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 www.ucpsnc.org

Invitation to Bid

NOTICE TO BIDDERS

Union County Public Schools

Invitation for Bids- IFB No. 6-97648066

Union County Public Schools is soliciting **sealed bids** from qualified vendors to provide
Fire Alarm System Replacement for:

Weddington High School, 4901 Monroe Weddington Road, Matthews, NC 28104

Porter Ridge High School, 2839 Ridge Road, Indian Trail, NC 28079

Antioch Elementary School, 3101 Antioch Church Rd, Matthew, NC 28104

Sealed bids will be received by the **Union County Public Schools/Facilities Department**, located at **201 Venus St. Monroe, NC 28112**, until **2:00 PM on Friday, May 22, 2026**, at which time and place all bids will be publicly opened and read aloud. Bids received after the stated deadline will not be accepted.

Bid documents, specifications, and submission requirements may be obtained beginning **Wednesday, May 6, 2026**, by accessing: eVP North Carolina Solicitations
<https://evp.nc.gov/solicitations/>

Purchasing Department / Lynn Elms

facilitiesbids@ucps.k12.nc.us

All bids must be submitted in a sealed envelope clearly labeled:
"IFB No. 6-97648066"

A **mandatory pre-bid meeting** will be held on **Monday, May 12, 2026, at 10:00 AM local time** at **Weddington High School, 4901 Monroe Weddington Road, Matthews, NC 28104** and will proceed to the other two locations, for the **purpose** of reviewing project requirements and answering questions.

Union County Public Schools reserves the right to reject any or all bids, to waive informalities, and to award the contract as deemed in the best interest of the district.

Lynn Elms

Director of Purchasing and Contracts

Union County Public Schools

In compliance with federal law, UCPS administers all educational programs, employment activities and admissions without discrimination against any person on the basis of gender, race, color, religion, national origin, age or disability.

**Invitation for Bid
Formal**

BID NO. 6-97648066

TITLE: Fire Alarm System Replacement – Weddington High School, Antioch Elementary School, & Porter Ridge High School

PROCUREMENT

**LEAD: Lynn Ems
UCPS Purchasing Department
facilitiesbids@ucps.k12.nc.us**

BID/QUOTE SUBMITTAL

Sealed Bids will be received no later than 2:00 pm (local time) on Friday, May 22, 2026 at Union County Public Schools, Facilities Department, 201 Venus St, Monroe, NC 28112. All sealed bids must be in an envelope marked with Bid # 6-97648066, Attention: Lynn Elms.

PREBID MEETING

A mandatory Pre-bid Meeting will be held at 10:00 am, (local time), Monday May 12, 2026. The meeting will begin at Weddington High School, 4901 Monroe Weddington Road, Matthews, NC 28104, and will proceed to the other two locations.

It is the sole responsibility of the Bidder, Contractor to familiarize themselves to all aspects of this project. Failure to meet this requirement will not justify a change order.

COMMUNICATION

During the bid process, all communication relating to this bid shall be directed to the Procurement Lead identified above. Failure to meet the requirement may consider your bid non-responsible.

All questions relating to this project shall be directed to the Procurement Lead identified above in the form of an email no later than **1:00 pm, Friday, May 15, 2026. Please include the following in the subject line: “Bid# 6-97648066 Questions”.**

Answers will be provided to all bidders in the form of an addendum which will be posted on UCPS website:

<https://www.ucpsnc.org/about/purchasing-and-contracts> and NC State website: <https://evp.nc.gov/solicitations/?status=0> on **Monday, May 18, 2026.**

DESCRIPTION OF PROJECT:

Union County Public Schools seeks formal bids for the above referenced Project.

The Scope of Work is attached as Exhibit 1.

AWARD:

UCPS desires to promptly approve and sign a contract after a decision has been made to award. Company awarded the contract is expected to promptly sign the contract in the form attached hereto as Exhibit 2. Any requested changes to this contract form should be provided with your response.

UCPS reserves the right to award this project in a method considered to be most advantageous. This includes the right to issue single award, multiple awards, or reject all bids. UCPS is not required to award a contract.

REQUIREMENTS:

HUB PARTICIPATION

Pursuant to North Carolina General Statute G.S. 143-48, it is UCPS policy to encourage and promote the use of small, minority, physically handicapped, and women contractors in purchasing Goods and Services. As such, this RFP will serve to identify those Vendors that are minority owned or have a strategic plan to support UCPS Historically Underutilized Business program by meeting or exceeding the goal of 10% utilization of diverse firms as 1st or 2nd tier subcontractors. Vendor shall complete Attachment B: HUB Supplemental Vendor Information.

E-VERIFY AND IRAN DIVESTMENT ACT NOTICE

Pursuant to North Carolina law, the successful bidder will be required to comply with the E-Verify requirements set forth in Article 2 of Chapter 64 of the North Carolina General Statutes and the Iran Divestment Act set forth in N.C.G.S. 147-86.58.

BIDDERS CHECKLIST

- Executed Cost Proposal Form for Each School Location
- Good Faith Efforts (Affidavit A, B, Identification of Minority Participation Form)
- 5% Bid Bond

RECOMMENDATION OF AWARD

- Certificate of Insurance (meeting the requirements stated within Attachment A).
- Good Faith Efforts (Affidavit C or D)
- 100% Performance and Payment Bond (within 10 days of award).
- E-Verify Affidavit
- Iran Divestment Certification

No Contract shall be executed, and no work shall commence, until all required documentation has been received and approved.

EXHIBIT 1

Scope of Work

Specifications & Drawings

- S-1 Location: Weddington High School
- S-2 Location: Porter Ridge High School
- S-3 Location: Antioch Elementary School

Exhibit 1

SCOPE OF WORK

SCOPE OF WORK

UCPS seeks to contract the equipment, software, and labor to a professional contractor that is experienced in commercial projects of this type and size. The project areas have been within the drawing sets provided. Specifications regarding the equipment, materials and other pertinent information are provided through the assembled document for each site.

General:

- a. Contractor is accountable to provide a turnkey project(s) to UCPS.
- b. Contractor shall be responsible for furnishing all materials including new equipment, labor, and supervision as necessary to complete the project.
- c. Contractor shall appoint a designated Project Coordinator to the project. She/he will remain the primary point of contact to UCPS resources for the duration of the project. If a change in contact is necessary, it shall be provided in an effective and timely manner to ensure no disruption to the project.
- d. Contractor shall have a minimum of five (5) years of successfully completing projects of this type and size.
- e. Contractor shall safeguard the project area(s) to ensure the safety and security of UCPS property.
- f. Contractor shall safeguard non-identified surfaces to ensure quality workmanship.
- g. Contractor shall identify and seek approval from UCPS prior to any award to a subcontracted service.
- h. Contractor shall review the Asbestos Hazard Emergency Response Act (AHERA) manual, where applicable, prior to his/her employees performing work. Contractor shall appropriately notify and safeguard their employees from exposure to potentially asbestos containing or asbestos containing materials.
- i. Contractor shall ensure his/her employees follow established UCBOE policy such as but not limited to the Jessica Lunsford Act, Tobacco Free Policy, etc.

Service Interruptions:

Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

- a. Notify UCPS Project Manager in advance of proposed interruption of fire-alarm service.
- b. Identify specific locations affected by interruption, circuits which may be inoperable during the outage, and the length of time the system will be impaired.
- c. Do not proceed with interruption of fire-alarm service without written approval by UCPS Project Manager

Cleanup:

- a. Contractor shall return campus and/or building to owner in a clean and orderly fashion.
- b. Contractor will properly dispose of all materials, tools, debris offsite. Contractor is not permitted to utilize UCPS dumpsters for the disposal of project waste.

- c. Contractor will address the cleanliness of the work site daily through the removal of materials, tools, waste debris. If contractor requires onsite storage for the duration of the project, he/she shall make arrangements with the UCPS representative prior to materials being stored onsite.

Schedule and Warranty:

- a. Contractor will work with UCPS representative to establish a schedule meeting the owners timeline. Contractor shall work diligently to meet established deadlines to minimize disruptions to the workplace.
- b. Contractor and UCPS representative will determine day of the week and working hours during the preconstruction meeting.
- c. Contractor shall provide a warranty from the date of final acceptance for workmanship, equipment, materials, and latent defects.
- d. During the warranty period, contractor shall promptly address defective equipment at no cost to UCPS.

S-1 Location: Weddington High School

SECTION 28 31 11 - ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This standard provides the functional requirements for the installation, programming, configuration, warranty and maintenance of a complete Class B Analog/Addressable Intelligent Fire Alarm / Life Safety System.
- B. This Fire Alarm / Life Safety System Standard must be conformed to in its entirety to ensure that the installed and programmed Life Safety System will function as designed, and will accommodate the future requirements and operations required by the building owner. All specified operational features will be met without exception.
- C. Section Includes:
 - 1. Fire-alarm control unit or fire alarm control panel.
 - 2. Manual fire-alarm boxes.
 - 3. System smoke detectors.
 - 4. Heat detectors.
 - 5. Detector mounting bases.
 - 6. Air-sampling smoke detectors.
 - 7. Carbon monoxide detectors.
 - 8. Notification appliances.
 - 9. Magnetic door holders.
 - 10. Remote annunciator.
 - 11. Addressable interface device.
 - 12. Digital alarm communicator transmitter.
 - 13. Device guards.
 - 14. Standby Power Supplies.
 - 15. Surge Protection and Grounding.
 - 16. Fire-alarm wire and cable.
 - 17. Programming, Commissioning and Training of Operators.
 - 18. Accessories required to furnish a complete and Operational Life Safety System.

1.3 DEFINITIONS

- A. EMT: Electrical Metallic Tubing.
- B. FACP: Fire Alarm Control Panel.
- C. LED: Light-emitting diode.
- D. NICET: National Institute for Certification in Engineering Technologies.

1.4 PERFORMANCE REQUIREMENTS

- A. Statutory and Reference Standard Compliance:

1. The latest edition of the North Carolina State Building Code.
2. North Carolina Department of Insurance "Requirements for Fire Alarm Detection and Alarm Systems", latest revision.
3. National Fire Protection Association Standards:
 - a. NFPA 70 - National Electric Code
 - b. NFPA 72 - National Fire Alarm Code
 - c. NFPA 90A - Air Conditioning Systems
 - d. NFPA 101 - Life Safety Code
4. Underwriters Laboratories Inc. for use in fire protective signaling systems shall list the system and all components. The UL Label shall be considered as evidence of compliance with this requirement. The equipment shall be listed by UL under the following standards as applicable:
 - a. UL 864/UOJZ, APOU - Control Units for Fire Protective Signaling Systems.
 - b. UL 1076/APOU - Proprietary Burglar Alarm Units and Systems.
 - c. UL 268 - Smoke Detectors for Fire Protective Signaling Systems.
 - d. UL 268A - Smoke Detectors for Duct Applications.
 - e. UL 217 - Smoke Detectors Single Station.
 - f. UL 521 - Heat Detectors for Fire Protective Signaling Systems.
 - g. UL 228 - Door Holders for Fire Protective Signaling Systems.
 - h. UL 464 - Audible Signaling Appliances.
 - i. UL 1638 - Visual Signaling Appliances.
 - j. UL 38 - Manually Activated Signaling Boxes.
 - k. UL 346 - Water flow Indicators for Fire Protective Signaling Systems.
 - l. UL 1971 - Visual Signaling Appliances.
 - m. UL 1481 - Power Supplies for Fire Protective Signaling Systems.
5. Americans with Disabilities Act (ADA).

1.5 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. Provide program report showing that air-sampling detector pipe layout balances pneumatically within the airflow range of the air-sampling detector.
12. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.
 - a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
 - b. Show field wiring required for HVAC unit shutdown on alarm.
 - c. Locate detectors according to manufacturer's written recommendations.
 - d. Show air-sampling detector pipe routing.
13. Include alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
14. 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. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
2. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by manufacturer in fire-alarm system design.
 - b. Licensed or certified by authorities having jurisdiction.

D. Delegated-Design Submittal: For notification appliances and smoke and heat detectors, in addition to submittals listed above, indicate compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Drawings showing the location of each notification appliance and smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the device.
2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72. Calculate spacing and intensities for strobe signals and sound-pressure levels for audible appliances.
3. Indicate audible appliances required to produce square wave signal per NFPA 72.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Seismic Qualification Certificates: For fire-alarm control unit, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Field quality-control reports.

1.7 Sample Warranty: For special warranty.

1.8 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.

1. Install next to fire alarm panel, a framed copy of the floor plans to indicate final device locations showing address of each addressable devices. This map will include room numbers and names, and addressable device identifier.

B. AUTOCAD copy of the as-built fire alarm map (not just the system as-builts). This is the as-built map that is posted by the annunciator.

1. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following and deliver copies to authorities having jurisdiction:
 - 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. Air-sampling system sample port locations and modeling program report showing layout meets performance criteria.
 - g. Record copy of site-specific software.
 - h. 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.
 - i. Manufacturer's required maintenance related to system warranty requirements.
 - j. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.

C. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On magnetic media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

1.9 COMMISSIONING

A. At Commissioning provide the following:

1. Warranty Statement from the manufacturer: Warranty statement will state the period of warranty for all of the products proposed for the project and shall include the name and address of the authorized manufacturers' agent who will honor any and all warranty claims.
2. Written Certification by the Fire Alarm Installer that no power supply or circuit in the system has an electrical load greater than 80% of its rated capacity.
3. A scaled plan of each building showing the placement of each individual item of fire alarm equipment as well as raceway size and routing, junction boxes, and conductor size, quantity, and color in each raceway.
4. A Single Line System Block Diagram and written System Operational Overview.
5. Complete calculations showing the electrical load on the following system components.
6. Each system Power Supply
7. Each standby Power Supply (batteries)
8. Each Notification Appliance Circuit.
9. Each auxiliary control circuit that draws power from any system power supply.
10. Field Connection Drawings: A complete set of drawings, one for each Fire Alarm Control Panel module which has any external (field) wiring connected to it, and one for each system detector, module or signaling appliance, shall be supplied. The Field Connection Drawings shall be provided in paper (hard-copy) format.
11. Print-out report detailing the sensitivity of each smoke detector installed in the system. Include date on report.

1.10 QUALITY ASSURANCE

- A. Installer Qualifications: The installer shall be a licensed low voltage contractor and a factory authorized distributor to ensure proper specification adherence, final connection, test, turnover, warranty compliance and service. The installer shall maintain a service organization with adequate spare parts stock within 50 miles of the installation. Installer shall have training certification by the manufacturer of the Fire Alarm Control Equipment. This certification shall not be more than two years old, to ensure up-to-date product and application knowledge on the part of the installing installer.
- B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level IV technician.
- C. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.

1.11 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Manual fire-alarm boxes and door holders: Quantity equal to 5 percent of amount of each type installed, but no fewer than 1 unit of each type.
 2. Smoke, Heat, Carbon Monoxide Detectors and detector mounting bases: Quantity equal to 10 percent of amount of each type installed, but no fewer than 1 unit of each type.
 3. Audible and Visual Notification Appliances: Quantity equal to 10 percent of amount of each type installed, but no fewer than 1 unit of each type.

1.12 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 Architect and 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 Architect'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.

1.13 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.

1.14 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: Two years from date of Substantial Completion.
- B. Installer Warranty: Installer shall warrant the installed fire alarm system to be free from any defects of material and installation for a period of 2 years from acceptance by the professional engineer and/or owner.
 - 1. Any deficiencies shall be immediately corrected at no additional cost to the owner.
 - 2. Any defects that render the system inoperative shall be repaired within 24 hours of the owner notifying the contractor. Other defects shall be repaired within 48 hours of the owner notifying the contractor.

1.15 INSPECTIONS

- A. All work shall be inspected and approved by the Local Fire Marshal and the School's Enforcement Inspectors prior to final payment. The Installer shall provide all material, equipment and labor necessary to pass inspections by the the Local Fire Marshal Office. Written documentation of inspections shall be provided to the Owner and Engineer.
- B. A complete set of as-built wiring schematics, drawn to scale; showing all device locations, wire routing and connections, etc. shall be provided to the Owner and Engineer prior to final inspection.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All equipment furnished for this project shall be new and unused. All equipment, materials, accessories, devices, and other facilities covered by this guideline 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.
- B. Manufacturer's representative and a Record of Completion presented upon completion shall verify system installation and operations. The manufacturer's representative shall be responsible for an on-site demonstration of the operation of the system and initial staff training.

2.2 SYSTEM DESCRIPTION

- A. All Control Panel Assemblies and the connected Automatic and Manual Alarm and Notification Appliances shall be designed and manufactured by the same company, shall be tested and cross-listed as compatible (to category UOJZ) to ensure that a fully functioning Life Safety System is designed and provided.
- B. The Fire Alarm / Life Safety System supplied under this guideline shall be a microprocessor-based direct wired system. System shall utilize independently addressed, microprocessor-based smoke detectors, heat detectors, and modules, as described in this specification.
- C. All initiation devices shall be analog addressable devices. The notification devices shall be installed where required to meet ADA, NFPA 72 and NC Building Code Standards.
- D. Locate the Fire Alarm Panel in the main electrical room. Locate a full function annunciator in the main office and a display only alpha-numeric display at the front door.
- E. All Fire Alarm / Life Safety equipment shall be arranged and programmed to provide an integrated system for the early detection of fire, the notification of building occupants, the notification of building security, the override of the HVAC system operation, the shut-down of the kitchen hood, and the activation of other auxiliary systems to inhibit the spread of smoke and fire and to facilitate the safe evacuation of building occupants.
- F. All strobes shall be synchronized. A strobe unit shall be installed in every occupied space which includes all classrooms, restrooms, conference rooms, tutor rooms, science prep rooms and waiting areas/lobbies. Smoke and thermal detectors shall be installed in compliance with NFPA 72 codes. Duct detectors shall interface with HVAC systems to shut down necessary air-handling units.
- G. The fire alarm system shall be microprocessor driven with stored program controllers. Each panel (node) on the network shall use a multiple microprocessor design so that the failure of a single microprocessor will not result in a local failure. Fire alarm systems that utilize only one microprocessor for system (node) and SLC control will not be accepted.
- H. The Life Safety System shall be UL listed under Standard 864 (Control Units for Fire-Protective Signaling Systems) under categories UOJZ and APOU. The specified modules shall also be listed under UL 1076 (Proprietary Burglar Alarm Units and Systems) under category APOU.
- I. A standby power supply shall automatically supply electrical energy to the system upon primary power supply failure. Use "Emergency Generator" circuit where available. Standby power shall be an electrical battery with capacity to operate the system under maximum supervisory load for 24 hours and capable of operating the system for 5 minutes in the alarm mode at 100% load, 15

minutes for voice components. Fire alarm shall include a charging circuit to automatically maintain the electrical charge of the battery.

- J. Do not install notification appliances on the exterior of the building unless specifically directed to do so by the Project Manager.
- K. Remote LED indicators must be installed at each duct detector location. Install the indicator in the ceiling so it can be seen while standing in the corridor/classroom.
- L. All power supplies must be on dedicated circuits. Existing building circuits (receptacles, lights, etc.) cannot be used. Use generator power where available.
- M. Smoke detectors shall be installed a minimum of 3' from air supply diffusers and lighting fixtures.
- N. Automatic door closers to be activated by local smoke detectors only.
- O. Use toggle bolts for all wall mounted equipment/components/appliances
- P. All Fire Alarm wiring shall be FPLR or FPLP in conduit or duct, or MC fire alarm cable.
- Q. Provide remote LED indicator lights for all duct detectors. Locate indicators in corridors.
- R. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Where an existing system is being expanded, components shall be compatible with, and operate as, an extension of the existing system. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.
- S. Automatic sensitivity control of certain smoke detectors.
- T. All components provided shall be listed for use with the selected system.
- U. 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.

2.3 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
 - 1. Manual stations.
 - 2. Heat detectors.
 - 3. Smoke detectors.
 - 4. Duct smoke detectors.
 - 5. Automatic sprinkler system water flow.
 - 6. Fire-extinguishing system operation.
 - 7. Fire standpipe system.
 - 8. Fire pump running.
- B. Fire-alarm signal shall initiate the following actions:
 - 1. Continuously operate alarm notification appliances, including voice evacuation notices.
 - 2. Local sounding device at panel shall be activated.
 - 3. Identify alarm and specific initiating device at fire-alarm control unit and remote annunciators.

4. Transmit an alarm signal to the remote alarm receiving station.
5. Unlock electric door locks in designated egress paths.
6. Release fire and smoke doors held open by magnetic door holders.
7. Activate voice/alarm communication system.
8. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
9. Close smoke dampers in air ducts of designated air-conditioning duct systems.
10. Recall elevators to primary or alternate recall floors.
11. Activate emergency shutoffs for gas and fuel supplies.
12. Mute elective audio systems installed permanently within the facility (Intercom, sound systems).
13. Record events in the system memory.

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

1. Valve supervisory switch.
2. Alert and Action signals of air-sampling detector system.
3. Elevator shunt-trip supervision.
4. User disabling of zones or individual devices.
5. Loss of communication with any panel on the network.
6. Carbon monoxide detectors.
7. Fire pump running.
8. Fire-pump loss of power.
9. Fire-pump power phase reversal.
10. ERRS
 - a. Donor antenna malfunction.
 - b. Active RF-emitting device failure.
 - c. Low battery capacity indication when 70 percent of the 12-hour operating capacity has been depleted.
 - d. Active system component failure.
 - e. Loss of normal AC power
 - f. Failure of battery charger
 - g. Communication link between fire alarm system and ERRS.

D. System Supervisory Signal Actions:

1. Identify specific device initiating the event at fire-alarm control unit and remote annunciators.
2. After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.
3. Display system status on graphic annunciator.
4. Transmit an alarm signal to the remote alarm receiving station.

E. 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.

F. System Trouble Signal Actions:

1. Trouble indicator shall flash.
2. A local sounding device in the panel shall be activated
3. Identify specific device initiating the event at fire-alarm control unit and remote annunciators.
4. Unacknowledged alarm messages shall have priority over trouble messages, and if such an alarm must also be displayed, the trouble message will not be displayed until the operator has acknowledged all alarm messages.
5. Transmit an alarm signal to the remote alarm receiving station.

2.4 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.5 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated in these specifications or comparable product by one of the following:

1. Fire-Lite ES-1000X
2. Notifier NFS640
3. Silent Knight 6820

2.6 FIRE-ALARM CONTROL UNIT

- A. General Requirements for Fire-Alarm Control Unit:

1. Operators' Interface:
 - a. Character Graphical Display shall provide the means to inform the System Operator with detailed information about the off-normal status of the installed Fire Alarm / Life Safety System. Character Graphical Display shall automatically respond to the status of the system and shall display that status in character front panel display.
2. Automatic Functions: The following status functions shall be annunciated by the Character Graphical Display:
 - a. When the Fire Alarm / Life Safety System is in the "Normal" Mode, the panel displays: Current Date and Time, Custom System Title (minimum 2 lines X 21 characters), and a summary total of system events.
 - b. The Character Graphical Display shall provide separate event queues for ALARM, TROUBLE, SUPERVISORY and MONITOR.
3. Loop Controller Interface:
 - a. An Electronic 100% digital Loop Controller shall be provided in each Fire Alarm Control Panel (where needed), to interface between the panel and the Analytical Microprocessor-based Detectors and modules.
 - b. It shall be possible to connect the electronic loop controller to the Analytical Microprocessor-based Detectors and modules utilizing any wiring material or

method complying with Chapter 3 of the National Electrical Code (ANSI/NFPA 70-1996) as Class A (Style 6 or Style 7) or Class B (Style 4) circuits without the use of special shielding, twisted wire, or conduits. It must be possible to wire branch circuits (T-Taps) from Class B Circuits (Style 4). Each Electronic Protection Loop shall be configurable to operate as a Style 7 loop without the need for additional hardware modules.

- c. All system programming and history shall be permanently stored in non-volatile memory to ensure that no programming or history is lost. Systems which store initial programming or field programming changes in battery backed memory will not be accepted.
 - d. The Electronic Loop Controller shall be capable of setting the address of all Analytical Microprocessor-based Detectors and modules connected to it electronically, without the need to set switches at any of the individual devices.
 - e. The Electronic Loop Controller shall notify the System Operator when any connected smoke detector reports a "Routine Maintenance Required" signal to the system.
4. Notification Appliance Circuits:
- a. Provide where indicated on the plans supervised hard-wired Notification Appliance Circuits (NAC) for the control of 24VDC signaling appliances. Each NAC shall operate as a Class B (Style Y) circuit and shall be capable of controlling up to 3.5 amps of signaling power.
 - b. NAC's shall be power limited to 3.5A at 24VDC and 4.1A at 20.4VDC to support higher current demand by visible appliances at lower battery voltages.
5. Remote Diagnostic Utility - RDUEU-E or equal:
- a. The Fire Alarm System shall have the ability to report its status and sensitivity remotely over modem to a personal computer. The system shall be capable of generating sensitivity, system status, and trend analysis reports from data downloaded from the panel. Installer to provide the modem at the panel to a personal computer as directed by the Owner.

2.7 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes:

- 1. Comply with UL 38.
- 2. Boxes shall be finished in red with white molded, "FIRE" raised-letter; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
- 3. Double-action mechanism requiring two actions to initiate an alarm with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
- 4. Station Reset: Key operated switch.

B. Fire-Lite #BG-12LX.

2.8 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:

- 1. Comply with UL 268.

2. System shall use Analytical Microprocessor-based Detectors that are capable of full digital communications with the Fire Alarm / Life Safety System using both broadcast and polling communications protocols. Each detector shall be capable of performing independent advanced fire detection algorithms. The fire detection algorithm shall measure sensor signal dimensions, time patterns and combine different fire parameters to increase reliability and distinguish real fire conditions from unwanted nuisance alarms caused by environmental events. Signal patterns that are not typical of fires shall be eliminated by digital filters and will not cause a system alarm condition. Devices not capable of combining different fire parameters or employing digital filters will not be acceptable.
3. Each detector shall have an integral microprocessor capable of making alarm decisions based on fire parameter information stored in the detectors' memory. Detectors not capable of making independent alarm decisions are not acceptable. Maximum total loop response time for detectors changing state (alarm or trouble) shall be 0.5 seconds.
4. Each detector shall be capable of identifying diagnostic codes to be used for system maintenance. All diagnostic codes shall be stored in the detector. Each detector shall be capable of transmitting pre-alarm, alarm, and maintenance signals to the Fire Alarm Control Panel via the Electronic Loop Controller. Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
5. Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring. All of these devices and their bases will also be required to be labeled with engraved Lexan labels to identify device address and intended location. Labels shall be red background with white letters, letters shall be a minimum of 1/4" in height.
6. Integral Visual-Indicating Light: LED type indicating detector has operated.

B. Photoelectric/Multi-Criteria Smoke Detectors:

1. Photoelectric detector shall utilize a light scattering type photoelectric smoke sensor to detect visible particulates produced by combustion. The integral microprocessor shall dynamically examine values from the sensor and initiate a system alarm based on the analysis of data. Detector shall continually monitor any changes in sensitivity due to the environmental effects of dirt, smoke, temperature, aging and humidity. Information shall be stored in the detectors' memory and shall be transferred to the electronic loop controller for retrieval using a laptop PC or the Intelligent Detector Program/Service Tool designed by the manufacturer specifically for the purpose.
2. The alarm set point shall be field selectable to any of five sensitivity settings ranging from 1.0% to 3.5% smoke obscuration per foot. The photo detector shall be suitable for operation in the following environment:
 - a. Temperature: 32° F to 120° F (0oC to 49oC)
 - b. Humidity: 0-93% RH, non-condensing
 - c. Elevation: no limit

C. Fire-Lite #SD365.

2.9 HEAT DETECTORS

A. General Requirements for Heat Detectors:

1. Comply with UL 521.
2. System shall use Analytical Microprocessor-based Detectors that are capable of full digital communications with the Fire Alarm / Life Safety System using both broadcast and polling communications protocols. Each detector shall be capable of performing independent advanced fire detection algorithms. The fire detection algorithm shall

measure sensor signal dimensions, time patterns and combine different fire parameters to increase reliability and distinguish real fire conditions from unwanted nuisance alarms caused by environmental events. Signal patterns that are not typical of fires shall be eliminated by digital filters and will not cause a system alarm condition. Devices not capable of combining different fire parameters or employing digital filters will not be acceptable.

3. Each detector shall have an integral microprocessor capable of making alarm decisions based on fire parameter information stored in the detectors' memory. Detectors not capable of making independent alarm decisions are not acceptable. Maximum total loop response time for detectors changing state (alarm or trouble) shall be 0.5 seconds.
4. Each detector shall be capable of identifying diagnostic codes to be used for system maintenance. All diagnostic codes shall be stored in the detector. Each detector shall be capable of transmitting pre-alarm, alarm, and maintenance signals to the Fire Alarm Control Panel via the Electronic Loop Controller. Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
5. Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring. All of these devices and their bases will also be required to be labeled with engraved Lexan labels to identify device address and intended location. Labels shall be red background with white letters, letters shall be a minimum of 1/4" in height.
6. Integral Visual-Indicating Light: LED type indicating detector has operated.

B. Fixed Temperature/Rate of Rise Heat Detector:

1. Heat Detector shall have a solid-state heat sensor, and shall transmit an alarm at a fixed temperature of 135° F (57°C) or due to a temperature Rate of Rise of 15°F/minute (9°C/minute). The detector shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm.
2. The heat detector shall be rated for ceiling installation at 70 ft (21.3m) centers and be suitable for wall mount applications.
3. Heat detectors provided for kiln rooms shall be standard rated.

C. Fire-Lite #H365.

2.10 DETECTOR MOUNTING BASES

A. Mounting base will not contain any electronics, shall support all Microprocessor-based Smoke detector types detailed in this specification, and have the following minimum requirements:

1. Removal of the respective detector will not affect electronic loop communications with other detectors on that loop.
2. Field Wiring Connections shall be made to the room side of the base, so that wiring connections can be made or disconnected by the installer without the need to remove the mounting base from the electrical box.
3. The base shall be capable of supporting remote alarm annunciation.
4. Bases will have the option of external L.E.D. operation, Relay base or data line isolator base.
 - a. Relay base shall mount in a standard electrical box described above and provide Form "C" contacts rated at 1 amp @ 30VDC and listed for "pilot duty".
 - b. Isolator bases shall operate within a minimum of 23 msec. Of a short circuit on the data line, shall run self-test procedure to re-establish normal operation, and shall operate in a class 'A' operation as well as class 'B'.

- B. Fire-Lite #B300-6.

2.11 DUCT SMOKE DETECTORS

- A. General Requirements for Duct Smoke Detectors:

1. Comply with UL 268A.
2. The Analytical Microprocessor-based photoelectric smoke detector shall be readily adaptable for use in air duct smoke detection applications, using a housing that mounts to the outside of the duct. When used for duct smoke detection, the smoke detectors will not forfeit any of the system functionality which they have when used as area smoke detectors.
3. The duct smoke detection housing shall allow the detector to sample and compensate for, variations in duct air velocity between 300 and 4000 feet per minute.
4. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
5. Remote alarm LEDs and Remote Test Stations shall be supported by the duct smoke detector and provided where indicated.
6. All detectors used in duct applications shall be located in accordance with NFPA 72 recommendations.

- B. Fire-Lite #D365PL, #DST5 & #RTS151.

2.12 CARBON MONOXIDE DETECTORS

- A. General Requirements for Carbon Monoxide Detectors:

1. Comply with UL 2075.
2. Listed for addressable connection to fire-alarm system.
3. Detector must send trouble alarm when nearing end-of-life, power supply problems, or internal faults.
4. Sounder base.

- B. Fire-Lite #FSCO-951 & #B200S.

2.13 NOTIFICATION APPLIANCES

- A. General Requirements for Notification Appliances:

1. Individually addressed, connected to a signaling line circuit, equipped for mounting as indicated and with screw terminals for system connections.
2. All appliances which are supplied for the requirements of this specification shall be U.L. Listed for Fire Protective Service and shall be capable of providing the "Equivalent Facilitation" which is allowed under the Americans with Disabilities Act Accessibilities Guidelines (ADA (AG)), and shall be UL 1971, and ULC S526 Listed.
3. All appliances shall be of the same manufacturer as the Fire Alarm Control Panel specified to insure absolute compatibility between the appliances and the control panels, and to ensure that the application of the appliances are done in accordance with the single manufacturers' instructions.
4. Wall or ceiling mount notification devices are acceptable.
5. All speaker/strobes shall be selectable candela output and wattage switch.

6. Speakers for Voice Notification: Locate speakers for voice notification to provide the intelligibility requirements of the "Notification Appliances" and "Emergency Communications Systems" chapters in NFPA 72.
7. Matching Transformers: Tap range matched to acoustical environment of speaker location.

B. Self - Synchronized Strobes:

1. Strobes shall be supplied by the same manufacturer as the Fire Alarm Control Equipment. In - Out screw terminals shall be provided for wiring. The Strobes shall have a red or white plastic faceplate. They shall provide the proper candela output for the project per NFPA 72 spacing guidelines and synchronized flash outputs minimum requirements. The strobe shall have lens markings oriented for wall mounting.
2. In - Out screw terminals shall be provided for wiring. They shall provide synchronized flash outputs as required to comply with code requirements.

C. System Sensor L-Series.

2.14 MAGNETIC DOOR HOLDERS

- A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.
1. Electromagnet: Requires no more than 3 W to develop 25-lbf holding force.
 2. Wall-Mounted Units: Flush mounted unless otherwise indicated.
 3. Rating: 24-V ac or dc.
- B. Material and Finish: Match door hardware.
- C. Norton Rixson #998M

2.15 REMOTE ANNUNCIATOR

- A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.
1. Mounting: Flush cabinet, NEMA 250, Type 1.
- B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.
- C. Fire-Lite #ANN-80.

2.16 ADDRESSABLE INTERFACE DEVICE

- A. General:
1. Fire Alarm / Life Safety System shall incorporate microprocessor-based addressable modules for the monitoring and control of system Input and Output functions over a 2 wire electronic communications loop, using both broadcast and serial polling protocols. All modules shall display communications and alarm status via LED indicators.

2. The function of each connected module shall be determined by the module type, and shall be defined in the system software through the application of a personality code. Simply changing the associated personality code may change module operation at any time.
 3. All addressing of the Microprocessor-based Addressable Modules shall be done electronically, and the electrical location of each module shall be automatically reported to the Fire Alarm Control Panel, where it may be downloaded into a PC, or printed out. The addressing of the modules will not be dependent on their electrical location on the circuit.
 4. All field wiring to the Microprocessor-based Addressable Modules shall be supervised for opens and ground faults and shall be location annunciated to the module of incidence.
 5. Diagnostic circuitry, and their associated indicators, with reviewable Trouble Codes, shall be integral to the Microprocessor-based Addressable Modules to assist in troubleshooting system faults.
 6. The module shall be suitable for operation in the following environment:
 - a. Temperature: 32oF to 120oF (0oC to 49oC)
 - b. Humidity: 0-93% RH, non-condensing
- B. Single Input Module:
1. Microprocessor-based Addressable Modules shall be used to provide one (1) supervised Class B (style B) input circuit capable of latching operation for use with contact devices, non-damped water flow switches, non-latching supervisory sprinkler switches.
 2. Fire-Lite #MMF-300(A).
- C. Dual Input Module:
1. Microprocessor-based Addressable Modules shall be used to provide two (2) independent supervised Class B (style B) input circuits capable of operating with two (2) contact devices. Both of the input circuits shall be terminated to, and operated from, the same microprocessor-based addressable module. The Initiating Device Circuit connected to the module shall be fully supervised for open circuits and ground faults.
 2. Fire-Lite #MDF-300(A).
- D. Single Riser Signal Module:
1. The Microprocessor-based Addressable Single Input Signal Module shall provide one (1) supervised Class B (style Y) Notification Appliance Circuit capable of a controlling 2A of polarized 24 VDC Notification Appliances, 50W speaker circuit power @ 25VRMS, or 35W speaker circuit power @ 70VRMS.
 2. Fire-Lite #MMF-301(A).
- E. Control Relay Module:
1. Microprocessor-based Addressable Control Relay Modules shall provide one form "C" dry relay contact rated at 2 amps @ 24 VDC or 0.5 amps at 120 VAC to, control external appliances or equipment processes. The control relay module shall be rated for pilot duty applications and releasing systems service. The position of the relay contact shall be confirmed by the system firmware.
 2. Fire-Lite #CRF-300(A).

2.17 DIGITAL ALARM COMMUNICATOR TRANSMITTER

- A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632.
 - 1. Cellular line – single main source. Provide Napco Starlink (SLE-MAX2) fire alarm communicator and SLE-ANTEXT50 external antenna. Cellular dial out shall be backed up as part of battery backup as well as generator backed up where available.
- B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on the cellular line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal. Transmitter shall automatically report cellular service restoration to the central station. If service is lost, 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 cellular line is 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.

