



**Access Control System
#2023-09 Keyless Entry Project
Bid Documents**

March 27, 2023

Prepared by:



**STATEMENT OF SCOPE
ACCESS CONTROL SYSTEM
#2023-09 KEYLESS ENTRY PROJECT**

The following documents define the scope of work for the Merced Community College District's Bid # 2023-09 Keyless Entry Project to install Access Control throughout the District. Key dates are included in the Call for Bids.

Section	Title	Date	Revision
<u>Specifications</u>			
270500	Common Work Results for Communications	03/24/23	0
280001	Security General Requirements	03/24/23	0
280511	Cyber Security	03/24/23	0
280513	Conductors and Cables for Electronic Safety and Security	03/24/23	0
280811	Security Testing	03/24/23	0
281000	Access Control System	03/24/23	0
285090	Security Details	03/26/23	0
	Merced_ACS_Security_DETAILS_20230326.pdf	03/26/23	0
<u>Schedules</u>			
	MCC230204_010_MCCD_ACS_Door_Detail_Schedule.pdf	03/26/23	0
	MCC230204_010_MCCD_ACS_Door_Detail_Schedule.xlsx	03/26/23	0
<u>Drawings</u>			
	MCCD_ACS_Security_Main_Campus_PLANS_20230326.pdf	03/26/23	0
	MCCD_ACS_Security_Business_Resource_Center_PLANS_20230326.pdf	03/26/23	0
	MCCD_ACS_Security_Los_Banos_Campus_PLANS_20230326.pdf	03/26/23	0
<u>Pricing</u>			
	MCC230204_001_MCCD_ACS_Bid_Response_Workbook.xlsx	03/24/23	0

Special Instruction(s):

- The Bid Response Workbook has been provided in Excel format. Completion of this Workbook is mandatory.

SECTION 270500 - COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Furnish and install conduit, back boxes, and junction boxes to support wiring and mounting of security devices on walls and ceilings at locations shown on the security drawings, details, and schedules.
 - 1. Fire and weather seals and approved sealant for the application is required where walls or roofs are penetrated or there is weather exposure.
 - 2. Where cable trays are available, those raceways are to be utilized.
- B. Work Included
 - 1. Furnish, install, and document conduit runs for all security components between field device locations and the panel locations shown on the associated security drawings.
 - 2. Furnish and install Security Junction Boxes (SJB's) with cover plates at the ends of each conduit run.
 - a. Recess junction boxes in walls or mount above suspended tile ceilings in concealed areas. Surface mount only when no other options are available.
 - b. Position exterior junction boxes to allow mounting of devices to face the desired direction. Install vertically and at a reasonable elevation to minimize weather exposure conditions.
 - c. Any visible conduit and junction boxes are to be painted to match the surface upon which it is mounted to maintain as low a profile as possible.
 - 3. Furnish and install fire stopping and weatherization sealant for wall penetrations, where required. Paint to match visible location.
 - 4. Install fire-treated backboards in locations where future back boxes will be installed, as defined on the Drawings. Ensure fire stamp remains exposed for inspection.
 - 5. Coordinate with Owner's Representative for all aspects of work and schedule.

1.2 RELATED SECTIONS

- A. DIVISION 28

1.3 CODES AND STANDARDS

- A. ORDINANCES

1. All work shall conform to all federal, state, and local ordinances and building official requirements.
2. BUILDING CODES
 - a. All work shall conform to all state and local building codes and the following:
 - 1) Appropriate State and local governmental codes.
 - 2) Uniform Building Code (UBC)
 - 3) National Electrical Code (NEC)
 - 4) National Electrical Contractors Association (NECA), National Electrical Installation Standards
 - 5) National Fire Protection Association (NFPA), including
 - a) Life Safety Code
 - b) National Fire code
 - 6) EIA/TIA Standards and Recommendations.

1.4 BASIC DEFINITIONS

A. Abbreviations:

1. ACS: Access Control System
2. IDF: Intermediate Distribution Frame Room
3. JB: Junction Box
4. SJB: Security Junction Box
5. MDF: Main Distribution Frame Room

PART 2 - PRODUCTS

2.1 WORK INCLUDED

- A. Provide all materials listed in PART 2 - PRODUCTS of this specification and on the Drawings, unless specifically excluded or modified in other portions of the contract document.
- B. Security Contractor shall:
1. Provide and install conduit, back boxes, and j-boxes where shown and for all permanently concealed spaces, e.g. above hard ceilings where access will not be available after the sheetrock is installed, and within walls. Include a pull string in each box from above the ceiling space or from underside of deck if no dropped ceiling.
 2. Provide and install conduit and wire required for 120VAC Emergency Power Circuit.
 3. Provide and install Security Junction Boxes (SJB's) above dropped ceiling or exposed wall in non ceiling areas where shown on drawings.
 4. Ensure bushings are on the ends of conduit prior to running cable in all cases where the conduit does not end at a junction box. This is to prevent damage to the cable.

2.2 MATERIALS

- A. EMT Conduit with fittings, size determined by information provided on Drawings.
- B. Rigid Conduit with fittings for exterior installation.
- C. Junction boxes with fittings, size determined by information provided on Drawings.
- D. Gaskets, weather proofing sealant, fire caulking or stopping, as appropriate to ensure all junctions are protected from water, fire and smoke, or other environmental damage.
- E. Ring washers, appropriately sized, to tie off pull string to prevent slipping into the conduit. Do not tie together to tether.
- F. $\frac{3}{4}$ " fire treated plywood for mounting security back-boxes and other equipment. These will be located in the IDF, MDF, Electrical, or Telecom closets, as shown on the drawings.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

- A. Furnish and install all designated conduit, fittings, junction boxes, and pull strings with rings. Verify exact location of all conduit runs with District Representative in advance of any installation. See drawings for approximate conduit location, security system designation, size of conduit, and length of run. Leave a minimum of 10-feet slack on all pull strings.
- B. All conduit and junction boxes are to be concealed, if at all possible. Obtain specific approval from District Representative for the location and appearance of any raceway that is not hidden.
- C. If approved, install raceway as inconspicuously as possible. Wherever possible, install raceway and junction boxes parallel and square with building lines.
- D. Furnish and install fire-treated plywood backboard in rooms where conduit runs are to be terminated for security equipment, as shown on the Drawings. Ensure that the fire treated stamp is not concealed by paint or other coverings. The final junction box for each completed run will be mounted on this backboard.
- E. Identify any condition that prevents successful meeting of the conditions in this specification at the approximate locations as shown on the drawing and bring each to the District's Representative in advance of attempting installation of that section or substituting another approach.
- F. Maintain a redline drawing at all times showing the actual location for each conduit run to be provided to Owner at the end of the project.
- G. Weather seal all connection points and junction boxes that have exterior exposure or leak potential.
- H. Fire-seal all interior wall penetrations.

3.2 PATCHING AND PAINTING

- A. Wherever wall, ceilings, or roofs have been penetrated or conduit or junction boxes have been surface mounted, patch with an approved material and paint to match the adjacent surface around opening to restore the aesthetic look of the area.
- B. Labeling required under 3.2 is to be applied on top of painting to ensure it remains visible.

3.3 DOCUMENTATION

- A. Submit one copy of the as-built redline drawings for review prior to final inspection.
- B. Participate in a final inspection to demonstrate that the as-built redline drawings are accurate and in compliance with the design drawings and specification. If the drawings require modification or changes need to be made following the final inspection, correct installation and drawings and re-submit for approval.
- C. Upon approval of submittal, provide a final set of all as-built redline drawings to District and one digital copy.

END OF SECTION 270500

PART 1 - SECTION 280101 – SECURITY GENERAL REQUIREMENTS

PART 1 - PART 1 - GENERAL

1.1 PROJECT INTENT

- A. The intent of this project is to provide and install new RS2 Access Control Systems for the Merced Community College District (MCCD) at their three locations. The Main Campus is located at 3600 M Street, Merced, CA. The Business Resource Center is located at 630 W 19th Street, Merced, CA. The Los Banos Campus is located at 22240 Highway 152, Los Banos, CA. The locations vary in age and construction, requiring a variety of solutions to meet the needs at each door. The work must be completed by August 31, 2023.
 - 1. The Learning Resource Center (LRC) on the Main Campus has an existing S2 Netbox Access Control System. This system will be transitioned to an RS2 system in a separate scope. There is minimal scope at the LRC to tie additional points into the new RS2 System.
 - 2. The new Agricultural and Industrial Technology Complex (AG/IT) building has an existing RS2 system and does not have any scope for this project.
- B. The primary component of this security approach is the Access Control System. The contractor will need to perform all aspects of the scope to install a functional system.

1.2 TERMINOLOGY

- A. This project's owner is referred to in this document as Owner, and the respondent is referred to as Contractor. The term Owner also includes MCCD's direct employees, affiliates owning the respective sites where the work is to be performed, and other Owner-appointed agents such as architects or consultants. These agents may be requested by Owner to represent Owner in undertaking certain project tasks.
 - 1. ACS - Access Control System
 - 2. CR - Card/Credential Reader
 - 3. IDF - Intermediate Distribution Frame
 - 4. IP - Internet Protocol
 - 5. MDF - Main Distribution Frame
 - 6. PoE - Power Over Ethernet
 - 7. UTP - Unshielded Twisted Pair
 - 8. VAC - Volts Alternating Current
 - 9. VDC - Volts Direct Current

The System Designer for the project is:
Security By Design, Inc. (SBD)
P.O. Box 1668
Lafayette, CA 94549
(925) 609-1000

1.3 PRECEDENCE

- A. If any statement in this or any other Specification is in conflict with any provision of the General Terms and Conditions to the contract, the provision stated in the General Terms and Conditions shall take precedence. Immediately bring to Owner's attention any questions that result from such potential conflict which require additional interpretation and guidance.
- B. Architectural drawings shall have precedence over other drawings in regard to dimensions and location.

