

PROJECT NAME:		FILLMORE HIGH SCHOOL NEW ATHLETIC COMPLEX	
PROJECT NUMBER:		Project No. 2024-017 / DSA #03-123950	
TO:		RJ Stump Fillmore Unified School Dist.	EMAIL: rj.stump@fillmoreusd.org
		Roy Frey WestGroup Designs	royf@westgroupdesigns.com
DATE:	01/23/25		
FROM:	AMG & Associates, Inc David Silva 661-251-7401	EMAIL:	estimating@ amgassociatesinc.com
DOCUMENT/DIVISION NUMBER:		28 00 00	DRAWING NUMBER: FA000

Regarding the fire alarm system. The specs call for Siemens but the plans show Silent Night. Please advise

Fire alarm to be Silent Night. Spec 28 00 00 has been updated to match drawings.
Daniel Lua, AG Design, 1/29/25

SECTION 28 00 00 –

INTELLIGENT FIRE DETECTION AND ALARM SYSTEM

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Manual and automatic fire alarm and smoke detection system.

1.02 CONTRACTOR QUALIFICATIONS

- A. All work specified in Section 28 00 00 shall be performed (furnished, installed and connected) by a Silent Knight . The fire alarm system contractor shall provide the following documentation to demonstrate compliance with the contract documents and qualifications. Documents shall be bound, indexed in the order listed below and provided during the submittal process. Equipment order, release or installation of any system components shall not occur without stamped approvals from the Project Architect.
 - 1. Contractor's License: A copy of the electronics contractor's valid State of California License.
 - 2. Proof of Experience: Proof that the fire alarm contractor has been regularly engaged in the business of fire alarm contracting consisting of, but not limited to, engineering, fabrication, installation, and servicing of fire alarm systems of the type specified herein for at least the past ten (10) consecutive years. Provide a statement summarizing any pending litigation involving any officer or principal of/or the company, the nature of the litigation and what effect the litigation may carry as it relates to this work in the worst case scenario. Non-disclosure of this item, if later discovered, may result, at the Owner's discretion, in the contractor bearing all costs and any cost related to associated delays in the progress of the work.
 - 3. Insurance Certificates: Copy of fire alarm contractor's current liability insurance and state industrial insurance certificates in conformance with the contract documents.
 - 4. Project List: A List containing at least ten (10) California installations completed within the last five (5) years by the fire alarm contractor that are comparable in scope and nature to that specified in the contract document.
 - 5. Service Capability: Documentation indicating in detail that the fire alarm contractor has competent engineering, installation, service personnel and facilities with reasonable stock of service parts within 100 air miles of the job site.
 - 6. Authorization Letters: Letters from the fire alarm equipment manufacturer stating that the fire alarm contractor is the Factory Authorized Distributor, and is trained and certified for the equipment he proposes to use on this project, and is licensed to purchase and install that software required to provide the specified functions.
 - 7. Certification:

- a. Proof that the fire alarm contractor is Underwriters Laboratories, Inc. (UL) listed under the classification of "PROTECTIVE SIGNALING SERVICES-LOCAL, AUXILIARY, REMOTE STATION AND PROPRIETARY (UUJS).
- b. Copy of the following (NICET) Certificates. Proof that the certificate holders are a part of the fire alarm contractor's local facility servicing this project and will be actively involved in this project.
 - 1) Certified Technologist or Registered Fire Protection Engineer.
 - 2) Technician Level 4 minimum of (1)
- 8. Proof of Trained Personnel: Documentation that the fire alarm contractor has on staff personnel factory-trained and certified for the equipment proposed for this project. Also, a statement that personnel meeting these qualifications are in the local facility, and will be maintained at that facility throughout the project and the warranty period.
- 9. Copy of state of California issued Fire Alarm Certificate cards for all employees working on the project site. These shall be kept up to date at all times with the site / field construction manager.

1.03 DESCRIPTION

- A. This section of the specification includes the furnishing, installation, and connection of the microprocessor controlled, intelligent reporting fire alarm equipment required to form a complete coordinated system ready for operation. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, control panels, auxiliary control devices, annunciators, power supplies, and wiring as shown on the drawings and specified herein.
- B. The fire alarm system shall comply with requirements of NFPA Standard No. 72 for protected premised signaling systems, except as modified and supplemented by this specification. The system shall be electrically supervised and monitor the integrity of all conductors.
- C. The system is that of Silent Knight Company, substitutions will not be considered.

