

DISTRICT TECHNOLOGY UPGRADES

Technology Request for Bid



KENTWOOD
PUBLIC SCHOOLS

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NOTE:

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SECTION 00 11 16
INVITATION TO BID

PART 1 - GENERAL

1.01 WORK INCLUDED: DISTRICT TECHNOLOGY UPGRADES

A. Kentwood Public Schools (Owner) is seeking bids for purchase and installation of multimedia and public address associated equipment and installation. Proposed systems shall be configured and installed as described herein.

B. Project: DISTRICT TECHNOLOGY UPGRADES

C. Owner: Kentwood Public Schools
5820 Eastern SE
Kentwood, MI 49508

D. Designer: Communications by Design, Inc.

E. Sites of Work:

1. Challenger Elementary School
2475 52nd Street SE
Kentwood, Michigan 49508
2. Crestwood Middle School
2674 44th Street
Kentwood, Michigan 49512
3. East Kentwood High School
6230 Kalamazoo Ave
Kentwood, Michigan 49508
4. Hamilton Elementary and Early Childhood Center
3303 Breton SE
Kentwood, Michigan 49508
5. Southwood Elementary School
630 66th SE
Kentwood, Michigan 49508
6. Townline Elementary School
100 60th Street SE
Kentwood, Michigan 49508

7. Valleywood Middle School
1110 50th Street
Kentwood, Michigan 49508

1.02 GENERAL DESCRIPTION OF PROJECT SEQUENCE

- A. Sequences and dates specified herein are for information only and indicate the plan and intent of the Owner. Actual dates shall be established based on the final award of project.
- B. Sequence of operations shall be established by the Contractor within the guidelines established by the Owner as required to meet schedules.
- C. Schedule:
 1. Request for Bid Distributed: December 18, 2024
 2. Pre-Bid Meeting: January 8, 2025 at 9:00am
 3. Intent to Bids Due: January 9, 2025 by 5:00pm
 4. Question and Clarification Deadline: January 10, 2025 at 5:00 PM
 5. Public Bids Due: January 21, 2025 at 3:30pm

1.03 TYPES OF BIDS

- A. Bids shall be submitted in total and with required detail for each item bid and as is required herein and include all portions of the work identified for the individual bid package as specified herein. Bids shall be made on unaltered bid forms as included herein. Bidder shall fill in all blank spaces and the bid shall be signed by a legal officer or agent authorized to bind the bidder to a contract.

1.04 PRE-BID CONFERENCE

- A. A pre-bid conference will be held. A discussion of the project and review of bid documents will be followed by a site review and an opportunity to ask questions. Attendance is highly encouraged for all contractors interested in bidding on any components or portions of this project. Attendance at the pre-bid conference will be a factor considered during evaluation of bids.
- B. Time: January 8, 2025 on 9:00am
- C. Location: Kentwood Public Schools
Administration Building – Collaboration Rooms
5820 Eastern SE
Kentwood, MI 49508

- D. Any drawings identified in the table of contents herein will be distributed and reviewed at this conference.
- E. Physical building inspections of sites of work will be provided for at this time.

1.05 TIME AND PLACE OF BID RECEPTION

- A. Physically sealed bids for the base bid work will be received at the district office and read aloud at a public opening. Bids arriving after the appointed time as determined by the Owner's representative conducting the public opening, shall be returned unopened. Bids will be accepted beginning forty-eight (48) hours prior to the appointed opening time provided they are in sealed packages and addressed as specified herein.
- B. Bid Receipt Deadline: January 21, 2025 at 3:30pm
- C. Bid Opening Location: Kentwood Public Schools
Administration Building – Collaboration Rooms
5820 Eastern SE
Kentwood, MI 49508
- D. Faxed or electronically delivered bids will not be accepted.

1.06 EXAMINATION AND PROCUREMENT OF DOCUMENTS

- A. Specifications and any relevant Drawings may be obtained from the Technology Designer. Contractors may obtain copies by documented request to Communications by Design, Attn: Rebecca Szilagy. Requests may be made by:
 - 1. Writing – 4101 Sparks Drive Grand Rapids, Michigan 49546
 - 2. Email – rszilagy@cbdconsulting.com

1.07 BID SECURITY

- A. Bid security equal to five percent (5%) of the total bid amount, must accompany each base bid in accordance with the Instruction to Bidders.
- B. Bid security shall be either a Bid Bond issued by a company licensed in the State of Michigan to furnish bid security or Certified Check made payable to the Owner.

1.08 OWNER'S RIGHT TO REJECT BIDS

- A. The Owner reserves the right to reject any and/or all bids. The Owner reserves the right to accept a bid, or portion thereof by issuance of a valid purchase

order within ninety (90) calendar days following the bid opening. No bids may be withdrawn during this time without the specific approval of the Owner.

- B. Withdrawal of any Bids after the opening time without specific approval by Owner may result in forfeiture of required bid security by Bidder.

1.09 DEFINITIONS

- A. “Owner” is intended to mean Kentwood Public Schools, a general powers school district.
- B. For purposes of this project, the terms “Architect”, “Engineer” and “Designer” are used synonymously to refer to Communications by Design, Inc., a Michigan Corporation.
- C. The term “Bidder” refers to any organization properly and accurately submitting a complete “Intent to Bid Form” prior to the required time specified herein and subsequently properly submitting completed set of bid documents as specified herein.
- D. The term “Contractor” herein is a reference to the firm(s) eventually selected by the Owner to provide the intended system(s), or any portion thereof, and fulfill the terms of the contract.
- E. The term Contract is a reference to the collective set of documents, drawings, diagrams, Owner’s Purchase Order, Addenda, and all other materials as provided for herein defining arrangement between Owner and Contractor.
- F. The term Addenda (or Addendum) are that portion of the Contract consisting of modifications, amendments, deletions, or substitutions to the contract documents issued prior to the execution of the Contract.

END OF SECTION

SECTION 00 40 00
BID FORMS

Intent to Bid Form

Complete and submit the following form if you have interest or intend to submit a Bid for this project. Unaltered and completed forms must be received on or before 5:00 PM on January 9, 2025. Only bidders returning a completed “Intent to Bid Form” will be notified of required addenda.

Company Information

Name: _____

Address Line1: _____

Address Line2: _____

City, State and Zip Code _____

Primary Contact Information

Name: _____

Phone No.: _____

Fax. No.: _____

E-Mail Address: _____

Portions of the bid for which you will be responding:

☐
☐
☐

Section 27 41 16 – Multimedia - Classrooms
Section 27 41 17 – Multimedia – Large Venue
Section 27 51 16 – Public Address System

Submit unaltered and completed form to:

Rebecca Szilagy

Communications by Design, Inc.

rszilagy@cbdconsulting.com

SEALED BID LABEL

Separate, or fold over, the label on the line below, and affix to the exterior of sealed container so information is clearly visible for Bid Submission. Ensure label is attached in a manner to prevent accidental removal or defacement. Label shall serve as sole identification for sealed bid at submission.

BID TO: Kentwood Public Schools
Attention: Mr. Tom Lagone
5820 Eastern Avenue SE
Kentwood, Michigan 49508

BID FROM: _____

PROJECT: DISTRICT TECHNOLOGY UPGRADES
TECHNOLOGY BID ID #3054

INCLUDING Addendum No. _____ Dated _____
ADDENDA: Addendum No. _____ Dated _____

DUE: January 21, 2025 at 3:30pm

BID FORM

BID TO: Kentwood Public Schools
Attention: Mr. Tom Lagone
5820 Eastern Avenue SE
Kentwood, Michigan 49508

BID FROM: _____

PROJECT: DISTRICT TECHNOLOGY UPGRADES
TECHNOLOGY BID #3054

The undersigned, having familiarized themselves with all local conditions affecting the cost of work, and having examined the site and all applicable Bidding Documents herein, and herein referenced, including, but not limited to, all addenda issued thereto, hereby propose to furnish all labor, material, equipment, applicable taxes and services required for proper completion of each of the following categories of this project for the sum of:

Bid Category _____ Title _____
_____ Dollars (\$) _____).

Said amount written above constituting the Base Bid

Bid Category _____ Title _____
_____ Dollars (\$) _____).

Said amount written above constituting the Base Bid

Bid Category _____ Title _____
_____ Dollars (\$) _____).

Said amount written above constituting the Base Bid

TAXES:

Bid sum includes all applicable taxes.

ALLOWANCES:

Base bid includes all applicable allowance cost(s) as set forth herein.

COST OF BONDS:

Bid sum includes cost of furnishing a Performance Bond and Labor and Material Payment Bond, each in the amount of one hundred percent (100%) of the bid.

ACKNOWLEDGEMENT OF ADDENDA:

The following addenda have been received, are hereby acknowledged, and their execution is included in both base bid and alternate bids herein.

Addendum No. _____ Dated _____ Addendum No. _____ Dated _____

Addendum No. _____ Dated _____ Addendum No. _____ Dated _____

ALTERNATES:

Based bid amount may be increased or decreased in accordance with each of the following alternate bids as may be selected, following procedures stated herein. Voluntary Alternates shown below are identified and described in detail on appropriate attachment(s) as referenced herein.

Alternate A _____

Alternate B _____

PRINCIPAL SUBCONTRACTORS

As required herein, the following Subcontractors are proposed to be used for this project:

Legal Name: _____ Work Proposed _____

Legal Name: _____ Work Proposed _____

Legal Name: _____ Work Proposed _____

BID SECURITY:

Accompanying this Bid, as required herein, is a bid security in the form of Certified Check/Cashier's Check/Bidder's Bond in the amount of:

_____ Dollars (\$ _____),

payable to the Owner, which it is agreed, shall be retained as liquidated damages, not as a penalty, by the Owner, if the undersigned fails to execute the Contract in conformity with the form of Contract incorporated and referenced herein and fails to furnish specified bonds within ten (10) days after date of issuance of a Letter of Intent to the undersigned.

If awarded the Contract, the undersigned agrees to commence work within ten (10) calendar days after date of issuance of a Purchase Order, which shall be considered as the notice to proceed, and agrees to complete the work in accordance with the schedule herein.

FAMILIAL DISCLOSURE:

Accompanying this Bid, as required herein, is a legally executed and notarized Michigan Familial Disclosure Statement.

EXCEPTIONS:

Bidder takes no exception to terms, conditions, specifications and/or any other requirements herein unless expressly noted, and specifically identified as provided for herein on unaltered Contract Exception form accompanying this Bid.

SIGNATORY AUTHORITY:

The undersigned certifies they are an authorized agent of the bidding entity, and legally able to bind the bidding entity to the terms, conditions and responsibilities of this, and all referenced bid documents. Furthermore, the undersigned acknowledges an understanding that non-compliance of this authority or any other bidding requirements may result in forfeiture of bid security, dismissal of consideration of bid submitted, and/or personal liability against the signatory.

AGREEMENT:

The undersigned agree(s) to provide the post-bid information required within ten (10) days after notification of a Letter of Intent and to execute an agreement for work covered by this Bid on the Owner's standard Purchase Order for which terms and conditions are expanded to include all Bidding Documents and subsequent addenda issued thereto.

In submitting this bid, it is understood that the Owner reserves the right to reject any or all bids. It is further agreed that this bid is binding for a period of Ninety (90) days from the opening thereof.

Respectfully submitted,

Date: _____

Firm Name: _____

By: _____

Signed: _____

Title: _____

Official Address: _____

Telephone Number: _____

Fax Number: _____

Primary Contact Email Address: _____

(If Corporation, affix Seal)

Michigan Familial Relationship Disclosure Statement

In accordance with Section 1267 of Michigan Revised School Code this sworn and notarized statement of an authorized representative, discloses any familial relationship between the owner and/or any employee of the Bidder, and any member of the project Owner's governing Board(s) or Superintendent(s).

If any conflict of interest is discovered subsequent to submission of bid, written disclosure shall be submitted to the project Owner within seven (7) days of discovery. The project Owner reserves the right to immediately terminate any contract with Bidder upon notification of a conflict of interest. Upon such termination, the project Owner shall compensate Bidder only for the value of any goods or services provided to the Owner prior to such termination as determined by Designer.

(Check only one Box Below)

☐ It is hereby acknowledged and certified by Bidder that no familial relationship exists between the owner or any employee of the Bidder and any member of the project Owner's governing Board(s) or Superintendent(s).

☐ A familial relationship exists between the owner or an employee of the Bidder and a member of the project Owner's governing Board(s) or Superintendent(s). The person(s) and the relationship(s) are as follows:

Bidder

Board or Superintendent

_____	_____
_____	_____
_____	_____
_____	_____

Bidder Authorized Representative:

Bidder: _____

Representative's Signature: _____

Print or Type Name: _____

Representative's Title: _____

Subscribed and sworn this _____ day of _____, 2025.

In the County of _____ State of _____

By _____
Notary Public Signature

Seal or Stamp:

My commission expires on: _____

IRAN LINKED BUSINESS AFFIDAVIT

All Bids shall be accompanied by a sworn statement disclosing any Iran Linked Business relationship that exists within the owners, including its officers, directors, and employees.

The undersigned, owner or authorized officer of

_____ (bidder), pursuant to Michigan Public Act No. 517 of 2012, the “Iran Linked Business” requirement provided in the Kentwood Public Schools Proposals hereby represents and warrants that the bidder, including its officers, directors and employees, is not an “Iran Linked Business” within the meaning of the applicable Public Act, and that in the event bidder is awarded a contract as a result of this RFB, the bidder will not become an “Iran Linked Business” at any time during the course of performing under the contract. The bidder further acknowledges that any person who is found to have submitted a false certification is responsible for a civil penalty of not more than \$250,000.00 or 2 times the amount of the contract or proposed contract for which the false certification was made, whichever is greater, the cost of the District investigation, and reasonable attorney fees, in addition to the fine. Moreover, any person who submitted a false certification shall be ineligible to bid on future Requests for Bids for three (3) years from the date that it is determined that the person has submitted the false certification.

There is not an “Iran Linked Business” that exists within the bidder and/or owner, officers, directors and employees.

Bidder:

[Company Name]

[Signature]

[Title]

Notary:

This instrument was acknowledged before me, a Notary Public in and for

_____ County, on this

_____ day of _____, 20_____.

[Notary Public Signature]

My Commission expires: _____

Acting in the County of: _____

REFERENCES

Customer name: _____
Address: _____
City/State/Zip: _____
Contact name: _____
Contact title: _____
Phone: _____
E-mail: _____
Scope of project: _____

Date of completion: _____

Customer name: _____
Address: _____
City/State/Zip: _____
Contact name: _____
Contact title: _____
Phone: _____
E-mail: _____
Scope of project: _____

Date of completion: _____

Customer name: _____
Address: _____
City/State/Zip: _____
Contact name: _____
Contact title: _____
Phone: _____
E-mail: _____
Scope of project: _____

Date of completion: _____

CONTRACT EXCEPTIONS

Check one Box

☐ Bidder takes no exception to, and agrees to comply with all sections, terms, conditions and/or requirements of the Contract Documents.

☐ Bidder proposes the following exceptions to the Contract Documents:

<i>Paragraph Number</i>	<i>Explanation</i>
<hr/>	<hr/>
<hr/>	<hr/>
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NOTE:

Exception(s) to any bid sections, terms, conditions and/or requirements deemed excessive for any reason by the Owner and/or Designer may result in disqualification of Bid.

SCHEDULE OF VALUES/BID FORM

(Bidder may submit version of only this form with slight variation. All information in this form is required for each division/category of work being bid. Submit a completed separate form for each division/category of work clearly delineating on the form the division/category of work for that form. Form submitted must materially match below both in content and format. Electronic version of this form for each project section/division/category being bid is required with bid package as Microsoft Excel compatible spreadsheet on a USB drive. Failure to provide appropriate and complete SCHEDULE OF VALUES for each division/category of work, as determined by the Owner and/or Designer, may result in disqualification of Bid.)

Bidder: _____ Bid Division: 27 41 16

[illegible]

SCHEDULE OF VALUES/BID FORM

(Bidder may submit version of only this form with slight variation. All information in this form is required for each division/category of work being bid. Submit a completed separate form for each division/category of work clearly delineating on the form the division/category of work for that form. Form submitted must materially match below both in content and format. Electronic version of this form for each project section/division/category being bid is required with bid package as Microsoft Excel compatible spreadsheet on a USB drive. Failure to provide appropriate and complete SCHEDULE OF VALUES for each division/category of work, as determined by the Owner and/or Designer, may result in disqualification of Bid.)

Bidder: _____ Bid Division: 27 41 17

[illegible]

SCHEDULE OF VALUES/BID FORM

(Bidder may submit version of only this form with slight variation. All information in this form is required for each division/category of work being bid. Submit a completed separate form for each division/category of work clearly delineating on the form the division/category of work for that form. Form submitted must materially match below both in content and format. Electronic version of this form for each project section/division/category being bid is required with bid package as Microsoft Excel compatible spreadsheet on a USB drive. Failure to provide appropriate and complete SCHEDULE OF VALUES for each division/category of work, as determined by the Owner and/or Designer, may result in disqualification of Bid.)

Bidder: _____ Bid Division: 27 51 16

[illegible]

END OF SECTION

SECTION 00 21 13
INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

1.01 OWNERSHIP

- A. Bidders prepare and provide bids without any cost to the Owner and/or Designer. Once opened, bids become the sole property of the Owner. Bidders have no claim to, or ownership of bids opened. Bids become subject to all legal statutes including, if applicable, United States and Michigan Freedom of Information Acts and related laws.

1.02 COMPLIANCE

- A. This document establishes the primary system(s) design configuration. The Bidder's bid response shall include all services, supplies, components, and equipment required to provide a complete turnkey system(s) which meets or exceeds all specifications for each given bid item being proposed.
- B. Owner prefers to enter into a contract with a single bidder for all materials for completion of this project but shall consider combinations of portions of bids from various bidders. The Owner reserves the right to award portions of the project to multiple bidders who will be required to cooperate with one another in order to complete the work.
- C. By their response, Bidders agree to comply with all sections, terms, conditions and/or requirements of the contract documents except as expressly noted, and specifically identified by paragraph number on the unaltered Contract Exceptions Bid Form. Exceptions to any bid sections, terms, conditions and/or requirements deemed excessive by the Owner and/or Bid Coordinator may disqualify bid.
- D. In compliance with the Freedom of Information Act (FOIA), the Owner shall make bid documents available for public review after issuance of purchase order to the successful bidder/s.
- E. In connection with the execution of this Contract, Contractor and any Subcontractors shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, or national origin.
- F. Negligence in preparation, improper preparation, errors in, or omissions from Bids shall not relieve Bidder from fulfillment of any and all obligations and requirements of the Contract Documents.

- G. All Bid documents and worksheets must be completed in detail and submitted together on time.
- H. All documents constituting the entire present agreement shall be construed in accordance with and governed by the laws of the State of Michigan.
- I. Designer shall have authority for interpretation of Contract Documents. In the event terms, provisions or any other portion of the Contract Documents is/are in dispute, Designer shall have full and final authority to interpret the Contract Documents, and such interpretation shall be final and binding.
- J. In the event of a conflict between any terms or conditions in any of the documents comprising the entire present Agreement, the terms and conditions set forth in this document shall take precedence.

1.03 NOTICE AND RESPONSE

- A. Upon notification of Bidder being considered as a finalist, the Bidder shall provide to the Owner and Designer, within 48 hours, a current “Dunn and Bradstreet Supplier Evaluation Report” and other documentation as may be required of finalists herein and as requested by Owner and/or Bid Coordinator.
- B. Bidder shall provide timely response to all requests from Designer and/or Owner regarding clarification and/or elaboration concerning, but not limited to its Bid as may be deemed relevant by the Owner and/or Designer.

