

**SECTION 635
PULL, SPLICE, AND JUNCTION BOXES**

PART 1 GENERAL

1.01 SUMMARY

A. Description

1. Furnish and install pull, splice, and junction boxes as shown in the Plans.

B. Method of Measurement

1. The Contract unit price each for pull, splice, and junction box, furnished and installed, will consist of the pull, splice, and junction box including all required hardware for the type of box and location as specified in the Contract Documents, and all labor and materials necessary for a complete and accepted installation.

C. Basis of Payment

1. Price and payment will be full compensation for all work specified in this Section, except grounding.
2. No separate payment for embedded junction boxes will be made. The Contractor shall include the cost of embedded junction boxes in the Contract unit price for the concrete substructure or superstructure items.
3. No separate payment will be made for the removal of pull, splice, and junction boxes.
4. Payment will be made under:

Item No.	Description	Unit
635-2-11	Pull & Splice Box, F&I, 13" X 24" Cover Size	EA
635-2-12	Pull & Splice Box, F&I, 24" X 36" Cover Size	EA
635-3-11	Junction Boxes, F&I, Aerial	EA
635-3-12	Junction Boxes, F&I, Mounted	EA

1.02 REFERENCES

- A. Miami-Dade County Traffic Signals and Signs Division's Qualified Product List (TSSQPL)
- B. FDOT Approved Product List (APL)
- C. American Society for Testing and Materials (ASTM)
- D. American Nation Standards Institute (ANSI)

PART 2 PRODUCTS

2.01 MATERIALS

A. General.

1. Use only pull and splice boxes that meet the requirements of this Specification and are listed on the FDOT's Approved Products List (APL) and the Department's Traffic Signals and Signs Division's Qualified Products List (TSSQPL).

B. Pull and Splice Boxes

1. General

- a. Manufacturers of concrete pull and splice boxes and covers must meet the requirements of FDOT Sections 105 and be currently on the FDOT's Production Facility Listing and.
- b. Ensure box bodies and covers are free of flaws such as cracks, sharp, broken, or uneven edges, and voids.
- c. Ensure in-ground boxes have an open bottom design.

2. Marking

Ensure the following information is permanently cast into the top surface of all pull and splice box covers:

- a. Unless otherwise shown in the Plans, mark application as follows:
 - 1) "TRAFFIC SIGNAL" for signalized intersections
 - 2) "FIBER OPTIC CABLE" for fiber optic cable
 - 3) "LIGHTING" for highway lighting
 - 4) "ELECTRICAL" for other electrical applications
 - b. Manufacturer's name or logo
 - c. FDOT APL or Miami-Dade County TSSQPL approval number
 - d. TIER rating
3. Ensure the date of manufacture (month/day/year, or date code) is permanently located on the top or bottom of the cover. Ensure the interior of the box body has a permanent marking that includes the manufacturer part/model number and date of manufacture near the top of box in a location that is visible after installation when the cover is removed.
 4. Dimensions
 - a. Unless otherwise shown in the Plans, provide pull and splice boxes with the following dimensions.
 - 1) For signalized intersection and lighting applications, provide pull boxes with nominal cover dimensions of 13 inches wide by 24 inches long or larger and no less than 12 inches deep. Ensure the inside opening area is a minimum of 240 square inches and no inside dimension is less than 12 inches.
 - 2) For fiber optic cable applications, provide pull boxes with nominal cover dimensions of 24 inches wide by 36 inches long or larger and no less than 24 inches deep.
 - 3) Provide rectangular splice boxes with nominal cover dimensions of 30 inches wide by 60 inches long or larger and no less than 36 inches deep. Provide round splice boxes with a nominal cover diameter of 36 inches or larger and no less than 36 inches deep.

5. Fabrication

- a. Provide box covers constructed of concrete, polymer concrete or other materials meeting the requirements of this Section.
- b. Provide box covers with lifting slots and a flush-seating lockdown mechanism. Use penta-head lockdown lag bolts. Ensure lockdown bolts and lifting slots are Type 316, 304, or 302 passivated stainless steel or brass. Ensure lockdown bolt assembly is designed to prevent seizing and can be removed without damaging the cover or box body. Ensure the lockdown bolt threaded insert/nut assembly is field replaceable.

