SECTION 271323 - COMMUNICATIONS OPTICAL FIBER BACKBONE CABLING

1.1 SUMMARY

A. Section Includes:

1. Supplemental requirements generally applicable to the Work specified in Division 27.

B. Related Requirements:

1. Work specified in the following Division 26 sections are related to Work specified in Division 27:
   a. Section 260010 "Supplemental Requirements for Electrical" for abbreviations and acronyms for electrical terms and units of measure, abbreviations and acronyms for electrical raceway types, abbreviations and acronyms for electrical cable types, definitions, and additional coordination drawing submittal requirements.
   b. Section 260011 "Facility Performance Requirements for Electrical" for seismic-load, wind-load, acoustic, and other field conditions applicable to Work.
   c. Section 260548 "Vibration and Seismic Controls for Electrical Systems" for seismic controls for communications systems.

1.2 COORDINATION

A. Interruption of Existing Telephone Service: Do not interrupt telephone service to facilities occupied by Owner or others unless permitted under the following conditions:

1. Notify Owner no fewer than seven days in advance of proposed interruption of telephone service.
2. Do not proceed with interruption of telephone service without Owner's written permission.

B. Interruption of Existing Internet Service: Do not interrupt internet service to facilities occupied by Owner or others unless permitted under the following conditions:

1. Notify Owner no fewer than seven days in advance of proposed interruption of internet service.
2. Do not proceed with interruption of internet service without Owner's written permission.

1.3 PREINSTALLATION MEETINGS

A. Communications Preconstruction Conference: Schedule conference with Architect and Owner not later than 10 days after notice to proceed.

1.4 SUBMITTALS

A. Action Submittals:

1. Product data.
2. Shop drawings.
3. Certificates.
4. Sustainable design submittals.

B. Closeout Submittals:

1. Maintenance Data: For optical fiber cable, splices, and connectors.

C. Maintenance Material Submittals:

1. Extra Stock Material:
   a. Patch-Panel Units: One of each type.
   b. Plugs: 10 of each type.
   c. Jacks: 10 of each type.

1.5 QUALITY ASSURANCE

A. Qualifications:

1. Qualified regional manufacturer.
2. Structural professional engineer.
3. Communications design professional.
4. Welder.
5. Communications cable installer.
6. Communications cable testing agency.
7. Structural testing and inspecting agency.

1.6 FIELD CONDITIONS

A. Modeling, analysis, product selection, installation, and quality control for Work specified in Division 27 must comply with requirements specified in Section 260011 "Facility Performance Requirements for Electrical."

1.7 SUBSTITUTION LIMITATIONS FOR COMMUNICATIONS EQUIPMENT

A. Substitution requests for communications equipment will be entertained under the following conditions:

1. Notification of Contractor's intent to request substitutions for convenience must be declared during the Communications Preconstruction Conference so potential risks to system performance and construction schedule may be identified for Contractor's response in submission of the substitution request. Submission of

requests for substitutions for convenience must meet the conditions and deadline specified in Section 012500 "Substitution Procedures" to receive approval.

2. For communications equipment and systems, substitutions for cause are considered major construction risks. If it is possible that Contractor may need to request substitutions for cause because of equipment unavailability, or inability to meet construction schedule because of lead time, Contractor must declare the possibility during the Communications Preconstruction Conference to permit establishing a mitigation plan for minimizing risks to system performance and construction schedule.

PART 2 - PRODUCTS

2.1 TYPE OFNR OPTICAL FIBER CABLE

A. Type OFNR, Designation OS2, Inside-Outside Plant, Single-Mode Optical Fiber Cable:

1. Options:
   a. Configuration:
      1) 12-fiber, ABF fiber cable bundle.
      2) 24 36 48 72 -fiber, stranded, ABF fiber cable bundle.
   b. Maximum Attenuation: 0.5 dB/km at 1310 nm wavelength; 0.5 dB/km at 1550 nm wavelength.
   c. Jacket Color: Yellow.

B. Type OFNR, Designation OS2, Inside Plant, Single-Mode Optical Fiber Cable:

1. Options:
   a. Configuration: 12 24 36 48 72 ABF optical fiber cable bundles.
   b. Maximum Attenuation: 0.5 dB/km at 1310 nm wavelength; 0.5 dB/km at 1550 nm wavelength.
   c. Jacket Color: Yellow.

2.2 TYPE OFCR OPTICAL FIBER CABLE

A. Type OFCR, Designation OS2, Inside Plant, Single-Mode Optical Fiber Cable:

1. Options:
   a. Configuration: 12 24 36 48 72 ABF optical fiber cable bundles.
   b. Maximum Attenuation: 0.5 dB/km at 1310 nm wavelength; 0.5 dB/km at 1550 nm wavelength.
   c. Jacket Color: Yellow.
   d. Armor: Steel.

2.3 TYPE OFNP OPTICAL FIBER CABLE

A. Type OFNP, Designation OS2, Inside-Outside Plant, Single-Mode Optical Fiber Cable:

1. Options:
   a. Configuration:
      1) 12-fiber, ABF fiber cable bundle.
      2) 24 36 48 72 -fiber, stranded, ABF fiber cable bundle.
   b. Maximum Attenuation: 0.5 dB/km at 1310 nm wavelength; 0.5 dB/km at 1550 nm wavelength.
   c. Jacket Color: Yellow.

