

SECTION 28 00 00  
ELECTRONIC SAFETY AND SECURITY  
(Part of the Work for Section 260001)

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the GENERAL REQUIREMENTS AND COVENANTS - DIVISION I, and the SPECIAL PROVISIONS - DIVISIONS IIA and IIB, which are hereby made a part of this Specification Section.
- B. Examine all Drawings and all Sections of the Specifications for requirements and provisions affecting the Work of this Section.

1.2 TRADE CONTRACT REQUIREMENTS

- A. Work of this Section is part of the Electrical Trade Contract. Refer to Section 26 00 00 "Electrical Trade Contract Requirements" for additional information about this Trade Contract.

1.3 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.4 SUMMARY

- A. Section Includes:
  - 1. This document covers the general requirements for work to be performed to provide electronic security and surveillance.
  - 2. The contents of this document, along with related drawings and documentary material are critical to the security of this project and Owner, and will remain secure and confidential.
    - a. Confidential information will not be deliberately or inadvertently disclosed other than the Security Subcontractor's personnel and Security Subcontractors who require disclosure to perform their portion of the work.
    - b. This confidential information will be tracked to ensure that copies are accounted for and properly destroyed when no longer needed to perform the work.
- B. The security systems will consist of the following unified or integrated subsystems as specified herein:
  - 1. Electronic Access Control System
  - 2. Intrusion Detection System
  - 3. Video Management System
- C. Integration between the subsystems is defined as follows:
  - 1. The Access Control System (ACS) will support integration with the Video Management System (VMS). Integration will permit the user to view live and recorded video from one GUI and one single window. The same GUI will be utilized for both the access control solution and the specified video surveillance solution. Switching from one application or GUI to another will not be acceptable as well as utilizing two applications simultaneously to achieve the functionality specified is not allowed.
  - 2. Integrated systems will communicate through bi-directional communication.

3. Each door contact, motion detector, panic button, will be individually annunciated on the security graphical user interface (GUI).
- D. Provide complete turnkey systems except for those items noted within this specification.
- E. Related Sections:
1. Section 08 71 00 Door Hardware
  2. Division 21 Fire Suppression
  3. Division 26 Electrical
  4. Division 27 Communications
  5. Division 28 Electronic Safety and Security
- 1.5 ACTION SUBMITTALS
- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
- B. Submittals for Division 28 Sections will include the following:
1. Drawings will be marked “Confidential” in the top and bottom of the page and subsequent pages will have the restriction appearing as a footer at the bottom of the page. The outside back cover of the submission will also contain the “Confidential” header and footer.
  2. Submit the following materials:
    - a. A description of the proposed ESS system operation, to include departures (exceptions, variances or substitutions).
    - b. Manufacturer's printed product data, catalog pages and descriptions of installed equipment and special installation procedures to be used for the ESS. Data sheets will be printed double sided in full color, separated by individual component and where multiple models exist on one data sheet, a red arrow or circle will clearly identify the exact model number proposed.
    - c. Provide special mounting details for access control devices, door contacts, locks, power supplies, request to exit devices, duress switches and intercom stations.
  3. Prepare and submit complete Shop Drawings in the manner described herein. Shop Drawings will include components depictions on 2D floor plans, necessary wiring diagrams and connectivity points of equipment. Shop drawings will be required of ESS devices including peripheral alarm devices, access control devices, magnetic door contacts, electric locking devices, power supplies, intercoms, request to exit devices, programmable logic controllers (PLC) controllers and control panels and related equipment.
  4. Provide a wiring schedule showing the individual ESS device type, wiring type, device location, associated panel(s) location, and alarm zone for wiring and connection of interior and exterior ESS devices. The wiring schedule provided with the Contract Documents to may be used to facilitate this task. The wire schedule will report the identification number of each wire or cable as they appear in the field.
  5. Shop Drawings will include ESS System Descriptions and calculations on how the equipment will operate as a system to meet the performance of this specification. The data package will include the following:
    - a. Description of site equipment and its configuration
    - b. Operating protocol description

- c. Startup operations
  - d. System expansion capability and method of implementation
  - e. System power requirements and UPS sizing
  - f. A “one-line riser” diagram, which will show the system as proposed, with device counts accurately depicted. “Typicals” will not be allowed.
6. Provide complete manufacturer’s operating equipment manuals, diagrams and pertinent data for the operation and maintenance of this equipment.
  7. A copy of the manufacturers standard warranty agreement must be provided.
  8. Provide within the proposal the required Vendor Quality Assurance information.
- 1.6 SECURITY SUBCONTRACTOR QUALIFICATIONS:
- A. The Security Subcontractor must be certified and have the project experiences listed below. Provide evidence of certification by providing documentation directly from the manufacturer for the following subsystems;
    1. These sub-systems include the following:
      - a. Electronic Access Control System
      - b. Video Management System
  - B. The installing Security Subcontractor shall contain an S-License in conformance with M.G.L. Chapter 147 Sections 57 through 61.
  - C. This Section will be provided by a qualified Systems Security Subcontractor.
    1. The Systems Security Subcontractor shall be DCAM Certified by the state of Massachusetts Division of Capital Asset Management, in the category of: ALARM SYSTEMS.
- 1.7 GENERAL REQUIREMENTS
- A. This specification is developed by the Fitchburg School District (FSD), the Owner, for the Crocker Elementary School in Fitchburg, MA.
  - B. The following general definitions will apply.
    1. The Electronic Safety and Security System (ESS) will consist of the Intrusion Detection System (IDS), Access Control System (ACS), Video Management System (VMS), and the Security Communications System (SCS).
    2. The Owner is Fitchburg School District (Owner); and, the Owner’s Engineering Technical Representative (Engineer) is Good Harbor Techmark, LLC.
    3. The Security Subcontractor (Security Subcontractor) is the firm selected by the Owner to perform the work outlined in this specification and supporting documentation. The Security Subcontractor shall supply equipment, labor, material and services necessary to complete the project construction in accordance with the Contract Documents.
  - C. The Items described herein will not be modified or substituted without consent of the Engineer and the Owner.
  - D. In cases where the term "provide" is used throughout this Specification and associated Contract Documents, it will mean, "provide, install and service".
  - E. The Security Subcontractor:
    1. The Security Subcontractor shall indemnify and hold harmless, to the fullest extent of the law, the Owner, the Architect, the Architect’s Engineers and agents and employees

