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

- **Area**
  - \( A = 2.26 \text{ ft.}^2 \)
  - \( A = 60,133 \text{ in.}^2 = 34.8 \text{ ft.}^2 \)

**GUIDE TO USE THIS INDEX**

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

2. **Steel Sign, Wind Beams and Column (Post) Materials:**
   - b. Aluminum Bar and Extruded Shapes: ASTM B221, Alloy 6061-T6
   - c. Aluminum Structural Shapes: ASTM B838, Alloy 6061-T6
   - d. Cast Aluminum: ASTM B26, Alloy A356-T6
   - e. Aluminum Weld Material: ER 5556 or 5356

3. **Sign Mounting Bolts, Nuts, and Washers:**
   - a. Galvanized U-Bolt (Column): ASTM A449 or ASTM A193 B7 according to ASTM F2329 with nuts and washers
   - b. Galvanized Bolts (Sleeves): ASTM F668, Alloy 6061-T6 or 6262-T19
   - c. Galvanized Washers: ASTM B221, Alloy 7075-T6

4. **Solder Joint Steel Bolts, Nuts and Washers may be used in lieu of the Aluminum bolt head and flat head bolts as follows:**
   - a. Stainless Steel Bolts: ASTM F 593, Alloy Group 2, Condition A, CW1 or SH1
   - b. Stainless Steel Nuts: ASTM F593

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. Galvanized Bolts (Sleeves): ASTM F668, Alloy 6061-T6 or 6262-T19
   - c. Galvanized Washers: ASTM B221, Alloy 7075-T6

6. **Coatings:**
   - a. Aluminum Fasteners: Anodized coating (0.002 inches min.) and chrome plated
   - b. High Strength Steel Bolts and Washers: ASTM F3125
   - c. Other steel items (including stainless steel): hot-dip galvanize - ASTM A123

7. **BREAKAWAY SUPPORT REQUIREMENTS:**
   - Install non-frangible aluminum column (post) (larger than 3SF) with breakaway supports as shown on Sheet 4. Signs shielded by barrier wall or guardrail do not require breakaway support.
**DESCRIPTION:**

**SINGLE COLUMN GROUND SIGNS**

**INDEX**

**STANDARD PLANS**

**FY 2018-19**

**SHEET 2 of 9**

**REVOLUTION DESCRIPTION:**

**REVOLUTION LAST INDEX:**

**700-010**

**COUNTY NORTH EAST**

**CENTROID AND HEIGHT**

**CALCULATION OF SIGN CLUSTER CENTROID**

\[
X_C = \frac{\Sigma (X_i \times A_i)}{\Sigma A_i} \\
Y_C = \frac{\Sigma (Y_i \times A_i)}{\Sigma A_i}
\]

- \( A_i \): Area of individual sign
- \( X_i \): Height of the edge of pavement from the mounting elevation
- \( Y_i \): Height of the centroid of the sign or cluster from the bottom of the sign or cluster
- \( h \): Individual sign height
- \( \text{height} \): Height of sign or cluster centroid from groundline
- \( a \): Individual sign width

**NOTES:**

1. For 'B' & 'C' see Index 700-101 and Roadway Plans.
2. Do not exceed an area of 30 SF or a width of 60 inches for a sign or a sign cluster, including rotated sign panels.
3. Vertical sign spacing (1" shown on Sign Cluster detail) also applies to rotated signs.
### ALUMINUM COLUMN (POST) SELECTION TABLE (O.D. in.)

<table>
<thead>
<tr>
<th>Height (ft)</th>
<th>Outside Diameter</th>
<th>Wall Thickness</th>
<th>Embedment Depth (ft)</th>
<th>Stub Length (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2.0</td>
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<td>4.5</td>
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<td>4.5</td>
<td>3.0</td>
</tr>
<tr>
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<td>3.0</td>
<td>1.5</td>
<td>4.5</td>
<td>3.5</td>
</tr>
<tr>
<td>6</td>
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<td>4.5</td>
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</tr>
<tr>
<td>9</td>
<td>5.0</td>
<td>3.5</td>
<td>4.5</td>
<td>5.5</td>
</tr>
<tr>
<td>10</td>
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<td>6.0</td>
</tr>
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<td>7.5</td>
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<td>4.5</td>
<td>8.0</td>
</tr>
<tr>
<td>15</td>
<td>8.0</td>
<td>6.5</td>
<td>4.5</td>
<td>8.5</td>
</tr>
</tbody>
</table>

*INSTALLING FRANGIBLE COLUMN SUPPORTS:*

Columns (posts) 3¾" 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.

### COLUMN AND FOUNDATION TABLE

<table>
<thead>
<tr>
<th>Column (Post) Scale</th>
<th>Driven Post *</th>
<th>Foundation Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Diameter (in.)</td>
<td>Embedment Depth (ft)</td>
</tr>
<tr>
<td>2.0</td>
<td>1.5</td>
<td>4.5</td>
</tr>
<tr>
<td>2.5</td>
<td>2.0</td>
<td>5.0</td>
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<tr>
<td>3.0</td>
<td>2.5</td>
<td>5.5</td>
</tr>
<tr>
<td>3.5</td>
<td>3.0</td>
<td>6.0</td>
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<tr>
<td>4.0</td>
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<td>6.5</td>
</tr>
<tr>
<td>4.5</td>
<td>4.0</td>
<td>7.0</td>
</tr>
</tbody>
</table>

*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 is not permitted.
STUB/SLEEVE & BASE PLATE DETAILS

Plan

Elevation

BOLT KEEPER PLATE DETAIL

SHIM DETAIL

SLIP BASE DETAIL

SLIP BASE AND FOUNDATION DETAIL

INDEX

SLIP BASE AND FOUNDATION DETAILS

NOTES:

1. Foundation Notes for Frangible Slip Base:
   a. Place Stub into concrete to diameter and depth shown in POST AND FOUNDATION TABLE using Class III Concrete.

2. Slip Base Fabrication Notes:
   a. The difference between the O.D. of the post and I.D. of the sleeve must be 3/4" or less.
   b. Either a Welded Stub Base or Bolted Stub/Sleeve Base may be used to fabricate the Slip Base.
   c. For cast base plates bolted to foundation stubs, use a foundation stub the same size as the sign column (Post).

3. Slip Base Assembly Instructions:
   a. Assemble Slip Base connections in the following manner:
      1. Insert Post into Sleeve and connect using 2 - 1/2" diameter Sleeve Bolts.
      2. Assemble top base plate to bottom Base Plate using Base Bolts (High strength) with 3 washers per bolt.
      3. Slip-Base Assembly Instructions:
         a. Place one washer on each Base Bolt between the Bottom Base Plate and the Base Bolt head.
         b. Place the third washer between the Top Base Plate and the Bolt Keeper Plate.
         c. Use brass shims to plumb the post.
         d. Add the top base plate section.
         e. Place the third washer between the Top Base Plate and the Nut.
   b. Orient the Bolt Keeper Plates in the Direction of Traffic.
   c. Tighten Base Bolts as follows:
      1. Tighten Base Bolts to the maximum possible with a 12" x 15" wrench (this will bed the washers and shims and clear the bolt threads).
      2. Loosen each Base Bolt one turn.
      3. 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.
      4. Distort bolt threads at the junction with nuts to prevent loosening (Repair damaged galvanizing)
      D. 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.

SLIP BASE DETAILS

<table>
<thead>
<tr>
<th>Column (Post) Size</th>
<th>Column Size &quot;D&quot;</th>
<th>Sleeve Diameter (Max) &quot;D&quot;</th>
<th>Sleeve Height &quot;H&quot;</th>
<th>Post Depth &quot;P&quot;</th>
<th>Base Plate Torque</th>
<th>Note</th>
<th>SHIM</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>13/16&quot;</td>
<td>4&quot;</td>
<td>6&quot;</td>
<td>3/4&quot;</td>
<td>3/4&quot;</td>
<td>3/4&quot;</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>15/16&quot;</td>
<td>6&quot;</td>
<td>9&quot;</td>
<td>3/4&quot;</td>
<td>3/4&quot;</td>
<td>3/4&quot;</td>
<td>1/2&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>13/16&quot;</td>
<td>8&quot;</td>
<td>10&quot;</td>
<td>1&quot;</td>
<td>1&quot;</td>
<td>1&quot;</td>
<td>2&quot;</td>
</tr>
</tbody>
</table>

SINGLE COLUMN GROUND SIGNS

FY 2018-19
STANDARD PLANS

LAST REVISION: 01/01/17
DESCRIPTION:

INDEX

SHEET

700-010 4 of 9
**DETAIL "B"**

Optional Slotted Holes

**ALUMINUM SOIL PLATE DETAIL**

- Thickness: 1/4"
- Optional Slotted Hole
- 1/4" Ø Bolt Holes (spaced to match U-Bolts) (washers as required)

**DRIVEN POST DETAIL**

(Frangible Post In Crossovers, Medians & Sidewalks)

- 8" Min., 1'-6" Max. (Driven to Full Embedment)
- 2" GROUT SEAL
- Concrete Sidewalk, Median, Etc.

**DRIVEN POST AND SOIL PLATE DETAIL**

- Aluminum Soil Plate
- 1/3 OF Embedment Depth
- Concrete Sidewalk, Median, Etc.
WIND BEAM CONNECTION NOTES:

1. (8") Ø Stainless Steel Hex Head Bolts with Flat Washer under Head and Lockwasher under Nut may be used in lieu of (8") Ø Aluminum Button Head Bolts.

2. Use Nylon washers (provided by the sheeting supplier) under the button bolt heads to protect sign sheeting.

3. Slots up to 2" long are allowed in wind beams to accommodate U-Bolts for varying Column (Post) diameters.

4. Wind beams may be oriented in either direction.

BACK-TO-BACK SIGN NOTE:
Use the area and the centroid location of the largest sign to determine aluminum column (post) size.

WIND BEAM PLACEMENT NOTES:

1. Install an additional third wind beam along the Sign for signs with heights greater than 30" and less than 72". For rectangular signs greater than 72" maintain a maximum wind beam spacing of 2'-6", with the additional wind beams spaced evenly between the top and bottom wind beams. For rectangular signs up to 12" in height, use only one wind beam at Sign.

2. Install an additional third wind beam along the Sign for Yield and School signs greater than 36".

3. Install an additional third wind beam along the Sign for Diamond signs 30" or greater.

WIND BEAM PLACEMENT NOTES:

1. Install an additional third wind beam along the Sign for signs with heights greater than 30" and less than 72". For rectangular signs greater than 72" maintain a maximum wind beam spacing of 2'-6", with the additional wind beams spaced evenly between the top and bottom wind beams. For rectangular signs up to 12" in height, use only one wind beam at Sign.

2. Install an additional third wind beam along the Sign for Yield and School signs greater than 36".

3. Install an additional third wind beam along the Sign for Diamond signs 30" or greater.
### Single Column Ground Signs

#### Size | Area | Total Area | Centroid
---|---|---|---
24x12 | 2.00 SF | 5.00 SF | 1.25 Ft.
30x24 | 3.90 SF | 1.97 Ft.
18x18 | 1.71 SF | 3.90 SF | 1.57 Ft.
24x12 | 3.13 SF | 1.75 Ft.
30x30 | 4.76 SF | 2.42 Ft.
21x15 | 2.19 SF | 2.19 SF | 1.97 Ft.
30x24 | 5.00 SF | 2.55 Ft.
21x15 | 2.19 SF | 2.19 SF | 1.97 Ft.
24x12 | 2.00 SF | 5.00 SF | 1.75 Ft.
30x30 | 4.76 SF | 2.42 Ft.
21x15 | 2.19 SF | 2.19 SF | 1.97 Ft.
30x30 | 4.76 SF | 2.42 Ft.
21x15 | 2.19 SF | 2.19 SF | 1.97 Ft.
30x24 | 5.00 SF | 2.55 Ft.
21x15 | 2.19 SF | 2.19 SF | 1.97 Ft.
30x30 | 4.76 SF | 2.42 Ft.
21x15 | 2.19 SF | 2.19 SF | 1.97 Ft.
30x24 | 5.00 SF | 2.55 Ft.
21x15 | 2.19 SF | 2.19 SF | 1.97 Ft.
30x30 | 4.76 SF | 2.42 Ft.
21x15 | 2.19 SF | 2.19 SF | 1.97 Ft.
30x24 | 5.00 SF | 2.55 Ft.
21x15 | 2.19 SF | 2.19 SF | 1.97 Ft.
30x30 | 4.76 SF | 2.42 Ft.
21x15 | 2.19 SF | 2.19 SF | 1.97 Ft.
30x24 | 5.00 SF | 2.55 Ft.
21x15 | 2.19 SF | 2.19 SF | 1.97 Ft.
30x30 | 4.76 SF | 2.42 Ft.
21x15 | 2.19 SF | 2.19 SF | 1.97 Ft.
30x24 | 5.00 SF | 2.55 Ft.
<table>
<thead>
<tr>
<th>Size</th>
<th>Area</th>
<th>Total Area</th>
<th>Centroid</th>
</tr>
</thead>
<tbody>
<tr>
<td>30x15</td>
<td>3.13 SF</td>
<td>3.13 SF</td>
<td>2.18 Ft.</td>
</tr>
<tr>
<td>45x36</td>
<td>8.99 SF</td>
<td>8.99 SF</td>
<td>2.18 Ft.</td>
</tr>
<tr>
<td>24x12</td>
<td>2.00 SF</td>
<td>2.00 SF</td>
<td>2.18 Ft.</td>
</tr>
<tr>
<td>24x24</td>
<td>3.20 SF</td>
<td>3.20 SF</td>
<td>2.18 Ft.</td>
</tr>
<tr>
<td>21x15</td>
<td>2.29 SF</td>
<td>2.29 SF</td>
<td>2.18 Ft.</td>
</tr>
<tr>
<td>30x24</td>
<td>3.99 SF</td>
<td>8.18 SF</td>
<td>2.33 Ft.</td>
</tr>
<tr>
<td>21x15</td>
<td>2.29 SF</td>
<td>2.29 SF</td>
<td>2.18 Ft.</td>
</tr>
<tr>
<td>30x15</td>
<td>3.13 SF</td>
<td>3.13 SF</td>
<td>2.18 Ft.</td>
</tr>
<tr>
<td>30x24</td>
<td>3.99 SF</td>
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<td>2.59 Ft.</td>
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<td>2.18 Ft.</td>
</tr>
<tr>
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<td>4.69 SF</td>
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<td>2.18 Ft.</td>
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<td>1.37 Ft.</td>
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<td>9.00 SF</td>
<td>9.00 Ft.</td>
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<td>3.75 SF</td>
<td>3.75 Ft.</td>
</tr>
<tr>
<td>36x36</td>
<td>9.00 SF</td>
<td>9.00 SF</td>
<td>9.00 Ft.</td>
</tr>
<tr>
<td>30x18</td>
<td>3.75 SF</td>
<td>3.75 SF</td>
<td>3.75 Ft.</td>
</tr>
</tbody>
</table>
GENERAL NOTES:
1. Refer to Index 700-010 for additional notes, assembly of base connection and material specifications not given in this Index.
3. Place galvanized steel shims between the Sleeve and Post to obtain a tight fit between the Post and Sleeve.
4. Wind Beam and Vertical Brace: Aluminum Z 3" x 2.1/2" x 3.38. Install Vertical Brace on 7'-0" to 8'-0" signs only.
5. Provide 2- 0.0149" Thick (28 guage) and 2- 0.0329" Thick (21 guage) Brass Shims Per Post. Used brass shims to plumb the post.

