GENERAL NOTES:

1. Install conduit in accordance with Specification 630.

7. When installing conduit under sidewalk by open trench, replace the entire sidewalk slab.

3. Trench not to be open more than 250' at a time when construction area is subject to vehicular or pedestrian traffic.

4. Sawcut asphalt at the edges of the trench to leave neat lines.

---

CONDUIT INSTALLATION DETAILS

FY 2019-20
STANDARD PLANS

INDEX
630-001
1 of 4

LAST
11/01/18
DESCRIPTION:
CONDUIT INSTALLATION DETAILS

REV 1
0

SIDE STREET

Curb Or Curb And Gutter

Utility Strip

Pull Box (See Index 635-001)

Sidewalk

Conduit

SIDE STREET

Curb Or Curb And Gutter

Pull Box (See Index 635-001)

Plan

Pull Box (See Index 635-001)

Street Surface

Pull Box (See Index 635-001)

Elevation

Curb And Gutter

Pull Box (See Index 635-001)

SIDE STREET

Pull Box (See Index 635-001)

Plan

Pull Box (See Index 635-001)

Street Surface

Pull Box (See Index 635-001)

Elevation

Flush Shoulder

Pull Box (See Index 635-001)

Grade

Conduit

Grade

Conduit
PLACEMENT WITHIN THE UTILITY STRIP

PLACEMENT UNDER SIDEWALK

PLACEMENT BEHIND GUARDRAIL

PLACEMENT IN FRONT OF GUARDRAIL

VERTICAL CLEARANCE NOTE:

Maintain 1'-0" minimum vertical clearance when crossing over pipe and/or utilities. If minimum vertical clearance cannot be maintained, conduit is to be routed under pipe maintaining 1'-0" minimum vertical clearance.

CONDUIT INSTALLATION DETAILS
NOTES:
1. Pavement Removal: The removal and replacement of the additional pavement width (i.e., 6" Width either side of trench) will not be required when the trench can be constructed without disturbing the asphalt surface on either side.

2. Placement Under Existing Pavement: Place conduit prior to installation of base and pavement, unless otherwise shown in the Plans or approved by the Engineer.

3. Placement Not Exposed to Vehicular Traffic:

4. Placement Under New Roadway Prior to Installation of Base and Pavement:

5. Placement Under Existing Pavement Not Adjacent to Gutter:

6. Placement Under Existing Pavement Adjacent to Gutter:
**CONDUIT INSTALLATION DETAILS**

**SECTION A-A**

**NOTES:**
1. Where conduits are to be installed over existing underground structures (e.g., drainage pipes or utility lines) which are less than 2'-6" deep, encase the conduit in Class NS concrete for the entire length of conduit that is installed at a depth of less than 2'-6".
2. Place 3" Warning Tape when new conduit is installed at a depth of 1'-6" or greater, and the new conduit is not encased in concrete.
**INSTALLATION DETAILS**

**SIGNAL CABLE AND SPAN WIRE**

**STEEL STRAIN POLE**

- Automatic Compression Type Clamp (Feed Through Deadend)
- Eye Bolt With Nut And Washer (Typ.)

**PRESTRESSED CONCRETE STRAIN POLE**

- Automatic Compression Type Clamp (Feed Through Deadend)
- Tether Wire (If Required)

**NOTES:**

1. Use only span wire mounting assemblies listed on the APL. For specific details and requirements, see the vendor drawings on the APL.

2. With the approval of the resident engineer, the service head hole for joint use poles may be drilled by the utility company at an angle of 90° but not less than 45° to the face of the pole.

3. Lashing wire should normally be used for distances of 12' or greater.

4. Use only stainless steel hardware on all signal attachments.

5. Hole for eyebolt will require field reaming for 1" & 1½" eyebolts.

6. Meet all grounding requirements of Specification 620.

7. The load face of pole is to be perpendicular to the resultant load.

8. Field Drill 2-1/2" drain holes in the bottom of the installed signals.

9. Method of framing corner Strain Poles angles 10° to 120°.

**ELEVATION**

**PLAN** (Two Span Connections Shown)
NOTES:
1. Meet all grounding requirements of Specification 620.
2. If accessible, ground the messenger wire of the interconnect cables to the copper ground wire of the pole or to the external wire extending down the pole.
3. When utilizing the external ground wire, install a piece of 1/2" conduit extending up 8' from the finish grade to protect the ground wire connecting the messenger wire to the ground rod.
4. Use either locking cable ties or lashing wire, placed no further than 12" apart. Except at the point of cable drop or terminations, place one (1) at the point where the cables separate from the messenger wire and place another at a maximum distance of 4' from that tie.
5. When installing Figure 8 interconnect cable, only use locking cable ties.
6. Lashing wire should normally be used for distances of 12' or greater.
NOTES:
1. Provide fiber optic splice boxes with cable hanger racks designed to support cables and splice enclosures.
2. Install a 1'-0" wide (Min.) concrete apron around all boxes using Class NS concrete. Slope the apron away from the box.
3. Where multiple pull boxes are placed side by side, maintain at least 8" between the pull boxes.
4. Rectangular boxes shown, others similar.
GENERAL NOTES:

1. It shall be the contractor's responsibility to provide a complete service assembly as per the plans and service specifications.
2. The service installation shall meet the requirements of the national electric code and applicable local codes.
3. Shop drawings are not required for service equipment, unless noted in the plans.
4. A Pull Box is required at each service point, see Index 635-001.

1. It shall be the contractor's responsibility to provide a complete service assembly as per the plans and service specifications.
2. The service installation shall meet the requirements of the national electric code and applicable local codes.
3. Shop drawings are not required for service equipment, unless noted in the plans.
4. A Pull Box is required at each service point, see Index 635-001.
Keyed Notes:
2. Service Feeder in Rigid Galvanized Steel Conduit.
3. Meter Socket by Contractor.
4. Service Main Disconnect.
6. Concrete Riser Pole.
7. Weatherhead.
8. Electrical Panel. Number and rating of Branch Circuit Breakers shall be as indicated on distribution point description on Lighting Plan Sheets.
10. #6 Insulated Copper Ground Wire. Bond the Service Neutral to Ground at Service Main Disconnect.
11. Fused Control Power Transformer 0.5 KVA, Single Phase, 480V Primary, 120V Secondary (Part of Lighting Contactor, Shown Outside for Clarity).
12. Lighting Arrester Mounted on Outside of Enclosure.
13. Lighting Control Panel Main Breaker.
14. 2 Pole Electrical Lighting Contactor.
15. Hand-off Automatic Selector Switch (Part of Lighting Contactor, Shown Outside for Clarity).
16. Concrete Pad.
17. Underground Feeder Conduct.
18. Mount on Riser Pole.
19. Ground BUS.

To Electrical Service Drop

Circuit 1
Circuit 2
Circuit 3
Circuit 4
Circuit 5
Circuit 6

GND

GND

GROUND BUS

Neutral Bar

Side or Back of Enclosure

PHOTO ELECTRIC CONTROLLER DETAIL

Cut a 2" hole in the side of the Lighting Control Panel enclosure for the operation and mounting of the Photo Electric controller. Use a gasket and a clear silicone sealant to cover hole. Install Photo Electric Controller.
### Notes:

1. The lightning arrester can be located on the side or bottom of the service disconnect enclosure at the Contractor's option.