from and against claims, damages, losses and expenses arising from these Specifications and associated Contract Documents.

2. The Security Subcontractor shall consider these plans and Specifications as containing confidential information of the Owner and will ensure that these plans and specifications are kept secure and not copied unless authorized by the Owner and Engineer. The Security Subcontractor shall restrict disclosure of specific ESS design information to duly assigned and authorized subcontractor personnel who require such disclosure to perform their work under this Contract.
  3. The Security Subcontractor shall respect and protect the privacy and confidentiality of the Owner, his employees, processes, products, and intellectual property to the extent necessary, consistent with the legal responsibilities of the State of Massachusetts and the Owner.
    - a. Security Subcontractor submittals including drawings will be marked "Confidential" in the top and bottom of the page and subsequent pages should have the restriction appearing as a footer at the bottom of the page. The outside back cover of the submission should also contain the "Confidential" header and footer.
    - b. If required, the Security Subcontractor shall sign a non-disclosure agreement and abide by its requirements to keep confidential information concerning bid documents and this Project.
  4. The Security Subcontractor shall attend meetings arranged by the General Contractor, Architect, Owner or additional authorized parties affected by the work of this and related specification sections.
  5. The Security Subcontractor shall provide components/materials essential for a complete and functional security access and surveillance system.
    - a. The integrator must be capable of an installation that falls under the manufacturer's guidelines necessary to obtain a manufacturer warranty.
    - b. If the manufacturer of security devices or connecting hardware has supplied post manufacture performance data, copies of such are to be kept for inclusion in the documentation and made available to the Owner upon request.
    - c. Materials are to be new unused and of the latest series of model number, unless otherwise indicated by the Engineer or Owner.
- F. Drawings and Specifications are to be used in conjunction with one another and to supplement one another.
1. In general, Specifications determine the nature and quality of the materials and tests, and drawings establish the quantities, details and give characteristics of performance that should be adhered to in the installation of the security system components.
  2. If there is an apparent conflict between the drawings and specifications, or within the specifications themselves, the items with greater quantity or quality will be estimated and installed.
    - a. Clarification with the Engineer about these items will be made prior to purchase and installation.
  3. Questions regarding the Specification, or system requirements, should be directed in writing to the Engineer.

## 1.8 REFERENCES

- A. The ESS will be installed in accordance with applicable national, state, provincial, regional and local codes and standards, including, but not limited to the most current issue of the following publications, including amendments thereto of the issue that is current on the date of the contract award. Where conflicts exist between the Contract Documents and the referenced publications, local codes will govern. Equipment will be U.L. listed or meet U.L. requirements for its intended use. Applicable requirements of the following publications will apply to the work under this specification as if fully written herein.
1. Federal, State, and Local codes, regulations and ordinances
  2. NFPA 101: Life Safety Code
  3. NFPA 70: National Fire Protection Association
  4. NFPA 72: National Fire Alarm Code
  5. NFPA 730: Guide for Premises Security
  6. NFPA 731: Standard for the Installation of Electronic Premises Security
  7. National Electric Code (NEC), latest edition
  8. Applicable Building Code, latest editions
  9. Occupational Health and Safety Act (OSHA)
  10. Americans with Disabilities Act (ADA)
  11. Local Governing Authorities Having Jurisdiction
  12. Underwriters Laboratories (UL) Applicable Standards for Safety
  13. Underwriters Laboratories (UL) Applicable Standards for Proprietary Security Systems
  14. National, State, Provincial, Regional and Municipal Building Codes and Authorities having Jurisdiction
  15. Institute of Electrical and Electronics Engineers (IEEE) Applicable Standards
  16. Telecommunications Industry Association (TIA) Applicable Standards
  17. Massachusetts Architectural Access Board (MAAB)
- B. The ESS equipment and its installation will comply with local codes and authorities having jurisdiction. In addition, the Security Subcontractor is responsible for coordinating with the local Fire Marshal prior to ESS turnover and commissioning to the Owner to ensure that the ESS hardware installation meets the local building code and local life safety requirements.
- C. The Security Subcontractor shall submit a letter to the Owner prior to final system acceptance, either signed by the Fire Marshal or indicating the installed ESS has been inspected and approved by the Fire Marshal with a specific reference to the date of the inspection and those present.
- D. The Security Subcontractor shall be responsible for their own cutting and patching, but will perform work in accordance with Division 01 "Execution".
- 1.9 DESCRIPTION OF WORK
- A. The scope of this project is to select a Security Subcontractor who will act as a Subcontractor to the Electrical Subcontractor for labor, equipment, materials and services to procure, install, commission and service the entire ESS consisting of the equipment depicted on the Contract Drawings and described in this Specification and accompanying drawings and schedules.
- B. The responsibility of the Security Subcontractor shall include, but not be limited to, the following:
1. Submittals on Section 28 00 00 systems and equipment