COLUMN SELECTION AND FOOTING SIZE TABLE

<table>
<thead>
<tr>
<th>Sign Size</th>
<th>Column Size Diameter x Thickness</th>
<th>Sleeve Size Diameter x Thickness</th>
<th>U-bolt Diameter</th>
<th>Base Bolt Diameter x Length</th>
<th>Torque Wash.</th>
<th>Base Place Thickness</th>
<th>Footing Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'-0&quot; x 9'-0&quot;</td>
<td>4.5&quot; x 0.337&quot; (Schedule 80)</td>
<td>5.56&quot; x 0.5&quot; (Schedule 120)</td>
<td>1/8&quot;</td>
<td>1/4&quot; x 3/4&quot;</td>
<td>270</td>
<td>1&quot;</td>
<td>6'-0&quot;</td>
</tr>
<tr>
<td>4'-0&quot; x 7'-0&quot;</td>
<td>4.56&quot; x 0.375&quot; (Schedule 80)</td>
<td>6.625&quot; x 0.437&quot; (Schedule 80)</td>
<td>1/4&quot;</td>
<td>3/8&quot; x 3/4&quot;</td>
<td>445</td>
<td>1 1/2&quot;</td>
<td>6'-0&quot;</td>
</tr>
</tbody>
</table>

SIGN DETAIL

- Column
- Wind Beam
- Vertical Brace
- Neoprene Pad
- Stainless Steel U-bolt
- Sign Face
- U-bolt (See Table)
- Vertical Brace (See Note #4)

SECTION A-A

- Sign
- U-bolt (See Table)
- Wind Beam
- Vertical Brace (See Note #4)

SECTION B-B

- Sign
- Column
- Wind Beam
- Vertical Brace
- Wind Beam
- 5/8 Dia. Aluminum Button Head Bolts with Nuts and Nylon Washers

SECTION C-C

- Sign
- Column
- Wind Beam
- Vertical Brace
- Wind Beam
- Neoprene Pad
- Stainless Steel U-bolt with Stainless Steel Nuts and Washer (See Table)
BOLT KEEPER PLATE DETAIL

SLEEVE & BASE PLATE DETAILS

BASE AND FOUNDATION DETAIL

STUB DETAIL

DETAIL 'A'

SLEEVE & BASE PLATE DETAILS

BASE AND FOUNDATION DETAIL

STUB DETAIL

DETAIL 'A'
NOTES:
1. Work with index 700-010.
2. Shop Drawings: Not required.

3. Materials:
A. Steel Pipe: ASTM A36 or ASTM A500 Grade 36
B. Steel Pipe (Support Post): ASTM A501 Schedule 40
C. Aluminum Pipe: ASTM B210 Alloy 6061-T6
D. Galvanized U-Bolts, Nuts and Plate Washer
   a. U-Bolts: ASTM A449
   b. Hex Nuts: ASTM A 563 Lock Nuts
   c. Plate Washer: ASTM A 36 or ASTM A500 Grade 36 or 50
E. Galvanized anchor bolts, nuts and washers:
   a. Anchor Rod: ASTM F1554 Grade 55 fully threaded (for Adhesive Anchors)
   b. Anchor Bolts: ASTM F1554 Grade 55 Grade A Hex
   c. Nuts: ASTM A563 Heavy Hex Locking
   d. Washers: ASTM F436
F. Adhesive Anchor Bonding Material: Specification Section 931 Type HF Adhesive.
G. Weld Material: E70XX
H. Snap-In Post Cap: UV and weather-resistant glass-filled polyester cap

4. Coating:
A. U-Bolts, Threaded Rods, Nuts and Washers: ASTM F2329
B. Other Steel: ASTM A123

5. Fabrication:
A. Weld: Specification Section 460-6.4
B. Hot dip galvanize after Fabrication

6. Construction:
A. Locate Sign Support a minimum of 5 feet from an open joint or transition (sign stationing may be adjusted to accommodate this requirement).
B. Base plate must be flush with back of Traffic Railing
C. Anchors in Traffic Railings:
   a. Install Adhesive Anchors in accordance with Specification section 416 except perform field test on one anchor per sign support location.
   b. Use templates and tie anchors as necessary to maintain correct placement of C-I-P Embedded Anchors
   c. Do not drill into existing conduit
D. Temporary Signs on Permanent Traffic Railings: Same as Permanent except Field testing of anchors is not required

7. Removal of Temporary Signs on Permanent Traffic Railings:
A. Cut anchor rods flush with the top of the traffic railing
B. Coat anchors with Type F-1 epoxy to prevent corrosion
   a. Extend coating 2 inches beyond edge of cut anchor rods
   b. Epoxy coating 1/16" thick minimum

8. Payment:
Include the cost of all materials and labor in the cost of the single post sign assembly.

---

<table>
<thead>
<tr>
<th>SIGN LIMITATIONS TABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAX. SIGN AREA (SF)</td>
</tr>
<tr>
<td>25</td>
</tr>
</tbody>
</table>

Dimension A = Distance from centerline of the Support Post to the bottom of the sign or sign cluster.

Dimension C = Vertical distance from the bottom of the sign or sign cluster to the centroid of the sign or sign cluster.
**NOTES:**

1. **Existing Traffic Railings:**
   - A. Locate existing conduit prior to drilling and adjust placement of base plate as necessary to avoid damaging existing conduit. Base plate must be flush with back of traffic railing. Maintain a minimum cover of 2" from face of traffic railing to tip of Adhesive Anchor.

2. **New Traffic Railings:**
   - B. For concrete parapets less than 12" thick, through bolt 1/2" Heavy Hex Head Bolts with Nuts and Washers in lieu of Adhesive Bonded Anchors. Bolt heads shall not protrude more than 1/8" beyond traffic face of railing.
   - C. For through bolting, countersink the nut and washer so that the bolt and nut does not extend beyond the face of the traffic railing. Do not exceed a countersink depth and diameter of 2x.

3. **Optional Couplers:**
   - A. Optional Couplers are shown for slipforming; keep Anchor Bolt coupler threads free of concrete.
   - B. For concrete parapets less than 10" thick, through bolt Adhesive Anchor.

4. **Bridge Deck shown, Approach Slab and Retaining Wall are similar.**

5. **36° Single-Slope Traffic Railing shown, other Traffic Railings and Parapets are similar.**

6. **Bridge Deck shown, Approach Slab and Retaining Wall are similar.**

---

**TYPICAL SECTION - NEW CONSTRUCTION**

**TYPICAL SECTION - EXISTING RAILING**

**TYPICAL SECTION - NEW CONSTRUCTION**

---

**SIGN SUPPORT BRACKET**
TABLE 1 - SIGN PANEL AND POST SIZING

<table>
<thead>
<tr>
<th>Temporary Signs</th>
<th>Permanet Signs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. Sign Area (SF)</td>
<td>Post Ø (NPS)</td>
</tr>
<tr>
<td>≤ 123</td>
<td>3 3/8</td>
</tr>
<tr>
<td>&gt; 123, ≤ 200</td>
<td>3 1/8</td>
</tr>
</tbody>
</table>

1. Work with Index 700-010.
2. Shop Drawings: Not required.
3. Materials:
   A. Steel Plate: ASTM A36 or ASTM A709 Grade 36
   B. Steel Pipe (Support Post): ASTM A501 Schedule 40
   C. Galvanized U-Bolts, Nuts and Plate Washer
      a. U-Bolts: ASTM A449
      b. Nuts: ASTM A 536 Lock Nuts
      c. Plate Washer: ASTM A 36 or ASTM A709 Grade 36 or 50
   D. Galvanized Anchor Bolts, Nuts and Washers:
      a. Anchor Rod: ASTM F1554 Grade 55 Fully threaded (for Adhesive Anchors)
      b. Anchor Bolt: ASTM A 325 Grade 55 Grade A Hex
      c. Nuts: ASTM A325 Heavy Hex Locking
      d. Washers: ASTM A496
   E. Adhesive Anchor Bonding Material: Specification 937 Type IV Adhesive
   F. Weld Material: E70XX
   G. Snap-In Post Cap: UV and weather-resistant glass-filled polyester cap
4. Coating:
   A. U-Bolts, Threaded Rods, Nuts and Washers: ASTM A325
   B. Other Steel: ASTM A123
5. Fabrication:
   A. Weld: Specification 460-6.4
   B. Hot dip galvanize after fabrication
6. Construction:
   A. Locate Sign Support a minimum of 5 feet from an open joint or transition (sign stationing may be adjusted to accommodate this requirement)
   B. Anchor Bolts must be flush with top of railing
   C. Anchors in Traffic Railings:
      a. Install Adhesive Anchors in accordance with Specification 416 except perform field test on one anchor per sign support location
      b. Use templates and tie anchors as necessary to maintain correct placement of C-1-P Embedded Anchors
      c. Do not drill into existing reinforcing
   D. Temporary Signs on Permanent Traffic Railings, Same as Permanent except field testing of anchors is not required
   E. Temporary Signs on Temporary Railings/Barriers:
      a. Install Sign Supports at the midpoint along the length of a single segment
      b. Avoid drilling through existing reinforcement; use of metal detector not required
      c. Field testing of anchors is not required
7. Removal of Temporary Signs on Permanent Traffic Railings:
   A. Cut anchor rods flush with the top of the railing
   B. Coat anchors with Type I-1 epoxy to prevent corrosion
      a. Extend coating 2 inches beyond edge of cut anchor rods
      b. Epoxy coating 1/16" thick minimum
   C. Anchors in Traffic Railings:
      a. Install Adhesive Anchors in accordance with Specification 416 except perform field testing of anchors is not required
      b. Use templates and tie anchors as necessary to maintain correct placement of C-1-P Embedded Anchors
      c. Do not drill into existing reinforcing
   D. Temporary Signs on Temporary Railings/Barriers:
      a. Install Sign Supports at the midpoint along the length of a single segment
      b. Avoid drilling through existing reinforcement; use of metal detector not required
      c. Field testing of anchors is not required
8. Payment:
   Include the cost of all materials and labor in the cost of the single post sign assembly.
**DESCRIPTION:**

FY 2018-19

**STANDARD PLANS**

**SINGLE POST MEDIAN BARRIER MOUNTED SIGN SUPPORT**

**REVISION**

01/01/17

**INDEX**

700-013

**SHEET**

2 of 2

---

**NOTES:**

1. Place anchor rods in a staggered or linear pattern as necessary to avoid reinforcing.
2. Use a staggered pattern for all temporary barriers.

---

**TABLE 2 - BASE PLATE TYPE AND ANCHOR ROD SIZING**

<table>
<thead>
<tr>
<th>Index No.</th>
<th>Type/Application</th>
<th>Base Plate Type</th>
<th>Anchor Rod Ø</th>
</tr>
</thead>
<tbody>
<tr>
<td>521-001</td>
<td>Full Wall</td>
<td>B</td>
<td>1&quot;</td>
</tr>
<tr>
<td>521-001</td>
<td>Cantilever or L-Wall</td>
<td>A</td>
<td></td>
</tr>
<tr>
<td>All listed above Plus 102-110 &amp; 102-100</td>
<td>Temporary Signs</td>
<td>C</td>
<td>7/8</td>
</tr>
</tbody>
</table>

---

**BASE PLATE TYPE A**

(Linear Anchor Rod Pattern)

**BASE PLATE TYPE B**

(Staggered Anchor Rod Pattern)

**BASE PLATE TYPE C**

(Staggered Anchor Rod Pattern shown)

---

**SIGN SUPPORT WELDMENT DETAIL**

(Staggered Anchor Rod Pattern shown)
GENERAL NOTES:
1. Verify Column lengths in the field prior to fabrication.
2. Shop drawings:
   A. Column/Sign Posts: Sign Support Shop drawings are not required when fabricated in accordance with this Index and support posts do not exceed the length shown in the plans by more than 2'-0".
   B. Sign Panels: Horizontal panel splices are allowed at interior wind beams for sign panels with a depth (>7) greater than 10 feet. Shop drawings required for panel splice details.
   C. When shop drawings are required; obtain approval prior to fabrication.
3. Materials:
   A. Sign Panel Mounting Materials:
      a. Aluminum Bars, and Extruded Shapes: ASTM B221, Alloy 6061-T6 or Alloy 6351-T5
      b. Aluminum Structural Shapes: ASTM 630B, Alloy 6061-T6
   B. Sign Support Structure Materials:
      a. Steel Plates and Structural Shapes: ASTM A36 or ASTM A709, Grade 36
      b. Steel Weld Metal: E70XX
      c. Rebar Sizes: ASTM B31.1
   C. Aluminum Bolts, Nuts and Washers:
      a. Flat Head and Button Head Bolts: ASTM F 468, Alloy 2024-T4
      b. Hex Nuts: ASTM F487, 2024-T4
   D. Stainless Steel Bolts, Nuts and Washers: ASTM F 593, 2013-16
   E. High Strength (H.S.) Steel Bolts, Nuts and Washers:
      a. Galvanized Hex Head Bolts: ASTM F3312, Grade A325, Type 1
      b. Galvanized Nuts: ASTM A4563 Hex, Grade DH
      c. Galvanized Washers: ASTM F436
   F. Concrete: Class I
   G. Reinforcing Bars or Welded Wire Reinforcement (WWR): Specification Section 615
4. Coatings:
   A. Aluminum Fasteners: Anodic coating (0.0002 inches min.) and chromate sealed
   B. Galvanize High Strength Steel Bolts Nuts and Washers: ASTM F3312
   C. Galvanize all other steel items (excluding stainless steel) Hot-dip ASTM A123
   D. Treat damaged galvanizing in accordance with Specification Section 562
5. Fabrication:
   A. All Base Connections and Stub Column materials are steel unless otherwise specified.
   B. Drill or sub-punch and ream holes in Fuse Plates and Hinge Plates
   C. Weld Base Plate to Post & Stub or if using the Alternate Connection Detail weld Base Plate and Stiffeners to Post and Stub (Sheet 2)
   D. Hot dip galvanize after fabrication. Remove all drips, runs or beads on base plate within washer contact areas (Including saw cuts)
6. Construction:
   A. Install the Sign Structure foundation in accordance with Specification Section 655. Orient Stub Post according to direction of traffic (Sheet 2)
   B. Tighten all high strength bolts except Base Bolts in accordance with Specification Section 710
   C. Assemble Post to Stub with Base Bolts and three flat washers per bolt (See Base Connection Details, Sheet 2). Tighten Base Bolts in accordance with Instructions Notes on Sheet 2.
**MULTI-COLUMN SIGN ASSEMBLY**

**FOUNDATION NOTES:**
The Contractor may use Welded Wire Reinforcement (WWR) for foundation reinforcing.

At the Contractor's option, the #4 tie bars at 12" o.c. may be replaced by #10 Spiral Wire at 6" pitch, with three flat turns at the top and one flat turn at the bottom in accordance with Specification Section 415.

**INSTRUCTIONS NOTES:**
1. Assembly of Base Instructions:
   A. Place one washer on each Base Bolt between the Bottom Base Plate and the head of high strength Base Bolt; place the next washer between the Bottom Base Plate and the head of high strength Base Bolt and the Nut.
   B. Shim as required to plumb column. Provide 2-0.0149" thick (28 gauge) brass shims per column.
   C. Under the supervision of the Engineer, use a calibrated wrench to tighten bolts to the torque prescribed in the Table. Over tightened Base Bolts will not be permitted.
   D. Burr threads at junction with nut to prevent nut loosening. Treat damaged galvanizing.

**BASE CONNECTION DATA**

1. Place one washer on each Base Bolt between the Bottom Base Plate and head of high strength Base Bolt. Place the next washer between the Bottom Base Plate and the head of high strength Base Bolt and the Nut. Shim as required to plumb column. Provide 2-0.0149" thick (28 gauge) brass shims per column.

2. Loosen each Base Bolt one turn.

3. H.S. Base Bolt with 3 washers & hex bolt on each bolt. See Table for Bolt Dia & Torque. See Assembly of Base Instructions.

