Business
Department
School Administration Building
304 New York Ave
Oak Ridge, Tennessee 37830
Phone (865) 425-9005
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 23-007) Jefferson Middle School Fire Alarm**.

General Requirements:

Proposals, bids, or responses will be accepted by the Oak Ridge Schools Business Department no later than **2:30 PM EDT, April 11, 2023.** 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: Jefferson Middle School Fire Alarm
(RFP 23-007)
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 7 Electrical Sections
Drawings – Cover sheet and 5 electrical drawings
Addendums – No addendums as of 3/7/2023

PLEASE NOTE:

FIRE ALARM SYSTEM MUST REMAIN OPERATIONAL FOR THE DURATION OF THE PROJECT.

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.

6. A copy of your W-9 should be included with bid documents.

7. Any questions should be directed to Mary Ann Riley via email: orspurchasing@ortn.edu

Schedule:

1. **A pre-bid walk through date for the project is set for March 29, 2023, at 3:30 PM EST. Interested parties are to meet at the entrance of Jefferson Middle School. Please meet at the front office. Address: 200 Fairbanks Rd., Oak Ridge, TN 37830.**

2. Sealed bids will be opened at the School Administration Building, 304 New York Avenue, Oak Ridge, TN 37830 at **2:30 PM EST April 11, 2023.**

3. **Project must be completed, inspected, and approved no later than December 31, 2023.**

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
Jefferson Middle Fire Alarm
RFP 23-007
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."

EDGAR Certification: The EDGAR certifications and provisions are required and applied when Oak Ridge Schools expends federal funds for any contract resulting from this procurement process. Pursuant to 2 C.F.R. § 200.326, all contracts, including small purchases, awarded by the District and the District's subcontractors shall contain the procurement provisions of Appendix II to Part 200, as applicable.

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-Boycott of Israel Affidavit: Concerning the Non-Boycott of Israel Act (TCA 12-4-1 et seq.), by submission of this bid/quote/proposal, each supplier and each person signing on behalf of any supplier certifies, and in the case of a joint bid/quote/proposal, each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief that each supplier is not boycotting Israel pursuant to TCA 12-4-1 and will not during the term of any award. Note: Applicable only to contracts of $250,000 or more and to suppliers with 10 or more employees.

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: **Jefferson Middle School Fire Alarm**
RFP 23-007

Bid Opening: **2:30 PM EDT, April 11, 2023**

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 23-007. 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_____,_____.

_____ _____

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.

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

EDGAR CERTIFICATIONS

ADDENDUM FOR AGREEMENT FUNDED BY U.S. FEDERAL GRANT

TO WHOM IT MAY CONCERN:

Oak Ridge Schools is in the process of ensuring that all policies and procedures involving the expenditure of federal funds are compliant with the new Education Department General Administrative Guidelines ("EDGAR"). Part of this process involves ensuring that all current vendors agree to comply with EDGAR. You must complete this form and return to Oak Ridge Schools along with your proposal.

The following certifications and provisions are required and apply when Oak Ridge Schools expends federal funds for any contract resulting from this procurement process. Pursuant to 2 C.F.R. § 200.326, all contracts, including small purchases, awarded by the District and the District's subcontractors shall contain the procurement provisions of Appendix II to Part 200, as applicable.

REQUIRED CONTRACT PROVISIONS FOR NON-FEDERAL ENTITY CONTRACTS UNDER FEDERAL AWARDS APPENDIX II TO 2 CFR PART 200

(A) Contracts for more than the simplified acquisition threshold currently set at $150,000, which is the inflation adjusted amount determined by the Civilian Agency Acquisition Council and the Defense Acquisition Regulations Council (Councils) as authorized by 41 U.S.C. 1908, must address administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as appropriate.

Pursuant to Federal Rule (A) above, when Oak Ridge Schools expends federal funds, Oak Ridge Schools reserves all rights and privileges under the applicable laws and regulations with respect to this procurement in the event of breach of contract by either party.

Does Vendor agree? YES _____ Initials of Authorized Representative of Vendor

(B) Termination for cause and for convenience by the grantee or subgrantee including the manner by which it will be effected and the basis for settlement. (All contracts in excess of $10,000)

Pursuant to Federal Rule (B) above, when Oak Ridge Schools expends federal funds, Oak Ridge Schools reserves the right to immediately terminate any agreement in excess of $10,000 resulting from this procurement process in the event of a breach or default of the agreement by Vendor in the event Vendor fails to: (1) meet schedules, deadlines, and/or delivery dates within the time specified in the procurement solicitation, contract, and/or a purchase order; (2) make any payments owed; or (3) otherwise perform in accordance with the contract and/or the procurement solicitation. Oak Ridge Schools also reserves the right to terminate the contract immediately, with written notice to vendor, for convenience, if Oak Ridge Schools believes, in its sole discretion that it is in the best interest of the District to do so. Vendor will be compensated for work performed and accepted and goods accepted by the District as of the termination date if the contract is terminated for convenience of the District. Any award under this procurement process is not exclusive and Oak Ridge Schools reserves the right to purchase goods and services from other vendors when it is in the District's best interest.

Does Vendor agree? YES _____ Initials of Authorized Representative of Vendor

(C) Equal Employment Opportunity. Except as otherwise provided under 41 CFR Part 60, all contracts that meet the definition of "federally assisted construction contract" in 41 CFR Part 60-1.3 must include the equal opportunity clause provided under 41 CFR 60-1.4(b), in accordance with Executive Order 11246, "Equal Employment Opportunity" (30 FR 12319, 12935, 3 CFR Part, 1964-1965 Comp., p. 339), as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and implementing regulations at 41 CFR part 60, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor."

Pursuant to Federal Rule (C) above, when Oak Ridge Schools expends federal funds on any federally assisted construction contract, the equal opportunity clause is incorporated by reference herein.

Does Vendor agree to abide by the above? YES _____ Initials of Authorized Representative of Vendor

(D) Davis-Bacon Act, as amended (40 U.S.C. 3141-3148). When required by Federal program legislation, all prime construction contracts in excess of $2,000 awarded by non-Federal entities must include a provision for compliance with the Davis-Bacon Act (40 U.S.C. 3141-3144, and 3146-3148) as supplemented by Department of Labor regulations (29 CFR Part 5, "Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction"). In accordance with the statute, contractors must be required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, contractors must be required to pay wages not less than once a week. The non-Federal entity must place a copy of the current prevailing wage determination issued by the Department of Labor in each solicitation. The decision to award a contract or subcontract must be conditioned upon the acceptance of the wage determination. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency. The contracts must also include a provision for compliance with the Copeland "Anti-Kickback" Act (40 U.S.C. 3145), as supplemented by Department of Labor regulations (29 CFR Part 3, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States"). The Act provides that each contractor or subrecipient must be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency.

Pursuant to Federal Rule (D) above, when Oak Ridge Schools expends federal funds during the term of an award for all contracts and subgrants for construction or repair, Vendor will be in compliance with all applicable Davis-Bacon Act provisions.

Does Vendor agree? YES _____ Initials of Authorized Representative of Vendor

(E)Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708). Where applicable, all contracts awarded by the non-Federal entity in excess of $100,000 that involve the employment of mechanics or laborers must include a provision for compliance with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

Pursuant to Federal Rule (E) above, when SAISD expends federal funds, Vendor certifies that Vendor will be in compliance with all applicable provisions of the Contract Work Hours and Safety Standards Act during the term of an award for all contracts by SAISD resulting from this procurement process.

Does Vendor agree? YES _____ Initials of Authorized Representative of Vendor

(F) Rights to Inventions Made Under a Contract or Agreement. If the Federal award meets the definition of "funding agreement" under 37 CFR §401.2 (a) and the recipient or subrecipient wishes to enter into a contract with a small business firm or nonprofit organization regarding the substitution of parties, assignment or performance of experimental, developmental, or research work under that "funding agreement," the recipient or subrecipient must comply with the requirements of 37 CFR Part 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," and any implementing regulations issued by the awarding agency.

Pursuant to Federal Rule (F) above, when federal funds are expended by Oak Ridge Schools, the vendor certifies that during the term of an award for all contracts by SAISD resulting from this procurement process, the vendor agrees to comply with all applicable requirements as referenced in Federal Rule (F) above.