2. Procurement and installation of Section 28 00 00 systems and equipment
3. Coordination of Section 28 00 00 system and equipment (including coordination required with other trades)
4. Coordination of conduit and wire for Section 28 00 00 Systems and equipment.
5. Termination of wiring to Section 28 00 00 systems and equipment.
6. Power conditioning for Section 28 00 00 systems and equipment.
7. Programming for Section 28 00 00 systems and equipment.
8. Testing and checkout of Section 28 00 00 systems and equipment.
9. Training for Section 28 00 00 systems and equipment.
10. Warranty, operation and maintenance manuals and other closeout requirements for Section 28 00 00 systems and equipment.

C. The Work of this Section is shown on the following Drawings:

1. Security Drawings
2. Architectural Drawings and Specifications
3. Electrical / Mechanical / Telecommunications specifications and plans.

1.10 SCOPE OF WORK

A. The School Building Authority has accepted the following systems as proprietary:

1. Access Control System – Lenel S2
2. Video Management System – Exacq Technologies, Inc.

B. The school shall integrate with the existing Fitchburg Police Departments LenelS2 and Exacq Technologies, Inc., Systems.

1. The integrator is responsible for updating the existing Exacq Professional camera licenses to Enterprise (Model number EVIP-EVENIP) as part of the project. This includes the following:

Location	Licenses Used	Total Licenses
Police Department	24	24
Boulder Garage	9	10
Putnam Garage	10	11

C. The Security Contractor is responsible for the following work at the Fitchburg Police Department (FPD).

1. Provide a dedicated client workstation and monitor in Dispatch with the access control and video management system to allow visibility of the cameras and events, as allowed, by the Owner.
2. Provide video management and access control licenses for visibility.
3. Provide visual notification on the client monitor of the lockdown alarm when triggered at the school.
4. All Security Contractors who will be performing work in the GPD will be required to be fingerprinted and undergo a background check.

5. All work provided in the FPD will required 48 hours of advance notice.
- B. Depicted on the Contract Drawings and in this Specification include the installation of the access control system, video management system and components, including access control panels and card readers, associated peripheral devices on perimeter and interior doors in the facility and other critical infrastructure spaces, the video management system server and recorder, the intrusion system, the video intercom system, the call for assistance system, workstations and monitors, CCTV cameras, networking devices, including switches and patch panels, and peripheral hardware.
- C. Low voltage cable, category cable and fiber optic cable including all connections, and fire alarm addressable modules and relays will be by the Security Subcontractor. Line voltage power (120VAC) for the ESS panels and sub-panels will be provided by Electrical Subcontractor.
  1. Category cable for cameras shall not exceed 90 meters. Cable distances greater than 90 meters shall utilize fiber optic cable and shall comply with specification section 28 05 13.
    - a. Cable types for each camera are depicted on the drawings and include an additional 10% of cable for unknown field conditions. The Security Subcontractor, at the time of bid, shall provide their own cable estimate and include the required cable and converters necessary for a functional installation. Change orders for cable lengths that exceed the specified distances, after the time of bid, will not be approved.
- D. Wire types, including gauge and conductor count, and conduit sizes have been specified in the Contract Documents. The Security Subcontractor, at the time of bid, shall review these wire types and conduit sizes and confirm that the specified wire gauge, conductor count and conduit size provides for a functional system, and conforms to the guidelines of the specification. Modifications to wire and/ or conduit shall be provided at the time of bid. Change orders for wire and conduit that differ from what is specified, after the time of bid, will not be approved.
- E. The Security Subcontractor shall work with the owner to build the access control database, including but not limited to, employee identification, functional requirements, time zones, holidays, companies, access levels, permissions, events and group access.
- F. The Security Subcontractor shall procure and install devices as shown on the Contract Documents, including the access control cable, connections, and fire alarm addressable modules and relays.
- G. No items are to be directly hung from the decking. Unistrut or similar supports should be used.
- H. Obtain approval from the Engineer of the layout of visible elements, stated below, of the security system in advance of the security system installation. Coordinate with trades in advance of installation to prevent schedule impacts.
  1. Card Reader
  2. Video Intercom
  3. Request to Exit
  4. Cameras
- I. The Security Subcontractor shall coordinate work through the Contractor and schedule work to cause as little interference or interruption as possible.
- J. The Security Subcontractor shall arrange and pay for necessary permits, licenses, and inspections.
  1. Security Subcontractor shall prepare information necessary to obtain a permit for Electronic Locking Mechanisms for the ESS in compliance with the Owner requirements.