1.4 BASIC DEFINITIONS

- A. Business days, weekdays or working days:
 - 1. In these specifications, mean 7:00 a.m. to 5:00 p.m., Monday through Friday (in local time zone) at Owner's site.
- B. Specified Items – Substitutions
 - 1. No Substitutes: Provide without exception the exact make and model number identified in this specification.
 - 2. Or Equal: An item may be substituted for the specified item provided that in every technical sense, the substituted item provides the same or better capability.
 - 3. Or Approved Equal: A substitute item for the specified item may be offered for approval by Owner. The proposed substitute item shall in every technical sense provide the same or better capability than the specified item. Submit such requests for approval in accordance with the provisions of 1.7 – BID RESPONSE, C – Prior Approvals, within the time frames outlined.
- C. Beneficial Use
 - 1. Each component of a system will be considered available for beneficial use when all components are installed and conditions are met to make the system fully operational.
 - 2. Beneficial use by the owner does not mean the warranty period has started. The warranty period only begins once the systems integrator has completed all of the contractual obligations for the contract. Reference section 1.22 for start of warranty information.
- D. Award of Contract, or award of contract:
 - 1. In these specifications, award of contract means both – Owner choosing Contractor as the successful Integrator, and the parties executing a contract for the work. In all cases, it is a condition of an award of contract that Contractor agrees to use the form of contract supplied by Owner.

1.5 CODES AND STANDARDS

- A. Perform the work in accordance with current editions of the following codes, rules and regulations:
1. Appropriate local governmental codes
 2. National Electrical Code (NEC)
 3. International Building Code (IBC)
 4. National Fire Protection Association (NFPA), National Fire Code
 5. National Fire Protection Association (NFPA), Life Safety Code
 6. National Electrical Contractors Association (NECA), National Electrical Installation Standards
 7. Federal Communications Commission (FCC), Communications Act of 1934
 8. Code of Federal Regulations, title 47, Telecommunication
 9. Underwriters Laboratories, Inc. (UL)

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications

1. Furnish only system components by manufacturers of established reputation and experience who have produced similar equipment and who are able to refer to similar installations rendering satisfactory service.

B. Contractor Qualifications

At the time of bid, provide evidence of the following items unless previously accomplished:

1. Having manufactured, supplied or installed at least 3 other systems of similar size, complexity, and general operation as the systems described in these specifications. Furnish written proof of compliance with this paragraph at time of bid.
2. Holding all legally required licenses necessary to accomplish the installation and activation of the described system at the facilities indicated. Submit copies of licenses.
3. Holding all legally required registrations.
4. Having a local office within 100 miles of the project site, staffed with RS2 factory-trained technicians with experience on systems of similar complexity and function as described in these specifications.
 - a. The factory-trained technicians shall be fully capable of system engineering support, installation supervision, system start-up, and providing Owner with training and service on both hardware and software for the systems specified.
 - b. If a Local Service Provider (LSP) is used to fulfill the distance requirement, the Contracted Integrator must oversee work done by LSP. The LSP must also have factory-trained technicians to support this project and future support calls. Clearly state in your bid response if a LSP is to be used.
 - c. Submit copies of the factory-training certifications, including LSP certificates, if required.

1.7 BIDDER RESPONSE

A. Bidders' Responsibility

1. Review the specifications, drawings, details, and diagrams.
2. Advise Owner in writing of any conditions that may adversely affect the work.
3. The drawings are accurate in terms of work scope and design for the function sought by Owner, but may have discrepancies in their depiction of the actual physical construction as of the date of installation. Notify Owner if discrepancies are found.
4. Provide a quote that meets the intent of the drawings and specifications to the satisfaction of Owner. This project will require all work to be completed by August 31, 2023.

B. Bid Response Workbook

1. Utilize the provided Bid Response Workbook to provide pricing for each building separately. MCCD reserves the right to deduct individual building scopes prior to finalizing the contract in order to meet budgetary requirements.
2. Provide installed unit prices for each major component of the security systems and each lettered detail shown on the drawings and details. The unit prices shall be the basis for the costing of changes to the security systems.

C. Prior Approvals

1. Submit the following for any substitution proposed by Bidder for equipment items and material (identified by catalog numbers and specified brands or trade names) that are designated as "or approved equal".
 - a. A list describing each proposed substitute item or material at least 7 working days prior to quote due date.
 - b. Provide sufficient data, drawings, samples, literature, or other detailed information to demonstrate that the proposed substitute is equal in quality, appearance, and functionality.
 - c. Submit a statement listing every technical and operational variance from the specified item. If the integrator fails to list a particular variance that is subsequently deemed to be unsatisfactory, such equipment shall be replaced or modified without cost to Owner.
 - d. Owner will respond in writing to substitution requests at least 4 working days prior to the quote due date. If required, an addendum will be issued listing products which are approved for substitution, and will be the sole source for such approval. After the Issue for Construction date, no substitutions will be allowed unless specified products are no longer available and new products must be approved on a case-by-case basis.
 - e. Such approval shall not relieve Contractor from complying with the requirements of the drawings and specifications.
 - f. Contractor shall be responsible, at Contractor's sole expense, for any detrimental consequences resulting from Owner-approved Integrator-proposed substitutions, including, but not limited to, their impact upon Contractor's work or the work of others.

1.8 SUBMITTALS

A. Requirements - At Bid Submission

1. Submit prices using the Bid Response Workbook.

B. Requirements - After Award of Contract

1. No later than 10 working days after the effective date of the Agreement (for construction and/or services) submit for approval the following:
 - a. Bill of Materials (BOM)
 - 1) Submit for approval the complete list of materials with specific part numbers indicated on cut sheets and quantities for each component.
 - 2) Due to lead times, some equipment will need to be ordered before other equipment. Approval for the equipment listed on the BOM may come in stages to expedite ordering.
2. No later than 15 working days after the effective date of the Agreement (for construction and/or services) submit for approval the following:
 - a. Plan of Operations and Project Schedule:
 - 1) Submit for approval a complete plan and schedule of proposed operations.
 - 2) Account for the schedules of all subcontractors, transportation, storage, and all other matters affecting the work.
 - 3) Revise this schedule on a weekly basis and present the updated version to Owner weekly.
 - 4) The head end system will need to be set up first to enable each building to come online as it is completed.
 - 5) It is acceptable in the schedule to have overlap between buildings, however plan to complete each building as the hardware is installed and tested. The goal is to minimize the interruption for each building.
 - b. Detail Drawings and Door Detail Schedules
 - 1) System Designer will furnish detail drawings and door detail schedules to Contractor.
 - 2) Submit for approval any proposed revisions to the detail drawings or door detail schedules with clear, legible, specific, and reproducible markings on the affected detail drawings or schedules. Any proposed revisions (not previously addressed) accepted by Owner must be undertaken at Contractor's sole expense.
 - 3) Submit only those drawings that have proposed revisions.
 - 4) These proposed revisions shall be without cost to Owner.
 - c. Markings
 - 1) Submit for approval samples of wire marking, panel label, terminal strip numbering, terminal strip identification styles, and typical per Section 28 05 01 - SECURITY WIRING AND CONDUIT and Detail Drawings 00.05.501 thru 507, et al.
3. No later than 20 working days after the effective date of the Agreement (for construction and/or services) submit for approval the following:

a. Project Progress Spreadsheet

- 1) Submit the initial version of the PROJECT PROGRESS SPREADSHEET in Microsoft Excel “.xlsx” format that is defined in Section 3.3. This spreadsheet will be edited and provided to Owner once work starts by Contractor throughout the project until project completion. The spreadsheet will be submitted each week, not later than one business day prior to the project status meetings.

b. Training Plan for operation and maintenance of the installed systems.

- 1) Design the training program to provide selected Owner personnel with a basic level of competence with the systems.
- 2) The trained Owner personnel will train other Owner personnel utilizing the training and the training documentation provided by Contractor.
- 3) Comply with the requirements stated in PART 1 - SYSTEM TRAINING in each respective system specification.
- 4) State all hours in terms of classroom hours.
- 5) Submit a curriculum for each subject of actual training. Account for all required hours.
- 6) In order to develop appropriate training plans and other training materials, expend 0.5 to 2.0 hours of preparation time for each actual classroom hour of training.
- 7) Submit a lesson plan for each class hour of training. Include a detailed outline of all subjects to be covered in each lesson plan. Also include a materials list of equipment, required handouts, cut sheets, etc.
- 8) Apportion the training hours to include "hands on" experience with appropriate system equipment. Identify the "hands on" time in each lesson plan.
- 9) Cover the overall system, each individual system, each subsystem, and each component. Also cover procedures for database management, normal operations, and failure modes with response procedures for each type of failure.

1.9 CHANGES

A. Prior to proceeding with changes or claims for extras for work that is out of scope;

1. Provide written notice to Owner.
2. Obtain written approval from Owner.
3. Substantiate the actual cost of each change or claim.

B. Base the cost of each change upon the item cost as shown in the Bid Response Workbook.

1.10 SUPERVISION OF WORK

A. Supervise the work from beginning to completion and, within reason, keep the same workers and lead technician on site throughout the duration of the project.

B. Site Project Manager

1. Provide a site project manager to interface with all appropriate subcontractors during the installation of the system.
 2. Maintain continuing coordination with Owner via the site project manager regarding progress and any problems that may develop.
- C. Do not begin the work before receiving Owner approval of the complete plan and schedule of proposed operations submitted in accordance with 1.8 - SUBMITTALS.

1.11 PROJECT MEETINGS

A. Pre-Construction Meeting

1. Attend a pre-construction meeting to be scheduled prior to the start of construction.
2. Owner will identify a representative at this time and will discuss specific work rules with Contractor.
3. Discuss the various aspects of the work and procedures for smooth job progress.