2.18 DEVICE GUARDS

- A. Description: Welded wire mesh of size and shape for the smoke detector, or notification device requiring protection.
 - 1. Factory fabricated and furnished by manufacturer of device.
 - 2. Finish: Paint of color to match the protected device.
 - 3. STI Damage Stoppers #STI-97 Series.
- B. Description: ADA compliant pull station protective shield with alarm signal:
 - 1. Indoor: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation. Provide for all pull stations.
 - 2. Outdoor: Factory-fabricated weatherproof clear plastic gasketed enclosure hinged at the top to permit lifting for access to initiate an alarm.
 - 3. STI Stopper II #STI-11 Series.

2.19 FIRE PULL STATION SIGNAGE

- A. Description: The signs shall read "FIRE ALARM PULL STATION". Signs shall be 3"x 8" x.0.13" made of molded styrene. White 0.132" raised copy letters with red background and Braille Grade 2. Letters to be 3/4" high, Helvetica medium and all caps.

2.20 MAPS

- A. Description: Identification map showing all initiating devices and their address numbers.

2.21 SURGE PROTECTION

- A. AC Protection
 - 1. DITEK #DTK-DF120S1.
- B. Notification Appliance Circuit (NAC), Initiating Device Circuit (IDC) and Signaling Line Circuit (SLC) Protection
 - 1. DITEK #DTK-2MHLP-BWB.
- C. Cellular Communicator Auto Dialer Lines Protection
 - 1. DITEK #DTK-VSPN.

2.22 FIRE ALARM WIRE AND CABLE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Genesis Cable Products; Honeywell International, Inc.
 - 2. Rockbestos-Suprenant Cable Corp.
 - 3. West Penn Wire.
 - 4. Windy City Wire Products.
- B. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.
- C. Signaling Line Circuits: Twisted, shielded pair, not less than No. 18 AWG size as recommended by system manufacturer.
 - 1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a two-hour rating.
- D. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation, and complying with requirements in UL 2196 for a two-hour rating.
 - 1. Low-Voltage Circuits: No. 16 AWG, minimum, in pathway.
 - 2. Line-Voltage Circuits: No. 12 AWG, minimum, in pathway.
 - 3. Multiconductor Armored Cable: NFPA 70, Type MC, copper conductors, Type TFN/THHN conductor insulation, copper drain wire, copper armor with outer jacket with red identifier stripe, NRTL listed for fire alarm and cable tray installation, plenum rated.

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.
- A. The entire system shall be installed in a workmanlike manner in accordance with approved manufacturers manuals and wiring diagrams. The contractor shall furnish all conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation.
 - 1. All wiring shall be of the type recommended by the NEC, approved by local authorities having jurisdiction for the purpose, and shall be installed in dedicated raceways throughout. All wiring shall be in conduit or the special MC cable noted below. Wiring shall be in rigid conduit when run outside above ground and in PVC when run outside below ground. Wiring run below ground shall be suitable for wet locations. Wiring shall be color coded red. All wiring shall be installed by the low voltage installer. All final connections shall be made by the low voltage installer.
 - 2. Run all fire alarm cable in separate pathways from other low voltage circuits.
 - 3. For indoor use, an acceptable alternative to cable in rigid conduit in most locations will be plenum rated MC fire alarm/control cable equal to AFC Cable Systems type FPLP. Cable will be color coded red. In new construction, EMT will be run in walls to a surface mounted box above the ceiling. MC cable will be run to the box with the armor stripped off enough to feed the device connected to the conduit without using additional splices. Use separate cables for data and signals. Cable will be supported in a similar manner as conduit. The fire alarm installer will be responsible for the installation of the fire alarm MC cable and fire alarm devices. The electrical contractor will provide AC power and conduit stub-ups in walls and related boxes. Connectors used will be those designed specifically for this type of cable.
 - 4. All junction and connection boxes shall be painted red for easy identification.
 - 5. All penetration of floor slabs and fire walls shall be fire stopped in accordance with all local fire codes.

6. End of Line Resistors: Shall be furnished as required for mounting as directed by the manufacturer.
 7. All wiring and equipment shall be installed according to the NEC and North Carolina Building Codes per the drawings submitted by the authorized Engineered Systems Distributor.
 8. Field Connected Devices must be installed and wired by a Factory Trained and Authorized Fire Alarm Installer or a licensed electrical contractor under direct supervision of a Factory Trained and Authorized Fire Alarm Installer.
 9. All auxiliary Power Supplies or other Fire Panels shall be located in electrical or mechanical rooms. They shall be mounted at a height between 48 to 60 inches from floor level. All such panels shall be "supervised" by the main Fire Alarm Panel.
- B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
1. Connect new equipment to existing control panel in existing part of the building.
 2. Connect new equipment to existing monitoring equipment at the supervising station.
 3. Expand, modify, and supplement existing control equipment as necessary to extend existing control functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.
- C. Install wall-mounted equipment, with tops of cabinets not more than 78 inches (1980 mm) above the finished floor.
1. Comply with requirements for seismic-restraint devices specified in Division 26 Section "Seismic Controls for Electrical Systems."
- D. 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. Install ADA compliant Stopper II pull station covers with alarm signal over all pull stations.
 5. Install identification signs next to all pull stations. Mount signs securely with screws or liquid nails. The center point of the signs shall correspond with the center point of the pull stations.
- E. Carbon Monoxide Detectors:
1. Install in kitchen for supervisory alarm detection.
 2. Install where required by code for fuel burning locations.
- F. Smoke- or Heat-Detector Spacing:
1. Comply with the "Smoke-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.
 2. Comply with the "Heat-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for heat-detector spacing.
 3. Smooth ceiling spacing shall not exceed 30 feet (9 m).
 4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Annex A or Annex B in NFPA 72.

5. HVAC: Locate detectors not closer than 36 inches ((910 mm)) from air-supply diffuser or return-air opening.
 6. 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.
- G. 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.
- H. 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.
1. Do not install smoke detector in duct smoke-detector housing during construction. Install detector only during system testing and prior to system turnover.
- I. Air-Sampling Smoke Detectors: If using multiple pipe runs, the runs shall be pneumatically balanced.
- J. Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location. Do not install smoke detectors in sprinklered elevator shafts.
- K. Remote Status and Alarm Indicators: Install in a visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.
- L. Audible/Visible or Visible Only Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install 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.
1. Protective covers shall be placed over the horn / strobe units in the Gym and Multi - Purpose room.
- M. Device Location-Indicating Lights: Locate in public space near the device they monitor.

3.3 FIRE ALARM WIRING INSTALLATION

- A. Comply with NECA 1 and NFPA 72.
- B. Wiring Method:
1. Cables and pathways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
 2. Fire-Rated Cables: Use of two-hour, fire-rated fire alarm cables, NFPA 70, Types MI and CI, is not permitted.
 3. Signaling Line Circuits: Power-limited fire alarm cables shall not be installed in the same cable or pathway as signaling line circuits.
- C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

- D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.
- E. Color Coding: Color code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm circuit wiring and another for supervisory circuits. Color code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.
- F. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signals from other floors or zones.
- G. Wiring to Remote Alarm Transmitting Device: 1-inch conduit between the fire alarm control panel and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.4 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 08 Section "Door Hardware." Connect hardware and devices to fire-alarm system.
 - 1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.
- B. 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. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 - 1. Magnetically held-open doors.
 - 2. Electronically locked doors and access gates.
 - 3. Alarm-initiating connection to elevator recall system and components.
 - 4. Alarm-initiating connection to activate emergency lighting control.
 - 5. Supervisory connections at valve supervisory switches.
 - 6. Supervisory connections at elevator shunt-trip breaker.
 - 7. Data communication circuits for connection to building management system.
 - 8. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
 - 9. Supervisory connections at fire-pump engine control panel.
- C. Provide relay connection to all permanently installed elective audio systems (auditoriums, gym sound systems, etc) to mute the respective system during general alarm.

3.5 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems." All initiating devices will also be required to be labeled with engraved Lexan labels to identify device address and intended location. Labels shall be red background with white letters, letters shall be a minimum of 1/4" in height. Install framed instructions in a location visible from fire-alarm control unit.
- B. Install framed instructions in a location visible from fire-alarm control unit.

- C. Install identification map showing all initiating devices and their address numbers beside the main panel for quick and easy location of alarmed or troubled devices.

- 1. Map shall be mounted under glass.

3.6 SURGE PROTECTION AND 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.
- C. All equipment shall be properly grounded. Main panel shall be grounded directly to 'earth ground'.
- D. Surge protection shall be installed on the AC supply circuit at the Fire Alarm Panel and on all initiating, notification and monitoring circuits at the Fire Alarm Panel. In addition, surge protection shall be installed on all initiating, notification and monitoring circuits at all points of entry to a building from the outside.

3.7 FIELD QUALITY CONTROL

- A. All work shall be inspected and approved by the Local Fire Marshal and the School's Enforcement Inspectors prior to final payment. The Contractor shall provide all material, equipment and labor necessary to pass inspections by the Local Fire Marshal Office. Written documentation of inspections shall be provided to the Owner and Engineer.
 - 1. A complete set of as-built wiring schematics, drawn to scale; showing all device locations, wire routing and connections, etc. shall be provided to the Owner and Engineer prior to final inspection.
- B. Field tests shall be witnessed by authorities having jurisdiction.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- D. Perform tests and inspections.
- E. 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. Test audible appliances for the private operating mode according to manufacturer's written instructions.

4. Test visible appliances for the public operating mode according to manufacturer's written instructions.
5. 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.

F. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

G. Fire-alarm system will be considered defective if it does not pass tests and inspections.

H. Prepare test and inspection reports.

3.8 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.

3.9 SOFTWARE SERVICE AGREEMENT

A. Comply with UL 864.

B. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.

C. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.

1. Upgrade Notice: At least 30 days to allow Owner to schedule access to system and to upgrade computer equipment if necessary.

3.10 COMMISSIONING

A. The system shall be commissioned in accordance with the needs of the occupants of the protected building. Both "Complete System Commissioning" and "Phased System Commissioning" shall be possible with the specified system, and the execution of either method of commissioning shall be treated as stand-alone projects, and shall be documented as such, including the need for a complete contract close out submittal package for each Project Phase.

B. Complete System Commissioning:

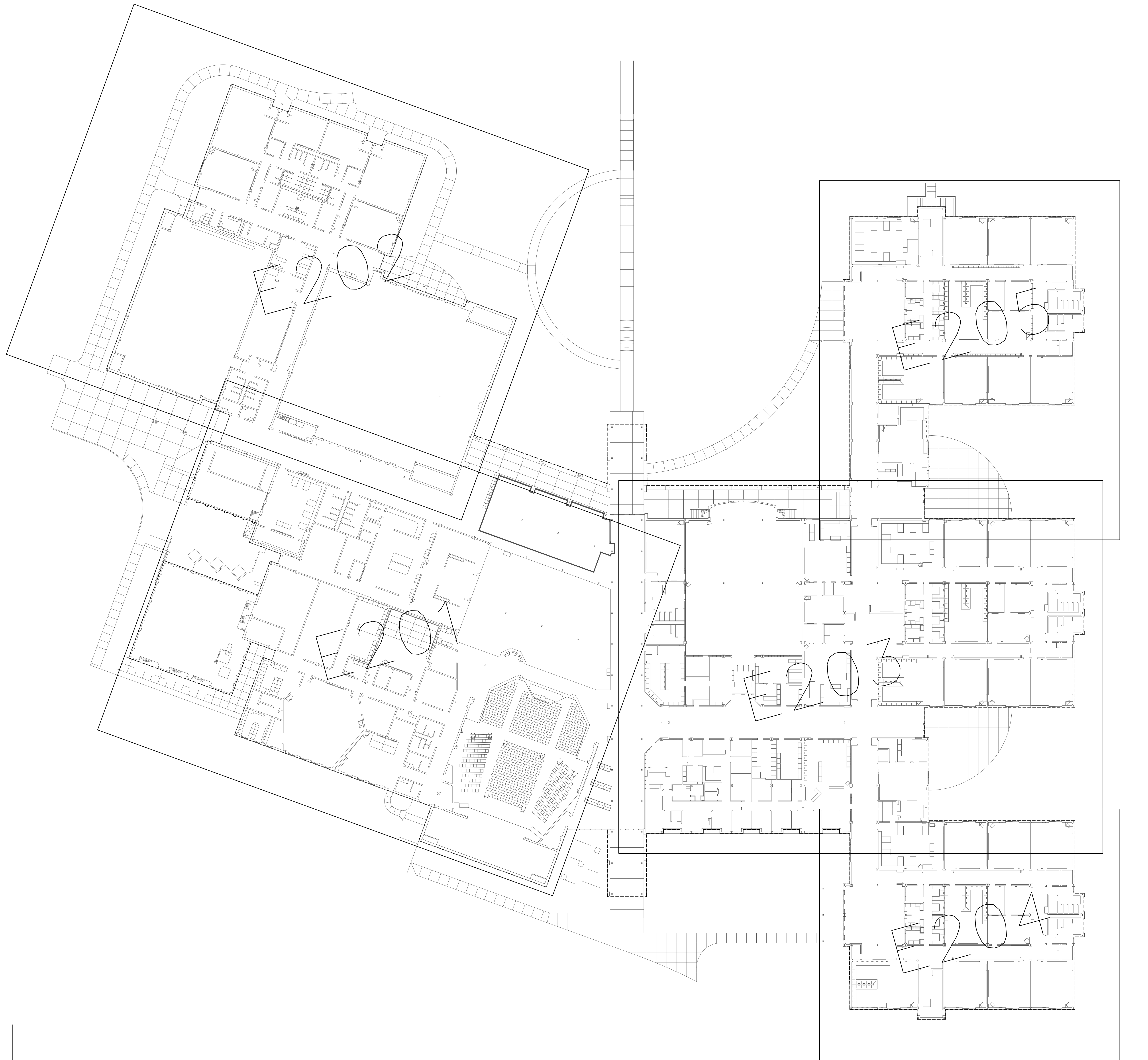
1. The Factory Trained and Authorized Fire Alarm Installer in the presence of the Local AHJ, the Building Owners' Representative, and a Representative of the General Contractor shall perform commissioning of the entire installed system, if deemed appropriate.
2. A complete system documentation package shall be provided to the Local Authority Having Jurisdiction and the Building Owners' Representative at the time of commissioning.

3.11 DEMONSTRATION

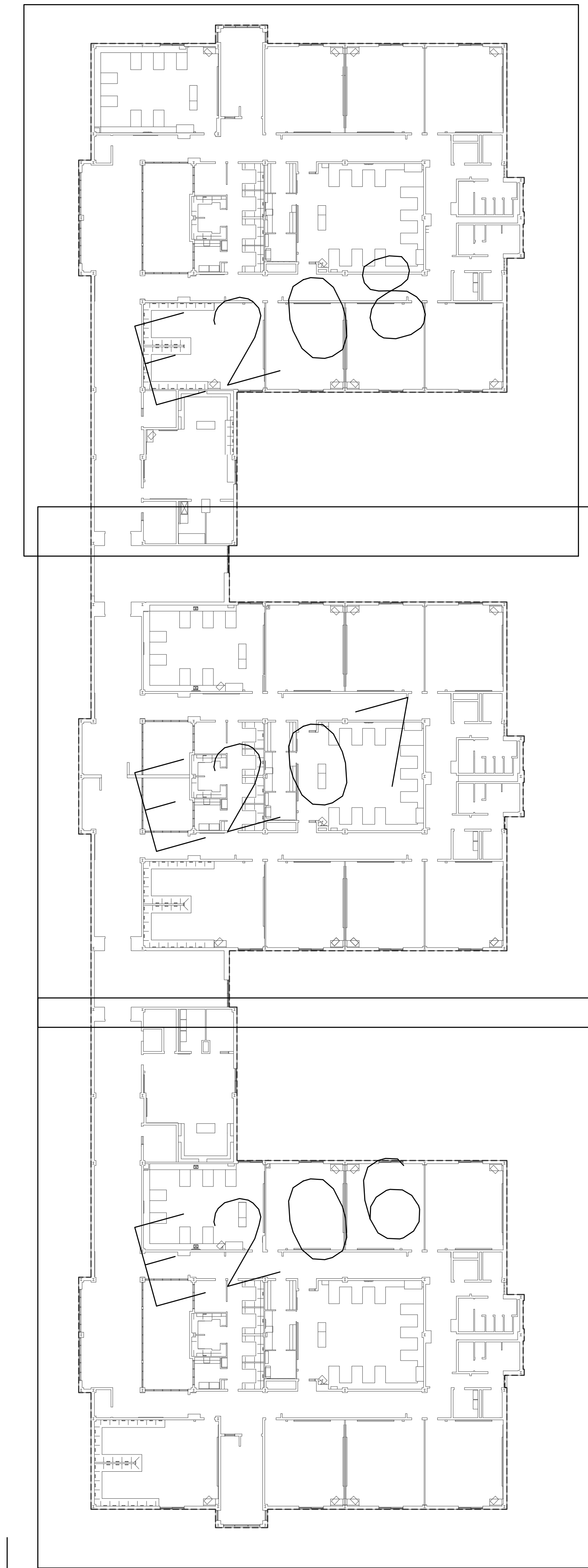
- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.
 1. The Fire Alarm Installer shall schedule and execute an instruction class for the Building owner, which details the proper operation of the installed fire alarm system. The instruction shall also cover the schedule of maintenance required by NFPA 72 and any additional maintenance recommended by the system manufacturer.
 2. This instruction shall also be separately furnished to the Local Municipal Fire Department if so requested by the Local Authority Having Jurisdiction.
 3. The instruction shall be a minimum of 8 hours in duration and 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.
 4. The Fire Alarm Installer shall provide service and operation manuals or any other curricula that may enhance the instruction of the Building Owners or Local Municipal Fire Department in the operation and maintenance of the system. Also provide software and hardware necessary to troubleshoot and completely program the system
- B. The completely installed fire alarm system will be fully tested in compliance with Testing Procedures for Signaling Systems (ANSI/NFPA 72) under the supervision of a trained manufacturer's representative. The system shall be demonstrated to perform all the functions as specified.
- C. The Fire Alarm Installer shall test:
 1. Every alarm initiating device for proper response and program execution.
 2. Every notification appliance for proper operation and audible/visual output.
 3. All auxiliary control functions such as elevator capture, smoke door and damper release, and functional override of HVAC, ventilation, and pressurization controls.
- D. The Owner must be notified at least 10 working days prior to the scheduled testing so that he/she may be present for such testing.
- E. After the system has been completely tested to the satisfaction of the Owner, the Fire Alarm Installer shall complete the Fire Alarm System Certification of Completion form published by the NFPA (Figure 1-7.2.1 in the National Fire Alarm Code).
- F. The completed form signed by a principal of the Fire Alarm System installer shall be delivered to the Project Manager with the other system documentation required by these specifications.
- G. All installation inspections are required prior to the walk through with the Fire Marshal.

END OF SECTION 28 31 11

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LEVEL ONE



LEVEL TWO

REV #	DATE	DESCRIPTION

DATE: 03-23-2026
PROJECT #: 26-0052
DRAWN BY: WBD
DESIGNED BY: WBD
CHECKED BY: MAM

SHEET TITLE:
OVERALL KEY
PLANS

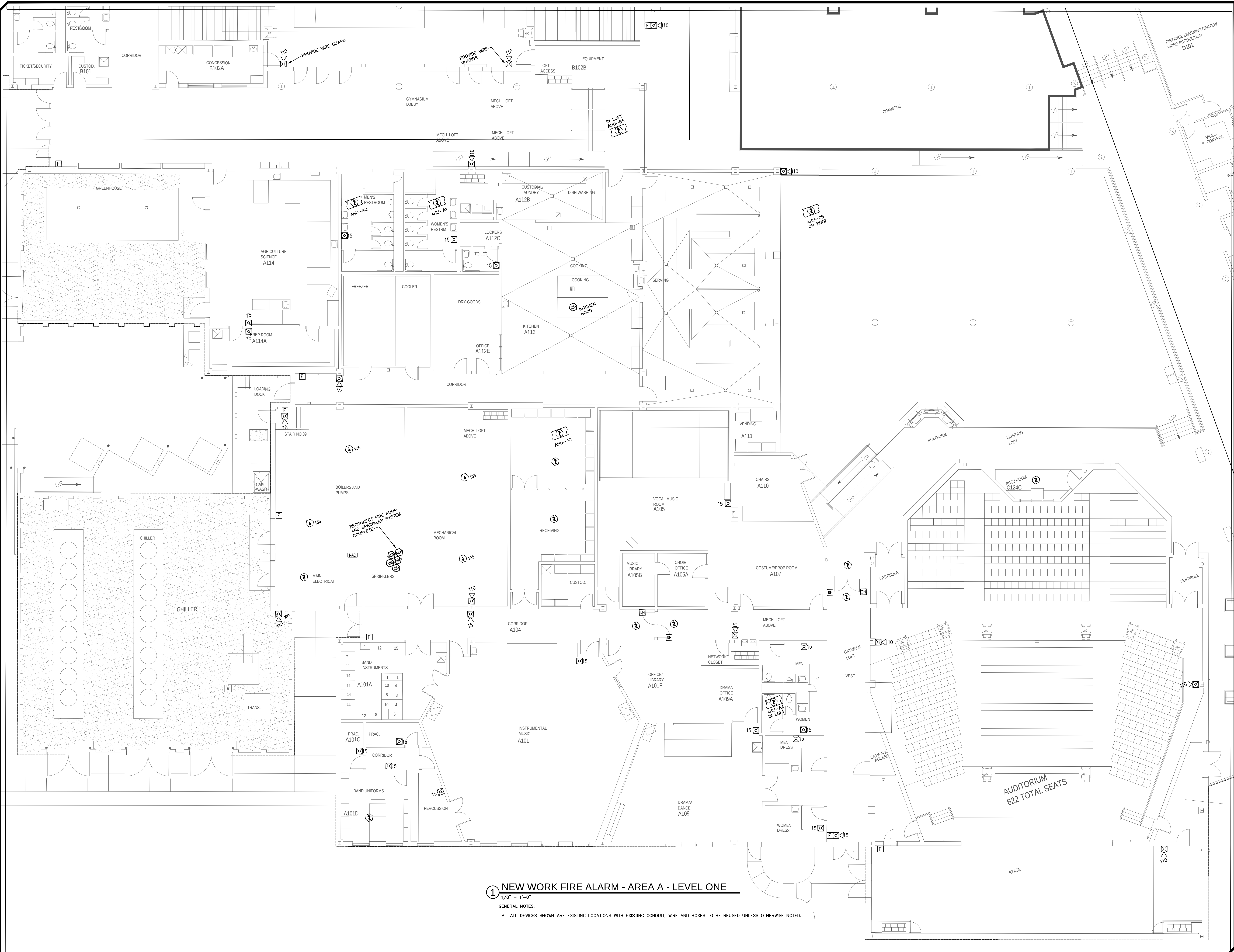
DWG #:
E200
SHEET NO: 2 of 10

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1 NEW WORK FIRE ALARM - AREA A - LEVEL ONE

1/8" = 1'-0"

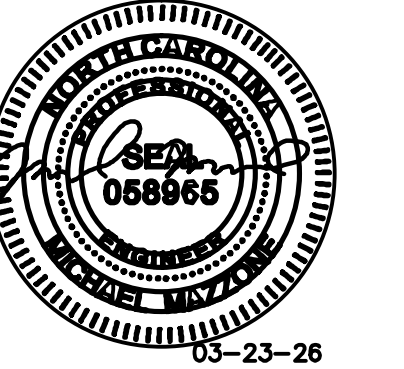
GENERAL NOTES:
A. ALL DEVICES SHOWN ARE EXISTING LOCATIONS WITH EXISTING CONDUIT, WIRE AND BOXES TO BE REUSED UNLESS OTHERWISE NOTED.

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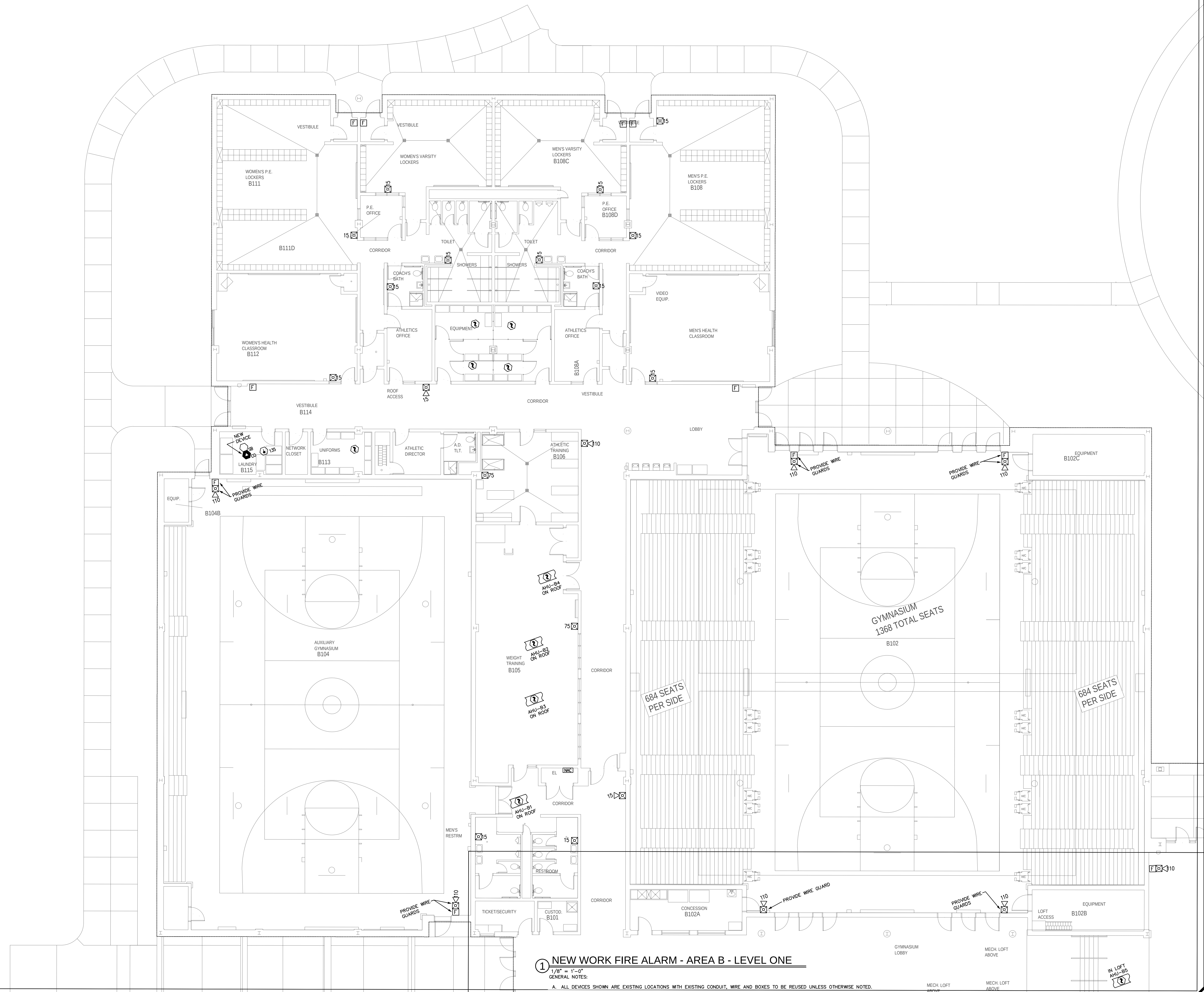
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REV #	DATE	DESCRIPTION

DATE:	03-23-2026
PROJECT #:	26-0052
DRAWN BY:	WBD
DESIGNED BY:	WBD
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SHEET TITLE:
NEW WORK FIRE
ALARM - AREA A -
LEVEL ONE

DWG #:
E201
SHEET NO: 3 of 10



① NEW WORK FIRE ALARM - AREA B - LEVEL ONE

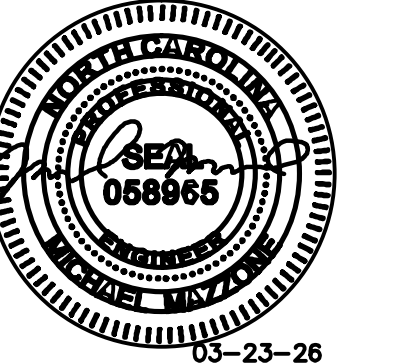
1/8" = 1'-0"
GENERAL NOTES:

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DATE: 03-23-2026
PROJECT #: 26-0052
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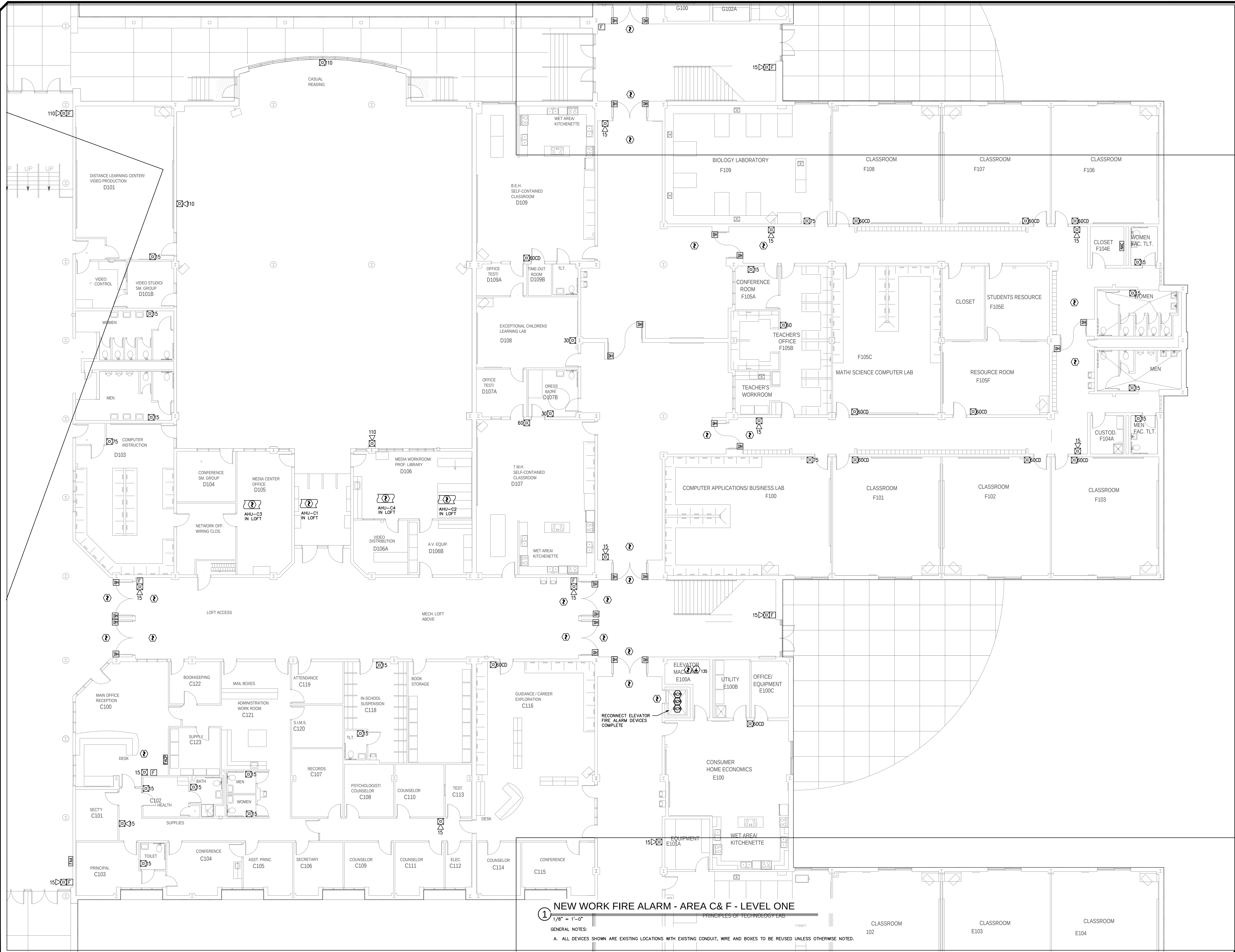
SHEET TITLE:

NEW WORK FIRE
ALARM - AREA B -
LEVEL ONE

DWG #:
E202

SHEET NO: 4 of 10

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REV #	DATE	DESCRIPTION

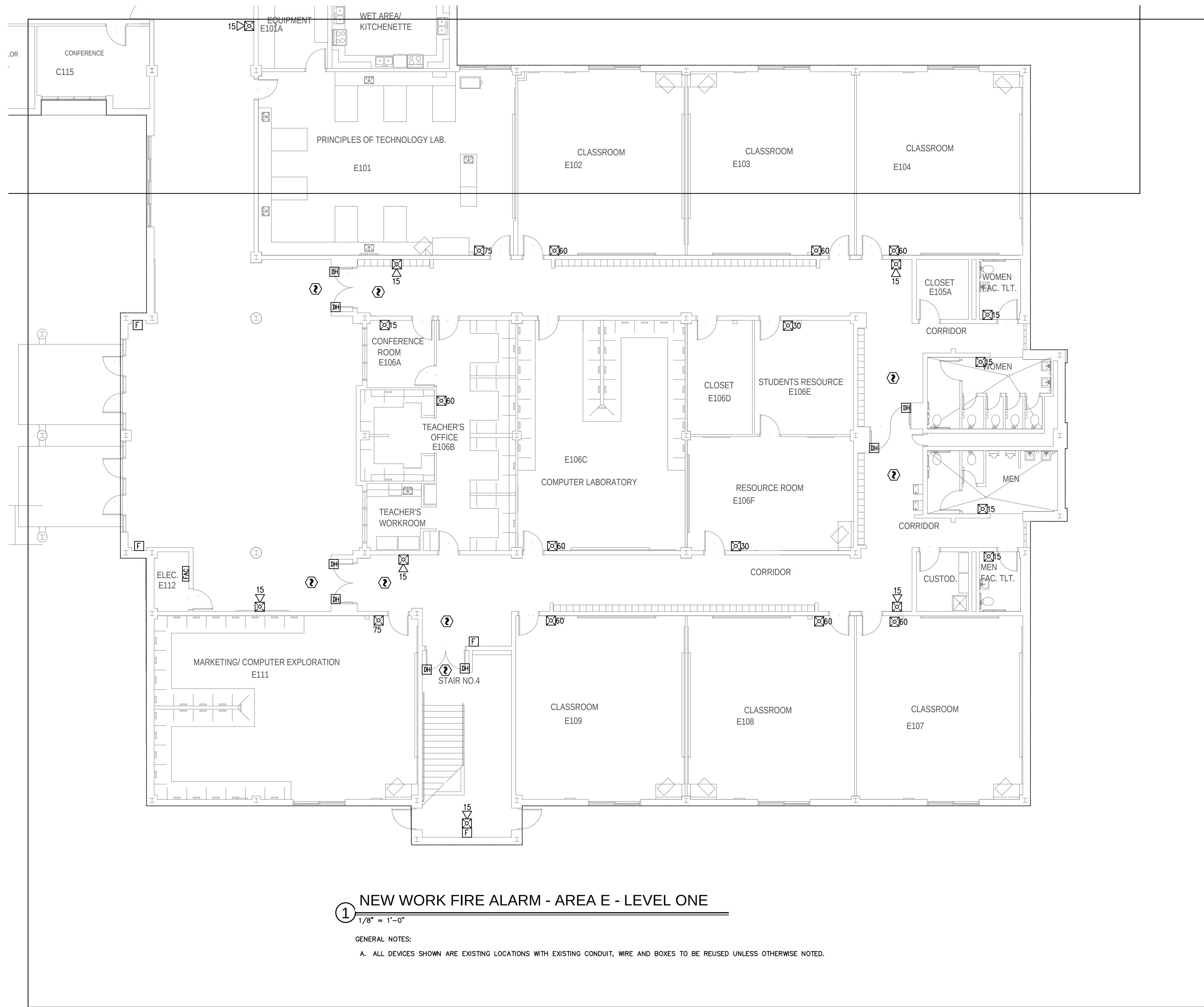
DATE: 03-23-2026
PROJECT #: 26-0052
DRAWN BY: WBD
DESIGNED BY: WBD
CHECKED BY: MAM

