BID NO. B17-10
Bldg 400 Replace Door Hardware,
Upper Campus

***Specifications***

Bid RFI/INQUIRY Questions Due:
Tuesday, April 04, 2017, 2:00PM
Gale Stevens, Buyer
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Rekey Replace Door Hardware Upper Campus Phase II

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SECTION 001: PROJECT SCOPE

Part 1: Project Intent

1.1

A. Provide fully functional Access Control system. System will incorporate all new and existing readers and associated devices, which will be fully functional upon completion of the project. All existing systems shall remain functional throughout the course of the project.

Part 2: Project Scope

2.1

A. Furnish and install at indicated locations specified integrated access control door hardware and access control system firmware and software for a completely operational access control and security site management system. Contractor (also referred to as Integrator) will be responsible for providing and installing all raceway, wire, readers, associated components, and software, per project specifications, needed for Cabrillo to have a fully functional system at project completion.

B. Base Quotation- The Contractor shall install fifty-nine (59) cylindrical and two (2) mortise type integrated access control door hardware, firmware and software in accordance with the project specifications, drawings and as per the description below:

1. Building 400
   i. The Contractor shall furnish and install:
      a. (1) Patch Panel
      b. (1) Drop Cable
      c. (1) Mod Jack
      d. (1) Mod Plug
   ii. The Contractor shall furnish and install:
      a. (59) IP enabled POE Integrated Card Reader Cylindrical Locks (ANSI/BHMA A156.2) IP enabled Grade 1 bored lockset with integrated proximity card reader and request-to-exit signaling in one complete unit
      b. (2) IP enabled POE Integrated Card Reader Mortise Locks (ANSI/BHMA A156.13) IP enabled Grade 1 mortise lockset with integrated proximity card reader, request-to-exit, latchbolt and deadbolt monitoring, and door position signaling in one complete unit.

2. See Part 6 for building layout and door locations.

C. Additive Alternate 1: The Contractor shall install fourteen (14) cylindrical and six (6) mortise type integrated access control door hardware, firmware and software in accordance with the project specifications, drawings and as per the description below:

1. Building 450
   i. The Contractor shall furnish and install:
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a. (1) Patch Panel
b. (1) Drop Cable
c. (1) Mod Jack
d. (1) Mod Plug

ii. The Contractor shall install:
   a. (14) IP enabled POE Integrated Card Reader Cylindrical Locks (ANSI/BHMA A156.2) IP enabled Grade 1 bored lockset with integrated proximity card reader and request-to-exit signaling in one complete unit
   b. (6) IP enabled POE Integrated Card Reader Mortise Locks (ANSI/BHMA A156.13) IP enabled Grade 1 mortise lockset with integrated proximity card reader, request-to-exit, latchbolt and deadbolt monitoring, and door position signaling in one complete unit.

2. See Part 7 for building layout and door locations.

D. Existing access database shall be integrated into new software specified in Part 2.4 of Project Spec. All programming and functionality of existing locks and software modules and associated devices must remain in use, fully accessible to the owner during and post update to new software installation; Allowing user to program and monitor all locks via a single platform. Current database contains:
   1. 47- Hardwired readers to access control panel (1-BAS 500 panel, 2-BAS 1000 panels)
   2. 149- Wireless, Stanley WiQ/Omni readers
   3. 182- Stanley Offline readers
   4. 22- Portal Gateways

2.2

A. Contractor / Integrator shall provide onsite technician 4 hours per day for 14 business days after integration is complete to ensure all access control software and hardware is working properly.

Part 3: Service Agreement

3.1

A. Contractor / Integrator shall provide one year service agreement on all new software and hardware installed. Service agreement shall include any issues with new software causing communication issues with existing readers and devices. The one year service agreement will also include any required service and repairs to all components of the system devices; including but not limited to any hardware components, lock and lock assembly mechanism, and any other software or component necessary for the complete operation of the system. Service technician shall be available by phone 24/7, and be onsite within a 24hr period if needed.

Part 4: Project Schedule
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4.1

A. Construction Start Date: 5-21-17

B. Substantial Completion: 7-31-17

1. Substantial completion shall be defined as all readers and associated components for base bid (Bldg. 400) and alternate bid (Bldg. 450) if approved, shall be installed, tested and operation on new Lenel 7.3 OnGuard software.

C. Final Completion: 8-07-17

2. Final completion shall be defined integration of existing access database to new Lenel OnGuard 7.3 software complete. All new and existing readers, controllers and associated devices shall be fully functional and programmable via Lenel OnGuard 7.3 software. Programming and functionality of access control system shall be tested and confirmed by Cabrillo College.

D. Work Hours

1. Work performed between 5/21/17 and 6/17/17 will be performed between the hours of 0700-1700.

2. Work performed between 5/21/17 and 6/17/17 will be performed between the hours of 0700-1700.

Part 5: Training

5.1

A. Contractor shall provide four (4), four (4) hour trainings on repair of locksets and programing as part of the base bid. All programing and lock functionality will be confirmed by Cabrillo College or other authorized personnel.
Part 6: 400bldg
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Part 7: 450bldg

<<<END SECTION>>>
Part 1: General Provisions

1.1 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum [5] years of documented experience in providing access control and security systems equipment and software similar to that indicated for this Project and that have a proven record of successful in-service performance.

1. Software and access control systems components to have been previously and thoroughly tested together with proven installations similar in size and functionality to the design requirements indicated for this Project.

B. Integrator Qualifications: Systems Integrators, verifiably factory trained and certified by the primary product manufacturers, with a minimum 3 years documented experience installing complete integrated access control systems similar in material, design, and scope to that indicated for this Project and whose work has resulted in construction with a proven record of successful in-service performance. Qualifications include, but are not necessarily limited, to the following:

1. References: Provide a list of references for similar projects including contact name, phone number, name and type of project.

2. Professional Staffing: Firms to have a dedicated access control systems integration department with full time, experienced professionals on staff experienced in providing on site consulting services for both electrified door hardware and integrated access control systems installations.

3. Factory Training: Installation and service technicians are to be competent factory trained and certified personnel capable of maintaining the system.

4. Service Center: Firms to have a service center capable of providing training, in-stock parts, and emergency maintenance and repairs at the Project site with 24-hour/7-days a week maximum response time.

5. Network installation must be completed by Commscope Authorized Partner, able to provide extended 25 year warranty. Each permanent link shall be tested to TIA/EIA standards with documentation provided to end user. If field manufactured patch cables are used a channel test per TIA/EIA standards will be required. Documentation shall be provided to end user.

6. General Installation shall be installed to applicable codes and standards. Inspection may be performed by the College or authority of their choosing.

C. Supplier/Dealer Qualifications: Supplier/Dealers, verifiably authorized and in good standing with the primary product manufacturers, with a minimum three (3) years experience supplying integrated access control systems similar in material, design, and scope to that indicated for this
SECTION 003: TECHNICAL SPECIFICATIONS
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Project and whose work has resulted in construction with a proven record of successful in-service performance.

D. Integrated Wiegand Output, Wireless, and IP-Enabled access control products are required to be supplied and installed only through designated ASSA ABLOY "Authorized Channel Partner" (ACP) and “Certified Integrator” (CI) accounts.

E. Source Limitations: Obtain the access control door hardware, system firmware and application software specified in this Part from a single source, qualified supplier/integrator unless otherwise indicated.
   1. Electrified modifications or enhancements made to a source manufacturer’s product line by a secondary or third party source will not be accepted.
   2. Provide integrated access control door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

Part 2: Products

2.1 ACCESS CONTROL AND SITE MANAGEMENT SYSTEM HARDWARE.

A. General: Provide all necessary access control field hardware devices required to receive alarms and administer all access granted/denied decisions. Field hardware devices must be designed and installed in accordance with applicable electrical codes.

B. Central Computer Host Server (Owner Provided): The central host server is interconnected to all system components, including client workstations and field installed controllers, providing operator interface, interaction, display, control, and real-time monitoring.

2.2 INTEGRATED IP-ENABLED ACCESS CONTROL DEVICES

A. To be furnished and installed by Contractor: IP Enabled Power-over-Ethernet (PoE) Integrated Card Reader Mortise Lock: IP enabled, PoE ANSI/BHMA A156.13 Grade 1 mortise lockset with integrated proximity card reader, request-to-exit, latchbolt and deadbolt monitoring, and door position signaling in one complete unit. Motor driven locking/unlocking control of the lever handle trim, 3/4" deadlocking anti-friction latch, and 1" case-hardened steel deadbolt (optional). Lock is U.L listed and labeled for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.

   1. Completely intelligent and integrated locking unit with Ethernet power and communication connection capability directly from the locking unit back to the central system host server without additional access control interfaces or components (excluding PoE switches and Mid-Span devices) via an existing or newly installed TCP/IP network.

   2. Open architecture design supports wired integration with third party access control systems applications via software development kit (SDK). Real-time software accessible alarms for forced door, unknown card and door held open, with inside lever handle (request-to-exit), auxiliary latchbolt, deadbolt, and door position (open/closed status) monitoring.
3. 2,400 users and 10,000 event transaction history (audit trail). Distributed intelligence allows standalone operation in absence of network communication allowing for system operational redundancy.

