SECTION 271800 – EXTERIOR FIBER OPTIC CABLE SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. This Section specifies the fiber optic cabling system for cable installed between buildings and structures.

2. Provide all labor, materials, and equipment as necessary to complete all work as indicated on the drawings, and as specified herein.

3. The Contractor shall furnish and install a complete fiber optic cabling system with all necessary components for a complete system as described in the specification and shown on the drawings.

B. Related Sections include the following:

1. Applicable sections of Division 26 - Electrical

1.3 SYSTEM DESCRIPTION

A. Installation of new fiber optic communication cable including all terminations for a complete system.

1.4 SUBMITTALS

A. Shop Drawings:

1. Fiber optic cables
2. Equipment racks, enclosures, patch panels, and all related components

1.5 QUALITY ASSURANCE

A. The fiber optic cables shall be installed under the supervision of an installer having a minimum of five years experience in fiber optic cable installation under this type of application.

B. All fiber optic connections and terminations shall be made by a fiber optic technician with a minimum of two years experience in similar installations.

C. The contractor assumes responsibility for ensuring the electrical and mechanical integrity of the combination of components used in the system. Any components which are not engineered suitably for the devices to which they are attached shall be subject to exchange before or after installation at the Contractor's expense. All components shall be operated within the manufacturer's specifications without modification.

D. The Contractor shall test each fiber to be used in the system using an OTDR. The test shall be performed at the installation site with cables on reels. An authorized Owner representative shall be present during the entire testing phase. The test data shall be submitted to the Project Representative prior to cable installation.

E. On-reel tests shall consist of OTDR traces for each multi-mode fiber at 850 and 1300 nm. Photographic or hardcopy traces shall be submitted to the Owner for approval.

F. After installation, Proof-of-Performance tests shall be performed and documented as described in Section 160800.

Use the following paragraph when new cable is installed adjacent to existing broadband cable and/or installed in existing broadband outlet boxes.

G. In some cases the new cable will be installed in the vicinity of the existing broadband cable. The broadband cable system is fully functional with no abnormalities. At the conclusion of the project, the Owner will test the broadband system and if any problems are identified the Owner will repair the system at the Contractors expense

PART 2 - PRODUCTS

2.1 FIBER OPTIC CABLES

A. Siecor part number: 072XW4-AK780A20.

B. Altos type loose tube cable.

C. Single PE jacket, six loose tubes.

D. 24 Multi-mode 62.5/125 um fibers, 3.5/1.00 dB/km (maximum attenuation) and 200/600 mHz-km (minimum bandwidth at 850/1300 nm).

E. 48 Single-mode 8.3/125 um fibers, 0.40/0.30 dB/km (maximum attenuation at 1310/1550 nm).

F. Fiber placement: SMF 12, 12, 12, 12 ; MMF 12, 12.

G. Loose tube colors: SMF Blue, Orange, Brown, Green ; MMF Slate, White.

H. Fiber Colors: Blue, Orange, Green, Brown, Slate, White, Red, Black, Yellow, Violet, Pink, Aqua.

2.2 SPLICES

A. All splices shall be fusion type.

B. The maximum loss of any splice shall be 0.20 dB.

C. All splices shall be contained in splice trays. Splice trays shall be Siecor M67-045.

D. Fiber Splice Centers shall be Siecor FSC-05D with all necessary manufacturer recommended components for a complete and secure installation.

