PART 1 GENERAL

1.1 SCOPE AND RELATED DOCUMENTS

A. Provide new addressable Intrusion Alarm System including, but not limited to; motion sensors, door position switches, duress buttons, monitoring points, keypads, power supplies at all locations as shown on the plans and/or as indicated in these specifications. The keypad(s) as indicated on the drawings will be used to arm and disarm the system.

B. Furnish and install a complete, addressable point, partitioned Intrusion Alarm System as described herein and as shown on the Plans; to be wired, connected, and left in first class operating condition. The system shall use programmable, multiplex, initiating device circuits with individual point identification, device supervision, primary and standby power. Include control panel(s), automatic detection devices, sirens, flashing lights, all wiring, connections to devices, outlet boxes, junction boxes, and all other necessary material for a completely reliable and fully functional system.

C. An important aspect of the construction process for this project is the Pre-Construction Kick Off Meeting, which shall take place PRIOR to Submittal of equipment data sheets. See "Submittals" and "Coordination" listed elsewhere within this specification.

D. The system shall meet ALL of the requirements listed in Section 270000 Low Voltage Systems General Requirements PART 3 "Testing & Complete System Functionality", prior to "Substantial Completion".

E. Contractual information, guidelines, requirements, or other work specified to provide a fully functional system for Section 281600 Intrusion Alarm System includes but is not limited to the sections identified in Section 270000.

1.2 SYSTEM OPERATION

A. The system shall be armed, disarmed, reset, monitored and altered by the use of an LCD Keypad and shall be capable of supporting up to eight (8) keypads. All points of identification shall clearly indicate the device type, room name, and room number. The system shall provide "fail safe arming" preventing arming of the system if a zone has been violated. It shall indicate which device is not ready for arming at the remote keypad(s).

B. Point identification of devices and their respective locations, shall be displayed at the keypad, reported to the remote monitoring agency.

C. Actuation of any monitored device shall cause the following to occur:
   1. Display device name, type, location within the building, and alarm device unique addressable point nomenclature at the LCD keypad.
   2. Activate the built-in digital communicator, communicate through the AES radio system and automatically report the alarm point/device to the remote monitoring agency.

D. General System Operation:
   1. The building shall be divided into the partitioned zones as indicated on the drawings and/or these specifications. A partition is defined as an area of protection, provided with its own keypad and group of sensors, connected to the main building system, whose operation in totally independent from a different section of the building or structure. Operation is similar to that of a completely separate control panel, keypad, or system.

a. Provide two (2) partitioned zones. One (1) for Gym & area on the gym side of the coiling door near the lobby to support after hours events in the gyms. One (1) for the remainder of the school.

2. Coordinate with owner for specific programming requirements prior to installation.

E. Communication and Alarm Monitoring Protocol
1. The Intrusion Alarm Control Panel shall only communicate through the included AES Antenna system mentioned elsewhere in this specification. The owner is not required to purchase a dedicated phone line service.

F. Integration to Other Low Voltage Systems:
1. Access Control System Interface - Provide the necessary cabling and (1) relay output from the Intrusion Alarm Control Panel (IACP) to the Access Control System. Connect and program as required. The Intrusion Alarm System shall toggle the relay each time the Intrusion Alarm System is "Armed" and "Dis-Armed". The Access Control System shall monitor the Armed/Dis-Armed status of the Intrusion Alarm System. See Section 281300 and the Drawings for more information.
2. Light Control Panel(s):
   a. Interior Lights. Provide necessary cabling and (1) relay output from the IACP to the Lighting Control panel. Connect and program as required. The Intrusion Alarm shall send a signal to turn on the Interior Lights and Site Lighting for 1 hour when the system is in Alarm state or when Armed.
   b. In addition to corridor and site lighting, the audible Intrusion Alarm Speakers shall sound for this duration during an Alarm state to notify intruder(s) local law authorities are en-route.
3. Intercom System:
   a. Provide necessary cabling and (1) relay output to the Intercom Control Module. Connect and program as required. The Intrusion Arm shall send a signal to the Intercom System to trigger a text message on the classroom clock/speaker's alphanumeric display and pulse the optional LED flashers with an audio message to be determined by the owner.
4. Access Control System:
   a. Provide integration and programming between Access Control Panel and Intrusion Alarm Control Panel for the monitoring/logging/notification of intrusion alarm system status and individual door status through access control manager (ACM) software as required.
5. Coordinate with owner for specific programming requirements prior to installation.

