

Addendum No. 1

June 10, 2020

A Renovation for:

Anderson County High School Fire Alarm

To: Prime contractors and all others to whom drawings and specifications have been issued. This Addendum forms part of the Contract Documents. It supplements and modifies them as follows:

A pre-bid meeting was conducted on June 8, 2020. Minutes of this meeting are officially adopted via this addendum.

A. Drawings:

Question: Contractor is unable to locate first floor plans of Building 1 and Building 2.

Response: First floor plans for Building 1 and Building 2 are provided on sheet E301. Drawing sheet is attached to addendum.

Question: Background floor plans on Drawing Sheets E305 and E306 is very light. Could a darker print be provided.

Response: Drawing sheets E305 and E306 with improved graphics are attached.

B. Specifications:

Specification 28 46 21 Addressable Fire Alarm System is revised. Refer to attached revised section for specific changes.

End of Addendum

Job Number: 190042-07

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651 E. Fourth Street, Suite 500
Chattanooga, TN 37403
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Architecture: AA26000828
Interiors: IB26000665

MEETING MINUTES

Project: Anderson County High School Fire Alarm System
Comm. No.: 190042-07

Time: 2:00 p.m.

Date: 6-8-2020

Location: 130 Maverick Circle

Members Present:

<i>Member</i>	<i>Company</i>	<i>Email</i>	<i>Phone Number</i>
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See attached Sheet

Meeting Content:

A sign in sheet was provided for all attendees and Architect inquired if all had opportunity to sign it. Advised all in attendance to sign before leaving.

Architect introduced Clay McKamey with Anderson County Schools, Katherine Ajmeri with Anderson County Purchasing Department, Steve Walker with MBI, Chuck Grant with MBI, and self (Jessica Carle) with MBI.

Architect thanked all for attending the meeting.

Architect advised that building would be available for viewing today at meeting and directed those wishing to return at a later time to contact Clay McKamey to schedule a time. Clay's contact information is provided on the drawing cover sheet.

Bids will be received at the Anderson County Purchasing Office in Clinton until 2:30 p.m. on Thursday June 18th. The address is 100 North Main Street – Suite 214. The time will be dictated by the clock in the purchasing department which may vary from cell phones.

Architect inquired if the bid date or time placed a hardship on any in attendance and none was indicated.

Architect announced that documents are being submitted to the State Fire Marshal and the County for plans review concurrently with bidding.

A bid bond is required. Refer to the project manual for additional information.

The successful bidder will also be required to provide performance and payment bonds for 100% of the contract sum.

Architect advised all bidders to review the insurance requirements in the project manual

including the County Document Insurance Requirement Acknowledgement and also the requirements in the Supplementary General Conditions of the Contract.

There are no liquidated damages specified for this project.

There is a discretionary fund specified and this is to be 3% of the base bid. Refer to Specification section 01 10 00 Summary of work for additional information.

Architect advised all bidders to note that there are a number of documents provided in the manual that must be completed by the bidder and returned with the bid. These include the
Non-Collusion Affidavit of Prime Bidder
Diversity Business Information
Insurance Requirement Acknowledgement
Background Check Compliance Form
Drug Free Workplace Affidavit
Specification Compliance Form

If any documents are missing or not completed and returned with the bid then the bid may be rejected.

Architect displayed bid form provided in the project manual and reminded all bidders that the form is 2 sided and both sides must be completed. Architect also displayed the bid envelope cover provided in the project manual and informed all bidders that it must also be completed.

Architect will recommend to the owner that any bids that re qualified will be rejected.

The building will be occupied during the work. Egress must be maintained. Additionally, the contractor will need to coordinate work schedule with the owner for access when classes are in session.

Trenching is anticipated as part of the project. The earth is not classified. No test results are available.

Architect informed all bidders that the existing fire alarm system must be maintained in operation until the new system is complete and activated. The owner as directed that if the existing system is damaged or becomes disabled as a result of the contractor's actions or work then the contractor will be responsible for providing a fire watch as required by the Authority Having Jurisdiction.

All parties present had opportunity to tour/inspect the site.

Bidders were provided with opportunity to ask questions.

Question: Is it possible to go overhead with connections instead of trenching.

Response: No. It is not allowed to use overhead connections.

Question: Contractor inquired about installation of new conduit via wall fish vs. exposed conduit.

Response: Owner prefers concealed conduit. Concealed conduit within wall is specified on the drawings.

Clarification: Exposed surface mounted conduit may be used where existing wall is solid grouted. Concealed conduit to be used at all other locations.

Question: Contractor inquired about possibility of installing ceiling mounted equipment instead

of wall equipment. This would eliminate run of conduit through existing masonry walls and conduit would be run above ceiling instead.

Response: Per Engineer and Owner use of ceiling mounted equipment in lieu of wall mounted is an option provided equipment and adjusted design meet code. Owner advised that there is significant amount of existing utility items, both active and abandoned in place, above the ceilings.

Question: Is exposed wire allowed above ceilings in lieu of conduit?

Response: Exposed wire is not allowed. New work will incorporate 100% conduit.

Question: Has a location been identified for new wall panels?