4. Supports HID 125 kHz proximity formats up to 39 bits, including Corporate 1000. Dual credentialing available with keypad option.

5. Power and communication from one Ethernet (CAT6a) cable. Compliant with 802.3af specifications requiring 12.95 watts for Power over Ethernet.


7. High security mechanical key provides emergency override retraction of latchbolt without need for electronic activation.

8. Ethernet system framework, network cabling and mounting boxes, are required for complete system functionality.
   i. Network Drop Cable Specifications: Cat 6A (Commscope Uniprise CMR-00423UNP10G-06) Blue. TIA/EIA-568-B.
   ii. Commscope Uniprise (UNJ10G-WH) 1-Port Mod Jack 8W8P 110 T568A/B Cat6A White
   iii. RJ45 Mod Plug-Commscope MP-6AU-Plug-B-1
   iv. 48 Port Patch Panel-Commscope (UNP10G-48P- Cat 6A

9. Acceptable Manufacturers:
   i. Corbin Russwin Hardware (RU) – IN220 ML Series.
   ii. Sargent Manufacturing (SA) – IN220 8200 Series.
   iii. Function 82278 / Credentials BIP / Reader “B” / Level “NJ2” / Rose “LN” / option “LC” less cylinder, or Corbin Russwin Equivalent

10. Exit Device Option-Sargent Manufacturing (SA)- IN 220 80 series or equivalent
   i. Function “8977” / Credentials “BIP” / Reader “B” / Lever NJ1/ 26D finish / option “LC” less cylinder, or Corbin Russwin equivalent.

B. To be furnished and installed by Contractor: IP Enabled Power-over-Ethernet (PoE) Integrated Card Reader Cylindrical Lock: IP enabled, PoE ANSI/BHMA A156.2 Grade 1 bored lockset with integrated proximity card reader and request-to-exit signaling in one complete unit. Motor driven locking/unlocking control of the lever handle trim with 1/2" deadlocking stainless steel latch. Lock is U.L listed and labeled for use on up to 3 hour fire rated openings

   1. Completely intelligent and integrated locking unit with Ethernet power and communication connection capability directly from the locking unit back to the central system host server without additional access control interfaces or components
(excluding PoE switches and Mid-Span devices) via an existing or newly installed TCP/IP network.

2. Open architecture design supports wired integration with third party access control systems applications via software development kit (SDK). Real-time software accessible alarms for forced door, unknown card and door held open, with inside lever handle (request-to-exit) signaling and door position (open/closed status) monitoring (via separately connected in-door DPS).

3. 2,400 users and 10,000 event transaction history (audit trail). Distributed intelligence allows standalone operation in absence of network communication allowing for system operational redundancy.

4. Supports HID 125 kHz proximity formats up to 39 bits, including Corporate 1000. Dual credentialing available with keypad option.

5. Power and communication from one Ethernet (CAT6a) cable. Compliant with 802.3af specifications requiring 12.95 watts for Power over Ethernet.

6. Supports real-time system lockdown capabilities.

7. High security mechanical key provides emergency override retraction of latchbolt without need for electronic activation.

8. Ethernet system framework, network cabling and mounting boxes, are required for complete system functionality.
   i. Network Drop Cable Specifications: Cat 6A (Commscope Uniprise CMR-00423UNP10G-06) Blue. TIA/EIA-568-B.
   ii. Commscope Uniprise (UNJ10G-WH) 1-Port Mod Jack 8W8P 110 T568A/B Cat6A White
   iii. RJ45 Mod Plug-Commscope MP-6AU-Plug-B-1
   iv. 48 Port Patch Panel-Commscope (UNP10G-48P- Cat 6A

9. Acceptable Manufacturers:
   i. Corbin Russwin Hardware (RU) – IN220 ML Series.
   ii. Sargent Manufacturing (SA) – IN220 8200 Series.
   iii. Function 82278 / Credentials BIP / Reader “B” / Level “NJ2” / Rose “LN” / option “LC” less cylinder, or Corbin Russwin Equivalent

10. Exit Device Option-Sargent Manufacturing (SA)- IN 220 80 series or equivalent
   i. Function “8977” / Credentials “BIP” / Reader “B” / Lever NJ1/ 26D finish / option “LC” less cylinder, or Corbin Russwin equivalent.

C. To be furnished and installed by Contractor: IP Enabled Power-over-Ethernet (PoE) Integrated
Card Reader Cylindrical Lock: IP enabled, PoE ANSI/BHMA A156.2 Grade 1 bored lockset with integrated proximity card reader and request-to-exit signaling in one complete unit. Motor driven locking/unlocking control of the lever handle trim with 1/2" deadlocking stainless steel latch. Lock is U.L listed and labeled for use on up to 3 hour fire rated openings. Lever shall be style “L” with 626 finish.

1. Completely intelligent and integrated locking unit with Ethernet power and communication connection capability directly from the locking unit back to the central system host server without additional access control interfaces or components (excluding PoE switches and Mid-Span devices) via an existing or newly installed TCP/IP network.

2. Open architecture design supports wired integration with third party access control systems applications via software development kit (SDK). Real-time software accessible alarms for forced door, unknown card and door held open, with inside lever handle (request-to-exit) signaling and door position (open/closed status) monitoring (via separately connected in-door DPS).

3. 2,400 users and 10,000 event transaction history (audit trail). Distributed intelligence allows standalone operation in absence of network communication allowing for system operational redundancy.

4. Supports HID 125 kHz proximity formats up to 39 bits, including Corporate 1000. Dual credentialing available with keypad option.

5. Power and communication from one Ethernet (CAT6a) cable. Compliant with 802.3af specifications requiring 12.95 watts for Power over Ethernet.

6. Supports real-time system lockdown capabilities.

7. High security mechanical key provides emergency override retraction of latchbolt without need for electronic activation.

8. Ethernet system framework, network cabling and mounting boxes, are required for complete system functionality.

   i. Network Drop Cable Specifications: Cat 6A (Commscope Uniprise CMR-00423UNP10G-06) Blue. TIA/EIA-568-B.
   
   ii. Commscope Uniprise (UNJ10G-WH) 1-Port Mod Jack 8W8P 110 T568A/B Cat6A White

   iii. RJ45 Mod Plug-Commscope MP-6AU-Plug-B-1

   iv. 48 Port Patch Panel-Commscope (UNP10G-48P- Cat 6A

9. Acceptable Manufacturers:

   i. Corbin Russwin Hardware (RU) – IN220 ML Series.

   ii. Sargent Manufacturing (SA) – IN220 8200 Series.
iii. Function 82278 / Credentials BIP / Reader “B” / Level “NJ2” / Rose “LN” / option “LC” less cylinder, or Corbin Russwin Equivalent

10. Exit Device Option-Sargent Manufacturing (SA)- IN 220 80 series or equivalent

i. Function “8977” / Credentials “BIP” / Reader “B” / Lever NJ1/ 26D finish / option “LC” less cylinder, or Corbin Russwin equivalent.

2.3 RACEWAY

A. All exposed wiring in offices, classrooms, storage or exterior shall be run in raceway. Refer to detail drawings for specific layout.

1. Raceway shall be ½” EMT or greater.

2. Exposed raceway on door shall be Legrand Wiremold V700.

3. Armored Loop- SDC PT-3/8V or equivalent.

4. Junction Box at door- Legrand Wiremold- V57242

2.4 ACCESS CONTROL AND SITE MANAGEMENT SYSTEM SOFTWARE

A. Lenel On Guard 7.3 SWS-ADV.

1. Integration of existing BASIS 6.5.264 and associated components to new On Guard 7.3 database shall be required.

<<<END SECTION>>>
SECTION 002: GENERAL CONDITIONS

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SECTION 002: GENERAL CONDITIONS

Part 1: General Provisions

1.1

A. All work on Campus is to be paid at Prevailing Wage. The Contractor and all Subcontractors shall prepare and submit Certified Payroll Records to the Labor Commissioner in compliance with requirements established in Labor Code §1771.4. The form and content of Certified Payroll Records shall be as established by the Labor Commissioner and the frequency of Certified Payroll Records submittal to the Labor Commissioner shall be pursuant to Labor Code §1771.4. Copies of the Certified Payroll Records shall also be electronically submitted to the PM monthly.

B. All required certificates of insurance to be submitted prior to commencement of work.

C. Compliance with all OSHA safety regulations throughout all phases of work.

D. Maintain a clean and orderly jobsite.

E. Remove and dispose of all job site waste and debris.

F. Return spaces to the condition in which they were found in- include vacuuming and pick up.

G. All work to be performed by individuals licensed to perform the work.

H. All work to be completed in an orderly and workman like manner.

I. All safety and traffic controls as dictated by the work and necessary for its successful completion.

J. All duties necessary to ensure compliance with manufacture’s specifications.

K. All clean up, demolition, transportation and dumping fees necessary for the successful completion of the work.

L. The Contractor agrees to submit the Construction Schedule to the Project Manager at the preconstruction meeting. Scheduling, shut downs, miles stones and impact to building occupants are to be discussed and coordinated at this meeting.

