SECTION 27 60 13

*~~~ **PROJECT NOTE** ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~*
ARCHITECT OF RECORD/ENGINEER OF RECORD IS RESPONSIBLE FOR REVIEWING THIS SPECIFICATION SECTION IN DETAIL FOR COORDINATION WITH THE PROJECT SCOPE OF WORK.
ALL "PROJECT NOTE" TEXT IS TO BE REMOVED FOLLOWING REVIEW OF THE CONTENT OF EACH NOTE BY THE ARCHITECT OF RECORD/ENGINEER OF RECORD.
EDIT THE DOCUMENT FOOTER TO INCLUDE THE PROJECT NAME AND NUMBER.
EDIT THE DOCUMENT HEADER TO INDICATE THE ARCHITECT OF RECORD PROJECT ISSUE" DATE. THE "CPS CONTROL" DATE SHOULD NOT BE EDITED.
ANY MODIFICATIONS TO THE TECHNICAL STANDARDS IN THIS SECTION - INCLUDING THE REMOVAL OR ADDITION OF MANUFACTURERS - MUST BE APPROVED BY CPS.
REQUESTS FOR MODIFICATION ARE TO BE SUBMITTED TO THE DESIGN MANAGER DURING THE DESIGN PHASE FOR REVIEW AND APPROVAL.

*~~~ **END OF PROJECT NOTE** ~~~~~~~~~~~~~~~~~~~~~~~~~*

WIRELESS ACCESS POINTS FOR DATA COMMUNICATIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wireless Access Point infrastructure.

B. Communications grounding and bonding.

1.02 DEFINITIONS

A. Refer to Section 27 05 03 - Communications General Requirements for definitions.

1.03 REFERENCE STANDARDS

A. City of Chicago Building Code - Municipal Code of Chicago for the Building Industry; 2017.

B. City of Chicago Electrical Code - National Electrical Code with Chicago Amendments; 2017.

C. TIA/EIA-568 - Commercial Building Telecommunications Cabling Standard. (consists of 3 Parts, listed below); Rev C, 2012, and latest addenda.

D. TIA-568 (SET) - Commercial Building Telecommunications Cabling Standard Set; 2016.

E. TIA-569-D - Telecommunications Pathways and Spaces; Rev D, 2015.

F. TIA-606-B - Administration Standard for Telecommunications Infrastructure; Rev B, 2012 (with Addenda; 2015).

G. TIA-607-C - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises; Rev C, 2015.

1.04 SUBMITTALS

A. Shop Drawings: Show compliance with requirements on schematic diagram of network layout, showing cable routings, telecommunication closets, rack and enclosure layouts and locations, service entrance, and grounding, prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
   1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Board Representative. Contractor shall follow the existing CPS Standard for labeling cables and pathways.
   2. Cabling administration drawings and printouts.
   3. Wiring diagrams to show typical wiring schematics including the following:
      a. Cross-connects.
      b. Patch panels.
   4. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.

B. Evidence of qualifications for installer.

C. Source quality-control reports.

D. Field Test Reports.

E. Project Record Documents: Prepared and approved by BICSI Registered Communications Distribution Designer (RCDD).
   1. Record actual locations of outlet boxes and distribution frames.
   2. Show as-installed color coding, pair assignment, polarization, and cross-connect layout.
   3. Identify distribution frames and equipment rooms by room number on contract drawings.

F. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of project record documents.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Comply with requirements of Section 27 05 03 - Communications General Requirements for installer qualifications as noted in "Quality Assurance" Article. Engage an experienced installer who has on staff a registered communications distribution designer (RCDD), certified by the Building Industry Consulting Service International (BICSI) and manufacture certified.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in City of Chicago Electrical Code, by a qualified testing agency, and marked for intended location and application.

C. Telecommunications Pathways and Spaces: Comply with TIA-569-D.

D. Grounding: Comply with TIA-607-C.

E. Manufacturer Qualifications: Engage firms experienced in manufacturing components listed and labeled under TIA-568 (SET) and who comply with these Specifications.

