

## SECTION 27 0000X - TELECOMMUNICATIONS SYSTEMS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including Maryland Department of Transportation/Maryland Aviation Administration “Standard Provisions for Construction Projects,” consisting of “Volume 1: General Provisions” January 2014 Edition, and “Volume 2: Special Provisions” January 2014 Edition, and other Division 01 Specifications Sections apply to this Section.

- B. Related Sections:

*Office of Airport Technology Standards and Specifications for Communications Systems and Infrastructure, Commonly referred to as the OT Standards*, located at:

<http://www.marylandaviation.com/OTstandards/>

S1 Change Request  
S1 Request for Variance  
S1 Resource Allocation Request  
S2 Introduction  
S3 SOP and Policy  
S4 Emergency Tenant Paging  
S4 275116-TC CORE PA and Emergency Tenant Paging System  
S5 OT Facility Warning Standard  
S7 270000-TC Common Work  
S7 270100-TC Systems Cabling  
S7 270101-TC COMCAST Standard  
S7 270526-TC Grounding and Bonding  
S7 270528-TC Hangers and Support  
S7 270553-TC Identification  
S7 271116-TC Cabinets Racks Frame Enclosures  
S7 271313-TC Cable Splicing and Termination  
S7 271523-TC Optical Fiber Splicing and Terminations  
S7 271543-TC Faceplates and Connectors  
S7 271119-TC Termination Blocks and Patch Panels  
S7 271519-TC Horizontal Cabling  
S7 271600-TC Telecommunications Station Equipment  
S7 271601 TC Courtesy Phone Backboard  
S8 PS ALI Standard  
S9 Approved Products

## 1.2 SUMMARY

- A. The Contractor shall download the OT Standard at the link above. All standards and specification sections within the OT Standard applies to this contract.**

## 1.3 REFERENCES

- A. The publications listed below form a part of this specification. The publications are referred to in the text by basic designation only.
- B. Specific reference in specifications to codes, rules, regulations, standards, manufacturer's instructions, or requirements of regulatory agencies shall mean the latest printed edition of each in effect at the date of contract unless the document is shown dated.
- C. Conflicts:
1. Between referenced requirements: Comply with the one establishing the more stringent requirements.
  2. Between referenced requirements and contract documents: Comply with the one establishing the more stringent requirements.
  3. OT Engineer will make final determination between conflicts
- D. References:
1. Underwriters Laboratories Inc. (UL) Cable Certification and Follow Up Program
  2. National Electrical Manufacturers Association (NEMA)
  3. National Electrical Code (NFPA-70)
  4. National Electrical Safety Code (NESC)
  5. Building Industry Consulting Service International (BICSI) Telecommunications Distribution Methods Manual (TDMM)
  6. Local, county, state and federal regulations and codes in effect as of date of purchase
  7. Equipment of foreign manufacture must meet U.S. codes and standards. It shall be indicated in the proposal the components that may be of foreign manufacture, if any, and the country of origin.

## 1.4 SUBMITTALS

- A. The Contractor (DCI) shall perform no portion of the work requiring submittal and review of record drawings, shop drawings, product data, or samples until the respective submittal has been

approved by the Office of Technology (OT). Such work shall be in accordance with approved submittals.

- B. **Qualifications:** The DCI shall submit qualification data sheets for firms and persons as specified in the “Quality Assurance” article of this specification to demonstrate their capabilities and experience.
- C. **Proposed product data sheets:** The DCI shall submit catalog cut-sheets that include manufacturer, trade name, and complete model number for each product specified. Model number shall be handwritten and/or highlighted to indicate exact selection. Identify applicable specification section reference for each product.
- D. **Samples:** The DCI shall provide one sample of each type of cable for testing and approval by the Office of Technology (OT) upon request.
- E. **Testing Plan:** The DCI shall provide a test plan for testing prior to beginning testing. The following minimal items shall be submitted for review:
  - 1. All testing methods
  - 2. Product data for test equipment
  - 3. Certifications and qualifications of all persons conducting the testing
  - 4. Calibration certificates indicating that equipment calibration meets National Institute of Standards and Technology (NIST) standards and has been calibrated at least once in the previous calendar year
  - 5. Examples of test reports, including all graphs, tables, and charts necessary for display of testing results
- F. **Testing Reports:** The DCI shall submit cable test reports as follows:
  - 1. Submit certification test reports of DCI-performed tests
  - 2. The tests shall clearly demonstrate that the media and its components fully comply with the requirements specified herein.
  - 3. Electronic and hardcopy versions of test reports shall be submitted together and clearly identified with cable identification.
  - 4. Submit data electronically on CD-ROM in Microsoft Excel format, listing products furnished, including:
    - 5. Manufacturer's name
    - 6. Manufacturer's part numbers