2.3 FIBER OPTIC PIGTAILS AND CONNECTORS

A. Pigtails shall be defined as a length of fiber with a connector on only one end. Pigtails shall be:

1. Siecor Fiber Optic Cable Assembly, part number 6100-01R3131-006M (single- mode)

2. Siecor Fiber Optic Cable Assembly, part number 5000-01K3141-006M (multi- mode)

B. Jumpers shall be defined as a length of fiber without connectors. Jumpers shall be:

1. Siecor Fiber Optic Interconnect Cable, part number 001R31-31131-00 (single- mode)

2. Siecor Fiber Optic Interconnect Cable, part number 001K31-31141-00 (multi- mode)

C. Pigtails shall be factory assembled production units.

D. The maximum loss of any pigtail's connector shall be 0.30 dB.

E. The optical return loss for each single mode pigtail's connector shall be greater than or equal to 55 dB.

2.4 EQUIPMENT

A. Fiber Optic Racks and Cabinets

1. Equipment rack shall be:
   a. BUD Open Relay Rack, type RR-1369MG, with 77"x19" panel space.

2. Equipment cabinets shall be:
   a. Everest, 19" vertical cabinet, model 4-771930, royal blue

3. Equipment cabinet shelves shall be:
   a. Everest, model SF1930-D

B. Connector Panels

1. Connectors shall terminate in a connector panel. Connector panels shall be Siecor CPC-D24 with all necessary manufacturer recommended components for a complete and secure installation.

2. Connector panels shall accommodate up to 24 adapters. Adapters shall be labeled and documented accordingly.

3. Connector panel adapters shall be: Siecor TER-067.

C. Connector Centers

1. Connector Center shall contain 48 adapters. Adapters shall be labeled and documented accordingly.

2. Connector Center adapters shall be: Siecor FCC-048-15.

D. Hose Racks

1. Hose racks shall be installed to hang large coils of fiber optic cable on. Hose racks shall be:
   a. Spencer Turbine Co. (800) 232-4321, model RKV-90000, for loops of cable 200' or less; model RKV-90003, for loops of cable over 200'; or approved equal.

E. Cable Loop Enclosures

1. New 14 gauge galvanized steel, 48"x48" (minimum), enclosures shall be constructed and secured to wall to cover new fiber optic cable loops where indicated on drawings. The fiber optic cable's innerduct shall extend into the new enclosure.

2.5 INNERDUCT

A. Innerduct in conduit

1. Innerduct shall have a 1", lubricated, spiraled interior, ribbed exterior, and a pull string. Four different color innerducts shall be installed in one 4" conduit along the entire fiber optic cable route. The four different colors shall be black, red, green, and white.

2. The innerduct shall be:
   a. Arnco, model SR-511-100-Y0 (colors from above), lubricated, with 1250# polyester pull tape; or approved equal.

B. Innerduct in Steam Tunnel

1. Cables in steam tunnels shall be installed in corrugated polyethylene innerduct.

2. The innerduct shall be:

a. Arnco, model COR-500-125; or approved equal.

C. Innerduct plugs

1. Innerduct plugs shall be solid compression plugs. Plugs shall be:
   a. Jackmoon U.S.A. (818) 854-1670, expansion blank duct plugs with rope tie.

D. Split innerduct

1. The split innerduct shall be:
   a. Arnco, model ARC-540-01-1-5/8 polyethylene corrugated split duct; or approved equal.

E. Transition couplers

1. New transition couplers shall be:
   a. Aeroquip, (800) 445-2192, transition couplers for converting from 3-channel FoDuct to single innerduct.

PART 3 - EXECUTION

3.1 GENERAL

A. Cables located inside buildings shall be run through new innerduct and installed in conduit or cable tray to the designated fiber optic room or loop location.

B. After all fibers have been terminated in equipment cabinets or racks, a 30' service loop of extra cable shall be provided in the cable tray.

C. Each loose tube of 12 fibers each shall be looped in the splice center. Minimum length of loose tube between the point of fiber entry into the splice center (where jacket is stripped away) and the splice tray entry point shall be 4 meters.

D. All fiber must be looped in the splice trays between the point of fiber entry and the splice. Sufficient spare fiber must be provided to permit replacement of the splice at a future date.

E. Install one new splice center for each 72 fiber cable entering the fiber optic cabinet. Each new splice center shall only contain splice trays containing fibers from the same 72 fiber cable; excluding jumpers and pigtails from a different fiber cable.

F. Each new fiber end shall be fusion spliced to either a pigtail or a jumper. Pigtails shall be used for linking to the connector panel, and jumpers shall be used for bridging between splice trays; as shown on drawings.

END OF SECTION 271800