SHEET TITLE:
**NEW WORK FIRE
ALARM - AREA C
& F - LEVEL ONE**

DWG #:
E203

SHEET NO: 5 of 10

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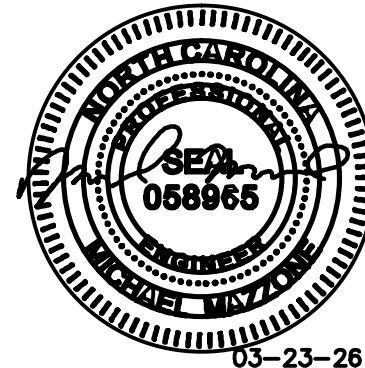


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DATE: 03-23-2026
PROJECT #: 26-0052
DRAWN BY: WBD
DESIGNED BY: WBD
CHECKED BY: MAM

SHEET TITLE:
NEW WORK FIRE
ALARM - AREA E -
LEVEL ONE

DWG #:
E204
SHEET NO: 6 of 10



1 NEW WORK FIRE ALARM - AREA G - LEVEL ONE

1/8" = 1'-0"

GENERAL NOTES:

A. ALL DEVICES SHOWN ARE EXISTING LOCATIONS WITH EXISTING CONDUIT, WIRE AND BOXES TO BE REUSED UNLESS OTHERWISE NOTED.

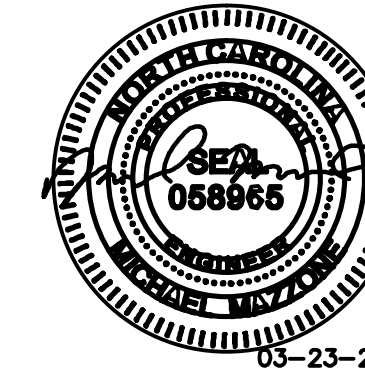
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REV # DATE DESCRIPTION

REV #	DATE	DESCRIPTION

DATE: 03-23-2026

PROJECT #: 26-0052

DRAWN BY: WBD

DESIGNED BY: WBD

CHECKED BY: MAM

SHEET TITLE:

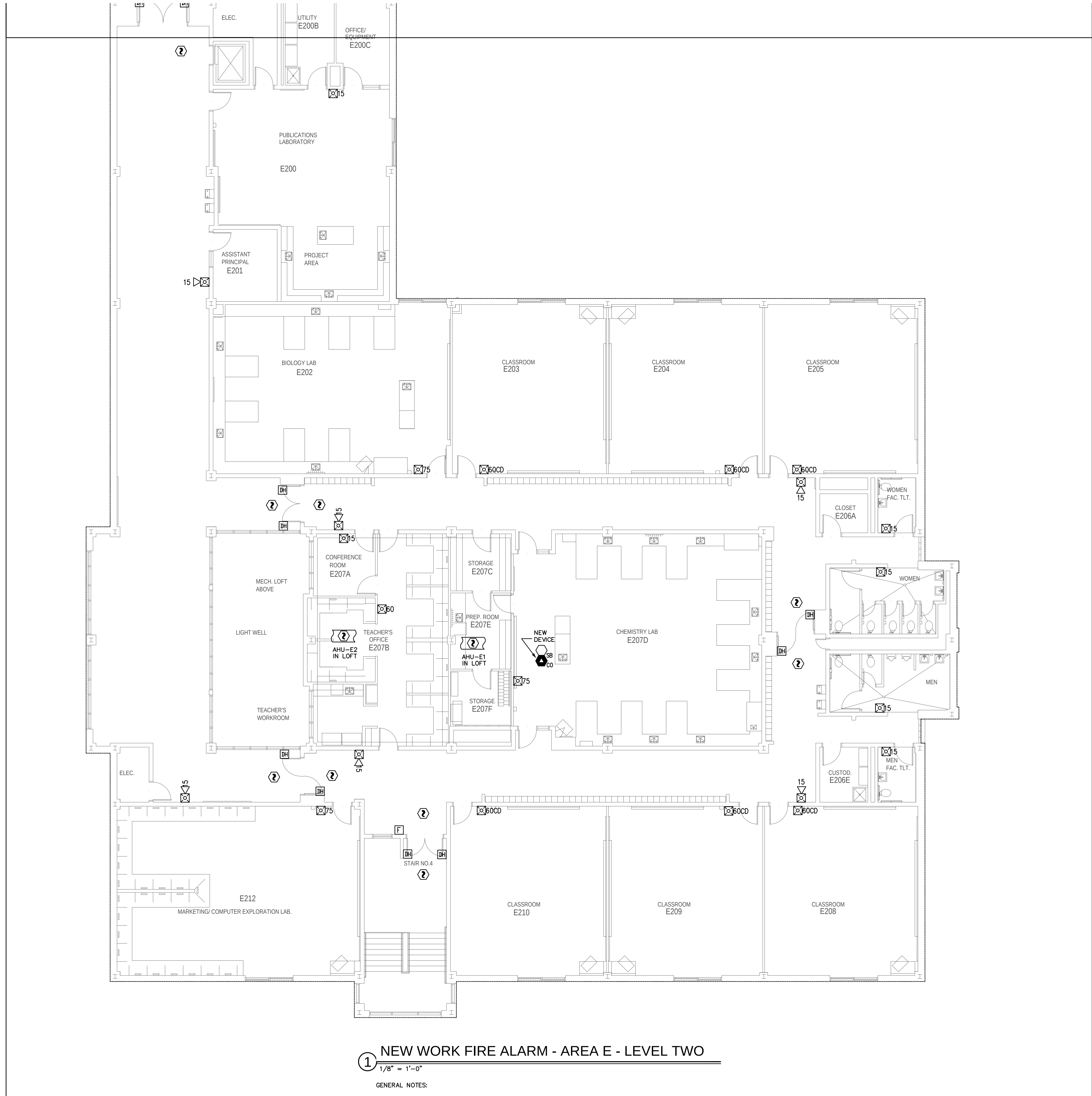
NEW WORK FIRE
ALARM - AREA G -
LEVEL ONE

DWG #:

E205

SHEET NO: 7 of 10

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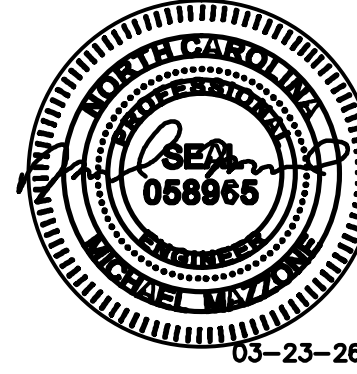


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REV #	DATE	DESCRIPTION

DATE: 03-23-2026
PROJECT #: 26-0052
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SHEET TITLE:
NEW WORK FIRE
ALARM - AREA E -
LEVEL TWO

DWG #:
E206
SHEET NO: 8 of 10

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① NEW WORK FIRE ALARM - AREA F - LEVEL TWO
1/8" = 1'-0"

GENERAL NOTES:

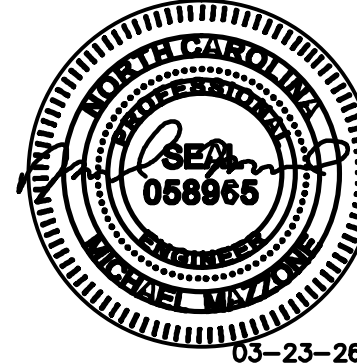
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REV #	DATE	DESCRIPTION

DATE: 03-23-2026
PROJECT #: 26-0052
DRAWN BY: WBD
DESIGNED BY: WBD
CHECKED BY: MAM

SHEET TITLE:
NEW WORK FIRE
ALARM - AREA F -
LEVEL TWO

DWG #:
E207
SHEET NO: 9 of 10



1 NEW WORK FIRE ALARM - AREA G - LEVEL TWO

$$1/8'' = 1'-0'$$

GENERAL NOTE

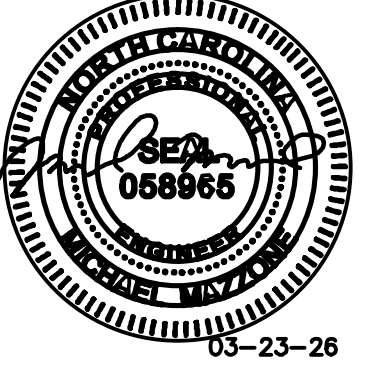
A. ALL DEVICES SHOWN ARE EXISTING LOCATIONS WITH EXISTING CONDUIT. WIRE AND BOXES TO BE REUSED UNLESS OTHERWISE NOTED

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REV #	DATE	DESCRIPTION
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DATE: 03-23-2026

PROJECT #: 26-0052

DRAWN BY: WBD

DESIGNED BY: WBD

CHECKED BY: MAM

SHEET TITLE:

NEW WORK FIRE
ALARM - AREA G -
LEVEL TWO

DWG #:

E208

SHEET NO: 10 of 10

S-2 Location: Porter Ridge High School

SECTION 28 31 11 - ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This standard provides the functional requirements for the installation, programming, configuration, warranty and maintenance of a complete Class B Analog/Addressable Intelligent Fire Alarm / Life Safety System.
- B. This Fire Alarm / Life Safety System Standard must be conformed to in its entirety to ensure that the installed and programmed Life Safety System will function as designed, and will accommodate the future requirements and operations required by the building owner. All specified operational features will be met without exception.
- C. Section Includes:
 - 1. Fire-alarm control unit or fire alarm control panel.
 - 2. Manual fire-alarm boxes.
 - 3. System smoke detectors.
 - 4. Heat detectors.
 - 5. Detector mounting bases.
 - 6. Air-sampling smoke detectors.
 - 7. Carbon monoxide detectors.
 - 8. Notification appliances.
 - 9. Magnetic door holders.
 - 10. Remote annunciator.
 - 11. Addressable interface device.
 - 12. Digital alarm communicator transmitter.
 - 13. Device guards.
 - 14. Standby Power Supplies.
 - 15. Surge Protection and Grounding.
 - 16. Fire-alarm wire and cable.
 - 17. Programming, Commissioning and Training of Operators.
 - 18. Accessories required to furnish a complete and Operational Life Safety System.

1.3 DEFINITIONS

- A. EMT: Electrical Metallic Tubing.
- B. FACP: Fire Alarm Control Panel.
- C. LED: Light-emitting diode.
- D. NICET: National Institute for Certification in Engineering Technologies.

1.4 PERFORMANCE REQUIREMENTS

- A. Statutory and Reference Standard Compliance:

1. The latest edition of the North Carolina State Building Code.
2. North Carolina Department of Insurance "Requirements for Fire Alarm Detection and Alarm Systems", latest revision.
3. National Fire Protection Association Standards:
 - a. NFPA 70 - National Electric Code
 - b. NFPA 72 - National Fire Alarm Code
 - c. NFPA 90A - Air Conditioning Systems
 - d. NFPA 101 - Life Safety Code
4. Underwriters Laboratories Inc. for use in fire protective signaling systems shall list the system and all components. The UL Label shall be considered as evidence of compliance with this requirement. The equipment shall be listed by UL under the following standards as applicable:
 - a. UL 864/UOJZ, APOU - Control Units for Fire Protective Signaling Systems.
 - b. UL 1076/APOU - Proprietary Burglar Alarm Units and Systems.
 - c. UL 268 - Smoke Detectors for Fire Protective Signaling Systems.
 - d. UL 268A - Smoke Detectors for Duct Applications.
 - e. UL 217 - Smoke Detectors Single Station.
 - f. UL 521 - Heat Detectors for Fire Protective Signaling Systems.
 - g. UL 228 - Door Holders for Fire Protective Signaling Systems.
 - h. UL 464 - Audible Signaling Appliances.
 - i. UL 1638 - Visual Signaling Appliances.
 - j. UL 38 - Manually Activated Signaling Boxes.
 - k. UL 346 - Water flow Indicators for Fire Protective Signaling Systems.
 - l. UL 1971 - Visual Signaling Appliances.
 - m. UL 1481 - Power Supplies for Fire Protective Signaling Systems.
5. Americans with Disabilities Act (ADA).

1.5 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. Provide program report showing that air-sampling detector pipe layout balances pneumatically within the airflow range of the air-sampling detector.
12. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.
 - a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
 - b. Show field wiring required for HVAC unit shutdown on alarm.
 - c. Locate detectors according to manufacturer's written recommendations.
 - d. Show air-sampling detector pipe routing.
13. Include alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
14. 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. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
2. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by manufacturer in fire-alarm system design.
 - b. Licensed or certified by authorities having jurisdiction.

D. Delegated-Design Submittal: For notification appliances and smoke and heat detectors, in addition to submittals listed above, indicate compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Drawings showing the location of each notification appliance and smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the device.
2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72. Calculate spacing and intensities for strobe signals and sound-pressure levels for audible appliances.
3. Indicate audible appliances required to produce square wave signal per NFPA 72.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Seismic Qualification Certificates: For fire-alarm control unit, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Field quality-control reports.

1.7 Sample Warranty: For special warranty.

1.8 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.

1. Install next to fire alarm panel, a framed copy of the floor plans to indicate final device locations showing address of each addressable devices. This map will include room numbers and names, and addressable device identifier.

B. AUTOCAD copy of the as-built fire alarm map (not just the system as-builts). This is the as-built map that is posted by the annunciator.

1. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following and deliver copies to authorities having jurisdiction:
 - 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. Air-sampling system sample port locations and modeling program report showing layout meets performance criteria.
 - g. Record copy of site-specific software.
 - h. 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.
 - i. Manufacturer's required maintenance related to system warranty requirements.
 - j. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.

C. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On magnetic media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

1.9 COMMISSIONING

A. At Commissioning provide the following:

1. Warranty Statement from the manufacturer: Warranty statement will state the period of warranty for all of the products proposed for the project and shall include the name and address of the authorized manufacturers' agent who will honor any and all warranty claims.
2. Written Certification by the Fire Alarm Installer that no power supply or circuit in the system has an electrical load greater than 80% of its rated capacity.
3. A scaled plan of each building showing the placement of each individual item of fire alarm equipment as well as raceway size and routing, junction boxes, and conductor size, quantity, and color in each raceway.
4. A Single Line System Block Diagram and written System Operational Overview.
5. Complete calculations showing the electrical load on the following system components.
6. Each system Power Supply
7. Each standby Power Supply (batteries)
8. Each Notification Appliance Circuit.
9. Each auxiliary control circuit that draws power from any system power supply.
10. Field Connection Drawings: A complete set of drawings, one for each Fire Alarm Control Panel module which has any external (field) wiring connected to it, and one for each system detector, module or signaling appliance, shall be supplied. The Field Connection Drawings shall be provided in paper (hard-copy) format.
11. Print-out report detailing the sensitivity of each smoke detector installed in the system. Include date on report.

1.10 QUALITY ASSURANCE

- A. Installer Qualifications: The installer shall be a licensed low voltage contractor and a factory authorized distributor to ensure proper specification adherence, final connection, test, turnover, warranty compliance and service. The installer shall maintain a service organization with adequate spare parts stock within 50 miles of the installation. Installer shall have training certification by the manufacturer of the Fire Alarm Control Equipment. This certification shall not be more than two years old, to ensure up-to-date product and application knowledge on the part of the installing installer.
- B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level IV technician.
- C. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.

1.11 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Manual fire-alarm boxes and door holders: Quantity equal to 5 percent of amount of each type installed, but no fewer than 1 unit of each type.
 2. Smoke, Heat, Carbon Monoxide Detectors and detector mounting bases: Quantity equal to 10 percent of amount of each type installed, but no fewer than 1 unit of each type.
 3. Audible and Visual Notification Appliances: Quantity equal to 10 percent of amount of each type installed, but no fewer than 1 unit of each type.

1.12 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 Architect and 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 Architect'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.

1.13 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.

1.14 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: Two years from date of Substantial Completion.
- B. Installer Warranty: Installer shall warrant the installed fire alarm system to be free from any defects of material and installation for a period of 2 years from acceptance by the professional engineer and/or owner.
 - 1. Any deficiencies shall be immediately corrected at no additional cost to the owner.
 - 2. Any defects that render the system inoperative shall be repaired within 24 hours of the owner notifying the contractor. Other defects shall be repaired within 48 hours of the owner notifying the contractor.

1.15 INSPECTIONS

- A. All work shall be inspected and approved by the Local Fire Marshal and the School's Enforcement Inspectors prior to final payment. The Installer shall provide all material, equipment and labor necessary to pass inspections by the the Local Fire Marshal Office. Written documentation of inspections shall be provided to the Owner and Engineer.
- B. A complete set of as-built wiring schematics, drawn to scale; showing all device locations, wire routing and connections, etc. shall be provided to the Owner and Engineer prior to final inspection.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All equipment furnished for this project shall be new and unused. All equipment, materials, accessories, devices, and other facilities covered by this guideline 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.
- B. Manufacturer's representative and a Record of Completion presented upon completion shall verify system installation and operations. The manufacturer's representative shall be responsible for an on-site demonstration of the operation of the system and initial staff training.

2.2 SYSTEM DESCRIPTION

- A. All Control Panel Assemblies and the connected Automatic and Manual Alarm and Notification Appliances shall be designed and manufactured by the same company, shall be tested and cross-listed as compatible (to category UOJZ) to ensure that a fully functioning Life Safety System is designed and provided.
- B. The Fire Alarm / Life Safety System supplied under this guideline shall be a microprocessor-based direct wired system. System shall utilize independently addressed, microprocessor-based smoke detectors, heat detectors, and modules, as described in this specification.
- C. All initiation devices shall be analog addressable devices. The notification devices shall be installed where required to meet ADA, NFPA 72 and NC Building Code Standards.
- D. Locate the Fire Alarm Panel in the main electrical room. Locate a full function annunciator in the main office and a display only alpha-numeric display at the front door.
- E. All Fire Alarm / Life Safety equipment shall be arranged and programmed to provide an integrated system for the early detection of fire, the notification of building occupants, the notification of building security, the override of the HVAC system operation, the shut-down of the kitchen hood, and the activation of other auxiliary systems to inhibit the spread of smoke and fire and to facilitate the safe evacuation of building occupants.
- F. All strobes shall be synchronized. A strobe unit shall be installed in every occupied space which includes all classrooms, restrooms, conference rooms, tutor rooms, science prep rooms and waiting areas/lobbies. Smoke and thermal detectors shall be installed in compliance with NFPA 72 codes. Duct detectors shall interface with HVAC systems to shut down necessary air-handling units.
- G. The fire alarm system shall be microprocessor driven with stored program controllers. Each panel (node) on the network shall use a multiple microprocessor design so that the failure of a single microprocessor will not result in a local failure. Fire alarm systems that utilize only one microprocessor for system (node) and SLC control will not be accepted.
- H. The Life Safety System shall be UL listed under Standard 864 (Control Units for Fire-Protective Signaling Systems) under categories UOJZ and APOU. The specified modules shall also be listed under UL 1076 (Proprietary Burglar Alarm Units and Systems) under category APOU.
- I. A standby power supply shall automatically supply electrical energy to the system upon primary power supply failure. Use "Emergency Generator" circuit where available. Standby power shall be an electrical battery with capacity to operate the system under maximum supervisory load for 24 hours and capable of operating the system for 5 minutes in the alarm mode at 100% load, 15

minutes for voice components. Fire alarm shall include a charging circuit to automatically maintain the electrical charge of the battery.

- J. Do not install notification appliances on the exterior of the building unless specifically directed to do so by the Project Manager.
- K. Remote LED indicators must be installed at each duct detector location. Install the indicator in the ceiling so it can be seen while standing in the corridor/classroom.
- L. All power supplies must be on dedicated circuits. Existing building circuits (receptacles, lights, etc.) cannot be used. Use generator power where available.
- M. Smoke detectors shall be installed a minimum of 3' from air supply diffusers and lighting fixtures.
- N. Automatic door closers to be activated by local smoke detectors only.
- O. Use toggle bolts for all wall mounted equipment/components/appliances
- P. All Fire Alarm wiring shall be FPLR or FPLP in conduit or duct, or MC fire alarm cable.
- Q. Provide remote LED indicator lights for all duct detectors. Locate indicators in corridors.
- R. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Where an existing system is being expanded, components shall be compatible with, and operate as, an extension of the existing system. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.
- S. Automatic sensitivity control of certain smoke detectors.
- T. All components provided shall be listed for use with the selected system.
- U. 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.

2.3 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
 - 1. Manual stations.
 - 2. Heat detectors.
 - 3. Smoke detectors.
 - 4. Duct smoke detectors.
 - 5. Automatic sprinkler system water flow.
 - 6. Fire-extinguishing system operation.
 - 7. Fire standpipe system.
 - 8. Fire pump running.
- B. Fire-alarm signal shall initiate the following actions:
 - 1. Continuously operate alarm notification appliances, including voice evacuation notices.
 - 2. Local sounding device at panel shall be activated.
 - 3. Identify alarm and specific initiating device at fire-alarm control unit and remote annunciators.

4. Transmit an alarm signal to the remote alarm receiving station.
5. Unlock electric door locks in designated egress paths.
6. Release fire and smoke doors held open by magnetic door holders.
7. Activate voice/alarm communication system.
8. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
9. Close smoke dampers in air ducts of designated air-conditioning duct systems.
10. Recall elevators to primary or alternate recall floors.
11. Activate emergency shutoffs for gas and fuel supplies.
12. Mute elective audio systems installed permanently within the facility (Intercom, sound systems).
13. Record events in the system memory.

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

1. Valve supervisory switch.
2. Alert and Action signals of air-sampling detector system.
3. Elevator shunt-trip supervision.
4. User disabling of zones or individual devices.
5. Loss of communication with any panel on the network.
6. Carbon monoxide detectors.
7. Fire pump running.
8. Fire-pump loss of power.
9. Fire-pump power phase reversal.
10. ERRS
 - a. Donor antenna malfunction.
 - b. Active RF-emitting device failure.
 - c. Low battery capacity indication when 70 percent of the 12-hour operating capacity has been depleted.
 - d. Active system component failure.
 - e. Loss of normal AC power
 - f. Failure of battery charger
 - g. Communication link between fire alarm system and ERRS.

D. System Supervisory Signal Actions:

1. Identify specific device initiating the event at fire-alarm control unit and remote annunciators.
2. After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.
3. Display system status on graphic annunciator.
4. Transmit an alarm signal to the remote alarm receiving station.

E. 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.

F. System Trouble Signal Actions:

1. Trouble indicator shall flash.
2. A local sounding device in the panel shall be activated
3. Identify specific device initiating the event at fire-alarm control unit and remote annunciators.
4. Unacknowledged alarm messages shall have priority over trouble messages, and if such an alarm must also be displayed, the trouble message will not be displayed until the operator has acknowledged all alarm messages.
5. Transmit an alarm signal to the remote alarm receiving station.

2.4 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.5 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated in these specifications or comparable product by one of the following:

1. Fire-Lite ES-1000X
2. Notifier NFS640
3. Silent Knight 6820

2.6 FIRE-ALARM CONTROL UNIT

- A. General Requirements for Fire-Alarm Control Unit:

1. Operators' Interface:
 - a. Character Graphical Display shall provide the means to inform the System Operator with detailed information about the off-normal status of the installed Fire Alarm / Life Safety System. Character Graphical Display shall automatically respond to the status of the system and shall display that status in character front panel display.
2. Automatic Functions: The following status functions shall be annunciated by the Character Graphical Display:
 - a. When the Fire Alarm / Life Safety System is in the "Normal" Mode, the panel displays: Current Date and Time, Custom System Title (minimum 2 lines X 21 characters), and a summary total of system events.
 - b. The Character Graphical Display shall provide separate event queues for ALARM, TROUBLE, SUPERVISORY and MONITOR.
3. Loop Controller Interface:
 - a. An Electronic 100% digital Loop Controller shall be provided in each Fire Alarm Control Panel (where needed), to interface between the panel and the Analytical Microprocessor-based Detectors and modules.
 - b. It shall be possible to connect the electronic loop controller to the Analytical Microprocessor-based Detectors and modules utilizing any wiring material or

method complying with Chapter 3 of the National Electrical Code (ANSI/NFPA 70-1996) as Class A (Style 6 or Style 7) or Class B (Style 4) circuits without the use of special shielding, twisted wire, or conduits. It must be possible to wire branch circuits (T-Taps) from Class B Circuits (Style 4). Each Electronic Protection Loop shall be configurable to operate as a Style 7 loop without the need for additional hardware modules.

- c. All system programming and history shall be permanently stored in non-volatile memory to ensure that no programming or history is lost. Systems which store initial programming or field programming changes in battery backed memory will not be accepted.
 - d. The Electronic Loop Controller shall be capable of setting the address of all Analytical Microprocessor-based Detectors and modules connected to it electronically, without the need to set switches at any of the individual devices.
 - e. The Electronic Loop Controller shall notify the System Operator when any connected smoke detector reports a "Routine Maintenance Required" signal to the system.
4. Notification Appliance Circuits:
- a. Provide where indicated on the plans supervised hard-wired Notification Appliance Circuits (NAC) for the control of 24VDC signaling appliances. Each NAC shall operate as a Class B (Style Y) circuit and shall be capable of controlling up to 3.5 amps of signaling power.
 - b. NAC's shall be power limited to 3.5A at 24VDC and 4.1A at 20.4VDC to support higher current demand by visible appliances at lower battery voltages.
5. Remote Diagnostic Utility - RDUEU-E or equal:
- a. The Fire Alarm System shall have the ability to report its status and sensitivity remotely over modem to a personal computer. The system shall be capable of generating sensitivity, system status, and trend analysis reports from data downloaded from the panel. Installer to provide the modem at the panel to a personal computer as directed by the Owner.

2.7 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes:

- 1. Comply with UL 38.
- 2. Boxes shall be finished in red with white molded, "FIRE" raised-letter; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
- 3. Double-action mechanism requiring two actions to initiate an alarm with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
- 4. Station Reset: Key operated switch.

B. Fire-Lite #BG-12LX.

2.8 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:

- 1. Comply with UL 268.

2. System shall use Analytical Microprocessor-based Detectors that are capable of full digital communications with the Fire Alarm / Life Safety System using both broadcast and polling communications protocols. Each detector shall be capable of performing independent advanced fire detection algorithms. The fire detection algorithm shall measure sensor signal dimensions, time patterns and combine different fire parameters to increase reliability and distinguish real fire conditions from unwanted nuisance alarms caused by environmental events. Signal patterns that are not typical of fires shall be eliminated by digital filters and will not cause a system alarm condition. Devices not capable of combining different fire parameters or employing digital filters will not be acceptable.
3. Each detector shall have an integral microprocessor capable of making alarm decisions based on fire parameter information stored in the detectors' memory. Detectors not capable of making independent alarm decisions are not acceptable. Maximum total loop response time for detectors changing state (alarm or trouble) shall be 0.5 seconds.
4. Each detector shall be capable of identifying diagnostic codes to be used for system maintenance. All diagnostic codes shall be stored in the detector. Each detector shall be capable of transmitting pre-alarm, alarm, and maintenance signals to the Fire Alarm Control Panel via the Electronic Loop Controller. Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
5. Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring. All of these devices and their bases will also be required to be labeled with engraved Lexan labels to identify device address and intended location. Labels shall be red background with white letters, letters shall be a minimum of 1/4" in height.
6. Integral Visual-Indicating Light: LED type indicating detector has operated.

B. Photoelectric/Multi-Criteria Smoke Detectors:

1. Photoelectric detector shall utilize a light scattering type photoelectric smoke sensor to detect visible particulates produced by combustion. The integral microprocessor shall dynamically examine values from the sensor and initiate a system alarm based on the analysis of data. Detector shall continually monitor any changes in sensitivity due to the environmental effects of dirt, smoke, temperature, aging and humidity. Information shall be stored in the detectors' memory and shall be transferred to the electronic loop controller for retrieval using a laptop PC or the Intelligent Detector Program/Service Tool designed by the manufacturer specifically for the purpose.
2. The alarm set point shall be field selectable to any of five sensitivity settings ranging from 1.0% to 3.5% smoke obscuration per foot. The photo detector shall be suitable for operation in the following environment:
 - a. Temperature: 32° F to 120° F (0oC to 49oC)
 - b. Humidity: 0-93% RH, non-condensing
 - c. Elevation: no limit

C. Fire-Lite #SD365.

2.9 HEAT DETECTORS

A. General Requirements for Heat Detectors:

1. Comply with UL 521.
2. System shall use Analytical Microprocessor-based Detectors that are capable of full digital communications with the Fire Alarm / Life Safety System using both broadcast and polling communications protocols. Each detector shall be capable of performing independent advanced fire detection algorithms. The fire detection algorithm shall

measure sensor signal dimensions, time patterns and combine different fire parameters to increase reliability and distinguish real fire conditions from unwanted nuisance alarms caused by environmental events. Signal patterns that are not typical of fires shall be eliminated by digital filters and will not cause a system alarm condition. Devices not capable of combining different fire parameters or employing digital filters will not be acceptable.

3. Each detector shall have an integral microprocessor capable of making alarm decisions based on fire parameter information stored in the detectors' memory. Detectors not capable of making independent alarm decisions are not acceptable. Maximum total loop response time for detectors changing state (alarm or trouble) shall be 0.5 seconds.
4. Each detector shall be capable of identifying diagnostic codes to be used for system maintenance. All diagnostic codes shall be stored in the detector. Each detector shall be capable of transmitting pre-alarm, alarm, and maintenance signals to the Fire Alarm Control Panel via the Electronic Loop Controller. Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
5. Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring. All of these devices and their bases will also be required to be labeled with engraved Lexan labels to identify device address and intended location. Labels shall be red background with white letters, letters shall be a minimum of 1/4" in height.
6. Integral Visual-Indicating Light: LED type indicating detector has operated.

B. Fixed Temperature/Rate of Rise Heat Detector:

1. Heat Detector shall have a solid-state heat sensor, and shall transmit an alarm at a fixed temperature of 135° F (57°C) or due to a temperature Rate of Rise of 15°F/minute (9°C/minute). The detector shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm.
2. The heat detector shall be rated for ceiling installation at 70 ft (21.3m) centers and be suitable for wall mount applications.
3. Heat detectors provided for kiln rooms shall be standard rated.

C. Fire-Lite #H365.

2.10 DETECTOR MOUNTING BASES

A. Mounting base will not contain any electronics, shall support all Microprocessor-based Smoke detector types detailed in this specification, and have the following minimum requirements:

1. Removal of the respective detector will not affect electronic loop communications with other detectors on that loop.
2. Field Wiring Connections shall be made to the room side of the base, so that wiring connections can be made or disconnected by the installer without the need to remove the mounting base from the electrical box.
3. The base shall be capable of supporting remote alarm annunciation.
4. Bases will have the option of external L.E.D. operation, Relay base or data line isolator base.
 - a. Relay base shall mount in a standard electrical box described above and provide Form "C" contacts rated at 1 amp @ 30VDC and listed for "pilot duty".
 - b. Isolator bases shall operate within a minimum of 23 msec. Of a short circuit on the data line, shall run self-test procedure to re-establish normal operation, and shall operate in a class 'A' operation as well as class 'B'.

- B. Fire-Lite #B300-6.

2.11 DUCT SMOKE DETECTORS

- A. General Requirements for Duct Smoke Detectors:

1. Comply with UL 268A.
2. The Analytical Microprocessor-based photoelectric smoke detector shall be readily adaptable for use in air duct smoke detection applications, using a housing that mounts to the outside of the duct. When used for duct smoke detection, the smoke detectors will not forfeit any of the system functionality which they have when used as area smoke detectors.
3. The duct smoke detection housing shall allow the detector to sample and compensate for, variations in duct air velocity between 300 and 4000 feet per minute.
4. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
5. Remote alarm LEDs and Remote Test Stations shall be supported by the duct smoke detector and provided where indicated.
6. All detectors used in duct applications shall be located in accordance with NFPA 72 recommendations.

- B. Fire-Lite #D365PL, #DST5 & #RTS151.

2.12 CARBON MONOXIDE DETECTORS

- A. General Requirements for Carbon Monoxide Detectors:

1. Comply with UL 2075.
2. Listed for addressable connection to fire-alarm system.
3. Detector must send trouble alarm when nearing end-of-life, power supply problems, or internal faults.
4. Sounder base.

- B. Fire-Lite #FSCO-951 & #B200S.

2.13 NOTIFICATION APPLIANCES

- A. General Requirements for Notification Appliances:

1. Individually addressed, connected to a signaling line circuit, equipped for mounting as indicated and with screw terminals for system connections.
2. All appliances which are supplied for the requirements of this specification shall be U.L. Listed for Fire Protective Service and shall be capable of providing the "Equivalent Facilitation" which is allowed under the Americans with Disabilities Act Accessibilities Guidelines (ADA (AG)), and shall be UL 1971, and ULC S526 Listed.
3. All appliances shall be of the same manufacturer as the Fire Alarm Control Panel specified to insure absolute compatibility between the appliances and the control panels, and to ensure that the application of the appliances are done in accordance with the single manufacturers' instructions.
4. Wall or ceiling mount notification devices are acceptable.
5. All speaker/strobes shall be selectable candela output and wattage switch.

6. Speakers for Voice Notification: Locate speakers for voice notification to provide the intelligibility requirements of the "Notification Appliances" and "Emergency Communications Systems" chapters in NFPA 72.
7. Matching Transformers: Tap range matched to acoustical environment of speaker location.

B. Self - Synchronized Strobes:

1. Strobes shall be supplied by the same manufacturer as the Fire Alarm Control Equipment. In - Out screw terminals shall be provided for wiring. The Strobes shall have a red or white plastic faceplate. They shall provide the proper candela output for the project per NFPA 72 spacing guidelines and synchronized flash outputs minimum requirements. The strobe shall have lens markings oriented for wall mounting.
2. In - Out screw terminals shall be provided for wiring. They shall provide synchronized flash outputs as required to comply with code requirements.

C. System Sensor L-Series.

2.14 MAGNETIC DOOR HOLDERS

- A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.

1. Electromagnet: Requires no more than 3 W to develop 25-lbf holding force.
2. Wall-Mounted Units: Flush mounted unless otherwise indicated.
3. Rating: 24-V ac or dc.

- B. Material and Finish: Match door hardware.

- C. Norton Rixson #998M

2.15 REMOTE ANNUNCIATOR

- A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.

1. Mounting: Flush cabinet, NEMA 250, Type 1.

- B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

- C. Fire-Lite #ANN-80.

2.16 ADDRESSABLE INTERFACE DEVICE

- A. General:

1. Fire Alarm / Life Safety System shall incorporate microprocessor-based addressable modules for the monitoring and control of system Input and Output functions over a 2 wire electronic communications loop, using both broadcast and serial polling protocols. All modules shall display communications and alarm status via LED indicators.

2. The function of each connected module shall be determined by the module type, and shall be defined in the system software through the application of a personality code. Simply changing the associated personality code may change module operation at any time.
 3. All addressing of the Microprocessor-based Addressable Modules shall be done electronically, and the electrical location of each module shall be automatically reported to the Fire Alarm Control Panel, where it may be downloaded into a PC, or printed out. The addressing of the modules will not be dependent on their electrical location on the circuit.
 4. All field wiring to the Microprocessor-based Addressable Modules shall be supervised for opens and ground faults and shall be location annunciated to the module of incidence.
 5. Diagnostic circuitry, and their associated indicators, with reviewable Trouble Codes, shall be integral to the Microprocessor-based Addressable Modules to assist in troubleshooting system faults.
 6. The module shall be suitable for operation in the following environment:
 - a. Temperature: 32oF to 120oF (0oC to 49oC)
 - b. Humidity: 0-93% RH, non-condensing
- B. Single Input Module:
1. Microprocessor-based Addressable Modules shall be used to provide one (1) supervised Class B (style B) input circuit capable of latching operation for use with contact devices, non-damped water flow switches, non-latching supervisory sprinkler switches.
 2. Fire-Lite #MMF-300(A).
- C. Dual Input Module:
1. Microprocessor-based Addressable Modules shall be used to provide two (2) independent supervised Class B (style B) input circuits capable of operating with two (2) contact devices. Both of the input circuits shall be terminated to, and operated from, the same microprocessor-based addressable module. The Initiating Device Circuit connected to the module shall be fully supervised for open circuits and ground faults.
 2. Fire-Lite #MDF-300(A).
- D. Single Riser Signal Module:
1. The Microprocessor-based Addressable Single Input Signal Module shall provide one (1) supervised Class B (style Y) Notification Appliance Circuit capable of a controlling 2A of polarized 24 VDC Notification Appliances, 50W speaker circuit power @ 25VRMS, or 35W speaker circuit power @ 70VRMS.
 2. Fire-Lite #MMF-301(A).
- E. Control Relay Module:
1. Microprocessor-based Addressable Control Relay Modules shall provide one form "C" dry relay contact rated at 2 amps @ 24 VDC or 0.5 amps at 120 VAC to, control external appliances or equipment processes. The control relay module shall be rated for pilot duty applications and releasing systems service. The position of the relay contact shall be confirmed by the system firmware.
 2. Fire-Lite #CRF-300(A).

