

**DIVISION 28**

**ELECTRONIC SAFETY AND SECURITY**

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PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Fire Alarm control panel(s).
2. Audio/visual alarm notification appliances.
3. Voice evacuation system.
4. Auxiliary NAC power supplies.
5. Digital communicator.
6. Automatic detection devices.
7. Manual alarm initiating devices.
8. Remote annunciation.
9. Addressable relays, control and monitoring devices.
10. Magnetic door holders.
11. All system cabling and raceways.
12. System programming.
13. System testing.

- A. Related Sections: The following sections contain requirements that relate to this Section:

1. Section "Fire Suppression Sprinkler Systems" for coordination of monitoring and supervision requirements with fire alarm system.
2. Section "Dry Pipe Sprinkler Systems" for coordination of monitoring and supervision requirements with fire alarm system.
3. Section "Access Control" for coordination and interface requirements including locked door release during fire alarm condition.
4. Section "HVAC Air Distribution System" for coordination of duct mounted smoke detectors, and power and control requirements to smoke/fire dampers.
5. Section "Pneumatic And Electric Control Systems For HVAC" for coordination of fire alarm system control signals with HVAC system components such as HVAC shutdown, damper closures, etc.
6. Section "Common Work Results for Electrical" for general requirements, submittal requirements, coordination, project conditions, labeling, fire stopping, commissioning, equipment supports, installation and

construction requirements, demolition, quality control, identification, and all other applicable paragraphs.

7. Section "Grounding & Bonding for Electrical Systems" for grounding, requirements of equipment.
8. Section "Low Voltage Electrical Power Conductors and Cables" for cabling requirements.
9. Section "Raceways & Boxes for Electrical Systems" for conduit, raceway and box requirements.
10. Section "Structured Cabling" for coordination with telephone system, and communication voice cable requirements.

B. Permits and Fees:

1. Apply, pay for and secure all permits, required by the Authorities Having Jurisdiction and necessary for specified work of this section, prior to start of work, in accordance with contract General Conditions and Division 01.
2. Deliver all certificates to the Owner prior to final acceptance of work.

1.3 SYSTEM DESCRIPTION

A. General System Description:

1. This section includes furnishing, assembly, construction, installation, connection and testing of modifications to an existing addressable fire alarm system.
2. This Section includes fire alarm systems, including manual stations, detectors, signal equipment, controls, wiring, raceways, and devices.

B. System Design Requirements: Installer shall meet the entire intent of these specifications and associated drawings. Deviations from specified equipment and/or operation of the system shall be at Installer's risk, unless written notification is made with the Shop Drawing submittal and such items are approved in writing.

C. Alarm Initiation:

1. Following devices shall cause a general alarm condition:
  - a. Manual pull stations.
  - b. Sprinkler flow or pressure switches.
  - c. CO detectors
  - d. Dry-pipe or pre-action sprinkler system activation.
  - e. Heat or area smoke detectors.
  - f. Kitchen grease hood fire suppression system activation.

D. Alarm Verification:

1. Control panel shall contain an alarm verification cycle to verify individual alarm signals and eliminate false alarms caused by transient conditions such as cigarette smoke, dust, etc.
2. Dry contact initiating devices, manual pull station, heat detector, water flow switch, etc. shall bypass verification cycle and immediately register an alarm.

E. Smoke Detector Sensitivity Adjust:

1. A means shall be provided for adjusting the sensitivity of any, or all, addressable intelligent detectors in the system from the system keypad. Sensitivity range shall be within the allowed UL window and have a minimum of 9 levels.

F. Point Disable:

1. Any addressable device or conventional circuit in the system may be enabled or disabled through the system keypad.

G. System History Recording and Reporting:

1. The fire alarm control panel shall contain a history buffer that will be capable of storing up to 800 events. Up to 200 events shall be dedicated to alarm and the remaining events are general purpose. Systems that do not have dedicated alarm storage, where events are overridden by non-alarm type events, are not suitable substitutes. Each of these activations will be stored and time and date stamped with the actual time of the activation. The contents of the history buffer may be manually reviewed, one event at a time, or printed in its entirety. The history buffer shall use non-volatile memory. Systems that use volatile memory for history storage are not acceptable substitutes.

H. Automatic Detector Maintenance Alert:

1. The fire alarm control panel shall automatically interrogate each intelligent detector and shall analyze the detector responses over a period of time. If any intelligent detector in the system responds with a reading that is above or below normal limits, then the system will enter the trouble mode, and the particular detector will be annunciated on the system display, and printed on the optional printer. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.

- I. Pre-Alarm Function:
  - 1. The system shall provide two levels of pre-alarm warning to give advance notice of a possible fire situation. Both pre-alarm levels shall be fully field-adjustable. The first level shall give an audible indication at the panel. The second level shall give an audible indication and may also activate control relays. The system shall also have the ability to activate local detector sounder bases at the pre-alarm level, to assist in avoiding nuisance alarms.
  
- J. Software Zones:
  - 1. The FACP shall provide 100 software zones, 10 additional special function zones, 10 releasing zones, and 20 logic zones.
  
- K. Alarm Functions:
  - 1. During a general alarm condition:
    - a. Flashing (strobe) visual alarm signals, synchronized, throughout building. Strobes shall continue to flash until the system has been reset. Strobes shall not stop operating when the "Alarm Silence" is pressed.
    - b. Temporal Code 3 audible signals.
    - c. Audible Voice Evacuation message signals.
    - d. Activate control relay to override (mute) all local sound and/or PA systems.
    - e. Red "ALARM" LED lit on control panel and remote annunciator panels.
    - f. Specific LCD alpha-numeric alarm message display on panels.
    - g. Digital communicator contacts Central Monitoring Station and transmits point identification.
  - 2. Initiate the following additional action through specified fire alarm device activation
    - a. Elevator capture and recall (primary floor, alternate floor and fireman's hat) from devices.
      - 1) Lobby smoke detectors.
      - 2) Machine room smoke & heat detectors.
      - 3) Shaft smoke & heat detector.
      - 4) Smoke and heat detectors shall also cause general alarm.
    - b. Shunt trip elevator breaker(s) via control relays from heat detector alarm signals:
      - 1) Machine heat detectors.
      - 2) Shaft top heat detector.
      - 3) Elevator pit heat detector.
      - 4) Smoke and heat detectors shall also cause general alarm.

- c. Shut down air handling equipment via addressable control relay at each associated AHU, RTU, etc. from duct smoke detector alarm or HVAC shutdown signal.
  - 1) Duct smoke detectors shall also cause Supervisory signal.
  - 2) Internal audible device shall sound at the control panel or command center.
  - 3) Illuminate alarm status LED's at remote test station, and remote graphic/LED annunciators.
- d. Close smoke dampers via control relay initiated by associated duct smoke detectors.
  - 1) Duct smoke detectors shall also cause Supervisory signal.
  - 2) Internal audible device shall sound at the control panel or command center.
  - 3) Illuminate alarm status LED's at remote test station, and remote graphic/LED annunciators.
- e. Release magnetically held doors via control relay, initiated by local smoke detector(s) at door.
  - 1) Smoke detectors shall also cause general alarm.

L. Alarm Silence:

- 1. Silence alarms using keyed ALARM SILENCE switch.
  - a. Silences horns and turns off
  - b. Visual alarms shall continue to flash until system is reset.
  - c. Displays ALARM SILENCE LED and LCD message on control panel.
  - d. Displays ALARM SILENCE LED and LCD message on graphic annunciator(s).

M. Alarm Resound:

- 1. Following Alarm Silence, any subsequent alarm shall immediately resound all audio and visual alarm devices. Silencing shall in no way, prohibit the resounding of additional alarms.

N. System Reset:

- 1. Reset system using keyed SYSTEM RESET switch(es) on fire alarm control panel and remote annunciator panels.

O. CO Detector:

- 1. Upon detection of CO gas, the CO sensor/detector shall provide a signal to the building fire alarm system. The CO detector shall be powered and monitored by the fire alarm system.

2. During a CO alarm condition, the fire control panel shall initiate a CO alarm notification signal that is audibly different and distinct from a general fire alarm. A signal shall also be sent to the central monitoring station.

P. Manual Functions:

1. HVAC Manual Shutdown switches per NFPA 90A Standard for the Installation of Air Conditioning and Ventilation Systems.
  - a. Shutdown switch(es) at the FACP or annunciator panel shall cause all HVAC units to shut down. Operation of HVAC switch(es) shall register a Supervisory signal with the FACP.
2. Fire pump 2-position control switch as part of the Fire Pump Control Annunciator Panel:
  - a. AUTO - responds to fire flow requirement for automatic starting/stopping of fire pump.
  - b. MANUAL START - Manual override start for testing, fire department use, etc.

Q. Alarm Simulation:

1. Simulates activation of alarm initiating device.
2. Disconnect switch prevents alarm signals to city or municipal monitoring circuit. Disconnect switch use shall transmit a supervisory signal, however.

R. Elevator Shunt Trip Monitoring:

1. Shall cause the following at Fire Alarm Control and Remote Annunciator Panel(s):
  - a. Provide for monitoring of elevator shunt trip control circuit voltage per NFPA 72 3.9.4.4.
  - b. Provide relay connected to shunt trip control voltage just prior to shunt trip test button and fire alarm control relay which initiates shunt trip.
  - c. Monitor relay contacts via an addressable control relay.
  - d. Relay activation shall cause Supervisory LED for "ELEVATOR SHUNT TRIP – LOSS OF CONTROL POWER" upon loss of control voltage.
  - e. Supervisory LED's shall light during this condition.
  - f. Display appropriate LCD messages.
  - g. Digital communicator contacts Central Monitoring Station and transmits Supervisory signal and point identification.

S. Emergency Responder Radio Repeater System Monitoring:

1. Provide monitoring and annunciation of the following at the Fire Alarm Control and Remote Annunciator Panel(s):
  - a. Emergency Responder Radio system trouble/alarm condition (Trouble).
  - b. Trouble LED's shall light.
  - c. Display LCD message "Emergency Responder Radio System Trouble".
  - d. Digital communicator contacts Central Monitoring Station and transmits appropriate signal and point identification.

T. Fire Pump Monitoring:

1. Provide monitoring and annunciation of the following at the Fire Alarm Control and Remote Annunciator Panel(s):
  - a. Pump or Engine running (Supervisory).
    - 1) Supervisory LED's shall light.
    - 2) Display LCD message "FIRE PUMP RUNNING".
  - b. Pump Controller Not in Auto mode (Supervisory).
    - 1) Supervisory LED's shall light.
    - 2) Display LCD message "FIRE PUMP NOT IN AUTO".
  - c. Phase Loss/Reversal (Trouble).
    - 1) Trouble LED's shall light.
    - 2) Display LCD message "FIRE PUMP PHASE LOSS/REVERSAL".
  - d. Digital communicator contacts Central Monitoring Station and transmits appropriate signal and point identification.

U. Sprinkler System Components:

1. Device shall perform as follows:
2. General ALARM condition:
  - a. Water Flow switches.
  - b. Sprinkler pressure switches.
  - c. Pre-Action system control panel alarms.
3. TROUBLE signal condition:
  - a. Dry pipe air compressor power loss and/or pressure loss.
  - b. Pre-Action system control panel Trouble condition.
4. SUPERVISORY signal condition:
  - a. Valve Tamper switches.
5. Light appropriate LED at annunciators.
6. Display appropriate LCD message at annunciators.
7. Digital communicator contacts Central Monitoring Station and transmits appropriate signal and point identification.



- V. Kitchen Grease Hood Extinguishing System Connections:
1. Each hood system activation shall:
    - a. Cause general ALARM condition in building.
    - b. Display LCD message "KITCHEN HOOD EXTINGUISHING SYSTEM."
    - c. Shut off cooking appliance gas supply via electric solenoid valve(s).
    - d. Shut off cooking appliance power via shunt trip breaker(s).
- W. Supervisory Signals:
1. Supervisory signals shall:
    - a. Light common Supervisory LED at all annunciators.
    - b. Light specific zone LED at all annunciators.
  2. Display appropriate LCD message at annunciators.
    - a. Sound audible warning tone at all annunciators.
- X. Trouble Signals:
1. Trouble signals shall:
    - a. Light Supervisory LED(s) at all annunciators.
    - b. Display specific LCD message at all annunciators.
    - c. Sound audible warning tone at all annunciators.
  2. The following shall cause a trouble signal:
    - a. Loss of AC power.
    - b. Wiring open circuit, short or ground fault.
    - c. Standby battery or charger failure.
    - d. Open or grounded circuit.
    - e. Disconnection of control panel module, card, cable.
    - f. Each alarm and trouble LED failure.
    - g. Remote annunciator open or grounded circuit.
    - h. Other functions specified herein.
- Y. System Wiring and Supervision:
1. Initiating Device Circuits: Initiating device circuits monitoring manual fire alarm stations, smoke and heat detectors, waterflow switches, valve supervisory switches, fire pump functions, and air pressure supervisory switches shall be:
    - a. Class A (Style "D" or "E")
  2. Signal Line Circuits (SLC):
    - a. For SLC's covering more than one fire/smoke compartment, a wire-to-wire short shall not affect the operation of the circuit from

- the other fire/smoke compartments.
- b. The signaling line circuit connecting network panel/nodes, remote annunciators, command centers, shall be CLASS A (style 7). The media shall be copper except where fiber optic cable is specified on the drawings.
  - c. SLC's connecting to addressable/analog devices including, detectors, monitor modules, control modules, isolation modules and notification circuit modules shall be CLASS A (style 7).
  - d. SLC connecting to the audio communications (pre-amp signal), amplifiers, and nodes shall be CLASS A (style 6). The circuit shall be power limited.
  - e. SLC connecting to the two-way communications circuit (riser) shall be CLASS A (style 6).
3. Notification Appliance Circuits: All notification appliance circuits shall be Class A (Style "Z").
  4. Voice Evac audio circuits shall have a minimum rating 50 watts @ 25V audio, and 35 watts @ 70V audio.
  5. The notification circuits shall be power limited. Non-power limited circuits are not acceptable.
  6. Each alarm and trouble LED on main and remote annunciators shall be supervised.

Z. Walk Test Feature:

1. Control panel switch shall allow a one man functional test of each alarm and supervisory device on the system. Walk-Test shall:
  - a. Disable city or municipal connection.
  - b. Disable digital communicator after sending Supervisory signal.
  - c. Bypass functional control relays (i.e. elevator capture, air handler shut down).
  - d. Control panel and remote annunciators shall illuminate the Supervisory LED and display appropriate LCD message.
  - e. Activation of any alarm initiating device shall:
  - f. Cause audible and visual alarm devices to pulse one round of code.
  - g. Control panel shall automatically reset without use of the keyed reset switch.
  - h. Auto reset time shall be adjustable to allow automatic reset of detectors and manual reset of N.O. contact devices. Momentary opening of an initiating or notification appliance circuit shall cause the alarm signals to sound for 4 seconds to indicate the trouble condition.

AA. Drill Feature:

1. Control panel switch shall allow a manual drill functional test of the alarm system. Manual Drill shall:
  - a. Disable city or municipal connection.
  - b. Disable automatic digital communicator after sending Supervisory signal.
  - c. Bypass functional control relays (i.e. air handler shut down).
  - d. Control panel and remote annunciators shall illuminate the Supervisory LED and display appropriate LCD message “Manual Drill”.
  - e. Drill initiation shall be via key-enabled function button on remote annunciator panel. Activation of the drill function shall:
  - f. Cause all audible and visual alarm devices to activate.
  - g. Cause voice activation systems to begin pre-recorded message.
  - h. General alarm condition shall continue for 5 minutes or until manually reset via “Reset” button on annunciator panel.

#### 1.4 SUBMITTALS

- A. General: Submit each item in this Section according to the conditions of the contract and Division 01 Specification Sections.
- B. Submittals shall also comply with the submittal procedures and requirements of electrical Specification Sections.
- C. Submittal Requirements of this section:
  1. Fire Alarm control panel(s)
  2. Audio/visual alarm notification appliances.
  3. Voice evacuation system.
  4. Auxiliary NAC power supplies.
  5. Digital communicator.
  6. Automatic detection devices.
  7. Manual alarm initiating devices.
  8. Remote annunciator panel.
  9. Graphic annunciator panel.
  10. Fire Fighters Smoke Control Panel.
  11. Addressable relays, control and monitoring devices.
  12. Magnetic door holders.
  13. System cabling.
  14. List of all system program points with device ID.
- D. Descriptive Data for Each Product:
  1. To verify specifications have been met/exceeded.
  2. Clearly indicate or state all options, etc.:

- a. Manufacturer/cat. number.
- b. Manufacturer's options.
- c. Accessories.
- d. Indicate point of connections with other equipment or systems.
- e. Bill of materials showing quantities and model numbers.
- f. Manufacturer's data on all proposed equipment.
- g. Highlight or clearly indicate all items to be provided.
- h. Catalogued by the control system manufacturer.
- i. UL Listing of each component individually.
- j. UL Listed for use in proposed system.
- k. Approved by local Fire Dept., Fire Marshal, or other local authority, where required.
- l. Combined components of several manufacturers are not permitted unless proof of UL approval with the proposed control panel is provided.

E. System Information:

1. Device schedule matrix indicating all devices and conditions down left side, and all functions across top. Fill in matrix to indicate functions, responses, etc. associated with each device or condition.
2. Written sequence of operation for all modes:
  - a. Alarm conditions.
  - b. Trouble conditions.
  - c. Supervisory signal conditions.
  - d. Manual switch functions (i.e. HVAC shutdown).
  - e. Other functions (Drill, Reset, etc.).
  - f. Digital Communicator functions.

F. Shop Drawings:

1. Graphic Annunciator Panels:
  - a. Submit full scale drawing of proposed graphic.
  - b. Submittal to accurately represent the proposed final graphic with color lines, line thicknesses, text font and size, etc.
  - c. Indicate all accessories to scale in proper position; keyed switches, LCD panels, LED's, buttons, etc.

G. Floor Plans:

1. Scaled Floor Plans of each building level shall be furnished, to indicate:
  - a. Scaled floor plans of all building areas.
  - b. Location and type of all proposed devices.
  - c. Proposed address location or identifying number for each device.
  - d. Plans shall include fire alarm supplier's company name, phone

number, etc.

H. Calculations:

1. Battery calculations for each control panel and power supply.
2. Voltage drop calculations for each Notification Appliance Circuit.
3. Voice Evacuation audio amplifier sizing calculations.
4. Battery calculations for voice evacuation audio system.

I. Wiring Diagrams:

1. Wiring connection diagrams for each proposed component.
2. Schematic wiring diagram for entire system, showing all connected devices, cable types, cable sizes, etc.
3. Indicate all points of connection between proposed fire alarm system and other devices: sprinkler switches, door holders, extinguishing system control panels, etc.

J. Submittal Deviations from Contract Documents:

1. Submittals shall explicitly identify any deviations from the drawings, specifications or design intent, including, but not limited to:
  - a. Different products used.
  - b. Products used in different locations from where shown or specified.
  - c. Changes to intended application, location, etc.
  - d. Changes to ratings, detector type or sizes, etc.
  - e. Differences in physical size which will create installation, clearance or access problems or Code violations.
2. Contractor shall clearly and specifically identify each such deviation, substitution or change to the contract documents to Architect's attention via note, clarification, etc. It is NOT considered to be explicitly identified simply by showing a device on the plans or including a product page in the submittal.

K. Quality Assurance:

1. Product Test Reports: Certified copies of manufacturer's design and routine factory tests required by the referenced standards.

L. Approval of Authority Having Jurisdiction:

1. Submit copies of Shop Drawings to Authority having Jurisdiction. Submit for review and approval, as required for permit.
  - a. Proposed system and all components.
  - b. Remote Annunciator Panel with graphic, as applicable.

2. Provide to the Architect a copy of the transmittal and application submitted to AHJ for record.
  3. Provide to the Architect a copy of the AHJ's review comments and/or approval for record.
  4. Comply with all AHJ comments. Make all necessary corrections, and resubmit to AHJ, as required, with copy to the Architect.
  5. Provide copy of all written comments and directions to Owner and Architect.
- M. Closeout Submittals: Submit in accordance with the General Conditions and Division 01 requirements, and Section "Common Work Results for Electrical", and as follows:
1. Operational Information: Provide full instruction manual to cover all aspects and components of the installed system and to be used to supplement the Owner Demonstration:
    - a. System reset.
    - b. Alarm acknowledge/silence.
    - c. Component reset.
    - d. Programming.
    - e. History log and information retrieval.
  2. Maintenance Data: Provide for all equipment and accessories to include in the "Operating and Maintenance Manual" specified in Division 01.
    - a. Include recommended periodic tests of equipment in service, and test parameters. Provide manufacturer's recommended test procedures, frequency and type of tests.
    - b. Specify cleaning procedures for all components.
  3. As-Built Drawings: Provide three (3) full-size copies of all plans, drawings and schematics to the owner after the acceptance test. The drawings shall be revised to show all terminal designations, location of all junction boxes, terminal cabinets, devices, wiring and conduit routings. Drawings, etc. shall be delivered as part of the O&M Manual package.
  4. Record of Completion form, as required by NFPA 72 National Fire Alarm Code.