1.3 QUALITY ASSURANCE

A. The system, devices, and equipment, shall be manufactured under the appropriate category by Underwriters' Laboratories, Inc. (UL), and shall bear the UL label. Partial or pending listings are not acceptable. The installation of EACH device and/or component shall be in compliance with the UL listing. The system, devices, and equipment shall fully comply with the latest issue of these standards, where applicable, which includes, but is not limited to:
1. National Fire Protection Association (NFPA) - USA:
   a. NFPA 70 National Electrical Code
   b. NFPA 71 Central Station Signaling Systems-Protected Premises Unit
   c. NFPA 72 National Fire Alarm Code
   d. NFPA 101 Life Safety Code
2. Underwriters Laboratories Inc. (UL) - USA:

a. UL 365 Police Station Burglar Alarm Units and Systems
b. UL 464 Audible Signal Appliances
c. UL 609 Local Burglar Alarm Units and Systems
d. UL 864 Control Units for Fire Protective Signaling Systems
e. UL 1076 Control Units for Burglar Alarm Proprietary Protective Signaling Systems
f. UL 1610 Central Station Burglar Alarm Units
g. UL 1635 Digital Alarm Communicator System Units

3. Meet or exceed Building Codes and Standards:
   a. Local Authority Having Jurisdiction (AHJ) Requirements
   b. State
      1) WAC 51-20 Washington Barrier Free Regulations
   c. National
      1) National Electrical Code (see NFPA 70)
      2) Americans with Disabilities Act
   d. International
      1) International Building Code
      2) International Mechanical Code
      3) International Electrical Code (see NFPA 70)
      4) International Fire Code

B. Approvals:
   1. The system shall have proper listing and/or approval from the following nationally recognized agencies:
      a. UL Underwriters Laboratories Inc.
      b. ULC Underwriters Laboratories Canada.
      c. Factory Mutual.
   2. The Intrusion Alarm Control Panel shall meet UL Standard 864 and UL Standard 1076.

C. The Installing Vendor shall, at a minimum, provide and/or perform on-site installation assistance to the Contractor throughout the duration of the project, up to and including acceptance of the System as defined in Section 270000 "Testing and Complete System Functionality".

D. Service and Software Modifications:
   1. Provide the services of a Manufacturer Certified/Authorized Technician to perform all system software modifications, upgrades or changes.

   2. Provide all hardware, software, programming tools and documentation necessary to modify the system on-site. Modification includes addition and/or deletion of system devices, changes to system operation, and custom label changes for devices. The system structure and software shall place no limit on the type or extent of software modifications on-site.

1.4 SUBMITTALS

A. Refer to specification 270000 Low Voltage Systems General Requirements, for additional data sheet submittal requirements and the shop drawing submittal requirements.

B. Refer to "As-Built Drawings" for additional requirements.

C. Data Sheets Submittals and Other Documentation.
   1. Installing Vendor Staff Qualifications. Provide copies of the following information

(Certification and Training documents):
   a. The Installing Vendor field staff installers (a minimum of 2) Installation certifications issued by the manufacturer of the equipment that is being installed.
2. Installing Vendor/Manufacturer Agreement. Provide the following documentation of the Manufacturer of the equipment being installed:
   a. The Installing Vendor shall be an Authorized Partner that is trained and certified by the Manufacturer of the equipment being installed.
3. Materials List:
   a. A complete materials list, which shall include; the quantity of each device, the manufacturer's name, model number, and a description of the equipment for each individual system component or device that will be provided. This list shall precede the data sheets.
   b. Equipment Data Sheets. Each System component or device data sheet shall have an indicating arrow next to each component or device that is being submitted.
   c. Prior to ordering or installation of any equipment, the Installing Vendor/Contractor shall obtain written approval by the Architect.
4. Provide ALL requested submittal documents in "Training Materials and Programming Survey" listed elsewhere in this specification. This includes, but is not limited items listed under "Interview the Owner":
   a. Provide a sample copy of the Training Syllabus.
   b. Provide a sample copy of the Step-by-Step Instructions.

D. Shop Drawing Submittals shall include the following items:
1. Prior to ordering or installation of any equipment, the Installing Vendor/Contractor shall obtain written approval by the Architect.
   a. The Installing Vendor shall make the necessary corrections or changes as and provide a Revised Submittal through the normal construction channels.
      1) Be sure to include ALL responses by the Owner in the Revised Submittal.
2. Device Point-to-Point Wiring Diagrams:
   a. Provide an Illustration of EACH Device that is being provided for this project.
      1) Identify EACH conductor and the equipment type and termination point that it is intended to be connected to.
      2) For equipment that is being connected to Integrate to another system, provide a brief description of the functional operation of the two different systems.

3. Device Mounting Details:
   a. Provide an Illustration of EACH Device that is being provided for this project.
      1) Identify the back box, conduit rough-in, and manufacturer recommended mounting method.
4. The Riser Diagram shall show the following items:
   a. Identify EACH Equipment location (the MDF and EACH designated IDF) separately.
      1) Identify EACH cable type, size, and quantities between the MDF and EACH designated IDF location.
   b. Identify EACH device and the associated room number where it is located in the building. Use the designated room number or door number on the Contract Drawings.
      1) Identify the associated cable for EACH device (as described on the wire legend) routed to the MDF and EACH designated IDF location.
5. Rack and/or Equipment Layout.
   a. Show the intended equipment layout within EACH of the Rack(s) and/or

Cabinets.
b. Indicate the rack unit size of each device or filler plate in the rack.
c. Show blank filler plates in spaces where equipment is not installed.
d. If rack equipment is installed on the rear side of the rack, show rear view of the rack also.
e. Show the equipment layout as it is intended to be installed.