4. Remove all galvanizing runs or beads in washer area. Shims as required.

5. Bolt keeper plate detail.

**ALTERNATIVE BASE CONNECTION DATA**

- **Base Bolt Dia:** L
- **Washer (Typ.):** M
- **Stiffener Plate & Thickness:** R
- **Tightening Instructions:** See Base Connections or Alternative Base Connection For Detail
- **Allowance for Beads:** ±2" for each bend
- **Base Bolt L:** ±1/2" for each bend
- **Finished Grade:** D
- **Elevations & Directions:** 30°
- **Washers & Hex Nut:** L
- **Bolt Plate & Thickness:** H
- **Plate Thickness:** 0.0149" (28 Gauge)
- **M x B x D:** 30°
- **L x H:** 270 x 13/16" x 3/8" for each bend

**Foundation:**
- **Depth:** 8-7/8"
- **Cover:** 3-1/4"
- **Dia.:** 8"
- **Grade:** 30°
- **Weight:** 270 lbs
- **Bolt Plate & Thickness:** H
- **Plate Thickness:** 0.0149" (28 Gauge)
- **Washers & Hex Nut:** L
- **Bolt Keeper Plate Detail:** R
- **Tightening Instructions:** See Instructions Note #18
- **Shim Detail:** B
- **Base Plate Detail:** E
- **Aluminum:** 1/4" thick
- **Torque:** See Assembly Instructions
- **Aluminum Bolts:** ±2" for each bend
- **Base Bolt Dia:** L
- **Washer (Typ.):** M
- **Stiffener Plate & Thickness:** R
- **Tightening Instructions:** See Base Connections or Alternative Base Connection For Detail
- **Allowance for Beads:** ±2" for each bend
- **Base Bolt L:** ±1/2" for each bend
- **Finished Grade:** D
- **Elevations & Directions:** 30°
- **Washers & Hex Nut:** L
- **Bolt Plate & Thickness:** H
- **Plate Thickness:** 0.0149" (28 Gauge)
- **M x B x D:** 30°
- **L x H:** 270 x 13/16" x 3/8" for each bend
- **Designations:** Normal Depth in inches x weight in pounds per linear foot
### Multi-Column Ground Sign

#### Back Elevation

- Multi-Column Sign Assembly
- See Plan Details for Column Size
- See Plans for Column Size
- See Plan Details for Column Size
- See Plan Details for Column Size

#### Side Elevation

- Wind Beam (Typ.)
- Backing Strip (Typ.)
- Column (Typ.)
- Panel Splice (Typ.)
- Sign Face
- See Detail 'A'

#### Sign Panel Splice

- **Panel Splice**
- **Sign Panels**
- **Bolt Together**

#### Number of Wind Beams For Given Depth

<table>
<thead>
<tr>
<th>No. Beams</th>
<th>Max. Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>7'-0&quot;</td>
</tr>
<tr>
<td>3</td>
<td>10'-0&quot;</td>
</tr>
<tr>
<td>4</td>
<td>16'-0&quot;</td>
</tr>
<tr>
<td>5</td>
<td>20'-0&quot;</td>
</tr>
</tbody>
</table>

#### Size of Wind Beams

<table>
<thead>
<tr>
<th>Size of Zee**</th>
<th>Length of Sign (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zee 3 x 2 1/2”</td>
<td>0 to 17'-8&quot;</td>
</tr>
<tr>
<td>Zee 3 x 2 1/2”</td>
<td>0 to 17'-8&quot;</td>
</tr>
<tr>
<td>Zee 3 x 2 1/2”</td>
<td>11'-1&quot; to 20'-8&quot;</td>
</tr>
</tbody>
</table>

** Zee Beams are aluminum. No steel equivalent available. Designation gives (Member Depth) x (Flange Width) x (lb/ft)

#### Wind Beam, Backing Strip & Fuse/Hinge Plate Details

- **W**
- **S**
- **D**

#### Fuse Plate Data

<table>
<thead>
<tr>
<th>Section</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>i₁</th>
<th>d₁</th>
<th>D₁</th>
<th>D₂</th>
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</thead>
<tbody>
<tr>
<td>S 3x52</td>
<td>7-1/8</td>
<td>2-3/8</td>
<td>1-1/4</td>
<td>1/2</td>
<td>1/2</td>
<td>5/16</td>
<td>3/16</td>
<td>7/16</td>
<td>9/16</td>
</tr>
<tr>
<td>W 8x12</td>
<td>7-3/4</td>
<td>4</td>
<td>1-1/4</td>
<td>7/8</td>
<td>15/16</td>
<td>3/16</td>
<td>1/16</td>
<td>3/16</td>
<td>11/16</td>
</tr>
<tr>
<td>W 2x10</td>
<td>8-1/8</td>
<td>3-1/8</td>
<td>1-1/8</td>
<td>1-1/4</td>
<td>3/16</td>
<td>1/2</td>
<td>1/2</td>
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<td>3/16</td>
</tr>
<tr>
<td>W 3x11</td>
<td>6-1/8</td>
<td>6-1/2</td>
<td>1-3/8</td>
<td>1-7/8</td>
<td>1-7/8</td>
<td>1-7/8</td>
<td>1/2</td>
<td>1/2</td>
<td>1/2</td>
</tr>
</tbody>
</table>

*Designations: Normal Depth in inches.

### REVISION

- **10/27/2017**
- **10:19:52 AM**

### DESCRIPTION

- **REV 001 11/01/17**

### FY 2018-19

- **STANDARD PLANS**
- **MULTI-COLUMN GROUND SIGN**
- **MULTI-COLUMN SIGN BACK PANEL**
- **DETAIL 'A'**

### INDEX

- **700-020**
- **3 of 3**
WIND BEAMS AND VERTICAL HANGERS

**TYPICAL SIGN FOR OVERHEAD TRUSS**

**GENERAL NOTES**

1. Work this Index with Index 700-040 and 700-041.
2. The number and location of the Panel Splices are determined by the Sign Face supplier.
3. Spacing of Vertical Hangers:
   A. Two Vertical Hangers = 21.0% L
   B. Three Vertical Hangers = 14.5% L
   C. Four Vertical Hangers = 10.7% L
   D. Five Vertical Hangers = 8.5% L
   E. Six Vertical Hangers = 7.0% L

4. Spacing of Wind Beams:
   A. Two Wind Beams = 21.0% D
   B. Three Wind Beams = 14.5% D
   C. Four Wind Beams = 10.7% D
   D. Five Wind Beams = 8.5% D
   E. Six Wind Beams = 7.0% D

5. Shop Drawings:
   A. Required for Sign Panels deeper than 10'-0" with a horizontal panel splice.
   B. Splice must be located in between interior Zee Supports and only allowed on signs greater than 10'-0".

6. Materials:
   A. Aluminum:
      a. Bars, and Extruded Shapes: ASTM B 221, Alloy 6061-T6 or Alloy 6351-T5
      b. Structural Shapes: ASTM B611, Alloy 6061-T6
      c. Flat Head and Hex Head Machine Bolts: ASTM F468, Alloy 2024-T4
      d. Structural Shapes: ASTM B611, Alloy 6061-T6
      e. Lock Washers: ASTM B221, Alclad 2024-T4
   B. Steel:
      a. U-Bolts: ASTM A449 or ASTM A193 B7
      b. Nuts: ASTM F563, 2 per leg
      c. Flat Head Machine Bolt With Lock Washers & Nuts: ASTM F436, (Flat Washers)
   C. Coatings:
      a. Washers: ASTM F467, Alloy 6061-T6 or Alloy 6262-T9
      b. Structural Shapes: ASTM B611, Alloy 6061-T6
      c. Washers: ASTM F436, (Flat Washers)
   D. Wind Speed by county: see Index 715-010.

**5. Shop Drawings**

A. Required for Sign Panels deeper than 10'-0" with a horizontal panel splice.
B. Splice must be located in between interior Zee Supports and only allowed on signs greater than 10'-0".

**6. Materials**

A. Aluminum:
   a. Bars, and Extruded Shapes: ASTM B 221, Alloy 6061-T6 or Alloy 6351-T5
   b. Structural Shapes: ASTM B611, Alloy 6061-T6
   c. Flat Head and Hex Head Machine Bolts: ASTM F468, Alloy 2024-T4
   d. Structural Shapes: ASTM B611, Alloy 6061-T6
   e. Lock Washers: ASTM B221, Alclad 2024-T4
B. Steel:
   a. U-Bolts: ASTM A449 or ASTM A193 B7
   b. Nuts: ASTM F563, 2 per leg
   c. Flat Head Machine Bolt With Lock Washers & Nuts: ASTM F436, (Flat Washers)
C. Coatings:
   a. Washers: ASTM F467, Alloy 6061-T6 or Alloy 6262-T9
   b. Structural Shapes: ASTM B611, Alloy 6061-T6
   c. Washers: ASTM F436, (Flat Washers)
D. Wind Speed by county: see Index 715-010.
**PLACEMENT OF SIGN LIGHTS**

1. This Index details a bottom luminaire support structure. For signs requiring top luminaire support structures, the detail can be reversed.

2. Luminaire spacing and arm length is shown on Guide Sign Worksheet.

3. The Guide Sign Worksheet indicates the sign luminaire used for basis of design. The contractor may propose a different luminaire by submitting photometric calculations for each lighted sign for review by the Engineer.

**SIGN LIGHTING INSTALLATION**

**Roadway Lighting included in contract:**

1. Power for the sign lighting provided from the roadway lighting circuit.

2. Indicate sign location and a pull box location for connection to the sign lights in the lighting plans.

3. Lighting contractor installs pull box and loops 2' of lighting circuit conductors in the pull box for connection by the signing contractor.

4. Signing contractor furnishes and installs the luminaires, Nema 3R enclosure, 30 amp breaker, conduit, conductors and all other electrical equipment necessary for connection to the lighting circuit.

**Roadway Lighting not included in contract:**

1. Signing plans include the pay item numbers to furnish and install conduit, conductors, ground rods, pull boxes and service point equipment.

2. Signing plans indicate the location of the service point equipment and circuit runs.

3. Signing contractor provides all electrical equipment necessary for connection of the sign lights.
NOTES

1. Install hanger pipe to each vertical beam crossed with a 3/8" U-Bolt, lock washers and hex nuts. Cap both ends of the horizontal pipe.

2. Materials:
   A. Steel Pipe: ASTM A53 (Grade A or B)
   B. Steel Plate: ASTM A36
   C. Bolts: ASTM A563
   D. Hex Nuts: ASTM A563
   E. Washers: ASTM F436


4. All pipe dimensions are NPS.

5. Chord O.D. + 5" (Min.)

2" Sch. 40 Steel Pipe

---

SECTION B-B

Bolt Circle (4 Req'd)

" Ø Holes On 5" Ø

16

9

3" Sch. 40 Pipe

---

SECTION A-A

PLATE 'A'

---

PLATE 'B'

---

DETAIL 'A'

( Luminaire Support Structure )

---

DETAIL 'B'

( Hanger Pipe Connection )

---

LUMINAIRE SUPPORT STRUCTURE

---

EXTERNAL LIGHTING FOR SIGNS

---

FY 2018-19

STANDARD PLANS

---

700-031

2 of 2
NOTES:
1. Work this Index in conjunction with CANTILEVER SIGN STRUCTURE.
   DATA TABLES in the Plans and Index 700-030.
2. Handholes are required at pole base for DNS Structures. Refer to Index 700-090 for Handhole Details.
3. Shop Drawings are required.
   Obtain Shop Drawing approval prior to fabrication. Include the following:
   A. Upright Pipe height ('A') and Foundation elevations. Verify dimension in the field prior to submittal to ensure minimum vertical clearances of the sign panel over the roadway.
   B. Height of the foundation above adjacent ground.
   C. Anchor bolt orientation with respect to centerline of truss and the direction of traffic.
   D. Chord Splices.
   E. Handholes at pole base (when required).

4. Materials:
   A. Sign Structure:
      a. Upright and Chords (Steel Pipe): API 5L X42 PSL2, 42 ksi yield or ASTM A606, Grade B (W只剩下).
      b. Steel Angles and Structural Plates and Bars: ASTM A709 Grade 3.
      c. Wood Material: ETSEX.
   B. Bolts, Nuts and Washers:
      a. High Strength Bolts: ASTM F3125, Grade A325 Type 1.
      b. Nuts: ASTM A325 Grade D Heavy-Hex.
      c. Washers: ASTM F436 Type 1, one under turned element.
   C. Anchor Bolts, Nuts and Washers:
      a. Anchor Bolts: ASTM F1554 Grade 5.
      b. Nuts: ASTM A563 Grade A Heavy-Hex (5 per bolt).
      c. Plate Washers, ASTM A36 (2 per bolt).
   D. Concrete:
      a. Spread Footing Concrete: Class IV.
      b. Drilled Shaft concrete: Class IV (Drilled Shaft).
   E. Reinforcing Steel: Specification Section 415.

5. Fabrication:
   A. Welding: Specification Section 460-6.4.
   B. Chord Splices: "SD" Panel from upright is the closest panel in which a chord splice may be used. See Plans for CANTILEVER SIGN STRUCTURE.
   C. Anchor bolt orientation with respect to centerline of truss and the direction of traffic.
   D. Height of the foundation above adjacent ground.
   E. Upright Splices: Not allowed.
   F. Structural bolt hole diameters: Bolt diameter plus 1/4".
   G. Anchor bolt hole diameters: Bolt diameter plus 1/2".
   H. Drilled Shaft concrete: Class IV.
   I. Nuts: ASTM A563 Grade DH Heavy-Hex.
   J. Congealed, as necessary, and secure components for shipment.

6. Coatings:
   A. Bolts, Nuts and Washers: ASTM F3125.
   B. All other steel, including Plate Washers, hot dip galvanize: ASTM A53.

7. Construction:
   A. Construct foundation in accordance with Specification Section 455.
   B. Prior to erection, record the as-built anchor locations and submit to the Engineer.
   C. Upright Splices: Not allowed.
   D. Structural bolt hole diameters: Bolt diameter plus 1/4".
   E. Anchor bolt hole diameters: Bolt diameter plus 1/2".
   F. Upright Splice: Not allowed.
   G. Chord Splice: Not allowed.
   H. Disassemble, as necessary, and secure components for shipment.
NOTES:
1. Construction joint allowed, roughen surface to \( \frac{3}{16} \) minimum amplitude prior to pour.
2. See Traffic Plans for elevation at top of Foundation.
3. Install Drilled Shaft with a 2'-0" minimum from top elevation of the drill shaft to the finished grade, unless specified otherwise in the plans.
4. The shaft length is based on 2'-0" height above finished grade.
5. Structural Grout Pad dimension may be modified to be less than 3" where the footprint of the Structural Grout Pad does not provide adequate clearance for accessibility considerations.
6. Wrap fillet weld around the stiffener termination on the tube wall.
NOTE:

1. Wrap fillet weld around the stiffener termination on the tube wall.

2. Truss Chord Bolts:
   A. Top and Bottom: Install 'TC' hex head bolts.
   B. Back: Install 'TB' hex head bolts.

SECTION A-A
(With Gusset Plates And Web Angles Omitted For Clarity)

DETAIL 'C'

UPRIGHT-TRUSS CONNECTION DETAIL
(Web Members From Back Truss Chord Omitted For Clarity)

NOTE:

1. Wrap fillet weld around the stiffener termination on the tube wall.

2. Truss Chord Bolts:
   A. Top and Bottom: Install 'TC' hex head bolts.
   B. Back: Install 'TB' hex head bolts.
TRUSS NOTES:
1. Out-of-plane members are not shown for clarity.
2. Wrap fillet weld around plate termination on the tube wall.
3. Chord Splices not shown.