1.04 PROTECTION AND SAFETY

- A. Contractor shall continuously maintain adequate protection of all Work from damage and shall protect the Owner’s property from injury or loss arising in connection with the execution of the Contract. Contractor shall make good any such damage, injury or loss, except such as may be directly caused by agents or employees of the Owner. The Contractor shall adequately protect adjacent property as required by law, by the Contract Documents, or as otherwise required, to cause no damage to them during the execution of the Contract. This requirement shall also apply to structures above and below ground as conditions of the site require.
- B. Contractor shall be solely responsible for, and have control over means, methods, techniques, sequences, and procedures for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the contract. Contractor shall take all necessary precautions for the safety of employees and visitors on the site of the Project and shall comply with applicable provisions of federal, state, and municipal safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed. Contractor shall erect and properly maintain at all times, as required by the conditions and

progress of the Work, all necessary safeguards for the protection of workers and the community.

- C. Contractor shall vigorously defend any and all suits that may be brought against the Owner by any person and/or entity, whether in the employ of the Contractor or not, for damage to property, and/or injury or death to persons alleged or claimed to have been caused by or through the performance of work.

1.05 DRAWINGS DIAGRAMS AND ILLUSTRATIONS

- A. Drawings, Diagrams, and Illustrations are diagrammatic in nature and indicate general arrangement and nature of systems and work included.
- B. Floor plan drawings are provided to assist the contractor in preparing documentation and reports as required herein.

PART 2 - MATERIALS

2.01 VOLUNTARY ALTERNATES AND SUBSTITUTION OF SPECIFIED PRODUCTS

- A. This Request for Bid describes a particular implementation. All Bids must provide pricing on the “base bid” as described herein. Voluntary alternatives providing comparable functionality with significant cost reduction and/or performance enhancement may be proposed. Voluntary alternatives are encouraged but must be identified as “Voluntary Alternates” and detailed on unaltered Bid Forms contained herein. Voluntary Alternates may be further detailed and/or explained in attachments to the unaltered Bid Forms contained herein. Exceptions to the Request for Bid specifications must be clearly noted and explained for each Voluntary Alternate proposed.
- B. No substitutions of specified products may be made without specific prior authorization by Designer and Owner. Individual bid divisions herein contain particular information related to acceptable manufacturer and product requirements.
- C. Trade-in, equipment/license exchanges or other return allowances may be provided as a voluntary alternate. Trade-in, exchange, or other return equipment allowances shall not be included in base bid amount.

PART 3 - EXECUTION

3.01 EXAMINATION OF DOCUMENTS AND SITE

- A. Bidders shall carefully examine the Contract Documents and the construction site to obtain first-hand knowledge of existing conditions and requirements. No plea of ignorance of conditions that exist, or any other relevant matter

concerning work to be performed in the execution of work will be accepted as justification for failure to fulfill every detail of all requirements as described herein.

3.02 QUESTIONS, INTERPRETATIONS, AND ADDENDA

- A. Any bidder finding discrepancies between Drawings, Specifications, and/or Bid Documents, or be in doubt as to the exact meaning of any provision or detail shall notify the Designer at once, and before the deadline for Questions and Clarifications. The Designer may then, at their option, issue Addenda clarifying same. The Designer is not responsible for oral instructions, or Bidder's/Contractor's misinterpretations of Drawings, Specifications, and/or Bid Documents.
- B. The Designer reserves the right to issue Addenda at any time up to thirty-six (36) hours prior to the scheduled bid opening. All such addenda shall become, upon issuance, an inseparable part of the Specification/Contract Documents. Each bidder shall incorporate within their bid all costs for items listed in any/all Addenda and shall acknowledge receipt and identifying number of each Addendum on the Bid Form and on the outside of the sealed bid container.
- C. Addenda will be forwarded to each bidder who has received a copy of the Bidding Documents and has submitted "Intent to Bid Form".

3.03 BID SECURITY, BONDS, AND INSURANCE

- A. Bid Security, Performance and Payment Bonds are required on this project.
 - 1. Bid security equal to five percent (5%) of the bid amount must accompany each bid in accordance with the Instruction to Bidders.
 - a. Bid security shall be either a Bid Bond issued by a company licensed in the State of Michigan to furnish bid security or Certified Check made payable to the Owner.
- B. The selected Contractor will be required to provide a performance bond and a payment bond each in an amount equal to one hundred percent (100%) of the bid amount including any accepted alternates at the Owner's discretion.
 - 1. The surety of the performance bond shall remain in effect until all acceptances and final contract close-out requirements herein have been executed by the Owner.
- C. Contractor shall provide, prior to beginning any work at the sites, certificate of insurance for delivery to Owner indicating all required insurance coverage is in force.

1. Workers' Compensation and Employer's Liability Insurance
 - a. Coverage A – Statutory
 - b. Coverage B - \$1,000,000 Per Accident
 2. Broad Form Comprehensive General Liability Insurance (including – Premises, Elevators, Contractor's Protective Liability, Contractual, Products & Completed Operations – including Broad Form Extensions).
 - a. Each Occurrence - \$1,000,000
 - b. General Aggregate - \$2,000,000
 - c. Products & Completed Operation Aggregate - \$2,000,000
 - d. Personal Injury & Advertising Injury - \$1,000,000
 - e. Fire Legal - \$100,000
 3. Sub-contractors Operations, Products – Completed Operations and Contractual Liabilities, plus such excess coverage as may be appropriate for the limits listed.
 4. Comprehensive Automobile Liability Insurance (owned, hired, and non-owned automobiles).
 - a. Bodily - \$1,000,000 each Person and \$1,000,000 each Occurrence
 - b. Property Damage - \$1,000,000
 5. Furnish Owner with Contingent Liability Insurance Policy with coverage and liability limits the same as for Public Liability Insurance specified herein. Designate on policy as assured, only the Owner.
 6. Furnish Owner with Contingent Property Damage Insurance Policy with coverage and liability limits the same as for Property Damage specified herein. Designate on policy as assured, only the Owner.
 7. Policies shall include notification clause requiring ninety (90) days written notice to Owner in the event of policy cancellation, expiration, non-renewal, coverage reduction or other material change.
 8. Contractor shall not commence work under the Contract until after all insurance required herein has been obtained and certificates for such are approved by Owner.
- D. All such bonds and/or insurance shall be issued by surety licensed by the State of Michigan and acceptable to the Owner.

1. Insurance certificate(s) shall be signed by insurance agent licensed in the state of Michigan or a representative of the insurance company.
- E. Contractor agrees to indemnify and hold harmless the Owner and Designer, including their agents and employees, from and against all claims, damages, losses and expenses, including, but not limited to, attorney fees arising out of, or resulting from the performance of the work to the fullest extent allowed by law on a comparison basis of fault.

3.04 MODIFICATION AND WITHDRAWAL

- A. Bids may be withdrawn and/or changed any time prior to the deadline for submission of bids. Bids may not be withdrawn or changed thereafter and shall be deemed a firm offer continuing for ninety (90) calendar days. Bids received after the deadline for submission will be returned unopened at the Owner's discretion.
- B. Withdrawal of any Bid after the opening time without specific approval by Owner may result in forfeiture of required bid security by Bidder.

3.05 CODES, ORDINANCES, REGULATIONS AND RELATED

- A. All labor and materials shall be furnished and installed in strict accordance with the latest applicable codes, ordinances and regulations of any governing body having jurisdiction over this project.
- B. In the event the quality of labor and materials required by the Drawings and Specifications herein exceeds requirements of current applicable codes, ordinances and regulations, the Drawings and Specifications shall take precedence.
- C. In the event the quality of labor and materials required by current applicable codes, ordinances and regulations having jurisdiction over this project exceeds that of the Drawings and Specifications herein, the applicable codes, ordinances and regulations shall take precedence.
- D. The Contractor shall give all notices and comply with all codes, laws, ordinances, rules, and regulations of any authority having jurisdiction, which bears on the performance of its work. This compliance includes, but is not limited to, the Michigan School Safety Initiative (PA129, PA130, PA131 and PA138) if applicable to work being performed.
- E. The Contractor shall pay for all licenses, permits, taxes, and fees required for this project; and shall comply with all federal, state, local and Owner's codes, laws, ordinances, regulations and other requirements applicable to the work specified at no additional cost to the Owner. Contractor shall submit copies of all approved certificates and approvals to the Owner upon receipt.

3.06 SUB-CONTRACTOR AND MATERIAL SUPPLIER

- A. The successful Bidder shall submit to the Owner and Designer a complete list of all sub-contractors and all material suppliers proposed to engage on the work. Sub-contracts shall not be awarded until after they have been approved by the Designer and Owner.
- B. Finalist bidders may be required to submit additional details related to sub-contractors and suppliers within forty-eight (48) hours after the bid opening.
- C. Names of any principal sub-contractors must be listed on the Bid Form.
- D. All contracts made by the successful Bidder with Subcontractors shall be covered by the terms and conditions herein. The successful Bidder shall see to it that Subcontractors are fully informed in regard to these terms and conditions and shall bind all subcontractors to the same terms and conditions. Failure to do so will absolve the Owner from any liability for additional cost due to subcontractor claims for additional cost, time, or any claim(s) for additional cost by subcontractor(s).

3.07 BID RESPONSE FORMAT

- A. Bidder shall provide complete Bid copies in two formats as described herein.
 - 1. One (1) Hard copy format responses shall be in a bound tabulated format. Each response shall have tab indicators for each section.
 - 2. One (1) Electronic copy format responses shall be submitted on a USB Drive, readable by a standard Microsoft Windows 11 workstation. Electronic media shall contain separate folders to organize response documentation as described herein. Files submitted electronically shall be **Adobe Acrobat** "PDF" format (SCHEDULE OF VALUES is additionally required to be on the disk in the appropriate folder as a Microsoft Excel compatible spreadsheet and as described herein).
- B. All Bid Response formats shall be clearly externally marked to include, but not be limited to:
 - 1. Bidder identification.
 - 2. Project Owner identification.
 - 3. Project name.
 - 4. Bid submission date.

- C. Bid Responses shall include an index containing copies/PDF of a complete index of documents comprising Bid Response. Responses shall include, but not be limited to the following tabbed/folder sections:
1. Section 1 – Forms, which shall contain copies/PDF files of all required and completed bid forms.
 - a. BID FORM
 - b. Michigan Familial Relationship Disclosure Statement
 - c. REFERENCES
 - d. CONTRACT EXCEPTIONS
 - e. SCHEDULE(s) OF VALUES
 - f. BID BOND
 2. Section 2 – Overview, which shall contain copies/PDF files of cover letter and/or executive overview.
 3. Section 3 – Submittals, which shall contain copies/PDF files of all required and voluntary submittals.
 4. Section 4 – Appendices, which shall contain copies/PDF files of other reference materials Bidder wishes to or is required to submit.

3.08 AWARD OF CONTRACT

- A. The material proposed to be used for the completion of work, and the competency, solvency and responsibility of bidders will receive due consideration before award of contract. In the reception of bids for this work, the Owner incurs no obligation to accept the lowest, or any bid submitted. The right to accept or reject any and all bids or portion thereof is reserved by the Owner. The Owner reserves the right to require testimonial, accounting or legal documents pertaining to the solvency of a Contractor, or any other decision factor the Owner deems appropriate, prior to award of contract.
- B. Owner reserves the right to select individual components from schedule of values independent of installation as may be determined in Owners best interest. Selected bidder may be required to install selected components provided by others.
- C. Issuance of a Purchase Order by Owner in response to a valid bid shall be a Notice to Proceed, and shall become part of, but not limited to, all terms, conditions, and requirements herein. Notice to Proceed shall have the full effect of contract award, and shall make all terms, conditions, requirements,

and responsibilities of Bidder binding upon issuance. Notice to Proceed, once issued, shall become an inseparable part of the contract documents herein, and constitute both Bidder and Owner's acceptance of contract.

3.09 TIME, SCHEDULES, PROJECT MANAGEMENT, MEETINGS AND PLANS

- A. Time is of the essence on this project. Award of contracts for this project will be contingent on the bidder's agreement to complete the work on or before the contract completion date stated herein.
- B. All Contractors will commence work in such a manner and at such a time as to expeditiously interface with the work of other Contractors and will pursue the project diligently to completion. All Contractors will work in a cooperative manner with Owner and other Contractors.
- C. Contractor shall appoint an overall Project Manager acceptable to Owner, with skills and experience deemed appropriate by the Owner for the scope and size of the project. Project Manager shall be responsible for the scheduling of all Contractor resources and attending all project meetings. Upon notification of Bidder being considered a finalist, the Bidder shall submit professional resume of proposed Project Manager within forty-eight (48) hours.
 - 1. Project meetings shall be conducted at Owner's selected and identified location weekly and at Owner's and/or Designer's discretion.
 - 2. Within five (5) days of Notice to Proceed (issuance of a Purchase Order by the Owner), Contractor's Project Manager shall provide to the Owner a critical flow path in the form of a "Gantt Chart" (or equivalent) indicating the proposed sequence of events and approximate beginning and completion dates in accordance with, compliance to, and coordinated with requirements herein.
 - 3. Changes of the Project Manager during the project shall not be acceptable without prior written approval from the Owner.
 - 4. It is the responsibility of the Contractor's Project Manager to schedule work, work out issues, ensure that all required products and services are delivered according to schedule and attend to any other matters required by the Owner in the interest of professional and timely completion of the project.
 - 5. The appointed Project Manager, or a designee acceptable to the Owner, shall be in attendance of all project meetings throughout the term of the project. Failure to do so may be considered a material breach of contract.
 - 6. After a ten (10) business day notice, the Owner reserves the right to request a new Project Manager, when it appears that, in the Owner's sole

discretion, the Project Manager is not fulfilling the full responsibilities of the position. Failure by Contractor to provide adequate Project Manager meeting requirements of the Owner, may result in Contract termination.

3.10 CHANGES IN THE WORK

- A. No changes in work with the effect of either increasing or decreasing in the project value shall be made without specific and prior authorization by the Owner and Designer.
- B. Owner, without invalidating the contract and without notice to any surety, may at any time order extra work or make changes by altering, adding to or deducting from the work, the Contract Sum being adjusted accordingly. All such work shall be authorized by a written Change Order approved by Owner and Contract Designer. Upon receipt of such an order Contractor shall promptly proceed with the work involved. All such work shall be executed under the conditions of the original Contract. Owner authorized change order(s) may be issued at any time prior to Contract close out.
- C. When so directed, Contractor shall promptly submit an itemized estimate and a unit price for performing or deleting such extra or changed work as may be contemplated. Any extensions or reductions of the contract time associated with extra or changed work shall be identified at the time Contractor submits such documentation.
- D. At the Owner's discretion, adjustments in the Contract Sum shall be determined by one or more of the following methods:
 - 1. By mutual acceptance of a lump sum cost, including overhead and profit, itemized and supported by sufficient substantiating data to permit evaluation.
 - 2. By unit prices stated in the Contract Documents including, but not limited to, Schedule of Values.
 - 3. By unit prices mutually agreed upon.

3.11 PAYMENT REQUESTS AND PAYMENTS

- A. Contractor's invoices shall be submitted monthly in correlation with the Project Schedule indicating percentage of work completed.
- B. All contract and change order invoices shall be sent directly to Contract Designer.
- C. A 10% retainage shall be held back on all payment requests, including, but not limited to hardware, software, change orders and services, until final

completion and close out of the project or project phase as determined by Owner and Designer.

- D. Contractors are required to submit all invoices on approved AIA Payment Request Forms or other billing format pre-approved by Contract Designer. Each AIA Payment Request Form shall be accompanied by a properly completed, executed, and notarized Waiver of Lien which shall be in a format and contain verbiage approved by Owner.
- E. The Contract Designer and Owner shall process payment requests on a monthly schedule and in accordance with their respective established processes and procedures. Payments will be made by the Owner based only on AIA Request Forms having been previously certified, audited and approved by Contract Designer and accompanied by acceptable Waiver of Lien.

END OF SECTION

SECTION 00 65 00
CONTRACT CLOSE OUT

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Provide an orderly and efficient transfer of the completed work to Owner.
- B. Details affecting work of this Section includes but is not limited to all other Sections herein and all related Contract Documents.
- C. Activities relative to Contract close-out are described in, but not limited to, this and other Sections of this document.

1.02 SUBSTANTIAL COMPLETION

- A. "Substantial Completion" shall be defined as:
 - 1. All responsibilities of Contractor for all provisions and requirements of all divisions and sections of complete Contract herein, and as amended, are properly and fully completed, or properly, accurately and acceptably provisioned for.
 - 2. All systems, equipment, facilities, services, programming and/or components required by all divisions and sections of complete Contract are fully operational, acceptable, and useful to the Owner for their intended purposes.
- B. Prior to requesting inspection by Designer to certify Substantial Completion, Contractor shall use adequate means to assure the Work is completed in accordance with the specified requirements and is ready for such inspection.

PART 2 - MATERIALS

2.01 NOT USED FOR THIS SECTION

PART 3 - EXECUTION

3.01 PROCEDURES

- A. Contractor shall submit a written request to Designer indicating they have achieved Substantial Completion of Work.
- B. Within a reasonable time after receipt of the request, Designer will inspect Work to determine status of completion.
- C. Should Designer determine the Work is not substantially complete:

1. Designer promptly will so notify Contractor, in writing giving reasons therefore and providing sufficient details to allow Contractor to make corrective actions.
2. Contractor shall then expeditiously remedy the deficiencies and notify Designer in writing when ready for re-inspection.
3. Designer will re-inspect the Work.
4. Excessive re-inspections of Work may result in fees being assessed Contractor.

D. Should Designer concur the Work is substantially complete:

1. Designer will prepare a letter of Substantial Completion.
2. Designer will submit the letter to Owner and Contractor.
3. Contract shall be deemed "Closed Out" for retainage purposes.
4. Final Acceptance of the system shall be deemed complete.

END OF SECTION

SECTION 27 41 16
MULTIMEDIA SYSTEMS - CLASSROOMS

PART 1 - GENERAL

1.01 DESCRIPTION OF PROJECT

- A. Work described in this specification section pertains to new classroom multimedia infrastructure and instructional equipment for Kentwood Public Schools.
- B. Contractors shall propose Systems and/or components to be deployed using standard procedures and technology components and as specified herein. The system components shall be installed and connected to the owner's existing physical infrastructure and as specified herein.
- C. Contractor shall advise, coordinate and work cooperatively with Owner representatives or owner's designee related to any configuration changes required and/or proposed for Owner's existing physical infrastructure.
- D. Contractor shall work collaboratively with Owner and Designer. Work shall include but not be limited to installation of supplied equipment, removal of existing equipment and full operational capacity of system as specified herein.
- E. The Contractor shall design, engineer, configure, supply, connect, test, document, train Owner representatives and warrant a fully operational and compliant system and/or component connection to the system complete and with full functionality as specified herein.
- F. Contractor shall provide all transportation and delivery services in a timely manner to individual work location(s) at each site of work in preparation for installation activity.
- G. Contractor shall coordinate their installation with other contractors, Designer and the Owner as is appropriate.

1.02 WARRANTY

- A. Complete installation shall be free from defect and/or failure for a period of warranty. Any replacement, upgrade or fix, including labor for any non-conforming or non-operational part of the system shall be fixed and/or replaced at no cost to the Owner.
- B. Manufacturer's warranty shall be provided for all components of the system.

