Contact Information:
Date: November 23, 2020
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Standard Plans:
Index Number: 649-031
Sheet Number(s): 1, 2, 3, 4, and 6 of 6
Index Title: Mast Arm Assemblies

Summary of the changes:
Sheet 1: Note 4I added optional other materials; Added information on terminal compartment to note 5G
Sheet 2: Added Note 4
Sheet 3 & 4: Added bolt as option for splice connection
Sheet 6: Clarified that a domed shape top cap is permissible.

Commentary / Background:
Changes are added because of repeated shop drawing comments that need to be approved everytime. Purpose is to prevent shop drawings from being rejected due to these changes, and to reduce the number of shop drawings related to the items clarified.

Other Affected Offices / Documents: (Provide name of person contacted)
Yes ☑ No ☐
☑ Other Standard Plans –
☑ FDOT Design Manual –
☑ Basis of Estimates Manual –
☑ Standard Specifications –
☑ Approved Product List –
☑ Construction –
☑ Maintenance –

Origination Package Includes:
(Email or hand deliver package to Rick Jenkins)
Yes ☑ N/A ☐
☑ Redline Mark-ups
☑ Proposed Standard Plan Instruction (SPI)
☑ Revised SPI
☑ Other Support Documents

Implementation:
☑ Design Bulletin (Interim)
☐ DCE Memo
☐ Program Mgmt. Bulletin
☐ FY-Standard Plans (Next Release)

Contact the Roadway Design Office for assistance in completing this form
GENERAL NOTES:
1. Shop Drawings. This Index is considered fully detailed, only submit shop drawings for minor modifications not detailed in the Plans.
2. Prior to Fabrication: Verify the installed foundation elevation will result in the required signal elevation and adjust the pole height as needed.
3. Details for Signal and Sign locations, Signal Head attachments, Pedestrian Head attachment, and Foundation Conduit are not shown for simplicity.

4. Materials:
   A. Poles, Mast Arm and Backing Rings
      - Less than 3"; ASTM A1011 Grade 50, 55, 60 or 65
      - Greater than or equal to 3"; ASTM A52 Grade 50, 55, 60 or 65
      - ASTM A595 Grade A (5ksi yield) or Grade B (8ksi yield)
   B. Steel Plates: ASTM A36
   C. Weld Metals: ETX1X
   D. Bolts, Nuts and Washers:
      - High Strength Hex Head Bolts; ASTM F3175, Grade A325
      - Nuts: ASTM A563 DH Heavy-Hex
      - Washers: ASTM F436 Type 1, one under turned element
   E. Anchor Bolts, Nuts and Washers:
      - Anchor Bolts: ASTM F1554 Grade 55
      - Nuts: ASTM A563 Grade 56
      - Plate Washers: ASTM A352 (per bolt)
   F. Threaded Bar/Studs: ASTM A307
   G. Handhole Plates: ASTM A309 or ASTM A49, Grade 36
   H. Aluminum Pole Caps and Nut Covers: ASTM B26 (319-F)
   I. Stainless Steel Access Holes: AASHTO M 159-95
   J. Reinforcing Steel: Specification 415

5. Fabrication:
   A. Welding:
      - Specification 460-6.4 and
      - AASHTO LRFD Specification for Structural Supports for Highway Signs, Luminaires, and Traffic Signals Section 14.4.4
   B. Poles and Mast Arms:
      - Round or 12-sided (Min.)
      - Taper pole diameter at 0.14 inches per foot
   C. Upright poles must be a single section. For arms and upright support (See Sheet 4)
   D. Arms may be either one or two sections. See Sheet 6
   E. Fabricate longitudinal seam welds with 60 percent minimum penetration or fusion welds except:
      - Use full-penetration groove welds on the female end section of telescopic (i.e., slip type) field splices for a minimum length of one and one-half times the inside diameter of the female section plus 6 inches.
   F. Locate longitudinal seam welds along the:
      - Lower quadrant of the arms.
      - Same side of the pole as the arm connections.
   G. Face handhole perpendicular from arm on single arm poles, perpendicular from the first arm of double arms poles facing away from traffic or see special instructions on the Mast Arm Tabulation Sheet:
      - Provide a 2" or 4" back at the top of the pole for signal wiring support (See Sheet 6)
      - First and Second arm camber angle = 2
      - Bolt holes diameters as follows:
        - Bolts (except Anchor bolts): Bolt diameter plus \( \frac{3}{16} \) prior to galvanizing.
        - Anchor Bolts: Bolt diameter plus \( \frac{3}{16} \) Max.
   H. Materials:
      - All Nuts, Bolts, Washers and Threaded Bar/Studs: ASTM F3329
      - All other steel items including plate washers ASTM A123
   I. Reinforcing Steel: Specification 415

