



August 7, 2020

ADDENDUM NO. 1

RE: Site Improvements and Renovations to Davis Hall
Bridge Valley Community and Technical College
Montgomery, West Virginia 25136
Architect's Job No. 18046

TO: Prospective Bidders

FROM: ZMM, Inc. Architects and Engineers

This Addendum forms a part of the Contract Documents and modifies the original Bidding Documents.

ATTACH THIS ADDENDUM TO THE FRONT COVER OF THE PROJECT MANUAL AND ACKNOWLEDGE RECEIPT OF THIS ADDENDUM IN THE SPACE PROVIDED ON THE BID FORM.

PART 1 - INFORMATION FOR BIDDERS

- A. Refer to Pre-Bid Sign-In Sheet as attached to this Addendum.

PART 2 - CLARIFICATIONS

- A. Drawing A131 – First Floor Plan & Demolition Plan:
 - 1. Note the south 2-story curtainwall that extends from the first floor to the second floor, adjacent to the Lobby and under the overhang, the sealant around the curtainwall is not required to be replaced. This curtainwall and soffit shall be cleaned as part of the exterior building cleaning.
 - 2. The existing sealant on the metal wall panels surrounding the entry vestibule on the south side of the building is to remain.

PART 3 - CHANGES TO SPECIFICATIONS

- A. Specification 26200 2.3 C 1. Dry-Type Transformers (600V and Less): An encapsulated transformer is not required.

- B. Specification Section 271323, “Communications Optical Fiber Backbone Cabling” 2.2 A. to: Description: Multimode, 50/125-micrometer, 6-fiber, nonconductive tight buffer, optical fiber cable.
- C. Specification Section 271323, “Communications Optical Fiber Backbone Cabling” 2.2 G 1. to: Jacket Color: Manufacturer Standard Color.
- D. REPLACE Section 271513 “Communications Copper Horizontal Cabling dated 07/29/20 with replacement Section 271513 as attached to this Addendum.
- E. ADD the following Sections as attached to this Addendum:
 - 1. Section 281353.11 “IP Network Compatible Emergency Tower”.
 - 2. Section 282000 “Video Surveillance”.

PART 4 - CHANGES TO DRAWINGS

- A. Drawing C-1 - Existing & Proposed Site Plans:
 - 1. Refer to the existing site plan and note the existing chain rope fence and posts are to be removed and salvaged.
 - 2. The chain rope fence and posts are to be re-installed once the site work is completed. All fence posts shall be set in concrete base, minimum 8” diameter and 3’-0” deep to match the sign post details on the sheet.
 - 3. The existing sidewalk on the south side of the parking lot shall be removed and replaced in its entirety from east to west on the site plan. Reinstall concrete curb and grass between sidewalk and street to match adjacent walk area. This is the area between the two asphalt drive entrances on the south side. The south corner of the existing sidewalk shall be removed and replaced to accommodate the new storm piping as shown on the Drawings.
 - 4. The existing curb cut on the east side of the parking lot shall be removed in its entirety. Reinstall concrete curb and grass between sidewalk and street to match adjacent walk area.

Attachments: Pre-Bid Sign-In Sheet2 pages
 Section 271513 “Communications Copper Horizontal Cabling” 11 pages
 Section 281353.11 “IP Network Compatible Emergency Tower”5 pages
 Section 282000 “Video Surveillance”.....8 pages

END OF ADDENDUM

PRE-BID MEETING SIGN-IN SHEET

#18046 Bridge Valley Davis Hall

August 6, 2020 @ 2:00 PM

PLEASE PRINT

NAME: Austin King
FIRM: Ayden Construction Co Inc.
ADDRESS: 1700 WV 34
Hurricane WV 25526
PHONE: 304-343-5400 FAX: _____
EMAIL: AKing@AydenConstruction.com
BIDDING CONTRACT FOR: GC

NAME: Michael Ball
FIRM: BBL Caetlon
ADDRESS: 600 Kanawha Blvd. East
Charleston WV 25301
PHONE: 304-345-1300 FAX: 304-345-1304
EMAIL: mball@bblcaetlon.com
BIDDING CONTRACT FOR: _____

NAME: Danhill Const. Co.
FIRM: Dan Hill
ADDRESS: P.O. Box 685
Gauley Bridge, WV 25085
PHONE: 304-632-1600 FAX: 304-632-1501
EMAIL: Rdanhill@hotmail.com
BIDDING CONTRACT FOR: GC

NAME: Walt Clark (Chick)
FIRM: _____
ADDRESS: _____
PHONE: _____ FAX: _____
EMAIL: _____
BIDDING CONTRACT FOR: _____

PLEASE PRINT

NAME: CHRIS DOZIER
FIRM: DANHILL
ADDRESS: P.O. Box 685 GAVLEY BRIDGE
WV 25085
PHONE: 304-553-1553 FAX: _____
EMAIL: CDOZIER@YAHOO.COM
BIDDING CONTRACT FOR: GC

NAME: JEFFREY GARRETT
FIRM: PERKINER & ASSOCIATES
ADDRESS: P.O. BOX 511 CHARLESTON
WV 25302
PHONE: 304-531-2143 FAX: _____
EMAIL: JEFF@PERKINERANDASSOCIATES.COM
BIDDING CONTRACT FOR: G.C.