M. The Contractor agrees to take every measure and incur all cost associated with protecting the existing equipment and facilities.

N. The Contractor agrees to accept liability for any damage cause through neglect and/or wanton disregard during the course of their construction and/or for the failure of their installation.

Part 2: Specifications and Standards

2.1 SUMMARY

A. Furnish all labor, materials, apparatus, tools, equipment, transportation, temporary construction and special or occasional services as required to make a complete working Access Control system, as shown on the drawings and/or as described in these specifications. The work shall include materials, appliances and apparatus not specifically mentioned herein or noted on the drawings as being furnished and installed under another Part.
B. Work Included:
   1. Incidental work and materials involved in installing the electrical, data and Power-Over-Ethernet (POE) equipment including, but not limited to, rigging, support hardware, temporary lighting and carpentry.
   2. Fire-stopping.
   3. Compliance with all applicable codes.
   4. Testing.
   5. Seismic bracing and bracing of installed equipment.
   6. Project record drawings.

2.2 Perform all work, in accordance with the appropriate Parts of the specifications, necessary to furnish a complete Power-Over-Ethernet, networking connection, raceway and proximity card reader installation, including without limitation:
   1. Moisture protection: Include sheet metal flashing, counter flashing, caulking and sealants as required for waterproofing of conduit penetrations through walls, and roofs. All leaks caused by this contractor’s work shall be repaired at no additional cost to the owner.
   2. Miscellaneous metal work: Include fittings, brackets, supports, rods, welding and pipe as required for support and bracing of raceways, lighting fixtures, panel boards, etc.

2.3 SEISMIC BRACING

   A. All major fixtures and components shall be anchored and braced to conform to the International Building Code.

2.4 QUALITY ASSURANCE

   A. Code Compliance: Comply with applicable codes, laws, ordinances, rules, regulations, standards of applicable code-enforcing authorities and best industry practice.

   B. References and Standards: All materials and equipment shall comply with all applicable standards and requirements of the standards listed below. Nothing in the Drawings or Specifications shall be construed to permit Work not conforming to applicable codes, laws, ordinances, rules, regulations. It is not the intent of Drawings or Specifications to repeat requirements of codes except where necessary for completeness or clarity.

   1. Underwriters' Laboratories, Inc. (UL).
   3. Institute of Electrical and Electronics Engineers (IEEE).
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7. National Electrical Manufacturer's Association (NEMA).

C. Manufacturer's Directions: Comply and conform to manufacturer's directions for specific equipment installation requirements.

D. Protection of Equipment:

1. Care shall be exercised during construction to avoid damage to equipment. Equipment shall be protected from theft, dust and moisture prior to and during construction.
2. Where required or directed, construct temporary protection for equipment and installations so as to protect same from dust and debris caused by construction.
3. The Contractor shall repair by spray or brush painting, after properly preparing the surface, scratches or defects in the finish of the equipment. Only identical paint furnished by the equipment manufacturer shall be used.
4. Failure of the Contractor to protect the equipment as outlined herein shall be grounds for rejection of the equipment and its installation.

E. Qualifications and License Requirements:

1. The Subcontractor performing the work shall have an appropriate license from the State of California.
2. The Subcontractor performing the work shall have sufficient experience in this type of construction and shall, upon request, provide details of that experience (project names and addresses and references with names and phone numbers).

2.5 PROTECTION

A. Keep conduits, junction boxes and outlet boxes and other openings closed to prevent entry of foreign matter; cover fixtures, equipment and apparatus; protect against dirt, paint, water, chemical, or mechanical damage before and during construction period. Restore to original condition any fixture, apparatus, or equipment damaged prior to final acceptance, including restoration of damaged shop coats of paint, before final acceptance. Protect bright finished surfaces and similar items until in service. No rust or damage will be permitted.

2.6 SITE INVESTIGATION
A. The Contractor acknowledges that he has investigated and satisfied himself as to the conditions affecting his work including reviewing the site. No allowance shall be subsequently made for any extra expense incurred due to Contractor’s failure or neglect to determine conditions affecting the Work.

2.7 SAFETY AND INDEMNITY

A. The Contractor shall be responsible for implementing, maintaining and supervising all necessary safety precautions which will insure against injury to persons or damage to property as a result of any of his work, tools or equipment on or off the project, before, during or after normal working hours. No drawing review, construction review or any other act or services rendered by the District, Architect/Engineer, and/or Project Manager, their employees or consultants, shall be construed to approve or judge upon the adequacy of the Contractor’s safety measures.

B. The Contractor shall hold harmless, indemnify and defend the District, its Architect/Engineerz, and Project Manager, their employees and consultants from any and all liability claims, losses or damage arising or alleged to arise from the performance of the work described herein, but not including the sole negligence of the District, Architect/Engineer, Program Manager, their employees or consultants.

2.8 PROJECT RECORD DRAWINGS

A. Prepare complete record drawings showing actual installed locations and equipment specifications, fixtures, devices, feeders, branch circuits and empty conduit runs and a complete and accurate single-line diagram of the POE work as installed.

B. Submit As-Built drawings to the District representative.

2.9 WORKMANSHIP

A. All workmanship shall be of highest quality, done by persons especially skilled at assigned tasks, and shall result in neat installation consistent with best practices of trades.

B. Install work uniform, level and plumb in relationship to lines of building. Do not install any exposed diagonal, or otherwise irregular work unless approved by the District.

2.10 TESTING AND COMMISSIONING

A. General:

1. Provide all required labor, equipment and materials to perform the tests. Tests must be successfully completed prior to and after energizing systems. Defects
which are found during tests shall be corrected. Any test which fails shall be repeated, after the problem is corrected, until it passes.

2. All system testing shall be performed in the presence of the District’s representative and after all equipment is anchored securely and connected. Provide two weeks’ notice prior to commencement of the testing and provide a complete testing schedule at the time of the notice.

2.11 IDENTIFICATION AND LABELING

A. POE lines are to be clearly labeled at the IDF and MDF connect to reflect the camera it powers.
   1. Reference Part 3

2.12 CLEANING AND PROTECTION

A. During progress of the work, keep premises reasonably free of debris, cuttings and waste material. Upon completion of work, and at other times as directed by the District’s representative, remove all such debris from premises.

B. Interior of conduits and equipment shall be kept free of direct rubbish and other foreign materials during and after installation. Conduits and ducts shall be capped when work is stopped and for future use.

C. Fixtures shall be protected from dirt, moisture and mechanical damage during and after installation. Damaged fixtures shall be restored to their original condition or shall be replaced at no additional cost to the District.

D. Upon completion of the work under this Part, remove immediately all surplus materials, rubbish and equipment associated with or used in the performance of this work. Failure to perform such cleanup operations within 24 hours of notice by the District’s representative shall be considered adequate grounds for having the work done by others at this Contractor’s expense.

2.13 WATERPROOF CONSTRUCTION:

A. Maintain waterproof integrity of all penetrations of materials intended to be waterproof. Flash all raceways extending through the roof with galvanized metal roof jacks and seal with approved sealants to make the flashing watertight. All leaks caused by this Contractor’s work shall be repaired at no additional cost to the District.
2.14 CLEAN-UP

A. Perform the work under this Part so as to keep affected portions of the building and site neat, clean and orderly. Upon completion of the work under this Part, remove immediately all surplus materials, rubbish and equipment associated with or used in the performance of this work. Failure to perform such cleanup operations within 24 hours of notice by the District shall be considered adequate grounds for having the work done by others at this Contractor’s expense.

2.15 PROJECT CLOSEOUT

A. The Contractor shall notify the District’s representative when the Project is ready for final inspection for the purpose of determining the Substantial Completion of the Project. From the information gathered from this inspection, the District’s representative will prepare a Punchlist of work to be performed, corrected, or completed before the Project will be accepted. All work on the Punchlist shall be completed by the scheduled Final Completion Date as set forth in the Contract Documents.

B. Project as-built record drawings, together with the operation and maintenance manuals, shall be completed within 30 calendar days after the Punchlist completion and shall be delivered to the District’s PM at that time. Provide four copies.

Part 3: Telecommunication Specifications

3.1 REFERENCE PART 004- “Cabrillo_TeleCom_Spec”

Part 4: Equipment, Installation Intent and Project Scope

4.1 Equipment:

A. Specifications For Equipment Furnished and installed by Contractor:
   1. “IP Enabled Power-over-Ethernet (PoE) Integrated Card Reader Mortise Lock”
      i. ANSI/BHMA A156.13 Grade 1 mortise lockset with integrated proximity card reader
   2. “IP Enabled Power-over-Ethernet (PoE) Integrated Card Reader Cylindrical Lock”
      i. PoE ANSI/BHMA A156.2 Grade 1 bored lockset with integrated proximity card reader

B. Specifications For Equipment Furnished and Installed by Contractor:
   1. “Drop Cable”
      i. Cat6A – CommScope Uniprise (CMR-00423UNP10G-06) Blue. TIA/EIA-568-B
   2. “Mod Jack”
      i. 1-Port CommScope Uniprise (UNJ10G-WH) 8W8P 110 T568A/B Cat6 White
   3. “Mod Plug”
      i. RJ45 CommScope MP-6AU-Plug-B-1
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4. “Patch Panel”
   i. CommScope 48-port Patch Panel (UNP10G-48P-Cat6A)

5. “Exit Device”
   i. Sargent Manufacturing (SA) – IN220 80 series or equivalent

C. All unspecified misc materials, including without limitation, connectors, conduit and fasteners, necessary for the successful installation and operation of the Owner furnished equipment, as per the plans and specifications, shall be provided by the Contractor.