2.17 DIGITAL ALARM COMMUNICATOR TRANSMITTER

- A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632.
 - 1. Cellular line – single main source. Provide Napco Starlink (SLE-MAX2) fire alarm communicator and SLE-ANTEXT50 external antenna. Cellular dial out shall be backed up as part of battery backup as well as generator backed up where available.
- B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on the cellular line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal. Transmitter shall automatically report cellular service restoration to the central station. If service is lost, 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 cellular line is 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.

2.18 DEVICE GUARDS

- A. Description: Welded wire mesh of size and shape for the smoke detector, or notification device requiring protection.
 - 1. Factory fabricated and furnished by manufacturer of device.
 - 2. Finish: Paint of color to match the protected device.
 - 3. STI Damage Stoppers #STI-97 Series.
- B. Description: ADA compliant pull station protective shield with alarm signal:
 - 1. Indoor: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation. Provide for all pull stations.
 - 2. Outdoor: Factory-fabricated weatherproof clear plastic gasketed enclosure hinged at the top to permit lifting for access to initiate an alarm.
 - 3. STI Stopper II #STI-11 Series.

2.19 FIRE PULL STATION SIGNAGE

- A. Description: The signs shall read "FIRE ALARM PULL STATION". Signs shall be 3"x 8" x.0.13" made of molded styrene. White 0.132" raised copy letters with red background and Braille Grade 2. Letters to be 3/4" high, Helvetica medium and all caps.

2.20 MAPS

- A. Description: Identification map showing all initiating devices and their address numbers.

2.21 SURGE PROTECTION

- A. AC Protection
 - 1. DITEK #DTK-DF120S1.
- B. Notification Appliance Circuit (NAC), Initiating Device Circuit (IDC) and Signaling Line Circuit (SLC) Protection
 - 1. DITEK #DTK-2MHLP-BWB.
- C. Cellular Communicator Auto Dialer Lines Protection
 - 1. DITEK #DTK-VSPN.

2.22 FIRE ALARM WIRE AND CABLE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Genesis Cable Products; Honeywell International, Inc.
 - 2. Rockbestos-Suprenant Cable Corp.
 - 3. West Penn Wire.
 - 4. Windy City Wire Products.
- B. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.
- C. Signaling Line Circuits: Twisted, shielded pair, not less than No. 18 AWG size as recommended by system manufacturer.
 - 1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a two-hour rating.
- D. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation, and complying with requirements in UL 2196 for a two-hour rating.
 - 1. Low-Voltage Circuits: No. 16 AWG, minimum, in pathway.
 - 2. Line-Voltage Circuits: No. 12 AWG, minimum, in pathway.
 - 3. Multiconductor Armored Cable: NFPA 70, Type MC, copper conductors, Type TFN/THHN conductor insulation, copper drain wire, copper armor with outer jacket with red identifier stripe, NRTL listed for fire alarm and cable tray installation, plenum rated.

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.
- A. The entire system shall be installed in a workmanlike manner in accordance with approved manufacturers manuals and wiring diagrams. The contractor shall furnish all conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation.
 - 1. All wiring shall be of the type recommended by the NEC, approved by local authorities having jurisdiction for the purpose, and shall be installed in dedicated raceways throughout. All wiring shall be in conduit or the special MC cable noted below. Wiring shall be in rigid conduit when run outside above ground and in PVC when run outside below ground. Wiring run below ground shall be suitable for wet locations. Wiring shall be color coded red. All wiring shall be installed by the low voltage installer. All final connections shall be made by the low voltage installer.
 - 2. Run all fire alarm cable in separate pathways from other low voltage circuits.
 - 3. For indoor use, an acceptable alternative to cable in rigid conduit in most locations will be plenum rated MC fire alarm/control cable equal to AFC Cable Systems type FPLP. Cable will be color coded red. In new construction, EMT will be run in walls to a surface mounted box above the ceiling. MC cable will be run to the box with the armor stripped off enough to feed the device connected to the conduit without using additional splices. Use separate cables for data and signals. Cable will be supported in a similar manner as conduit. The fire alarm installer will be responsible for the installation of the fire alarm MC cable and fire alarm devices. The electrical contractor will provide AC power and conduit stub-ups in walls and related boxes. Connectors used will be those designed specifically for this type of cable.
 - 4. All junction and connection boxes shall be painted red for easy identification.
 - 5. All penetration of floor slabs and fire walls shall be fire stopped in accordance with all local fire codes.

6. End of Line Resistors: Shall be furnished as required for mounting as directed by the manufacturer.
 7. All wiring and equipment shall be installed according to the NEC and North Carolina Building Codes per the drawings submitted by the authorized Engineered Systems Distributor.
 8. Field Connected Devices must be installed and wired by a Factory Trained and Authorized Fire Alarm Installer or a licensed electrical contractor under direct supervision of a Factory Trained and Authorized Fire Alarm Installer.
 9. All auxiliary Power Supplies or other Fire Panels shall be located in electrical or mechanical rooms. They shall be mounted at a height between 48 to 60 inches from floor level. All such panels shall be "supervised" by the main Fire Alarm Panel.
- B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
1. Connect new equipment to existing control panel in existing part of the building.
 2. Connect new equipment to existing monitoring equipment at the supervising station.
 3. Expand, modify, and supplement existing control equipment as necessary to extend existing control functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.
- C. Install wall-mounted equipment, with tops of cabinets not more than 78 inches (1980 mm) above the finished floor.
1. Comply with requirements for seismic-restraint devices specified in Division 26 Section "Seismic Controls for Electrical Systems."
- D. 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. Install ADA compliant Stopper II pull station covers with alarm signal over all pull stations.
 5. Install identification signs next to all pull stations. Mount signs securely with screws or liquid nails. The center point of the signs shall correspond with the center point of the pull stations.
- E. Carbon Monoxide Detectors:
1. Install in kitchen for supervisory alarm detection.
 2. Install where required by code for fuel burning locations.
- F. Smoke- or Heat-Detector Spacing:
1. Comply with the "Smoke-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.
 2. Comply with the "Heat-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for heat-detector spacing.
 3. Smooth ceiling spacing shall not exceed 30 feet (9 m).
 4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Annex A or Annex B in NFPA 72.

5. HVAC: Locate detectors not closer than 36 inches ((910 mm)) from air-supply diffuser or return-air opening.
 6. 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.
- G. 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.
- H. 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.
1. Do not install smoke detector in duct smoke-detector housing during construction. Install detector only during system testing and prior to system turnover.
- I. Air-Sampling Smoke Detectors: If using multiple pipe runs, the runs shall be pneumatically balanced.
- J. Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location. Do not install smoke detectors in sprinklered elevator shafts.
- K. Remote Status and Alarm Indicators: Install in a visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.
- L. Audible/Visible or Visible Only Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install 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.
1. Protective covers shall be placed over the horn / strobe units in the Gym and Multi - Purpose room.
- M. Device Location-Indicating Lights: Locate in public space near the device they monitor.

3.3 FIRE ALARM WIRING INSTALLATION

- A. Comply with NECA 1 and NFPA 72.
- B. Wiring Method:
1. Cables and pathways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
 2. Fire-Rated Cables: Use of two-hour, fire-rated fire alarm cables, NFPA 70, Types MI and CI, is not permitted.
 3. Signaling Line Circuits: Power-limited fire alarm cables shall not be installed in the same cable or pathway as signaling line circuits.
- C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

- D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.
- E. Color Coding: Color code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm circuit wiring and another for supervisory circuits. Color code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.
- F. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signals from other floors or zones.
- G. Wiring to Remote Alarm Transmitting Device: 1-inch conduit between the fire alarm control panel and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.4 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 08 Section "Door Hardware." Connect hardware and devices to fire-alarm system.
 - 1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.
- B. 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. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 - 1. Magnetically held-open doors.
 - 2. Electronically locked doors and access gates.
 - 3. Alarm-initiating connection to elevator recall system and components.
 - 4. Alarm-initiating connection to activate emergency lighting control.
 - 5. Supervisory connections at valve supervisory switches.
 - 6. Supervisory connections at elevator shunt-trip breaker.
 - 7. Data communication circuits for connection to building management system.
 - 8. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
 - 9. Supervisory connections at fire-pump engine control panel.
- C. Provide relay connection to all permanently installed elective audio systems (auditoriums, gym sound systems, etc) to mute the respective system during general alarm.

3.5 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems." All initiating devices will also be required to be labeled with engraved Lexan labels to identify device address and intended location. Labels shall be red background with white letters, letters shall be a minimum of 1/4" in height. Install framed instructions in a location visible from fire-alarm control unit.
- B. Install framed instructions in a location visible from fire-alarm control unit.

- C. Install identification map showing all initiating devices and their address numbers beside the main panel for quick and easy location of alarmed or troubled devices.

- 1. Map shall be mounted under glass.

3.6 SURGE PROTECTION AND 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.
- C. All equipment shall be properly grounded. Main panel shall be grounded directly to 'earth ground'.
- D. Surge protection shall be installed on the AC supply circuit at the Fire Alarm Panel and on all initiating, notification and monitoring circuits at the Fire Alarm Panel. In addition, surge protection shall be installed on all initiating, notification and monitoring circuits at all points of entry to a building from the outside.

3.7 FIELD QUALITY CONTROL

- A. All work shall be inspected and approved by the Local Fire Marshal and the School's Enforcement Inspectors prior to final payment. The Contractor shall provide all material, equipment and labor necessary to pass inspections by the Local Fire Marshal Office. Written documentation of inspections shall be provided to the Owner and Engineer.
 - 1. A complete set of as-built wiring schematics, drawn to scale; showing all device locations, wire routing and connections, etc. shall be provided to the Owner and Engineer prior to final inspection.
- B. Field tests shall be witnessed by authorities having jurisdiction.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- D. Perform tests and inspections.
- E. 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. Test audible appliances for the private operating mode according to manufacturer's written instructions.

4. Test visible appliances for the public operating mode according to manufacturer's written instructions.
5. 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.

F. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

G. Fire-alarm system will be considered defective if it does not pass tests and inspections.

H. Prepare test and inspection reports.

3.8 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.

3.9 SOFTWARE SERVICE AGREEMENT

A. Comply with UL 864.

B. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.

C. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.

1. Upgrade Notice: At least 30 days to allow Owner to schedule access to system and to upgrade computer equipment if necessary.

3.10 COMMISSIONING

A. The system shall be commissioned in accordance with the needs of the occupants of the protected building. Both "Complete System Commissioning" and "Phased System Commissioning" shall be possible with the specified system, and the execution of either method of commissioning shall be treated as stand-alone projects, and shall be documented as such, including the need for a complete contract close out submittal package for each Project Phase.

B. Complete System Commissioning:

1. The Factory Trained and Authorized Fire Alarm Installer in the presence of the Local AHJ, the Building Owners' Representative, and a Representative of the General Contractor shall perform commissioning of the entire installed system, if deemed appropriate.
2. A complete system documentation package shall be provided to the Local Authority Having Jurisdiction and the Building Owners' Representative at the time of commissioning.

3.11 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.
 1. The Fire Alarm Installer shall schedule and execute an instruction class for the Building owner, which details the proper operation of the installed fire alarm system. The instruction shall also cover the schedule of maintenance required by NFPA 72 and any additional maintenance recommended by the system manufacturer.
 2. This instruction shall also be separately furnished to the Local Municipal Fire Department if so requested by the Local Authority Having Jurisdiction.
 3. The instruction shall be a minimum of 8 hours in duration and 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.
 4. The Fire Alarm Installer shall provide service and operation manuals or any other curricula that may enhance the instruction of the Building Owners or Local Municipal Fire Department in the operation and maintenance of the system. Also provide software and hardware necessary to troubleshoot and completely program the system
- B. The completely installed fire alarm system will be fully tested in compliance with Testing Procedures for Signaling Systems (ANSI/NFPA 72) under the supervision of a trained manufacturer's representative. The system shall be demonstrated to perform all the functions as specified.
- C. The Fire Alarm Installer shall test:
 1. Every alarm initiating device for proper response and program execution.
 2. Every notification appliance for proper operation and audible/visual output.
 3. All auxiliary control functions such as elevator capture, smoke door and damper release, and functional override of HVAC, ventilation, and pressurization controls.
- D. The Owner must be notified at least 10 working days prior to the scheduled testing so that he/she may be present for such testing.
- E. After the system has been completely tested to the satisfaction of the Owner, the Fire Alarm Installer shall complete the Fire Alarm System Certification of Completion form published by the NFPA (Figure 1-7.2.1 in the National Fire Alarm Code).
- F. The completed form signed by a principal of the Fire Alarm System installer shall be delivered to the Project Manager with the other system documentation required by these specifications.
- G. All installation inspections are required prior to the walk through with the Fire Marshal.

END OF SECTION 28 31 11

Appendix B – Building Code Summary For All Commercial Projects (Except 1 and 2-Family Dwellings and Townhouses)

2018 APPENDIX B BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS (EXCEPT 1 AND 2-FAMILY DWELLINGS AND TOWNHOUSES)

Name of Project: UCPS PORTER RIDGE HIGH FIRE ALARM REPLACEMENT
Address: 2839 RIDGE RD., INDIAN TRAIL, NC Zip Code: 2804
Owner/Authorized Agent: DANIEL LARNES Phone # (704) 298-3540 (E267899) E-Mail: daniel.larnes@ucps.k12.nc.us
Owned By: ☒ City/County ☐ Private ☐ State
Code Enforcement Jurisdiction: ☐ City ☒ County ☐ State

CONTACT:				
DESIGNER	FIRM	NAME	LICENSE #	TELEPHONE # E-MAIL
Architectural	N/A	N/A	N/A	(N/A) N/A N/A
Civil	N/A	N/A	N/A	(N/A) N/A N/A
Electrical	OPTIMA ENGINEERING	MIKE MAZZONE	058865	(704) 927-1790, MAZZONE@OPTIMAENGINEERING.COM
Fire Alarm	N/A	N/A	N/A	(N/A) N/A N/A
Plumbing	N/A	N/A	N/A	(N/A) N/A N/A
Mechanical	N/A	N/A	N/A	(N/A) N/A N/A
Sprinkler-Standpipe	N/A	N/A	N/A	(N/A) N/A N/A
Structural	N/A	N/A	N/A	(N/A) N/A N/A
Retaining Walls >5' High	N/A	N/A	N/A	(N/A) N/A N/A
Other	N/A	N/A	N/A	(N/A) N/A N/A

2018 NC BUILDING CODE: ☐ New Building ☐ Addition ☒ Renovation
☐ 1st Time Interior Completion
☐ Shell/Core - Contact the local inspection jurisdiction for possible additional procedures and requirements
☐ Phased Construction - Shell/Core - Contact the local inspection jurisdiction for possible additional procedures and requirements
2018 NC EXISTING BUILDING CODE: EXISTING: ☐ Prescriptive ☐ Repair ☐ Chapter 14
Alteration: ☒ Level I ☐ Level II ☐ Level III
☐ Historic Property ☐ Change of Use
CONSTRUCTED: (date) N/A CURRENT OCCUPANCY(S) (Ch. 3): N/A
RENOVATED: (date) N/A PROPOSED OCCUPANCY(S) (Ch. 3): N/A
RISK CATEGORY (Table 1604.5): Current: ☐ I ☐ II ☒ III ☐ IV
Proposed: ☐ I ☐ II ☒ III ☐ IV

BASIC BUILDING DATA
Construction Type: ☐ I-A ☒ II-A ☐ III-A ☐ IV ☐ V-A
(check all that apply) ☐ I-B ☐ II-B ☐ III-B ☐ V-B
Sprinklers: ☐ No ☐ Partial ☒ Yes ☒ NFPA 13 ☐ NFPA 13R ☐ NFPA 13D
Standpipes: ☐ No ☒ Yes Class ☐ I ☐ II ☐ III ☐ Wet ☐ Dry
Fire District: ☒ No ☐ Yes Flood Hazard Area: ☒ No ☐ Yes
Special Inspections Required: ☒ No ☐ Yes (Contact the local inspection jurisdiction for additional procedures and requirements.)

Gross Building Area Table			
FLOOR	EXISTING (SQ FT)	NEW (SQ FT)	SUB-TOTAL
3rd Floor	N/A	N/A	N/A
2nd Floor	53,752	N/A	N/A
Mezzanine	N/A	N/A	N/A
1st Floor	120,810	N/A	N/A
Basement	N/A	N/A	N/A
TOTAL	213,552	N/A	N/A

ALLOWABLE AREA
Primary Occupancy Classification(s):
Assembly ☐ A-1 ☐ A-2 ☐ A-3 ☐ A-4 ☒ A-5
Business ☐
Educational ☒
Factory ☐ F-1 Moderate ☐ F-2 Low
Hazardous ☐ H-1 Detonate ☐ H-2 Deflagrate ☐ H-3 Combust ☐ H-4 Health ☐ H-5 HPM
Institutional ☐ I-1 ☐ I-2 ☐ I-3 ☐ I-4
Mercantile ☐ R-1 ☐ R-2 ☐ R-3 ☐ R-4
Storage ☐ S-1 Moderate ☐ S-2 Low ☐ High-piled
☐ Parking Garage ☐ Open ☐ Enclosed ☐ Repair Garage
Utility and Miscellaneous ☐
Accessory Occupancy Classification(s): N/A
Incidental Uses (Table 509): N/A
Special Uses (Chapter 4 – List Code Sections): N/A
Special Provisions: (Chapter 5 – List Code Sections): N/A
Mixed Occupancy: ☒ No ☐ Yes Separation: N/A_Hr. Exception: N/A
☒ Non-Separated Use (508.3) - The required type of construction for the building shall be determined by applying the height and area limitations for each of the applicable occupancies to the entire building. The most restrictive type of construction, so determined, shall apply to the entire building.
☒ Separated Use (508.4) - See below for area calculations for each story, the area of the occupancy shall be such that the sum of the ratios of the actual floor area of each use divided by the allowable floor area for each use shall not exceed 1.
Actual Area of Occupancy A + Actual Area of Occupancy B ≤ 1
Allowable Area of Occupancy A Allowable Area of Occupancy B
N/A + N/A + ... = N/A ≤ 1.00

STORY NO.	DESCRIPTION AND USE	(A) BLDG AREA PER STORY (ACTUAL)	(B) TABLE 506.2.4 AREA	(C) AREA FOR FRONTAGE INCREASES	(D) ALLOWABLE AREA PER STORY OR UNLIMITED

- Frontage area increases from Section 506.3 are computed as:
a. Perimeter which fronts a public way or open space having 20 feet minimum width = _____ (F)
b. Total Building Perimeter = _____
c. Ratio (F/P) = _____
d. W = Minimum width of public way = _____ (W)
e. Percent of frontage increase (F = 100(P/W) x 0.25) x W/30 = _____ (%)
2. Unlimited area applicable under conditions of Section 507.
3. Maximum Building Area = total number of stories in the building x D (maximum 3 stories) (506.2).
4. The maximum area of open parking spaces must comply with Table 406.5.4.
5. Frontage increase is based on the unsprinklered area value in Table 506.2.

ALLOWABLE HEIGHT		
	ALLOWABLE	SHOWN ON PLANS
Building Height in Feet (Table 504.3) 2		
Building Height in Stories (Table 504.4) 3		

- Provide code reference if the "Shown on Plans" quantity is not based on Table 504.3 or 504.4.
- The maximum height of air traffic control towers must comply with Table 412.3.1.
- The maximum height of open parking garages must comply with Table 406.5.4.

FIRE PROTECTION REQUIREMENTS									
BUILDING ELEMENT	FIRE SEPARATION DISTANCE (FEET)	REQ'D	BATING PROVIDED (W/ REDUCTION)	DETAIL # AND SHEET #	DESIGN # FOR RATED ASSEMBLY	SHEET # FOR RATED PENETRATION	SHEET # FOR RATED JOINTS		
Structural Frame, including columns, girders, trusses									
Bearing Walls									
Exterior									
North									
East									
West									
South									
Interior									
Nonbearing Walls and Partitions									
Exterior walls									
North									
East									
West									
South									
Interior walls and partitions									
Floor Construction including supporting beams and joists									
Floor Ceiling Assembly									
Columns Supporting Floors									
Roof Construction, including supporting beams and joists									
Roof Ceiling Assembly									
Columns Supporting Roof									
Shaft Enclosures - Bot									
Shaft Enclosures - Other									
Corridor Separation									
Occupancy/Fire Barrier Separation									
Party/Fire Wall Separation									
Smoke Barrier Separation									
Smoke Partition									
Tenant/Dwelling Unit/ Sleeping Unit Separation									
Incidental Use Separation									

* Indicate section number permitting reduction

PERCENTAGE OF WALL OPENING CALCULATIONS			
FIRE SEPARATION DISTANCE (FEET) FROM PROPERTY LINES	PERCENT OF OPENINGS PROTECTION (TABLE 705.8)	ALLOWABLE AREA (%)	ACTUAL SHOWN ON PLANS (%)

LIFE SAFETY SYSTEM REQUIREMENTS
Emergency Lighting: ☐ No ☐ Yes
Exit Signs: ☐ No ☐ Yes
Fire Alarm: ☐ No ☐ Yes
Smoke Detection Systems: ☐ No ☐ Yes ☐ Partial
Carbon Monoxide Detection: ☐ No ☐ Yes

LIFE SAFETY PLAN REQUIREMENTS
Life Safety Plan Sheet #:
☐ Fire and/or smoke rated wall locations (Chapter 7)
☐ Assumed and real property line locations (if not on the site plan)
☐ Exterior wall opening area with respect to distance to assumed property lines (705.8)
☐ Occupancy Use for each area as it relates to occupant load calculation (Table 1004.1.2)
☐ Occupant loads for each area
☐ Exit access travel distances (1017)
☐ Common path of travel distances (Tables 1006.2.1 & 1006.3.2(1))
☐ Dead end lengths (1020.4)
☐ Clear exit widths for each exit door
☐ Maximum calculated occupant load capacity each exit door can accommodate based on egress width (1005.3)
☐ Actual occupant load for each exit door
☐ A separate schematic plan indicating where fire rated floor/ceiling and/or roof structure is provided for purposes of occupancy separation
☐ Location of doors with panic hardware (1010.1.10)
☐ Location of doors with delayed egress locks and the amount of delay (1010.1.9.7)
☐ Location of doors with electromagnetic egress locks (1010.1.9.9)
☐ Location of doors equipped with hold-open devices
☐ Location of emergency escape windows (1030)
☐ The square footage of each fire area (202)
☐ The square footage of each smoke compartment for Occupancy Classification I-2 (407.5)
☐ Note any code exceptions or table notes that may have been utilized regarding the items above

ACCESSIBLE DWELLING UNITS (SECTION 1107)						
TOTAL UNITS	ACCESSIBLE UNITS REQUIRED	ACCESSIBLE UNITS PROVIDED	TYPE A UNITS REQUIRED	TYPE A UNITS PROVIDED	TYPE B UNITS REQUIRED	TYPE B UNITS PROVIDED

ACCESSIBLE PARKING (SECTION 1109)					
LOT OR PARKING AREA	TOTAL # OF PARKING SPACES REQUIRED	PROVIDED	# OF ACCESSIBLE SPACES PROVIDED	REGULAR WITH 9' ACCESS AISLE	TOTAL # ACCESSIBLE PROVIDED
TOTAL					

PLUMBING REQUIREMENTS (TABLE 2902.1)									
USE	WATERCLOSETS	URINALS	LAVATORIES	SHOWERS	DRINKING FOUNTAINS				
SPACE	MALE	FEMALE	UNSEX	MALE	FEMALE	UNSEX	TUBS	REGULAR	ACCESSIBLE
EXISTING									
NEW									
REQ'D									

SPECIAL APPROVALS
Special approval: (Local Jurisdiction, Department of Insurance, OSC, DPI, DHHS, etc., describe below)

ENERGY REQUIREMENTS:
The following data shall be considered minimum and any special attribute required to meet the energy code shall also be provided. Each Designer shall furnish the required portions of the project information for the plan data sheet. If performance method, state the annual energy cost for the standard reference design vs annual energy cost for the proposed design.

Existing building envelope complies with code: ☐ No ☐ Yes (The remainder of this section is not applicable)

Exempt Building: ☐ No ☐ Yes (Provide code or statutory reference):

Climate Zone: ☐ 3A ☐ 4A ☐ 5A

Method of Compliance: Energy Code ☐ Performance ☐ Prescriptive
ASHRAE 90.1 ☐ Performance ☐ Prescriptive
(If "Other" specify source here):

THERMAL ENVELOPE (Prescriptive method only)

Roof/Ceiling Assembly (each assembly)

Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____
Skylights in each assembly: _____
U-Value of skylight: _____
total square footage of skylights in each assembly: _____

Exterior Walls (each assembly)

Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____
Openings (windows or doors with glazing): _____
U-Value of assembly: _____
Solar heat gain coefficient: _____
projection factor: _____
Door R-Values: _____

Walls below grade (each assembly)

Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____

Floors over unconditioned space (each assembly)

Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____

Floors slab on grade

Description of assembly: _____
U-Value of total assembly: _____
R-Value of insulation: _____
Horizontal/vertical requirement: _____
slab heated: _____

2018 APPENDIX B BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS STRUCTURAL DESIGN (PROVIDE ON THE STRUCTURAL SHEETS IF APPLICABLE)

DESIGN LOADS:

Importance Factors: Snow (IS) _____
Seismic (IE) _____

Live Loads: Roof _____ psf
Mezzanine _____ psf
Floor _____ psf

Ground Snow Load: _____ psf

Wind Load: Ultimate Wind Speed _____ mph (ASCE-7)
Exposure Category _____

SEISMIC DESIGN CATEGORY: ☐ A ☐ B ☐ C ☐ D
Provide the following Seismic Design Parameters:
Risk Category (Table 1604.5) ☐ I ☐ II ☐ III ☐ IV
Spectral Response Acceleration S_{DS} _____ %g S₁ _____ %g
Site Classification (ASCE 7) ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F
Data Source: ☐ Field Test ☐ Presumptive ☐ Historical Data
Basic structural system ☐ Bearing Wall ☐ Dual w/Special Moment Frame
☐ Building Frame ☐ Dual w/Intermediate R/C or Special Steel
☐ Moment Frame ☐ Inverted Pendulum
Analysis Procedure: ☐ Simplified ☐ Equivalent Lateral Force ☐ Dynamic
Architectural, Mechanical, Components anchored? ☐ Yes ☐ No

LATERAL DESIGN CONTROL: Earthquake ☐ Wind ☐

SOIL BEARING CAPACITIES:
Field Test (provide copy of test report) _____ psf
Presumptive Bearing capacity _____ psf
File size, type, and capacity _____

2018 APPENDIX B BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS MECHANICAL DESIGN (PROVIDE ON THE MECHANICAL SHEETS IF APPLICABLE)

MECHANICAL SUMMARY
MECHANICAL SYSTEMS, SERVICE SYSTEMS AND EQUIPMENT

Thermal Zone

winter dry bulb: _____
summer dry bulb: _____

Interior design conditions

winter dry bulb: _____
summer dry bulb: _____
relative humidity: _____

Building heating load: _____

Building cooling load: _____

Mechanical Spacing Conditioning System

Unitary description of unit: _____
heating efficiency: _____
cooling efficiency: _____
size category of unit: _____
Boiler size category, if oversized, state reason: _____
Chiller size category, if oversized, state reason: _____

List equipment efficiencies: _____

2018 APPENDIX B BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS ELECTRICAL DESIGN (PROVIDE ON THE ELECTRICAL SHEETS IF APPLICABLE)

ELECTRICAL SUMMARY

ELECTRICAL SYSTEM AND EQUIPMENT

Method of Compliance: Energy Code ☐ Performance ☐ Prescriptive
ASHRAE 90.1 ☐ Performance ☐ Prescriptive

Lighting schedule (each fixture type)
lamp type required in fixture _____
number of lamps in fixture _____
ballast type used in the fixture _____
number of ballasts in fixture _____
total wattage per fixture _____
total interior wattage specified vs. allowed (whole building or space by space) _____
total exterior wattage specified vs. allowed _____

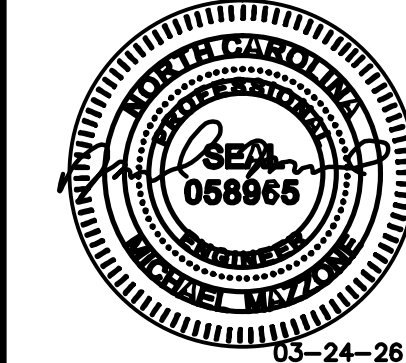
Additional Efficiency Package Options
(When using the 2018 NCECC; not required for ASHRAE 90.1)

- ☐ C406.2 More Efficient HVAC Equipment Performance
- ☐ C406.3 Reduced Lighting Power Density
- ☐ C406.4 Enhanced Digital Lighting Controls
- ☐ C406.5 On-Site Renewable Energy
- ☐ C406.6 Dedicated Outdoor Air System
- ☐ C406.7 Reduced Energy Use in Service Water Heating

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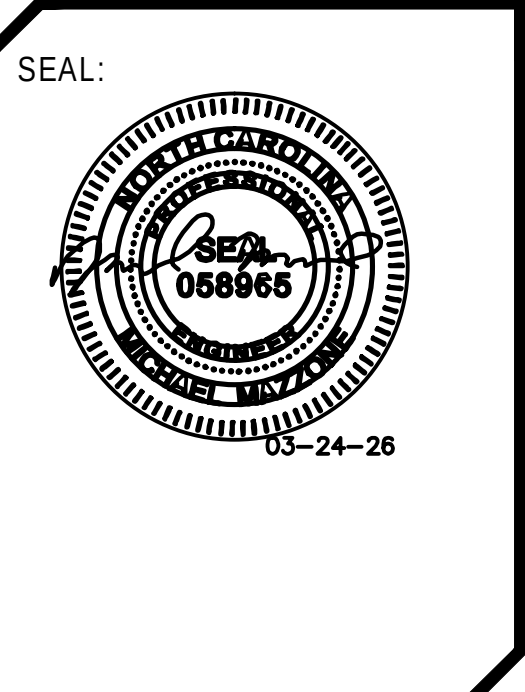
REV #	DATE	DESCRIPTION

DATE: 03-24-2026
PROJECT #: 26-0066
DRAWN BY: WBD
DESIGNED BY: WBD
CHECKED BY: MAM

SHEET TITLE:
appendix b

DWG #:
000
SHEET NO: 0 of

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REV #	DATE	DESCRIPTION

DATE: 03-24-2026
PROJECT #: 26-0066
DRAWN BY: WBD
DESIGNED BY: WBD
CHECKED BY: MAM

SHEET TITLE:
**OVERALL KEY
PLANS**

DWG #:
E200

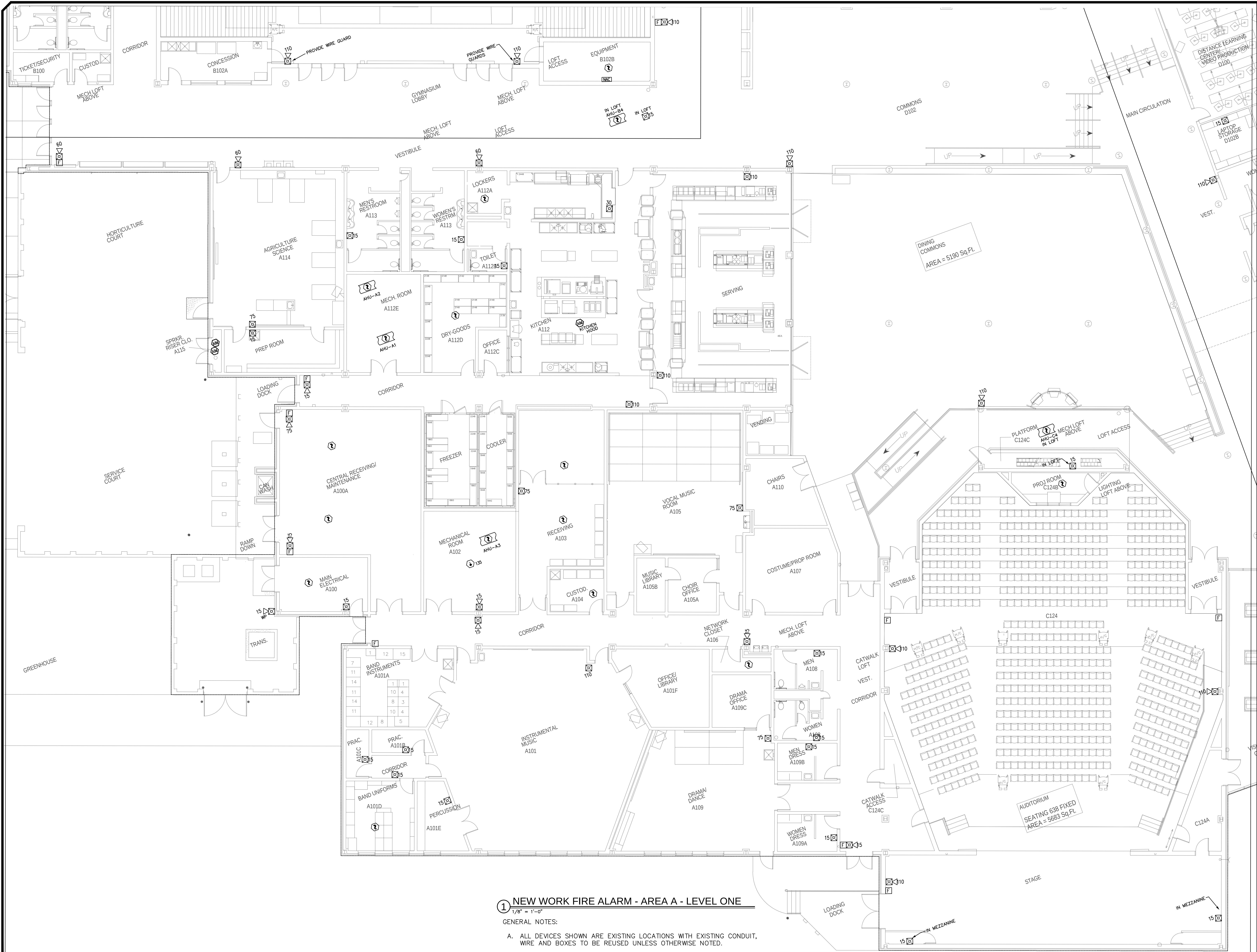
SHEET NO: 2 of 10

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1 NEW WORK FIRE ALARM - AREA A - LEVEL ONE

1/8" = 1'-0"

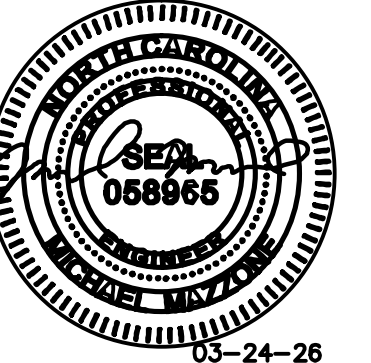
GENERAL NOTES:

A. ALL DEVICES SHOWN ARE EXISTING LOCATIONS WITH EXISTING CONDUIT, WIRE AND BOXES TO BE REUSED UNLESS OTHERWISE NOTED.

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REV # DATE DESCRIPTION

DATE: 03-24-2026

PROJECT #: 26-0066

DRAWN BY: WBD

DESIGNED BY: WBD

CHECKED BY: MAM

SHEET TITLE:

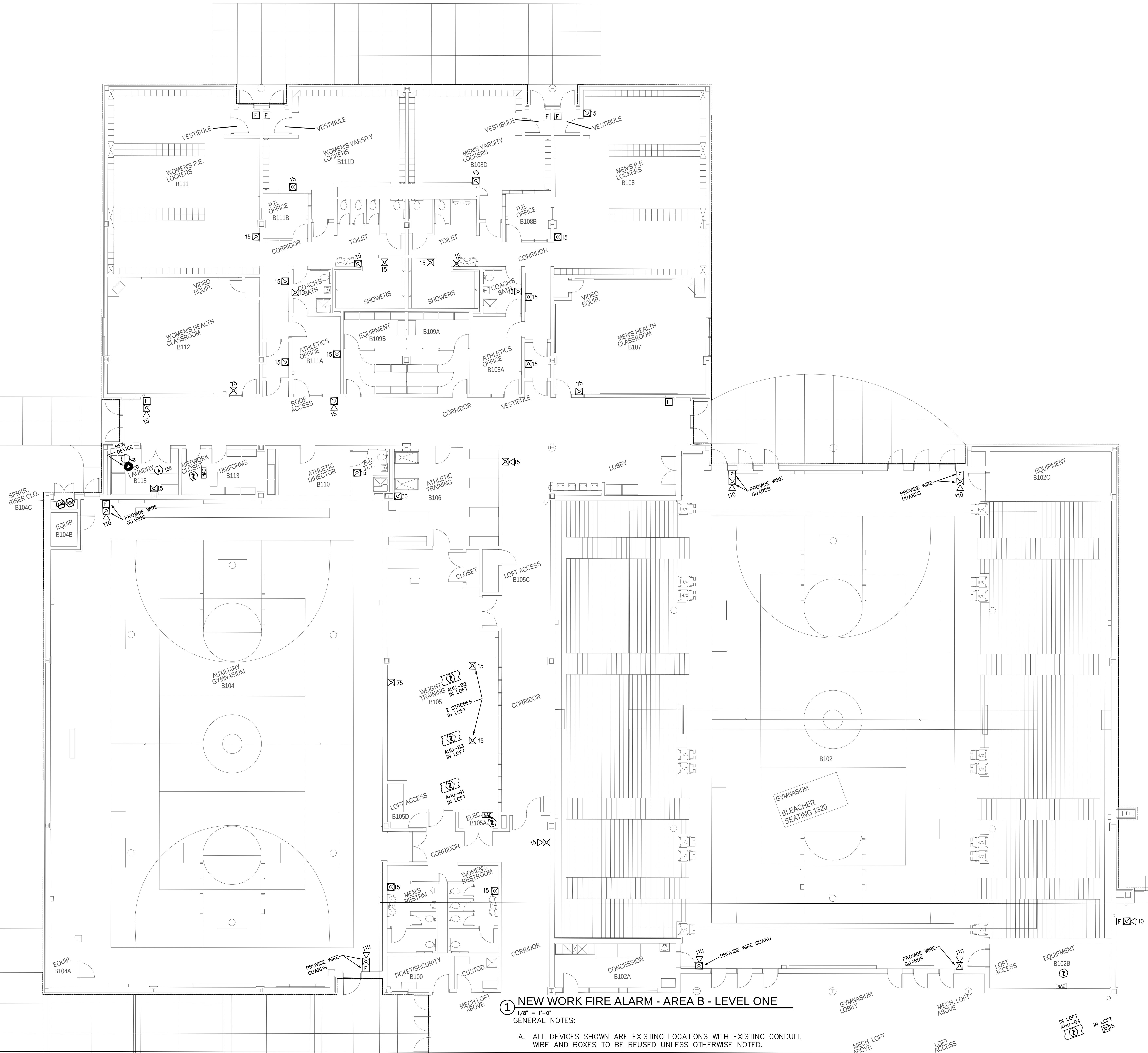
NEW WORK FIRE
ALARM - AREA A -
LEVEL ONE

DWG #:

E201

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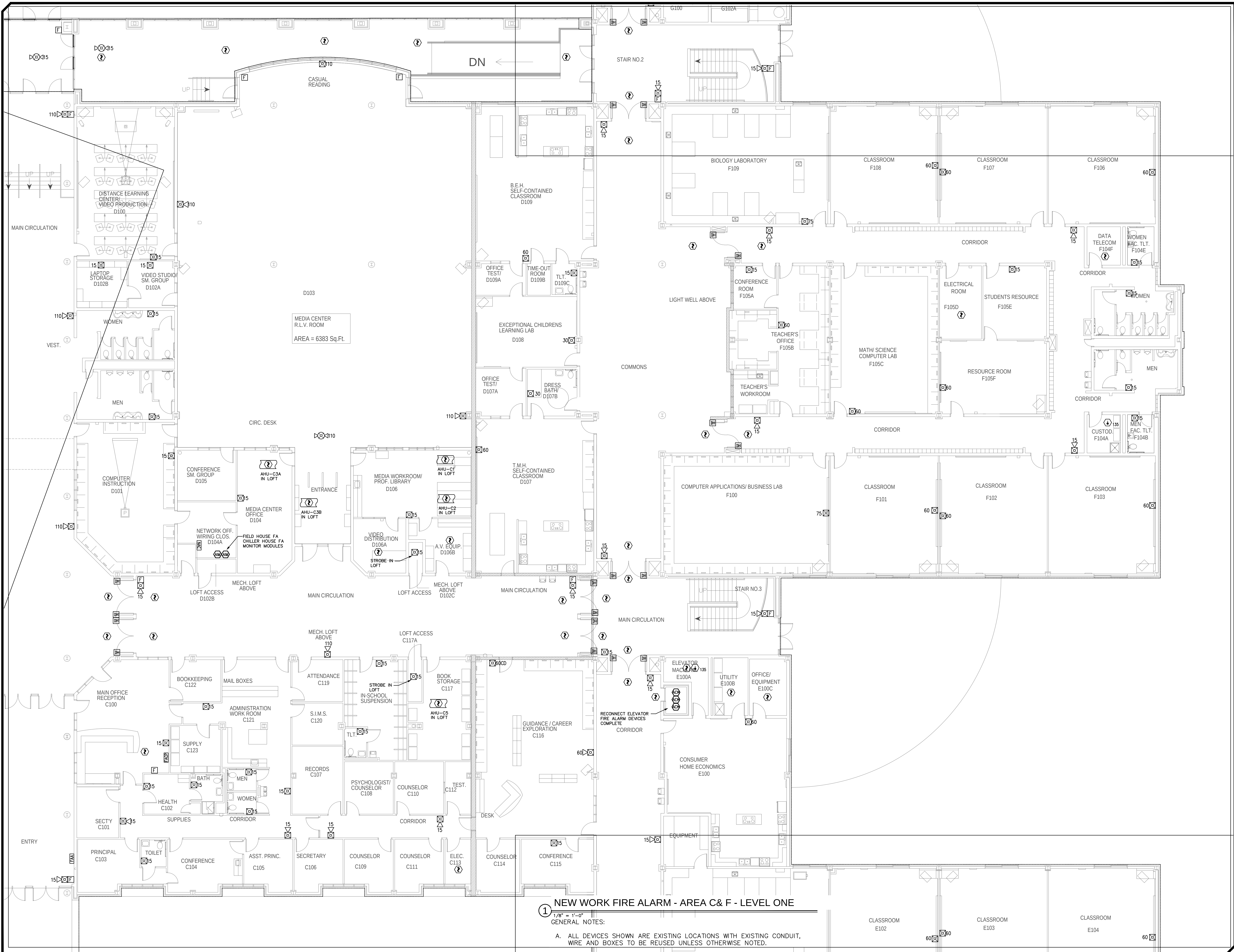
REV #	DATE	DESCRIPTION

DATE: 03-24-2026
PROJECT #: 26-0066
DRAWN BY: WBD
DESIGNED BY: WBD
CHECKED BY: MAM

SHEET TITLE:
NEW WORK FIRE
ALARM - AREA B -
LEVEL ONE

DWG #:
E202
SHEET NO: 4 of 10

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REV #	DATE	DESCRIPTION

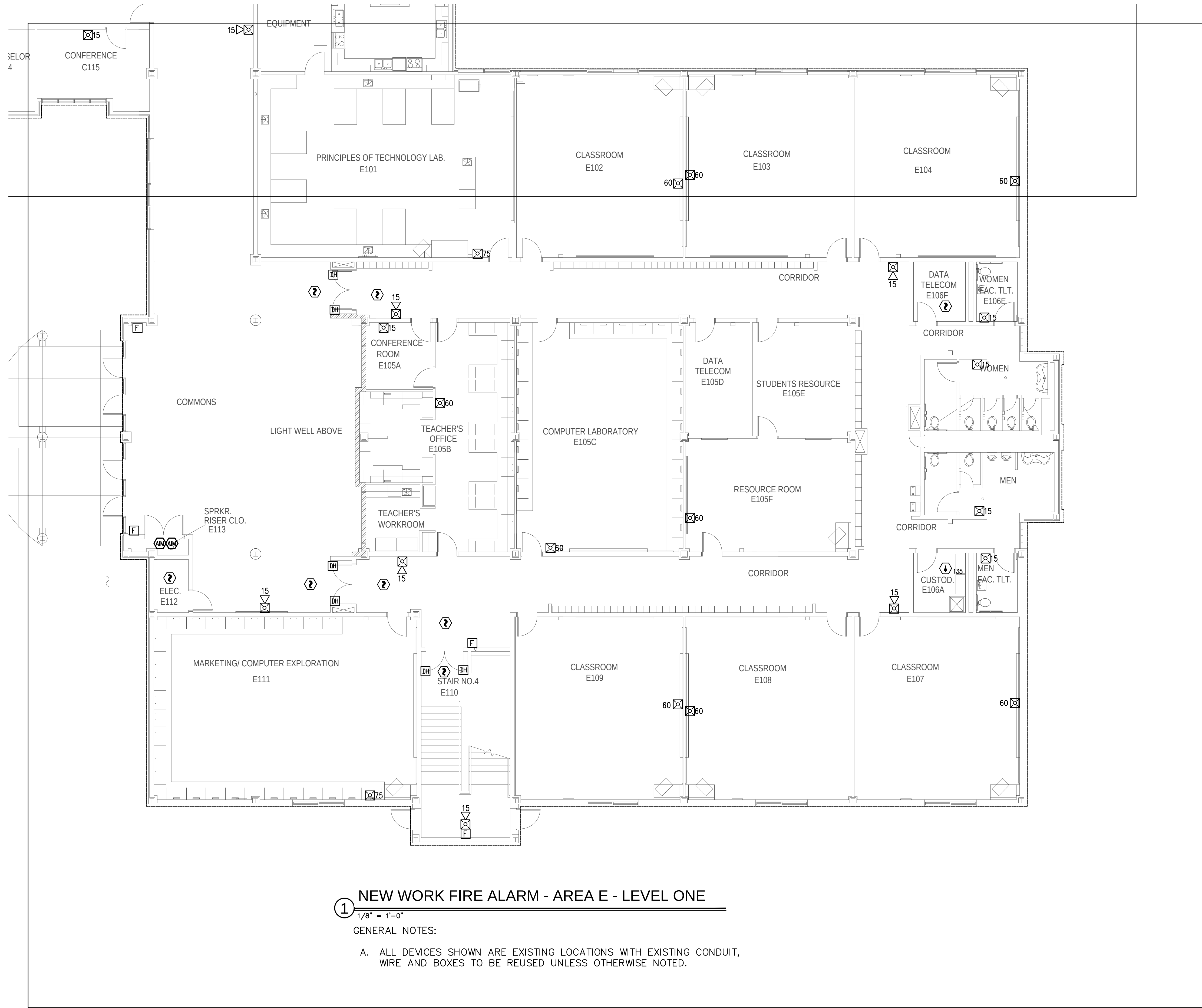
DATE: 03-24-2026
PROJECT #: 26-0066
DRAWN BY: WBD
DESIGNED BY: WBD
CHECKED BY: MAM

SHEET TITLE:
**NEW WORK FIRE
ALARM - AREA C
& F - LEVEL ONE**

DWG #:
E203

SHEET NO: 5 of 10

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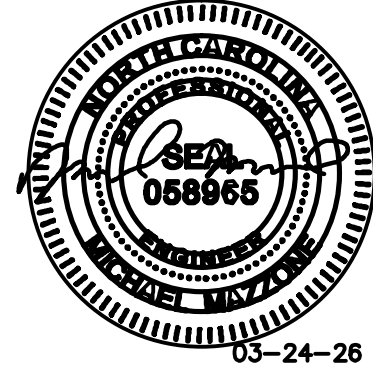


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REV #	DATE	DESCRIPTION

DATE:	03-24-2026
PROJECT #:	26-0066
DRAWN BY:	WBD
DESIGNED BY:	WBD
CHECKED BY:	MAM

SHEET TITLE:
NEW WORK FIRE
ALARM - AREA E -
LEVEL ONE

DWG #:
E204
SHEET NO: 6 of 10



1 NEW WORK FIRE ALARM - AREA G - LEVEL ONE

1/8" = 1'-0"

GENERAL NOTES:

- A. ALL DEVICES SHOWN ARE EXISTING LOCATIONS WITH EXISTING CONDUIT, WIRE AND BOXES TO BE REUSED UNLESS OTHERWISE NOTED.

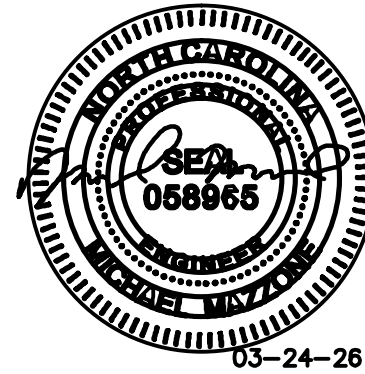
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REV #	DATE	DESCRIPTION

DATE: 03-24-2026
PROJECT #: 26-0066
DRAWN BY: WBD
DESIGNED BY: WBD
CHECKED BY: MAM

SHEET TITLE:
NEW WORK FIRE
ALARM - AREA G -
LEVEL ONE

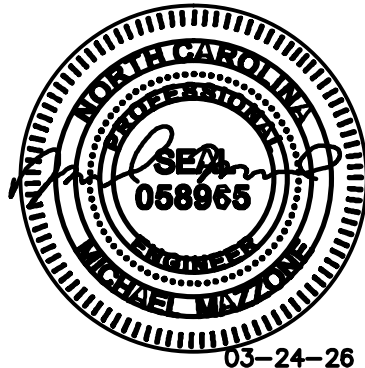
DWG #:
E205
SHEET NO: 7 of 10

A. ALL DEVICES SHOWN ARE EXISTING LOCATIONS WITH EXISTING CONDUIT, WIRE AND BOXES TO BE REUSED UNLESS OTHERWISE NOTED.

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REV #	DATE	DESCRIPTION

DATE: 03-24-2026
PROJECT #: 26-0066
DRAWN BY: WBD
DESIGNED BY: WBD
CHECKED BY: MAM

SHEET TITLE:

NEW WORK FIRE
ALARM - AREA E
LEVEL TWO

DWG #: **E206**

SHEET NO: 8 of 10

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① **NEW WORK FIRE ALARM - AREA F - LEVEL TWO**
1/8" = 1'-0"

GENERAL NOTES:

- A. ALL DEVICES SHOWN ARE EXISTING LOCATIONS WITH EXISTING CONDUIT, WIRE AND BOXES TO BE REUSED UNLESS OTHERWISE NOTED.

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REV #	DATE	DESCRIPTION

DATE: 03-24-2026
PROJECT #: 26-0066
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DESIGNED BY: WBD
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SHEET TITLE:
**NEW WORK FIRE
ALARM - AREA F -
LEVEL TWO**

DWG #:
E207
SHEET NO: 9 of 10

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1 NEW WORK FIRE ALARM - AREA G - LEVEL TWO
1/8" = 1'-0"

GENERAL NOTES:

- A. ALL DEVICES SHOWN ARE EXISTING LOCATIONS WITH EXISTING CONDUIT, WIRE AND BOXES TO BE REUSED UNLESS OTHERWISE NOTED.

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REV #	DATE	DESCRIPTION

DATE: 03-24-2026
PROJECT #: 26-0066
DRAWN BY: WBD
DESIGNED BY: WBD
CHECKED BY: MAM

SHEET TITLE:
**NEW WORK FIRE
ALARM - AREA G -
LEVEL TWO**

DWG #:
E208
SHEET NO: 10 of 10

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S-3 Location: Antioch Elementary School

SECTION 28 31 11 - ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This standard provides the functional requirements for the installation, programming, configuration, warranty and maintenance of a complete Class B Analog/Addressable Intelligent Fire Alarm / Life Safety System.
- B. This Fire Alarm / Life Safety System Standard must be conformed to in its entirety to ensure that the installed and programmed Life Safety System will function as designed, and will accommodate the future requirements and operations required by the building owner. All specified operational features will be met without exception.
- C. Section Includes:
 - 1. Fire-alarm control unit or fire alarm control panel.
 - 2. Manual fire-alarm boxes.
 - 3. System smoke detectors.
 - 4. Heat detectors.
 - 5. Detector mounting bases.
 - 6. Air-sampling smoke detectors.
 - 7. Carbon monoxide detectors.
 - 8. Notification appliances.
 - 9. Magnetic door holders.
 - 10. Remote annunciator.
 - 11. Addressable interface device.
 - 12. Digital alarm communicator transmitter.
 - 13. Device guards.
 - 14. Standby Power Supplies.
 - 15. Surge Protection and Grounding.
 - 16. Fire-alarm wire and cable.
 - 17. Programming, Commissioning and Training of Operators.
 - 18. Accessories required to furnish a complete and Operational Life Safety System.

1.3 DEFINITIONS

- A. EMT: Electrical Metallic Tubing.
- B. FACP: Fire Alarm Control Panel.
- C. LED: Light-emitting diode.
- D. NICET: National Institute for Certification in Engineering Technologies.

1.4 PERFORMANCE REQUIREMENTS

- A. Statutory and Reference Standard Compliance:

1. The latest edition of the North Carolina State Building Code.
2. North Carolina Department of Insurance "Requirements for Fire Alarm Detection and Alarm Systems", latest revision.
3. National Fire Protection Association Standards:
 - a. NFPA 70 - National Electric Code
 - b. NFPA 72 - National Fire Alarm Code
 - c. NFPA 90A - Air Conditioning Systems
 - d. NFPA 101 - Life Safety Code
4. Underwriters Laboratories Inc. for use in fire protective signaling systems shall list the system and all components. The UL Label shall be considered as evidence of compliance with this requirement. The equipment shall be listed by UL under the following standards as applicable:
 - a. UL 864/UOJZ, APOU - Control Units for Fire Protective Signaling Systems.
 - b. UL 1076/APOU - Proprietary Burglar Alarm Units and Systems.
 - c. UL 268 - Smoke Detectors for Fire Protective Signaling Systems.
 - d. UL 268A - Smoke Detectors for Duct Applications.
 - e. UL 217 - Smoke Detectors Single Station.
 - f. UL 521 - Heat Detectors for Fire Protective Signaling Systems.
 - g. UL 228 - Door Holders for Fire Protective Signaling Systems.
 - h. UL 464 - Audible Signaling Appliances.
 - i. UL 1638 - Visual Signaling Appliances.
 - j. UL 38 - Manually Activated Signaling Boxes.
 - k. UL 346 - Water flow Indicators for Fire Protective Signaling Systems.
 - l. UL 1971 - Visual Signaling Appliances.
 - m. UL 1481 - Power Supplies for Fire Protective Signaling Systems.
5. Americans with Disabilities Act (ADA).

1.5 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. Provide program report showing that air-sampling detector pipe layout balances pneumatically within the airflow range of the air-sampling detector.
12. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.
 - a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
 - b. Show field wiring required for HVAC unit shutdown on alarm.
 - c. Locate detectors according to manufacturer's written recommendations.
 - d. Show air-sampling detector pipe routing.
13. Include alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
14. 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. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
2. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by manufacturer in fire-alarm system design.
 - b. Licensed or certified by authorities having jurisdiction.

D. Delegated-Design Submittal: For notification appliances and smoke and heat detectors, in addition to submittals listed above, indicate compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Drawings showing the location of each notification appliance and smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the device.
2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72. Calculate spacing and intensities for strobe signals and sound-pressure levels for audible appliances.
3. Indicate audible appliances required to produce square wave signal per NFPA 72.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Seismic Qualification Certificates: For fire-alarm control unit, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Field quality-control reports.

1.7 Sample Warranty: For special warranty.

1.8 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.

1. Install next to fire alarm panel, a framed copy of the floor plans to indicate final device locations showing address of each addressable devices. This map will include room numbers and names, and addressable device identifier.

B. AUTOCAD copy of the as-built fire alarm map (not just the system as-builts). This is the as-built map that is posted by the annunciator.

1. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following and deliver copies to authorities having jurisdiction:
 - 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. Air-sampling system sample port locations and modeling program report showing layout meets performance criteria.
 - g. Record copy of site-specific software.
 - h. 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.
 - i. Manufacturer's required maintenance related to system warranty requirements.
 - j. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.

C. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On magnetic media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

1.9 COMMISSIONING

A. At Commissioning provide the following:

1. Warranty Statement from the manufacturer: Warranty statement will state the period of warranty for all of the products proposed for the project and shall include the name and address of the authorized manufacturers' agent who will honor any and all warranty claims.
2. Written Certification by the Fire Alarm Installer that no power supply or circuit in the system has an electrical load greater than 80% of its rated capacity.
3. A scaled plan of each building showing the placement of each individual item of fire alarm equipment as well as raceway size and routing, junction boxes, and conductor size, quantity, and color in each raceway.
4. A Single Line System Block Diagram and written System Operational Overview.
5. Complete calculations showing the electrical load on the following system components.
6. Each system Power Supply
7. Each standby Power Supply (batteries)
8. Each Notification Appliance Circuit.
9. Each auxiliary control circuit that draws power from any system power supply.
10. Field Connection Drawings: A complete set of drawings, one for each Fire Alarm Control Panel module which has any external (field) wiring connected to it, and one for each system detector, module or signaling appliance, shall be supplied. The Field Connection Drawings shall be provided in paper (hard-copy) format.
11. Print-out report detailing the sensitivity of each smoke detector installed in the system. Include date on report.

1.10 QUALITY ASSURANCE

- A. Installer Qualifications: The installer shall be a licensed low voltage contractor and a factory authorized distributor to ensure proper specification adherence, final connection, test, turnover, warranty compliance and service. The installer shall maintain a service organization with adequate spare parts stock within 50 miles of the installation. Installer shall have training certification by the manufacturer of the Fire Alarm Control Equipment. This certification shall not be more than two years old, to ensure up-to-date product and application knowledge on the part of the installing installer.
- B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level IV technician.
- C. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.

1.11 EXTRA MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Manual fire-alarm boxes and door holders: Quantity equal to 5 percent of amount of each type installed, but no fewer than 1 unit of each type.
 2. Smoke, Heat, Carbon Monoxide Detectors and detector mounting bases: Quantity equal to 10 percent of amount of each type installed, but no fewer than 1 unit of each type.
 3. Audible and Visual Notification Appliances: Quantity equal to 10 percent of amount of each type installed, but no fewer than 1 unit of each type.

1.12 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 Architect and 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 Architect'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.

1.13 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.

1.14 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: Two years from date of Substantial Completion.
- B. Installer Warranty: Installer shall warrant the installed fire alarm system to be free from any defects of material and installation for a period of 2 years from acceptance by the professional engineer and/or owner.
 - 1. Any deficiencies shall be immediately corrected at no additional cost to the owner.
 - 2. Any defects that render the system inoperative shall be repaired within 24 hours of the owner notifying the contractor. Other defects shall be repaired within 48 hours of the owner notifying the contractor.

1.15 INSPECTIONS

- A. All work shall be inspected and approved by the Local Fire Marshal and the School's Enforcement Inspectors prior to final payment. The Installer shall provide all material, equipment and labor necessary to pass inspections by the the Local Fire Marshal Office. Written documentation of inspections shall be provided to the Owner and Engineer.
- B. A complete set of as-built wiring schematics, drawn to scale; showing all device locations, wire routing and connections, etc. shall be provided to the Owner and Engineer prior to final inspection.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All equipment furnished for this project shall be new and unused. All equipment, materials, accessories, devices, and other facilities covered by this guideline 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.
- B. Manufacturer's representative and a Record of Completion presented upon completion shall verify system installation and operations. The manufacturer's representative shall be responsible for an on-site demonstration of the operation of the system and initial staff training.

2.2 SYSTEM DESCRIPTION

- A. All Control Panel Assemblies and the connected Automatic and Manual Alarm and Notification Appliances shall be designed and manufactured by the same company, shall be tested and cross-listed as compatible (to category UOJZ) to ensure that a fully functioning Life Safety System is designed and provided.
- B. The Fire Alarm / Life Safety System supplied under this guideline shall be a microprocessor-based direct wired system. System shall utilize independently addressed, microprocessor-based smoke detectors, heat detectors, and modules, as described in this specification.
- C. All initiation devices shall be analog addressable devices. The notification devices shall be installed where required to meet ADA, NFPA 72 and NC Building Code Standards.
- D. Locate the Fire Alarm Panel in the main electrical room. Locate a full function annunciator in the main office and a display only alpha-numeric display at the front door.
- E. All Fire Alarm / Life Safety equipment shall be arranged and programmed to provide an integrated system for the early detection of fire, the notification of building occupants, the notification of building security, the override of the HVAC system operation, the shut-down of the kitchen hood, and the activation of other auxiliary systems to inhibit the spread of smoke and fire and to facilitate the safe evacuation of building occupants.
- F. All strobes shall be synchronized. A strobe unit shall be installed in every occupied space which includes all classrooms, restrooms, conference rooms, tutor rooms, science prep rooms and waiting areas/lobbies. Smoke and thermal detectors shall be installed in compliance with NFPA 72 codes. Duct detectors shall interface with HVAC systems to shut down necessary air-handling units.
- G. The fire alarm system shall be microprocessor driven with stored program controllers. Each panel (node) on the network shall use a multiple microprocessor design so that the failure of a single microprocessor will not result in a local failure. Fire alarm systems that utilize only one microprocessor for system (node) and SLC control will not be accepted.
- H. The Life Safety System shall be UL listed under Standard 864 (Control Units for Fire-Protective Signaling Systems) under categories UOJZ and APOU. The specified modules shall also be listed under UL 1076 (Proprietary Burglar Alarm Units and Systems) under category APOU.
- I. A standby power supply shall automatically supply electrical energy to the system upon primary power supply failure. Use "Emergency Generator" circuit where available. Standby power shall be an electrical battery with capacity to operate the system under maximum supervisory load for 24 hours and capable of operating the system for 5 minutes in the alarm mode at 100% load, 15

minutes for voice components. Fire alarm shall include a charging circuit to automatically maintain the electrical charge of the battery.

- J. Do not install notification appliances on the exterior of the building unless specifically directed to do so by the Project Manager.
- K. Remote LED indicators must be installed at each duct detector location. Install the indicator in the ceiling so it can be seen while standing in the corridor/classroom.
- L. All power supplies must be on dedicated circuits. Existing building circuits (receptacles, lights, etc.) cannot be used. Use generator power where available.
- M. Smoke detectors shall be installed a minimum of 3' from air supply diffusers and lighting fixtures.
- N. Automatic door closers to be activated by local smoke detectors only.
- O. Use toggle bolts for all wall mounted equipment/components/appliances
- P. All Fire Alarm wiring shall be FPLR or FPLP in conduit or duct, or MC fire alarm cable.
- Q. Provide remote LED indicator lights for all duct detectors. Locate indicators in corridors.
- R. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Where an existing system is being expanded, components shall be compatible with, and operate as, an extension of the existing system. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.
- S. Automatic sensitivity control of certain smoke detectors.
- T. All components provided shall be listed for use with the selected system.
- U. 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.

2.3 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
 - 1. Manual stations.
 - 2. Heat detectors.
 - 3. Smoke detectors.
 - 4. Duct smoke detectors.
 - 5. Automatic sprinkler system water flow.
 - 6. Fire-extinguishing system operation.
 - 7. Fire standpipe system.
 - 8. Fire pump running.
- B. Fire-alarm signal shall initiate the following actions:
 - 1. Continuously operate alarm notification appliances, including voice evacuation notices.
 - 2. Local sounding device at panel shall be activated.
 - 3. Identify alarm and specific initiating device at fire-alarm control unit and remote annunciators.

4. Transmit an alarm signal to the remote alarm receiving station.
5. Unlock electric door locks in designated egress paths.
6. Release fire and smoke doors held open by magnetic door holders.
7. Activate voice/alarm communication system.
8. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
9. Close smoke dampers in air ducts of designated air-conditioning duct systems.
10. Recall elevators to primary or alternate recall floors.
11. Activate emergency shutoffs for gas and fuel supplies.
12. Mute elective audio systems installed permanently within the facility (Intercom, sound systems).
13. Record events in the system memory.

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

1. Valve supervisory switch.
2. Alert and Action signals of air-sampling detector system.
3. Elevator shunt-trip supervision.
4. User disabling of zones or individual devices.
5. Loss of communication with any panel on the network.
6. Carbon monoxide detectors.
7. Fire pump running.
8. Fire-pump loss of power.
9. Fire-pump power phase reversal.
10. ERRS
 - a. Donor antenna malfunction.
 - b. Active RF-emitting device failure.
 - c. Low battery capacity indication when 70 percent of the 12-hour operating capacity has been depleted.
 - d. Active system component failure.
 - e. Loss of normal AC power
 - f. Failure of battery charger
 - g. Communication link between fire alarm system and ERRS.

D. System Supervisory Signal Actions:

1. Identify specific device initiating the event at fire-alarm control unit and remote annunciators.
2. After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.
3. Display system status on graphic annunciator.
4. Transmit an alarm signal to the remote alarm receiving station.

E. 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.

F. System Trouble Signal Actions:

1. Trouble indicator shall flash.
2. A local sounding device in the panel shall be activated
3. Identify specific device initiating the event at fire-alarm control unit and remote annunciators.
4. Unacknowledged alarm messages shall have priority over trouble messages, and if such an alarm must also be displayed, the trouble message will not be displayed until the operator has acknowledged all alarm messages.
5. Transmit an alarm signal to the remote alarm receiving station.

2.4 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.5 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated in these specifications or comparable product by one of the following:

1. Fire-Lite ES-1000X
2. Notifier NFS640
3. Silent Knight 6820

2.6 FIRE-ALARM CONTROL UNIT

- A. General Requirements for Fire-Alarm Control Unit:

1. Operators' Interface:
 - a. Character Graphical Display shall provide the means to inform the System Operator with detailed information about the off-normal status of the installed Fire Alarm / Life Safety System. Character Graphical Display shall automatically respond to the status of the system and shall display that status in character front panel display.
2. Automatic Functions: The following status functions shall be annunciated by the Character Graphical Display:
 - a. When the Fire Alarm / Life Safety System is in the "Normal" Mode, the panel displays: Current Date and Time, Custom System Title (minimum 2 lines X 21 characters), and a summary total of system events.
 - b. The Character Graphical Display shall provide separate event queues for ALARM, TROUBLE, SUPERVISORY and MONITOR.
3. Loop Controller Interface:
 - a. An Electronic 100% digital Loop Controller shall be provided in each Fire Alarm Control Panel (where needed), to interface between the panel and the Analytical Microprocessor-based Detectors and modules.
 - b. It shall be possible to connect the electronic loop controller to the Analytical Microprocessor-based Detectors and modules utilizing any wiring material or

method complying with Chapter 3 of the National Electrical Code (ANSI/NFPA 70-1996) as Class A (Style 6 or Style 7) or Class B (Style 4) circuits without the use of special shielding, twisted wire, or conduits. It must be possible to wire branch circuits (T-Taps) from Class B Circuits (Style 4). Each Electronic Protection Loop shall be configurable to operate as a Style 7 loop without the need for additional hardware modules.

- c. All system programming and history shall be permanently stored in non-volatile memory to ensure that no programming or history is lost. Systems which store initial programming or field programming changes in battery backed memory will not be accepted.
 - d. The Electronic Loop Controller shall be capable of setting the address of all Analytical Microprocessor-based Detectors and modules connected to it electronically, without the need to set switches at any of the individual devices.
 - e. The Electronic Loop Controller shall notify the System Operator when any connected smoke detector reports a "Routine Maintenance Required" signal to the system.
4. Notification Appliance Circuits:
- a. Provide where indicated on the plans supervised hard-wired Notification Appliance Circuits (NAC) for the control of 24VDC signaling appliances. Each NAC shall operate as a Class B (Style Y) circuit and shall be capable of controlling up to 3.5 amps of signaling power.
 - b. NAC's shall be power limited to 3.5A at 24VDC and 4.1A at 20.4VDC to support higher current demand by visible appliances at lower battery voltages.
5. Remote Diagnostic Utility - RDUEU-E or equal:
- a. The Fire Alarm System shall have the ability to report its status and sensitivity remotely over modem to a personal computer. The system shall be capable of generating sensitivity, system status, and trend analysis reports from data downloaded from the panel. Installer to provide the modem at the panel to a personal computer as directed by the Owner.

2.7 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes:

- 1. Comply with UL 38.
- 2. Boxes shall be finished in red with white molded, "FIRE" raised-letter; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
- 3. Double-action mechanism requiring two actions to initiate an alarm with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
- 4. Station Reset: Key operated switch.

B. Fire-Lite #BG-12LX.

2.8 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:

- 1. Comply with UL 268.

2. System shall use Analytical Microprocessor-based Detectors that are capable of full digital communications with the Fire Alarm / Life Safety System using both broadcast and polling communications protocols. Each detector shall be capable of performing independent advanced fire detection algorithms. The fire detection algorithm shall measure sensor signal dimensions, time patterns and combine different fire parameters to increase reliability and distinguish real fire conditions from unwanted nuisance alarms caused by environmental events. Signal patterns that are not typical of fires shall be eliminated by digital filters and will not cause a system alarm condition. Devices not capable of combining different fire parameters or employing digital filters will not be acceptable.
3. Each detector shall have an integral microprocessor capable of making alarm decisions based on fire parameter information stored in the detectors' memory. Detectors not capable of making independent alarm decisions are not acceptable. Maximum total loop response time for detectors changing state (alarm or trouble) shall be 0.5 seconds.
4. Each detector shall be capable of identifying diagnostic codes to be used for system maintenance. All diagnostic codes shall be stored in the detector. Each detector shall be capable of transmitting pre-alarm, alarm, and maintenance signals to the Fire Alarm Control Panel via the Electronic Loop Controller. Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
5. Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring. All of these devices and their bases will also be required to be labeled with engraved Lexan labels to identify device address and intended location. Labels shall be red background with white letters, letters shall be a minimum of 1/4" in height.
6. Integral Visual-Indicating Light: LED type indicating detector has operated.

B. Photoelectric/Multi-Criteria Smoke Detectors:

1. Photoelectric detector shall utilize a light scattering type photoelectric smoke sensor to detect visible particulates produced by combustion. The integral microprocessor shall dynamically examine values from the sensor and initiate a system alarm based on the analysis of data. Detector shall continually monitor any changes in sensitivity due to the environmental effects of dirt, smoke, temperature, aging and humidity. Information shall be stored in the detectors' memory and shall be transferred to the electronic loop controller for retrieval using a laptop PC or the Intelligent Detector Program/Service Tool designed by the manufacturer specifically for the purpose.
2. The alarm set point shall be field selectable to any of five sensitivity settings ranging from 1.0% to 3.5% smoke obscuration per foot. The photo detector shall be suitable for operation in the following environment:
 - a. Temperature: 32° F to 120° F (0oC to 49oC)
 - b. Humidity: 0-93% RH, non-condensing
 - c. Elevation: no limit

C. Fire-Lite #SD365.

2.9 HEAT DETECTORS

A. General Requirements for Heat Detectors:

1. Comply with UL 521.
2. System shall use Analytical Microprocessor-based Detectors that are capable of full digital communications with the Fire Alarm / Life Safety System using both broadcast and polling communications protocols. Each detector shall be capable of performing independent advanced fire detection algorithms. The fire detection algorithm shall

measure sensor signal dimensions, time patterns and combine different fire parameters to increase reliability and distinguish real fire conditions from unwanted nuisance alarms caused by environmental events. Signal patterns that are not typical of fires shall be eliminated by digital filters and will not cause a system alarm condition. Devices not capable of combining different fire parameters or employing digital filters will not be acceptable.

3. Each detector shall have an integral microprocessor capable of making alarm decisions based on fire parameter information stored in the detectors' memory. Detectors not capable of making independent alarm decisions are not acceptable. Maximum total loop response time for detectors changing state (alarm or trouble) shall be 0.5 seconds.
4. Each detector shall be capable of identifying diagnostic codes to be used for system maintenance. All diagnostic codes shall be stored in the detector. Each detector shall be capable of transmitting pre-alarm, alarm, and maintenance signals to the Fire Alarm Control Panel via the Electronic Loop Controller. Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
5. Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring. All of these devices and their bases will also be required to be labeled with engraved Lexan labels to identify device address and intended location. Labels shall be red background with white letters, letters shall be a minimum of 1/4" in height.
6. Integral Visual-Indicating Light: LED type indicating detector has operated.

B. Fixed Temperature/Rate of Rise Heat Detector:

1. Heat Detector shall have a solid-state heat sensor, and shall transmit an alarm at a fixed temperature of 135° F (57°C) or due to a temperature Rate of Rise of 15°F/minute (9°C/minute). The detector shall continually monitor the temperature of the air in its surroundings to minimize thermal lag to the time required to process an alarm.
2. The heat detector shall be rated for ceiling installation at 70 ft (21.3m) centers and be suitable for wall mount applications.
3. Heat detectors provided for kiln rooms shall be standard rated.

