State of Delaware
Department of Transportation

ITMS FIBER NETWORK
Construction, Installation, and Maintenance Services

Request For Proposals

Contract No. DOT1885-FIBER_NETWORK

APPENDIX A

SCOPE OF WORK

TABLE OF CONTENTS

1 Scope Summary

1.1 Background

DelDOT's broadband communications requirements necessitate a State-owned and –operated, high-capacity fiber optic network. The current network supports connectivity to hundreds of field devices comprising the DelDOT Integrated Transportation Management System (ITMS), including traffic signals, variable message signs, traffic sensors, traffic cameras. Additionally, the fiber infrastructure forms the communications backbone for nearly all other Delaware State agencies, supporting a diverse range of essential government services and internal communications requirements. Over the past 15 years, DelDOT has constructed over 250 route miles of fiber optic cable plant, of which 30 miles are aerial.

The number and types of ITMS applications continues to grow. Based on the current and projected traffic devices and applications, more than 200 miles of fiber plant will be required to complete statewide backbone coverage.

1.2 Summary of Required Services and Materials

DelDOT requires an experienced and qualified contractor to provide turnkey construction services, fiber installation, and material supply for new fiber construction, as well as on-call maintenance and repair of existing fiber infrastructure. The scope of the work consists of, but is not limited to following tasks:

- Initiation of utility of locate requests through the Miss Utility One Call Center, and strict adherence to all Delaware Underground Utility Damage Prevention Laws;
- Sub-surface installation of conduit, primarily through the use of horizontal directional drilling, plowing, and trenching, including existing utility locating through test pitting, traffic control, and permanent surface restoration;
- Installation of underground junction wells and ground rods, including permanent paved surface restoration;
- Placement of fiber optic cable and tracer wire in conduit;
- Installation of new messenger strand between utility poles for aerial cable construction;
- Lash and/or overlash fiber optic cable to aerial messenger strand;
- Installation of new wooden utility poles;
- Installation of fiber splice enclosures and fiber splicing;
- Placement and assembly of fiber termination panels and related hardware;
- Installation of Fiber Mini Hub cabinet bases and electrical service pedestals;
- Indoor cable placement, including creating building penetrations, installation of innerduct and/or Rigid Galvanized Conduit (RGC), and fiber termination;
- Optical performance testing of fiber optic strands; and
- Provision and storage of all materials related to the above construction tasks.

Depending on the size and location of the specific project, DelDOT will make reasonable efforts to provide the Contractor with staging and/or storage yard(s), when available.

The Contractor shall provide regular progress reporting, and will closely coordinate its construction schedule with DeDOT and its designated project management designee. The Contractor shall provide a primary point of contact to DelDOT for the duration of the contract, and shall be expected to attend regular project status and management meetings. The Contractor shall provide daily progress reporting and forecasting of the construction locations for the following work day during active construction phases of the project, and shall provide weekly reporting of key progress metrics to be defined by DelDOT.

1.3 Project Timeline

DelDOT anticipates the construction of approximately 50 or more routes miles of fiber optic infrastructure will be constructed by the awarded Contractor during the initial three-year term of the contract. DelDOT will issue Purchase Orders to the Contractor for individual segments of the network upon availability of completed engineering drawings and funding.

The Contractor must be prepared to initiate new fiber construction and maintenance activities within 30 days of contract award.

The Contractor should anticipate the requirement to provide construction services for multiple segments using multiple construction crews simultaneously. To the extent allowed by engineering and budgetary timeframes, DelDOT will make reasonable attempts to schedule construction projects so that work can be performed efficiently and continuously by the Contractor during the course of the contract term.

Timelines for specific network segments are not guaranteed. Proposal pricing shall be inclusive of any required demobilization and remobilization costs, unless otherwise indicated.

2 General Requirements of Construction and Maintenance Services

This section defines general requirements and terms applicable to all ITMS fiber network construction, fiber installation, and maintenance services provided by the Contractor.

2.1 General Work Elements

The following elements apply to all work specified in this document unless a particular exception is noted in the specifications for the individual item.

- Each item shall be repaired or installed in accordance with the design at locations as shown on the plans or as directed by DelDOT inspectors.

- Backfill in trenches, around forms and junction wells, or at any other place shall be completed according to DelDOT Standard Specifications. Any paving material or fill removed for trenching shall be replaced in kind according to DelDOT Standard Specifications.

- All holes and trenches shall be protected at the Contractor's expense from accidental entry by vehicles and pedestrians through the use of steel plates or other approved materials as required by DelDOT Standard Specifications. Should the Contractor fail to provide adequate protection to the surroundings of a work site, or should the operations be carried out in such a way as to allow or cause damage to any roadway, street, sidewalk, the property of any utility, or other private or public property, work may be stopped until deficiencies are corrected. Should the repair not be undertaken and should it be necessary for DelDOT to protect the area and/or make the repair, the cost shall be deducted from payment due the Contractor.

- All concrete work shall be performed and tested in accordance with applicable DelDOT Standard Specifications. Concrete shall be finished to match any adjacent concrete. If no match is required, the surface area shall be broom finished and edged.

- All fiber cable shall be transported by and unreeled from a cable trailer(s). The laying of reels on the ground and subsequent removal of fiber cable from this position is prohibited.

2.2 Work Standards and Quality

2.2.1 Applicable Standards

The Contractor shall comply with all applicable Federal, State and local laws and regulations. The Contractor is retained by DelDOT for this Project based on Contractor's expertise and experience in the type of work that is the subject of this Contract. The Contractor represents and warrants that Contractor is familiar with the aforementioned Codes and standards, as well as those referenced below. Construction methods and techniques used by the Contractor shall be

in accordance with the recommended practices and procedures published by leading industry manufacturers and trade associations, including but not limited to the following:

- ANSI/TIA/EIA Telecommunication Standards (latest editions)
- Nation Electrical Code (NEC) (latest edition)
- BICSI Telecommunications Distribution Methods Manual (TDMM)
- BICSI Outside Plant Design Reference Manual (OSPDRM) (Latest Edition)
- Telcordia Blue Book – Manual of Contractor's Procedures;
- Federal Occupational Safety and Health Administration (OSHA) regulations.

The Contractors shall also follow all applicable DelDOT Standard Specifications and Construction Details:

- DelDOT Standard Specifications for Road and Bridge Construction
- DelDOT Standard Construction Details

DelDOT publications may be found on the DelDOT website:
https://www.deldot.gov/Publications/index.shtml

The Contractors shall be aware of all standards and their application. Ignorance or lack of knowledge shall not be an excuse for improper work to occur. Any work constructed in violation of any applicable code shall be corrected and re-installed properly at the Contractor's expense.