6. An Elevation View of the Wall Mount equipment for the MDF Room and each designated IDF location shall be provided.
   a. The proposed locations for EACH wall mount device (control panel(s), power supplies, and other equipment), proposed cable routing, wire management, 120vac conduits (including receptacles and junction boxes).
   b. All equipment shall be shown to scale.
   c. Provide dimensions of the equipment, the space required between the adjacent item and the overall dimensions of the anticipated wall space.
7. Floor Plans shall show each Outlet type, style, and each individual cable required for EACH Device.
8. Shop Drawings shall be specific to the System that is specified in the Section.
   a. Do NOT show other low voltage system equipment on the Shop Drawings, except where this system is integrated to other equipment and/or systems.
   b. Provide EACH device Symbol and related description (as described on the Contract Drawings) on the Legend with the text that states "provided by others".
      1) Access Control System integration as described on the Floor Plans and Riser Diagrams.
      2) Fire Alarm System integration as described on the Floor Plans and Riser Diagrams.

PART2 PRODUCTS

2.1 MATERIALS

A. See Section 270000 Low Voltage Systems General Requirements for additional requirements.

B. Bosch manufactures the products that are used for the basis of design for this specification.

C. The System design, devices and/or wiring arrangement shown on the drawings represent that based on various equipment manufacturers. Any changes resulting from differences between the specified product and other manufacturers or substitute manufacturers, shall be the responsibility of the Installing Vendor.
   1. Substitutions of the specified equipment and/or supplier will be considered provided that sufficient documentation is provided to the Engineer which certifies that the equipment and or supplier qualification meets the requirement of these specifications. Any request for substitution shall be submitted by the contractor in writing so as to be received by the Architect not later than (10) days prior to the bid due date. Approval by the Engineer will be issued by addendum prior to the bid date.

D. Provide all equipment as defined in the specification(s) and shown on the drawings.

E. Refer to PART 1 for any equipment that is not specifically defined.

2.2 COORDINATION

A. Refer to "Submittals" for additional coordination requirements.

B. The Installing Vendor shall include in their bid; the time, staff, and materials that are necessary to perform the following services.

C. Provide the follow up documentation.

2.3 INTRUSION ALARM CONTROL PANEL (IACP)

A. Approved Intrusion Alarm Control Panel (IACP) Manufacturers
   1. Bosch: Model# B9512G.

B. Provide one (1) Intrusion Alarm Control Panel (IACP) and communicator as shown on the drawings. EACH IACP shall be a microprocessor-based control panel. All eight master zones shall be individually programmable to support 246 individually annunciated points of protection through the addition of a two wire, multiplex zone expansion system (ZONEX). Points of protection are annunciated with custom text at the Remote LCD Keypad.
   1. This installation shall use addressable modules for EACH device and shall display a unique point identification label on the LCD Keypad.
   2. The IACP shall be listed by UL for Power Limited Circuits and the central processor control panel that controls all functions of the system shall be an integral UL listed commercial fire and burglary digital communicator.
   3. The control panel metal enclosure shall be lockable with a key.

C. The system shall include the following features as minimum:
   1. Standard Features:
      a. Eight programmable zones.
      b. 12 VDC, 2-amp alarm power with three separate outputs.
      c. 12 VDC, 1-amp auxiliary power with two separate outputs.
      d. Built-in digital communicator with phone line monitor.
      e. Battery charging circuit.
      f. Battery voltage supervision.
      g. Automatic reset circuit protectors.
      h. Onboard warning buzzer and diagnostic LED's.
      1. Lightning and RFI protection.
      J. Power limited external circuits.
      k. Auto-answer modem
      l. Real time clock and test timer
   2. Programmable Features:
      a. Modem 3A2(tm) Central station reporting format.
      b. Two telephone numbers.
      c. Automatic test reports.
      d. Individual zone responses.
      e. Custom annunciator text.
      f. Alarm test mode.
      g. Audible alarm output, steady or pulsed.
      h. Silence option by zone.
      i. Automatic silencing.
   3. Zone Expansion (Zonex):
      a. 246 points of protection
      b. Two wire multiplex communication
   4. Event Logger:
      a. 500 event memory
      b. Remote event retrieval