1. Any documents and/or submittals required by individual manufacturers for compliance with the standard and/or applicable extended warranty programs shall be provided and submitted for approval by the Contractor.
 2. Contractor shall submit all documents, apply for warranty or extended warranty certification, and provide a Certificate of Warranty or Extended Warranty as may be applicable from the manufacturer prior to project closeout.
 3. Standard manufacturer warranty duration and terms shall be identified for each component with bid as well as additional fee required for warranty duration election of each of the following terms:
 - a. Three (3) year parts and labor warranty.
- C. On site services provided under the warranty shall be performed by personnel or representatives of manufacturer of individual components and/or appropriately trained and certified Contractor representatives as herein defined and located within physical proximity to provide response levels deemed acceptable to Owner.
- D. Contractor shall provide the following response times for all malfunctioning equipment:
1. Twenty-four (24) hours or less for matters that render twenty percent (20%) or more of the system unable to maintain normal functionality.
 2. Two (2) business days for matters not meeting the above criteria.
 3. Response time shall be measured from the time Contractor is notified by Owner to the time work is begun to resolve the matter.
- E. Bidder shall provide current annual maintenance contract pricing, terms and conditions for recommended maintenance programs for all equipment following the specified and included warranty periods as a Voluntary Alternate. This information will be considered by Owner and Designer as part of the bid evaluation process.
- F. System Warranty shall commence on date of substantial completion as certified by Designer and provided for herein. Delivery to work site of materials, physical removal from packaging, issuance of Contractor documents including, but not limited to invoices and/or packing slips, or any event or documentation, not specifically provided for herein, shall have no effect on Warranty or System Acceptance by Owner and/or Designer.

1.03 SUBMITTALS

- A. Submittals shall consist of, but not be limited to, technical cut sheets and detailed information pamphlets on all components of the system to be installed. All cut sheets and submittals shall be distinctly marked to highlight the actual part number of the item being submitted for approval with Bid Proposals.
- B. Shop drawings, data sheets and diagrams shall be submitted by Bidder for approval by Designer with Bid Proposals.
 - 1. Shop drawings, data sheets and diagrams shall show all data relating to structural, electrical, wiring, cross connect, interconnect, equipment arrangement/layout, and any other information deemed significant by the Designer.
 - 2. No work constituting final installation shall be commenced until after approval of shop drawings, data sheets and diagrams by Designer.
- C. Contractor shall provide proof of manufacturer support by photocopy of certification and letter of support from major component manufacturers for this specific project with Bid Proposals.
- D. Equipment or material installed for this project that do not have an approved submittal associated with it, will be removed and replaced with acceptable equipment or material as defined by the Designer. All replacement costs including, but not limited to material and labor, shall be the sole responsibility of the Contractor.
 - 1. The Owner and/or Designer may notify Contractor of any offending situations under this provision allowing Contractor up to forty-eight (48) hours to correct the situation prior to taking other corrective action.
 - 2. The Owner reserves the right to replace unapproved materials and deduct the costs of doing so as defined herein from any amounts that may be due, or become due Contractor.
- E. The Contractor shall submit within ten (10) calendar days after the Notice to Proceed, a schedule that reflects the sequence of activities of the contractor's approach to the execution of and completion of the work. The schedule shall be broken into work areas to provide for a clear identification of the planned progress of the work. Included in the schedule will be a list of tasks with list of deliverables and the percentage of work completed. This schedule shall coincide with progress payments applications dates and projected amounts. All durations shown will be in working days. Applications that generate Microsoft Project compatible files shall be management tools of choice. The timeframe described in the Contractor's Schedule shall represent the Contractor's plan for organizing, directing, managing, controlling, staffing and executing the work required by the Contract Documents. The district will rely

on such schedules to coordinate and otherwise plan the work of the District, other separate contractors, or the District's routine daily work.

1.04 REFERENCE SPECIFICATIONS

- A. All work, products, and materials shall conform with the following standards as applicable for the intended use:
 - 1. EIA/TIA Commercial and Administration Standards
 - 2. NEC
 - 3. IEEE 802
 - 4. IETF RFCs
 - 5. FCC – All Applicable Rules and Regulations
 - 6. UL
 - 7. MIOSHA Safety Standards

1.05 CONTRACTOR

- A. The Contractor shall accept complete responsibility for the installation, certification and support of the system and/or components as required herein. Contractor shall be an authorized vendor of all major components.
- B. All work shall be performed and supervised by Project Managers, Engineers and/or Technicians who are qualified to install specified equipment and perform related tests as recommended by the manufacturer and in accordance with the manufacturer's best practices and methods and as required herein.
- C. Project Managers, Engineers and Technicians employed on this project shall be properly and fully trained and qualified by the manufacturer on the installation and testing of the equipment and systems to be installed.
- D. The Contractor shall have a proven track record in comparable system supply, configuration and installation. This must be shown by the inclusion of references of at least three (3) projects involving the supply and/or installation of similar systems completed by the Contractor in the prior two (2) years with the sealed Bid Proposal as provided herein.

PART 2 - PRODUCTS

2.01 Acceptable Manufacturers

- A. Acceptable manufacturers have been provided to comply with a standard for individual components associated with the specified system. Indicated

components include particular models and makes currently installed and/or preferred by Owner.

- B. Any system bid shall be based only on acceptable manufacturer's components.

2.02 Supply most current version of all products provided.

- A. Manufacturer shall have five (5) years of experience and history manufacturing similar products to those specified.
- B. Proposed components shall have been field tested and proven in actual use.
- C. Prior and/or old versions of products, unless specifically approved and documented by Designer and/or Owner shall not be acceptable.
- D. In cases where a newer version of hardware or software is available at the time of installation, Contractor shall request clarification from Designer on which version is to be used.

2.03 Furnish only new, first-class quality materials and equipment.

2.04 All wiring not installed in conduit shall be plenum type cable and shall be so identified with continuous marking.

2.05 All connectors and accessories not installed in conduit and installed above finished ceiling shall be plenum rated.

2.06 MULTIMEDIA INFRASTRUCTURE CABLE

- A. All cable shall be factory manufactured with terminations and connector assemblies fully attached and integral to the cable to industry published quality standards and meet performance requirements specified herein. Multimedia infrastructure cable shall be provided in all locations receiving new and Owner provided interactive short throw projectors equipment as identified on Appendix A – Classroom AV Equipment Schedule
- B. Infrastructure cable to connect projector to a teacher station wall plate shall be provided.
- C. Acceptable Cable:
 - 1. HD Base-T Digital Video Cable shall be of commercial first-class quality manufacture and meet or exceed the following requirements:
 - a. Cable shall meet or exceed Shielded Category 6a certification.
 - b. Cable shall be constructed of solid 23 AWG conductors.

- D. Cable shall be extended from Contractor provided faceplate to projector.
- E. All cables originating from wall plate shall terminate in a service loop eight (8) feet in length at projector location or above casework location. Service loop shall be carefully connected to j-hook or similar hanger to keep off of ceiling grid.
- F. Teacher workstation wall plate provided shall be constructed of commercial grade stainless steel.
 - 1. Wall plate shall contain connection points for all specified cables
 - 2. Two (2) data outlet locations.
 - 3. Unpopulated data connections shall all have blank covers installed.
 - 4. Any existing terminated category cabling should be securely locked into new plate and any existing labeling shall be transferred.
- G. Contractor shall supply a stainless-steel brush plate to transition HD-Base-T digital video cable from above finished ceiling location to projector. Cables shall be neatly wrapped with white split braid sleeving for a finished installation.
- H. Cable shall terminate in the following connector gender:
 - 1. HD-Base-T Digital Video (Category 6a STP)
 - a. Terminate into an active HD-Base-T input on projector.
 - b. Terminate in a 568-compliant type female jack located on the face plate.
- I. HD-Base-T Digital Video Cable shall be constructed using 23 AWG solid conductors and of a high-quality construction method for minimal loss characteristics, to maintain quality high-resolution video image and include support for 1080p video resolution for the installed distance plus a fifteen (15) foot extension for device attachment.

2.07 MULTIMEDIA CONNECTION CABLE

- A. Fully assembled infrastructure cable bundles for each classroom indicated to receive a new Contractor or Owner provided interactive short throw projector as indicated on Appendix A – Classroom AV Equipment Schedule shall be provided for final connection to components installed at Owner provided teacher station.
- B. Acceptable Manufacturer

1. Cable shall be of commercial first-class quality manufacture.
- C. All Cable shall be fifteen (15) feet in length and terminate in the following connector genders:
 - a. Male Shielded Category 6a cable to Contractor provided projector transmitter/control pad.
2. Coordinate power cable relationship to connection bundle with Owner and Designer.

2.08 SURGE PROTECTOR

- A. All classrooms receiving new Contractor or Owner provided short throw interactive projection systems as indicated on Appendix A – Classroom AV Equipment Schedule shall receive new surge protection power strips.
- B. Contractor shall supply surge suppressed power strip installed at teacher workstation location for connection of teacher devices. Power strip shall contain six (6) grounded AC power connectors.
 1. Tripp-Lite TLP615 or equal
 2. Power cord should be sufficient length to support the OPE desk attached with the 15' cable bundle and be elegantly mounted at teacher desk location.
 3. Coordinate power cable relationship to connection bundle for neat and fully functional installation.

2.09 WIRELESS PRESENTATION SYSTEM

- A. Wireless Presentation Systems shall be provided and installed in locations as indicated in Appendix A – Classroom AV Equipment Schedule.
- B. Acceptable Manufacturers (in alphabetical order):
 1. KRAMER
 - a. VIA GO3
 2. HDMI output with support for up to 4K video streaming
 3. Gigabit LAN and dual-band 802.11ac Wireless connectivity
 4. 16GB Memory
 5. 128GB Storage

6. All other features currently a part of the manufacturer's latest commercial release.
- C. Contractor shall provide all necessary licensing for cloud management of all Kramer VIA GO3 wireless presentation system. Contractor shall fully configure all Kramer VIA GO3 wireless presentation devices to be connected to Owner provide network and configured in provided cloud management system.
- D. Cables and Accessories
1. All necessary mounting brackets and connectors to securely mount at projector location.
 2. Contractor shall supply necessary HDMI cable to connect Kramer VIA GO3 device to projector input.
 3. Work includes extending Ethernet Category 6 compliant patch cables from installed equipment, as required, to Owner identified connection ports at all locations.
 - a. Patch cables shall not exceed fifteen (15) feet in length.
 4. Material and labor to cross connect wireless presentation systems in communication closets to PoE switches shall be provided by Contractor using provided Category 6 patch cables.
 - a. Cable lengths shall be appropriate for connections made, and not include excessive cable.
 - b. Coordinate all work with Owner, Designer and other contractors prior to installation.
 5. Contractor shall coordinate installation and configuration of Wireless Presentation System per manufacturer recommended guidelines. Contractor shall work collaboratively as necessary with Owner and network support resources for a complete and compliant installation.
 6. Contractor shall supply **additional** Kramer VSM cloud management licenses for in the following quantities and terms:

Quantity	Expiration Date	Added Term
106	7/26/2025	3 years
19	12/30/2025	3 years
3	3/16/2026	2 years
1	10/18/2026	2 years
250	6/7/2027	1 year

250	8/1/2026	2 years
1	9/10/2027	1 year
1	9/20/2027	1 year
8	6/21/2027	1 year
2	4/26/2026	2 years

2.10 DOCKING STATION

- A. Computer docking stations shall be provided in all locations receiving Contractor and Owner provided Ultra Short Throw Interactive Projectors as indicated on Appendix A – Classroom AV Equipment Schedule.
- B. Acceptable Manufacturer (In alphabetical order):
 - 1. Hewlett Packard (HP)
 - a. USB-C Dock G5 – 5TW10AA#ABA
- C. Contractor shall update docking station to latest firmware version at installation date.
- D. Contractor shall set in place and make fully functional with Owner provided Windows laptop computer.
- E. Contractor shall supply all necessary cables and accessories for a fully functional system.

2.11 OWNER PROVIDE ULTRA SHORT THROW PROJECTOR DEVICES

- A. Owner shall supply Epson 1485FI projectors in quantities indicated on Appendix A – Classroom AV Equipment Schedule to use as part of the project materials. Contractor shall install, configure and integrate devices as specified herein. Owner provided devices shall be included in Contractor labor warranty.

2.12 ULTRA SHORT THROW INTERACTIVE PROJECTORS

- A. Ultra-short throw projectors, each with accompanying projector specific mount shall be provided. Please refer to Appendix A – Classroom AV Equipment Schedule for quantities and locations.
- B. Acceptable Manufacturers (In alphabetical order):
 - 1. EPSON
 - a. BRIGHLINK 1485Fi

- C. Projectors shall include full functionality of the following feature sets and/or standards in projector management software and/or remote access capability and in conjunction with proposed projectors, and shall provide for all management, configuration and control features and/or standards from a management administrative interface:
 - 1. Administration access shall be protected by unique and secure log on (User ID and Password).
 - 2. System administrator shall be capable of complete system back-up and full system restoration from a previously saved configuration.
 - 3. Projector reporting shall include, but not be limited to:
 - a. Device power status (on/off).
 - b. Filter status management.
 - c. Source selection status.
 - 4. Projector Control shall include, but not be limited to:
 - a. Device power (on/off).
 - b. Source selection.
 - c. Internal or downloadable program schedule database for timed execution of projector control functions based on, but not limited to time of day and day of week.
- D. Contractor shall supply three (3) outlet surge protector at projector for connection of projector and other devices. Surge protector device shall be Tripp-Lite SK3-0 or equivalent.
- E. Projector management software shall be installed on equipment provided at Owner discretion to be located at the owner's discretion and communicate over the existing installed infrastructure provided by Others.
- F. Projectors shall meet or exceed the following minimum output, port availability and other standards:
 - 1. Slim design touch module
 - 2. Laser display
 - 3. 5000 Lumens
 - a. 16:6 Resolution

4. +/- 3-degree keystone correction.
5. Three (3) HDMI Inputs
6. 7 second power-on to image.
7. Bidirectional RS-232 serial control port.
8. Operating volume level of less than 37dB (fan).
9. Operating temperature range of 45 – 95 degrees Fahrenheit.
10. Accessible top or front panel mechanical controls including, but not limited for the following functions:
 - a. Power on.
 - b. Power off.
 - c. Video input port selection.
11. Mechanical keypad lock out to minimize tampering with device settings
12. Ethernet connector for management, monitoring and control applications.
13. User definable power on graphic to replace factory default or manufacturer logo
14. HDBaseT port for connection of supplied transmitter/control pad.
- G. In the event of a power failure, system shall automatically re-initialize and “become active” to the last configuration in use with no human intervention.
- H. All other features currently a part of the manufacturer’s latest commercial release.

2.13 VOICE AMPLIFICATION

- A. Voice Amplification Systems shall be provided and installed in locations as indicated in Appendix A – Classroom AV Equipment Schedule.
- B. Acceptable Manufacturers
 1. LIGHTSPEED
 - a. T25
- C. Major components of Voice Amplification System shall be installed at projector location.

- D. Voice Amplification systems shall meet or exceed the following minimum standards:
 - 1. DECT (1.9 GHz) communication for complete classroom coverage of two (2) microphones simultaneously.
 - 2. Two (2) highly durable, rechargeable, battery powered, tamper resistant, impact resistant, lanyard based pendant microphones.
 - a. Two (2) Lightspeed volume control Clearmikes
- E. Contractor shall provide one (1) shielded 3.5mm audio cable for connectivity from audio output of projector to voice amplification system installed in projector location to support a fully functional and compliant system.
- F. In the event of a power failure, system shall automatically re-initialize and “become active” to the last configuration in use with no human intervention.
- G. All other features currently a part of the manufacturer’s latest commercial release.
- H. Voice Amplification Systems shall be neatly and securely mounted at projector location. As indicated in the provided line diagram, Contractor shall supply and install audio cabling from projector output to connect to provided Voice Amplification Systems.
- I. Contractor shall supply sixteen (16) Clearmikes for Owner shelf spares.
- J. Contractor shall rework and reconfigure existing speaker cabling to connect to new voice lift systems (where applicable). Contractor shall carefully extend existing speaker cabling to voice lift system at projector location for a fully functional system.
- K. In locations identified in provided Appendix A – Classroom AV Equipment Schedule where the Lightspeed T-25 devices will replace existing Lightspeed 975 devices, Contractor shall fully install new device, carefully deinstall existing device and transport to Owner for shelf spares.
 - 1. Contractor shall carefully mount new devices and redress all cabling for a fully functional system.

2.14 DOCUMENT CAMERAS

- A. Document cameras shall be provided and installed in locations as indicated in Appendix A – Classroom AV Equipment Schedule.
 - 1. Acceptable Manufacturer(s)

- a. IPEVO

- 1. V4K PRO ULTRA – Model CDVU-10IP

- 2. Document cameras shall meet or exceed the following requirements:

- a. 8 MP Image Sensor
 - b. Integral Microphone
 - c. Integral LED Light
 - d. USB connectivity and power

2.15 ALLOWANCES

A. Contractor shall include allowances for equipment and/or other contract service reimbursements as required below in base bid lump sum amount(s). Equipment and/or contract services shall be provided and sourced at Owner's discretion and convenience with full cooperation by Contractor and paid for from successful bidder's contract in the amount(s) provided for herein. Any allowance amount proving to be excessive for the intended equipment and/or contract services shall be credited to the Owner against contract payment requests.

- 1. Allowance shall be made in the amount of \$10,000.00 for Owner directed infrastructure upgrades.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Contractor shall conduct detailed walk-through examination with Designer, Construction Manager and Owner verifying equipment and material locations as well as mounting and placement requirements prior to commencement of other installation activities.
- B. Contractor shall ensure all submittals and have been provided to, and approval has been obtained from Designer and Owner prior to commencement of any final installation activities. Submittals shall include, but not be limited to:
 - 1. Shop drawings, data sheets and system diagrams including specific cable connectors and types proposed to be installed.
 - 2. Asset tag format, composition, attachment method and location on each serialized component being provided.
 - 3. Firmware configuration template to be used for each component provided.

4. Written installation, coordination and test procedure to be followed by installing technicians and engineers.

5. Final documentation template.

3.02 DEMOLITION

- A. Remove ALL abandoned AV cabling including VGA, Cable TV (in classroom only), unused speaker cables, shelves, brackets and blank any open locations in all rooms receiving new AV equipment.

- B. All removed equipment shall be properly disposed of by Contractor.

3.03 INSTALLATION

- A. Contractor shall be familiar with the environment where work will be done as specified herein and make every reasonable effort to minimize interference with Owner's or other contractor's activities.

1. Appendices depicting general ceiling conditions for areas of buildings are included herein. Contractors shall field verify specific room conditions.

- B. Work Areas shall be cleaned at the end of each day. All debris shall be cleared, removed and disposed of off premise. All equipment and tools shall be removed from common areas and stored in approved, secure storage locations.

1. Owner shall not be responsible for disposal or transportation of any packaging materials or other waste items.

2. Owner's waste containers including site dumpsters shall not be used for material disposal.

- C. All equipment and materials shall be installed in a neat and workmanlike manner. Best practices installation principles shall be used throughout the project.