- K. The Security Subcontractor shall verify and coordinate with Division 26 installer of related conduits, power and special back box requirements, and Division 27 for network equipment, cable and rack equipment. Specific responsibilities are listed below:
1. Responsibilities of Others:
    - a. Electrical Subcontractor – Division 26
      - i. Procurement and Installation of conduit, junction boxes, handholes, pull strings and line voltage power (120VAC) for the ESS panels and sub-panels.
    - b. Communications Subcontractor – Division 27
      - i. Procurement and installation of equipment racks for the security equipment, as noted on the Contract Drawings and within this Specification.

#### 1.11 COMPLETION

- A. The security system will be fully operational with specified features and function before acceptance. A point-to-point test of parts of the system conducted by the Security Subcontractor and the Engineer will be required for acceptance. The schedule must reflect at least 30-days for inspection, demonstration and commissioning of the system in advance of the proposed acceptance date.

#### 1.12 RECORD DRAWINGS

- A. Provide and keep on the job one (1) complete separate set of redline drawings, elementary diagrams and wiring diagrams of the ESS on which will be clearly, neatly and accurately noted, promptly as the work progresses, architectural and electrical/electronic changes, revisions and additions to the work. Wherever work is installed otherwise than as shown on the Contract Drawings, such changes will be noted.
- B. Indicate daily progress on these prints by coloring in various devices as they are installed, wired and initially tested.
- C. No approval of requisition for work installed will be given unless supported by record prints as required above.
- D. At the conclusion of the work, prepare Record Drawings in accordance with the Submittal requirements as stated below:
1. Record Drawings will include the specific location of components, wiring diagrams, and schematics to allow for the understanding and troubleshooting of the system. Block drawings and riser diagrams will accurately represent the true number of major components. For example, the number of reader control panels fed from a building controller, and the number of portals serviced by reader control panel must be accurate. In the interest of simplifying these diagrams, minor details, such as the number of door contacts at a portal featuring multiple sets of door leaves, will have the proper symbol placed, followed by the number of provided devices, enclosed by parenthesis. The digital images will be provided in high quality PDF format and will comprehensively represent both the facility and the security system.
  2. The record drawings will include but not be limited to the following types of drawings:
    - b. Floor plans depicting security devices as installed under this contract and their locations with system identification numbers and labels as they are programmed into the ESS.
    - c. Riser diagrams accurately showing security devices as installed under this contract and wiring installed to each device with corresponding identification numbers and labels as they are programmed into the ESS.

- d. Panel layout and panel wiring diagrams as installed under this contract.
- e. Overall system communications block diagram for devices installed under this contract.

1.13 COORDINATION DRAWINGS

- A. Division 28 sections will comply with sections of specification Section 01 31 00, Project Management and Coordination.

1.14 COOPERATION AND COORDINATION WITH OTHER TRADES

- B. The work will be performed such that there is field coordination with other trades to ensure no delays and that the work of other contractors is not interfered with. Materials and apparatus will be installed as fast as conditions of the building will permit. Coordination with different vendors includes, but not limited to, landscape, electrical, masonry, door and door hardware, storefront, carpentry, gypsum and communications contractors.
- C. Provide, install, program, troubleshoot, train and warranty service of security systems devices and cabling, terminal equipment, control and display equipment specified in this section for a completely operational system.

1.15 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

- A. Provide operating and maintenance manuals for Division 28 Sections in accordance with the requirements herein and forward them to the Engineer prior to ESS test and evaluation.
- B. Provide a draft copy of the operation and maintenance manuals, which will be delivered to the Engineer prior to beginning the performance verification test for use during site testing.
- C. The Security Subcontractor shall enter and program ESS data needed to make the system operational. Deliver the data to the Engineer on data entry forms, utilizing data from the contract documents and pertinent information in the Security Subcontractor 's possession required for complete installation of the database. The Security Subcontractor shall identify to the Engineer additional data needed to provide a complete and operational ESS.
- D. The operating instructions will be specific for each system and will include copies of posted specific instructions.
- E. For maintenance purposes, provide shop drawings, parts lists, specifications and manufacturer's bulletins for each piece of ESS equipment.

1.16 WORKMANSHIP

- A. It is the intent of this Specification to provide for the system equipment and installation of the ESS that complies in respects with the requirements of applicable codes and standards. Equipment, material, installation practices, that do not meet requirements or do not meet the performance standards herein specified will not be acceptable.
- B. The entire work provided in this Specification will be constructed and finished in every respect in a workmanlike and substantial manner. It is not intended that the contract drawings will show every installation support device, pipe, fitting or fixture associated with installation and operation. It is the responsibility of the Security Subcontractor to provide and install parts as necessary to complete the ESS in accordance with the best trade practice and to the satisfaction of the Engineer.
- C. Coordinate with the General Contractor and other Subcontractors as to shape, size and position of openings required for the ESS equipment.
- D. Hoisting and rigging specific to the installation of the security system is required in this scope of work.