2. Liquidtight flexible conduit is approved for use from the electrical disconnect to the cabinet when both are installed on the same pole.

3. Bond all elements together to form an Intersection Grounding Network in accordance with Specification 620. The bond wires shall be run in conduit with the Electrical Service Wire or Signal Cable.

4. Meet all grounding requirements of Specification 620.

5. The Service Disconnect shall be lockable by padlock and four keys provided to the maintaining agency. The door shall have a minimum of three hinges and be lockable. No screws to be used to attach door.

6. The Service Disconnect shall be NEMA 3R or better.
GENERAL NOTES:

1. Work these Index drawings with the Strain Pole Schedule in the Plans.
   Submit shop drawings for minor modifications not detailed in the plans.
2. Materials:
   A. Concrete: Class V Special or Class VI
   B. Prestress Strands & Spiral Reinforcing: Specification Section 641
   C. Hand and coupler cover plates: Non-corrosive material
   D. Screws: Round headed, chrome plated
3. Fabrication:
   A. Pole Taper for pole width, strands, reinforcing and void: 0.081 in/ft per face.
   B. Concrete Taper: 0.5 in/ft minimum
   C. Spiral Reinforcing: As shown, plus one turn for splices and two turns at both the tip and butt ends of the pole.
   D. The design dimensions for Front Face (FF) and Back Face (BF) of the poles may vary transversely from the section shown by ± ¼" to assist with removal from forms. Balance addition and subtraction of the face widths to maintain section areas shown.
   E. Tie ground wires to the interior of reinforcing steel to prevent displacement during concreting operations.
   F. Cut the tip end of the prestressed strand first or simultaneously with the butt end.
   G. Provide cover plates and screws for hand hole and couplers. Attach cover plates to the poles using lead anchors or embedded threaded inserts.
   H. Provide aluminum identification tags on the poles with the following information:
      a. Financial Project ID
      b. Pole Manufacturer
      c. Standard Pole Type Number
      d. Pole Length (L)
4. Support locations are for strand release, storage, lifting and transport. Keep BF oriented downward until final erection.
5. Pick-up and support locations shown may vary within a tolerance of ±3".
6. Two point attachment: provide an eye bolt hole for the messenger wire.
7. Tether Wire: When required, field-drill the eyebolt hole prior to installation.
CONCRETE POLES

STANDARD PLANS

REV 5

DESCRIPTION:

REVISION

INDEX

SHEET

641-010

5 of 8

SPRIN FORCING ELEVATION

(Strands, Holes, and Fixtures Not Shown)

POLE ELEVATION

(Strands and Reinforcing Not Shown)

NOTES:

Strands shown are continuous from Tip End to Butt End.
Elevation view scale is exaggerated vertically for clarity.

For final erection, tilt pole upright with single point attachment
located a distance 12.5% L from the Tip End.

* Dimension may vary from 3½" to 4½" to accommodate
smaller radius of optional stepped (PVC) void. The void
diameter shall not be less than 4".
**POLE ELEVATION**

(Strands and Reinforcing Not Shown)

**SPIRAL REINFORCING ELEVATION**

(Strands, Holes, and Fixtures Not Shown)

**STRAND LEGEND**

- Prestressed Strand 0.5 in. – 31 kips Before Transfer (8 strands total)
- Dormant Strand 0.5 in. (4 strands total)
  One 24" Splice Allowed Per Strand

**NOTES:**

Strands shown are continuous from Tip End to Butt End.

Elevation view scale is exaggerated vertically for clarity.

For final erection, tilt pole upright with single point attachment located a distance 10% L from Tip End.

* Dimension may vary from 3" to 4¼" to accommodate smaller radius of optional stepped (PVC) void. The void diameter shall not be less than 6½".

**CONCRETE POLES**

**STRAIN POLE TYPE P-VI**

**REV IS IO N DESCRIPTION:**

- 0.162 in./ft. Total Taper
- 10'-0" from Top
- 41 Turns @ 3" Pitch
- Min. 3" of Concrete
- Void & Section
- 1½" Min. (Typ.)
- 3½" Chamber (Typ.)
- #5 Gauge Spiral
- Circular Void
- Grounded Strands
- 10'-0" from Top

**POLE ELEVATION**

(Typical Square Section)

**SECTION A-A**

(Typical Square Section)

**TIP END SECTION (TOP)**

(For Dormant Strand Locations, See Section A-A)
**POLE ELEVATION**

(Strands and Reinforcing Not Shown)

**SPIRAL REINFORCING ELEVATION**

(Strands, Holes, and Fixtures Not Shown)

**STRAIN POLE TYPE P-VIII**

**NOTES:**
- Strands shown are continuous from Tip End to Butt End.
- Elevation view scale is exaggerated vertically for clarity.
- For final erection, tilt pole upright with single point attachment located a distance 10% L from the Tip End.
- Dimension may vary from 3½" to 5" to accommodate smaller radius of optional stepped (PVC) void. The void diameter shall not be less than 6½".

**STRAND LEGEND**
- Prestressed Strand
  0.5 in. - 31 kips Before Transfer (12 strands total)
- Dormant Strand
  0.5 in. (8 strands total) One 24" Splice Allowed Per Strand

**TIP END SECTION (TOP)**

(For Dormant Strand Locations, See Section A-A)

**SECTION A-A**

(Typical Square Section)
GENERAL NOTES:
1. Work this Index with Specifications 641.
2. This Index is considered fully detailed and no shop drawings are necessary. Submit Shop Drawings for minor modifications not detailed in the Plans.
3. Install pole plumb.
4. Provide either round or 12-sided Poles.
5. See Index 635-001 for additional details for Pull Boxes.
6. Materials:
   A. Pole: Use VCI concrete with aksi minimum strength at transfer.
   B. Precrushing Screws: ASTM A416, Grade 270 low relaxation.
   C. Reinforcing Steel: ASTM A615, Grade 60
   D. Spiral Reinforcing: ASTM A1084 Cold-Drawn
   E. Bolts: ASTM F1554, Grade 55
   F. Nuts: ASTM A563, Grade A Heavy Hex
   G. Washers: ASTM F236
   H. Steel plates and Pole Caps: ASTM A38 or ASTM A709, Grade 50
   I. Galvanization Bolts, nuts and washers: ASTM F2329
   J. All other steel: ASTM A123
7. Pole Fabrication:
   A. Cut the tip end of the prestressed strand first or simultaneously with the butt end.
   B. For spiral reinforcing, one turn is required for spiral splices and two turns are required at the top and bottom of poles.
   C. For Reinforcing Steel, lap splice to consist of a 3'-0" lap length at each splice, no more than two opposing rebars to be spliced at the same cross-section. Stagger lap splices as needed.
   D. Provided a Class 3 surface finish in accordance with Specification 400.
   E. Provide a 3'-0" minimum cover.
   F. Provide handhole and coupler cover plates made of non-corrosive materials. Attach cover plates to poles using lead anchors or threaded inserts embedded in the poles in conjunction with round headed chrome plated screws.
   G. Provide identification markings on the poles where indicated on the following sheets.
8. Cabinet Installation:
   I. Storage, handling and erection locations shown may vary within ±3".
9. Lowering Device Installation:
   A. Place the lowering cable that moves within the pole in an interior conduit to prevent it from tangling or interfering with any electrical wire that is in the pole. Ensure that any electrical wire within the pole is routed securely and free from slack.
   B. Mount lowering arm perpendicular to the roadway or as shown in the plans. Position CCTV pole so that the camera can be safely lowered without requiring lane closures.
   C. Coordinate all lowering device hardware requirements (including Tenon, Tenon mounting plates, parking stabs, etc.) with lowering device manufacturer.