F. Comply with City of Chicago Building Code (CCBC). CCBC will have preference over other codes, unless requirements of other codes are more stringent than CCBC, in which case more stringent requirements shall govern.

G. Comply with the following:
   1. TIA-568 (SET), Commercial Building Telecommunications Cabling Standard.
   2. TIA-569-D, Commercial Building Standard for Telecommunications Pathways and Spaces.
   3. TIA-606-B, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.
   4. TIA-607-C, Commercial Building Grounding and Bonding Requirements for Telecommunications.

H. Listing and Labeling: Provide products specified in this Section that are listed and labeled.
   1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
   2. Listing and labeling agency qualifications: A Nationally Recognized Testing Laboratory (NRTL) as defined in OSHA Regulation 1910.7.

I. Work Coordination: Coordinate work of this Section with School's existing wall and ceiling devices such as telephone instrument, workstation, wide area network (WAN) equipment suppliers and the Board's Office of Information and Technology Service and Department of Facilities.
   1. Record agreements reached in meetings and distribute record to all participants in the meetings.
   2. Adjust the arrangements and locations of distribution frames, patch panels, and cross connects in equipment rooms and wiring closets to accommodate and optimize the arrangement and space requirements of the telephone switch, LAN equipment, MMTV equipment and WAN equipment.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 27 05 03 - Communications General Requirements for delivery, storage and handling of materials provided under this Section.

B. Test cables upon receipt of spool of cable at Project site.
   1. Test each pair of UTP cable per current BICSI Standards.
   2. A copy of the test results shall be delivered to Board's Office of Information and Technology Service.

C. Materials shall be suitably packaged by manufacturers to prevent damage during shipment and handling. Damaged materials will not be acceptable for use.

D. Store materials on site in clean, dry storage area.

E. New Construction wireless active components will be procured, configured and installed by ITS.

1.07 WARRANTY

A. General Warranty: The special warranty specified in this Article shall not deprive the Board of other rights the Board may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under other requirements of the Contract Documents.

B. Special Warranty: The data communications system, including wireless access points, workstation, cabling, connectors, patch panels and other connecting hardware, shall be warranted to be free from defects in material or faulty workmanship, and shall meet the performance requirements of TIA/EIA-568. The warranty shall cover material, services and operation of the data communications system.
   1. Special Warranty Period: 25 years from date of acceptance.

PART 2 PRODUCTS

2.01 SYSTEM DESIGN

A. Provide a complete permanent system of cabling and pathways for voice and data communications, including cables, conduits and wireways, pull wires, support structures, enclosures and cabinets, and outlets.
   1. Comply with TIA-568 (SET) (cabling) and TIA-569-D (pathways), latest editions (commercial standards).
   2. Provide fixed cables and pathways that comply with City of Chicago Electrical Code and TIA-607-C and are UL listed or third party independent testing laboratory certified.
   3. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F at relative humidity of 0 to 95 percent, noncondensing.
   4. In this project, the term plenum is defined as return air spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.

2.02 WIRELESS INFASTRUCTURE PRODUCTS

A. Category 6 cable, Category 6 jacks, faceplate and patch panel to supply network connectivity from the Enclosure to the Wireless Access Point.

B. Actual - Wireless Access Point, configured and installed by the Board.

C. Board to provide patch cords to interconnect patch panels, switches, media converters and to cross-connect horizontal cabling to backbone cabling.

2.03 GROUNDING AND BONDING REQUIREMENTS

A. Comply with TIA-607-C.

B. Comply with Section 26 05 26 - Grounding and Bonding for Electrical Systems.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine pathway elements to receive cable. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.

B. Notify Architect/Engineer of Record of conditions that would adversely affect installation or subsequent use.

C. Proceed only after unsatisfactory conditions have been corrected. Commencement of work in this section will be an indication of the acceptance of substrate conditions and the Contractor will be held responsible for the satisfactory execution and results of the finished work.