- D. The Contractor shall furnish, set in place, and install all equipment necessary for a fully compliant and operational system as specified herein. The installation process includes, but is not limited to the following:

1. Inventory receipt of all components and equipment.

2. Storage of all equipment and components until such time those items are installed according to the specifications.

3. Transport equipment to the Owner's installation location(s).

4. Assemble, install, configure and test all equipment and components, maintaining accurate inventory records and status documents and discarding packaging.
5. Collect all information necessary to accurately program all system devices to the Owner's intended use and need.
6. Label with asset tags and other markings provided by Owner all system devices as may be appropriate and required by Owner and Designer.
7. Work shall be performed to meet local codes and industry standards including proper grounding and bonding of installed equipment. Work shall conform to "best practices" observed by industry professional installers and as required by Owner and Designer.
8. Work shall include careful coordination and cooperation with others to ensure a timely, cost effective and proper installation for Owner's intended application. Such efforts shall include, but not be limited to, coordinating and cooperating with other contractors, Owner, Designer and Engineer.
9. Where cables are to be routed through or on a finished wall, standard connectors must be used at the wall location to terminate call cables. All wall plates shall be stainless steel. Plastic or nylon plates shall not be acceptable. Cables routed out of a wall box on a finished wall without proper standard connection termination shall not be acceptable.
10. All cables shall be proper and adequately supported using hooks or rings no more than eight feet (8') apart. Cables supported by structural steel, ceiling grid or hanger wires will not be acceptable. All cable routing shall be neat and orderly.
11. All cable connecting components mounted in/on Technology Cart, shall have adequate cable slack to provide for full system inspection and or service without the removal (intentional or inadvertent) of connecting cables, including items that will be placed on the keyboard tray of equipment carts.
12. Label all cable connections for intuitive user access and as directed by Owner and Designer.
13. Work may include extending cables from installed equipment, and as required and/or specified herein, to Owner identified connection outlets.
 - a. Work includes supply, connection and testing of any such cables.
14. ULTRA SHORT THROW INTERACTIVE PROJECTORS

- a. Install, configure and test approved firmware configuration template including, but not limited to:
 - 1. Power on Image.
 - 2. Lamp setting.
 - 3. Firmware based Device ID (Including parameters such as: TCP/IP settings, Host Name, etc.).
 - 4. Default port selection.
- b. Contractor shall install and fully configure Epson projector management software and enable projectors for management.
- c. Contractor shall install manufacturer recommended firmware during initial installation.
- d. Neatly configure all cables as directed by Owner.
- e. Attach projector to mount using manufacturer best practices.
- f. Connect AC power using cord provided to projector.
- g. Align projector with whiteboard provided by Others. Contractor shall install projector in relationship to the whiteboard to maximize the projected image and provide reliable interactive functionality.
- h. Contractor shall supply and connect category 6 patch cable for each projector device at both projector and switch locations. Contractor shall cross connect projector locations and report back switch and switch port locations to Owner for programming.
- i. Set keystone adjustment(s) as required.
- j. Zoom and focus projector as required.
- k. Secure all adjustment points.

15. WIRELESS PRESENTATION SYSTEM

- a. Provide and connect all audio and video input and output device cables.
- b. Contractor shall install manufacturer recommended firmware during initial installation.
- c. Secure mounting location at projector location with provided mount to eliminate involuntary equipment movement.

- d. Neatly route all cabling and secure slack.
- e. Adjust balance levels for standard configuration.
- f. Neatly route all cabling and secure slack.
- g. Install, configure and test approved firmware configuration template including, but not limited to:
 - 1. Power on Image.
 - 2. Firmware based Device ID (Including parameters such as: TCP/IP settings, Host Name, etc.).
- h. Collaborate and coordinate with Owner or Others to fully configure wireless presentation system to function on Owner provided network equipment.
- i. Contractor shall supply and connect category 6 patch cable for each wireless presentation device at both projector and switch locations. Contractor shall cross connect projector locations and report back switch and switch port locations to Owner for programming.
- j. Contractor shall supply, install and fully configure Kramer VIA cloud management software for a fully functional system.

16. VOICE AMPLIFICATION

- a. Provide and connect all audio input and output device cables.
- b. Secure mounting location at projector location with mounting screws or Velcro pads to eliminate involuntary equipment movement.
- c. Neatly route all cabling and secure slack.
- d. Adjust balance levels for standard configuration.
- e. Neatly route all cabling and secure slack.
- f. Provide and install connection from audio output on Contractor supplied projection units.

17. DOCUMENT CAMERAS

- a. Connect USB cable to Owner provided teacher computer or docking station.
- b. Fully cooperate with Owner for classroom workstation software installation.

E. SPECIAL CONFIGURATION – FINE ARTS

1. Contractor shall supply one (1) of the specified configurations in each of the following locations.
 - a. East Kentwood High School
 1. Band Room
 2. Orchestra Room
 3. Choir Room
 - b. Valleywood Middle School
 1. Band Room
 2. Orchestra Room
 3. Choir Room
2. One (1) Projector shall be provided.
 - a. Acceptable Manufacturer(s)
 1. EPSON – L530U
 - b. Projector shall meet or exceed the following minimum requirements:
 1. 5200 Lumens
 2. Full HD WUXGA support
 3. Horizontal and vertical lens shift
 - c. Contractor shall supply and install appropriate mounting bracket to install projector on existing downpipe.
 - d. Projector shall be integrated with existing Kramer VP-440 presentation switcher. Contractor shall reconnect and make functional existing receiver for a fully functional system.
 - e. Contractor shall rework existing cables at projector and switcher location for a neat and professional installation.
3. One (1) Wireless Presentation System
 - a. Acceptable Manufacturers (in alphabetical order):

1. KRAMER - VIA GO3
- b. Wireless Presentation System shall meet or exceed the following requirements:
 1. HDMI output with support for up to 4K.
 2. Gigabit LAN and dual-band 802.11ac Wireless connectivity
 3. 16GB Memory
 4. 128GB Storage
 5. All other features currently a part of the manufacturer's latest commercial release.
 6. All necessary cables, mounting brackets and connectors to securely mount Wireless presentation system at monitor location.
 7. Contractor shall provide licensing for Kramer VIA Cloud management platform for term of warranty (three (3) years). Contractor shall work collaboratively with Owner to make all Kramer VIA devices fully functional in management software.
 8. Contractor shall supply all necessary patch cables to connect Wireless Presentation Device to Owner supplied network cabling and switches. Contractor shall fully patch all devices and report back switch ports to Owner for programming.
 9. Contractor shall connect Kramer VIA GO3 device to existing Kramer VP440 presentation switcher. Contractor shall supply all necessary cables and accessories for a fully functional system.
4. One (1) Document Camera shall be provided and installed.
 - a. Acceptable Manufacturer(s)
 1. IPEVO - V4K PRO ULTRA – Model CDVU-10IP
 - b. Document cameras shall meet or exceed the following requirements:
 1. 8 MP Image Sensor
 2. Integral Microphone
 3. Integral LED Light
 4. USB connectivity and power

5. One (1) Voice Amplification System shall be provided and installed.
 - a. Acceptable Manufacturer(s)
 1. LIGHTSPEED - ACCESS LINK
 - b. Major components of the Voice Amplification System shall be carefully installed at rack location.
 - c. Voice Amplification systems shall meet or exceed the following minimum standards:
 1. DECT (1.9 GHz) communication for complete classroom coverage of two (2) microphones simultaneously.
 2. Two (2) highly durable, rechargeable, battery powered, tamper resistant, impact resistant, lanyard based pendant microphones.
 3. Two (2) Lightspeed volume control Flexmikes
 - d. In the event of a power failure, system shall automatically re-initialize and “become active” to the last configuration in use with no human intervention.
 - e. All other features currently a part of the manufacturer’s latest commercial release.
 - f. Voice Amplification Systems shall be neatly and securely mounted at audio equipment rack location. Contractor shall supply necessary shielded audio cable to extend output Lightspeed system to existing sound system.
- F. It shall be the responsibility of the Contractor to repair or replace any damage done to the structure of finishes in the building by the Contractor. If in the course of work, Contractor damages, marks or misplaces any surfaces or access plates/panels the Contractor shall repair and/or replace the surface, plate or panel to the original condition.
 1. Repairs shall include, but not be limited to patching and painting.
 2. Final determination as to the damage condition and/or repair/replacement fitness of any surface, plate or panel shall be the sole responsibility of the Designer.
 3. The building and work area shall be returned to its original condition prior to final sign off of the project.

- G. No remote management software shall be installed on any Kentwood Public Schools server or workstation without prior approval. No remote access devices shall be installed on the Kentwood Public Schools network. Any costs for mitigation of installed software or devices will be charged to the Contractor.
- H. Following installation and system “turn-up”, but prior to final acceptance of the system, Contractor shall conduct follow-up interviews with Owner identified administrators and staff to review system functionality, suitability and confirm feature and program fitness for Owner applications.
 - 1. Follow-up interviews shall be fully documented by Contractor and submitted to Owner for approval.
- I. All cable and device labels shall match existing standard.
- J. Sites of Work:
 - 1. East Kentwood High School
6230 Kalamazoo Ave
Kentwood, Michigan 49508
 - 2. Hamilton Elementary School
3303 Breton SE
Kentwood, Michigan 49508
 - 3. Valleywood Middle School
1110 50th Street
Kentwood, Michigan 49508

3.04 TESTING

- A. In an effort to ensure a smooth “turn-up” of the new system Contractor shall submit to a thorough testing process as defined herein prior to cut-over.
- B. Prior to requesting testing by Designer, the Contractor shall use adequate means to assure the Work is completed in accordance with the specified requirements, meets the owner’s specific application requirements and is ready for functionality and integrity testing.
- C. Testing Procedures
 - 1. Prior to system “turn-up”, Contractor shall submit a written request and proposed test plan to Designer indicating they have completed full and final configuration of the system and are ready to have system integrity and functionality tested.

2. Within reasonable time after receipt of request, Designer will accept or revise the proposed test plan, provide a test schedule and coordinate testing date(s) with Owner and Contractor.
3. Should Designer determine the Work is not acceptably configured or not of adequate integrity:
 - a. Designer promptly will so notify Contractor, giving reasons therefore and providing sufficient details to allow Contractor to make corrective actions.
 - b. Contractor shall then expeditiously remedy the deficiencies and notify Designer in writing when ready for re-testing.
 - c. Designer will schedule re-test of the Work.
 - d. Excessive re-testing of Work may result in fees being assessed Contractor.
4. Should Designer and Owner concur the Work is configured properly and system integrity is as required:
 - a. Designer will review Contractors detailed “turn-up” plan, and upon finding it acceptable issue a memorandum of Testing Completion to Owner and Contractor after which system “turn-up” can proceed.

3.05 DOCUMENTATION

- A. Contractor shall, throughout the completion of the project, provide Owner a file storage system that shall include all necessary equipment, including if reasonably required, file drawers, folders, dividers, etcetera, to contain all as-built drawings, owner’s manuals of all equipment installed, warranty and maintenance information and other information the Contractor, Designer and/or Owner deem necessary. Documentation shall also be provided in a digital format in file formats and on media as specified by Owner and/or Designer.
- B. Contractor shall be responsible for providing thorough, timely documentation on all hardware, software. Documentation shall include, but not be limited to:
 1. Equipment description.
 2. Equipment make.
 3. Model number.
 4. Software release.

5. Date installed.
6. Manufacturer's warranty.
7. Maintenance contract terms.
8. Verification of maintenance contract engagement.
9. Telephone numbers for service and support.
10. Detailed technical support and service procedure instructions.
11. All product (hardware and software) manuals and manufacturer supplied documentation, including, but not limited to owner manuals, system administrator manuals and configuration guides. Where number of duplicate copies for particular manual or documentation item could be reasonably considered excessive, Contractor shall request direction from Owner and Designer.
12. Photocopy of original invoice listing make and model for all components and equipment from individual manufacturer(s), distribution source(s), or authorized agent(s) to establish manufacturer warranty start date for potential use after end of contract warranty provisions.
13. CAD or Visio as built drawings/diagrams for each building.
14. System Configuration Report.
15. Complete inventory of installed hardware and system software including, but not be limited to, model numbers, Ethernet MAC address, serial numbers, physical installation location and software options.

3.06 TRAINING

- A. No training shall be conducted prior to training outline and/or syllabus being approved by Owner, Instructional or overview activities conducted without prior content approval with not be deemed contract training, and Contractor shall remain responsible for delivery of approved training.

3.07 SCHEDULE, MEETINGS AND PLANS

A. Schedule

1. Post bid Interviews: Week of January 27, 2025
2. Contractor Chosen: Week of February 10, 2025
3. Work Commences: April 1, 2025

4. Substantial Completion of Project (Hamilton Elementary): July 15, 2025
 5. Substantial Completion of Project (Remainder): August 1, 2025
 6. Project Close-out: October 1, 2025
- B. Planned sequence of operations shall be established by the Contractor within the guidelines established by the Owner, as required herein and as required to meet schedules.
 - C. All work shall be coordinated with Owner's construction manager on site.
 - D. Project progress meetings shall be held, but not limited to, weekly at a site and time identified as convenient for Owner and as required herein. Meetings will be attended as required herein.

END OF SECTION

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MULTIMEDIA SYSTEMS – LARGE VENUE

PART 1 - GENERAL

1.01 DESCRIPTION OF PROJECT

- A. Work described in this specification section pertains to new multimedia infrastructure and instructional equipment for Kentwood Public Schools.
- B. Contractors shall propose Systems and/or components to be deployed using standard procedures and technology components and as specified herein. The system components shall be installed and connected to the owner's existing physical infrastructure and as specified herein.
- C. Contractor shall advise, coordinate and work cooperatively with Owner representatives or owner's designee related to any configuration changes required and/or proposed for Owner's existing physical infrastructure.
- D. Contractor shall work collaboratively with Owner and Designer. Work shall include but not be limited to installation of supplied equipment, removal of existing equipment and full operational capacity of system as specified herein.
- E. The Contractor shall design, engineer, configure, supply, connect, test, document, train Owner representatives and warrant a fully operational and compliant system and/or component connection to the system complete and with full functionality as specified herein.
- F. Contractor shall provide all transportation and delivery services in a timely manner to individual work location(s) at each site of work in preparation for installation activity.
- G. Contractor shall coordinate their installation with other contractors, Designer and the Owner as is appropriate.

1.02 WARRANTY

- A. Complete installation shall be free from defect and/or failure for a period of warranty. Any replacement, upgrade or fix, including labor for any non-conforming or non-operational part of the system shall be fixed and/or replaced at no cost to the Owner.
- B. Manufacturer's warranty shall be provided for all components of the system.
 - 1. Any documents and/or submittals required by individual manufacturers for compliance with the standard and/or applicable extended warranty programs shall be provided and submitted for approval by the Contractor.

2. Contractor shall submit all documents, apply for warranty or extended warranty certification, and provide a Certificate of Warranty or Extended Warranty as may be applicable from the manufacturer prior to project closeout.
 3. Standard manufacturer warranty duration and terms shall be identified for each component with bid as well as additional fee required for warranty duration election of each of the following terms:
 - a. Three (3) year parts and labor warranty.
- C. On site services provided under the warranty shall be performed by personnel or representatives of manufacturer of individual components and/or appropriately trained and certified Contractor representatives as herein defined and located within physical proximity to provide response levels deemed acceptable to Owner.
- D. Contractor shall provide the following response times for all malfunctioning equipment:
1. Twenty-four (24) hours or less for matters that render twenty percent (20%) or more of the system unable to maintain normal functionality.
 2. Two (2) business days for matters not meeting the above criteria.
 3. Response time shall be measured from the time Contractor is notified by Owner to the time work is begun to resolve the matter.
- E. Bidder shall provide current annual maintenance contract pricing, terms and conditions for recommended maintenance programs for all equipment following the specified and included warranty periods as a Voluntary Alternate. This information will be considered by Owner and Designer as part of the bid evaluation process.
- F. System Warranty shall commence on date of substantial completion as certified by Designer and provided for herein. Delivery to work site of materials, physical removal from packaging, issuance of Contractor documents including, but not limited to invoices and/or packing slips, or any event or documentation, not specifically provided for herein, shall have no effect on Warranty or System Acceptance by Owner and/or Designer.

1.03 SUBMITTALS

- A. Submittals shall consist of, but not be limited to, technical cut sheets and detailed information pamphlets on all components of the system to be installed. All cut sheets and submittals shall be distinctly marked to highlight the actual part number of the item being submitted for approval with Bid Proposals.

- B. Shop drawings, data sheets and diagrams shall be submitted by Bidder for approval by Designer with Bid Proposals.
 - 1. Shop drawings, data sheets and diagrams shall show all data relating to structural, electrical, wiring, cross connect, interconnect, equipment arrangement/layout, and any other information deemed significant by the Designer.
 - 2. No work constituting final installation shall be commenced until after approval of shop drawings, data sheets and diagrams by Designer.
- C. Contractor shall provide proof of manufacturer support by photocopy of certification and letter of support from major component manufacturers for this specific project with Bid Proposals.
- D. Equipment or material installed for this project that do not have an approved submittal associated with it, will be removed and replaced with acceptable equipment or material as defined by the Designer. All replacement costs including, but not limited to material and labor, shall be the sole responsibility of the Contractor.
 - 1. The Owner and/or Designer may notify Contractor of any offending situations under this provision allowing Contractor up to forty-eight (48) hours to correct the situation prior to taking other corrective action.
 - 2. The Owner reserves the right to replace unapproved materials and deduct the costs of doing so as defined herein from any amounts that may be due, or become due Contractor.
- E. The Contractor shall submit within ten (10) calendar days after the Notice to Proceed, a schedule that reflects the sequence of activities of the contractor's approach to the execution of and completion of the work. The schedule shall be broken into work areas to provide for a clear identification of the planned progress of the work. Included in the schedule will be a list of tasks with list of deliverables and the percentage of work completed. This schedule shall coincide with progress payments applications dates and projected amounts. All durations shown will be in working days. Applications that generate Microsoft Project compatible files shall be management tools of choice. The timeframe described in the Contractor's Schedule shall represent the Contractor's plan for organizing, directing, managing, controlling, staffing and executing the work required by the Contract Documents. The district will rely on such schedules to coordinate and otherwise plan the work of the District, other separate contractors, or the District's routine daily work.

1.04 REFERENCE SPECIFICATIONS

- A. All work, products, and materials shall conform with the following standards as applicable for the intended use:

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1. EIA/TIA Commercial and Administration Standards
2. NEC
3. IEEE 802
4. IETF RFCs
5. FCC – All Applicable Rules and Regulations
6. UL
7. MIOSHA Safety Standards

1.05 CONTRACTOR

- A. The Contractor shall accept complete responsibility for the installation, certification and support of the system and/or components as required herein. Contractor shall be an authorized vendor of all major components.
- B. All work shall be performed and supervised by Project Managers, Engineers and/or Technicians who are qualified to install specified equipment and perform related tests as recommended by the manufacturer and in accordance with the manufacturer's best practices and methods and as required herein.
- C. Project Managers, Engineers and Technicians employed on this project shall be properly and fully trained and qualified by the manufacturer on the installation and testing of the equipment and systems to be installed.
- D. The Contractor shall have a proven track record in comparable system supply, configuration and installation. This must be shown by the inclusion of references of at least three (3) projects involving the supply and/or installation of similar systems completed by the Contractor in the prior two (2) years with the sealed Bid Proposal as provided herein.

PART 2 - PRODUCTS

2.01 Acceptable Manufacturers

- A. Acceptable manufacturers have been provided to comply with a standard for individual components associated with the specified system. Indicated components include particular models and makes currently installed and/or preferred by Owner.
- B. Any system bid shall be based only on acceptable manufacturer's components.

