12" from top of the pole or 270° to pole HH
Attached Oriented 90°
3" Coupling Manufacturer to pole.

Cap shall be secured
Removable steel pole attachment of (2) #4 wires.
Nut to accommodate the space between weld and retainer (Allow sufficient grounding provision nut retainer).

SHOP WELD JOINT
WEATHERHEAD TO POLE
ADD WELD JOINT TO BASE

ANCHOR BASE STEEL STRAIN POLE

WEATHERHEAD TO POLE
SHOP WELD JOINT

Access hand hole
2"x4" stainless steel identification tag attached to pole 4" from base using stainless steel hardware. See Base ID Tag Detail.

ALL NEW & EXISTING STEEL POLES
ACCESS HAND HOLE

GROUNDING PROVISION

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR
6 ANCHOR BOLT STRAIN POLE AND FOUNDATION
SIG-153-A

PREPARED BY
TRAFFIC AND SAFETY

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

FHWA APPROVAL DATE

PLAN DATE

SHEET 1 of 7
### Pole Requirements

<table>
<thead>
<tr>
<th>Pole Length</th>
<th>30 feet</th>
<th>36 feet</th>
<th>40 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness min.</td>
<td>0.429 inches</td>
<td>0.625 inches</td>
<td>0.625 inches</td>
</tr>
<tr>
<td>Pole dia.</td>
<td>B</td>
<td>B'</td>
<td>B'</td>
</tr>
<tr>
<td>At top</td>
<td>8&quot; min</td>
<td>8&quot; min</td>
<td>8½&quot; min</td>
</tr>
<tr>
<td>At bottom</td>
<td>13&quot; ± ½&quot;</td>
<td>13&quot; ± ½&quot;</td>
<td>14&quot; ± ½&quot;</td>
</tr>
<tr>
<td>Full length taper</td>
<td>+0.002 in/ft</td>
<td>+0.002 in/ft</td>
<td>+0.002 in/ft</td>
</tr>
<tr>
<td>Anchor bolt cord</td>
<td>C</td>
<td>9&quot;</td>
<td>10&quot;</td>
</tr>
<tr>
<td>Base plate edge</td>
<td>D</td>
<td>12½&quot;</td>
<td>14½&quot;</td>
</tr>
<tr>
<td>Base plate thickness</td>
<td>T</td>
<td>2&quot;</td>
<td>2½&quot;</td>
</tr>
<tr>
<td>Anchor bolt circle</td>
<td>BC</td>
<td>18&quot;</td>
<td>21&quot;</td>
</tr>
<tr>
<td>Anchor bolt hole dia.</td>
<td>d</td>
<td>1½&quot;</td>
<td>2½&quot;</td>
</tr>
<tr>
<td>Anchor bolt dia.</td>
<td>1½&quot;</td>
<td>2½&quot;</td>
<td>2½&quot;</td>
</tr>
<tr>
<td>Foundation dia.</td>
<td>36&quot;</td>
<td>42&quot;</td>
<td>42&quot;</td>
</tr>
<tr>
<td>Anchor bolt length</td>
<td>72&quot;</td>
<td>72&quot;</td>
<td>72&quot;</td>
</tr>
<tr>
<td>Pole band (span clamp)</td>
<td>8.5&quot;</td>
<td>POCH</td>
<td>POCH</td>
</tr>
<tr>
<td></td>
<td>25'-6&quot; to 28'-6&quot;</td>
<td>32'-6&quot; to 34'-6&quot;</td>
<td>36'-0&quot; to 38'-6&quot;</td>
</tr>
<tr>
<td></td>
<td>9.5&quot;</td>
<td>POCH</td>
<td>POCH</td>
</tr>
<tr>
<td></td>
<td>20'-0&quot; to 25'-0&quot;</td>
<td>25'-0&quot; to 32'-0&quot;</td>
<td>29'-0&quot; to 35'-6&quot;</td>
</tr>
</tbody>
</table>

**NOTES:**

1. Acceptable mill tolerances to apply to all nominal dimensions.

2. Materials and galvanizing:
   a. Steel for poles shall conform to ASTM A572, Grade 50, fy=50 ksi, or ASTM A595, Grade A, fy=55 ksi.
   b. Base plate and steel bottom template ASTM A36, fy=36 ksi.
   c. Galvanize all exposed nuts, bolts, and washers according to ASTM F2329. Galvanize all other steel items according to ASTM A123. Embedded nuts, bolts, washers, and steel ring need not be galvanized.
   d. Anchor bolts shall conform to ASTM F1554, Grade 105, fy=105 ksi. Coarse pitch thread will be allowed provided threads conform to designation: 06 UNC 2A (1.5 inch dia) 05 UNC 2A (1.75 inch dia).
   e. Nuts for anchor bolts shall conform to ASTM A194 Grade 2H or ASTM A563 Grade DH
   f. Washers for anchor bolts shall conform to ASTM F436 Type I.

3. Welding
   a. Welding shall conform to ANSI/AWS D1.1
   b. 100% of welds shall be inspected. Full-penetration groove weld inspection shall be performed by nondestructive ultrasonic methods. Other welds shall have visual and/or magnetic particle inspection.