## 1.5 QUALITY ASSURANCE

- A. Listing and Labeling: Provide products specified in this Section that are listed and labeled.
1. The Terms "Listed and Labeled": As defined in the National Electrical Code, Article 100.
  2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
  3. Where equipment consists of multiple components, the entire assembly or

product shall be UL Listed and Labeled, or Labeled by a testing organization acceptable to the Authority Having Jurisdiction per the NEC.

- B. The contractor shall have in-house engineering and project management capability consistent with the requirements of this project. Qualified and approved representatives of the system manufacturer shall perform the detailed engineering design of central and remote control equipment. Qualified and approved representatives of the system manufacturer shall produce all panel and equipment drawings and submittals, operating manuals. The contractor is responsible for retaining qualified and approved representative(s) of those system manufacturers specified for detailed system design and documentation, coordination of system installation requirements, and final system testing and commissioning in accordance with these specifications.
  
- C. Single-Source Responsibility:
  - 1. The complete performance of the assembled system, including all accessories shall be the sole responsibility of the supplier. It is the installer's responsibility to ensure that all factory and field installed accessories and loose components used in the system, meet these specifications, and perform up to the stated and tested standards.
  
- D. Manufacturer's Requirements: Proposed equipment manufacturer must meet the following:
  - 1. All products designed and manufactured to ISO 9001 standards.
  - 2. Engaged in manufacturing of fire alarm systems at least 5 years.
  - 3. System shall be of latest design. No obsolete or pending obsolete parts shall be used.
  - 4. Maintain current stock of all spare parts at local service organization.
  - 5. Provide local maintenance and service with location less than 50 miles from project site.
  - 6. Provide list of technical support staff, project experience, training, etc. as requested. Staff must be factory trained or have received on-site training from manufacturer.
  - 7. Provide technical support to installer.
  - 8. Make all final connections, adjustments, and supervision for system testing.
  - 9. Provide all system programming.
  - 10. Provide references upon request:
    - a. Names of (6) similar projects in size and scope.
    - b. Contact person and phone number for each project.
  - 11. System design shall be by Certified NICET Level III technician or registered Fire Protection Engineer.

- E. Field Certifications and Labeling:
1. UL UOJZ Certification of system.
    - a. Provide the services and equipment of a UL Listed alarm service company, capable of and authorized to issue a UL Certificate for the equipment described herein, and all connected wiring and devices that form the entire system. The alarm service company shall issue the UL Certificate stating that the system and its installation are in compliance with the established requirements of UL.
    - b. Costs associated with this certification, including the first year maintenance contract, shall be included in the base bid.
- F. Installer Qualifications: Engage an experienced factory-authorized Installer to perform work of this Section.
1. Installing contractor must meet the following:
    - a. Factory trained to install the proposed system.
    - b. Has installed a minimum of 6 comparable systems within local area.
  2. Provide references upon request:
    - a. Names of (6) similar projects in size and scope.
    - b. Contact person and phone number for each project.
- G. Installation Quality: In accordance with listed Codes, recognized trade organizations and standards.
1. ADA Americans with Disabilities Act
  2. ANSI American National Standards Institute
  3. ASME American Society of Mechanical Engineers
  4. FM Factory Mutual Approval Guide
  5. NFPA National Fire Protection Association
  6. UL Underwriter's Laboratories
- H. Comply with the latest version of following codes and regulations as adopted by the Authority Having Jurisdiction, unless otherwise specified.
1. Americans with Disabilities Act Accessibility Guidelines (ADAAG).
  2. National Fire Protection Association (NFPA):
    - a. NFPA 70 National Electrical Code
    - b. NFPA 72 National Fire Alarm Code
    - c. NFPA 90A Standard for Installation of Air Conditioning and Ventilating Systems
    - d. NFPA 92A Smoke Control Systems
    - e. NFPA 92B Smoke Management Systems in Malls, Atria, and





- A. Existing Conditions: Interface with existing fire alarm system(s), as follows:
  - 1. Existing control panel shall be removed and replaced. Existing graphic annunciator shall be modified as necessary to allow connection new control panel. All other existing devices/components not affected by spaces being renovated or components not needed for the new control panel shall remain
  - 2. Existing fire alarm system:
    - a. Wiring: addressable.
    - b. Manufacturer: Edwards System Technologies - EST 2

## 1.8 MAINTENANCE

- A. Keys: Provide minimum of six (6) keys of each different type used on the project. Keys shall be identified by an appropriate number, stamped on the key or on a metal tag attached thereto.
- B. Extra Materials:
  - 1. Furnish extra materials described below, at completion of project, that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.
  - 2. Deliver spare parts to Owner with signed delivery ticket specifically itemizing all parts delivered.
  - 3. Furnish the following items, in quantities listed:
    - a. Manual pull stations: two (2)
    - b. Photoelectric smoke detectors with addressable base: Two (2).
    - c. Alarm signal speakers: two (2).
    - d. 15 candela strobe light: five (5)
    - e. Combination speaker/15 candela strobe: three (3).
    - f. Combination speaker/15 candela strobe: two (2).

## 1.9 SYSTEM STARTUP

- A. System Programming:
  - 1. Performed by a technician, trained and certified by manufacturer.
  - 2. All custom and standard functions.
  - 3. Addresses and modules as applicable.
  - 4. Control functions and monitoring.
  - 5. Message displays with signal type (i.e. smoke detector, sprinkler tamper, etc.) and a custom location message.
  - 6. Location messages shall be approved by Owner to determine exact

- wording of each location, room, floor or space.
7. Provide additional reprogramming services as required for additional devices added during construction, changes due to Final Inspection comments, and Owner changes of display messages, etc. prior to Owner's final acceptance of system.

## PART 2 MATERIALS

### 2.1 MANUFACTURER

- A. Available Manufacturers: Subject to compliance with requirements, provide a system by the named "Basis of Design" manufacturer, or a comparable product of one of the other following named manufacturers:
  1. Fire Alarm Control Units and Accessories:
    - a. Edwards Systems Technologies (Basis of Design)
    - b. Simplex Time Recorder Co.
    - c. Siemens (Cerberrus)
    - d. Notifier
  2. Graphic Annunciator Panels:
    - a. Quality Engraving & Design, Inc.
    - b. Light Engineered Displays, Inc.
    - c. WSA, FAA series

### 2.2 MANUAL PULL STATIONS

- A. Addressable Manual Alarm (Pull) Station:
  1. Listed under UL 38 Manual Signaling Boxes for Fire Alarm Systems.
  2. Addressable, double action, toggle switch type.
  3. Cover locks in down position after use.
  4. Lexan, red with raised white letters.
  5. Semi-flush in finished areas; surface in unfinished areas.
  6. Keyed or tool reset.
  7. Field set device "address" location.
  8. Screw terminal wiring connections.
  9. EST Model SIGA-278.

### 2.3 CARBON MONOXIDE DETECTORS

- A. Carbon monoxide sensors shall be powered and monitored by the fire alarm system control panel.
  1. UL Listed 2075 Gas and Vapor Detectors and Sensors.

2. Electro-chemical CO sensing.
3. Field-replaceable CO sensor/module.
4. Non-volatile memory.
5. Addressable, compatible with FACP.
6. Green/Red status/alarm LED.
7. With audible sounder mounting base.
8. Stand-alone operation and simultaneous monitoring/alarming thru FACP.
9. EST model SIGA2-COS, or equal.

## 2.4 SMOKE DETECTORS

### A. All system smoke detectors:

1. Listed under UL 268 Smoke Detectors for Fire Protective Signaling Systems.
2. Supervised for power failure.
3. LED on detector to indicate:
  - a. Pulsing - power available.
  - b. Steady - alarm activation.
4. Addressable base with twist lock mounting.
5. #30 mesh insect screen.
6. Closed back to prevent insect and dust entry.
7. Corrosion and vibration resistant.
8. Shielded against EMI and RFI.
9. Interchangeable detector heads.
10. Screw terminal wiring connections.
11. Factory serial number to identify particular detector, its location, and sensitivity setting.
12. Auxiliary N.O. alarm contacts in detectors used for:
  - a. Door holder release.

### B. Photoelectric Smoke Detectors:

1. No required replacement or readjustment after alarm.
2. Adjustable sensitivity within UL specifications to compensate for ambient conditions.
3. Operable with 10-95% RH.
4. 3.3 % nominal sensitivity, field adjustable.
5. Easily disassembled for cleaning.
6. EST Model SIG-PS

### C. Duct Smoke Detectors:

1. Listed under UL 268A Smoke Detectors for Duct Applications.
2. Photoelectric type.

3. 3.3 % nominal sensitivity, field adjustable.
4. Easily disassembled for cleaning.
5. Mounted on exterior of and accessible side of ductwork.
6. Sampling tubes matched to the size/shape of duct.
7. Functional test circuit to simulating smoke for alarm.
8. 6 levels of sensitivity adjustment.
9. Red Alarm, green Power and yellow Trouble LED's.
10. Powered from Fire Alarm Control Panel.
11. Remote Test & LED station.
  - a. Key operated test switch.
  - b. Red alarm LED.
  - c. Green power-on LED.
12. Duct detectors shall cause Supervisory Signal only.
13. EST SIGA-SD.

D. Exterior & Harsh Environment Duct Smoke Detectors:

1. Specifically designed for installation in dirty, wet and unconditioned areas, including exterior and rooftop applications where exposed to weather.
2. Operating temperature range of -4°F to 158°F.
3. Gasketed, waterproof housing and connections for wet locations.
4. Listed under UL 268A Smoke Detectors for Duct Applications.
5. Photoelectric type.
6. 3.3 % nominal sensitivity, field adjustable.
7. Easily disassembled for cleaning.
8. Mounted on accessible side of ductwork.
9. Sampling tubes matched to the size/shape of duct.
10. Functional test circuit to simulating smoke for alarm.
11. 6 levels of sensitivity adjustment.
12. Red Alarm, green Power and yellow Trouble LED's.
13. Powered from Fire Alarm Control Panel.
14. Remote Test & LED station (Mounted inside building where accessible and visible).
  - a. Key operated test switch.
  - b. Red alarm LED.
  - c. Green power-on LED.
15. Duct detector/housing enclosure:
  - a. UL Listed, NEMA 4, 16-gauge, corrosion resistant metal enclosure, to contain duct smoke detector and housing.
  - b. Removable front cover.
  - c. Drip-proof top.
  - d. Gasketed holes in rear for sampling tubes.
  - e. Air flow holes to provide air flow from duct through the outer housing containing the duct detector.

16. Duct detectors shall cause Supervisory Signal only.
17. Edwards Systems Technologies SIGA-SD, with required gasketing and outer enclosure, or equal.

## 2.5 MISCELLANEOUS INITIATING DEVICES

- A. Provide connections, wiring, resistors, etc. for all contact closure devices listed and/or described herein.

## 2.6 TROUBLE SIGNAL INITIATING DEVICES

- A. Disconnecting any signal-initiating device shall cause a trouble signal at the Fire Alarm Control Panel.

## 2.7 ADDRESSABLE MONITORING MODULES

- A. UL 864 listed for Control Units and Accessories for fire Alarm systems.
- B. Provide addressable monitoring modules for all contact closure devices listed and as required:
  1. For alarm initiation:
    - a. Sprinkler water flow switches.
    - b. Kitchen hood extinguishing system activation.
    - c. Hardwired alarm devices monitored by system.
    - d. All other alarm initiating devices.
  2. For Trouble signals:
    - a. Sprinkler air pressure switches.
    - b. Fire pumps – fault conditions.
    - c. Emergency Responder Radio Repeater system – fault conditions.
  3. For Supervisory signals:
    - a. Sprinkler Valve Tamper switches.
    - b. Fire pumps – Running or Not in Auto conditions.
- C. Single device addressable monitoring module for connection to contact closure alarm, trouble or supervisory signal devices. Latching function for momentary contact devices.
- D. EST Model SIGA-CT1 for single address; or use SIGA-CT2 for dual addresses.

## 2.8 ADDRESSABLE CONTROL RELAYS

- A. UL 864 for Control Units and Accessories for fire Alarm systems.
- B. Addressable for control of elevator recall, AHU shutdown, etc.:

1. Provide interface between fire alarm control panel and all other systems and equipment controlled by the fire alarm system:
  - a. AHU shutdown.
  - b. Damper closure.
  - c. Fire/smoke door holder release.
  - d. (3) for Elevator recall (primary, alternate and fireman's hat).
  - e. Elevator breaker shunt trip activation.
  - f. Shunt trip circuit activation (grease hood extinguishing system).
  - g. Gas solenoid shutoff (grease hood extinguishing system).
  - h. Fire Pump – manual Start command.
  - i. Priority Override for sound and PA system muting.
  - j. Smoke Control Systems for activation of stair pressurization or smoke evacuation fans, damper opening/closing, and other controlled equipment.
2. Single device addressable control module.
3. Field selectable address through DIP or rotary switches.
4. Form C contacts for misc. control functions.
5. Locate relay within 36" of controlled equipment.
6. Form C relay contacts, rated for voltage and amperage of controlled load.
7. UL Listed for fire alarm use and application.
8. Metal NEMA 1 enclosure with status LED.
9. Provide for future connections for kitchen equipment shutdown, HVAC Manual Shutdown, etc. where indicated.

C. EST Model SIGA-CR

## 2.9 LINE ISOLATION MODULES

A. Interior Circuit Protection:

1. Provide line isolation modules on alarm initiating devices circuits to isolate every 50 initiating devices. Also, provide isolation for all circuits between buildings and for every other floor in high-rise buildings.

B. EST Model SIGA-IM.

## 2.10 NOTIFICATION APPLIANCES

A. Alarm Lights:

1. Listed under UL 1971 Signaling Devices for the Hearing Impaired.
2. Xenon strobe unit.
3. Clear polycarbonate lens.
4. "FIRE" marked in white letters on red housing.

5. Flash rate of 1 Hz. Self synchronized flash of all strobes.
6. Field-configurable ratings of 15, 30, 75 or 110 candela, set per drawings and to meet room application per NFPA.
7. Candela rating setting visible on exterior of installed unit.
8. ADA compliant - must meet 75 cd on-axis requirement.
9. Semi-flush mounted.
10. EST G1R-VM

B. Combination Speaker & Light Unit:

1. Combination speaker & strobe in single unit.
2. Semi-flush mounted.
3. Strobe as specified previously.
4. EST G4RF-S7VM (wall mounted) or GCF-S7VM (ceiling mounted)

A. Outdoor NEMA 4X Hazardous Strobes and Speakers:

1. Listed under UL 464 Audible Signal Appliances.
2. Designed/UL Listed for use in Wet Locations.
3. NEMA 4X - Water-tight construction to prevent ingress of driven water, dust, etc.
4. Red, non-metallic housings, corrosion resistant, stainless steel hardware.
5. Operable from -40°F to 150°F.
6. Strobe candela ratings per drawings.
7. Minimum sound pressure level of at least 100 dBA at 10'.
8. System Sensor SpectraAlert Advance Outdoor A/V Devices, or equal.

B. Alarm Speaker:

1. Listed under UL 1480 Speakers for Fire Protective Signaling Systems.
2. High efficiency, weather resistant transducers.
3. Voice and/or tone signaling.
4. Die cast aluminum housing and red grill.
5. Semi-flush mounted in finished areas.
6. Sound pressure level of 88 dBA at 10 feet.
7. Weatherproof and gaskets where exposed to weather.
8. EST Genesis GCF-S7(ceiling) and G4W-S2 (wall mounted).

## 2.11 SURFACE MOUNTED FIRE ALARM DEVICE BACKBOXES

A. Surface mounted metal boxes for mounting of fire alarm devices (where flush mounting is not possible):

1. NEMA 1 smooth steel construction.
2. Red finish to match alarm devices.



3. Concealed knockouts (scored on inside of box only) for entry of surface raceway.
4. No visible or open unused knockouts.
5. Minimum 1-3/4" deep.
6. Single or double gang box as required for each device.
  - a. 1-gang for single strobes.
  - b. 2-gang for horn/strobes, pull stations.
7. Wiremold # R5700 Series, or equal.

## 2.12 NOTIFICATION APPLIANCE POWER EXTENDER PANELS

### A. NAC Power Extender Panel:

1. Listed under UL 864 Control Units for Fire Protective Signaling Systems.
2. UL Listed for use with fire alarm system.
3. Receives input from FACP through appliance circuit.
4. Four general alarm circuits, Style Y or Z at 2 amps each.
5. Flush mounted in finished areas.
6. Individual circuit trouble LED's.
7. Internal 8 amp power supply, batteries and charger.
8. 120 VAC input.
9. Power ON and TROUBLE LED's.
10. EST BPS series.

## 2.13 FIRE ALARM CONTROL PANEL (FACP)

- A. FACP for operation of complete 24 VDC, addressable system.
- B. General: Comply with UL 864 Control Units and Accessories for Fire Alarm Systems..
- C. Device designations and quantities shall be as shown on drawings and provided additionally as required to connect all specified functions.
- D. Multi-processor based FACP, custom field programmable through operator interface buttons on the control panel. Panel shall contain a minimum of:
  1. The control panel shall include the following capacities:
  2. Support up to 2500 analog/addressable points.
  3. Support network connections up to 63 other control panels and annunciators.
  4. Support multiple digital dialers and modems
  5. Support multiple communication ports and protocols
  6. Support up to 1740 chronological events.
  7. The network of control panels shall include the following features:

8. Ability to download all network applications and firmware from the configuration computer from the configuration computer from a single location on the system.
9. Provide electronic addressing of analog/addressable devices.
10. Provide an operator interface control/display that shall annunciate, command and control system functions.
11. Provide an internal audible signal with different programmable patters to distinguish between alarm, supervisory, trouble and monitor conditions.
12. Provide a discreet system control switch provided for reset, alarm silence, panel silence, drill switch, previous message switch, next message switch and details switch.
13. Provide system reports that provide detailed description of the status of system parameters for corrective action or for preventative maintenance programs. Reports shall be displayed by the operator interface or capable of being printed on a printer.
14. Address modules for multiple (99-127) addressable devices per module. Minimum of 25% capacity for additional devices without adding modules.
15. 2 Alarm Notification Device circuits (Expandable to 6).
16. 4 form C auxiliary "Alarm" contacts.
17. 2 Audio output circuits for voice evacuation messages.
18. Pre-recorded digital voice evacuation message.
19. Alarm resound after initial alarm has been silenced.
20. 2 form C auxiliary TROUBLE dry output contacts.
21. Control relays for all functions specified.
22. One person Walk Test function.
23. Class A or B supervision of initiating circuits.
24. Municipal (City) connection (reverse polarity).
25. Transient voltage protection for connections to City and power supply.
26. Supervised remote annunciator outputs if so equipped.
27. Switch selectable programming of system functions.
28. Ground and brownout protection.
29. Supervised battery(ies) and charger circuit.
30. Low and No voltage battery supervision.
31. Field programmable and expandable.
32. Secure access protection of programming.
33. Individual circuit disconnect and disable switches.
34. Supervised serial or hardwired remote annunciator outputs.
35. Alarm resound feature.
36. Trouble silenced reminder.
37. Field programmable Trouble alarm status LED's.
38. Drift compensation to extend detector accuracy over life. Drift compensation shall also include a smoothing feature, allowing transient noise signals to be filtered out.
39. Detector sensitivity test, meeting requirements of NFPA 72, Chapter 7.

40. Maintenance alert, with two levels (maintenance alert/maintenance urgent), to warn of excessive smoke detector dirt or dust accumulation.
41. Nine sensitivity levels for alarm, selected by detector. The alarm level range shall be .5 to 2.35 percent per foot for photoelectric detectors and 0.5 to 2.5 percent per foot for ionization detectors. The system shall also support sensitive advanced detection laser detectors with an alarm level range of .03 percent per foot to 1.0 percent per foot. The system shall also include up to nine levels of Pre-alarm, selected by detector, to indicate impending alarms to maintenance personnel.
42. The ability to display or print system reports.
43. Alarm verification, with counters and a trouble indication to alert maintenance personnel when a detector enters verification 20 times.
44. PAS pre-signal, meeting NFPA 72 3-8.3 requirements.

E. Control Panel Annunciation:

1. Common System LED Signal Lamps:
  - a. Red ALARM.
  - b. Yellow SUPERVISORY.
  - c. Yellow TROUBLE.
  - d. Green POWER ON.
2. Lamp test switch.
3. Audible alarm and trouble buzzer.
4. Control Panel LCD Message Annunciator:
  - a. 80 character backlit LCD message display.
  - b. Alphanumeric English language display.
  - c. Display/Action keypad for user interface.
  - d. Custom programmable messages.
  - e. Custom programmable function buttons.
  - f. Identify the type of alarm, trouble, or supervisory signal, the device, and location. Each addressable device shall be identified by device address, device type, physical location, and other custom programmed information per Owner.

F. Physical construction:

1. 16 gauge cold rolled steel.
2. Rust inhibiting finishes. Red outer finish.
3. Semi-flush in finished areas; surface mounted in unfinished spaces.
4. Key lockable door with lexan cover over visible displays.
5. UL Listed and shall bear the UL Label.
6. Arrange panel so all operations required for testing or for normal care and maintenance of the system are performed from the front of the enclosure. If more than a single unit is required to form a complete control panel, provide exactly matching modular unit enclosures.