B. Progress Meetings

1. Attend meetings as scheduled by the Owner for coordination with all disciplines.
2. Hold periodic job site meetings to review progress of the work and resolve installation problems. Invite representatives of Owner and System Designer. Provide current copies of Project Progress Spreadsheet (defined in 3.3 A.3) to all attendees.
3. At the initial meeting, review all required permits.
4. Also during the initial meeting, establish the frequency of future meetings to Owner's satisfaction.

1.12 EXAMINATION OF SITE AND VERIFICATION OF EXISTING CONDITIONS

A. Visit the sites and become familiar with all existing conditions prior to proceeding with the work.

1. Perform and complete the work within the existing limitations. If work cannot be completed within the existing limitations, notify Owner as soon as the issue is identified to get resolution.

B. Verify all required dimensions, including those shown on the drawings, by measurement at the job site.

1. Notify Owner of all exceptions before proceeding with the work.

C. Confirm the availability of a proper power source for each piece of specified equipment to be installed, on the basis of site visits and the drawings.

1. If proper power is not available, consult with Owner for affirmative guidance.

1.13 DATA ACCURACY

- A. Absolute accuracy of information regarding existing conditions is not guaranteed. The drawings and specifications are for the assistance and guidance of Contractor.
- B. Exact locations, distances, elevations, etc., will be governed by actual field conditions.
- C. Obtain prior approval where variations from the bid documents are required. If no exceptions are brought to the attention of Owner prior to or at the time of providing the bid, Contractor is still required to perform the work as if exceptions had been noted or changes recommended, but at the cost of Contractor. Even without recompense from Owner, nothing shall excuse Contractor from satisfactorily completing the work in the manner customarily expected from a professional contractor.

1.14 PARKING

- A. Coordinate with Owner to determine location of contractor parking.
- B. Make special arrangements with Owner if delivery to specific outside doorways is required.

1.15 SECURITY

- A. Comply with all Owner and facility security requirements.
 - 1. Be responsible for theft or damage to Owner's equipment, tools, and materials.
 - 2. If any deviation from Owner security requirements is necessary, obtain approval for such deviation from Owner.
- B. Do not disclose any confidential information of Owner.
 - 1. Comply with the policies and provisions of Owner regarding outside contractors and consultants.
 - 2. Utilize reasonable care with Owner's data and information. Take precautions with any printed material including plans.

1.16 UTILITIES

- A. Owner will supply utilities at the closest convenient box for Contractor use.
- B. Provide all temporary connections and cables, lighting, light stands, and hoses.
- C. Use facilities in accordance with applicable state and local government regulations with regard to operations, safety, and fire hazards.

1.17 PERMITS

- A. Secure all permits required for the performance and completion of the work.
- B. Review permits at the initial project progress meeting.

1.18 NORMAL WORKING HOURS

- A. Do not begin work at the facility earlier than 6:00 a.m. and do not work later than 6:00 p.m., Monday through Friday, unless approved otherwise by Owner.

1.19 NOTIFICATION

- A. Do not shut off any existing systems without first notifying Owner and receiving Owner's express authorization.
- B. Give Owner at least 7 calendar days' notice of any requirement to shut off or interfere with existing alarm, regulating, computer, or other service systems.
- C. Owner will arrange and execute any shutdown.
- D. Perform all work necessary to establish or re-establish any system, such as splicing or connecting, in close coordination with Owner.

1.20 INTERFERENCES WITH OWNER

- A. Conduct transportation, storage of materials, work involving the facility, and all other matters affecting the use by Owner of its buildings, to cause the least possible interferences.
- B. Coordinate with Owner to eliminate or minimize interferences.

1.21 PROJECT RECORD DRAWINGS

- A. Project Record Drawings include all bid drawings and all submittals.
- B. Owner will furnish floorplans electronically in PDF.
- C. Obtain, keep up-to-date, and make available to Owner, complete redlined plans, details, and schedules of the project clearly annotated with "as-built" data as the work is performed. Include the following:
 - 1. Routing of conduit and signal cables, including the cable designations assigned to each cable.
 - 2. Accurate location of all equipment installed under the specifications.
 - 3. A complete equipment list for each functional area.
 - 4. Complete schedules for all equipment, indicating addresses.

5. Complete point-to-point wiring diagrams, including complete terminal strip layout and identification, and wire termination and tagging for all conductors for doors with card readers that are connected to Mercury hardware directly, but not AD-300 products.
- D. Record drawings are required to be kept up-to-date on a daily basis and are required to be current prior to the authorization of each progress payment.
- E. Upon completion of this project, upload all information shown on these prints to ASSIST for the creation of a final set of as-built drawings.
- F. The Close-out Documents review will be performed in two stages.
 1. Stage 1. Submit the following to Owner for review:
 - a. Complete set of printed as-built redlined plans.
 - b. Complete documentation of each point with pictures on SBD ASSIST website in accordance with 28 08 11 SECURITY TESTING.
 2. Stage 2. Submit any corrections noted during review.
- G. Validate the final Close-out Documents in accordance with 3.09 SYSTEM ACCEPTANCE REQUIREMENTS in this section.

1.22 WARRANTY

- A. Warrant for one full year after Notice of Completion that the work is:
 1. Free from defects in workmanship and material
 2. Free from design defects
 3. New, and of the kind and quality specified
 4. Suitable for the use intended
 5. Performing in the manner specified
- B. The warranty shall start upon filing of Notice of Completion, shall remain in effect for one year, and shall include on-site service for parts and labor:
 1. Normal Service
 - a. Provide normal service at no additional cost to Owner during normal business hours (7:00 AM to 5:00 PM) Monday through Friday, excluding holidays. Respond by the next working day before 1:00 PM.
 - b. Normal service is defined as repairs, adjustments, parts, replacement of parts, or any service that the system requires to be fully functional that is not an emergency service.
 2. Emergency Service

- a. Provide emergency service at an additional cost to Owner according to labor rate schedule contractually agreed upon. Emergency service shall respond within a 4-hour period on a 24-hour-per-day, 365-day-per-year basis.
 - b. Emergency service is defined as any repair that Owner deems an emergency and for which it requests emergency service.
 - c. Provide full factory technical support and same day shipping of replacement parts for all equipment.
 - d. Upon award of contract, provide Owner with a cost estimate for emergency service.
 3. Prior to filing the Notice of Completion, system maintenance is the sole responsibility of Contractor.
- C. Provide service through an organization which meets the following criteria:
1. Factory-trained by system manufacturer.
 2. Minimum of 5 years of experience servicing the installed systems and equipment.
 3. Location within 100 miles of the job site.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide all the materials listed in PART 2 - PRODUCTS of the individual specification sections and on the detail drawings unless specifically excluded or modified in other portions of the contract document.
- B. These material lists and equipment lists are not necessarily 100 percent complete and/or accurate. Verify all quantities and part numbers, whether listed or not.
- C. Material lead times can vary greatly with different distributors. Check multiple sources when creating the schedules to obtain the appropriate lead times to meet the required installation window.

2.2 MATERIALS

- A. Use the following items to complete equipment, wire and cable installation called for by the other security specification sections and detail drawings. Provide the make and model shown below when the items are needed but not called out in the specifications or the detail package drawings.
 1. Terminal Blocks
 - a. Phoenix Model UK5 Universal Terminal Blocks, or approved equal.
 - b. Include Phoenix terminal marking material - ZB, SBS, or approved equal.
 - c. Use Phoenix bridging accessories, end covers, partition plates, and other parts as required, or approved equal.

2. Mounting Rails
 - a. Phoenix Model NS 35/7.5 (perforated), or approved equal
3. Wire Duct
 - a. Tyton or Panduit wire duct with slotted sidewall and cover, or approved equal.
 - b. Size for specific backboard or backplane space and load requirements.
4. Cable and Wire Marking
 - a. Panduit, Brady, Brother or approved equal, machine-printed Polyolefin wire markers for each cable and each conductor at every cable termination point.
 - b. For any exposed wiring, all cables are to be neatly tethered and either braided or combined using hook and loop type wire wraps to prevent damage to the cables. Do not use plastic tie-wrap or twist ties to secure cabling.
5. Wire Soldering
 - a. Do not splice cable or wire without specific written authorization from Owner. Where a splice is required, any of the following options are acceptable:
 - 1) Heat shrink solder sleeves.
 - 2) Solder all un-terminated wire connections and insulate with heat shrink.
 - 3) UL Listed 3M Insulation Displacement Connector (IDC) moisture resistant seal or approved equal.
6. Resistor Packs
 - a. EOL-1K End-of-Line-Resistors (EOLR)s on each supervised input at the field end of the line.
7. Tamper Resistant Screws
 - a. Tamperproof Snake Eyes type fasteners, <http://tamperproof.com/categories/snake-eyes-spanner.html> or approved equal.
 - b. Provide 6 tamper-resistant screwdrivers and transfer to Owner prior to final acceptance testing.
8. Ceiling Tiles
 - a. Replace any ceiling tiles that are damaged during construction with matching tiles for the area.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

- A. This contract may involve functioning systems.