Response: An exact location has not been specified. Owner will coordinate with the Contractor on exact location in the field and will attempt to identify location that will facilitate installation of system. Owner stated that placing the main FACP in a location away from main reception desk and using a Remote Annunciator Panel at the main desk would be an acceptable option

Question: Contractor noted that some existing fire alarm pull stations are 50 inches above finish floor and new locations be lowered. Contractor inquired if pull stations could be surface mounted or if they needed to be cut in.

Response: Pull stations shall be cut in at mounting heights shown on drawings. Owner stated students will cause damage to anything left exposed.

Question: Contractor requested clarification on the warranty to be provided.

Response: Per Spec 28 46 21 section 1.11. a five year warranty from date of substantial completion for fire alarm system equipment and components that fail in materials or workmanship shall be provided. Warranty Extent is defined as all equipment and components not covered in the Maintenance Service Agreement.

Per Spec 28 46 21 section 3.7 Maintenance Service states beginning at substantial completion, maintenance service shall include 12 months full maintenance, including preventative maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operation.

Engineer's clarification of intent: Contractor shall provide 1 year of complete maintenance and testing of the system and must replace anything that stops working within that year. Contractor shall replace any components that fail in materials or workmanship within 5 years.

Question: Existing system is simplex. Is new system required to be simplex?

Response: No – new system is not required to be simplex. New system must meet code requirements.

Question: May concrete walkways be patched after trenching or must entire section of concrete be replaced?

Response: Concrete walkways may be patched.

Question: Contractor asked if there was a rock clause in effect for the project.

Response: No – there is no rock clause.

Question: Contractor asked for clarification of scheduling possibilities.

Response: Per owner night shift is an option if/when students return to building for on site classes. Exact student schedule currently unknown due to COVID.

Clarification: Katherine Ajmeri with Anderson County Purchasing Department announced that any contractors who are not already in the County System may provide a W-9 form with their bid to expedite the contract processes upon award to successful bidder.

Report By:

Jessica Carle, AIA
MBI Companies

All parties should review these minutes and report any discrepancies within 5 working days or these minutes will constitute the official record of the meeting.

Anderson County High School Fire Alarm System

130 Maverick Circle, Clinton, TN

MBI #190042-07

PreBid Meeting

Attendees

June 8, 2020

	Name	Company	Address	Phone/Fax	E-mail
1.	Anthony Copeland	Copeland Brothers Inc	1671 Lake City Hwy	865-457-4290	copebro@comcast.net
2.	Keith Copeland	Copeland Bros		865-457-4290	keithcope@comcast.net
3.	Ralph Vest	CES		865-523-3070	rjwvest@comcast.net
4.	Lynn Davis	CES		865-523-3070	ces.lynn@comcast.net
5.	Randall Davis	Gallaher & Associates		865-970-2471	rdavis@gallahersafe.com
6.	Anthony Wilson	Commercial Bldg Systems	9821 Cogdill Rd	865-824-3063	awilson@cbsincorps.com
7.	John Stafford	Fleenor Security	6700 Baum Dr	865-544-9964	jstafford@fleenorsecurity.com
8.	Katherine Ajmeri	Anderson Co		865-457-6218	kajmeri@andersontn.org
9.	Clay McKamey	Anderson County Schools		865-457-2519	cmckamey@acs.ac
10.	Chuck Grant	MBI	299 N. Weisgarber Rd	865-584-0999	chuckg@mbicompanies.com
11.	Steve Walker	MBI	299 N. Weisgarber Rd	865-584-0999	stevew@mbicompanies.com
12.	Jessica Carle	MBI	299 N. Weisgarber Rd	865-584-0999	jessicac@mbicompanies.com



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PROJECT INFORMATION

PROJECT:
 Anderson County High School Fire Alarm Renovation

PROJECT ADDRESS:
 130 Mayvick Circle
 Clinton, TN 37716

PROJECT NO.: 190042.07

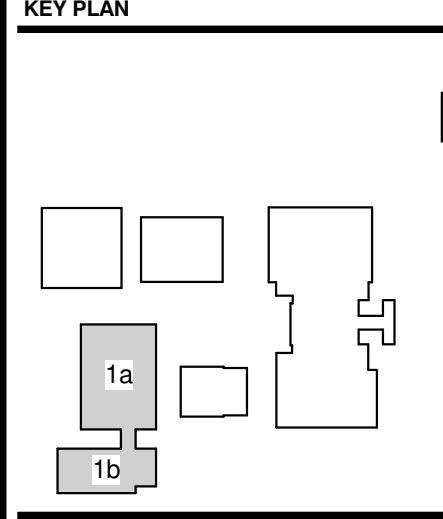
NOTES

ACTIVE DESIGN PHASE

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<input type="checkbox"/>	FOR PERMITTING ONLY
<input type="checkbox"/>	SCHEMATIC DESIGN
<input type="checkbox"/>	DESIGN DEVELOPMENT
<input type="checkbox"/>	CONSTRUCTION BIDDING
<input type="checkbox"/>	CONSTRUCTION DOCUMENTS
<input type="checkbox"/>	AS-BUILT RECORD SET