2.02 Supply most current version of all products provided.

- A. Manufacturer shall have five (5) years of experience and history manufacturing similar products to those specified.
 - B. Proposed components shall have been field tested and proven in actual use.
 - C. Prior and/or old versions of products, unless specifically approved and documented by Designer and/or Owner shall not be acceptable.
 - D. In cases where a newer version of hardware or software is available at the time of installation, Contractor shall request clarification from Designer on which version is to be used.
- 2.03 Furnish only new, first-class quality materials and equipment.
- 2.04 All wiring not installed in conduit shall be plenum type cable and shall be so identified with continuous marking.
- 2.05 All connectors and accessories not installed in conduit and installed above finished ceiling shall be plenum rated.
- 2.06 SPECIAL CONFIGURATION LOCATIONS
- A. Configuration A
- 1. Contractor shall supply one (1) of the specified configurations in each of the following locations.
 - a. Pinewood Middle School
 - 1. Reception – B103 - (65’)
 - 2. Foyer – Corridor B119 – (65’)
 - b. Challenger Elementary School
 - 1. Cafeteria Servery – (65’)
 - c. Southwood Elementary School
 - 1. Cafeteria Servery – (65’)
 - d. Crestwood Middle School
 - 1. Cafeteria Servery – (65’)
 - e. Townline Elementary School
 - 1. Cafeteria Servery – (65’)

2. One (1) LED Monitor(s)
 - a. Acceptable Manufacturer(s)
 1. LG
 - b. LED Monitor shall meet or exceed the following minimum requirements:
 1. 65" diagonal
 2. Brightness 350 cd/m
 3. Rated for 16/7 run-time
 4. 8ms refresh rate
 5. 3840 x 2160 resolution
 6. 16:9 aspect ratio
 7. Two (2) HDMI input ports
 8. RS232C In/out
 9. Must include Web OS 6.0 or higher for integration with Owner supplied Carousel digital signage platform.
 - c. Contractor shall supply and install appropriate flat mounts for supplied LED monitors. Mounts shall be Peerless (SF660) or Chief equivalent.
 - d. Contractor shall patch in monitor to Owner provided network using Contractor supplied category 6 patch cables at both monitor and switch location. Contractor shall report back switch port for Owner programming. Contractor shall fully configure provided monitor for usage with Owner provided digital signage system.

B. Configuration B

1. Contractor shall supply one (1) of the specified configurations in each of the following locations.
 - a. Pinewood Middle School
 1. Office Conference Room - (65")
2. One (1) LED Monitor(s)
 - a. Acceptable Manufacturer(s)

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1. LG
- b. LED Monitor shall meet or exceed the following minimum requirements:
 1. 65” diagonal
 2. Brightness 350 cd/m
 3. Rated for 16/7 run-time
 4. 8ms refresh rate
 5. 3840 x 2160 resolution
 6. 16:9 aspect ratio
 7. Two (2) HDMI input ports
 8. RS232C In/out
- c. Contractor shall supply and install appropriate tilt mounts for supplied LED monitors. Mounts shall be Peerless (ST660) or Chief equivalent.
3. One (1) HDMI Transmission Device(s)
 - a. Acceptable Manufacturer(s)
 1. CRESTRON
 2. KRAMER
 - a. TP-583T/TP-583R
 - b. HDMI Transmission Device shall meet or exceed the following minimum requirements:
 1. HDBaseT 1.0
 2. 4K60 4:4:4 Up to 130'
 3. HDCP 2.2
 - c. Contractor shall install HDMI transmitter at conference table provided by Others and integrate into table pocket. HDMI pass through connector in table pocket provided by Others.
 - d. Contractor shall securely and neatly mount HDMI transmission equipment at table and monitor locations.

- e. Contractor shall supply and install category 6 shielded cable for HDMI transmission.
- f. Contractor to supply 8' ultra-slim HDMI cable for device connection.

C. Configuration C

- 1. Contractor shall supply one (1) of the specified configurations in each of the following locations.
 - a. Townline Elementary Cafeteria
- 2. One (1) Projector
 - a. Acceptable Manufacturer(s)
 - 1. Epson
 - a. EB-PU1008W
 - b. 8,500 Lumens
 - c. Projector will be white in color
 - d. Projector shall be provided with appropriate lens for an approximate 25' throw to fill a 14.5' wide front projection system with a 16:9 ratio projected image.
 - e. Projector shall be securely installed and affixed to mounting system and downpipe that is structurally attached to finished ceiling. Contractor shall supply appropriate mount and downpipe to securely and safely extend projector to optimal location for projection onto screen.
 - f. Projector shall be connected to supplied AV control system to receive transmission of signal from supplied input locations.
- 3. One (1) Multimedia Processor
 - a. Acceptable Manufacturer(s)
 - 1. QSC
 - b. Contractor shall supply all parts, cables and accessories to securely mount unit in existing AV rack.
 - c. Contractor shall provide all control, communication, audio and video patch cables to connect input and output ports to all Contractor provided materials.

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- d. Contractor shall program Multimedia processor to integrate with powered roll-up screen (provided by Others) and projector. Contractor shall supply all necessary cabling and programming to fully enable integration with control system.
 - e. Contractor shall provide all system programming and operation software for a fully functional and operational system. All programming and/or configuration activity shall be completely coordinated and approved by Owner and/or Designer prior to initiation of final installation activity.
 - f. Contractor shall provide and install fully compliant shielded cabling and any other low voltage communication infrastructure needed to fully connect to the projection system from one (1) input plates and one (1) wireless presentation system. Cable shall meet or exceed manufacturer requirements for AV over IP systems.
 - g. Contractor shall completely integrate control system and multimedia systems with provided audio system.
4. One (1) multimedia input locations shall be provided.
- a. Acceptable Manufacturer(s)
 - 1. QSC
 - b. Rack input location shall be installed in provided rack, wall input to be installed in provided double gang box, Contractor shall supply stainless steel plate for fully finished installation.
 - c. Contractor will supply correct in-plate transmit and receive equipment to extend input location to supplied encoder.
 - d. Contractor will supply all necessary encoder and decoder equipment to connect supplied projector.
 - e. Valid video input into the system shall turn on system automatically.
 - f. System shall power down after ten (10) minutes of no video signal.
 - g. AV over IP units shall properly scale input image to projector to optimal resolution.

5. One (1) Touch Screen(s) shall be provided

- a. Acceptable Manufacturer(s)
 - 1. QSC

- b. 7" diagonal size
- c. White
- d. Touch Screen(s) shall be provided to control system operations.
 - 1. Connect touch screens to supplied AV over IP control system as per manufacturer installation instructions.
 - 2. Provide all necessary cabling, mounts and accessories to securely mount touch screen in provided double gang box.
 - 3. Control touch screen shall be provided in locations specified herein that shall provide the following functions but not limited to.
 - a. System Power On
 - b. System Power Off
 - c. Select Source, input 1 or wireless presentation system
 - d. Audio Level Increase
 - e. Audio Level Decrease
 - f. Image Freeze
 - g. Audio Mute
 - e. Contractor shall provide all control, communication, audio and video patch cables, transmitters and receivers to connect input and output ports to all Contractor and Owner provided materials in the space.
 - f. Contractor shall program Multimedia Control System to integrate with Owner provided motorized electric screens.
- 6. One (1) PDU shall be provided and installed
 - a. Contractor to supply 8-Outlet PDU (Middle Atlantic PD-815R or Equal) for installation in 2 post rack provided by Others.
- 7. One (1) Wireless Presentation System
 - a. Acceptable Manufacturers (in alphabetical order):
 - 1. KRAMER
 - a. VIA GO3

- b. Wireless Presentation System shall meet or exceed the following requirements:
 - 1. HDMI output with support for up to 4K
 - 2. Gigabit LAN and dual-band 802.11ac Wireless connectivity
 - 3. 16GB Memory
 - 4. 128GB Storage
 - 5. All other features currently a part of the manufacturer's latest commercial release.
 - 6. All necessary cables, mounting brackets and connectors to securely mount Wireless presentation system in Contractor provided rack.
 - c. Contractor shall integrate wireless presentation system with provided control system.
 - d. Contractor shall supply three (3) years of licensing for Kramer Cloud VSM for Kramer VIA GO3 management. Contractor shall make Kramer VIA GO3 device fully functional within the Kramer Cloud VSM system.
 - e. Contractor shall coordinate installation and configuration of Wireless Presentation System per manufacturer recommended guidelines. Contractor shall work collaboratively as necessary with Owner and network support resources for a complete and compliant installation.
 - f. Contractor shall supply and install all necessary patch cables to connect equipment to network and in data closet location. Contractor shall cross connect equipment in data closet and report to Owner data closet, switch and port location for programming.
8. One (1) Voice Amplification System(s) shall be provided and installed
- a. Acceptable Manufacturer(s)
 - 1. SHURE
 - a. QLXD4
 - b. Handheld and Lavalier microphone combo
 - c. Contractor shall supply and install any necessary external antennas and cabling to enable clear and reliable audio signal coverage for entire cafeteria.

- d. Contractor shall supply all mounting hardware to securely mount equipment into 2 post rack supplied by Others.
 - e. Contractor shall supply 3U drawer to store microphone in IT rack supplied by Others.
9. Eight (8) Speakers shall be provided and installed
- a. Acceptable Manufacturer(s)
 - 1. HARMAN/JBL PRO
 - a. JBL CONTROL 18C/T
 - 2. Or Equal
 - b. Passive 2-way full range speaker
 - c. 8" Low Frequency Driver, 1-inch Voice Coil
 - d. 180W peak
 - e. 8 ohms
 - f. 94 dB sensitivity
 - g. 34Hz-18kHz +/- 3dB, -10dB @ 50Hz
 - h. Contractor shall safely and securely mount speakers to cafeteria ceiling structure using manufacturer recommended and industry best practices.
 - i. Contractor shall include any necessary backbox and speaker protection for a fully functional and compliant system where applicable.
 - j. Contractor shall supply and install properly sized speaker cabling to support supplied speakers. Each speaker shall be independently wired back to provided rack.
 - k. Speakers shall be white in color.
10. One (1) Mixer/DSP shall be provided and installed.
- a. Acceptable Manufacturer(s)
 - 1. QSC
 - 2. Or Equal

- b. System shall be populated with necessary accessories for 4 line-level input audio channels.
- c. Contractor shall supply all parts, cables and accessories to securely mount unit in provided cabinet.
- d. Contractor shall supply all necessary labor to configure Mixer/DSP.
- e. Contractor shall integrate DSP with provided touchscreen and control system
- f. Contractor shall provide all system programming and operation software for a fully functional and operational system. All programming and/or configuration activity shall be completely coordinated and approved by Owner and/or Designer prior to initiation of final installation activity.
- g. Contractor shall supply all cables and accessories for a fully functional system.

11. One (1) Amplification System shall be provided and installed

- a. Acceptable Manufacturer(s)
 - 1. HARMAN/JBL PRO
 - a. CSA2300Z
 - 2. Or Equal
- b. Two (2) input channels
- c. Two (2) output channels
- d. 300W maximum output per channel
- e. S/N (20 Hz – 20kHz @ 8 Ohms) > 97 dB

12. One (1) Remote input location(s) shall be provided and installed.

- a. Remote input location shall provide XLR and 3.5mm connectivity in identified locations.
- b. Contractor shall supply all cabling, faceplates and accessories for a complete installation.
- c. Contractor shall integrate XLR and 3.5mm connection into provided DSP/Mixer system.

D. Configuration D

1. Contractor shall supply one (1) of the specified configurations in the following locations.
 - a. Townline Elementary Gymnasium
2. One (1) Rack System(s) shall be provided and installed.
 - a. Acceptable Manufacturer(s)
 1. Middle Atlantic
 - a. DWR-12-26PD
 2. Or Equal.
 - b. Wall Mount
 - c. 12U
 - d. Plexiglas Locking Door
 - e. Forward rackrail
 - f. UL Load Capacity 200 lbs
 - g. 26" usable depth
 - h. 21" usable height
 - i. Contractor to supply 8-Outlet PDU (Middle Atlantic PD-815R or Equal).
3. One (1) Voice Amplification System(s) shall be provided and installed
 - a. Acceptable Manufacturer(s)
 1. SHURE – QLXD4
 2. Or Equal.
 - b. Handheld and Lavalier microphone combo
 - c. Contractor shall supply and install any necessary external antennas and cabling to enable clear and reliable audio signal coverage for entire gymnasium.

- d. Contractor shall supply all mounting hardware to securely mount equipment into Contractor supplied rack.
 - e. Contractor shall supply 3U drawer to store microphone in Contractor supplied rack.
4. Eight (8) Speakers shall be provided and installed
- a. Acceptable Manufacturer(s)
 - 1. Harman/JBL Pro
 - a. JBL CONTROL 321CT
 - 2. Or Equal
 - b. Passive 2-way full range speaker
 - c. 12" Low Frequency Driver, 2-inch Voice Coil
 - d. 1.75" High Frequency Driver
 - e. 200W AES, 600W peak
 - f. 8 ohms
 - g. 94 dB sensitivity
 - h. 34Hz-18kHz +/- 3dB, -10dB @ 50Hz
 - i. Contractor shall safely and securely mount speakers to gymnasium ceiling structure using manufacturer recommended and industry best practices.
 - j. Contractor shall include any necessary backbox and speaker protection for a fully functional and compliant system.
 - k. Contractor shall supply and install properly sized speaker cabling to support supplied speakers. Each speaker shall be independently wired back to provided rack.
 - l. Speakers shall be white in color.
 - m. Proposed speaker quantities are based on the provided base speaker models. If alternate equipment is proposed, Contractor shall provide speaker analysis to verify even distribution of sound throughout the gymnasium for review.

5. One (1) Mixer(s) shall be provided and installed.

- a. Acceptable Manufacturer(s)
 - 1. HARMAN/JBL PRO
 - a. CSM14
 - 2. Or Equal
 - b. 4 Inputs – 1 Output
 - c. Contractor shall supply all parts, cables and accessories to securely mount unit in provided cabinet.
 - d. Contractor shall supply all cables and accessories for a fully functional system.
6. One (1) Amplification System shall be provided and installed.
- a. Acceptable Manufacturer(s)
 - 1. Harman/JBL Pro
 - a. CSA2300Z
 - 2. Or Equal
 - b. Two (2) input channels
 - c. Two (2) output channels
 - d. 300W maximum output per channel
 - e. S/N (20 Hz – 20kHz @ 8 Ohms) > 97 dB
7. One (1) CD/Bluetooth Player shall be provided and installed (one in gymnasium one in cafeteria).
- a. Acceptable Manufacturer(s)
 - 1. TASCAM
 - a. CD-400U
 - 2. Or Equal.
 - b. Contractor shall supply all parts, cables and accessories to securely mount unit in provided cabinet.

- c. Contractor shall provide all audio cables and accessories to integrate CD/Bluetooth player with provided DSP/Mixer system.
- 8. One (1) Remote input location(s) shall be provided and installed (one in gymnasium one in cafeteria).
 - a. Remote input location shall provide XLR and 3.5mm connectivity in identified locations.
 - b. Contractor shall supply all cabling, faceplates and accessories for a complete installation.
 - c. Contractor shall integrate XLR and 3.5mm connection into provided Mixer system.

E. Configuration E

- 1. Contractor shall supply one (1) of the specified configurations in each of the following locations.
 - a. Crestwood Middle School Cafeteria
- 2. One (1) Projector
 - a. Acceptable Manufacturer(s)
 - 1. Epson
 - a. EB-PU1008W
 - b. 8,500 Lumens
 - c. Projector will be white in color
 - d. Projector shall be provided with appropriate lens for an approximate 55' throw to fill a 14' wide front projection system with a 16:9 ratio projected image.
 - e. Projector shall be securely installed and affixed to mounting system and downpipe that is structurally attached to finished ceiling. Contractor shall supply appropriate mount and downpipe to securely and safely extend projector to optimal location for projection onto screen.
 - f. Contractor shall supply all necessary AV over IP decoder devices to integrate projector with system.
 - g. Contractor shall supply and install all necessary patch cables to connect equipment to network and in data closet location. Contractor

shall cross connect equipment in data closet and report to Owner data closet, switch and port location for programming.

h.

3. One (1) Powered Rollup Projection Screen

a. Acceptable Manufacturer(s)

1. DA-LITE

a. Tensioned Myriad Reveal

b. Powered Rollup Projection Screen shall meet or exceed the following minimum requirements:

c. 94.5" x 168" – Wide (16:9) Format

d. White powder coated finish

e. Surface mount

f. Progressive 1.1 Screen Surface

g. Sitrine Cable Drop

h. Low voltage control RS-232 capable

4. One (1) Multimedia Processor

a. Acceptable Manufacturer(s)

1. QSC

b. Contractor shall supply all parts, cables and accessories to securely mount unit in existing IT rack.

c. Contractor shall provide all control, communication, audio and video patch cables to connect input and output ports to all Contractor provided materials.

d. Contractor shall program Multimedia processor to integrate with Contractor provided powered roll-up screen and projector. Contractor shall supply all necessary cabling and programming to fully enable integration with control system.

e. Contractor shall provide all system programming and operation software for a fully functional and operational system. All programming and/or configuration activity shall be completely

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coordinated and approved by Owner and/or Designer prior to initiation of final installation activity.

- f. Contractor shall provide and install fully compliant shielded cabling and any other low voltage communication infrastructure needed to fully connect to the projection system from two (2) input plates and one (1) wireless presentation system. Cable shall meet or exceed manufacturer requirements for AV over IP systems.
 - g. Contractor shall completely integrate control system and multimedia systems with provided audio system.
5. One (1) multimedia input locations shall be provided.
- a. Acceptable Manufacturer(s)
 - 1. QSC
 - b. Wall input to be installed in provided double gang box, Contractor shall supply stainless steel plate for fully finished installation.
 - c. Contractor will supply correct in-plate transmit and receive equipment to extend input location to supplied encoder.
 - d. Contractor will supply all necessary encoder and decoder equipment to connect supplied projector.
 - e. Valid video input into the system shall turn on system automatically.
 - f. System shall power down after ten (10) minutes of no video signal.
 - g. AV over IP units shall properly scale input image to projector to optimal resolution.
6. One (1) Touch Screen(s) shall be provided
- a. Acceptable Manufacturer(s)
 - 1. QSC
 - b. 7” diagonal size
 - c. White
 - d. Touch Screen(s) shall be provided to control system operations.
 - 1. Connect touch screens to supplied AV over IP control system as per manufacturer installation instructions.

2. Provide all necessary cabling, mounts and accessories to securely mount touch screen in provided double gang box.
3. Control touch screen shall be provided in locations specified herein that shall provide the following functions but not limited to.
 - a. System Power On
 - b. System Power Off
 - c. Select Source, input 1 or wireless presentation system
 - d. Control Provided LED Panels
 - e. Audio Level Increase
 - f. Audio Level Decrease
 - g. Image Freeze
 - h. Audio Mute
- e. Contractor shall provide all control, communication, audio and video patch cables, transmitters and receivers to connect input and output ports to all Contractor and Owner provided materials in the space.
- f. Contractor shall program Multimedia Control System to integrate with Owner provided motorized electric screens.
7. One (1) PDU shall be provided and installed
 - a. Contractor to supply 8-Outlet PDU (Middle Atlantic PD-815R or Equal) for installation in 2 post rack provided by Others.
8. OPE Digital Signage Player Integration
 - a. Contractor shall securely install existing signage player in Contractor provided rack for connection to Contractor supplied AV over IP Encoders.
 - b. Contractor shall supply all necessary AV over IP encoder devices to integrate OPE digital signage player with system.
 - c. Contractor shall supply and install all necessary patch cables to connect equipment to network and in data closet location. Contractor shall cross connect equipment in data closet and report to Owner data closet, switch and port location for programming.
9. OPE Existing LED Monitors

- a. Contractor shall carefully remove, store and reinstall in locations identified on provided diagrams.
- b. All existing monitors shall be controlled through supplied control system. If expansion of controller IO is necessary Contractor shall provide necessary IO expansion units. System shall be capable of discrete output to each monitor.
- c. Contractor shall supply appropriate Q-SYS AV over IP equipment for discrete output for each monitor and projector concurrently for a fully functional system.
- d. Supplied Q-SYS AV over IP equipment shall scale images to optimal projector resolution.