CONCRETE CCTV POLE
NOTES:

1. Diameter of 12-sided poles are measured flat to flat.

2. Total Taper applies to pole, strands and reinforcing.

3. For 12-Sided Pole and Round Roles Option 2, Stress prestressed strand to 70% of Ultimate before transfer. For Round Pole Option 3, stress prestressed strand to 60% of Ultimate before transfer.

4. Pole Design Tables. Burial Depth is based on level ground (flatter than 1:5). Increase the burial depth in accordance with the Additional Burial Depth Due To Ground Slope for foundations with slopes 1:5 and steeper. Use the higher value for slope or diameter values that fall between those shown on the table.

ADDITIONAL BURIAL DEPTH DUE TO GROUND SLOPE

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<th>Ground Slope</th>
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<td>3</td>
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12-SIDED POLE DESIGN TABLE

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ROUND POLE DESIGN TABLE

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<td>22.45</td>
<td>1</td>
<td>3.5</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Pole Identification Markings

Handhole With Cover at 90º From The Lowering Arm and Away From Approaching Traffic

2-2 Couplings With Caps At 90º To Handhole Box

Conduit Entry Hole

1" Lifting Hole

2" Couplings

Concrete Pole

Air Terminal (See Sheet 5)

Dome Type CCTV Camera

Dome Type CCTV Camera (Camera Cable Entry Point)

Fixed Mounting Bracket

APPENDIX A

CONCRETE CCTV POLE

PLAN VIEW

ELEVATION

ASSEMBLY

CONCRETE CCTV POLE
NOTES:
1. Install all handhole and opening covers prior to shipment.
2. Install ½" Ø x 5" long stud with hex nut in insert before shipment.
3. As an alternative, embed 4½" Ø x 18" stainless steel threaded rods with a threaded nut. At top of rod, thread a coupling nut to attach plate at 4½" x 1½" stainless steel bolts.
4. Handhole frame may be Cast Aluminum 356.2.

ASSEMBLY
1. Install all handhole and opening covers prior to shipment.
2. Install ½" Ø x 5" long stud with hex nut in insert before shipment.
3. As an alternative, embed 4½" Ø x 18" stainless steel threaded rods with a threaded nut. At top of rod, thread a coupling nut to attach plate at 4½" x 1½" stainless steel bolts.
4. Handhole frame may be Cast Aluminum 356.2.

HANDHOLE DETAIL

1. Install all handhole and opening covers prior to shipment.
2. Install ½" Ø x 5" long stud with hex nut in insert before shipment.
3. As an alternative, embed 4½" Ø x 18" stainless steel threaded rods with a threaded nut. At top of rod, thread a coupling nut to attach plate at 4½" x 1½" stainless steel bolts.
4. Handhole frame may be Cast Aluminum 356.2.

ELEVATION

POLE TOP DETAIL

FROM 5 BAR TO SIDE SURFACE OF HANDHOLE (Typ.)

HANDHOLE COVER

2" Couplings With Cap

CAP PLATE DETAIL

(WITHOUT LOWERING DEVICE)

LOWERED DEVICE TENON

ELEVATION

CONCRETE CCTV POLE

INDEX

STANDARD PLANS

REV 01/01/17

DESCRIPTION:

REV 01/01/17

CONCRETE CCTV POLE

INDEX

STANDARD PLANS

REV 01/01/17

DESCRIPTION:
NOTES:

1. Work with Index 634-001 for grounding and span wire details. See the Plans for clamp spacing, cable sizes and forces, signals and sign mounting locations and details.

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

3. Materials:

   A. Strain Pole and Backing Rings:
      
      a. Less than or equal to Hs: ASTM A1011 Grade 50, 55, 60 or 65
      b. Greater than or equal to Hs: ASTM A325 Grade 50, 55, 60 or 65
   
   B. Steel Plates: ASTM A36
   
   C. Weld Metal: E70XX
   
   D. Bolts, Nuts and Washers:
      
      a. High Strength Bolts, ASTM F3125, Grade A325, Type 1
      b. Nuts, ASTM A563 Grade DH Heavy-Hex
      c. Washers: ASTM F1366 Type 1, one under turned element
   
   E. 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 Washers: ASTM A193 (per bolt), split-lock washers and self-locking nuts are not permitted
   
   F. Handhole Frame: ASTM A416 or ASTM A68, Grade 36
   
   G. Handhole Cover: ASTM A1011 Grade 50, 55, 60 or 65
   
   H. Aluminum Pole Caps and Nut Covers: ASTM B26 (319-F)
   
   I. Stainless Steel Screws: AISI Type 316
   
   J. Threaded Bars/Studs: ASTM A36 or ASTM A307
   
   K. Concrete: Class IV (Drilled Shaft) for all environmental classifications.
   
   L. Reinforcing Steel: Specification 415

4. Fabrication:

   A. Pole Taper: Change diameter at a rate of 0.14 inches per foot, round or 12-sided (Min.).
   
   B. Upright splice are not permitted. Transverse welds are only permitted at the base.
   
   C. Provide bolt hole diameters as follows:
      
      a. Bolts (except Anchor Bolts): Bolt diameter plus 1/64", prior to galvanizing.
      b. Anchor Bolts: Bolt diameter plus 1/4", maximum.
   
   D. Locate handhole 180° from 2" wire entrance pipe.
   
   E. Identification Tag: Submit details for approval.
      
      a. T, U (Max.) aluminum identification tag.
      b. Locate on the inside of the pole and visible from the handhole.
      c. Secure to pole with 3/8" diameter stainless steel rivets or screws.
      
