SECTION 00990 - TRAFFIC SIGNALS

(Follow all instructions and make all edits with "Track Changes" turned on. If there are no instructions [orange text] above a subsection, paragraph, sentence, or bullet, then include it in the Project. Delete all orange text before preparing the final document. All other modifications to this Section will require ODOT Technical Resource and State Specifications Engineer approval.)

Comply with Section 00990 of the Standard Specifications modified as follows:

(Use the following lead-in paragraph and subsection .10 when inductive loops are used.)

Add the following subsection:

00990.10 Materials - Furnish backer rod materials meeting the requirements of 02440.14. Furnish hot-melt loop sealant from the QPL.

(Use the following lead-in paragraph and subsection .40 when there is work at an existing controller cabinet.)

Add the following subsection:

00990.40 Work in Existing Controller Cabinets - Install new field wiring as shown into the existing controller cabinet without terminating.

New control equipment installed as shown in an existing controller cabinet will be tested prior to installation according to 00990.70.

At existing controller cabinets the Agency will be responsible for:

- Storage, delivery, installation, and activation of new control equipment
- Any required modifications to existing control equipment or existing field wiring terminations
- Terminating new field wiring

Prior to the anticipated installation of new control equipment, modification of existing control equipment, or modification of existing field wiring terminations, schedule field testing according to 00990.70(g). Field testing and activation of the new control equipment or modifications will occur within the same work shift. Be present at the Project Site during field testing.

(Use the following lead-in paragraph and subsection .41 when inductive loops are used.)

Add the following subsection:

00990.41 Inductive Loop Detectors:

(a) General - Do not begin sawcutting until the loop layout has been inspected by the Engineer.

Do not place wire in sawcuts until the cuts have been inspected by the Engineer.

(b) Saw Cut and Wire Installation - Sawcut in a manner that is the most practicable, direct line between loops and junction boxes.

Immediately after sawcutting and before the cuttings dry, thoroughly flush each cut with a high-pressure water stream. Before the cuts dry, blow cuts free of water, debris, rock, and grit with compressed air. Slots may also be cleaned by means of a high-pressure water injection/vacuum extraction system. Remove rocks or other material that may be wedged in the cut. Remove and dispose of all cuttings according to 00290.20.

Dry cuts before placing wire.

After the sawcut is cleaned of debris, place the loop wire by pushing it into the slot with a blunt nonmetallic object. Use care to avoid damaging the insulation.

(c) Sealant - Install the sealant in slots according to the manufacturer's instructions. Furnish a copy of the manufacturer's specifications including application procedures. The Engineer may order a test run of any application method or material before filling sawcuts.

In order to prevent heat damage to the insulation, do not allow the temperature of the sealant to exceed 410 °F during application. Install hot-melt sealants in layers to prevent damage to wire insulation. Allow each layer to cool before the next layer is installed. Do not use water to accelerate cooling.

Sealants that crack or pull away from the sawcuts after curing will be rejected.

(d) Resistance and Continuity Testing - The resistance to ground of the loop and loop feeder combinations, shall be 500 MΩ or greater when checked at the following conditions:

- Before splicing and sealing - continuity test
- Before splicing after sealing - resistance test
- After splicing and sealing - resistance test

Furnish a report of the resistance and continuity results for each loop at each testing condition.

(Use the following lead-in paragraph and subsection .42(b) when inductive loops are used.)

Add the following subsection:

00990.42(b) Loop Feeder Cables – When terminating loop feeder cable inside the controller cabinet, do not remove the outside jacket and shield more than 6 inches from the end of the cable. Crimp lugs used for loop wire field terminals may be insulated or non-insulated. Terminate loop feeder shield drain wire to the cabinet input panel grounding bus nearest the feeder wire termination point.

Add the following subsection:

00990.45 Repair Open Holes In Metal Poles, Pedestals, and Mast Arms – Repair holes in metal poles, pedestals, and mast arms caused by removal of equipment using pipe plugs. For holes larger than 1 inch in diameter or of irregular shape, submit method and materials to be used.

(Use the following lead-in paragraph and subsection .47 when Railroad interconnect is required.)

Add the following subsection:

00990.47 Railroad Interconnect - Run the circuit conductors in underground electrical conduit of the size shown. Terminate the conduit at the Railroad cabinet at the location and in the manner directed by the Railroad company. Extend the ends of the wire at least 3 feet beyond the end fitting of the supplied conduit. All other Work inside the Railroad cabinet is the responsibility of the Railroad.

Do not Work in the immediate vicinity of the Railroad cabinet without first notifying the Engineer and receiving permission. The Agency will obtain supervisory personnel from the Railroad company.

Do not place any Materials or Equipment in the vicinity of the tracks without observing proper clearance (see 00170.01(e)).

(Use the following lead-in paragraph and subsection .70(i) when Copper Twisted Pair interconnect is required.)

Add the following subsection:

00990.70(i) Interconnect System Testing for Copper Twisted Pair:

Test each new interconnect cable circuit installed in the system. Test the complete system only when all terminations for each cable circuit are completed from the interconnect or controller cabinet at the beginning of the new cable run to the controller or interconnect cabinet at the end of the new cable run. If any test is failed, repair the circuit and repeat the entire test series for that cable circuit.

Perform all tests in the presence of the Engineer. Document the test results. When the tests are completed, furnish the test results and the test data to the Engineer. Conduct tests, as described below, for all cable conductors, including spares, the cable shield, and all field terminations.

In addition to testing the complete system, perform the following tests for each cable circuit:

(1) Continuity - Perform a continuity measurement for each conductor and the cable shield in the system. Conductor resistance shall not be more than 10 Ω per 1,000 feet for each cable pair and shield of the communications cable. Measure the resistance with an ohmmeter having a minimum input impedance of 10 MΩ /V. Record the resistance of each pair and furnish to the Engineer as described above.

(2) Isolation - Perform an isolation measurement for each conductor and cable shield in the system. Measure the insulation resistance with all connections to the conductor or shield under test removed and all other conductors in the cable grounded. Make the measurement with a DC potential of not less than 360 V nor more than 550 V, continuously applied for 1 minute. Insulation resistance of each cable conductor and the shield shall exceed 1,000 MΩ per mile. Use an insulation resistance (Megger) tester with a meter scale for measurements, marked with a range from 100 KΩ to 100 GΩ, and with zero and infinity also marked.

(Use the following subsection .80 when unintegrated speed feedback assemblies are required.)

00990.80 Measurement – Add the following paragraph to the end of this subsection:

Unintegrated speed feedback assemblies will be measured according to 00991.80.

(Use the following subsection .90 when unintegrated speed feedback assemblies, installing conduit on or in a structure, or crosswalk closure supports are required.)

00990.90 Payment -

(Use the following paragraph and bullet when installing conduit on or in a structure)

In the paragraph that begins "No separate or additional payment will be…", add the following bullet to the bullet list:

- Conduit installed according to 00960.42(f)

(Use the following paragraph when crosswalk closure supports are required.)

Add the following paragraph to the end of this subsection:

Crosswalk closure supports will be paid for according to 00902.90.

(Use the following paragraph when unintegrated speed feedback assemblies are required.)

Add the following paragraph to the end of this subsection:

Unintegrated speed feedback assemblies will be paid for according to 00991.90.