10. One (1) LED Monitor(s)

- a. Acceptable Manufacturer(s)
 - 1. LG
- b. LED Monitor shall meet or exceed the following minimum requirements:
 - 1. 65" diagonal
 - 2. Brightness 350 cd/m
 - 3. Rated for 16/7 run-time
 - 4. 8ms refresh rate
 - 5. 3840 x 2160 resolution
 - 6. 16:9 aspect ratio
 - 7. Two (2) HDMI input ports
 - 8. RS232C In/out
- c. Contractor shall supply and install appropriate mounts for supplied LED monitors, one (1) flat mount Peerless ST660P or Chief equivalent shall be provided. See drawings for location.
- d. All monitors shall be controlled through supplied control system. If expansion of controller IO is necessary Contractor shall provide necessary IO expansion units. System shall be capable of discrete output to each monitor.

- e. Contractor shall supply appropriate Q-SYS AV over IP equipment for discrete output for each monitor and projector concurrently for a fully functional system.
- f. Supplied Q-SYS AV over IP equipment shall scale images to optimal projector resolution.

11. One (1) Wireless Presentation System

- a. Acceptable Manufacturers (in alphabetical order):
 - 1. KRAMER
 - a. VIA GO3
- b. Wireless Presentation System shall meet or exceed the following requirements:
 - 1. HDMI output with support for up to 4K
 - 2. Gigabit LAN and dual-band 802.11ac Wireless connectivity
 - 3. 16GB Memory
 - 4. 128GB Storage
 - 5. All other features currently a part of the manufacturer's latest commercial release.
 - 6. All necessary cables, mounting brackets and connectors to securely mount Wireless presentation system in Contractor provided rack.
- c. Contractor shall integrate wireless presentation system with provided control system.
- d. Contractor shall supply three (3) years of licensing for Kramer Cloud VSM for Kramer VIA GO3 management. Contractor shall make Kramer VIA GO3 device fully functional within the Kramer Cloud VSM system.
- e. Contractor shall coordinate installation and configuration of Wireless Presentation System per manufacturer recommended guidelines. Contractor shall work collaboratively as necessary with Owner and network support resources for a complete and compliant installation.
- f. Contractor shall supply and install all necessary patch cables to connect equipment to network and in data closet location. Contractor

shall cross connect equipment in data closet and report to Owner data closet, switch and port location for programming.

12. Two (2) Voice Amplification System(s) shall be provided and installed

- a. Acceptable Manufacturer(s)
 - 1. SHURE
 - a. QLXD4
 - b. Handheld and Lavalier microphone combo
 - c. Contractor shall supply and install any necessary external antennas and cabling to enable clear and reliable audio signal coverage for entire cafeteria.
 - d. Contractor shall supply all mounting hardware to securely mount equipment into 2 post rack supplied by Others.
 - e. Contractor shall supply 3U drawer to store microphone in existing IT rack.

13. Sixteen (16) Speakers shall be provided and installed

- a. Acceptable Manufacturer(s)
 - 1. HARMAN/JBL PRO
 - a. JBL CONTROL 18C/T (Recessed)
 - b. JBL CONTROL 68HP (Pendant)
 - 2. Or Equal
 - b. Passive 2-way full range speaker
 - c. 8" Low Frequency Driver, 1-inch Voice Coil
 - d. 180W peak
 - e. 8 ohms
 - f. 94 dB sensitivity
 - g. 34Hz-18kHz +/- 3dB, -10dB @ 50Hz

- h. Contractor shall safely and securely mount speakers to cafeteria ceiling structure using manufacturer recommended and industry best practices.
- i. Contractor shall include any necessary backbox and speaker protection for a fully functional and compliant system where applicable.
- j. Contractor shall supply and install properly sized speaker cabling to support supplied speakers. Each speaker shall be independently wired back to provided rack.
- k. Speakers shall be white in color.

14. One (1) Mixer/DSP shall be provided and installed.

- a. Acceptable Manufacturer(s)
 - 1. QSC
 - 2. Or Equal
- b. System shall be populated with necessary accessories for 4 line-level input audio channels.
- c. Contractor shall supply all parts, cables and accessories to securely mount unit in provided cabinet.
- d. Contractor shall supply all necessary labor to configure Mixer/DSP.
- e. Contractor shall integrate DSP with provided touchscreen and control system
- f. Contractor shall provide all system programming and operation software for a fully functional and operational system. All programming and/or configuration activity shall be completely coordinated and approved by Owner and/or Designer prior to initiation of final installation activity.
- g. Contractor shall supply all cables and accessories for a fully functional system.

15. One (1) Amplification System shall be provided and installed

- a. Acceptable Manufacturer(s)
 - 1. HARMAN/JBL PRO
 - a. CSA2300Z

2. Or Equal

- b. Two (2) input channels
- c. Two (2) output channels
- d. 300W maximum output per channel
- e. S/N (20 Hz – 20kHz @ 8 Ohms) > 97 dB

16. One (1) Remote input location(s) shall be provided and installed.

- a. Remote input location shall provide XLR and 3.5mm connectivity in identified locations.
- b. Contractor shall supply all cabling, faceplates and accessories for a complete installation.
- c. Contractor shall integrate XLR and 3.5mm connection into provided DSP/Mixer system.

F. Configuration F

- 1. Contractor shall supply one (1) of the specified configurations in each of the following locations.
 - a. Crestwood Middle School
 - 1. Science Lab – 213
 - 2. Science Lab – 215
 - 3. Science Lab – 313
 - 4. Science Lab – 315
 - 5. Science Lab – 413
 - 6. Science Lab - 415
- 2. OPE Projector
 - a. Contractor shall integrate control system equipment with existing 1485FI project.
 - b. Contractor shall provide all necessary AV over IP decoder equipment to integrate existing projector with control system for a fully functional system.

3. USB Extension Device

- a. Contractor shall supply USB extension device to extend OPE projector interactivity to teacher input location. Contractors shall supply all necessary cabling and transmission devices to make interactivity fully functional.

4. Six (6) LED Monitor(s)

- a. Acceptable Manufacturer(s)

- 1. LG

- b. LED Monitor shall meet or exceed the following minimum requirements:

- 1. 55" diagonal
 - 2. Brightness 350 cd/m
 - 3. Rated for 16/7 run-time
 - 4. 8ms refresh rate
 - 5. 3840 x 2160 resolution
 - 6. 16:9 aspect ratio
 - 7. Two (2) HDMI input ports
 - 8. RS232C In/out

- c. Contractor shall supply and install appropriate mounts for supplied LED monitors, one (1) flat mount Peerless ST660P or Chief equivalent shall be provided. See drawings for location.
- d. All monitors shall be controlled through supplied control system. If expansion of controller IO is necessary Contractor shall provide necessary IO expansion units. System shall be capable of discrete output to each monitor.
- e. Contractor shall supply appropriate Q-SYS AV over IP equipment for discrete output for each monitor and projector concurrently for a fully functional system.
- f. Supplied Q-SYS AV over IP equipment shall scale images to optimal projector resolution.

5. One (1) Rack System(s) shall be provided and installed. **NOTE: One (1) rack system shall be provided for each pair of rooms for a total of three (3) total racks.**
 - a. Acceptable Manufacturer(s)
 1. Middle Atlantic
 - a. DWR-18-22PD
 2. Or Equal.
 - b. Wall Mount
 - c. 18U
 - d. Plexiglas Locking Door
 - e. Forward rackrail
 - f. UL Load Capacity 200 lbs
 - g. 20" usable depth
 - h. 31.5" usable height
 - i. Contractor to supply 8-Outlet PDU (Middle Atlantic PD-815R or Equal).
6. One (1) Multimedia Processor/DSP
 - a. Acceptable Manufacturer(s)
 1. Q-SYS
 - b. Contractor shall supply all parts, cables and accessories to securely mount unit in building MDF location.
 - c. Contractor shall provide all control, communication, audio and video patch cables to connect input and output ports to all Contractor provided materials.
 - d. Contractor shall program Multimedia processor to integrate with Contractor provided monitors and projector. Contractor shall supply all necessary cabling and programming to fully enable integration with control system.
 - e. Contractor shall provide all system programming and operation software for a fully functional and operational system. All

programming and/or configuration activity shall be completely coordinated and approved by Owner and/or Designer prior to initiation of final installation activity.

- f. System shall be populated with necessary accessories for 8 line-level input audio channels.
 - g. Contractor shall supply all parts, cables and accessories to securely mount unit in provided cabinet.
 - h. Contractor shall supply all necessary labor to configure Mixer/DSP.
 - i. Contractor shall integrate Multimedia Processor/DSP with provided touchscreen.
 - j. Contractor shall provide all system programming and operation software for a fully functional and operational system. All programming and/or configuration activity shall be completely coordinated and approved by Owner and/or Designer prior to initiation of final installation activity.
 - k. Contractor shall supply all cables and accessories for a fully functional system.
 - l. Contractor shall provide and install fully compliant shielded cabling and any other low voltage communication infrastructure needed to fully connect to the projection system from seven (7) input plate(s) and one (1) wireless presentation system(s). Cable shall meet or exceed Q-SYS requirements for AV over IP systems.
7. Seven (7) Multimedia Input Location shall be provided.
- a. Acceptable Manufacturer(s)
 - 1. Q-SYS
 - b. Wall input to be installed in provided double gang box (transmitter should be single gang), Contractor shall supply stainless steel plate for fully finished installation.
 - c. Contractor shall supply correct in-plate transmit and receive equipment to extend input location to supplied Q-SYS AV over IP encoder.
 - d. Contractor will supply all necessary Q-SYS AV over IP decoder equipment to connect supplied projector and monitors.
 - e. Valid video input into the system shall turn on system automatically.

- f. System shall power down after ten (10) minutes of no video signal.
 - g. Q-SYS AV over IP units shall properly scale input image to projector to optimal resolution.
8. One (1) Touch Screen(s) shall be provided
- a. Acceptable Manufacturer(s)
 - 1. Q-SYS
 - b. Touch Screen(s) shall be provided to control system operations.
 - 1. Touchscreen shall be 7”
 - 2. White
 - 3. Connect touch screens to supplied control system as per manufacturer installation instructions.
 - 4. Provide all necessary cabling, mounts and accessories to securely mount touch screen in provided double gang box.
 - 5. Control touch screen shall be provided in locations specified herein that shall provide the following functions but not limited to.
 - a. System Power On
 - b. System Power Off
 - c. Select Source, input 1-7 or wireless presentation system
 - d. Control Provided LED Panels and Projector.
 - e. Audio Level Increase
 - f. Audio Level Decrease
 - g. Image Freeze
 - h. Audio Mute
 - c. Contractor shall provide all control, communication, audio and video patch cables, transmitters and receivers to connect input and output ports to all Contractor and Owner provided materials in the space.
9. One (1) Wireless Presentation System
- a. Acceptable Manufacturers (in alphabetical order):

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1. KRAMER
 - a. VIA GO3
 - b. Wireless Presentation System shall meet or exceed the following requirements:
 1. HDMI output with support for up to 4K.
 2. Gigabit LAN and dual-band 802.11ac Wireless connectivity
 3. 16GB Memory
 4. 128GB Storage
 5. All other features currently a part of the manufacturer's latest commercial release.
 6. All necessary cables, mounting brackets and connectors to securely mount Wireless presentation system in existing rack.
 - c. Contractor shall integrate wireless presentation system with provided Crestron control system.
 - d. Contractor shall coordinate installation and configuration of Wireless Presentation System per manufacturer recommended guidelines. Contractor shall work collaboratively as necessary with Owner and network support resources for a complete and compliant installation.
 - e. Contractor shall provide licensing for Kramer VIA Cloud management platform for three (3) years. Contractor shall work collaboratively with Owner to make all Kramer VIA devices fully functional in management software.
 - f. Contractor shall supply all necessary patch cables to connect Wireless Presentation Device to Owner supplied network cabling and switches. Contractor shall fully patch all devices and report back switch ports to Owner for programming.
10. Four (4) Speakers shall be provided and installed
 - a. Acceptable Manufacturer(s)
 1. HARMAN/JBL PRO
 - a. CONTROL 16C-T
 2. Or Equal

- b. Recessed
- c. Passive 2-way full range speaker
- d. 6.5" Low Frequency Driver, 1-inch Voice Coil
- e. 150W Continuous
- f. 8 ohms
- g. 94 dB sensitivity
- h. 58Hz-18kHz +/- 3dB, -10dB @ 50Hz
- i. Contractor shall safely and securely mount speakers in acoustical ceiling tile using manufacturer recommended and industry best practices.
- j. Contractor shall supply and install properly sized speaker cabling to support supplied speakers.
- k. Speakers shall be white in color.

11. One (1) Amplification System shall be provided and installed

- a. Acceptable Manufacturer(s)
 - 1. HARMAN/JBL PRO
 - a. CSA-180Z
 - 2. Or Equal
- b. One (1) input channels
- c. One (1) output channels
- d. 80W maximum output per channel
- e. S/N (20 Hz – 20kHz @ 8 Ohms) > 97 dB

12. One (1) Voice Amplification System shall be provided and installed.

- a. Acceptable Manufacturer(s)
 - 1. LIGHTSPEED
 - a. ACCESS LINK

- b. Major components of the Voice Amplification System shall be carefully installed at rack location.
- c. Voice Amplification systems shall meet or exceed the following minimum standards:
 - 1. DECT (1.9 GHz) communication for complete classroom coverage of two (2) microphones simultaneously.
 - 2. Two (2) highly durable, rechargeable, battery powered, tamper resistant, impact resistant, lanyard based pendant microphones.
 - a. Two (2) Lightspeed volume control Flexmikes
- d. In the event of a power failure, system shall automatically re-initialize and “become active” to the last configuration in use with no human intervention.
- e. All other features currently a part of the manufacturer’s latest commercial release.
- f. Voice Amplification Systems shall be neatly and securely mounted at projector location. Contractor shall supply necessary shielded audio cable to extend output Lightspeed system to Multimedia Processor/DSP in AV rack location.

2.07 ALLOWANCES

- A. Contractor shall include allowances for equipment and/or other contract service reimbursements as required below in base bid lump sum amount(s). Equipment and/or contract services shall be provided and sourced at Owner’s discretion and convenience with full cooperation by Contractor and paid for from successful bidder’s contract in the amount(s) provided for herein. Any allowance amount proving to be excessive for the intended equipment and/or contract services shall be credited to the Owner against contract payment requests.
 - 1. Allowance shall be made in the amount of \$25,000.00 for Owner directed infrastructure upgrades.

PART 3 - EXECUTION

3.08 PREPARATION

- A. Contractor shall conduct detailed walk-through examination with Designer, Construction Manager and Owner verifying equipment and material locations as well as mounting and placement requirements prior to commencement of other installation activities.

- B. Contractor shall ensure all submittals and have been provided to, and approval has been obtained from Designer and Owner prior to commencement of any final installation activities. Submittals shall include, but not be limited to:
 - 1. Shop drawings, data sheets and system diagrams including specific cable connectors and types proposed to be installed.
 - 2. Asset tag format, composition, attachment method and location on each serialized component being provided.
 - 3. Firmware configuration template to be used for each component provided.
 - 4. Written installation, coordination and test procedure to be followed by installing technicians and engineers.
 - 5. Final documentation template.

3.09 DEMOLITION

- A. Remove ALL abandoned AV cabling including VGA, Cable TV (in classroom only), unused speaker cables, shelves, brackets and blank any open locations in all rooms receiving new AV equipment.
- B. Contractor shall remove any existing equipment and transport to Owner directed site for disposition. Any equipment not retained by Owner shall be properly disposed of by Contractor.

3.10 INSTALLATION

- A. Contractor shall be familiar with the environment where work will be done as specified herein and make every reasonable effort to minimize interference with Owner's or other contractor's activities.
 - 1. Appendices depicting general ceiling conditions for areas of buildings are included herein. Contractors shall field verify specific room conditions.
- B. Work Areas shall be cleaned at the end of each day. All debris shall be cleared, removed and disposed of off premise. All equipment and tools shall be removed from common areas and stored in approved, secure storage locations.
 - 1. Owner shall not be responsible for disposal or transportation of any packaging materials or other waste items.
 - 2. Owner's waste containers including site dumpsters shall not be used for material disposal.

- C. All equipment and materials shall be installed in a neat and workmanlike manner. Best practices installation principles shall be used throughout the project.
- D. The Contractor shall furnish, set in place, and install all equipment necessary for a fully compliant and operational system as specified herein. The installation process includes, but is not limited to the following:
 - 1. Inventory receipt of all components and equipment.
 - 2. Storage of all equipment and components until such time those items are installed according to the specifications.
 - 3. Transport equipment to the Owner's installation location(s).
 - 4. Assemble, install, configure and test all equipment and components, maintaining accurate inventory records and status documents and discarding packaging.
 - 5. Collect all information necessary to accurately program all system devices to the Owner's intended use and need.
 - 6. Label with asset tags and other markings provided by Owner all system devices as may be appropriate and required by Owner and Designer.
 - 7. Work shall be performed to meet local codes and industry standards including proper grounding and bonding of installed equipment. Work shall conform to "best practices" observed by industry professional installers and as required by Owner and Designer.
 - 8. Work shall include careful coordination and cooperation with others to ensure a timely, cost effective and proper installation for Owner's intended application. Such efforts shall include, but not be limited to, coordinating and cooperating with other contractors, Owner, Designer and Engineer.
 - 9. Where cables are to be routed through or on a finished wall, standard connectors must be used at the wall location to terminate call cables. All wall plates shall be stainless steel. Plastic or nylon plates shall not be acceptable. Cables routed out of a wall box on a finished wall without proper standard connection termination shall not be acceptable.
 - 10. All cables shall be properly and adequately supported using hooks or rings no more than eight feet (8') apart. Cables supported by structural steel, ceiling grid or hanger wires will not be acceptable. All cable routing shall be neat and orderly.

11. All cable connecting components mounted in/on Technology Cart, shall have adequate cable slack to provide for full system inspection and or service without the removal (intentional or inadvertent) of connecting cables, including items that will be placed on the keyboard tray of equipment carts.
12. Label all cable connections for intuitive user access and as directed by Owner and Designer.
13. Work may include extending cables from installed equipment, and as required and/or specified herein, to Owner identified connection outlets.
 - a. Work includes supply, connection and testing of any such cables.

14. PROJECTORS

- a. Install, configure and test approved firmware configuration template including, but not limited to:
 1. Power on Image.
 2. Lamp setting.
 3. Firmware based Device ID (Including parameters such as: TCP/IP settings, Host Name, etc.).
 4. Default port selection.
- b. Contractor shall install and fully configure Epson projector management software and enable projectors for management.
- c. Contractor shall install manufacturer recommended firmware during initial installation.
- d. Neatly configure all cables as directed by Owner.
- e. Attach projector to mount using manufacturer best practices.
- f. Connect AC power using cord provided to projector.
- g. Align projector with Contractor provided screen. Contractor shall install projector in relationship to the screen to maximize the projected image.
- h. Set keystone adjustment(s) as required.
- i. Zoom and focus projector as required.
- j. Secure all adjustment points.

15. WIRELESS PRESENTATION SYSTEM

- a. Provide and connect all audio and video input and output device cables.
- b. Contractor shall install manufacturer recommended firmware during initial installation.
- c. Secure mounting location at projector location with provided mount to eliminate involuntary equipment movement.
- d. Neatly route all cabling and secure slack.
- e. Adjust balance levels for standard configuration.
- f. Neatly route all cabling and secure slack.
- g. Install, configure and test approved firmware configuration template including, but not limited to:
 - 1. Power on Image.
 - 2. Firmware based Device ID (Including parameters such as: TCP/IP settings, Host Name, etc.).
- h. Collaborate and coordinate with Owner or Others to fully configure wireless presentation system to function on Owner provided network equipment.
- i. Contractor shall supply, install and fully configure Kramer VIA cloud management software for a fully functional system.