NAME: Mark Stolle
FIRM: FOSTER
ADDRESS: _____
SCOTT DEPOT WV
PHONE: 304.206.7808 FAX: _____
EMAIL: mark@fostersupply.com
BIDDING CONTRACT FOR: Supplies

NAME: Howard Offenberger
FIRM: Wolf Creek Contracting
ADDRESS: 403 Water town Road
Waterford, OH 45796
PHONE: (740) 749-5818 FAX: _____
EMAIL: hoffenberger@wolfcreekcontractors.com
BIDDING CONTRACT FOR: G.C.



PRE-BID MEETING SIGN-IN SHEET

#18046 Bridge Valley Davis Hall

August 6, 2020 @ 2:00 PM

PLEASE PRINT

NAME: Todd Kisor
FIRM: Buckeye Construction & Restoration
ADDRESS: 405 Watertown Rd.
Waterford, OH 45786
PHONE: 740-749-5735 FAX: 740-749-0602
EMAIL: TKisor@bcmco.com
BIDDING CONTRACT FOR: Joint sealant/Cleaning

NAME: JOHN SMOCKLANDO
FIRM: MAYNARD C. SMITH CONSTR. CO
ADDRESS: 3910 CHESTERFIELD AVE
CHARLESTON, WV 25384
PHONE: 304-925-5910 FAX: 304-925-3228
EMAIL: ESTIMATING@MCSCONSTRUCTIONWV.COM
BIDDING CONTRACT FOR: GC.

NAME: _____
FIRM: _____
ADDRESS: _____
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SECTION 271513 - COMMUNICATIONS COPPER HORIZONTAL CABLING

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. Section Includes:

1. Category 6 twisted pair cable.
2. Twisted pair cable hardware, including plugs and jacks.
3. Cabling identification products.
4. Grounding provisions for twisted pair cable.
5. Source quality control requirements for twisted pair cable.

- B. Related Requirements:

1. Section 270513 "Conductors and Cables for Communications Systems" for data cabling associated with system panels and devices.

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. FTP: Shielded twisted pair.
- C. F/FTP: Overall foil screened cable with foil screened twisted pair.
- D. F/UTP: Overall foil screened cable with unshielded twisted pair.
- E. IDC: Insulation displacement connector.
- F. LAN: Local area network.
- G. Jack: Also commonly called an "outlet," it is the fixed, female connector.
- H. Plug: Also commonly called a "connector," it is the removable, male telecommunications connector.
- I. UTP: Unshielded (unshielded) twisted pair.

1.4 COPPER HORIZONTAL CABLING DESCRIPTION

- A. Horizontal cable cabling system shall provide interconnections between Distributor A, Distributor B, or Distributor C, and the equipment outlet, otherwise known as "Cabling Subsystem 1," in the telecommunications cabling system structure. Cabling system consists of horizontal cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for horizontal-to-horizontal cross-connection.
 - 1. TIA-568-C.1 requires that a minimum of two equipment outlets be installed for each work area.
 - 2. Horizontal cabling shall contain no more than one transition point or consolidation point between the horizontal cross-connect and the telecommunications equipment outlet.
 - 3. Bridged taps and splices shall not be installed in the horizontal cabling.
- B. A work area is approximately 100 sq. ft., and includes the components that extend from the equipment outlets to the station equipment.
- C. The maximum allowable horizontal cable length is 295 feet. This maximum allowable length does not include an allowance for the length of 16 feet to the workstation equipment or in the horizontal cross-connect.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Twisted pair cable testing plan.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer, installation supervisor, and field inspector.
- B. Product Certificates: For each type of product.
- C. Source quality-control reports.
- D. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For splices and connectors to include in maintenance manuals.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Connecting Blocks: One of each type.
 - 2. Faceplates: One of each type.

3. Jacks: Ten of each type.
4. Patch-Panel Units: One of each type.
5. Plugs: Ten of each type.

1.9 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Testing agency must have personnel certified by BICSI on staff.
 1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.
 1. Test each pair of twisted pair cable for open and short circuits.

1.11 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.12 COORDINATION

- A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications, LAN equipment and existing conditions.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.
- B. Telecommunications Pathways and Spaces: Comply with TIA-569-D.
- C. Grounding: Comply with TIA-607-B.

2.2 GENERAL CABLE CHARACTERISTICS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70 for the following types:
 1. Communications, Plenum Rated: Type CMP complying with UL 1685.