REVISION INFORMATION

NO.	DATE	DESCRIPTION



SHEET INFORMATION

SHEET ISSUED:	09/22/2020
DESIGNED BY:	SWW
DRAWN BY:	WAH
REVIEWED BY:	SWW
SHEET TITLE:	

1A AND 1B SECOND FLOOR PLAN - FIRE ALARM

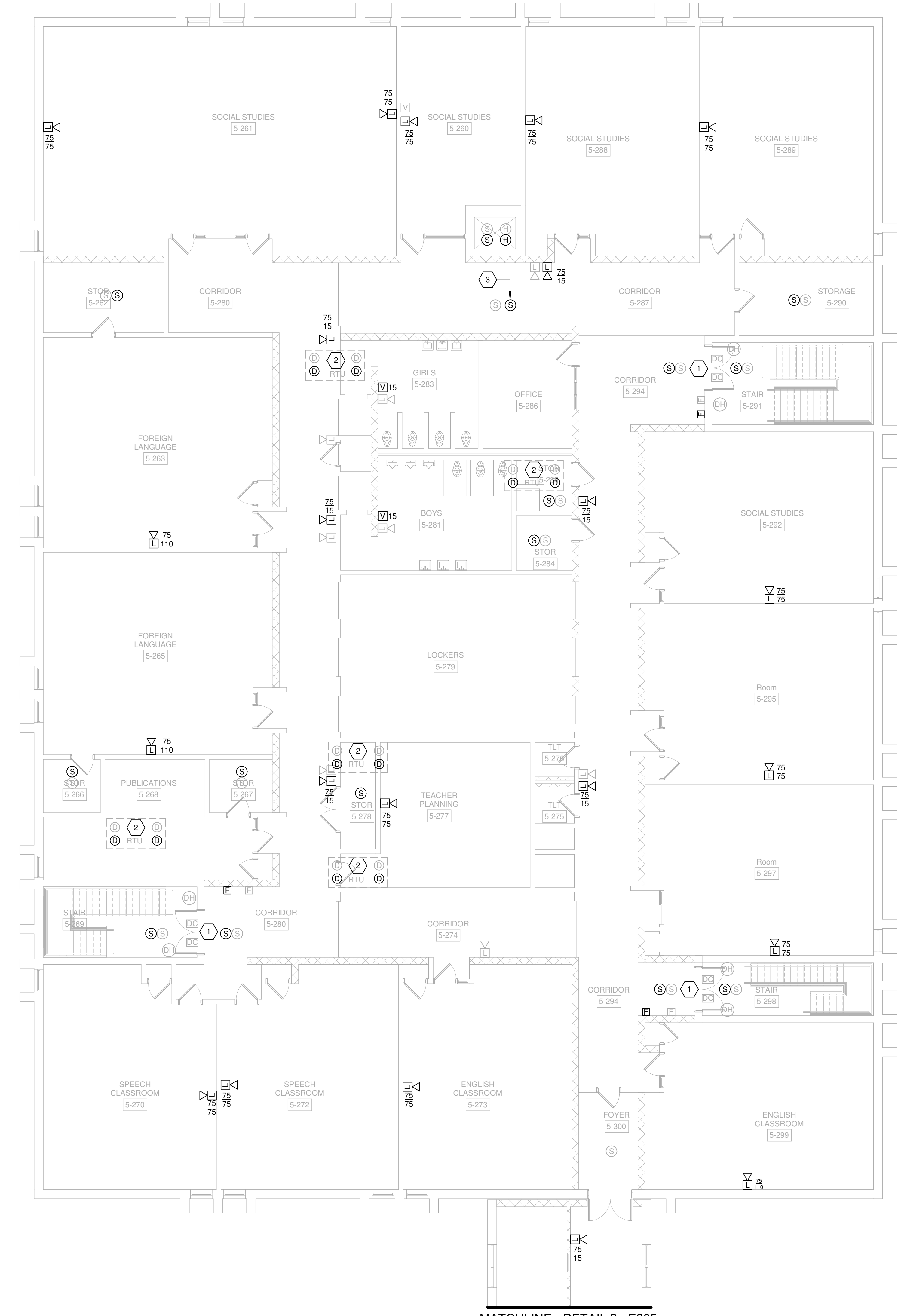
SHEET NO.: **E305**

GENERAL SHEET NOTES

- SEE SHEET E0.1 FOR ELECTRICAL LEGEND AND GENERAL NOTES.
- ALL HALF TONED FIRE ALARM DEVICES SHALL BE DEMOLISHED.