1.04 CODES

- A. The installation shall be made in accordance with the drawings, specification and the following:
 - 1. National Electrical Code, Article 760
 - 2. National Fire Protection Association Standards
 - 3. California State Fire Marshall
 - 4. U.L. 1971
 - 5. Local Codes and Authorities having jurisdiction
 - 6. Codes as listed on the drawings.
- B. The system including all components shall be listed by the California State Fire Marshal (CSFM) and Underwriters Laboratories (UL) Inc. for use as a fire protective signaling system.

1.05 APPROVALS

- A. The system must have proper listing and/or approval from the following nationally recognized agencies:
 - UL Underwriters Laboratories, Inc.
 - CSFM California State Fire Marshal
 - FM Factory Mutual
 - ISO International Standards Organization
- B. The Fire Alarm Contractor shall submit shop drawings to the Project Architect prior to the commencement of any fire alarm system work. Reference section 1.08 of this specification for submittal requirements.

1.06 RELATED WORK AND SPECIFICATIONS

- A. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections of Divisions 1 and 16 of these specifications.
- B. Basic Electrical Materials Section.
- C. Mechanical and Fire Protection Sections.
- D. Interface to Special Extinguishing Systems.

1.07 SCOPE

- A. Provide a new intelligent reporting, microprocessor controlled fire detection system. It shall be installed in accordance with the specifications and drawings.
- B. Provide all hardware, software, programming tools and documentation necessary to replace, modify or install new, the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site.
 - 1. The contractor shall have System Program Labels approved by District's Electronic Supervisor prior to programming the system.
 - 2. The contractor shall make, and include in his bid, all necessary provisions to maintain all existing fire alarm system warranties that are in place on this project site. Existing fire alarm system expansions completed by this contractor shall not void said warranties and this contractor shall warrant his work as defined under the descriptions of system warranties and guarantees of this specification.
- C. All required special programming equipment shall be furnished by the fire alarm contractor, turned over to the District and shall remain on site and shall be covered during the warranty period.
- D. Basic Performance:
 - 1. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded onto a (Class B) signaling line circuit.

2. Initiation device circuits shall be wired (Class B).
 3. Indication appliance circuits shall be wired (Class B).
 4. Digitized electronic signals shall employ check digits or multiple polling.
 5. A Single ground or open on any system signaling line circuit, initiating device circuit, or indicating appliance circuit shall indicate a trouble condition at the control panel.
 6. Alarm signals arriving at the main FACP shall not be lost following a power failure (or outage) until the alarm signal is processed and recorded.
- E. Basic System Functional Operation: When a fire alarm condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:
1. The system Alarm LED shall flash.
 2. A local signal in the control panel shall sound.
 3. Network annunciators shall display and indicate all information associated with the Fire Alarm condition, including the type of alarm point and its location within the protected premises.
 4. Printing and history storage equipment shall log the information associated with Fire alarm Control Panel condition, along with time and date of occurrence.
 5. All system output programs assigned via control by event equations to be activated by the particular point in alarm shall be executed, and the associated System Outputs (alarm indicating appliances and/or relays) shall be activated.
- F. Circuiting Guidelines:
1. All system smoke detectors shall be of the Addressable Analog type. Although each individual device point number and message shall be displayed on the LCD, the initiating devices shall be zoned as follows to provide the appropriate indication on the LED Annunciator.
 2. Provide one alarm initiating zone per device as shown on the plans and annunciator(s).
 - a. Manual stations per floor and building.
 - b. Area smoke detectors, heat detectors and beam detectors per floor and building.
 - c. Duct mounted smoke detectors, combination smoke/fire dampers and door hold devices per floor and building.
 - d. Special Extinguishing Systems.
 - e. Elevator recall and power disconnect.