2.2.2 Unsatisfactory Operations

Should it be necessary to halt the work because of incorrect or unsatisfactory operations under the terms of the awarded contract or because of failure to follow safety standards applicable hereto, the Contractors must take immediate steps to remedy the deficiencies. Should repair or correction of any safety defect or deficiency not be immediately undertaken, and should DelDOT be required to protect the site or make the repair or correction, the cost of such work shall be deducted from payment due the Contractor.

2.2.3 Inspection and Testing

The Contractor shall be responsible for performing quality control inspection and testing as required to verify that workmanship and products are provided as specified in this document, to include fiber optic cable performance testing, inspection of roadway and right-of-way restoration, and material testing of concrete and backfill placement. The Contractor shall be responsible for testing concrete structures and backfill to demonstrate compliance with DelDOT Standard Specifications.

During any inspection, including, but not limited to, the final inspection of each work site, should it be found that non-concealed work is substandard, the burden of proof that the concealed work is up to standard shall be the Contractor's, who shall do such as is necessary, including exposing the concealed work, to clearly establish that the concealed work meets the specifications as outlined. Any and all items such as, but not limited to, improperly set couplings and concrete or masonry work that is not up to specified standards shall be removed and replaced at the Contractor's expense.

2.3 Project Deliverables and Documentation

2.3.1 Engineering Redlines and As-Builts

The Contractor shall provide detailed as-built documentation in the final deliverable package for each assigned task.

The Contractor shall provide markups of the original designs, to include field notes that detail any deviation from the original task/ proposal. Field notes and drawings will be digitized/ scanned and provided in the deliverable package.

The Contractor shall supply comprehensive GPS data for all tasks to enable DelDOT to maintain accurate GIS records of its fiber plant. This information shall be provided to DelDOT in an .mdb database format, and shall include all location information pertaining to installed conduit, installed fiber, the compass direction, conduit junction wells, and related components. DelDOT will provide the data dictionary for the collection of this information.

DelDOT uses Trimble handhelds for the collection of the data in conjunction with Pathfinder and TerraSync software by Tremble. Both the GPS unit and the software necessary to use it, including the pathfinder licenses and TerraSync licenses, are the responsibility of the Contractor.

When applicable, Contractor shall supply DelDOT with log data from the directional bore guidance system used during construction, indicating depth of the conduit placement. Also, markups shall indicate measured depth of conduit placement for conduit placed using open trenching or open cut methodologies at intervals not to exceed 50 feet.

Construction may not deviate from DelDOT-supplied engineering drawings without prior approval from DelDOT or its appointed designee.

2.3.2 Fiber Testing

The Contractor shall perform bi-directional Optical Time Domain Reflectometer (OTDR) and optical power meter tests for all terminated fiber optic strands installed and/or spliced by the Contractor on both 1310 nm and 1550 nm wavelengths, or as otherwise directed by DelDOT. All fiber testing methods and deliverables shall comply with specifications defined in Section 3.2.9.

ODTR and power meter data shall be provided in the final deliverable package for quality assurance review by DelDOT in both the native and PDF file formats.

Failures of fiber strands, for any reason, shall not be accepted. Any issues identified during testing, including those located outside the responsibility of the Contractor, shall be reported back to DelDOT Fiber Representative/Inspector for each strand.

2.3.3 Warranty Documentation and Packing Slips

Packing slips shall be provided for all equipment and materials over $1,000 supplied for a specific task. DelDOT is required to collect and store copies of these slips for audit purposes. Any deliverable packages that do not contain all applicable packing slips will be rejected.

All warranty information pertaining to the supplied materials and workmanship shall be provided in the final deliverable package for each task.

2.4 Material Handling

2.4.1 Materials Transport

The Contractor shall be responsible for trans-shipping material between their yards and for maintaining the inventory of these items once acquired from DelDOT or received from suppliers on behalf of DelDOT. Materials or equipment shall be transported in a legal fashion and shall be protected from damage or loss. Lost or unaccounted material will be the responsibility of the Contractor, and will be reimbursed to DelDOT.

2.4.2 Materials Damaged

Any damage to or loss of any materials or equipment supplied by DelDOT to the Contractors, which occurs from handling or transport, or from any other source or way, shall be the sole responsibility of the Contractor and the value thereof shall be deducted from any payments due the Contractor.

2.4.3 Salvageable Materials

The Contractor shall salvage all useful materials and reuse materials for other DelDOT projects to the extent feasible at the agreement of DelDOT Fiber Representative/Inspector and the Contractor.

2.5 Safety Documentation and Training

The Contractor shall comply with all the requirements set forth in Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330) as supplemented by Department of Labor regulations (29 CFR Part 5). The Contractor shall maintain records of safety training classes held, and any safety certifications held by its employees and sub-contractors.

The Contractor, its employees, agents, and subcontractors must be trained on the Underground Damage Prevention statutes and best practices prior to excavating on DelDOT project. All

Contractor crew members must carry a training verification card with the date of training and prime contractor/subcontractor crew name at all times.

2.6 State of Delaware License Requirements

Professional Electrician License. Effective June 30, 2012, it is illegal in Delaware per Del Code Title 24, Chapter 14, for unlicensed persons to perform electrical services. Electrical services or electrical work is defined to mean any activity covered by the National Electric Code (NEC) as adopted by the Delaware State Fire Commission.

Rules and Regulations regarding Professional Electrical Licenses (including exceptions) can be found at: http://regulations.delaware.gov/AdminCode/title24/1400.shtml

2.7 Construction Safety and Health Standards

The Contractor and any subcontractors shall not require any laborer or mechanic employed in performance of the contract to work under working conditions or in surroundings which are unsanitary, hazardous, or dangerous to the worker's health or safety, as determined under construction safety and health standards (Title 29, Code of Federal Regulations, Part 1926, published in the Federal Register on December 16, 1972), as revised from time to time. The Contractors and any subcontractors shall comply with all OSHA regulations.

2.8 Traffic Control and Work Area Protections

2.8.1 Traffic Control Standards

The Contractor shall provide all equipment and personnel necessary to protect the well-being of employees, motorists and all others who come in contact with construction areas. Such precautions include, but are not limited to, use of crash cushions, flashing arrow boards, lighted barricades, steel plates, concrete barriers, and flaggers. The Contractor shall ensure that all required signage meets Federal, State and Local standards.

The Contractor shall furnish, erect, maintain, relocate, and/or remove traffic control devices in accordance with the Contract Documents, as well as the latest version of the Delaware Manual on Uniform Traffic Control Devices, Part 6, Temporary Traffic Control: (http://deldot.gov/information/pubs_forms/manuals/de_mutcd/index.shtml).

All traffic control shall be performed by personnel certified by DelDOT-recognized flagger certification programs.

