Business
Department
School Administration Building
304 New York Ave
Oak Ridge, Tennessee 37830
Phone (865) 425-9003
Fax (865) 425-9060

Request for Proposal

Description of items/services requested:

The Oak Ridge Schools Board of Education is soliciting proposals for fire alarm upgrades (**RFP 21-002) Willow Brook Elementary Fire Alarm**.

General Requirements:

Proposals, bids, or responses will be accepted by the Oak Ridge Schools Business Department no later than **2:00 PM EDT, March 10.** Every document must be enclosed in an envelope clearly marked as a bid document. Two full copies of the proposal must be submitted each with original signatures on both Bid Forms (included in this packet). Any response, bid, or proposal received after the above deadline shall be considered late, and will not be opened or considered. Bid prices must be valid for no less than sixty (60) days from the date of the bid**.**

All documents shall be submitted to the following address:

Mary Ann Riley, Purchasing Specialist
Re: Willow Brook Elementary
Fire Alarm
(RFP 21-002)
Oak Ridge Schools
304 New York Ave
Oak Ridge, TN 37830

SPECIFICATIONS:

All work shall be as bid documents prepared by:

WWR Engineers, Inc.
5417 Ball Camp Pike
Knoxville, TN 37921
865-770-5436
shicks@wwrengrs.com

Attachments:
Specifications – Owners RFP plus electrical 7 Sections
Drawings – 8 sheets
Addendums – none as of 2-11-2021

Submission Requirements:

1. A detailed bid form, which includes quantity and unit cost must be included in the bid package. Please include specification sheets on all products/terms.

2. Two full copies of the proposal must be submitted, with original Bid Forms included with each copy.

3. A detailed description of all warranties and support for equipment and software must be included.

4. Any license or renewal costs (if any) shall be included in notes on the Bid Form. Specifically, anticipated annually recurring costs for maintenance, support, and software updates and upgrades, if any, must be listed.

5. The amount listed on the Bid Form should reflect the total implementation costs of this project as submitted.

Schedule:

1. **A pre-bid walk through date for the project is set for March 3, 2021 at 2:00 PM EST. Interested parties are to meet at the entrance of Willow Brook Elementary. Please follow COVID-19 protocol and do not attend if ill. Please do wear a mask and maintain distance between others in attendance.**

2. Sealed bids will be opened at the School Administration Building, 304 New York Avenue, Oak Ridge, TN 37830 at **2:00 PM EST on Wednesday, March 10, 2021.**

3. **Project must be completed, inspected and approved no later than July 16, 2021.**

Bidding Procedures

Location: All bids must be submitted to the Oak Ridge Schools Business Department at or before the announced deadline.

Mary Ann Riley,
Purchasing Specialist
Willow Brook Elem Fire Alarm
RFP 21-002
304 New York Ave.
Oak Ridge, TN 37830

Award of Contract: The owner (Oak Ridge Schools) further reserves the right to reject any and all bids, to waive any and all informalities and to negotiate contract terms with the successful bidder, and the right to disregard all non-conforming, non-responsive, or conditional bids. Oak Ridge Schools may conduct such investigations, as it deems necessary, to assist in the evaluation of any bid to establish the responsibility, qualifications, and financial ability of the bidder, proposed sub-contractors and other persons and organizations to perform the work in accordance with the contract documents to the bidder who does not pass any such evaluation to the owner's satisfaction. The contract shall be awarded to the bidder, whose evaluation by the owner indicates to the owner that the award will be in the best interest of Oak Ridge Schools. It is also understood that the "apparent low bidder" will be announced at the bid opening; however the "successful bidder," who may or may not be the lowest bidder, will not be announced until all issues, which include, but are not limited to quality, service, conformity to specifications, etc. have been resolved and until a period of review has been completed by the owner. Price will be the primary factor when determining the successful bidder assuming all bid specifications are met. Oak Ridge Schools does not enter into contracts that provide for mediation or arbitration. The owner (Oak Ridge Schools) further reserves the right to reject any and all bids, to waive any and all informalities, and to negotiate contract terms with the successful bidder (e.g., product line-item deletions or adjustments), and the right to disregard all non-conforming, non- responsive, or conditional bids.

Bid Document: For certain projects the Owner will supply a bid form to be completed by the bidder. When such forms are issued, only bids returned with the proper forms will be accepted. Envelopes must be sealed and marked as a bid document. Any bid may be withdrawn prior to the date and time as set forth in the "bid invitation."

Errors in Bids: When an error is made in extending total prices, the unit bid price will govern. Carelessness in quoting prices or in preparation of bid otherwise, will not relieve the bidder. Erasures or changes to bids must be initialed. Any alteration, erasure, addition to or omission of required information, change of the specifications, or bidding schedule, is made at the risk of the bidder.

Facsimile transmissions: Electronic transmissions will not be accepted, except when in the course of the bidding process addendums or other notifications of errors on behalf of the owner places an undue hardship upon prospective bidders. Written notification by the owner must precede the acceptance of Facsimile transmissions.

Hold Harmless Agreement: Bidders shall be required to complete the attached Hold Harmless Agreement.

Laws and Regulations: The bidder's attention is directed to the fact that all applicable state laws, municipal ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the project shall apply to the contract throughout, and they will be deemed to be included in the contract the same as though herein written out in full.

Legal Issues: Contracts with Oak Ridge Schools will be subject to the laws of Tennessee. Disputes will be tried in the State of Tennessee and in the Court of Anderson County. Bids will be denied if these provisions are not included in the contract.

Non-Collusion Affidavit: Bidder shall be required to complete the attached Non-Collusion Affidavit.

Payments: Invoices that are submitted by the awarded bidder are required to provide accurate and current addresses.

Payment terms shall be specified in the bid response, including any discounts for early payment. The Oak Ridge Schools Business Department discourages the practice of picking up checks in person, unless there is an emergency situation.

Purchase: No purchase or contract is authorized or valid until the issuance of a Purchase Order from Oak Ridge Schools and the Board of Education approval of project in accordance with Oak Ridge Schools Policy. No employee is authorized to purchase equipment, supplies or services prior to the issuance of such Purchase Order and Board of Education approval**.**

Sub-contracts: The Bidder is specifically advised that any person, firm, or other party to whom it is proposed to award a sub-contract under this contract must be acceptable to the Owner.

Subcontractors and employees: If work is to be performed during regular school hours when children are present, the BOE reserves the right to require background checks, dress codes, and certain ethical standards of all employees on school property.

Taxes: Oak Ridge Schools is tax exempt.

Tie Bids: If two or more bidders submit identical bids and is equally qualified; selection shall be made at the discretion of the owner.

Title VI of the Civil Rights Act of 1964: All interested parties, without regard of race, color, or national origin, shall be afforded the opportunity to bid and shall receive equal consideration. Title VI states "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program activity receiving Federal financial assistance." Oak Ridge Schools strives to protect individuals' civil rights through active compliance with the requirements of Title VI.

Vendor Indemnify: Oak Ridge Schools will indemnify vendor to the extent Tennessee law allows.

Warranty: The vendor shall provide warranty information on the equipment, components and items bid with the bid submittal.

Bid Form

Owner: Oak Ridge Schools Board of Education
Mary Ann Riley, Purchasing Specialist
School Administration Building
304 New York Ave
Oak Ridge, TN 37830

Project: **Willow Brook Elementary Fire Alarm**
RFP 21-002

Bid Opening: **2:00 PM EDT, March 10, 2021**

Company Name: _____

Address: _____

_____

Phone Number: _____

Email: _____

Main Bid: ***This Price is to be for the complete specified equipment and installation as outlined on page 2 of this RFP 21-002. ALL COSTS ARE TO BE INCLUDED IN THE FINAL PRICE.***

Bid Amount: $_____USD

Company: _____

Signature: _____

Title: _____

Date: _____

Please attach detailed specifications.

HOLD HARMLESS AGREEMENT

This Hold Harmless Agreement is between _____

Name of Contractor

(Hereinafter Contractor), and Oak Ridge Schools named in this bid.

Contractor agrees that as a condition precedent to "Contractor" being awarded a contract from Oak Ridge Schools, "Contractor" agrees to indemnify, protect, defend, and hold harmless Oak Ridge Schools, its Board Members, agents, and employees from all judgments, claims, demands for payment, suits or actions of every nature and description brought against Oak Ridge Schools, its Board Members, agents, and employees alleging injuries or damages sustained by any person arising out of or in the course of "Contractor's" providing goods or services to Oak Ridge Schools.

Name of Contractor: _____

By: _____

Title: _____

STATE OF_____

County of _____

_____ personally appeared before me, the undersigned, with whom I am personally acquainted and who, upon oath, acknowledged that he/she/it executed the within instrument for the purposes therein contained, and who further acknowledge that he/she/it is authorized to execute this interment on behalf of

_____.

_____

Signature

Witness by hand and Notaries seal at office this _____ day of _____, year of _____.

_____

Notary Public

My Commission Expires: _____

NON-COLLUSION AFFIDAVIT

NON-COLLUSION AFFIDAVIT TO BE EXECUTED
BY DESIGN-BUILDER

State of _____

County of _____

_____, being first duly sworn, deposes and says that he or she is of the party making the foregoing bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder neither possesses a business relationship with any employee of the District which may be involved in the award or administration of the project nor has received or solicited either directly or indirectly any inside information from an employee of the District which would give the bidder an advantage over any other bidder; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract or any interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price of any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

Subscribed and sworn to (or affirmed) before me this _____ day

of _____, 2021.

_____ _____

Signature of Officer Notary Signature

_____

Typed Name of Officer

_____

Office Notary Seal

WARNING! PROPOSALS WILL NOT BE CONSIDERED UNLESS THIS AFFIDAVIT IS COMPLETED AND EXECUTED, INCLUDING THE AFFIDAVIT OF THE NOTARY AND THE NOTORIAL SEAL.

DRUG-FREE WORKPLACE AFFIDAVIT

STATE OF_____

COUNTY OF _____

The undersigned, principal officer of _____, an employer of five (5) or more employees contracting with Oak Ridge School District to provide construction services, hereby states under oath as follows:

1. The undersigned is a principal officer of _____ (hereafter referred to as the "Company"), and is duly authorized to execute this Affidavit on behalf of the Company.
2. The Company submits this Affidavit pursuant to T.C.A. § 50-9-113 which requires each employer with no less than five (5) employees receiving pay who contracts with the state or any local government to provide construction services to submit an affidavit stating that such employer has a drug-free workplace program that complies with Title 50, Chapter 9, of the Tennessee Code Annotated.
3. The Company is in compliance with the terms of T.C.A. § 50-9-113.

Further affiant saith naught.

Principal Officer: _____

STATE OF _____

COUNTY OF _____

Before me personally appeared _____ with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence), and who acknowledged that he/she is the _____ of _____ and is authorized to execute this instrument on behalf of the principal for the purposes therein contained.

Witness my hand and seal at office this _____ day of _____, 20_____.

Notary Public: _____

My commission expires: _____

CRIMINAL BACKGROUND COMPLIANCE AFFIDAVIT

STATE OF _____

COUNTY OF _____

The undersigned, principal officer of _____, an Employer contracting with the Oak Ridge School Board of Education to provide services having direct contact with children or access to grounds of an Oak Ridge public school while students are on grounds, hereby states under oath as follows:

1. The undersigned is a principal officer of _____ (hereafter referred to as the "Company"), and is duly authorized to execute this Affidavit on behalf of the Company.
2. The Company submits this Affidavit pursuant to T.C.A. § 49-5-413 as amended effective September 1, 2007, for entities entering into contracts with a local board of education where the Company's employees will have direct contact with school children or access to the grounds of a school when children are present. It is the duty of the Company to require applicants supply a fingerprint sample and submit to a criminal history records check to be conducted by the Tennessee Bureau of Investigation and the Federal Bureau of Investigation prior to permitting the person to have contact with such children or enter school grounds and to take certain other actions based upon the results of the records check.
3. The Company is in compliance with the terms of T.C.A. § 49-5-413.

Further affiant saith naught.

Principal Officer: _____

STATE OF _____

COUNTY OF _____

Before me personally appeared _____ with whom I am personally acquainted (or proved to me on the basis of satisfactory evidence), and who acknowledged that he/she is the _____ of _____ and is authorized to execute this instrument on behalf of the principal for the purposes therein contained.

Witness my hand and seal at office this _____ day of _____, 20_____.

Notary Public: _____

My commission expires: _____

IRAN DIVESTMENT ACT REQUIREMENTS

Pursuant to Tennessee Code Annotated § 12-12-106 (as enacted by Chapter 817 of the Public Acts of 2016) the chief procurement officer for the State of Tennessee shall publish a list of persons determined to be engaging in investment activities in Iran. The list is posted on the website of the Tennessee General Services Department's Central Procurement Office*. When competitive bidding is required, Tennessee Code Annotated § 12-12-111 requires every bid or proposal submitted to a local government for goods or services to include the following statement, subscribed or affirmed by the bidder as true under the penalty of perjury:

CERTIFICATION

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each bidder is not on the list created pursuant to *T.C.A.* § 12-12-106.

Signature	Date
Printed Name	Title
Name of Firm/Company	

*https://tn.gov/assets/entities/generalservices/cpo/attachments/List_of_persons_pursuant_to_Tenn._Code_Ann._12-12-106._Iran_Divestment_Act-July.pdf

SECTION 26 05 00

BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Unused

1.02 SCOPE:

A. Furnish all labor, materials, equipment and services necessary for and reasonably incidental to the complete installation of all electrical as shown on the drawings and as specified herein to result in a complete and operable access control, intrusion detection, and fire alarm reporting system.

B. Principal features of the installation are as follows:

1. Service entrance, branch panelboards, wiring devices, etc.

2. Lighting fixtures and lamps.

3. Wiring in connection with mechanical equipment.

4. Outside lighting and control.

5. Emergency lighting system.

6. Telephone system provisions.

7. Control systems.

8. Control wiring provisions.

9. Electric unit heaters.

10. Underground system installation.

SECTION 26 05 19

WIRES AND CABLES

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. Extent of electrical wire and electrical cable work is indicated by drawings and schedules.

B. Types of wire, cable and connectors in this section include, but are not limited to, the following and requirements of the service application:

Copper conductors.
Fixture wires.
Switchboard wires.
Tap type connectors.
Split-bolt connectors.
Wire nuts.