- B. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Flame-Spread Index: 25 or less.
 - 2. Smoke-Developed Index: 50 or less.
- C. RoHS compliant.

2.3 CATEGORY 6 TWISTED PAIR CABLE

- A. Description: Four-pair, balanced-twisted pair cable, certified to meet transmission characteristics of Category 6 cable at frequencies up to 250MHz.
- B. Provide products from one of the following manufacturers:
 - 1. 3M
 - 2. Belden CDT Networking Division
 - 3. Berk-Tek Leviton
 - 4. General Cable: General Cable Corporation
 - 5. Mohawk; a division of Belden Networking
- C. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.
- D. Conductors: 100-ohm, 23 AWG solid copper.
- E. Shielding/Screening: Unshielded twisted pairs (UTP).
- F. Cable Rating: Plenum.
- G. Jacket: Yellow or Green thermoplastic.

2.4 TWISTED PAIR CABLE HARDWARE

- A. Description: Hardware designed to connect, splice, and terminate twisted pair copper communications cable.
- B. Provide products from one of the following manufacturers:
 - 1. 3M
 - 2. American technology Systems Industries, Inc.
 - 3. Belden CDT Networking Division.
 - 4. General Cable; General Cable Corporation
 - 5. Hubbell Premise Wiring
 - 6. Trendnet
 - 7. Leviton Manufacturing Corporation
- C. General Requirements for Twisted Pair Cable Hardware:
 - 1. Comply with the performance requirements of Category 6.

2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
 3. Cables shall be terminated with connecting hardware of same category or higher.
- D. Source Limitations: Obtain twisted pair cable hardware from single source from single manufacturer.
- E. Connecting Blocks:
1. 110-style IDC for Category 6.
 2. Provide blocks for the number of cables terminated on the block, plus 25 percent spare, integral with connector bodies, including plugs and jacks where indicated.
- F. Patch Panel: Modular panels housing numbered jack units with IDC-type connectors at each jack location for permanent termination of pair groups of installed cables.
1. Features:
 - a. Universal T568A and T568B wiring labels.
 - b. Labeling areas adjacent to conductors.
 - c. Replaceable connectors.
 - d. 24 or 48 ports.
 2. Construction: 16-gauge steel and mountable on 19-inch equipment racks.
- G. Power Over Ethernet Switches:
1. 10-Port Industrial Gigabit PoE+ DIN-Rail Switch shall be equal to Trendnet TI-PG102 (v1.0R)
 2. 8 x Gigabit Ultra PoE ports.
 3. 2 x Gigabit RJ-45/SFP shared ports.
 4. 240-watt power budget.
 5. 12 Gbps switching capacity.
 6. Hardened IP30 rated metal switch.
 7. Dual redundant power inputs with overload current protection.
 8. Power supply.
 9. Ethernet: 10 Mbps (half duplex), 20 Mbps (full duplex)
 10. Gigabit: 2000 Mbps (full duplex)
 11. Data RAM buffer: 1024 KB.
- H. PoE injector
1. PoE injector to increase delivered power from PoE+ switch to cameras.
 2. PoE injector and the PoE switch shall deliver up to 100W to the specified PTZ camera.
- I. Media Converter:
1. Fiber optic cable to copper module.
 2. Trendnet multimode media converter.
 3. SFP Multi-Mode LC Module (TEG-MGBSX (3.0R)
 4. LC Duplex connector-type

5. Compatible with standard SFP slots
 6. IEEE 802.3z Gigabit Ethernet
 7. ANSI Fiber Channel compliant.
 8. Supports data rate up to 1.25 Gbps.
- J. Patch Cords: Factory-made, four-pair cables in nominal lengths, as short as possible; terminated with an eight-position modular plug at each end.
1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure performance. Patch cords shall have latch guards to protect against snagging.
- K. Plugs and Plug Assemblies:
1. Male; eight position; color-coded modular telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
 2. Standard: Comply with TIA-568-C.2.
- L. Jacks and Jack Assemblies:
1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
 2. Designed to snap-in to a patch panel or faceplate.
 3. Standard: Comply with TIA-568-C.2.
- M. Faceplate:
1. Two port, vertical single gang faceplates designed to mount to single gang wall boxes.
 2. Metal Faceplate: Stainless steel, complying with requirements in Section 262726 "Wiring Devices."
 3. For use with snap-in jacks accommodating any combination of twisted pair, optical fiber, and coaxial work area cords.
 - a. Flush mounting jacks, positioning the cord at a 45-degree angle.
- N. Legend:
1. Machine printed, in the field, using adhesive-tape label.
 2. Snap-in, clear-label covers and machine-printed paper inserts.

2.5 IDENTIFICATION PRODUCTS

- A. Comply with TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

2.6 GROUNDING

- A. Comply with requirements in Section 270526 "Grounding and Bonding for Communications Systems" for grounding conductors and connectors.
- B. Comply with TIA-607-B.