7. Construction:
   A. Foundation: Specification 455 Drilled Shaft, except that payment is included in the cost of the Mast Arm.
   B. Install Pole vertically.
   C. Place structural grade pad with drain between top of foundation and bottom of baseplate in accordance with Specification 649-7
   D. Attach Sign Panels and Signs centered on the elevation of the Mast Arm.
   E. Wire Access holes are \( \frac{3}{16} \) Max, or less in diameter.

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Single Arm Shown, Double Arm Similar (Luminaire Arm Not Shown)
NOTES:

1. The Structural Grout Pad diameter may be reduced where the footprint of the Grout Pad does not provide adequate clearance for the sidewalk and/or accessibility considerations.

2. See Index 649-030 and the plans for actual quantity of bolts in the Base Plate Connection.

3. The bottom hex nut of the Double Nuts shown in Section A-A may be substituted by a half-height anchor 'jam' nut. Provide individual nut covers that allow for each bolt.

4. Detail 'A' Silicone Caulk may be applied after installation. Consult with Manufacturer.

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2. See Index 649-030 and the plans for actual quantity of bolts in the Base Plate Connection.

3. The bottom hex nut of the Double Nuts shown in Section A-A may be substituted by a half-height anchor 'jam' nut. Provide individual nut covers that allow for each bolt.

4. Detail 'A' Silicone Caulk may be applied after installation. Consult with Manufacturer.

NOTE:

1. Install the 'Slip Joint' splice with a tight fit and no change in the Mast taper due to the splice.

2. Details shown on this sheet are for 12 sided pole sections. However, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced.

3. Match mark the Arm and Connection Plates to ensure proper assembly and the seam weld is in the proper location (seam located at the bottom side of the Arm).

11/01/21
**DESCRIPTION:**

1. Install the 'Slip Joint' splice with a tight fit and no change in the Mast Arm taper due to the splice.
2. Details shown on this sheet are for 12 sided pole sections. However, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced.
3. Match mark the Arm and Connection Plates to ensure proper assembly and the seam weld is in the proper location (seam located at the bottom side of the Arm).
4. 'UF' measured counter clockwise from \( \xi \) First Mast Arm Extension.
5. Adjust width of top and bottom Connection Plates to maintain minimum clearance shown.

**NOTE:**

- \( \xi \) Mast Arm
- \( \xi \) First Mast Arm Extension
- \( \xi \) Second Mast Arm Extension
- 4" Ø Connections Bolt
- \( \xi \) Splice Bolt

**SECTION E-E**

- Pole Connection Plate Base Plate
- \( \xi \) SP Ø Connection Bolt
- Top And Bottom Plates (Typ.)

**SECTION F-F**

- Side Connection Plate Edge Of Top Plate
- Opening
- Backing Ring

**SECTION G-G**

- Full Penetration Weld (Typ.)
- Double Penetration Weld (Typ.)

**DOUBLE ARM CONNECTIONS & SPLICE DETAILS**

- Provide Ultrasonic Testing for lamellar tearing in Connection Plate when Minimum Internal Bend Radius = 5x Wall Thickness (1" Min.)
- Minimum Inside Radius Measured Center To Flat
- Seam Weld (Typ.)
- Six 'SP' Ø Connection Bolts (May Vary For Special Design)

**NOTE:**

- See DETAIL 'F'
- See DETAIL 'E'
- See DETAIL 'D'
- See DETAIL 'A'

**REVISION**

11/01/21

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11/01/19

**LAST**

11/01/21
**NOTES:**

1. Handhole covers may be omitted when Terminal Compartment is provided.
2. See Mast Arm Tabulation sheet to see if Terminal Compartment is required and for locations.
3. Terminal Compartment Frame Height 2'-0" minimum to 2'-6" maximum. Align bottom of Terminal Compartment a minimum of 1" below the bottom of the Handhole Frame.
4. Any combination of Option 'a' or 'b' may be used, provided both lifting and wiring is accommodated.