Does Vendor agree? YES _____ Initials of Authorized Representative of Vendor

(G)Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended— Contracts and subgrants of amounts in excess of $150,000 must contain a provision that requires the non- Federal award to agree to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251- 1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

Pursuant to Federal Rule (G) above, when federal funds are expended by Oak Ridge Schools, the vendor certifies that during the term of an award for all contracts by Oak Ridge Schools member resulting from this procurement process, the vendor agrees to comply with all applicable requirements as referenced in Federal Rule (G) above.

Does Vendor agree? YES _____ Initials of Authorized Representative of Vendor

(H)Debarment and Suspension (Executive Orders 12549 and 12689)—A contract award (see 2 CFR 180.220) must not be made to parties listed on the government wide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), "Debarment and Suspension." SAM Exclusions contains the names of parties debarred, suspended, or otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

Pursuant to Federal Rule (H) above, when federal funds are expended by Oak Ridge Schools, the vendor certifies that during the term of an award for all contracts by Oak Ridge Schools resulting from this procurement process, the vendor certifies that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation by any federal department or agency.

Does Vendor agree? YES_____Initials of Authorized Representative of Vendor

(I) Byrd Anti-Lobbying Amendment (31 U.S.C. 1352)—Contractors that apply or bid for an award exceeding $100,000 must file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier must also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the non-Federal award.

(1) Pursuant to Federal Rule (I) above, when federal funds are expended by Oak Ridge Schools, the vendor certifies that during the term and after the awarded term of an award for all contracts by Oak Ridge Schools resulting from this procurement process, the vendor certifies that it is in compliance with all applicable provisions of the Byrd Anti-Lobbying Amendment (31 U.S.C. 1352). The undersigned further certifies that:

(2) No Federal appropriated funds have been paid or will be paid for on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of congress, or an employee of a Member of Congress in connection with the awarding of a Federal contract, the making of a Federal grant, the making of a Federal loan, the entering into a cooperative agreement, and the extension, continuation, renewal, amendment, or modification of a Federal contract, grant, loan, or cooperative agreement.

(3) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of congress, or an employee of a Member of Congress in connection with this Federal grant or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying", in accordance with its instructions.

(4) The undersigned shall require that the language of this certification be included in the award documents for all covered sub- awards exceeding $100,000 in Federal funds at all appropriate tiers and that all subrecipients shall certify and disclose accordingly.

Does Vendor agree? YES_____Initials of Authorized Representative of Vendor

EMPLOYMENT VERFICATION
FAR 22.18

As applicable, and as a condition for the award of any Federal contract at $50,000 or greater, Vendor certifies that vendor is enrolled in, and is currently participating in, E-Verify or any other equivalent electronic verification of work authorization program operated by the U.S. Department of Homeland Security and does not knowingly employ any person who is an unauthorized alien in conjunction with the contracted services. A breach in compliance with immigration laws and regulations shall be deemed a material breach of the contract and may be subject to penalties up to and including termination of the contract.

Does vendor agree? YES_____ Initials of Authorized Representative of vendor

RECORD RETENTION REQUIREMENTS FOR CONTRACTS INVOLVING FEDERAL FUNDS

When federal funds are expended by Oak Ridge Schools for any contract resulting from this procurement process, Vendor certifies that it will comply with the record retention requirements detailed in 2 CFR § 200.333. The Vendor further certifies that Vendor will retain all records as required by 2 CFR § 200.333 for a period of three years after grantees or subgrantees submit final expenditure reports or quarterly or annual financial reports, as applicable, and all other pending matters are closed.

Does Vendor agree? YES_____Initials of Authorized Representative of Vendor

CERTIFICATION OF COMPLIANCE WITH EPA REGULATIONS
APPLICABLE TO GRANTS, SUBGRANTS, COOPERATIVE AGREEMENTS, AND CONTRACTS
IN EXCESS OF $50,000 OF FEDERAL FUNDS

When federal funds are expended by Oak Ridge Schools, and/or its cooperative members, for any contract resulting from this procurement process in excess of $50,000, the vendor certifies that the vendor is in compliance with all applicable standards, orders, regulations, and/or requirements issued pursuant to the Clean Air Act of 1970, as amended (42 U.S.C. 1857(h)), Section 508 of the Clean Water Act, as amended (33 U.S.C. 1368), Executive Order 117389 and Environmental Protection Agency Regulation, 40 CFR Part 15.

Does Vendor agree? YES_____Initials of Authorized Representative of Vendor

CERTIFICATION OF COMPLIANCE WITH THE ENERGY POLICY AND CONSERVATION ACT

When Oak Ridge Schools expends federal funds for any contract resulting from this procurement process, Vendor certifies that it will comply with the mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 U.S.C. 6321 et seq.; 49 C.F.R. Part 18).

Does Vendor agree? YES_____ Initials of Authorized Representative of Vendor

CERTIFICATION OF COMPLIANCE WITH BUY AMERICA PROVISIONS

Vendor certifies that Vendor is in compliance with all applicable provisions of the Buy America Act. Purchases made in accordance with the Buy America Act must still follow the applicable procurement rules calling for free and open competition.

Does Vendor agree? YES_____ Initials of Authorized Representative of Vendor

CERTIFICATION OF ACCESS TO RECORDS — 2 C.F.R. § 200.336

Vendor agrees that the Inspector General of the District or any of their duly authorized representatives shall have access to any books, documents, papers and records of Vendor that are directly pertinent to Vendor's discharge of its obligations under the Contract for the purpose of making audits, examinations, excerpts, and transcriptions. The right also includes timely and reasonable access to Vendor's personnel for the purpose of interview and discussion relating to such documents.

Does Vendor agree? YES _____ Initials of Authorized Representative of Vendor

CERTIFICATION OF APPLICABILITY TO SUBCONTRACTORS

Vendor agrees that all contracts it awards pursuant to the Contract shall be bound by the foregoing terms and conditions.

Does Vendor agree? YES_____ Initials of Authorized Representative of Vendor

Vendor agrees to comply with all federal, state, and local laws, rules, regulations *and* ordinances, as applicable. It is further acknowledged that vendor certifies compliance with all provisions, laws, acts, regulations, etc. as specifically noted above.

Corporate/Company Name: _____

Authorized Signature: _____

Printed Name: _____

Title: _____

Date: _____

Address: _____

City, State, Zip Code: _____

Phone #: _____

Fax #: _____

Email Address: _____

Corporate/Company Website: _____

DUNS #: _____

CAGE#: _____

Oak Ridge Schools RFP #_____

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.

11. Connection of equipment.

12. Demolition of existing electrical systems.

13. Fire alarm system.

14. Sound system.

15. Computer system provisions and relocation of existing computer equipment.

16. Security and CCTV systems.

1.03 CODES AND STANDARDS:

A. The entire electrical installation shall be made in strict accordance with the requirements of any and all City, County, State or Federal codes of Law having jurisdiction, the requirements and recommendations of the Board of Fire Underwriters, including all amendments and/or additions to the said codes, laws, requirements, and recommendations, the requirements and recommendations of the local utility, the Owner, and the Standard Building Code Congress International, Inc. Standard Codes.

B. Should any work shown on the drawings or herein specified be construed as being contrary to or not conforming to the previously mentioned codes, laws, etc., the same shall be brought to the attention of the Designer or Owner's Representative to be reviewed, approved, and/or corrected prior to final bid date.

C. Should any work shown on the drawings or herein specified be more rigid as to requirements than the requirements of the various codes, the drawings and specifications shall be followed in executing the work.

D. The Contractor shall file with proper authorities all necessary drawings as required by various codes, laws, ordinances and/or other requirements.

E. Permits, inspections and fees: The Contractor shall obtain all permits and inspections required for the work, and shall pay all costs and fees thereof including the Power Company's contribution to construction costs.

1.04 RELATED PROJECT DOCUMENTS:

A. The complete set of project documents contain requirements that relate to the electrical construction work specified by the electrical specifications and illustrated by the electrical design drawings. All project documents shall be referenced and comformed with for the required electrical installation work. All specification section or subsection relates to all other sections or subsections. No specification section may be used as stand alone requirements.

1.05 QUALITY ASSURANCE:

A. Manufacturers: Firms regularly engaged in manufacture of electrical construction products of types required for this project, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer: A firm with not less than 5 years of successful experience in installation of products similar to those required for this project.

C. UL Compliance: Comply with applicable portions of UL safety standards pertaining to electrical equipment and installation required for this project.