1. If it does, coordination with Owner is critical.
 2. Do not interrupt any functioning system without complying with 1.19 NOTIFICATION.
- B. This project has a critical scheduling path which must be closely followed in order to meet the completion date.
1. Create a proposed schedule to be reviewed and approved by the Owner.
 2. Provide work force staffing according to the schedule constraints.
- C. Aesthetics are an important consideration in this installation.
1. Install all components to have aesthetically pleasing results to Owner.
 2. Coordinate actual locations of all visible components in advance with Owner.
- D. Install, make fully operational, and test the system as indicated on the drawings and in the specifications.
1. Where any requested information is not available from Owner for bid purposes, assume the worst case condition necessary to ensure complete, functional systems.
- E. Be responsible for interfacing with other systems under this contract.
1. Show the details (both logical and physical) of such interfaces on the Submittal drawings and as-built redline drawings per 1.21 PROJECT RECORD DRAWINGS.
- F. Coordinate interfaces with Owner's telecommunications system with Owner.
1. Furnish and install all back-boxes, pull-boxes, supports, conduit, connectors, cable, and wire necessary to provide a complete and reliable system. CAT6 cable will be furnished and installed through the Owner.
- G. Where required or when requested by Owner, provide and terminate 120-VAC, 60-Hz power from nearest electrical panel through a junction box, to security system devices.
- H. Install conduit, cable, and wire parallel and square with building lines, including raised floor areas.
1. Do not exceed 40 percent conduit fill.
- I. Install all equipment parallel and square to building lines.
1. Provide sufficient clearances to meet all applicable codes and to facilitate observation and testing.
 2. Securely hang and/or fasten with appropriate fittings to ensure positive grounding, free of ground loops, throughout the entire system.
- J. Install all equipment to achieve quiet and vibration-free operation.
1. Adjust, repair, balance, or replace any equipment producing any noise or vibration that is objectionable to Owner.

2. Provide additional brackets and bracing as necessary.
 3. Provide any such additions or changes at no additional cost to Owner.
- K. Comply with 1.5 CODES AND STANDARDS.
1. Where more than one code or regulation is applicable or where specifications and codes disagree, the more stringent shall apply.
 2. Install seismic bracing on equipment where required by local codes.
- L. Where new equipment is replacing existing equipment, remove the existing equipment and perform repair work as necessary to meet Owner standards.
- M. At the completion of work and prior to final testing, install fire stopping at all penetrations in slabs and fire walls to meet codes.
- N. Install Theft-Pruf™ type fasteners for all security equipment in accessible locations.

3.2 WORKMANSHIP

- A. Perform the installation in a professional and workmanlike manner.
- B. Perform all preparation, handling, and installation work in accordance with the manufacturers' written instructions and technical data.
- C. Perform all work in conformance with the National Electrical Contractors Association "Standard of Installation" for general installation practice.
- D. On a daily basis, clean up all debris from work performed and deposit in appropriate containers.
- E. Stack and organize all parts, tools, and equipment when not being used.
- F. At the conclusion of the installation at all work areas, including all panel boxes, vacuum and clean to remove all debris and grease.

3.3 COORDINATION WITH OWNER (PROJECT PROGRESS SPREADSHEET)

- A. Coordinate closely with Owner to achieve a complete and aesthetically pleasing installation.
 1. Keep Owner fully apprised of job progress. Provide a fully vetted and updated copy of this spreadsheet to the Owner and construction team one working day prior to the weekly meeting. This process may be moved to an online file sharing platform, however the requirements will be the same.
 2. PROJECT PROGRESS SPREADSHEET - At time of first construction meeting with Owner or System Designer, secure from System Designer a copy of the Detail Point List in an EXCEL spreadsheet format with tabs for each building.
 - a. Agree upon a series of additional columns (with headings) to insert in the spreadsheet for the purpose of tracking completion milestones for all Points in the list. For

example, create a column named “Door Devices Installed”. A column with this heading could be used to show when a door Point has all its security equipment mounted (e.g. reader, lock, REX, door contact, etc.). Contractor will enter a date in the pertinent cell to show when the task was completed, and this spreadsheet can then be used by all parties to accurately assess the status of all Points and the progress of the installation work.

- b. Include in the spreadsheet not only those points such as door “AX-101A” but also the rack and wall-mounted security equipment and panels, so that important installation milestones can be recorded. Inevitably, some column headings will not apply to all Points.
- c. Name the column farthest to the right, “ISSUES” or “CHALLENGES”. Entries in this column can reflect impediments to completion such as, “Conduit not installed to door frame.” When this problem has been rectified, the entry can be deleted.
- d. The notes field is not intended to store a cumulative record of the history of work at that Detail Point. Rather, the information briefly describing the most current challenge(s) can be entered and updated as problems are corrected. Previous versions can be reviewed for historical data.
- e. Organize the spreadsheet in such a way that any party can “sort” data by whether there is an entry in the final, “ISSUES” column. This will enable efficient review of only those Points with outstanding challenges.
- f. Name the two columns preceding the last column, “Contractor Tested”, and “System Designer Tested”.
- g. One purpose of this document is to assist in the distribution of current and accurate data regarding the state of the project. While installation work is in “full-swing”, submit the latest electronic version of the spreadsheet to Owner and System Designer each week.
- h. The spreadsheet will also assist Owner in making timely progress payments based on an accurate assessment of the degree of project completion.

3.4 CUTTING, PAINTING, AND PATCHING

- A. Do not drill, bore, or notch any structural member in any manner that impairs its structural value.
 - 1. If cutting holes in structural members is required, only use core drills and only with the specific approval of Owner for each instance.
- B. Return all walls cut or repaired during the installation process to their original condition.
 - 1. Match colors and finishes to the satisfaction of Owner, at no additional cost to Owner.

3.5 SITE MANAGEMENT RESPONSIBILITY

- A. Provide an on-site Project Manager as defined in 1.10 - SUPERVISION OF WORK.

3.6 DATABASE PREPARATION, CHECKING, AND ACTIVATION

- A. Owner will be responsible for the accuracy of the database information.
- B. If later versions of the operating security systems or application software are made available by the manufacturers, install the software and ensure that it is fully operational at no additional cost to Owner over the life of the software maintenance agreement(s).
 - 1. Before installing upgrade software, ensure that existing database information is properly "backed-up".

3.7 START-UP RESPONSIBILITY

- A. Properly ground each piece of electronic equipment prior to applying power.
- B. Properly ground all shielded wire shields to the appropriate earth ground at the hub end only, not at the remote or device end.
- C. Initiate security systems operation.
- D. Provide competent start-up personnel on each consecutive working day until the security systems are functional and ready to start the acceptance test phase.
- E. Where appropriate, bring the security systems on-line in their basic state (i.e., alarm reporting, facility code access control, etc.).
 - 1. Owner will provide the specific database information that will allow fully integrated security systems operation.
 - 2. Request the database information from Owner in sufficient time to not delay the project schedule.
- F. Use a start-up sequence that incrementally brings each portion of the system on-line in a logical order that incorporates checking individual elements before proceeding to subsequent elements until the entire system is operational. The basic steps should include:
 - 1. Establishing ground planes at the security closets and hub end of the system.
 - 2. Setting up battery and power supplies at security closets and hub end of the system.
 - 3. Disconnecting power.
 - 4. Connecting the first security point or camera, reconnecting power, and verifying operational correctness.
 - 5. Repeat steps 3 and 4 until the entire security systems are verified and operational.
- G. If any technical problems occur, and if in Owner's judgment adequate progress is not being demonstrated resolving the problems, provide manufacturers' factory technical representatives and diagnostic equipment at no additional cost to Owner until the problems are resolved.

3.8 PREPARATION FOR ACCEPTANCE (PRIOR TO FINAL INSPECTION)

- A. If, under the Scope of Services of this project, Contractor is required to remove and dispose of any existing apparatus or materials, undertake such disposal in accordance with any and all legal requirements.
- B. Label and identify all systems, equipment, and devices.
- C. Have all systems, equipment, and devices in full and proper adjustment and operation.
- D. Have all equipment and materials in neat, clean, and unmarred condition with parts securely attached.
- E. Replace or properly repair all broken work, including glass, raised flooring and supports, ceiling tiles and supports, walls, doors, etc. Clean up and appropriately discard all debris.
- F. Deliver and store all extra materials at the premises as directed.
- G. Complete the test reports of each system and each system component (electronically) and the As-built project drawings.
 - 1. Deliver to Owner for review and acceptance.

3.9 SYSTEM ACCEPTANCE REQUIREMENTS

- A. Before final acceptance of work, perform and/or deliver each of the following in the order stated.
 - 1. Testing
 - a. Perform all tests required by the Security Testing Specification SECTION 28 08 11 and those submitted per the "Test Procedure" section of 1.8 – SUBMITTALS in this section.
 - b. Activate all devices and verify proper operation of the security systems. Include supervisory and trouble circuit tests.
 - c. If activation of a device is impractical (e.g., a discharge test of a fire suppression system), initiate a simulated alarm or trouble by closing or opening the appropriate contact points.
 - d. Do not activate audible alarms except on a one-time, coordinated basis, to check the actual sounding devices. Coordinate closely with Owner.
 - e. Electronically submit a test report for each piece of equipment to Owner. Use SBD Assist website for testing and sign-off. Include all security systems devices, the dates tested, by whom, the results, and dates retested (if failure occurred during any previous tests). Request access through Owner.
 - f. Successful testing of all security system devices is required. Failure to completely test, document the tests, and upload associated pictures will delay final testing and acceptance.
 - 2. As-built Redline Drawings

- a. After completion of all the tests listed above, and prior to the acceptance test for each building, Contractor shall submit the complete as-built markup drawings as identified in section 1.21 – PROJECT RECORD DRAWINGS.

B. Final Acceptance Test

1. Before final acceptance testing begins, submit the following to Owner for review and approval:
 - a. Test reports through SBD Assist website. Testing should show 100 percent completion for each affected plan sheet to enable Owner verification.
 - b. As-built markup drawings
 - c. Tamper-resistant screwdrivers
2. After the test reports and as-built markup drawings are approved by Owner, test the completed security systems in the presence of Owner. Demonstrate performance and compliance with security systems specifications.

3.10 NOTICE OF COMPLETION

- A. Letter of Completion. After the system acceptance requirements described above have been satisfactorily completed, including the final acceptance testing, Owner will issue a letter of completion to Contractor indicating the date of such completion.
- B. Notice of Completion. Record the Notice of Completion upon receipt of Owner's letter of completion. The date of recording shall be the start of the warranty period.

END OF SECTION 280101

SECTION 280511 - CYBER SECURITY

PART 1 - GENERAL

1.1 DESCRIPTION

A. Configure Cyber Security parameters of all IP components. Key characteristics are:

1. Harden the setup of all field devices.
2. Harden the switches that support the field devices.
3. Harden the configurations of the servers.