6. Testing Requirements:

For all pull and splice boxes submitted provide test data demonstrating conformance with the American National Standards Institute/Society of Cable Telecommunications Engineers (ANSI/SCTE) 77 2013 Specification for Underground Enclosure Integrity for TIER 15.

C. Junction Boxes

Fabrication.

Provide galvanized steel, aluminum or NEMA 4X non-metallic junction boxes. Ensure all attachment hardware is Type 316 or 304, passivated stainless steel.

1. Ensure the outside surface has a smooth, uniform finish. Ensure boxes are free of burrs, pits, sharp corners and dents. Ensure all welds are neatly formed and free of cracks, blow holes, and other irregularities.
 - a. Aerial Junction Boxes

Unless otherwise shown in the Plans, provide aerial junction boxes with minimum inside dimensions of 8 inches wide by 8 inches long and at least 3 inches deep.
 - b. Mounted Junction Boxes

Provide mounted junction boxes fabricated of 5052 sheet aluminum alloy with a minimum thickness of 1/8 inch. Ensure all mounted junction boxes have a hinged door and lock as specified in FDOT Specification Section 676.

Unless otherwise shown in the Plans, provide mounted junction boxes for the following installations:

 - 1) For pole and cabinet mounted installations, provide junction boxes with minimum inside dimensions of 13 inches long by 10 inches wide and at least 3 inches deep.
 - 2) For base mounted installations, provide junction boxes with minimum inside dimensions of 21 inches long by 10 inches wide and at least 8 inches deep.
 - c. Embedded Junction Boxes
 - 1) Provide weatherproof embedded junction boxes for use in concrete substructures or superstructures. Include gasketed weatherproof covers made of the same material as the box and Type 316 or 304, stainless steel, tamper resistant screws for securing the cover. Fabricate galvanized steel boxes and their covers from steel meeting the requirements of ASTM A36 and galvanized in accordance with ASTM A123.
 - 2) For embedded junction boxes not exposed to vehicular impacts, provide the following types of junction boxes.
 1. Where the structure's environmental classification is slightly or moderately aggressive, provide a galvanized steel or NEMA 4X (non-metallic) box, as approved by the Engineer.

2. Where the structure's environmental classification is extremely aggressive, provide a NEMA 4X (non-metallic) box, unless otherwise directed by the Engineer.
 - 3) For embedded junction boxes exposed to vehicular impacts, provide a galvanized steel box regardless of the structure's environmental classification.
2. Barrier Terminal Blocks
- a. Provide a barrier terminal block with a minimum of ten positions and rated at 600 V_{AC} in all aerial and mounted junction boxes. Ensure each terminal block position has two screws electrically connected by a shorting bar or other Department approved method. Ensure all terminal block positions are numbered sequentially.

PART 3 EXECUTION

3.01 INSTALLATION

A. General

1. Do not install power and communication cables in the same box unless otherwise shown in the Plans.
2. When signal or 120 volt (or greater) power is present, ground all metal covers in accordance with FDOT Specification Section 620.

B. Pull and Splice Boxes

Install pull and splice boxes in accordance with the Miami-Dade Pull Box / Fiber Optic Box Details (N.T.S), Index. Ensure pull and splice boxes are sized for the amount of cable to be placed inside. Ensure that the pull or splice box cover is flush with the concrete apron or sidewalk. Do not install pull or splice boxes in roadways, driveways, parking areas, ditches or public sidewalk curb ramps. Avoid placing pull and splice boxes in low-lying locations with poor drainage. Ensure that pull and splice boxes house fiber optic cable without subjecting the cable to a bend radius less than 14 times the diameter of the cable.