ADDED to Note 4:
Cap may be flat plate or domed cap with set screws.

ADDED Note 5: An alternate terminal compartment frame detail is allowed where the compartment frame is of constant depth and cuts into the pole at the frame top and bottom but lays flush with the pole on the frame sides. The frame is then welded to the pole using fillet welds all around the outside.

5.
**DESCRIPTION:**

1. **Foundation:** Specification 455 Drilled Shaft, except that payment is included in the cost of the Mast Arm.
2. **Pole:** Install Pole vertically.
3. **Pole Top:** Specification 455 Drilled Shaft, except that payment is included in the cost of the Mast Arm.
4. **Mast Arm Splice:** (Double Arm See Sheet 3) (Single Arm See Sheet 4)
5. **Pole Connection:** (Single Arm See Sheet 3) (Double Arm See Sheet 4)
6. **Handhole and Mast Arm:** (See Sheet 6)

**GENERAL NOTES:**

1. **Materials:**
   - **Poles, Mast Arms and Backing Rings:**
     - Less than 3\(\text{in.}\): ASTM A1011 Grade 30, 55, 60 or 65
     - Greater than or equal to 3\(\text{in.}\): ASTM A572 Grade 50, 55, 60 or 65
   - **Upright (Main) Section:** ASTM A959 Grade A (53 ksi yield) or Grade B (60 ksi yield)
   - **Steel Plates:** ASTM A36
   - **Stainless Steel Set Screws:** Stainless Steel Set Screws
   - **Threaded Bars/Studs:** ASTM A36 or ASTM A307
   - **Anchor Bolts, Nuts and Washers:**
     - **Anchor Bolts:** ASTM F1554 Grade 55
     - **Nuts:** ASTM A563 DH Heavy-Hex
   - **Threaded Rods:** ASTM A307
   - **Steel Plates:** ASTM A36
   - **Weld Metal:** E70XX
   - **Bolts, Nuts and Washers:** C. ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield)
   - **Reinforcing Steel:** Specification 415
   - **Concrete:** Class IV (Drilled Shaft) for all environmental classifications.
   - **Handhole Frame:** ASTM A709 or ASTM A36, Grade 36
   - **Concrete:** ASTM C 676-97
   - **Cast Iron:** ASTM A212 Grade F 105
   - **Aluminum:** ASTM B 211-85
   - **Stainless Steel Screws:** AISI Type 316
   - **Threaded Rods:** ASTM A307

2. **Dimensions:**
   - **Lamp Post:** 1-0" from arm base plate.
   - **Street Name:** Located at bottom of arm.
   - **Quadrant with Controller:** Located at bottom of arm.
   - **One-Story Building:** Located at bottom of arm.
   - **Pole Top:** (See Sheet 6)
   - **Aluminum Identification Tag:** Tag to exceed 1" x 4".
   - **Minimum Visibility:** 2" x 4".
   - **Pole Base:** Located at bottom of arm.
   - **Mast Arm Splice:** (Double Arm See Sheet 4)
   - **Pole Connection:** (Single Arm See Sheet 3)

3. **Notes:**
   - **Aluminum Identification Tag:** Tag to exceed 1" x 4".
   - **Minimum Visibility:** 2" x 4".
   - **Pole Base:** Located at bottom of arm.
   - **Mast Arm Splice:** (Double Arm See Sheet 4)
   - **Pole Connection:** (Single Arm See Sheet 3)

4. **Construction:**
   - **Foundation:** Specification 455 Drilled Shaft, except that payment is included in the cost of the Mast Arm.
   - **Install Pole vertically.**
   - **Pole Top:** Specification 455 Drilled Shaft, except that payment is included in the cost of the Mast Arm.
   - **Mast Arm Splice:** (Double Arm See Sheet 3) (Single Arm See Sheet 4)
   - **Pole Connection:** (Single Arm See Sheet 3) (Double Arm See Sheet 4)
   - **Handhole and Mast Arm:** (See Sheet 6)