2.8.2 Traffic Control Construction Methods

Traffic control shall be considered incidental to unit pricing for applicable construction tasks. All traffic control devices furnished by the Contractor shall remain the property of the Contractor, unless otherwise specified by the contract. Traffic control devices shall include, but are not limited to signs, drums, barricades, barriers, electronic variable message boards, cones,

delineators, flashing arrow panels, temporary guardrails, temporary concrete median barriers, vehicle-mounted temporary impact attenuators, pavement markings, and raised reflective pavement markers.

Existing public streets and highways shall be kept open to traffic at all times by the Contractor unless permission to close these streets, or portions thereof, is granted by DelDOT. DelDOT must approve all lane closures required to complete the work. DelDOT may request that the Contractor make additional notifications to property owners.

Traffic control devices shall be installed at the inception of construction operations, and shall be properly maintained, relocated as necessary, cleaned, and operated during the time they are in use. They shall remain in place only as long as they are needed and shall be immediately removed thereafter. Where operations are performed in stages, only those devices that apply to the conditions present shall be left in place.

During periods when not warranted, warning signs and other devices shall be removed from the work area, covered with specified material, or otherwise positioned so that they do not convey their message to the traveling public. Covering material shall be maintained in a neat manner during its use.

Weeds, brush, trees, construction materials, equipment, etc. shall not be allowed to obscure any traffic control device in use. There will be no separate compensation for any trimming or cutting required for this purpose.

Competent and properly trained flaggers, properly attired and equipped, shall be provided in accordance with DelDOT standards and when directed by the Engineer or Inspector or when the Contractor deems it necessary to safely handle traffic through the construction zone.

The Contractor shall assume full responsibility for the continuous and expeditious maintenance of all construction warning signs, barricades, and other traffic control devices which in the opinion of the Engineer are damaged by traffic or other means or deteriorated beyond effectiveness. Conditions covered under maintenance shall include but not be limited to replacement due to loss of reflectivity; replacement of broken supports; plumbing of leaning signs; cleaning of dirty signs, barricades, and other devices; repair of defaced sheeting and legend; and replacement of stolen or vandalized items. All items used for traffic control shall be maintained in a satisfactory condition. Failure to maintain all traffic control devices in a satisfactory condition may be cause for suspension of construction operations until proper traffic control is re-established.

The Contractor shall follow the construction procedure and maintenance of traffic as shown on the Traffic Control Plan, unless a more workable plan is agreed to by DelDOT prior to or during the execution of the work. The Contractor shall complete each construction phase in the sequence shown if phasing is specified.

The Contractor shall continuously review and maintain all traffic control measures to assure that adequate provisions have been made for the safety of the public and workers.

2.9 Accident Reporting

Any accident resulting in damage to property or causing personal injury within the limits of a work site shall be immediately reported to the appropriate police agency, other required agencies and DelDOT.

The Contractor shall immediately contact the Utility Operator/Owner, DelDOT's Traffic Management Center, and the DelDOT Fiber Representative/Inspector when damage to an underground facility is identified. If a Natural or Propane Gas line is damaged, the Contractor must call 911 prior to notifying the Utility Operator. The Contractor shall not backfill around the underground utility line until the Utility Operator has repaired the damage and has given clearance to backfill. DelDOT will not pay the Contractor for labor, vehicles, material, or equipment or any other cost associated with the repair to any at-fault damage. Failure to comply may result in a verbal warning, suspension of the crew, loss of work, and/or termination.

2.10 Warranty

All proposed solutions must provide at least 25- year performance and 15-year manufacturer's parts and labor warranty in relation to fiber optic cables, connectors, termination panels, and related fiber optic system components. The fiber optic "system" must meet the selected Manufacturer's requirements for an installed "Warranted System" to ensure a 25-year performance and 15-year manufacturer's parts and labor guarantee for a permanent link and or channel system.

The contractor shall warranty workmanship related to all other components (conduit, junction wells, etc.) for a minimum of two years. All other manufacturer material warranties shall be passed through to DelDOT.

2.11 Fiber Maintenance and Emergency Response

The Contractor shall provide on-call maintenance and repair services in a timely and responsive manner. All permanent repairs shall comply with applicable specifications in Section 3. Fiber maintenance and repair response shall generally occur according to the following repair escalation definitions and procedures:

- ***Notifications:*** The contractor shall be available to receive notifications from DelDOT of repair or maintenance needs on a 24x7 basis.

- ***Non-emergency response:*** Damage or maintenance conditions that are not service-impacting, or that are otherwise deemed to be non-emergency at DelDOT's sole discretion, shall be handled as follows:

  - Initial onsite response for trouble diagnosis is required within 4 hours of notification during daytime hours (i.e. 7 AM to 5 PM), or by 7 AM the following morning when notification occurs after hours, 7 days a week.
  - Repair to service-impacting damage shall be completed on the same day as the initial response, when feasible, and always within two days of notification.

- ***Emergency response:*** Damages or plant failures that are service-impacting, or that are otherwise deemed to be critical at DelDOT's sole discretion, shall be handled as follows:
  - Initial onsite response is required within 2 hours of notification on a 24x7-basis, with temporary repairs initiated immediately, when feasible.
  - Crew(s) and equipment necessary to effect permanent repairs shall be onsite within 4 hours of initial notification.
  - All reasonable efforts shall be made to complete repairs within 24 hours of initial notification.

The Contractor shall maintain a reasonable amount of key materials as necessary to effect emergency repairs, each consistent with the applicable material specifications referenced in Section 3, to include at a minimum:

- Type 4 Conduit Junction Well, quantity 2
- Type 7 Conduit Junction Well, quantity 2
- Type 11 Conduit Junction Well, quantity 1
- Type 14 Conduit Junction Well, quantity 2
- Type 16 Conduit Junction Well, quantity 2
- 4" HDPE conduit, quantity 600 feet
- HDPE Couplers for Fusion Splice, quantity 2
- HDPE Coupler Fusion Machine
- 2" Galvanized Steel Conduit, 10-foot segments, quantity 5
- 2" Galvanized Steel Conduit bends, quantity 1 each 11-degree, 22-degree, 45-degree, and 90-degree sweeps
- Quantity 4 - 1" corrugated innerduct, 1,350 feet
- 12 AWG tracer wire, 1,350 feet
- 4" Schedule 80 PVC conduit, quantity 100 feet
- 4" Schedule 80 PVC conduit bends, quantity 1 each 11-degree, 22-degree, 45-degree, and 90-degree sweeps
- 48-strand loose buffer tube fiber cable, quantity, 1,500 feet
- 144-strand loose buffer tube fiber cable, quantity 1,500 feet
- 24-strand loose buffer tube fiber cable, quantity 1,500 feet
- 12-strand singlemode loose buffer tube fiber cable, quantity 1,500 feet
- 12-strand multimode loose buffer tube fiber cable, quantity 1,500 feet