2.7 SOURCE QUALITY CONTROL

- A. Factory test cables on reels according to TIA-568-C.1.
- B. Cable will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 WIRING METHODS

- A. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
- B. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools. Install conductors parallel with or at right angles to sides and back of enclosure.

3.2 INSTALLATION OF PATHWAYS

- A. Comply with requirements for demarcation point, cabinets, and racks specified in Section 271100 "Communications Equipment Room Fittings."
- B. Comply with Section 270528 "Pathways for Communications Systems."
- C. Comply with Section 270529 "Hangers and Supports for Communications Systems."
- D. Drawings indicate general arrangement of pathways and fittings.

3.3 INSTALLATION OF TWISTED-PAIR HORIZONTAL CABLES

- A. Comply with NECA 1, NECA 303 and NECA/BICSI 568.
- B. General Requirements for Cabling:
 - 1. Comply with TIA-568-C.0, TIA-568-C.1, and TIA-568-C.2.
 - 2. Comply with BICSI's "Information Transport Systems Installation Methods Manual (ITSIMM), Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section.
 - 3. Install 110-style IDC termination hardware unless otherwise indicated.
 - 4. Do not untwist twisted pair cables more than 1/2 inch from the point of termination to maintain cable geometry.
 - 5. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
 - 6. Consolidation points may be used only for making a direct connection to equipment outlets:

- a. Do not use consolidation point as a cross-connect point, as a patch connection, or for direct connection to workstation equipment.
 - b. Locate consolidation points for twisted-pair cables at least 49 feet from communications equipment room.
7. Cables may not be spliced. Secure and support cables at intervals not exceeding 48 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 8. Install lacing bars to restrain cables, prevent straining connections, and prevent bending cables to smaller radii than minimums recommended by manufacturer.
 9. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section. Use lacing bars and distribution spools.
 10. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation, and replace it with new cable.
 11. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
 12. In the communications equipment room, install a 10-foot-long service loop on each end of cable.
 13. Pulling Cable: Comply with BICSI Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Pulling and Installing Cable" Section. Monitor cable pull tensions.
- C. Open-Cable Installation:
1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
 2. Suspend twisted pair cabling, not in a wireway or pathway, a minimum of 8 inches above ceilings by cable supports not more than 48 inches apart.
 3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
- D. Group connecting hardware for cables into separate logical fields.
- E. Separation from EMI Sources:
1. Comply with recommendations from BICSI's "Telecommunications Distribution Methods Manual" and TIA-569-D for separating unshielded copper communication cable from potential EMI sources, including electrical power lines and equipment.
 2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.
 3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

- a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.
4. Separation between communications cables in grounded metallic raceways, power lines, and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
- a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.
5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches.

3.4 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA-569-D, Annex A, "Firestopping."
- C. Comply with "Firestopping Systems" Article in BICSI's "Telecommunications Distribution Methods Manual."

3.5 GROUNDING

- A. Install grounding according to the "Grounding, Bonding, and Electrical Protection" chapter in BICSI's "Telecommunications Distribution Methods Manual."
- B. Comply with TIA-607-B and NECA/BICSI-607.
- C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall, allowing at least a 2-inch clearance behind the grounding bus bar. Connect grounding bus bar to suitable electrical building ground, using a minimum No. 4 AWG grounding electrode conductor.
- D. Bond metallic equipment to the grounding bus bar, using not smaller than a No. 6 AWG equipment grounding conductor.

3.6 IDENTIFICATION

- A. Cable Schedule: Install in a prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.
- B. Cable and Wire Identification:

1. Label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
 2. Each wire connected to building-mounted devices is not required to be numbered at the device if wire color is consistent with associated wire connected and numbered within panel or cabinet.
 3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet, if the color of cable jacket is not unique to the site.
 4. Label each terminal strip, and screw terminal in each cabinet, rack, or panel.
 - a. Individually number wiring conductors connected to terminal strips, and identify each cable or wiring group, extended from a panel or cabinet to a building-mounted device, with the name and number of a particular device.
 - b. Label each unit and field within distribution racks and frames.
 5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and -connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.
- C. Labels shall be preprinted or computer-printed type, with a printing area and font color that contrast with cable jacket color but still comply with TIA-606-B requirements for the following:
1. Cables use flexible vinyl or polyester that flexes as cables are bent.

3.7 FIELD QUALITY CONTROL

- A. Perform tests and inspections with the assistance of a factory-authorized service representative.
- B. Tests and Inspections:
1. Visually inspect jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568-C.1.
 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
 3. Test twisted pair cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.
 - a. Test instruments shall meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
- C. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similarly to Table 10.1 in BICSI's "Telecommunications Distribution Methods Manual," or shall be transferred from the instrument to the computer, saved as text files, printed, and submitted.