   F. Include the following information on the ID Tag:
      
      1. Financial Project ID
      2. Pole Type
      3. Pole Height
      4. Manufacturers’ Name
      5. Ty of Steel
      6. Base Wall Thickness
      
   G. Provide a "T" or "U" hook at the top of the pole for signal wiring support (See Sheet 3).
   
   H. Hit Dip Galvanize after fabrication.

5. Coatings:

   A. All Nuts, Bolts, Washers and Threaded Bars/Studs: ASTM F3129
   
   B. All other steel items including plate washers: ASTM A123

6. Construction:

   A. Foundation: Specification 455, except that payment is included in the cost of the strain pole.
   
   B. After installation, place wire screen between top of foundation and bottom of baseplate in accordance with Specification 649-6.
### Drilled Shaft & Pole

- **BC Dia. Anchor Bolt:** Threaded Each End (Typ.)
- **1" x 1" Chamfer**

#### Foundation and Base Details

- **Foundation**
- **Base Plate**

#### POLE ASSEMBLY

- **6-#5 Tie Bars Spaced @ 4'**
- **Double Nuts (Typ.)**
- **#5 Tie Bars Spaced @ 1'-0" (Max.)**

#### NOTE:

1. Double Nuts: Bottom nut may be half-height "jam" nut. Provide individual nut covers (not shown) for each bolt.

#### Foundation

- **Shaft Diameter**
- **Center Of Drilled Shaft**
- **Anchor Bolts (Typ.)** (See Table For Size And Quantity)
- **6" Cover (Typ.)**
- **6" Cover (Typ.)**

#### Base Plate

- **#11 Bars Equally Spaced (See Table For Quality)**
- **BC Dia. Anchor Bolt**
- **Sheet Metal (Typ.)**

#### Base Plate Details

- **Foundation**
- **Base Plate**
- **Cement Ring**
- **Wire Screen** (See Spec. 649-6)

#### Pole Details

- **Pole**
- **Silicone Caulk**
- **2" x ½ Backing Ring**
- **1" (Min.)**

#### Plane & Elevation

- **PLAN**
- **ELEVATION**
- **SECTION A-A**
- **SECTION B-B**

### STEEL STRAIN POLE

**FY 2019-20**

**Standard Plans**

**INDEX**

**SHEET**

**649-010**

**2 of 3**
POLE ASSEMBLY

NOTES:
1. Clamps have been sized for Design Cable Loads shown in the Clamp Thickness Table, and a Maximum Pole Diameter at the Clamp location of 2'-7". Use one clamp per cable.
2. Install a properly sized Weather Head, fastened securely to the standard pipe for each pole location. At locations other than the wire entrance, the Weather Head face is to be left closed to outside atmosphere. Wire entrance installed per Index 634-001.
3. Any combination of Option 'a' or 'b' may be used provided both lifting and wiring is accommodated.

CLAMP THICKNESS TABLE

<table>
<thead>
<tr>
<th>Cable Diameter (in.)</th>
<th>Minimum Breaking Strength (kip)</th>
<th>Plate Thickness (in.)</th>
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HANDHOLE

2 - 1/2" Holes For 2 - 3/8" Stainless Steel Passivated Cotter Pins

A - 1/2" x 2" Lifting Bar With Hole & Matching Nut Tack Welded to Underside Of Bar

CUT-AWAY (Option 'a')

CUT-AWAY (Option 'b')

CUT-AWAY (See Note 3)

ATTACHMENT DETAILS
GENERAL NOTES:

1. Work this Index with Specification 649.

2. This Index is considered fully detailed; only submit shop drawings for minor modifications not detailed in the Plans.

3. Materials:

   A. Pole: ASTM A1011 Grade 50, 55, 60 or 65 (less than or equal to 1½") or ASTM A572 Grade 50, 60 or 65 (greater than or equal to 1½") or ASTM A595 Grade A (55 ksi yield) or Grade B (60 ksi yield).
   B. Steel Plates and Pole Cap: ASTM A6 or ASTM A690 Grade 50.
   C. Weld Metal: E70XX.
   D. Bolts: ASTM 332/3, Grade A325, Type 1.
   E. Washers: ASTM A563.
   F. Anchor Bolts: ASTM F355 Grade 55 with ASTM A563 Grade A hex nuts and ASTM A36 plate washers.
   G. Handhole Frame: ASTM A509 Grade 36 or ASTM A36.
   H. Handhole Cover: ASTM A1011 Grade 50, 55, 60 or 65.
   I. Stainless Steel Screws: AISI Type 316.
   J. Reinforcing Steel: ASTM A615 Grade 60.
   K. Galvanization: Bolts, nuts and washers: ASTM F332/3 Other steel including plate washer: ASTM A123.
   L. Concrete: Class IV (Drilled Shaft) for all environment classifications.

4. Fabrication:

   A. Welding:
      a. Specification Section 460-4.4 and
   B. Poles:
      a. Round or 16-sided (Min.)
      b. Taper pole diameter at 0.14 inches per foot
      c. Fabricate Pole longitudinal seam welds (2 maximum) with 60 percent minimum penetration or fusion welds except as follows:
         1. Use a full-penetration groove weld within 6 inches of the circumferential tube-to-plate connection and
         2. 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.
      d. Pole shaft may be either one or two sections (with telescopic field splices)
      e. Circumferentially welded pole shafts and laminated pole shafts are not permitted
      f. The following information shall be supplied with the ID:
         1. Financial Project ID
         2. Pole Type
         3. Pole Height
         4. Manufacturers Name
         5. Yield Strength (Fy of Steel)
         6. Basic Wall Thickness
   C. Identification Tag: (Submit details for approval)
      a. 2" x 4" (Max) aluminum tag
      b. Locate on the inside of the pole and visible from the handhole
      c. Secure with 1/4" 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. Manufacturers Name
         5. Yield Strength (Fy of Steel)
         6. Basic Wall Thickness
      D. Except for Anchor Bolts, bolt hole diameters are bolt diameter plus 1/2" and anchor bolt holes are bolt diameter plus 1/2" (Max) prior to galvanizing.
   
5. Pole Installation:

   A. Do not install additional wire access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   B. Install Anchor Bolts in accordance with Specification 649-5.
   C. Cable Supports: Electrical Cable Guides and Eyebolts
      a. Locate top and bottom cable guides within the pole aligned with each other.
      b. Position one cable guide 2" below the handhole.
      c. Position other cable guide 1" directly below the top of the tenon.
      d. Position Park Stands 2" below the top of the handhole.
   D. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   E. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   F. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   G. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   H. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   I. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   J. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   K. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   L. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   M. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   N. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   O. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   P. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   Q. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
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   T. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   U. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   V. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   W. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   X. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   Y. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   Z. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.

6. Cabinet Installation:

   A. Splice fiber optic cables in cabinet to preterminator patch panel.
   B. Furnish and install Surge Protection Devices (SPDs) on all cabling in cabinet.
   C. Furnish and install secondary SPDs protection on outlets for equipment in cabinet.
   D. Ensure that all electronic equipment power is protected and conditioned with SPDs.
   E. Install the pole mounted cabinet with the hinges next to the pole.
   F. Ensure that equipment cabinet is bonded to CCTV pole grounding system.
   G. Sizes and types of conduits and inner ducts for network communications between the pullbox and cabinet are stated in the Contract Documents.

7. Lowering Device Installation:

   A. Do not install additional access holes (not shown in this Index) with a diameter that exceeds 1½" in diameter.
   B. Install Anchor Bolts in accordance with Specification 649-5.
   C. Coordinate all lowering device hardware requirements (including Tenon, Tenon mounting plates, parking stands, etc.) with lowering device manufacturer.
NOTES:
1. Shaft Length is based on 1'-0" height above the finished grade.
2. Double Nuts: Bottom nut may be half-height (jam nut). Provide individual nut covers (not shown) for each bolt.
3. Conduit and CSL Tubes not shown for clarity.
4. Work these details with Data Table on Sheet 2.