B. Work included, but not specified under other sections

1. Section 280101 – Security General Requirements
2. Section 280513 – Conductors and Cables for Electronic Safety and Security
3. Section 280811 – Security Testing
4. Section 281000 – Access Control System

1.2 BASIC DEFINITIONS

A. Abbreviations:

1. VLAN: Virtual Local Area Network

B. Terminology

1. Server: Central Server Computer – Could be a virtual server

1.3 SUBMITTALS

A. Submit a cyber hardening planning document that outlines all the hardening activities.

B. Submit a cyber hardening document that specifies each type of IP connected field device and defines the configurations that will be applied to each type of device.

C. Work with Owner to define Contractor's appropriate access to the systems for remote support.

1. Define required access.
2. Owner will define a plan that provides the required access in a safe and secure manner that meets the Owner's security policies.
3. Document this plan and submit for approval.

1.4 SYSTEM TRAINING

A. Define a training plan that walks the trainees through the process of hardening each type of field device.

1. Discuss the need for each hardening step and how the risk is lowered by taking this action.
- B. Provide trained personnel to execute the training plan described in SECTION 28 00 01, SECURITY GENERAL REQUIREMENTS.
- C. Establish a specific training schedule satisfactory to Owner.

1.5 ASSISTANCE

- A. Coordinate with the Owner for any of the settings that are within Owner's direct operational control and which form a component of the cyber security plan.

1.6 OVERVIEW OF THE CYBER PROTECTION PROGRAM

- A. The following is an overview of the cyber hardening configuration and is provided to define a framework for understanding the design philosophy:
 1. Field Devices
 - a. Each field device must be hardened at the time of installation of that device on the LAN.
 - 1) Strong passwords
 - 2) Current firmware
 - 3) Least required permissions
 - 4) Disable unused services
 2. Switches
 - a. Deactivate unused switch ports
 - b. Segmentation
 - c. Current operating version
 - d. Connect the camera subnet to the recording server VLAN subnet only
 - e. Set port security with shutdown and short timeout
 3. Servers
 - a. Limit server services to those that are required for system operation and recovery if there is a discontinuous operation.
 - b. Current OS and database
 - c. Active directory
 - d. Follow Microsoft OS Security Best Practices
 - e. Create dedicated user accounts
 4. Clients
 - a. Use AD sign on

- b. Current OS and Owner standard image
- 5. Firewalls
 - a. Utilize firewalls between the security systems and the organization's network
 - b. Provide path for remote serviceability with control

PART 2 - PRODUCTS

2.1 WORK INCLUDED

- A. Furnish and install all of the materials listed below in MATERIALS - 2.2 and in the Details.

2.2 MATERIALS

- A. There are no physical materials specified by this section.

2.3 SPARE PARTS

- A. None.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

- A. This contract may involve currently functioning systems. Coordination with Owner is critical. Do not interrupt any functioning system without complying with the provisions of SECTION 28 00 01, SECURITY GENERAL REQUIREMENTS.
- B. Comply with the wire marking and panel labeling provisions stated in SECTION 28 05 01, SECURITY WIRING AND CONDUIT.

3.2 CYBER PROTECTION IMPLEMENTATION

- A. Work with owner to agree on a strong password procedure for use for each type of device.
- B. Set up each device with a strong root password.
- C. Validate that each field device has the latest firmware.
- D. Enable encryption for access to the camera using HTTPS. Once the device is fully configured, shut off web services.

- E. Turn off – disable all extra, non-used options
 - 1. UPnP
 - 2. Bonjour
 - 3. AVHS
 - 4. Discovery Services
 - 5. Link-local address
 - 6. SOCKS
 - 7. QoS
 - 8. Always Multicast Video
 - 9. SSH
 - 10. Audio
 - 11. Disable “Enable anonymous view” and “Enable anonymous PTZ”
- F. Set network time throughout the system using a link to owner’s NTP
- G. Where there is a Radius server supporting 802.1x, set up the certificates and enable IEEE 802.1x.
- H. Set up switches:
 - 1. Deactivate unused ports
 - 2. Validate that switches have the current software and firmware
 - 3. Define the access to the switch and VLANs for the least required permissions
 - 4. Set strong passwords
 - 5. Disable unused services
- I. Servers:
 - 1. Disable all services that are not required for system operation or recovery.
 - 2. Validate that the OS and database are the appropriate for the site and current.
 - 3. Utilize AD.
 - 4. Follow Microsoft OS Security Best Practices.
 - 5. Create dedicated user accounts.

3.3 SYSTEM TESTING

- A. Validate each configuration setting.
- B. Test the port security feature by disconnecting a field IP device. The port should shut down and require manual intervention to reactivate the port.

3.4 WARRANTY SERVICE

- A. Provide normal and emergency warranty service in accordance with the provisions stated in SECTION 28 00 01, GENERAL SECURITY REQUIREMENTS.

- B. Provide normal service, defined as minor repairs and/or adjustments or any service that the system requires in order to be fully functional that does not fall into the category of Emergency Service at the option of Owner.
- C. Provide emergency service at additional cost to Owner, defined as repairs, adjustments, parts, replacement of parts, or any service required to make the system fully functional and is beyond the category of Normal Service, at the option of the Owner.

END OF SECTION 280511

SECTION 280513 - CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY

PART 1 - GENERAL

1.1 DESCRIPTION

Furnish and install wire and cable for the security system components shown on the security drawings, details, and schedules with the exception of the CAT 6/6A cables. CAT 6/6A cable will be furnished, installed, terminated, tagged, and tested by owner.

A. Work Included:

1. Furnish, install, tag, and document wire and cable to provide all electrical and data circuits for the Physical Access Control System, all other systems, and any other associated work shown on the security drawings, details, and schedules.
2. 120VAC Emergency Power Circuits.
3. Terminate low voltage conductors and install all of the security components.
4. Coordinate with Owner and System Designer for all aspects of work and schedule.
5. Review all work by others on a continuous basis and coordinate with the security team to ensure the entire project team meets the project target completion date.

B. Work Included, but Specified Under Other Sections:

1. Section 270500 – Common Work Results for Communications
2. Section 280101 – Security General Requirements
3. Section 280511 – Cyber Security
4. Section 280811 – Security Testing
5. Section 281000 – Access Control System

C. Work By Others:

1. Owner will furnish, install, terminate to biscuit jack on field device end, and test CAT 6/6A cable for all security IP devices. Owner will tag all CAT 6/6A with permanent tags in a standard format.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide all materials listed in PART 2 - PRODUCTS of this specification and the Detail Package unless specifically excluded or modified in other portions of the contract document.
- B. Wire/cable pulls are scheduled in the detail package. Use the wire/cable brand and type shown unless a substitute has been specifically approved by Owner. Use outdoor rated cable for exterior applications.

- C. The contract documents define the minimum acceptable quality by designation of a manufacturer's name, part number or performance standards. It is the responsibility of Contractor to verify that the proposed system components meet or exceed the minimum acceptable performance requirements in the Contract Documents.
- D. All products shall be new, unused, in perfect working condition and in the original packaging upon arrival at the site prior to installation. Any product found to be non-compliant shall be replaced at the cost of Contractor.

2.2 CABLE

- A. Refer to the security details for all cable requirements and the cable legend for specific part numbers.

2.3 CABLE HANGERS

- A. Provide Legrand CABLOFIL or approved equal cable support. Assemblies shall consist of a steel angled hanger bracket holding up to six non-continuous cable supports, rated for indoor use in non-corrosive environments; UL Listed.
- B. Provide and install hangers at 4-foot maximum intervals along every wire run wherever cable tray or conduit is not present.

2.4 WIRE DUCT

- A. Tyton or Panduit wire duct with slotted sidewall and cover, or approved equal
- B. Size for specific backboard or backplane space and load requirements

2.5 CABLE TIES

- A. Provide Hook and Loop plenum-rated cable ties, sized appropriately to the conditions. Velcro, Tefzel, or equal.
- B. Install at 4-foot maximum intervals, roughly centered between hangers, and at other appropriate locations to keep the wire groups neat.

2.6 CABLE AND WIRE MARKING

- A. Temporary Wire Tags:

1. During installation, cables may be tagged with Panduit, Brady, or approved equal wrap around tags.
2. Provide tags at both ends of each cable.
3. Write on temporary tags with a black "Sharpie" brand pen (or approved equal).
4. Following installation, install the permanent tags and remove all temporary tags.

2.7 PERMANENT WIRE TAGS

- A. Provide Brady, Panduit, or equal heat-shrink or permanent wrap-around, machine-printed, polyolefin wire markers for all cables.
- B. Hand written tags are not acceptable.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

- A. Obtain specific approval from Owner for the location and appearance of any cable or raceway that is not hidden. If approved, install as inconspicuously as possible.
- B. Where required, install cable and wire parallel and square with building lines, including raised floor areas.
- C. Comb wire groups. Route and support all wiring and cable to achieve the highest quality appearance in all areas, including the interior of all panels and racks.
- D. Install, label, and terminate cable in accordance with manufacturer's installation manuals and applicable codes. In the absence of manufacturer's recommendations on single conductor application or being shown on the contract drawings select and install cables that meet all technical requirements of the equipment.
- E. Install wire tags per specifications and position so that they are easily read without needing to move the cables.

3.2 WIRE AND CABLE

- A. Install all wires/cable on walls in exposed areas in thin wall EMT, or other Owner approved raceway, unless otherwise noted or exempted. For wire/cable runs above suspended ceilings, clamp cable to underside of deck or use wire hangers noted above in 2.2.A; do not allow cable to lie on top of the ceiling panels. In open ceiling areas, clamp cable to underside of deck in pan troughs or along beams to aid concealment. Do not attach wiring or raceway to suspended ceiling support wires.