4.2 Installation Intent: Electrical, Data, Power-Over-Ethernet
   A. All work shall be routed and concealed in wall cavities and/or utility spaces.
      1. If conditions are discovered that necessitate the surface mounting of conduit they shall be discussed and review with the Project Manager in advance of installation.
   B. All surface mounted conduit shall be made of Type 5 electric metallic EMT, Set screw or compression fittings for all interior runs, and compression fittings for all exterior runs, and boxes rated for their intended use.

4.3 Project Scope Description
   A. Base Quotation- The Contractor shall install fifty-nine (59) cylindrical and two (2) mortise type integrated access control door hardware, firmware and software in accordance with the project specifications, drawings and as per the description below:
      1. Building 400
         i. The Contractor shall furnish and install:
            a. (1) Patch Panel
            b. (1) Drop Cable
            c. (1) Mod Jack
            d. (1) Mod Plug
         ii. The Contractor shall install:
            a. (59) IP enabled POE Integrated Card Reader Cylindrical Locks (ANSI/BHMA A156.2) IP enabled Grade 1 bored lockset with integrated proximity card reader and request-to-exit signaling in one complete unit
            b. (2) IP enabled POE Integrated Card Reader Mortise Locks (ANSI/BHMA A156.13) IP enabled Grade 1 mortise lockset with integrated proximity card reader, request-to-exit, latchbolt and deadbolt monitoring, and door position signaling in one complete unit.

      2. Reference project drawings for hardware locations by door

   B. Additive Alternate 1: The Contractor shall install fourteen (14) cylindrical and six (6) mortise type integrated access control door hardware, firmware and software in accordance with the project specifications, drawings and as per the description below:
      1. Building 450
         i. The Contractor shall furnish and install:
            a. (1) Patch Panel
            b. (1) Drop Cable
SECTION 002: GENERAL CONDITIONS
Rekey Replace Door Hardware Upper Campus Phase II

c. (1) Mod Jack
d. (1) Mod Plug

ii. The Contractor shall install:
   a. (14) IP enabled POE Integrated Card Reader Cylindrical
      Locks (ANSI/BHMA A156.2) IP enabled Grade 1 bored
      lockset with integrated proximity card reader and
      request-to-exit signaling in one complete unit
   b. (6) IP enabled POE Integrated Card Reader Mortise Locks
      (ANSI/BHMA A156.13) IP enabled Grade 1 mortise lockset
      with integrated proximity card reader, request-to-exit,
      latchbolt and deadbolt monitoring, and door position
      signaling in one complete unit.

   2. Reference project drawings for hardware locations by door

4.4 Project Schedule
A. Construction Start Date: 5-21-17
B. Substantial Completion: 7-31-17
   1. Substantial completion shall be defined as all readers and associated
      components for base bid (Bldg. 400) and alternate bid (Bldg. 450) if
      approved, shall be installed, tested and operation on new Lenel 7.3 OnGuard
      software.
C. Final Completion: 8-07-17
   2. Final completion shall be defined integration of existing access database
to new Lenel OnGuard 7.3 software complete. All new and existing readers,
controllers and associated devices shall be fully functional and
programmable via Lenel OnGuard 7.3 software. Programming
and functionality of access control system shall be tested and confirmed by
Cabrillo College.
CABRILLO COMMUNITY COLLEGE DISTRICT
6500 SOQUEL DRIVE
APTOS, CA 95003

Rekey Replace Door Hardware Upper Campus Phase II

TELECOMMUNICATIONS
SPECIFICATION
PREPARED BY SPRING ANDREWS AND MIKKI ADAMS
FEBRUARY 6, 2015
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GENERAL REQUIREMENTS OF THE WORK

OVERVIEW

This standards document provides specifications for cabling, wiring, termination, labeling and documentation applied at Cabrillo College.

PROJECT PLANS & SCOPE

1. Contractor shall furnish and install all Contractor Furnished Equipment and install all Owner Furnished equipment necessary to complete the Work of the Project including, but not limited to the following:
   a. All components of the work as identified and specified within this document and any above referenced plans. The listing below (items b through h) is for general reference only and is not intended to be all inclusive.
   b. Backbone cabling and wiring for all communications with all necessary and appropriate termination hardware, connectors, etc. as specified.
   c. Installation of hooks and other suspension devices to sufficiently and appropriately support cable runs.
   d. Installation of sleeves and related access facilities, as necessary within specified standards.
   e. Cabinet, racking, and wire management installations.
   f. Termination devices, as well as the telecommunications grounding system as specified.
   g. Testing, certification, and labeling of all cabling plant components.
   h. Complete and provide project documentation including, but not limited to, all submittal, shop drawings, “as-built” and testing as specified in these specifications.

2. Cleanliness of work area
   a. All work areas must be kept reasonably free of debris and swept clean on a daily basis.
   b. Contractor will remove debris and surplus materials from work areas on a daily basis and haul off-site.

DEFINITIONS

1. The terms used in this specification shall be as defined within this document and within the accompanying General Conditions.
2. District. The "District" refers to Cabrillo Community College District and unless otherwise stated, includes the District’s authorized representatives, including the District’s Project Manager, if a Project Manager is designated, the District’s Board of Trustees and the District’s officers, employees, agents and representatives. The District is designated and may be called out as “Owner”, “District” or “College” in the Contract Documents.
3. Project Manager; District’s Project Manager. The Project Manager is an independent contractor retained by the District and shall be authorized and empowered to act on behalf of the District.
4. Contractor. “The Contractor” shall mean the person or persons, partnership or corporation, who has entered into the Agreement for Construction of the Work described in the Contract Documents with the District. The Contractor is required by law to be holding and maintain a valid California Contractor’s license and who has contracted with the District to perform work or render services as a prime or trade contractor in or about the construction of the work as described in the Contract Documents. References to "Contractor" include the Contractor’s authorized representative.
5. **Contract Documents.** The Contract Documents consist of the Agreement between the District and the Contractor, Conditions of the Contract (whether General, Special, Supplemental or otherwise), Drawings, Specifications, including addenda thereto issued prior to execution of the Agreement and any other documents listed in the Agreement. The Contract Documents shall include modifications issued after execution of the Agreement. The Contract Documents form the Contract for Construction.

6. **Equal (as in “or equal”).** “Equal” shall mean a system, product or material which is of the same quality, appearance, utility and performance in all respects to that shown or specified but produced by a manufacturer not listed in the specification, in the opinion of the Project Manager. The Contractor bears the burden of proof of equality. Equal shall also require no additional approval processing by the Division of the State Architect (DSA). See also: Substitution.

7. **Shop Drawings; Samples; Product Data (“Submittals”).** Shop Drawings are diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-Subcontractor, manufacturer, Material Supplier, or distributor to illustrate some portion of the Work. Samples are physical examples of materials, equipment or workmanship forming a part of, or to be incorporated into the Work. Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

8. **Substitution.** “Substitution” shall mean a system, process, product or material similar in form or function and equal in quality and performance to that shown or specified, but differing in some essential element, e.g., chemical composition, mechanism of action, surface finish, dimensions, durability, electrical or mechanical or plumbing requirements. See also: Equal.

---

**SUBMITTALS**

1. The Contractor shall submit to the District three (3) copies of all Submittals required by the Contract Documents. All Submittals required by the Contract Documents shall be submitted by the Contractor to the District within TWELVE calendar days after the Board of Trustee's Award of Contract.

2. Contractor’s submission of Submittals in conformity with this schedule is a material obligation of the Contractor.

3. The Contractor represents to the District that the Contractor has determined and verified materials, field measurements, field construction criteria, catalog numbers and similar data related thereto and has checked and coordinated the information contained within such Submittals with the requirements of the Work and of the Contract Documents.

4. All Submittals shall be accompanied by a written transmittal or other writing by the Contractor providing an identification of the portion of the Drawings or the Specifications pertaining to the Submittal. Each Submittal shall contain the following information: (i) date of submission; (ii) project name; (iii) name of submitting contractor; and (iv) if applicable, the revision number. The foregoing information is in addition to, and not in lieu of, any other information required for the District's review, evaluation and approval of the Contractor's Submittals.

5. The Contractor shall perform no portion of the Work requiring the District's review of Submittals until the District has completed its review and returned the Submittal to the Contractor indicating 'No Exception Taken' to such Submittal. The Contractor shall not perform any portion of the Work forming a part of a Submittal or which is affected by a related Submittal until the entirety of the Submittal or other related Submittal has been fully processed. Such Work shall be in accordance with the final action taken by the Project Manager in review of Submittals and other applicable portions of the Contract Documents.