- Preterminated Termination Panel (i.e. "Zeux Panel"), quantity 2
- Preterminated Fiber Cable Tails (single-ended, non-pinned MT style connector)
    - 100-foot, quantity 2
    - 500-foot, quantity 2
    - 1,000- foot, quantity 2
    - 1,500- foot, quantity 2
    - 2,000- foot, quantity 2
    - 2,400- foot, quantity 2
- Preterminated Fiber Cable Trunks (dual-ended, non-pinned MT style connector
    - 500-foot, quantity 2
    - 2,400-foot, quantity 2
- Singlemode Connectors
    - SC Anaerobic, quantity 288
    - SC/UPC, quantity 144
    - SC/APC, quantity 144
- Multimode SC Anaerobic Connectors, quantity 24
- Fiber optic splice enclosure and related splice materials for loose buffer tube splicing only – quantity 4
- Fiber Mini Hub with 12" extension base, fan kit, thermostat, power board, and transfer switch – quantity 2
- All required material to rebuild a service pedestal with meter and disconnect

Proposals should describe in detail the Contractor's proposed approach to meeting DelDOT's fiber maintenance and emergency response requirements, to include capacity, capabilities, and location of applicable crews and equipment.

2.12 Night and Weekend Work

Most work tasked in accordance with this RFP will be required to occur between the hours of 9:00 A.M. to 3:00 P.M., Monday through Friday. DelDOT may require work to occur outside of these timeframes to minimize traffic conflicts for some work sites. The Contractor should anticipate nighttime and/or weekend operations being required for work affecting traffic lanes on multi-lane, high volume locations.

All Pay Items that are not "furnish only" and used for Night / Saturday Work or Sunday Work shall be allowed a percentage-based surcharge to be specified by the Bidder in Appendix B to the RFP (Pricing Forms).

Night / Saturday Work shall be defined as work performed from the hours of 8:00 P.M. to 6:00 A.M., Monday through Friday, or anytime on Saturday. Sunday Work shall be defined as work performed anytime on Sunday.

3 Fiber Construction Services Unit Pricing Specifications

The following sections identify the Contract Unit Price items that are applicable to the ITMS Fiber Network Construction, Fiber Installation, and Maintenance Services contract.

Each item shall be provided in accordance with the specifications defined in the DelDOT Standard Specifications for Road and Bridge Construction and/or Special Provision Item Specifications (Appendix C). In addition, all work performed shall adhere to all applicable requirements in Section 2 of this document, and shall include all labor, equipment, and incidental materials necessary to deliver turnkey services and functional fiber optic communications infrastructure.

3.1 Standard Specification Items

The following items shall be provided in accordance with the referenced DelDOT Standard Specifications for Road and Bridge Construction.

3.1.1 Electrical Service Pedestals

746925 Electric Service Pedestal-Lighting, Signal & ITMS Component Installation

Description:

This work consists of installing electric service pedestal components for ITMS systems in accordance with the DelDOT Standard Specifications and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to Section 746.02 of the DelDOT Standard Specifications.

Construction Methods:

The construction methods used should comply with Section 746.03 of the Standard Specifications.

Method of Measurement:

Installation shall be measured according to Section 746.04 of the Standard Specifications.

Basis of Payment:

The quantity of conduit furnished and installed will be paid at the Contract Unit Price per each item for the Pay Items listed above. Price and payment constitutes full compensation for furnishing conduit, installing conduit under the method specified by the Contract Documents, and for all labor, tools, Equipment and incidentals required to complete the Work as specified and as directed by the Engineer. Trench backfill and surface restoration materials shall be considered incidental to these items.

3.1.2 Conduit Junction Wells

830001	***Conduit Junction Well, Type 1, 20" x 20" Precast Concrete***
830002	***Conduit Junction Well, Type 4, 20" x 42½" Precast Concrete***
830004	***Conduit Junction Well, Type 7, 36" x 60" Precast Polymer Concrete***
830005	***Conduit Junction Well, Type 11, Precast Concrete/Polymer Lid-Frame***
830006	***Conduit Junction Well, Type 14, Precast Concrete/Polymer Lid-Frame***

Description:

This work consists of installing conduit junction wells in accordance with the DelDOT Standard Specifications and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to Section 830.02 of the DelDOT Standard Specifications.

Construction Methods:

The construction methods used should comply with Section 830.03 of the Standard Specifications.

Method of Measurement:

Installation shall be measured according to Section 830.04 of the Standard Specifications.

Basis of Payment:

The quantity of junction wells installed will be paid at the Contract Unit Price per each item for the Pay Items listed above. Price and payment constitutes full compensation for installation, materials, excavation, backfilling, and installing the stone base, grounding and bonding new junction well, and for all labor, equipment, tools and incidentals required to complete the work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

3.1.3 Conduit

831001	***Furnish and Install up to 3" flexible metallic liquid-tight conduit***
831005	***Furnish and Install up to 4" Schedule 80 PVC conduit (On Structure)***
831006	***Furnish and Install up to 4" Galvanized Steel Conduit (Trench)***
831007	***Furnish and Install up to 4" Galvanized Steel Conduit (Bore)***
831008	***Furnish and Install up to 4" Galvanized Steel Conduit (Open Cut)***
831009	***Furnish and Install up to 4" Galvanized Steel Conduit (On Structure)***
831010	***Furnish and Install up to 4" nonmetallic pole riser shield***
831011	***Removal of conduit from wood pole***

Description:

This work consists of installing conduit junction wells in accordance with the DelDOT Standard Specifications and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to Section 831.02 of the DelDOT Standard Specifications.

Construction Methods:

The construction methods used should comply with Section 831.03 of the Standard Specifications.

Method of Measurement:

Installation shall be measured according to Section 831.04 of the Standard Specifications.

Basis of Payment:

The quantity of conduit furnished and installed will be paid at the Contract Unit Price per linear foot for the Pay Items listed above. Price and payment constitutes full compensation for furnishing conduit, installing conduit under the method specified by the Contract Documents, and for all labor, tools, Equipment and incidentals required to complete the Work as specified and as directed by the Engineer. Trench backfill and surface restoration materials shall be considered incidental to these items.

3.1.4 Electrical Cable and Splicing

832028 Furnish and Install #6 Bare Stranded Copper Ground Wire

832029 Furnish and Install #8/2 Wire UF w/Ground

Description:

This work consists of installing electrical cable in accordance with the DelDOT Standard Specifications and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to Section 832.02 of the DelDOT Standard Specifications.

Construction Methods:

The construction methods used should comply with Section 832.03 of the Standard Specifications.

Method of Measurement:

Installation shall be measured according to Section 832.04 of the Standard Specifications.