7. Accommodate all components and allow ample gutter space for interconnection of panels and field wiring.
  8. Identify each enclosure by an engraved, red, laminated, phenolic-resin nameplate. Lettering on the enclosure's nameplate shall not be less than 1 inch high. Identify individual components and modules within the cabinets with permanent labels.
- G. Control Modules: Types and capacities required to perform all functions of the fire alarm systems. Local, visible, and audible signals announce alarm, supervisory, and trouble conditions. Each type of audible alarm has a different sound.
- H. Address Modules: Provide in sufficient quantity to connect all required addressable devices plus the required spare addresses, as specified previously.
- I. Control Switches:
1. Alarm Silence.
  2. Trouble Silence.
  3. System Reset.
  4. Battery Test.
  5. All switches clearly, permanently labeled.
  6. Custom programmable switches.
  7. Key enable function programmable for all buttons.
- J. Fire Pump Monitoring:
1. Control Panel shall monitor fire pump, jockey pump and controller as specified in paragraph "FUNCTIONAL DESCRIPTION OF SYSTEM":
    - a. Circuits shall be powered from the FACP.
    - b. Operate through N.O. or N.C. dry contacts at the engine or pump controller.
    - c. Dry contacts provided by the fire pump manufacturer per NFPA 20, 9-4.4 "Controller Alarm Contacts for Remote Indication".
    - d. Each function monitored as individual address and point ID.
- K. Voice Alarm: An emergency communication system, integral with the FACP, includes central voice alarm system components complete with microphones, preamplifiers, amplifiers, tone generators and battery backup. Features include the following:
1. Amplifiers comply with UL 1711 Amplifiers for Fire Alarm Systems.
  2. Two alarm channels permit simultaneous transmission of different announcements to different building zones or floors automatically or by using the central control microphone. All announcements are made over

- dedicated, supervised communication lines.
3. Status annunciator indicates the status of the various voice alarm speaker zones and the status of firefighter telephone 2-way communication zones.

L. Manufacturer and Model Number:

1. Edwards EST-3X. (Basis of Design)

## 2.14 BATTERIES

A. Self contained batteries mounted within main control panel.

1. Rated for (24) hours of non-alarm monitoring plus (5) minutes of alarm conditions.
2. Sized for 120% of Amp-Hour requirement per calculations
3. Sealed lead acid type, maintenance free.
4. Minimum projected life of 5 years.
5. Automatic operation upon loss of primary power.

B. Accessories:

1. Solid state automatic transfer switch to switch to battery power if the normal AC input voltage falls below 15% of nominal. The audible system trouble tone shall sound upon loss of AC input, and "LOSS OF AC POWER" message shall be displayed.

C. Automatic, variable rate battery charger:

1. Capacity for 150% of the connected system load while maintaining batteries fully charged.
2. Capable of recharging batteries from fully discharged to fully charged in 4 hours.
3. Fully supervised charger output.

D. Battery Test switch to disconnect power supply and operate all notification appliances from the standby batteries, without sending central station alarm or initiating other auxiliary functions (i.e. elevator capture, HVAC shut down, etc.).

## 2.15 REMOTE LCD ANNUNCIATOR

A. UL 864 Control Units and Accessories for Fire Alarm Systems.

B. Provide remote annunciator panel(s) where indicated:

1. Flush mounted in wall.

2. Serial communications with control panel.
3. Hinged lexan cover with lock keyed same as control panel.
4. All LED's mounted behind lexan cover.
5. Vandal resistant construction.
6. Integral piezo-electric alarm sounder.
7. LED Signal Lamps:
  - a. Red ALARM.
  - b. Yellow SUPERVISORY.
  - c. Yellow TROUBLE.
  - d. Green POWER ON.
8. Audible alarm and trouble buzzer.
9. Lamp test pushbutton (accessible without opening cover).
10. Keyed control switches (Clearly labeled):
  - a. Alarm Silence.
  - b. Trouble Silence.
  - c. System Reset.
11. 80 character backlit LCD English language display.
  - a. User interface buttons.
  - b. Custom programmable function buttons.

## 2.16 DIGITAL COMMUNICATOR

- A. Automatic digital telephone communicator for transmission of alarm, supervisory, and trouble signals to a UL Listed Central Station. Signals required shall be as per Authority having jurisdiction, and as specified herein.
- B. Construction:
  1. Digital communicator.
  2. Phone line monitor (loop or ground start).
  3. Multiple telephone numbers, primary and duplicate paths with main and alternate destinations.
  4. Automatic test and status reports.
  5. 2 modular jacks for connections to 2 phone lines via RJ31X jacks.
  6. Supervision of two phone lines, with status LED's, and audible buzzer.
  7. Listed under UL 1635 Digital Alarm System Communicator Units.
- C. Related work and connections:
  1. Power connections.
  2. Telephone jacks (RJ31X), wiring and connections to phone system and FACP.
  3. 1" EMT conduit for phone wiring to point of connection with telephone system.

D. Manufacturer/Model:

1. Communicator to transmit in Contact ID format. EST Model 2-DACT.

2.17 AUDIO AMPLIFIER AND MICROPHONE CABINET

A. Provide an audio amplifier for distribution of pre-recorded and/or live voice evacuation messages.

1. Listed under UL 1711 Amplifiers for Fire Protective Signaling Systems.
2. Enclosed cabinet installed at location of the FACP.
3. Integral batteries and charger.
4. Batteries sized for 60 hours of standby operation and 15 minutes of alarm activation on all system devices.
5. Amplifier and battery capacity sized 120% of actual building speaker load (with all speakers at highest taps).

B. Provide a remote mounted microphone cabinet for manual broadcast of live evacuation instructions.

1. Flush mounted adjacent to the fire alarm remote annunciator panel, unless noted otherwise.
2. Cabinet shall contain microphone, mic bracket, mic jack, and all required controls.
3. Hinged, lexan cover to restrict access to mic and controls.
4. Supervised wiring to amplifier cabinet.

2.18 HVAC MANUAL SHUTDOWN SWITCH

A. Description: HVAC Manual Shutdown Switch for Fire Dept. shut down of all HVAC equipment per requirements of NFPA 90A.

1. Location as approved by local Authority.
2. With all required relays, wiring, contacts, switches, and interfaces for interrupting HVAC equipment run circuits or power wiring.
3. Blue lexan housing, semi-flush mounting.
4. Maintained position pushbutton (Turn to reset). PUSH label on center of button.
5. Label as HVAC SHUTDOWN.
6. Top-hinged, clear lexan cover to discourage tampering.
7. Safety Technology International, Inc. #SS2-4-3-1, or equal.

2.19 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are

complete with matching door plate. Electromagnet operates from a dedicated power source and requires no more than 3 W to develop 25-lb holding force.

1. Listed under UL 228 Door Closers-Holders With or Without Integral Smoke Detectors.
- B. Material and Finish: Match door hardware.
- C. Powered from 24VDC power supplied from the FACP. Released by removal of the 24VDC power.

## 2.20 SYSTEM FIELD WIRING

- A. All cables:
  1. Solid copper conductors, #16 AWG minimum unless otherwise required by the system manufacturer.
  2. Twisted pair or cabled construction, as required for specified system.
  3. UL 1424 Listed, Cables for Power Limited Fire Alarm Circuits.
  4. Compliant with NEC Art. 760.
  5. Plenum rated, unless installed in metallic conduit or raceway.
- B. Addressable Data Cables:
  1. #18 AWG minimum unless otherwise required by the system manufacturer.
  2. UL Listed, NEC type FPLP.
  3. Aluminum polyester foil shield with 20AWG stranded drain wire.
  4. Plenum rated cables:
    - a. 150°C halar insulation.
    - b. Flexible plenum rated jacket (red color).
    - c. WestPenn Plenecon II, or equal
- C. Notification Appliance and Control Circuit Cables:
  1. Minimum gauges unless otherwise required by the system manufacturer or circuit loading.
    - a. Notification circuits #14 AWG minimum
    - b. Control circuits #16 AWG minimum
  2. Multiple conductor cable assembly.
  3. UL Listed, NEC type FPLR.
  4. Plenum rated cables:
    - a. 150°C halar insulation.
    - b. Flexible plenum rated jacket (red color).
    - c. WestPenn Plenecon II, or equal



## 2.21 KEYS

- A. Keys and locks to be identical for all equipment:
  - 1. Control panel.
  - 2. Annunciator panel(s).
  - 3. Manual station reset.
  - 4. Duct detector test stations.
  - 5. Keyed switch functions (i.e. Fire Pump).

## PART 3 INSTALLATION

### 3.1 EXAMINATION

- A. Site Verification of Conditions: Examine the conditions under which the equipment shall be delivered, installed, and operated. Make all allowances required for installation and maintenance of the equipment, per Codes and manufacturer.

### 3.2 PREPARATION

- A. Protection: Protect all existing systems and components, which will be affected by the work. Protect against contamination from dust, dirt and moisture. Take precautions to protect against electrical surges, shorts, etc. which may damage existing equipment.

### 3.3 INSTALLATION

- A. Rough-in: Mounting height for individual devices shall be as follows (all dimensions above finished floor):
  - 1. Manual stations 48" to top of device
  - 2. Alarm Speakers, Lights 80" to bottom (and >>6" below ceiling)
  - 3. Alarm Speakers 80" to bottom
  - 4. Speaker/strobe (exterior) 10 feet minimum above finished grade
  - 5. Fire Alarm Control Panel 72 inches to top
  - 6. LCD Annunciator Panels 60 inches to center, unless noted.
  - 7. HVAC Shutdown Switch 60 inches to center, unless noted
  - 8. Fire Pump Control Annunciator 60 inches to center, unless noted
  - 9. Graphic Annunciator Panels 72 inches to top

- |     |                              |                     |
|-----|------------------------------|---------------------|
| 10. | Building Graphic Panels      | 72 inches to top    |
| 11. | Remote Microphone Panels     | 60 inches to top    |
| 12. | Duct detector remote station | 60 inches to center |
- B. Manual Pull Stations: Mount semi-flush in recessed back boxes with operating handles 48 inches above the finished floor or lower as indicated.
- C. Water-Flow Detectors and Valve Supervisory Switches: Connect for each sprinkler valve station required to be supervised.
- D. Ceiling Smoke Detectors:
1. Comply with NFPA 72 National Fire Alarm Code.
  2. Maintain proper clearances from air registers, grills.
  3. Coordinate with other ceiling devices such as lights, speakers, etc.
  4. Install ceiling-mounted detectors not less than 4 inches from a side wall to the near edge.
  5. Install detectors located on the wall at least 4 inches, but not more than 12 inches, below the ceiling.
  6. For exposed solid-joint construction, mount detectors on the bottom of the joists. On smooth ceilings, install detectors not over 30 feet apart in any direction.
  7. Install detectors no closer than 60 inches from air registers.
- E. Duct Smoke Detectors:
1. Comply with NFPA 72 National Fire Alarm Code.
  2. Comply with NFPA 90A Standard for the Installation of Air Conditioning and Ventilation Systems.
  3. Mount where accessible after all equipment is installed.
  4. Mount only in conditioned spaces, unless a wet/harsh-location detector is used.
  5. Where mounted on ducts on roofs or outside buildings, detector housing shall be mounted on the vertical sides of ducts. Do not mount on top of ducts. Install detector and housing within outer metal enclosure.
  6. Use of area smoke detectors mounted inside of duct is NOT acceptable.
  7. Test stations installed where readily accessible and visible inside building.
  8. Remote test stations mounted on nearest wall or flush in ceiling tile directly below device.
  9. Label each remote test station as to supply or exhaust and unit/equipment:
    - a. AHU-10
    - b. SUPPLY DUCT
  10. Provide wiring connections to equipment and systems controlled by the fire alarm system, including:
    - a. Air handling equipment.

b. Smoke dampers.

F. Audible Alarm-Indicating Devices:

1. Comply with NFPA 72 National Fire Alarm Code.
2. Comply with ADA Americans with Disabilities Act.
3. Install at height to match visual alarm indicating devices.
4. Install on flush-mounted back boxes with the device-operating mechanism concealed behind a grille or as indicated.
5. Combine audible and visual alarms at the same location into a single unit.
6. Exterior devices shall be installed at 10 feet above the finished grade.

G. Visual Alarm-Indicating Devices:

1. Comply with NFPA 72 National Fire Alarm Code.
2. Comply with ADA Americans with Disabilities Act.
3. Install at 80" AFF to device bottom, and at least 6" below the ceiling.
4. In corridors, install not more than 15 feet from ends of corridor.

H. Addressable Monitoring Modules and Relays:

1. Comply with NFPA 72 National Fire Alarm Code.
2. Mount addressable fire alarm system device (monitor module or relay) within 36 inches of the controlled or monitored device or equipment.
3. Install module or relay in metal junction/device box, with rigid or flexible conduit and wiring to respective monitored or controlled equipment.

I. Fire Alarm Control Panel (s):

1. Comply with NFPA 72 National Fire Alarm Code.
2. Surface mount in unfinished areas, or as indicated.
3. Install semi-flush in finished areas.
4. Provide ceiling smoke detector in room with FACP, per NFPA 72.

J. Notification Appliance Circuit Power Supply Panel(s):

1. Comply with NFPA 72 National Fire Alarm Code.
2. Surface mount in unfinished areas, or as indicated.
3. Install semi-flush in finished areas.
4. Provide ceiling smoke detector in room with each panel, per NFPA 72.

K. Remote and Graphic Annunciators: Arrange as indicated, with mounting height of cabinets as indicated.

1. Surface mount in unfinished areas, as indicated.

2. Install semi-flush in finished areas.
3. Install and orient graphic panels to match building orientation as installed.

L. Wiring Within Enclosures & Cabinets: All wiring shall be installed in a workmanlike manner:

1. Comply with NFPA 72 National Fire Alarm Code.
2. Run parallel, or perpendicular, to surfaces.
3. All connections made to terminal blocks.
4. Label each terminal in accordance with the wiring diagram for identification.
5. Crimp-on terminal spade lugs or approved pressure type terminal block connections.
6. Terminal cabinet to be installed where circuit risers originate or where any circuit tap is made.
7. All wiring within panels shall be readily accessible without removing any component parts.
8. Mark each terminal according to the system's wiring diagrams.

M. Field Wiring:

1. Comply with NFPA 72 National Fire Alarm Code.
2. Install all wiring in conduit or metal raceway according to Section "Raceways & Boxes for Electrical Systems." Conceal raceway except in unfinished spaces and as indicated.
3. Identify conduit and boxes with red paint at regular intervals. (all boxes and every 8-10 LF).
4. UL Listed Fire Alarm MC Cable may be used in lieu of EMT.
5. Do not mix fire alarm wiring with wiring of any other system.
6. Use distinctive color coding for insulation.
  - a. Distinct from all power wiring colors.
  - b. Different colors for IDC, NAC and SLC wiring.

N. Cable Taps: Use numbered terminal strips in junction, pull or outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

### 3.4 CONSTRUCTION

A. Connections to Existing Fire Alarm System(s):

1. Provide all temporary connections, wiring, relocations, etc. of existing fire alarm system to insure that no area is left without proper protection during construction.
2. Provide for existing system, as required:
  - a. Modifications to wiring and connections.

- b. Reprogramming of control panel.
  - c. Addition parts, modules, relays, etc.
  - d. Modifications to graphic annunciator panel(s) to reflect final system.
  - e. Connections for auxiliary functions, as required.
  - f. Extensions of signal, control and power wiring, as required.
  - g. Connections to new and existing components.
  - h. Battery calculations and larger batteries, if required.
3. Remove all existing (original building) fire alarm devices, controls and wiring, unless noted otherwise.

B. Interface with Other Work: Coordinate fire alarm system connections and equipment locations with other contractors and/or equipment prior to ordering or installing any wiring, materials, etc.

- 1. Duct Detector Installation:
  - a. Duct detectors furnished under this section.
  - b. Detectors installation in ducts shall be by mechanical Division.
  - c. Furnish all wiring, relays, contacts, etc. to break HVAC unit control circuits.
  - d. Connections to fire alarm under this section.
  - e. Final connections from control relay wiring at HVAC equipment shall be provided under mechanical Division of work.
- 2. HVAC Manual Shutdown:
  - a. Provide manual shutdown controls to shut off all air handling equipment in the contract area(s).
  - b. Provide addressable control relays for shut down of all air handling units.
  - c. Provide control relay with N.C. contacts and wiring to each individual AHU. Locate relay within 36" of AHU circuit connection.
  - d. Alternately, for buildings with DDC system(s), provide control relay with N.C. contacts and wiring to the individual DDC system control panel(s) to signal shutdown for all AHU's. Locate relay within 36" of DDC panel connection.
  - e. Activating the HVAC shutdown switch shall, through fire alarm system programming, cause each relay to open its associated contacts, shutting down all air handling units in the building.
  - f. Coordinate point of interface with ATC contractor and for exact location of all relays.
  - g. Final connections to AHU control circuits or to DDC system and associated DDC system programming shall be by mechanical Division.
- 3. Magnetic Door Holders:
  - a. Provide smoke detectors at all magnetic holder locations, per

NFPA.

- b. Magnetic door holders are provided under another Division.
  - c. Smoke Detectors with Relay Base: Provide detectors with relay base for release of magnetic holder(s) upon local smoke condition.
  - d. Addressable Relays: Provide addressable control relays for release of magnetic door holder(s) upon local smoke condition.
  - e. Line Voltage Magnetic Holders: Where magnetic holders are powered from building 120VAC system, provide relays with suitably rated contacts.
  - f. Coordinate voltage and connections of existing and/or approved magnetic holders.
4. Door Access Control System:
- a. Provide interface with existing system to cause release of all electrically locked doors during a fire alarm condition, per NFPA.
  - b. Addressable Relays: Provide addressable control relays for connection to door access control panel.
  - c. Secure the services of the Owner's authorized service company to make final connections to the existing access system control panel.

C. Grounding:

1. Refer to Section "Grounding & Bonding for Electrical Systems" for general requirements, in addition to those specified herein.
2. Ground cable shields and equipment according to system manufacturer's instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments.
3. Signal Ground Terminal: Locate at main equipment rack or cabinet. Isolate from power system and equipment grounding.
4. Ground equipment and conductor and cable shields.
5. For audio circuits, minimize, to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.

D. Interior Circuit Isolation:

1. Provide line isolation modules for all interior initiating device circuits and/or signal line circuits between buildings, between floors of buildings, and to group devices in groups not to exceed 50 on each isolation module.

E. Underground Circuit Protection:

1. Provide lightning protection for all underground or exterior circuits, as per NEC.

F. Electrical Power:

1. Connect control panel primary power to 120 VAC power system, as indicated.
2. Provide dedicated circuit.
3. Clearly label "FIRE ALARM" on panelboard directory.
4. Locking clip for breaker handle to lock in "ON" position, but not prevent tripping of breaker.
5. Fire Alarm Power Supply Disconnect: Where system is served from an enclosed breaker or fusible switch, paint red and label "FIRE ALARM".

G. TELCO Lines for Central Station Monitoring:

1. Arrange for and provide two (2) dedicated telephone lines from the serving utility company, installed to the fire alarm digital communicator location.
2. Provide and terminate two (2) Cat 5e UTP cables.
3. Install telephone cables in 1" EMT conduit from the digital communicator to the point of connection with telephone system (MDF or main telephone room).
4. Provide telephone jacks (RJ31X), wiring and connections to phone system and communicator.
5. Label phone cables at telephone connection to indicate "FIRE ALARM COMMUNICATOR".

H. Identification: Identify system components, wiring, cabling, and terminals according to Section "Common Work Results for Electrical".

### 3.5 REPAIR/RESTORATION

- A. Restore all finishes, equipment and surfaces to original condition, where affected by the work of this section.
- B. Comply with all requirements as specified in Section "Common Work Results for Electrical".

### 3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Services:

1. Provide services of a factory-authorized service representative to supervise the final connection of all system cabling at the control panels, and associated components and accessories.
2. Be present and supervise all pretesting of cabling system prior to

- connections to control equipment.
  3. Be present and supervise the adjustment of all settings, components and accessories.
  4. Provide all system programming, based on project conditions, room names (per Owner direction), etc.
  5. Assist in the troubleshooting, as necessary to provide a system free from all faults, trouble conditions, etc. prior to required testing by AHJ.
- B. Pretesting:
1. After installation, align, adjust, and balance the system and perform complete pretesting.
  2. Determine, through pretesting, the conformance of the system to the requirements of the Drawings and Specifications.
  3. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new ones and retest until satisfactory performance and conditions are achieved.
  4. Prepare forms for systematic recording of acceptance test results.
- C. Report of Pretesting: After pretesting is complete, provide a letter certifying the installation is complete and fully operable, including the names and titles of the witnesses to the preliminary tests.
- D. Final Test Notice: Provide a 10-day minimum notice in writing when the system is ready for final acceptance testing.
- E. Provide all testing to certify the system is complete and fully operable.
1. All tests required by Authority Having Jurisdiction.
  2. Provide written statement of successful test results.
  3. Submit letter to Owner and Architect.
  4. Perform tests in presence of Owner or Authorized Representative.
  5. Manufacturer's technician shall be present to make adjustments related to the testing.
- F. Minimum System Tests: Test the system according to the procedures outlined in NFPA 72 National Fire Alarm Code. Minimum required tests are as follows:
1. Absences of grounded, shorted or open circuits.
  2. Each initiating device functions as specified.
  3. Abnormal conditions on any supervised circuit or device provided specified trouble signals.
  4. Batteries can operate the system for minimum 30-minute test, including 5 minutes of alarm.
  5. Alarm signals are audible in all building areas.