6. Submittals are required for the following items:
a. Copper cabling
b. Wall and Floor WAO Outlets (All associated Cable Apparatus)
c. Systems Furniture WAO Outlets
d. J-Hooks
e. Cable Ties
f. Wire Management
g. Fiber Termination (Equipment & Apparatus)

**CONTRACTOR’S LICENSE**
The contractor must possess a valid C-7 or C-10 California State Contractor’s license in good standing. The contractor must submit a copy of their license prior to the commencement of work.

**CERTIFIED CONTRACTOR**
1. The Contractor must provide proof of current manufacturer “Certified Installer” Certification for copper and fiber installation warranty. Contractor’s personnel must be trained and certified to design and install selected manufacturers Products.

**“AS BUILT” DOCUMENTATION AND DRAWINGS**
1. Contractor shall prepare and provide a complete “Cabling Manual” as documentation of the work. The Cabling Manual shall include:
   a. As-built drawings (minimum scale 1/8” = 1’) denoting the final locations and labeling scheme.
   b. 8 1/2 ” x 11” test results color-printed, laminated and posted in each IDF.
   c. Cable identification, location, and routing lists prepared by computer in sufficient detail and form for cross-connecting analog lines and patching data locations to network electronics.
   d. As-built drawings of all cabling, identifying location and routing of area served with its appropriate description and path from MDF100 (Equipment Room) to the Bldg. 800 IDF (IDF) and CIS Data Center, as well as the location of each WAO and its appropriate label and path of the cable from the WAO to the IDF.
2. In addition to the hard copy requirements, the as-builts will be prepared on AutoCAD or Visio files and supplied to the District in electronic form upon completion of installation, prior to final payment of the Contractor.
3. Contractor shall submit as-built drawings and electronic media for drawings and testing results no later than 30 days after substantial completion of the work.

**PERFORMANCE STANDARDS**
Except as modified by governing codes, the Contractor shall adhere to all applicable provisions and recommendations of building, regulatory, equipment manufacturer and the College standards applicable to the project. All work shall conform to the most current version of the following codes and standards, where applicable; and when a conflict occurs, the Contractor will follow the most stringent requirements:
1. California and Federal OSHA requirements.
4. National Electrical Code, in particular NEC Parts 600-3(b) and 800-3(d), and applicable local electrical code.
6. Underwriters' Laboratories (UL).
7. FCC CFR 47 part 68 subpart F
8. IEC 60603-7
10. Institute of Electrical and Electronic Engineers (IEEE).
13. ANSI / EIA / TIA-568, Commercial Building Telecommunications Wiring Standard
14. ANSI / EIA / TIA-569, Commercial Building Standard for Telecommunications Pathways and Space
15. ANSI / EIA / TIA-606, Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
16. ANSI / EIA / TIA-607, Commercial Building Grounding/Bonding Requirements
17. ANSI / EIA / PN-3398, Additional Horizontal Cabling Practices for Open Offices
18. ANSI / EIA / PN-2498, Technical Specifications for 100 Ohm Screened Twisted Pair Cabling
19. ANSI / NFPA 70, National Electric Code
20. BICSI, Telecommunications Distribution Methods Manual
21. EIA / TIA 568, 569, 606, 607, All current and past Technical Service Bulletins

**WARRANTY**

1. As per the guidelines set forth by the State Contractors Association, the Contractor will provide a one-year written warranty covering workmanship and compliance with any written specifications and/or standards provided by the District.
2. All repairs related to workmanship and material deficiencies (materials provided by Contractor) shall be made at no cost to the District during the warranty period.
3. The Contractor will provide to the District warranty information covering parts & materials used by Contractor.
4. All cabling non-consumable products must have a 20-year guarantee. In order to qualify for the guarantee, the structured cabling system must be installed per the following:
   a. Meet all TIA/EIA commercial building wiring standards.
   b. Must be single source manufacturer with end to end solution.
   c. Products must be installed by a trained contractor with current certification of selected manufacturer.

**QUALITY ASSURANCE**

1. It is the intent of this document to establish a standard of quality for labor and materials.
2. All cabling installations shall be performed by qualified technicians, certified under standards generally accepted within the industry, to perform installation work related to the type of cable and specific manufacturer's product to be installed.

3. Comparable or equal to in quality in materials.
   a. Where specific makes or models of equipment or materials have been specified, the words "approved or equal" will be understood to appear after the product reference unless the words "no substitutions" or wording to the same effect appears.
   b. If the Contractor proposes to offer a substitution item, it is the Contractor's responsibility to prove that such an item is an equal product and will meet the intent and requirements of the specifications.
   c. A detailed explanation as well as literature or other documentation shall be provided.
   d. In all cases, the District’s Project Manager will make the final decision on the acceptability of an alternate item.
   e. Unless otherwise noted by Contractor in writing, it is assumed that all equipment offered is exactly as specified.

**ACCEPTANCE**

a. The District will visit and inspect work progress and status during course of project.

b. The District will conduct a follow-up job walk through with Contractor at the completion of the project to determine if all requirements have been met. A list will be created to correct or include any work that has not been completed. The project will not be considered complete until a designated representative has observed and verified that all specifications have been installed and/or completed.

c. Two (2) copies of all cable certification data and drawings for all cabling plant identifications will be provided to the District before the review.

d. The District will review certification and identification drawings.

e. The District will randomly check cabling plant to ensure correctness of installation.

f. In the event of discrepancies or deficiencies, Contractor will make good on repairs within five (5) working days of notification by the District.

g. Final acceptance will occur when all discrepancies and deficiencies are reconciled and all documentation has been received by the District.
STRUCTURED WIRING - DEFINITIONS

STRUCTURED WIRING COMPRISSES SIX AREAS AS DEFINED BY THE EIA/TIA STANDARD.
They are:

- WA - Work Area
- HC - Horizontal Cabling
- MDF - Main Distribution Frame (same as: Equipment Room)
- BBC - Backbone Cabling
- IDF - Intermediate Distribution Frame (same as: Telecommunications Room)
- EF - Entrance Facilities (same as: MPOE – Minimum Point of Entry)

The following diagram is an example of how these areas are interconnected:

![Structured Wiring Diagram](image)

Figure 1: Structured Wiring – Generic Plan
WORK AREA - DEFINITIONS

Work Area components extend from the Telecommunication Outlet end of the horizontal wiring system to the station equipment (telephone, computers, etc.). Items typically included are the faceplate, jacks (individual female jacks and adapters) and patch cords. The following are a list of terms which will be used.

WAO – WORK AREA OUTLET

The WAO typically consists of a block or faceplate and associated adapters mounted in a work location, typically in a cubicle or on a wall in an office or work area. Adapters might include RJ45 type jacks. In the labeling scheme another name for a WAO is “location.”

JACK

A jack is the individual female type RJ connector (or port). These are the modules that snap into faceplates to make up a WAO.

PATCH PANEL

A patch panel is a rack mountable unit that has 8-position modular jacks (RJ45s) on the front with stationary cables terminated on the back.

PERMANENT LINK

This is a definition of the permanent part of a cabling system. The link starts at the WAO, includes the horizontal cabling in the ceiling and ends with the first termination in an IDF. This is typically what installers test upon completion. This is not to be confused with the older term “Basic Link” that is similar in definition for general terms, but different in terms of testing.

CHANNEL

A channel is a complete structured cabling path from an end user device, such as a PC or phone, to another device, such as a switch. This includes the link plus the cords at either end to connect to the equipment.
The Work, Equipment and Materials to be provided and installed by the Contractor:

1. Standard WAO’s [insert symbol], typically have two “multi-use” CAT-6 jacks installed by the Contractor. These will contain two white jacks for each WAO and are to be terminated at the patch panel in the IDF. There are two types:
   a. Wall and Floor Outlets – Figure 2 below.

2. Any WAO location with empty ports will be covered with the following dust cover
   a. CommScope Uniprise Dust Cover, White, UNDC-WH

3. More than 95% of WAO’s are ‘home runs’ in conduit to their associated IDF. Changes made after slab pours can require running conduit to the nearest j-box and then home.

4. For termination information see Figure 3, Jack Pin Assignments.

5. For each [insert symbol] on the plans, provide and install the unit in Figure 2 below.

6. The [insert symbol] with a number next to it represents the unit in Figure 2 with additional active jacks to total the number shown.

7. The [insert symbol] with an ‘f’ indicates the jack is to be installed in a floor box.

8. The [insert symbol] with a ‘w’ indicates the jack is to be installed 48” above the finished floor, without wall plate, for wall-mounted telephones.