Basis of Payment:

The quantity of conduit furnished and installed will be paid at the Contract Unit Price per linear foot for the Pay Items listed above. Price and payment constitutes full compensation for furnishing conduit, installing conduit under the method specified by the Contract Documents, and for all labor, tools, Equipment and incidentals required to complete the Work as specified and as directed by the Engineer. Trench backfill and surface restoration materials shall be considered incidental to these items.

3.1.5 Grounding

833001 Bonding and Grounding Existing Junction Well

833002 Furnish and Install Ground Rod

Description:

This work consists of installing ground rods in accordance with the DelDOT Standard Specifications and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to Section 1039 of the Standard Specifications.

Construction Methods:

The construction methods used shall comply with Section 833.03 of the Standard Specifications.

Method of Measurement:

Installation shall be measured according to Section 833.04 of the Standard Specifications.

Basis of Payment:

Price and payment constitutes full compensation for furnishing and installation of Pay Items at the pay unit listed above and for all labor, tools, Equipment, and necessary incidentals to complete the Work as specified and as directed by the Engineer. No payment will be made for ground rods installed as part of other Items (Pole Bases, Cabinet Bases and Metered Service Pedestals). No payment will be made for grounding and bonding new junction wells.

3.1.6 Cabinet Bases

835001 Construct Type F Cabinet Base

Description:

This work consists of constructing the Type F cabinet base in accordance with the DelDOT Standard Specifications and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to Section 835.02 of the DelDOT Standard Specifications.

Construction Methods:

The construction methods used shall comply with Section 835.03 of the Standard Specifications.

Method of Measurement:

Installation shall be measured according to Section 835.04 of the Standard Specifications.

Basis of Payment:

The accepted quantity of cabinet bases constructed will be paid at the Contract Unit Price per each item for the Pay Items listed above. Price and payment constitutes full compensation for installation, equipment, tools and incidentals required to complete the Work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector. All concrete, ground rods, conduit sweeps, anchors, and required materials shall be considered incidental to these items.

3.1.7 Span Wire and Messenger Wire

838001	***Furnish and Install Span Wires, 7/16”***
838002	***Furnish and Install Span Wires, 1/4"***
838003	***Furnish and Install Dead End Messenger Wire Attachment***
838004	***Furnish and Install Intermediate Messenger Wire Attachment***
838005	***Furnish and Install Angular Intermediate Messenger Wire Attachment***
838006	***Adjustment of Span or Messenger Wire***
838007	***Relocation of Messenger Attachment***
838008	***Transfer of Existing Span or Messenger Attachments***
838009	***Removal of Messenger Wire from Pole Line***

Description:

This work consists of installing, transferring, adjusting, relocating, or removing messenger wire and associated utility pole attachments in accordance with the DelDot Standard Specifications and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to Section 838.02 of the Standard Specifications.

Construction Methods:

The construction methods used shall comply with Section 838.03 of the Standard Specifications.

Method of Measurement:

Installation shall be measured according to Section 838.04 of the Standard Specifications.

Basis of Payment:

The quantity of messenger wire either installed, or removed will be paid at the Contract Unit Price per linear foot for the Pay Items listed above. Price and payment constitutes full compensation for installation, materials, equipment, tools and incidentals required to complete the Work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

3.1.8 Wood Poles

839001	***Furnish & Install Wood Pole***
839002	***Cutting of Wood Pole***
839003	***Removal of Wood Pole***

Description:

This work consists of installing, cutting, or removing wooden utility poles in accordance with the DelDot Standard Specifications and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to Section 839.02 of the Standard Specifications.

Construction Methods:

The construction methods used shall comply with Section 839.03 of the Standard Specifications.

Method of Measurement:

Installation shall be measured according to Section 839.04 of the Standard Specifications.

Basis of Payment:

The quantity of wooden utility poles installed, cut, or removed will be paid at the Contract Unit Price per each item for the Pay Items listed above. Price and payment constitutes full compensation for installation, materials, equipment, tools and incidentals required to complete the Work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

3.1.9 Down Guys and Anchors

840001	***Furnish & Install Down Guy and Anchor***
840002	***Furnish & Install Overhead Guy***
840003	***Relocation of Down Guy and Anchor***
840004	***Relocation of Overhead Guy***
840005	***Removal of Down Guy and Anchor***
840006	***Removal of Overhead Guy***

Description:

This work consists of furnishing and installing, relocating and/or removing down guy and anchor, sidewalk guy and anchor or overhead guy in accordance with the DelDot Standard

Specifications and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to Section 1077 of the Standard Specifications.

Construction Methods:

The construction methods used shall comply with Section 840.03 of the Standard Specifications.

Method of Measurement:

Installation shall be measured according to Section 840.04 of the Standard Specifications.

Basis of Payment:

The quantity of anchors and down guys, sidewalk guys, or overhead guys either installed, relocated, or removed will be paid at the Contract Unit Price per each item for the Pay Items listed above. Price and payment constitutes full compensation for installation, materials, equipment, tools and incidentals required to complete the Work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector. Pricing shall not include the anchor and guy materials separately priced in the Material Bid Items.

3.2 Special Provision Items

The following items shall be provided in accordance with the Special Provision Item Specifications (Appendix C).

3.2.1 Conduit Junction Wells

SP830001 Furnish and Install Conduit Junction Well, Type 16, 17" x 30" x 18" Precast Concrete/Polymer

Description:

This work consists of furnishing and installing conduit junction wells in accordance with the Special Provision Item Specifications, applicable Standard Specifications, and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to Section SP830.02 of the Special Provision Item Specifications.

Construction Methods:

The construction methods used should comply with Section SP830.03 of the Special Provision Item Specifications.

Method of Measurement:

Installation shall be measured according to Section SP830.04 of the Special Provision Item Specifications.

Basis of Payment:

The quantity of junction wells installed will be paid at the Contract Unit Price per each item for the Pay Items listed above. Price and payment constitutes full compensation for installation, materials, excavation, backfilling, and installing the stone base, grounding and bonding new junction well, and for all labor, equipment, tools and incidentals required to complete the work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

3.2.2 Conduit

SP831001 Furnish and Install 2" Schedule 80 HDPE Conduit (Bore)

SP831002 Furnish and Install 4" Schedule 80 HDPE Conduit (Bore)

SP831003 Furnish and Install 2" Schedule 80 PVC Conduit (Open Cut)

SP831004 Furnish and Install 4" Schedule 80 PVC Conduit (Open Cut)

SP831005 Furnish and Install 2" Schedule 80 PVC Conduit (Trench)

SP831006 Furnish and Install 4" Schedule 80 PVC Conduit (Trench)

SP831007 Furnish and Install Additional 2" Schedule 80 HDPE Conduit (Bore)

SP831008 Furnish and Install Additional 4" Schedule 80 HDPE Conduit (Bore)

SP831009 Furnish and Install Additional 2" Schedule 80 PVC Conduit (Open Cut)

SP831010 Furnish and Install Additional 4" Schedule 80 PVC Conduit (Open Cut)

SP831011 Furnish and Install Additional 2" Schedule 80 PVC Conduit (Trench)

SP831012 Furnish and Install Additional 4" Schedule 80 PVC Conduit (Trench)

SP831013 Proof Conduit

SP831014 Furnish and Install Tracer Wire in Conduit

SP831015 Furnish and Install Pull Tape in Conduit

Description:

This work consists of installing underground communications conduit, proofing conduit, installing tracer wire in conduit, and/or installing pull tape in conduit in accordance with the Special Provision Item Specifications, applicable Standard Specifications, and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to a SP831.02 of the Special Provision Item Specifications.