1. Placement and Spacing

Place pull and splice boxes as shown in the Plans and at the following locations, unless directed otherwise by Engineer:

- a. At all major fiber optic cable and conduit junctions.
- b. Approximately every 2,500 feet for fiber optic cable applications in rural areas with any continuous section of straight conduit if no fiber optic cable splice is required.
- c. At a maximum of 1,760 feet for fiber optic cable applications in metropolitan areas.
- d. At each end of a tunnel, and on each side of a river or lake crossing.
- e. On each side of an aboveground conduit installation, such as an attachment to a bridge or wall.
- f. At all turns in the conduit system.
- g. Near the base of a service pole or communication cabinet to provide:
 - 1) A transition point between the fiber optic conduits extending from the fiber backbone and the conduit feeding the communication cabinet.
 - 2) An assist point for the installation of fiber optic drop cable.
 - 3) Storage of slack fiber optic drop cable.

2. Electronic Box Marker

Equip all pull and splice boxes buried below finish grade with an electronic box marker inside the pull or splice box to mark the location. Ensure that the electronic box marker is a device specifically manufactured to electronically mark and locate underground facilities. Ensure that the electronic box marker includes circuitry and an antenna encased in a waterproof polyethylene shell. Ensure that the outer shell is impervious to minerals, chemicals, and temperature extremes normally found in underground plant environments. Ensure that the electronic box marker does not require any batteries or active components to operate. Ensure that electronic box markers used to mark fiber optic cable and general telecom applications are orange in color and operate at 101.4 kHz. Ensure that the electronic box marker's passive circuits produce an RF field when excited by a marker locator to direct the locator to the marker's position. Ensure that the electronic box marker has a minimum operating range of 5 feet from the marker locator.

C. Aerial Junction Boxes

Install aerial junction boxes in accordance with FDOT Design Standards, Index No. 17733.