C. Applications for wire, cable and connectors required for project are as follows:

Power distribution circuitry.
Lighting circuitry.
Appliance and equipment circuitry.
Motor-branch circuitry.
Control circuitry.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following:

SECTION 26 05 20

ELECTRICAL CONNECTIONS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. Extent of electrical connections for equipment is indicated by drawings and schedules. Electric connections are hereby defined to include, but not necessarily limited to, connections for providing electrical power to equipment, control wiring connections, communication connections.

B. Types of electrical power and electrical system connections specified in this section includes, but is not limited to the following:

To motors.
To equipment.
To ground.
To master units of communication, signal, and alarm.

C. Motor starters and controls not furnished integrally with equipment are specified in applicable Electrical work sections along with installation specifications.

D. Refer to other specifications sections for motor starters and controls furnished with equipment; not work of this section.

E. Junction boxes and disconnect switches required for motors and other electrical units of equipment are specified in applicable Electrical work sections.

F. Refer to other specifications sections and the drawings for control system wiring work described and installed under Electrical work.

G. Refer to specification sections and plans of other work Divisions for specific individual equipment power requirements.

H. Furnish all labor and material and making power connections to all electric equipment furnished under the Architectural, Plumbing, Heating, Air Conditioning and equipment sections of the specifications and plans.

SECTION 26 05 33

RACEWAYS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. Extent of raceways is indicated by drawings and application. Provide raceway as required by the application. Use EMT for interior of building, as permitted by the codes, except imbeded in masonry. Type ENT, AC cable, and MC cable conduit is not permitted to be used. Use schedule 40 PVC or RMC as directed under slab or encased. Use RMC where exposed to damage. Provide a code size grounding conductor in all nonmetallic conduit. Install an insulated code size grounding conductor in all metallic raceway systems and connect/bond to all electrical system boxes, enclosures, frames and device grounds. Connect this conductor to all equipment frames, metallic boxes, device frames and other metallic components of the electrical distribution and utilization systems.

B. Types of raceways in this section include the following:

Electrical metallic tubing.
Flexible metal conduit.
Liquid-tight flexible metal conduit.
Rigid metal conduit.
Rigid nonmetallic conduit.
Surface metal and nonmetallic raceways.
Cable trays.

PART 2 - PRODUCTS

2.01 METAL AND NONMETALLIC CONDUIT AND TUBING:

A. General: Provide metal and nonmetallic conduit, tubing and fittings of types, grades, sizes and weights (wall thicknesses) for each service indicated. Where types and grades are not indicated, provide proper selection determined by Installer to fulfill wiring requirements, and comply with fire codes and applicable portions of NEC for raceways.

SECTION 26 05 34

ELECTRICAL BOXES AND FITTINGS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. Extent of electrical box and electrical fitting work is indicated by drawings and schedules.

B. Types of electrical boxes and fittings in this section include, but are not limited to, the following and the requirements of the application.

Outlet boxes.
Junction boxes.
Pull boxes.
Floor boxes.
Conduit bodies.
Bushings.
Locknuts.
Knockout closures.

PART 2 - PRODUCTS

2.01 FABRICATED MATERIALS:

A. Interior Outlet Boxes: Provide galvanized flat rolled sheet steel interior outlet wiring boxes, of types, shapes and sizes, including box depths, to suit each respective location and installation; construct with stamped knockouts on back and sides, and with threaded screw holes with corrosion-resistant screws for securing box covers and wiring devices.

1. Interior Outlet Box Accessories: Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, fixture studs, cable clamps, and metal straps for supporting outlet boxes, which are compatible with outlet boxes being used and fulfilling requirements of individual wiring situations. Choice of accessories is Installer's option.

SECTION 26 05 53 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. Extent and types of electrical identification are indicated herein and as follows:

1. Operational instructions and warnings.

2. Danger signs.

3. Equipment/system identification signs.

4. Conduit Identification.

5. Power and control wiring identification.

6. Terminal marking.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering identification products which may be incorporated in the work include, but are not limited to, the following:

W.H. Brady Co.
Ideal Industries, Inc.
Seton Name Plate Co.

2.02 ELECTRICAL IDENTIFICATION MATERIALS:

A. General: Except as otherwise indicated, provide manufacturer's standard products of categories and types required for each application. Where more than single type is specified for an application, selection is Installer's option, but provide single selection for each application.

SECTION 28 31 11
ADDRESSABLE FIRE ALARM

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Expandable emergency evacuation fire alarm system.

1.2 REFERENCES

A. Underwriters Laboratories (UL):
1. UL 268 - Standard for Smoke Detectors for Fire Alarm Signaling Systems.
2. UL 864 - Standard for Control Units and Accessories for Fire Alarm Systems.
3. UL 1971 - Standard for Signaling Devices for the Hearing Impaired.
4. UL 2572 - Standard for Control and Communication Units For Mass Notification Systems.

1.3 SYSTEM DESCRIPTION

A. A new intelligent reporting, Style 7 networked, fully peer-to-peer, microprocessor-controlled fire detection and emergency voice alarm communication system shall be installed in accordance with the specifications and as indicated on the Drawings.

B. Each Signaling Line Circuit (SLC) and Notification Appliance Circuit (NAC): Limited to only 80 percent of its total capacity during initial installation.

C. Basic Performance:
1. Network Communications Circuit (NetSOLO) Serving Network Nodes: Wired using single twisted non-shielded 2-conductor cable or connected using approved fiber optic cable between nodes in Class A configuration.
2. Signaling Line Circuits (SLC) Serving Addressable Devices: Wired Class A.
3. Initiation Device Circuits (IDC) Serving Non-addressable Devices Connected to Addressable Monitor Modules: Wired Class A.
4. Notification Appliance Circuits (NAC) Serving Strobes, Horns and Speakers: Wired Class A.
5. On Class A Configurations: Single ground fault or open circuit on Signaling Line Circuit shall not cause system malfunction, loss of operating power, or ability to report alarm.
6. Alarm Signals Arriving at INCC COMMAND CENTER: Not be lost following primary power failure until alarm signal is processed and recorded.
7. Transponders:
   a. Operate in peer-to-peer fashion with other panels and transponders in

system.
   b. Each transponder shall store copy of audio evacuation messages and tones.
   c. Systems that use centralized message storage and control at main fire alarm control panel shall not be acceptable.
8. Network Node Communications, Audio Evacuation Channels and Fire Phone Communications:
   a. Communicated between panels and transponders on single twisted pair of copper wires or fiber optic cables.
   b. To enhance system survivability, ability to operate on loss of INCC Command Center, short or open of entire riser at INCC Command Center shall be demonstrated at time of system acceptance testing.
   c. Systems that are not capable of providing true Class A performance for fire fighter's phone communications shall not be acceptable.
9. Signaling Line Circuits (SLC):
   a. Reside in remote transponders with associated audio zones.
   b. SLC modules shall operate in peer-to-peer fashion with all other panels and transponders in system.
   c. On loss of INCC Command Center, each transponder shall continue to communicate with remainder of system, including all SLC functions and audio messages located in all transponders.
   d. Systems that provide a "Degraded" mode of operation upon loss of INCC Command Center or short in riser shall not be acceptable.
10. Audio Amplifiers and Tone-Generating Equipment: Electrically supervised for normal and abnormal conditions.
11. Amplifiers: Located in transponder cabinets serving no more that 3 floors per transponder to enhance system survivability, reduce required riser wiring, simplify installation, and reduce power losses in length of speaker circuits.
12. Speaker NAC Circuits: Arranged such that there is a minimum of 1 speaker circuit per fire alarm zone.
13. Notification Appliance Circuits (NAC), Speaker Circuits, and Control Equipment: Arranged such that loss of any 1 speaker circuit will not cause loss of any other speaker circuit in system.
14. Speaker Circuits:
   a. Electrically supervised for open and short circuit conditions.
   b. If short circuit exists on speaker circuit, it shall not be possible to activate that circuit.
   c. Arranged for 25 or 70 VRMS and shall be power limited in accordance with NEC
   d. 20 percent spare capacity for future expansion or increased power output requirements.
15. Speaker Circuits and Control Equipment:
   a. Arranged such that loss of any 1 speaker circuit will not cause loss of any other speaker circuit in system.
   b. Systems utilizing "bulk" audio configurations shall not be acceptable.
16. 2-Way Telephone Communication Circuits:
   a. Shall communicate digitally over the network between transponders.

b. Supervised for open and short circuit conditions.
c. Short circuit condition on 2-way telephone communications circuit shall result in trouble condition and not result in call-in condition.

17. Voice Communication:
    a. Connect telephone circuits to speaker circuits to allow voice communication over speaker circuit from telephone handset.
    b. Capable of remote phone-to-phone conversations and party-line communications as required.

D. Basic System Functional Operation: When fire alarm condition is detected and reported by 1 of the system alarm initiating devices, the following functions shall immediately occur:
    1. System Alarm LEDs: Flash.
    2. Local Piezo-Electric Signal in Control Panel: Sound at a pulse rate.
    3. 80-Character LCD Display: Indicate all information associated with fire alarm condition, including type of alarm point and its location within protected premises.
    4. Historical Log: Record information associated with fire alarm control panel condition, along with time and date of occurrence. History Log shall have capacity for recording up to 4,100 events.
    5. System output programs assigned via control-by-event equations to be activated by particular point in alarm shall be executed, and the associated system outputs (alarm notification appliances and/or relays) shall be activated.
        a. Close Fire Doors
        b. Shot down air handlers as required by code
        c. Notify the Central Station or Municipal Tie.
    6. Strobes flash synchronized continuously.
    7. Audio Portion of System: Sound alert tone followed by pre-recorded message determined by event and this scenario repeating or other message as approved by local authority until system is reset.

E. Fire Alarm System Functionality:
    1. Provide complete, electrically supervised distributed, Class A networked analog/addressable fire alarm and control system, with analog initiating devices, integral multiple-channel voice evacuation, and fire fighter's phone system.
    2. Fire Alarm System:
        a. Consist of multiple-voice channels with no additional hardware required for total of 4 channels.
        b. Incorporate multiprocessor-based control panels, including model E3 Series modules includes Intelligent Network INCC Command Center(s) (INCC), Intelligent Loop Interface (ILI-MB-E3 or ILI95-MB-E3), Intelligent Network Transponders (INX), communicating over peer-to-peer token ring network with standard capacity of up to 64 nodes expandable to 122.
    3. Each ILI-MB-E3 or ILI95-MB-E3 Node: Incorporate 2 Signaling Line Circuits (SLC), with capacity to support in Velociti ® mode up to 159 analog addressable detectors and 159 addressable modules per ILI-MB-E3 SLC or support in Apollo

mode up to 126 detectors and modules per ILI95-MB-E3 SLC.

4. Voice, Data, and Fire Fighter's Phone Riser: Transmit over single pair of wires or fiber optic cable.
5. Each Intelligent Network Transponder: Capable of providing 16 distributed voice messages, fire fighter phones connections, SLC loop for audio control devices, and integral network interface.
6. Each Network Node: Incorporate Boolean control-by-event programming, including as a minimum AND, OR, NOT, and Timer functions.
7. Control Panels: Capability to accept firmware upgrades via connection with laptop computer, without requirement of replacing microchips.
8. Network:
    a. Based on peer-to-peer token ring technology operating at 625 K baud, using Class A configuration.
    b. Capability of using twisted-pair wiring, pair of fiber optic Multi-mode cable strands up to 200 microns or Single-mode optimized for 9/125 microns, or any combination, to maximize flexibility in system configuration.
9. Each Network Node:
    a. Capability of being programmed off-line using Windows-based software supplied by fire alarm system manufacturer. Capability of being downloaded by connecting laptop computer into any other node in system. Systems that require system software to be downloaded to each transponder at each transponder location shall not be acceptable.
    b. Capability of being grouped with any number of additional nodes to produce a "Region", allowing that group of nodes to act as 1, while retaining peer-to-peer functionality. Systems utilizing "Master/Slave" configurations shall not be acceptable.
    c. Capability of annunciating all events within its "Region" or annunciating all events from entire network, on front panel LCD or touchscreen display without additional equipment.
10. Each SLC Network Node: Capability of having integral DACT (digital alarm communicator transmitter) that can report events in either its region, or entire network to single central station monitoring account.
11. Each Control Panel: Capability of storing its entire program, and allow installer to activate only devices that are installed during construction, without further downloading of system.
12. Password Protection: Each system shall be provided with 4 levels of password protection with up to 16 passwords.
13. Have the capacity for multiple pre-recorded messages (at least sixteen (16), but more if required by local AHJ) and address a list of subjects.
    a. Fire evacuation and relocation
    b. Intruder or hostile person sighted within or around the building grounds
    c. Directions to occupants to take cover within building
    d. Emergency weather conditions appropriate for local area
    e. All Clear

1.4 SUBMITTALS

A. Comply with Section 01330 (01 33 00) - Submittal Procedures.

B. Include sufficient information, clearly presented, to determine compliance with the specifications and the Drawings.

C. Equipment Submittals:
   1. Cover Page: Indicate the following:
      a. Project name and address.
      b. Engineered systems distributor's name and other contact information.
      c. Installing contractor's name and other contact information.
      d. Date of equipment submittals. Indicate on revised submittals the original submittal date and revised submittal date.
   2. Table of Contents: Lists each section of equipment submittal.
   3. Scope of Work Narrative: Detail indented scope of work.
   4. Sequence of Operations: Use matrix or written text format, detailing activation of each type of device and associated resulting activation of the following:
      a. Control panel.
      b. Annunciator panels.
      c. Notification appliances.
      d. Building fire safety functions, including elevator recall, elevator power shutdown, door lock release, door holder release, HVAC unit shutdown, smoke evacuation system activation, and stair pressurization fan activation.
   5. Bill of Material: Indicate for each component of system the following:
      a. Quantity.
      b. Model number.
      c. Description.
   6. SLC Circuit Schedule: Detail address and associated description of each addressable device. Clearly provide information that indicates number of both active and spare addresses.
   7. Battery Calculations: Show load of each of, and total of, components of system along with standby and alarm times that calculations are based on. Show calculated spare capacity and size of intended battery.