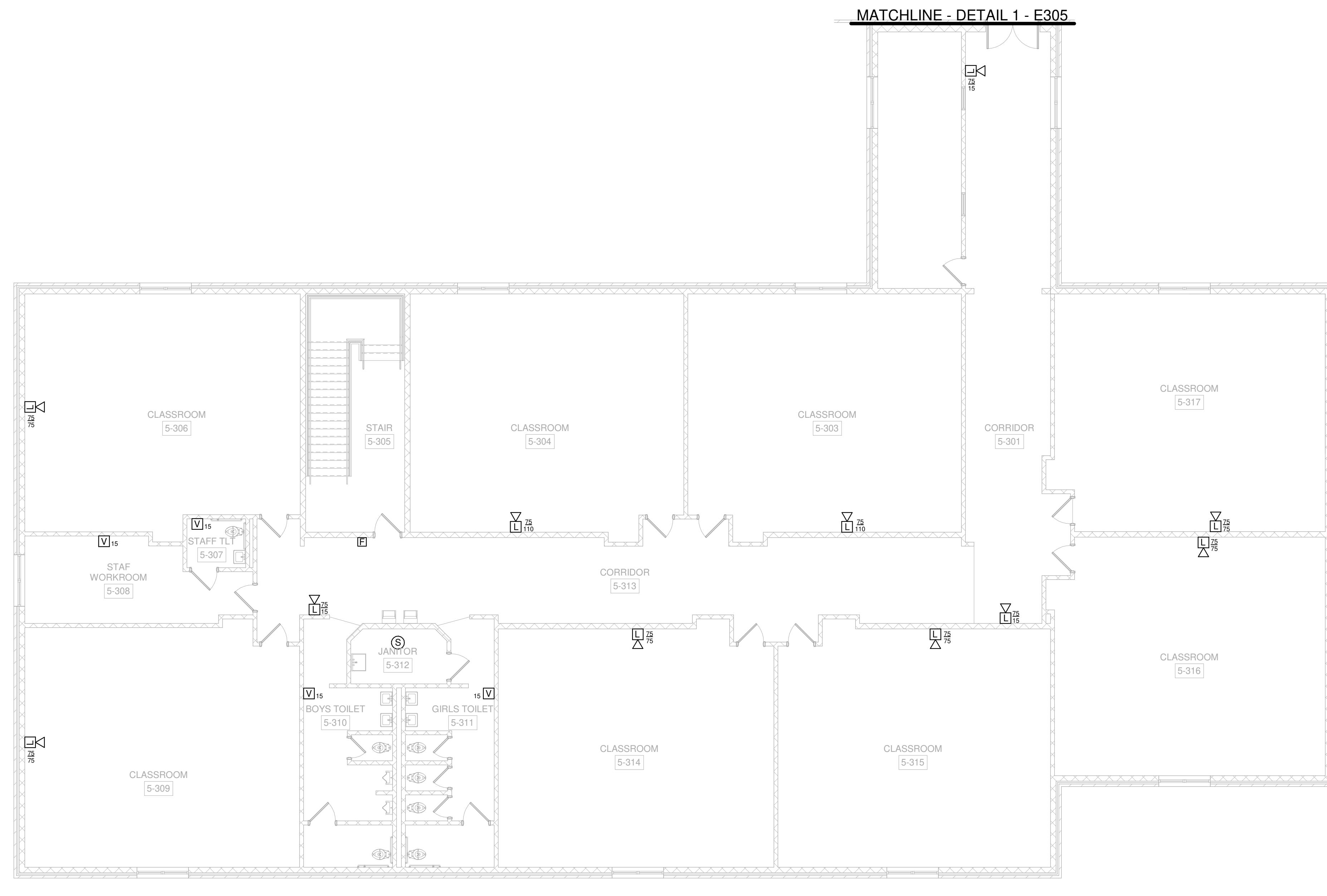
KEYED SHEET NOTES

- PROVIDE NEW SMOKE DETECTORS ON BOTH SIDES OF DOOR AND CONNECT TO NEW FIRE ALARM SYSTEM. CONNECT EXISTING DOORS CONTACTS AND EXISTING DOOR HOLDERS TO DOOR TO RELEASE DOOR AND VERIFY CLOSING UPON SENSING OF SMOKE.
- PROVIDE NEW DUCT DETECTORS, ONE IN SUPPLY AND ONE IN RETURN. CONNECT AUX CONTACTS ON DETECTORS TO SHUT DOWN UNIT UPON ALARM.
- SMOKE DETECTORS FOR ELEVATOR RECALL. CONNECT FIRE ALARM SYSTEM WITH ELEVATOR CONTROLS FOR CODE COMPLIANT OPERATION.



MATCHLINE - DETAIL 2 - E305

BUILDING 1A SECOND FLOOR PLAN - FIRE ALARM
 SCALE: 1/8" = 1'-0"



MATCHLINE - DETAIL 1 - E305

BUILDING 1B SECOND FLOOR PLAN - FIRE ALARM
 SCALE: 1/8" = 1'-0"

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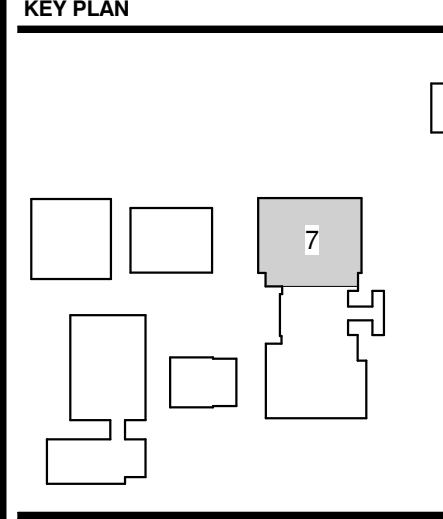
NOTES