c. Log opening/closing by user
d. Log alarms, troubles, and restorals

D. IACP Components and Related Equipment:
1. Provide quantities as required. Depending on system requirements, this may include but is not limited to the following items:
2. Transformer Enclosure for the Intrusion Alarm Control Panel (IACP) shown on the drawings.
a. Bosch: Model # D8004.
3. Dual Phone Line Switcher:
a. Furnish all necessary wiring, RJ3 lX jacks, modular harness(s), and cabling, as required for connection to Owner furnished telephone lines. Provide programming, final testing using the communication protocol as necessary so that this information is reported to the remote monitoring agency. Coordinate with Owner, as required.
b. Bosch: Model # D928.
4. Multiplex Zone Expansion module:
a. Bosch: Model# D8125MUX.
5. Alarm Status Relay:
a. Bosch: Model # D8l 1.
b. Section 281300 Access Control System shall monitor the Alarm Status of the Intrusion Alarm System. Provide connections and programming as required.
6. Powered loop interface module:
a. Bosch: Model# Dl25B.
7. Dual Battery Harness:
a. Bosch: Model# D122.
8. Enclosure:
a. Bosch: Model# D8103.
9. Lock and Keys for Enclosure:
a. Bosch: Model # D101.
10. Mounting Skirt:
a. Bosch: Model# D9002-5.
11. Tamper Switch:
a. Bosch: Model # D110.
12. Adapter:
a. Bosch: Model# MP203.

2.4 INTRUSION ALARM POWER SUPPLY (IAPS)

A. The Intrusion Alarm Control Panel shall NOT be used to power any low voltage device, except for nominal voltage on the addressable data circuits.

B. Use an Intrusion Alarm Power Supply(s) (IAPS's) as required for serving all Intrusion Alarm devices that consume 12vdc or 24vdc power. The power supply shall be U.L. listed, have sixteen (16) Class 2 Rated PTC Power Limited outputs and a key locking enclosure. The IACP shall have automatic switch over to stand-by batteries when AC power fails, and have AC fail supervision which is a Form "C" contact closure upon loss of power. Connect as required, one (1) addressable module to monitor AC power for EACH IAPS that is provided for this system. The power supply shall be capable of supplying 4.0 Amps or 6.0 Amps.

C. At a minimum, provide one (1) IAPS at EACH location shown on the drawings. If additional IAPS's are needed, provide the quantities as required for a fully functional system, while

maintaining the design requirements that are defined elsewhere in these specifications.

D. Altronix: Model# AL400ULXPD16CB or AL600ULXPD16CB. Provide sizes and quantities, as required.

2.5 SURGE SUPPRESSION

A. Provide (1) dedicated TVSS at EACH 120vac hard wired connection point.

B. Provide manufacturer and model number as specified in Section 264300.

2.6 BATTERY BACKUP FOR COMPLETE SYSTEM OPERATION

A. Battery backup power shall be an integral part of the Intrusion Alarm system.

B. Provide and install gel-cell, maintenance free batteries, as required. Provide battery back up power for the entire Access Control system to provide one (1) hour of standby operation. Batteries shall be sized to provide at least 20% spare capacity.

C. Provide quantities as required for maintaining or exceeding the submittal calculation requirements listed elsewhere in Section 270000 "Submittals and Shop Drawings".

D. EACH Power Supply shall have automatic switch over to stand-by batteries when AC power fails. The power supply/charger shall be an integral portion of the control panel and/or power supply and be capable of charging fully discharged system batteries to 100% in 8 hours.

E. All batteries shall be placed inside a key lockable, metal enclosure that is approved by the manufacturer.

F. Each battery shall have the date of installation written on the battery with a permanent marker. The date shall be legible and clearly written in **l"** numbers and be visible when the enclosure door is open.

2.7 KEYPAD FOR REMOTE OPERATION

A. Provide one (1) LCD Keypad, adjacent to the IACP and at EACH location shown on the drawings. The Keypad(s) shall have the following features:
1. An illuminated, backlit touch screen display with proximity sensor to illuminate when a person approaches in the dark.
2. Multi-line alphanumeric English language LCD display.
3. A built-in sounder that emits several distinct warning tones.
4. Remote control or relays.
5. User-programmable pass codes.
6. System diagnostic tests.

B. Bosch: Model# B942W:
1. Provide quantities shown on the drawings.
   a. Provide model B56 surface mount box for mounting a keypad to concrete or block.
   b. Coordinate with architect for color choice.

2.8 FIELD DEVICES

A. Provide one **(1)** addressable module and/or addressable input for EACH Intrusion Alarm device and related equipment as shown on the drawings.

B. Addressable Module(s):
1. Use the addressable module that when the system is laid out, it follows a logical sequence, unless otherwise noted elsewhere in the drawings or specifications. Provide the following quantities as required. Depending on system requirements, this may include but is not limited to:
2. MUX Mini Single Input, Single Point identification module. This is the Owners "Standard" addressable module. This is the ONLY type of addressable module that shall be used for this project.
   a. Bosch: Model# DS7457i.