B. Type OFNP, Designation OS2, Inside Plant, Single-Mode Optical Fiber Cable:

1. Options:
   a. Configuration: 12 24 36 48 72 fiber ABF fiber cable bundle.
   b. Maximum Attenuation: 0.5 dB/km at 1310 nm wavelength; 0.5 dB/km at 1550 nm wavelength.
   c. Jacket Color: Yellow.

2.4 TYPES OFC AND OFCG OPTICAL FIBER CABLE

A. Types OFC and OFCG, Designation OS2, Inside Plant, Single-Mode Optical Fiber Cable:

1. Options:
   a. Configuration: 12 24 36 48 72 fiber ABF fiber cable.
   b. Maximum Attenuation: 0.5 dB/km at 1310 nm wavelength; 0.5 dB/km at 1550 nm wavelength.
   c. Jacket Color: Yellow.
   d. Armor: Steel.

2.5 OPTICAL FIBER CABLE HARDWARE

A. Cross-Connects and Patch Panels:

1. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.

B. Patch Cords: Factory-made, dual-fiber cables in 1-meter lengths.

C. Connector Type: Type LC complying with TIA-604-10, connectors.

D. Plugs and Plug Assemblies:

1. Male: color-coded modular telecommunications connector designed for termination of single optical fiber cable.
2. Insertion loss of not more than 0.25 dB.
3. Marked to indicate transmission performance.

E. Jacks and Jack Assemblies:

1. Female; quick-connect, simplex and duplex; fixed telecommunications connector designed for termination of single optical fiber cable.
2. Insertion loss of not more than 0.25 dB.
3. Marked to indicate transmission performance.
4. Designed to snap-in to patch panel or faceplate.

PART 3 - EXECUTION

3.1 PREPARATION

A. Installation Schedule for Communications Systems: At preconstruction meeting, and periodically thereafter as dates change, provide schedule for installation of communications Work to Owner and Architect including, but not limited to, milestone dates for the following activities:

1. Submission of specified coordination drawings.
2. Submission of action submittals specified in Division 27.
3. Orders placed for major equipment.
4. Arrival of major equipment on-site.
5. Preinstallation meetings specified in Division 27.
6. Telephone and internet service outages.
7. Telephone and internet service inspection and activation.
8. Mockup reviews.
9. Closing of walls and ceilings containing communications Work.
10. System startup, testing, and commissioning activities for communications equipment.
11. System startup, testing, and commissioning activities for Work specified in other divisions that depend on Work specified in Division 27.
12. System startup, testing, and commissioning activities for automation systems (for example, SCADA, BMS, lighting, HVAC, fire alarm, fire pump).
13. Requests for special inspections.
14. Requests for inspections by authorities having jurisdiction.

3.2 INSTALLATION OF COMMUNICATIONS WORK

A. Unless more stringent requirements are specified in the Contract Documents or manufacturers' instructions, comply with NFPA 70, NECA NEIS 1, and BICSI N1 for installation of Work specified in Division 27. Consult Architect for resolution of conflicting requirements.

3.3 SOURCE QUALITY CONTROL

A. Owner will witness required factory tests. Notify Architect at least 14 days before date of tests and indicate their approximate duration.

B. Testing Administrant: Owner will engage qualified testing agency to evaluate cables.

C. Prepare test and inspection reports.

3.4 INSTALLATION OF OPTICAL FIBER BACKBONE CABLES

A. Optical fiber backbone cabling system must provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.

B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters may not be used as part of backbone cabling.

C. Comply with BICSI N1, NECA NEIS 1, and NECA NEIS 301.

D. Backbone cabling system must comply with transmission standards in TIA-568.1.

E. Telecommunications Pathways and Spaces: Comply with TIA-569.

3.5 GROUNDING

A. Install grounding in accordance with BICSI ITSIMM, "Grounding (Earthing), Bonding, and Electrical Protection" Chapter.

3.6 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA-606. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

1. Administration Class: Class 3.
2. Color-code cross-connect fields and apply colors to voice and data service backboards, connections, covers, and labels.

B. Paint and label colors for equipment identification must comply with TIA-606 for Class 3 level of administration including optional identification requirements of this standard.

3.7 FIELD QUALITY CONTROL

A. Field tests and inspections must be witnessed by Owner or Owner representative.

B. Collect, assemble, and submit test and inspection reports.

1. Data for each measurement must be documented.

2. Data for field quality-control report submittals must be printed in summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from instrument to computer, saved as text files, and printed and submitted.

C. Manufacturer Services:

1. Engage factory-authorized service representative to support field tests and inspections.

3.8 MAINTENANCE

A. Software Service Agreement:

1. Technical Support: Beginning at Substantial Completion, verify that software service agreement includes software support for two years.
2. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Verify that upgrading software includes operating system and new or revised licenses for using software.

END OF SECTION 270010