C. Fire-Lite #H365.

2.10 DETECTOR MOUNTING BASES

A. Mounting base will not contain any electronics, shall support all Microprocessor-based Smoke detector types detailed in this specification, and have the following minimum requirements:

1. Removal of the respective detector will not affect electronic loop communications with other detectors on that loop.
2. Field Wiring Connections shall be made to the room side of the base, so that wiring connections can be made or disconnected by the installer without the need to remove the mounting base from the electrical box.
3. The base shall be capable of supporting remote alarm annunciation.
4. Bases will have the option of external L.E.D. operation, Relay base or data line isolator base.
 - a. Relay base shall mount in a standard electrical box described above and provide Form "C" contacts rated at 1 amp @ 30VDC and listed for "pilot duty".
 - b. Isolator bases shall operate within a minimum of 23 msec. Of a short circuit on the data line, shall run self-test procedure to re-establish normal operation, and shall operate in a class 'A' operation as well as class 'B'.

- B. Fire-Lite #B300-6.

2.11 DUCT SMOKE DETECTORS

- A. General Requirements for Duct Smoke Detectors:

1. Comply with UL 268A.
2. The Analytical Microprocessor-based photoelectric smoke detector shall be readily adaptable for use in air duct smoke detection applications, using a housing that mounts to the outside of the duct. When used for duct smoke detection, the smoke detectors will not forfeit any of the system functionality which they have when used as area smoke detectors.
3. The duct smoke detection housing shall allow the detector to sample and compensate for, variations in duct air velocity between 300 and 4000 feet per minute.
4. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
5. Remote alarm LEDs and Remote Test Stations shall be supported by the duct smoke detector and provided where indicated.
6. All detectors used in duct applications shall be located in accordance with NFPA 72 recommendations.

- B. Fire-Lite #D365PL, #DST5 & #RTS151.

2.12 CARBON MONOXIDE DETECTORS

- A. General Requirements for Carbon Monoxide Detectors:

1. Comply with UL 2075.
2. Listed for addressable connection to fire-alarm system.
3. Detector must send trouble alarm when nearing end-of-life, power supply problems, or internal faults.
4. Sounder base.

- B. Fire-Lite #FSCO-951 & #B200S.

2.13 NOTIFICATION APPLIANCES

- A. General Requirements for Notification Appliances:

1. Individually addressed, connected to a signaling line circuit, equipped for mounting as indicated and with screw terminals for system connections.
2. All appliances which are supplied for the requirements of this specification shall be U.L. Listed for Fire Protective Service and shall be capable of providing the "Equivalent Facilitation" which is allowed under the Americans with Disabilities Act Accessibilities Guidelines (ADA (AG)), and shall be UL 1971, and ULC S526 Listed.
3. All appliances shall be of the same manufacturer as the Fire Alarm Control Panel specified to insure absolute compatibility between the appliances and the control panels, and to ensure that the application of the appliances are done in accordance with the single manufacturers' instructions.
4. Wall or ceiling mount notification devices are acceptable.
5. All speaker/strobes shall be selectable candela output and wattage switch.

6. Speakers for Voice Notification: Locate speakers for voice notification to provide the intelligibility requirements of the "Notification Appliances" and "Emergency Communications Systems" chapters in NFPA 72.
7. Matching Transformers: Tap range matched to acoustical environment of speaker location.

B. Self - Synchronized Strobes:

1. Strobes shall be supplied by the same manufacturer as the Fire Alarm Control Equipment. In - Out screw terminals shall be provided for wiring. The Strobes shall have a red or white plastic faceplate. They shall provide the proper candela output for the project per NFPA 72 spacing guidelines and synchronized flash outputs minimum requirements. The strobe shall have lens markings oriented for wall mounting.
2. In - Out screw terminals shall be provided for wiring. They shall provide synchronized flash outputs as required to comply with code requirements.

C. System Sensor L-Series.

2.14 MAGNETIC DOOR HOLDERS

- A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.
1. Electromagnet: Requires no more than 3 W to develop 25-lbf holding force.
 2. Wall-Mounted Units: Flush mounted unless otherwise indicated.
 3. Rating: 24-V ac or dc.
- B. Material and Finish: Match door hardware.
- C. Norton Rixson #998M

2.15 REMOTE ANNUNCIATOR

- A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.
1. Mounting: Flush cabinet, NEMA 250, Type 1.
- B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.
- C. Fire-Lite #ANN-80.

2.16 ADDRESSABLE INTERFACE DEVICE

- A. General:
1. Fire Alarm / Life Safety System shall incorporate microprocessor-based addressable modules for the monitoring and control of system Input and Output functions over a 2 wire electronic communications loop, using both broadcast and serial polling protocols. All modules shall display communications and alarm status via LED indicators.

2. The function of each connected module shall be determined by the module type, and shall be defined in the system software through the application of a personality code. Simply changing the associated personality code may change module operation at any time.
 3. All addressing of the Microprocessor-based Addressable Modules shall be done electronically, and the electrical location of each module shall be automatically reported to the Fire Alarm Control Panel, where it may be downloaded into a PC, or printed out. The addressing of the modules will not be dependent on their electrical location on the circuit.
 4. All field wiring to the Microprocessor-based Addressable Modules shall be supervised for opens and ground faults and shall be location annunciated to the module of incidence.
 5. Diagnostic circuitry, and their associated indicators, with reviewable Trouble Codes, shall be integral to the Microprocessor-based Addressable Modules to assist in troubleshooting system faults.
 6. The module shall be suitable for operation in the following environment:
 - a. Temperature: 32oF to 120oF (0oC to 49oC)
 - b. Humidity: 0-93% RH, non-condensing
- B. Single Input Module:
1. Microprocessor-based Addressable Modules shall be used to provide one (1) supervised Class B (style B) input circuit capable of latching operation for use with contact devices, non-damped water flow switches, non-latching supervisory sprinkler switches.
 2. Fire-Lite #MMF-300(A).
- C. Dual Input Module:
1. Microprocessor-based Addressable Modules shall be used to provide two (2) independent supervised Class B (style B) input circuits capable of operating with two (2) contact devices. Both of the input circuits shall be terminated to, and operated from, the same microprocessor-based addressable module. The Initiating Device Circuit connected to the module shall be fully supervised for open circuits and ground faults.
 2. Fire-Lite #MDF-300(A).
- D. Single Riser Signal Module:
1. The Microprocessor-based Addressable Single Input Signal Module shall provide one (1) supervised Class B (style Y) Notification Appliance Circuit capable of a controlling 2A of polarized 24 VDC Notification Appliances, 50W speaker circuit power @ 25VRMS, or 35W speaker circuit power @ 70VRMS.
 2. Fire-Lite #MMF-301(A).
- E. Control Relay Module:
1. Microprocessor-based Addressable Control Relay Modules shall provide one form "C" dry relay contact rated at 2 amps @ 24 VDC or 0.5 amps at 120 VAC to, control external appliances or equipment processes. The control relay module shall be rated for pilot duty applications and releasing systems service. The position of the relay contact shall be confirmed by the system firmware.
 2. Fire-Lite #CRF-300(A).

2.17 DIGITAL ALARM COMMUNICATOR TRANSMITTER

- A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632.
 - 1. Cellular line – single main source. Provide Napco Starlink (SLE-MAX2) fire alarm communicator and SLE-ANTEXT50 external antenna. Cellular dial out shall be backed up as part of battery backup as well as generator backed up where available.
- B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on the cellular line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal. Transmitter shall automatically report cellular service restoration to the central station. If service is lost, 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 cellular line is 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.

2.18 DEVICE GUARDS

- A. Description: Welded wire mesh of size and shape for the smoke detector, or notification device requiring protection.
 - 1. Factory fabricated and furnished by manufacturer of device.
 - 2. Finish: Paint of color to match the protected device.
 - 3. STI Damage Stoppers #STI-97 Series.
- B. Description: ADA compliant pull station protective shield with alarm signal:
 - 1. Indoor: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation. Provide for all pull stations.
 - 2. Outdoor: Factory-fabricated weatherproof clear plastic gasketed enclosure hinged at the top to permit lifting for access to initiate an alarm.
 - 3. STI Stopper II #STI-11 Series.

2.19 FIRE PULL STATION SIGNAGE

- A. Description: The signs shall read "FIRE ALARM PULL STATION". Signs shall be 3"x 8" x.0.13" made of molded styrene. White 0.132" raised copy letters with red background and Braille Grade 2. Letters to be 3/4" high, Helvetica medium and all caps.

2.20 MAPS

- A. Description: Identification map showing all initiating devices and their address numbers.

2.21 SURGE PROTECTION

- A. AC Protection
 - 1. DITEK #DTK-DF120S1.
- B. Notification Appliance Circuit (NAC), Initiating Device Circuit (IDC) and Signaling Line Circuit (SLC) Protection
 - 1. DITEK #DTK-2MHLP-BWB.
- C. Cellular Communicator Auto Dialer Lines Protection
 - 1. DITEK #DTK-VSPN.

2.22 FIRE ALARM WIRE AND CABLE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - 1. Genesis Cable Products; Honeywell International, Inc.
 - 2. Rockbestos-Suprenant Cable Corp.
 - 3. West Penn Wire.
 - 4. Windy City Wire Products.
- B. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.
- C. Signaling Line Circuits: Twisted, shielded pair, not less than No. 18 AWG size as recommended by system manufacturer.
 - 1. Circuit Integrity Cable: Twisted shielded pair, NFPA 70, Article 760, Classification CI, for power-limited fire alarm signal service Type FPL. NRTL listed and labeled as complying with UL 1424 and UL 2196 for a two-hour rating.
- D. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation, and complying with requirements in UL 2196 for a two-hour rating.
 - 1. Low-Voltage Circuits: No. 16 AWG, minimum, in pathway.
 - 2. Line-Voltage Circuits: No. 12 AWG, minimum, in pathway.
 - 3. Multiconductor Armored Cable: NFPA 70, Type MC, copper conductors, Type TFN/THHN conductor insulation, copper drain wire, copper armor with outer jacket with red identifier stripe, NRTL listed for fire alarm and cable tray installation, plenum rated.

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.
- A. The entire system shall be installed in a workmanlike manner in accordance with approved manufacturers manuals and wiring diagrams. The contractor shall furnish all conduit, wiring, outlet boxes, junction boxes, cabinets and similar devices necessary for the complete installation.
 - 1. All wiring shall be of the type recommended by the NEC, approved by local authorities having jurisdiction for the purpose, and shall be installed in dedicated raceways throughout. All wiring shall be in conduit or the special MC cable noted below. Wiring shall be in rigid conduit when run outside above ground and in PVC when run outside below ground. Wiring run below ground shall be suitable for wet locations. Wiring shall be color coded red. All wiring shall be installed by the low voltage installer. All final connections shall be made by the low voltage installer.
 - 2. Run all fire alarm cable in separate pathways from other low voltage circuits.
 - 3. For indoor use, an acceptable alternative to cable in rigid conduit in most locations will be plenum rated MC fire alarm/control cable equal to AFC Cable Systems type FPLP. Cable will be color coded red. In new construction, EMT will be run in walls to a surface mounted box above the ceiling. MC cable will be run to the box with the armor stripped off enough to feed the device connected to the conduit without using additional splices. Use separate cables for data and signals. Cable will be supported in a similar manner as conduit. The fire alarm installer will be responsible for the installation of the fire alarm MC cable and fire alarm devices. The electrical contractor will provide AC power and conduit stub-ups in walls and related boxes. Connectors used will be those designed specifically for this type of cable.
 - 4. All junction and connection boxes shall be painted red for easy identification.
 - 5. All penetration of floor slabs and fire walls shall be fire stopped in accordance with all local fire codes.

6. End of Line Resistors: Shall be furnished as required for mounting as directed by the manufacturer.
 7. All wiring and equipment shall be installed according to the NEC and North Carolina Building Codes per the drawings submitted by the authorized Engineered Systems Distributor.
 8. Field Connected Devices must be installed and wired by a Factory Trained and Authorized Fire Alarm Installer or a licensed electrical contractor under direct supervision of a Factory Trained and Authorized Fire Alarm Installer.
 9. All auxiliary Power Supplies or other Fire Panels shall be located in electrical or mechanical rooms. They shall be mounted at a height between 48 to 60 inches from floor level. All such panels shall be "supervised" by the main Fire Alarm Panel.
- B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
1. Connect new equipment to existing control panel in existing part of the building.
 2. Connect new equipment to existing monitoring equipment at the supervising station.
 3. Expand, modify, and supplement existing control equipment as necessary to extend existing control functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.
- C. Install wall-mounted equipment, with tops of cabinets not more than 78 inches (1980 mm) above the finished floor.
1. Comply with requirements for seismic-restraint devices specified in Division 26 Section "Seismic Controls for Electrical Systems."
- D. 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. Install ADA compliant Stopper II pull station covers with alarm signal over all pull stations.
 5. Install identification signs next to all pull stations. Mount signs securely with screws or liquid nails. The center point of the signs shall correspond with the center point of the pull stations.
- E. Carbon Monoxide Detectors:
1. Install in kitchen for supervisory alarm detection.
 2. Install where required by code for fuel burning locations.
- F. Smoke- or Heat-Detector Spacing:
1. Comply with the "Smoke-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.
 2. Comply with the "Heat-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for heat-detector spacing.
 3. Smooth ceiling spacing shall not exceed 30 feet (9 m).
 4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Annex A or Annex B in NFPA 72.

5. HVAC: Locate detectors not closer than 36 inches ((910 mm)) from air-supply diffuser or return-air opening.
 6. 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.
- G. 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.
- H. 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.
1. Do not install smoke detector in duct smoke-detector housing during construction. Install detector only during system testing and prior to system turnover.
- I. Air-Sampling Smoke Detectors: If using multiple pipe runs, the runs shall be pneumatically balanced.
- J. Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location. Do not install smoke detectors in sprinklered elevator shafts.
- K. Remote Status and Alarm Indicators: Install in a visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.
- L. Audible/Visible or Visible Only Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install 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.
1. Protective covers shall be placed over the horn / strobe units in the Gym and Multi - Purpose room.
- M. Device Location-Indicating Lights: Locate in public space near the device they monitor.

3.3 FIRE ALARM WIRING INSTALLATION

- A. Comply with NECA 1 and NFPA 72.
- B. Wiring Method:
1. Cables and pathways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
 2. Fire-Rated Cables: Use of two-hour, fire-rated fire alarm cables, NFPA 70, Types MI and CI, is not permitted.
 3. Signaling Line Circuits: Power-limited fire alarm cables shall not be installed in the same cable or pathway as signaling line circuits.
- C. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

- D. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.
- E. Color Coding: Color code fire alarm conductors differently from the normal building power wiring. Use one color code for alarm circuit wiring and another for supervisory circuits. Color code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.
- F. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signals from other floors or zones.
- G. Wiring to Remote Alarm Transmitting Device: 1-inch conduit between the fire alarm control panel and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.4 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Division 08 Section "Door Hardware." Connect hardware and devices to fire-alarm system.
 - 1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.
- B. 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. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 - 1. Magnetically held-open doors.
 - 2. Electronically locked doors and access gates.
 - 3. Alarm-initiating connection to elevator recall system and components.
 - 4. Alarm-initiating connection to activate emergency lighting control.
 - 5. Supervisory connections at valve supervisory switches.
 - 6. Supervisory connections at elevator shunt-trip breaker.
 - 7. Data communication circuits for connection to building management system.
 - 8. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
 - 9. Supervisory connections at fire-pump engine control panel.
- C. Provide relay connection to all permanently installed elective audio systems (auditoriums, gym sound systems, etc) to mute the respective system during general alarm.

3.5 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems." All initiating devices will also be required to be labeled with engraved Lexan labels to identify device address and intended location. Labels shall be red background with white letters, letters shall be a minimum of 1/4" in height. Install framed instructions in a location visible from fire-alarm control unit.
- B. Install framed instructions in a location visible from fire-alarm control unit.

- C. Install identification map showing all initiating devices and their address numbers beside the main panel for quick and easy location of alarmed or troubled devices.

- 1. Map shall be mounted under glass.

3.6 SURGE PROTECTION AND 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.
- C. All equipment shall be properly grounded. Main panel shall be grounded directly to 'earth ground'.
- D. Surge protection shall be installed on the AC supply circuit at the Fire Alarm Panel and on all initiating, notification and monitoring circuits at the Fire Alarm Panel. In addition, surge protection shall be installed on all initiating, notification and monitoring circuits at all points of entry to a building from the outside.

3.7 FIELD QUALITY CONTROL

- A. All work shall be inspected and approved by the Local Fire Marshal and the School's Enforcement Inspectors prior to final payment. The Contractor shall provide all material, equipment and labor necessary to pass inspections by the Local Fire Marshal Office. Written documentation of inspections shall be provided to the Owner and Engineer.
 - 1. A complete set of as-built wiring schematics, drawn to scale; showing all device locations, wire routing and connections, etc. shall be provided to the Owner and Engineer prior to final inspection.
- B. Field tests shall be witnessed by authorities having jurisdiction.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- D. Perform tests and inspections.
- E. 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. Test audible appliances for the private operating mode according to manufacturer's written instructions.

4. Test visible appliances for the public operating mode according to manufacturer's written instructions.
5. 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.

F. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

G. Fire-alarm system will be considered defective if it does not pass tests and inspections.

H. Prepare test and inspection reports.

3.8 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.

3.9 SOFTWARE SERVICE AGREEMENT

A. Comply with UL 864.

B. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.

C. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.

1. Upgrade Notice: At least 30 days to allow Owner to schedule access to system and to upgrade computer equipment if necessary.

3.10 COMMISSIONING

A. The system shall be commissioned in accordance with the needs of the occupants of the protected building. Both "Complete System Commissioning" and "Phased System Commissioning" shall be possible with the specified system, and the execution of either method of commissioning shall be treated as stand-alone projects, and shall be documented as such, including the need for a complete contract close out submittal package for each Project Phase.

B. Complete System Commissioning:

1. The Factory Trained and Authorized Fire Alarm Installer in the presence of the Local AHJ, the Building Owners' Representative, and a Representative of the General Contractor shall perform commissioning of the entire installed system, if deemed appropriate.
2. A complete system documentation package shall be provided to the Local Authority Having Jurisdiction and the Building Owners' Representative at the time of commissioning.

3.11 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.
 1. The Fire Alarm Installer shall schedule and execute an instruction class for the Building owner, which details the proper operation of the installed fire alarm system. The instruction shall also cover the schedule of maintenance required by NFPA 72 and any additional maintenance recommended by the system manufacturer.
 2. This instruction shall also be separately furnished to the Local Municipal Fire Department if so requested by the Local Authority Having Jurisdiction.
 3. The instruction shall be a minimum of 8 hours in duration and 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.
 4. The Fire Alarm Installer shall provide service and operation manuals or any other curricula that may enhance the instruction of the Building Owners or Local Municipal Fire Department in the operation and maintenance of the system. Also provide software and hardware necessary to troubleshoot and completely program the system
- B. The completely installed fire alarm system will be fully tested in compliance with Testing Procedures for Signaling Systems (ANSI/NFPA 72) under the supervision of a trained manufacturer's representative. The system shall be demonstrated to perform all the functions as specified.
- C. The Fire Alarm Installer shall test:
 1. Every alarm initiating device for proper response and program execution.
 2. Every notification appliance for proper operation and audible/visual output.
 3. All auxiliary control functions such as elevator capture, smoke door and damper release, and functional override of HVAC, ventilation, and pressurization controls.
- D. The Owner must be notified at least 10 working days prior to the scheduled testing so that he/she may be present for such testing.
- E. After the system has been completely tested to the satisfaction of the Owner, the Fire Alarm Installer shall complete the Fire Alarm System Certification of Completion form published by the NFPA (Figure 1-7.2.1 in the National Fire Alarm Code).
- F. The completed form signed by a principal of the Fire Alarm System installer shall be delivered to the Project Manager with the other system documentation required by these specifications.
- G. All installation inspections are required prior to the walk through with the Fire Marshal.

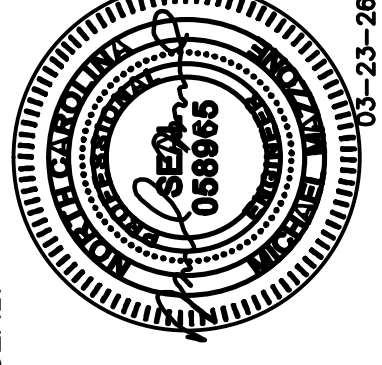
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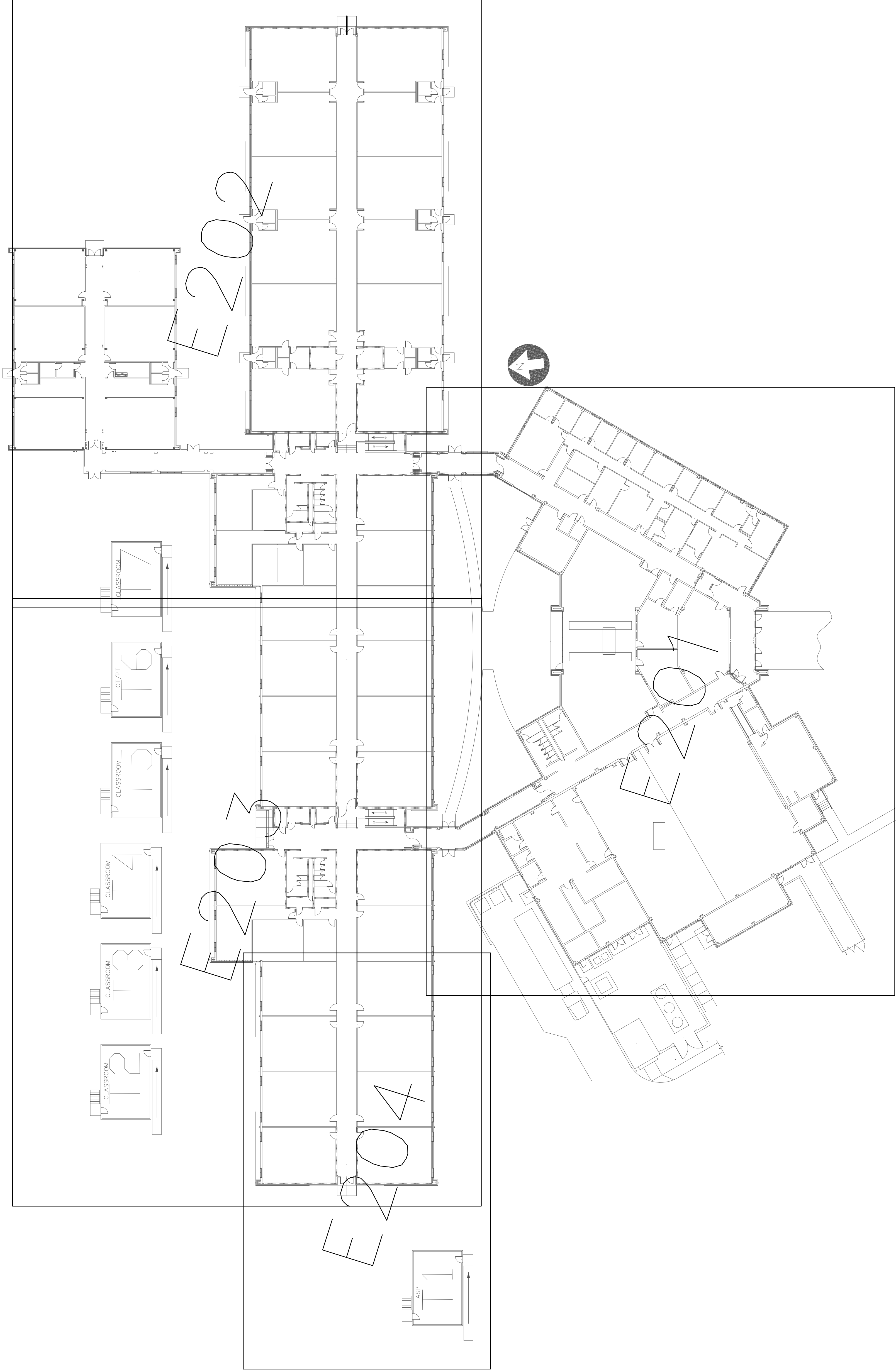
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3101 ANTIOCH CHURCH RD.
MATTHEWS, NC 28104

REV #	DATE	DESCRIPTION

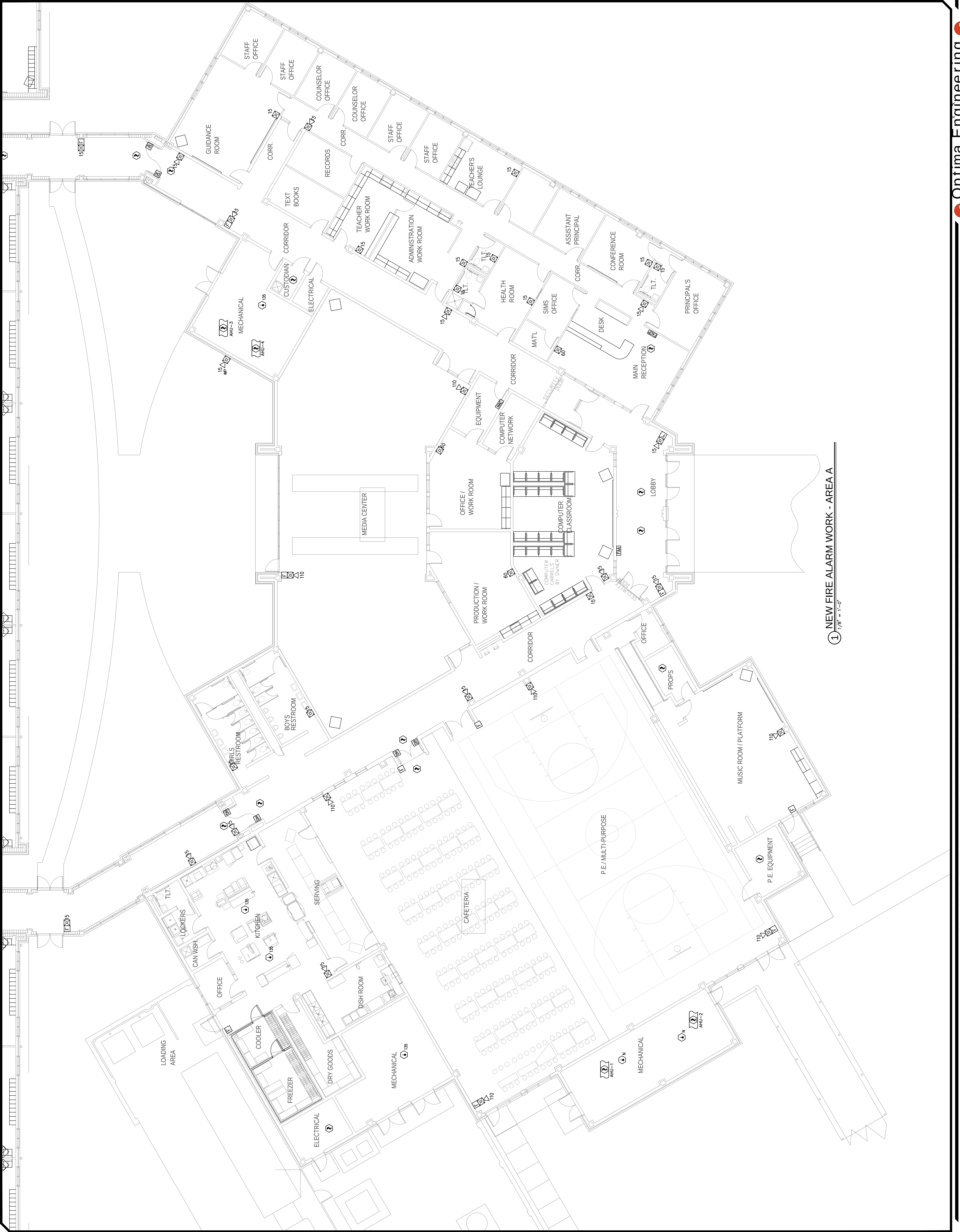
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PROJECT #: 26-0053
DRAWN BY: WBD
DESIGNED BY: WBD
CHECKED BY: MAM

SHEET TITLE:
NEW FIRE ALARM
WORK - AREA A

DWG #:
E200
SHEET NO: 2 of 6
OPTIMA # 26003



① KEY PLANS
NOT TO SCALE



1 NEW FIRE ALARM WORK - AREA A
1/8" = 1'-0"

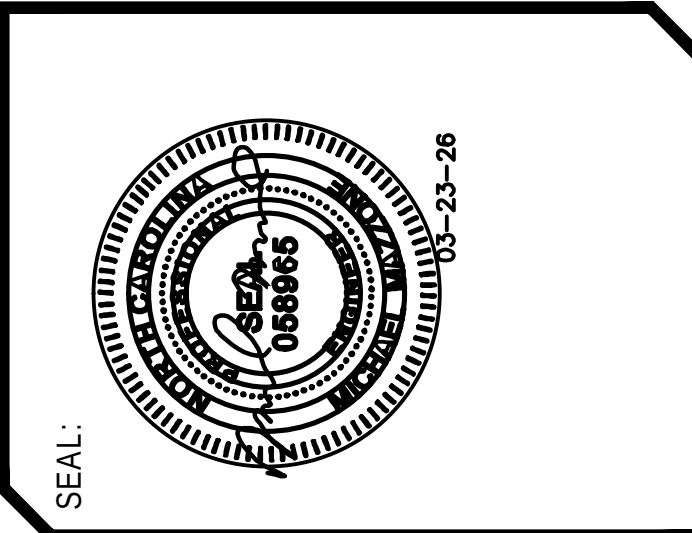
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DATE:	03-23-2026
PROJECT #:	26-0053
DRAWN BY:	WBD
DESIGNED BY:	WBD
CHECKED BY:	MAM

SHEET TITLE:	NEW FIRE ALARM WORK - AREA A
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DWG #:	E201
SHEET NO:	3 of 6
OPTIMA #:	50053

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① NEW FIRE ALARM WORK - AREA B
1/8" = 1'-0"

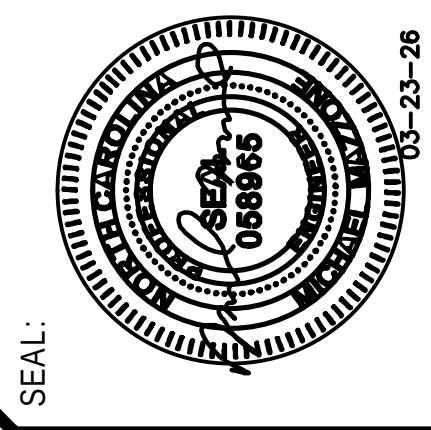
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OPTIMA # 24003

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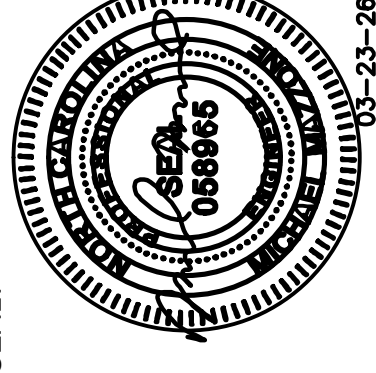
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PROJECT #: 26-0053
DRAWN BY: WBD
DESIGNED BY: WBD
CHECKED BY: MAM

REV #	DATE	DESCRIPTION

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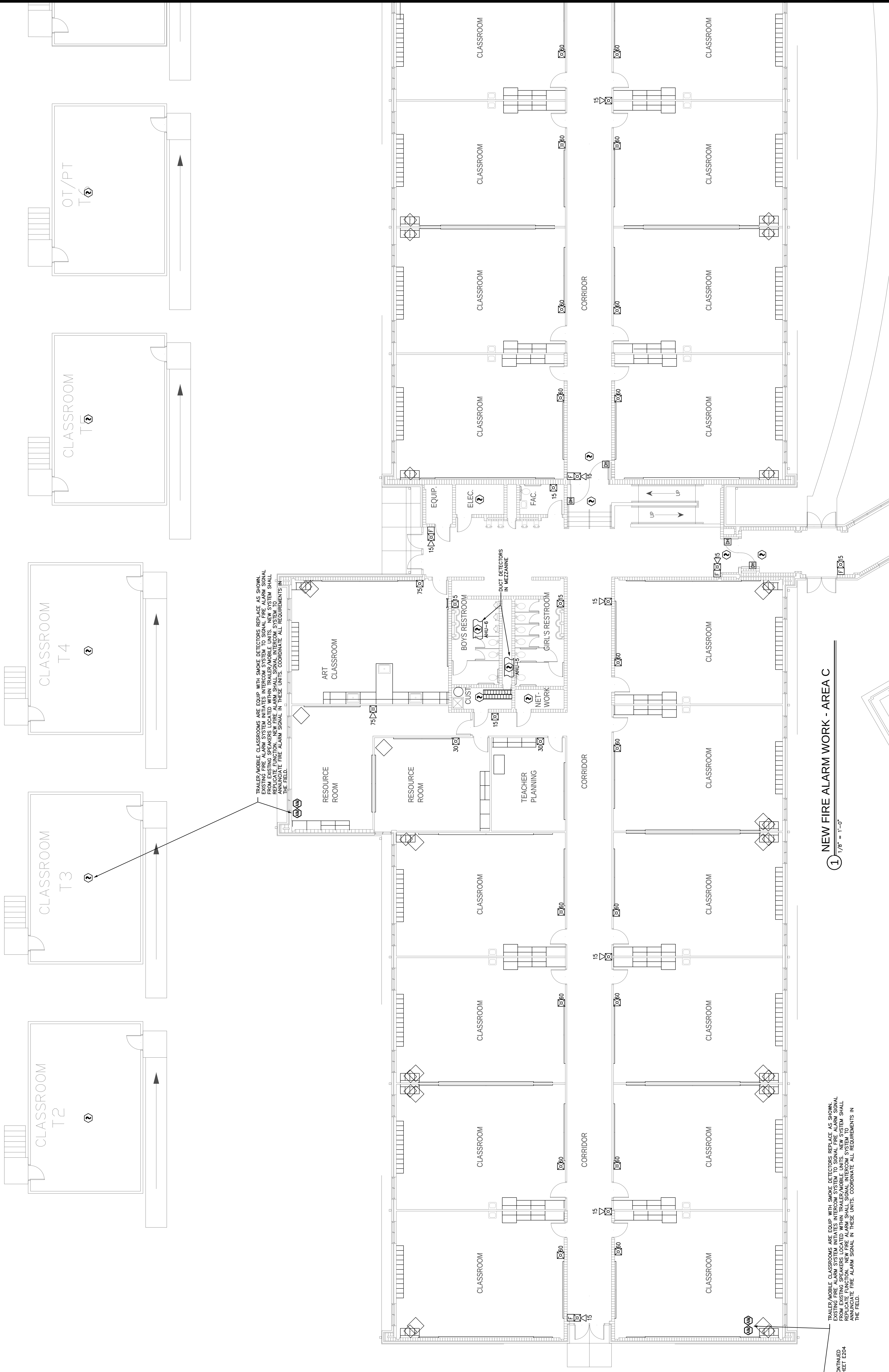


REV #	DATE	DESCRIPTION
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DATE: 03-23-2026
PROJECT #: 26-0053
DRAWN BY: WBD
DESIGNED BY: WBD
CHECKED BY: MAM

SHEET TITLE:
**NEW FIRE ALARM
WORK - AREA C**

DWG #: **E203**
 SHEET NO: **5 of 6**



1 NEW FIRE ALARM WORK - AREA C

TRAILER/MOBILE CLASSROOMS ARE EQUIP WITH SMOKE DETECTORS REPLACE AS SHOWN. EXISTING FIRE ALARM SYSTEM INITIATES INTERCOM SYSTEM TO SIGNAL FIRE ALARM SIGNAL FROM EXISTING SPEAKERS LOCATED WITHIN TRAILER/MOBILE UNITS. NEW SYSTEM SHALL REPLICATE FUNCTION. NEW FIRE ALARM SHALL SIGNAL INTERCOM SYSTEM TO ANNUNCIATE FIRE ALARM SIGNAL IN THESE UNITS. COORDINATE ALL REQUIREMENTS IN THE FIELD.