D. Shop Drawings:
   1. Cover Page: Indicate the following:
      a. Project name and address.
      b. Engineered systems distributor's name and other contact information.
      c. Installing contractor's name and other contact information.
      d. Date of equipment submittals. Indicate on revised submittals the original submittal date and revised submittal date.
   2. Floor Plans:
      a. Provide separate floor plan for each floor.
      b. If a floor plan must be split using match lines to fit on the page, provide match lines and match line references that refer to sheet number that shows area on opposite side of match line.

c. Prepare using AutoCAD.
d. Prepare to scale 1/8 inch = 1'-0", unless otherwise required by the Architect or Engineer.
e. Show equipment and device locations.
f. Show wiring information in point-to-point format.
g. Show conduit routing, if required by the AHJ.

3. Title Block: Provide on each sheet and include, at a minimum, the following:
   a. Project name.
   b. Project address.
   c. Sheet name.
   d. Sheet number.
   e. Scale of drawing.
   f. Date of drawing.
   g. Revision dates, if applicable.
4. Control Panel: Provide sheet that details exterior and interior views of control panel and clearly shows associated wiring information.
5. Annunciator Panels: Provide sheet that details exterior and interior views of annunciator panels and clearly shows associated wiring information.

E. Certification: Submit with equipment submittals and shop drawings, letter of certification from major equipment manufacturer, indicating proposed engineered system distributor is an authorized representative of major equipment manufacturer.

F. Project Record Drawings:
1. Submit complete project record drawings within 14 calendar days after acceptance test.
2. Project record drawings shall be similar to shop drawings, but revised to reflect changes made during construction.

G. Operation and Maintenance Manuals:
1. Submit complete operation and maintenance manuals within 14 calendar days after acceptance test.
2. Operation and maintenance manuals shall be similar to equipment submittals, but revised to reflect changes made during construction.
3. Include factory's standard installation and operating instructions.

1.5 QUALITY ASSURANCE

A. Codes and Standards:

1. ADA: System shall conform to American with Disabilities Act (ADA).

B. To ensure reliability and complete compatibility, all items of fire alarm system, including control panels, power supplies, initiating devices, and notification appliances, shall be listed by Underwriters Laboratories Inc. (UL) and shall bear "UL" label.

C. Alarm Control Panel Equipment: UL-listed under UL 864 Ninth Edition and UL 2572.

D. Equipment, Programming, and Installation Supervision:
   1. Provide services of approved Platinum Level engineered systems distributor of Gamewell-FCI for equipment, programming, and installation supervision.
   2. Provide proof of factory training within 14 calendar days of award of the Contract.

E. Software Modifications:
   1. Provide services of Gamewell-FCI factory-trained and authorized technician to perform system software modifications, upgrades, or changes.
   2. Provide use of all hardware, software, programming tools, and documentation necessary to modify fire alarm system software on-site.
   3. Modification includes addition and deletion of devices, circuits, zones, and changes to system operation and custom label changes for devices or zones.
   4. System structure and software shall place no limit on type or extent of software modifications on-site.
   5. Modification of software shall not require power-down of system or loss of system fire protection while modifications are being made.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store materials in clean, dry area indoors in accordance with manufacturer's instructions.

C. Handling: Protect materials from damage during handling and installation.

1.7 COORDINATION

A. Coordinate the Work of this section with the Work of other sections, including sprinkler systems as specified in Section _____, elevators as specified in Section _____, HVAC systems as specified in Section _____, and security/door locking systems as specified in Section _____ .

1.8 WARRANTY

A. Warranty Period for System Equipment: 3 years from date of final acceptance.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Gamewell-FCI, Honeywell Fire Systems, 12 Clintonville Road, Northford, Connecticut

06472. Phone (203) 484-7161. Fax (203) 484-7118. Website: <www.gamewell-fci.com>.

B. References to manufacturer's model numbers and other information is intended to establish minimum standards of performance, function, and quality. Equivalent equipment from Gamewell may be substituted for the specified equipment, as long as minimum standards are met. No other manufacturers, other than Gamewell-FCI, FCI, and Gamewell will be considered for use on this project.

C. Panel must communicate to the FocalPoint graphics workstation at the school maintenance office.

2.2 DISTRIBUTED NETWORKED FIRE ALARM SYSTEM

A. Distributed Networked Fire Alarm System: Gamewell-FCI E3 Series Expandable Emergency Evacuation Fire Alarm System.

2.3 INTELLIGENT NETWORK INCC COMMAND CENTER HARDWARE

A. Intelligent Network INCC Command Center (INCC): Supply user interface, including LCD or touch-screen 1/4 VGA display Intelligent Loop Interface Modules (ILI-MB-E3/ILI95-MB-E3), manual switching, phone, and microphone inputs to the network. INCC shall consist of the following units and components:

1. System Cabinet (B-, C-, or D-Size Cabinet) with associated inner door.
2. Power Supply Module (PM-9) with batteries.
3. Intelligent Network Interface Voice Gateway (INI-VG).
4. 80-Character LCD Display (LCD-E3).
5. Intelligent Loop Main Board Interface (ILI-MB-E3 or ILI95-MB-E3).
6. Optional Intelligent Loop Supplemental Interface (ILI-S-E3 or ILI95-S-E3).
7. Optional DACT (DACT-E3).
8. Optional ARCNET Repeater (RPT-E3) with fiber optic modules (FSL-E3 or FML-E3).
9. Optional 1/4 VGA touch-screen display (NGA).
10. Optional Auxiliary Switch Module (ASM-16).
11. Optional LED Driver Module (ANU-48)
12. Optional Microphone Assembly (INCC-MIC).
13. Optional Telephone Assembly (INCC-TEL).
14. Optional AM-50 Series amplifiers (AM-50, AM-50-70).
15. Optional Addressable Node Expander (ANX-SR, ANX-MR-FO, ANX-MR-UTP).

B. System Cabinet:

1. Surface or semi-flush mounted with texture finish.
2. Consist of back box, inner door, and door.
3. Available in at least 3 sizes to best fit project configuration.
4. Houses 1 or more PM-9 Power Supply Modules, INI-VG Intelligent Network Interface Voice Gateway, 1 or more ILI-MB-E3/ILI95-MB-E3 assemblies, and other

optional modules as specified.

5. Construction: Dead-front steel construction with inner door to conceal internal circuitry and wiring.
6. Wiring Gutter Space: A minimum of 1-inch wiring gutter space behind mounting plate.
7. Wiring: Terminated on removable terminal blocks to allow field servicing of modules without disrupting system wiring.

C. Power Supply Module (PM-9): Use latest technologies to provide system power, incorporates the following features:
   1. Power-saving switching technology using no step-down transformers.
   2. 9-amp continuous-rated output to supply up to all power necessary under normal and emergency conditions for INCC Command Center Modules.
   3. Integral battery charger with capacity to charge up to 55 amp-hour batteries while under full load.

D. Batteries:

   1. Sufficient capacity to provide power for entire system upon loss of normal AC power for a period of 24 hours with 15 minutes of alarm signaling at end of this 24-hour period, as required by NFPA 72, Local Systems.

E. Intelligent Network Interface Voice Gateway INCC Command Center (INI-VG): INI-VG shall be a multi-function board interchangeable in both INCC and INX. Functions of board shall have the following features as a minimum:
   1. Microprocessor shall monitor all system events and perform all system programs, for all control-by-event (CBE) functions. System program shall not be lost upon failure of both primary and secondary power. Programming shall supporting Boolean logic including AND, OR, NOT, TIMING functions for maximum flexibility.
   2. Network Interface: Operate at 625 K baud configurable with any combination of wire and/or fiber topologies. Interface shall communicate with up to122 nodes in peer-to-peer fashion.
   3. Fire Fighter Phone Riser: INI-VG shall generate local phone riser for use with AOM-TEL phone modules for connection to fire fighter phone stations and/or for connection of local phone when used as INCC Command Center, including phone circuits. INI-VG shall mix its local phone riser to network in true Class A fashion. Systems not capable of true Class A communications for fire fighter's phone risers shall not be acceptable.
   4. Advanced Processing: INI-VG shall incorporate latest in digital signaling processing technology with supporting Boolean logic including AND, OR, NOT, TIMING, COUNT, SCHEDULE functions.
   5. Microphone Input: On-board and allow for addition of local microphone when used as INCC Command Center, including speaker circuit control.
   6. Signal Processing: INCC shall use advanced Digital Signal Processing (DSP) technology to allow maximum flexibility of digital audio and control capabilities and

operation. Signals to and from INCC shall be transmitted over single pair of twisted unshielded wire or fiber optic pair.

7. Field Programmable: INCC shall be capable of being fully programmed or modified by Field Configuration Program (FCP), to be downloaded via portable computer from any node in system.
8. Control-by-Event Programming (CBE): INCC shall be capable of programming using Boolean logic including AND, OR, NOT, COUNT, TIMING, and SCHEDULE functions to provide complete programming flexibility.
9. Remote INCC Command Center Options: System shall have capability of adding remote INCC Command Centers or re-locating INCC Command Centers utilizing only single pair of twisted unshielded wire or fiber optic pair for all functions.
10. RS-485 Serial Output: System shall incorporate RS-485 bus via ribbon harness for connection of modules inside same cabinet, and via 4-wire quick connector for connection of modules up to 3,000 feet from cabinet.
11. Riser Wiring: All data, voice, and fire fighter phone riser shall transmit over single pair of twisted unshielded wire or fiber optic pair for all functions configured in Class A format. Any short or open in data, voice, or phone sections shall not affect transmission over remainder of network.
12. Class A Network: All communication between control panels and transponders shall be through supervised Style 7 token passing network. In event of single short, open, or ground, all system communication shall operate as normal and report fault. This protection shall incorporate all data, voice, and fire fighter phone transmissions. Upon single short, open, or ground of either system data, live voice, pre-recorded channels, or phone risers, the function of each of these items shall continue to operate. "Degrade" functionality shall not be acceptable. This shall be demonstrated at system acceptance.

F. LCD Display Module (LCD-E3):

1. LCD Display: 80-character RS-485 based textual annunciator with capability of being mounted locally or remotely. Provides audible and visual annunciation of all alarms and trouble signals. Provide dedicated LEDs for:
   a. AC Power On: Green.
   b. Alarm: Red.
   c. Supervisory: Yellow.
   d. System Trouble: Yellow.
   e. Power Fault: Yellow.
   f. Ground Fault: Yellow.
   g. System Silenced: Yellow.
2. 80-Character Alphanumeric Display: Provide status of all analog/addressable sensors, monitor and control modules. Display shall be liquid crystal type (LCD), clearly visible in dark and under all light conditions.
3. Panel shall contain 4 functional keys:
   a. Alarm Acknowledge.
   b. Trouble Acknowledge.
   c. Signal Silence.
   d. System Reset/Lamp Test.

4. Panel shall contain 3 configuration buttons:
   a. Menu/Back.
   b. Back Space/Edit.
   c. OK/Enter.
5. Panel shall have 12-key telephone-style keypad to permit selection of functions.

G. Intelligent Loop Interface (ILI-MB-E3/ILI95-MB-E3): System shall be of multiprocessor design to allow maximum flexibility of capabilities and operation. Intelligent Loop Interface shall be capable of mounting in stand-alone enclosure or integrated with Intelligent Network INCC Command Center (INCC) as specified.
   1. Field Programmable: System shall be capable of being programmed by Field Configuration Program (FCP), allowing programming to be downloaded via portable computer from any node on network.
   2. RS-232C Serial Output: Supervised RS-232C serial port shall be provided to operate remote printers and/or video terminals, accept downloaded program from portable computer, or provide 80-column readout of all alarms, troubles, location descriptions, time, and date. Communication shall be standard ASCII code operating from 1,200 to 115,200 baud rate.
   3. RS-485 Serial Output: Each ILI-MB-E3/ILI95-MB-E3 shall incorporate RS-485 bus via ribbon harness for connection of modules inside same cabinet, and via 4-wire quick connector for connection of modules up to 3,000 feet from cabinet. RS-485 bus shall support up to 16 ASM-16 auxiliary switch modules, 6 LCD-E3 main annunciators, and 5 LCD-7100 annunciators.
   4. Peer-to-Peer Panel Configuration: All Loop Interface Modules shall incorporate own programming, log functions, Central Processor Unit, and control-by-event (CBE) programming. If any loop becomes disabled, each remaining loop driver shall continue to communicate with remainder of network and maintain normal operation. "Degrade" configurations under these conditions shall not be acceptable.
   5. Control-by-Event (CBE) Program: ILI-MB-E3/ILI95-MB-E3 shall be capable of programming using Boolean logic including AND, OR, NOT, TIMING, COUNT, SCHEDULE functions to provide complete programming flexibility.
   6. Alarm Verification: Smoke detector alarm verification shall be standard option while allowing other devices such as manual stations and sprinkler flow to create immediate alarm. This feature shall be selectable for smoke sensors that are installed in environments prone to nuisance or unwanted alarms.
   7. Alarm Signals: All alarm signals shall be automatically latched or "locked in" at control panel until operated device is returned to normal and control panel is manually reset. When used for sprinkler flow, "SIGNAL SILENCE" switch may be bypassed, if required by AHJ.
   8. Electrically Supervised:
      a. Each SLC and NAC circuit shall be electrically supervised for opens, shorts, and ground faults. Occurrence of fault shall activate system trouble circuitry, but shall not interfere with proper operation of other circuits.
      b. Yellow "SYSTEM TROUBLE" LEDs shall light and system audible sounder shall steadily sound when trouble is detected in system. Failure of power,

open or short circuits on SLC or NAC circuits, disarrangement in system wiring, failure of microprocessor or any identification module, or system ground faults shall activate this trouble circuit. Trouble signal shall be acknowledged by operating "TROUBLE ACKNOWLEDGE" switch. This shall silence sounder. If subsequent trouble conditions occur, trouble circuitry shall resound. During alarm, all trouble signals shall be suppressed with exception of lighting yellow "SYSTEM TROUBLE" LEDs.