- D. Remove and replace cabling where test results indicate that they do not comply with specified requirements.
- E. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

END OF SECTION 271513

SECTION 281353.11 IP NETWORK COMPATIBLE EMERGENCY TOWER

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 SECTION INCLUDES

- A. IP Video Intercom. (Aiphone IX Series)

1.3 REFERENCES

- A. American National Standards Institute (ANSI/TIA/EIA) 568 - Commercial Building Telecommunications Cabling Standard.
- B. International Organization for Standards (ISO) 9001:2000 - Quality Management Systems - Requirements.

1.4 SYSTEM DESCRIPTION

- A. IP Network Compatible Video Intercom System: A network-based communication and security system featuring emergency stations, and paging. All units and app in the systems shall be able to assist onsite visitors from an offsite location, broadcast emergency announcements, and communicate using a PoE network.
 - 1. Power Source: Power over Ethernet (802.3af).
 - 2. Network Interface: 10 BASE-T / 100 BASE-TX Ethernet (RJ-45).
 - 3. Network Protocols: IPv4, IPv6, TCP, UDP, SIP, HTTP, HTTPS, MJPEG, RTSP, RTP, RTCP, IGMP, MLD, SMTP, DHCP, NTP, DNS.
 - 4. Bandwidth Usage:
 - a. G.711: 64Kbps x 2 per video call.
 - b. 64Kbps per monitor.
 - c. H.264: 24Kbps ~ 2,048Kbps.
 - 5. Communication: Hands-free (VOX), push-to-talk (simplex), or handset (full-duplex).
 - 6. Video Display: 7 inch color LCD.
 - 7. Camera: Type:
 - a. 1/3 inch color CMOS. 1.23 Megapixels.
 - b. View Area at 0 degree camera angle mounted at 4 feet 11 inches (1500 mm) AFF: 2 feet 3 inches (700 mm) vertical x 3 feet 9 inch (1150 mm) horizontal at 19 inches (500 mm).
 - 8. Video Stream: ONVIF Profile S.
 - 9. Wire Type: CAT-6.
 - 10. Distance:
 - a. Any station to Network Node: 330 feet.

1.5 ACTIONS SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings: Submit the following:
 - 1. Wiring Diagrams: Indicate wiring for each item of equipment and interconnections between items of equipment.
 - 2. Include manufacturer's names, model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
- C. Installation and Operation Manuals:
 - 1. Include plans, elevations, sections, and mounting attachment details.
 - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Submit manufacturer's installation and operation manual, including operation instructions and component wiring diagrams.
 - 4. Provide detailed information required for Owner to properly operate equipment.
 - 5. Include diagrams for power, signal, and control wiring.
- D. Warranty: Submit manufacturer's standard warranty.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches square, representing actual product, color, and patterns.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: ISO 9001:2015 certified company.
- B. Installer Qualifications: Factory trained and experienced with system installations of scope and size required for the Project.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
- C. Handling: Protect materials during handling and installation to prevent damage.

1.8 PROJECT CONDITIONS

- A. Exterior Conditions for local weather.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
 - 1. Aiphone Corp.,
 - 2. Code Blue
 - 3. Talkaphone
- B. IP Video Intercom System: IX Series Intercom System as manufactured by Aiphone Corporation or equal.

2.2 FUNCTIONAL COMPONENTS:

- A. The Emergency Tower shall be provided as a complete system with all necessary hardware.
- B. Mobile device Sub Master App.
- C. IP relay Adapter with Mobile App server for IX Series (four inputs, ten outputs, PoE).
- D. IP-PBX for IX Series, 500 Users.
- E. Programming Software for the IX Series.
- F. Functional Components: As indicated on the drawings or as required to complete system.

1. Video Master Station Series IX-MV7:

- a. Model IX-MV7-HB (Master Station - Black w/Handset).
- b. Locate as directed by owner.
- c. Intercom-over IP shall notify campus security and/or emergency personnel.

2. Emergency and Assistance Modular Towers: TW-Series.

a. Modular tower:

- 1) 3-Module, high level Tower.

- b. Color: To be selected by Architect from the manufacturer's standard colors.
- c. Lettering Color: To be selected by Architect.
- d. Top Cover:

- 1) Light cage with blue beacon and strobe.

- e. UL Listed electrical box included in base module
- f. Material: 0.25 inch zinc treated steel powder coated exterior.
- g. Elongated access panel on back of each module for easier installation and wiring.
- h. Mounting studs in both top and base modules for internal product (power supply, relay, etc.).
- i. Weather and vandal resistant.
- j. Mounting: L-brackets, anchor bolts to foundation meeting size requirements of manufacturer.
- k. Compatible with IX-Series emergency and assistance stations.
- l. Beacon / Strobe is always lit; flashes during emergency call-in. Install transformer for required 24V DC.