1. Shaft Length is based on 1'-0" height above the finished grade.
2. Double Nuts: Bottom nut may be half-height (jam nut). Provide individual nut covers (not shown) for each bolt.
3. Conduit and CSL Tubes not shown for clarity.
4. Work these details with Data Table on Sheet 2.

SECTION A-A

SECTION B-B

JOINT WELD DETAIL

DETAIL "A"
NOTE:
To secure the cover plate, install a steel chain from the cover to the pole or by mounting the cover with hinges and install a pad lock tab.
Bend #6 ABC Tin-Plated Bare Solid Copper Wire to Camera Support Base as Required.

Dome Type CCTV Camera

2" Min. - 8" Max. Pull Box

Finished Grade

Grounding Conduit

Ground Rod

Concrete Slab

Fiber Optic Pull Box

Fiber Optic Communications Conducts (As Shown On Plans)

To Power Service Assembly

To Ground Rod C as Required

To Ground Rod D as Required

Finished Grade

2" PVC Camera Cabling Conduit

1/2" x 20" Copper-Clad Steel Ground Rod (Typ.)

Foundation (Drilled Shaft) (See Sheet 2)

Primary Ground Rod A

Primary Ground Rod B

Ground Rod C

Ground Rod D

Primary Ground Rod A

Primary Ground Rod B

Ground Rod C

Ground Rod D

Composite Camera Cable

CCTV Pole

Steel Band

With Stainless Steel Band

Pole Plate

Ground Rod B as Required

Ground Rod B as Required

Ground Rod B as Required

Ground Rod B as Required

To Power Service Assembly

1/2" PVC Conduit For Grounding Conductors

Pull Box (See DETAIL "B")

Ground Mounted Cabinet

1/2" PVC Conduit For Ground Wire

Ground Rod A

Ground Rod B

40'-0" (Typ.)

To Power Service Assembly

Finished Grade

40'-0" (Typ.)

Pole Mounted CCTV Cabinet

Fiber Optic Communications Conducts (As Shown On Plans)

Fiber Optic Pull Box

Pole Mounted CCTV Cabinet (See DETAIL "E")

1/2" PVC Conduit For Grounding Conductors

Pull Box (See DETAIL "B")

Ground Rod A

Ground Rod B

40'-0" (Typ.)

To Power Service Assembly

Finished Grade

40'-0" (Typ.)

STEEL CCTV POLE GROUNDING

STEEL CCTV POLE

INDEX

649-020

6 of 6

FY 2019-20

STANDARD PLANS

LAST

REVISION

3/01/17

DESCRIPTION:

REVISED

6/01/17

20' Rods, 40' Spacing

TYPICAL MODIFIED

DETAIL "B"

DETAIL "C"

DETAIL "D"

DETAIL "E"
### Arm and Base Plate

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Mast Arm Assembly

**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 "jam" nut. Provide individual nut covers (not shown) for each bolt.

**Description:**

- **Foundation and Base Plate Details**
- **Mast Arm Assemblies**
- **Standard Plans**

- **Foundation and Base Plate Connection**
- **Foundation and Base Plate Details**

- **Foundation**
- **Elevation**
- **Plan**

- **Joint Weld Detail**
- **Detail 'A'**

**Revision:** 649-031

**Sheet:** 2 of 6

**Index:** FY 2019-20

**Revision:** 01/18

**Description:**

- **Base Plate and Anchors**
- **Foundation (Drilled Shaft)**
- **Opening**
- **Anchor Bolt (Typ.)**
- **Compartment Terminal**
- **Handhole Center of**
- **2'-0" Lap (Min.)**
- **Shaft Diameter**
- **CSL Tube (Typ.)**
- **5 Tie Bars Remaining Spacing @ 12" Max.**
- **45°**
- **Back Face Shown**
- **Structural Grout Pad**
- **Grout Pad**
- **Double Nut (Typ.)**
- **Leveling Nut**
- **Foundation**
- **Opening**
- **Base Plate**
- **Anchor Bolt (Typ.)**
- **Pole and Anchor Bolt**
- **Connections**
- **Drilled Shaft and Pole Base Plate**
- **Bell-Joint Weld Detail**
- **Details 'A'**
- **Base Plate Connection**
- **Foundation and Base Plate Details**

**Dimensions:**

- **Opening**
- **9" Min.**
- **2X'BC'**
- **2" X 1/2" Backing Ring**
- **4" Min.**
- **Back Face Shown**
- **Structural Grout Pad**
- **Drain Hole**
- **(Typ.)**
- **Wall Thick. + 1/2"**
- **Bell-Joint Weld Detail**
- **Details 'A'**
- **Base Plate Connection**
- **Foundation and Base Plate Details**

**Sections:**

- **Section A-A**
- **Joint Weld Detail**
- **Detail 'A'**

**Acknowledgments:**

- **REVISION 01/01/18**
DESCRIPTION:

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).

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).
**DOUBLE ARM CONNECTIONS & SPLICE DETAILS**

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 "First Mast Arm Extension".

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

**SECTION E-E**
- Pole Connection Plate
- Mast Arm Extension Base Plate
- Bottom Connection Plate (Top Conn. Plate Similar)

**SECTION F-F**
- Side Connection Plate
- Edge of Top Plate
- Opening
- See DETAIL 'D' (Shim 2)

**SECTION G-G**
- Full Penetration Weld (Typ.)
- Seam Weld (Typ.)

**NOTE:**
- 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 "First Mast Arm Extension".
- 5. Adjust width of top and bottom Connection Plates to maintain minimum clearance shown.

**DETAIL 'D'**
- Pole Connection Plate
- Mast Arm Extension Base Plate
- Bottom Connection Plate (Top Conn. Plate Similar)

**DETAIL 'E'**
- Side Connection Plate
- Edge of Top Plate
- Opening
- See DETAIL 'D' (Shim 2)

**DETAIL 'F'**
- Full Penetration Weld (Typ.)
- Seam Weld (Typ.)
NOTES:
1. Luminaire type and luminaire length may be found in the Lighting Plans.
2. Align Luminaire Arm with Single Mast Arm or First Arm of Double Mast Arm unless indicated otherwise in the plans.
3. The fabricator may substitute a \( \frac{1}{2} \) in thick bent plate with the same flange width, height, and length as the MC 10x33.6 Channel section.
4. 'LL' measure counter clockwise from First Mast Arm.