- E. Obtain detailed information from the manufacturers of ESS equipment as to the proper method of installation and connection. Obtain information from the other Subcontractors that may be necessary to facilitate their work and the completion of the whole project.
  - F. Remove daily to a centrally designated location on-site rubbish and debris and refuse from workmen's lunches and at completion, remove surplus materials, and temporary works, in addition to, complying with cleanup requirements specified in Division 01.
  - G. No chemical may be brought on the property, whether in the performance of this project or not, without approval from the appropriate parties and being accompanied by the proper and current material safety data sheet. No hazardous materials or chemicals will be left unsecured or unattended.
  - H. Provide tools, materials, equipment, workmen and labor to successfully complete the project.
  - I. Penetrations of floor slabs and fire walls will be sleeved in appropriately sized rigid steel conduit and fire stopped in accordance to applicable building and fire codes.
  - J. Penetrations of fire rated wall, floors or structural members must have that member sleeved by a suitably sized conduit or approved sleeve. Such sleeve must extend at least one inch (1") beyond the surface of the member being penetrated (on both sides) to provide evidence to the inspectors that the sleeve is in code compliance.
- 1.17 DELIVERY, STORAGE AND HANDLING
- A. Division 28 Section equipment and components will be delivered properly protected and undamaged with original containers, packaging, and labels intact.
  - B. Store, handle, and protect related materials and equipment in accordance with Manufacturer's recommendations.
  - C. Provide additional protection during handling as necessary to prevent breaking, scraping, marring, or otherwise damaging products or surrounding areas.
  - D. Equipment and components will be protected from the weather, humidity, temperature variations, dirt, dust, or other contaminants.
  - E. Equipment damaged prior to system acceptance will be replaced at no cost to the owner.
  - F. Protect equipment and components that are to be installed from theft, vandalism, or use by unauthorized persons.
- 1.18 PROJECT CONDITIONS
- A. For Division 28 Sections, inspect locations where installation work will be performed and verify that conditions found are in accordance with the Contract Drawings and are acceptable for installation work. Report discrepancies in writing to the Engineer requesting clarification.
  - B. The Security Subcontractor shall make requests for stakeouts and utility mapping prior to the initiation of excavations, and will ensure that applicable parties suitably respond prior to excavation. To be considered as included within the parameters of this subsection are requests for the movement of overhead or underground utilities, as well as the sleeving of appropriate electrical conductors.
- 1.19 APPROVED EQUAL
- A. For Division 28 Sections, the materials specified within these Contract Drawings will not be substituted unless be noted as "or approved equal."
    - 1. Approved equal will mean that the use of materials will be submitted to the Engineer for approval, and that such approval will be the sole discretion of the Engineer.
  - B. The term "submit for approval" or similar expressions will mean that work will be contingent upon the specific approval of shop drawings by the Engineer in writing.

1.20 MAINTENANCE AND SERVICE

- A. For Division 28 Sections, provide services required and equipment necessary to maintain the entire ESS in an operational state as specified for a period of one year after Substantial Completion, and will provide necessary material required for performing scheduled adjustments or other nonscheduled work.
- B. The adjustment and repair of the ESS includes computer equipment, software updates, communications transmission equipment, local processors, and access control, facility interface, and support equipment. Provide the manufacturer's required adjustments and other work as necessary.
- C. The Security Subcontractors service personnel will be qualified to accomplish work promptly and satisfactorily. The Owner will be advised in writing of the name of the designated service representative, and of change in personnel.
- D. The Owner will initiate service calls to the Security Subcontractor when the ESS is not functioning properly. Qualified personnel will be available to provide service to the complete ESS. The Owner will be provided with a telephone number where the service supervisor can be reached. Service personnel will be at the site within four (4) hours after a service request has been submitted and repairs must be performed immediately. The Security Subcontractor must be prepared to provide temporary capability to maintain security function of the facility in the event that repairs are unavoidably delayed. Lack of access to spare parts will not constitute an unavoidable delay.
- E. Failure of the Security Subcontractor to provide appropriate response within the specified time period will result in the imposition of a penalty against the Security Subcontractor. The penalty will be for each hour, or fraction thereof, in excess of four (4) hours, the Security Subcontractor shall credit the Owner with one (1) hour of current service labor cost. Appropriate response will be defined as the arrival on site of a technically certified and qualified service representative, who is trained, equipped and experienced to repair, said problem or malfunction.
- F. Performance of scheduled adjustments and repair will include verification of operation of the ESS as demonstrated by the applicable tests of the performance verification test.
- G. The Security Subcontractor shall keep records and logs of each task, and will organize cumulative records for each major component, and for the complete system chronologically. A continuous log will be maintained for devices. The log will contain calibration, repair, and programming data. Complete logs will be kept and will be available for inspection on site, demonstrating that planned and systematic adjustments and repairs have been accomplished for the ESS.
- H. The Security Subcontractor shall separately record each service call request, as received. The form will include the serial number identifying the component involved, its location, date and time the call was received, nature of trouble, names of the service personnel assigned to the task, instructions describing what has to be done, the amount and nature of the materials to be used, the time and date work started, and the time and date of completion. The Security Subcontractor shall deliver a record of the work performed within five (5) days after work is accomplished.
- I. The Security Subcontractor shall make recommendations for system modification in writing to the Owner. No system modifications, including operating parameters and control settings, will be made without prior approval of the Owner. Modifications made to the systems will be incorporated into the operations and maintenance manuals, and other documentation affected.
- J. The Security Subcontractor shall provide, at no additional cost, software updates and labor to install updates, automatically during the first warranty year. These updates will be accomplished in a timely manner, fully coordinated with the Owner, and will be incorporated into the operations and maintenance manuals, and software documentation. There will be at least one scheduled update before the first year's warranty inspection, at which time the

Security Subcontractor shall install and validate the latest released version of the manufacturer's software.