9. Provide and install copper CAT-6e cabling as specified in item ‘A’ below from IDF to all WAO locations as manufactured by CommScope Uniprise or equal.
   a. CommScope Uniprise Ultrapipe Category 6E CMR, UTP, BLUE, 6ECMR/CM-00424COME-7RB-06

10. In work areas if cables are exposed, the Project Manager will determine the appropriate remedy.

11. All cables and connectors are to be clearly labeled in accordance with the labeling standards included herein.

12. Cable ties are required every 9” except when cables are in conduit. The following products will be provided and installed by the Contractor as required.
   b. Hook & loop tie 8" 40lb 1.9" bundle dia. 0.50" W, black, Panduit mfg. part no. HLT21-X0 / 167686
   c. Cable tie 7.4" 50lb 1.88" bundle dia. Halar, Panduit mfg. part no. PLT2S-C702 / 104753
   d. Cable tie 7.4" 50lb 1.88" bundle dia. Black, Panduit mfg. part no. PLT2S-C0 / 104678

13. B-Line J-Hooks are to be used for all applications when J-Hooks are called for.

14. Fastening of J-Hooks to the structure is to be determined in the field and done to manufacturer’s specification.

15. The following products from Cooper B-Line will be provided and installed by the Contractor.
   a. Straight j-hook, 1 1/4", 1/4" x 1 1/4", zinc P/N: B3191-1 1/4 ZN
   b. Straight j-hook, 2", 1/4" x 1 1/4", zinc P/N: 3191-2 ZN
   c. Offset j-hook, 4", 3/8" x 1 1/2", zinc P/N: B3190-4 ZN

16. Provide miscellaneous hardware and fasteners as required.
Figure 2: Standard Work Area Outlet

STANDARD WORK AREA OUTLET – WALL OR FLOOR OUTLET

Provide CommScope Uniprise Brand (No substitutions)

Wall Plate       To match electrical wall plates (White, unless otherwise specified)
                  White 2-port single gang wall plate M12L-262; AXE# 197604

Connectors      CAT6 MOD Jack, White UNJ600-AXE# 279888
JACK PIN ASSIGNMENTS

Pin/pair assignments in the jack – T568B. The contractor will terminate all CAT 6 cabling using the T568B configuration.

![Diagram showing pin assignments](image)

<table>
<thead>
<tr>
<th>Pinout</th>
<th>568A</th>
<th>568B</th>
</tr>
</thead>
<tbody>
<tr>
<td>White/Green</td>
<td>1</td>
<td>White/Orange</td>
</tr>
<tr>
<td>Orange</td>
<td>2</td>
<td>Orange</td>
</tr>
<tr>
<td>White/Orange</td>
<td>3</td>
<td>White/Green</td>
</tr>
<tr>
<td>Blue</td>
<td>4</td>
<td>Blue</td>
</tr>
<tr>
<td>White/Blue</td>
<td>5</td>
<td>White/Blue</td>
</tr>
<tr>
<td>Green</td>
<td>6</td>
<td>Green</td>
</tr>
<tr>
<td>White/Brown</td>
<td>7</td>
<td>White/Brown</td>
</tr>
<tr>
<td>Brown</td>
<td>8</td>
<td>Brown</td>
</tr>
</tbody>
</table>

Figure 3: RJ-45 Jack and Pin Assignments

Any transposition of wiring pairs, if required for specific devices, must be done with clearly labeled adapters or cords in plain view in the work area, not behind the walls or any other permanent fixture in the horizontal cable system.
**INSTALLATION – GENERAL NOTES**

### PLENUM AND NON-PLENUM CABLE

All station cable will be fire rated to the appropriate codes, i.e., plenum or non-plenum.

### CABLE INSTALLATION AND SUPPORT

1. The cable support system is a subset of the horizontal cable system. It is an established series of pathways (J-Hooks, conduit, cable raceways, runways, trays, ladders, etc.) that support the horizontal cabling from the WAO to the IDF.

2. Cable pathways are to be in straight lines with as few turns as possible. No one conduit segment shall be more than 100 ft. in length with no more than 2 (two) 90 degree bends per segment.

3. Cables will primarily be installed in conduits and within systems furniture.

4. Conduits or sleeves shall never be filled with more than a 40% fill ratio. See Figure 7 for examples based on specific manufacturer’s cable diameters.

5. Cables are to be installed according to BISCI standards for routing, placement and access.

6. It is not the Cabling Contractor’s responsibility to install any conduit or cable tray, unless specifically stated.

7. J-Hooks or cable straps to support cable shall be spaced no farther than 4 feet apart, and shall be the cables’ only means of support. Cables may not be allowed to rest on or attach to ducting, conduit, walls, or any other structure in the facility.

8. The number of cables allowed in a J-Hook is determined by the size of the hook as detailed below. If more cables are present, multiple J-Hooks or cable tray are to be used.

<table>
<thead>
<tr>
<th>SIZE</th>
<th>1.31”</th>
<th>2.00”</th>
<th>4.00”</th>
</tr>
</thead>
<tbody>
<tr>
<td>COUNT</td>
<td>35</td>
<td>50</td>
<td>125</td>
</tr>
</tbody>
</table>

**J-HOOK MAXIMUM CABLE CAPACITY**

9. Interim hanging of cable during installation must be accomplished by hanging no more than ten (10) 4-pair cables per coil, to prevent a teardrop effect – the bending or deforming that occurs at the suspension point.

10. Velcro ties must be used in all accessible areas, such as the IDF.

11. Plastic ties are acceptable in non-accessible areas such as in ceilings, but must meet the appropriate fire code. Installer must be cautious of tension when using plastic ties to prevent constricting or pinching cables.

12. Adhesive tape is not acceptable to secure cables under any circumstance.

13. Cables may not be bundled in groups of more than 24 cables.

14. All cable ties are to be installed so that one (1) finger can be slipped inside the tie.
15. **Cable Protection.** In areas where cables are exposed such as from the floor to modular furniture, they must be covered with either black spiral wrap or black split innerduct for protection and aesthetics. The use of adhesive tape is not acceptable.

16. **Penetrations and Poke-Through**
   
   a. The District’s Electrician has installed conduits, j-boxes, and associated hardware in advance of this work from the IDF to the rooms containing WAO’s.
   
   b. Cable is to be pulled in continuous lengths only – splices will not be accepted and will be re-pulled at no labor or material cost to the District.
   
   c. The Cabling Contractor is required to ask for and receive permission from the District’s Project Manager prior to making any penetrations in any walls, floors, ceilings, decks or roofs.

---

**FIRE-STOP**

1. The Cabling Contractor is required to ask for and receive permission from the District’s Project Manager prior to making any penetrations in any walls, floors, ceilings, decks or roofs. If any of the above is allowed by the District’s Project Manager, it will be the Cabling Contractor’s responsibility to fire-stop all penetrations through fire rated barriers, through which communications cable was placed, to meet all applicable code requirements.

2. Installation shall follow the manufacturer’s approved UL system for the type of barrier encountered.

---

**WORK AREA DAMAGE**

The Cabling Contractor will be charged back for any ceiling tiles, tee-bar, paint and gyp-board or other building components broken or damaged by the Cabling Contractor.
INSTALLATION – WORKSTATION SPECIFIC NOTES

PLENUM AND NON-PLENUM CABLE
All station cable will be fire rated to the appropriate codes, i.e. plenum or non-plenum.

CABLE INSTALLATION AND SUPPORT
1. The cable support system is a subset of the horizontal cable system. It is an established series of pathways (J-Hooks, conduit, cable raceways, runways, trays, ladders, etc.) that support the horizontal cabling from the WAO to the IDF.
2. Cable pathways are to be in straight lines with as few turns as possible. No one conduit segment shall be more than 100 ft. in length with no more than 2 (two) 90 degree bends per segment.
3. Cables will primarily be installed in conduits.
4. Conduits or sleeves shall never be filled with more than a 40% fill ratio. See Figure 7 for examples based on specific manufacturer’s cable diameters.
5. Cables are to be installed according to BISCI standards for routing, placement and access.
6. It is not the Cabling Contractor’s responsibility to install any conduit or cable tray, unless specifically stated.
7. J-Hooks or cable straps to support cable shall be spaced no farther than 4 feet apart, and shall be the cables only means of support. Cables may not be allowed to rest on or attach to ducting, conduit, walls, or any other structure in the facility.
8. The number of cables allowed in a J-Hook is determined by the size of the hook as detailed below. If more cables are present, multiple J-Hooks or cable tray are to be used.

<table>
<thead>
<tr>
<th>SIZE</th>
<th>1.31”</th>
<th>2.00”</th>
<th>4.00”</th>
</tr>
</thead>
<tbody>
<tr>
<td>COUNT</td>
<td>35</td>
<td>50</td>
<td>125</td>
</tr>
</tbody>
</table>

J-HOOK MAXIMUM CABLE CAPACITY
9. Interim hanging of cable during installation must be accomplished by hanging no more than ten (10) 4-pair cables per coil, to prevent a teardrop effect – the bending or deforming that occurs at the suspension point.
10. Velcro ties must be used in all accessible areas, such as the IDF.
11. Plastic ties are acceptable in non-accessible areas such as in ceilings, but must meet the appropriate fire code. Installer must be cautious of tension when using plastic ties to prevent constricting or pinching cables.
12. Adhesive tape is not acceptable to secure cables under any circumstance.
13. Cables may not be bundled in groups of more than 24 cables.
14. All cable ties are to be installed so that one (1) finger can be slipped inside the tie.
15. **Cable Protection.** In areas where cables are exposed such as from the floor to modular furniture, they must be covered with either black spiral wrap or black split innerduct for protection and aesthetics. The use of adhesive tape is not acceptable.