6. The system shall be operable under the specified trouble conditions.
7. Automatic battery operation upon loss of AC power.
8. All auxiliary functions are executed correctly, completely and as required.
9. Communicator successfully transmits to UL Central Station.
10. Verify the absence of unwanted voltages between circuit conductors and ground.
11. Test all conductors for short circuits using an insulation-testing device.
12. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on the record drawings.
13. Verify that the control unit is in the normal condition as detailed in the manufacturer's operation and maintenance manual.
14. Test signal line, initiating and indicating circuits for proper signal transmission under open circuit conditions. One connection each should be opened at not less than 10 percent of the initiating and indicating devices. Observe proper signal transmission according to class of wiring used.
15. Test each initiating and indicating device for alarm operation and proper response at the control unit.
16. Test smoke detectors with actual products of combustion.
17. Test the system for all specified functions according to the approved operation and maintenance manual. Systematically initiate specified functional performance items at each station, including making all possible alarm and monitoring initiations and using all communications options. For each item, observe related performance at all devices affected by the item under all system sequences. Observe indicating lights, displays, signal tones, and annunciator indications.
18. Test Both Primary and Secondary Power: Verify by test that the secondary power system is capable of operating the system for the period and in the manner specified.
19. Magnetically held doors are released by associated local smoke detectors.
20. Motor operated smoke dampers operate and reset properly in response to duct smoke detector activation.
21. HVAC manual shutdown switch(es) function properly to shut down appropriate HVAC units.
22. General alarm condition mutes all local sound systems, as specified.
23. Carbon Monoxide detection initiates specified building FACP response and evacuation signaling.
24. Test Grease Hood Extinguishing System installations:
  - a. Extinguishing system control panel alarm and trouble conditions are correctly monitored by building FACP.
  - b. Automatic and Manual Activation/alarm of Extinguishing System initiates specified actions, signals and responses from local and building FACP.
    - 1) Building wide general alarm condition

- 2) Shunt trip of all electric appliances below hood.
    - 3) Shut off of gas solenoid valve (where applicable).
  - 25. Test Elevator System installations:
    - a. Test each individual smoke detector in Elevator Lobby for proper cab recall response to primary or alternate floor .
- G. Submit a completed "Record of Completion" as included in NFPA 72
- H. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.
- I. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Submit log upon the satisfactory completion of tests.
- J. Tag all equipment, stations, and other components at which tests have been satisfactorily completed.
- K. Inspections by AHJ:
  - 1. Arrange all required inspections by the local Fire Department, Fire Marshal, or Authority Having Jurisdiction.
  - 2. Notify all parties of Inspection and results.
  - 3. Perform all adjustments, changes, etc. required.
  - 4. Provide for re-inspections, if required.

### 3.7 ADJUSTING

- A. Sensitivity Adjustments:
  - 1. Initial Settings: Provide initial setting of detector sensitivity prior to final testing, based on assumed room use.
  - 2. Final adjustments: Provide adjustments to detector sensitivity after Owner occupancy, where required, due to actual room use, environmental conditions, false alarms, etc.
- B. Audio System Adjustments:
  - 1. Initial Settings: Provide initial tap setting of speaker volume prior to final testing, based on assumed room use, background noise, etc.
  - 2. Final adjustments: Provide adjustments to tap settings after AHJ inspections and Owner occupancy, where required, due to actual differences in room use, environmental conditions, background noise, etc.

### 3.8 CLEANING

#### A. General:

1. Remove paint splatters and other spots, dirt, and debris.
2. Touch up scratches and marred finishes to match original finish.
3. Clean front panels of all control panels, annunciators, graphic panels, etc. using methods and materials recommended by manufacturer.
4. Remove dust covers from all smoke detectors.

### 3.9 DEMONSTRATION

#### A. Fire alarm system manufacturer shall provide a factory trained representative for purpose of training owner's personnel:

1. Discuss proper operation, maintenance, and use of system.
2. Demonstrate the following specific tasks, as applicable:
  - a. Alarm acknowledge/silence.
  - b. System reset.
  - c. Individual device reset.
3. Instructor shall be fully knowledgeable of the installed system and all components.
4. Training shall be completed at the project site following Owner occupancy, at Owner's discretion.
5. Schedule after all final tests, adjustments and Owner's acceptance.
6. Training shall include use of delivered O&M manuals.

END OF SECTION

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SECTION 28 60 01 - INTEGRATED ACCESS CONTROL SYSTEM

PART 1 GENERAL

1.1 SUMMARY

- A. This section includes furnishing, installation, commissioning, testing and extending the existing Integrated Access Control Security Management System (ISMS).

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.
- B. Related Sections: The following sections contain requirements that relate to this Section:
1. Section "Fire Alarm Systems" for coordination and interface with fire alarm system.
  2. Section "Intrusion Detection Systems" for coordination and interface requirements.
  3. Section "Camera Surveillance Systems" for coordination and interface requirements.
  4. Section "Common Work Results for Electrical Systems" for general requirements, submittal requirements, coordination, project conditions, labeling, fire stopping, commissioning, equipment supports, installation and construction requirements, demolition, quality control, identification, and all other applicable paragraphs.
  5. Section "Grounding" for grounding, requirements of equipment.
  6. Section "Conductors and Cables" for cabling requirements.
  7. Section "Raceways & Boxes" for conduit, raceway and box requirements.
  8. Section "Telecommunication Systems" for coordination with telephone system, network and communication voice cable requirements.

1.3 SUMMARY OF WORK INCLUDED

- A. Coordinate all related work specified elsewhere with the access control system.
- B. Integrate with and extend the existing Honeywell Pro Series access control system currently serviced by and originally installed by Atlantic Security System's Inc.
1. The existing system shall be extended to support all additions and

- changes that are specified and shown on the drawings.
2. The existing PRO-2200 Series Access Control Panel is located in the BISFA MDF.
  3. All new access control card readers will be connected to the new PRO-3200 access control panels located in MDF-006.

C. Materials

1. Furnish and install at locations that show the specified equipment to provide a completely operational Integrated Security Management System. .
2. The following list of main items of the installation shall not be considered to be all inclusive:
  - a. Smart Card Readers and Cards.
  - b. Reader modules.
  - c. Output relays.
  - d. Zone inputs.
  - e. Alarm monitoring panels.
  - f. Intelligent controllers.
  - g. Software.
  - h. Client workstation set-up.
  - i. Wire for readers/panel communication.
  - j. Surge and noise suppressors.
  - k. Integration wiring and communications between the existing access control panel and new access control panels.
3. Provide and install all equipment, components, wire, cable, and mounting hardware as required to meet manufacturer's specifications and documented installation procedures.
4. Provide all accessories and misc. items required for an operating system.
5. Installer shall meet the entire intent of these specifications and associated drawings. Deviations from specified equipment and/or operation of the system shall not be permitted.

1.4 SYSTEM DESCRIPTION

- A. The Integrated Security Management System (ISMS) shall be part of a modular, networked access control system capable of handling large facilities with multiple remote sites, alarm monitoring, video imaging, badging, paging, guard tour, digital video servers and CCTV switcher control. The system shall allow for easy expansion or modification of inputs, outputs, and remote control stations.
- B. The system control at the central computer location shall be under a single software program control, shall provide full integration of all components, and shall be alterable at any time, depending upon the facility requirements.

Reconfiguration shall be accomplished online through system programming, without hardware changes.

- C. Operating Environment: The ISMS shall be a true 32-bit or 64-bit, 3-tier client/server, ODBC compliant application based on Microsoft tools and standards. The ISMS application shall operate in the following environments: Microsoft Windows® Server 2008 R2 SP1, Microsoft Windows® 7 SP1 (64-bit), Windows Server 2012 R2, Windows 8.1 and Windows 10.
- D. The software program shall consist of multiple servers including, but not limited to, Database Server, Communications Server, and Client Workstation Server. The Servers shall be capable of being installed on one or more PCs across a network providing a distribution of system activities and processes.
- E. The system shall support multiple communication servers on a LAN/WAN, to provide distributed networking capabilities, which significantly improve system performance.
- F. Regional database Management System: The Security Management System shall support industry standard relational database management systems. This shall *include* relational database management system Microsoft SQL Server 2012 Enterprise Edition. The RDBMS shall provide edit, add, delete, search, sort, and print options for records in the selected databases.
- G. The system shall have the capability to communicate with the control panels via LAN/WAN connections utilizing industry standard TCP/IP communication protocol.
- H. The system software shall allow support for multiple accounts allowing separate access to the card database, badge layout, operator access, and reporting. Physical hardware may be filtered by operator level into sites. (*EXAMPLE: Filtering operator levels by sites helps prevent users from making unauthorized changes to other sites. An administrator operator at a remote school site account with five access control doors could only view and make changes associated with those five doors located at that site. The operator level could be filtered to inhibit unauthorized changes to other sites*). Sites may reside in multiple accounts. The system shall allow control of common areas between accounts. Access levels and time zones shall be global to allow for easy administration. The global access levels and time zones shall be capable of being used by several accounts. Administrators shall have the ability to move cardholders from one account to another.
- I. The software program shall use Abstract Devices (ADV) for representing hardware devices in the system. The ADVs shall be used in Floor Plans to provide the user interface to control and monitor the system, and shall also be

used in the Data Trees to organize, display, and control system information. The CUSTOMER shall provide necessary floor plans to the CONTRACTOR.

- J. The system shall support both manual and automatic responses to alarms entering the system. Each alarm shall be capable of initiating a number of different actions, such as camera switching, activation of remote devices, door control, and activation of WAV files.
- K. The system shall provide both supervised and non-supervised alarm point monitoring. The system shall be capable of arming or disarming alarm points both manually and automatically, by time of day, and by day of week.
- L. Access control functions shall include validation based on time of day, day of week, holiday scheduling, site code and card number verification, automatic or manual retrieval of cardholder photographs, and access validation based on positive verification of card, card and PIN, card or pin, pin only and Site Code only.
- M. Alarm events with defined priorities shall be able to pop-up automatically in an Alarm event window for operator attention. The pop-up shall display the name of the event (reader, alarm point, cardholder or system alarm), time, date, site, account, if a card event the card number, type of event and cardholder name. An event counter shall also display the number of times the event was reported to the Alarm event monitor prior to Acknowledgement or Clearing the event. Event instructions shall be made available by double clicking on the event.
- N. The Alarm event window shall allow the operator to initiate a physical response to the event as well as a written response. Responses shall include but not be limited to: acknowledge, clear, open a preprogrammed floor plan, energize, de-energize, pulse, time pulse, add comment, shunt or un-shunt.
- O. Assigned passwords shall be possible to define the levels of system operation for each individual operator. System operation for individual operators shall include, but not be limited to, restricted time periods for login, available accounts and default language selection at login. Operator actions range from no view or control rights to basic monitoring to full control of the system including programming.
- P. The system programming shall be user friendly, and capable of being accomplished by personnel with no prior computer experience. . The software shall utilize drop boxes for all previously entered system-required data. The programming shall be MENU driven and include online "Help" or "Tutorial" information, as well as online data entry examples. The Help shall be available by using the F1 key. When using the F1 help access, the help menu will provide

detailed information relative to the operation that the user is performing without the need to key in additional search parameters.

- Q. The access system shall be integrated with the Honeywell Intrusion Detection System Access Control. Integration shall provide ability to arm/disarm intrusion system via card readers located beside each security keypad.
- R. After installation, the OWNER shall be able to perform hardware configuration changes. These hardware configuration changes shall include, but not be limited to, door open time, door contact shunt time, point and reader names, when and where a cardholder is valid, and the ability to add or modify card databases as desired without the services of the CONTRACTOR or MANUFACTURER.
- S. Equipment repair shall be able to be accomplished on site, by module replacement.
- T. All control components shall utilize "Distributed-Processing" concepts. The distributed processing shall include the ability to download operating parameters to any field panel, thus allowing the field panel to provide full operating functions independent of the access control system computer.

#### 1.5 SYSTEM CAPACITIES

- A. The system shall require one master control file server station. The access control program running on the file server shall restrict the number of operator workstations working in a LAN/WAN based on the access software licensing. Licensing shall be by software activation monitoring concurrent connection and not require the use of hardware keys per workstation. The only restriction will be imposed by the operating system and hardware configuration. Operator workstations shall provide all functionality as available at the server with the exception of database maintenance functions.
- B. The system software shall not use a hardware dongle unless required by the system hardware and then only on the PC where the database server resides. No dongles shall be required at any workstations.
- C. Overall control of the access control, CCTV, paging, and alarm monitoring shall be through software control, which provides complete integration of the security components.
- D. The file server station shall operate in both a programmed and a manual mode.
- E. The system shall be expandable in modular increments to total capacity. The



software shall not require installation of any module or any other upgrading to achieve above stated capacities. Unrestricted number of operator workstations and multiple communication servers shall be supported as a standard feature of the WIN-PAK PRO PE access control software.

## 1.6 BASIC SYSTEM CAPABILITIES

- A. The following functional capabilities are considered essential for the system described in this specification. The capabilities are to be considered standard, without the need for add-on software or hardware.
1. All databases will have the ability to ADD, DELETE, REPORT, VIEW or EDIT information.
  2. Provide storage of all system transactions in a retrievable file.
  3. Log all events by time and date.
  4. Provide capability to store all or selected system transactions to a disk file.
  5. Provide ability for CUSTOMER to make system configuration changes such as, but not limited to door open time, door contact shunt time, point and reader names, when and where a cardholder is valid, and the ability to add or modify card databases at any time.
  6. Support "Global Anti-passback", allowing cardholder to enter/exit any such defined card reader on the same intelligent control panel or RS-485 drop line consisting of 2 or 4 door controllers.
  7. Anti-passback modes shall include hard (no forgiveness), soft (allows access but generates an alarm event) and timed for all readers on the intelligent controller, on specified reader or card for a definable period of time up to 32,000 seconds.
  8. Two card holder rule, where two valid, non-identical cards must be used within a 20 second period of time to grant access.
  9. Ability to display when a card holder who uses the reader has accessed (opened) the door or if the card was used but the door was not opened.
  10. Ability to select appropriate doors to remain locked even though it is programmed by time zone control to be unlocked, until the first valid card read is seen during the door's time zone at which time the door will remain unlocked for the duration of its defined time period.
  11. Latch mode operation where the first card read unlocks the door and the second causes it to lock the door.
  12. Provide mode of system operation that stores system commands that were not accepted by the hardware.
  13. Provide mode of system operation that requires the operator to enter a response to an event when acknowledging it from the alarm view window.
  14. Provide mode of system operation that allows acknowledged alarms to be

- automatically cleared.
15. Provide mode of system operation where un-acknowledged events will cause the computer to continuously emit a pulsating beep until all un-acknowledged alarms are acknowledged. A momentary silence feature shall allow the beeping to cease for up to 60 seconds. The silence feature shall also provide a visual count down to when the beeping will begin again.
  16. Provide mode of system operation where when an acknowledged, but not cleared event will be reissued requiring acknowledgement when the event changes to an alarm or trouble state.
  17. Provide mode of system operation that does not allow the operator to clear an alarm prior to it being restored to normal.
  18. Provide ability for manual operator control of system output relays. The manual functions shall include the ability to energize, de-energize, return to time zone, or pulse the output relay. The pulse time shall be a programmable setting.
  19. Provide ability for manual operator control of system doors. The manual functions shall include the ability to Lock, Un-Lock, Disable, Card only, Card-Pin only, Pin only, exit only and site code only.
  20. Provide ability to automatically display stored “video image” of cardholder.
  21. The cardholder “video image” pop-up shall be activated based on a priority level set to the cardholder or reader. Information in the pop-up shall include, but not be limited to the card holder’s primary image a live video pop-up showing the person who initiated the pop-up, entrance name, time, date, cardholder name, and status. User shall be able to display up to 40 note fields. The size of the pop-ups shall be adjustable by the operator.
  22. Support multiple card reader technology including:
    - a. Smart Card
    - b. Wiegand effect
    - c. Biometrics
    - d. Magnetic stripe
    - e. Bar code
    - f. Keypad
    - g. Card/keypad (PIN)
  23. Provide a means for scheduled automatic backups of any or all database system files. A means to restore these files from a simple menu shall exist.
  24. Provide the ability to address up to 255 serial communication ports per communication server, where each port can be configured for either hardwired or dial-up. When configured for dial-up, any one port can support multiple dial-up locations.
  25. Communication from the access control communication server to the

remote intelligent control panels shall be selectable. Communication options shall be RS-232 directly to the intelligent control, via RS-485 converter, dial-up, leased line from a defined communication port or by LAN/WAN using an IP address for direct connection to the intelligent controller via network interface card. When using IP addressing it shall be un-acceptable to use a communication port converter device on the communication server side of the transmission. A minimum of 255 such IP connections shall be allowed per communication server.

26. All commands and updates to the panels shall be verified and shall automatically retry if communications have failed.
27. Provide a system scheduler that shall automatically:
  - a. Call remote locations to retrieve history transactions and update panel information, including time and date.
  - b. Activate or deactivate cards locally or at remote dial-up sites.
  - c. Initiate a preprogrammed command event/action.
  - d. Synchronize system to intelligent controller time.
  - e. Run a pre-defined (template) History or Card Holder report.
  - f. Card frequency report defined by reader(s), over a defined period of time with disposition options to automatically report or report and de-activate card or change the access level of the card.
  - g. Frequency shall be defined as Never, Now, Once, Hourly, Daily, Weekly, Once per 2 weeks, and Monthly.
28. Provide drop boxes for all system-required information that the user has previously entered.
29. Provide the ability to initiate an email (via SMTP) or page to a paging system based on a transaction state. A transaction state shall be defined as but not limited to Normal, Alarm, Trouble, Ajar, Trace, Not Found, Anti-Passback Violation, PIN Violation, Time Zone Violation, Site Code Violation, Door Used, Duress, No Second Card Presented, Trace Card or Expired Card, and System Alarms including, Panel Com, Panel Power Failure, Modem Pool, Guard Tour, and Tamper.
30. A host grant mode of operation shall exist that requires the host computer to grant accesses to “valid” cards. An alternate host grant mode shall allow the card access information to be downloaded along with unlocking the door for “valid” cards.

## B. Card Database

1. Provide a simple card and card holder database import utility. The utility shall be password protected and accessible only to administrators of the access control system. Information that can be imported shall include but not be limited to: First Name, Last Name, card number, activation date, de-activation date, status, up to 40 note fields and photo images. A simple CSV (comma separated value) file shall be used for the importing of data

- and image file name.
2. Cardholder information shall include unique card number up to 15 digits and optional Personal Identification Number.
  3. Allow multiple cards per cardholder.
  4. Provide 40 user definable fields.
  5. Provide special card options that include, but are not limited to:
    - a. Time zone reference, which defines valid time.
    - b. Visitor use, which provides a specified activation date and expiration date (spanning years).
    - c. Trigger control value, which can initiate a predefined procedure at the intelligent control independent from any control function from the system computer.
  6. Provide a card "Trace" function. The Trace function shall allow normal access control, but will provide a tracking alarm at the system monitor.
  7. Provide ability to store digital images of cardholder or other digital images such as property or family members. Up to 99 such images shall be associated with the cardholder.
  8. Provide ability to store a written signature of the cardholder or other signatures such as family members. Up to 99 such signatures shall be associated with the cardholder.
  9. Provide the ability to prioritize specific card usage from 1 to 99 with separate priority options shall included but not be limited to Anti-passback, Trace, PIN Violation, Normal, Not Found, Expired, Host Grant, Site Code and Time Zone card activities or violations.
  10. Allow the user the ability to assign an operator message per card event state and a procedure for the intelligent control shall perform per event state.
  11. Upon editing card information, the updated information shall be sent automatically to the appropriate access control panel, when hardwired, with no other user intervention. If the port is dial-up, the entry will be stored on disk and shall be updated when connection is made to the remote loop. If the scheduler is used, then card updates shall be sent based on scheduling.
  12. In a traditional (Wiegand) 5 digit card database, the numbers 0 and 65,535 shall not be valid card numbers as some devices transmit these numbers on an improper read.
  13. In a 15-digit card database, the number 0 shall not be a valid card number as some devices transmit this number on an improper read.
  14. A card shall have the ability to be allowed to access one or selected accounts up to all available accounts.

#### C. Access Levels

1. Provide the ability to define specific times of access.

2. Provide the ability to define specific readers for access.
3. Provide a template of a defined access level detail, where changes can be made to the template and saved as a new access level detail.
4. Provide an access control tree structure that allows groupings of entrances. User shall have the ability to group program all entrances on the branch or make specific changes to individual entrances

## 1.7 SUBMITTALS

### A. Provide submittal data for each system, as follows:

1. To verify specifications have been met.
2. Clearly indicate or state all options, etc.:
  - a. Manufacturer/cat. number.
  - b. Manufacturer's options.
  - c. Accessories.
  - d. Indicate point of connections with other equipment or systems.
3. Bill of materials showing equipment quantities and model numbers.
4. Manufacturer's technical information sheets on all proposed equipment.
  - a. Highlight or clearly indicate all items to be provided.
  - b. Include wire/cable specifications.
5. Proof of component and system UL Listing.
6. Provide proof of required certifications and installer qualifications.
7. Drawings:
  - a. Riser diagrams showing all devices and wiring types. Indicate all points of connection between Access System and Intrusion Detection System.
  - b. Wiring connection diagrams for each proposed component.