D. NEC Compliance: Comply with NEC and NESC as applicable to installation of equipment and installation required for this project.

E. Comply with all current work safety rules and regulations as well as the owners safety requirements and regulations.

PART 2 - GENERAL ELECTRICAL REQUIREMENTS

2.01 REQUIREMENTS:

A. Drawings indicate the general character, scope, and arrangements of the electrical installation. Approval of any change or departure from the drawings must be obtained from the Designer or Owner’s Representative.

B. Equal Products: Those items on the drawings or in these specifications designating particular product numbers limit their use only as to design, workmanship and quality, not manufacturer. Approval for alternate or substitute items shall be secured from the Owner’s Representative, and submittals for approval must be accompanied by all necessary descriptions, catalog sheets, etc. Authority over such submittals shall rest with the Owner’s Representative.

C. Workmanship: All work shall be performed by skilled workmen in a manner reflecting the best modern construction practices. It shall present, upon completion, a neat, orderly, finished appearance. All evidence of debris associated with the work shall be removed from the premises. Conform to all OSHA workplace requirements.

D. Coordination with other trades to the fullest of ability in relation with others to result in a professional installation shall be complete, and more specifically, as follows:

1. The drawings and specifications are based on the best information available when prepared. Frequently minor changes occur with respect to the architectural plans, construction, and the requirements of equipment furnished by others. The electrical contractor shall recognize this in bidding, supervising, and in planning construction.

2. Before locating conduit runs, boxes, etc., the drawings shall be carefully checked to see that they are in accord with the electrical drawings. Required adjustments shall be made with the General Contractor's superintendent and with the Designer.

3. Before proceeding with the wiring for mechanical, owner furnished material and equipment trades, each item requiring electrical work shall be reviewed with those responsible for their installation. The electrical contractor shall become well acquainted with their characteristics, location and arrangement for mounting. Changes in wiring arrangements and other adjustments necessary or desirable shall be reviewed with the Owner's Representative for authorization. This applies also to all equipment for which wiring is required, such as HVAC units, water heating, pumps, thermostats, motors, pushbuttons, limit switches, fire protection systems, shop equipment, cooking equipment etc., as they occur.

E. Allowances for Contingencies: No change in contract price will be allowed for alternate work which requires approximately the same work to adjust or relocate electrical components or devices as part of the construction coordination work. An adequate allowance shall be included in the bid price for such coordination contingencies and for the additional work required by these coordination adjustments.

F. Record Drawings: The job supervisor shall maintain a set of prints on the job to be used to illustrate and note job changes as they occur. This shall include the locations of concealed or underground lines, and any other information necessary to record the

job as actually installed. Upon completion of the prints, the electrical contractor shall turn over these marked drawings and field notes to the Designer for developement of as-built documents.

G. Coordinate the proposed locations of major raceway systems, equipment, and materials. Include the following:

1. Clearances for servicing equipment, including space for equipment disassembly required for periodic maintenance. Comply with code requirements for working space about electrical equipment.

2. Exterior wall and foundation penetrations.

3. Fire-rated wall and floor penetrations.

4. Equipment connections and support details.

5. Sizes and location of required concrete pads and bases.

6. Scheduling, sequencing, movement, and positioning of large equipment into the building during construction.

7. Penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.

8. Coordinate and integrate ceiling installations, air outlets and inlets, light fixtures, communications systems components, sprinklers, and other ceiling-mounted devices.

H. Materials shall be new and unused and shall bear the Underwriters' Seal where applicable.

I. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.

J. Retain two sets of all equipment or device installation instructions and submit to the Owner’s Representative prior to project completion.

PART 3 - EXECUTION

3.01 ROUGH-IN:

A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected. Refer to individual equipment shop drawings prior to rough-in installation work.

B. Not Used

3.02 ELECTRICAL INSTALLATIONS

A. General: Sequence, coordinate, and integrate the various elements of electrical systems, materials, and equipment. Comply with the following requirements:

1. Coordinate electrical systems, equipment, and materials installation with other building components.

B. Verify all dimensions by field measurements.

C. Arrange for chases, slots, and openings in other building components during progress of construction, to allow for electrical installations.

D. Coordinate the installation of required supporting devices and sleeves to be set in poured-in-place concrete and other structural components, as they are constructed.

E. Sequence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the Work. Give particular attention to large equipment requiring positioning prior to closing in the building.

F. Where mounting heights are not detailed or dimensioned, install systems, materials, and equipment to provide the maximum headroom possible.

G. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

H. Install systems, materials, and equipment to conform with approved submittal data, including coordination drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Owner's Representative.

I. Install systems, materials, and equipment level and plumb, parallel and perpendicular to other building systems and components, where installed exposed in finished spaces.

J. Install electrical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.

K. Install systems, materials, and equipment giving right-of-way priority to systems required to be installed at a specified slope.

3.03 CUTTING AND PATCHING

A. General: Perform cutting and patching in a neat and workman like manner with appropriate industry standard materials.
   1. Perform cutting, fitting, and patching of electrical equipment and materials required to:

      a. Uncover Work to provide for installation of ill-timed Work.

      b. Remove and replace defective Work.

      c. Remove and replace Work not conforming to requirements of the Contract Documents.

      d. Remove samples of installed Work as specified for testing.

      e. Install equipment and materials in existing structures.

      f. Upon written instructions from the Owner's Representative, uncover and restore Work to provide for Owner's Representative observation of concealed Work.

2. Cut, remove, and legally dispose of selected electrical equipment, components, and materials as indicated, including but not limited to removal of electrical items indicated to be removed and items made obsolete by the new Work.

3. Protect the structure, furnishings, finishes, and adjacent materials not indicated or scheduled to be removed.

4. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.

5. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

B. Patch existing finished and disturbed new finished surfaces and building components using new materials matching existing materials and experienced Installers. Installers' qualifications refer to the materials and methods required or the surface and building components being patched.

3.04 TEST AND GUARANTEES:

A. The Contractor shall perform, prior to final acceptance, an operations test to all electrical equipment. The entire installation shall be free from grounds and short circuits. Before the Owner operates the equipment for the first time, the Contractor shall furnish a person familiar with the equipment to instruct and assist the Owner's personnel in the proper operation and maintenance of said equipment.

B. Warranty-Guarantee: The electrical contractor shall warrant that all work executed under this Division of the specifications will be free from defects in materials and workmanship for a period of one year from the date of final acceptance of the building. The above parties agree that they will, at their own expense, repair and replace all such defective work, and all other work damaged thereby, which becomes defective during the term of the warranty-guarantee.

3.05 PROTECTION OF MATERIALS:

A. All work, fixtures, and materials shall be protected at all times. Fixtures and equipment shall be tightly covered and protected against dirt, water, chemical, or

mechanical injury. At final completion, all work shall be thoroughly cleaned and delivered in an unblemished condition.

B. The Contractor shall defer the installation of all electrical fixtures liable to damage until authorized by the Owner's Representative. After fixtures are permanently installed, they shall be completely protected against breaking, damage, or the depositing of any waste or materials therein or thereon until the system is accepted.

C. Touch up all damaged painted surfaces on equipment to match original paint.

3.06 SHOP DRAWINGS AND MAINTENANCE MANUALS:

A. Shop Drawings: Furnish quantity, in accordance with Division I requirements, shop drawings and wiring diagrams for the following:

1. Acess control/IDS system

B. Materials and Equipment Submittals: Furnish catalog sheets or cuts for all items above, and submit catalog data of the following:

1 All access control and IDS system devices.

2. Fire stop assemblies.
3. Software

C. Furnish all equipment submittals in one package to Engineer for approval. All partial submittals will be rejected, or will be held unchecked until submittals are complete.

D. Maintenance Manuals: Upon completion of the work, deliver to the Designer for the Owner's use, two copies each of complete operation and maintenance instructions and data for the electrical equipment furnished under the electrical contract work . Data shall include catalog pages or data sheets for each piece of equipment, wiring diagrams showing the internal and external elements and their connections, manufacturer's maintenance manuals, bills of materials showing necessary data for ordering repair parts, and approved shop drawings. This information shall be furnished for the following systems and items.

1. Access control and IDS systems equipment
2. Software

3.07 WORK IN CONNECTION WITH EQUIPMENT FURNISHED BY OTHERS:

A. Owner Furnished: Furnish power wiring and connections to all equipment furnished by others and shown on the plans.

3.08 TEMPORARY WIRING

A. The installation of the temporary wiring shall comply with the current codes and rulings of the local inspector. All breakers serving receptacle outlets shall have ground fault protection.