- K. The project will not be deemed "complete" until phases are installed and fully operational, with the final testing completed and the clean-up "punch list" compiled and completion dates assigned to each deficiency. In the event that a sizable punch list develops, at the option of the owner, it may be required that some unsatisfactory items are corrected prior to final.

#### 1.21 QUALITY ASSURANCE

- A. The Security Subcontractor shall establish and maintain a quality assurance (QA) program and specific procedures which provide documented evidence of system compliance and ensures that security related and manufactured components and ESS installation meet or exceed contract requirements. Inspections and tests, which are conducted under this quality assurance program, will be subject to review.
- B. The Security Subcontractor shall have local in-house engineering and project management capabilities consistent with the requirements of the project.
- C. The Security Subcontractor shall engage system manufacturers technical personnel to assist in troubleshooting and correction of technical issues that cannot be resolved by the Security Subcontractor to the satisfaction of the Engineer.
- D. The Security Subcontractor shall provide at the time of the installation the latest version, unless specified otherwise, of equipment and software. Discontinued equipment will not be accepted and will not be installed by the Security Subcontractor.
- E. For Division 28 Sections, units of the same type of equipment will be products of a single manufacturer. Material and equipment will be new and currently in production. Each major component of equipment will have the manufacturer's model and serial number in a conspicuous place. Parts, other than small hardware items and fittings, but not including locks, latches, strikes and card readers will be of the same model throughout the course of this project.

#### 1.22 WARRANTY

- A. The complete ESS system including equipment, operations, programming will be warranted for a period of one (1) year from Substantial Completion.
- B. The warranty will guaranty that security equipment and labor provided in the complete ESS system will, under normal use and service, be free from defects and faulty workmanship.
- C. The warranty will provide for repair or replacement of defective equipment, parts including the associated labor at no additional cost to the Owner. Warranty will guaranty that the replacement or repaired equipment provided hereunder and labor will be in accordance with current industry standards.
- D. The Owner is granted a nontransferable fully paid license to use software provided by the Security Subcontractor as part of the security equipment under terms established by the software manufacturer. The Owner will be provided with a copy of applicable licenses. The Security Subcontractor shall warrant that it has the right to grant such licenses.
- E. Provide contact and backup contact information to the Owner to ensure immediate connection with a live representative 24/7/365 who will immediately initiate a response to service calls made by the Owner during the warranty period.
- F. The Security Subcontractor shall maintain an inventory of security equipment spare parts, materials, consumables, and other system item in order to meet the specified warranty maintenance requirements and keep the security equipment in a continuous operational mode during the warranty period.
  - 1. A list of spare equipment for the ESS stocked and available for immediate use at the owner's site, will system impairment occur will be provided with the project submittal.

- G. Maintenance service will not be assigned or transferred to an alternate agent or Security Subcontractor.

#### 1.23 DRAWINGS

- A. The security drawings are diagrammatic only and are not intended to show every detail of construction or arbitrary location of wiring. Each system will be complete with minor parts not specifically noted on the drawings, but required for a properly functioning system conforming to state and local codes.
- B. In case of conflict with building parts or the work of other trades, the Engineer will be notified immediately and requested to render a decision so that there will be no delay in ESS installation.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Acceptable Manufacturers are shown in individual specification sections.

### PART 3 - EXECUTION

#### 3.1 GENERAL

- A. For Division 28 Sections, install proposed ESS system components in accordance with the manufacturers' instructions, and as shown on the Contract Drawings.
- B. Provide necessary interconnections, services, and adjustments required for a complete and operable ESS as specified and shown during each phase of construction as shown on the Contract Drawings.
- C. Low voltage wiring outside the control console/control desk area, cabinets, boxes, and similar enclosures, will be plenum rated wiring.
- D. Check power and communications cabling for continuity before making connections.
- E. Exterior devices will be sealed and protected against weather conditions including heat, cold, moisture, dust and sand.
- F. Conduit, cable and wire will be installed parallel and square with building lines, including raised floor areas. Conduit fill will not exceed forty percent (40%). Wires will be gathered and tied up to create an orderly installation.
- G. Network switches will be interconnected via multi-mode fiber SFP ports.

#### 3.2 PREPARATION

- A. Coordinate with the work of related Contractors, as required and as necessary for the purposes of having the security installation progress as rapidly and as smoothly as possible with minimum interference.
- B. Before starting work, submit information to the Engineer additional or reconfigured openings and/or penetrations into the core building that may be required for the work. In no case will core building penetration or opening in the building exterior without expressed approval of the General Contractor in writing.

#### 3.3 COMPLIANCE

- A. Install the equipment in accordance with the Contract Documents, applicable codes and standards and the manufacturer's written instructions. The installed ESS will meet applicable equipment and performance requirements.
- B. Standardize the installation practices and material to provide uniform materials and procedures to the maximum extent possible.

- C. Ensure that the location of pull boxes, wireways or items requiring inspection, removal, or replacement area convenient and accessible with reference to the finished facilities.
- D. Installation of electrical service to equipment will conform to specific UBC Codes and Standards, NFPA 70, and applicable requirements.