Construction Methods:

The construction methods used should comply with Section SP831.03 of the Special Provision Item Specifications.

Method of Measurement:

Installation shall be measured according to Section SP831.04 of the Special Provision Item Specifications.

Basis of Payment:

The quantity of conduit, tracer wire, or pull tape furnished and installed will be paid at the Contract Unit Price per linear foot for the Pay Items listed above. The quantity of conduit proofed will be paid at the Contract Unit Price per linear foot for the Pay Items listed above. Price and payment constitutes full compensation for furnishing conduit, installing conduit under the method specified by the Contract Documents, and for all labor, tools, Equipment and incidentals required to complete the Work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector. Trench backfill and surface restoration materials shall be considered incidental to these items.

3.2.3 Innerduct

SP852001 Furnish and Install Quantity 4 - 1" HDPE Innerduct in Conduit

SP852002 Furnish and Install 2-inch, 2-Cell Fabric Innerduct in Conduit

SP852003 Furnish and Install 4-inch, 3-Cell Fabric Innerduct in Conduit

SP852004 Furnish and Install Second 4-inch, 3-Cell Fabric Innerduct in Conduit

SP852005 Removal of Innerduct from Conduit

Description:

This work consists of furnishing and installing innerduct in new or existing conduit in accordance with the Special Provision Item Specifications, applicable Standard Specifications, and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to a SP852.02 of the Special Provision Item Specifications.

Construction Methods:

The construction methods used should comply with Section SP852.03 of the Special Provision Item Specifications.

Method of Measurement:

Installation shall be measured according to Section SP852.04 of the Special Provision Item Specifications.

Basis of Payment:

The quantity of innerduct furnished and installed will be paid at the Contract Unit Price per linear foot for the Pay Items listed above. The quantity of conduit proofed will be paid at the Contract Unit Price per linear foot for the Pay Items listed above. Price and payment constitutes

full compensation for furnishing conduit, installing conduit under the method specified by the Contract Documents, and for all labor, tools, Equipment and incidentals required to complete the Work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector. Trench backfill and surface restoration materials shall be considered incidental to these items.

3.2.4 Microduct and Microtrenching

SP853001	***Furnish and Install 12/8mm HDPE Microduct Under Existing Pavement – Micro-Trenching***
SP853002	***Furnish and Install 14/10mm HDPE Microduct Under Existing Pavement –Micro-Trenching***
SP853003	***Furnish and Install 12/8mm HDPE Microduct in Unpaved Right-of-Way – Micro-Trenching***
SP853004	***Furnish and Install 14/10mm HDPE Microduct in Unpaved Right-of-Way – Micro-Trenching***

Description:

This work consists of cutting into existing pavement or unpaved right-of-way to create a trench with a maximum width of 1.5-inches and maximum depth of 14-inches, and placing microduct in an open trench.

Materials:

Materials supplied by the Contractor used shall conform to Section SP852.02 of the Special Provision Item Specifications.

Construction Methods:

The construction methods used should comply with Section SP852.03 of the Special Provision Item Specifications.

Method of Measurement:

Installation shall be measured according to Section SP852.04 of the Special Provision Item Specifications.

Basis of Payment:

The quantity of microduct furnished and installed will be paid at the Contract Unit Price per linear foot for the Pay Items listed above. The quantity of microduct installed will be paid at the Contract Unit Price per linear foot for the Pay Items listed above. Price and payment constitutes full compensation for furnishing and installing microduct under the method specified by the Contract Documents, and for all labor, materials, tools, equipment and incidentals required to complete the work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

3.2.5 Underground Fiber Optic Cable Installation

SP854001 ***Furnish and Install 12-Strand Singlemode, Loose Buffer Tube Cable in Conduit***

SP854002 ***Furnish and Install 24-Strand Singlemode, Armored, Plenum Rated, Loose Buffer Tube Cable in Conduit***

SP854003 ***Furnish and Install 24-Strand Singlemode, Loose Buffer Tube Cable in Conduit***

SP854004 ***Furnish and Install 48-Strand Singlemode, Armored, Plenum Rated, Loose Buffer Tube Cable in Conduit***

SP854005 ***Furnish and Install 48-Strand Singlemode, Loose Buffer Tube Cable in Conduit***

SP854006 ***Furnish and Install 48-Strand Singlemode, Ribbon Cable in Conduit***

SP854007 ***Furnish and Install 96-Strand Singlemode, Loose Buffer Tube Cable in Conduit***

SP854008 ***Furnish and Install 108-Strand Singlemode, Armored, Loose Buffer Tube Cable in Conduit***

SP854009 ***Furnish and Install 144-Strand Singlemode, Armored, Plenum Rated, Loose Buffer Tube Cable in Conduit***

SP854010 ***Furnish and Install 144-Strand Singlemode, Loose Buffer Tube Cable in Conduit***

SP854011 ***Furnish and Install 144-Strand Singlemode, Ribbon Cable in Conduit***

SP854012 ***Furnish and Install 216-Strand Singlemode, Ribbon Cable in Conduit***

SP854013 ***Furnish and Install 100-Foot Fiber Optic Tail in Conduit***

SP854014 ***Furnish and Install 250-Foot Fiber Optic Tail in Conduit***

SP854015 ***Furnish and Install 500-Foot Fiber Optic Tail in Conduit***

SP854016 ***Furnish and Install 1000-Foot Fiber Optic Tail in Conduit***

SP854017 ***Furnish and Install 1500-Foot Fiber Optic Tail in Conduit***

SP854018 ***Furnish and Install 2000-Foot Fiber Optic Tail in Conduit***

SP854019 ***Furnish and Install 2400-Foot Fiber Optic Tail in Conduit***

SP854020 ***Furnish and Install 100-Foot Fiber Optic Trunk in Conduit***

SP854021 ***Furnish and Install 500-Foot Fiber Optic Trunk in Conduit***

SP854022 ***Furnish and Install 1000-Foot Fiber Optic Trunk in Conduit***

SP854023 Furnish and Install 1500-Foot Fiber Optic Trunk in Conduit

SP854024 Furnish and Install 2000-Foot Fiber Optic Trunk in Conduit

SP854025 Furnish and Install 2400-Foot Fiber Optic Trunk in Conduit

SP854026 Removal of Fiber Optic Cable from Conduit

SP854027 Install DelDOT-furnished Fiber Optic Cable in Conduit

Description:

This work consists of installing or removing fiber optic cable in conduit in accordance with the Special Provision Item Specifications and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to Section SP854.02 of the Special Provision Item Specifications.