B. In renovation construction, maintain the existing lighting and power systems as required for temporary power or provide temporary wiring and lighting in accordance with (A.) above.

END OF SECTION 26 05 00

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:

1. Wire and Cable:
   Advance Wire and Cable, Inc.
   General Cable Corp.
   Rome Cable Corp.
   Southwire

2. Connectors:
   AMP, Inc.
   Burndy Corp.
   Ideal Industries, Inc.

2.02 WIRE, CABLE, AND CONNECTORS:

A. General: Except as otherwise indicated, provide wire, cable and connectors of manufacturer's standard materials, as indicated by published product information; designed and constructed as recommended by manufacturer, and as required for the installation.

B. Wire: Provide factory-fabricated copper conductor, wire of sizes, ratings, materials, and types indicated for each service. Where type is not indicated, provide proper selection as determined by Installer to comply with project's installation requirements and NEC standards. Power wiring of different voltages shall not be allowed to be run in the same raceway, junction box, or wireway. Conductor colors for ungrounded conductors in 480Y/277 volt systems shall be brown, orange, and yellow. Conductor colors for ungrounded conductors in 208Y/120 volt systems shall be red, blue, and black.

C. Connectors: Provide factory-fabricated, metal connectors of sizes, ratings, materials, types and classes as indicated for each service. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements and NEC standards. All wire nuts shall be twist-on type. Non-twist-on type wire nuts shall not be allowed.

PART 3 - EXECUTION:

3.01 INSTALLATION:

A. General: Install electrical cables, wires and connectors as indicated, in compliance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in accordance with recognized industry practices as well as owner's requirements..

B. Coordinate cable and wire installation work with electrical raceway and equipment installation work, as necessary for proper interface.

C. Pull conductors together where more than one is being installed in a raceway.

D. Use pulling compound or lubricant, where necessary; compound must not deteriorate conductor or insulation.

E. Use pulling means, including fish tape, cable or rope which cannot damage raceway.

F. Install exposed cable, parallel and perpendicular to surfaces or exposed structural members and follow surface contours, where possible.

G. Keep conductor splices to minimum.

H. Install splices and taps which have mechanical strength. Current and insulation rating shall be equivalent-or-better than conductor. All splices shall be compression type with cold shrink wrap and taped.

I. Use splice and tap connectors which are compatible with conductor material.

3.02 FIELD QUALITY CONTROL:

A. Prior to energization, test cable and wire for continuity of circuitry, and also for short circuits. Correct malfunctions when detected.

B. Subsequent to wire and cable hook-ups, energize circuitry and demonstrate functioning in accordance with requirements.

C. Use THHN/THWN stranded for all field motor and control work. Use solid copper only for building branch wiring circuits at size No. 12 and No. 10. All other wiring shall be class and type approved for the applications.

END OF SECTION 26 05 19

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.

I. Provide the electrical installation of all control devices, including 115-volt, 1-phase firestats, mount all electrical equipment non-furnished as an integral part of the equipment, all control and power conduit, wiring, disconnect switches, etc., to make the installation. The mechanical section shall furnish all control devices for HVAC and plumbing systems.

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:

3-M Corp.
AMP Products Corp.
Appleton Electric Co.
Burndy Corp.
Ideal Industries, Inc.
T and B/Thomas and Betts Corp.

2.02 MATERIALS AND COMPONENTS:

A. General: For each electrical connection indicated, provide complete assembly of materials, including but not necessarily limited to, pressure connectors, terminals (lugs), electrical insulating tape, electrical solder, electrical soldering flux, heat-shrinkable insulating tubing, cable ties, solderless wire nuts, and other items and accessories as needed to complete splices and terminations of types indicated.

B. Metal Conduit, Tubing and Fittings: Provide metal conduit, tubing and fittings of types, grades, sizes and weights (wall thicknesses) indicated for each type service. Where types and grades are not indicated, provide proper selection as determined by Installer to fulfill wiring requirements; comply with NEC requirements for raceways. Provide products complying with Electrical Work basic materials and methods section "Raceways", and in accordance with the raceway material required for the project.

C. Wire, Cable, and Connectors: Provide wires, cables, and connectors complying with Electrical Work basic materials and methods section "Wires and Cables".

D. Wire: Unless otherwise indicated, provide wires/conductors for electrical connections which match wires/conductors of wiring supplying power.

E. Connectors and Terminals: Provide electrical connectors and terminals as recommended by connector and terminal manufacturer for intended applications.

F. Electrical Connection Accessories: Provide electrical insulating tape, heat-shrinkable insulating tubing and boots, solder, electrical soldering flux, wire nuts and cable ties as recommended for use by accessories manufacturers for type services indicated.

PART 3 - EXECUTION

3.01 INSTALLATION OF ELECTRICAL CONNECTIONS:

A. Install electrical connections as indicated; in accordance with connector manufacturer's written instructions and with recognized industry practices, and complying with requirements of NEC and NECA's "Standard of Installation" to ensure that products fulfill requirements.

B. Connect electrical power supply conductors to equipment conductors in accordance with equipment manufacturer's written instructions and wiring diagrams. Wherever possible, mate and match conductors of electrical connections for proper interface between electrical power supplies and installed equipment.

C. Coordinate installation of electrical connections for equipment with equipment installation work.

D. Cover splices with electrical insulation equivalent to, or of higher rating, than insulation on conductors being spliced.

E. Prepare cables and wires. by cutting and stripping covering armor, jacket, and insulation properly to ensure uniform and neat appearance where cables and wires are terminated.

F. Trim cables and wires as short as practicable and arrange routing to facilitate inspection, testing and maintenance.

G. Tighten wire-binding connector screws firmly.

H. Provide flexible conduit for motor connections, and for other electrical equipment connections where subject to movement and vibration.

I. Provide liquid-tight metallic flexible conduit for connection of motors and for other electrical equipment where subject to movement and vibration, and also where subjected to one or more of the following conditions:

Exterior location.
Moist or humid atmosphere where condensate can be expected to accumulate.
Corrosive atmosphere.
Subjected to water spray.
Subjected to dripping oil, grease, or water.

J. Refer to basic electrical requirements section for identification of electrical power supply conductor terminations with markers approved as to types, colors, letter and marker sizes, by Designer. Affix markers at each point of termination, as close as possible to each point of connection.

END OF SECTION 26 05 20

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.

B. Provide connectors, fittings, accessories and installation tools suitable for the product and application.

C. Install conduit systems complying with manufacturers' published product information.

D. Minimum conduit system shall be electrical metallic tubing except as otherwise noted.

E. Minimum size conduit shall be 3/4 inch except for single receptacles or switch leg drops.

2.02 WIREWAYS:

A. General: Provide electrical raceways of types, grades, sizes, weights (wall thicknesses), number of channels, for each type service indicated. Provide complete assembly of raceway including, but not necessarily limited to, couplings, offsets, elbows, expansion joints, adapters, holddown straps, end caps, and other components and accessories as needed for complete system. Where types and grades are not indicated, provide proper selection as determined by Installer to fulfill wiring requirements, and comply with applicable provisions of NEC for electrical raceways.

2.03 ELECTRICAL (50-V OR HIGHER) SURFACE MOUNTED RACEWAY

A. Provide metal one-piece surface mounted raceway, Wiremold Company or approved equal. Raceway shall be permanently attached using 2-hole straps designed for use with the raceway. Area of raceway shall meet NEC requirements for the conductors installed. Raceway containing more than one circuit shall be equivalent in area to 3/4 inch conduit. Boxes and fittings shall be metal and shall be provided as required to meet the applications.

B. Surface mounted raceway shall be used where raceways are exposed in finished areas such as offices, classrooms, assembly areas, conference room and other similar spaces. EMT conduit is acceptable in other areas.

C. All raceway shall be installed plumb and level. Surface mounted raceways shall be used for runs to surface mounted receptacles.

2.04 POWER POLES

A. Power poles shall be two compartment aluminum construction. Pole shall extend to the structural ceiling and be attached to structure as required by the pole manufacturer. The communications compartment shall allow for a minimum of a 1 inch bending radius. Surface mounted faceplates shall be installed on pole as indicated on the contract documents. Wiremold 25DTP-4 or equal.