- G. Record Drawings: Furnish CAD drawings of completed work including cable ID numbers following the Office of Technology (OT)'s labeling standards. Submit in hardcopy (two full size and two half size) and electronic formats.
- H. Standard products:
  - 1. Equipment and materials shall be standard products of a manufacturer regularly engaged in the manufacture of structured cabling products and shall be the manufacturer's latest standard design.
  - 2. Items of the same classification shall be identical. This requirement includes equipment, modules, assemblies, parts, and components.
  - 3. All components of each kind shall be covered by a single warranty program with a single point of contact. Cable and connecting hardware shall be manufactured by the same company or be part of the same system, i.e. warranted by the manufacturer(s) as one system.

#### 1.5 WARRANTY

- A. The DCI shall provide a joint written warranty of the manufacturer(s) and the installer(s), on a single document. The document shall warrant complete installation of the equipment, system to be free from defects in materials and workmanship for a period of no less than 2 years starting with the date of Final System Acceptance.
- B. DCI shall warrant that all approved components meet or exceed the specifications provided in the product data submittal and exceed standards referenced for the warranty period. The warranty shall apply to all components.
- C. The DCI shall warrant that the proposed merchandise will conform to its description and any applicable specifications, and shall be of good quality for the known purpose for which it is intended.
- D. The product warranty shall cover the replacement or repair of defective products and labor for the replacement or repair of such defective products.

#### 1.6 MAINTENANCE AND SUPPORT

- A. System Assurance: The System Assurance shall cover the failure of the system to support the application which it was designed to support, as well as additional application(s) introduced in the future for the (2) two year warranty period.
- B. System Certification: Upon successful completion of the installation and subsequent inspection, the DCI shall be provided with a numbered certificate, from the manufacturing company, registering the installation.
- C. Support Availability: The DCI shall commit to make available local support for the product and system during the Warranty period.

## 1.7 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Project Documents; no media, fiber or copper, shall be installed in lengths surpassing Standards based length requirements.
- B. Cable routing shown on Drawings is approximate unless dimensioned. Route cable as required to meet Project Conditions.
- C. Where cable routing is not shown, and destination only is indicated, determine exact routing and lengths required. Record actual routing on as-builts including, but not limited to all conduit larger than 3/4 inch, all exterior conduit/cabling, and all Work Area communications outlet information.

## 1.8 DELIVERY AND STORAGE

- A. Equipment shall be delivered in original packages with labels intact and identification clearly marked.
- B. Equipment shall not be damaged in any way and shall comply with manufacturer's operating specifications.
- C. Equipment and components shall be protected from the weather, humidity, temperature variations, dirt, dust, or other contaminants. Equipment damaged prior to system acceptance shall be replaced at no cost to the Office of Technology (OT).

## 1.9 COORDINATION

- A. Determine required separation between other work.
- B. Coordinate to avoid interference with other work disciplines.
- C. Coordinate installation with other trades and furniture installers.
- D. Coordinate with all DCIs providing equipment outside the scope of this contract.

## PART 2 - PRODUCTS

### 2.1 HORIZONTAL TELECOMMUNICATION CABLING SYSTEM

- A. Definition:
- B. Primary Industry Standard Requirements for Horizontal Cable Systems:
  - 1. Communications, Plenum Rated: Type CMP, complying with NFPA 262.
  - 2. Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.