1.08 SUBMITTALS

- A. Coordination Drawings: Prepare coordination drawings in accordance with the provisions in Section 01300.
- B. The construction documents have been designed based on School District Standards. The system shown on the drawings is a Silent Knight networked system.
- C. Submittal package shall be as follows
 - 1. Within thirty-five (35) calendar days after the date of award of the Contract, the Contractor shall submit eight (8) copies of the complete submission to the Architect for review.
 - 2. The submission shall consist of five (5) major sections with each section separated with index tabs. Each page in the submission shall be numbered chronologically and shall be summarized in the index.
 - 3. The first section shall be the "index" which shall include the project title and address, name of the firm submitting the proposal and name of the Architect.
 - 4. The second section shall include the following items:
 - a. As indicated in Section 1.02 of this specification.
 - 5. The third section shall contain the comparative specification listing, including a complete listing of the characteristics of the equipment to be furnished next to all of the specified equipment's features and functions as stated in the specifications and data sheets. Include CSFM listing sheet for each component.
 - 6. The fourth section shall contain an original factory data sheet for every component in the specifications.
 - 7. The fifth section shall contain a designation schedule for each Fire Alarm System device / component location and complete 1/8" = 1'-0" scale drawing showing system wiring plans.
 - a. Riser Diagram.
 - b. Typical Device Wiring Diagram.
 - c. Wire Legend.
 - d. Battery calculation for each control panel, power supply, field power supply and network annunciator.
 - e. Voltage drop for each notification circuit type per building.
 - f. Floor Plans showing all conduits, sizes and quantity of conductors.
 - g. Mounting Height of each devices and back box requirement.
 - h. Zoning and address description legend.

- D. Failure to comply with all of the requirements listed above will result in the rejection of the entire submittal package.
- E. The Contractor shall provide two (2) copies of an "Operating and Servicing Manual" for the system. The manuals shall be bound in flexible binders. All data shall be printed material or typewritten. Each manual shall include the following: Instructions necessary for the proper operation and servicing of the system; complete as-built installation drawings of the system; a wiring destination schedule for each circuit leaving for each piece of equipment; a schematic diagram of major components with all transistor and IC complements and replacement numbers. Manual shall also include manufacturer's data sheets and installation manuals/instructions for all equipment supplied and installed

1.09 INSTALLATION COMPANY

- A. The fire alarm contractor shall be a UL listed company under the UL classification of (UUJS). The installation company shall UL certify this installation.
- B. The fire alarm contractor shall have a NICET Certified Engineering Technologist and Technicians on staff in their facility directly involved with this project to ensure technical expertise to this project and adherence with these specifications.
- C. The fire alarm contractor shall maintain sufficient stock on hand and have a fully equipped service organization capable of guaranteeing response time within eight (8) hours of service calls, twenty four (24) hours a day, seven (7) days a week to service completed systems.
- D. Equipment, wire and materials shall only be installed by the fire alarm contractor.
- E. The fire alarm contractor shall provide, install and test all equipment related to this section.

PART 2 - PRODUCTS

2.01 GENERAL EQUIPMENT AND MATERIAL REQUIREMENTS

- A. All equipment shall be new and unused. All components and systems shall be designed for uninterrupted duty. All equipment, materials, accessories, devices, and other facilities covered by this specification or noted on contract drawings and installation specifications shall be the best suited for the intended use and shall be provided by a single manufacturer. If provided by different manufacturers, system devices shall be recognized as compatible by both manufacturers and shall both receive equivalent warranties.

2.02 EQUIPMENT MANUFACTURERS

- A. The Fire Alarm System shall be limited to the following manufacturers and suppliers:
 - 1. Silent Knight
- B. To ensure that compatibility and continuity is maintained throughout the existing School District, no other manufacturers or system suppliers will be considered.
- C. Fire alarm system manufacturer shall be ISO 9001 certified.