### B. Closeout Submittals: Submit in accordance with the General Condition requirements and as follows:

1. Operational Information: Provide full instruction manual to cover all aspects and components of the installed system and to be used to supplement the Owner Demonstration.
2. Maintenance Data: Provide for all equipment and accessories to include in the "Operating and Maintenance Manual" specified in Division 1.
  - a. Include recommended periodic tests of equipment in service, and test parameters. Provide manufacturer's recommended test procedures, frequency and type of tests.
  - b. Specify cleaning procedures for all components.
3. As-Built Drawings: Provide three (3) full-size copies of all plans, drawings and schematics to the owner after the acceptance test. The

drawings shall be revised to show equipment locations, location of all junction boxes, terminal cabinets, devices, wiring and conduit routings. Drawings, etc. shall be delivered as part of the O&M Manual package.

## 1.8 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: All system components shall be furnished by manufacturers of established reputation and experience who shall have produced currently operating Integrated Security Management Systems which include access control, alarm monitoring, CCTV video switching, paging, and video badging. Manufacturer shall be able to refer to similar installations rendering satisfactory service. Proposed equipment manufacturer must meet the following:
1. All products designed and manufactured to ISO 9001 standards.
  2. Engaged in manufacturing of access control systems at least 10 years.
  3. System shall be of latest design. No obsolete or pending obsolete parts shall be used.
  4. Provide technical support to installer.
- B. Installer Qualifications: Engage an experienced factory-authorized Installer to perform work of this Section.
1. Installing contractor must meet the following:
    - a. Factory trained Honeywell WinPak Pro technicians to install the proposed system.
    - b. The Installer must be certified by Honeywell Integrated Security Dealer Service Certification Program (DSCP).
    - c. The installer shall be a Honeywell Commercial Security Systems (CSS) Dealer. Proof of compliance with manufacturer's system installation certification program must be provided in writing to owner along with submittal.
    - d. Company shall employ experienced installation and service Technicians that are certified to work with Network systems (minimum CompTIA Network+ Certified).
    - e. Hold all legally required state and local contractor's licenses necessary to accomplish the installation and activation of the described system. Copies of required licenses shall be submitted prior to start of work.
    - f. The system contractor shall have been regularly engaged in the access control business for the past (7) years and shall provide proof of installing at least (6) systems of the same design/manufacturer in the past two years at similar facilities in the local area; no exceptions.
    - g. Maintain and provide proof of current stock of all spare parts at



entering all data shall be provided to the OWNER by the CONTRACTOR. Written instructions on the use of all forms shall be included. Examples of the sequence of completion for all related forms shall be provided. The OWNER shall be responsible for the actual data collection and entry to ensure a complete understanding of the system and its contents.

- B. Programming: The CONTRACTOR shall initially configure the system in accordance with the design shown in the drawings. All the access control requirements, alarm point definitions, alarm point call up and in/out relationships, individual component descriptions, and any other programmable parameters required shall be as shown in the appropriate drawings and schedules. The OWNER shall perform any additional programming with the assistance of the CONTRACTOR.

#### 1.10 TRAINING

- A. The CONTRACTOR shall supply personnel to create a cadre of key OWNER employees in the operation and maintenance of the installed system. A training program shall be designed to provide a comprehensive understanding and basic level of competence with the system. It shall be sufficiently detailed to allow OWNER personnel to operate the system independent of any outside assistance.
- B. The training plan shall include detailed session outlines and related reference materials. The OWNER personnel shall be able to utilize these materials in the subsequent training of their co-workers.
- C. Provide two sessions. Each training session shall be 2-hour and shall consist of system training and maintenance familiarization training. Contractor shall also provide a (2) hour follow-up training session shall be provided to customer within 60 days of initial training.
- D. The specified training schedule shall be coordinated with the OWNER. Specific schedules shall be established at the convenience of the OWNER.

#### 1.11 COORDINATION WITH OTHER TRADES

- A. Coordinate access control system connections and equipment locations with other equipment, construction, and installers prior to ordering or installing any wiring, materials, etc.
  - 1. Electrical latch retraction push bars, door handsets, door strikes, releases, and hardware.
  - 2. Fire Alarm systems.
  - 3. Intrusion Detection system.



4. Door/frame installation.
5. Communication/Network Systems.

#### 1.12 SUPERVISION OF WORK

- A. The CONTRACTOR shall personally, or through an authorized and competent representative, constantly supervise the work from beginning to completion and shall, within reason, keep the same workmen and foreman on the project throughout the duration.
- B. Site Project Manager: ordinate intrusion detection system connections and equipment locations with other equipment, construction, and installers prior to ordering or installing any wiring, materials, etc.
  1. The CONTRACTOR shall provide a Site Project Manager to interface with all appropriate subcontractors during the installation of the system.
  2. The Site Project Manager shall maintain continuing coordination with the CUSTOMER Project Coordinator, keeping him abreast of progress and informed on any problems that may develop. This is absolutely essential so that interference with daily facility operations is held to the minimum.

### PART 2 PRODUCTS

#### 2.1 MANUFACTURER

- A. No Substitutes. To insure system uniformity and compatibility with all other Washington County Public Schools Access systems, alternative equipment other than the exact make and model number identified in this specification will not be accepted.
- B. All equipment shall be of the same design and manufacturer as existing access control systems currently in use by Washington County Public Schools. PROVIDE HONEYWELL CONTROL PANELS/CARD READERS and related equipment as specified. Alternative manufacturers will not be compatible with the existing equipment and will not be accepted.
- C. The quantities of components shall be determined and installed by the Contractor based on the requirement to provide a fully operational Integrated Security Management System (ISMS), as per the intent of the specification, and as shown on the drawings and recommended by the Manufacturer.
- D. The system shall operate under OS 64-bit and 32-bit Microsoft Windows® Server 2008 R2 SP1, Microsoft Windows® 7 SP1 (64-bit), Windows Server

2012 R2 and Windows 8.1.

- E. Communication between satellite stations and the master file server station shall be in accordance with conventional Windows LAN/WAN operation using TCP/IP protocol.

## 2.2 FRONT END SYSTEM

- A. The master file server station, stand-alone stations, and workstations shall utilize compatible desktop (full-size) or Server computers (PCs). The requirements for the PC shall be scaled according to system application requirements. The work station shall be provided by the customer.

## 2.3 FRONT END SOFTWARE SPECIFICATIONS

- A. The System software shall be HONEYWELL ACCESS SYSTEMS WIN-PAK PRO PE WPP4. The OWNER shall provide the server.

## 2.4 ACCESS CONTROL FIELD HARDWARE DEVICES

- A. The security management system shall be equipped with access control field hardware required to receive alarms and administer all access granted/denied decisions. All field hardware shall meet UL requirements. The system shall include the following **PRO3200** series components:

1. Intelligent Controller shall be HONEYWELL ACCESS SYSTEMS PRO32IC. A PRO32IC shall link the security management system software to all other field hardware components (card reader modules and input and output control modules). The PRO32IC shall provide full distributed processing of access control and alarm monitoring operations. Access levels, hardware configurations, and programmed alarm outputs assigned at the administration workstation shall be downloaded to the PRO32IC, which shall store the information and function using its high-speed, local 32-bit microprocessor. All access granted/denied decisions shall be made at the PRO22IC to provide fast responses to card reader transactions.
  - a. Networking of PRO32IC: The system shall include a built-in network interface module. The interface shall be 10/100 Mbps Ethernet based and capable of residing on a local area network (LAN) or wide area network (WAN) without connectivity to a PC serial port. PRO32ICs with the network interface module shall be able to communicate with the database server through industry standard switches and routers.
  - b. Offline Operation: In the event that the PRO32IC loses

communication with system software, it shall continue to function normally (stand-alone). While in this offline state, the PRO32IC shall make access granted/denied decisions and maintain a log of the events that occur. Events shall be stored in local memory and uploaded to the system software after communications are restored.

c. Features: The PRO32IC shall contain the following features:

Communications: The following communication formats shall be supported:

RS-232 at a speed of 38.4 Kbps

RS-485 at a speed of 38.4 Kbps.

Ethernet at 10/100Mbps (10/100BASE-T, RJ45)

Memory:

Real time program updates, and overall host communications shall utilize flash memory.

Can be configured for up to 50,000 cardholders and 35,000 event buffer.

Additional ports shall be provided for connecting card readers and data gathering panels via RS-485 multi-drop wiring configuration. Two (2) ports shall be available with up to 8 total boards connected in any combination.

Devices: Up to 8 devices consisting of reader interface modules, input modules, and output modules shall be supported. The devices shall be connected in any combination.

Processor: The PRO32IC shall contain a 32-bit processor.

Light emitting diodes (LED) shall indicate status of components and communication links.

Readers: The PRO32IC shall support the following:

Up to eight card formats and facility codes.

Multiple card technologies.

Biometric interface support.

Integration with other manufacturers' card readers.

Issue code support shall be provided for both magnetic and Wiegand card readers.

Up to eight-digit PIN codes.

Electrical Power:

Primary input power shall be 12VDC $\pm$ 15%@ 350 mA with an operating range of 10 VDC to 16VDC.

The PRO32IC shall be equipped with an uninterruptible power supply (UPS) and backup battery.

2. Dual Reader Module shall be HONEYWELL ACCESS SYSTEMS PRO32R2: The PRO32R2 shall provide an interface between the

PRO32IC and the card readers. The PRO32R2 shall operate with any card reader that produces a standard Wiegand (Data 1/Data 0) or Clock and Data communication output. A single PRO32IC shall be able to multi-drop up to sixteen (16) PRO32R2s. The following requirements shall also apply:

- a. Each PRO32R2 shall support two card readers, each of which may be up to 500 feet from the PRO32R2.
  - b. Up to 16 PRO32R2s shall be connected to each PRO32IC.
  - c. Each PRO32R2 shall include Three (3) relay inputs and two (2) relay outputs per reader. Two (2) additional inputs and two (2) additional outputs shall be available when the module is mounted flat.
  - d. Up to eight (8) unique card formats shall be supported.
  - e. The PRO32R2 shall support three access modes upon loss of communication with the PRO22IC. These modes shall be:  
Locked/Unlocked/Facility code
  - f. Input power shall be 12VDC $\pm$ 15%@ 175 mA with an operating range of 10 VDC to 14VDC.
  - g. A PRO32R2 shall be provided to support integrated security system card readers for disarm functions. Provide a PRO22R2 for each security disarm station located on drawings. Connecting more than one reader per port will not be accepted.
3. INPUT MODULE PRO32IN: The PRO32IN monitors all system alarm inputs. The following requirements shall apply:
- a. The PRO32IN shall provide up to sixteen (16) supervised alarm inputs to monitor and report fault conditions, (open, short, ground, or circuit fault) alarm conditions, power faults, and tampers. Upon alarm activation, the associated alarm condition shall be reported to the PRO32IC and subsequently to the system alarm monitoring workstation.
  - b. Light emitting diodes (LED) shall indicate the status of the sixteen (16) alarm zones, cabinet tamper, and power fault.
  - c. The input modules shall operate independently and in conjunction with the output modules (PRO32OUT), which shall send an output signal to a corresponding output device upon alarm activation. Upon alarm activation, the PRO32IN shall activate any or all alarm outputs within the PRO32OUT. The PRO32OUT shall provide sixteen (16) Form C outputs rated at 2A @ 30VDC. Upon receipt of an alarm input from the PRO32IN, the PRO32OUT shall transmit an activating signal to a corresponding output device.
  - d. Up to eight (8) PRO32INs shall be connected to an available PRO32IC via RS-485 cabling.
  - e. Diagnostic light emitting diodes (LED) shall indicate PRO32IC

- communication, input zone scanning, and PRO32IN heartbeat.
- f. The PRO32IN contains the following features:
    - Alarm contact status scanning at up to 180 times per second for each zone.
    - Eight configuration DIP switches to assign unit addresses and communications speed.
    - A low power CMOS microprocessor. Filtered data for noise rejection to prevent false alarms.
    - Two form-C, 2A @ 30VDC contacts for load switching.
    - Two dedicated inputs for tamper and power status.
    - Individual shunt times (ADA requirement).
  - g. Input power shall be 12VDC $\pm$ 15%@ 350 mA with an operating range of 10 VDC to 16VDC.
4. OUTPUT MODULE PRO32OUT: The PRO32OUT incorporates sixteen (16) output relays that are capable of controlling a corresponding output device upon any input activation or on command from the system.
- a. Output relays shall be capable of responding to:
    - Input alarms from within the same PRO32IC.
    - Commands from a system operator.
    - Time zone control commands for automatic operation.
  - b. Output relays shall be capable of:
    - Pulsing for a predetermined duration, which shall be programmable for each relay individually.
    - Following any input point from a PRO32IN attached to the same PRO32IC (on with alarm, off when clear, or as required).
    - Responding on command from the system operator to pulse, command on, command off, or reset to normal state.
    - Each PRO32OUT shall provide 16 form-C relays rated at 2A @ 30VDC. The PRO32OUT shall control the relays via digital communication. Upon receipt of an input from the PRO32IN or command from the system operator, the PRO32IN will transmit an activating signal to the corresponding relay.
    - Input power shall be 12VDC $\pm$ 15%@ 350 mA with an operating range of 10 VDC to 16VDC.
5. Enclosure shall be HONEYWELL ACCESS SYSTEMS PRO22ENC1 wall enclosure.
  6. Power supply shall be HONEYWELL ACCESS SYSTEMS PRO32E1PS.
  7. Provide and install two (2) HONEYWELL ACCESS CONTROL PANELS to support access control and intrusion disarm readers.

## 2.5 ACCESS CONTROL READERS

A. Access control card readers shall be HONEYWELL ACCESS SYSTEMS OM40BHOND Contactless Smart Card Readers.

1. Provide single gang surface mounting style 13.56 MHz contactless smart card readers suitable for minimal space mounting configurations as shown on the project plans.
2. *Provide manual bypass switch for each elevator*
3. Provide HONEYWELL ACCESS SYSTEMS OM40BHOND Contactless Smart Card Readers for all locations shown on drawings. .

## 2.6 INTRUSION DETECTION DISARM READERS

A. Intrusion detection arm/disarm readers shall be HONEYWELL ACCESS SYSTEMS OM40BHOND Contactless Smart Card Readers.

1. Provide single gang surface mounting style 13.56 MHz contactless smart card readers suitable for minimal space mounting configurations as shown on the project plans.
2. Provide one (1) OM40BHOND reader located beside each Honeywell 6160 security system keypad for integrated disarm functions. Readers shall be professionally labeled “DISARM”.
3. Provide one (1) PRO32R2 module to support each disarm card reader.
  - a. The access system shall be integrated with the Honeywell Intrusion Detection System Access Control. Integration shall provide ability to arm/disarm intrusion system via card readers located beside each security keypad. Utilizing trigger and procedures programming, card holders shall either be granted or denied access to the building based on the armed status of the intrusion alarm system (via programming, selected card users may be restricted access to the building when the intrusion alarm system is armed).
  - b. Security/access system shall log arm/disarm events by user in event history log.
4. Provide one (1) LANSRLU1 Ethernet Serial Converter for integration with Honeywell Access and CCTV systems.
5. Provide one (1) PRO32OUT relay for integration with Honeywell intrusion detection system

## 2.7 ACCESS CONTROL CARDS

A. Access control cards shall be HONEYWELL ACCESS SYSTEMS OKM2N34SP

1. Provide (100) PVC printable “smart” access cards, compatible with the specified card readers.
2. The card shall be capable of accepting a slot punch on one end, allowing it to be hung from a strap/clip in a vertical orientation.
3. The card shall meet the following standards for contactless smart cards: ISO 15693 and ISO 14443B2.
4. Facility code and card numbers shall be coordinated with owner.

## 2.8 SURGE PROTECTION

- A. Access control panel surge suppressor shall be TRIPP-LITE IBAR12-20ULTRA.
- B. Electronic door hardware surge/noise suppressors shall be HONEYWELL S-4 (2 per door).
- C. Surge protection for electronic door hardware power supply shall be DITEK DTK-120HW (1 per power supply / each door).

## 2.9 DOOR POSITION SENSORS AND SOUNDERS

- A. Door status sensors shall be installed for each controlled access door. Door sensors contacts shall be Door contacts shall be HONEYWELL 3/4" diameter wide gap.
- B. Door lock status (latch bolt monitor built into electronic door hardware) sensors shall be supervised to monitor door lock status for each controlled access door.
- C. A shunt lock shall be located at access control panel for manual bypass on/off control of door status sensors. Shunt lock shall be HONEYWELL 4005 SERIES SHUNT LOCK with stainless steel face plate and back box.

## 2.10 ELEVATOR CARD READER INTEGRATION

- A. Coordinate elevator access control system connections with elevator contractor. Provide a manual bypass switch for each access control relay output to allow manually bypassing of each card reader relay output to elevator control equipment. Bypass switches shall be installed on a cabinet in the elevator equipment room and shall be professional labeled and identified.
- B. All final connections inside elevator equipment room shall be performed by the elevator contractor.

## 2.11 ELECTRONIC DOOR EQUIPMENT

- A. Coordinate access control system connections with electronic door hardware and power supplies supplied and installed by door hardware contractor. Provide necessary make/break connections at power supplies provided by door hardware contractor(s).

## 2.12 FLOOR PLAN GRAPHIC

- A. Update existing floor plan graphic to include all new card reader locations. Owner to provide floor plans in WMF format. .
- B. Program to allow multiple floor plans to be viewed simultaneously. .

## 2.13 INTEGRATED VIDEO ENTRY SYSTEM

- A. Install an integrated Video Entry System in accordance with manufacturer's instructions at locations indicated on the Drawings and Riser Diagrams.
- B. The Video Entry System shall be the Aiphone Corporation "JO Series" door entry and communication system.
- C. The following Aiphone JP Series components shall be installed:
  - 1. Two (2) AIPHONE PS-1820UL Power Supplies
  - 2. Two (2) AIPHONE JO-1MD Video Master Stations with wall or MCW-S/A desk stands
    - a. (1) Front
    - b. (1) Rear
  - 3. Two (2) AIPHONE JO-DV Video Intercom Door Stations
    - a. (1) Front entrance
    - b. (1) Rear entrance
  - 4. Two (2) AIPHONE RY-ES relays
  - 5. Two (2) Aiphone piezo sounders for audible notification when door is released.
  - 6. (\*) Integrate with access control system for release of controlled doors
  - 7. (\*) Integrate with IP camera surveillance system for event recording activation when exterior door button is pushed.
  - 8. (\*) Necessary Aiphone cable per manufacturer's specifications
  - 9. (\*) Installation in accordance with manufacturer's requirements.
  - 10. (\*) Necessary programming for proper operation and in accordance with Owner's requirements

## 2.14 ACCESS CONTROL PARTS INVENTORY

- A. The CONTRACTOR shall maintain a stock of replacement parts sufficient to



provide responsive same-day or next-day service with a minimum down time. Written verification of required inventory shall be provided prior to completion of installation.

- B. CONTRACTOR to maintain an inventory of one (1) of each of the following critical components:
1. PRO32IC Intelligent Controller
  2. PRO32IN Input Module
  3. PRO32OUT Output Module
  4. PRO32R2 Two Reader Module
  5. PRO22DCC Daisy Chain Cable
  6. PRO22BAT1 Operational Backup Battery
  7. PRO32E1PS Power Supply
  8. OM40BHOND Smart Card Reader
  9. S-4 Suppressor kit
  10. LANSRLU1 Ethernet Serial Converter
  11. JO-1MD Master Station
  12. JO-DV Video Intercom Door Station
  13. *PS-1820UL Power Supply*

## PART 3 EXECUTION

### 3.1 GENERAL INSTALLATION

- A. Install, make fully operational, and test the access control system as indicated both on the drawings and in this specification. Where information is not available from the Owner upon request, the worst case condition must be assumed for bidding purposes to ensure a complete, functional system. Where appropriate, interfaces with the Customer's Telecommunications System shall be coordinated with the Owner's Representative.
- B. Where appropriate, interfaces with the Customer's Telecommunications System shall be coordinated with the Owner's Representative.
- C. All necessary back-boxes, pull-boxes, connectors, supports, conduit, cable, and wire shall be furnished and installed to provide a complete and reliable system. Exact location of all boxes, conduit, and wiring runs shall be confirmed with the OWNER or the owner's representative.
- D. Install conduit, cable, and wire parallel and square with building lines, including raised floor areas. Conduit fill shall not exceed forty (40) percent.

- E. All equipment shall be rack-mounted with sufficient clearance to meet all applicable codes and facilitate observation and testing. All equipment shall be securely fastened with appropriate fittings to ensure positive grounding and be free of ground loops throughout the entire system. Units shall be installed parallel and square to building lines. All wires shall be gathered and fastened to create an orderly installation.