<table>
<thead>
<tr>
<th>Bolt Size</th>
<th>Distance EA</th>
<th>Distance EB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4&quot; Ø</td>
<td>4 3/4&quot;</td>
<td>2 1/8&quot;</td>
</tr>
<tr>
<td>1/2&quot; Ø</td>
<td>3 7/8&quot;</td>
<td>1 1/4&quot;</td>
</tr>
<tr>
<td>5/8&quot; Ø</td>
<td>2 1/8&quot;</td>
<td>1 1/4&quot;</td>
</tr>
<tr>
<td>3/4&quot; Ø</td>
<td>2 5/8&quot;</td>
<td>1 1/4&quot;</td>
</tr>
</tbody>
</table>

FRONT ELEVATION

SIDE ELEVATION

CANTILEVER ASSEMBLY

TRUSS NOTES:
1. Out-of-plane members are not shown for clarity.
2. Wrap fillet weld around plate termination on the tube wall.
3. Chord Splices not shown.
CANTILEVER ASSEMBLY

SPLICE CONNECTION NOTES:
1. Only 6 bolts are shown in detail for clarity. (One Half Each Side Of Splice)
2. Splices are not permitted for trusses less than or equal to 40', Splice optional for trusses greater than 40'.

TRUSS PLUG DETAIL

 UPRIGHT CAP DETAIL
NOTES:
1. Work this Index in conjunction with SPAN SIGN STRUCTURE DATA TABLES in the Plan and Index 700-020.
2. Handholes at the pole base are required for DMS Structures. Refer to Index 700-090 for Handhole Details.
3. Shop Drawings are required.

Obtain Shop Drawing approval prior to fabrication. Include the following:
A. Upright Pipe heights ("C" & "B") and foundation elevations: Verify and validate/document alignment and clearance for bolted connections of the sign panel over the roadway.
B. Height of the foundation above adjacent ground.
C. Anchor bolt orientation with respect to centerline of truss and direction of traffic.
D. Method to be used to provide the required parabolic camber.
E. Handholes at pole base (when required).

4. Materials:
A. Sign Structure:
   a. Upright and Chords (Steel Pipe): API 5L X42 PS512, 42 ksi yield or ASTM A500, Grade B (Min.)
   b. Steel Angles and Plates: ASTM A369 grade 36
   c. Weld Material: E70XX
B. Bolts, Nuts and Washers:
   a. High Strength Bolts: ASTM F3123, Grade A325, Type 1
   b. Nuts: ASTM A563 Grade A Heavy-Hex
   c. Plate Washers: ASTM A36, Grade A Heavy-Hex
   d. Steel Angles (E120, Type 1), one under turned element
   e. Anchor bolts, nuts and washers
      a. Anchor bolt material: Carbon Steel, Grade 55, threaded full length
      b. Anchor bolts: ASTM A490, Grade 55, threaded full length
      c. Plate Washers: ASTM A325, 12 per bolt
C. Drilled Shaft, except payment is included in the cost of the structure.
D. Concrete: Class IV (Drilled Shaft)
E. Reinforcing Steel: Specification Section 415
F. Hot Dip Galvanize after fabrication.
G. Shop assemble the entire structure after galvanizing to validate/document alignment and clearance for bolted connections as well as contact between connecting plates. Take remedial action, if necessary, prior to shipment.
H. Disassemble as necessary and secure components for shipment.

5. Fabrication:
A. Welding: Specification Section 460-6.4
B. Chord Splices: Minimum splice spacing is three truss panel lengths apart and three (3) truss panel lengths from the uprights.
   a. Chord Splices may be either the Standard Splice or the Alternate Splice but not both on the same structure.
   b. Upright splice: Not allowed
   c. Structural bolt hole diameters: Bolt diameter plus 16".
   d. Anchor bolt hole diameters: Bolt diameter plus 16".
   e. Anchor bolt hole diameters: Bolt diameter plus 1/2".
F. Hot Dip Galvanize after fabrication.
G. Shop assemble the entire structure after galvanizing to validate/document alignment and clearance for bolted connections as well as contact between connecting plates. Take remedial action, if necessary, prior to shipment.
H. Disassemble as necessary and secure components for shipment.

6. Coatings:
A. Bolts, Nuts and Washers: ASTM F3272
   a. Anchor bolts, nuts and washers:
      a. Anchor bolts, nuts and washers:
      b. Anchor bolts, nuts and washers:
      c. Plate Washers: ASTM A36, Grade A Heavy-Hex
   b. Nuts: ASTM A563 Grade A Heavy-Hex
   c. Washers: ASTM F436, Type 1, one under turned element
   d. High Strength Bolts: ASTM F3123, Grade A325, Type 1

7. Construction:
A. Construct foundation in accordance with Specification Section 455
B. Method to be used to provide the required parabolic camber as shown on the Camber Diagram.
C. Anchor bolt orientation with respect to centerline of truss and direction of traffic.
D. Confirm Class IV (Drilled Shaft).
E. Handholes at pole base (when required).

8. Production Plan:
A. Upright Pipe height ("C" & "B") and foundation elevations: Verify and validate/document alignment and clearance for bolted connections of the sign panel over the roadway.
B. Height of the foundation above adjacent ground.
C. Anchor bolt orientation with respect to centerline of truss and direction of traffic.
D. Method to be used to provide the required parabolic camber.
E. Handholes at pole base (when required).

D. Bolted connection:
   a. Bolted connection:
      a. Bolted connection:
      b. Bolted connection:
      c. Bolted connection:
      d. Bolted connection:
      e. Bolted connection:
      f. Bolted connection:
      g. Bolted connection:
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      v. Bolted connection:
      w. Bolted connection:
      x. Bolted connection:
      y. Bolted connection:
      z. Bolted connection:
NOTES:
1. See Traffic Plans for elevation at top of Foundation.
2. Install Drilled Shaft with a 2'-0" minimum from top elevation of the drill shaft to the finished grade, unless specified otherwise in the plans.
3. The shaft length is based on 2'-0" height above finished grade.
4. Wrap fillet weld around the stiffener termination on the tube wall (Typ).

1. See Traffic Plans for elevation at top of Foundation.
2. Install Drilled Shaft with a 2'-0" minimum from top elevation of the drill shaft to the finished grade, unless specified otherwise in the plans.
3. The shaft length is based on 2'-0" height above finished grade.
4. Wrap fillet weld around the stiffener termination on the tube wall (Typ).
**NOTES:**

1. Wrap fillet weld around the stiffener termination on the tube wall.
2. Truss Chord Bolts: 'LB' or 'RB' Hex Head Bolts 'LA' or 'RA' Ø.
3. Right Upright Truss connection shown. Left Upright Truss connection similar.
SPAN SIGN ASSEMBLY

NOTES:
1. Out-of-plane members are not shown for clarity.
2. Back truss chord and attached angles are not shown for clarity.
3. Wrap fillet weld around plate termination on the tube wall.

<table>
<thead>
<tr>
<th>Bolt Diameter (in.)</th>
<th>Distance (in.)</th>
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<tr>
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<td>2 1/2</td>
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</table>

Truss Chord 'F' (Typ.)
See DETAIL 'E' For Edge Distance

Truss Web Angles (Typ.)
See DETAIL 'F' For Plane Of View

TRUSS

SIDE ELEVATION

BACK-SIDE SIGN MOUNTING

2-1/2" Ø B-Hole With Double Nuts And Washers (Typ.)

See DETAIL 'K'

See DETAIL 'K' For Sign Luminaire Mounting Details

SPAN SIGN STRUCTURE

DESCRIPTION:
FY 2018-19
STANDARD PLANS
INDEX
700-041
4 of 5
Street Name

DESCRIPTION:

1. Free-swinging, internally-illuminated street signs shall only be installed on the signal pole for span wire assemblies. For mast arm assemblies the street sign may be installed on the arm or pole.

2. Free-swinging, internally-illuminated street signs shall meet the requirements of Section 700 of the Standard Specifications for Road and Bridge Construction.

3. Pole attachments and cantilever arm (or truss) assemblies may be accepted by Contractor certification provided the signs being supported meet the weight and area limitations included in Section 700 for “Acceptance by Certification.”

4. Pole attachments and cantilever arm (or truss) assemblies supporting signs not meeting the weight or area limitations included in Section 700 for “Acceptance by Certification” require the submission of structural calculations and Shop Drawings that have been prepared by and sealed by the Specialty Engineer.

OPTION 1

OPTION 2

MAST ARM ASSEMBLY

SPAN WIRE ASSEMBLY

NOTES:
GENERAL NOTES:

1. Mark this Index with Specification 700.

2. Furnish and install the Dynamic Message Sign (DMS) sign structure in accordance with Index 700-040 or 700-041. Locate foundations at locations shown in the Plans.

3. Shop Drawings are required:
   A. Include the DMS geometry.
   B. Catwalk design in accordance with AISC, AASHTO, and OSHA requirements as applicable.
   C. Do not start fabrication until the shop drawings are approved.

4. Install Catwalk from DMS to outer edge of paved shoulder and not less than 4 feet in length.

5. If required, install guardrail at location shown in the Plans and in accordance with Index 536-001.

6. Materials:
   A. Sign Mounting Components:
      a. Aluminum Structural Shapes: ASTM B308, Alloy 6061-T6
      b. Vertical Hangers: ASTM A404, Grade 88
      c. U-Bolts: ASTM A449 or A193 B7
      d. Steel Bolts, Nuts, and Washers:
         1. High Strength Bolts: ASTM F3125, Grade A325, Type 1
         2. Nuts: ASTM F563
         3. Washers: ASTM F463 (Flat Washer)
   B. Coatings:
      a. All nuts, bolts and washers ASTM A329
      b. All other steel items ASTM A123
      c. Bolt hole Diameters: Bolt plus $\frac{3}{8}$ before galvanizing

7. Installation:
   A. See project requirements for location of DMS Cabinet.
   B. Field Adjust pole-mounted DMS cabinet height to achieve best access for maintenance personnel given site condition as directed by the Engineer. Avoid conflicts with stiffeners, handholes and maintenance of anchor bolts.
   C. Locate the sign horizontal on the structure as shown in the Plans. Vertically center the sign enclosure with the centerline of the truss.
   D. Before erection, field drill the bolt holes in the vertical hangers and horizontal mounting member attached to the sign enclosure. Field locate holes to allow vertical hanger placement as shown on the Plans with no conflicts with gusset or splice plates.
   E. Locate threaded couplings on sign side of upright above the sign truss.
   F. Connect grounding conductors to the steel framework that has been treated to base metal by use of bonding plates, having contact area of not less than 8 square inches or by welding or brazing. Drilling and tapping the steel structure to accept a threaded connector is also an acceptable method.
   G. If steel framework is to be drilled and tapped to accept a threaded connector, the threaded connector shall be galvanized and have at least 3 threads fully engaged and secured with a jam nut to the steel framework.
   H. Bends in the conduit must be greater than the minimum bending radius for the cable contained in the conduit.
   I. Completely encase all data, fiber optic and power cables for the DMS within the sign structure or in conduit.
   J. Permanently stamp/mark foundation to indicate conduit locations.
   K. Transition conduit in foundation to indicate underground conduit with appropriate reducer outside the limits of the foundation.
NOTE: Actual number and direction of travel lanes varies.
**DETAIL "B"**

2" Min. - 8" Max.

Finished Grade

Grounding Conduit

Pull Box

Ground Rod

(Pole Mounted Cabinet Configuration Shown)

**GROUND ROD ARRAY DETAIL**

**DETAIL "C"**

20' Radius Each "Sphere of Influence"

Primary Ground Rod A

Primary Ground Rod B

Primary Ground Rod C

Primary Ground Rod D

Der #2 AWG Tin-Plated Bare Solid Copper Wire To Ground Mounted Cabinet

Exothermic Weld (Typ.)

**DETAIL "D"**

TYPICAL
(20' Rods, 40' Spacing)

GROUND ROD ARRAY DETAIL

**DETAIL "E"**

(Thru Handhole)

**SECTION A-A**

**DESCRIPTION:**

REVISION

REVISION

STANDARD PLANS

DYNAMIC MESSAGE SIGN WALK-IN

INDEX

700-090

4 of 5
**DESCRIPTION:**

**REVISIO N**

**LAST**

**STANDARD PLANS**

**FY 2018-19**

**INDEX**

**700-090**

**SHEET**

**5 of 5**

---

**HANGER LOCATION DETAIL**

(Cantilever Sign Structure Shown, Span Sign Structure Similar)

---

**SECTION B-B**

---

**SECTION C-C**

---

**SECTION D-D**

---

**DYNAMIC MESSAGE SIGN END VIEW**

---

**DYNAMIC MESSAGE SIGN WALK-IN**

---

Vertical Hanger Spacing 5'-0" (Max.)

Quantity And Spacing Of The Hangers Will Be Dictated By Locations Of Truss Connection Plates, Splices And 5'-0" (Max.) Spacing.

2-3/8" Threaded Couplings

Zee Beam Aluminum Zee 4½"x3½"x33½ (Typ.) Horizontal Member Attached To The Internal Framework And Included With The DNS Sign

Vertical Hanger Galvanized W6x9 (Typ.) Hanger @ 5'-0" (Max.) Spacing

2-½" Ø U-Bolts With Double Nuts And Washers

Provide 2 - ½" Ø Bolts With Nuts And Washers

Field Drill Holes And

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GENERAL NOTES:

1. Single-Column Signs Shown, Multi-Column Signs similar. These typical sections serve as a guide for locating the traffic signs required under various roadside conditions. For size and details of sign construction and footing, refer to the appropriate Index and Plans.

2. Verify the length of sign supports in the Yield prior to fabrication.

3. Install ground signs at an angle of 1 to 4 degrees away from the traffic flow (see illustration). Install shoulder mounted signs rotated counterclockwise and median mounted signs rotated clockwise. Install signs on a curve as noted above from the perpendicular to the motorist line of sight.

4. The setback for Stop and Yield signs may be reduced to 3 minimum from the Edge of Travelled Way if required for visibility in business or residential sections with no curb and speeds of 30 MPH or less.

5. The mounting heights are measured from the bottom of the sign panel to a horizontal line extended from the Edge of Travelled Way or from the ground surface at the back of curb. If the standard heights cannot be met, the minimum heights are as follows:
   - Freeways & Freeway Systems Other Roadway Systems: 9 - Rural
   - Expressway & Freeway Systems: 7 - Urban (including residential with parking and/or pedestrian activity)
   - Expressway and Freeway Systems: If a secondary sign is mounted below the major sign, mount the major sign so that the bottom of the sign is at least 8' above the edge of the traveled way and the secondary sign at least 6' above the edge of the traveled way.

6. Do not install sign supports in the bottom of ditches.

7. Install sign supports so they do not reduce the accessible width of sidewalks or Shared Use Paths to less than 4' min. clear width.

DESCRIPTIION:

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NOTE:

If median width does not allow standard offset from both roadways, center sign in median.

1. Single-Column Signs Shown, Multi-Column Signs similar. These typical sections serve as a guide for locating the traffic signs required under various roadside conditions. For size and details of sign construction and footing, refer to the appropriate Index and Plans.

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6. Do not install sign supports in the bottom of ditches.

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**NOTES:**
1. Stroke width of State Outline shall be 1".
2. Color: Yellow Legend and Border on Blue Background.
4. When two or more County Route Markers are mounted together, use the dimensions of the largest marker for all other markers.

**GUIDE SIGN USE**

**FTP-17-06 - FLORIDA ROUTE MARKER**

- **1 OR 2 DIGITS**
  - A
  - B
  - C
  - D
  - E
  - F
  - G
  - H

- **3 OR MORE DIGITS**
  - A
  - B
  - C
  - D
  - E
  - F
  - G
  - H

**DIMS**

**FY 2018-19 STANDARD PLANS**

**INDEX**

**700-102**

**3 of 11**
NOTES:
1. Signs must comply with Rule 14-51, Florida Administrative Code.
2. Use 6" Type C lettering.
4. See Index 700-020 for Multi-Column Ground Sign for foundation and connection details.
5. See Index 102-600, Work Zone Sign Supports, for Temporary 3-Post Sign Support assembly and foundation details. Galvanize Steel U-Channel in accordance with ASTM 123.