2.03 EQUIPMENT MANUFACTURERS

- A. Description: Provide a Silent Knight Intelligent Fire Detection and Alarm System as indicated on the plans.
- B. Mechanical Design:
 - 1. The control panel shall be housed in a UL cabinet designed for mounting directly to a wall or vertical surface. The back box shall be suitable for surface or flush mounting.
 - 2. The door shall provide a key lock and shall include a transparent opening for viewing of all indicators.
- C. System Capacity and General Operation:
 - 1. Control panel shall be capable of accommodating all devices shown on the drawing and additional 50% initiating and alarm devices.
 - 2. The Fire Alarm Control Panel shall include a full featured operator interface control and annunciation panel that shall include a backlit Liquid Crystal Display, individual, color coded system status LED's, and an alphanumeric keypad for the Field Programming and Control of the Fire Alarm System.
 - 3. All programming or editing of the program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the Fire Alarm Control Panel.
 - 4. The FACP shall provide the following features: Drift Compensation to extend detector accuracy over life. Sensitivity Test, meeting requirements of NFPA 72, Maintenance Alert Verification, with verification counters. PAS pre-signal, meeting NFPA 72 requirements. Rapid manual station reporting (under 2 seconds). Non-Alarm points for general (non-fire) control. Periodic Detector Test, conducted automatically by software. Pre-alarm for advanced fire warning. Counting "cross-zone" options. March time and temporal coding options. Walk Test, with check for two detectors set to same address. Security Monitor Points, meeting requirements of UL 1076. Control By Time for non-fire operations, with holidays. Day/Night automatic adjustment of detector sensitivity. Device Blink Control for sleeping areas.
- D. Central Microprocessor:
 - 1. The Microprocessor unit shall communicate with, monitor, and control all external interfaces with the control panel. It shall include EPROM for system program storage; non-volatile memory for building-specific program storage; and a "watch dog" timer circuit to detect and report microprocessor failure.
 - 2. The Microprocessor unit shall contain and execute all control by event programs for specific action to be taken if an alarm condition is detected by the system. Such control by event programs shall be held in non-volatile programmable memory, and shall not be lost even if system primary and secondary power failure occurs.
 - 3. The Microprocessor Unit shall also provide a Real Time Clock for time annotation of system displays, printer, and history file. The Time of Day and date shall not be lost if system primary and secondary power supplies fail. The Real Time Clock may also be used to control non-fire functions at programmed time-of-day, day-of-week, and day-of-year.

- E. Display:
1. The Display shall provide all the controls and indicators used by the system operator and may also be used to program all system operational parameters.
 2. The Display shall include status information and custom alphanumeric labels for all Intelligent Detectors, Addressable Modules, and Software zones.
 3. The Display shall provide an 80 character back-lit alphanumeric Liquid Crystal Display (LCD). It shall also provide Light Emitting Diodes (LED's), that will indicate the status of the following system parameters: AC POWER, SYSTEM ALARM, SYSTEM TROUBLE, SIGNAL SILENCED, SUPERVISORY, and PRE -ALARM.
 4. The Display shall provide key touch keypad with control capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels shall be provided to prevent unauthorized system control or programming.
 5. The Display shall include the following operator functions: SIGNAL SILENCE, RESET, DRILL, and ACKNOWLEDGE.
- F. SLC Loop Interface: The SLC Interface shall provide power to, and communicate with, all of the Intelligent/Addressable Detectors and Addressable Modules over a single pair of wires. This SLC Loop shall be capable of operation as NFPA Style 4, Style 6, or Style 7.
- G. Serial Interfaces:
1. An EIA-232 interface between the Fire Alarm Control Panel and UL Listed Electronic Data Processing (EDP) peripherals shall be provided (1AM-WF).
 2. The EIA-232 interface shall allow the use of printers, CRT monitors, and PC compatible computers.
 3. The EIA 485 port for the serial connection of the optional Annunciators and remote LCD displays shall be provided.
 4. The EIA-485 interface may be used for network connection to a Proprietary Receiving Unit.
- H. Field Charging Power Supply: The FCPS is a device designed for use as either a remote 24 volt power supply or used to power Notification Appliances.
1. The FCPS shall offer up to 6.0 amps (4.0 amps continuous) of regulated 24 volt power. It shall include and integral charger designed to charge 7.0 amp hour batteries and to support 24-hour standby.
 2. The Field Charging Power Supply shall have two input triggers. The input trigger shall be a Notification Appliance Circuit (from the fire alarm control panel) or a relay. Four outputs (two Style Y or Z and two Style Y) shall be available for connection to the Notification devices.
 3. The Field Charging Power Supply shall include the ability to delay the AC fail delay per 1996 NFPA requirements.