**LUMINAIRE ELEVATION**

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**LUMINAIRE ORIENTATION**

**LUMINAIRE CONNECTION ELEVATION**

**DETAIL 'G'**

**LUMINAIRE ARM AND CONNECTION DETAILS**
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.
CONCRETE POLE MOUNTED SIGNAL

EXISTING CONSTRUCTION

NEW CONSTRUCTION

SEE NOTE 7

NOTES:
1. As an option, pedestrian signals may be installed on concrete poles and pedestals using lead anchors (two bolts same size per hub) in lieu of the stainless steel bands.
2. Repair drilled or punched holes in galvanized steel poles or pedestals in accordance with Specifications 562. Install grommets or bushings in each hole.
3. Meet grounding requirements of Specifications 620.
4. See APL for Department-approved Pedestrian Signal Assemblies and hardware.
5. Construct footing with Class I Concrete, footing may be Cast-In-Place (CIP) or Precast.
6. For Steel Strain Poles see Index 649-010.
7. For Prestressed Concrete Poles see Index 641-010.
8. Install 4 - \( \frac{3}{4} \) x 18" Anchor Bolts With Double Nuts. (ASTM F1554 Grade 55)
9. Meet the requirements of Specifications 646 for aluminum poles and transformer bases.
NOTES:
1. A transformer base is required for both conventionally-powered and solar-powered applications (conventional power shown).
2. Install the RRFB in pairs, one on either side of approach traffic.
3. Install controller on the backside of post from approach traffic.
4. Install a 30" x 30" W11-2 sign on two-lane roadways and a 36" x 36" W11-2 sign for multiple lane roadways.
5. Install push button and R10-25 sign in accordance with Index 665-003.
6. Engage all threads on the transformer base and post unless the aluminum post is fully seated into base.
7. Meet the requirements of Specifications 646 for aluminum poles and transformer bases.
8. 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.
9. For assemblies connected to conventional power, provide single pole non-fused watertight breakaway electrical connectors in the frangible transformer base.
10. When wire entry holes are drilled in the sign column, use a bushing or rubber grommet to protect conductors.
11. For solar-powered applications, orient solar panel to face South for optimal exposure to sunlight.

See DETAIL "A"

POLE WIRING AND FOOTING DETAIL

FLASHERS

FRONT VIEW

SIDE VIEW

DETIAL "A"

DETIAL "B"
**NOTES:**

1. **Materials:**
   - A. Sign panels, wind beams and associated hardware: See Index 760-020
   - B. Sign adjustable hangers, wire rope clamps and associated hardware: See APL
   - C. Wire and additional hardware requirements: See Specification 634

2. **Type B and C Attachments:**
   - A. Extend wind beams to within 6" of the sign edge.
   - B. Number of sign hangers required based on sign width:
     - a. Sign width < 4'-0": One
     - b. 4'-0" ≤ sign width ≤ 7'-0": Two
   - C. Number of wind beams required based on sign depth:
     - a. Sign depth < 3'-6": One
     - b. 3'-6" ≤ Sign depth ≤ 7'-0": Two

3. **Type D Attachments:**
   - A. Maximum sign width = 3'-0".
   - B. Align the bottom edges of signs to approximately the same elevation.
   - C. Wire and additional hardware requirements: See Specification 634

4. **Typical Installations for Sign Panel(s) Mounted on Span Wire:**
   - a. Sign width < 4'-0": One
   - b. 4'-0" ≤ sign width ≤ 7'-0": Two
   - c. Sign depth < 3'-6": One
   - d. 3'-6" ≤ Sign depth ≤ 7'-0": Two

5. **Use a minimum of 2 bolts with a minimum spacing of 2" for overlapped connection of the adjustable hangers.**

---

**SIGN MOUNTING DETAIL**

**OPPOSING SIGN MOUNTING DETAIL**

**TYPICAL INSTALLATIONS FOR SIGN PANEL(S) MOUNTED ON SPAN WIRE**
GENERAL NOTES:

1. Lowering device to be shipped ready for pole attachment to include 100 ft. of composite power and signal cable prewired to lowering device at the factory.

2. The lowering device manufacturer shall supply both a portable lowering tool with a manual hand crank and a half-inch chuck variable-speed reversible industrial-duty electric drill that matches the winch's manufacturer-recommended revolutions per minute. One lowering tool per every 10 lowering devices is required.

3. The lowering device manufacturer shall provide an on-site installation inspection and operator instruction and certification. This ensures the product is assembled correctly and that all necessary persons are trained in the proper, safe operation of the system. Before erecting the first pole the contractor must contact the lowering device supplier and schedule a manufacturer's representative to be on-site.


5. Camera to be mounted to camera junction box and stabilizing weight via 1\(\frac{1}{2}\) Standard NPT Pipe Thread.

6. Use air terminal extension when the pole top junction box is wider than top of pole.

7. The stainless steel device lowering cable shall be installed inside the pole within a 1\(\frac{1}{2}\) diameter PVC conduit.

8. All communication and power cables must be neatly bundled and secured.


10. Use a Camera Lowering Device listed on the Approved Product List (APL).

See Index 641-020 for concrete pole details and Index 649-020 for steel pole details.
GENERAL NOTES:

1. Verify the pole type, the dimensions of the pole at the pole of installation of the camera mount, and angle with respect to the roadway before manufacturing camera mount assembly.

2. Design camera mounting arm and connection to the pole according to FDOT Structures Manual (current edition).

3. No field welding shall be permitted.

4. Mounting bracket arm shall be level after installation.

5. The contractor shall submit shop drawings for the proposed fixed mounting arm, signed and sealed by a Professional Engineer registered in the State of Florida, to the Engineer for review and approval.


7. Galvanized pipe connections and conduit entry points shall be sealed in accordance with Specification 630.

Pole Plate With Stainless Steel Band (Or Method Approved By Engineer)

Bond #4 AWG Tin-Plated Bare Solid Copper Ground Wire To Camera Support Base By An Aluminum To Copper #2-#14 AWG Lug. Attached To Camera Base With A Stainless Steel Screw. Remove Paint Or Protective Coating Where Attaching Lug.

Camera Connector Harness Supplied To Match Camera

Bracket Design May Vary By CCTV Manufacturer

Strain Relief Fitting

Dome Type Camera Assembly (TYP)

CAST IN PLACE 2" Galvanized Nipple For Concrete Poles. Hole With Nipple Grommet For Steel Poles.

Cabling To Camera

Pole Plate With Stainless Steel Band (Or Method Approved By Engineer)

Fixed Mounting Bracket Must Be Designed To Match Mounting Provisions For CCTV Camera

Camera Connector Harness Supplied To Match Camera

The Contractor Shall Coordinate Assembly (TYP)

Dome Type Camera Housing Supplied To Match Camera

Galvanized pipe connections and conduit entry points shall be sealed in accordance with Specification 630.

Nipple Grommet For Steel Poles.

The Contractor Shall Coordinate

Bracket Design And Flange Connection With CCTV Camera Manufacturer For Mounting The CCTV Camera Housing
GENERAL NOTES:

1. If the loop lead-in is 75' or less from the edge of the loop detector to controller cabinet, continue the twisted pair to the cabinet. If the loop lead-in is greater than 75' continue the twisted pair an Intermediate Pullbox, splice to shielded lead-in wire and continue to the controller cabinet.

2. Provide sufficient saw-cut width to allow unforced placement of loop wires or lead-in cables into the saw-cut. Except across expansion joints, saw-cut to a standard depth of 3", but no more than 4" below the top of the final surface.

3. On resurfacing or new roadway construction projects, install the loop wires and lead-in cables in the asphalt structural course prior to the placement of the asphalt friction course. Place the loop wires and lead-in cables in a saw cut in the structural course.

4. On an alternate installation width to secure loop wires and lead-ins to the bottom of saw-cuts. Place the hold down material approximately 12" intervals around loops and 24" intervals on lead-ins.