### 3.4 INSTALLATION REQUIREMENTS

- A. Control signal, communications, and data transmission line grounding will be installed as necessary to preclude ground loops, noise, and surges from adversely affecting system operation. Provide mounting hardware as required.
- B. Provide the wiring from the ESS field panel to the installed fire alarm addressable module system such that, in the event of a fire alarm, specified doors fitted with electromagnetic, fail-safe locks or fail safe systems, will revert to a fail-safe (unlocked) mode of operation in accordance with the local, applicable building code, unless noted otherwise in these Specifications. The Security Subcontractor shall be responsible for terminating this wiring within the network connected field control panels.
- C. Connect the panels installed as part of this project to an Access Control File Server. This equipment will be located in the MDF Room. Security equipment will be housed in Security Server Room and Electrical Closets as indicated on the contract drawings.
- D. The ESS will be a modular, networkable, distributed database design, using a microprocessor based field panels, to make access/denial/alarm decisions at doors, exits or entrances, and points which communicate to the ESS File Server, as the host computer for programming instructions, event monitoring and record keeping.
- E. The ESS will be capable of integrated access control and alarm monitoring that allows for easy expansion or modification of inputs, outputs, and remote control stations.
- F. The wiring between ESS field devices/remote access control equipment and ESS field panels and from the field panels to the ESS file server will consist of cable types recommended by the manufacturer, will be a minimum of No. 22 AWG for signal/control, except for network cable which will be CAT-6 No. 24 AWG. Cable will be installed in accordance with manufacturers' specifications. Cabling for the ESS will be plenum rated. Exception: where installed in damp or wet locations, cable types will be of the direct burial type.
- G. The ESS will utilize four state supervised input wiring with functions to operate as described, referenced and as shown on the Contract Documents.
- H. Install the security equipment in accordance with the applicable local and national standards for safety and the appropriate installation manual for each equipment type. Components within the system will be configured with appropriate service points to pinpoint system trouble in less than 20 minutes.
- I. Wiring, including low voltage wiring, cabinets, boxes, and similar enclosures will be plenum rated.
- J. Fasteners used in wet or damp locations will be manufactured from stainless steel.
- K. Equipment connected to alternating current circuits will be protected from power line surges. Equipment protection will meet the requirements of ANSI C62.41. Fuses will not be used for surge protection.
- L. Inputs will be protected against surges induced on device wiring. Outputs will be protected against surges induced on control and device wiring installed outdoors. Communications equipment will be protected against surges induced on the communications circuit. Cables and conductors, except fiber optics, will have surge protection circuits installed at each end.
- M. Inspect each component, determine obvious defects, and correct.

- N. Perform tests as recommended by manufacturer or as required to ensure the security equipment is operating properly and meets specified requirements.
- O. Correct deficiencies detected and retest affected components.
- P. Record test data, tabulate, and write narrative describing tests, results, deficiencies found, corrective measures, and results of retesting. Certify to the Engineer that the security equipment has been tested and is ready for performance verification testing.
- Q. Enclosure penetrations will be from the bottom unless the system design requires penetrations from other directions. Penetrations of enclosures involving transitions of cable or cable from interior to exterior, and penetrations on exterior enclosures will be sealed with rubber silicone or similar sealant to preclude the entry of water.
- R. Penetrations through enclosures will be bushed with a fitting or bushing approved for the purpose to provide physical protection for the cable sheathing.
- S. During and upon completion of the installation, debris created by the installation will be removed from the premises and disposed of.

### 3.5 LABELING

- A. The guidance below will be followed with regard to marking and labeling devices and cabling:
  - 1. The labeling system convention will be coordinated with Section 27 15 00.
  - 2. ESS System labels, whether installed on devices or cables will be a machine printed label designed for the type of surface and environment in which it will be installed.
  - 3. At the field device end, cables will be marked within six (6) inches of the termination.
  - 4. At the panel location, cables will be marked within six (6) inches of entering the cabinet where the cable is to be terminated.
  - 5. Where ESS related cables are terminated on an ESS network patch panel, these cables do not need to be marked with ESS System number.
  - 6. Card readers, cameras and glass break detectors will be labeled on the exterior of the device as it is designated when programmed into the ESS System.

### 3.6 POWER REQUIREMENTS

- A. Cabling where installed in an underground environment must be installed on a raceway suitable for the environment in which it is installed and at a depth on accordance with NEC table 300.5. Back-up power for equipment and devices will be for at least 4 hours unless otherwise specified.
- B. When generator backup power is available, provide a UPS, rated to maintain the load for a minimum of thirty (30) minutes for 120VAC equipment.
- C. Rack mounted components, including active network communication hardware, will be on the UPS system.
- D. Connect to AC power and provide UL listed power supplies and transformers to distribute low voltage power to the system components as required.
  - 1. Provide uninterrupted battery backup power for the duration required above.
- E. Equipment connected to AC circuits will be protected from power surges.
  - 1. The devices will be installed and grounded per manufacturer instructions.
  - 2. Equipment protection will meet requirements of ANSI C62.41.

3. Fuses will not be used for surge protection.

F. Non-fiber-optic data circuits that serve devices on the exterior of the buildings will be protected by surge protectors at the device and the termination.

1. The devices will be installed and grounded per manufacturer instructions.

2. Equipment protection will meet requirements of ANSI C62.41.

3. Fuses will not be used for surge protection.

### 3.7 SITE TESTING

A. General:

1. Provide personnel, equipment, instrumentation, and supplies necessary to perform testing of the ESS. The Engineer and the Owner's representative will witness performance verification and endurance testing. Original copies of data produced during performance verification and endurance testing will be turned over to the Engineer for the Owner at the conclusion of each phase of testing.