- B. Obtain specific approval from Owner for the location and appearance of any cable or raceway that is not hidden. If approved, install as inconspicuously as possible. Wherever possible, make square runs that follow existing building lines.
- C. Wiring Inspection:
 - 1. Visually inspect wire and cable for faulty insulation prior to installation.
 - 2. After installation, visually inspect all wiring for flaws such as cuts, punctures, and abrasions. If any flaws are found, replace the wire at no additional cost to Owner, and without negative impact to the schedule.
- D. For all wires installed between buildings or in underground conduit: Test with a megohmmeter (megger). A reading of 20 megohms minimum is required. Test between each conductor and ground, and between each pair of conductors.
- E. Prior to termination: Test each conductor for voltage. Replace and re-pull any conductor that has voltage. Splices are not an acceptable alternative.
- F. Where it is cost effective, and with Owner's written permission, conduits and raceways from more than one detail point may be grouped together only if:
 - 1. Physical space allows
 - 2. Appropriately sized junction boxes are used
 - 3. Conduits do not exceed the maximum 40 percent fill, conditioned by bends and length
 - 4. Security Contractor coordinates with Owner
- G. Run wires continuously from termination to termination without splices. ASSUME NO SPLICES. Splices at certain junction box locations may be allowed at the discretion of Owner. Make recommendations for splices at such points to Owner and obtain written approval to proceed.
- H. Where splices are allowed, join the wire with solder, not wire nuts, and then cover with heat shrink insulation in an appropriate manner to ensure mechanical and electrical integrity. An acceptable alternative is to utilize UL-rated IDC moisture resistant seal connectors to connect the cables.
- I. Make all connections at terminal boards with full tagging, labeling, and documentation.
- J. Install wire hangers at 4-foot intervals for every wire run. Run wires at least 1 foot above the ceiling where possible. Run wires above other crossing items where possible. In no case shall a wire run rest on the ceiling tiles unless specifically approved by Owner in writing.
- K. Support wire and cable in all equipment, all terminal cabinets and in all terminals and pull boxes in vertical risers and horizontal runs with wire duct and strap-type supports.
 - 1. Furnish and install appropriate wire duct at all locations where wire duct is required for good wire management, whether shown on elevations or not.
 - 2. Where terminal boards are used, furnish and install wire duct on both sides. At no time shall wires cross over terminal boards.
 - 3. Arrange cables neatly to allow inspection, removal, and replacement.

4. Lace cables as required.
 5. Spot tie wire bundles with plastic cable ties and secure to panels.
 6. If screw type terminals are specified, terminal strip connections shall be locking, tongue style, pressure crimp, solderless spade lug.
- L. Visually inspect wire and cable for faulty insulation prior to installation.
 - M. Protect cable ends at all times with acceptable end caps except during actual termination.
 - N. At no time subject any fiber optic cable to any bend of less than 8-inch radius.
 - O. Protect wire and cable from kinks.
 - P. Provide grommets and strain relief material where necessary to avoid abrasion of wire and excess tension on wire and cable.
 - Q. Keep security cabling neatly grouped together and separated from all other cabling when utilizing shared cable trays.
 - R. Adhere to the shielding design shown on the Detail Package, particularly the requirements of 00.06.501, "Wire Shield Termination." Proper shielding is crucial to maintaining data integrity.

3.3 IDENTIFICATION AND TAGGING

- A. Identify all cables, wires, wiring forms, terminal blocks, and terminals using labels, tags or other permanent markings.
 1. Clearly indicate the function, source, or destination of all cabling, wiring, and terminals.
 2. Use the wire-marking format and appropriate naming convention shown on Details 00.05.501 through 00.05.507 for all wiring. Utilize the Door Number in place of the 5-digit number shown in the detail. Example "AX-158".
 3. Identify all cables and wires with heat-shrink, machine-printed, polyolefin wire markers.
 4. Handwritten tags are not acceptable.
- B. If the wire-tagging format as shown on the drawings cannot be used, submit a substitute format that complies with the intent to provide documentation for end-to-end tracing of all wiring.
- C. Appropriately label all terminal points.
- D. Furnish and install machine-printed labels on all panels.
 1. Print the labels with identifying names and functions. Include names of the specific systems or subsystems.
 2. Printed labels are to be consistent in form, color, and typeface throughout the system.
 3. Coordinate the design, color, font, and layout with Owner.

END OF SECTION 280513

SECTION 280811 - SECURITY TESTING

PART 1 - GENERAL

1.1 DESCRIPTION

The close out of a project is the culmination of many steps from inception to fully operational. Testing is the critical process required by SECTION 28 01 01, SECURITY GENERAL REQUIREMENTS that leads to project completion and the Owner's assurance by the Integrator that every design element is fully functional. Test all installed work using the SBD ASSIST web portal (ASSIST) to document the results.

A. Work included

1. Complete mandatory ASSIST testing training to understand requirements for testing and documenting points prior to providing a bid. The testing process requires on-line forms to be filled out and pictures taken and uploaded to ASSIST. Log in with the following information:
 - a. Link: <https://sbd.us/training/testing>
 - b. User Name is: testing
 - c. Password is: site
 - d. Training Code is: MCC230204
2. Test each defined point and element shown on the drawings and details to verify the appropriate operation. Submit test results, documented on the ASSIST forms located at <https://sbd.us/Assist/Login>. Use the same location for documenting the Final Acceptance Test. Refer to 1.2 – SUBMITTALS to obtain login information.
3. Pictures of completed work are required as part of this testing process to clearly show the quality of the installation. Take portrait images where possible and adjust image rotation as required. Image resolution and quality must be sufficient to clearly read wire tags, see wire terminations, and door hardware. Refer to line drawings to capture the appropriate information.
4. Review requirements for photographs and test information prior to initiating testing and upload results once online connection is restored. The same forms will be used for documenting the Final Acceptance Test. In the event that sufficient connectivity is not available to complete the testing documentation online at the site, information and photos can be identified by door or point number and uploaded at a later time.
5. After all information and required pictures have been entered for each point, certify the point as Tested. The quality of the information is critical, both data and images. By marking the Tested box, the Integrator is assuring the Owner that the work is neat, high quality, and 100 percent ready.
6. All field work will be tested via this process prior to scheduling validation completion by Owner.
7. The Owner and/or Designer will review all the data that is marked Tested and will be able to certify each point as Completed once the data appropriately supports the design intent.

These forms will be made available to the contractor and to the Owner for review and as a permanent record.

8. When any wiring change or correction is made to a field point or a panel equipment area, all potentially affected system components must be retested to assure complete design functionality.
9. A Final Acceptance Test with the Integrator, Designer, and other Owner Representatives will be scheduled once all of the system elements are Completed. The Designer will create a punch list based on the Final Acceptance Test. When all items on the punch list are resolved, a *Letter of Completion* will be issued. The date on the *Letter of Completion* is the start date of the system warranty.

B. Work Included, but Specified Under Other Sections

1. Section 270500 – Common Work Results for communications
2. Section 280101 – Security General Requirements
3. Section 280511 – Cyber Security
4. Section 280513 – Conductors and Cables for Electronic Safety and Security
5. Section 281000 – Access Control System

1.2 SUBMITTALS

- A. Submit written test procedures for approval in accordance with specification SECTION 28 01 01 - SECURITY GENERAL REQUIREMENTS - 1.8 SUBMITTALS.
- B. Each ASSIST user will need a unique login to document the testing.
 1. Provide a first and last name, company, email, and mobile phone number with mobile phone service provider for each user to enable account creation to the Designer. The users should be the technicians who will be performing the testing.
 2. ASSIST includes two-factor authentication using a one-time password (OTP) code that can be sent via text or email. Please select each user's preferred option to receive the login confirmation code sent each time they log in. A new code is required each time a user signs in.
 3. SBD will send a direct link to ASSIST along with login information following account creation.
- C. After Contractor testing and at least two working days prior to Final Acceptance Testing, ensure the testing and picture documentation is completed online for review. Submit a report to the owner of all points by building and floor or plan sheet to verify completion of contractor testing.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide test data electronically as described above in 1.2 Submittals.

PART 3 - EXECUTION

3.1 GENERAL

- A. Execute the tests required to completely test all work. All work must be physically functional at its point of use and be operationally integrated into the appropriate system.
- B. Use ASSIST to provide image and written test results on web forms. Where appropriate, upload printouts from test equipment and/or the systems being tested.
- C. Provide qualified personnel to test each type of work.

3.2 BASIC TEST PARAMETERS

- A. Access Control System:
 - 1. If, at the time of testing, Owner has not provided setup parameters, or if the setup parameters have not been entered into the system database, use the following default standard setup values for testing:

Door unlock time	5 seconds
Door held open time	60 seconds

3.3 SPECIFIC TEST DEFINITIONS

- A. Overall
 - 1. The tests included in this specification section are the base level of testing requirements.
 - 2. In addition to the tests defined by ASSIST, perform all manufacturer recommended test procedures that exercise all normal system attributes.
 - 3. In the absence of manufacturer-defined tests, use a copy of the operator manual to define tests that demonstrate the operation of each system function. Initial and date each function successfully demonstrated and include the pages in the testing binder.

- B. Access Control System Tests

- 1. 2-state alarm point, test an open and a short as an alarm, and the single end-of-line as normal.

Open circuit	Alarm
Short circuit	Alarm
Single end-of-line resistor current value	Normal

- 2. 4-state alarm point, test for alarm as one value and one state, normal as another value and state, and short and open as discrete values and as supervisory (trouble) states.

Open Circuit	Trouble
Short circuit	Trouble

First end-of-line resistor current value	Alarm
Second end-of-line resistor current value	Normal

3. Record the monitor messages on the test forms.

C. Fiber-Optic Tests

1. Optical Power Meter (OPM) Test

- a. Test each fiber twice from end to end, including all splices and connections, once from the remote end to the hub end and once from the hub end to the remote end.
- b. Document the results on the test forms.