9. Drift Compensation - Analog Smoke Sensors: System software shall automatically adjust each analog smoke sensor approximately once each week for changes in sensitivity due to effects of component aging or environment, including dust. Each sensor shall maintain its actual sensitivity under adverse conditions to respond to alarm conditions while ignoring factors which generally contribute to nuisance alarms. System trouble circuitry shall activate, display "DIRTY DETECTOR" and "VERY DIRTY DETECTOR" indications and identify individual unit that requires maintenance.
10. Analog Smoke Sensor Test: System software shall automatically test each analog smoke sensor a minimum of 3 times daily. Test shall be recognized functional test of each photocell (analog photoelectric sensors) and ionization chamber (analog ionization sensors) as required annually by NFPA 72. Failure of sensor shall activate system trouble circuitry, display "Test Failed" indication, and identify individual device that failed.

11. Off-Premises Connection:

    a. Fire Alarm System: Connect via Digital Alarm Communicator Transmitter (DACT) and telephone lines to central station or remote station. Panel shall contain disconnect switch to allow testing of system without notifying fire department.

12. Central Station Option: Fire alarm control panel shall provide integral Digital Alarm Communicator Transmitter (DACT) for signaling to central station. DACT shall contain "Dialer-Runaway" feature preventing unnecessary transmissions as result of intermittent faults in system and shall be Carrier Access Code (CAC) compliant, accepting up to 20-digit central station telephone numbers. Fire department shall be consulted as to authorized central station companies serving municipality. Fire alarm system shall transmit both alarm and trouble signals, with alarm having priority over trouble signal. Contractor shall be responsible for all installation charges and Owner will be responsible for line lease charges.

13. Network Annunciator Option: Each ILI-MB-E3 or ILI95-MB-E3 and associated display shall provide option of being configured as network annunciator. Options for annunciation shall default as regional annunciator with capability of selecting global annunciation to provide system-wide protection and Acknowledge, Silence, and Reset capabilities.
14. Redundant History Log: Each ILI-MB-E3 or ILI95-MB-E3 shall contain full 4100 event history log supporting local and network functions. If a main processor or

network node is lost the entire log shall be accessible at any other Loop Interface board. This shall be demonstrated by removing power from INCC Command Center followed by extraction of history log from any loop driver location, including INCC Command Center or Transponder.

15. LEDs Indicator and Outputs: Each ILI-MB-E3/ILI95-MB-E3 Loop Interface shall incorporate as a minimum the following diagnostic LED indicators:
    a. Power: Green.
    b. Alarm: Red.
    c. Supervisory: Yellow.
    d. General Trouble: Yellow.
    e. Ground Fault: Yellow.
    f. Transmit: Green.
    g. Receive: Green.
16. Auxiliary Power Outputs: Each ILI-MB-E3/ILI95-MB-E3 Loop Interface shall provide the following supply outputs:
    a. 24 VDC non-resettable, 1 amp. maximum, power limited.
    b. 24 VDC resettable, 1 amp. maximum, power limited.
17. Microprocessor: Loop interface shall incorporate 32-bit RISC processor. Isolated "watchdog" circuit shall monitor microprocessor and upon failure shall activate system trouble circuits on display. Microprocessor shall access system program for all control-by-event (CBE) functions. System program shall not be lost upon failure of both primary and secondary power. Programming shall support Boolean logic including AND, OR, NOT, TIME DELAY functions for maximum flexibility.
18. Auto Programming: System shall provide for all SLC devices on any SLC loop to be pre-programmed into system. Upon activation of auto programming, only devices that are present shall activate. This allows for system to be commissioned in phases without need of additional downloads.
19. Environmental Drift Compensation: System shall provide for setting Environmental Drift Compensation by device. When detector accumulates dust in chamber and reaches unacceptable level but yet still below allowed limit, control panel shall indicate maintenance alert warning. When detector accumulates dust in chamber above allowed limit, control panel shall indicate maintenance urgent warning.
20. NON-FIRE Alarm Module Reporting: Non-reporting type ID shall be available for use for energy management or other non-fire situations. NON-FIRE point operation shall not affect control panel operation nor shall it display message at panel LDC. Activation of NON-FIRE point shall activate control by event logic, but shall not cause indication on control panel.
21. 1-Man Walk Test:
    a. System shall provide both basic and advanced walk test for testing entire fire alarm system. Basic walk test shall allow single operator to run audible tests on panel. All logic equation automation shall be suspended during test and while annunciators can be enabled for test, all shall default to disabled state. During advanced walk test, field-supplied output point programming shall react to input stimuli, such as CBE and logic equations. When points are activated in advanced test mode, each initiating event shall latch input. Advanced test shall be audible and shall be used for pull station verification,

magnet activated tests on input devices, input and output device, and wiring operation/verification.

b. Test feature is intended to provide for certain random spot testing of system and is not intended to comply with requirements of testing fire alarm systems in accordance with NFPA 72, as it is impossible to test all functions and verify items such as annunciation with only 1 person.

22. Signaling Line Circuits: Each ILI-MB-E3 module shall provide communication with analog/addressable (initiation/control) devices via 2 signaling line circuits. Each signaling line circuit shall be capable of being wired Class B, Style 4 or Class A, Style 6. Circuits shall be capable of operating in NFPA Style 7 configuration when equipped with isolator modules between each module type device and isolator sensor bases. Each circuit shall communicate with a maximum of 159 analog sensors and 159 addressable monitor/control devices. Unique 40-character identifier shall be available for each device. Devices shall be of the Velocity series with capability to poll 10 devices at a time with a maximum polling time of 2 seconds when both SLCs are fully loaded.
23. Notification Appliance Circuits: 2 independent NAC circuits shall be provided on ILI-MB, polarized and rated at 2 amperes DC per circuit, individually over current protected and supervised for opens, grounds, and short circuits. They shall be capable of being wired Class B, Style Y or Class A, Style Z.
24. Alarm Dry Contacts: Provide alarm dry contacts (Form C) rated 2 amps at 30 VDC (resistive) and transfer whenever system alarm occurs.
25. Supervisory Dry Contacts: Provide supervisory dry contacts (Form C) rated 2 amps at 30 VDC (resistive) and transfer whenever system supervisory condition occurs.
26. Trouble Dry Contacts: Provide trouble dry contacts (Form C) rated 2 amps at 30 VDC (resistive) and transfer whenever system trouble occurs.

H. Auxiliary Switch Module (ASM-16):
1. Each ASM-16 has 16 programmable push-button switches.
2. Each push-button switch has 3 associated status LEDs (red, yellow, and green), configurable to indicate any combination of functions.
3. Flexible switch configurations to allow flexible set-up of phone, speaker, and auxiliary function circuits.
4. An insertable label to identify function of each switch and LEDs combination.
5. Provide capability to communicate with up to 16 ASM-16 modules locally, up to 3,000 feet from INCC Command Center.
6. Specialty modules that only perform 1 task such as speaker, phone, or auxiliary shall not be acceptable.

I. Microphone Assembly: Include the following items:
1. Mounting cabinet which occupies 1 module location on inner door of INCC.
2. Interconnect cable for connection of microphone to INI-VG.
3. 1 noise canceling microphone with push-to-talk button.

J. Intelligent Network Interface Voice Gateway (INI-VG): INI-VG shall be a multi-function

board interchangeable in both INCC and INX. Functions of board shall include the following features as a minimum:

1. Network interface operating at 625 K baud configurable with any combination of wire and/or fiber topologies. Interface shall communicate with up to 122 total INCC, INX, and E3 and S3 control panels in peer-to-peer fashion.
2. Fire Fighter Phone Riser: INI-VG shall generate local phone riser for use with AOM-TEL phone modules for connection to fire fighter phone. INI-VG shall mix its local phone riser to network in true Style 7 fashion.
3. Signaling Line Circuit (SLC): INI-VG shall generate local SLC to communicate with and control up to 16 AOM-TEL modules and 32 AOM-2S or AOM-MUX circuits for fire phone interfacing and additional split-speaker circuits.
4. RS-485: Provide capability to communicate with up to 16 ASM-16 modules, when used in INX mode up to 3,000 feet.
5. Advanced Processing: INI-VG shall incorporate latest in digital signaling processing technology with supporting Boolean logic including AND, OR, NOT, TIME DELAY functions.
6. Voice Generation: INI-VG shall incorporate all processing to allow for 16 distinct pre-recorded messages used in priority fashion with message 1 as highest priority. Total length for 1 to 16 messages shall be up to 3 minutes.

K. Power Supply Module (PM-9): PM-9 power supply shall supply all power necessary under normal and emergency conditions. Power supply shall provide capacity to charge up to 55 amp-hour batteries while under full load. Technology used shall be of power-saving switching configuration, eliminating need of stepping transformer.

L. Audio Amplifier (AM-50): Include as a minimum, the following features:
   1. 50-watt switching audio amplifier:
      a. AM-50-25 amplifier produces $25V_{RMS}$ at 50 watts digital audio output.
      b. AM-50-70.7 amplifier produces $70V_{RMS}$ at 50 watts digital audio output.
   2. 2 individually addressable speaker circuits, each with capability of handling part or all of 50-watt supplied power.
   3. Power shall be 24 VDC supplied via terminal block from local PM-9 power supply.
   4. Ability to select from 1 of 16 pre-programmed messages in INI-VG, and paging from locally or from INCC Command Center.
   5. Back-up amplification configurable so 1 AM-50 can perform back-up or 3, or perform 1-to-1 back-up if configured to do so in programming.
   6. Status LEDs to indicate normal operation and trouble condition.

2.4 SUPPLEMENTAL NOTIFICATION APPLIANCE CIRCUIT (HPFF)

A. Supplemental Notification Appliance Circuit (HPFF) shall be Model HPFF8 offering up to 8.0 amps (8.0 amps continuous) of regulated 24-volt power. HPFF shall include the following features:
   1. Integral Charger: Charge up to 18.0 amp-hour batteries and support 60-hour standby.

2. 2 Input Triggers. Input trigger shall be Notification Appliance Circuit (from fire alarm control panel) or relay.
3. Surface-mount back box.
4. Ability to delay AC fail delay in accordance with applicable NFPA requirements.
5. Power limited circuitry in accordance with applicable UL standards.
6. Operates as sync follower or a sync generator.

2.5 SYSTEM PERIPHERALS - Velociti

A. Addressable Devices - General:
   1. Provide address-setting means using rotary-decimal switches.
   2. Use simple to install and maintain decade-type (numbered 0 to 9) address switches by using standard screwdriver to rotate 2 dials on device to set address. Devices which use binary address set via dipswitch packages, handheld device programmer, or other special tools for setting device address shall not be acceptable.
   3. Detectors: Analog and addressable. Connect to fire alarm control panel's Signaling Line Circuits.
   4. Addressable Thermal and Smoke Detectors: Provide 2 status LEDs. Both LEDs shall flash under normal conditions, indicating detector is operational and in regular communication with control panel, and both LEDs shall be placed into steady illumination by control panel, indicating alarm condition has been detected. If required, flashing mode operation of detector LEDs can be programmed off via fire control panel program.
   5. Fire Alarm Control Panel: Permit detector sensitivity adjustment through field programming of system. Sensitivity can be automatically adjusted by panel on time-of-day basis.
   6. Using software in INCC Command Center, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. Detectors shall be listed by UL as meeting calibrated sensitivity test requirements of NFPA 72, Chapter 7.
   7. Detectors shall be ceiling-mounted and shall include separate twist-lock base with tamper-proof feature.
   8. Following bases and auxiliary functions shall be available:
      a. Standard base with remote LED output.
      b. Sounder base rated at 85 dBA minimum.
      c. Form-C relay base rated 30 VDC, 2.0 A.
      d. Isolator base.
   9. Detectors shall provide test means whereby they will simulate alarm condition and report that condition to control panel. Such test shall be initiated at detector itself by activating magnetic switch or initiated remotely on command from control panel.
   10. Detectors shall store internal identifying type code that control panel shall use to identify type of device (ION, PHOTO, THERMAL).

B. Addressable Manual Stations (MS-7AF):

1. Manual Fire Alarm Stations: Non-code, non-break glass type, equipped with key lock so they may be tested without operating handle.
2. Operated Station: Visually apparent, as operated, at a minimum distance of 100 feet (30.5 m) from front or side.
3. Stations shall be designed so after actual activation, they cannot be restored to normal except by key reset.
4. Manual stations shall be constructed of Lexan with clearly visible operating instructions provided on cover. The word FIRE shall appear on front of stations in raised letters, 1.75 inches (44 mm) or larger.
5. Addressable manual stations shall, on command from control panel, send data to panel representing state of manual switch and addressable communication module status.

C. Intelligent Thermal Detectors (ATD-RL2F): Intelligent addressable devices rated at 135 degrees F (58 degrees C) and have rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. Connect via 2 wires to fire alarm control panel signaling line circuit.

D. Intelligent Photoelectric Smoke Detectors (ASD-PL2F): Use photoelectric (light-scattering) principal to measure smoke density and shall, on command from control panel, send data to panel representing analog level of smoke density. Provide intelligent, multi-criteria (smoke/CO) detectors in HVAC zones as called for on the drawings.

E. Intelligent Duct Smoke Detector Base (DNR, DNRW):
1. In-Duct Smoke Detector Housing: Use ASD-PL2F intelligent photoelectric detector, ASD-PL2FR intelligent remote test photoelectric detector or ASD-IL2F intelligent ionization detector, which provides continuous analog monitoring and alarm verification from panel.
2. When sufficient smoke is sensed, alarm signal is initiated, and appropriate action taken to shut down or change over air handling systems to help prevent rapid distribution of toxic smoke and fire gases throughout areas served by duct system.
3. Duct Smoke Detectors Mounted Above Ceiling or Otherwise Obstructed from Normal View: Provide an (RTS151KEY) Remote test station accessory, designed to test a remotely located Intelligent Duct Smoke detector with remote alarm indicator.
4. Each Detector: Install in either supply side or return side duct in accordance with local mechanical code.
5. DST Sampling Tube
    a. No tools needed for installation or removal
    b. Installs/removes from front or back of detector
    c. Available in 1 ft, 1.5ft, 3 ft, 5 ft, and 10 ft lengths

F. Addressable Dry Contact Monitor Modules (AMM-2F):
1. Provide to connect 1 supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to 1 of the fire alarm control panel SLCs.