ACTIVE DESIGN PHASE

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<input type="checkbox"/>	SCHEMATIC DESIGN
<input type="checkbox"/>	DESIGN DEVELOPMENT
<input type="checkbox"/>	CONSTRUCTION BIDDING
<input checked="" type="checkbox"/>	CONSTRUCTION DOCUMENTS
<input type="checkbox"/>	AS-BUILT RECORD SET

REVISION INFORMATION

NO.	DATE	DESCRIPTION



SHEET INFORMATION

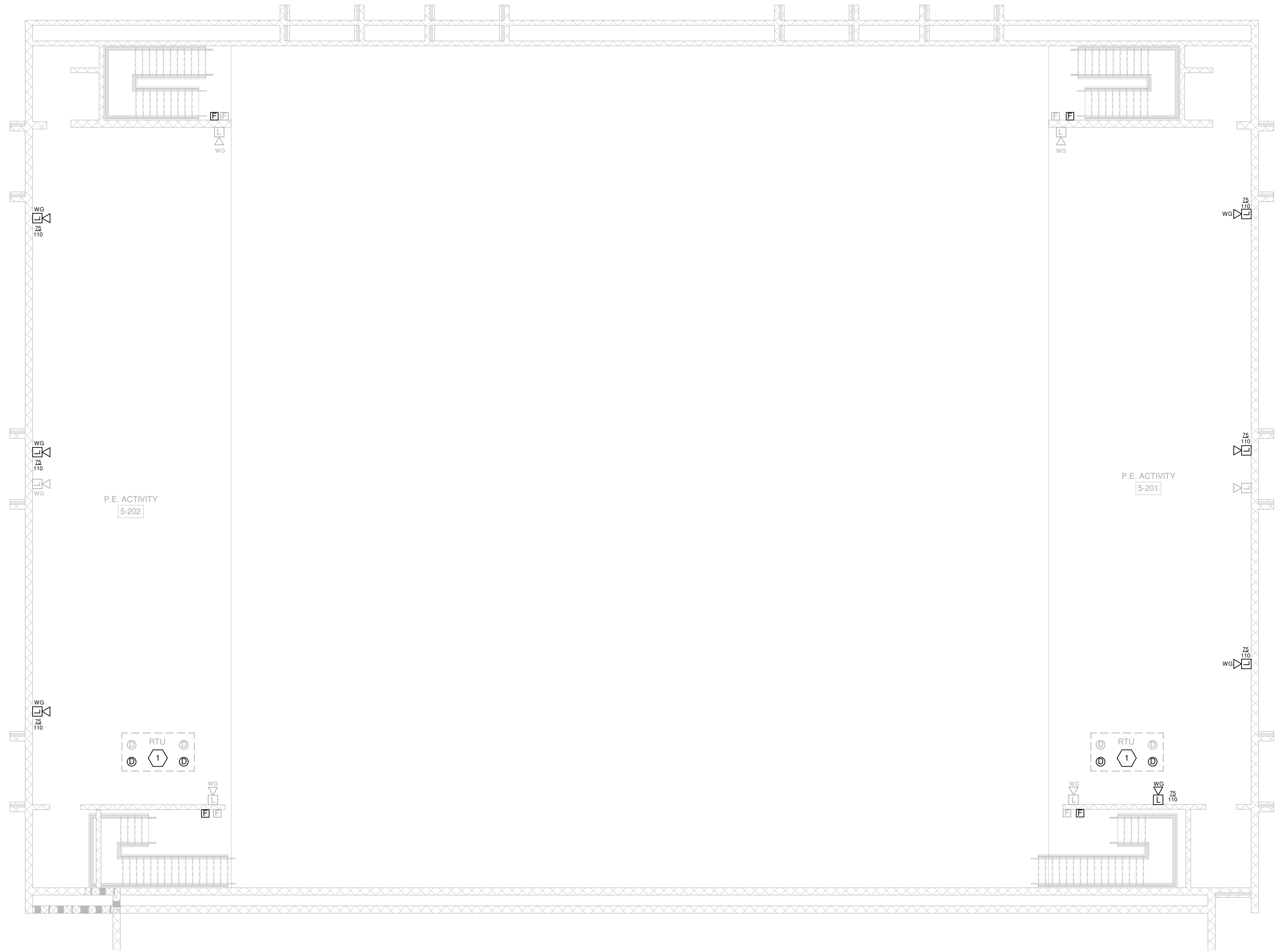
SHEET ISSUED:	09/22/2020
DESIGNED BY:	SWW
DRAWN BY:	WAH
REVIEWED BY:	SWW
SHEET TITLE:	

GENERAL SHEET NOTES

- SEE SHEET E0.1 FOR ELECTRICAL LEGEND AND GENERAL NOTES.
- ALL HALF TONED FIRE ALARM DEVICES SHALL BE DEMOLISHED.

KEYED SHEET NOTES

- PROVIDE NEW DUCT DETECTORS, ONE IN SUPPLY AND ONE IN RETURN. CONNECT AUX CONTACTS ON DETECTORS TO SHUT DOWN UNIT UPON ALARM.