2. Optical Time Domain Reflectometer (OTDR) Test

- a. Test each fiber once from end to end, including all splices and connections.
- b. Store the test results and print as data values and a graphical trace of the data. Label and attach the print to the test form for each fiber.
- c. Annotate each graphical trace to identify and explain the following discontinuities that deviate from the normal exponential decay slope of the trace:
 - 1) Launch pulse
 - 2) End-of-fiber reflection pulse
 - 3) Splice reflections
 - 4) Losses due to poor connections
 - 5) Any other losses (or gains)
- d. Document the results on the test forms.

D. Cat 6/6A Tests Unshielded Twisted Pair (UTP) Wiring

1. Owner will complete the Category 6/6A cable run testing for conformance to the specifications of EIA/TIA 569-C Category 6 and must be tested for:

- a. NEXT
- b. PS NEXT
- c. Attenuation
- d. Continuity
- e. Insertion Loss
- f. Distance
- g. Delay Skew
- h. ACR

2. Obtain copies of testing documentation prior to connecting IP devices.

- a. Notify Owner of any pairs not meeting the requirements of the standard. These pairs shall be brought into compliance by the Owner and re-tested. Verify compliance on new testing documentation prior to completing IP device connection.

3. Factory manufactured CAT6 jumper cables do not require field testing.

E. Dynamic Battery Test

1. Test each battery.

- a. Measure the voltage across a 3-ohm high watt resistor for 20 seconds.
- b. Verify that the voltage does not drop below 90 percent of the rated voltage.

2. Replace any battery for which the measured voltage drops below 90 percent of the rated voltage during the 20-second test.

F. N/A (Not Applicable): Indicates that the particular test or parameter does not apply to this project.

3.4 TEST FORMS

A. The test forms are automatically assigned as part of the ASSIST testing.

1. Where a specific line on a test form does not apply, check the “N/A” (Not Applicable) box.
2. Where a test form does not apply, but a similar form would be more applicable, submit a substitute form for approval prior to commencing any relevant testing.

END OF SECTION 280811

SECTION 281000 - ACCESS CONTROL SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Furnish and install Access Control System (ACS) components that have the following key characteristics:
 - 1. RS2 Technologies' Access It! Universal (RS2)
 - 2. Mercury hardware
 - 3. Allegion door hardware
 - 4. Wavelynx readers and credentials
- B. Work Included:
 - 1. Furnish, install, program, test, and make fully operational at the locations shown, the specified equipment and all associated conductors to provide a completely operational Access Control System. Include:
 - a. Access control server and licenses
 - 1) The server may be virtualized. Coordinate with Owner to ensure it is sized to support the full system.
 - b. Access control panels
 - c. Power supplies
 - d. 120 VAC power to panels
 - e. Credential readers
 - f. Credentials
 - g. Doors
 - 1) Preparation of existing doors
 - 2) Removal of damaged doors
 - 3) Installation and preparation of new doors
 - h. Door hardware
 - i. Door alarm devices
 - j. Miscellaneous hardware
- C. Work Included, but Specified Under Other Sections:
 - 1. Section 270500 - Common Work Results for Communications
 - 2. Section 280101 - Security General Requirements
 - 3. Section 280513 - Conductors and Cables for Electronic Safety and Security
 - 4. Section 280811 - Security Testing

1.2 SUBMITTALS

- A. Provide submittals as required in SECTION 280101, SECURITY GENERAL REQUIREMENTS.
- B. Access control server and licenses
 - 1. No later than 20 working days after the effective date of the Agreement, provide a submittal that reflects discussions with the District allowing for the District to decide to provide the server themselves, and/or take advantage of some District-owned license capacity. This submittal will be accompanied by a potential deduct change order.

1.3 PERFORMANCE EVALUATION/TERMINATION

Furnish and install a complete ACS which meets or exceeds the following performance requirements:

- A. NEC Class II standards:
 - 1. Furnish and install the ACS in such a way that it is fully compliant with the Class II limited power requirements of the NEC.
- B. Underwriters' Laboratories Compliance:
 - 1. Furnish and install ACS to fully satisfy all UL 294 requirements both in terms of its design and documentation, and also in the completed installation. All aspects of the enclosures, power supplies, relays, circuit breakers, controllers, reader-port circuit boards, I.P. interface hardware, and cabling must meet the requirements of UL 294.
- C. Ethernet Connectivity:
 - 1. Furnish and install ACS hardware and software possessing the ability to connect controllers, servers, and workstations through Ethernet to Owner's LAN (Local Area Network) or WAN (Wide Area Network). All aspects of the controller and IP interface hardware must meet the requirements of UL 294. Where controllers are equipped and installed with IP modules, the hardware must also be able to be installed in a way that fully satisfies UL 294.
- D. Event Processing Performance:
 - 1. Maximum card access transaction time of 0.5 seconds
 - 2. Alarm processing time of 4 seconds or less
- E. Processing multiple credential and communication formats:
 - 1. Furnish and install ACS with controllers which can concurrently process different credential formats (Smart, NFC & BLE) and which can be set up to process OSDP Secure Channel and RS-485 communication.
- F. Door Re-locking:
 - 1. Furnish and install ACS with the programmability to set each door to re-lock after any of the following events:

- a. Door has been opened (provide ability to re-lock within no more than 0.5 seconds)
- b. Door has been left open for a certain (Owner-defined) length of time (e.g. five seconds)
- c. Door has been closed (provide ability to re-lock no slower than within 0.5 seconds)

G. Shunt Request-to-Exit (REX):

1. Furnish and install ACS with the ability to program door apparatus to shunt the alarm upon receipt of a signal from a REX device, without sending an unlock signal to the door.

H. Controllers:

1. Furnish and install ACS with controller panels, each to include power supply and access control boards to support the associated devices indicated in the Door Detail Schedule and drawing set.
2. Provide “flash”, online-upgradeable firmware so that remote application version updates can be safely accomplished.
3. Furnish and install ACS with the capability to support:
 - a. A one-door or two-door controller (to be located at the location indicated on the plans) with Ethernet TCP/IP, Power-over-Ethernet (PoE) which uses a data connection back to the controller, and which supports (at a minimum) four-state, REX and supervised-door-contact inputs, a tamper input, a reader input, an LED, a beeper, and lock outputs.
 - b. PoE door locking/controller integrated hardware.
 - c. Controllers that can be configured to support up to 64 readers.
 - d. Support OSDP V2 (Secure Channel) with encryption for connection of credential readers, with control of LED and beeper functionality.
4. Provide controllers with the capability of being configured with sufficient memory to support at least 100,000 cardholders.

I. Report Management:

1. Furnish and install ACS which provides users with the ability to use common report-generating software to create a report on any of the system’s database or history records and to store and manipulate reports within the application itself.

J. Alarm Presentation:

1. Alarm management screen must have the following attributes and functions:
 - a. ACS software must present alarms on the alarm screen in a “double-sort” fashion, with priority as the first sort, and initiation time as the second sort. Sort order must refresh in real time upon each addition or deletion of active alarm events.
 - b. Owner must have the ability to govern permissions granted to alarm management screen operators and the option to deny them the ability to modify sort preferences.

K. User Permissions:

1. Furnish and install ACS which offers a “matrix” approach to the granting of operator permissions. Provide different groups of operators with the ability to manipulate any programmable set of system functions.
2. Provide Owner with the capability of limiting or controlling operators’ ability to view, edit, add, or delete any fields or attributes of the database.

L. Operator Audit Trail:

1. Create a record of, and provide the ability to create reports of, all operator actions within the ACS software including:
 - a. The time a change was made by an operator
 - b. The operator’s name
 - c. The item’s state before the change was made
 - d. The item’s state after the change

M. Badging Integration with ACS:

1. Furnish and install an ACS whose badging system software is (or can be) seamlessly integrated with access control software suite. Ensure that, as a rule, when updates or upgrades become available for the access control portion of the software, the badging software application (along with technical support available for it) is also concurrently updated by the same software manufacturer.

N. Double Card Tap:

1. Furnish and install an ACS that can execute virtually any command following a double card tap.

1.4 SYSTEM TRAINING

A. Furnish personnel to execute the training plan described in SECTION 280101, SECURITY GENERAL REQUIREMENTS.

1. Establish a specific schedule that meets the convenience of Owner.
2. Provide training literature and outlines at the beginning of each session.
3. Operator and management training:
 - a. Provide 8 hours total operator and management training time to include system operation and database management. This training will be split into at least two training sessions on different dates to enable initial interaction and a follow-up training for questions and review.
4. Technical maintenance training:
 - a. Provide 8 hours total technical maintenance training time.

1.5 DATABASE ASSISTANCE

- A. Assist Owner in setting up database requirements and formats. Provide appropriate forms and written instructions to Owner. Provide examples of the sequence of completion for all related forms.