4. Provide quantity sufficient for a complete and operable system with no voltage drop to a signal device exceeding 8%.

I. Printer:

1. Printers shall be of the automatic type, printing code, time, date, location, category, and condition.
2. The Printer shall provide hard copy printout of all changes in status of the system and shall time stamp such printouts with the current time of day and date. The printer shall be standard carriage with 80 characters per line and shall use standard pin feed paper.
3. The printer shall be enclosed in a separate cabinet suitable for placement on a desk top or table. The printer shall communicate with the control panel using an interface complying with Electrical Industries Association standard EIA 232D. Power to the printer shall be 120 VAC 60 Hz.

J. Field Programming:

1. The system shall be programmable, configurable and expandable in the field without the need for special tools or electronic equipment and shall not require field replacement of electronic integrated circuits.
2. All programming may be accomplished through the standard FACP keypad.
3. All field defined programs shall be stored in non volatile memory.
4. The programming function shall be enabled with a password that may be defined specifically for the system when it is installed. Two levels of password protection shall be provided in addition to a key-lock cabinet. One level is used for status level changes such as zone disabled or manual on/off commands. A second (higher-level) is used for actual change of program information.
5. A special program check function shall be provided to detect common operator errors.
6. An Auto-Program (self-learn) function shall be provided to quickly program initial functions and make the system operational.
7. An off-line programming function, with batch upload/download, shall also be provided.

2.04 SYSTEM COMPONENTS

A. Main Fire Alarm Control Panel (FACP)

1. Silent Knight (Existing – For reference only not required as part of scope)
2. Control Panel enclosure. (Existing – For reference only not required as part of scope)

B. Programmable Electronic Horns: (Indoor/Outdoor)

1. Electronic horns shall operate on 24 VDC nominal.
2. Shall be suitable for mounting on the wall or ceiling.
3. Shall be semi-flush or surface mounted as shown on plans.
4. Devices mounted on the exterior of buildings shall be installed as follows:
 - a. Flush mount device in a soundolier #193-8-6 backbox with a Soundolier VP-161 cover for all stud wall applications.
 - b. Surface mount devices with manufacturer's listed weatherproof backbox for locations where flush mounting can not be utilized (such as concrete, block, brick or similar). Contractor shall notify Architect and engineer of record should such locations exist prior to mounting device. Surface mounted device shall be red in color.
5. Manufacturer: Wheelock AH series

C. Strobe Lights:

1. Shall operate on 24 VDC nominal.
2. Shall meet the requirements of the ADA and UL 1971.
 - a. The maximum pulse duration shall be 2/10ths of one second
 - b. Intensity shall be as specified on the drawings.
 - c. The flash rate shall be one flash per every second.
 - d. The appliance shall be placed 80 inches to bottom of device above the highest floor level within the space, or 6 in below the ceiling, which ever is the lower.
 - e. Candela rating shall be as required per each space.

D. Audible/Visual Combination Devices:

1. Shall meet the applicable requirements of section B listed above for audibility.
2. Shall meet the requirements of section C listed above for visibility.
3. Audible and visual devices shall operate on separate circuits for the expansion of existing systems in order to match existing site conditions. All new system components for audible and visual devices shall operate on a single notification circuit.

E. Addressable Manual Stations:

1. Addressable Manual Stations shall be provided to connect to the Fire Alarm Control Panel Signaling Line Circuit (SLC) Loops.

2. All operated stations shall have a positive, visual indication of operation that cannot be reset without the use of a key.
2. Stations shall be suitable for surface mounting, or semiflush mounting as shown on the plans, and shall be installed at 48 inches above the finished floor.
3. Shall comply with CBC Sections 1117B.6 and 1118b.

F. Intelligent Photoelectric Smoke Detectors: (Low Profile)

1. Smoke detectors shall be intelligent and addressable devices, and shall connect with two wires to one of the Fire Alarm Control Panel Signaling Line Circuit loops.
2. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control pane, send data to the panel representing the analog level of smoke density.
3. The detector shall be ceiling mount and shall include a twist lock base.
4. The detector sensitivity shall be set through the Fire Alarm Control Panel, and shall be adjustable in the field through the field programming of the system. Sensitivity may be automatically adjusted by the panel on a time-of-day basis.
4. Detectors located above finished ceiling or in areas which are not readily visible shall be provided with remote indicator LED's.