16. **Penetrations and Poke-Through**
   a. The District’s Electrician has installed conduits, j-boxes, and associated hardware in advance of this work from the IDF to the rooms containing WAO’s to be provided by this contract.
   b. Cable is to be pulled in continuous lengths only – splices will not be accepted and will be re-pulled at no labor or material cost to the District.
   c. The Cabling Contractor is required to ask for and receive permission from the District’s Project Manager prior to making any penetrations in any walls, floors, ceilings, decks or roofs.

---

**FIRE-STOP**

1. It should not be necessary for the Cabling Contractor to penetrate walls as conduit has been extensively provided.

2. The cabling contractor is required to ask for and receive permission from the District’s Project Manager prior to making any penetrations in any walls, floors, ceilings, decks or roofs. If any of the above is allowed by the District’s Project Manager, it will be the Cabling Contractors responsibility to fire-stop all penetrations through fire rated barriers, through which communications cable was placed, to meet all applicable code requirements.

3. Installation shall follow the manufacturer’s approved UL system for the type of barrier encountered.

---

**WORK AREA DAMAGE**

The Cabling Contractor will be charged back for any ceiling tiles, tee-bar, paint and gyp-board or other building components broken or damaged by the Cabling Contractor.
LABELING

1. See Figure 2, and Figure 4 in this specification manual for typical Work Area Outlets (WAO) and their respective labeling schemes. The contents of this Part apply to all WAO and Patch Panel locations.

2. The Cable Contractor, based on the examples given in this document, will provide and install labels. All labeling shall be performed in accordance with EIA/TIA 568, 569, and 606 standards. A marked drawing of each building's/floor horizontal cable identification numbers shall be attached to the wall in each IDF room. Also, a marked drawing of all fiber optic cable identification numbers shall be attached to the wall in each cross-connect area. Each drawing shall indicate the cable identification of every single cable that is installed by the contractor. Additionally, two (2) copies of the drawings of each building's cable IDs and the location of all fibers shall also be provided to the District.

3. All face plates and patch panels will be labeled with a white or clear plastic typewritten label. A 3M, Panduit or approved equivalent self-laminating write-on label shall be used. All information written on cable labels shall be done with the use of a permanent marker (such as a Sanford Sharpie ultra fine point pen) and be legible. Each label shall be placed 6 inches from the end of each cable.

4. All labeling should be unique across the entire wiring infrastructure within a building and between buildings on a campus.

5. Labeling tags and markings should be permanent enough to last the life of the component to which it is attached. This can range from a few years for telecom equipment up to 50 years for parts of the building such as rooms and pathways.

6. Cables must be labeled at both ends and use the same alphanumeric identifiers.

7. Location numbers are to be determined in a logical manner so that numbers are adjacent to one another.

IDF LABELING

Each rack within the IDF shall be labeled from 1 to 9 (applies to rooms with multiple racks). The rack in the front row on the left is rack 1 and proceeds to the right. The left most rack in row 2 (if a second row is present) continues with the numbering sequence until a maximum of 9.

WAO PATCH PANELS

1. The following designation (Figure 4) shows the label layout for the typical WAO cable at the patch panel.

2. Patch panel labeling must be consecutive and orderly, beginning on the top left and reading left to right, top to bottom, like a book.

![Figure 4: Work Area Patch Panel Labeling](image-url)
TESTING

All testing must be done using a Fluke cable tester. Each individual cable or fiber strand must be tested. Copper test equipment must be certified to test Category 6 cable to TIA/EIA-568-B standards.

WA O COPPER CABLE

1. All cable WAO channels from the outlet patch cord to the data room patch cord must be tested to the specifications below.

2. All Copper connections must be tested as an entire channel, including a patch cord in the data room and a patch cord at the WAO. Testing must be done on a Level III EIA/TIA tester.

3. Test results must show a pass for the channel parameters specified below, as well as wire map.

<table>
<thead>
<tr>
<th>Maximum Length:</th>
<th>328 feet</th>
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<tbody>
<tr>
<td>Maximum Delay Skew:</td>
<td>25</td>
</tr>
<tr>
<td>Input Impedance:</td>
<td>1MHz to 100 MHz is 100 Ohms +/- 15 Ohms</td>
</tr>
<tr>
<td></td>
<td>100MHz to 200MHz is 100 Ohms +/- 23 Ohms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CAT 6 Wiring Standards</th>
<th>Frq. (MHz)</th>
<th>ATTN</th>
<th>PSNEXT</th>
<th>PSACR</th>
<th>PSELFEXT</th>
<th>RL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2.1</td>
<td>70.3</td>
<td>68.2</td>
<td>60.8</td>
<td>19.0</td>
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<td>16</td>
<td>8.1</td>
<td>50.6</td>
<td>42.5</td>
<td>36.7</td>
<td>19.0</td>
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<tr>
<td></td>
<td>20</td>
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<td>39.9</td>
<td>34.8</td>
<td>19.0</td>
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<td>24.2</td>
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<td>37.1</td>
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<td>4.2</td>
<td>15.9</td>
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<td>14.8</td>
<td>9.0</td>
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<td>250</td>
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<td>30.2</td>
<td>-4.9</td>
<td>12.8</td>
<td>8.0</td>
</tr>
</tbody>
</table>

All values are in dB

ATTN – Attenuation
PSNEXT – Power Sum Near-End Cross-talk
PSACR – Power Sum Attenuation to Cross-talk Ratio
PSELFEXT – Power Sum Equal Level Far-End Cross-talk
RL – Return Loss

Figure 5: CAT 6 Wiring Standards
DOCUMENTATION
1. A complete set of test results must be presented at completion of installation. Tests are to be identified as specified in the labeling Part. A reference page should be included to identify the type of cable tester used when presenting the results.
2. Test results must be submitted to the owner in electronic formats. Electronic results must be presented in a form that is readable by Cabrillo College, such as Excel or PDF.
3. Results should include cable and termination name as well as all tests specified.

PROJECT COMPLETION
As a condition for project acceptance, the Cabling Contractor shall submit the following for review and approval.

INSPECTION AND TEST REPORTS
The Cabling Contractor shall provide both type written and electronic format documentation, which indicates that all cable termination testing was completed, and that all irregularities were corrected prior to job completion. This should include individual records for each cable, pair or stand tested.

INSTALLATION – MDF & IDF SPECIFIC NOTES

PLANS
See attached plans

RELAY RACKS
All racks are to be installed and seismically braced per local codes and manufacturers’ recommendations.

CABLE MANAGEMENT
1. Velcro cable ties are to be used every 9” on all cabling not in conduit.
2. Cable must be supported at all elevation changes.
3. Drop outs or radii shall be put on all edges and bends in the cable.

GROUNDING AND BONDING
1. The Cabling Contractor will connect all racks to the ground bus bar in each room per applicable standards – see the Part on “Performance Standards.”
2. Cross connect frames, patch panels and racks shall be grounded in compliance with ANSI/NFPA 70, the National Electrical Code (NEC) as well as local codes.
3. Use appropriate gauge grounding wire for specific distance, 6AWG is not sufficient for the whole grounding system.
4. Run Telecommunications Bonding Backbone (TBB) without splices (no daisy chains.)

6. Any metallic component must be bonded (equipment, racks, ladder racks, etc.)

7. All active electronics mounted in a rack or enclosures are to have an individual ground jumper that is bonded to the in rack vertical or horizontal busbar strips (no daisy chains.)

CABLE RUNWAY

1. Cable runways and ladder racks are to be run per plan.

2. Runway is to be attached to a plywood-covered wall.

MATERIAL & EQUIPMENT – OWNER SUPPLIED / CONTRACTOR INSTALLED

The following will be provided by the District and installed by the Contractor:

1. All fiber optic cable described in this contract will be owner supplied.

2. Cable line pull is by the owner.

3. Fiber optic cable terminations are by this Contractor.

4. Wi-Fi Access Points & Antennas as specified on Attachment A.

MATERIAL & EQUIPMENT – CONTRACTOR SUPPLIED / CONTRACTOR INSTALLED

PLANs

See attached plans, if any.

CABLE

1. All horizontal copper media will be CommScope Uniprise CAT 6E with the appropriate fire rating.

2. Cable to be typically installed is blue. Cable visible in public areas may be supplied or requested by the District for installation in an alternate neutral color.

CABLE TRAYS & LADDER RACKS

All cable trays and ladder racks will be supplied and installed by Contractor.

1. Cable Tray Manufacturer will be B-Line.

2. Ladder Rack Manufacturer will be CPI.

PATCH PANELS

Patch Panels will be supplied and installed by Contractor.