PART 3 - EXECUTION

3.01 INSTALLATION OF ELECTRICAL RACEWAYS:

A. Install electrical raceways where indicated; in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA "Standard of Installation", and complying with recognized industry practices.

B. Coordinate with other work including metal and concrete deck work, as necessary to interface installation of electrical raceways and components with other work.

C. Level and square raceway runs, and install at proper elevations/heights.

D. Complete installation of electrical raceways before starting installation of cables/wires within raceways.

E. Install flexible conduit for motor connections, and for other electrical equipment connections where subject to movement and vibration.

F. Install liquid-tight flexible conduit for connection of motors and for other electrical equipment where subject to movement and vibration, and also where subjected to one or more of the following conditions:

Exterior location.
Moist or humid atmosphere where condensate can be expected to accumulate.
Subjected to water spray.
Subjected to dripping oil, grease, or water.

G. Wherever possible, install horizontal raceway runs above water and steam piping.

H. Provide secure fastening and support of conduit systems from the building structural system using materials manufactured for the intended application.

I. Support conduit runs in accordance to seismic code requirements.

END OF SECTION 26 05 33

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.

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

Appleton Electric Co.
Crouse-Hinds Co.
RACO, Inc.
Steel City/Midland-Ross Corp.

C. Weatherproof Outlet Boxes: Provide corrosion-resistant cast-metal weatherproof outlet wiring boxes, of types, shapes and sizes, including depth of boxes, with threaded conduit ends, cast-metal face plates with springhinged waterproof caps suitably configured for each application, including face plate gaskets and corrosion-resistant fasteners.

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

Appleton Electric Co.
Crouse-Hinds Co.
O-Z/Gedney Co.

E. Junction and Pull Boxes: Provide galvanized code-gage sheet steel junction and pull boxes, with screw-on covers; of types, shapes and sizes, to suit each respective location and installation; with welded seams and equipped with stainless steel nuts, bolts, screws, and washers.

F. Available Manufacturers: Subject to compliance with requirements, manufacturers offering junction and pull boxes which may be incorporated in the work include, but are not limited to, the following:

Appleton Electric Co.
Crouse-Hinds Co.
O-Z/Gedney Co.
Spring City Elect Mfg Co.

G. Conduit Bodies: Provide galvanized cast-metal conduit bodies, of type, shapes and sizes, to suit respective locations and installation, construct with threaded-conduit-entrance ends, removable covers, and corrosion-resistant screws.

H. EMT Fittings: Use steel compression connectors.

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

Appleton Electric Co.
Crouse-Hinds Co.
Thomas & Betts Co., Inc.

J. Bushings, Knockout Closures and Locknuts: Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts and malleable iron conduit bushings, offset connectors, of types and sizes to suit respective uses and installation.

K. Available Manufacturers: Subject to compliance with requirements, manufacturers offering bushings, knockouts closures, locknuts, and connectors which may be incorporated in the work include, but are not limited to, the following:

O-Z/Gedney Co.
RACO, Inc.
Steel City/Midland-Ross Corp.
Thomas and Betts Co., Inc.

PART 3 - EXECUTION

3.01 INSTALLATION OF ELECTRICAL BOXES AND FITTINGS:

A. General: Install electrical boxes and fittings where indicated, complying with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation", and in compliance with recognized industry practices to ensure that products fulfill requirements.

B. Coordinate installation of electrical boxes and fittings with wire/cable and raceway installation work.

C. Provide knockout closures to cap unused knockout holes where blanks have been removed.

D. Install boxes and conduit bodies in those locations to ensure ready accessibility of electrical wiring.

E. Avoid using round boxes where conduit must enter box through side of box, which would result in difficult and insecure connections when fastened with locknut or bushing on rounded surface.

F. Fasten boxes rigidly to substrates or structural surfaces to which attached, or solidly embedded electrical boxes in concrete or masonry.

G. Provide electrical connections for installed boxes.

H. Use cast metal outlets and device boxes for all exposed work outside.

I. Ground all metallic junction boxes by bonding to the system raceway grounding conductor. Ground the yoke or frame of all box mounted devices.

END OF SECTION 26 05 34

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.

B. Cable/Conductor Identification Bands: Provide manufacturer's standard vinyl-cloth self-adhesive cable/conductor markers of wrap-around type; either prenumbered plastic coated type, or write-on type with clear plastic self-adhesive cover flap; numbered to show circuit identification. Provide markers for all field control wiring.

C. Self-Adhesive Plastic Signs: Provide manufacturer's standard, self-adhesive or pressure-sensitive, pre-printed, flexible vinyl signs for operational instructions or warnings; of sizes suitable for application areas and adequate for visibility, with proper wording for each application (as examples: 208V, EXHAUST FAN).

1. Colors: Unless otherwise indicated or required by governing regulations, provide orange signs with black lettering.

2. Mark the identification of all disconnect switches.

D. Engraved Plastic-Laminate Signs: Provide engraving stock melamine plastic Laminate, complying with FS L-P-387, in sizes and thicknesses indicated, engraved with engraver's standard letter style of sizes and wording indicated, black and white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate. Mark all panelboard and equipment panels.

E. Thickness: 1/16", for units up to 20 sq. in. or 8" length; 1/8" for larger units.

F. Fasteners: Self-tapping stainless steel screws.

2.03 LETTERING AND GRAPHICS:

A. General: Coordinate names, abbreviations and other designations used in electrical identification work, with corresponding designations shown, specified or scheduled. Provide numbers, lettering and working as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of electrical systems and equipment.

PART 3 - EXECUTION

3.01 APPLICATION AND INSTALLATION:

A. General Installation Requirements:

1. Coordination: Where identification is to be applied to surfaces which require finish, install identification after completion of painting.

2. Regulations: Comply with governing regulations and requests of governing authorities for identification of electrical work.

3. Conduit Identification: Where electrical conduit is exposed in spaces with exposed mechanical piping which is identified by a color-coded method, apply color-coded identification on electrical conduit in a manner similar to piping identification. Except as otherwise indicated, use orange as coded color for conduit.

4. Equipment/System Identifications: Install engraved plastic-laminate sign on each major unit of electrical equipment in building; including central or master unit of each electrical system including communication/signal systems, unless unit is specified with its own self-explanatory identification or signal system. Except as otherwise indicated, provide single line of text, 1/2" high lettering on 1-1/2" high sign (2" high where 2 lines are required), white lettering in black field. Provide text matching terminology and numbering of the contract documents and shop drawings. Provide signs for each unit of the following categories of electrical work.

    a. Panelboards, electrical cabinets and enclosures.

    b. Access panel/doors to electrical facilities.

    c. Transformers.

    d. Control stations.

    e. Motor disconnects.

    f. Telephone and communication switching equipment.

B. Install signs at locations indicated or, where not otherwise indicated, at location for best convenience of viewing without interference with operation and maintenance of equipment. Secure to substrate with fasteners.

END OF SECTION 26 05 53

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 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. For the purpose of maintaining a district standard and remote online monitoring on the same platform. No other manufacturers, other than Gamewell-FCI, 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-SLP):
1. LCD Display: Touchscreen 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 (HPF)

A. Supplemental Notification Appliance Circuit (HPF) shall be Model HPF-PS10 offering up to 10.0 amps (10.0 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-L3): 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-PL3): 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.

E. Intelligent Duct Smoke Detector Base (DNR, DNRW):
   1. In-Duct Smoke Detector Housing: Use ASD-PL3R intelligent photoelectric 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 (RTS151) 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-SLP. Annunciator shall be a touchscreen 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 15 remote LCD-SLP 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. Open signaling line circuits and notification appliance circuits in at least 2 locations to verify presence of supervision.
   4. 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.
   5. 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.

6. 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.
7. 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.
8. 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.
9. 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-
JEFFERSON MIDDLE 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.

TFM ITEMS:

911 ADDRESS:
200 FAIRBANKS RD
OAK RIDGE, TENNESSEE 37830

USE AND OCCUPANCY CLASSIFICATION: EDUCATION

RESPONDING FIRE DEPARTMENT:
OAK RIDGE FIRE DEPARTMENT
CHIEF TRAVIS SOLOMAN
TSOLOMON@OAKRIDGETN.GOV
865–425–3520
200 SOUTH TULANE AVE.
OAK RIDGE, TENNESSEE 37831

PROJECT SCOPE OF WORK: REPLACEMENT OF THE EXISTING FIRE ALARM SYSTEM, BRINGING AS MUCH AS POSSIBLE UP TO CURRENT CODES.