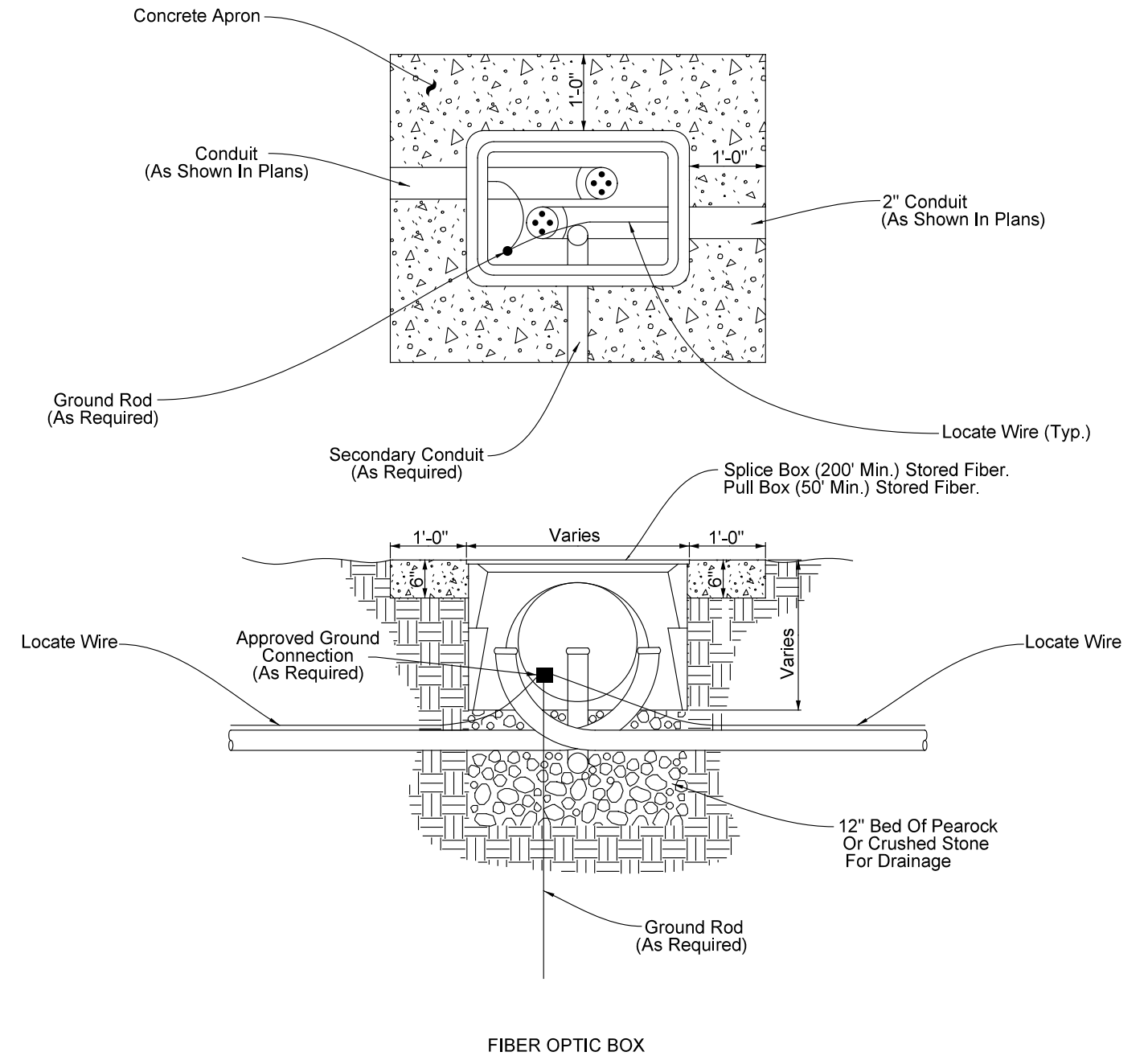
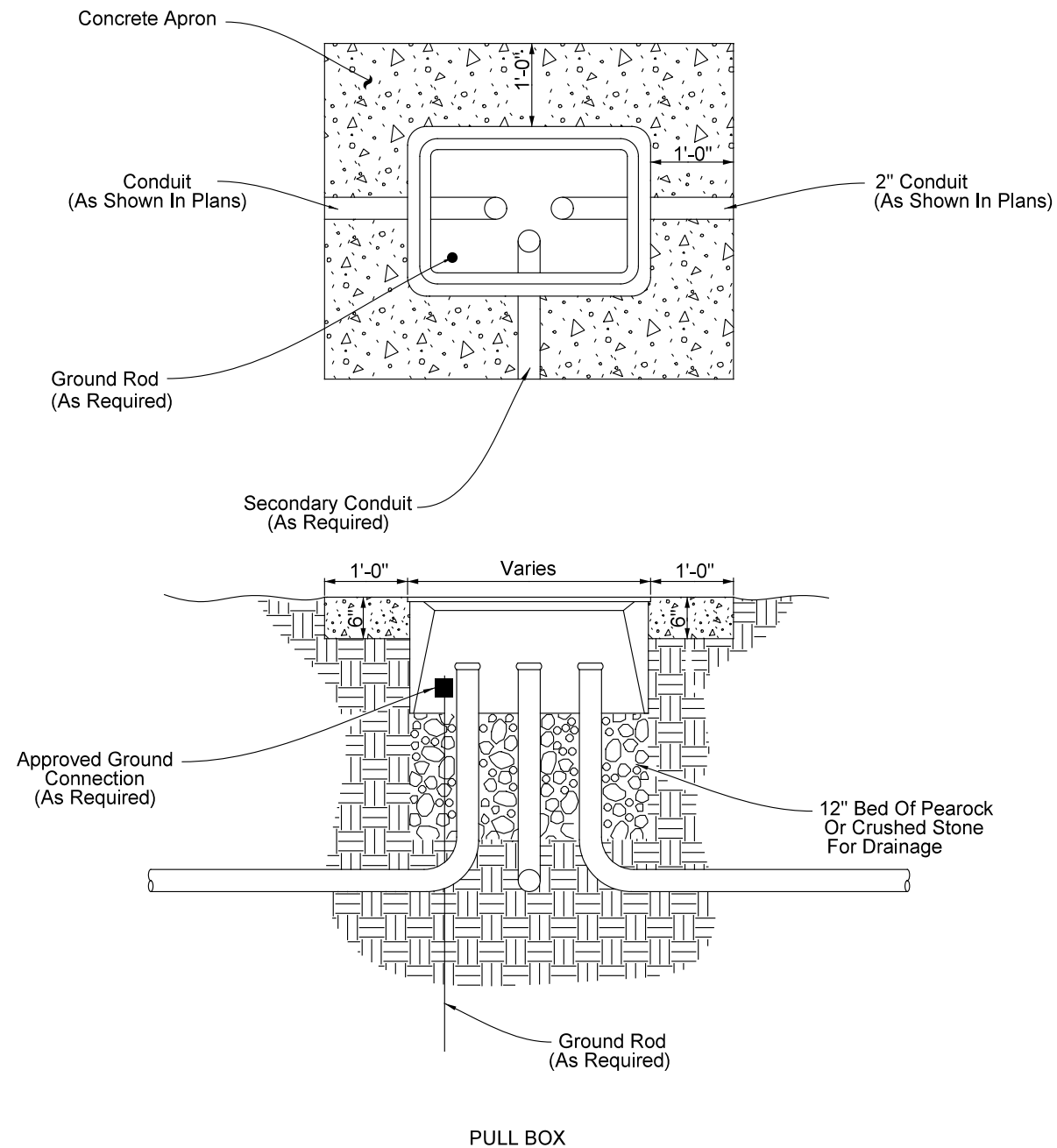
D. Mounted Junction Boxes