2. Mount in standard deep electrical box.
3. IDC Zone: Suitable for Style B operation.

G. Addressable Relay Modules (AOM-2RF):
1. Provide two isolated sets of Form-C contacts, which operate as a double pole double throw switch. The module shall allow the control panel to switch these contacts on command. The module shall not provide supervision for the notification appliance circuit (NAC). Module shall have both normally open and normally closed connections available for field wiring.
2. Available for HVAC control and other building functions. Relay shall have 2 Form C sets of contacts that operate in tandem and are rated for a minimum of 2.0 amps resistive or 1.0 amps inductive. Relay coil shall be magnetically latched to reduce wiring connection requirements and to ensure 100 percent of all auxiliary relay or NACs shall be energized at same time on same pair of wires.
3. Mount in standard 4-inch (101.6-mm) square, 2-1/8-inch (54-mm) deep electrical box or to surface-mounted back box.
4. LEDs: Flash under normal conditions, indicating monitor module is operational and in regular communication with control panel.

2.6 SYSTEM PERIPHERALS - E3 SERIES

A. LCD Display Annunciator:
1. Furnish and install as indicated on the Drawings a remote serial annunciator, Model LCD-7100. Annunciator shall provide 80-character display, which shall duplicate all information on basic system display, including any network nodes its host panel is annunciating, with exception of menus. Contain the following function keys:
   a. Alarm Acknowledge.
   b. Trouble Acknowledge.
   c. Signal Silence.
   d. System Reset/Lamp Test.
   e. System Drill Test.
2. Key Lock: Enable switches only when placed in "ON" position, with exception of Trouble Acknowledge, which is used to silence local trouble audible sounder. Annunciator shall contain the following LEDs:
   a. Alarm.
   b. Supervisory.
   c. System Trouble.
   d. Power Fault.
   e. System Silenced.
3. Mount on standard 3-gang surface or flush electrical box.
4. Each ILI-MB-E3/ILI95-MB-E3: Accommodate up to 5 remote LCD-7100

annunciators which shall be located up to 3,000 feet from control panel.

B. Strobes:
   1. Compliance: ADA and UL 1971.
   2. Maximum Pulse Duration: 0.2 second.
   3. Strobe Intensity: UL 1971.
   4. Flash Rate: UL 1971.
   5. Strobe Candela Rating: Determine by positioning selector switch on back of device.

C. Speaker/Strobes:
   1. Operate on 25 VRMS or with field-selectable output taps from 0.5 to 2.0 watt
   2. Speakers in Corridors and Public Spaces: Produce nominal sound output of 84 dBA at 10 feet (3 m).
   3. Frequency Response: Minimum of 400 Hz to 4,000 Hz.
   4. Back of Each Speaker: Sealed to protect speaker cone from damage and dust.
   5. Audibility: NFPA 72.
   6. Maximum Pulse Duration: 0.2 second.
   7. Strobe Intensity: UL 1971.
   8. Flash Rate: UL 1971.
   9. Strobe Candela Rating: Determine by positioning selector switch on back of device.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas and surfaces to receive fire alarm system.
   1. Notify Architect of conditions that would adversely affect installation or subsequent use.
   2. Do not begin installation until unacceptable conditions are corrected.

3.2 INSTALLATION

A. Install fire alarm system in accordance with NFPA 72, NFPA 70, state and local codes, manufacturer's instructions, and as indicated on the Drawings.

B. Conceal conduit, junction boxes, and conduit supports and hangers in finished areas. Conceal or expose conduit, junction boxes, and conduit supports and hangers in unfinished areas.

C. Do not install smoke detectors before system programming and test period. If construction is ongoing during this period, take measures to protect smoke detectors from contamination and physical damage.

D. Flush-mount fire detection and alarm system devices, control panels, and remote

annunciators in finished areas. Flush-mount or surface-mount fire detection and alarm system devices, control panels, and remote annunciators in unfinished areas.

E. Ensure manual stations are suitable for surface mounting or semi-flush mounting as indicated on the Drawings. Install not less than 42 inches, nor more than 48 inches, above finished floor measured to operating handle.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Provide service of competent, factory-trained technician authorized by manufacturer to technically supervise and participate during pre-testing and acceptance testing of system.

B. Testing:
   1. Conduct complete visual inspection of control panel connections and test wiring for short circuits, ground faults, continuity, and insulation before energizing cables and wires.
   2. Close each sprinkler system control valve and verify proper supervisory alarm at INCC Command Center.
   3. Verify activation of flow switches.
   4. Open initiating device circuits and verify that trouble signal actuates.
   5. Open signaling line circuits and verify that trouble signal actuates.
   6. Open and short notification appliance circuits and verify that trouble signal actuates.
   7. Ground initiating device circuits and verify response of trouble signals.
   8. Ground signaling line circuits and verify response of trouble signals.
   9. Ground notification appliance circuits and verify response of trouble signals.
   10. Check alert tone and prerecorded voice message to alarm notification devices.
   11. Check installation, supervision, and operation of intelligent smoke detectors.
   12. Introduce on system each of the alarm conditions that system is required to detect. Verify proper receipt and proper processing of signal at INCC Command Center and correct activation of control points.
   13. Consult manufacturer's manual to determine proper testing procedures when system is equipped with optional features. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality, and similar.

C. Acceptance Testing:
   1. Before installation shall be considered completed and acceptable by AHJ, a complete test using as a minimum, the following scenarios shall be performed and witnessed by representative approved by Engineer. Monitoring company and/or fire department shall be notified before final test in accordance with local requirements.
   2. Contractor's job foreman, in presence of representative of manufacturer, representative of Owner, and fire department shall operate every installed device to verify proper operation and correct annunciation at control panel.

3. System shall be placed on battery power 24 hours before commencement of system testing. The system shall then be placed in an alarm condition for a 5 minute duration of all signal and control devices operating.
4. Open signaling line circuits and notification appliance circuits in at least 2 locations to verify presence of supervision.
5. Completely disconnect INCC Command Center from rest of network, including Voice INCC Command Center. Activate initiating device from transponder. All speaker circuits activated from each transponder shall transmit the correct evacuation or alert message. These messages shall be same messages transmitted with INCC Command Center activated. Default tones or messages shall not be acceptable.
6. Completely disconnect INCC Command Center from rest of network. Activate initiating device. All control outputs supported by transponder SLC circuits shall operate under project programming mode. Default or degrade mode programming shall not be acceptable.
7. Fire fighter phone riser shall be directly shorted between INCC Command Center and first transponder, followed by test of fire phones between INCC Command Center and farthest transponder. Phones shall operate in normal fashion.
8. All audio risers shall be directly shorted between INCC Command Center and first audio transponder, followed by activation of alarm initiating device. Correct pre-recorded messages shall transmit from all speakers, including evacuation and alert channels. Default or degrade messages shall not be acceptable.
9. When testing has been completed to satisfaction of both Contractor's job foreman and representatives of manufacturer and Owner, a notarized letter co-signed by each attesting to satisfactory completion of said testing shall be forwarded to Owner and fire department.
10. Leave fire alarm system in proper working order and, without additional expense to Owner, replace defective materials and equipment provided within 1 year (365 days) from date of final acceptance by the owner.

3.4 DEMONSTRATION

A. Provide instruction as required for operating fire alarm system.

B. Provide hands-on demonstrations of operation of fire alarm system components and functions.

END OF SECTION

FIRE ALARM REPLACEMENT
-FOR-
WILLOW BROOK ELEMENTARY SCHOOL

MAP OF THE AREA

SCALE: NONE

DRAWING INDEX

CODES:

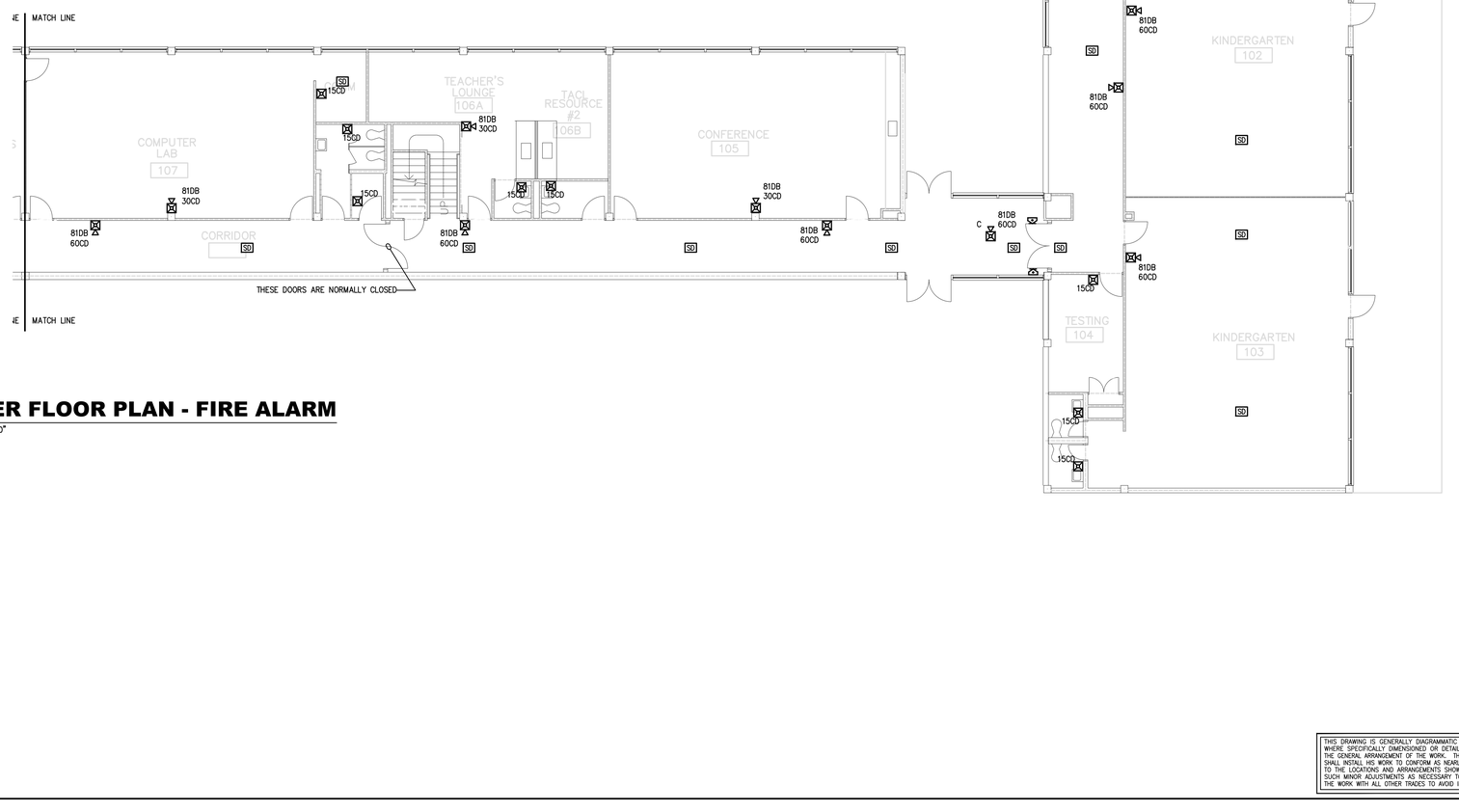
(a) International Building Code (IBC), 2012 edition, published by the International Code Council (ICC), except for:
1. Chapter 11 Accessibility; and,
2. Chapter 34, Section 3411 Accessibility For Existing Buildings;
(a) The International Fuel Gas Code (IFGC), 2012 edition, published by the International Code Council (ICC);
(b) The International Mechanical Code (IMC), 2012 edition, published by the International Code Council (ICC);
(c) The International Plumbing Code (IPC), 2012 edition, published by the International Code Council (ICC);
(d) The International Property Maintenance Code (IPMC), 2012 edition, published by the International Code Council (ICC);
(e) The International Fire Code (IFC), 2012 edition, published by the International Code Council (ICC);
(g) The International Energy Conservation Code (IECC), 2012 edition, published by the International Code Council (ICC), except that the provisions of the International Energy Conservation Code, 2006 edition

2012 NFPA 101 Life Safety Code.
2017 NEC NFPA 70.
2010 ADA
ALL WORK SHALL ALSO BE IN COMPLIANCE WITH NFPA 101 7.2.1.6.2

NOTES:

1. ALL REQUIRED DOCUMENTATION REGARDING THE DESIGN OF FIRE DETECTION, ALARM, AND COMMUNICATIONS SYSTEMS AND THE PROCEDURES FOR MAINTENANCE, INSPECTION, AND TESTING OF FIRE DETECTION, ALARM, AND COMMUNICATIONS SYSTEMS SHALL BE MAINTAINED AT AN APPROVED, SECURED LOCATION FOR THE LIFE OF THE SYSTEM.
2. THE FIRE ALARM CONTRACTOR MUST BE CERTIFIED IN ACCORDANCE WITH THE TENNESSEE ALARM CONTRACTORS LICENSING ACT OF 1991, TCA TITLE 62, AND CHAPTER 32 (CALL 615-741-9771 FOR ADDITIONAL INFORMATION).
3. THE FIRE ALARM CONTROL PANEL CIRCUIT DISCONNECTING MEANS SHALL HAVE A RED MARKING, SHALL BE ACCESSIBLE ONLY TO AUTHORIZED PERSONNEL, AND SHALL BE IDENTIFIED AS "FIRE ALARM CIRCUIT". THE LOCATION OF THE CIRCUIT DISCONNECTING MEANS SHALL BE PERMANENTLY IDENTIFIED AT THE FIRE ALARM CONTROL UNIT.

RICHARD ALAN CREECH
REGISTERED
PROFESSIONAL ENGINEER
No. 106405
STATE OF TENNESSEE



LOWER FLOOR PLAN - FIRE ALARM

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

GENERAL NOTES:
1. CONTRACTOR SHALL PLACE WITHIN 30' OF THE FIRST DUCT DIFFUSER OF EVERY GAS-FIRE HEATING UNIT (AIR OR WATER), AN ADDRESSABLE, COMBINATION CARBON MONOXIDE/PHOTO SMOKE DETECTOR. IF A SMOKE DETECTOR IS ALREADY SHOWN IN THE AREA, IT CAN BE EXCHANGED . THERE WILL BE AREAS THAT WILL REQUIRE AN ADDITIONAL COMBINATION DETECTOR TO MEET THE 30' LIMIT.
2. MANUAL PULL STATIONS HAVE BEEN REPLACED WITH SMOKE AMD HEAT DETECTORS PER LS 101, 15.3.4.2.3.1

KEYED NOTES:

(1) PROVIDE SMOKE DETECTOR IN ELEVATOR PIT AND TOP OF HOIST-WAY. COORDINATE RECALL FUNCTION WITH ELEVATOR CONTRACTOR. SUPPLY ADDRESSABLE RELAY MODULES IN QUANTITY AS REQUIRED FOR RECALL FUNCTIONS.