### 3.2 WIRE AND CABLE

- A. After installation, and before termination, all wiring and cabling shall be checked and tested to ensure there are no grounds, opens, or shorts on any conductors or shields. A V.O.M. shall be utilized to accomplish these tests.
- B. Visually inspect wire and cable for faulty insulation prior to installation. Protect cable ends at all times with acceptable end caps except during actual termination.
- C. All wiring shall be installed concealed above ceiling and in walls. Conductors shall be carefully cabled and laced. All exposed wiring below ceiling shall be installed in EMT conduit or metal raceway wiremold. Exposed wiring in public areas will not be accepted.
- D. All cable shall be as specified by the manufacturer: All access control cables shall be plenum rated with shield.
  - 1. Card readers: 18-6 from card reader to access panel
  - 2. Door status: 18-2 from door status sensor to access panel
  - 3. Door locks: 14-2 from door lock to power supply to access panel
  - 4. Panel integration 18-6 between existing and new access control panels
  - 5. Spare: 18-2 from each door power supply to access panel
  - 6. Network connection: CAT-6 from access panel to network connection
- E. Protect wire and cable from kinks. Provide grommets and strain relief material where necessary, to avoid abrasion of wire and excess tension on wire and cable.
- F. All cables, wires, wiring forms, antennas, terminal blocks, and terminals shall be identified by labels, tags, or other permanent markings. The markings shall clearly indicate the function, source, and destination of all cabling, wiring and terminals. All cables and wires shall be identified, utilizing heat-shrunk, pre-printed, wire markers. Individual conductors shall be tagged with E-Z Code Markers indicating circuit number and type. Markers shall be used on all conductors at each outlet, pull box and termination points.

### 3.3 INSPECTIONS

- A. Arrange all required inspections by the Authority Having Jurisdiction.
  - 1. Notify all parties of Inspection and results.
  - 2. Perform all adjustments, changes, etc. required.

### 3.4 START-UP RESPONSIBILITY

- A. The Contractor shall properly ground each piece of electronic equipment prior to applying power. Properly ground all shielded wire shields to the appropriate earth ground at the hub end only, not at the remote or device end.
- B. The Contractor shall initiate system operation. Competent start-up personnel shall be provided by the Contractor on each consecutive working day until the system is fully functional and ready to start the acceptance test phase.
- C. Where appropriate, the Contractor shall bring the System online in its basic state. It is the responsibility of the Customer to provide the specific database information that will provide full, integrated system operation.

### 3.5 PREPARATION FOR ACCEPTANCE (Prior to Final Inspection)

- A. Temporary facilities and utilities shall be properly disconnected, removed, and disposed of off-site.
- B. All systems, equipment, and devices shall be in full and proper adjustment and operation, and properly labeled and identified.
- C. All materials shall be neat, clean, and unmarred and parts securely attached.
- D. All broken work, including glass, raised flooring and supports, ceiling tiles and supports, walls, doors, etc. shall be replaced or properly repaired, and debris cleaned up and discarded.
- E. All extra materials as specified shall be delivered and stored at the premises as directed.
- F. Test reports of each system and each system component, and As-Built project drawings shall be complete and available for inspection and delivery as directed by the Customer.

### 3.6 SYSTEM ACCEPTANCE REQUIREMENTS

- A. Before final acceptance of work, the Contractor shall perform and/or deliver each of the following in the order stated:
  - 1. Systems Operation and Maintenance Manuals. The Contractor shall deliver three (3) composite “Systems Operation and Maintenance” manuals in three ring binders, sized to hold the material below, plus 50% excess. Each manual shall contain, but not be limited to:
    - a. A Statement of Guarantee including date of termination and the name and phone number of the person to be called in the event of

- equipment failure.
- b. A set of operational procedures for the overall system that includes all required Customer activities and that allows for Customer operation of all system capabilities. This procedure shall fully address all Customer established system operating objectives.
  - c. Individual factory issued manuals, containing all technical information on each piece of equipment installed. In the event such manuals cannot be obtained from a manufacturer, it shall be the responsibility of the Contractor to compile and include them. Advertising brochures or operational instructions shall not be used in lieu of the required technical manuals and information. All manuals shall be printed to ensure their permanence. No “blue line” type of reproduction is acceptable.
2. System testing.
- a. Activate all alarm or other output devices that are in the system for proper operation, including supervisory and trouble circuit tests.
  - b. A checkout report for each piece of equipment shall be prepared by the CONTRACTOR and submitted to the OWNER, one copy of which shall be registered with the equipment manufacturers. This report shall include a complete listing of every device, the date it was tested and by whom, and the results and date tested (if failure occurred during any previous tests). The final test reports shall indicate that every device tested successfully. Submit two typed copies of the test reports on 8 ½” x 11” paper, in a neatly bound folder to the OWNER for approval. Failure to comply with this will result in a delay of final testing and acceptance.
3. As-Built Drawings. After completion of all the tests listed above, and prior to the Final Acceptance Test, the Contractor shall submit the complete As-Built drawings as identified in Project Record Drawings. These drawings shall include:
- a. As-Built conduit layout diagrams, including wire and cable tag designations.
  - b. Complete As-Built wiring diagrams, including complete terminal strip layout and identification, and wire termination and tagging for all conductors.
  - c. Locations for all major equipment components installed under this specification.
4. Final Acceptance Test.
- a. After the testing report and as-built drawings have been approved by the Customer’s representative, the completed system shall be tested in the presence of the Customer’s representative.
  - b. Acceptance of the system shall require a demonstration of the

stability of the system. This shall be adequately demonstrated if the system operates for a ninety (30) day period with a 99% system on-line reliability. Should major equipment failure occur, the Contractor shall replace component(s). This test shall not start until the Customer has obtained beneficial use of the system. Once the final test is complete, each purchased spare component must be inserted into the System and the System tested in potentially affected areas again to insure complete functionality. The original removed parts will become the System spares.

5. Notice of Completion.
  - a. When the Final Acceptance Test described above has been satisfactorily completed, the two (2) year guarantee period will start.

### 3.7 WARRANTY SERVICE

- A. Warrant the equipment and wiring free from electrical and mechanical defects for a period of two years from the date of Owner's acceptance of system.
- B. The Contractor shall employ a factory-trained service organization within 35 miles of the job site. This organization shall have a minimum of seven (7) years experience in servicing integrated Access Control, Alarm Monitoring, CCTV, and Video Badging Systems and equipment.
- C. Fully qualified repair and maintenance personnel shall be available on a twenty-four (24) hour a day basis, three hundred and sixty-five (365) days a year, with four (4) hour maximum response time for service.
- D. Normal service shall be defined as minor repairs and/or adjustments. Service of this nature shall be provided at no cost to the Customer during normal business hours, which are between 8:00AM and 5:00PM, Monday through Friday. For service calls requested by phone before 11:00 AM on a weekday, service shall occur on a same-day basis.
- E. Emergency service shall be required for emergencies defined as critical equipment not being functional, and shall be furnished at no cost to the Customer during the warranty period. Emergency service shall respond within a four (4) hour period, twenty-four (24) hours per day, three hundred and sixty-five (365) days a year. A list of critical equipment shall be developed and coordinated by the Customer and the Contractor.

END OF SECTION

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## SECTION 28 60 05 - INTEGRATED CCTV SURVEILLANCE SYSTEM

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. This section includes furnishing, installation, commissioning, testing and extending the existing Video Management System (VMS).

#### 1.2 RELATED SECTIONS

- A. Related Sections: The following sections contain requirements that relate to this Section:
1. Section "Access Control" for coordination and interface requirements.
  2. Section "Common Work Results for Electrical" for general requirements, submittal requirements, coordination, project conditions, labeling, fire stopping, commissioning, equipment supports, installation and construction requirements, demolition, quality control, identification, and all other applicable paragraphs.
  3. Section "Grounding & Bonding for Electrical Systems" for grounding, requirements of equipment.
  4. Section "Low Voltage Electrical Power Conductors and Cables" for cabling requirements.
  5. Section "Raceways & Boxes for Electrical Systems" for conduit, raceway and box requirements.
  6. Section "Structured Cabling" for coordination with telephone system, and data cable requirements.

#### 1.3 SUMMARY OF WORK INCLUDED

- A. Coordinate all related work specified elsewhere with the CCTV Surveillance System.
- B. Integrate with and extend the existing ExacqVision CCTV Surveillance System currently serviced and originally installed by Atlantic Security System's Inc.
1. The existing system shall be extended to support all additions and changes that are specified and shown on the drawings.
  2. The existing camera system server is located in the BISFA MDF.
  3. All new IP Camera equipment will be supported by the existing server provided by the OWNER.

- C. Materials
  - 1. Furnish and install at the locations that show the specified equipment to provide a completely operational IP camera surveillance system..
  - 2. The following list of main items of the installation shall not be considered to be all inclusive.
    - a. Software licenses
    - b. Client workstation set-up
    - c. Camera floor plan map
    - d. Camera mounts and adapters
    - e. Surge suppressors
    - f. Patch panels & jumper cables
    - g. Cable for cameras
  - 3. Provide and install all equipment, components, cable, and mounting hardware as required to meet manufacturer's specifications and documented installation procedures.
  - 4. Provide all accessories and misc. items required for an operating system.
  - 5. Installer shall meet the entire intent of these specifications and associated drawings. Deviations from specified equipment and/or operation of the system shall not be permitted.

#### 1.4 SYSTEM DESCRIPTION

- A. System Design Requirements: Installer shall meet the entire intent of these specifications and associated drawings.
- B. Integration requirements:
  - 1. Installation shall be consistent with existing Washington County Public Schools that are currently integrated with the ExacqVision Enterprise VMS and Enterprise System Manager Software.
- C. System includes equipment, installation and connections:
  - 1. IP cameras with housings, lenses, accessories.
  - 2. PoE switches (provided by OWNER).
  - 3. Server (provided by the OWNER).
  - 4. Integration with access control system.
  - 5. Adding camera icons to floor plan map (coordinate with OWNER).
  - 6. Interconnecting video and control cabling.
- D. System shall provide video surveillance of areas indicated via specified cameras defined in specifications and shown on drawings.

- E. Network video recorder shall also provide full video multiplexing for all existing and new cameras. .
- F. Full video recording shall be provided of all system cameras as follows:
  - 1. Record all images of all cameras during occupied periods and/or motion detection as directed by the Owner.
  - 2. Record only those camera images where motion is detected, during unoccupied periods of each area of the building. Unoccupied periods may be different for each camera and shall be defined by the Owner.
- G. Video recording parameters shall be as follows:
  - 1. Network video recorder software shall provide recording capacity for up to 128 cameras.
  - 2. Settings shall be checked after 30 days of normal occupancy to verify performance (adjust settings as needed to meet owners acceptance).
- H. Full Multiplex system: System shall be multiplexed to provide video capture and recording of all cameras simultaneously, regardless of camera image displayed on monitor. System shall provide time division multiplexing of multiple cameras and store their digitized and compressed images on integral hard disk drives for fast search and retrieval at the unit, and from remote work stations (in building and remote) through data network.
- I. System shall provide full video control of selected camera(s) via digital video recorder controls and Networked PC's.
- J. System shall display real-time images of each camera on the associated monitors.
- K. Transmission of video images between cameras and NVR control system shall be via CAT-6e, plenum rated cables, installed in concealed areas of the building structure.

## 1.5 SUBMITTALS

- A. Submittal Requirements of this section:
  - 1. IP surveillance cameras.
  - 2. Camera housings, lenses and accessories.
  - 3. Camera housing mounts and adapters.
  - 4. Video controls and recording equipment.
  - 5. Cabling and accessories.
  - 6. System wiring schematic.



B. Descriptive Data for Each Product:

1. To verify specifications have been met.
2. Clearly indicate or state all options, etc.:
  - a. Manufacturer/cat. number.
  - b. Manufacturer's options.
  - c. Accessories.
3. Bill of materials showing quantities and model numbers.
4. Manufacturer's data on all equipment.
  - a. Highlight or clearly indicate all items provided.
5. Catalogued by the control system manufacturer.

C. Submit the following for each Camera/lens/housing assembly:

1. Parts list and configuration for each camera location:
  - a. Camera type.
  - b. Lens type.
  - c. Focal length and field of view data for installed location.
  - d. Camera housing and all accessories, as applicable.
  - e. Camera mount.

D. Shop Drawings:

1. Rack or Wall Mounted Monitors/Controls:
  - a. Submit drawing of proposed racks, enclosures, supports, etc.
  - b. Submittal to accurately represent the proposed physical arrangement of equipment.
  - c. Identify all mounted equipment in its proposed position within the rack, shelf or support system.

E. Calculations:

1. Calculations for bandwidth and storage requirements (itemized per camera).
2. Lens focal distance and field of view calculations.

F. Wiring Diagrams:

1. Wiring connection diagrams for each proposed component.
2. Schematic wiring diagram for entire system, showing all connected cameras, power supplies, recording devices, monitors, user controls, cable types, etc.
3. Indicate all points of connection between NVR system and other devices: such as intrusion alarm system connection, door controls, card access control

panels, etc.

G. Quality Assurance:

1. Product Test Reports: Certified copies of manufacturer's design and routine factory tests required by the referenced standards.
2. Provide proof of required certifications and installer qualifications.
- 3.

H. Closeout Submittals: Submit the following documentation and drawings.

1. Operational Information: Provide full instruction manual to cover all aspects and components of the installed system and to be used to supplement the Owner Demonstration:
  - a. Camera/lens selections and specs for each installed camera.
  - b. Recording system operational information.
  - c. Programming for NVR for settings of camera views, on-screen camera identification, etc.
  - d. Recorded video retrieval and storage.
2. Maintenance Data: Provide for all equipment and accessories to include in the "Operating and Maintenance Manual".
  - a. Include recommended periodic tests of equipment in service, and test parameters. Provide manufacturer's recommended test procedures, frequency and type of tests.
  - b. Specify cleaning procedures for all components.
3. As-Built Drawings: Provide three (3) full-size copies of all plans, drawings and schematics to the owner after the acceptance test. The drawings shall be revised to show all terminal designations, location of all junction boxes, terminal cabinets, devices, wiring and conduit routings. Drawings, etc. shall be delivered as part of the O&M Manual package.

## 1.6 QUALITY ASSURANCE

A. Manufacturer's Qualifications: All system components shall be furnished by manufacturers of established reputation and experience who shall have produced currently operating IP Camera Surveillance Systems. Manufacturer shall be able to refer to similar installations rendering satisfactory service. Equipment manufacturer must meet the following:

1. All products designed and manufactured to ISO 9001 standards.
2. Engaged in manufacturing of CCTV and video systems for at least 10 years.
3. System shall be of latest design. No obsolete or pending obsolete parts shall be used. Equipment shall be consistent with WCPS standards for video

- surveillance systems at the time when submittals are provided for approval.
4. Provide 24/7 technical assistance and support to installer.
- B. Installer Qualifications: Engage an experienced factory-authorized Installer to perform work of this Section.
1. Installing Contractor must meet the following:
    - a. Factory trained Technicians to install the proposed system.
    - b. Installer shall be an ExacqVision Select or Elite Partner with a minimum of two (2) years experience of designing and installing ExacqVision Enterprise and ESM systems. Proof of compliance with manufacturer's system installation certification program must be included with submittal.
    - c. Contractor shall be a Vicon/IQInvision Certified Installer with a minimum of two (2) years experience of designing and installing IQInvision Network cameras. Technicians shall be IQInvision Certified with a minimum of one (1) year experience installing IQInvision IP cameras. Proof of compliance with manufacturer's system installation certification program must be included with submittal.
    - d. The installer must be certified by Honeywell Integrated Security Dealer Service Certification Program (DSCP).
    - e. Shall be a Honeywell Commercial Security Systems (CSS) Dealer. Proof of compliance with manufacturer's system installation certification program must be provided in writing to owner along with submittal.
    - f. Contractor shall maintain a minimum of one (1) employee possessing a valid certificate of competency issued by the National Institute of Certification in Engineering Technologies (minimum NICET Level 1 or 2 for Video Security Systems Technician). Contractor shall be shall provide annual information on NICET certificate holders employed by their company for the purpose of maintenance, repair or inspection activities.
    - g. Company shall employ experienced installation and service Technicians that are certified to work with Network systems (minimum CompTIA Network+ Certified).
    - h. Hold all legally required state and local contractor's licenses necessary to accomplish the installation and activation of the described system. Copies of required licenses shall be submitted prior to start of work.
    - i. The system contractor shall have been regularly engaged in the access control business for the past (7) years and shall provide proof of installing at least (6) systems of the same design/manufacturer in the



## 1.8 SEQUENCING

### A. General Sequencing:

1. Coordinate camera locations with exterior and/or interior construction.
2. Provide for through-wall sleeves, where required for wiring or cabling.
3. Arrange for blocking or other suitable material, where required, for mounting of cameras, housings, etc.
4. Coordinate above ceiling structural requirements for suspended monitors, etc.

## 1.9 SYSTEM STARTUP

### A. System Programming:

1. Performed by a technician, trained and certified by manufacturer.
2. All custom and standard functions.
3. On-screen camera identification (location) shall be approved by Owner to determine exact wording of each location, room, floor or space.
4. Provide additional reprogramming services as required for additional devices added during construction, changes due to Final Inspection comments, and Owner changes of display messages, etc. prior to Owner's final acceptance of system.

### B. Camera Setup:

1. Establish and set all field adjustable parameters with Owner's input and acceptance.
2. Set all adjustable lens parameters for the location, direction and environmental variables to be encountered at each location, i.e. direct sunlight.

### C. Recording System Setup:

1. Setup and/or program all initial recording system variables with Owner's input and acceptance.
2. Set recording system speeds, frames/second, etc. for each camera, as applicable (minimum 7pps).
3. Set the pre-event record setting for all cameras to minimum of 5 seconds and post event recording to minimum of 10 seconds.
4. Set image quality setting to high for all cameras.
5. Setup and/or program automatic recording based on occupied/unoccupied periods for system wide and/or individual camera motion detection, etc.

## PART 2 MATERIALS

### 2.1 MANUFACTURER

- A. No Substitutes. To insure system uniformity and compatibility with all other Washington County Public Schools IP Camera systems, alternative equipment other than the exact make and model number identified in this specification will not be accepted.
- B. All video recording equipment and Network viewing software shall be of the same design and manufacturer as existing ExacqVision VMS systems currently in use by Washington County Public Schools. Provide VMS software, cameras, and related equipment as specified. Alternative manufacturers will not be compatible with the existing equipment and will not be accepted.

### 2.2 IP NETWORK CAMERAS

- A. Cameras shall be IP Mega Pixel, Day/Night, Outdoor, Vandal Resistant, Fixed Dome Cameras:
  - 1. The product specified shall be an all-in-one vandal/tamper resistant HD720P/HD1080p/3MP resolution color dome camera designed for indoor/outdoor applications providing multiple H.264 (MPEG4, Part 10) and simultaneous MJPEG streams that can be individually configured. The dome camera was designed to provide 30fps at maximum resolution with audio, and shall conform to the ONVIF and PSIA standards.
  - 2. The camera offers Lightgrabber™II for enhanced image sensitivity and DTS (Direct-To-Storage) recording. The camera offers Day/Night functionality with high sensitivity for use in low light indoor/outdoor applications, and is prepackaged with a varifocal IR corrected lens to allow manual zoom and focus adjustment. The dome camera is constructed of cast-aluminum housing with polycarbonate dome bubble and auto tracking inner liner. The dome camera was designed to protect against water and dust to IP66 / NEMA 4 standards. Requiring low power the dome camera is PoE (IEEE 802.3af) compliant, and can be powered from 12-24VDC or 24VAC.
- B. Day/Night Dome Camera Components

1. The specified product shall consist of the following components:
  - a. A camera module and mounting base.
  - b. An inner liner to disguise the viewing position of the lens.
  - c. A clear polycarbonate dome bubble with UV blocking anti-scratch coating.
  - d. An aluminum housing with tamper resistant screws.

C. Mounting and Viewing Adjustment Requirements

1. The manufacturer of the specified day/night dome camera shall provide optional hardware to allow the camera to be surface mounted, wall mounted, interior corner mounted, pendant pipe mounted, and suspended ceiling mounted. The camera shall be designed to be mounted to a standard 4S electrical box.
2. The dome camera shall provide cable entry via a side conduit opening or through mounting surface cutouts.
3. The camera viewing position shall be adjustable along three (axes) providing an adjustment range of 360° pan, 90° tilt, and ±90° azimuth.