TYPE IN ACCORDANCE WITH IBC CHAPTER 6: TYPE 4

FLOORS: 3

SPRINKLER: PARTIALLY SPRINKLED

⚠1

⚠1 TFM COMMENTS 2–21–23

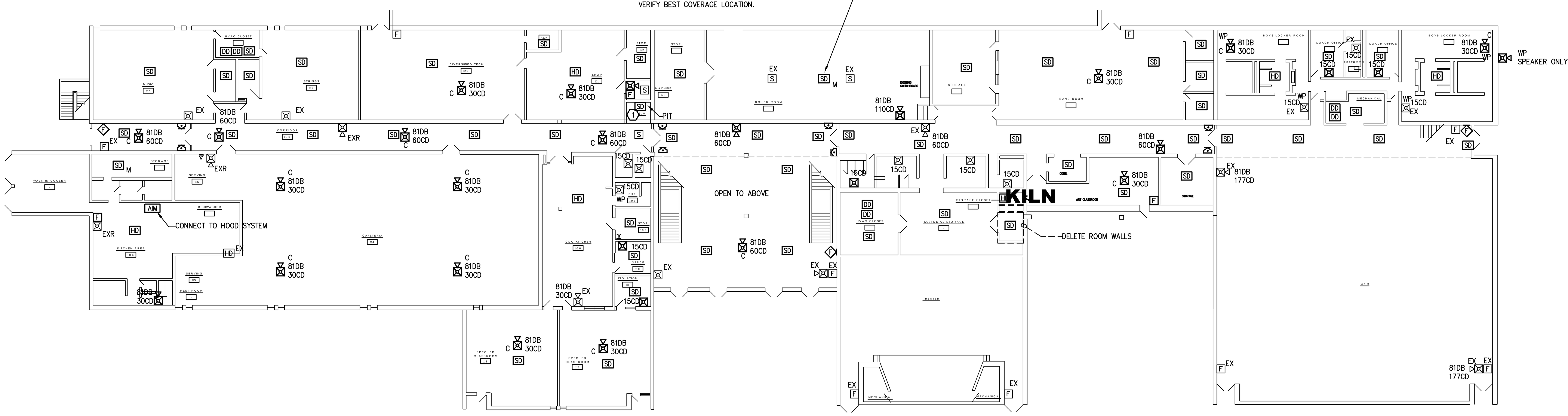
RONALD ALAN CARTER
REGISTERED ENGINEER
AGRICULTURE
COMMERCE
No. 106462
STATE OF TENNESSEE
2/6/23

WWR ENGINEERS INC
WEST, WELCH, REED ENGINEERS, INC.
ELECTRICAL & MECHANICAL ENGINEERING
5417 BALL CAMP PIKE
KNOXVILLE, TN 37921
PHONE: (865) 588–2431

GENERAL NOTES:
1. CONTRACTOR HAS THE OPTION TO INSTALL CEILING MOUNTED A/V DEVICES AS LONG AS THE DESIGN INTENT IS MET.

(1) VERIFY AND RECONNECT ELEVATOR RECALL EQUIPMENT.

NOTE:
ALL GAS FIRED HEATING AND BOILER UNITS SHALL HAVE MINIMUM OF 1 MULTI-CRITERIA SMOKE AND CO DETECTION UNITS INSTALLED IN THE AREA OF THE FIRST ZONE SERVED BY THE DUCTWORK. FIELD VERIFY BEST COVERAGE LOCATION.



GROUND FLOOR PLAN - FIRE ALARM

SCALE: 1"=20'-0"

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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JEFFERSON MIDDLE SCHOOL
FIRE ALARM UPGRADES

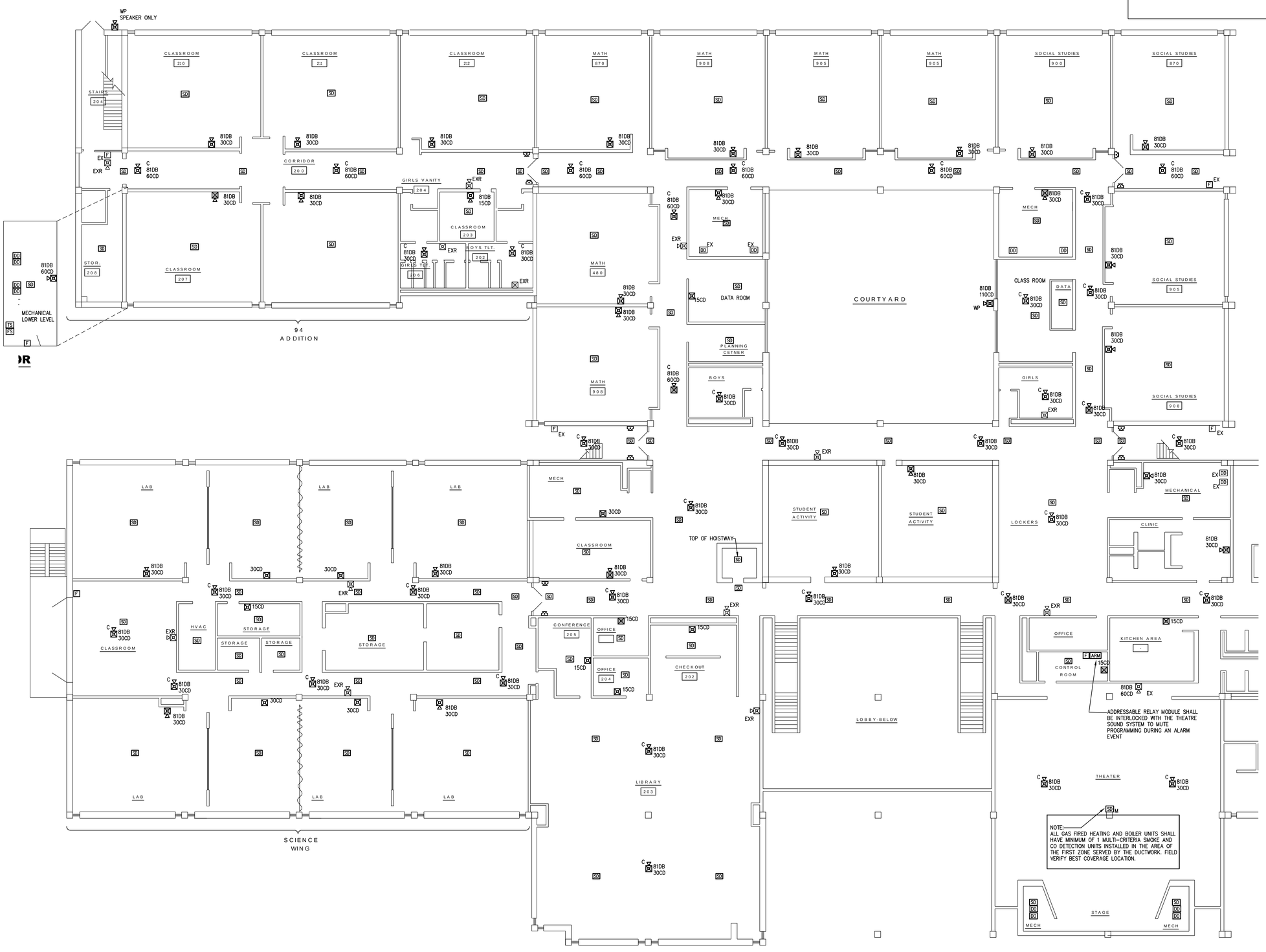
GROUND FLOOR PLAN – FIRE ALARM

JOB NO:	122090
FILE:	
DRAWN:	SRH
DESIGNED:	SRH
APPROVED:	RAC
DATE:	02-06-23

REVISIONS:

E1

GENERAL NOTES:
1. CONTRACTOR HAS THE OPTION TO INSTALL CEILING MOUNTED A/V DEVICES AS LONG AS THE DESIGN INTENT IS MET.