16. VOICE AMPLIFICATION

- a. Provide and connect all audio input and output device cables.
 - b. Secure mounting location at projector location with mounting screws or Velcro pads to eliminate involuntary equipment movement.
 - c. Neatly route all cabling and secure slack.
 - d. Adjust balance levels for standard configuration.
 - e. Neatly route all cabling and secure slack.
- E. It shall be the responsibility of the Contractor to repair or replace any damage done to the structure of finishes in the building by the Contractor. If in the course of work, Contractor damages, marks or misplaces any surfaces or

access plates/panels the Contractor shall repair and/or replace the surface, plate or panel to the original condition.

1. Repairs shall include, but not be limited to patching and painting.
 2. Final determination as to the damage condition and/or repair/replacement fitness of any surface, plate or panel shall be the sole responsibility of the Designer.
 3. The building and work area shall be returned to its original condition prior to final sign off of the project.
- F. No remote management software shall be installed on any Kentwood Public Schools server or workstation without prior approval. No remote access devices shall be installed on the Kentwood Public Schools network. Any costs for mitigation of installed software or devices will be charged to the Contractor.
- G. Following installation and system “turn-up”, but prior to final acceptance of the system, Contractor shall conduct follow-up interviews with Owner identified administrators and staff to review system functionality, suitability and confirm feature and program fitness for Owner applications.
1. Follow-up interviews shall be fully documented by Contractor and submitted to Owner for approval.
- H. All cable and device labels shall match existing standard.
- I. Sites of Work:
1. Challenger Elementary School
2475 52nd Street SE
Kentwood, Michigan 49508
 2. Crestwood Middle School
2674 44th Street
Kentwood, Michigan 49512
 3. Southwood Elementary School
630 66th SE
Kentwood, Michigan 49508
 4. Townline Elementary School
100 60th Street SE
Kentwood, Michigan 49508

3.11 TESTING

- A. In an effort to ensure a smooth “turn-up” of the new system Contractor shall submit to a thorough testing process as defined herein prior to cut-over.
- B. Prior to requesting testing by Designer, the Contractor shall use adequate means to assure the Work is completed in accordance with the specified requirements, meets the owner’s specific application requirements and is ready for functionality and integrity testing.
- C. Testing Procedures
 - 1. Prior to system “turn-up”, Contractor shall submit a written request and proposed test plan to Designer indicating they have completed full and final configuration of the system and are ready to have system integrity and functionality tested.
 - 2. Within reasonable time after receipt of request, Designer will accept or revise the proposed test plan, provide a test schedule and coordinate testing date(s) with Owner and Contractor.
 - 3. Should Designer determine the Work is not acceptably configured or not of adequate integrity:
 - a. Designer promptly will so notify Contractor, giving reasons therefore and providing sufficient details to allow Contractor to make corrective actions.
 - b. Contractor shall then expeditiously remedy the deficiencies and notify Designer in writing when ready for re-testing.
 - c. Designer will schedule re-test of the Work.
 - d. Excessive re-testing of Work may result in fees being assessed Contractor.
 - 4. Should Designer and Owner concur the Work is configured properly and system integrity is as required:
 - a. Designer will review Contractors detailed “turn-up” plan, and upon finding it acceptable issue a memorandum of Testing Completion to Owner and Contractor after which system “turn-up” can proceed.

3.12 DOCUMENTATION

- A. Contractor shall, throughout the completion of the project, provide Owner a file storage system that shall include all necessary equipment, including if reasonably required, file drawers, folders, dividers, etcetera, to contain all as-built drawings, owner’s manuals of all equipment installed, warranty and maintenance information and other information the Contractor, Designer

and/or Owner deem necessary. Documentation shall also be provided in a digital format in file formats and on media as specified by Owner and/or Designer.

- B. Contractor shall be responsible for providing thorough, timely documentation on all hardware, software. Documentation shall include, but not be limited to:
1. Equipment description.
 2. Equipment make.
 3. Model number.
 4. Software release.
 5. Date installed.
 6. Manufacturer's warranty.
 7. Maintenance contract terms.
 8. Verification of maintenance contract engagement.
 9. Telephone numbers for service and support.
 10. Detailed technical support and service procedure instructions.
 11. All product (hardware and software) manuals and manufacturer supplied documentation, including, but not limited to owner manuals, system administrator manuals and configuration guides. Where number of duplicate copies for particular manual or documentation item could be reasonably considered excessive, Contractor shall request direction from Owner and Designer.
 12. Photocopy of original invoice listing make and model for all components and equipment from individual manufacturer(s), distribution source(s), or authorized agent(s) to establish manufacturer warranty start date for potential use after end of contract warranty provisions.
 13. CAD or Visio as built drawings/diagrams for each building.
 14. System Configuration Report.
 15. Complete inventory of installed hardware and system software including, but not be limited to, model numbers, Ethernet MAC address, serial numbers, physical installation location and software options.

3.13 TRAINING

- A. No training shall be conducted prior to training outline and/or syllabus being approved by Owner, Instructional or overview activities conducted without prior content approval with not be deemed contract training, and Contractor shall remain responsible for delivery of approved training.
- B. Contractor shall provide training for the Owner designated system administrator(s). Owner shall designate up to four (4) administrators to be trained. Training shall be a minimum of two (2), two (2) hour sessions in length, at the convenience of the Owner personnel, and of sufficient duration to satisfactorily complete training on all system administration functions including, but not limited to:
 - 1. Basic trouble shooting of the installed system and components including diagnostic and problem resolution actions.
 - 2. System back-up and restore functions and procedures for all system parameters and configurations.
 - 3. Device additions, moves and changes as well as reconfiguration.
 - 4. Review of system alerts, logs and monitoring of configuration parameters including, but not limited to and system configuration changes.

3.14 SCHEDULE, MEETINGS AND PLANS

- A. Schedule
 - 1. Post bid Interviews: Week of January 27, 2025
 - 2. Contractor Chosen: Week of February 10, 2025
 - 3. Work Commences: April 1, 2025
 - 4. Substantial Completion of Project: August 1, 2025
 - 5. Project Close-out: October 1, 2025
- B. Planned sequence of operations shall be established by the Contractor within the guidelines established by the Owner, as required herein and as required to meet schedules.
- C. All work shall be coordinated with Owner's construction manager on site.
- D. Project progress meetings shall be held, but not limited to, weekly at a site and time identified as convenient for Owner and as required herein. Meetings will be attended as required herein.

END OF SECTION

MULTIMEDIA SYSTEMS – LARGE VENUE

27 41 17 - 97

SECTION 27 51 16
PUBLIC ADDRESS SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION OF PROJECT

- A. Work described in this specification section pertains to Public Address and Intercom Systems. Work shall include, but not be limited to, head-end equipment, cabling, ceiling and/or wall speakers, interface units and all other components and services required for a full and operational system.
- B. Owner desires to add to systems currently in operation and serving indicated locations.
 - 1. Challenger Elementary School
2475 52nd Street SE
Kentwood, Michigan 49508
 - 2. Hamilton Elementary and Early Childhood Center
3303 Breton SE
Kentwood, Michigan 49508
 - 3. Southwood Elementary School
630 66th SE
Kentwood, Michigan 49508
 - 4. Townline Elementary School
100 60th Street SE
Kentwood, Michigan 49508
 - 5. Valleywood Middle School
1110 50th Street
Kentwood, Michigan 49508
- C. The Contractor shall design, engineer, configure, supply, connect, test, document, and warrant a fully operational and compliant system, complete and with full functionality as specified herein.
- D. Contractor shall coordinate their installation with other communication systems, contractors, Designer, and the Owner as is appropriate.

1.02 WARRANTY

- A. Complete installation shall be fully functional and free from defect and/or failure for a period of three (3) years. Any replacement, upgrade, or fix, including labor for any non-conforming or non-operational part of the system shall be fixed and/or replaced at no cost to the Owner.

1. Owner shall be provided full operation of system functions and features during the complete warranty period incurring absolutely no costs during that time.
- B. Manufacturer's warranty shall be provided for all components of the system.
1. Any paperwork and/or submittals required by individual manufacturers for compliance with the standard and/or applicable extended warranty programs shall be provided and submitted for approval by the Contractor.
 2. Contractor shall submit all paperwork, apply for warranty or extended warranty certification, and provide a Certificate of Warranty or Extended Warranty as may be applicable from the manufacturer prior to project closeout.
- C. On site services provided under the warranty shall be performed by personnel or representatives of Contractor as herein defined and located within physical proximity to provide response levels deemed acceptable to Owner.
- D. Contractor shall provide the following response times for all malfunctioning equipment:
1. Four (4) hours or less for matters that render twenty percent (20%) or more of the system users unable to maintain normal productivity.
 2. Two (2) business days for matters not meeting the above criteria.
 3. Response time shall be measured from the time Contractor is notified by Owner to the time work is begun to resolve the matter.
- E. Bidder shall provide current monthly maintenance/service contract pricing for recommended programs for all equipment following the specified and included period as additional information. This information will be considered by Owner and Designer as part of the bid evaluation process.
- F. System Warranty shall commence on date of substantial completion as certified by Designer and provided for herein. Delivery to work site of materials, connection of circuits, turn-up of system, physical removal from packaging, issuance of Contractor documents including, but not limited to invoices and/or packing slips, or any event or documentation, not specifically provided for herein, shall have no effect on Warranty or System Acceptance by Owner and/or Designer.

1.03 STORAGE OF MATERIALS

- A. All materials shall be secured when not in use by the Contractor.

- B. It shall be the Contractor's responsibility to secure all equipment including material to be installed as part of the contract. No changes shall be made to the contract due to loss or theft of equipment and/or materials not officially accepted by the Owner.
- C. Formal receipt of the materials shall not be completed by the Owner until completion of project closeout. The Contractor shall be responsible for all equipment until time of closeout as provided for herein.

1.04 SUBMITTALS

- A. Submittals shall consist of, but not be limited to, technical cut sheets and detailed information pamphlets on all components of the system to be installed. All cut sheets and submittals shall be distinctly marked to highlight the actual part number of the item being submitted for approval with Bid Proposals.
- B. Shop drawings and diagrams shall be submitted by Bidder for approval by Designer with Bid Proposals.
 - 1. Shop drawings and diagrams shall show all data relating to structural, electrical, wiring, cross connect, interconnect, equipment arrangement/layout, and any other information deemed significant by the Designer.
 - 2. No work constituting final installation shall be commenced until after approval of shop drawings by Designer.
- C. Contractor shall provide proof of manufacturer support by photocopy of certification and letter of support from major component manufacturers for this specific project with Bid Proposals.
- D. Equipment or material installed for this project that does not have an approved submittal associated with it, will be removed, and replaced with acceptable equipment or material as defined by the Designer. All replacement costs including, but not limited to material and labor, shall be the sole responsibility of the Contractor.
 - 1. The Owner and/or Designer may notify Contractor of any offending situations under this provision allowing Contractor up to forty-eight (48) hours to correct the situation prior to taking other corrective action.
 - 2. The Owner reserves the right to replace unapproved materials and deduct the costs of doing so as defined herein from any amounts that may be due or become due Contractor.
- E. The Contractor shall submit within five (5) calendar days after the Notice to Proceed, a schedule that reflects the sequence of activities of the contractor's

approach to the execution of and completion of the work. The schedule shall be broken into work areas to provide for a clear identification of the planned progress of the work. Included in the schedule will be a list of tasks with list of deliverables and the percentage of work completed. This schedule shall coincide with progress payments applications dates and projected amounts. All durations shown will be in working days. The timeframe described in the Contractor's Schedule shall represent the Contractor's plan for organizing, directing, managing, controlling, staffing and executing the work required by the Contract Documents. Owner will rely on such schedules to coordinate and otherwise plan related work of Owner personnel, other separate contractors, or the Owner's routine daily work.

1.05 REFERENCE SPECIFICATIONS

- A. All work, products, and materials shall conform with the following standards as applicable for the intended use:
 - 1. EIA/TIA Commercial and Administration Standards
 - 2. NEC
 - 3. IEEE 802
 - 4. IETF RFCs
 - 5. FCC Emissions Ratings
 - 6. UL
 - 7. MOSHA Safety Standards

1.06 CONTRACTOR

- A. The Contractor shall accept complete responsibility for the installation, certification, and support of the system. Contractor shall be an authorized vendor of all major components.
- B. All work shall be performed and supervised by Project Managers, Engineers and/or Technicians who are qualified to install Voice Communication System and perform related tests as recommended by the manufacturer and in accordance with the manufacturer's best practices and methods.
- C. Project Managers, Engineers and Technicians employed on this project shall be properly and fully trained and qualified by the manufacturer on the installation and testing of the equipment and systems to be installed.
- D. The Contractor shall have a proven track record in Public Address System configuration and installation. This must be shown by the inclusion of

references of at least three (3) projects involving the installation of similar systems completed by the Contractor in the prior two (2) years on unaltered forms with the sealed Bid Proposal as provided herein.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturer of major components of the included Public Address / Intercom system shall be known and leading entity in the relevant communications field, and shall have been designing, manufacturing, and installing similar systems for a period of no less than three (3) years.

- 1. Acceptable Manufacturers

- a. ATLASIED
 - b. SINGLEWIRE

2.02 Supply most current version of all products provided.

- A. Prior and/or old versions of products, unless specifically approved and documented by Designer and/or Owner shall not be acceptable.
- B. In cases where a newer version of hardware or software is available at the time of installation, Contractor shall request clarification from Designer on which version is to be used.

2.03 Furnish only new, first-class quality materials and equipment.

2.04 PUBLIC ADDRESS AND PROGRAM SYSTEM

- A. A fully compliant public address and program system devices shall be configured and installed to service Owner's worksites listed herein.
- B. New Interior PoE speaker and clock locations shall be provided in locations identified on provided drawings. Quoted cost must include all materials and labor to integrate devices into Contractor provided mass notification software.
- C. New exterior, weatherproof wide-angle sound dispersion PoE exterior horn(s) shall be provided in locations identified on provided drawings. Quoted cost must include all parts and labor to integrate into Contractor provided mass notification software.

- D. CENTRAL CONTROLLER

- 1. Contractor shall supply appropriate licensing and labor to integrate all devices into existing Singlewire Informacast Fusion system. Licensing shall be provided for term of warranty.

2. Central control software shall be configured and installed for amplification and distribution of audio programming to all areas of the facility. Owner applications may include, but will not be limited to:
 - a. Emergency alerting including possible building evacuation, shelter in place and/or lock-down.
 - b. System access from remote locations via either telephone and/or web browser to individual buildings for zone paging and/or alerting.
 - c. System access from remote locations via web browser to allow for program changes (i.e. Regular schedule to Snow day).
3. Central control software and all attached devices shall be installed and configured to meet or exceed all of the following requirements:
 - a. Interface to Voice Communication system (phone system) as primary voice input connection.
 1. Specific coded authorization shall be required to authenticate any user attempting to broadcast on the system. Codes shall originate by DTMF from voice terminals, and shall be up to four (4) tones (keys) in length.
 2. Capable of integrating with existing Shoretel phone system over SIP protocol.
 - b. Interface to computer data network system over Owner provided Ethernet network.
 1. Specific password protected authorization shall be required to authenticate any user attempting to broadcast or modify programming on the system.
 2. Access shall be by standard web browser (MS Edge, Chrome, etc.) and shall not require specific application software be loaded onto access devices.
 - c. System shall store pre-recorded schedule for tone generation and interface to Owner's existing time sync (NTP Server) over Ethernet. System shall broadcast school "bells".
 1. Unlimited number of schedules must be supported for each building/facility (half day, normal day, exam schedule, etc.)
 - d. System shall store pre-recorded emergency alert messages matching owners existing standard in use at other facilities.

1. Broadcast of up to six (6) alarm tones, pre-recorded messages or emergency voice messages to all or selected areas of the facility.
 2. Specific alarm tones shall be given priority over any other broadcast material.
- e. System shall provide eight (8) additional contact closures, which when activated result in broadcast of predefined alarm tone(s) to predefined zone(s).
 - f. Paging system zones shall be customizable to allow complete control over paging zone output. Zones shall be easily modified using the web browser interface to add or eliminate individual classrooms, hallways, and large venue spaces from zone lists.
 - g. Owner provided PoE+ switches shall supply suitable power to enable intelligible audio from supplied Ethernet connected speakers.
 - h. System shall contain one (1) physical external interface in addition to telephone (primary voice interface) for connection to any one of a variety of music sources (including, but not limited to MP3, tuner, etc.) to be broadcast to designated zones or groups of zones. This interface shall be 3.5mm audio jack, and located in building central office to provide for building administrator convenient access.
 - i. System shall automatically generate and transmit a pre-announcement attention signal prior to any voice broadcast.
 - j. Feedback elimination precautions or system features shall be employed to suppress any audio coupling between and audio source and nearby speaker.
 - k. All building-based equipment shall be mounted in Owner designated rack in MDF room(s), except classroom equipment, which shall be installed in each classroom.
 - l. Gain control of alarms and announcements shall be individually configurable to different volume levels.
 - m. The unit shall operate from standard owner supplied 110 VAC power outlets within six feet (6') of required rack mounting in normal ambient climatic conditions for office communication closets.
4. Program System shall provide for, but not be limited to:
 - a. Integrated calendar for storage of various different programs to be scheduled

1. Normal Day
 2. Half Day
 3. Early Release Day
 4. Exam Day
 5. Delayed Start Day
- b. Six (6) different tones/chimes/bells to signify class start/end/tardy etc.
 - c. Password protected unique User ID access to the system by individual building principals and/or secretaries to manage and administer program calendars. Such credentials shall be integrated with the Owner's existing Microsoft Active Directory for common login control across the network.
 - d. Separate program databases for each facility that can be manipulated/managed by that facility's specific administrative team.
5. Preference will be given to system architectures where a common central server can be used from the district's data center for control and management of building operations.
 6. Contractor shall work collaboratively with Owner and other trades to fully integrate provided paging speakers and devices for building lockdown. Lockdown triggered from within Informacast will be configured to integrate with IP messaging clock devices and door access software (Genetec) via provided contact closure.

E. OWNER PROVIDED EQUIPMENT

1. Contractor shall reuse and reallocate forty (20) Owner provided AtlasIED – IPSMDF 2x2 ceiling speakers for integration with proposed work. Ceiling speakers shall be updated, reprogrammed and reinstalled to be integrated with speaker layout plan included in Appendix E – Paging Diagrams.

F. EXISTING SPEAKER REWORK/RECONFIGURE – HAMILTON ELEMENTARY AND EARLY CHILDHOOD CENTER

1. Contractor shall completely reconfigure and rework existing IP speaker devices in Hamilton Elementary School. Speaker devices shall be updated, reconfigured and rebalanced as specified in provided bid documents. Devices are identified as S8 on provided Appendix E – Paging Diagrams.