- m. LED light for station illumination in middle module. Install required transformer for required 24V DC.
- n. Call button mounting height and signage meet ADA regulations.
- o. Call button to notify campus security and/or emergency personnel.
- p. Capture Streaming with ONVIF audio and video (24/7) to the existing video management system.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive integrated security and communication system.
- B. Notify Architect of conditions that would adversely affect installation or subsequent use.
- C. Do not begin installation until unacceptable conditions are corrected.

3.2 PREPARATION

- A. Verify the following compliance before starting installation.
 - 1. The unit turns inoperative during power failure.
 - 2. Keep the intercom wires at least 1 foot away from strong electrical wiring (AC 100-240 V) including wiring for inverter electrical appliances. Noise and malfunction could result.
 - 3. If a strong light shines on the main unit screen, the picture may turn white or only silhouettes will be visible.
 - 4. Other manufacturer's devices (such as sensor, detectors, door releases) used with this system, comply with the manufacturer's installation requirements.

3.3 INSTALLATION

- A. Install integrated security and communication system in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Mount equipment plumb, level, square, and secure. For video entrance stations and video door stations, comply with manufacturer's design requirements to provide optimum picture quality of station monitoring.
- C. Install required transformers for required 24V DC.

3.4 SET-UP AND ADJUSTING

- A. Adjust integrated security and communication system for proper operation in accordance with manufacturer's instructions.

3.5 DEMONSTRATION AND TRAINING

- A. Demonstration:
 - 1. Demonstrate that integrated security and communication system functions properly.
 - 2. Perform demonstration at final system inspection by qualified representative of manufacturer.

B. Instruction and Training:

1. Provide instruction and training of Owner's personnel as required for operation of integrated security and communication system.
2. Provide hands-on demonstration of operation of system components and complete system, including user-level program changes and functions.
3. Provide instruction and training by qualified representative of manufacturer.

3.6 PROTECTION

- A. Protect installed integrated security and communication system from damage during construction.

END OF SECTION

SECTION 282000 - VIDEO SURVEILLANCE

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. Section includes a video surveillance system consisting of cameras, digital video recorder, data transmission wiring, and a control station with its associated equipment.

1.3 DEFINITIONS

- A. AGC: Automatic gain control.
- B. BNC: Bayonet Neill-Concelman - type of connector.
- C. CCD: Charge-coupled device.
- D. FTP: File transfer protocol.
- E. IP: Internet protocol.
- F. LAN: Local area network.
- G. MPEG: Moving picture experts group.
- H. NTSC: National Television System Committee.
- I. PC: Personal computer.
- J. PTZ: Pan-tilt-zoom.
- K. TCP: Transmission control protocol - connects hosts on the Internet.
- L. WAN: Wide area network.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include dimensions and data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For video surveillance. Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 2. Functional Block Diagram: Show single-line interconnections between components for signal transmission and control. Show cable types and sizes.
 3. Dimensioned plan and elevations of equipment racks, control panels, and consoles. Show access and workspace requirements.
 4. Wiring Diagrams: For power, signal, and control wiring.
- C. Design Data: Include an equipment list consisting of every piece of equipment by model number, manufacturer, serial number, location, and date of original installation. Add pretesting record of each piece of equipment, listing name of person testing, date of test, set points of adjustments, name and description of the view of preset positions, description of alarms, and description of unit output responses to an alarm.

1.5 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Product Warranty: Sample of special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For cameras, power supplies, infrared illuminators, monitors, videotape recorders, digital video recorders, video switches, and control-station components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 1. Lists of spare parts and replacement components recommended to be stored at the site for ready access.

1.7 PROJECT CONDITIONS

- A. Environmental Conditions: Capable of withstanding the following environmental conditions without mechanical or electrical damage or degradation of operating capability:
 1. Exterior Environment: System components installed in locations exposed to weather shall be rated for continuous operation in ambient temperatures of minus 40 to plus 140 deg F dry bulb and 0 to 95 percent relative humidity, condensing. Rate for continuous operation when exposed to rain as specified in NEMA 250, winds up to 85 mph. Outdoor housing IEC 60529 IP66 certified for comprehensive dust and water ingress protection.
 2. Security Environment: IK10 Impact Rating and UL/CSA/IEC 60950-22.
 3. Electromagnetic Immunity: EN 55024, EN 61000-6-1

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of cameras, equipment related to camera operation, and control-station equipment that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM REQUIREMENTS

- A. Video-signal format shall comply with NTSC standard, composite interlaced video. Composite video-signal termination shall be 75 ohms.
- B. Surge Protection: Protect components from voltage surges originating external to equipment housing and entering through power, communication, signal, control, or sensing leads. Include surge protection for external wiring of each conductor's entry connection to components.
 - 1. Minimum Protection for Power Connections 120 V and More: Auxiliary panel suppressors complying with requirements in Section 264313 "Surge Protection for Low-Voltage Electrical Power Circuits."
 - 2. Minimum Protection for Communication, Signal, Control, and Low-Voltage Power Connections: Comply with requirements in Section 264313 "Surge Protection for Low-Voltage Electrical Power Circuits" as recommended by manufacturer for type of line being protected.