PARTIAL FIRST FLOOR PLAN - FIRE ALARM

SCALE: 1"=10'-0"

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

JEFFERSON MIDDLE SCHOOL
FIRE ALARM UPGRADES

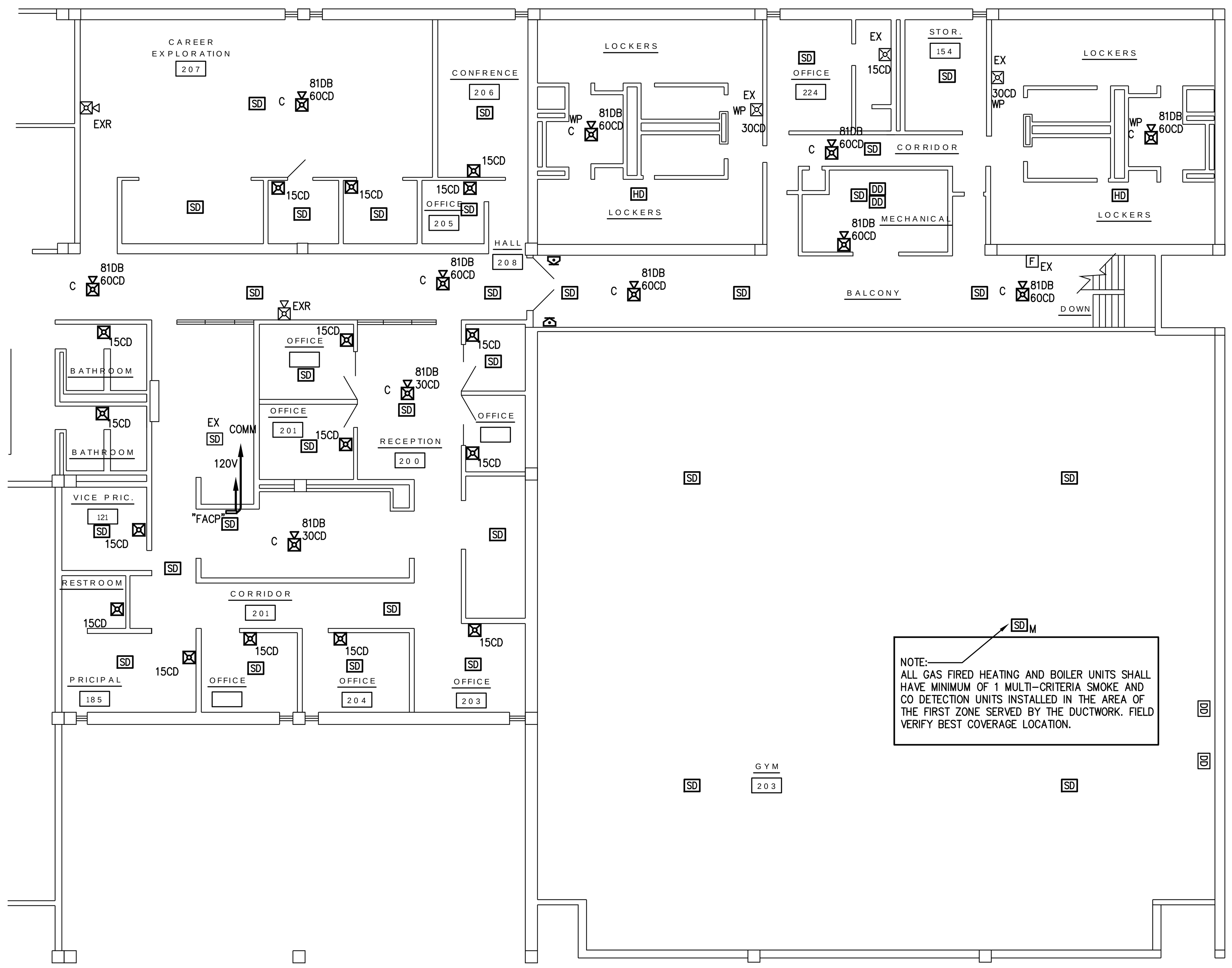
FIRST FLOOR PLAN – FIRE ALARM

DONALD ALAN CARR — REGISTERED PROFESSIONAL ENGINEER — No. 108479 — STATE OF TENNESSEE

JOB NO:	122090
FILE:	
DRAWN:	SRH
DESIGNED:	SRH
APPROVED:	RAC
DATE:	02-06-23

REVISIONS:

E2



PARTIAL FIRST FLOOR PLAN - FIRE ALARM

SCALE: 1"=10'-0"

GENERAL NOTES:

1. CONTRACTOR HAS THE OPTION TO INSTALL CEILING MOUNTED A/V DEVICES AS LONG AS THE DESIGN INTENT IS MET.

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JEFFERSON MIDDLE SCHOOL
FIRE ALARM UPGRADES

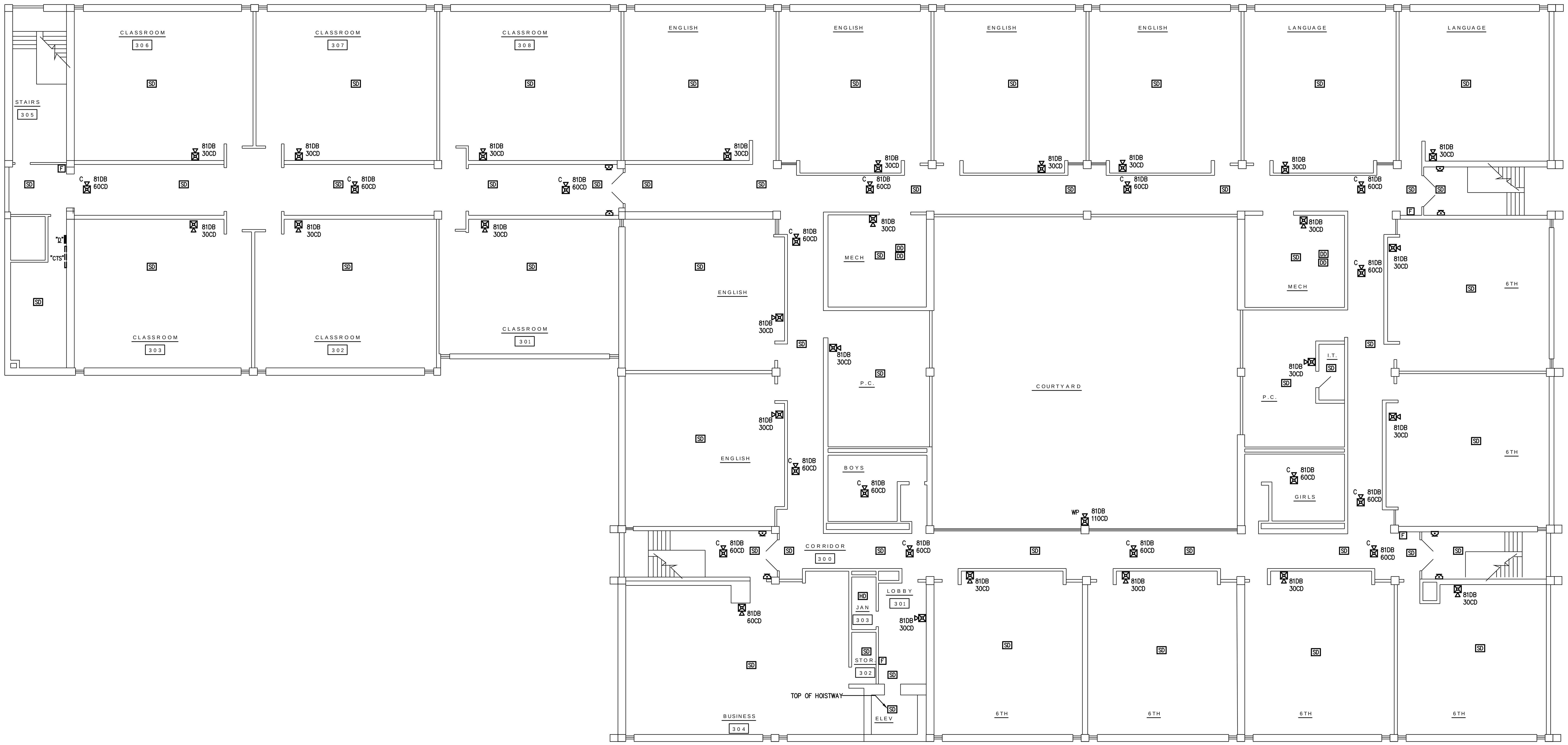
FIRST FLOOR PLAN – FIRE ALARM

JOB NO:	122090
FILE:	
DRAWN:	SRH
DESIGNED:	SRH
APPROVED:	RAC
DATE:	02-06-23

REVISIONS:

E3

GENERAL NOTES:
1. CONTRACTOR HAS THE OPTION TO INSTALL CEILING MOUNTED A/V DEVICES AS LONG AS THE DESIGN INTENT IS MET.