Construction Methods:

The construction methods used should comply with Section SP854.03 of the Special Provision Item Specifications.

Method of Measurement:

Installation shall be measured according to Section SP854.04 of the Special Provision Item Specifications.

Basis of Payment:

The quantity fiber optic cable either furnished and installed, or removed will be paid at the Contract Unit Price per each item or per linear foot, as applicable, for the Pay Items listed above. Price and payment constitutes full compensation for installation, materials, equipment, tools and incidentals required to complete the work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

3.2.6 Aerial Fiber Optic Cable Installation

SP855001 ***Furnish and Install 12-Strand Singlemode, Loose Buffer Tube Cable on Strand***

SP855002 ***Furnish and Install 12-Strand Multimode, Plenum Rated, Loose Buffer Tube Cable on Strand***

SP855003 ***Furnish and Install 24-Strand Singlemode, Loose Buffer Tube Cable on Strand***

SP855004 ***Furnish and Install 48-Strand Singlemode, Loose Buffer Tube Cable on Strand***

SP855005 ***Furnish and Install 96-Strand Singlemode, Loose Buffer Tube Cable on Strand***

SP855007 ***Furnish and Install 144-Strand Singlemode, Loose Buffer Tube Cable on Strand***

SP855008 ***Furnish and Install 108-Strand Singlemode, Armored, Loose Buffer Tube Cable on Strand***

SP855009 ***Furnish and Install 144-Strand Singlemode, Ribbon Cable on Strand***

SP855010 ***Furnish and Install 216-Strand Singlemode, Ribbon Cable on Strand***

SP855011 ***Furnish and Install 100-Foot Fiber Optic Tail on Strand***

SP855012 ***Furnish and Install 250-Foot Fiber Optic Tail on Strand***

SP855013 ***Furnish and Install 500-Foot Fiber Optic Tail on Strand***

SP855014 ***Furnish and Install 1000-Foot Fiber Optic Tail on Strand***

SP855015 ***Furnish and Install 1500-Foot Fiber Optic Tail on Strand***

SP855016 ***Furnish and Install 2000-Foot Fiber Optic Tail on Strand***

SP855017 ***Furnish and Install 2400-Foot Fiber Optic Tail on Strand***

SP855018 ***Furnish and Install 100-Foot Fiber Optic Trunk on Strand***

SP855019 ***Furnish and Install 500-Foot Fiber Optic Trunk on Strand***

SP855020 ***Furnish and Install 1000-Foot Fiber Optic Trunk on Strand***

SP855021 ***Furnish and Install 1500-Foot Fiber Optic Trunk on Strand***

SP855022 ***Furnish and Install 2000-Foot Fiber Optic Trunk on Strand***

SP855023 ***Furnish and Install 2400-Foot Fiber Optic Trunk on Strand***

SP855024 ***Removal of Fiber Optic Cable from Strand (De-lash)***

SP855025 ***Install DelDOT-furnished Fiber Optic Cable on Strand***

SP855026 Furnish and Install Aerial Fiber Optic Cable Storage Loop

Description:

This work consists of furnishing and installing, or removing aerial fiber from messenger wire or existing cable attachments in accordance with the Special Provision Item Specifications and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to Section SP855.02 of the Special Provision Item Specifications.

Construction Methods:

The construction methods used should comply with Section SP855.03 of the Special Provision Item Specifications.

Method of Measurement:

Installation shall be measured according to Section SP855.04 of the Special Provision Item Specifications.

Basis of Payment:

The quantity aerial fiber either installed, or removed will be paid at the Contract Unit Price per each item or per linear foot, as applicable, for the Pay Items listed above. Price and payment constitutes full compensation for installation, materials, equipment, tools and incidentals required to complete the work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector..

3.2.7 Microfiber Cable Installation

SP856001 Furnish and Install 48-strand Microfiber Cable in Microduct

SP856002 Furnish and Install 144-strand Microfiber Cable in Microduct

Description:

This work consists of installing microfiber in microduct using air-assisted installation.

Materials:

Materials supplied by the Contractor used shall conform to Section SP856.02 of the Special Provision Item Specifications.

Construction Methods:

The construction methods used should comply with Section SP856.03 of the Special Provision Item Specifications.

Method of Measurement:

Installation shall be measured according to Section SP856.04 of the Special Provision Item Specifications.

Basis of Payment:

The quantity of conduit installed will be paid at the Contract Unit Price per linear foot for the Pay Items listed above.

3.2.8 Fiber Optic Cable Splice Enclosure Installation

SP857001 Furnish and Install of New Splice Enclosure

SP857002 Re-entry of an Existing Splice Enclosure

SP857003 Furnish and Install of New Mid-sheath Splice Enclosure (Ring Cut)

Description:

This work consists of installing fiber optic cable splice enclosures, including furnishing and installing fiber splice enclosures and related materials in accordance with the manufacturer's specifications and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to Sections SP857.02 of the Special Provision Item Specifications.

Construction Methods:

The construction methods used should comply with Section SP857.03 of the Special Provision Item Specifications.

Method of Measurement:

Installation shall be measured according to Section SP857.04 of the Special Provision Item Specifications.

Basis of Payment:

The quantity splice enclosures will be paid at the Contract Unit Price per each item for the Pay Items listed above. Price and payment constitutes full compensation for installation, materials, equipment, tools and incidentals required to complete the work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

3.2.9 Fiber Optic Cable Termination Panel Installation

SP858001 ***Furnish and Install Rack Mounted CCH-Style Termination Panel Housing, 1RU***

SP858002 ***Furnish and Install Rack Mounted CCH-Style Termination Panel Housing, 2RU***

SP858003 ***Furnish and Install of Rack Mounted CCH-Style Termination Panel Housing, 4RU***

SP858004 ***Furnish and Install Rack Mounted CLSSC-Style Termination Panel Housing, 4RU***

SP858005 ***Furnish and Install Wall Mounted SPH-Style Termination Panel Housing, 1 Connector Panel Capacity***

SP858006 ***Furnish and Install Wall Mounted WCH-Style Termination Panel Housing, 2 Connector Panel Capacity***

SP858007 ***Furnish and Install Wall Mounted WCH-Style Termination Panel Housing, 4 Connector Panel Capacity***

SP858008 ***Furnish and Install Wall Mounted WCH-Style Termination Panel Housing, 12 Connector Panel Capacity***

SP858009 ***Furnish and Install Termination Coupler Panel in Housing, SC Multimode, 12-Port***

SP858010 ***Furnish and Install Termination Coupler Panel in Housing, SC/UPC Singlemode, 12-Port***

SP858011 ***Furnish and Install Termination Coupler Panel in Housing, SC/APC Singlemode, 12-Port***

SP858012 ***Furnish and Install Termination Coupler Panel in Housing, LC/UPC Singlemode, 12-Port***

SP858013 ***Furnish and Install Termination Coupler Panel in Housing, LC/UPC Singlemode, 24-Port***

SP858014 ***Furnish and Install Indoor/Outdoor Preterminated Termination Panel, SC/UPC Singlemode Connector Type, 12 Strand Capacity***

Description:

This work consists of the installation of a wall-mounted, rack-mounted, or DIN rail-mounted fiber termination panel for fiber strand counts ranging from 12 to 288.