BALCONY FLOOR PLAN - FIRE ALARM

SCALE: 1/8" = 1'-0"

1

SECTION 284621.11 - ADDRESSABLE FIRE-ALARM SYSTEMS

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 unit.
 - 2. Manual fire-alarm boxes.
 - 3. System smoke detectors.
 - 4. Air-sampling smoke detectors.
 - 5. Heat detectors.
 - 6. Notification appliances.
 - 7. Device guards.
 - 8. Addressable interface device.
 - 9. Digital alarm communicator transmitter.
 - 10. Radio alarm transmitter.
 - 11. Network communications.
 - 12. System printer.

1.3 DEFINITIONS

- A. EMT: Electrical Metallic Tubing.
- B. FACP: Fire Alarm Control Panel.
- C. HLI: High Level Interface.
- D. NICET: National Institute for Certification in Engineering Technologies.
- E. PC: Personal computer.

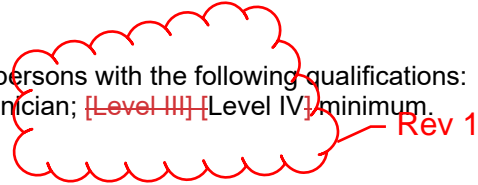
1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product, including furnished options and accessories.
 - 1. Include construction details, material descriptions, dimensions, profiles, and finishes.
 - 2. Include rated capacities, operating characteristics, and electrical characteristics.
- B. Shop Drawings: For fire-alarm system.
 - 1. Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.

2. Include plans, elevations, sections, details, and attachments to other work.
3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
4. Detail assembly and support requirements.
5. Include voltage drop calculations for notification-appliance circuits.
6. Include battery-size calculations.
7. Include input/output matrix.
8. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.
9. Include performance parameters and installation details for each detector.
10. Verify that each duct detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
11. Include alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
12. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.

C. General Submittal Requirements:

1. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. NICET-certified, fire-alarm technician; ~~Level III~~ ~~Level IV~~ minimum.



1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.
 1. Include the following:
 - a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 - b. Provide "Fire Alarm and Emergency Communications System Record of Completion Documents" according to the "Completion Documents" Article in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
 - c. Complete wiring diagrams showing connections between all devices and equipment. Each conductor shall be numbered at every junction point with indication of origination and termination points.
 - d. Riser diagram.
 - e. Device addresses.
 - f. Record copy of site-specific software.
 - g. Provide "Inspection and Testing Form" according to the "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:
 - 1) Equipment tested.
 - 2) Frequency of testing of installed components.
 - 3) Frequency of inspection of installed components.

- 4) Requirements and recommendations related to results of maintenance.
- 5) Manufacturer's user training manuals.

- h. Manufacturer's required maintenance related to system warranty requirements.
- i. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but no fewer than one unit.
 - 2. Smoke Detectors: Quantity equal to 10 percent of amount of each type installed, but no fewer than one unit of each type.
 - 3. Detector Bases: Quantity equal to two percent of amount of each type installed, but no fewer than one unit of each type.
 - 4. Keys and Tools: One extra set for access to locked or tamperproofed components.
 - 5. Audible and Visual Notification Appliances: One of each type installed.
 - 6. Fuses: Two of each type installed in the system. Provide in a box or cabinet with compartments marked with fuse types and sizes.

1.8 QUALITY ASSURANCE

- A. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level IV technician.

- B. NFPA Certification: Obtain certification according to NFPA 72 by an NRTL (nationally recognized testing laboratory).

1.9 PROJECT CONDITIONS

- A. Perform a full test of the existing system prior to starting work. Document any equipment or components not functioning as designed.

- B. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:
 - 1. Notify Owner no fewer than seven days in advance of proposed interruption of fire-alarm service.
 - 2. Do not proceed with interruption of fire-alarm service without Owner's written permission.

- C. Use of Devices during Construction: Protect devices during construction unless devices are placed in service to protect the facility during construction.

1.10 SEQUENCING AND SCHEDULING

- A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN

SERVICE" until it is accepted. Remove labels from new equipment when put into service, and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.

- B. Equipment Removal: After acceptance of new fire-alarm system, remove existing disconnected fire-alarm equipment and wiring.

1.11 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
 - 2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Noncoded, UL-certified addressable system, with multiplexed signal transmission and horn/strobe evacuation.
- B. Automatic sensitivity control of certain smoke detectors.
- C. All components provided shall be listed for use with the selected system.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices:
 - 1. Manual stations.
 - 2. Heat detectors.
 - 3. Smoke detectors.
 - 4. Duct smoke detectors.
 - 5. Automatic sprinkler system water flow.
- B. Fire-alarm signal shall initiate the following actions:
 - 1. Continuously operate alarm notification appliances , including voice evacuation notices.
 - 2. Identify alarm and specific initiating device at fire-alarm control unit and connected network control panels
 - 3. Transmit an alarm signal to the remote alarm receiving station.
 - 4. Release fire and smoke doors held open by magnetic door holders.
 - 5. ~~Activate voice/alarm communication system.~~
 - 6-5. Recall elevators to primary or alternate recall floors.
 - 7-6. Activate elevator power shunt trip.
 - 8-7. Record events in the system memory.
 - 9-8. Record events by the system printer.