D. NETWORKING REQUIREMENTS:

1. The IP dome camera shall incorporate a built-in web server allowing full control and configuration of the camera.
2. The IP dome camera shall be Power over Ethernet (IEEE802.3af Class1) compliant .
3. The IP dome camera shall have a 100 Mbps Ethernet RJ-45 connection that can deliver data at a maximum rate of 35 Mbps.
4. Ethernet:10Base-T/100 Base-TX, Auto-sensing, Half/Full Duplex and RJ45
5. The IP dome camera shall provide integrated support for TCP/IP, HTTP, HTTPS, DHCP, UDP, RTP, RTSP, DNS, ARP, ICMP, NTP, UPnP, ZeroConf, APIPA, UDP multicast, SNMP, FTP, SMTP, Telnet, and CIFS protocols.
6. The IP dome camera shall have RTSP (Real Time Streaming Protocol) support for compatibility with media players such as VLC Player, Apple QuickTime, Windows Media Player, and Core Player.
7. The IP dome camera shall deliver HD720P/HD1080p/3MP quality video at a frame rate of 30fps via TCP/IP over CAT5 or CAT6 cable.
8. The IP dome camera shall not require unique or proprietary client software for viewing or controlling the camera.
9. The IP dome camera shall conform to the ONVIF and PSIA standards.
10. IP dome camera shall be available to users running versions of Internet

Explorer™, Firefox™, Safari™, Chrome™, Opera™, or Mozilla™.

11. The IP dome camera shall provide secure user and administrator password protection.

E. ELECTRICAL SPECIFICATIONS:

1. Input power: 12 to 24 VDC, 24VAC or IEEE 802.3af Power over Ethernet.
2. Power: 3.4 watts maximum.
3. PoE Class: Class 1.

F. MECHANICAL SPECIFICATIONS:

1. Construction
  - a. Cast-aluminum ceiling plate
  - b. Cast-aluminum back box enclosure
  - c. Aluminum trim ring
  - d. Clear scratch resistant polycarbonate dome bubble.
2. Mounting: Surface Mount, Single or double gang outlet box, Wall Mount with accessory.
3. Viewing adjustment: pan 360°: tilt 90°: azimuth (rotation) 350°.
4. Dimensions:
  - a. IQA6XWR-A4
    - 1) 96.1 H x 152 W (mm)
    - 2) 3.8 H x 6 W (in)

G. ENVIRONMENTAL SPECIFICATIONS:

1. Temperature range: -34°C (-30°F) to +50°C (+122°F)
2. Operating Humidity range: 10% to 80% non-condensing.
3. Ingress Protection rating: IP66 / NEMA 4 rated.
4. Impact Protection rating: N50102, IK 10 (exterior cameras).

- H. Provide IQEYE/VICON ALLIANCE PRO SERIES IQM63WRA4 IP CAMERAS with IQM-GBA adapter plates for all interior locations shown on drawings (excluding camera at front main entrance on First Floor).

- I. Provide IQEYE/VICON ALLIANCE PRO SERIES IQM62WRA4 IP CAMERA with IQM-GBA adapter plate for interior camera located at front main entrance (First Floor).

- J. Provide IQEYE/VICON ALLIANCE PRO SERIES IQM62WRA4 IP CAMERAS with IQA-WM3 wall mount adaptors for all exterior locations shown on drawings.



## 2.3 NETWORK VIDEO RECORDER SOFTWARE ADDITIONS

- A. Provide EXACQVISION VIDEO MANAGEMENT SYSTEM (VMS) SOFTWARE consisting of the following:
  - a. Fourteen (14) EVEPNIP-01 Enterprise IP Camera Licenses (one per new camera)
  - b. Twenty eight (28) SSA-EVENIP-01 Enterprise Software Updates for unlimited software updates.

## 2.4 PATCH PANELS

- A. Provide four (4) AMP NETCONNECT 1375014-2 CAT-6 patch panels. Coordinate labeling with OWNER. Install necessary AMP CAT-6 patch cables.

## 2.5 NETWORK VIDEO SWITCHES

- A. Network Video PoE Switches and fiber converters to support specified IP cameras shall be provided and installed by the OWNER. Coordinate IP address programming, bandwidth requirements and connection to Network with OWNER prior to installation.

## 2.6 SURGE PROTECTION:

- A. Provide surge protection for all exterior IP network cameras. Protection shall be as recommended by system manufacturer and shall comply with NEC requirements. DITEK DTK-MRJPOE Network POE surge suppressors shall be installed for each exterior camera.

## 2.7 LOW VOLTAGE VIDEO AND CONTROL CABLING:

- A. Cables to power low voltage systems shall be as recommended by the system manufacturer.
  - 1. Interior and exterior IP cameras (maximum 328’).
  - 2. One continuous cable run to each camera. No splices.
- B. All low voltage cabling installed on this project shall be plenum rated cable.
- C. Video and Control Cabling: Circuits:
  - 1. UL Listed, NEC Type CMR.
  - 2. Plenum rated.
- D. Provide SMART WIRE 556600 CAT-6e CABLE for all interior and exterior cameras.

1. CAT-6 #23 AWG, solid copper (white jacket).
2. Compliant with EIA/TIA 568-B and 569-A, including all subsections and addenda.
3. Plenum rated.
  - a. Color coded fluorinated ethylene FEP insulation.
  - b. Low smoke PVC (LSPVC) outer sheath.

## 2.8 CAMERA PARTS INVENTORY:

- A. The CONTRACTOR shall maintain a stock of replacement parts sufficient to provide responsive same-day or next-day service with a minimum down time. Written verification of required inventory shall be provided prior to completion of installation.
- B. CONTRACTOR to maintain an inventory of two (2) of each of the following critical components:
  1. IQM62WRA4 IP camera
  2. IQM63WRA4 IP camera
  3. DTK-MRJPOE Network POE surge suppressor

## PART 3 INSTALLATION

### 3.1 EXAMINATION

- A. Site Verification of Conditions: Examine the conditions under which the equipment shall be delivered, installed, and operated. Make all allowances required for installation and maintenance of the equipment, per Codes and manufacturer.

### 3.2 INSTALLATION

- A. Rough-in: Mounting height for individual devices shall be as follows (all dimensions above finished floor):
 

1. Interior Wall Cameras	8' AFF, unless noted otherwise
2. Interior Ceiling Cameras	Ceiling, unless noted
3. Exterior Wall Cameras	12' AFG, unless noted otherwise
4. Equipment Rack	84" to top of rack enclosure
- B. Installation Requirements for all Cameras:

1. Comply with all manufacturer's installation requirements and instructions.
2. All connectors or connections shall be located within the camera housing.
3. Provide sufficient slack in all cables to permit full range of movement or adjustment of camera without stressing cables or connectors.

C. Interior Cameras - Ceiling Mounted:

1. Support ceiling housings, assemblies or camera mounts to building structure (do not support from ceiling tiles, drywall, or grid alone).
2. Provide all wiring to camera housing from above finished ceiling. No exposed or hanging wires permitted.

D. Interior Cameras - Wall Mounted:

1. Attach building structure (do not support from drywall).
2. Provide all wiring to camera housing from recessed device box at same elevation as the camera. No exposed or hanging wires permitted.

E. Exterior Cameras:

1. Conceal cables between housing to building structure in flexible weatherproof conduit. Terminate flexible conduit to single gang weatherproof backbox near camera. No exposed or hanging wires permitted.
2. All connectors or connections shall be located within the camera housing or inside the building wall (within accessible ceiling space).
3. Cameras mounted on underside of exterior ceilings shall be surface mounted, with all wiring concealed above ceiling.

F. Field Wiring:

1. Comply with NFPA 70 National Electrical Code.
2. Install all wiring, without conduit or raceways, concealed within walls and above finished ceilings. Use surface raceways where concealment is not possible.
3. Wiring within walls shall be in rigid or flexible conduit.
4. Do not mix CCTV cabling with wiring of any other system.
5. Provide conduit sleeves for cabling running through exterior walls.
6. Do not splice video, power or control cables at any point between devices or equipment, unless the length of the run exceeds to available reel length of available cables. Necessary splices shall be enclosed inside a labeled junction box.

7. All wiring shall be installed above accessible ceilings.
8. Install cables in cable tray, where applicable, except where making final runs to cameras or video equipment.
9. Provide adequate supports for cabling, as recommended by cable manufacturer, where not installed in cable tray. Do not lay directly on ceilings.
10. Do not install cables closer than 12 inches to:
  - a. Fluorescent, HID ballasts/fixtures & dimming systems.
  - b. HVAC equipment and controls.
  - c. Digital or CPU controlled equipment.
11. Install all cabling so as to limit exposure to EMI/RFI sources.
12. Do not install where subject to damage such as heat, physical contact or abrasion.
13. Do not install in conduit with any other wiring systems.

### 3.3 CONSTRUCTION

#### A. Grounding:

1. Ground cable shields and equipment according to system manufacturer's instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments.
2. Signal Ground Terminal: Locate at main equipment rack or cabinet. Isolate from power system and equipment grounding.
3. Ground equipment and conductor and cable shields.

#### B. Underground Circuit Protection:

1. Provide lightning protection for all underground or exterior circuits, as per NEC.

#### C. Identification: Identify system components, wiring, cabling, and terminals according to Division 16 Section "Basic Electrical Materials and Methods."

### 3.4 FIELD QUALITY CONTROL

#### A. Manufacturer's Field Services:

1. Assist in the troubleshooting, as necessary to provide a system free from all faults, trouble conditions, etc. prior to owner demonstration and required training.

- B. Pretesting:
1. After installation, align, adjust, and operate the system to assure proper operation of all features and controls.
  2. Determine, through pretesting, the conformance of the system to the requirements of the Drawings and Specifications.
  3. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new ones and retest until satisfactory performance and conditions are achieved.
  4. Prepare forms for systematic recording of acceptance test results.
- C. Report of Pretesting: After pretesting is complete, provide a letter certifying the installation is complete and fully operable, including the names and titles of the witnesses to the preliminary tests.
- D. Minimum System Tests: Test the system according to the manufacturer's recommended procedures. Minimum required tests are as follows:
1. System is free from grounded or open circuits.
  2. System has no interference or anomalies that affect picture quality.
  3. Each camera functions properly under all conditions encountered at the location including, daylight, artificial light, weather, etc.
  4. Camera displays indicate titling as directed by owner for each view.
  5. All video monitors display camera views properly and are fine tuned for picture quality.
  6. Video recording and playback equipment functions properly.
  7. Camera controls and video display controls function properly for image scanning, split screen, etc.
  8. Video devices function as specified and produce picture quality in compliance with specification.
  9. Any test such as loss of power supplies, will initiate the proper system response in compliance with specification.
- E. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.

### 3.5 ADJUSTING

A. Camera Adjustments:

1. Initial Settings: Provide initial setting of all lens and camera parameters prior

- to owner demonstration, based on assumed room use.
2. Final adjustments: Provide adjustments to such settings after Owner occupancy, where required, due to actual room use, environmental conditions, reported problems, etc.

B. Control Adjustments:

1. Initial Settings: Provide initial setting of all control and recording system parameters prior to final owner demonstration.
2. Final adjustments: Provide adjustments to such settings after Owner occupancy, where required, due to actual system use, environmental conditions, reported problems, etc.

### 3.6 CLEANING

A. General:

1. Remove paint splatters and other spots, dirt, and debris.
2. Touch up scratches and marred finishes to match original finish.
3. Clean all camera housings, and panels on interior and exterior of camera view ports.
4. Clean all camera lenses and dome housings.
5. Perform all cleaning using methods and materials recommended by equipment manufacturers.

### 3.7 TRAINING AND DEMONSTRATION

A. System installer shall provide a factory trained representative for purpose of instructing the owner's maintenance personnel:

1. Discuss proper operation, maintenance, and use of system.
2. Instructor shall be factory trained representative fully knowledgeable of the installed system and all components.
3. Training shall be completed at the project site following Owner occupancy, at Owner's discretion. Training to consist of minimum of two (2) hours of training and instruction.
4. Training and demonstrations shall utilize the installed system and equipment.
5. Schedule after all final tests and adjustments are complete.
6. Training shall include use of delivered O&M manuals.

### 3.8 DRAWINGS:

A. The contractor shall furnish three (3) copies of all plans, drawings and schematics to

the owner after the acceptance test. The drawings shall show all terminal designation, location of all cameras, control equipment, junction boxes, terminal cabinets, devices, wiring and conduit routings.

### 3.9 WARRANTY AND SERVICE

- A. Warrant the equipment and wiring free from electrical and mechanical defects for a period of two years from the date of Owner's acceptance of system.
- B. The Contractor shall employ a factory-trained service organization within 35 miles of the job site. This organization shall have a minimum of seven (7) years experience in servicing Integrated CCTV Surveillance Systems and equipment.
- C. Fully qualified repair and maintenance personnel shall be available on a twenty-four (24) hour a day basis, three hundred and sixty-five (365) days a year, with four (4) hour maximum response time for service.
- D. Normal service shall be defined as minor repairs and/or adjustments. Service of this nature shall be provided at no cost to the Customer during normal business hours, which are between 8:00AM and 5:00PM, Monday through Friday. For service calls requested by phone before 11:00 AM on a weekday, service shall occur on a same-day basis.
- E. Emergency service shall be required for emergencies defined as critical equipment not being functional, and shall be furnished at no cost to the Customer during the warranty period. Emergency service shall respond within a four (4) hour period, twenty-four (24) hours per day, three hundred and sixty-five (365) days a year. A list of critical equipment shall be developed and coordinated by the Customer and the Contractor.

END OF SECTION

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## SECTION 28 60 10 - INTEGRATED INTRUSION DETECTION SYSTEM

### PART 1 GENERAL

#### 1.1 SUMMARY

- A. This section includes furnishing, assembly, construction, installation, connection, testing and extending the existing integrated intrusion detection system.

#### 1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section.
- B. Related Sections: The following sections contain requirements that relate to this Section:
  - 1. Section "Fire Alarm Systems" for coordination and interface with fire alarm system.
  - 2. Section "Access Control Systems" for coordination and interface requirements.
  - 3. Section "Camera Surveillance Systems" for coordination and interface requirements.
  - 4. Section "Common Work Results for Electrical Systems" for general requirements, submittal requirements, coordination, project conditions, labeling, fire stopping, commissioning, equipment supports, installation and construction requirements, demolition, quality control, identification, and all other applicable paragraphs.
  - 5. Section "Grounding" for grounding, requirements of equipment.
  - 6. Section "Conductors and Cables" for cabling requirements.
  - 7. Section "Raceways & Boxes" for conduit, raceway and box requirements.
  - 8. Section "Telecommunication Systems" for coordination with telephone system, network and communication voice cable requirements.

#### 1.3 GENERAL

- A. Coordinate all related work, specified elsewhere, with the intrusion detection equipment.
- B. This Intrusion Detection System shall include motion detectors, door sensors, signal equipment, controls, wiring, raceways, and devices. Provide all other accessories and miscellaneous items required for an operating system.
- C. Installer shall meet the entire intent of these specifications and associated drawings.



Deviations from specified equipment and/or operation of the system shall not be permitted.

#### 1.4 SUBMITTALS

- A. General: Submit the following according to the Conditions of the Contract and Specification Sections.
- B. Product data, including dimensions, construction, materials, performance data, etc.
- C. Provide proof of required certifications and installer qualifications.
- D. Operation and maintenance data for materials and products to include in the "Operating and Maintenance Manual".
- E. Provide submittal data for each system, as follows:
  - 1. To verify specifications have been met.
  - 2. Clearly indicate or state all options, etc.:
    - a. Manufacturer/cat. number.
    - b. Manufacturer's options.
    - c. Accessories.
    - d. Indicate point of connections with other equipment or systems.
  - 3. Bill of materials showing quantities and model numbers.
  - 4. Manufacturer's data on all proposed equipment.
    - a. Highlight or clearly indicate all items to be provided.
  - 5. Proof of component and central station UL Listing.
  - 6. Sequence of operation for all modes:
    - a. Alarm conditions.
    - b. Trouble conditions.
    - c. Entry/Exit procedures.
    - d. Arming/disarming functions.
    - e. Zone bypass/shunt functions.
    - f. Other functions (Programming, Reset, etc.).
  - 7. Drawings:
    - a. Riser diagrams showing all devices and wiring types.
    - b. Wiring connection diagrams for each connected device.
    - c. Details/drawing of remote annunciator panel(s) or arming stations.

#### 1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: All system components shall be furnished by manufacturers of established reputation and experience who shall have produced currently operating Integrated Intrusion Detections Systems. Manufacturer shall be

able to refer to similar installations rendering satisfactory service. Proposed equipment manufacturer must meet the following:

1. All products designed and manufactured to ISO 9001 standards.
2. Engaged in manufacturing of Intrusion Detection Systems at least 10 years.
3. System shall be of latest design. No obsolete or pending obsolete parts shall be used.
4. Provide technical support to installer.

B. Installer Qualifications: Engage an experienced factory-authorized Installer to perform work of this Section.

1. Installing contractor must meet the following:
  - a. Factory trained Technicians to install the proposed system.
  - b. The installer e Installer must be certified by Honeywell Integrated Security Dealer Service Certification Program (DSCP).
  - c. The installer shall be installer shall be a Honeywell Commercial Security Systems (CSS) Dealer. Proof of compliance with manufacturer's system installation certification program must be provided in writing to owner along with submittal.
  - d. Contractor shall maintain a minimum of one (1) employee possessing a valid certificate of competency issued by the National Institute of Certification in Engineering Technologies (NICET Level 3 or 4 for Fire Alarm Systems). Contractor shall be shall provide annual information on NICET certificate holders employed by their company for the purpose of maintenance, repair or inspection activities.
  - e. Shall be an authorized AlarmNet Central Station provider with a minimum (3) years experience monitoring, installing and servicing AlarmNet communication equipment.
  - f. Shall provide network compatible Honeywell Compass support for upload/download services.
  - g. Company shall employ experienced installation and service Technicians that are certified to work with Network systems (minimum CompTIA Network+ Certified).
  - h. Hold all legally required state and local contractor's licenses necessary to accomplish the installation and activation of the described system. Copies of required licenses shall be submitted prior to start of work.
  - i. The system contractor shall have been regularly engaged in the access control business for the past (7) years and shall provide proof of installing at least (6) systems of the same design/manufacturer in the past two years at similar facilities in the local area; no exceptions.
  - j. Maintain current stock of all spare parts at local service organization.
  - k. Provide local maintenance and service with location less than 35 miles from project site.

- l. Provide list of technical support staff, project experience, training, etc. as requested. Staff must be factory trained or have received on-site training from manufacturer.
    - m. Make all final connections, adjustments, and supervision for system testing.
    - n. Provide all system programming.
  - 2. Provide references upon request:
    - a. Names of (6) similar projects in size and scope.
    - b. Contact person and phone number for each project.
- C. Single source responsibility: The complete performance of the assembled system, including all accessories shall be the sole responsibility of the supplier. It is the installer's responsibility to ensure that all factory and field installed accessories and loose components used in the system, meet these specifications, and perform up to the stated and tested standard.
- D. Comply with the applicable building code, local ordinances, and regulations, and the requirements of the authorities having jurisdiction. Installation and operation shall conform to the latest applicable requirements of the following publications:
  - 1. National Fire Protection Association (NFPA):
    - a. NFPA 70 National Electrical Code
    - b. NFPA 101 Code for Safety to Life from Fire in Buildings and Structures
  - 2. Underwriters Laboratories (UL):
    - a. Electrical Construction Materials Directory
  - 3. Factory Mutual Approval Guide
  - 4. American Insurance Association Fire Protection Code (Article 14)
  - 5. Building Officials and Code Administration (BOCA) National Building Code
  - 6. Americans with Disabilities Act (ADA)
  - 7. Occupational Safety and Health Act
- E. Certification of all system components:
  - 1. Catalogued by the system manufacturer.
  - 2. UL Listing of each component individually.
  - 3. All components shall be recognized by the control system manufacturer for use and compatibility with proposed system.

## 1.6 COORDINATION WITH OTHER TRADES

- A. Coordinate intrusion detection system connections and equipment locations with other equipment, construction, and installers prior to ordering or installing any wiring, materials, etc.

1. Electrical door hardware and releases.
  2. Fire Alarm systems.
  3. Access Control systems.
  4. Door/frame installation.
  5. Communication/Network Systems.
- B. Coordinate protection/detection zones with Owner, or other structural elements, and specifications for proper function. Specifically, coordinate the arming/bypass of any subzones from remote entry points while remainder of building is protected.

## 1.7 SYSTEM OPERATION

- A. System shall detect unauthorized entry via:
1. Magnetic door contacts.
  2. Interior motion detectors.
- B. Addressable system: Initiating devices shall report via individual addresses for specific alarm point identification. All zones shall report in alpha/numeric English language for ease of identification of trouble and zone alarms.
- C. All alarms and reporting shall be via LCD status message display. Remote arming station/annunciator panels shall display all alarms, trouble messages, etc. in alpha/numeric English language.
- D. Upon detection of unauthorized entry, the system shall report alarm information at the main control panel, display alarm information at the remote annunciator panels, and send all digital reports to a central station alarm monitoring company.
- E. The system alarm shall activate audible interior and exterior speaker/sirens at the building. Exterior sirens shall be supervised with tamper switch.
- F. Security alarm system shall have ability for programmed partitioning to allow after hours use of defined areas while the remainder of the building is armed.
- G. System shall include a voice annunciation alert interface. Provides voice message pre-alert prior to security system arming. Upon arming of system, a pre-alert voice message shall annunciate throughout the facility. A custom voice message shall alert any remaining occupants that system will be activated in 5 minutes or time period as instructed by owner. Provide a line level output for connection to PA, intercom or telephone system.