Materials:

Materials supplied by the Contractor used shall conform to Section SP854.02 of the Special Provision Item Specifications.

Construction Methods:

The construction methods used should comply with Section SP854.03 of the Special Provision Item Specifications.

Method of Measurement:

Installation shall be measured according to Section SP854.04 of the Special Provision Item Specifications.

Basis of Payment:

The quantity termination panels will be paid at the Contract Unit Price per each item for the Pay Items listed above. Price and payment constitutes full compensation for installation, equipment, tools and incidentals required to complete the work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

3.2.10 Fiber Optic Cable Splicing

SP859001 ***Individual Fiber Strand Fusion Splice (per strand)***

SP859002 ***Fiber Ribbon Mass-Fusion Splice (per ribbon)***

SP859003 ***Individual Fiber Strand Termination, Fusion (per strand)***

SP859004 ***Individual Fiber Strand Termination, Anaerobic (per strand)***

Description:

This work consists of splicing fiber optic cable, either between two fiber strands or a fiber strand and a compatible fiber connector. The work shall be performed in accordance with the manufacturer's specifications and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

Materials:

Materials supplied by the Contractor used shall conform to Sections SP859.02 of the Special Provision Item Specifications.

Construction Methods:

The construction methods used should comply with Section SP859.03 of the Special Provision Item Specifications.

Method of Measurement:

Installation shall be measured according to Section SP859.04 of the Special Provision Item Specifications.

Basis of Payment:

The quantity splice enclosures will be paid at the Contract Unit Price per each item for the Pay Items listed above. Price and payment constitutes full compensation for installation, materials, equipment, tools and incidentals required to complete the work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

3.2.11 Fiber Optic Cable Testing

SP860001 Final Acceptance Testing of Terminated Fiber Strand

Description:

This work consists of bi-directional OTDR and power meter testing for installed fiber optic cable, terminated on both ends.

Materials:

n/a

Construction Methods:

The construction methods used should comply with Section SP860.03 of the Special Provision Item Specifications.

Method of Measurement:

Installation shall be measured according to Section SP860.04 of the Special Provision Item Specifications.

Basis of Payment:

The quantity fibers tested will be paid at the Contract Unit Price per each item for the Pay Items listed above. Price and payment constitutes full compensation for equipment, materials, tools and incidentals required to complete the work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

3.2.12 Fiber Optic Cable Building Entry

SP861001 Furnish and Install 2" Rigid Metal Conduit (RMC)

SP861002 Furnish and Install Indoor Non-Metallic Junction Box, 18" x 18" x 8"

SP861003 Furnish and Install Indoor Non-Metallic Junction Box, 24" x 24" x 10"

SP861004 Furnish and Install External Building Penetration with Metallic Pull Box, 24" x 20" x 8"

SP861005 Furnish and Install External Building Penetration with Metallic Pull Box, 30" x 24" x 12"

SP861006 Furnish and Install External Building Penetration with Metallic Pull Box, 36" x 30" x 12"

SP861007 Furnish and Install External Building Penetration with Non-Metallic Pull Box, 24" x 20" x 8"

SP861008 Furnish and Install External Building Penetration with Non-Metallic Pull Box, 30" x 24" x 12"

SP861009 Furnish and Install External Building Penetration with Non-Metallic Pull Box, 36" x 30" x 12"

SP861010 Install Core Drill Interior Wall or Floor

Description:

This work consists of creating indoor pathways for fiber optic cable, to include building penetrations and installing Rigid Metal Conduit (RMC), and/or PVC conduit from the building entry point of the cable to a fiber termination location internal to the building.

Materials:

Materials supplied by the Contractor used shall conform to Section SP861.02 of the Special Provision Item Specifications.

Construction Methods:

The construction methods used should conform with Section SP861.03 of the Special Provision Item Specifications.

Method of Measurement:

Installation shall be measured according with Section SP861.04 of the Special Provision Item Specifications.

Basis of Payment:

The quantity of RMC, indoor non-metallic junction boxes, building penetrations, and core drills shall be paid at the Contract Unit Price per each item for the Pay Items listed above. Price and

payment constitutes full compensation for installation, equipment, tools and incidentals required to complete the Work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector. Pricing shall not include the external building materials separately priced in the Material Bid Items.

3.2.13 As-Built Data Collection

SP862001 Fiber Optic As-built GPS Data Collection

Description:

This work consists of using a handheld GPS device to record all location information pertaining to installed conduit, installed fiber, the compass direction, junction wells, and related components.

Materials:

N/A

Construction Methods:

The data collection methods used shall conform with Section SP855.03 of the Special Provision Item Specifications.

Method of Measurement:

Data collection shall be measured in the number of linear feet of fiber infrastructure recorded into GPS.

Basis of Payment:

The quantity of GPS data collection shall be paid at the Contract Unit Price per linear foot for the Pay Items listed above. Price and payment constitutes full compensation for labor, equipment, tools and incidentals required to complete the Work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector.

3.2.14 Fiber Optic Mini Hubs

SP863001 Furnish and Install Fiber Optic Mini Hub

Description:

This work consists of furnishing and installing fiber optic “Mini Hub” cabinets intended to protect ITMS network hardware and related components from the elements.

Materials:

Materials supplied by the Contractor used shall conform to Section SP856.02 of the Special Provision Item Specifications.

Construction Methods:

The construction methods used should conform with Section SP856.03 of the Special Provision Item Specifications.

Method of Measurement:

Installation shall be measured according with Section SP856.04 of the Special Provision Item Specifications.

Basis of Payment:

The quantity of fiber optic mini hubs shall be paid at the Contract Unit Price per each item for the Pay Items listed above. Price and payment constitutes full compensation for installation, equipment, tools and incidentals required to complete the Work as specified and as directed by the DelDOT Contract documents and/or as directed by DelDOT Fiber Representative/Inspector. Pricing shall not include required cabinet bases separately priced in the Material Bid Items.