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C. Supervisory signal initiation shall be by one or more of the following devices and actions:

1. Valve supervisory switch.
2. Elevator shunt-trip supervision.
3. Loss of communication with any panel on the network.

D. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of communication with any addressable sensor, input module, relay, control module, remote annunciator, printer interface, or Ethernet module.
4. Loss of primary power at fire-alarm control unit.
5. Ground or a single break in internal circuits of fire-alarm control unit.
6. Abnormal ac voltage at fire-alarm control unit.
7. Break in standby battery circuitry.
8. Failure of battery charging.
9. Abnormal position of any switch at fire-alarm control unit or annunciator.
10. ~~Voice signal amplifier failure.~~

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E. System Supervisory Signal Actions:

1. Initiate notification appliances.
2. Identify specific device initiating the event at fire-alarm control unit and connected network control panels.
3. Record the event on system printer.
4. After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.

2.3 FIRE-ALARM CONTROL UNIT

A. General Requirements for Fire-Alarm Control Unit:

1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864.
 - a. System software and programs shall be held in nonvolatile flash, electrically erasable, programmable, read-only memory, retaining the information through failure of primary and secondary power supplies.
 - b. Include a real-time clock for time annotation of events on the event recorder and printer.
 - c. Provide communication between the FACP and remote circuit interface panels, annunciators, and displays.
 - d. The FACP shall be listed for connection to a central-station signaling system service.
 - e. Provide nonvolatile memory for system database, logic, and operating system and event history. The system shall require no manual input to initialize in the event of a complete power down condition. The FACP shall provide a minimum 500-event history log.
2. Addressable Initiation Device Circuits: The FACP shall indicate which communication zones have been silenced and shall provide selective silencing of alarm notification appliance by building communication zone.

3. Addressable Control Circuits for Operation of Notification Appliances and Mechanical Equipment: The FACP shall be listed for releasing service.
- B. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
1. Annunciator and Display: Liquid-crystal type, 80 characters, minimum.
 2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.
- C. Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:
1. Pathway Class Designations: NFPA 72, Class B.
 2. Install no more than 50 addressable devices on each signaling-line circuit.
 3. Serial Interfaces:
 - a. One dedicated RS 485 port for remote station operation using point ID DACT.
 - b. One RS 485 port for remote annunciators, Ethernet module, or multi-interface module (printer port).
 - c. One USB port for PC configuration.
- D. Smoke-Alarm Verification:
1. Initiate audible and visible indication of an "alarm-verification" signal at fire-alarm control unit.
 2. Activate an approved "alarm-verification" sequence at fire-alarm control unit and detector.
 3. Record events by the system printer.
 4. Sound general alarm if the alarm is verified.
 5. Cancel fire-alarm control unit indication and system reset if the alarm is not verified.
- E. Notification-Appliance Circuit:
1. Audible appliances shall sound in a three-pulse temporal pattern, as defined in NFPA 72.
 2. Visual alarm appliances shall flash in synchronization where multiple appliances are in the same field of view, as defined in NFPA 72.
- F. Elevator Recall:
1. Elevator recall shall be initiated only by one of the following alarm-initiating devices:
 - a. Elevator lobby detectors except the lobby detector on the designated floor.
 - b. Smoke and heat detector in elevator machine room.
 - c. Smoke and heat detectors in elevator hoistway.
 2. Elevator controller shall be programmed to move the cars to the alternate recall floor if lobby detectors located on the designated recall floors are activated.
 3. Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.
 - a. Water-flow switch associated with the sprinkler in the elevator pit may have a delay to allow elevators to move to the designated floor.

- G. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke-barrier walls shall be connected to fire-alarm system.
- H. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.
- I. Printout of Events: On receipt of signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble) and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also, print system reset event, including same information for device, location, date, and time. Commands initiate the printing of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.
- J. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory signals, supervisory and digital alarm communicator transmitters and digital alarm radio transmitters shall be powered by 24-V dc source.
 - 1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.
- K. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
 - 1. Batteries: Sealed lead calcium.

2.4 MANUAL FIRE-ALARM BOXES

- A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
 - 1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.

2.5 SYSTEM SMOKE DETECTORS

- A. General Requirements for System Smoke Detectors:
 - 1. Comply with UL 268; operating at 24-V dc, nominal.
 - 2. Detectors shall be two-wire type.
 - 3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
 - 4. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
 - 5. Integral Visual-Indicating Light: LED type, indicating detector has operated.
- B. Photoelectric Smoke Detectors:
 - 1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.

2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).

C. Duct Smoke Detectors: Photoelectric type complying with UL 268A.

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).
3. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
4. Relay Fan Shutdown: Fully programmable relay rated to interrupt fan motor-control circuit.

2.6 HEAT DETECTORS

A. General Requirements for Heat Detectors: Comply with UL 521.

1. Temperature sensors shall test for and communicate the sensitivity range of the device.

B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or a rate of rise that exceeds 15 deg F (8 deg C) per minute unless otherwise indicated.