### DESIGN FOR TOURIST ORIENTED DIRECTIONAL SIGNS

<table>
<thead>
<tr>
<th>Total Area (SF)</th>
<th>Single Post Configuration</th>
<th>Two Post Configuration</th>
<th>Three Post Configuration</th>
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* Limited to 22 SF Total Sign Area.
**GENERAL NOTES**

1. Only those services meeting criteria established by the Department and approved by the State Traffic Operations Engineer for each interchange shall be shown. Symbol signs for motorist services shall always appear in the following order: Gas, Food, Lodging, Phone*, Hospital, Camping.

2. Symbols shall appear consecutively on the sign with no positions left blank or reserved for intermediate symbols not currently approved for a particular interchange.

3. All motorist service signs shall have White Legend and Border with Blue Background.

4. For mounting details see Index 700-020 for Type "A" breakaway or Index 700-010 for Type "C" Frangibility.

* The phone symbol shall not be shown whenever any Gas, Food, Lodging or Camping symbol appears.

** Note:
- Two assemblies are required: one for each side of the ramp, showing those services in each particular direction from the ramp terminal.
- Ramp mounted signs shall be installed to avoid conflict with existing signs and in no case should they be placed within 100 feet of another sign.

** Note:
- One Post Service Signs
- See Detail "D"

** Approximate Position of Second Motorist Service Sign
- Details "B" or "C" for Interchanges
- With Two Exit Ramps

** Note:
- Ramp mounted signs shall be installed to avoid conflict with existing signs and in no case should they be placed within 100 feet of another sign.
STATE OF FLORIDA
WELCOME CENTER
1 MILE

STATE OF FLORIDA
OFFICIAL
WELCOME CENTER

STATE OF FLORIDA
WELCOME CENTER

WELCOME CENTER

Sign No. FTP-10-06
Sign No. FTP-11-06
Sign No. FTP-12-06
Sign No. FTP-13-06

Note: Roadway not drawn to scale
Distances shown are adequate for driver communication
but may be altered slightly if conditions require.

Tourist Information
Center
NEXT RIGHT

Sign No. FTP-14-06

Note: Sign FTP-14-06 shall be used as a supplemental guide sign at
interchanges which have a Tourist Information Center approved
for such signing (locate half-way between normal guide signs).

Notes:
1. Signs and sign structures shall be erected in accordance
   with the details shown on Index 700-020.
2. Sign FTP-12-06 shall be located on the Welcome Center
   grounds in proximity to the building and as far from the
   main line roadway as possible (2 signs back to back).
3. Sign FTP-10-06, 11-06, 12-06 shall be located as limited
   access highways only.
4. All legend to be Series E.
5. See Index 700-102 for sign details.

FOR LIMITED ACCESS HIGHWAYS
1. Signs and sign structures shall be erected in accordance with the details shown on Index 700-020.

2. Sign FTP-12-06 shall be located on the Welcome Center grounds in proximity to the building and as far from the Main Line Roadway as possible (2 signs back to back).

3. All legend to be Series E.

4. One sign FTP-15A-06 or 15B-06 should be used depending on speed, roadside development & geometric conditions.
NOTES:

1. Roadways with Two-Way Traffic: No passing zone should be extended 1570' in advance of narrow bridge.

2. If the bridge or the approach is on a curve, delineators shall be installed for a distance of 1570' in advance of narrow bridge on the outside portion of the roadway. Spacing shall be 100' between delineators. Delineators are to be placed not less than 2' or not more than 8' outside the outer edge of pavement.

3. Object markers and delineators on both sides of roadway shall face traffic approaching bridge.

4. The OM-3R & OM-3L object markers shall be installed 4' above the roadway edge. The panels may be post mounted at the bridges.

<table>
<thead>
<tr>
<th>Shoulder Width</th>
<th>No. of RPM's</th>
<th>Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>2</td>
<td>18&quot;</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>18&quot;</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>18&quot;</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>16.67&quot;</td>
</tr>
</tbody>
</table>
SIGN LOCATIONS TYPICAL

2. Location of Sign No. 3 may require some field adjustment.
3. The Cross Road is the last detour to route around the restricted bridge.
4. Location of Sign No. 2 should be established from the Cross Road
   the following approximate distances: Interstate-1 Mile Non- Interstate-1/2 Mile.
5. See Index 700-102 for sign details.
WEIGH STATION SIGNING

4 - LANE DIVIDED INSTALLATION

1. **WEIGHT STATION 1 MILE**
   - DB-1
   - FTP-1-06
   - FTP-3-06
   - FTP-83-06

2. **ALL TRUCKS ENTER WEIGH STATION**
   - DB-2
   - FTP-2-06
   - FTP-3-06
   - FTP-83-06

3. **WEIGH STATION NEXT RIGHT**
   - DB-3
   - FTP-1-06
   - FTP-2-06
   - FTP-3-06
   - FTP-83-06

**Note:** Signs DB-3 to be placed at or near the theoretical gore.

2 - LANE INSTALLATION

1. **WEIGH STATION 1 MILE**
   - DB-1
   - FTP-1-06
   - FTP-3-06
   - FTP-83-06

2. **ALL TRUCKS ENTER WEIGH STATION**
   - DB-2
   - FTP-2-06
   - FTP-3-06
   - FTP-83-06

3. **WEIGH STATION 1000 FT**
   - DB-3
   - FTP-1-06
   - FTP-2-06
   - FTP-3-06
   - FTP-83-06

MEDIAN INSTALLATION

1. **WEIGH STATION**
   - DB-1
   - FTP-1-06
   - FTP-2-06
   - FTP-3-06
   - FTP-83-06

2. **ALL TRUCKS ENTER WEIGH STATION**
   - DB-2
   - FTP-1-06
   - FTP-2-06
   - FTP-3-06
   - FTP-83-06

3. **WEIGH STATION NEXT LEFT**
   - DB-3
   - FTP-1-06
   - FTP-2-06
   - FTP-3-06
   - FTP-83-06

WEIGHT STATION SIGNING

**Description:**

- Lane divided installation
- Two-lane installation
- Median installation

**Note:** Signs DB-3 to be placed at or near the theoretical gore.
DESCRIPTION:

REVISION LAST of STANDARD PLANS FY 2018-19

INDEX 11/01/17

INSPECTION STATION SIGNING

TYPICAL SIGNING FOR TRUCK WEIGH AND INSPECTION STATIONS

FY 2018-19

STANDARD PLANS

INDEX 700-108

SHEET 2 of 2
CASE I Type I Object Markers shall consist of nine yellow reflectors mounted on a yellow reflective background or consist of a retroreflective panel of the same size.

CASE II End of Road Markers shall consist of nine red reflectors mounted on a red reflective background or consist of a retroreflective panel of the same size.

NOTES:

1. This index is applicable to residential and minor streets only. Major streets to be evaluated on a case by case basis.

2. "T" intersection/Twice-Way arrows and reflectors are optional. The need should be based on a review of each location.

3. For additional details on aluminum round post, sign panel material and bolts, nuts and washers see Index 700-010.

4. Case I Installation - The arrow panels and object markers shall be located approximately 20' but not less than 12' from the edge of the travel lane.

5. Dead end sign shall be posted a sufficient advance distance to permit the vehicle operator to avoid the dead end by turning off, if possible, at the nearest intersecting street.

6. For pavement marking see Index 711-001.

7. No guardrail is required unless special field conditions require its use.

---

Object markers shall be installed on 2" Ø x 1/4" Stainless Steel Hex Head Bolt with Nut and Lockwasher or 5/16" Stainless Steel Hex Head Bolt with Flat Washer under Head and Lockwasher under Nut. Post foundation shall be installed in accordance with Index 700-010.

Supplemental sign with distance panel, to be used as needed.
MOUNTING Exit Number Panels To Highway Signs

ELEVATION

GENERAL NOTES

MATERIALS:
All aluminum materials shall meet the requirements of the Aluminum Association Alloy 6061-T6 and also the following ASTM specifications for the following: Sheets and plates B209, extruded shapes B221 and standard structural shapes B208.

ALUMINUM BOLTS, NUTS & LOCK WASHERS:
Aluminum bolts shall meet the requirements of the Aluminum Association Alloy 2024-T4 (ASTM F468). The bolts shall have an anodic coating of at least 0.002" thick and be chromate sealed. Lockwashers shall meet the requirement of Aluminum Association Alloy 2024-T4 (ASTM F468).

SIGN FACE:
All sign face corners shall be rounded. See sign layout sheet for dimension "L" and sign face details. For mounting details refer to Index 700-030.

NOTE: Exit numbering panel shall be located to the right side for right exit and to the left for left exit.

Mounting of Exit Numbering Panels To Highway Signs
GENERAL NOTES:

1. Use aluminum materials that meet the requirements of Aluminum Association Alloy 6061-T6 (ASTM B209, B221, B308 or B429), except as noted in the Plans.

2. Install sign panel, wind beam and columns in accordance with Index 700-010 and Specifications 700.

3. Install sign column so that the height and offset are in accordance with Index 700-201.

4. When aluminum column (post) are installed with a frangible transformer bases, engage all threads on the transformer base and post unless the aluminum post is fully seated into base.

5. Meet the requirements of Specifications 646 for aluminum poles and transformer bases.

6. Install a concrete slab around all flashing beacon assemblies on slopes 6:1 or greater. The minimum slab dimension is 4'-0" by 5'-0".

7. Install a concrete slab around all pull boxes. The minimum slab dimension is 4'-0" by 4'-0". In urban areas where space is limited, slab dimensions may be adjusted as shown in the Plans.

8. For beacon assemblies connected to conventional power, provide single pole non-fused watertight breakaway electrical connectors in the frangible transformer base.

9. Install the connection of controller cabinet and solar panel to the column in accordance with manufacturer's recommendations.

10. When wire entry holes are drilled in the sign column, use a bushing or rubber grommet to protect conductors.

11. Orient solar panel to face South for optimal exposure to sunlight.
WARNING SIGN

12" Yellow Flashing Beacon

Beacon Controller

Sign Panel (48" x 48")

12" Yellow Flashing Beacon

Nominal 4" (Sch. 40) Aluminum

Transformer Base and Foundation (See DETAIL "A")

Ground Wire

#6 TW Green

Strain Relief Fitting

Nominal 4" (Sch. 40) Aluminum

Breakaway Electrical Connectors

Relief Strain

Concrete Apron (Typ.)

12" Bed of Pearsack or Crushed Stone For Drainage

1 1/4 Diameter 20' Long Copper Clad with Approved Ground Connection (At all Pull Boxes)

POLICE VIEW

SIDE VIEW

DETIAL "A"

CONVENTIONAL POWERED WARNING SIGN DETAILS

DESCRIPTION:

FRONT VIEW

SIDE VIEW

POLE WIRING AND FOOTING DETAIL

CONVENTIONAL POWERED WARNING SIGN DETAILS
NOTES:
1. Install the sign column slip base in accordance with Index 700-010.
2. Use beacon and beacon controllers that are listed on the Approved Products List (APL).
3. Details show a typical warning sign with two flashing beacon heads. When only one beacon is required, install upper beacon.
NOTES:
1. Install a separate pole for mounting the solar panel, controller and batteries for all flashing beacon assemblies with solar panels, controllers and batteries weighing more than 170 lbs.
2. Install the auxiliary pole as close to the right of way as possible.
3. Install the auxiliary pole so that the height is the same as the column for the beacon assembly.
4. Payment for the separate pole, foundation, conduit and wiring are included in the cost of the electronic warning sign with flashing beacon.

DESCRIPTION:
12" Yellow Flashing Beacon

NOTES:
- Batteries Control Unit and Controller, Solar Cabinet For Beacon
- Solar Panel 1'-0" 7'-0"
- Aluminum (Sch. 40) Nominal 4"
- Solar Panel (See Sheet 2 For Details)
- Transformer Base and Foundation (See Note #6, Sheet 1)
- Pull Box

SOLAR POWERED BEACON WITH AUXILIARY POLE AND CONCRETE SLAB DETAIL

ROADSIDE FLASHING BEACONS
FY 2018-19
STANDARD PLANS
ELECTRONIC DISPLAY SIGN - 700-120
4 of 9
1. A transformer base is required for both conventional powered and solar powered applications. (Conventional Power Shown)
2. Use Rectangular Rapid Flashing Beacon (RRFB) equipment and hardware that are listed on the Approved Products List (APL).
3. Install the RRFB in pairs, one on either side of approach traffic.
4. Install controller on the backside of post from approach traffic.
5. Install a 30" X 30" W11-2 sign on single lane facilities and a 36" X 36" W11-2 sign for multi-lane facilities.
6. Install push button and R10-25 sign in accordance with Index 663-001.
NOTES:
1. A transformer base is required for both conventional powered and solar powered applications. (Conventional Power Shown)
2. Use beacons and beacon controllers that are on the Approved Products List (APL).
NOTES:
1. A transformer base is required for both conventional powered and solar powered applications. (Conventional Power Shown)
2. Use speed feedback display, beacons, beacon controllers and installation hardware that are on the Approved Products List (APL).
3. For posted speeds less than 45 mph, install a speed feedback display with numeral heights of 15" and for posted speeds 45 mph or greater, install a speed feedback display with numeral heights of 18".
4. Only speed display units weighing 62 lbs. or less may be mounted with a 5'-0" clearance. Mount speed display units that weight more than 62 lbs. with a 7'-0" clearance.
5. The beacon controller and solar batteries may be in the same compartment.
NOTES:

1. A transformer base is required for both conventional powered and solar powered applications. (Conventional Power Shown)

2. Use speed feedback display, beacons, beacon controllers and installation hardware that are on the Approved Products List (APL).

3. For posted speeds less than 45 mph, install a speed feedback display with numeral heights of 15" and for posted speeds 45 mph or greater, install a speed feedback display with numeral heights of 18".

4. Only speed display units weighing 62 lbs. or less may be mounted with a 5'-0' clearance. Mount speed display units that weigh more than 62 lbs. with a 7'-0' clearance.

5. The beacon controller and solar batteries may be in the same compartment.
**DESCRIPTION:**

1. Flasher unit and cabinet to be placed on the strain pole supporting overhead sign assembly or on service pole. The flasher unit not to overhang private property or sidewalk.

2. Optional flashing beacon will be called for in the Plans. They may be placed within or below the panel, or face to the rear.

**NOTES:**

---

**OVERHEAD SCHOOL SIGN ASSEMBLY**

**SIDE VIEW**

- 12" Signal Head (Yellow Lens)
- Lock Nut
- "Ø U-BOLT" 8 3
- "Ø Bolt For Mounting Sign"
- Messenger Wire
- Wire Rope Clamp
- 3'-6" Sign Panel
- " Ø Bolt" 8 3
- " Ø Bolt For Mounting Sign"
- Wire Rope Clamp
- To Flasher Unit
- Signal Cable & Clamps

**REAR VIEW**

- " Ø Bolt" 8 3
- " Ø U-BOLT" 8 3
- Pipe Cap
- " Ø U-Bolt"
- " Ø Bolt For Mounting Sign"
- Signal Cable & Clamps
- To Flasher Unit
- Signal Panel
- 1 1/8" Pipe Nominal 1.900 O.D.
- 3'/4" Zee - 3' X 2.33"
- ZEE SECTION DETAIL

**MOUNTING DETAIL**

- " Ø Bolt For Mounting Sign"
- " Ø Bolt For Mounting Sign"
- " Ø Bolt For Mounting Sign"
- " Ø Bolt For Mounting Sign"
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- " Ø Bolt For Mounting Sign"

**CABLE ENTRY DETAIL**

- Signal Head
- Lock Nut
- Cap
- " Ø Flexible Conduit Or 90° Angle Connector"
- " Ø Hole"
- " Ø U-Bolt"
- " Ø Bolt For Mounting Sign"
- " Ø Bolt For Mounting Sign"
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**NOTES:**

- See DETAIL "E"
- See DETAIL "F"
- See DETAIL "D"
- See DETAIL "F"

---
DESCRIPTION:

1. Flasher unit and cabinet to be placed on the strain pole supporting overhead sign assembly or on service pole. The flasher unit not to overhang private property or sidewalk.