G. Intelligent Heat Detectors

1. Heat Detectors shall be Intelligent and Addressable devices, and shall connect with two wires to one of the Fire Alarm Control Panel Signaling Line Circuits.
2. The detectors shall use and electronic sensor to measure thermal conditions caused by a fire.
3. The detectors shall be ceiling mount and shall include a twist lock base.
4. Detectors located above finished ceiling or in areas which are not readily visible shall be provided with remote indicator LED's.

H. Duct Smoke Detectors:

1. In-Duct Smoke Detector Housing shall be completed with an Intelligent Photoelectric Sensor, that provides continuous analog monitoring and alarm verification from the panel.
2. When sufficient smoke is sensed, and alarm signal is initiated at the FACP, and appropriate action taken to shut down air handling systems.
3. Detectors located above finished ceiling or in areas which are not readily visible shall be provided with remote indicator LED's.

I. Monitor Module:

1. Addressable Monitor modules shall be provided to connect one supervised IDC zone of conventional Alarm Initiating Devices (any NO. dry contact device) to one of the Fire Alarm Control Panel Signaling Line Circuit (SLC) Loops.
2. The Monitor Module shall mount in a 4-inch square, 2 1/8" deep electrical box.

J. Control Module:

1. Addressable Control Modules shall be provided control functions with Form "C" contracts.
2. The Control Module shall mount in a 4-inch square 2 1/8" deep electrical box.

K. Network Annunciator:

1. Furnish and install an alphanumeric, liquid crystal display, annunciators.
2. Shall be capable of displaying each individual addressable point. Minimum point capacity shall be not less than 200,000 points.
3. Provide a separate power supply and battery system for this annunciator.

2.05 BATTERIES

A. Battery:

1. Shall be Gel-Cell type.
2. Battery shall have sufficient capacity to power the fire alarm system for not less than twenty-four hours plus five minutes of alarm upon a normal AC power failure.
3. The batteries are to be completely maintenance free.

2.06 CONDUIT AND SURFACE RACEWAY

- A. All conduit, surface raceways, outlet boxes, junction boxes, pull boxes, terminal cabinets, and similar devices required in this section of the work shall be provided under Division 16000 and as shown on drawings.
- B. Conduit and surface raceways shall comply with the requirements of Sections as described in the applicable specification sections.
- C. Conduit shall not enter the Fire Alarm Control Panel, or any other remotely mounted Control Panel equipment or backbox, except where conduit entry is specified by the FACP manufacturer.
- D. All fire alarm related conduits and shall be clearly marked as "Fire Alarm System" and be painted red in color to indicate such system. Paint conduits with 6" red stripe every 36 inches minimum.

2.07 WIRE

- A. All low voltage wire required in this section shall be furnished and installed by the fire alarm contractor.

- B. All wire shall be installed in conduit. Wiring installed in underground conduits shall be approved for wet applications in accordance with the National Electric Code.
- C. All fire alarm system wiring shall be new.
- D. Wiring shall be in accordance with local stated and national codes (e.g., CEC Article 760) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 14 AWG for Initiating Device Circuits and Signaling Line Circuits, and 12 AWG for Indicating Appliance Circuits.
- E. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
- F. Wiring used for the multiplex communication loop shall be 18AWG twisted and shielded and installed in conduit. The system shall permit use of IDC and IAC wiring in the same conduit with the communication loop.
- G. All field wiring shall be completely supervised. In the event of a primary power failure, disconnected standby battery, removal of any internal modules, or any open circuits in the field wiring; a trouble signal will be activated until the system and its associated field wiring are restored to normal condition.

2.08 TERMINAL CABINETS AND JUNCTION BOXES

- A. All boxes and cabinets shall be UL listed for their use and purpose.
- B. Terminal cabinets shall comply with the requirements of Section 16160 Terminal Cabinets.
- C. Provide terminal blocks for all conductors entering and/or exiting each terminal cabinet.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

- A. The wiring of the system shall be executed in accordance with the drawings and the equipment manufacturer's wiring diagrams. Should any variations in these requirements occur, the contractor shall notify the architect before making any changes. It shall be the responsibility of the factory-authorized distributor of the approved equipment to install the equipment and guarantee the system to operate as per plans and specifications.
- B. Furnish all conduit, junction boxes, conductors, equipment plugs, terminal strips, etc., and labor to install a complete and operable system.
- C. The cables within the rack or cabinets shall be carefully cabled and laced with no. 12 Cord waxed linen lacing twine or ty-raps. All cables shall be numbered for identification.
- D. Splices of conductors in underground pull boxes is not permitted.
- E. The labor employed by the contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the owner and architect to engage in the installation and service of this system.