2.2 PERFORMANCE REQUIREMENTS

- A. The new equipment shall be compatible with the existing video surveillance management system.
- B. The hardware shall be installed to accommodate the new cameras.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- D. Comply with NECA 1.
- E. Comply with NFPA 70.

2.3 CAMERAS

- A. Avigilon outdoor Pan Tilt Zoom camera equal to: H4 IR PTZ.
- B. Image Performance:
 - 1. 2.0 mega pixels

2. Active Pixels: 1920(H) x 1080(V).
3. Imaging Area: 4.8mm (H) x 2.7mm (V).
4. IR Illumination: 820 ft maximum distance at 0 lux
5. Minimum Illumination: 0 lux in IR mode; 0.1 lux (F/1.6) in color mode no IR); 0.0. lux (F/1.6) in monochrome mode (no IR).
6. Dynamic Range 120+ dB.
7. Image Rate: Up to 60 fps
8. Resolution Scaling: down to (16:9) or (5:4).
9. 3D Noise Reduction Filter: Yes, Adjustable Strength

C. Lens:

1. Lens: 4.3 to 129 mm, F/1.6 – F/4.7, autofocus
2. Angle of View: 2.3” – 63.7”
3. Optical Zoom: 30x

D. Image Control:

1. Video Compression: H.264 (MPEG-4 Part 10/AVC, Motion JPEG, HDSM SmartCodec technology
2. Streaming: Multi-stream H.264 and Motion JPEG
3. Motion Detection: Selectable sensitivity and threshold
4. Electronic Shutter Control: Automatic, Manual (1/1 to 1/10,000 sec)
5. Iris Control: Automatic, Manual
6. Day/Night Control: Automatic, Manual
7. Flicker Control: 50 Hz, 60 Hz
8. White Balance: Automatic, Manual
9. Backlight Compensation: Manual
10. Privacy Zones: Up to 64 zones, 3D privacy mask supported
11. Presets: 500 named presets
12. Tours: 10 named guard tours
13. Audio Compression Method: G.711PCM 8 kHz
14. Digital Zoom: Up to 100x when used with ACC Client for Windows
15. Electronic Image Stabilization: on/off
16. Digital Defog: Adjustable/Off

E. Network:

1. Network: 100BASE-TX
2. Cabling Type: CAT6
3. Connector: RJ-45
4. API: ONVIF Profile S compliant
5. Security: Password protection, HTTPS encryption, digest authentication, WS authentication, user access log, 802.1x port based authentication
6. Protocol: IPv6, IPv4, HTTP, HTTPS, SOAP, DNS, NTP, RTSP, RTCP, RTP, TCP, UDP, IGMP, ICMP, DHCP, Zeroconf, ARP, LLDP.
7. Streaming Protocols: RTP/UDP, RTP/UDP multicast, RTP/RTSP/TCP, RTP/RTSP/HTTP/TCP, RTP/RTSP/HTTPS/TCP, HTTP
8. Device Management Protocols: SNMP v2c, SNMP v3

F. Peripherals:

1. Audio Input/Output: Line level input and output
2. External I/O Terminals: Four Alarm In; Two Alarm Out
3. Onboard Storage: microSD/microSDHC/microSDXC slot – minimum class 6; class 10/UHS-1 or better recommended

G. Mechanical:

1. Body: Aluminum
2. Housing: Pendant Mount
3. Finish: Powder coat, cool grey
4. Tilt: -20° to 90°, Auto-Flip, 300°/second max
5. Pan: 360°, endless, 300°/second

H. Electrical:

1. Power Consumption: 71 W with 95 W PoE
2. Power Source: PoE

I. Certifications:

1. Certifications/Directives: UL, cUL, RCH, WEEE, EAC, BIS.
2. Safety: UL 6236B-1
3. Environmental: IK10 Impact Rating, IEC 60529 IP66 Rating, UL/CSA/IEC 60950-22.

J. Supported Video Analytics Events:

1. Objects in Area: The event is triggered when the selected object type moves into the region of interest.
2. Objects Loitering: The event is triggered when the selected object type stays within the region of interest for an extended amount of time.
3. Objects Crossing Beam: The event is triggered when the specified number of objects have crossed the directional beam that is configured over the camera's field of view. The beam can be unidirectional or bidirectional.
4. Object Appears or Enters Area: the event is triggered by each object that enters the region of interest. The event can be used to count objects.
5. Object Not Present in Area: The event is triggered when no objects are present in the region of interest.
6. Object Enter Area: the event is triggered when the specified number of objects have entered the region of interest.
7. Object Leave Area: the event is triggered when the specified number of objects have entered the region of interest.
8. Object Stops in Area: the event is triggered when an object in a region of interest stops moving for the specified threshold time.
9. Direction Violated: the event is triggered when an object moves in the prohibited direction of travel.
10. Tamper Detection: The event is triggered when the scene unexpectedly changes.

