of nearly cohesive soils with an average Unconfined Compressive Strength (Qu) of at least 1.25 tsf, which must be determined by previous soil investigations at the jobsite. When other conditions are indicated, the boring data will be included in the plans and the foundation dimensions shown in the Foundation Data Table will be the result of site specific design. If the conditions encountered are different than those indicated, the Contractor shall notify the Engineer to determine if the foundation dimensions need to be modified. If dimensions "B" or "F" are revised by more than 12" by the Contractor, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.

No sonotubes or decomposable forms shall be used below the lower conduit entrance. Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission. Concrete shall be placed monolithically, without construction joints. Backfill shall be placed per Article 502 of Standard Specification and prior to erection.

Foundations shall be included in cost of 'Drilled Shaft Concrete Foundations' as shown in the Foundation Design Table. Cost of rod, cable and clamps shall be included in cost of rod driven into natural ground.

Concrete shall be placed monolithically, without construction joints. Without the Engineer's written permission, Concrete shall be placed as required in construction joints. No sonotubes or decomposable forms shall be used below the lower conduit entrance. Permanent metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.

Concrete shall be placed at the lowest elevation 6" below finished ground line. Cost included in 'Drilled Shaft Concrete Foundations'.

A normal surface finish followed by a Concrete Sealer application will be required on concrete surfaces of support columns.

Thread and cap both ends.

**NOTES:**

The foundation dimensions shown in the Foundation Design Table are based on the presence of mostly cohesive soils with an average Unconfined Compressive Strength (Qu) of at least 1.25 tsf, which must be determined by previous soil investigations at the jobsite. When other conditions are indicated, the boring data will be included in the plans and the foundation dimensions shown in the Foundation Design Table will be the result of site specific designs.

- If the conditions encountered are different than those indicated, the Contractor shall notify the Engineer to determine if the foundation dimensions need to be modified. If dimensions "D" or "F" are revised by more than 12" by the Contractor, "as-built" plans shall be prepared and submitted to the District Bureau of Operations for future reference.
- Permeable metal forms or other shielding may not be left in place below that elevation without the Engineer's written permission.
- Concrete shall be placed monolithically, without construction joints. Sono-locks shall be placed per Article 512 of Standard Specification and prior to erection of support columns. A normal surface finish followed by a Concrete Sealer application will be required on concrete surfaces above the lowest elevation 6" below finished ground line. Cost included in "Drilled Shaft Concrete Foundation".

### Foundation Design Table

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<th>Structure Number</th>
<th>Station</th>
<th>Truss Type</th>
<th>Shaft Diameter</th>
<th>Elevation Top</th>
<th>Elevation Below</th>
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<th>B</th>
<th>F</th>
<th>Class O5</th>
<th>Cubic Yards</th>
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### Foundation Data Table

<table>
<thead>
<tr>
<th>Station</th>
<th>Truss Type</th>
<th>Post Hole Sheet</th>
<th>Maximum Coat (in.)</th>
<th>Minimum Total Sign Area (sq. ft.)</th>
<th>Shaft Diameter (in.)</th>
<th>&quot;B&quot; (ft)</th>
<th>&quot;F&quot; (ft)</th>
<th>Anchor Rods Diameter (in.)</th>
<th>Anchor Rods Diameter (in.)</th>
<th>Class O5</th>
<th>Cubic Yards</th>
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<td>0</td>
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</tbody>
</table>

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**BUTTERFLY SIGN STRUCTURES - DRILLED SHAFT FOR FRONT ACCESS VMS - ALUMINUM TRUSS & STEEL POST**

FILE NAME = USER NAME

PLOT SCALE =

PLOT DATE =

CHECKED = DRAWN =

CHECKED =

REVISED =

REVISED =

REVISED =

REVISED =

DEPARTMENT OF TRANSPORTATION

STATE OF ILLINOIS

CONTRACT NO.

8-21-13
PLAN DETAIL

Cross Tubes

Top Chord

Device

Damping

Horizontal

Diagonal

(See Table on Standard OSF-A-D)

Mounting Tube

Damping Device

U-Bolt

GENERAL NOTES

Dampers: One damper per truss. 136 lbs. Stockbridge-Type Aluminum-29° minimum between ends of weights.

Materials: Aluminum tubes shall be ASTM B221 alloy 6061 temper T6.

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DEPARTMENT OF TRANSPORTATION

BUTTERFLY SIGN STRUCTURE

OSF-A-D

6-1-12