2. Calibrate and test equipment, verify signal/control cable operation, place the integrated system in service, and test the integrated system.

B. Performance Verification Test:

1. The Security Subcontractor shall demonstrate that the completed ESS complies with the Contract requirements. Using approved test procedures, physical and functional requirements of the ESS project will be demonstrated and shown.

C. ESS Endurance Test:

1. The ESS endurance test will be conducted twenty-four (24) hours per day for two (2) consecutive calendar days, including holidays, and the system will operate as specified. No repairs during this phase of testing are allowed unless authorized by the Engineer. If the system experiences no failures during testing, the Security Subcontractor and/or Security Subcontractor may proceed directly to Acceptance Testing upon receipt of authorization from the Engineer.

### 3.8 SYSTEM COMMISSIONING

A. General:

1. After installation and acceptance test requirements specified have been complied with, the equipment will be commissioned. After commissioning has been completed, the Engineer will recommend that the Owner take possession of the equipment and utilize it in accordance with the conditions described in the Contract documents.

B. Pre-Commissioning:

1. Outstanding Work items that may exist, such as facility interfaces, project record drawings, and/or in-process change orders, will be documented and submitted to the Engineer for review prior to the start of equipment commissioning. Documentation of outstanding Work items will take the form of punch lists of critical action items lists that describe the Work, the expected completion schedule, and the impact upon operation. Depending upon the nature of the outstanding Work items, the Engineer may grant a waiver to accomplish partial commissioning of the equipment. Completion of waived outstanding Work items will then be assigned to the post-commissioning operations and maintenance.

C. Commissioning:

1. The ESS commissioning process will be performed by the Engineer. The commissioning procedure will be conducted with the Security Subcontractor and will

consist of a detailed inspection, and a physical accounting of each equipment item. An operational demonstration will then be conducted in which the equipment will function in the normal operational mode, and will operate completely error-free in terms of hardware and software performance.

2. Occurrence of equipment failure will terminate the demonstration at that device. The demonstration will restart at the next device unless it is determined by the Engineer that additional work of the Security Subcontractor is required to correct major failures of the system. Except for outstanding work items as previously described, this will complete the commissioning procedure.

### 3.9 TRAINING

- A. The Security Subcontractor shall conduct training courses for designated Owner personnel in the maintenance and operation of the Owner ESS as specified. The training will be oriented to the specific system being installed under this contract.
- B. Training manuals will be delivered for each trainee with two additional copies delivered for archiving at the project site.
- C. Videotaping is required for training sessions. Each videotaped session will be indexed to allow the user to access specific section of the training.
- D. The Security Subcontractor shall schedule sufficient training segments to ensure that the required training can be attended by workers on each shift. Scheduling of these sessions will be coordinated with the Owner so that the appropriate staff is made available to attend. Specified training sessions may be scheduled in separated sessions.
- E. The Security Subcontractor shall prepare, administer, and conduct a training program for designated Owner operator personnel to fully and efficiently operate the installed ESS and maintain configurable databases. At a minimum, the following training elements will be incorporated into the training program and documented separately for individual training segments:
  1. Alarm management, monitoring and displays
  2. Adding, deleting and editing users, user information and access levels
  3. System back-up and restoration
  4. Badge administration
  5. VMS system interfaces and control
  6. Software access and operator tasks
  7. Maintenance and preventive maintenance
- F. Training will be in sufficient scope and depth to ensure that designated personnel who complete the program will be fully qualified, certified, and capable of operating the system and subsystems as installed.
- G. The Security Subcontractor shall provide training, orientation, and "hands-on" practical familiarization necessary to ensure a smooth transition between system installation and operational activities.
- H. Operator training will be provided for the topics indicated above at least one week prior to the scheduled turnover to the Owner of the system. Upon completion of training, each trainee, using appropriate documentation, will be able to perform elementary operations with guidance and describe the general hardware architecture and functionality of the system.
- I. Upon completion of training outlined above, each trainee will be able to start the system, operate the system, recover the system after a failure, and describe the specific hardware architecture and operation of the system. The course will consist of hands-on training under

the constant monitoring of the instructor.

- J. The instructor(s) will be responsible for determining the appropriate password to be issued to the student commensurate with each trainee's acquired skills at the beginning of each of these individual training sessions.
- K. The Security Subcontractor shall provide and use training aids such as films, slides, audio/video tapes as necessary to complement instruction and enhance learning.
- L. Provide an indexed training manual for trainees' use during and after training. The Training Manuals will include a list of recommended references useful for learning the details of ESS operation.

3.10 OPERATIONS AND MAINTENANCE DOCUMENTATION

- A. Provide the Owner with applicable Operations and Maintenance (O&M) manual(s), as specified in Division 01, which describe the equipment installed under this Contract. The O&M manual(s) will, as a minimum, consist of an operations Section, a maintenance Section, and a drawings Section where necessary.
- B. O&M cut sheets and instruction manuals will be in color and clear resolution.
- C. User licenses, software, original software media and manuals will be turned over to the Owner at completion of the project. Project specific application software will be transferred at the end of the warranty period.
- D. Except as otherwise specified, documentation will contain sufficient written text and illustrations necessary to present a full description of the equipment, including an overview, concept of operation or maintenance, operating instructions using functions and capabilities, and interfaces with systems/subsystems.

END OF SECTION