C. Door Position Switches (DPS's):
1. Coordinate with the Division 8 Door Hardware supplier, prior to bidding or ordering any equipment. Provide the appropriate style of Door Position Switch and application appropriate magnet for each type of door. Each switch shall be UL listed and 100% Manufacturer tested prior to installation.
2. Provide DPS(s) at EACH exterior door location.
   a. For EACH single door locations, provide (1) DPS.
   b. For EACH double door locations, provide (2) DPS's.
3. Recessed Mount:
   a. Recessed Mount: GRI; Model# 199-12WG.
4. Roll-up Doors:
   a. Each switch shall be provided with the magnet, for the roll-up doors application and all necessary mounting brackets as recommended by the manufacturer. Provide all necessary mounting brackets and fasteners, as recommended by the manufacturer.
   b. GE (formerly Sentrol): Model #2202AU-L.

D. Motion Detectors:
1. All motion detectors shall utilize Tri-Tech features and be UL listed. Provide one (1) Motion Sensor at EACH location as shown on the drawings.
2. Wall Mount: The Motion Sensor shall offer wall or comer mounting.
   a. Bosch: Model# ISC-PDL1-W18G.
   b. Accessories for the Motion Sensor:
      1) Provide (1) Gimbal-mount bracket for EACH Motion Sensor.
      2) Bosch: Model# B328.
3. Ceiling Mount: The Motion Sensor shall offer the detection pattern applicable to area served.
   a. Bosch: Model# DS9370.

E. Combination Siren/Strobe:
1. Provide (1) combination siren/strobe at each location shown on the drawings with (1) single gang box for mounting.
   a. ATW: Model # Doberman Indoor/Outdoor Siren & Strobe Combination, with ivory body and blue strobe.

2.9 MULTIPLEX PROGRAMMER

A. Provide a total of (1) Multiplex Programmer for the purpose of programming the MUX protocol addressable points.

B. Turn over to the Architect prior to any Training and no less than ten (10) business days prior to project completion.

C. This unit shall be new, unopened, and delivered with the factory seal intact on the box that the programmer comes in.

D. Bosch: Model# D5060

2.10 SPARE CAPACITY

A. Spare capacity to add additional devices in the future shall be an integral part of the system design.

B. Within the Building and other Structures:
1. Low Voltage Power - Regardless of where the low voltage circuit is in the building, each individual cable run shall not exceed 80% of the Amp Draw load capacity of each run.
2. Addressable Devices - The system design should be able to add no less than Twenty (20) additional addressable devices for EACH of the following sections;
   a. Each area or wing of the building.
   b. Each floor shall be divided into two equal areas
3. For projects with more than one floor (or level), then each floor (or level) shall also be divided into two equal areas.

2.11 FLEXIBILITY IN SYSTEM DESIGN LAYOUT

A. Where indicated on the drawings, the Installing Vendor shall have the flexibility in their design to provide system equipment at any of the MDF and designated IDF locations. Do not install equipment in other locations, unless noted otherwise.

B. Provide all quantities of equipment as specified, while maintaining the "Spare Capacity" requirements listed elsewhere within this specification.

C. Coordinate the exact location of field devices with the Architect, prior to installation.

2.12 SYSTEM CABLES, CONNECTORS, AND PATCH CORDS

A. See PART 3 of this specification and Section 270000 for additional requirements.

B. ALL cables and conductors shall be the same size and color throughout EACH cable run. Such as from EACH field device to the terminals on the IACP and Power Supply.
1. The color of the overall cable jackets shall be green. If this color is not available, provide a permanent colored marking in green on the cable for every 1O'-0" of cable for the duration of the cable run.

C. Cables/Conductors: The minimum allowable size conductors are specified below. Use larger conductors and/or additional conductors, as required. Prior to Bidding, consult with the system Manufacturer that the following cable types are acceptable. It shall be the Installing Vendors responsibility to provide and install Manufacturer approved cables. Use the Manufacturers equivalent cable requirements, to meet all code requirements [such as "Wet Rated" or "Aerial Rated" cable] for the appropriate devices.
1. CAT6 cable(s):
   a. Refer to Section 272000.

2. CAT3 cable(s):
   a. Refer to Section 272000.
3. D8125 MUX Addressable Data Protocol field devices:
   a. Non-Plenum: West Penn: Model# 244 (18/4ns) or approved equal.
   b. Plenum: West Penn: Model# 25244B (18/4ns) or approved equal.
4. Serial Data Bus (SDI) Data Protocol for LCD Keypads:
   a. The length of the cable run shall not exceed 1,000 feet.
   b. Non-Plenum: West Penn: Model# 244 (18/4ns) or approved equal.
   c. Plenum: West Penn: Model# 25244B (18/4ns) or approved equal.
5. Non-addressable initiating field devices shall have the addressable module installed at the device.
6. Motion Sensors (MS):
   a. Non-Plenum: West Penn: Model# 244 (18/4ns) or approved equal.
   b. Plenum: West Penn: Model# 25244B (18/4ns) or approved equal.
7. Door Position Switches (DPS's):
   a. Non-Plenum: West Penn: Model# 221 (22/2ns) or approved equal.
   b. Plenum: West Penn: Model# 25221B (22/2ns) or approved equal.