- CONTINUED
SHEET E204

DWG #:
E204

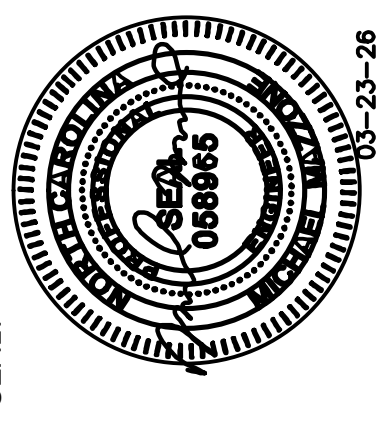
SHEET NO: 6 of 6
OPTIMA # 26003

SHEET TITLE:
**NEW FIRE ALARM
WORK -
additional trailer**

DATE: 03-23-2026
PROJECT #: 26-0053
DRAWN BY: WBD
DESIGNED BY: WBD
CHECKED BY: MAM

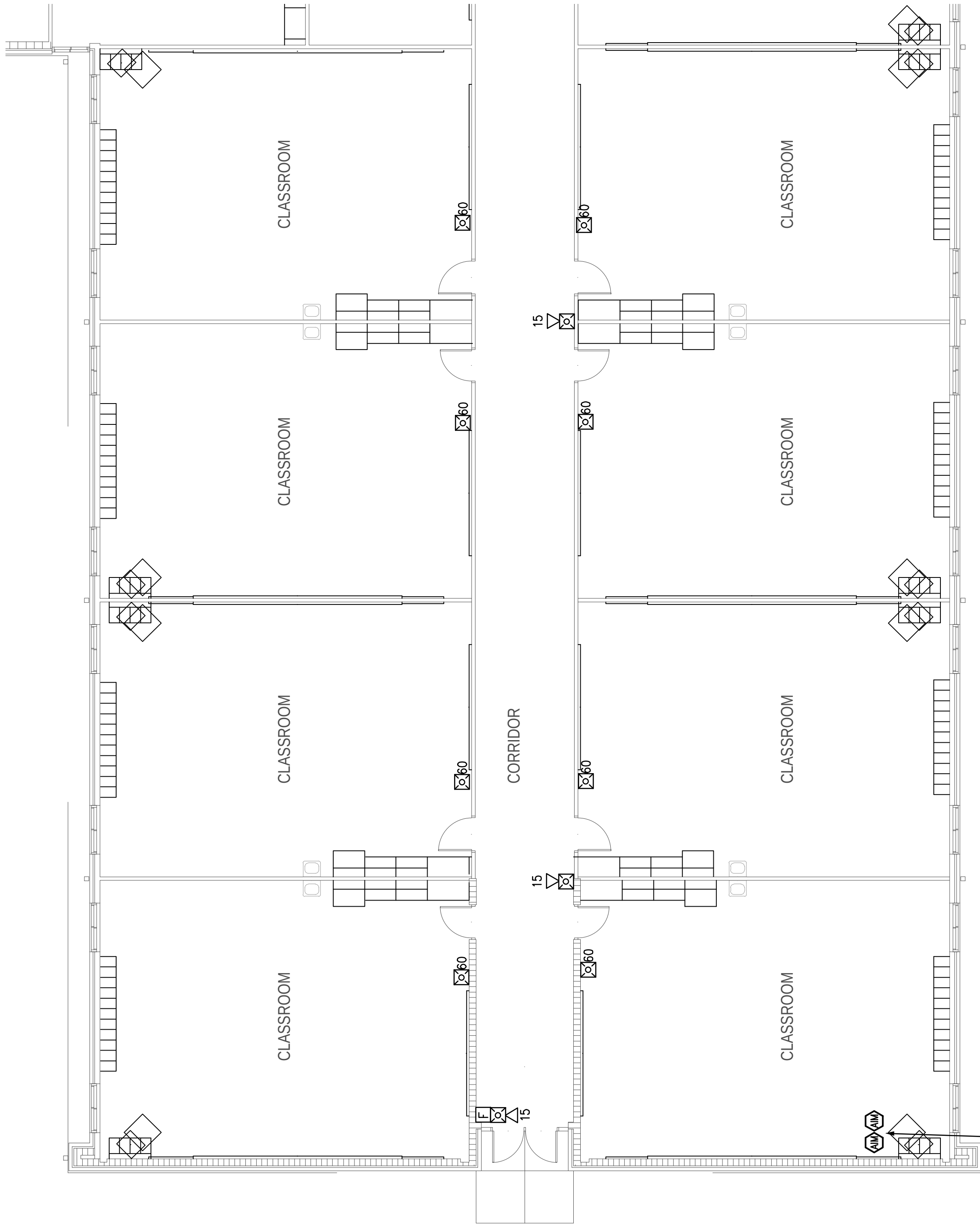
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TRAILER/MOBILE CLASSROOMS ARE EQUIP WITH SMOKE DETECTORS REPLACE AS SHOWN.
EXISTING FIRE ALARM SYSTEM INITIATES INTERCOM SYSTEM TO SIGNAL FIRE ALARM SIGNAL.
NEW SMOKE DETECTORS SHALL BE INSTALLED IN ALL TRAILER/MOBILE CLASSROOMS AND SHALL
REPLICATE FUNCTION. NEW FIRE ALARM SHALL SIGNAL INTERCOM SYSTEM TO
ANNUNCIATE FIRE ALARM SIGNAL IN THESE UNITS. COORDINATE ALL REQUIREMENTS IN
THE FIELD.

**NEW FIRE ALARM WORK - AREA
MOBILE TRAILER**

1/16" = 1'-0"

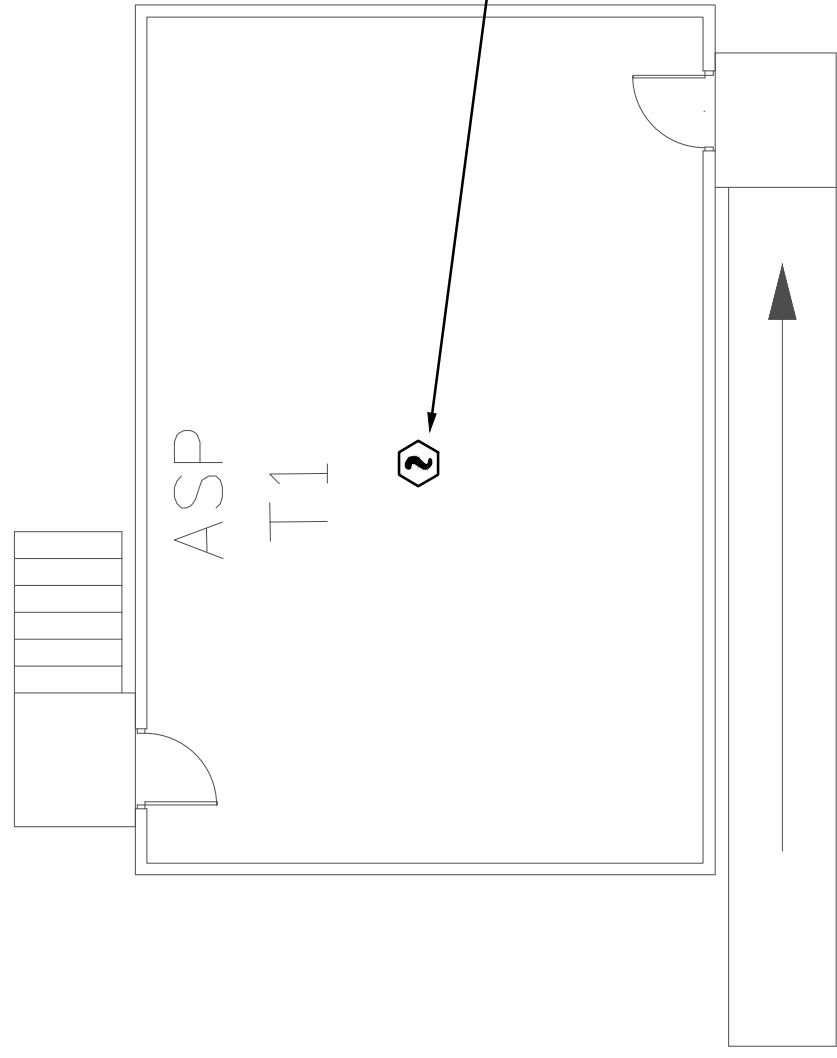


EXHIBIT 2

Draft Contract

Contract #:

**CONTRACT FOR SERVICES
(CONTRACT FOR SERVICES AND/OR GOODS UNDER \$500,000)**

This **Contract for Services** ("Contract") is made and entered into [Date] between **The Union County Board of Education**, with a mailing address of 400 North Church Street, Monroe, North Carolina 28112 ("UCBOE") and [Vendor Name] ("Vendor" or "Contractor" or "Service Provider").

For and in consideration of the mutual promises set forth in this Contract, the parties do mutually agree as follows:

1. Obligations of Vendor. The Vendor agrees to provide the services, goods, materials, equipment, and/or software (the "Services" and/or "Goods," as appropriate) to fully, timely and properly complete [Project Name] as more particularly described in the Scope of Work document attached hereto and incorporated herein by reference as Exhibit 1.

[If master work order contract, then insert: Individual tasks will be assigned in writing on a project by project basis by an authorized representative of UCBOE. Such writing shall be in the form of a standard UCBOE purchase order ("Purchase Order"), such Purchase Order to specify the specific Services and/or Goods desired by UCBOE; the dates, times and locations that the Vendor shall provide the requested Services and/or Goods; and the compensation that the Vendor will be paid for providing the requested Services and/or Goods. The Vendor will be deemed to have accepted a Purchase Order and be obligated to provide the Services and/or Goods outlined in the Purchase Order in accordance with the price and other terms of the Purchase Order, and the terms and conditions hereof, unless within 24 hours after the Vendor's receipt of a Purchase Order, the Vendor notifies the Project Coordinator (as hereinafter defined) in writing that it does not accept the Purchase Order and will not provide the requested Services and/or Goods.]

[If construction contract and if applicable, insert: For construction Contracts, this Contract incorporates by reference the construction design drawings, plans and specifications, described as follows, which will govern the Services and/or Goods to be provided by the Vendor: [Reference Plans, if any.]]

[If construction contract and if applicable, insert: The UCBOE and Vendor recognize that time is of the essence to this Agreement and that the UCBOE will suffer financial loss if the work is not completed within the times specified herein. Both parties also recognize the delays, difficulties and expense involved in proving, in a legal or arbitration proceeding, the actual loss suffered by the UCBOE if the Work is not completed on time. Accordingly, in lieu of requiring such proof, the UCBOE and Vendor agree that as liquidated damages for delay (but not as penalty) the Vendor shall pay to the UCBOE for each day in excess of the term allowed for completion of the Work, the sum of \$100 as liquidated damages.

The term of this Contract shall be [Term of Contract].

This Contract does not grant the Vendor the right or the exclusive right to provide specified Services and/or Goods to UCBOE. Similar Services and/or Goods may be obtained from sources other than the Vendor (or not at all) at the discretion of UCBOE.

The Vendor shall begin work immediately upon issuance of a written notice to proceed. The Vendor agrees to perform the Services and supply the Goods or in a timely, complete, and professional manner and in accordance with the terms and conditions of this Contract. Furthermore, the Vendor represents and warrants that (i) it is duly qualified and, if required by law, licensed to provide the Services and/or Goods; (ii) it will provide the Services and/or Goods in a manner consistent with the level of care and skill ordinarily exercised by contractors providing similar Services and/or Goods under similar conditions; (iii) it possesses sufficient experience, personnel, and

resources to provide the Services and/or Goods; (iv) it shall provide the Services and/or Goods in compliance with applicable laws, statutes, ordinances, codes, orders, rules and regulations; and (v) its reports, if any, shall be complete, accurate, and unambiguous.

2. **Obligations of UCBOE.** UCBOE hereby agrees to pay to the Vendor for the faithful performance of this Contract, and the Vendor hereby agrees to provide all of the Services and/or Goods, for the sum not to exceed **[Contract Price]** ("Contract Price") subject to adjustments as provided for in the Contract Documents:

		Budget Account No.:
(i) Vendor's Fee	\$ _____	_____
(ii) Taxes	\$ _____	_____
(iii) Travel/Lodging/Food Not to Exceed	\$ _____	_____
(iv) Other	\$ _____	_____
(v) Total Not to Exceed	_____	_____

[If multi-year: The parties acknowledge that UCBOE operates on a July 1-June 30 fiscal year and that operating funds are made available to UCBOE on a year to year basis. Accordingly, see Section 27 of Article I of the Standard Terms and Conditions for All Contracts. The mechanism by which UCBOE shall confirm that funding is available will be issuance of standard UCBOE purchase orders (each, a "Purchase Order") from time-to-time. The initial Purchase Order for services is expected to be issued on or about **[DATE]** and will reflect the amount of the authorization for the Services for **[Described initial scope]** in the amount of **[Dollar Amount]**. Thereafter, on an as-needed basis as determined by UCBOE, UCBOE may amend existing Purchase Orders from time to time or issue a new Purchase Order (e.g. at the start of each new fiscal year).]

[If master contract: A separate Purchase Order shall be issued for each assignment and the total amount due to the Vendor for a particular work assignment shall not exceed the amount shown in the Purchase Order for that assignment.]

3. **Project Coordinator.** **[Primary Contact for UCBOE]** is designated as the Project Coordinator for UCBOE. The Project Coordinator shall be UCBOE's representative in connection with the Vendor's performance under this Contract. UCBOE has complete discretion in replacing the Project Coordinator with another person of its choosing.
4. **Vendor Supervisor.** **[Primary Contact for Vendor]** is designated as the Vendor Supervisor for the Vendor. The Vendor Supervisor is fully authorized to act on behalf of the Vendor in connection with this Contract.
5. **Terms and Methods of Payment.** UCBOE will make payment after invoices are approved on a net 30-day basis. UCBOE will not pay for services or materials in advance without the prior approval of the Finance Officer. Vendor to submit invoices on the following schedule: **[Invoice Schedule]**.
6. **Standard Terms and Conditions:** Vendor agrees to the Standard Terms and Conditions set forth as **Attachment A** attached hereto and incorporated herein by reference.
7. **Counterpart Execution.** This Contract may be executed and recorded in two or more counterparts, each of which shall be deemed an original and all of which, when taken together, shall constitute one and the same instrument. Each party shall be entitled to rely upon executed copies of this Contract transmitted by facsimile or electronic "PDF" to the same and full extent as the originals.

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[SIGNATURES ON NEXT PAGE]

IN WITNESS WHEREOF, UCBOE and the Vendor have executed this Contract on the day and year first written above.

[CONTRACTOR NAME]

Vendor Name

Signature of Authorized Representative

Date

Vendor's Federal Identification #

[if Contract is with Organization or Social Security Number if individual]

THE UNION COUNTY BOARD OF EDUCATION

Authorized Representative

Date

Procurement Director

Date

This instrument has been preaudited
in the manner required by the School Budget
and Fiscal Control Act.

Finance Officer

Date

Attachment A

Standard Terms and Conditions

DRAFT

I. Standard Terms and Conditions for All Contracts

1. Defined Terms, "Contract" means the agreement between UCBOE and Vendor which consists of the applicable Contract Documents. "Contract Documents" means: (i) any applicable purchase order between Vendor and UCBOE specifically including all terms and conditions set forth or referenced herein and on the face of a Purchase Order, (ii) any attachments hereto, (iii) any applicable solicitation documentation related to hereto (including without limitation any request for proposals or invitation for bids and Vendor's response thereto), and (iv) any other terms and conditions of a written agreement signed by Vendor and UCBOE that deals with the same subject matter. "Goods" means any supplies, materials, products or other tangible personal property provided by Vendor to UCBOE. "Purchase Order" mean any applicable purchase order issued by UCBOE. "Services" means services, specifically including without limitation construction services, design services, professional or consulting services and software as a service, "UCBOE" means the Union County Board of Education. "Vendor" means the party contracting with UCBOE and includes individual and entities that may be referred to in Contract Documents as "vendor", "seller", "service provider", or "contractor".
2. Written Agreement Signed by Both Parties; Acceptance of Purchase Order Terms and Conditions when there is not a Separate Written Agreement Signed by Both Parties. When a Contract is signed by both UCBOE and Vendor then the Purchase Order issued by UCBOE is for administrative convenience and is not part of the Contract Documents. When there is not a separate Contract signed by both UCBOE and Vendor, then Vendor's acknowledgment of the terms of any Purchase Order, without timely objection, or Vendor's shipment or performance of any part of a Purchase Order, constitutes an agreement to all terms and conditions set forth or referenced herein and on the face of the Purchase Order, together with the terms and conditions of any other applicable Contract Documents. The terms and provisions set forth in the Contract Documents shall constitute the entire agreement between Vendor and UCBOE with respect to the purchase by UCBOE of the Services and/or Goods work performed as described in the Contract Documents. In the event of any conflict between any terms and conditions of the Contract Documents, the terms and conditions most favorable to UCBOE shall control. A Purchase Order constitutes an offer by UCBOE and expressly limits acceptance to the terms and conditions stated therein. No additional or supplemental provision or provisions in variance herewith that may appear in Vendor's quotation, acknowledgment, invoice, or in any other communication from Vendor to UCBOE shall be deemed accepted by or binding on UCBOE. UCBOE hereby expressly rejects all such provisions which supplement, modify or otherwise vary from the terms of the Contract Documents, and such provisions are superseded by the terms and conditions stated in the Contract Documents, unless and until UCBOE's authorized representatives expressly assent, in writing, to such provisions. Stenographic and clerical errors and omissions by UCBOE are subject to correction.
3. Cancellation of Purchase Order. UCPS may cancel any Purchase Order or portion thereof without liability, if: (a) Vendor fails upon request to give reasonable assurance of timely performance or UCPS otherwise determines that it has reasonable grounds for insecurity regarding Vendor's performance; (b) conforming Goods or Services (including the quantities specified for delivery) are not delivered within the time specified or, if no time is specified, within a commercially reasonable time; (c) Vendor otherwise breaches the Contract and such breach is not corrected within thirty (30) days following written notice of breach; or (d) cancellation is otherwise required or allowed by law.
4. Quantities. Shipments must equal exact amounts ordered unless otherwise agreed in writing by UCBOE. The award of a term contract neither implies nor guarantees any minimum or maximum purchases. Materials received in excess of quantity specified on the purchase order , at UCBOE option's, may be returned at the Vendor's expense.
5. Prices. If Vendor's price or the regular market price of any of the Goods covered hereunder is lower than the price stated in the Contract Documents on the date of shipment of such Goods, Vendor agrees to give UCBOE the benefit of such lower price on any such Goods. In no event shall Vendor's price be higher than the price last quoted or last charged to UCBOE unless otherwise agreed in writing. No charges for transportation, boxing, crating, etc. are allowable unless such charges are included in the Contract Documents.
6. Invoices. It is understood and agreed that orders will be shipped at the established Contract prices in effect on dates orders are placed. Invoicing at variance with this provision may subject the Contract to cancellation.

Applicable North Carolina sales tax shall be invoiced as a separate item. Invoices shall be sent to UCBOE's accounts payable department with a copy to UCBOE Project Coordinator.

7. Freight on Board. All shipments of Goods are FOB destination unless otherwise stated in the Contract Documents. Any freight charges prepaid by Vendor are to be itemized on the invoice unless stated otherwise in writing by form of quote, bid, contract. In instances where Goods are shipped against this order by parties other than those specified on the Purchase Order, the third-party shipper must be instructed to list the UCBOE purchase order number on all packages, bills of lading, etc. to insure prompt identification of order.
8. Taxes. Taxes are included in the Contract Price. Applicable taxes shall be invoiced as a separate item for UCBOE's records.
9. Payment Terms. Payment terms are Net 30 days after receipt of correct invoice or acceptance of Goods, whichever is later.
10. Condition and Packaging. Unless otherwise provided by special terms and conditions or specifications, it is understood and agreed that any item offered or shipped has not been sold or used for any purpose and shall be in first class condition. All containers/packaging shall be suitable for handling, storage or shipment.
11. Safety Data Sheets. Safety Data Sheets must be provided with shipment of all chemicals."
12. Delays in Shipment. Time and date of delivery are of the essence, except when delay is due to causes beyond Vendor's reasonable control and without Vendor's fault or negligence.
13. Risk of Loss. Vendor shall have the risk of loss of and damage to the Goods subject to the Contract Documents until such Goods are delivered to the destination and accepted by UCBOE or its nominee.
14. Rejection. All Goods shall be received subject to UCBOE's inspection. Goods that are defective in workmanship or material or otherwise not in conformity with the requirements of the Contract Documents may be rejected and returned at Vendor's expense or may be accepted at a reduced price. UCBOE may require Vendor to promptly replace or correct any rejected Goods Services and, if Vendor fails to do so, UCBOE may contract with a third party to replace such Goods Services and charge Vendor the additional cost.
15. Warranties. Vendor warrants that all Goods delivered hereunder will be free from defects in materials and workmanship and will conform strictly to the specifications, drawings, or samples specified or furnished. This warranty shall survive any inspection, delivery, acceptance or payment by UCBOE of the Goods and shall run to UCBOE and any user of the Goods. This express warranty is in addition to Vendor's implied warranties of merchantability and fitness for a particular purpose which shall not be disclaimed. In addition to any other rights available at law or equity, UCBOE shall be entitled to all rights and remedies provided by the Uniform Commercial Code, Chapter 25 of the North Carolina General Statutes, for breach of express warranties and implied warranties of merchantability or fitness for a particular purpose, including but not limited to consequential and incidental damages.
16. Compliance with All Laws. Vendor warrants that all performance hereunder shall be in accordance with all applicable federal, state and local laws, regulations and orders. The right of Vendor to proceed may be terminated immediately by written notice if UCBOE determines that Vendor, its agent or another representative, has violated any provision of law.
17. Use of Federal Funds. If the source of funds for this Contract is federal funds, the following federal provisions apply pursuant to 2 C.F.R. § 200.326 and 2 C.F.R. Part 200, Appendix II (as applicable): Equal Employment Opportunity (41 C.F.R. Part 60); Davis-Bacon Act (40 U.S.C. 3141-3148); Copeland "Anti-Kickback" Act (40 U.S.C. 3145); Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708); Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387); Debarment and Suspension (Executive Orders 12549 and 12689); Byrd Anti-Lobbying Amendment (31 U.S.C. 1352); Procurement of Recovered Materials (2 C.F.R. § 200.322); and Record Retention Requirements (2 CFR § 200.324).
18. Registered Sex Offenders; Jessica Lunsford Act. Under North Carolina law, certain sex offenders are prohibited from coming onto school campuses. Vendor agrees to conduct an annual check of the N.C. Sex Offender and Public Protection Registration Program, the N.C. Sexually Violent Predator Registration Program and the National Sex Offender Registry for all of its employees whose job involves direct interaction with students as part of the job. UCBOE prohibits any personnel listed on such registries from being on any property owned or operated by UCBOE and from having any direct interaction with students. As a term of the Agreement, said checks must be performed by the Vendor and reported to UCBOE's Superintendent or designee, if Vendor's employees will be working directly with students. Under provisions set forth in the Jessica Lunsford Act under North Carolina law, the signature below certifies that neither Vendor nor any employee or agent of Vendor is

- listed as a sex offender on the N.C. Sex Offender and Public Protection Registration Program, the N.C. Sexually Violent Predator Registration Program, and/or the National Sex Offender Registry.
19. Nondiscrimination. During the performance of the Contract, Vendor shall not discriminate against or deny the Contract's benefits to any person on the basis of sexual orientation, national origin, race, ethnic background, color, religion, gender, age or disability.
 20. FERPA Electronically Stored Data Compliance: Vendor is expressly prohibited from selling or trading any education records or personally identifiable information acquired under the Agreement. Furthermore, Vendor agrees not to attempt to re-identify students from aggregated data. Further, Vendor will not use any personally identifiable information or education records to advertise or market to students of UCBOE or their parents. Any personally identifiable information and education records held by Vendor pursuant to the Agreement will be made available to UCBOE upon request. Vendor will store and process all data using appropriate administrative, physical, and technical safeguards to secure personally identifiable information and education records from unauthorized access, disclosure, and use. Vendor will conduct periodic risk assessments and remediate any identified security vulnerabilities in a timely manner. Vendor will also have a written incident response plan, to include prompt notification to UCBOE in the event of a security or privacy incident, as well as procedures for responding to a breach of data. Vendor agrees to share its incident response plan upon request. Vendor shall, for all personally identifiable data and education records in its possession and in the possession of any subcontractors, or agents to which it has transferred data as permitted herein, destroy or de-identify such data when such data is no longer needed to perform the Agreement. Vendor hereby agrees to abide by all Board of Education policies and procedures governing the confidentiality of student records and the responsible use of technology and internet safety. If Vendor experiences a security breach concerning any information covered by the Agreement, and such breach is covered by N.C.G.S. §75.61(14), then Vendor will (a) fully comply with Vendor's obligations under the N.C. Identity Theft Protection Act, (b) immediately notify UCBOE with the information listed in N.C.G.S. §75-65(d)(1-4), and (c) fully cooperate with UCBOE in carrying out its obligations under said Identity Theft Protection Act. Vendor will indemnify UCBOE for any breach of confidentiality or failure of its responsibilities to protect confidential information, and for cost of notification of affected persons as a result of its accidental or negligent release of personally identifiable information or education records provided to Vendor pursuant to the Agreement.
 21. North Carolina Public Records Law: Vendor acknowledges that UCBOE is subject to the requirements of North Carolina's Public Records Law ("NCPRL"), N.C.G.S. § 132-1, et. seq. The Agreement and any related documents, papers, letters, maps, books, photographs, films, sound recordings, magnetic or other tapes, electronic data-processing records, artifacts, or other documentary material, regardless of physical form or characteristics, made or received by UCBOE in connection with the transaction of the Agreement may be considered a "public record," subject to disclosure under the NCPRL. UCBOE is under no obligation to notify Vendor prior to its compliance of its duties under NCPRL.
 22. Conflict of Interest. Vendor represents and warrants that no member of UCBOE or any of its employees or officers who may obtain a direct benefit, personal gain or advantage for themselves or a relative or associate as a result of the Contract, subcontract or other agreement related to the Contract is in a position to influence or has attempted to influence the making of the Contract, has been involved in making the Contract, or will be involved in administering the Contract. Vendor also represents and warrants that, if the Contract is funded by any amount of federal funds, no violation of 2 C.F.R. § 200.318(c) or any other applicable federal conflict of interest law has occurred or will occur. Vendor shall cause this paragraph to be included in all Contracts, subcontracts and other agreements related to the Contract.
 23. Gratuities. Vendor represents and warrants that no member of UCBOE or any of its employees has been or will be offered or given a gratuity to an official or employee of UCBOE in violation of applicable law or policy.
 24. Kickbacks to Vendor. Vendor shall not permit any kickbacks or gratuities to be provided, directly or indirectly, to itself, its employees, subcontractors or subcontractor employees for the purpose of improperly obtaining or rewarding favorable treatment in connection with a UCBOE Contract or in connection with a subcontract relating to a UCBOE Contract. When Vendor has grounds to believe that a violation of this clause may have occurred, Vendor shall promptly report to UCBOE in writing the possible violation.
 25. Iran Divestment Act. Vendor certifies that, as of the date listed below, it is not on the Final Divestment List, as created by the State Treasurer pursuant to N.C.G.S. § 143-6A-4, in violation of the Iran Divestment Act. In compliance with the requirements of the Iran Divestment Act and N.C.G.S. § 143C-6A-5(b), Vendor shall not

utilize in the performance of the contract any subcontractor that is identified on the Final Divestment List. The Final Divestment List can be found on the State Treasurer's website at the address www.nctreasurer.com/Iran and should be updated every 180 days.

26. Divestment from Companies that Boycott Israel. The Vendor certifies that it has not been designated by the North Carolina State Treasurer as a company engaged in the boycott of Israel pursuant to N.C.G.S. 147-86.81. It is the responsibility of each vendor or contractor to monitor compliance with this restriction. Contracts valued at less than \$1,000.00 are exempt from this restriction.
27. E-Verification. Vendor shall comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes
28. Indemnification. To the fullest extent permitted by law, Vendor shall indemnify and hold harmless UCBOE, its officers, agents, employees and assigns from and against all claims, losses, costs, damages, expenses, attorneys' fees and liability that any of them may sustain (a) arising out of Vendor's failure to comply with any applicable law, ordinance, regulation, or industry standard or (b) arising directly or indirectly out of Vendor's performance or lack of performance of the terms and conditions of the Contract. In the event that any Services and/or Goods sold and delivered or sold and performed under the Contract Documents shall be defective in any respect whatsoever, Vendor shall indemnify and save harmless UCBOE, its officers, agents, employees and assigns from all loss or the payment of all sums of money by reason of all accidents, injuries or damages to persons or property that shall happen or occur in connection with the use or sale of such Services and/or Goods and are contributed to by said condition. In the event Vendor, its employees, agents, subcontractors and or lower-tier subcontractors enter premises occupied by or under the control of UCBOE in the performance of the Contract Documents, Vendor agrees that it will indemnify and hold harmless UCBOE, its officers, agents, employees and assigns, from any loss, costs, damage, expense or liability by reason of property damage or personal injury of whatsoever nature or kind arising out of, as a result of, or in connection with such entry.
29. Insurance. Unless such insurance requirements are waived or modified by UCBOE or risk management ("DIRM"), Vendor certifies that it currently has and agrees to purchase and maintain during its performance under the Contract the following insurance from one or more insurance companies acceptable to UCBOE and authorized to do business in the State of North Carolina: Automobile - Vendor shall maintain bodily injury and property damage liability insurance covering all owned, non-owned and hired automobiles. The policy limits of such insurance shall not be less than \$1,000,000 combined single limit each person/each occurrence. Commercial General Liability - Vendor shall maintain commercial general liability insurance that shall protect Vendor from claims of bodily injury or property damage which arise from performance under the Contract. This insurance shall include coverage for contractual liability. The policy limits of such insurance shall not be less than \$1,000,000 combined single limit each occurrence/annual aggregate. Worker's Compensation and Employers' Liability Insurance - If applicable to Vendor, Vendor shall meet the statutory requirements of the State of North Carolina for worker's compensation coverage and employers' liability insurance. Vendor shall also provide any other insurance or bonding specifically recommended in writing by the DIRM or required by applicable law. Certificates of such insurance shall be furnished by Vendor to UCBOE and shall contain the provision that UCBOE be given 30 days' written notice of any intent to amend or terminate by either Vendor or the insuring company. Failure to furnish insurance certificates or to maintain such insurance shall be a default under the Contract and shall be grounds for immediate termination of the Contract.
30. Termination for Convenience. In addition to all of the other rights which UCBOE may have to cancel this Contract or an applicable Purchase Order, UCBOE shall have the further right, without assigning any reason therefore, to terminate the Contract (or applicable Purchase Order), in whole or in part, at any time at its complete discretion by providing 10 days' notice in writing from UCBOE to Vendor. If the Contract is terminated by UCBOE in accordance with this paragraph, Vendor will be paid in an amount which bears the same ratio to the total compensation as does the Services and/or Goods actually delivered or performed to the total originally contemplated in the Contract. UCBOE will not be liable to Vendor for any costs for completed Goods, Goods in process or materials acquired or contracted for if such costs were incurred prior to the date of this Contract or an applicable Purchase Order.
31. Termination for Default. UCBOE may terminate the Contract, in whole or in part, immediately and without prior notice upon breach of the Contract by Vendor. In addition to any other remedies available to UCBOE law or equity, UCBOE may procure upon such terms as UCBOE shall deem appropriate, Services and/or Goods

- substantially similar to those so terminated, in which case Vendor shall be liable to UCBOE for any excess costs for such similar goods, supplies, or services and any expenses incurred in connection therewith.
32. **Contract Funding.** It is understood and agreed between Vendor and UCBOE that UCBOE's obligation under the Contract is contingent upon the availability of appropriated funds from which payment for Contract purposes can be made. No legal liability on the part of UCBOE for any payment may arise until funds are made available to UCBOE's Finance Officer and until Vendor receives notice of such availability. Should such funds not be appropriated or allocated, the Contract shall immediately be terminated. UCBOE shall not be liable to Vendor for damages of any kind (general, special, consequential or exemplary) as a result of such termination.
 33. **Accounting Procedures.** Vendor shall comply with any accounting and fiscal management procedures prescribed by UCBOE to apply to the Contract and shall assure such fiscal control and accounting procedures as may be necessary for proper disbursement of and accounting for all project funds.
 34. **Improper Payments.** Vendor shall assume all risks attendant to any improper expenditure of funds under the Contract. Vendor shall refund to UCBOE any payment made pursuant to the Contract if it is subsequently determined by audit that such payment was improper under any applicable law, regulation or procedure. Vendor shall make such refunds within thirty (30) days after UCBOE notifies Vendor in writing that a payment has been determined to be improper.
 35. **Contract Transfer.** Vendor shall not assign, subcontract or otherwise transfer any interest in the Contract without the prior written approval of UCBOE.
 36. **Contract Personnel.** Vendor agrees that it has, or will secure at its own expense, all personnel required to provide the Services and/or Goods set forth in the Contract.
 37. **Key Personnel.** Vendor shall not substitute for key personnel (defined as those individuals identified by name or title in the Contract Documents or in written communication from Vendor) assigned to the performance of the Contract without prior written approval from UCBOE Project Coordinator (the individual at UCBOE responsible for administering the Contract).
 38. **Contract Modifications.** The Contract may be amended only by written amendment duly executed by both UCBOE and Vendor.
 39. **Relationship of Parties.** Vendor is an independent contractor and not an employee of UCBOE. The conduct and control of the work will lie solely with Vendor. The Contract shall not be construed as establishing a joint venture, partnership or any principal-agent relationship for any purpose between Vendor and UCBOE. Employees of Vendor shall remain subject to the exclusive control and supervision of Vendor, which is solely responsible for their compensation.
 40. **Advertisement.** The Contract will not be used in connection with any advertising by Vendor without prior written approval by UCBOE.
 41. **Monitoring and Evaluation.** Vendor shall cooperate with UCBOE, or with any other person or agency as directed by UCBOE, in monitoring, inspecting, auditing or investigating activities related to the Contract. Vendor shall permit UCBOE to evaluate all activities conducted under the Contract. UCBOE has the right at its sole discretion to require that Vendor remove any employee of Vendor from UCBOE Property and from providing Services and/or Goods under the Contract following provision of notice to Vendor of the reasons for UCBOE's dissatisfaction with the Services and/or Goods of Vendor's employee.
 42. **Financial Responsibility.** Vendor is financially solvent and able to perform under the Contract. If requested by UCBOE, Vendor agrees to provide a copy of its latest audited annual financial statements or other financial statements as deemed acceptable by UCBOE's Finance Officer. In the event of any proceedings, voluntary or involuntary, in bankruptcy or insolvency by or against Vendor, the inability of Vendor to meet its debts as they become due or in the event of the appointment, with or without Vendor's consent, of an assignee for the benefit of creditors or of a receiver, then UCBOE shall be entitled, at its sole option, to cancel any unfilled part of the Contract without any liability whatsoever.
 43. **Governmental Restrictions.** In the event any governmental restrictions are imposed which necessitate alteration of the material, quality, workmanship or performance of the items offered prior to their delivery, it shall be the responsibility of the Vendor to notify, in writing, the issuing purchasing office at once, indicating the specific regulation which required such alterations. UCBOE reserves the right to accept any such alterations, including any price adjustments occasioned thereby, or to cancel the Contract.
 44. **Inspection at Vendor's Site.** UCBOE reserves the right to inspect, at a reasonable time, the equipment/item, plant or other facilities of a prospective contractor prior to Contract award, and during the Contract term as

necessary for UCBOE determination that such equipment/item, plant or other facilities conform with the specifications/requirements and are adequate and suitable for the proper and effective performance of the Contract.

45. Confidential Information. All information about UCBOE provided to the Vendor or its officers, employees, agents, representatives and advisors (the "Vendor Representatives"), and all copies or other full or partial reproductions thereof and notes, memoranda or other writings related thereto created by Vendor or any Vendor Representative, regardless of whether provided before or after the date of the Contract and regardless of the manner or medium in which it is furnished, is referred to as "Confidential Information". Confidential Information does not include any information that (a) is or becomes generally available to the public other than as a result of an impermissible disclosure by Vendor, (b) was known by or available on a nonconfidential basis to Vendor before it was disclosed by UCBOE or (c) becomes available to Vendor on a nonconfidential basis from a third party whom Vendor does not know to be bound by a confidentiality agreement with, or have an obligation of secrecy to, UCBOE. Except as and to the extent required by law or order or demand of any governmental or regulatory authority, Vendor and Vendor Representatives will (x) keep all Confidential Information confidential and (y) will only disclose or reveal any Confidential Information to Vendor Representatives who must have the information to fulfill Vendor's obligations under the Contract and who agree to observe the terms of this Section. Vendor and Vendor Representatives will not use the Confidential Information for any purpose other than fulfilling Vendor's obligations under the Contract. By way of example and not limitation, Vendor shall not sell, market, or commercialize Confidential Information, create derivative products or applications based on Confidential Information. If Vendor is requested or required, pursuant to applicable law or regulation or by legal process, to disclose any Confidential Information, Vendor will provide UCBOE with prompt and timely notice of the requests or requirements so that UCBOE can seek an appropriate protective order or other remedy and will not be prejudiced by delay. If UCBOE does not obtain a protective order or other remedy, Vendor will only disclose that portion of the Confidential Information which Vendor's legal counsel determines Vendor is required to disclose. Upon termination of the Contract or otherwise upon UCBOE's request, Vendor will promptly deliver to UCBOE all Confidential Information in the possession of Vendor or the Vendor Representatives.