1. Mounting: Adapter plate for outlet box mounting.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.7 NOTIFICATION APPLIANCES

A. General Requirements for Notification Appliances: Individually addressed, connected to a signaling-line circuit, equipped for mounting as indicated, and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.

B. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level as

indicated on drawings, measured 10 feet (3 m) from the horn, using the coded signal prescribed in UL 464 test protocol.

- C. Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.
 - 1. Rated Light Output:
 - a. As indicated on drawings.
 - 2. Mounting: Wall mounted unless otherwise indicated.
 - 3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
 - 4. Flashing shall be in a temporal pattern, synchronized with other units.
 - 5. Strobe Leads: Factory connected to screw terminals.
 - 6. Mounting Faceplate: Factory finished, red.

2.8 ADDRESSABLE INTERFACE DEVICE

- A. General:
 - 1. Include address-setting means on the module.
 - 2. Store an internal identifying code for control panel use to identify the module type.
- B. Monitor Module: Microelectronic module providing a system address for alarm-initiating devices for wired applications with normally open contacts.

2.9 DIGITAL ALARM COMMUNICATOR TRANSMITTER

- A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632.
- B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture one telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.
- C. Local functions and display at the digital alarm communicator transmitter shall include the following:
 - 1. Verification that both telephone lines are available.
 - 2. Programming device.
 - 3. LED display.
 - 4. Manual test report function and manual transmission clear indication.
 - 5. Communications failure with the central station or fire-alarm control unit.
- D. Digital data transmission shall include the following:
 - 1. Address of the alarm-initiating device.

2. Address of the supervisory signal.
3. Address of the trouble-initiating device.
4. Loss of ac supply.
5. Loss of power.
6. Low battery.
7. Abnormal test signal.
8. Communication bus failure.

E. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

2.10 NETWORK COMMUNICATIONS

A. Provide network communications for fire-alarm system according to fire-alarm manufacturer's written requirements.

2.11 SYSTEM PRINTER

A. Printer shall be listed and labeled as an integral part of fire-alarm system.

2.12 DEVICE GUARDS

A. Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.

1. Factory fabricated and furnished by device manufacturer.
2. Finish: Paint of color to match the protected device.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.

1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.

B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EQUIPMENT INSTALLATION

A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."

1. Devices placed in service before all other trades have completed cleanup shall be replaced.
 2. Devices installed but not yet placed in service shall be protected from construction dust, debris, dirt, moisture, and damage according to manufacturer's written storage instructions.
- B. Install wall-mounted equipment, with tops of cabinets not more than 78 inches (1980 mm) above the finished floor.
- C. Manual Fire-Alarm Boxes:
1. Install manual fire-alarm box in the normal path of egress within 60 inches (1520 mm) of the exit doorway.
 2. Mount manual fire-alarm box on a background of a contrasting color.
 3. The operable part of manual fire-alarm box shall be between 42 inches (1060 mm) and 48 inches (1220 mm) above floor level. All devices shall be mounted at the same height unless otherwise indicated.
 4. HVAC: Locate detectors not closer than 36 inches (910 mm) from air-supply diffuser or return-air opening.
 5. Lighting Fixtures: Locate detectors not closer than 12 inches (300 mm) from any part of a lighting fixture and not directly above pendant mounted or indirect lighting.
- D. Install a cover on each smoke detector that is not placed in service during construction. Cover shall remain in place except during system testing. Remove cover prior to system turnover.
- E. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct. Tubes more than 36 inches (9100 mm) long shall be supported at both ends.
- F. Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location. Do not install smoke detectors in sprinklered elevator shafts.
- G. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Install all devices at the same height unless otherwise indicated.
- H. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling. Install all devices at the same height unless otherwise indicated.

3.3 PATHWAYS

- ~~A. Pathways above recessed ceilings and in nonaccessible locations may be routed exposed.~~
1. ~~Exposed pathways located less than 96 inches (2440 mm) above the floor shall be installed in EMT. All pathways shall be installed in EMT.~~
- B. Exposed EMT shall be painted red enamel.

3.4 CONNECTIONS

- A. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 36 inches (910 mm) from the device controlled.

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Make an addressable confirmation connection when such feedback is available at the device or system being controlled.

1. Magnetically held-open doors.
2. Alarm-initiating connection to elevator recall system and components.
3. Supervisory connections at valve supervisory switches.
4. Supervisory connections at elevator shunt-trip breaker.

3.5 GROUNDING

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.
- B. Ground shielded cables at the control panel location only. Insulate shield at device location.

3.6 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by Architect.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
- D. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 1. Visual Inspection: Conduct visual inspection prior to testing.
 - a. Inspection shall be based on completed record Drawings and system documentation that is required by the "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
 - b. Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
 2. System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 3. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
- E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- F. Fire-alarm system will be considered defective if it does not pass tests and inspections.
- G. Prepare test and inspection reports.
- H. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.7 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
 - 1. Include visual inspections according to the "Visual Inspection Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 - 2. Perform tests in the "Test Methods" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 - 3. Perform tests per the "Testing Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

3.8 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION 284621.11