SECOND FLOOR PLAN - FIRE ALARM

SCALE: 1"=10'-0"

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OAK RIDGE SCHOOLS — EXCELLENCE IN EDUCATION SINCE 1943 — TENNESSEE

JEFFERSON MIDDLE SCHOOL
FIRE ALARM UPGRADES

SECOND FLOOR PLAN - FIRE ALARM

RONALD ALAN CARVER — STATE OF TENNESSEE

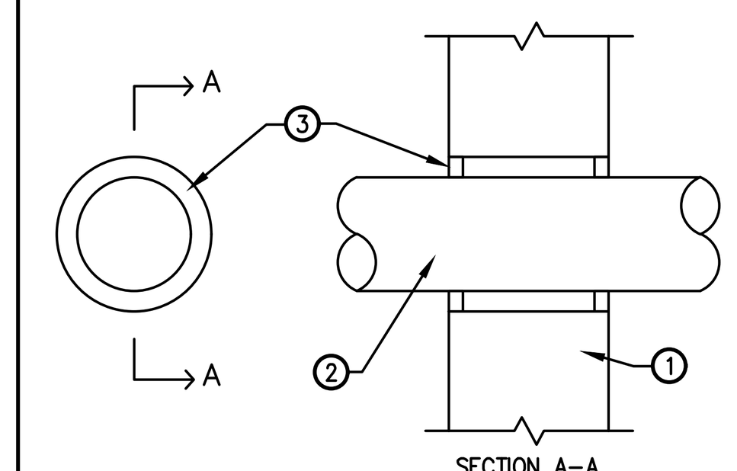
JOB NO:	122090
FILE:	
DRAWN:	SRH
DESIGNED:	SRH
APPROVED:	RAC
DATE:	02-06-23

REVISIONS:

E4

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.

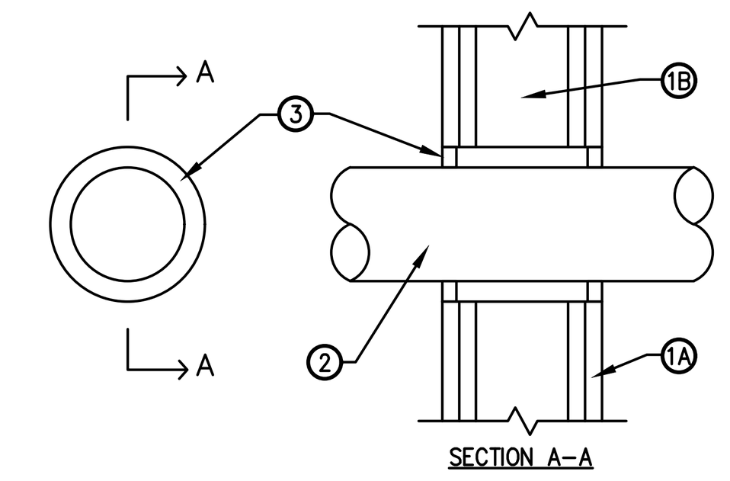
   *BEARING THE UL CLASSIFICATION MARK

   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.

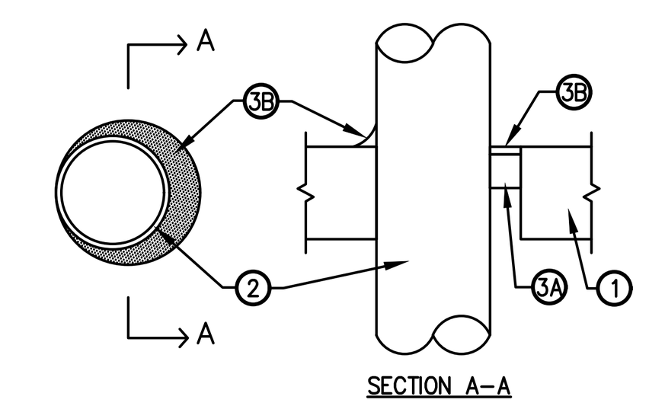
   *BEARING THE UL CLASSIFICATION MARK

   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)
AC	INDICATES DEVICE SHALL BE MOUNTED ABOVE COUNTERTOP
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AFI	ARC FAULT INTERRUPTER (AT CKT. BKR.)
AIC	AMPS INTERRUPTING CURRENT
BKR	BREAKER
C	CONDUIT
CKT	CIRCUIT
CU	COPPER CONDUCTOR
DISC.	DISCONNECT
DN	DOWN
EM	CONNECTED TO EMERGENCY POWER
EMT	ELECTRICAL METALLIC TUBING
FLA	FULL LOAD AMPS
G	GROUND (ALSO "GND")
GFI	GROUND-FAULT CIRCUIT-INTERRUPTER (ALSO "GFCI")
GRS	GALVANIZED RIGID STEEL CONDUIT
HP	HORSEPOWER
IMC	INTERMEDIATE METALLIC CONDUIT
KCMIL	1000 CIRCULAR MILS. SAME AS "MCM".
KVA	KILOVOLT-AMPS
KW	KILOWATT
MCA	MINIMUM CIRCUIT AMPS
MCC	MOTOR CONTROL CENTER
MCM	1000 CIRCULAR MILS. SAME AS "KCMIL".
N	NEUTRAL
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT. LUMINAIRE SHALL BE UNSWITCHED EXCEPT FOR CIRCUIT BREAKER.
PC	INDICATES DEVICE IS CONTROLLED BY PHOTOCELL OR TIMECLOCK
PVC	POLYVINYLCHLORIDE CONDUIT. CLASSIFIED AS RIGID NONMETALLIC CONDUIT PER NEC. SCHEDULE 40 UON.
QR	INDICATES LUMINAIRE SHALL BE PROVIDED WITH QUARTZ RESTRIKE
SCCR	SHORT-CIRCUIT CURRENT RATING
TR	TAMPER RESISTANT
UC	UNDER COUNTER. INDICATES DEVICE SHALL BE LOCATED BELOW THE COUNTERTOP.
UON	UNLESS OTHERWISE NOTED
V	VOLTS
W	WATTS
WG	INDICATES DEVICE SHALL BE PROVIDED WITH WIRE GUARD
WP	WEATHERPROOF
XFMR	TRANSFORMER

COMMUNICATION SYSTEMS NOTATIONS

2D	INDICATES QUANTITY OF DATA NETWORK CONNECTIONS TO BE INSTALLED AT AN ACCESS POINT.
1T	INDICATES QUANTITY OF TELEVISION CONNECTIONS TO BE INSTALLED AT AN ACCESS POINT.
2D	INDICATES QUANTITY OF VOICE (TELEPHONE) CONNECTIONS TO BE INSTALLED AT AN ACCESS POINT.
IC	INDICATES OUTLET OR FLOOR BOX SHALL BE PROVIDED WITH A STANDARD INTERCOM CONNECTION AND INTERCOM STATION.
ICA	INDICATES OUTLET OR FLOOR BOX SHALL BE PROVIDED WITH AN INTERCOM CONNECTION AND ADMINISTRATIVE INTERCOM STATION.

EXISTING DEVICE NOTATIONS

EX	EXISTING DEVICE REPLACE WITH NEW
EXM	EXISTING DEVICE TO BE MOVED TO NEW LOCATION SHOWN
EXR	EXISTING DEVICE TO BE REMOVED

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. "M" SUFFIX INDICATES MULTI (CO) CRITERIA.
F	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.
	FIRE ALARM COMBINATION SPEAKER/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.
F	LCD ANNUNCIATOR
DD	FIRE ALARM DUCT MOUNTED SMOKE DETECTOR – PROVIDE 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.
AIM	ADDRESSABLE INPUT MODULE TO MONITOR DRY CONTACT STATUS CHANGE.
AIM	ADDRESSABLE RELAY MODULE.

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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EXCELLENCE IN EDUCATION SINCE 1943
TENNESSEE

JEFFERSON MIDDLE SCHOOL
FIRE ALARM UPGRADES

LEGEND AND DETAILS

RONALD ALAN CARDEN
STATE OF TENNESSEE

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FILE:	
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DATE:	02-06-23

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