D. Connectors/Terminations: Use the manufacturer approved wire strippers and crimping tool as required.
   I. CAT6 cable(s):
      a. Refer to Section 272000.
   2. CAT3 cable(s):
      a. Refer to Section 272000
   3. Maintain all cable and system requirements.

E. Patch Cords: Size EACH cable length to provide ease of maintenance, while not leaving excessive slack.
   I. CAT6 cable(s):
      a. Refer to Section 272000.
   2. CAT3 cable(s):
      a. Refer to Section 272000.
   3. Maintain all cable requirements.

2.13 ADDITIONAL INTRUSION ALARM EQUIPMENT

A. See Part 3 of this specification for additional provision of system Equipment and/or Labor.

PART 3 EXECUTION

3.1 GENERAL

A. See Section 270000 Low Voltage Systems General Requirements for additional information.

B. See Section 272000 Data and Voice Infrastructure for additional cable and installation requirements.

C. Prior to rough-in, coordinate with the Architect for the exact location(s.)

D. Install all cabling, devices, and/or equipment per the manufacturer's recommendation.

E. Coordinate with the Owner for final program settings.

3.2 INSTALLATION

A. Setup, connect, and configure the system per the manufacturer's recommendations to operate as intended. Load, configure, and test the software for a fully functional system.

B. T-Tapping of Addressable device conductors is acceptable when all of the manufacturer's requirements for the MUX protocol are fulfilled.
   I. T-Tapping of Notification device conductors is NOT acceptable.

3.3 INTEGRATION TO OTHER LOW VOLTAGE SYSTEMS

A. See "System Operation" listed elsewhere in this specification for more information.

3.4 MOUNTING HEIGHTS, LOCATIONS, AND SETTINGS

A. Prior to rough-in, coordinate with the Architect for the exact location(s). Install all devices and/or equipment per the manufacturer's recommendation.

B. The IACP shall be mounted at 60" from the finished floor to the top of the enclosure and shall be level.

C. Prior to Bidding, coordinate with the Installing Vendor(s), for actual quantities and locations of power requirements (see "Intrusion Alarm Power Supply" asssnd "Flexibility in System Design Layout" in PART 2 of this specification). At a minimum, provide 120vac wiring and connections to EACH the IACP Transformer Enclosure for the IAPS as shown on the drawings and as required for a fully functional system, while maintaining all of the design requirements described elsewhere within these specifications. This shall include the following;
   1. Install the Transformer Enclosure (with duplex 120vac outlet located inside the enclosure) at the following location(s);
      a. Provide and Install one (1) Transformer Enclosure above the IACP location shown on the drawings.
      b. The bottom of each Transformer Enclosure shall be a minimum of 6" inches above the accessible ceiling tiles (where applicable) or 8'-0" above the finished floor, directly above the Intrusion Alarm Control Panel.
      c. Provide one (**1)** ¾ inch conduit between the Transformer Enclosure to the Intrusion Alarm Control Panel, for the purpose of running a power cable from the plug-in transformer (within the Transformer Enclosure) down into the IACP.

D. The Keypad(s) shall be mounted at 48" from the finished floor to the top of the Keypad and shall be level.

E. Motion Sensors:
   1. Ceilings Mount - Install per manufacturer's recommendations.
   2. Wall Mount motion sensors shall be mounted:
      a. Install per manufacturer's recommendations and at 8'-0" above the finished floor, unless approved by the Architect.
      b. Provide (1) 4-square junction box with a single-gang reducing ring and **(1) l"** conduit up to the accessible ceiling space for EACH motion sensor.
      c. Locate on a perimeter wall. The detection pattern shall NOT face toward exterior windows.

d. Sensor shall be switch selected to provide a 25'-0" x 32'-0" protection pattern.
e. Enable the bottom "look down" sensor.
f. Enable the anti-masking feature.

3. The following hard-wired contacts shall be monitored:
4. Alarm contact closure shall be monitored by an addressable point.
5. The Trouble contact closure shall NOT be monitored.
6. The Tamper switch contact closure shall NOT be monitored.
a. Prior to rough-in, consult with the manufacturer. Upon their suggestion, install the Gimbal-mount bracket where required for proper detection.
b. Adjust each sensor as required per the manufacturer's recommendations for each area and location. Walk test each device to confirm the detection pattern area is set correctly.
c. When all adjustments have been completed, leave the detection LED's in the active mode. The Owner wants to view the LED's at all times.

3.5 ADDRESSABLE MODULE INSTALLATION

A. Single Input Addressable Point Module(s) shall be used for EACH device as outlined below.

B. Motion Sensors:
1. The addressable input module shall be installed inside the motion sensor or installed inside the Motion Sensor Junction Box and monitor the "Alarm" contact.