1.6 OVERVIEW OF THE SYSTEM

- A. The following overview of the ACS is provided to define a framework for understanding the system design approach:
 - 1. The access control system headend will be installed in the MDF/IDF and will be monitored at the Public Safety Complex. All components added in this scope will need to be tied into this system.
 - 2. Two main categories of security doors will connect public areas with private Owner areas.
 - a. Access Control System doors.
 - b. Emergency exits:
 - 1) By their nature, emergency exits must allow egress by anyone from inside the building.
 - 2) Certain emergency exit doors at stairways may need to be unlocked automatically by a signal from the fire alarm system, to allow entry into the building.
 - 3. Owner will use access control credentials encoded with a unique number for each cardholder.
 - 4. ACS databases will be organized by unique person Identity.
 - a. Main database at the Server:
 - 1) Will contain cardholder card numbers and access information that will be used to control door unlocking.
 - 2) May also store other personnel related data such as name, address, role, etc.
 - 3) Normally, no door unlocking decisions will be made at the Server level.
 - b. Remote panel databases:
 - 1) Will be subsets of the main Server database.
 - 2) Will store card number, time zone, and door group data from cardholder records downloaded from the Server.
 - 3) Normally, all door unlocking decisions will be made at the remote panel level.
 - 4) Initially, all remote panel databases will be empty.
 - 5) Data will be downloaded from the Server on demand and edited as needed.
 - 5. RS2 will provide Owner a tool for auditing security doors' activity.
 - 6. Integrations will be required to ensure desired functionality is obtained.
 - a. API to class scheduling software should be complete for scheduled unlocking and locking of doors. Work with Owner to ensure it is functioning properly for new doors.
 - b. Integration with Allegion AD-300 Series Locks requires specialty equipment to program the lock. Ensure all boards have current firmware. Additional information is listed on the following page: <https://accessit.acre-co.com/kb/article/281-allegion-ad-300-series/>

- B. Learning Resource Center (LRC) updates
 - 1. There will be separate scope to transition the S2 Netbox system to an RS2 system at the LRC.
 - 2. Following completion of that transition, within this contract and scope of work, do the following:
 - a. Install REX devices for each access control door.
 - b. Wire REX devices to panels utilizing existing cabling.
 - c. Validate door contact and end of line resistor functionality for all access control doors. Add or replace as needed to achieve full functionality.
 - d. Add all required components for additional monitored doors as defined in the Door Detail Schedule.
 - e. Remove dogging functions from all alarm and access control doors.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Furnish and install products from the following manufacturers:
 - 1. Allegion (Schlage & Von Duprin)
 - 2. Altronix
 - 3. Alutech
 - 4. Mercury
 - 5. RS2
 - 6. Wavelynx
- B. The ACS central components and field panels shall all be from the same system manufacturer.
- C. Furnish and install all materials identified below and in the Security Details, Drawing set, and Door Detail Schedule. Review the Details and Schedules to identify any additional components required to provide a complete and operable system.
- D. Carefully review all bid documents for exact type and quantity of parts and devices required to support field and head-end security apparatus.
- E. Furnish and install materials, equipment, software, and any other apparatus or support necessary to comply with the requirements articulated above in Part 1.4 – PERFORMANCE EVALUATION/ TERMINATION.
- F. Furnish and install printed labels for each card reader to identify the specific location in accordance with the Door Detail Schedule. Label with the detail type and door number, example: AX-101A. Place label on the hinge side of the reader. Use white tape with black 12 point font.

2.2 ACCESS CONTROL PANEL FOR UP TO 16 READERS WITH POWER SUPPLY

- A. Review Detail 07.05.001 and the Door Detail Schedule for configurations for each panel. The components and quantities of boards are based on the requirements identified for each building. The 07.05.001 panels need to have sufficient boards to support the associated card readers and inputs. The Door Detail Schedule indicates loading for each field point. All enclosures should be keyed-alike.

2.3 ACCESS CONTROL SERVER SOFTWARE

- A. Access It! Universal.NET Enterprise Version 10
 - 1. The Enterprise solution enables the three separated locations to be partitioned for greater monitoring separation.

2.4 CARD READERS

- A. There are multiple card readers included in this design.
 - 1. The Schlage AD-300 locksets have integrated card readers. Ensure all AD-300 locks are ordered with the MT series reader. Specific part number options are listed in the AX and BX details.
 - 2. The stand-alone card readers will be Wavelynx Technologies' Ethos line, which support NXP's MIFARE DESFire EV3 credential technologies, LEAF credentials, and mobile credentials. Use Single Gang Readers as the default and Mullion Readers where the reader must mount on a mullion. Do not mount a Single Gang Reader on a mullion.
 - a. Mullion Readers: ET10-6WS
 - b. Single Gang Readers: ET20-6WS

2.5 CREDENTIALS

- A. Provide the following Wavelynx credentials:
 - 1. 600 Wavelynx EV3, 4K ISO Cards
 - a. Coordinate with Owner to define specific part number prior to ordering.

2.6 DOOR COMPONENTS

- A. This project has a mix of door conditions. There are existing doors and hardware that will need to be modified. There are existing doors where the hardware will need to be entirely replaced and the door will need to be prepped for the new hardware. There are existing doors that will need to be removed and a new, prepped door will need to be installed in the same location. Refer to the Door Detail Schedule for specific information for each door.
- B. Review equipment lists on each detail to determine the components required for each door type. Existing doors have some required components already installed. Refer to the Door Detail Schedule to determine which of the components need to be added for each location. Where AX and BX AD-300 hardware has been specified, refer to the Door Detail Schedule to select the appropriate version (Cylindrical, Mortise, or Panic).

- C. The Door Detail Schedule lists the current finish. Where there are a mix of hardware finishes in a building, confirm with Owner prior to ordering.
- D. Sliding doors may require an additional security tie-in board depending on the manufacturer. Confirm requirements for each sliding door.
- E. Some doors have existing pick plates (Latch Gard) that will not work with the AD-300 locksets. Replace pick plates on these doors with models that work with the new hardware.

2.7 ROLL-UP COUNTER DOORS

- A. There are two service windows in the IT/WAT building that require automated roll-up counter doors. There are existing roll-up doors that will need to be replaced in order to achieve a lockdown state upon a trigger from the ACS. Confirm whether fire rating is required prior to ordering. Safety sensors must be installed to prevent injury. Final location of contacts and sensors will need to be field coordinated for each location.

2.8 UNSPECIFIED EQUIPMENT AND MATERIAL

- A. Any item of equipment or material not specifically addressed on the drawings or in this document and required to provide a complete and functional communications pathway system installation shall be provided in a level of quality consistent with other specified items.

2.9 SPARE PARTS

- A. (2) Wavelynx Single Gang card readers
- B. (2) Wavelynx Mullion card readers
- C. (1) Schlage AD-300 MT Cylindrical Lockset
- D. (1) Mercury LP1501 board
- E. (1) Mercury LP1502 board
- F. (1) Mercury LP4502 board
- G. (2) Mercury MR-52 board
- H. (2) Mercury MUX-8 board

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

- A. This contract may involve currently functioning systems. Coordination with Owner is critical. Do not interrupt any functioning system without complying with the provisions of specification SECTION 280101, SECURITY GENERAL REQUIREMENTS.
- B. Locate and install all security devices and components in accordance with the details and drawings. Create Load Schedule/Programming Sheet to be verified by Owner prior to programming, based on the panel loading information provided. Make any required updates and obtain final verification by Owner. Complete programming two weeks prior to installation for each building. Post load schedule/Programming Sheet inside Security Panel in a sheet protector.
- C. Aesthetics are an important consideration in this installation. Install all components to provide aesthetically pleasing results. Coordinate the actual locations of all visible components in advance with Owner.
- D. Provide appropriate conductors for all security devices, per cable schedule and tags in the Security Details.
- E. Wire doors in a home run configuration back to the panel locations according to the drawings. Notify Owner if there are conditions that might prevent this solution. Exceptions may be granted on a case-by-case basis.
- F. Install all accessible components with tamperproof security fasteners.
- G. Ensure there are sufficient boards in each security panel to support the devices. All cables, both internal and external to panels and junction boxes must be cleanly routed, combed, and supported by Velcro or equal ties. Provide lockable panels and cabinets; provide labeled keys to Owner.
- H. Connect and terminate as shown in the details and the panel designs the tampers for the panels and power supplies.
- I. Install End-of-Line-Resistors (EOLR)s on each supervised input at the field end of the line. The security panel is the "Head" of the line and the actual contact or sensing point is the "End" of the line.
- J. Comply with the wire marking and panel labeling provisions stated in SECTION 280101, SECURITY GENERAL REQUIREMENTS.
- K. Before commencing panel installation, confirm that the necessary electrical power and grounding provisions are installed to meet the security system manufacturer's stated requirements.
- L. Provide device labeling on all card readers, security panel, power devices, and tag inside wires based on standards given to vendor.

3.2 SYSTEM INSTALLATION

- A. Confirm that the locking hardware for individual doors is consistent with the security design and the normal use of the space.
- B. Do not apply power to a remote panel until the manufacturer's grounding requirements are complete.
- C. Coordinate this work with Owner's IT and Security departments. A significant effort has been made by Owner's IT department to plan the integration of these security systems into the infrastructure of the Owner in a secure and resilient way.

3.3 SYSTEM PROGRAMMING

- A. Program the hardware as defined in the Detail Package and on the Drawings. If a database backup is required, Owner coordination is required in advance.

3.4 SYSTEM FIRMWARE

- A. Apply the current firmware version for each panel type prior to starting system testing.

3.5 SYSTEM TESTING

- A. Test each building as it is completed. Use the test procedures submitted as outlined in SECTION 280811, SECURITY TESTING to test and evaluate the system. These tests shall be part of the overall Final System Acceptance Testing Requirements. Once complete, notify Owner for commissioning.
- B. After the system is completely installed in accordance with the Specifications, Drawings, and Details, conduct a full systems test. Ensure all documentation is complete in ASSIST.

3.6 WARRANTY SERVICE

- A. Provide warranty service in accordance with SECTION 280101, SECURITY GENERAL REQUIREMENTS.

END OF SECTION 281000

SECTION 285090 - SECURITY DETAILS

PART 1 - GENERAL

1.1 1.1 DESCRIPTION

- A. The Details attached to this Specification Section are included in the Scope of Work.
- B. See Table of Contents Detail No. 00.00.001 et al for a listing of the detail numbers, titles, revision numbers, and revision dates of each detail.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide all materials listed in the Details attached to this specification for each type of location, as defined on each sheet.
- B. Provide all of the materials listed in the Drawings and Door Detail Schedule, as defined on each sheet.
- C. These material lists and equipment lists are not necessarily 100% complete and/or accurate. Verify all quantities and part numbers, whether listed or not.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

- A. Install all products with the workmanship and coordination described in the individual specification section for the type of product.

END OF SECTION 285090