## PART 2 PRODUCTS

## 2.1 MANUFACTURER

- A. No Substitutes. To insure system uniformity and compatibility with all other Washington County Public Schools Intrusion systems, alternative equipment other than the exact make and model number identified in this specification will not be accepted.
- B. All equipment shall be of the same design and manufacturer as existing Intrusion Systems currently in use by Washington County Public Schools. Provide Honeywell control panel/keypad and related equipment as specified. Alternative manufacturers will not be compatible with the existing equipment and will not be accepted.

## 2.2 CONTROL/COMMUNICATOR PANEL

- A. The existing Honeywell UL Fire/Burglary addressable control panel will be utilized to support all new security protection. Control Panel is located in the existing MDF (BISFA).
- B. Installation of an enclosed tampered attack resistant cabinet shall be installed near the existing control panel to support all new zone expanders and relay boards. Install HONEYWELL UL-KT cabinet.
- C. System shall operate as an addressable system on twisted pair communication wires. Provide shielded wire for all circuits per Manufacturer's specifications.
- D. Upon arming the system from the remote stations, the user shall have a (programmable) delay to exit and secure the building prior to actual activation of detector zones.

## 2.3 REMOTE KEYPAD ANNUNCIATORS

- A. Provide remote keypad annunciators as shown on drawings for control of security system from selected entry points.
  - 1. Semi- flush wall mounted.
  - 2. Touch pad for arming and disarming system.
  - 3. LED's for status indication.
    - a. Green LED - normal status, READY TO ARM.
    - b. Red LED - system ARMED.
  - 4. The installer shall select a height recommended by ADA standards, and mount the keypad onto back box, ensuring that the keypad is level. Where possible, the installer shall align the keypad with other nearby switches or fixtures.
  - 5. The installer shall route the system's ECP bus to the location of each system keypad. Keypad leads shall be connected to the ECP bus according to

manufacturer instructions.

- B. Alpha/numeric English language display:
  - 1. Pre-programmed message display any system alarm or trouble condition.
  - 2. When in ready mode, display shall indicate SYSTEM READY.
  - 3. 32 character backlit LCD display (16 x 2 lines).
  - 4. Keypad shall be UL approved.
- C. System shall be disarmed through use of integrated Access Control System Smart Card Readers via authorized Smart Cards.
- D. Entry into the armed building shall require the user to deactivate the system via entry of number code at touch pad or integrated access system Smart card. A warning tone shall sound upon entry identifying that the system has been breached and must be deactivated within an adjustable time period. A 45 second delay shall be present prior to general alarm for entry doors at the remote arming stations only. Entry through any other door or into non-time-delay motion detector zones shall cause immediate alarm.
- E. Faulted zones shall be identified at all keypad/annunciator LCD message displays. Prior to arming system, faulted zones must be corrected or bypassed. Any zone in fault shall cause the READY TO ARM message to extinguish at all arming stations, and shall prohibit arming of the system.
- F. Keypad annunciators shall be HONEYWELL 6160.

## 2.4 MOTION DETECTORS

- A. Motion detectors shall be dual technology with built-in addressable point module.
- B. PIR Detector construction features:
  - 1. Advanced dual core processor.
  - 2. K-Band microwave technology.
  - 3. High/Low pulse count selectable.
  - 4. Walk test LED.
  - 5. Fluorescent light filter
  - 6. Field adjustable sensitivity.
  - 7. Internal tamper switch contact.
  - 8. RFI immunity.
- C. Wall and ceiling mounted detectors:

1. Customizable coverage patterns
  - a. 50' x 60'
  - b. 35' x 40'
2. Standard mounting at 6 to 9 feet above floor.
3. Installer shall activate all onboard tamper switches and equipment, and shall verify that the system responds to tamper activation according to the owner's direction
4. Motion detectors shall be HONEYWELL ADDRESSABLE DT7500SN with SMB10 and SMB10C mounting brackets. Include DT7000-LRLK long range lenses for all motion sensors.

## 2.5 MAGNETIC DOOR CONTACTS

### A. Concealed magnetic door contact switches:

1. Fully recessed in wood or steel doors and frames.
2. 3/4" diameter, wide gap.
3. Hermetically sealed contacts.
4. Contacts supervised for open circuits, wiring shorts.
5. Unaffected by normal temperature swings, vibration, shock, etc.
6. Door contacts shall be HONEYWELL with 4190SN remote point module. Install on main level perimeter doors.

## 2.6 REMOTE POINT MODULES

- A. Provide V-Plex addressable Remote Point Modules (RPM's) at every detection device to provide addressable interface and single point identification of each device via control panel. RPM's shall be mounted within 6 feet of each monitored device and shall be mounted in a 1900 box, with wiring connections made within box.
- B. A single RPM shall be permitted to monitor two door contact switches where the contacts are installed on two leaves of the same door.
- C. Provide all wiring for connection of RPM's to Control panel and to each field device. Provide wiring, connections and EOL resistors for each hard-wired device connection to RPM.
- D. Provide necessary RPM's to supervise Access Control System door ajar alarm outputs. See Access Control System specification for detailed integration requirements.
- E. Provide HONEYWELL V-PLEX 4190SN REMOTE POINT MODULES.

## 2.7 ZONE EXPANDER BOARDS

- A. Provide V-Plex zone expander boards to supervise Generator and Fire alarm system outputs. Expander boards shall be mounted inside a dedicated Honeywell UL-KT cabinet.
- B. Provide dedicated zone expanders to supervise outputs from the Fire Alarm System and Generator. See Integrated Intrusion Alarm System Riser Diagram for zone types to be supervised.
- C. Provide all wiring for connection of Zone Expander's to Control panel. Provide connections and EOL resistors for each hard-wired device connection to Zone Expander.
- D. Provide two (2) HONEYWELL 4208SN ZONE EXPANDER BOARDS.

## 2.8 V-PLEX BUS EXTENTION/ISOLATOR MODULES

- A. V-Plex bus branch circuits shall be scaleable to increase the total size of the bus in larger installations. Branch circuits leading from different areas of building or from different floors in multi-story buildings shall be isolated from one another so that a shorted or grounded branch circuit is isolated away from other near-side branch circuits, allowing other V-Plex devices to be isolated so that they can continue to operate. The installer shall follow manufacture's instructions when installing and programming system equipment.
  - 1. 12VDC power shall be provided by Honeywell supervised power supply.
  - 2. Each 4297 module shall connect to a number of devices, which Unit Loads added together shall not exceed 128mA. Devices remaining over 128mA shall be connected to a different 4297 module. (follow manufacturer's documentation).
  - 3. The total V-Plex bus circuit shall not exceed a total cumulative length of 12,000 feet.
  - 4. Provide one (1) HONEYWELL 4297 V-PLEX BUS EXTENSION/ISOLATION MODULE mounted in UL-KT cabinet.
  - 5. Provide two (2) HONEYWELL VSI V-PLEX SHORT ISOLATORS to support new additions.

## 2.9 PROGRAMMABLE INTELLIGENT RELAYS

- A. Provide programmable relay boards installed within separate UL-KT cabinet beside existing control panel. Board shall consist of four (4) programmable relays capable of individual programmed response to system activity. Relays shall contain Form C contacts with N.O. and N.C. contacts rated 2.0 A @ 28VDC/AC.
  - 1. One (1) relay shall be programmed and wired to interior speaker/sirens. Relay



shall be programmed to activate upon any alarm condition and deactivate upon alarm reset or time out period as defined by owner.

2. One (1) relay shall be programmed and wired to exterior siren. Relay shall be programmed to activate upon any alarm condition and deactivate upon alarm reset or time out period as defined by owner.
3. One (1) relay shall be programmed and wired to CCTV Surveillance System. Relay shall be programmed to activate upon any alarm condition and deactivate upon alarm reset.
4. One (1) relay shall be programmed and wired to CCTV Surveillance System to provide intrusion system armed/disarmed status.
5. One (1) relay shall be programmed and wired to Honeywell Access Control System to provide intrusion system armed/disarmed status.

- B. Provide two (2) HONEYWELL 4204 PROGRAMMABLE INTELLIGENT RELAY BOARDS.

#### 2.10 AUDIBLE ALARM SIRENS

- A. Provide (1) HONEYWELL 748LC OUTDOOR DUAL TONE SPEAKER/SIREN as indicated on drawings near front main entrance. Provide 4190SN RPM to supervise speaker tamper switch.
- B. System shall include a voice annunciation alert interface. Provides voice message pre-alert within building prior to security system arming. Upon arming of system, a pre-alert voice message shall annunciate throughout the facility. A custom voice message shall alert any remaining occupants that system will be activated in 5 minutes or time period as instructed by owner. Upon alarm Provide a line level output for connection to intercom or telephone system. Provide two (2) ELK-120 RECORDABLE VOICE MODULES.

#### 2.11 AUXILIARY POWER SUPPLY

- A. Provide auxiliary power supply to supplement Honeywell control panel. Provide Honeywell HP400ULPD8CB power supply with two (2) 10Ah batteries. Supervise low battery and AC power loss conditions with 4190SN RPM's.

#### 2.12 SURGE PROTECTION

- A. Provide transient voltage surge protectors for the 120-volt circuit serving new auxiliary power supply.
- B. All surge protectors shall be hard wired and contained within metal enclosures. Units shall be grounded per NEC and manufacturer's recommendations, and mounted adjacent to circuit source panel. Provide one (1) DITEK DTK-120HW surge protector.

## 2.13 SYSTEM FIELD WIRING

- A. All wiring shall be in accordance with manufacturer's instructions and shall meet applicable provisions of national and local codes. All system field wiring shall be supervised:
1. UL Listed, NEC Type CMR.
  2. V-Plex wiring: Shielded, stranded copper # 16 AWG minimum size conductors, with drain wire.
  3. Keypad wiring: stranded copper #18 AWG
  4. Detector power and speakers: Unshielded, stranded copper # 16 AWG minimum size conductors.
  5. Plenum rated, teflon, halar, or other UL Listed insulation for plenum applications.
  6. Larger conductor sizes as recommended by manufacturer.
  7. All new cable shall be pulled from the existing Honeywell control communicator panel.

## 2.14 INTRUSION DETECTION PARTS INVENTORY

- A. The CONTRACTOR shall maintain a stock of replacement parts sufficient to provide responsive same-day or next-day service with a minimum down time. Written verification of required inventory shall be provided prior to completion of installation.
- B. CONTRACTOR to maintain an inventory of one (1) of each of the following critical components:
1. VISTA-128FBPT Control Communicator
  2. 5140DLM dialer
  3. 6160 keypad
  4. 6160CR annunciator
  5. 4204 relay board
  6. 4190SN V-Plex remote point module
  7. 4208SN V-Plex zone expander board
  8. 4297 V-PLEX module
  9. VSI V-PLEX module
  10. DT7500SN V-Plex Dual Technology motion sensor
  11. HP400ULPD8CB power supply
  12. 748LC outdoor speaker/siren
  13. ELK-120 voice module

## PART 3 INSTALLATION

### 3.1 INSTALLATION, GENERAL

- A. Install system according to NECA standards referenced in Parts 1 and 2 of this Section, and per manufacturer's written instructions.

### 3.2 EQUIPMENT INSTALLATION

- A. Mounting height for individual devices shall be as follows (all dimensions above finished floor):

1. Motion Detectors	96" (6" below clg if <8')
2. Remote keypads	54 inches
3. Alarm horns/sirens (interior)	90" inches
4. Glass break sensors	ceiling mount
5. Control Panel	72 inches to top

- B. Wall mounted motion detectors:

- 1. Provide recessed steel backbox for mounting of all detectors.
- 2. Mount detectors at 8 foot AFF, unless otherwise noted.
- 3. Install at locations and heights as recommended by detector manufacturer.
- 4. Minimum of 12" of cable coiled inside box following connection to detector.

- C. Magnetic door contact switches:

- 1. Coordinate with door/frame installer.
- 2. Install contacts at top of door, except for overhead doors or otherwise noted.
- 3. Install in locations of least visibility and where not subject to physical damage.
- 4. For hollow frame doors:
  - a. Concealed magnet and contact elements, recessed in door and frame.
  - b. Flexible steel conduit from frame to accessible ceiling space for wiring.
  - c. Route wiring concealed within frame.
- 5. For grout or masonry filled hollow frame doors:
  - a. Concealed magnet and contact elements, recessed in door and frame.
  - b. 1" EMT conduit sleeve installed from exterior of frame top. Install conduit sleeves prior to filling frames with grout.
  - c. Extend EMT conduit to accessible ceiling space for wiring access.
  - d. Install contact and wiring through sleeve in top of frame.
- 6. For hollow aluminum storefront doors:
  - a. Concealed magnet and contact elements, recessed in door and frame.
  - b. Flexible steel conduit from top frame section (concealed) to accessible ceiling space for wiring.
  - c. Route wiring concealed within frame.

- D. Control Panel:

1. Surface mount.
- E. Remote Disarming Stations and Annunciators: Arrange as indicated, with mounting height of cabinets as indicated.
1. Install semi-flush on back-box.
- F. Remote Auxiliary Power Supplies:
1. Mount in accessible utility spaces, utility closets, etc.
  2. Do not mount above ceilings or in similar spaces.
  3. Surface mount in unfinished areas, or as indicated.
  4. Install in NEMA 1 enclosure with lock.

### 3.3 WIRING WITHIN ENCLOSURES & CABINETS

- A. All wiring shall be installed in a workmanlike manner:
1. Train parallel, or perpendicular, to surfaces.
  2. All connections made to terminal blocks.
  3. Label each terminal in accordance with the wiring diagram for identification.
  4. Crimp-on terminal spade lugs or approved pressure type terminal block connections.
  5. Terminal cabinet to be installed where circuit risers originate or where any circuit tap is made.
  6. All wiring within panels shall be readily accessible without removing any component parts.
  7. Mark each terminal according to the system's wiring diagrams.

### 3.4 FIELD WIRING

- A. Installation of intrusion detection system wiring:
1. Install all wiring, without conduit or raceways, concealed within walls and above finished ceilings. Use surface raceways where concealment is not possible.
  2. Wiring within walls shall be in rigid or flexible conduit.
  3. Do not mix detection system wiring with wiring of any other system.
  4. Use distinctive color-coding for insulation. Distinct from all power wiring colors.
  5. Do not install cabling where subject to damage from excessive heat, physical contact or abrasion.
  6. Provide adequate supports for cabling, as recommended by cable manufacturer, where not installed in cable tray. Do not lay directly on

ceilings.

7. Do not install where subject to EMI or RFI interference. Provide a minimum of 12" of separation from:
  - a. Lighting ballasts.
  - b. Variable speed drives.
  - c. Motors.
  - d. Other electrified equipment.

- B. Cable Taps: Use numbered terminal strips in junction, pull or outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

### 3.5 GROUNDING

- A. Ground cable shields and equipment according to system manufacturer's instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments.
- B. Signal Ground Terminal: Locate at main equipment rack or cabinet. Isolate from power system and equipment grounding.
- C. Ground equipment and conductor and cable shields. For audio circuits, minimize, to the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.

### 3.6 ELECTRICAL POWER

- A. Connect auxiliary control panel power to 120-volt AC power system, as indicated.
  1. Dedicated circuit.
  2. Circuit clearly marked "SECURITY ALARM" on panel directory.
  3. Locking clip for breaker handle to lock in "ON" position, but not prevent tripping of breaker.

### 3.7 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals according to Division 16 Section "Basic Electrical Materials and Methods."

### 3.8 SYSTEM PROGRAMMING

- A. Manufacturer shall provide a trained technician for field programming:
  1. Device addresses.
  2. Control function and monitoring modules.

3. Message displays with signal type (i.e. motion detector, door contact, etc.) and a custom location message.
  4. Location messages shall be approved by Owner to determine exact wording of each location, room, floor or space.
- B. Technician shall provide additional reprogramming services as required for additional devices added during construction, changes due to Final Inspection comments, and Owner changes of display messages, etc.

### 3.9 FIELD QUALITY CONTROL

- A. **Manufacturer's Field Service:** Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and the pretesting, testing, and adjustment of the system.
- B. **Pretesting:**
1. After installation, adjust the system and perform complete pretesting.
  2. Determine, through pretesting, the conformance of the system to the requirements of the Drawings and Specifications.
  3. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new ones and retest until satisfactory performance and conditions are achieved.
  4. Prepare forms for systematic recording of acceptance test results.
- C. **Report of Pretesting:** After pretesting is complete, provide a letter certifying the installation is complete and fully operable, including the names and titles of the witnesses to the preliminary tests.
- D. **Final Test Notice:** Provide a 10-day minimum notice in writing when the system is ready for final acceptance testing.
- E. **Provide all testing to certify the system is complete and fully operable.**
1. Provide written statement of successful test results.
  2. Submit letter to Owner and Architect.
  3. Perform tests in presence of Owner or Authorized Representative.
  4. Manufacturer's technician shall be present to make adjustments related to the testing.
- F. **Minimum System Tests:** Test the system according to the manufacturer's recommended procedures. Minimum required tests are as follows:
1. Absences of grounded, shorted or open circuits.

2. Each initiating device functions as specified.
  3. Abnormal conditions on any supervised circuit or device provided specified trouble signals.
  4. Batteries can operate the system, as specified.
  5. Automatic battery operation upon loss of AC power.
  6. All auxiliary functions are executed correctly, completely and as required.
  7. Communicator successfully transmits to UL Central Station, for each type of condition.
  8. Verify the absence of unwanted voltages between circuit conductors and ground.
  9. Test all conductors for short circuits using an insulation-testing device.
  10. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on the record drawings.
  11. Verify that the control unit is in the normal condition as detailed in the manufacturer's operation and maintenance manual.
  12. Test each detection device for alarm operation and proper response at the control unit.
  13. Test each device for tamper alarm, where applicable, by actually opening the device to trigger the tamper switch.
  14. Perform a walk test of all system motion detectors to prove proper detection throughout the entire area. Verify that no blind or dead spots exist. Make required adjustments to coverage pattern or aiming, to correct deficiencies.
    - a. Test every magnetic contact switch by opening the associated door and verifying control system sensing.
    - b. Test Both Primary and Secondary Power: Verify by test that the secondary power system is capable of operating the system for the period and in the manner specified.
- G. Central Station Testing: Test all new system devices including door and motion sensors to the existing UL Listed central monitoring station. No changes will be made to the existing security devices or central station programming.
1. A print-out of all new devices installed shall be tested to the central station and be provided to the Owner upon completion..
  2. Each zone shall be identified with a alphanumeric description approved by the Owner.
  3. Procedures for central station notification and response shall be coordinated closely with the Owner.
- H. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets the Specifications and complies with applicable standards.
- I. Report of Tests and Inspections: Provide a written record of inspections, tests, and

detailed test results in the form of a test log. Submit log upon the satisfactory completion of tests.

### 3.10 CLEANING AND ADJUSTING

#### A. Cleaning:

1. Remove paint splatters and other spots, dirt, and debris.
2. Touch up scratches and marred finishes to match original finish.
3. Clean front panels of all control panels, annunciators, graphic panels, etc. using methods and materials recommended by manufacturer.

#### B. Motion detector Adjustments:

1. Adjust each detector for optimum operation:
  - a. Sensitivity adjustments.
  - b. Fresnel lens selection.
  - c. Lens masking.
  - d. Reflector adjustments (where applicable).
  - e. Mounting bracket adjustments (where applicable).

### 3.11 DEMONSTRATION

#### A. Intrusion detection system manufacturer shall provide a factory trained representative for purpose of training owner's maintenance personnel:

1. Discuss proper operation, maintenance, and use of system.
2. Instructor shall be factory trained representative fully knowledgeable of the installed system and all components.
3. Training shall be completed at the project site following Owner occupancy, at Owner's discretion. Training to consist of minimum of two (2) hours of training and instruction.
4. Training and demonstrations shall utilize the installed system and equipment.
5. Schedule after all final tests and adjustments are complete.
6. Training shall include use of delivered O&M manuals.

### 3.12 DRAWINGS

- #### A.
- The contractor shall furnish three (3) copies of all plans, drawings and schematics to the owner after the acceptance test. The drawings shall show all terminal designation, location of all junction boxes, terminal cabinets, devices, wiring and conduit routings.



### 3.13 WARRANTY SERVICE

- A. Warrant the equipment and wiring free from electrical and mechanical defects for a period of two (2) years from the date of Owner's acceptance of system.
- B. The Contractor shall employ a factory-trained service organization within 35 miles of the job site. This organization shall have a minimum of seven (7) years experience in servicing integrated Intrusion Alarm Systems and equipment.
- C. Fully qualified repair and maintenance personnel shall be available on a twenty-four (24) hour a day basis, three hundred and sixty-five (365) days a year, with four (4) hour maximum response time for service.
- D. Normal service shall be defined as minor repairs and/or adjustments. Service of this nature shall be provided at no cost to the Customer during normal business hours, which are between 8:00AM and 5:00PM, Monday through Friday. For service calls requested by phone before 11:00 AM on a weekday, service shall occur on a same-day basis.
- E. Emergency service shall be required for emergencies defined as critical equipment not being functional, and shall be furnished at no cost to the Customer during the warranty period. Emergency service shall respond within a four (4) hour period, twenty-four (24) hours per day, three hundred and sixty-five (365) days a year. A list of critical equipment shall be developed and coordinated by the Customer and the Contractor.

END OF SECTION