2. Optional flashing beacon will be called for in the Plans. They may be placed within or below the panel, or face to the rear.

NOTES:
**LEGEND:**

- **B/C** = BACK OF CURB
- **EOP** = EDGE OF PAVEMENT
- **RPM** = RAISED PAVEMENT MARKER
- **W/R** = WHITE/RED RPM
- **Y/Y** = YELLOW/YELLOW RPM
- **W/Y** = WHITE/YELLOW RPM

**GENERAL NOTES:**

1. Offset all RPMs 1" from solid longitudinal lines unless otherwise noted or shown.
2. Spacing may be reduced for sharp curves if required.
3. For placement of RPMs on ramps, see Index 711-003.
4. Make the traffic face of the RPM the same color as the pavement marking that it is supplementing.

**LAST REVISION:**

11/01/17

**DESCRIPTION:**

**REV IS IO N**

10/27/2017 10:20:30 AM

**INDEX**

706-001

**SHEET**

1 of 4
RPM PLACEMENT AT INTERSECTIONS

RPM PLACEMENT AT TRAFFIC CHANNELIZATION AT GORE (Traffic Flows In Same Direction)

RPM PLACEMENT AT TRAFFIC SEPARATION (Traffic Flows In Opposite Direction)

RPM PLACEMENT AT ROADSIDE CROSSHATCHING

NOTE:
1. Center the Raised Pavement Markers between chevrons and crosshatching.

LEGEND:
B/C = BACK OF CURB
EDP = EDGE OF PAVEMENT
RPM = RAISED PAVEMENT MARKER
W/R = WHITE/RED RPM
Y/Y = YELLOW/YELLOW RPM
Y/R = YELLOW/RED RPM
MD/Y = MONO-DIRECTIONAL YELLOW RPM
NOTES:

1. For Type "C" Curb, install RPMs along the pavement edge marking using the same spacing shown.

2. Orient traffic faces of RPMs in curb median radii to be parallel to direction of travel lanes.

LEGEND:

B/C = BACK OF CURB
EOP = EDGE OF PAVEMENT
RPM = RAISED PAVEMENT MARKER
W/R = WHITE/RED RPM
Y/Y = YELLOW/YELLOW RPM
Y/R = YELLOW/RED RPM
MD/Y = Mono-DIRECTIONAL YELLOW RPM

FLUSH MEDIAN OPENINGS
RPM PLACEMENT AT MEDIAN OPENINGS
(When called for in the Plans)

DETAIL "A"

DETAIL "B"

DETAIL "C"

DETAIL "D"

DETAIL "E"

DETAIL "F"

MPH
SPEED LIMIT
POSTED

30 OR LESS
10
25

40
20

45
30

50 OR MORE
40

YELLOW RPM
MD/Y = Mono-DIRECTIONAL YELLOW RPM

REVISION

DESCRIPTION:

REVISION

LAST

REV

11/01/17

DESCRIPTION:

706-001

STANDARD PLANS

INDEX

FY 2018-19

TYPICAL PLACEMENT OF
RAISED PAVEMENT MARKERS

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3 of 4

SHEET
NOTES:
1. For Type "E" Curb install RPMs along the pavement edge marking using the same spacing shown.
2. Orient traffic faces of RPMs in medium radii to be parallel to direction of travel lanes.

LEGEND:
- B/C = BACK OF CURB
- EOP = EDGE OF PAVEMENT
- RPM = RAISED PAVEMENT MARKER
- W/R = WHITE/RED RPM
- Y/Y = YELLOW/YELLOW RPM
- W/R = WHITE/RED RPM
- MD/Y = MONO-DIRECTIONAL YELLOW RPM

RPM PLACEMENT AT ISLANDS
(When called for in the Plans)

<table>
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<th>POSTED SPEED LIMIT</th>
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</tr>
<tr>
<td>35</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>40</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>50 OR MORE</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

RPM PLACEMENT AT TRAFFIC SEPARATORS
(When called for in the Plans)
NOTES:
1. When an arrow and a pavement message are used together, locate the arrow 25' downstream from the pavement message. Measure the distance from the base of the arrow to the base of the pavement message.
2. Place stop message 25' back from the stop line.
3. Dimensions are within ±1".
4. All grids are 4" x 4".

PAVEMENT MESSAGE AND ARROW DETAILS
**Description:**

**Contras Markings with Alternating Skip Pattern**

(10'-30' Skip Line Shown, Dotted Lines Similar)

- Yield Lines consist of five 18" x 27" white triangles which face traffic. Equally space triangles within traffic lane. When a bike lane is present, add one additional triangle in the center of the bike lane.

- **Yield Lines**

---

**PAVEMENT MARKING LINES**

- Solid Edge Line or Lane Line
- Solid Channelizing Line
- Two-Lane Passing Prohibited Lines
- Double Solid Line
- 12" Solid Pedestrian Crosswalk Line

---

**Contrast Markings with Alternating Skip Pattern**

10' White Skip With 10' Black Contrast and 20' Gaps
Curb and Gutter

Flush Shoulder

Striping for Buffered Bike Lane

Striping with Shoulder or Non-Buffered Bike Lane

Striping with No Shoulder or Bike Lane

Notes:
1. Lane widths (X) may not be same for each lane in the section.
2. For placement of RPMs, see Index 708-001.
NOTES:

1. Lane widths (X) may not be same for each lane in the section.

2. For placement of Express Lane markers and associated RPMs, see the Plans.

3. For placement of RPMs, see Index 706-001.

4. For placement of Express Lane markers and associated RPMs, see the Plans.

INTERSECTION APPROACH STRIPING WITH TURN
LANES AND BUFFERED BIKE LANE KEY HOLE

PLACEMENT OF LONGITUDINAL PAVEMENT MARKINGS
PLACEMENT OF LONGITUDINAL PAVEMENT MARKINGS

CURB AND GUTTER SHOWN
PLACEMENT OF LONGITUDINAL PAVEMENT MARKINGS

FLUSH SHOULDER SHOWN
PAVEMENT MARKINGS AND DELINEATORS FOR MEDIAN CROSS-OVER

NOTE:
1. Apply yellow reflective paint to the noses of curbed medians, traffic separators, and raised islands. When applying yellow reflective paint in conjunction with Raised Pavement Markers, see Index 706-001.
2. Use yellow retro-reflective sheeting on both sides of the delineator. Install the post so that the top is 4' above the grade at the edge of the pavement.
Use stop line at signalized intersection only.

DESCRIPTION:

**REVISION**

**LAST REVISION DATE:**

**REVISION:**

**DESCRIPTION:**

**FY 2018-19 STANDARD PLANS**

**PAVEMENT MARKINGS**

**INDEX**

**SHEET**

**PAVEMENT MARKINGS**

**TWO WAY LEFT TURN LANE**

(With Single Lane Left Turn Channelization)

**SCHEME ONE**

**SCHEME TWO**

**TWO WAY LEFT TURN LANE DROP AND ISLAND DETAILS**

**RIGHT TURN LANE DROP AND ISLAND DETAILS**

**LEFT TURN LANE DROP IS MIRROR IMAGE**

**RIGHT TURN LANE AND ISLAND DETAILS**

**TRAFFIC CHANNELIZATION AT GORE**

For use in congested urban areas where available storage length between intersections is limited and a permanent point of transition from the two-way turning lane to the exclusive turning lane cannot be determined.

For use in rural & suburban areas where an adequate storage lane length can be specifically determined.
**DESCRIPTION:**

REVISION of STANDARD PLANS FY 2018-19

**SHEET INDEX**

PAVEMENT MARKINGS

**NOTE:**

Make pavement markings yellow for left roadway centered on existing roadway. Right roadway centered on existing roadway is similar with white pavement markings.

**DETAILED "D"**

- 6" Pavement Marking (See Note)
- 18" Pavement Marking (See Note)
- Edge Of Pavement

**DETAILED "E"**

**MARKINGS FOR TRAFFIC SEPARATION**

**SYMBOLS FOR TRANSITION - 2 LANE / 4 LANE ROADWAY**

**LEFT ROADWAY CENTERED ON EXISTING ROADWAY**

15:1 Taper (4:1 Minimum Not Less Than 50')

White Delineators Shall Be Used Throughout The Transition Where 85th Percentile Approach Speeds Are Greater Than 50 mph

**RIGHT ROADWAY CENTERED ON EXISTING ROADWAY**

15:1 Taper (4:1 Minimum Not Less Than 50')

White Delineators Shall Be Used Throughout The Transition Where Design Speeds Are Greater Than 50 mph

**SCHEMES FOR TRANSITION - 2 LANE / 4 LANE ROADWAY**

**DESIGN SPEED"S" (MPH) **

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<th>MPH</th>
<th>SPEED LIMIT (FT.)</th>
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<td>60</td>
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<td>595</td>
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<td>45</td>
<td>500</td>
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<td>40</td>
<td>455</td>
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<tr>
<td>30</td>
<td>365</td>
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</tbody>
</table>

* 50' Minimum

**POSTED SPEED LIMIT (MPH)**

<table>
<thead>
<tr>
<th>MPH</th>
<th>LENGTH 'L' (FT.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>20</td>
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<tr>
<td>55</td>
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**DESIGN SPEED"S" (MPH)**

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<th>LENGTH 'L' (FT.)</th>
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<td>40</td>
<td>80</td>
</tr>
<tr>
<td>45</td>
<td>80</td>
</tr>
</tbody>
</table>

**NOTE:**

See DETAIL "D"

See DETAIL "E"
NOTES:

1. For crosswalk width, exceed width of the adjacent sidewalk, but do not make width less than 4' for intersection crosswalks and 10' for midblock crosswalks. Measure width from the inside of the transverse crosswalk markings.

2. When the Special Emphasis Crosswalk is not perpendicular to the lane lines, make the longitudinal markings parallel to the lane lines.

3. Extend double yellow centerlines 100' back from intersection on all approaches or 50' for unmarked cross roads.

4. Refer to Index 522-002 when Curb Ramps are present.
** Queue Length **

- **Stop Bar (If Required)**
  - 6" White
  - 6" White
  - 6" White

** Begin Lane Line **

- 6" Pavement Marking (See Note 2)
  - 6" Pavement Marking (See Note 2)
  - 6" Pavement Marking (See Note 2)

** Lane Length **

- 25'

** SINGLE LEFT TURNS **

- **Queue Length**
  - 25'
  - 15'
  - 15'

** Turn Lane Markings **

** Turn Lane Markings - Curbed and Uncurbed Medians **

<table>
<thead>
<tr>
<th>URBAN CONDITIONS</th>
<th>RURAL CONDITIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design Speed (mph)</td>
<td>Clearance Distance</td>
</tr>
<tr>
<td>35</td>
<td>10'</td>
</tr>
<tr>
<td>40</td>
<td>10'</td>
</tr>
<tr>
<td>45</td>
<td>10'</td>
</tr>
<tr>
<td>50</td>
<td>100'</td>
</tr>
<tr>
<td>55</td>
<td>125'</td>
</tr>
<tr>
<td>60</td>
<td>145'</td>
</tr>
<tr>
<td>65</td>
<td>170'</td>
</tr>
</tbody>
</table>

- Arrow should be evenly spaced between first and last arrow. Turn lanes longer than 200' add one arrow for each 100' additional length.

** Arrow Spacing **

NOTES:

1. This Index applies to right turn lanes.
2. Make pavement marking yellow for left-turn lanes and white for right-turn lanes.

** Notes: **

- 6" Pavement Marking (See Note 2)
  - 6" Pavement Marking (See Note 2)
  - 6" Pavement Marking (See Note 2)

** Double Left Turns **

- Through Lane Becomes Exclusive Left Turn
  - Through Lane Becomes Optional Left Turn

** Pavement Markings **

<table>
<thead>
<tr>
<th>INDEX</th>
<th>SHEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>711-001</td>
<td>11 of 14</td>
</tr>
</tbody>
</table>
**RAILROAD CROSSING AT 2-LANE ROADWAY**

**RAILROAD CROSSING AT 4-LANE ROADWAY**

**NOTES:**

1. Do not include transverse markings in pavement message quantities.

2. When dynamic devices are not present or are to be installed, place the crossbucks at the future location of the RR gate or signal and gate in accordance with Index 509-070.

3. Place an additional W10-1 sign where street intersections occur between the R/R pavement message and the tracks.

4. Place FTP-61-06 sign or FTP-62-06 sign 100' in advance of the crossing for urban locations and 300' in advance of the crossing for rural locations.

---

**TYPICAL MARKINGS FOR R/R CROSSING**

**TERMINATION OF TWO WAY LEFT TURN AT R/R CROSSINGS**

**NOTE:**

Pavement Markings symmetrical about centerline of Railroad.

<table>
<thead>
<tr>
<th>SPEED MPH</th>
<th>A in FT</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>400</td>
</tr>
<tr>
<td>55</td>
<td>325</td>
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<tr>
<td>50</td>
<td>250</td>
</tr>
<tr>
<td>45</td>
<td>225</td>
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<tr>
<td>40</td>
<td>175</td>
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<tr>
<td>35</td>
<td>150</td>
</tr>
<tr>
<td>30</td>
<td>120</td>
</tr>
</tbody>
</table>

*Does not include 24" bars.*
NOTES:
1. Dimensions are to the centerline of markings.
2. An Access Aisle is required for each accessible space when angle parking is used.
3. Criteria for pavement markings only, no public sidewalk curb ramp locations. For ramp locations refer to plans.
4. Tint blue pavement markings to match color 15180 of Federal Standards 595a.
5. Mount FTP-22-06 sign below the FTP-21-06 sign.

"DIMENSIONS"

<table>
<thead>
<tr>
<th>Angle</th>
<th>45°</th>
<th>60°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>18-1&quot;</td>
<td>10-5&quot;</td>
</tr>
<tr>
<td>Height</td>
<td>7-0&quot;</td>
<td>5-9&quot;</td>
</tr>
</tbody>
</table>

"Use of pavement symbol in accessible parking spaces is optional, when used the symbol shall be 3' or 5' high and white in color.

PAVEMENT MARKING FOR PARKING

UNIVERSAL SYMBOL OF ACCESSIBILITY
NOTES:
1. All grids are 4" x 4".
2. Pavement Marking Should Not Extend Into Opposing Lane.

SCHOOL PAVEMENT MARKING

MARKINGS FOR SCHOOL ZONES

SCHOOL

SCHOOL

SCHOOL

SCHOOL

SCHOOL

SCHOOL

SCHOOL

SCHOOL

SINGLE-LANE APPROACH

TWO-LANE APPROACH

MULTI-LANE APPROACH
(Three or More)
NOTES:
1. All bicycle markings and pavement messages shall be White.
2. All bicycle markings shall be preformed thermoplastic.
3. All grids are 4" x 4".

---

**STANDARD PAVEMENT MARKING MESSAGE LAYOUTS**

- **Shared Lane Marking (SLM)**
- **Helmeted Bicyclist Symbol**
- **Bike Lane Arrow**
- **Railroad Crossing (For Shared Use Path Only)**
APPRAOCH TO INTERSECTIONS DETAILS

BUFFERED BIKE LANES
GENERAL NOTES:

1. Make the traffic face of the raised pavement marker (RPM) the same color as the pavement marking that it is supplementing.