3.02 WIRELESS SITE SURVEY

A. A wireless site survey will be performed by the Board to determine the placement of the access points.

3.03 INSTALLATION - GENERAL

A. Comply with latest editions and addenda of TIA-568 (SET) (cabling), TIA-569-D (pathways), TIA-607-C (grounding and bonding), NECA/BICSI 568, City of Chicago Electrical Code, and SYSTEM DESIGN as specified in PART 2.

B. Grounding and Bonding: Perform in accordance with TIA-607-C and City of Chicago Electrical Code.

C. New Construction wireless active components (WAP) will be procured, configured and installed by ITS.

D. Existing facilities configured and install wireless active components in accordance with ITS instructions.

E. Wireless access point ports shall be wall mounted and installed not less than 84 inches above finished floor at the teacher location. All other WAP locations shall not be less than 96 inches above finished floor. Should ceiling height for either scenario be less than indicated, the port shall be installed 6-inches below the ceiling. Wireless access points shall not be installed closer than 15 feet apart.

F. Wiring Method: Install wiring and fiber-optic cable in a separate metal raceway system in accordance with Sections 26 05 33.13 - Conduit for Electrical Systems, 26 05 33.16 - Boxes for Electrical Systems, and 26 05 33.23 - Surface Raceways for Electrical Systems. Conceal raceway except in unfinished spaces. Comply with TIA-569-D for raceway sizing and routing not indicated on drawings.

G. Install components as indicated, according to manufacturers' written instructions. Use techniques, practices and methods that are consistent with the Category 6 rating of the components, and that assure Category 6 performance of completed and linked single paths, end-to-end.
   1. Install cable without damaging conductors, shield or jacket.
   2. Do not bend cable in handling or installation to smaller radii than minimums required by current standards. Radius inserts shall be used in surface raceways to maintain minimum cable bending radii.
   3. Pull cables without exceeding cable manufacturer's recommended pulling tensions.
   4. Pull cables simultaneously where more than one is being installed in the same raceway.
   5. Only use pulling compound or lubricant where necessary. Use compounds that will not damage conductor or insulation.
   6. Use pulling means, including fish tape, cable, rope and basket- weave wire/cable grips that will not damage media or raceway.
   7. Secure and support cable at intervals not exceeding 30 inches and not more than six (6) inches from racks, frames and terminals. Velcro straps shall be used to secure cables in MDF racks and in concentrator enclosures.

8. Wiring within Enclosures: Provide adequate length of conductors. Train the conductors to terminal points with no excess. Use lacing bars to restrain cables, to prevent straining connections and to prevent bending cables to radii smaller than allowed.
9. Separation of Wires: Comply with TIA-569-D rules for separation of unshielded copper data system cables from potential EMI sources, including electrical power lines and equipment.

H. Make terminations only at indicated data jacks, terminals, and cross-connect and patch panels. Splices and taps are not permitted.

I. Terminate cables in appropriate jack/connector at workstation and patch panels.

J. Terminate all cables in concentrator enclosures with appropriate jack/connector.

3.04 FIELD QUALITY CONTROL

A. Comply with inspection and testing requirements of specified installation standards.

B. Visual Inspection:
1. Inspect cable jackets for certification markings.
2. Inspect cable terminations for color coded labels of proper type.
3. Inspect patch panels for complete labels.
4. Inspect patch cords for complete labels.

C. Testing: Upon installation of cable and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance and prompt report. Remove temporary connections when tests have been satisfactorily completed.

3.05 CLEANING

A. Equipment removed for remodeling and cleaning shall be reinstalled by Contractor.

B. Equipment removed that will not be reused (Switches, hubs, media converters, cables, etc.) shall be boxed up and given to the Board Representative. Equipment removed shall remain the property of the Board.

C. On completion of system installation, including fittings and devices, inspect exposed finish. Remove burrs, dirt and construction debris, and repair damaged finish, including chips, scratches and abrasions.

END OF SECTION 27 60 13