5. The minimum distance between the twisted pairs of loop lead-in wire is 6" from the loop to 12" from the pavement edge or curb.

6. Splice Connections in pull boxes with UL listed, watertight, insulated enclosures. Place one enclosure over the end of each conductor and place a third enclosure over the exposed end of the shielded cable. An alternate, a larger diameter enclosure that will accommodate both the splices of the conductors and not within 2" of the top of the hole.

7. Do not disturb more than a 6" x 6" area of asphalt. Restore asphalt as directed by the Engineer.

8. Alternative installations may be approved by the State Traffic Operations Engineer.

NOTES:

1. Drill a hole through the curb at the point which the required saw-cut depth is obtained, just prior to cutting the top inside edge of the curb or curb base at an appropriate angle to intercept the trench or pull box hole.

2. Place the top of the rigid conduit approximately 2" below the top of the roadway surface. The departure angle of the conduit from the roadway is between 30° to 45°. 3. The departure angle of the conduit from the roadway surface.

4. Install a molded bushing (nonmetallic) on the roadway surface. 5. Use a nonmetallic material to prevent excessive loop sealant from entering the flexible conduit.

INSTALLATION WITHOUT CURB & GUTTER

ALTERNATIVE 1

INSTALLATION WITH CURB & GUTTER

ALTERNATIVE 2

TWISTED PAIR AND LOOP LEAD-IN INSTALLATION

VEHICLE LOOP INSTALLATION DETAILS

INDEX 660-001

FY 2019-20

STANDARD PLANS

DESCRIPTION:

REV 0

REVIEW 0

LAST REVISION 01/01/18

1 of 2
LOOPER TYPES, EXPANSION JOINTS, AND DETAILS

CONCRETE PAVEMENT EXPANSION JOINTS

LOOP TYPES

NOTE:
Loop conductors must follow saw-cut to bottom forming slack section at joint.

NOTES:
1. The number of “Turns” indicated at the specified point on the loop refers to the number of passes of loop wires which are placed in the saw-cut forming the complete loop.
2. Loop types or details not drawn to scale.
3. Loop Types are centered in a single lane except Type C which is centered on two lanes.
4. The number of individual loops in the Type G loop may vary up to a maximum of four (4).
5. Lead-in may be connected to either end of loop.
6. When shown in the Plans, the leading edge of loop Types A, C, D, & F may extend past the stop line a maximum of 10' and the length of these loops may be extended to a maximum of 60'.
7. Do not install loop lead-in wires in the same pull box with signal power cable.

 LOOP CORNER AND LEAD-IN DETAILS

VEHICLE LOOP INSTALLATION DETAILS
NOTES:
1. Mount Signs above the detectors. See Index 700-102 for sign details.
2. Install Pushbuttons and Pedestrian Actuation Signs with faces parallel to the crossing direction.
3. Mount pushbuttons and Signs in accordance with Specification 665.
4. Install all grounding per Specification 620.
5. Pushbutton mounting height shown above is taken at the center of the actuation switch.
Vehicle movements & signal head number assignments are not directionally oriented but shall maintain their relative orientation about the intersection (i.e., movements 7 and 4 are always to the right of movements 3 and 6 etc.).
CABINET INSTALLATION DETAILS

NOTES:
1. If cabinet mounting requires relocation of hole in concrete pole, fill existing hole with concrete or cover with a noncorrosive cover plate.
2. Liquidtight flexible conduit is approved for use from the electrical disconnect to the cabinet when both are installed on the same pole.

POLE MOUNTED CONTROLLER CABINET

- Polled Plate With Steel Bands or Anchors & Bolts
- Pulling Elbow Type LB
- Steel Bands or Pole Plate With Anchors & Bolts
- Generator Panel
- Service Slab: slope 1" to 1' for drainage. Not required in sidewalk, pavement areas, or where R/W is restricted.
- Conduit: 2" Min.
- Transfer Switch

INTERCONNECT JUNCTION BOX

- Generator Power for Signalized Intersection controller cabinet are located at:

- Grounding Rod (As Required)

NEW CONTROLLER CABINET

EXISTING CONTROLLER CABINET

PEDESTAL MOUNTED CABINET

1. Retrofit existing controller cabinets in accordance with Specification 678.
1. Traffic monitoring site cabinet includes:
   A. One adjustable shelf, equipped as shown.
   B. One backplane assembly, equipped as shown.
   C. One J1 receptacle with mounting bracket.
   D. One J1 equipment cable 5 ft. long (Reference Sheet 4);
   E. All associated wiring and wiring harnesses.

2. Basic backplane assembly consists of:
   A. Two inductive loop terminal strips;
   B. One piece sensor terminal strip;
   C. One battery terminal strip;
   D. One solar panel terminal strip.

3. The contractor is responsible for contacting the TMS Manager at the Transportation Statistics Office for lane number information and verification.

4. Speed/Classification Unit and Modem furnished separately.

5. Cable ends must be fabricated to fit the vehicle speed/classification unit (Reference Sheet 4).

NOTE:
Fabricate bracket out of ⅜ in. - ⅜ in. thick aluminum. Dimensions may vary depending on the manufacturer of the J1 receptacle being furnished. The cabinet manufacturer will construct the mounting bracket to fit the receptacle.
CABINET LAYOUT DETAILS (Five to Eight Lanes)

NOTES:
1. Traffic monitoring site cabinet includes:
   A. One adjustable Shelf (equipped as shown)
   B. Two backplane assembly (equipped as shown)
   C. Two J1 receptacle with mounting brackets.
   D. One J1 equipment cable 5 ft. long (Reference Sheet 4).
   E. All Associated wiring and wiring harnesses.

2. Basic backplane assembly consists of:
   A. Two inductive loop terminal strips
   B. One piezo sensor terminal strip
   C. One battery terminal strip
   D. One solar panel terminal strip

3. The contractor is responsible for contacting the TMS Manager in the Transportation Statistics Office for lane number information and verification.

4. Speed/Classification unit and modem furnished separately.

5. Cable ends must be fabricated to fit the vehicle speed/classification unit. (Reference Sheet 4) for Pinout Charts, receptacle and plug details.

OPTION A
(Shown)

Backplane For Lanes 1 To 4 (See Note 3)

Backplane For Lanes 5 To 8 (See Note 3)

Aluminum Bracket For J1 Receptacle (Reference Detail, Sheet 3) (Attach To Shelf Mounting Rail In Cabinet)

OPTION B

Vehicle Speed/Classification Unit (See Note 4)

Equipment Cables (See Note 4)

P1 Equipment Cable Plug (Lanes 1 Through 4)

P1 Equipment Cable Plug (Lanes 5 Through 8)

J1 Receptacle

Wiring To Backplane

P1 Equipment Cable Plug (Lanes 1 Through 4)

P1 Equipment Cable Plug (Lanes 5 Through 8)

J1 Receptacle

Wiring To Backplane

CABINET LAYOUT DETAILS (Five to Eight Lanes)
1. The contractor is responsible for contacting the EMS Manager in the Transportation Statistics Office for lane number information and verification.

2. The equipment cable can accommodate up to four lanes of inductive loop and sensor inputs (Reference Sheet 1 for cabinet layout).