- F. The contractor shall thoroughly clean all equipment and materials. All exposed parts of the equipment, cabinets, and other equipment shall be left in a clean condition, unblemished and free of all dirt, dust, smudges, spots, fingerprints, etc., The contractor shall remove all debris and rubbish occasioned by the electronic systems work from the site. The contractor shall thoroughly clean all buildings of any dirt, debris, rubbish, marks, etc., Caused by the performance of this work.
- G. The system must meet all local and other prevailing codes.
- H. All cabling installations shall be performed by qualified technicians.
- I. All cabling shall be splice free.
- J. In order to ensure the least amount of cable untwisting, it is required that all cables shall be stripped using a special tool.
- K. The use of lubricants (i.e. Yellow 77) to facilitate the installation of cables in conduits is highly discouraged. If such a lubricant must be used, the contractor shall verify the acceptability of the lubricant to be used with the cable manufacturer, prior to using such a lubricant.
- L. Under no circumstance are "channel locks" or other pliers to be used.
- M. All firewalls penetrated by structured cabling shall be sealed by use a non-permanent fire blanket or other method in compliance with the current edition of National Fire Protection Association (NFPA) and the National Electric Code (NEC) or other prevailing code. The contractor must not use concrete or other non-removable substance for fire stopping on cable trays, wireways or conduits. Contractors who use this method will be required to replace all cables affected and provide the original specified access to each effected area.
- N. Contractor shall furnish and install access panels, as required, for devices that require servicing, trouble shooting, testing, etc. Contractor shall coordinate all access panel sizes and locations with architect and other trades prior to rough in.

3.02 SPECIFIC INSTALLATION REQUIREMENTS

- A. The entire system shall be installed in a workmanlike manner in accordance with approved manufacturer's manuals and wiring diagrams. The contractor shall furnish all wiring, conduit, outlet boxes, junction boxes, terminal cabinets and similar devices necessary for the completed installation.
- B. Installation of conduit, outlet boxes, junction boxes, terminal cabinets, special back boxes and similar devices shall comply with the requirements of Division 16000 sections.
- C. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detector heads shall not be installed prior to the system programming and test period. If construction is on going during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.
- D. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas. Verify with the Project Architect prior to any surface mounted installations.

- E. All penetrations of floor slabs and fire walls shall be sleeved (1" conduit minimum) and fire stopped in accordance with the electrical specifications.
- F. Duct mounted Smoke Detectors shall be furnished and wired by this Contractor and installed by the Mechanical Contractor. All shutdown and interface wiring shall be performed by the Electrical Contractor. All air pressure differential testing shall be performed by the Mechanical/Air Balance Contractor.
- G. Sprinkler flow and tamper switches shall be furnished, installed and adjusted by the sprinkler contractor, wired and tested by this Contractor.

3.03 TESTING REQUIREMENTS

- A. Provide all instruments for testing and demonstrating in the presence of the owner's inspector that the frequency response is as stated in the factory data sheets. Check all circuits and wiring to verify they are free of shorts and grounds.
- B. All fire alarm testing shall be in accordance with NFPA 72.
- C. The system shall be pre-tested and documented prior to the final inspection by the AHJ. The owner shall be notified of the pretest 48 hours in advance and shall witness this test if desired.
- D. The pre-test shall include the following
 - 1. All intelligent analog addressable devices shall be tested for current address, sensitivity and user defined message.
 - 2. All wiring shall be tested for continuity, shorts and grounds before the system is activated.
 - 3. Proper operation and execution of all its sequences.
- E. At the final test and inspection, a factory-trained representative of the system manufacturer shall demonstrate to the Owner, his representative and the local fire inspector all its sequence of operations and any additional tests required by the AHJ. In the event the system does not operate properly, the test may be terminated. Corrections shall be made and the testing procedure shall be repeated until it is acceptable to the Owner, his representatives and the fire inspector.
- F. Provide all instruments for testing and demonstrating in the presence of the owner's inspector that the frequency response is as stated in the factory data sheets. Check all circuits and wiring to verify they are free of shorts and grounds.
- G. Contractor shall provide all DSA required testing and certification at no cost to the Owner.