2. See Index 706-001 for additional information on RPMs.

DETAIL "A"
INTERCHANGE MARKINGS

TAPER - TYPE ENTRANCE

PARALLEL - TYPE ENTRANCE
PARALLEL ACCELERATION AND DECELERATION LANE

TYPICAL MARKINGS AT DUAL LANE EXITS

TYPICAL LANE DROP MARKINGS AT EXIT RAMPS
NOTES:

1. Place the Wrong Way Arrow at the physical gore or 100'-0" from the theoretical gore.

2. Post delineators spaced at 40' on curves of the entrance and exit of ramps. The spacing on the tangent portion of the ramp section is 300'-0". All delineators are to be setback 4' from shoulder break. Post delineators should not be discontinued in sections with guardrail.

TYPICAL CURVED EXIT RAMPS
NOTES:

1. Place the Wrong Way Arrow at the end of the physical gore or 100'-0 ± from the end of theoretical gore.

2. Post delineators spaced at 40' on curves of the entrance and exit of ramps. The spacing on the tangent portion of the ramp section is 300'-0 ±. All delineators are to be setback 4' from shoulder break. Post delineators should not be discontinued in sections with guardrail.
**TYPICAL PARTIAL CLOVERLEAF/TRUMPET EXIT RAMP**

**NOTE:**
Do not place wrong way arrows in between consecutive directional arrows.
EXIT RAMP WITHOUT AUXILIARY LANE

EXIT RAMP WITH AUXILIARY LANE

NOTES:
1. This Index shows layouts for 1, 2, and 3 lane exits regardless of the number of lines of information.
2. The message consist of white letters and numbers with black contrasting material.
3. The "EXIT NUMBER" position remains the same distance from the beginning of taper regardless of the number of lines of information.
4. All grids are 4" x 4"
**DESCRIPTION:**

**LAST REV ISIO N**

**CONVENTIONAL LIGHTING**

**INDEX**

**SHEET**

**REV.**

**1/01/17**

**DATE**

**WIRING DIAGRAM**

- Pole
- Luminaire
- Luminaire Cable
- Breakaway Fuseholders
- Strain Relief Fitting (See Note #2)
- PVC Conduit
- Pull box
- Ground Rod
- Ground wire
- Equipment Ground Conductor
- Pole Ground Conductor
- Strain Relief Fitting (See Note #2)
- Ground Rod
- Access Panel
- Breakaway Fuseholders
- Surge Protective Device (SPD)
- SPD Ground Conductor
- Breakaway Fuseholders on Neutral side with solid copper slug (Line To Neutral Service). Slugs to be same size as 10 Amp fuse.
- Breakaway fuseholder on 480V side with a 10 Amp slow blow fuse for line to line service both lines to be fused.
- Breakaway fuseholders with solid copper slugs. Slugs to be same size as 10 Amp fuse.
- Surge Protective Device (SPD)
- Breakaway fuseholder on 480V side with a 10 Amp slow blow fuse for line to line service both lines to be fused.
- Circuit conductors in schedule 40 PVC conduit. Conduit conductors and conduit size as shown in plans. (Typical)
- Ground Rod
- #6 TW Green Bonding Ground
- Access Panel
- Strain Relief Fitting (See Note #2)
- Copper Ground Wire (Bare)
- 12" bed of Pearock or crushed stone for drainage
- U.L. approved Ground Rod 1/2" diameter 20' long copper clad with approved ground connection (At all pull boxes)

**NOTES:**

1. Barrier wall or bridge mounted poles: The wiring shall be in accordance with Section 992 of the Standard Specifications.

2. Provide cable length to remove fuseholders from transformer base, pole base or pullbox for maintenance. Remove slack from the luminaire cable to provide tension on the fuseholders if the pole breaks away. Pull excess cable into pull box tighten strain relief fittings or cable clamps at both ends of conduit to prevent cable from slipping.

**METAL POLE DETAIL**

- Edge of traveled pavement or face of curb.
- 12" bed of Pearock or crushed stone for drainage.
- #6 TW Green Ground Wire
- Grounding Lug
- Strain Relief Fitting
- Pole Ground Conductor
- Equipment Ground Conductor
- Surge Protective Device (SPD)
- Pole Wire Detail
- Metal Pull Box

**WIRING DETAILS**

- 13" PVC conduit with Type TC Cable
- 12" bed of Pearock or crushed stone for drainage
- #6 Solid Copper Ground Wire (Bare)
- #6 Solid Copper Ground Wire (Bare)
- #6 Solid Copper Ground Wire (Bare)
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- #6 TW Green Bonding Ground
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- Access Panel
- Strain Relief Fitting (See Note #2)
- Breakaway Fuseholders
- Surge Protective Device (SPD)
- Breakaway fuseholder on 480V side with a 10 Amp slow blow fuse for line to line service both lines to be fused.
- Circuit conductors in schedule 40 PVC conduit. Conduit conductors and conduit size as shown in plans. (Typical)
NOTES:
1. Use compacted select material in accordance with Index 120-001.
2. Concrete shall be Class NS with a minimum strength at 28 days of f'c=2.5 ksi.
3. Outside edge of slab shall be cast against formwork.
4. The pull box shown is 13' x 24"; others approved under Section 635 of the Standard Specifications may be used.
5. Slabs to be placed around all Poles and Pull Boxes in rural locations. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
6. Concrete for slabs around pull boxes shall be included in the price of pull box.

SLAB DIMENSIONS

SLAB DETAILS FOR INTERMEDIATE PULLBOX LOCATIONS
NOTES:
1. Use compacted select material in accordance with Index 120-001.
2. Concrete shall be Class NS with a minimum strength at 28 days of f'c=2.5 ksi.
3. Outside edge of slab shall be cast against formwork.
4. The pull box shown is (1' x 2'); others approved under Section 835 of the Standard Specifications may be used.
5. Slabs to be placed around all Poles and Pull Boxes. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
6. Concrete for slabs around poles and pull boxes shall be included in the price of pole or pull box.
7. The expansion joint shall consist of 1/2" of closed-cell polyethylene foam expansion material. The top 1/2" of expansion material shall be removed after pouring the slab and sealed with an ARL approved Type A sealant meeting the requirements of Section 932.

Concrete shall be Class NS with a minimum strength at 28 days of f'c=2.5 ksi. Use compacted select material in accordance with Index 120-001. The pull box shown is (1' x 2'); others approved under Section 835 of the Standard Specifications may be used. Slabs to be placed around all Poles and Pull Boxes. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans. Concrete for slabs around poles and pull boxes shall be included in the price of pole or pull box. The expansion joint shall consist of 1/2" of closed-cell polyethylene foam expansion material. The top 1/2" of expansion material shall be removed after pouring the slab and sealed with an ARL approved Type A sealant meeting the requirements of Section 932.
GENERAL NOTES:

1. Pole are designed to support the following:
   a. Luminaire Effective Projected Area (EPA): 1.55 SF
   b. Weight: 75 lb.

2. Shop Drawings: This Index is considered fully detailed, only submit shop drawings for minor modifications not included in the Plans.

3. Materials:
   a. Pole, Pole Connection Extrusions and Arm Extrusions: ASTM B221, Alloy 6063-T6
   b. Bars, Plates, Stiffeners and Backer Ring: ASTM B221, Alloy 6063-T6
   c. Caps and Covers: ASTM B221, Alloy 319-F
   d. Steel Bearing Plate: ASTM A709 or ASTM A36 Grade 36
   e. Aluminum Weld Material: ER 4043
   g. Bolts, Nuts and Washers:
      - ASTM A325, Grade A325, Type 1
      - Nuts: ASTM F593 Grade A, Heavy-Hex
      - Washer: ASTM F436
      - Stainless Steel Fasteners:
        - ASTM F593 Alloy 2, Condition A, CW1 or SH1
      - Concrete: Class 1
      - Reinforcing Steel: Specification Section 415
   h. Anchor Bolts, Nuts, and Washers:
      - Anchor Bolt: ASTM F436 Grade 55
      - Nuts: ASTM A563 Grade DH
      - Washer: ASTM A36
   i. Concrete: Class 1
   j. Nut Covers: ASTM B26
   k. Concrete: Class 1
   l. Reinforcing Steel: Specification Section 415

4. Fabrication:
   a. Weld Arm and Pole (Alloy 6063) in the T4 temper using 4043 filler. Age the Arm and Pole artificially to the T6 temper after welding.
   b. Finish: 50 grit satin rubbed. Transverse welds are only allowed at the base.
   c. Roadway Light Pole Taper: Taper as required to provide a round top O.D. of 6" and a base O.D. of 10". Portions of the pole near the base shoe and at the arm connections may be held constant at 10" and 6" respectively to simplify fabrication.
   d. Median Barrier Mounted Light Pole Taper: Taper as required to provide a 6" O.D. round top with a 11" x 7" O.D. oblong base. Portions of the pole near the base and at the arm connections may be held constant at 11" x 7" oblong and 6" round respectively to simplify fabrication.
   e. Provide 3", 5" or 6" hoop at top of pole for electrical wires.
   f. Equip poles located on bridges, walls and concrete median barriers/Traffic Railings with a vibration damper.
   g. Perform all welding in accordance with AWS D1.2.
   h. Embeddable Junction Box (EJB):
      - Weld all seams continuously and grind smooth.
      - Use DIP Galvanize after fabrication.
      - Provide a watertight cover with neoprene gasket and secure cover with galvanized screws.
      - For Median Barrier Mounted Aluminum Light Poles, the fabricator must demonstrate the ability to produce a crack free pole. The fabricator's Department-approved QC Plan must contain the following information prior to fabrication:
        a. Tests demonstrating a pole with a 92% wall thickness achieves ultimate moment capacity of 44 kip*ft in the strong axis and 30 kip*ft in the weak axis.
        b. Tests demonstrating a pole with a 90% wall thickness achieves ultimate moment capacity of 44 kip*ft in the strong axis and 30 kip*ft in the weak axis.
        c. Test results showing the pole does not buckle at the shape transition area under the ultimate moment capacity loads.
        d. Complete details and calculations for the reinforced 4" x 6" (Min.) handhole located 1'-6" above the base plate.
      - Do not use any strain gage for load monitoring.
      - Do not erect pole without Luminaire attached.
   i. For Median Barrier Mounted Aluminum Light Pole, the fabricator must demonstrate the ability to produce a crack free pole. The fabricator's Department-approved QC Plan must contain the following information prior to fabrication:
      a. Tests demonstrating a pole with a 92% wall thickness achieves ultimate moment capacity of 36 kip*ft in the strong axis and 30 kip*ft in the weak axis.
      b. Tests demonstrating a pole with a 90% wall thickness achieves ultimate moment capacity of 36 kip*ft in the strong axis and 30 kip*ft in the weak axis.
      c. Test results showing the pole does not buckle at the shape transition area under the ultimate moment capacity loads.
      d. Complete details and calculations for the reinforced 4" x 6" (Min.) handhole located 1'-6" above the base plate.
   j. Identifying Tag (Subject Details for Approval):
      1. Description Project ID
      2. Pole Height
      3. Manufacturer's Name

5. Coatings/Finish:
   a. Pole and Arm Finish: 50 grit satin rubbed.
   b. Galvanize Steel Bolts, Screws, Nuts and Washers: ASTM F2229
   c. Hot Dip Galvanize EJB and other steel items including poles: ASTM A123

6. Construction:
   a. Foundation: Specification Section 635, except payment for the foundation is included in the cost of the pole.
   b. Frangible Base, Base Shoe, and Clamp:
      a. Certify that the Clamp, Frangible Transformer Base, and Base Shoe Design are capable of providing the required 50 years service life.
      b. Certify the Base conforms to the current FHWA required ASHTO Frangibility Requirements, tested under NCARP Report 350 Guidelines (e.g. Akron Foundry TB1-17).
   c. Do not erect pole without Luminaire attached.

7. Embedded Junction Box (EJB): Install EJBs per Note 4 and in accordance with Specification Section 635, as shown on the following Sheets.

8. Wind Speed by County:
   - 120 MPH
   - 140 MPH
   - 160 MPH
     - Broward, Brevard, Charlotte, Citrus, Escambia, Indian River, Lee, Martin, Miami-Dade, Monroe, Palm Beach, Sarasota and St. Lucie Counties.
NOTE:
Pole wall thicknesses shown in the POLE TABLE are nominals and shall be within the Aluminum Association Tolerances. Thicker walls are permitted and tapered walls may be used provided the minimum Aluminum Association thicknesses are not violated.

NOTE:
1. For locations of Bearing Plates, Base Plates and Details 'A' see Sheets 6 & 7.
2. Double Nuts: The bottom hex nut may be substituted by a half height 'Jam' nut.
3. Provide individual nut covers (not shown) for each bolt.

POLE TABLE

<table>
<thead>
<tr>
<th>WIND SPEED (MPH)</th>
<th>ARM LENGTH (FT)</th>
<th>MOUNTING HEIGHT (FT)</th>
<th>POLE WALL (IN)</th>
<th>FILL HEIGHT (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>8, 10, 12</td>
<td>40</td>
<td>0.25</td>
<td>Up to 70</td>
</tr>
<tr>
<td>160</td>
<td>8, 10, 12</td>
<td>40</td>
<td>0.313</td>
<td>Up to 70</td>
</tr>
</tbody>
</table>

NOTE:
Pole wall thicknesses shown in the POLE TABLE are nominals and shall be within the Aluminum Association Tolerances. Thicker walls are permitted and tapered walls may be used provided the minimum Aluminum Association thicknesses are not violated.

BASE PLATE DETAILS FOR MEDIAN BARRIER MOUNTED ALUMINUM LIGHT POLE

1. Stiffener Plate (see Stiffener Plate Detail)
2. Full Penetration Weld
3. Full Penetration Weld

DETAIL 'A'

BASE PLATE PLAN

BASE PLATE ELEVATION

BEARING PLATE ELEVATION

BEARING PLATE PLAN
**REVISION DESCRIPTION:**

**LAST REVIEW:** 01/01/17  
**DESCRIPTION:**  
**FY 2018-19**  
**STANDARD PLANS**  
**STANDARD ALUMINUM LIGHTING**  
**INDEX:** 715-002  
**SHEET:** 6 of 8
**Cylindrical Foundation Details for Median Barrier Mounted Aluminum Light Pole**

<table>
<thead>
<tr>
<th><strong>Wind Speed (MPH)</strong></th>
<th><strong>Design Mounting Height (FT)</strong></th>
<th><strong>Foundation Depth (FT)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>40</td>
<td>9</td>
</tr>
<tr>
<td>140</td>
<td>40</td>
<td>9</td>
</tr>
<tr>
<td>160</td>
<td>40</td>
<td>9</td>
</tr>
</tbody>
</table>

**Notes:**
1. For Bearing Plate and Base Plate Details, see Sheet 5.
2. For connections to adjacent Median Barrier, use the Doweled joint detail per Index 521-002. Alternatively, a continuous concrete pour or a construction joint may be substituted; these alternatives require the Median Barrier's longitudinal steel to lap a minimum of 2'-0" with the Barrier's longitudinal steel to lap 2'-0" to 3'-0". The lap varies as shown herein.

