

SPECIAL PROVISIONS FOR SECTION 750-C: ITS PULL BOX AND MANHOLE

The 2014 Edition of the New Mexico Department of Transportation Standard Specifications for Highway and Bridge Construction shall apply in addition to the following:

1.0 DESCRIPTION.

Furnish and install ITS Pull Boxes and Manholes of the type, size, and quantity as shown in the plans.

1.01 Use pull boxes and manholes that provide:

1. At-grade access to fiber optic cables housed within conduit systems used for Department ITS communications.
2. At-grade access to aid in the installation of fiber optic cable.
3. Protection for installed fiber optic cable.
4. Adequate space for cable storage and splice enclosures.

Ensure that pull boxes and manholes containing fiber optic cable do not contain power cables for ITS devices or other equipment unless otherwise specified in the plans.

2.0 MATERIALS.

2.01 General. Ensure that all pull boxes and manholes are compatible with the fiber optic cable and are approved by the Engineer. Use pull boxes and manholes that are stackable and are structurally designed to meet or exceed ANSI Tier 15 loading requirements. Ensure that pull boxes and manholes:

1. Are rated as having a minimum compressive strength of 20,000 pounds per square inch, and are suitable for installation and use through a temperature range of -40° to 194°F.
2. Are rated as having a flexural strength of 6,000 pounds per square inch as required in the ASTM D790 standard.
3. Are rated as having a tensile strength of 800 pounds per square inch as required in the ASTM C496 standard.
4. Are rated to withstand a minimum vertical load of 20,000 pounds and a lateral load on the pull box wall of 1,200 pounds.
5. Provide accelerated service as required in Procedure E of the ASTM D756 standard.
6. Provide water absorption as required in Sections 5, 6.1, and 6.5 of the ASTM D570 standard.
7. Provide an impact resistance of 72 foot-pounds when using a "C" tup as required in the ASTM D2444 standard.
8. Include covers that provide skid resistance with a 0.5 friction coefficient as required in the ASTM C1028 standard.
9. Comply with the flammability testing requirements as detailed in the ASTM D635 standard.

10. Comply with the ASTM G53 requirements for UV exposure using a 340-nanometer ultraviolet A (UVA) bulb.
11. Provide chemical resistance as required in Section 7, Procedure 1, of the ASTM D543 standard.

Ensure that all pull box and manhole covers are a single piece and provide a 20,000-pound gross vehicle weight capacity with a live load rating of 20,000 pounds as required for ANSI Tier 15 loading conditions. Ensure that pull box and manhole covers comply with the ASTM C857 standard. Ensure that all pull box and manhole covers include bolt holes and stainless steel hex head bolts to secure the cover to the box. Ensure that bolts are 0.375 inch in diameter with 16 unified coarse threads (UNC) for every 1 inch. Ensure that covers and bolts seat flush when installed on the box. Ensure that covers are equipped with a minimum 0.5 inch by 2 inch lifting slot with lift pin. Ensure that the pull box cover is constructed in compliance with the ASTM A48 Class 20 standard requirements. Ensure that the pull box and cover complies with the structural capacity requirements of the NMDOT specifications.

2.02 ITS Pull Box. Ensure that all pull boxes have an open bottom and are constructed of polymer concrete consisting of an aggregate matrix bound together with a polymer resin. Ensure that box construction includes internal reinforcement by means of steel or fiberglass, or a combination of the two. Ensure that the pull box is equipped with a nonskid cover secured by hex head bolts and any other miscellaneous hardware required for installation or as shown in the in the plans. Ensure that the pull box is large enough to house fiber optic cable without subjecting the cable to a bend radius less than 14 times the diameter of the cable.

2.03 ITS Manhole. Use manholes at all fiber optic splice locations, as shown in the plans, and at other locations as approved by the Engineer. Ensure that the ITS manholes are concrete box with internal steel reinforcement. Ensure that the manhole is equipped with a nonskid cover secured by hex head bolts; cable racks and hooks; pulling eyes; and any other miscellaneous hardware required for installation or as shown in the plans. Ensure that the manhole is large enough to house fiber optic cable without subjecting the cable to a bend radius less than 14 times the diameter of the cable.

2.04 Marking. Ensure that all pull box and manhole covers include the words "NMDOT COMMUNICATIONS" permanently cast into their top surface. Ensure that markings are permanently affixed and clearly visible after installation.