Ensure that the bottom surface of pole mounted junction boxes is a minimum of 4 feet above the finished grade.

E. Cable Terminations

Make cable terminations in junction boxes in accordance with FDOT Specification Section 632. Route and form the cable to allow access to the terminal screws. Do not cover the terminal identification numbers with the cable.

END OF SECTION 635



Rectangular boxes are depicted. Round fiber optic splice boxes and lids are allowed.

GENERAL NOTES:

1. MEET THE REQUIREMENTS OF MIAMI-DADE COUNTY TRAFFIC CONTROL EQUIPMENT STANDARDS AND SPECIFICATIONS SECTION 635 (PULL, SPLICE, AND JUNCTION BOXES)
2. BOXES SHALL NOT BE INSTALLED IN ROADWAYS OR DRIVEWAYS.
3. BOXES SHALL BE ON THE FDOT APPROVED PRODUCT LIST (APL) AND THE MIAMI-DADE COUNTY QUALIFIED PRODUCT LIST (QPL)
4. BOXES SHALL BE INSTALLED FLUSH WITH THE FINISHED GRADE SURFACE.
5. FIBER OPTIC SPLICE BOXES SHALL BE PROVIDED WITH CABLE HANGER RACKS DESIGNED TO SUPPORT CABLES AND SPLICE ENCLOSURES. COST OF RACKS TO BE INCLUDED IN COST OF SPLICE BOX.
6. FIBER OPTIC BOXES SHALL CONTAIN ONLY FIBER OPTIC CABLE, CONDUIT, AND LOCATE WIRE

7. CONDUIT CENTER LINE SHALL BE ALIGNED TO TOP EDGE OF BOX TO FACILITATE CABLE PULLING.
8. CONDUIT CENTER LINE SHALL BE ALIGNED TO TOP EDGE OF BOX TO FACILITATE CABLE PULLING.
9. ALL BOXES SHALL HAVE 1'-0" WIDE (MIN.) CONCRETE APRON. CONCRETE FOR CONCRETE APRONS SHALL BE CLASS NS WITH A MINIMUM STRENGTH AT 28 DAYS OF F'C=2.5 KSI. APRONS SHALL BE SLOPED AWAY FROM BOX. COST OF APRON TO BE INCLUDED IN THE COST OF EACH BOX.
10. PREVENT THE INGRESS OF WATER, DIRT, SAND, AND OTHER FOREIGN MATERIALS INTO THE CONDUIT PRIOR TO, DURING AND AFTER CONSTRUCTION USING A FOAM-SEALING MATERIAL, RUBBER PLUG, OR OTHER DEVICE DESIGNED FOR THIS APPLICATION.
11. WHERE MULTIPLE PULL BOXES ARE PLACED SIDE BY SIDE, MAINTAIN AT LEAST 8" BETWEEN THE PULL BOXES.