THIS DRAWING IS GENERALLY DIAGRAMMATIC AND, EXCEPT WHERE SPECIFICALLY DIMENSIONED OR DETAILED, INDICATES THE GENERAL ARRANGEMENT OF THE WORK. THE CONTRACTOR SHALL INSTALL HIS WORK TO CONFORM AS NEARLY AS POSSIBLE TO THE LOCATIONS AND ARRANGEMENTS SHOWN, WITH ONLY SUCH MINOR ADJUSTMENTS AS NECESSARY TO COORDINATE THE WORK WITH ALL OTHER TRADES TO AVOID INTERFERENCES.

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OAK RIDGE SCHOOLS — EXCELLENCE IN EDUCATION SINCE 1943 — TENNESSEE

WILLOW BROOK ELEMENTARY
FIRE ALARM UPGRADES

FLOOR PLAN - FIRE ALARM

RONALD ALAN CARTER — REGISTERED PROFESSIONAL ENGINEER — No. 104482 — STATE OF TENNESSEE

JOB NO:	120073
FILE:	
DRAWN:	SRH
DESIGNED:	SRH
APPROVED:	RAC
DATE:	2-4-21

REVISIONS:

E1

GENERAL NOTES:
1. CONTRACTOR SHALL PLACE WITHIN 30' OF THE FIRST DUCT DIFFUSER OF EVERY GAS-FIRE HEATING UNIT (AIR OR WATER), AN ADDRESSABLE, COMBINATION CARBON MONOXIDE/PHOTO SMOKE DETECTOR. IF A SMOKE DETECTOR IS ALREADY SHOWN IN THE AREA, IT CAN BE EXCHANGED . THERE WILL BE AREAS THAT WILL REQUIRE AN ADDITIONAL COMBINATION DETECTOR TO MEET THE 30' LIMIT.
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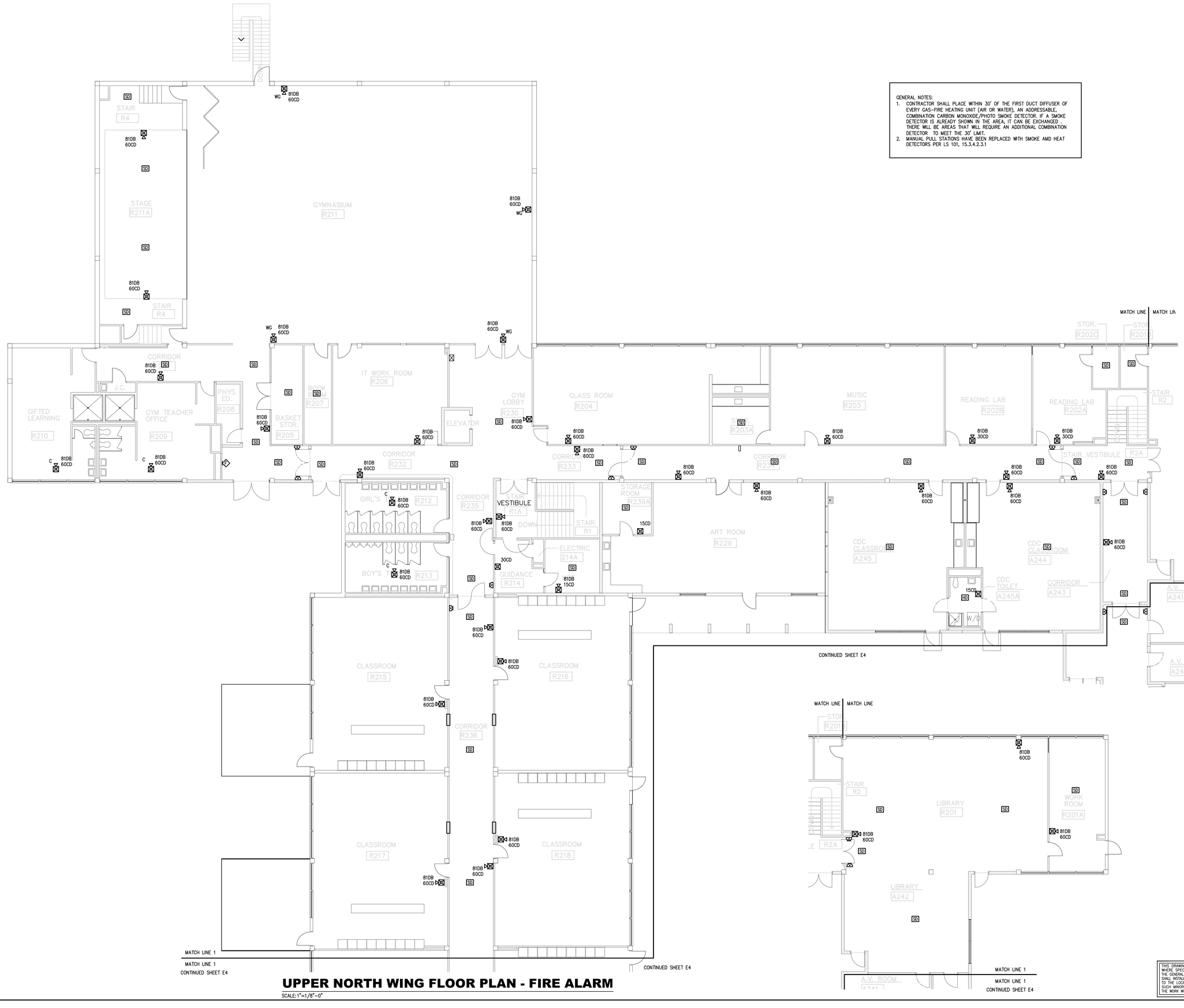

UPPER NORTH WING FLOOR PLAN - FIRE ALARM

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

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WILLOW BROOK ELEMENTARY FIRE ALARM UPGRADES

FLOOR PLAN - FIRE ALARM

RONALD ALAN CARTER — REGISTERED ENGINEER — No. 106402 — STATE OF TENNESSEE

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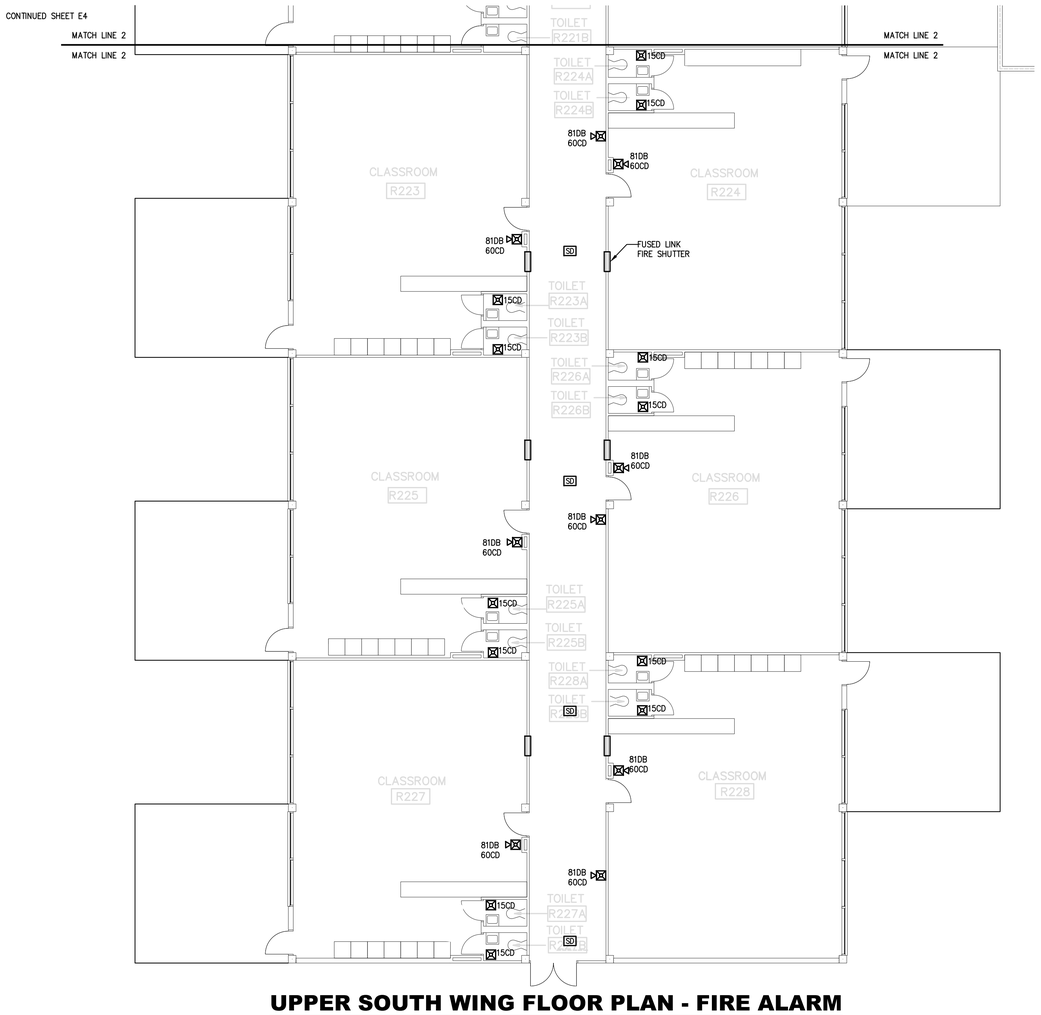
REVISIONS:

E2

GENERAL NOTES:
1. CONTRACTOR SHALL PLACE WITHIN 30' OF THE FIRST DUCT DIFFUSER OF EVERY GAS-FIRE HEATING UNIT (AIR OR WATER), AN ADDRESSABLE, COMBINATION CARBON MONOXIDE/PHOTO SMOKE DETECTOR. IF A SMOKE DETECTOR IS ALREADY SHOWN IN THE AREA, IT CAN BE EXCHANGED. THERE WILL BE AREAS THAT WILL REQUIRE AN ADDITIONAL COMBINATION DETECTOR TO MEET THE 30' LIMIT.
2. MANUAL PULL STATIONS HAVE BEEN REPLACED WITH SMOKE AMD HEAT DETECTORS PER LS 101, 15.3.4.2.3.1



UPPER SOUTH WING FLOOR PLAN - FIRE ALARM

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

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WILLOW BROOK ELEMENTARY
FIRE ALARM UPGRADES

FLOOR PLAN - FIRE ALARM

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DATE:	2-4-21

REVISIONS:

E3

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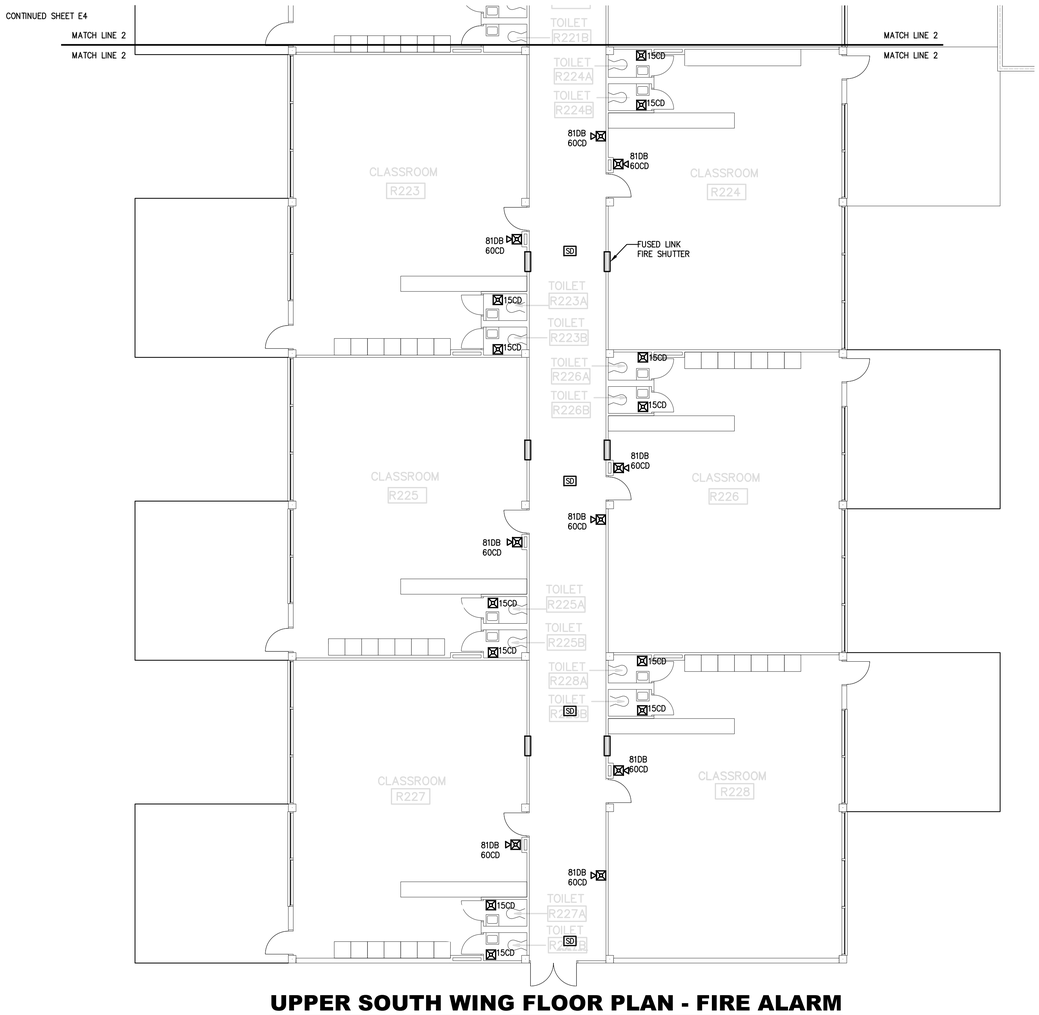