4. Tolerances
   a. Overall height ± 1%.
   b. Sweep and camber 1/8 in/ft.
   c. Twist 10° max. overall.


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**NOT TO SCALE**

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**MICHIGAN DEPARTMENT OF TRANSPORTATION**
**BUREAU OF HIGHWAYS**
**DELIVERY STANDARD PLAN**

**FHWA APPROVAL DATE**

**Plan Date**

**SIG-153-A**

**File:** PW1TR/Sig/Web/SBD/Devel/top/mdot sig 153a.dgn

**Rev.** 11/17/15

**2 of 7**
ANCHOR BASE STEEL STRAIN POLE FOUNDATION

NOTE:
- Install (3) 3" and (1) 1 1/2" conduits in all steel strain pole foundations. (Indicate direction of bends in foundation top.)
- All metal bases must be connected to a ground rod with a #6 ground wire.

- Handhole
- Use non-solder type connection
- Gravel
- 3/4" x 10'-0" copper clad ground rod(s) as directed by Engineer and in accordance with the current N. E. C. All grounds shall provide less than 10 ohm resistance to ground.
- All metal bases must be connected to a ground rod with a #6 ground wire.
- (3) 3" Schedule 80 PVC conduits and (1) 1 1/2" Schedule 80 PVC conduits
- 90 degree elbows
NOTE:
Secure conduits together with suitable banding to insure placement prior to concrete pour.

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**BASE PLATE**

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**PLAN**

---

**ELEVATION**

---

**DRILLED SHAFT FOUNDATION FOR STRAIN POLE (SHOWN WITH CASING PAY ITEM)**
#5 bars @ 12" centers
(8) #8 bars equally spaced (36" dia. foundation)
(8) #9 bars equally spaced (42" dia. foundation)

Steel casing per plan
1½" or 1¼" anchor bolts
(6 required)

3½" (1½" Bolts)
3½" (1½" Bolts)

2½" Thick (1½" Bolts)
1½" Thick (1¾" Bolts)

1¾" or 2½" (1½" Bolts)
1¾" or 2½" (1¾" Bolts)

3 CLR (typ)

Heavy hex nuts (24), flat washers (24), and lock washers (12)
for anchor bolt cage assembly

#4 AWG or larger standard bare ground wire with 24" min slack above foundation
top. Bond to reinforcement.

Keep anchor bolts plumb (typ)

Bottom template required
ASTM A36 steel

Grade level

Bottom steel template

Foundation elevation (shown with casing pay item)
FOUNDATION NOTES:

1) Construct strain pole foundations according to 718.03 of the Standard Specifications for Construction. All work and materials shall be in accordance with the MDOT Standard Specifications.

2) If soil conditions indicate there is no need for a casing pay item as shown on the plans, the contractor should request permission of the engineer to install the foundation without casing.

3) When the casing pay item is included on the plans for a foundation (due to granular soils or a wet hole), steel casing (smooth walled) is to be installed to enable the foundation to be poured. The thickness of the steel casing is to be determined by the contractor. The steel casing shall be left in place. A suitable method of compaction must be employed to ensure the soil immediately outside the casing is compacted properly.

4) When the casing pay item is called for on the plans, the steel casing may stop at the conduit entrance to the foundation. Top of foundation must then be formed separately. The casing pay item quantity will be paid for based on actual linear feet installed.

5) Dewatering of wet shafts is not allowed. A wet shaft is defined as having more than 3 inches of standing water or as having water infiltrating at a rate equal to or exceeding 12 inches per hour. For wet shafts, concrete is to be placed in accordance with section 718.03. (wet construction method) with a tremie tube or concrete pump beginning at the shaft bottom. Grade T concrete must be used for underwater placement. Grade S2 may be used in dry excavations only. See MDOT standard specifications Tables 701-1A and 701-1B (Concrete Structure Mixtures) for acceptable slump range.

6) Per MDOT standard specifications 718-02, the Grade S2 acceptable slump range is 6-8 inches. The Grade T acceptable slump range is 7-9 inches.

7) Steel reinforcement shall be ASTM A615 grade 60 without epoxy coating.

8) Exposed concrete surfaces shall be cast in forms. Exposed concrete edges shall be beveled 3/4 inches.

9) Steel reinforcement shall have a clear cover of 3 inches unless noted otherwise. Steel reinforcement may be adjusted to ensure proper clear cover.

10) Conduits and anchor bolts shall be rigidly installed before concrete is placed. Anchor bolts shall be spaced by means of a template. The center of the template shall coincide with the center of the foundation.

11) Grounding of pole includes adding #4 bare copper ground wire bonded by mechanical connection to foundation reinforcing steel and having 24" of slack above the top of foundation.

12) Refer to the following special provisions related to 6 anchor bolt strain poles:
   - Steel Strain Pole
   - Strain Pole Foundation and Anchor Bolts
   - Casing Used With Strain Poles and Mast Arm Poles

13) The 36 inch foundation should only be used in areas with utilities in close proximity to the foundation which restricts the construction of a 42 inch diameter foundation.
HORIZONTAL REINFORCEMENT DETAIL

#5 bar horizontal reinforcement

2'-2" LAP MIN

#8 bar (36° foundation) or
#9 (42° foundation) bar vertical

ELEVATION VIEW

CONDUIT LAYOUT

(3) 3" Schedule 80 PVC conduits (90 degree elbows)

(1) 1 1/2" Schedule 80 PVC conduits (90 degree elbows)