2.4 CAMERA-SUPPORTING EQUIPMENT

- A. The equipment supports shall be compatible and approved with the cameras specified.

- B. Minimum Load Rating: Rated for load in excess of the total weight supported times a minimum safety factor of two.
- C. Pan Units: Motorized automatic-scanning units arranged to provide remote-controlled manual and automatic camera panning action and equipped with matching mounting brackets.
 - 1. Scanning Operation: Silent, smooth, and positive.
 - 2. Stops: Adjustable without disassembly, to limit the scanning arc.
- D. Mounting Brackets for Fixed Cameras: Type matched to items supported and mounting conditions. Include manual pan-and-tilt adjustment.
- E. Protective Housings for Fixed and Movable Cameras: Aluminum enclosures with internal camera mounting and connecting provisions that are matched to camera/lens combination and mounting and installing arrangement of camera to be housed.
 - 1. Camera Viewing Window: **[Polycarbonate] [Lexan]** window, aligned with camera lens.
 - 2. Alignment Provisions: Camera mounting shall provide for field aiming of camera and permit removal and reinstallation of camera lens without disturbing camera alignment.
 - 3. Sun shield shall not interfere with normal airflow around the housing.
 - 4. Mounting bracket and hardware for pole mounting of the housing. Bracket shall be of same material as the housing; mounting hardware shall be stainless steel.
 - 5. Finish: Housing and mounting bracket shall be factory finished using manufacturer's standard finishing process suitable for the environment.
 - 6. Enclosure Rating: IP66.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine pathway elements intended for cables. Check raceways and other elements for compliance with space allocations, installation tolerance, hazards to camera installation, and other conditions affecting installation.
- B. Examine roughing-in for LAN, WAN, and IP network before device installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 WIRING

- A. Comply with requirements in Section 270528 "Pathways for Communications Systems."
- B. Wiring Method: Install cables in raceways unless otherwise indicated.
 - 1. Conceal raceways except in unfinished spaces.
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

- D. Splices, Taps, and Terminations: For power and control wiring, use numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- E. For communication wiring, comply with the following:
 - 1. Section 271323 "Communications Optical Fiber Backbone Cabling."
 - 2. Section 271513 "Communications Copper Horizontal Cabling."
- F. Grounding: Provide independent-signal circuit grounding recommended in writing by manufacturer.

3.3 VIDEO SURVEILLANCE SYSTEM INSTALLATION

- A. Install cameras and infrared illuminators level and plumb.
- B. Set pan unit and pan-and-tilt unit stops to suit final camera position and to obtain the field of view required for camera. Connect all controls and alarms and adjust.
- C. Identify system components, wiring, cabling, and terminals according to Section 270553 "Identification for Communications Systems."

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Tests and Inspections:
 - 1. Inspection: Verify that units and controls are properly installed, connected, and labeled, and that interconnecting wires and terminals are identified.
 - 2. Pretesting: Align and adjust system and pretest components, wiring, and functions to verify that they comply with specified requirements. Conduct tests at varying lighting levels, including day and night scenes as applicable. Prepare video-surveillance equipment for acceptance and operational testing as follows:
 - a. Prepare equipment list described in "Informational Submittals" Article.
 - b. Verify operation of auto-iris lenses.
 - c. Set back-focus of zoom lenses. At focus set to infinity, simulate nighttime lighting conditions by using a dark glass filter of a density that produces a clear image. Additionally, set zoom to full wide angle and aim camera at an object 50 to 75 feet away. Adjust until image is in focus from full wide angle to full telephoto, with the filter in place.
 - d. Set and name all preset positions; consult Owner's personnel.
 - e. Set sensitivity of motion detection.

- f. Connect and verify responses to alarms.
 - g. Verify operation of control-station equipment.
 - 3. Test Schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 14 days. Provide a minimum of 10 days' notice of test schedule.
 - 4. Operational Tests: Perform operational system tests to verify that system complies with Specifications. Include all modes of system operation. Test equipment for proper operation in all functional modes.
- C. Cameras will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.5 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to four visits to Project during other-than-normal occupancy hours for this purpose. Tasks shall include, but are not limited to, the following:
- 1. Check cable connections.
 - 2. Check proper operation of cameras and lenses. Verify operation of auto-iris lenses and adjust back-focus as needed.
 - 3. Adjust all preset positions; consult Owner's personnel.
 - 4. Recommend changes to cameras, lenses, and associated equipment to improve Owner's use of video surveillance system.
 - 5. Provide a written report of adjustments and recommendations.

3.6 CLEANING

- A. Clean installed items using methods and materials recommended in writing by manufacturer.
- B. Clean video-surveillance-system components, including camera-housing windows, lenses, and monitor screens.

3.7 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain video-surveillance equipment.

END OF SECTION 282000