Student Information: If, during the course of Vendor's performance of the Contract, Vendor should obtain any information pertaining to students or students' official records, Vendor agrees to keep any such information confidential and to not disclose or permit it to be disclosed, directly or indirectly, to any person or entity. The Contract shall not be construed by either party to constitute a waiver of or to in any manner diminish the provisions for confidentiality of students' records. Additionally, pursuant to N.C.G.S. 115C-401.1, it is unlawful for a person who enters into a contract with a local board of education to sell personally identifiable information that is obtained from a student as a result of that person's performance under the Contract.

Employee Personnel Information: If, during the course of Vendor's performance of the Contract, Vendor should obtain any information pertaining to employees of UCBOE's personnel records, Vendor agrees to keep any such information confidential and to not disclose or permit it to be disclosed, directly or indirectly, to any person or entity. This section will survive the termination of this Contract.

46. Intellectual Property. Vendor agrees, at its own expense, to indemnify, defend and save UCBOE harmless from all liability, loss or expense, including costs of settlement and attorney's fees, resulting from any claim that UCBOE's use, possession or sale of the Services and/or Goods infringes any copyright, patent or trademark or is a misappropriation of any trade secret.
47. No Pre-Judgment or Post-Judgment Interest. In the event of any action by Vendor for breach of contract in connection with the Contract, any amount awarded shall not bear interest either before or after any judgment, and Vendor specifically waives any claim for interest.
48. Background Checks. At the request of UCBOE's Project Coordinator, Vendor (if an individual) or any individual employees of Vendor shall submit to UCBOE criminal background check and drug testing procedures.
49. Mediation. If a dispute arises out of or relates to the Contract, or the breach of the Contract, and if the dispute cannot be settled through negotiation, the parties agree to try in good faith to settle the dispute by mediation administered by the American Arbitration Association under its Commercial Mediation Rules before resorting to litigation.

50. No Third-Party Benefits. The Contract shall not be considered by Vendor to create any benefits on behalf of any third party. Vendor shall include in all contracts, subcontracts or other agreements relating to the Contract an acknowledgment by the contracting parties that the Contract creates no third-party benefits.
51. Force Majeure. Neither party shall be responsible to the other for any losses resulting from the failure to perform any terms or provisions of the Agreement if the party's failure to perform is attributable to war, riot or other disorder, strike or other work stoppage; fire; flood; storm; illness; pandemic, communicable disease, or any other act not within the control of the party whose performance is interfered with, and which, by reasonable diligence, such party is unable to prevent. However, UCBOE will be entitled to a refund for fees paid on account of services not rendered by Vendor including any and all deposits.
52. Ownership of Documents; Work Product. All documents created pursuant to the Contract shall, unless expressly provided otherwise in writing, be owned by UCBOE. Upon the termination or expiration of the Contract, any and all finished or unfinished documents and other materials produced by Vendor pursuant to the Contract shall, at the request of UCBOE, be turned over to UCBOE. Any technical knowledge or information of Vendor which Vendor shall have disclosed or may hereafter disclose to UCBOE shall not, unless otherwise specifically agreed upon in writing by UCBOE, be deemed to be confidential or proprietary information and shall be acquired by UCBOE free from any restrictions as part of the consideration of the Contract.
53. Strict Compliance. UCBOE may at any time insist upon strict compliance with these terms and conditions notwithstanding any previous course of dealing or course of performance between the parties to the contrary.
54. General Provisions. UCBOE's remedies as set forth herein are not exclusive. Any delay or omission in exercising any right hereunder, or any waiver of any single breach or default hereunder, shall not be deemed to be a waiver of such right or of any other right, breach, or default. If action be instituted by Vendor hereunder, UCBOE shall be entitled to recover costs and reasonable attorney's fees. Vendor may not assign, pledge, or in any manner encumber Vendor's rights under this Contract or applicable Purchase Order or delegate the performance of any of its obligations hereunder, without UCBOE's prior, express written consent.
55. Contract Situs. All matters, whether sounding in contract or tort relating to the validity, construction, interpretation and enforcement of the Contract, will be determined in Union County, North Carolina. North Carolina law will govern the interpretation and construction of the Contract.
56. Severability. Any provision of this Contract that is determined by any court of competent jurisdiction to be invalid or unenforceable will not affect the validity or enforceability of any other provision. Any provision of the Contract held invalid or unenforceable only in part or degree will remain in full force and effect to the extent not held invalid or unenforceable.

II. Additional Standard Terms and Conditions for Construction Contracts

1. Supervision and Provision for Labor and Supplies. The Vendor will supervise and direct the construction work (the "Work") and shall furnish, provide, and pay for all labor, materials, equipment, machinery, utilities, and services reasonably necessary for the execution and completion of the Work.
2. Coordination of Work and Notification of Progress. The Vendor agrees to coordinate its Work with the work of any other separate contractors or with the work of UCBOE's own forces to avoid delaying or interfering with their work. Vendor shall enforce good order and discipline among his employees and subcontractors on the Project. The Vendor further agrees to inform UCBOE on a regular basis or at UCBOE's request of the progress of the Work.
3. Provision for all Permits, Licenses, and Inspections. Unless otherwise provided, the Vendor shall secure and pay for all permits, licenses, and inspections necessary for the proper execution and completion of the Work.
4. Cleanliness. Vendor shall keep the Project reasonably free from waste materials or rubbish resulting from the Vendor's operations.
5. Additional Warranties. The Vendor warrants that the Vendor has visited the location of the Project and is familiar with all field conditions bearing upon the Vendor's performance of the Work; that the materials and equipment furnished under the Contract are of good quality and new (unless otherwise permitted); that the Work is non-negligent and meets or exceeds the standards ordinarily observed in the industry; and that the Work conforms to the requirements of the Contract and to all applicable codes, ordinances, laws, or regulations. The Vendor further warrants and promises that the Work shall be free from defects

and nonconformities in materials and workmanship for a period of one year from the later of the Date of Completion, which is the date UCBOE accepts the Work or such date as the Vendor actually completes all the Work (the "Date of Completion"). During such period, the Vendor will remedy at Vendor's expense nonconformities or defects in the Work within a reasonable time after receiving notice thereof from UCBOE.

6. Indemnity for Subcontractor Payment. In addition to the indemnification obligations contained in the attached terms and conditions to this Contract, the Vendor further agrees to defend and indemnify UCBOE from and against all claims, damages, losses, and expenses, including reasonable attorneys' fees, arising out of the Vendor's failure to pay subcontractors or materials suppliers.
7. Change Orders. The Vendor agrees that UCBOE may order changes in the general scope of the Work, including additions, deletions, and similar revisions. The parties agree to adjust the Contract Price and Date of Completion to reflect the effects of such changes, which adjustments shall be authorized only upon execution of a written change order (a "Change Order"). In case of emergency or extenuating circumstances or if a construction contingency is provided as stated below, approval of changes may be obtained verbally by telephone or field orders approved by UCBOE Project Coordinator and promptly thereafter substantiated in writing as outlined under normal procedures. The amount of any increase or decrease in the Contract Price shall be by mutual acceptance of a total amount supported by sufficient data and information to substantiate the change. Any decrease in Contract Price for a decrease in the Work will be the reasonable costs of the Work deleted, including a reasonable amount for the decrease in the Vendor's overhead.
8. Performance/Payment Bond. If required by law and/or the bidding documentation, the Vendor agrees to provide a Performance Bond and Labor and Material Payment Bond for its faithful performance in a form reasonably satisfying to UCBOE.
9. Payments Withheld. The UCBOE may withhold payment for the following reasons to the extent permitted under N.C. Gen. Stat. § 143-134.1(e): (1) defective Work not remedied; (2) third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to UCBOE is provided by the Vendor; (3) failure of the Vendor to make payments properly to subcontractors or for labor, materials or equipment; (4) reasonable evidence that the Work will not be completed with the time specified, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; (5) failure to carry out the Work in accordance with the Contract Documents; (6) failure to provide sales tax documentation in accordance with subparagraph 9.3.5; (7) failure or refusal of the Vendor to submit the required information on minority business enterprises; and (8) failure of the Vendor to comply with (a) the provisions of the Sedimentation and Pollution Control Act (N.C. Gen. Stat. § 113A-50 *et seq.*), and/or (b) any Notice of Violation issued by the North Carolina Department of Natural Resources.
10. Retainage. For public construction contracts costing an amount equal to or greater than \$100,000, the UCBOE will retain five percent of the amount of each progress payment on the project for as long as is authorized by N.C. Gen. Stat. § 143-134.1. At all times during the Project, the UCBOE may retain the maximum funds allowed by N.C. Gen. Stat. § 143-134.1. The UCBOE specifically reserves the right to withhold additional funds as authorized by this Contract and N.C. Gen. Stat. § 143-134.1. The Vendor may pay each subcontractor no later than seven days after receipt of payment from the UCBOE and in accordance with N.C. Gen. Stat. § 143-134.1 the amount to which the subcontractor is entitled, reflecting percentages actually retained from payments to the Vendor on account of the subcontractor's portion of the Work. The Vendor shall, by appropriate agreement with each subcontractor, require each subcontractor to make payments to sub-subcontractors in a similar manner and in accordance with N.C. Gen. Stat. § 143-134.1.
11. The Vendor shall use and submit applications for payment using a form reasonably satisfactory to UCBOE ("Application for Payment"). The Contractor shall submit with each Application for Payment a completed "Statement of Sales Tax Paid" and "Minority Business Enterprise" documentation in a form acceptable to UCBOE.

III. Additional Standard Term and Condition for Designer Contracts (which include Architectural, Engineering, Surveying, and Technical Services)

Additional Insurance. In addition to the insurance required pursuant to Section 22 of the Standard Terms and Conditions for All Contracts, the Vendor certifies that it currently has and agrees to purchase and maintain during its performance under the Contract the following insurance from one or more insurance companies acceptable to UCBOE and authorized to do business in the State of North Carolina: Professional liability insurance in commercially reasonable amounts as reasonably determined by UCBOE.

IV. Additional Standard Terms and Conditions for Information Technology Contracts

1. Definitions.

“Hardware” means the hardware the Vendor utilizes in the Hosted Environment for delivery and maintenance of the Hosted Software Services.

“Hosted Environment” means the Hardware, system software, hosting support software, network connectivity, and facility used by Vendor to support the Hosted Software Services.

“Hosted Software Services” means the application, including the Hosted Software and any applicable Third-Party Software, as run on the Hosted Environment.

“Hosted Software” means the software owned and controlled by Vendor or Vendor’s third-party contractor that supports the Hosted Software Services.

“Support Services” means application and technical support required to maintain the performance, uptime and connectivity of the Hosted Software Services for UCBOE access and use, including without limitation, telephone support, error correction, maintenance, and installation of Updates and Upgrades to the Hosted Software.

“Updates” means (i) modifications to or releases of the Hosted Software that (a) add new features, functionality, and/or improved performance, (b) operate on new or other databases, operating systems, or server platforms or (c) extend the Hosted Software functionality to take advantage of advances in coding language, hardware, network or wireless infrastructures; and (ii) deviation corrections, bug or error fixes, patches, workarounds, and maintenance releases.

“Upgrades” means any new version or new release of the Hosted Software typically provided on an annual or bi-annual basis by the Vendor that includes new features, functions, support or service that were not in place with the immediately prior version.

2. Grant of License. Vendor grants to UCBOE for the term of this Contract a non-exclusive, non-transferable license to access and use over the internet the Hosted Software (the “License”).
3. Updates and Upgrades. Vendor will make certain limited and applicable Hosted Software Updates and Upgrades available to UCBOE at no additional cost. All such Updates and Upgrades shall automatically become subject to the benefits and terms of this Contract and shall automatically be considered part of the License granted under this Contract.
4. Security. Vendor’s Hosted Environment shall maintain security measures in place to help protect against the loss, misuse, and alteration of the Hosted Software Services, and specifically the Confidential Information provided to Vendor by UCBOE.
5. Warranties. Vendor warrants the following: (a) Vendor has the full authority to grant the License; (b) the Hosted Software is free from material defects or viruses; (c) the Hosted Software contains no disabling devices; and (d) the Hosted Software conforms to all material specifications set forth in the documentation and any other written material provided to UCBOE for any purpose. Without limiting any other remedies available to UCBOE under this Contract, at law or in equity, in the event that any Hosted Software does not conform to the warranties set forth for the Hosted Software herein, Vendor shall, at UCBOE’s option, promptly correct or replace such Hosted Software and, in either case, Vendor shall perform any Support Services or other work required to restore the Hosted Software to the state that existed prior to any such breach, all at Vendor’s expense. UCBOE reserves the right to reject the Hosted Software and to hold Vendor responsible for any loss, direct or indirect, caused by any such breach of warranty. In the event Vendor is or becomes aware of a problem with any item of Hosted Software, Vendor shall notify UCBOE upon such determination. Acceptance or use of the Hosted Software shall not constitute a waiver of any claim under any warranty.
6. Effect of Termination and Orderly Transition. Upon termination or expiration of this Contract for any reason, Vendor will cooperate in good faith with UCBOE to provide for an orderly transfer of the Goods and Services

and Confidential Information to UCBOE or UCBOE's successor vendor ("Orderly Transition") and according to the terms of this section.

- a. **Scope of Work for Orderly Transition.** Within thirty (30) days of notification by UCBOE that it will transfer Goods and Services to itself or a successor vendor, the parties will create and execute a scope of work document detailing tasks, the responsible parties for individual tasks, and timeframes for completion of tasks necessary to complete an Orderly Transition. The final, executed Orderly Transition scope of work shall be incorporated into this Contract and become subject to its terms. Vendor's failure to (a) cooperate in developing the Orderly Transition scope of work, (b) execute an Orderly Transition scope of work, or (c) abide by the executed Orderly Transition scope of work shall be deemed a material breach of this Contract.
 - b. **Time Frame.** Unless otherwise mutually agreed in an executed Orderly Transition scope of work, Vendor shall continue to provide Goods and Services while UCBOE migrates its Confidential Information from Vendor's Hosted Software Services in the Orderly Transition process. Vendor agrees that, as part of the Orderly Transition process and within the specified time frame, it will transfer to UCBOE all of the Confidential Information provided to Vendor by UCBOE pursuant to this Contract. Vendor will provide the Confidential Information in commercially reasonable electronic format as agreed in the Orderly Transition scope of work at no additional cost.
 - c. **Time and Material Costs Only.** UCBOE will be obligated to pay for time and materials at a reasonable hourly rate of no more than \$75/hour for the Orderly Transition. No other fees will be assessed for the Orderly Transition. Fees shall be agreed upon in advance as part of developing the scope of work referenced in subsection (a) above.
 - d. **Destruction of Confidential Information after Orderly Transition.** Unless otherwise mutually agreed in an executed Orderly Transition scope of work, Vendor agrees that after returning all Confidential Information to UCBOE pursuant to subsection (b) above it will destroy all remaining copies of Confidential Information and back-up Confidential Information in its possession, contained in or on any medium (such as a storage area network or "SAN") or as may be stored offsite, within thirty (30) days of completion of Orderly Transition. Vendor shall provide UCBOE with a detailed summary of the destruction process and standards to be utilized by Vendor with respect to the Confidential Information, and UCBOE shall approve such process and standards prior to Vendor commencing such destruction.
7. **Intellectual Property Warranty.** In addition to the warranties set forth elsewhere in this Contract with respect to the Goods and Services, Vendor expressly represents, warrants and covenants that neither the furnishing of Hosted Services to UCBOE hereunder, nor does the Hosted Software, violate, in whole or in part, any provision of any law, common law or regulation concerning copyrights, trade secrets, trademarks, tradenames, service marks, patents or other provisions regulating or concerning intellectual property rights.
8. **Additional Indemnification.** To the fullest extent permitted by law, Vendor shall indemnify, defend and hold harmless UCBOE, its and directors, officers, managers, employees and agents, from all suits, claims, costs, damages and other liabilities, including reasonable attorneys' fees as incurred by counsel of UCBOE's choice, relating to or arising from (a) Vendor's failure to maintain the security and integrity of Confidential Information, the Hosted Software Services and the Hosted Environment; (b) any claim for infringement of any copyright, trade secret, trademark, tradename, service mark, patent, or other law or regulation concerning intellectual and/or proprietary property rights; and (c) any claims by third party interests in the Hosted Software.
9. **Data Use.** Notwithstanding the foregoing, Vendor acknowledges and agrees that all Confidential Information is proprietary to and owned exclusively by UCBOE, whether provided in tangible or electronic form and whether entered into any software or Hosted Software Services owned or licensed by Vendor (including without limitation the Hosted Software and Hosted Software Services) or otherwise provided in connection with any products provided and services performed by Vendor (including without limitation the Goods and Services) and whether to, by or through a Vendor-affiliated ASP or other Hosted Software Services. Furthermore, Vendor shall not sell, market, or commercialize Confidential Information, create derivative products or applications based on Confidential Information or otherwise use Confidential Information in any manner unrelated to the performance of Vendor's obligations under the Contract. Vendor shall not share Confidential Information with any parent or subsidiary company of Vendor or any other Vendor-affiliated entity without the express prior written consent of UCBOE detailing the scope of allowable disclosure. Vendor agrees that if it breaches this

section, UCBOE may, at its option, pursue any or all of the following remedies: (a) immediately terminate this Contract without liability to Vendor; (b) seek an injunction without posting a bond; and (c) pursue whatever other remedies may be available to it at law, in equity or pursuant to this Contract.

DRAFT

ATTACHMENT A

Required Forms with Bid Submission

- Good Faith Efforts (Affidavit A, B, Identification of Minority Participation Form)
- 5% Bid Bond

Identification of HUB Certified/ Minority Business Participation

(Name of Bidder)

do hereby certify that on this project, we will use the following HUB Certified/ minority business as construction subcontractors, vendors, suppliers or providers of professional services.

Firm Name, Address and Phone #

Work Type

*Minority
Category

****HUB
Certified
(Y/N)**

[illegible]

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

The total value of minority business contracting will be (\$)_____.

State of North Carolina AFFIDAVIT A – Listing of Good Faith Efforts

County of _____

(Name of Bidder)

Affidavit of _____

I have made a good faith effort to comply under the following areas checked:

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive. (1 NC Administrative Code 30 I.0101)

- ☐ **1 – (10 pts)** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- ☐ **2 --(10 pts)** Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- ☐ **3 – (15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- ☐ **4 – (10 pts)** Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- ☐ **5 – (10 pts)** Attended prebid meetings scheduled by the public owner.
- ☐ **6 – (20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- ☐ **7 – (15 pts)** Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- ☐ **8 – (25 pts)** Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.
- ☐ **9 – (20 pts)** Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- ☐ **10 - (20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

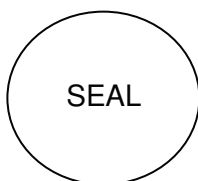
The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

State of North Carolina --AFFIDAVIT B-- Intent to Perform Contract with Own Workforce.

County of _____

Affidavit of _____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the _____
_____ contract.
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

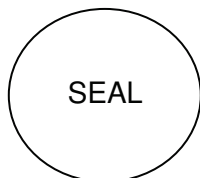
The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement. The Bidder agrees to make a Good Faith Effort to utilize minority suppliers where possible.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

DOCUMENT 00 43 13
BID SECURITY FORM

Date of Execution of this bond	
Name and Address of Principle (Bidder)	
Name and Address of Surety	
Name and Address of Contracting Body	THE UNION COUNTY BOARD OF EDUCATION a body corporate of the State of North Carolina, 400 N Church St, Monroe, NC 28112
Amount of Bond Bid Amount and Proposal Dated:	 for

KNOW ALL MEN BY THESE PRESENTS, that we the PRINCIPLE above named and SURETY above named who is duly licensed to act as SURETY in the State of North Carolina, are held and firmly bound unto THE UNION COUNTY BOARD OF EDUCATION, a body corporate of the State of North Carolina, as Obligee, in the penal sum of five percent (5%) of the amount bid in the bid and proposal described in lawful money of the United States of America, for the payment of which well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such, that if the PRINCIPLE shall be awarded the contract for which the bid and proposal above described is submitted and shall execute the contract, give bond for the faithful performance of the contract, and give bond for the payment of all persons supplying labor and materials in the prosecution of the work provided for in said contract, within ten (10) days after the award of the same to the PRINCIPLE above named, then this obligation shall be null and void; but if the PRINCIPLE above named fails to so execute such contract and give performance bond and payment bond as required by Section 129 of Chapter 143 of the General Statutes of North Carolina, as amended, the Article 3 of Chapter 44-A of the General Statutes of North Carolina, as amended, the Surety shall upon demand, forthwith pay the Obligee the amount of this bond set forth above.

IN WITNESS WHEREOF, the Principle above named and the Surety above named have executed this instrument under their several seals on the date set forth above.

WITNESS:

Principle (Name of individual, and trade
Name, partnership, corporation, or joint
venture)

(Proprietorship or Partnership)

BY _____(Seal)

TITLE _____
(Owner, Partner, Office held in
corporation, joint venture)

(Corporate Seal)

ATTEST

BY _____
(Corporation)

TITLE _____
(Corporation Secretary or Assistant Secretary Only)

Surety (Name of Surety Company)

BY _____

TITLE Attorney in Fact

(Corporate Seal of Surety)

(Address of Attorney in Fact)

WITNESS:

COUNTERSIGNED:

N.C. Licensed Resident Agent

ATTACHMENT B

Required Forms with Recommendation of Award

- Certificate of Insurance (meeting the requirements stated within Attachment A **of Draft Contract**).
- Good Faith Efforts (Affidavit C or D)
- 100% Performance and Payment Bond (within 10 days of award)
- E-Verify Affidavit
- Iran Divestment Certification

State of North Carolina - AFFIDAVIT C - Portion of the Work to be Performed by HUB Certified/Minority Businesses

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the portion of the work to be executed by HUB certified/minority businesses as defined in GS143-128.2(g) and 128.4(a),(b),(e) is equal to or greater than 10% of the bidders total contract price, then the bidder must complete this affidavit.

This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

Affidavit of _____ I do hereby certify that on the
(Name of Bidder)

(Project Name)
Project ID# _____ Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below.

Attach additional sheets if required

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

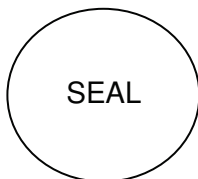
*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____



Signature: _____

Title: _____

State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

State of North Carolina AFFIDAVIT D – Good Faith Efforts

County of _____

(Note this form is to be submitted only by the apparent lowest responsible, responsive bidder.)

If the goal of 10% participation by HUB Certified/ minority business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts:

Affidavit of _____ I do hereby certify that on the _____
(Name of Bidder)

Project ID# _____ (Project Name) Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with HUB certified/ minority business enterprises. Minority businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below. (Attach additional sheets if required)

Name and Phone Number	*Minority Category	**HUB Certified Y/N	Work Description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

**** HUB Certification with the state HUB Office required to be counted toward state participation goals.**

Examples of documentation that may be required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

- Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.
- Copies of quotes or responses received from each firm responding to the solicitation.
- A telephone log of follow-up calls to each firm sent a solicitation.
- For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.
- Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.
- Copy of pre-bid roster
- Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.
- Letter detailing reasons for rejection of minority business due to lack of qualification.
- Letter documenting proposed assistance offered to minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

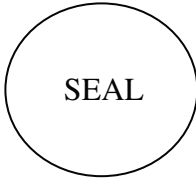
Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____ Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

FORM OF PERFORMANCE BOND

Date of Contract: _____

Date of Execution: _____

Name of Principal
(Contractor) _____

Name of Surety : _____

Name of Contracting
Body : _____

Amount of Bond : _____

Project _____

KNOW ALL MEN BY THESE PRESENTS, that we, the principal and surety above named, are held and firmly bound unto the above named contracting body, hereinafter called the contracting body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind, ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the contracting body, identified as shown above and hereto attached:

NOW, THEREFORE, if the principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the contracting body, with or without notice to the surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in _____ counterparts .

Witness :

Contractor: (Trade or Corporate Name)

(Proprietorship or Partnership)

By : _____

Attest: (Corporation)

Title : _____
(Owner, Partner, or Corp.
Pres. or Vice Pres. only)

By : _____

Title : _____
(Corp. Sec. or Asst. Sec.. only)

(Corporate Seal)

(Surety Company)

Witness :

By : _____

Title : _____
(Attorney in Fact)

Countersigned :

(Surety Corporate Seal)

(N.C. Licensed Resident Agent)

Name and Address-Surety Agency

Surety Company Name and N.C.
Regional or Branch Office Address

FORM OF PAYMENT BOND

Date of Contract: _____

Date of Execution: _____

Name of Principal
(Contractor) _____

Name of Surety : _____

Name of Contracting
Body : _____

Amount of Bond : _____

Project _____

KNOW ALL MEN BY THESE PRESENTS, that we, the principal and surety above named, are held and firmly bound unto the above-named contracting body, hereinafter called the contracting body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the contracting body identified as shown above and hereto attached:

NOW, THEREFORE, if the principal shall promptly make payment to all persons supplying labor/material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise, to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in _____ counterparts.

Witness :

(Proprietorship or Partnership)

Attest: (Corporation)

By : _____

Title : _____
(Corp. Sec. or Asst. Sec... only)

(Corporate Seal)

Witness :

Countersigned :

(N.C. Licensed Resident Agent)

Name and Address-Surety Agency

Surety Company Name and N.C.
Regional or Branch Office Address

Contractor: (Trade or Corporate Name)

By : _____

Title : _____
(Owner, Partner, or Corp.
Pres. or Vice Pres. only)

(Surety Company)

By : _____

Title : _____
(Attorney in Fact)

(Surety Corporate Seal)



E-VERIFY COMPLIANCE STATEMENT

The contractor shall comply with the requirements of Article 2 of Chapter 64 of the North Carolina General Statutes. Further, should Contractor utilize a subcontractor(s), Contractor shall require the subcontractor(s) to comply with the requirements of Article 2, Chapter 64 of the General Statutes. Pursuant to North Carolina General Statute § 143-133.3(c)(2), contracts solely for the purchase of apparatus, supplies, materials, and equipment are exempt from this E-Verify provision. If, at any time during the period this statement is considered valid, the Contractor should become non-compliant, it shall be the Contractor's responsibility to acknowledge the change in status to Union County Public Schools in writing.

{CONTRACTOR'S FULL LEGAL NAME} _____

SIGNATURE

PRINTED NAME & TITLE

WITNESS

PRINTED NAME & TITLE

IRAN DIVESTMENT ACT CERTIFICATION

REQUIRED BY N.C.G.S. 147-86.58

As of the date listed below, the vendor or bidder listed above is not listed on the Final Divestment List created by the State Treasurer pursuant to N.C.G.S. 147-86.58.

The undersigned hereby certifies that he or she is authorized by the vendor or bidder listed above to make the foregoing statement.

Signature _____

Date _____

Printed Name _____

Title _____

Notes to persons signing this form:

N.C.G.S. 147-86.58 requires this certification for bids or contracts with the State of North Carolina, a North Carolina local government, or any other political subdivision of the State of North Carolina. The certification is required at the following times:

- When a proposal is submitted
- When a contract is entered into (if the certification was not already made when the vendor made its proposal)
- When a contract is renewed or assigned

N.C.G.S. 147-86.58 requires that contractors with the State, a North Carolina local government, or any other political subdivision of the State of North Carolina must not utilize any subcontractor found on the State Treasurer's Final Divestment List.

The State Treasurer's Final Divestment List can be found on the State Treasurer's website at the address www.nctreasurer.com/iran and will be updated every 180 days.

ATTACHMENT C

Cost Proposal Sheet

- C-1: Location - Weddington High
- C-2: Location - Porter Ridge High
- C-3: Location - Antioch Elementary School

C-1 Weddington High School

Cost Proposal/Execution of Proposal

Bidders Checklist:

___ Bid Submittal form

___ Affidavit A or B

___ Identification of Minority Business
Form

___ 5 % Bid Bond

Project Title: Fire Alarm System Replacement

Location: Weddington High School

BID NO: 6-97648066

Cost Proposal Structure

Bidders shall submit **separate, completed Cost Proposal forms for each school location** identified in this Invitation for Bids. Each Cost Proposal shall represent the **full and complete scope of work** for that individual site in accordance with the contract documents, including but not limited to the Scope of Work, drawings, specifications, and all addenda.

The required Cost Proposal forms are:

- **Attachment C-1 – Cost Proposal: Weddington High School**
- **Attachment C-2 – Cost Proposal: Porter Ridge High School**
- **Attachment C-3 – Cost Proposal: Antioch Elementary School**

Union County Public Schools reserves the right to **award one site, multiple sites, or all sites**, or to reject any or all bids, as determined to be in the best interest of the Owner.

Failure to submit a completed and executed Cost Proposal form for **each required school location** may result in the bid being deemed **non-responsive**.

By submitting the required executed Cost Proposal forms for each location, the potential contractor certifies that:

- The proposal is signed by an authorized representative of the firm.
- The cost and availability of all equipment, materials, and supplies associated with performing the services described herein for each school location have been determined and included in the proposed cost.
- All labor costs, direct and indirect, sales tax, etc. have been determined and included in the proposed cost.
- The offeror is aware of prevailing site conditions associated with performing these services at each school.
- The potential contractor has read and understands the conditions set forth in this Invitation for Bids and agrees to them with no exceptions.

C-1 Weddington High School

Therefore, in compliance with this Invitation for Bids and subject to all conditions herein, the undersigned offers and agrees, if this proposal is accepted within 60 days from the date of the opening, to furnish the subject services for a cost not to exceed:

Base Bid:

Base Bid	\$ _____
10% Allowance	\$ _____
Total Base Bid + Allowance	\$ _____
Alternate 1: N/A	\$ _____ (Add or Deduct)
Alternate 2: N/A	\$ _____ (Add or Deduct)
Acknowledge Addenda:	Addendum 1 ____ Addendum 2 ____ Addendum 3 ____ Addendum 4 ____ Not Applicable ____
Project Schedule:	Consecutive <u>calendar</u> days required to achieve Final Completion from issuance of Notice to Proceed: _____ calendar days
Notice to Proceed:	
Substantial Completion:	
Final Completion:	

Unit Costs:

Unit Costs may be used to add or delete from the project.

Execution:

Offeror: _____ Federal Tax ID No. _____

License Description: _____ License No. _____

Address: _____ City, State, Zip _____

Telephone Number: _____ Mobile: _____ Email: _____

By: _____ Date: _____ Title: _____

(Typed or printed name)

C-2 Porter Ridge High School

Cost Proposal/Execution of Proposal

Bidders Checklist:

- ___ Bid Submittal form
- ___ Affidavit A or B
- ___ Identification of Minority Business Form
- ___ 5 % Bid Bond

Project title: Fire Alarm System Replacement

Location: Porter Ridge High School

BID NO: 6-97648066

Cost Proposal Structure

Bidders shall submit **separate, completed Cost Proposal forms for each school location** identified in this Invitation for Bids. Each Cost Proposal shall represent the **full and complete scope of work** for that individual site in accordance with the contract documents, including but not limited to the Scope of Work, drawings, specifications, and all addenda.

The required Cost Proposal forms are:

- **Attachment C-1 – Cost Proposal: Weddington High School**
- **Attachment C-2 – Cost Proposal: Porter Ridge High School**
- **Attachment C-3 – Cost Proposal: Antioch Elementary School**

Union County Public Schools reserves the right to **award one site, multiple sites, or all sites**, or to reject any or all bids, as determined to be in the best interest of the Owner.

Failure to submit a completed and executed Cost Proposal form for **each required school location** may result in the bid being deemed **non-responsive**.

By submitting the required executed Cost Proposal forms for each location, the potential contractor certifies that:

- The proposal is signed by an authorized representative of the firm.
- The cost and availability of all equipment, materials, and supplies associated with performing the services described herein for each school location have been determined and included in the proposed cost.
- All labor costs, direct and indirect, sales tax, etc. have been determined and included in the proposed cost.
- The offeror is aware of prevailing site conditions associated with performing these services at each school.
- The potential contractor has read and understands the conditions set forth in this Invitation for Bids and agrees to them with no exceptions.

C-2 Porter Ridge High School

Therefore, in compliance with this Invitation for Bids and subject to all conditions herein, the undersigned offers and agrees, if this proposal is accepted within 60 days from the date of the opening, to furnish the subject services for a cost not to exceed:

Base Bid:

Base Bid	\$ _____						
10% Allowance	\$ _____						
Total Base Bid + Allowance	\$ _____						
Alternate 1: N/A	\$ _____ (Add or Deduct)						
Alternate 2: N/A	\$ _____ (Add or Deduct)						
Acknowledge Addenda:	Addendum 1 ____ Addendum 2 ____ Addendum 3 ____ Addendum 4 ____ Not Applicable ____						
Project Schedule:	Consecutive calendar days required to achieve Final Completion from issuance of Notice to Proceed: _____ calendar days						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Notice to Proceed:</td> <td> </td> </tr> <tr> <td>Substantial Completion:</td> <td> </td> </tr> <tr> <td>Final Completion:</td> <td> </td> </tr> </table>	Notice to Proceed:		Substantial Completion:		Final Completion:		
Notice to Proceed:							
Substantial Completion:							
Final Completion:							

Unit Costs:

Unit Costs may be used to add or delete from the project.

Execution:

Offeror: _____ Federal Tax ID No. _____

License Description: _____ License No. _____

Address: _____ City, State, Zip _____

Telephone Number: _____ Mobile: _____ Email: _____

By: _____ Date: _____ Title: _____

(Typed or printed name)

C – 3 Antioch Elementary School

Cost Proposal/Execution of Proposal

Bidders Checklist:

- ___ Bid Submittal form
- ___ Affidavit A or B
- ___ Identification of Minority Business Form
- ___ 5 % Bid Bond

Project title: Fire Alarm System Replacement

Location: Antioch Elementary School

BID NO: 6-97648066

Cost Proposal Structure

Bidders shall submit **separate, completed Cost Proposal forms for each school location** identified in this Invitation for Bids. Each Cost Proposal shall represent the **full and complete scope of work** for that individual site in accordance with the contract documents, including but not limited to the Scope of Work, drawings, specifications, and all addenda.

The required Cost Proposal forms are:

- **Attachment C-1 – Cost Proposal: Weddington High School**
- **Attachment C-2 – Cost Proposal: Porter Ridge High School**
- **Attachment C-3 – Cost Proposal: Antioch Elementary School**

Union County Public Schools reserves the right to **award one site, multiple sites, or all sites**, or to reject any or all bids, as determined to be in the best interest of the Owner.

Failure to submit a completed and executed Cost Proposal form for **each required school location** may result in the bid being deemed **non-responsive**.

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- The cost and availability of all equipment, materials, and supplies associated with performing the services described herein for each school location have been determined and included in the proposed cost.
- All labor costs, direct and indirect, sales tax, etc. have been determined and included in the proposed cost.
- The offeror is aware of prevailing site conditions associated with performing these services at each school.
- The potential contractor has read and understands the conditions set forth in this Invitation for Bids and agrees to them with no exceptions.

C – 3 Antioch Elementary School

Therefore, in compliance with this Invitation for Bids and subject to all conditions herein, the undersigned offers and agrees, if this proposal is accepted within 60 days from the date of the opening, to furnish the subject services for a cost not to exceed:

Base Bid:

Base Bid	\$ _____						
10% Allowance	\$ _____						
Total Base Bid + Allowance	\$ _____						
Alternate 1: N/A	\$ _____ (Add or Deduct)						
Alternate 2: N/A	\$ _____ (Add or Deduct)						
Acknowledge Addenda:	Addendum 1 ____ Addendum 2 ____ Addendum 3 ____ Addendum 4 ____ Not Applicable ____						
Project Schedule:	Consecutive <u>calendar</u> days required to achieve Final Completion from issuance of Notice to Proceed: _____ calendar days						
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Notice to Proceed:							
Substantial Completion:							
Final Completion:							

Unit Costs:

Unit Costs may be used to add or delete from the project.

Execution:

Offeror: _____ Federal Tax ID No. _____

License Description: _____ License No. _____

Address: _____ City, State, Zip _____

Telephone Number: _____ Mobile: _____ Email: _____

By: _____ Date: _____ Title: _____

(Typed or printed name)