C. Provide a device cable from each of the following non-addressable field device to an Addressable Module Junction Box;
1. Loss of Primary Power:
a. For Loss of Primary Power, wire the IAPS's relay output to a separate single addressable input.
2. Freezer Alarm (where applicable).
a. For Freezer, wire EACH Freezer Alarm relay output to a separate single addressable input.

D. The Addressable Module Junction Box(s) shall consist of the Addressable Module being installed in a 4-square junction box (with a blank cover) 6" to 12" above the accessible ceiling.
1. For doors, install the junction box on the hinge side of the door, and approximately 5'-0" from the door on parallel or perpendicular walls, to accommodate servicing this unit without blocking the doorway. From the junction box, wire the door contacts as recommended by the manufacturer.
2. For other devices that are out in the open or require the addressable module to be installed in a location other than at the device, install the addressable module in a logical location on the nearest wall that is a minimum of 5'-0" from the nearest doorway. Indicate on the As-builts where the junction box is for each device.
3. Conceal all wiring within the walls and/or ceiling, as required.

3.6 PROGRAMMING AND CONFIGURATION

A. The Installing Vendor shall program the system as coordinated with the Owner, as described throughout this specification, and as required for a fully functional system.

B. The Installing Vendor shall program the Configuration Files of the system to be automatically backed up onto the Owners Designated Server. These back ups shall occur once per week. Coordinate with the Owners IT Department, as required.

C. The partitioning of the system, shall be programmed as follows;
   1. As shown on the Drawings.
   2. As coordinated with the Owner.

D. For Bidding Purposes, the Installing Vendor shall be expected to program the system to Industry Standards, based on a project of this size, scope, typical functionality for this market segment, and as described throughout this specification.
   1. Review the testing requirements specified elsewhere within this specification for additional information.

PART 4 AES RADIO SYSTEM

4.1 WORK INCLUDED

A. The Project involves the installation of a new AES wireless communication. The contractor is responsible for a turnkey radio monitoring solution, including:
   1. Determining the preferred antenna location
   2. Selection of the correct antenna for location
   3. Installing the AES antenna
   4. Providing cabling and conduit between the Intrusion Alarm Panel and antenna
   5. Providing conduit and power to the AES radio for the Class 2 transformer
   6. Testing and Commissioning the new antenna system

B. All equipment must be installed in accordance with National Electric Code, NFPA 70, and local building codes.

C. Coordination is required with the owner's designated monitoring company throughout this project.

4.2 DETERMINING AES ANTENNA LOCATION

A. The contractor is responsible for measuring the signal strength and determining the ideal location for the AES antenna and the correct antenna. Signal strength shall be a NETCON 5 or better. An ideal location shall incorporate both the signal strength for the given facility as well as creating a strong link for the rest of the mesh network.

4.3 AES WIRELESS TRANSCEIVER

A. The contractor is responsible for providing and installing the AES Wireless Transceiver at each facility.
   1. AES Wireless Transceiver shall be listed to UL #365 " Standard for Police Station Connected Burglar Alarm Units and Systems", and UL #1681 "Standard for Wiring Device Configurations".
   2. The AES Hybrid 2.0 Wireless Transceiver (AES 7177H-88-ULP) shall provide a wireless communication link and IP Link capabilities between the Intrusion Alarm System Control Panel and the central station monitoring company receiver.
   3. The AES Wireless Transceiver shall be capable of supporting Alarm, Supervisory, and Trouble signals from the Intrusion Alarm System Control Panel and shall be able to monitor telephone lines, antenna cuts, battery status, and AC power status.
   4. The standard frequency range of the AES Wireless Transceiver shall be (TBD) and shall be narrow band compliant.
   5. The AES Wireless Transceiver shall be provided within a full sized rugged metal

enclosure.

6. The Fire Alarm System Contractor shall confirm radio signal strength and provide appropriate antenna.
7. Exterior antenna installations shall require all exterior building penetrations to be sealed.

4.4 AES ANTENNA

A. The contractor is responsible for providing and installing cabling between the Intrusion Alarm System and the AES transceiver to the AES antenna at each facility.
   1. Antennas shall be omnidirectional coaxial half-wave dipole type for radio transmitters with a driving point impedance to match transmitter output.
   2. VHF Antennas provide transmission and reception of the VHF RF signals between the radio Transmitter and the Radio Frequency Modem that is connected to the Radio Central Receiving System.
   3. The antenna and antenna mounts shall be corrosion resistant and designed to withstand wind velocities up to 100 m.p.h.
   4. Do not mount antennas to any portion of the building roofing system.
   5. Protect the antenna from physical damage.
   6. The Antenna shall be provided with a Lightning Arrestor to drain static charges from the antenna system.
   7. The Lightning Arrestor shall allow direct earth ground connection in accordance with N.F.P.A. #70 Section 810-21 while preventing energy from being coupled to the equipment through the coaxial shields.
   8. The use of enlarged coaxial cabling shall require Voltage Drop Calculations.
   9. The contractor shall provide the Omnidirectional Antenna model# 7210-3-UM for standard installations and the Omnidirectional Antenna model# 7210-5-UM for locations requiring Hi Gain installation.