**Foundation Table**

<table>
<thead>
<tr>
<th><strong>Foundation Details</strong></th>
<th><strong>Foundation Depth (FT)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>#4 Bars (Typ.)</td>
<td>2'-6&quot;</td>
</tr>
<tr>
<td>1&quot; Chamfer</td>
<td>2'-6&quot;</td>
</tr>
<tr>
<td>#5 Bars, 6'-10&quot; long (Typ.)</td>
<td>2'-6&quot;</td>
</tr>
<tr>
<td>Bars 5V @ 8&quot; (Typ.)</td>
<td>2'-6&quot;</td>
</tr>
<tr>
<td>#7 Bars</td>
<td>2'-6&quot;</td>
</tr>
</tbody>
</table>

**Additional Details:**

- ** embedment block to fit EJB**
- **Grounding Rod (± 8 ~ #7 Bars) for grounding**
- **Bars 5V @ 8" (Typ.) with Tie Bars**
- **Class I concrete may be cast-in-place or precast with "Flowable Fill" backfill**

**Diagram Notes:**

- ** Provide dowel bars @ construction joint**
- **Optional Construction Joint (Typ.) (See Note 2)**
- **Grounding Rod (See Note 2)**

**Construction Joint (Typ.)**

- **Construction Joint per Index 521-001.**

**See Roadway Plans Construction Joint (Typ.)**

- **See Sheet 5 for Details**
- **Embedded Junction Box (EJB)**
- **See Sheet 6 for Details**
- **See Detail 'A'**

**Anchor Bolts**

- **4 ~ 1'-0" Ø Anchor Bolts to fit EJB**
- **4 ~ 1'-0" Ø Anchor Bolts (Typ.)**

**Bearing Plate**

- **Base Plate**
- **Base Plate & Stirrups Not Shown**
- **Bearing Plate (See Note 2)**

**Gutter Line (Typ.)**

- **Provide 2" Ø Conduit for grounding**
- **2" Ø Conduit**

**END VIEW**

- **2'-6" Ø Anchor Bolts**
- **2'-6" Ø Base Plate**
- **2'-6" Ø Design**

**SECTION C-C**

- **2'-9" Ø Anchor Bolts (Typ.)**
- **2'-9" Ø Anchor Bolts (Typ.)**
- **2'-9" Ø Anchor Bolts (Typ.)**

**PLAN (Reinforcing steel not shown)**

- **Provide dowel bars @ construction joint**

**NOTE:**

- **Debate 2" Ø Conduit to avoid cylindrical foundation.**

**END VIEW**

- **2'-0" Min.**
- **2'-0" Min.**
- **2'-0" Min.**

**VIEW B-B**

- **(Anchor Bolts and Barrier Longitudinal Steel & Stirrups Not Shown)**

**SECTION C-C**

- **2'-9" Ø Anchor Bolts (Typ.)**
- **2'-9" Ø Anchor Bolts (Typ.)**
- **2'-9" Ø Anchor Bolts (Typ.)**

**NOTE:**

- **Class I concrete may be cast-in-place or precast with "Flowable Fill" backfill.**

**ELEVATION**

- **3'-0" Cover (Typ.)**
- **3'-0" Cover (Typ.)**
- **3'-0" Cover (Typ.)**

**NOTES:**

- **Provide dowel bars @ construction joint**

**FY 2018-19 STANDARD PLANS**

**STANDARD ALUMINUM LIGHTING**

**INDEX 715-002**

**Sheet 7 of 8**
DESCRIPTION:

REVISION LAST of STANDARD PLANS FY 2018-19

SECTION D-D

(Longitudinal and transverse deck reinforcing steel not shown)

NOTES:

1. For Base Plate Details, Bearing Plate Details, and Detail 'A', see Sheet 5.
2. See Index 521-426 for details of adjacent Traffic Railing (Median 36" Single-Slope) and for angles 'A' and 'B'.
3. See Index 630-010 for Conduit, EJB and supplemental reinforcing details.

*At the Contractor's option, Bars SW may be fabricated as a two piece bar with a 1'-2" lap splice at the bottom legs.
HIGHMAST LIGHTING NOTES:

1. Poles are designed to support the following:
   A. One (1) cylindrical head assembly with a maximum effective projected area of 6 sf and 340 lbs (Max.)
   B. Eight (8) cylindrical luminaires with a maximum effective projected area of 1.5 sf and 77 lbs each.

2. Shop Drawings: This Index is considered fully detailed, only submit shop drawings for minor modifications not detailed in the Plans.

3. High Mast Structure Materials:
   A. Poles and Bucking Rings:
      a. Less than 70": ASTM A1011 Grade 50, 55, 60 or 65
      b. Greater than or equal to 70": ASTM A572 Grade 50, 55, 60 or 65
      c. ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield)
   B. Pole Caps: ASTM A1011 Grade 50, 55, 60, or 65 or ASTM A8209
   C. Bolt Cap: ASTM A595 Grade 50, 55, 60 or 65
   D. Bolt: ASTM A582 Grade A Heavy-Hex (5 per anchor bolt)
   E. Plate Washer: ASTM A36 (4 per anchor bolt)
   F. Nut Covers: ASTM B36 (319-F)
   G. Concrete: Class IV (Drilled Shaft)
   H. Reinforcing Steel: Specification Section 415

4. Fabrication:
   A. Welding: Specification Section 460-6.4
   B. Poles:
      a. Round or 16-Sided (Min.)
      b. Pole Taper: Diameter changing at 0.14 inches per foot.
      c. Two longitudinal seam welds (Max.)
      d. Longitudinal seam welds within 6" of pole to base must be complete penetration welds.
      e. Longitudinal seam welds at telescopic field joints must be complete penetration welds for the splice length plus 6".
      f. Circumferentially welded pole shaft, bolt splices and laminated pole shafts are not permitted.
   C. Holes for Anchor Bolts: Anchor Bolt Diameter plus 3/8" (Max.), prior to galvanizing.
   D. Hot Dip Galvanize after Fabrication
   E. Identification Tag: (Submit details for approval.)
      a. 2" x 4" (Max.) aluminum identification tag.
      b. Location on the inside of the pole and visible from the handhole.
      c. Secured to pole with 3/8" diameter stainless steel rivets or screws.
      d. Include the following information on the ID Tag:
         1. Financial Project ID
         2. Pole Type
         3. Pole Height
         4. Manufacturer's Name
         5. Fe of Steel
         6. Base Wall Thickness
   F. Anchor Bolts, Nuts and Washers:
      a. Anchor Bolts: ASTM F1554 Grade 55
      b. Nuts: ASTM A563 Grade A Heavy-Hex (5 per anchor bolt)
      c. Plate Washer: ASTM A36 (4 per anchor bolt)
      d. Stainless Steel Screws: AISI 316
      e. Longitudinal seam welds within 6" of pole to base must be complete penetration welds.
      f. Secure to pole with 3/8" diameter stainless steel rivets or screws.
   G. Nut Covers: ASTM B26 (319-F)
      a. ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield)
      b. Greater than or equal to 70": ASTM A572 Grade 50, 55, 60 or 65
      c. Less than 70": ASTM A1011 Grade 50, 55, 60 or 65
   H. Concrete: Class IV (Drilled Shaft)
   I. Reinforcing Steel: Specification Section 415

5. Coating:
   A. Galvanize Anchor Bolts, Nuts and Washers: ASTM F2329
   B. Hot Dip Galvanize all other steel items: ASTM A123

6. Construction:
   A. Foundation: Specification Section 455 Drilled Shaft, except that payment is included in the cost of the Structure.
   B. After Installation: Place wire screen between top of foundation and bottom of baseplate in accordance with Specification Section 647-6.

7. Wind Speed by County:
   170 MPH: Brevard, Broward, Charlotte, Collier, Escambia, Indian River, Lee, Martin, Miami-Dade, Monroe, Palm Beach, Sarasota and St. Lucie Counties.
1. At all pull boxes and pole bases, ends of conduit shall be sealed in accordance with Section 630 of the Standard Specifications For Road And Bridge Construction.

2. Slabs to be placed around all Poles and Pull Boxes.

3. For Pull Boxes between Poles refer to Index 715-001.

WIRING DETAILS
The contractor's attention is directed to those plan sheets detailing the mounting of luminaires at the pole top. Particular attention is directed to alignment of luminaire light distributions. Special attention must be exercised in the physical alignment of these luminaires to ensure that the approved photometric layout is physically produced at each lighting standard in the field. A marking shall be placed on the external face of the refractor to allow visual inspection of alignment. The marking shall correspond to the 0° axis of the refractor.

<table>
<thead>
<tr>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>See legend for number of luminaires, lamp weight and light distribution.</td>
<td></td>
</tr>
<tr>
<td>Luminaire support ring</td>
<td></td>
</tr>
<tr>
<td>2&quot; slip fitter</td>
<td></td>
</tr>
<tr>
<td>Cover</td>
<td></td>
</tr>
<tr>
<td>Lift cables</td>
<td></td>
</tr>
<tr>
<td>Luminaires</td>
<td></td>
</tr>
<tr>
<td>Pole cable &amp; sheaves</td>
<td></td>
</tr>
<tr>
<td>Lift cable sheaves</td>
<td></td>
</tr>
<tr>
<td>Lift cables (2 minimum)</td>
<td></td>
</tr>
<tr>
<td>Power Cable Terminator</td>
<td></td>
</tr>
<tr>
<td>600 Volt rated Pole Cable. Size of conductors to be determined by luminaire load.</td>
<td></td>
</tr>
<tr>
<td>Luminaire support ring</td>
<td></td>
</tr>
<tr>
<td>2&quot; Slip/Fitter Assembly (equally spaced around ring)</td>
<td></td>
</tr>
<tr>
<td>Male Inlet</td>
<td></td>
</tr>
<tr>
<td>Covered receptacle to power luminaires when in the lowered position with Male Inlet.</td>
<td></td>
</tr>
<tr>
<td>A surge protector shall be located in the pole with the circuit breaker. The surge protector shall be mounted at the front near hand hole for easy access.</td>
<td></td>
</tr>
<tr>
<td>Positive drive reversible winch</td>
<td></td>
</tr>
<tr>
<td>20' Ground Rod</td>
<td></td>
</tr>
<tr>
<td>Ground to Winch Support Plate</td>
<td></td>
</tr>
<tr>
<td>Grounding Array</td>
<td></td>
</tr>
<tr>
<td>#6 Bonding Ground</td>
<td></td>
</tr>
<tr>
<td>480V Phase to Phase</td>
<td></td>
</tr>
<tr>
<td>Winch cable</td>
<td></td>
</tr>
<tr>
<td>Lift cables (2 minimum)</td>
<td></td>
</tr>
<tr>
<td>Size of conductors to be determined by luminaire load.</td>
<td></td>
</tr>
<tr>
<td>600 Volt rated Circuit Breaker Cable. Size of conductors to be determined by luminaire load.</td>
<td></td>
</tr>
<tr>
<td>Remote control switch</td>
<td></td>
</tr>
<tr>
<td>Step-down transformer provided with 120V grounded receptacle for electric control &amp; receptacle for supply cable. (see schematic)</td>
<td></td>
</tr>
<tr>
<td>25' minimum remote control cable same as Pole Cable.</td>
<td></td>
</tr>
<tr>
<td>Supply cable receptacle</td>
<td></td>
</tr>
<tr>
<td>Circuit Breaker Cable with Female Plug</td>
<td></td>
</tr>
<tr>
<td>Female Plug</td>
<td></td>
</tr>
<tr>
<td>Positive drive reversible winch</td>
<td></td>
</tr>
<tr>
<td>Winch</td>
<td></td>
</tr>
<tr>
<td>Lock nuts</td>
<td></td>
</tr>
<tr>
<td>Hand hole</td>
<td></td>
</tr>
<tr>
<td>Winch</td>
<td></td>
</tr>
<tr>
<td>Base plate</td>
<td></td>
</tr>
<tr>
<td>Pole cable</td>
<td></td>
</tr>
<tr>
<td>Lift cables</td>
<td></td>
</tr>
<tr>
<td>Lift cable sheaves</td>
<td></td>
</tr>
</tbody>
</table>

Schematic of Remote Auxiliary Power Unit

High Mast Pole Wiring Diagram

Lowering Details
NOTES:
1. Use compacted select material in accordance with Index 120-001.
2. Concrete shall be Class NS with a minimum strength at 28 days of f'c=2.5 ksi.
3. Outside edge of slab shall be cast against formwork.
4. The pull box shown is 13" x 24" others approved under Section 635 of the Standard Specifications may be used.
5. Slabs to be placed around all Poles and Pull Boxes. In urban areas or where space is limited slab dimensions may be adjusted as shown in the plans.
6. Concrete for slabs around poles and pull boxes shall be included in the price of pole or pull box.
7. The expansion joint shall consist of ½" of closed-cell polyethylene foam expansion material. The top ½" of expansion material shall be removed after pouring the slab and sealed with an APL approved Type A sealant meeting the requirements of Section 932.
### GENERAL NOTES

1. The Railroad Company will furnish and install all track bed (ballast), crossties, rails, crossing surface panels and accessory components. All pavement material, including that through the crossing, will be furnished and installed by the Department or its Contractor, unless negotiated otherwise.

2. When a railroad grade crossing is located within the limits of a highway construction project, a transition pavement will be maintained at the approaches of the crossing to reduce vehicular impacts to the crossing. The transition pavement will be maintained as appropriate to protect the crossing from low clearance vehicles and vehicular impacts until the construction project is completed and the final highway surface is constructed.

3. The Central Rail Office will maintain a list of currently used Railroad Crossing Products and will periodically distribute the current list to the District Offices as the list is updated.

4. The Railroad Company shall submit engineering drawings for the proposed crossing surface type to the Construction Project Engineer and/or the District Rail Office for concurrence along with the list of Railroad Crossing Products. The approved engineering drawings of the crossing surface type shall be made a part of the installation agreement.

5. Sidewalks shall be constructed through the crossing between approach sidewalks of the crossing. Sidewalks shall be constructed with appropriate material to allow unobstructed travel through the crossing in accordance with ADA requirements.

6. Install pavement in accordance with the Specifications.

7. The Department will participate in crossing work that requires adjustments to rail outside of the crossing, no more than 50 feet from the edge of the travel way.

### CROSSING SURFACES

<table>
<thead>
<tr>
<th>Type</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Concrete</td>
</tr>
<tr>
<td>R</td>
<td>Rubber</td>
</tr>
<tr>
<td>RA</td>
<td>Rubber/Asphalt</td>
</tr>
<tr>
<td>TA</td>
<td>Timber/Asphalt</td>
</tr>
</tbody>
</table>

### STOP ZONE FOR RUBBER CROSSING

<table>
<thead>
<tr>
<th>Design Speed (mph)</th>
<th>Zone Length (Distance From Stop)</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 or less</td>
<td>250'</td>
</tr>
<tr>
<td>50 - 55</td>
<td>350'</td>
</tr>
<tr>
<td>60 - 65</td>
<td>500'</td>
</tr>
<tr>
<td>70</td>
<td>600'</td>
</tr>
</tbody>
</table>

Notes:

1. Type R Crossings are NOT to be used for multiple track crossings within zones for an existing or scheduled future vehicular stop. Zone lengths are charted above.

2. Single track Type R Crossings within the zones on the chart may be used unless engineering or safety considerations dictate otherwise.
Crossing Shoulder Pavement (Except Area Occupied By Crossing Surfacing Material):
a. To Shoulder Line For Outside Shoulders Less Than 8 Wide.
b. To B Maximum Width For Outside Shoulders B Or Wider (Regardless Of Approach Shoulder Pavement Width).
c. For Median Shoulders.

* Where the existing shoulder is substandard for the facility type, the shoulder width is to be widened to accommodate crossing shoulder pavement.

**Pavement**

Beveled Edge (1:4 Slope)

Shoulder Line

**Pavement**

Edge Of Travel Way

**Pavement**

Flexible Pavement

HALF PLAN

ROADWAYS WITH FLUSH SHOULDERS

SECTION VIEW

**TYPICAL CROSSING MATERIAL REPLACEMENT AT RR CROSSINGS**

**VERTICAL ROADWAY ALIGNMENT THROUGH A RAILROAD CROSSING**

To prevent low-clearance vehicles from becoming caught on the tracks, the crossing surface should be at the same plane as the top of the rails for a distance of 2 feet outside the rails. The surface of the highway should also not be more than 3 inches higher or lower than the top of the nearest rail at a point 30 feet from the rail unless track superelevation makes a different level appropriate. Vertical curves should be used to traverse from the highway grade to a level plane at the elevation of the rails. Rails that are superelevated, or a roadway approach section that is not level, will necessitate a site specific analysis for rail clearances.

HALF PLAN

CURBED ROADWAYS