3.0 INSTALLATION. Install all pull boxes and manholes according to the manufacturer's recommendations and as shown in the plans. Complete the installation of pull boxes, manholes, and conduit prior to cable installation. Provide all pull boxes and manholes a final finish grade elevation as shown in the plans. Excavate pull box and manhole installation sites to a depth of 1.5 feet below the bottom of the box, and replace with a 1.5 feet bed of NO. 57 aggregate as per AASHTO M 43 at the excavation base prior to installing the box. Ensure that the box cover is flush with the existing finish grade after installation. Taper the finish grade contour to provide drainage from the manhole.

3.01 General Placement and Spacing. Place pull boxes and manholes as detailed in the plans, and at the following locations, unless directed otherwise by the Engineer:

1. At all major fiber optic cable and conduit junctions.
2. Approximately every 1000 feet in rural areas with any continuous section of straight conduit if no fiber optic cable splice is required.

3. At a maximum of 500 feet in metropolitan areas.
4. On each side of an aboveground conduit installation, such as an attachment to a bridge or wall.
5. At all 90-degree turns in the conduit system.

Ensure that all pull boxes and manholes are flush mounted at grade level, and are located near the base of a service pole or near the communication equipment cabinet serving the ITS field device 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.

Do not place the pull boxes in roadways, driveways, parking areas, ditches, or public sidewalk curb ramps. Avoid placing pull boxes and manholes on steep slopes where the cover cannot be leveled within a tolerance of 1 inch of drop to 1 foot of grade or in low-lying locations with poor drainage.

3.02 Bonding and Grounding. Ensure that pull box and manhole installation includes a bonding and grounding system including a driven rod that is a minimum of 8 feet in length and 0.75 inch in diameter. Ensure that grounding rod is constructed of copper clad steel and complies with the UL 467 standard. Ensure that bonding conductors are bare solid AWG #6 copper wire as required in the ASTM B1 standard. Ensure that splice and termination components meet or exceed the UL 467 requirements, and are clearly marked with the manufacturer, catalog number, and conductor size. Ensure that grounding system complies with the NEC.

3.03 Material Removal and Restoration Specifications. Provide all material, equipment and labor for the removal of turf, earth, concrete/asphalt pavement or other site specific material to be removed for box installation. Ensure that original turf, earth, concrete/asphalt pavement or other site specific material is restored to its original condition once box installation is complete.

4.0 TESTING. Inspect all pull boxes and manholes prior to installation, and again after installation prior to fiber optic cable installation.

Perform compaction tests for each soil type encountered. Provide sufficient in-place density tests to confirm the adequacy and uniformity of the compaction procedures as required by the governing authorities or ROW owners, or as shown in the plans.

5.0 Documentation. Provide manufacturer's cut sheets and product specifications to the NMDOT ITS Engineer or designee for review and approval at least 30 days prior to ordering the materials.

5.01 Data Collection. Contractor shall provide following data included in GPS shape file of the system installed. GPS data shall be collected in WGS84 and decimal degrees format. In addition, the Contractor shall contact ITS Engineer to obtain the excel file template of documenting required data.

Project CN, Lat, Long, Size, service, comm, Fiber Slack length, and splice info (if any)

6.0 WARRANTY. Ensure that ITS pull boxes and manholes have a two-year manufacturer's warranty from the date of final acceptance by the Engineer. If the manufacturer's warranties for the components are for a longer period, those longer period warranties will apply.

Ensure that the manufacturer's warranties on the ITS pull boxes and manholes are fully transferable from the Contractor to the Department. Ensure that these warranties require the manufacturer to furnish replacements for any part or equipment found to be defective during the warranty period at no cost to the Department within 10 calendar days of notification by the Department.

7.0 METHOD OF MEASUREMENT. ITS pull boxes and manholes will be measured by the unit per each.

8.0 BASIS OF PAYMENT. ITS pull boxes and manholes will be measured by the unit per each.

8.01 The accepted quantities of ITS pull boxes and ITS manholes will be paid for at the contract unit price per installed each.

<u>Pay Item</u>	<u>Pay Unit</u>
ITS Pull Box	EACH
ITS Manhole	EACH

7.02 Work Included in Payment. The accepted quantity complete in place will be considered full compensation for furnishing and installing all materials, labor, tools, equipment, excavation, backfill, replacing any disturbed existing condition (pavement, curb, riprap,...), testing, documentation, warranty and appurtenances necessary to complete the work as directed by the ITS Engineer or designee.

The documentation of the system shall be provided by and at the expense of the Contractor. All documents shall be provided to the ITS Engineer or designee at least 30 days in advance of final acceptance. The documentation shall be approved by the ITS Engineer or designee prior to final acceptance of the ITS Pull Boxes and Manholes.