4.5 AES INSTALLATION

A. AES Wireless Transceiver
   1. The AES Wireless Transceiver shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.
   2. The top of The AES Wireless Transceiver shall be located 60" above the finished floor, unless noted otherwise and shall be installed level.
   3. The maximum distance between the AES Wireless Transceiver and the Intrusion Alarm System Control Panel shall be 25'-0"

B. Antennas
   1. Antenna shall be installed above the roof line of the building in a location having an unobstructed path to the supervising station receiving equipment.
   2. Coaxial cabling length shall not exceed 100'-0" and shall be cut to length with a maximum service loop of 1'-0" provided at the radio transmitter enclosure.
   3. Standard coaxial cabling length shall not exceed 100'-0" and shall be cut to length with a maximum service loop of l'-0" provided at the radio transmitter enclosure.
   4. Enlarged coaxial cabling length shall not exceed 500'-0" and shall be cut to length with a maximum service loop of l'-0" provided at the radio transmitter enclosure.
   5. The coaxial cable shall be entirely installed in metallic conduit.
   6. The coaxial cable shall be routed from the antenna to the lightning arrestor (static discharge unit) and from the lightning arrestor to the radio transmitter.
   7. The connections at the antenna and lightning arrestor shall be provided with a sealant

for weatherproofing.

8. Where the conduit penetrates the building, the conduit should be, at a minimum, 3/4-inch rigid conduit.
9. Penetrating conduit should directly enter the lightning arrestor enclosure on the inside of the building.
10. lA drip loop shall be provided where the cable enters conduit to prevent rain or moisture from entering.
11. Conduit shall be painted to match adjacent surfaces in exterior applications and all interior applications with finished spaces.

4.6 TESTING AND COMMISSIONING AES SYSTEM

A. The AES system, including antenna, cabling and ancillary equipment shall be tested, commissioned, programmed and connection verified. The communication system shall be fully functional and tested in the presence of the owner (at the owner's option) for full functionality.

4.7 TESTING

A. See Section 270000 Low Voltage Systems General Requirements for "Test Forms" and "Testing & Complete System Functionality", and "Test Forms" listed elsewhere in this specification for more information.

B. The Installing Vendor shall provide the staff and necessary equipment to meet or exceed the testing requirements.

C. The Installing Vendor shall provide the Staff, walkie-talkies, test equipment, additional equipment, resources, and time necessary to support the Owner to provide the Commissioning of this Systems. The installing Vendor shall demonstrate to the Owner the complete operation of each device, head end functionality, system configuration, and software functionality. The Installing Vendor shall also make adjustments to the equipment and changes to the program settings, as requested.

4.8 TRAINING

A. Training for Site Staff:
   1. The training sessions shall be held at the project site.
      a. Provide Training for up to ten (10) Site Staff.
      b. Provide a total of two (2) separate training sessions for the Owners personnel. Schedule both training sessions with the Owner, providing a minimum of 14 days advance notice, and offer a minimum of three dates to choose from.
   2. The Site Training Session(s) shall only take place AFTER the Owners Administrative Staff have had their first training session.
   3. The Training Session shall consist of:
      a. Providing the printed Training Manuals to EACH attendee.
      b. Being conducted by one of the designated Installing Vendor technicians. The training shall be a minimum of one (1) 2-Hour session that shall be held on the same day and provide a thorough and in depth full feature training session. Provide additional training time as required, to answer EACH of the staffs questions, at no additional cost to the Owner. This training shall address the Owners requirements identified on the documents.

4.9 AS-BUILTS

A. Provide all As-Built documentation as defined in Section 270000 Low Voltage Systems General Requirements and listed elsewhere in this specification.

B. Update all documents provided in the Submittal and Shop Drawings to accurately reflect the actual equipment that was provided for this project, and the actual locations of the installed equipment.

C. The Installing Vendor shall include in the pricing of their bid, the time and materials to generate and create the documentation, as described below.
   1. Provide an "Equipment Information Sheet", in the O & M manuals. At a minimum, from left to right, provide the following information;
      a. Manufacturers Name.
      b. Equipment Device Type (such as Workstation, Control Panel, etc.).
      c. Location (such as MDF room 103, or area of building).
      d. IP Address.
      e. Software Name.
      f. Software Version that is installed on the device.
      g. List the "Highest Level" configurable password for EACH device.
      h. List "EACH System Operator" password.
      1. List all other password settings for EACH device.

END OF SECTION