3. For more than four lanes and up to eight lanes of inputs, the following options are available:
   - A. Second Vehicle Speed/Class. Unit and separate equipment cable connecting to a second J1 receptacle; or
   - B. Single Vehicle Speed/Class. Unit capable of up to eight lanes of inputs and a single equipment cable with split ends to fit two J1 receptacles. (Reference Sheet 2 detail)

4. Numbers in parenthesis in the pinout chart identify lane numbers when connecting to a second J1 receptacle; or

5. Cable ends must be fabricated to fit the vehicle speed/classification unit.

**NOTES:**

- Option A
- Option B

**J1 EQUIPMENT CABLE PLUG**

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<thead>
<tr>
<th>Pins</th>
<th>Description</th>
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<tbody>
<tr>
<td>A</td>
<td>Loop 1a (5a) yellow</td>
</tr>
<tr>
<td>B</td>
<td>Loop 1a (5a) purple</td>
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<tr>
<td>C</td>
<td>Loop 1b (5b) purple</td>
</tr>
<tr>
<td>D</td>
<td>Loop 1b (5b) pink</td>
</tr>
<tr>
<td>E</td>
<td>Loop 2a (6a) brown</td>
</tr>
<tr>
<td>F</td>
<td>Loop 2a (6a) blue</td>
</tr>
<tr>
<td>G</td>
<td>Loop 2b (6b) orange</td>
</tr>
<tr>
<td>H</td>
<td>Loop 2b (6b) tan</td>
</tr>
<tr>
<td>J</td>
<td>Loop 3a (7a) white</td>
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<td>K</td>
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<tr>
<td>M</td>
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<tr>
<td>N</td>
<td>Gnd</td>
</tr>
<tr>
<td>P</td>
<td>Loop 4a (8a) w/yellow</td>
</tr>
<tr>
<td>Q</td>
<td>Loop 4a (8a) w/purple</td>
</tr>
<tr>
<td>S</td>
<td>Loop 4b (8b) w/gray</td>
</tr>
<tr>
<td>T</td>
<td>Loop 4b (8b) w/brown</td>
</tr>
<tr>
<td>U</td>
<td>Piezo 1 (5) (+) w/blue</td>
</tr>
<tr>
<td>V</td>
<td>Piezo 1 (5) sh w/orange</td>
</tr>
<tr>
<td>W</td>
<td>Piezo 2 (6) (+) w/green</td>
</tr>
<tr>
<td>X</td>
<td>Piezo 2 (6) sh w/red</td>
</tr>
<tr>
<td>Y</td>
<td>Piezo 3 (7) (+) w/black</td>
</tr>
<tr>
<td>Z</td>
<td>Piezo 3 (7) sh w/red/shblk</td>
</tr>
<tr>
<td>a</td>
<td>Piezo 4 (8) (+) red/green</td>
</tr>
<tr>
<td>b</td>
<td>Piezo 4 (8) (+) red/blk</td>
</tr>
<tr>
<td>c</td>
<td>Gnd</td>
</tr>
<tr>
<td>d</td>
<td>Gnd red/black</td>
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</tbody>
</table>

**J1 RECEPTACLE PINOUT**

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</tr>
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<tr>
<td>d</td>
<td>Gnd red/black</td>
</tr>
</tbody>
</table>
ROADWAYS WITH PAVED SHOULDERS

1. Install axle sensors and loops associated with axle sensors after placement of the friction course.

2. Cut a 30" deep slot for the Inductive loops. Loop slots will be cut wide enough to allow unforced placement of the cable into the bottom of the slot. Four turns of #14 AWG Inductive loop wire is placed in each slot. Place short pieces of backer rod (2” to 3” in length) every 18” to 24” to hold the loop wire in the bottom of the slot.

3. Twist loop leads at the rate of 8 to 16 turns per foot. Loops that are within 150' of the cabinet, extend the twisted pair loop wire directly to the cabinet. For distances over 150', #14 IMIA 50-2 shielded lead-in cable must be spliced to the loop wire twisted pair at the first pull box to which the loop wire is pulled.

4. Marking will consist of two rounds of contrasting colored tape, one color for the lane number and the second color for the lead loop location in the lane. The first band closest to the cabinet will represent the lane number, one color for lane 1 and two colors will be lane 2, etc. The trailing loop in lane one would have one round of tape and a second round of a contrasting colored tape for the lead loop in the lane. The trailing loop in lane two would have two rounds of contrasting colored tape of the same color.

5. See Index 635-001 for pull box and apron details.

6. All splices will be performed using splice kits designed for direct burial. Splice kits will include screw on wire connectors and a housing with sufficient sealant to fully encapsulate the spliced connections. Taped splices are not permitted.

7. Use a chalk line or string and paint to layout the position of the sensor and lead-in cable slots. Ensure saw cuts do not deviate more than 0.5 inches from the chalk line. Use a single blade or ganged blade saw wide enough to cut the axle sensor slot at full width in a single pass. Cutting two slots and chipping out roadway material between them is not allowed.

8. All sensor slots and any cuts in the roadway will be thoroughly blown out to ensure there is no dust or debris prior to installation of sensors or leads.

9. Install Exit Windows at least 2’ apart.

NOTES:

1. TYPICAL FOR UP TO 4 LANES OF SENSOR LEADS PULLED TO ONE SIDE OF THE ROADWAY
NOTES:

1. The unit must be capable of detecting up to eight lanes of traffic (in either or both directions) when mounted perpendicular to the roadway.

2. Coverage area of the unit is affected by the roadway geometry: distance from the travel lanes, median type and width, barrier walls, etc.

3. Mounting height of the unit and offset from the roadway must be determined on a site-by-site basis, in accordance with the manufacturer's recommended guidelines. Offset of pole must be greater than or equal to minimum clear zone requirements.

NON-INTRUSIVE VEHICLE SENSOR
NOTE:

1. Cabinet installed per Index 676-010 except cabinet center will be 4 feet above grade.

2. Place pole in accordance with the Standard Specification 125.4 and 125.8.2.

3. Use #10 AWG stranded copper wire for Solar Panel Array installations. Red insulation is THHN or THWN for positive 12 volts wiring. Black insulation is THHN or THWN for negative, 12 volts wiring. Green insulation is THHN or THWN for ground bonding of the solar panel frame to the pole and earth.

4. Solar panel should be installed facing due south with angle of tilt equal to the sum of the following equation: Latitude of the panel’s location, multiplied by 0.76, plus 3.1 degrees. Equation expressed as (LAT) x (0.76) + (3.1°).

5. Encase all wiring from the weather head to the solar panel in outdoor flexible conduit.

6. Concrete Base Requirements:
   a. 4' poles: 2'-0" x 2'-0" wide, a depth of 2'-0"
   b. 12', 15' or 20' poles: 3'-0" x 3'-0" wide, a depth of 3'-0"
   c. 30' or 35' poles: 3'-0" x 3'-0" wide, a depth of 4'-0"

SOLAR POWER POLE
WITH POLE MOUNTED CABINET
(Telemeter Sites)

PEDESTAL MOUNTED CABINET
(Portable Traffic Monitoring Sites)