**ELEVATION AND NOTES**

**INDEX**

- **Lamp Post:** 1-0" from arm base plate.
- **Street Name:** Located at bottom of arm.
- **Quadrant with Controller:** Located at bottom of arm.
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**MAST ARM ASSEMBLY**

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**LAST REVISION:** 01/01/21

**DESCRIPTION:** FY 2022-23 STANDARD PLANS

**INDEX:**

- **Lamp Post:** 1-0" from arm base plate.
- **Street Name:** Located at bottom of arm.
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**MAST ARM ASSEMBLY**

**ELEVATION AND NOTES**
NOTES:
1. The Structural Grout Pad diameter may be reduced where the footprint of the Grout Pad does not provide adequate clearance for the sidewalk and/or accessibility considerations.

2. See Index 649-030 and the plans for actual quantity of bolts in the Base Plate Connection.

3. The bottom hex nut of the Double Nuts shown in Section A-A may be substituted by a half-height anchor jam nut. Provide individual nut covers (not shown) for each bolt.

4. Detail ‘A’ Silicone Caulk may be applied after installation. Consult with Manufacturer to determine the suitability of the caulk to be applied.

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4. Detail ‘A’ Silicone Caulk may be applied after installation. Consult with Manufacturer to determine the suitability of the caulk to be applied.
NOTE:

1. Install the Slip joint splice with a tight fit and no change in the Mast taper due to the splice.

2. Details shown on this sheet are for 12 sided pole sections. However, sections with more than 12 sides and round sections are permitted provided outside diameter and wall thickness are not reduced.

3. Match mark the Arm and Connection Plates to ensure proper assembly and the seam weld is in the proper location (seam located at the bottom side of the Arm).
1. Install the 'Slip Joint' splice with a tight fit and no change in the Mast Arm taper due to the splice.

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3. Match mark the Arm and Connection Plates to ensure proper assembly and the seam weld is in the proper location (seam located at the bottom side of the Arm).

4. 'UF' measured counter clockwise from § First Mast Arm Extension.

5. Adjust width of top and bottom Connection Plates to maintain minimum clearance shown.

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NOTES:
1. Handhole covers may be omitted when Terminal Compartment is provided.
2. See Mast Arm Tabulation sheet to see if Terminal Compartment is required and for locations.
3. Terminal Compartment Frame Height 2'-0" minimum to 2'-6" maximum. Align bottom of Terminal Compartment a minimum of 1" below the bottom of the Handhole Frame.
4. Any combination of Option 'a' or 'b' may be used, provided both lifting and wiring is accommodated. Cap may be flat plate or domed cap with set screws.
5. An alternate terminal compartment frame detail is allowed where the compartment frame is of constant depth and cuts into the pole at the frame top and bottom but lays flush with the pole on the frame sides. The frame is then welded to the pole using fillet welds all around the outside.

11 Gage Mast Arm Handhole Cover

5/8" OD x 1/4" Wall
Thick Std. Mast Arm Handhole Frame

Threaded Hole For 5/8" Hex Head Screw (Typ.)

Mast Arm Handhole Frame

Handhole Frame

Handhole Frame

3/4" Ø Stainless Steel Hex Head Screw (Typ.)

1/2" Ø Stainless Steel Hex Head Screw (Typ.)

SECTION K-K (Thru Handhole)

SECTION K-K (Terminal Compartment)

1/4" Thick

1/4" Ø Min. Bolt

1/4" Overhang (Min.)

CENTER OF POLE, POLE TOP AND LIFTING BAR

1/4" Overhang (Min.)

5/8" Bar Welded To Underside Of Bar

HEAD SCREW (Typ.)

" Ø Hex For Threaded Hole

1/2" Min. Thick.

1/2" Commercial Grade Hot Rolled Bar Welded To Inside Of Pole

POLE CAP PLATE

POLE TOP DETAILS

1/2" Min. Thick.

1/2" Commercial Grade Hot Rolled Bar Welded To Inside Of Pole

C Hook For Wiring And Lifting.