3.04 TRAINING

- A. The contractor shall include in his bid, all costs and charges (including travel, lodging, meals, etc...) required to provide factory certification, equal to that of a Factory Authorized Distributor for two (2) selected Owner's representatives. This training shall occur at the primary factory of the manufacturer and shall allow the selected Owner's representatives to

provide any and all Factory / manufacturer Approved repairs, services, software upgrades, etc. without affecting any available or applicable Manufacturer Warranties.

- B. The contractor shall provide not less than eight (8) hours for site instruction of personnel in the operation and maintenance of the installed systems. Instruction shall be documented and formalized for the Owner and/or Owner's representative. This instruction time shall be divided as directed by the Owner and made available at the completion of the project. This instruction is separate from that indicated in above Section 3.04.A.
 - 1. The instruction shall be presented in an organized and professional manner by a person factory trained in the operation and maintenance of the equipment and who is also thoroughly familiar with the installation.
 - 2. The instruction shall cover the schedule of maintenance required by NFPA 72 and any additional maintenance and testing procedures recommended by the system manufacturer and / or the Division of the State Architect (DSA).
 - 3. Instruction shall be made available to the Local Municipal Fire Department if requested by the Local Authority having Jurisdiction.
- C. Contractor shall provide, and turn over to the Owner at the time of training, one (1) new lap top computer, complete with all hardware and software for the maintenance and testing of the installed fire alarm system. Contractor shall include in his training the use of these programs.

3.05 FINAL ACCEPTANCE

- A. The Owner or Owner's representative may visit the site during the installation of the system to ensure that correct installation practices are being followed.
- B. The Owner or Owner's representative will conduct a final job review once the contractor has finished the job. This review will take place within one week after the contractor notifies the owner.
- C. Two (2) copies of all certification data, as-built drawings and maintenance and operation manuals for all identifications shall be provided to the Owner before the owner's review.
 - 1. Maintenance and Operation manual shall contain
 - a. A detailed narrative description of the system architecture, inputs, notification signaling, auxiliary functions, annunciation, sequence of operations, expansion capability, application considerations and limitations.
 - b. Manufacturer's data sheets and installation manuals for all equipment supplied.
 - 2. As Built Project Drawings and Data
 - a. Drawings consisting of a scaled plan of each building showing the placement of each individual item of the Integrated Life Safety System equipment as

well as raceway size and routing, junction boxes, and conductor size, quantity and color in each raceway.

- b. All drawings must reflect point to point wiring, device address and programmed characteristics as verified in the presence of the engineer and/or the Owner unless device addressing is electronically generated and automatically graphically self-documented by the system.
 - c. All drawings shall be provided in standard .dxf or AutoCAD format in addition to the (2) hard copies to be provided.
- D. The Owner or Owner's representative will review the installation and certification data prior to the system acceptance.
- E. The Owner or Owner's representative may test some of the systems features to ensure that the certification data is correct. If a substantial discrepancy is found, the Owner reserves the right to have an independent consultant perform a certification of the entire system. If such a procedure is undertaken, the cost of the testing will be billed back to the contractor.
- F. In the event that repairs or adjustments are necessary, the contractor shall make these repairs at his own expense. All repairs shall be completed within 10 days from the time they are discovered.
- G. The contractor shall hand to the owner a copy of any applicable installation specific software configurations in disk format.
- H. THE END-USER SHALL RETAIN COMPLETE RIGHTS AND OWNERSHIP TO ALL SOFTWARE RUNNING IN THE SYSTEM AT ALL TIMES. The application program listing (database) for the system, as installed at the time of acceptance by the building owner and/or local AHJ, shall be provided (disk and hard copy printout).
- I. A filled out Record of Completion, similar to the sample provided in NFPA 72, 2002, shall be turned over to the owner at the time of acceptance.

END OF SECTION 28 00 00