Manufacturer will be CommScope Uniprise Brand Angled Panels

24-port Patch Panel, Cat6 110-MOD, Black UNP610-ANG-24P/ 331423
SECTION 004: TELECOMMUNICATIONS SPECIFICATION
Rekey Replace Door Hardware Upper Campus Phase II

48-port Patch Panel, Cat6 110-MOD, Black UNP610-ANG-48P/ 331426

OTHER
1. Any other equipment or materials required for installation indicated within the Contract Documents whether mentioned above or mentioned elsewhere in the Contract Documents.

EQUIPMENT INSTALLATION

MDF
Install loaded fiber panels into existing fiber enclosure(s).
Verify exact panel location with Cabrillo IT prior to installation.
Use 1 - Single-Mode (SM) fiber panels loaded Corning CCH-CP12-A9
Use 1 - 50μm Multi-Mode (MM) fiber panels loaded Corning CCH-CP12-E4

IDF
Permanently and securely attach and ground 7-ft, 2-post 19” wide equipment racks, to the floor of the wiring closet per specification.
Use 2 post rack-black CPI 55053-703 / 167074
Use Rack install kit CPI 40604-001 / 125458

Attach ladder racks using all appropriate brackets, provide for proper cable path management and support.
Attach ladders to tops of the 2-post rack with black top plate
Use 12” black runway Part CPI 10250-712 (for normal density)
Use 12” black top plate CPI 10595-712 (for normal density)
OR
Use 18” black runway Part CPI 10250-718 (for high density)
Use 18” black top plate CPI 10595-718 (for high density)

Wall brackets, Butt-splice kits and Angled Support Brackets to be installed as required.

Install 2U fiber enclosure into top of first 2-post rack
Use Corning part number CCH-02U
Install loaded fiber panels into the fiber enclosure

Use Single-Mode (SM) fiber panels loaded Corning CCH-CP12-A9
Use 50µm Multi-Mode (MM) fiber panels loaded Corning CCH-CP12-E4

Install copper patch panel(s) in 2-post racks at specified elevation.

Install cable management between patch panels and along each side of rack.

Use 48-port Patch Panel, Cat6 110-MOD, Black UNP610-ANG-48P / 331426
Use 24-port Patch Panel, Cat6 110-MOD, Black UNP610-ANG-24P / 331423
Use 2U Horizontal Cable Manager, CPI 30530-719 / 27186
Use Vertical Master Cabling Part, CPI 30161-703 AXE# 249545

**PRIMARY TRUNK FIBER AND COPPER TERMINATION**

**MDF BUILDING 100 (BASEMENT) OR BUILDING 1300 (ROOM 1309A)**

Pull (1) 12 strand SM, 12 strand MM Hybrid fiber cable from IDF to Building 100 MDF
Use Corning Freedom One Interlocking Armored Hybrid 12 strand SM, 12 strand MM fiber

Install fiber ends and test link between MDF and IDF

Use 12 - LC 50um Multi-Mode Unicam Connectors Corning 95-050-99-X / 338911
Use 12 - LC Single-Mode Unicam Connectors Corning 95-200-99 / BA-280090 AXE# 338908

Install, terminate and ground 12 pair copper into customer-supplied 110 block. Verify exact location with Cabrillo IT prior to installation.

**IDF**

Install fiber ends and test link between IDF and MDF

Use 12 - LC 50um Multi-Mode Unicam Connectors Corning 95-050-99-X / 338911
Use 12 - LC Single-Mode Unicam Connectors Corning 95-200-99 / BA-280090 AXE# 338908
1. Please note – Within the Contract Documents as well as for communications on site with project management and other contractors this project is known as Networked Camera Project.

2. The Cable Contractor, based on the examples given in this document, will provide and install labels. All labeling shall be performed in accordance with EIA/TIA 568, 569, and 606 standards. A marked drawing of each building’s/floor horizontal cable identification numbers shall be attached to the wall in each IDF room. Also, a marked drawing of all fiber optic cable identification numbers shall be attached to the wall in each cross-connect area. Each drawing shall indicate the cable identification of every single cable that is installed by the contractor. Additionally, two (2) copies of the drawings of each building’s cable IDs and the location of all fibers shall also be provided to the District.

3. All face plates and patch panels will be labeled with a white or clear plastic typewritten label. A 3M, Panduit or approved equivalent self-laminating write-on label shall be used. All information written on cable labels shall be done with the use of a permanent marker (such as a Sanford Sharpie ultra fine point pen) and be legible. Each label shall be placed 6 inches from the end of each cable.

4. All labeling should be unique across the entire wiring infrastructure within a building and between buildings on a campus.

5. Labeling tags and markings should be permanent enough to last the life of the component to which it is attached. This can range from a few years for telecom equipment up to 50 years for parts of the building such as rooms and pathways.

6. Cables must be labeled at both ends and use the same alphanumeric identifiers.

7. Location numbers are to be determined in a logical manner so that numbers are adjacent to one another.
Backbone cable will be labeled as follows:

```
(LOC1)-(LOC2)-TYP-CNT
```

- **LOCATION 1**
- **LOCATION 2**
- **CABLE TYPE**
- **COUNT**

1. The Location names are to be the first two parts of the label.
2. Followed by the Cable Type.
3. And then the Cable Count.

**LABEL EXAMPLE:**

A 12 STRAND MULTIMODE CABLE FROM MDF 100 TO 800 IDF ROOM 821a WOULD BE LABELED:

```
MDF 100 – 800 IDF 821a – MM – 12
```

**NOTE:**

THE LOCATION CLOSEST TO THE MC IN THE BACKBONE SCHEMATIC WILL BE LISTED FIRST, SO MC BEFORE IC, BEFORE HC.

**Figure 6: Backbone Cable Labeling**

1. Each fiber box shall have the cable label above the couplers indicating the cable connected to the back of the box.
2. The label shall be a self-adhesive white label with minimum 12 point black lettering.
3. Cable abbreviations to be used:

   - **SM** = SINGLE-MODE FIBER
   - **MM** = MULTI-MODE FIBER
   - **UTP** = COPPER TWISTED PAIR
SECTION 004: TELECOMMUNICATIONS SPECIFICATION
Rekey Replace Door Hardware Upper Campus Phase II

TESTING

All testing must be done using a Fluke cable tester. Each individual cable or fiber strand must be tested. Copper test equipment must be certified to test Category 6 cable to TIA/EIA-568-B standards.

BACKBONE COPPER CABLE

All pairs on backbone cable must be tested for continuity, opens, shorts and reversals.

FIBER-OPTIC CABLE

All fiber optic cable links must be tested with a source and meter. The test results must include the loss generated by each connector. Loss should be stated in dB. No fiber optic link will be accepted with a loss greater than the calculated value based on the table below.

(MULTI-MODE) FIBER LINK LOSS

<table>
<thead>
<tr>
<th>Multi-Mode Cable</th>
<th>(Maximum Attenuation dB/km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wavelength (nm)</td>
<td></td>
</tr>
<tr>
<td>850</td>
<td>3.0</td>
</tr>
<tr>
<td>1300</td>
<td>1.0</td>
</tr>
</tbody>
</table>

A MAXIMUM OF 1.0 DB TOTAL CONNECTOR/SPLICE LOSS IS REQUIRED FOR ALL MULTIMODE LINKS DUE TO THE DISTANCE REQUIREMENTS OF 10 GIGABIT ETHERNET AT THE DISTANCES SPECIFIED IN THIS PROJECT.

(SINGLE-MODE) FIBER LINK LOSS

<table>
<thead>
<tr>
<th>LC Connector Pair</th>
<th>0.5dB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-Mode Cable</td>
<td></td>
</tr>
<tr>
<td>Wavelength (nm)</td>
<td>(Maximum Attenuation dB/km)</td>
</tr>
<tr>
<td>850</td>
<td>1.0</td>
</tr>
<tr>
<td>1300</td>
<td>1.0</td>
</tr>
</tbody>
</table>

All OSP fiber must be traced with an OTDR after installation to ensure compliance and results must be provided to the customer in both paper and computer copy.

DOCUMENTATION

A complete set of test results must be presented at completion of installation. Tests are to be identified as specified in the labeling Part. A reference page should be included to identify the type of cable tester used when presenting the results.

Test results must be submitted to the owner in electronic formats. Electronic results must be presented in a form that is readable by Cabrillo College, such as Excel or PDF.

Results should include cable and termination name as well as all tests specified.

As a condition for project acceptance, the Cabling Contractor shall submit the following for review and approval.

INSPECTION AND TEST REPORTS
SECTION 004: TELECOMMUNICATIONS SPECIFICATION
Rekey Replace Door Hardware Upper Campus Phase II

The Cabling Contractor shall provide electronic format documentation, which indicates that all cable termination testing was completed, and that all irregularities were corrected prior to job completion. This should include individual records for each cable, pair or stand tested.

### REFERENCE MATERIAL

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<th>Trade Size (in.)</th>
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<th>1 1/4</th>
<th>1 1/2</th>
<th>Calc. Cable Area (in.²)</th>
<th>Cable OD (in.)</th>
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<td></td>
<td>0.09621</td>
<td>0.35</td>
</tr>
</tbody>
</table>

Note: 0.25 inch = Typical Category 6
0.35 inch = Worst-case Category 6A

Figure 7: Cat6 Small Conduit Fill Chart