## 2.2 IDENTIFICATION METHODS AND LABELING PRODUCTS

- A. Comply with Section 5 of OT standards, OT warning label Marking and TIA/EIA-606-A and All Horizontal cable and termination fields shall be labeled with permanent, easy to read identifications which are compliant with MAA OAT cable labeling scheme.
- B. Coordinate with MAA OAT for cable labeling means and methods.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Verify liquid-carrying pipes are not installed in, above or thru voice and data system communications rooms. Do not proceed with installation in affected areas until removed.

### 3.2 INSTALLATION

- A. Install work following drawings, manufacturer's instructions and approved submittal data.
- B. All installation shall be done in conformance with standards, BICSI methods, industry standards and manufacturers' installation guidelines. The DCI shall ensure that the maximum pulling tensions of the specified distribution cables are not exceeded and cable bends maintain the proper radius during the placement of the facilities. Failure to follow the appropriate guidelines shall require the DCI to provide in a timely fashion the additional material and labor necessary to properly rectify the situation. This shall also apply to any and all damages sustained to the cables by the DCI during the implementation.
- C. Test Equipment
  - 1. Test equipment used under this contract shall be from manufacturers that have a minimum of 5 years experience in producing field test equipment. Manufacturers shall be ISO 9001 certified.
  - 2. The test instrument shall be within the calibration period recommended by the manufacturer.
  - 3. Test instruments shall have the latest software and firmware installed.
  - 4. All test tools of a given type shall be from the same manufacturer, and have compatible electronic results output.
  - 5. Test adapter cables shall be approved by the manufacturer of the test equipment. Adapters from other sources are not acceptable.
  - 6. All test equipment purchased for use under these tasks shall become the property of the MAA upon systems acceptance. The MAA reserves the right to provide test equipment for the use of the DCI

- D. No system shall be put into service until it is fully tested and accepted by the Office of Technology (OT).
- E. Install work following drawings, manufacturer's instructions and approved submittal data.
- F. Equipment Clearances
  - 1. Clearance distances are measured from the outermost surface of devices installed in rack or mounted on wall, rather than from the rack or backboard.
  - 2. Provide a minimum of three feet of space in front and rear of cabinets and racks.
  - 3. Provide a minimum of one-foot side clearance in corners.
  - 4. Provide a minimum of one-foot clearance above cable tray/ladder rack.
  - 5. Provide a minimum of one-foot clearance above top-most item (cable tray, ladder rack or fiber trough) to any ceiling or overhead condition.

### 3.3 CLEANING

- A. Remove all unnecessary tools and equipment, unused materials, packing materials, and debris from each area where Work has been completed unless designated for storage on a daily basis unless directed by Office of Technology (OT).

### 3.4 ACCEPTANCE

- A. Once all work has been completed, test documentation has been submitted and approved, and the Office of Technology (OT) is satisfied that all work has been completed in accordance with contract documents, the Office of Technology (OT) will notify DCI in writing of formal acceptance of the system.
- B. Acceptance shall be subject to completion of all work, successful post-installation testing which yields 100 percent PASS rating, and submittal and approval of full documentation as described above.
- C. Office of Technology (OT) reserves the right to conduct, using DCI equipment and labor, a random re-test of up to 10 percent of the cable plant to confirm documented results. Random re-testing, if performed, shall be at the expense of the DCI, using standard labor rates. Any failing cabling shall be re-tested and restored to a passing condition at no cost to the Office of Technology (OT). In the event more than two percent of the cable plant fails during re-test, the entire cable plant shall be re-tested and restored to a passing condition at no additional cost to the Office of Technology (OT).
- D. Office of Technology (OT) may agree to allow certain cabling runs to exceed standardized performance criteria (e.g. length). In this event, such runs shall be explicitly identified and excluded from requirements to pass standardized tests.

## PART 4 – PAYMENT

### 4.1 METHOD OF MEASUREMENT

- A. No separate measurement shall be made for work under this section.

## PART 5 - PAYMENT

### 5.1 BASIS OF PAYMENT

- A. No separate payment will be made for work under this Specification Section. The cost of the work, complete in place, described in this Specification Section shall be included in the respective Lump Sum Bids under:
  - Item 01 1000-1– BUILDING CONSTRUCTION – per lump sum
- B. Costs shall include all labor, materials, services, and equipment necessary to complete the work in every respect.

END OF SECTION 27 0000X