UPPER SOUTH WING FLOOR PLAN - FIRE ALARM

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

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FIRE ALARM UPGRADES

FLOOR PLAN - FIRE ALARM

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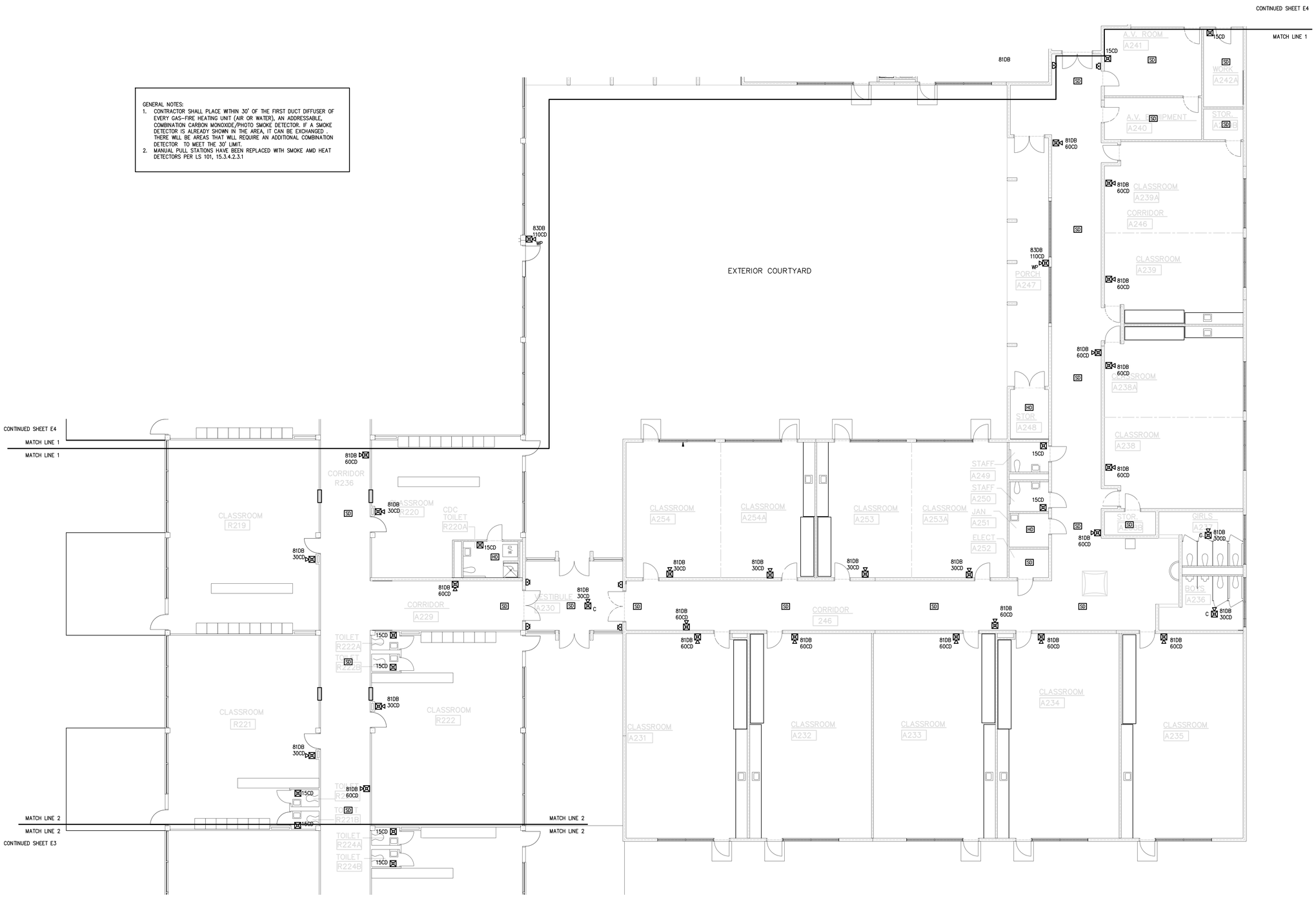

CLASSROOM ADDITION FLOOR PLAN - FIRE ALARM

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

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WILLOW BROOK ELEMENTARY FIRE ALARM UPGRADES

FLOOR PLAN - FIRE ALARM

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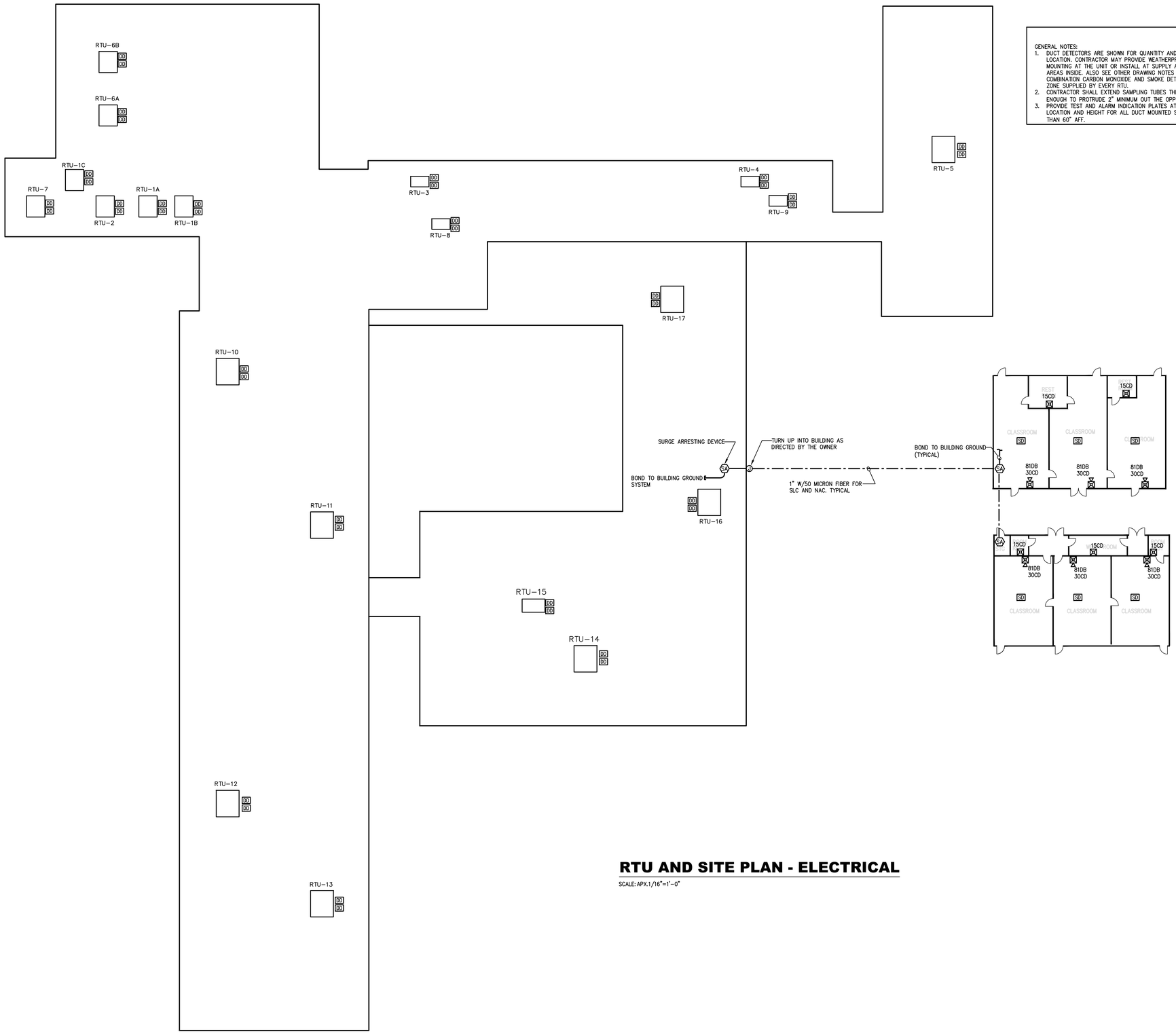
REVISIONS:

E4



GENERAL NOTES:
1. DUCT DETECTORS ARE SHOWN FOR QUANTITY AND GENERAL AREA OF LOCATION. CONTRACTOR MAY PROVIDE WEATHERPROOF ENCLOSURES FOR MOUNTING AT THE UNIT OR INSTALL AT SUPPLY AND RETURN DUCT IN THE AREAS INSIDE. ALSO SEE OTHER DRAWING NOTES FOR INCLUSION OF COMBINATION CARBON MONOXIDE AND SMOKE DETECTION DEVICES IN EACH ZONE SUPPLIED BY EVERY RTU.
2. CONTRACTOR SHALL EXTEND SAMPLING TUBES THE FULL WIDTH OF ALL DUCT, ENOUGH TO PROTRUDE 2" MINIMUM OUT THE OPPOSITE SIDE.
3. PROVIDE TEST AND ALARM INDICATION PLATES AT AN EASILY ACCESSIBLE LOCATION AND HEIGHT FOR ALL DUCT MOUNTED SMOKE DETECTORS. NO MORE THAN 60" AFF.

RTU AND SITE PLAN - ELECTRICAL

SCALE: APX.1/16"=1'-0"

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WILLOW BROOK ELEMENTARY
FIRE ALARM UPGRADES

FLOOR PLAN - FIRE ALARM

REGISTERED ENGINEER
RICHARD ALAN CARR
No. 108482
STATE OF TENNESSEE

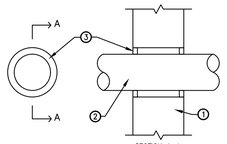
JOB NO:	120073
FILE:	
DRAWN:	SRH
DESIGNED:	SRH
APPROVED:	RAC
DATE:	2-4-21

REVISIONS:

SE1

SYSTEM NO. W-J-1156

F RATING – 2 HOUR
T RATING – 0 HOUR



SECTION A-A

1. WALL ASSEMBLY – MIN 6 IN. (152 MM) THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100–150 PCF OR 1600–2400 KG/M3) CONCRETE WALL. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. DIAM OF OPENING TO BE MIN 1/2 IN. (13 MM) TO MAX 4 IN. (102 MM) GREATER THAN OUTSIDE DIAM OF THROUGH–PENETRANT.

   SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.

2. THROUGH PENETRANTS – ONE METALLIC PIPE, CONDUIT OR TUBING CENTERED WITHIN OPENING. ANNULAR SPACE BETWEEN PENETRANT AND PERIPHERY OF OPENING TO BE MIN 1/4 IN. (6 MM) TO MAX 2 IN. (51 MM). PENETRANT TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL. THE FOLLOWING TYPES AND SIZES OF PENETRANTS MAY BE USED:

   A. STEEL PIPE – NOM 6 IN. (152 MM) DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.

   B. IRON PIPE – NOM 6 IN. (152 MM) DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.

   C. CONDUIT – NOM 4 IN. (102 MM) DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING (EMT) OR NOM 6 IN. (152 MM) RIGID STEEL CONDUIT.

   D. COPPER TUBING – NOM 3 IN. (76 MM) DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.

   E. COPPER PIPE – NOM 3 IN. (76 MM) DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.

3. FILL,VOID OR CAVITY MATERIAL* – SEALANT – MIN 5/8 IN. (16 MM) THICKNESS OF SEALANT APPLIED WITHIN ANNULUS, FLUSH WITH BOTH SURFACES OF WALL.

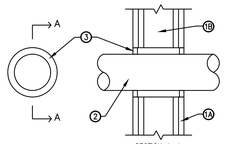
   *BEARING THE UL CLASSIFICATION MARK

   3M COMPANY – FB–1000 NS

   *BEARING THE UL CLASSIFICATION MARK

SYSTEM NO. W-L-1341

F RATING – 1 AND 2 HOUR (SEE ITEM 1)
T RATING – 0 HOUR



SECTION A-A

1. WALL ASSEMBLY – THE 1 OR 2 HR FIRE RATED GYPSUM BOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER DESCRIBED IN THE INDIVIDUAL U300 OR U400 SERIES WALL OR PARTITION DESIGN IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:

   A. STUDS – WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 IN. BY 4 IN. (51 MM BY 102 MM) LUMBER SPACED 16 IN. (406 MM) OC. STEEL STUDS TO BE MIN 3–1/2 IN. (89 MM) WIDE SPACED MAX 24 IN. (610 MM) OC.

   B. GYPSUM BOARD* – THE GYPSUM BOARD TYPE, THICKNESS, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES DESIGN IN THE UL FIRE RESISTANCE DIRECTORY. DIAM OF OPENING TO BE MIN 1/2 IN. (13 MM) TO MAX 4 IN. (102 MM) GREATER THAN OUTSIDE DIAM OF THROUGH–PENETRANT.

THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED.

2. THROUGH PENETRANTS – ONE METALLIC PIPE, CONDUIT OR TUBING CENTERED WITHIN OPENING. ANNULAR SPACE BETWEEN PENETRANT AND PERIPHERY OF OPENING TO BE MIN 1/4 IN. (6 MM) TO MAX 2 IN. (51 MM). PENETRANT TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL. THE FOLLOWING TYPES AND SIZES OF PENETRANTS MAY BE USED:

   A. STEEL PIPE – NOM 6 IN. (152 MM) DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.

   B. IRON PIPE – NOM 6 IN. (152 MM) DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.

   C. CONDUIT – NOM 4 IN. (102 MM) DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING (EMT) OR NOM 6 IN. (152 MM) RIGID STEEL CONDUIT.

   D. COPPER TUBING – NOM 3 IN. (76 MM) DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.

   E. COPPER PIPE – NOM 3 IN. (76 MM) DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.

3. FILL,VOID OR CAVITY MATERIAL* – SEALANT – MIN 5/8 IN. (16 MM) THICKNESS OF SEALANT APPLIED WITHIN ANNULUS, FLUSH WITH BOTH SURFACES OF WALL.

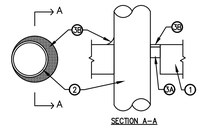
   *BEARING THE UL CLASSIFICATION MARK

   3M COMPANY – FB–1000 NS

   *BEARING THE UL CLASSIFICATION MARK

SYSTEM NO. C-AJ-1364

F RATING – 2 HOUR
T RATING – 0 HOUR
L RATING AT AMBIENT – LESS THAN 1 CFM/SQ. FT.
L RATING AT 400°F – 2 CFM/SQ. FT.
W RATING – CLASS I



SECTION A-A

1. FLOOR ASSEMBLY – MIN 4–1/2 IN. THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100–150 PCF) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX DIAM OF OPENING IS 25–7/8 IN.

   SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.

2. THROUGH PENETRANTS – ONE METALLIC PIPE, TUBING OR CONDUIT TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. THE ANNULAR SPACE BETWEEN TUBE AND PERIPHERY OF OPENING SHALL BE MIN 0 IN. TO MAX 1–7/8 IN. PENETRANTS TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, TUBING OR CONDUIT MAY BE USED:

   A. STEEL PIPE – NOM 24 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.

   B. IRON PIPE – NOM 24 IN. DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.

   C. CONDUIT – NOM 6 IN. DIAM (OR SMALLER) RIGID STEEL CONDUIT.

   D. CONDUIT – NOM 4 IN. (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING.

   E. COPPER TUBING – NOM 6 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBE.

   F. COPPER PIPE – NOM 6 IN. DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.

3. FIRESTOP SYSTEM – THE DETAILS OF THE FIRESTOP SYSTEM SHALL BE AS FOLLOWS:

   A. PACKING MATERIAL – MIN 3 IN. THICKNESS OF MIN 4 PCF MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.

   B. FILL,VOID OR CAVITY MATERIALS* – SEALANT – MIN 1/4 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH TOP SURFACE OF FLOOR. MIN 1/2 IN. DIAM BEAD OF CAULK APPLIED TO THE PENETRANT/CONCRETE INTERFACE AT THE POINT CONTACT LOCATION ON THE TOP SURFACE OF FLOOR.

      *BEARING THE UL CLASSIFICATION MARK

      3M COMPANY – FB–1000 NS, FB–1003 SL OR FB–3000 WT SEALANT.

      *BEARING THE UL CLASSIFICATION MARK

FIRESTOP DETAILS

SCALE: NONE

ELECTRICAL LEGEND

STANDARD ABBREVIATIONS AND NOTATIONS

A	AMPERE (AMPS)	KVA	KILOVOLT–AMPS	WP	WEATHERPROOF
AC	INDICATES DEVICE SHALL BE MOUNTED ABOVE COUNTERTOP	KW	KILOWATT	XFMR	TRANSFORMER
AFF	ABOVE FINISHED FLOOR	MCA	MINIMUM CIRCUIT AMPS		COMMUNICATION SYSTEMS NOTATIONS
AFG	ABOVE FINISHED GRADE	MCC	MOTOR CONTROL CENTER	2D	INDICATES QUANTITY OF DATA NETWORK CONNECTIONS TO BE INSTALLED AT AN ACCESS POINT.
AFI	ARC FAULT INTERRUPTER (AT OCT. BKR.)	MCM	1000 CIRCULAR MILS. SAME AS "KCMIL".	1T	INDICATES QUANTITY OF TELEVISION CONNECTIONS TO BE INSTALLED AT AN ACCESS POINT.
AIC	AMPS INTERRUPTING CURRENT	N	NEUTRAL	2D	INDICATES QUANTITY OF VOICE TELECHONE CONNECTIONS TO BE INSTALLED AT AN ACCESS POINT.
BKR	BREAKER	NIC	NOT IN CONTRACT	IC	INDICATES OUTLET OR FLOOR BOX SHALL BE PROVIDED WITH A STANDARD INTERCOM CONNECTION AND INTERCOM STATION.
C	CONDUIT	NL	NIGHT LIGHT. LUMINAIRE SHALL BE UNSWITCHED EXCEPT FOR CIRCUIT BREAKER.	ICA	INDICATES OUTLET OR FLOOR BOX SHALL BE PROVIDED WITH AN INTERCOM CONNECTION AND ADMINISTRATIVE INTERCOM STATION.
CKT	CIRCUIT	PC	INDICATES DEVICE IS CONTROLLED BY PHOTOCELL OR TIMECLOCK		EXISTING DEVICE NOTATIONS
CU	COPPER CONDUCTOR	PVC	POLYVINYLCHLORIDE CONDUIT. CLASSIFIED AS RIGID NONMETALLIC CONDUIT PER NEC. SCHEDULE 40 UON.	EX	EXISTING DEVICE TO REMAIN
DISC.	DISCONNECT	QR	INDICATES LUMINAIRE SHALL BE PROVIDED WITH QUARTZ RESTRIKE	EXM	EXISTING DEVICE TO BE MOVED TO NEW LOCATION SHOWN
DN	DOWN	SCCR	SHORT–CIRCUIT CURRENT RATING	EXR	EXISTING DEVICE TO BE REMOVED
EM	CONNECTED TO EMERGENCY POWER	TR	TAMPER RESISTANT		
EMT	ELECTRICAL METALLIC TUBING	UC	UNDER COUNTER. INDICATES DEVICE SHALL BE LOCATED BELOW THE COUNTERTOP.		
FLA	FULL LOAD AMPS	UON	UNLESS OTHERWISE NOTED		
G	GROUND (ALSO "GND")	V	VOLTS		
GFI	GROUND–FAULT CIRCUIT–INTERRUPTER (ALSO "GFCI")	W	WATTS		
GRS	GALVANIZED RIGID STEEL CONDUIT	WG	INDICATES DEVICE SHALL BE PROVIDED WITH WIRE GUARD		
HP	HORSEPOWER				
IMC	INTERMEDIATE METALLIC CONDUIT				
KCMIL	1000 CIRCULAR MILS. SAME AS "MCM".				

SYMBOL	DESCRIPTION
"FAP"	FIRE ALARM CONTROL PANEL – PROVIDED WITH BATTERY BACKUP PER NFPA REQUIREMENTS.
HD	FIRE ALARM AUTOMATIC HEAT DETECTOR – CEILING MOUNTED.
SD	FIRE ALARM AUTOMATIC SMOKE DETECTOR – CEILING MOUNTED.
K	FIRE ALARM REMOTE ANNUNCIATOR – MOUNT 54" AFF. EXTEND CONDUIT AND CONDUCTORS TO FIRE ALARM PANEL AND CONNECT.
F	FIRE ALARM MANUAL PULL STATION – MOUNT 48" ABOVE FINISHED FLOOR.
C	FIRE ALARM COMBINATION MULTI–TONE HORN/VISUAL UNIT – MOUNT 80" ABOVE FINISHED FLOOR BUT NO CLOSER THAN 6" TO CEILING. "C" INDICATES CEILING MOUNTED UNIT.
	FIRE ALARM STROBE UNIT – MOUNT 80" ABOVE FINISHED FLOOR BUT NO CLOSER THAN 6" TO CEILING. PROVIDE CANDELA RATING AS INDICATED ON THE DRAWINGS.
	MAGNETIC DOOR HOLD DEVICE. PROVIDE RELAYS AND POWER CIRCUITS AS REQUIRED.
	LCD ANNUNCIATOR
DD	FIRE ALARM DUCT MOUNTED SMOKE DETECTOR – PROVDE WITH CONTROLS, WIRING, AND CONDUIT TO SHUTDOWN UNIT UPON ALARM INDICATION. PROVIDE ENCLOSURE AND SAMPLING TUBE AS RECOMMENDED BY MANUFACTURER FOR THE DUCT INSTALLATION.
———	CONDUIT INSTALLED IN CEILING OR WALL CONSTRUCTION.
— — —	CONDUIT INSTALLED UNDERGROUND OR BELOW THE FLOOR CONSTRUCTION.
- - - - -	LOW–VOLTAGE WIRING INSTALLED ABOVE LAY–IN CEILING WITHOUT CONDUIT.

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TENNESSEE

WILLOW BROOK ELEMENTARY
FIRE ALARM UPGRADES

LEGEND AND DETAILS - FIRE ALARM

RONALD ALAN CARTER
REGISTERED ENGINEER
No. 109402
STATE OF TENNESSEE

JOB NO:	120073
FILE:	
DRAWN:	SRH
DESIGNED:	SRH
APPROVED:	RAC
DATE:	2–4–21

REVISIONS:

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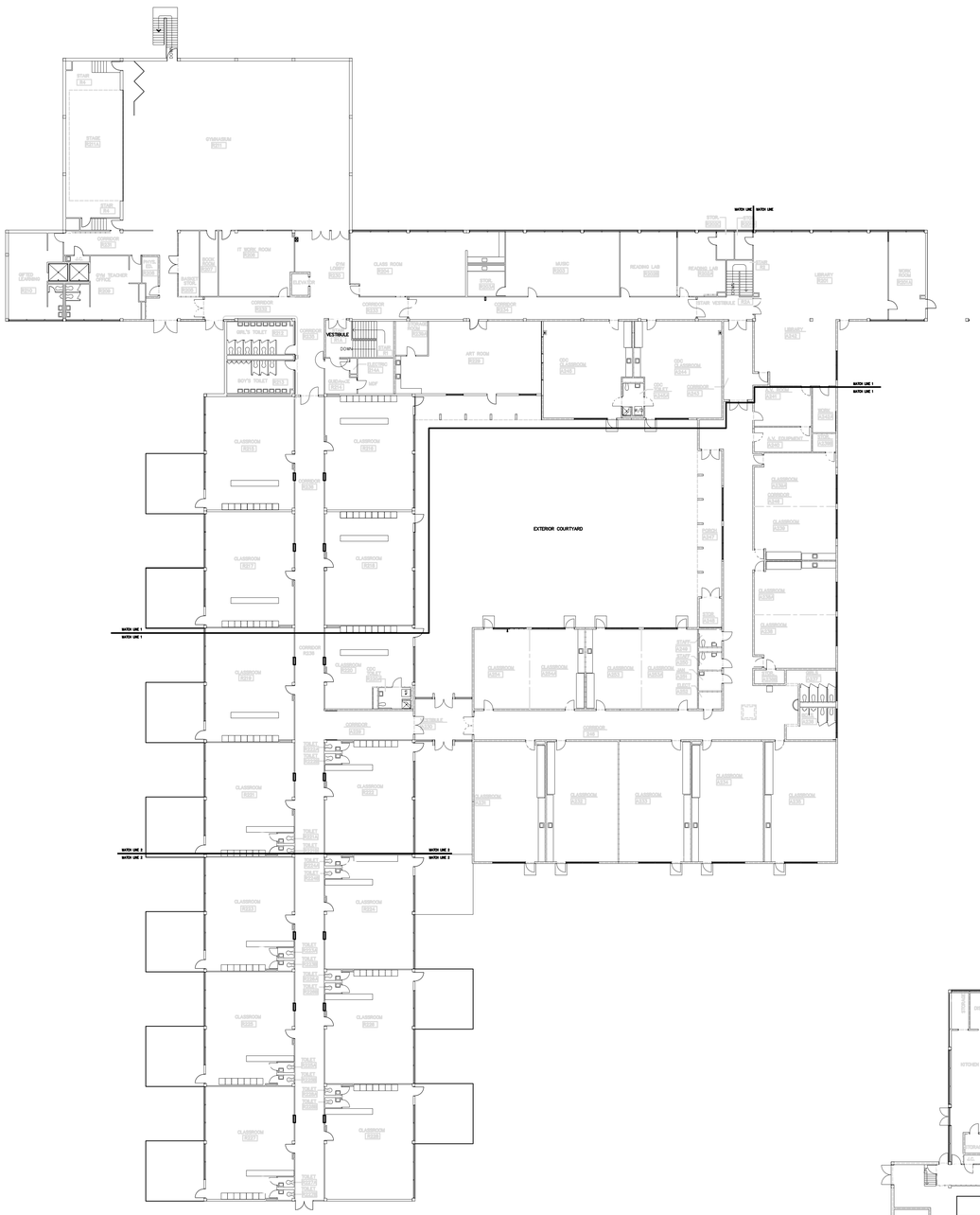
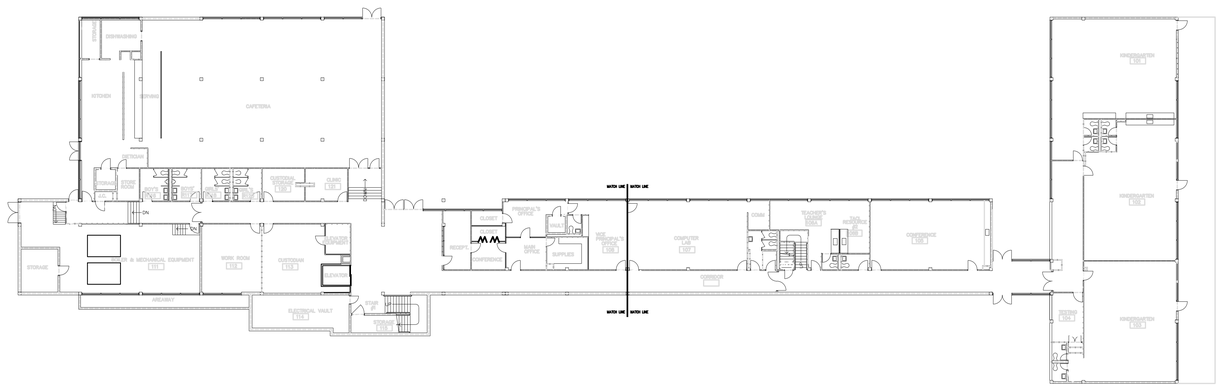


REFERENCE FLOOR PLAN - UPPER LEVEL

SCALE: APX. 1"=20'-0"



REFERENCE FLOOR PLAN - LOWER LEVEL

SCALE: APX. 1"=20'-0"

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REVISIONS:

THIS DRAWING IS GENERALLY DIAGRAMMATIC AND, EXCEPT WHERE SPECIFICALLY DIMENSIONED OR DETAILED, INDICATES THE GENERAL ARRANGEMENT OF THE WORK. THE CONTRACTOR SHALL INSTALL HIS WORK TO CONFORM AS NEARLY AS POSSIBLE TO THE LOCATIONS AND ARRANGEMENTS SHOWN, WITH ONLY SUCH MINOR ADJUSTMENTS AS NECESSARY TO COORDINATE THE WORK WITH ALL OTHER TRADES TO AVOID INTERFERENCES.

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