G. INTERIOR (PoE) CLOCK/SPEAKER COMBO

1. Acceptable Manufacturer(s)
 - a. ATLASIED
 1. IP-SDMF
2. Interior Clock/Speakers shall be provided in classrooms and other common areas. Speakers are identified as S1 on provided drawings Appendix E – Public Address Diagrams.
 - a. Final speaker placement shall be adjusted as needed for appropriate audio intelligibility, volume levels and ceiling obstructions and/or conditions and shall remain the responsibility of the contractor.
3. Speakers shall meet or exceed the following requirements:
 - a. Surface Mount
 - b. LED Flasher and Screen – 7 Colors
 - c. Frequency response – 60 Hz – 17kHz
 - d. Built-in 15 W amplifier (PoE)
 - e. PoE IEEE 802.3at (max 25 W)
 - f. Support for SIP integration with Voice over IP (VoIP) systems.
 - g. Full multicast and broadcast support.
 - h. Straight Enclosure
 - i. All devices, including but not limited to, amplifiers, brackets, baffles, and Control Unit shall be mounted square and plumb and as recommended by the manufacturer and required by Owner and Architect.
 - j. Each speaker shall be connected to central equipment using standard category 6 ethernet cabling provided by others. Contractor shall supply ethernet patch cables at both the closet and device location to extend provided cabling to optimal speaker location, cable shall not exceed 30'. Cable color shall be coordinated with Owner and/or designer.
 - k. Contractor shall be responsible for cross connecting speakers in data closet and reporting back switch and switch port locations to Owner for programming.

- l. Each speaker shall be volume adjustable at installation to accommodate specific acoustical properties of the intended coverage area.
- m. Contractor shall include all parts and accessories for a fully functional and securely installed system using manufacturer and industry best practices.
- n. Speakers located in gymnasium locations shall include appropriate protective cage.
- o. System shall produce audio at a peak level of approximately eighty-five (85) dBA at probable listener's positions.
- p. Provided speakers must be fully Singlewire Informacast and Syn-apps/Revolution compatible.

H. INTERIOR (PoE) DOUBLE SIDED CLOCK/SPEAKER COMBO

1. Acceptable Manufacturer(s)
 - a. ATLASIED
 1. IP-DDS
2. Interior Double-Sided Clock/Speakers shall be provided in hallways and other common areas. Speakers are identified as S2 on provided drawings – Appendix E – Public Address Diagrams.
 - a. Final speaker placement shall be adjusted as needed for appropriate audio intelligibility, volume levels and ceiling obstructions and/or conditions and shall remain the responsibility of the contractor.
3. Speakers shall meet or exceed the following requirements:
 - a. Surface Mount
 - b. Double Sided LED Flasher and Screen – 7 Colors
 - c. Frequency response – 60 Hz – 17kHz
 - d. Built-in 15 W amplifier (PoE)
 - e. PoE IEEE 802.3at (max 25 W)
 - f. Support for SIP integration with Voice over IP (VoIP) systems.
 - g. Full multicast and broadcast support.

- h. All devices, including but not limited to, amplifiers, brackets, baffles, and Control Unit shall be mounted square and plumb and as recommended by the manufacturer and required by Owner and Architect.
- i. Each speaker shall be connected to central equipment using standard category 6 ethernet cabling provided by others. Contractor shall supply ethernet patch cables at both the closet and device location to extend provided cabling to optimal speaker location, cable shall not exceed 30'. Cable color shall be coordinated with Owner and/or designer.
- j. Contractor shall be responsible for cross connecting speakers in data closet and reporting back switch and switch port locations to Owner for programming.
- k. Each speaker shall be volume adjustable at installation to accommodate specific acoustical properties of the intended coverage area.
- l. Contractor shall include all parts and accessories for a fully functional and securely installed system using manufacturer and industry best practices.
- m. System shall produce audio at a peak level of approximately eighty-five (85) dBA at probable listener's positions.
- n. Provided speakers must be fully Singlewire Informacast and Syn-apps/Revolution compatible.

I. INTERIOR (PoE) IN-CEILING (2x2) SPEAKERS

- 1. Acceptable Manufacturer(s)
 - a. ATLASIED
 - 1. IP-22SYSMF
- 2. Interior Speakers shall be provided in classrooms and other common areas. Speakers are identified as S3 on provided drawings – Appendix E – Public Address Diagrams.
 - a. Final speaker placement shall be adjusted as needed for appropriate audio intelligibility, volume levels and ceiling obstructions and/or conditions and shall remain the responsibility of the contractor.
- 3. Speakers shall meet or exceed the following requirements:
 - a. Square ceiling tile IP speaker (2'x 2')

- b. LED Flasher – 7 Colors
- c. Frequency response – 60 Hz – 17kHz
- d. Built-in 8 W amplifier
- e. PoE IEEE 802.3af/802.3af Type 1 Class 3 (max 12.95 W)
- f. Support for SIP integration with Voice over IP (VoIP) systems.
- g. Full multicast and broadcast support.
- h. All devices, including but not limited to, amplifiers, brackets, baffles, and Control Unit shall be mounted square and plumb and as recommended by the manufacturer and required by Owner and Architect.
- i. Each speaker shall be connected to central equipment using standard category 6 ethernet cabling provided by others. Contractor shall supply ethernet patch cables at both the closet and device location to extend provided cabling to optimal speaker location, cable shall not exceed 30'. Cable color shall be coordinated with Owner and/or designer.
- j. Contractor shall be responsible for cross connecting speakers in data closet and reporting back switch and switch port locations to Owner for programming.
- k. Each speaker shall be volume adjustable at installation to accommodate specific acoustical properties of the intended coverage area.
- l. Contractor shall include all parts and accessories for a fully functional and securely installed system using manufacturer and industry best practices.
- m. System shall produce audio at a peak level of approximately eighty-five (85) dBA at probable listener's positions.
- n. Provided speakers must be fully Singlewire Informacast and Syn-apps/Revolution compatible.

J. INTERIOR (PoE) SURFACE MOUNT SPEAKERS

- 1. Acceptable Manufacturer(s)
 - a. ATLASIED
 - 1. IP-SM

2. Interior Surface Mount Speakers shall be provided in classrooms and other common areas. Speakers are identified as S4 on provided drawings.
 - a. Final speaker placement shall be adjusted as needed for appropriate audio intelligibility, volume levels and ceiling obstructions and/or conditions and shall remain the responsibility of the contractor.
3. Speakers shall meet or exceed the following requirements:
 - a. Surface mount IP speaker
 - b. Frequency response – 60 Hz – 17kHz
 - c. Built-in 8 W amplifier
 - d. PoE IEEE 802.3af/802.3af Type 1 Class 3 (max 12.95 W)
 - e. Support for SIP integration with Voice over IP (VoIP) systems.
 - f. Full multicast and broadcast support.
 - g. Straight Enclosure
 - h. All devices, including but not limited to, amplifiers, brackets, baffles, and Control Unit shall be mounted square and plumb and as recommended by the manufacturer and required by Owner and Architect.
 - i. Each speaker shall be connected to central equipment using standard category 6 ethernet cabling provided by others. Contractor shall supply ethernet patch cables at both the closet and device location to extend provided cabling to optimal speaker location, cable shall not exceed 30'. Cable color shall be coordinated with Owner and/or designer.
 - j. Contractor shall be responsible for cross connecting speakers in data closet and reporting back switch and switch port locations to Owner for programming.
 - k. Each speaker shall be volume adjusted at installation to accommodate specific acoustical properties of the intended coverage area.
 - l. Each surface speaker shall include appropriate back box.
 - m. Contractor shall include all parts and accessories for a fully functional and securely installed system using manufacturer and industry best practices.
 - n. System shall produce audio at a peak level of approximately eighty-five (85) dBA at probable listener's positions.

- o. Provided speakers must be fully Singlewire Informacast and Syn-apps/Revolution compatible.

K. INTERIOR IP STROBE DEVICE

- a. ADVANCED NETWORK DEVICES
 - b. ATLASIED
 - c. VALCOM
 - d. Or Equal.
2. Interior IP Strobe Devices shall be provided in classrooms and other common areas. Speakers are identified as S5 on provided drawings – Appendix A – Public Address Diagrams.
- a. Final speaker placement shall be adjusted as needed for appropriate audio intelligibility, volume levels and ceiling obstructions and/or conditions and shall remain the responsibility of the contractor.
3. Strobes shall meet or exceed the following requirements:
- a. PoE IEEE 802.3af/802.3af Type 1 Class 3 (max 12.95 W)
 - b. Support for SIP integration with Voice over IP (VoIP) systems.
 - c. Vandal and weather resistant.
 - d. Strobes in gymnasiums shall include appropriate protective cage.
 - e. Strobes to include appropriate back box if necessary for a secure installation.
 - f. Blue lens
 - g. Each speaker shall be connected to central equipment using standard category 6 ethernet cabling provided by others. Contractor shall supply ethernet patch cables at both the closet and device location for each speaker to extend provided cabling to optimal speaker location, cable shall not exceed 30'. Cable color shall be coordinated with Owner and/or designer.
 - h. Contractor shall be responsible for cross connecting speakers in data closet and reporting back switch and switch port locations to Owner for programming.

- i. Contractor shall include all parts and accessories for a fully functional and securely installed system using manufacturer and industry best practices.
- j. Provided speakers must be fully Singlewire Informacast and Syn-apps/Revolution compatible.

L. INTERIOR/EXTERIOR POWER OVER ETHERNET (PoE) HORNS

a. ATLASIED

1. IP-APX

- 2. Interior/Exterior Horn Speakers shall be provided in identified areas. Speakers are identified as S6 or S7 on provided drawings Appendix E – Public Address Diagrams.
 - a. Final speaker placement shall be adjusted as needed for appropriate audio intelligibility, volume levels and ceiling obstructions and/or conditions and shall remain the responsibility of the contractor.
- 3. Horns shall meet or exceed the following requirements:
 - a. Built-in 8 W Class D amplifier
 - b. 121dB at 25 Watts (peak)
 - c. PoE IEEE 802.3at – 25 Watts Max
 - d. Support for SIP integration with Voice over IP (VoIP) systems.
 - e. Vandal and weather resistant.
 - f. Speaker to include appropriate vandal proof back box.
 - g. Frequency response of 400Hz – 7500 kHz.
 - h. Each speaker shall be connected to central equipment using standard category 6 ethernet cabling provided by others. Contractor shall supply ethernet patch cables at both the closet and device location for each speaker to extend provided cabling to optimal speaker location, cable shall not exceed 30'. Cable color shall be coordinated with Owner and/or designer.
 - i. Contractor shall be responsible for cross connecting speakers in data closet and reporting back switch and switch port locations to Owner for programming.

- j. Contractor shall include all parts and accessories for a fully functional and securely installed system using manufacturer and industry best practices.
- k. Provided speakers must be fully Singlewire Informacast and Syn-apps/Revolution compatible.

2.05 CLASSROOM AUDIO SYSTEM AND CLOCK INTEGRATION

- A. All clock/speaker combo devices installed in classroom spaces and media center shall be tied in AV Contractor supplied voice amplification system (Lightspeed T25) via line out.
- B. Clock Contractor shall be responsible for supplying all necessary cabling to tie clock/speaker combination device with Lightspeed priority audio input installed at projector.

2.06 COMPONENT INTERCONNECTION

- A. All wiring not installed in conduit shall be plenum type cable and shall be so identified with continuous marking.
- B. No wiring installed shall be visible unless specifically and individually approved by Owner and Designer. All wire that traverses open areas shall be installed in metal raceway of appropriate size for the number of wires installed plus twenty percent more.
 - 1. All metal raceway shall be ordered in standard colors to as closely match the environment in which it is being installed as possible.
 - 2. Metal raceway shall be carefully and neatly installed, to meet manufacturer recommendations and standards for professional installation.
 - 3. Sharp edges, gaps in the covering or corners or other unprofessional workmanship characteristics of installation will not be acceptable.
- C. Wiring color shall remain the same throughout the system. Colors used for coding shall be as directed by the system manufacturer, Owner, and Architect.
- D. Wire shall be copper.

2.07 ALLOWANCES

- A. Contractor shall include allowances for equipment and/or other contract service reimbursements as required below in base bid lump sum amount(s). Equipment and/or contract services shall be provided and sourced at Owner's discretion and convenience with full cooperation by Contractor and paid for from successful bidder's contract in the amount(s) provided for herein. Any

allowance amount proving to be excessive for the intended equipment and/or contract services shall be credited to the Owner against contract payment requests.

1. Allowance shall be made in the amount of \$5,000.00 for contract services related to supply, installation, and connection of contingency upgrades.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Contractor shall conduct detailed walk-through examination with Designer and Owner verifying equipment and material locations as well as mounting and placement requirements prior to commencement of other installation activities.
- B. Contractor shall ensure all submittals and shop drawings have been provided to, and approval has been obtained from Designer prior to commencement of any final installation activities.

3.02 INSTALLATION

- A. Contractor shall be familiar with the environment where work will be done as specified herein.
- B. Work Areas shall be cleaned at the end of each day. All debris shall be cleared, removed, and disposed of in an approved container for the site. All equipment and tools shall be removed from common areas and stored in approved, secure storage locations. Any work that may impede the general use of the space and cannot be removed shall be flagged and cordoned off by the Contractor prior to their departure.
- C. All equipment and materials shall be installed in a neat and workmanlike manner. Best practices installation principles shall be used throughout the project.
- D. No remote management software shall be installed on any Kentwood Public Schools server or workstation without prior approval. No remote access devices shall be installed on the Kentwood Public Schools network. Any costs for mitigation of installed software or devices will be charged to the Contractor.
- E. The Contractor shall furnish, set in place, and install all equipment necessary for a fully compliant and operational system as specified herein. The installation process includes, but is not limited to the following:
 1. Inventory receipt of all components and equipment.

2. Storage of all equipment and components until such time those items are installed according to the specifications.
3. Transport equipment to the Owner's installation location(s).
4. Assemble, install, configure, and test all equipment and components, maintaining accurate inventory records and status documents and discarding packaging.
5. Collect all information necessary to accurately program all sets and/or system devices to the Owner's intended use and need.
6. Complete end user and system administrator training programs as specified herein.
7. Work shall be performed to meet local codes and industry standards, including, but not limited to:
 - a. Adequate gas tube protection for outside plant cable connections.
 - b. Grounding and Bonding.
8. Owner will provide contractor with permanent asset tags for each system component that exceeds \$100.00 in value. Equipment installed in wiring closets will have district asset tags installed in a prominent location. Assets installed in public areas, such as staff desktop devices, will have asset tags installed in discreet but consistent area of each asset.
 - a. Asset number, device/component description, serial number, make, model, part-number, site, room number/name and any other critical asset information shall be recorded for Owner.

F. Worksites include the following:

1. Challenger Elementary School
2475 52nd Street SE
Kentwood, Michigan 49508
2. Hamilton Elementary
3303 Breton SE
Kentwood, Michigan 49508
3. Southwood Elementary School
630 66th SE
Kentwood, Michigan 49508

4. Townline Elementary School
100 60th Street SE
Kentwood, Michigan 49508

5. Valleywood Middle School
1110 50th Street
Kentwood, Michigan 49508

G. It shall be the responsibility of the Contractor to repair or replace any damage done to the structure of finishes in the building by the Contractor. If in the course of work, Contractor damages, marks, or misplaces any surfaces or access plates/panels the Contractor shall repair and/or replace the surface, plate, or panel to the original condition.

1. Final determination as to the damage condition and/or repair/replacement fitness of any surface, plate or panel shall be the sole responsibility of the Designer.
2. The building and work area shall be returned to its original condition prior to final sign-off of the project.

H. Following installation and prior to final acceptance of the system, Contractor shall conduct follow-up interviews with Owner identified administrators and staff to review system functionality, suitability and confirm feature and program fitness for Owner applications.

1. Follow-up interviews shall be fully documented by Contractor and submitted to Owner for approval.

I. Contractor shall collect, consolidate and otherwise prepare for shipping or disposal Owner's existing telecommunications system components, including, but not limited to stations, processors, cards, options, and application servers in a manner acceptable to, and consistent with, Owner's intended disposition of the items.

3.03 BALANCING

A. After installation, Contractor shall conduct a detailed walkthrough to verify optimal sound levels of installed devices.

B. Contractor shall verify eighty-five (85) dBA at probable listener's positions. Contractor shall verify dB rating with decibel meter.

1. dB readings shall be conducted in the center of each classroom, hallway and other common spaces.

C. Contractor shall supply written report with dB readings identified.

3.04 TESTING

- A. In an effort to ensure a smooth “turn-up” of the new system Contractor shall submit to a thorough testing process as defined herein prior to cut-over. Testing shall include, but not be limited to the following:
- B. Prior to requesting testing by Designer, the Contractor shall use adequate means to assure the Work is completed in accordance with the specified requirements, meets the owner’s specific application requirements and is ready for functionality and integrity testing.
- C. PROCEDURES
 - 1. Prior to system “turn-up”, Contractor shall submit a written request to Designer indicating they have completed full and final configuration of the system and are ready to have system integrity and functionality tested.
 - 2. Within reasonable time after receipt of request, Designer will provide a test schedule and coordinate testing date(s) with Owner and Contractor.
 - 3. Should Designer determine the Work is not acceptably configured or not of adequate integrity:
 - a. Designer promptly will so notify Contractor, giving reasons therefore and providing sufficient details to allow Contractor to make corrective actions.
 - b. Contractor shall then expeditiously remedy the deficiencies and notify Designer in writing when ready for re-testing.
 - c. Designer will schedule re-test of the Work.
 - d. Excessive re-testing of Work may result in fees being assessed Contractor.
 - 4. Should Designer and Owner concur the Work is configured properly, and system integrity is as required:
 - a. Designer will review Contractors detailed cut-over plan, and upon finding it acceptable issue a memorandum of Testing Completion to Owner and Contractor after which system cut-over can proceed.

3.05 DOCUMENTATION

- A. Contractor shall, throughout the completion of the project, provide Owner a file storage system that shall include all necessary equipment (file drawers, folders, dividers, etc.), to contain all as-built drawings, owner’s manuals of all

equipment installed, warranty and maintenance information and other information the Contractor, Designer and/or Owner deem necessary.

B. Contractor shall be responsible for providing thorough, timely documentation on all hardware, software. Documentation shall include, but not be limited to:

1. Equipment description.
2. Equipment make.
3. Model number.
4. Software release.
5. Date installed.
6. Manufacturer's warranty.
7. Maintenance contract terms.
8. Verification of maintenance contract engagement.
9. Telephone numbers for service and support.
10. Detailed technical support and service procedure instructions.
11. All product (hardware and software) manuals and manufacturer supplied documentation, including, but not limited to owner manuals, system administrator manuals and configuration guides. Where number of duplicate copies for particular manual or documentation item could be reasonably considered excessive, Contractor shall request direction from Owner and Designer.
12. Photocopy of original invoice listing make and model for all components and equipment from individual manufacturer(s), distribution source(s), or authorized agent(s) to establish manufacturer warranty start date for potential use after end of contract warranty provisions.
13. CAD as built drawings for each building.

3.06 TRAINING

A. No training shall be conducted prior to training outline and/or syllabus being approved by Owner. Instructional or overview activities conducted without prior content approval with not be deemed contract training, and Contractor shall remain responsible for delivery of approved training.

- B. Contractor shall provide training for the Owner designated system administrator(s). Training shall be a minimum of two (2), one (1) hour session in length, at the convenience of the Owner personnel, and of sufficient duration to satisfactorily complete training on all system administration functions including, but not limited to:
1. Basic trouble shooting of the installed system and components including diagnostic and problem resolution actions.
 2. System back-up and restore functions and procedures for all system parameters and configurations.
 3. Device additions moves and changes as well as reconfiguration.
 4. Review of system alerts, logs and monitoring of configuration parameters including, but not limited to and system configuration changes.
 5. System power-up and power down process.
 6. Recording and playing pre-recorded content.
 7. System update process
 8. System maintenance procedures.
 9. Problem reporting.
- C. Contractor shall provide in-person end user training for building office staff. Training shall be available at substantial completion. Training shall include, but not limited to the following:
1. System functionality overview.
 2. Bell schedule programming and changes.
 3. Paging zone controls.
 4. Intercom function use incoming and outgoing.
 5. System operation best practices.
 6. Building wide all page.
 7. Recording and playing pre-recorded content.
 8. Problem reporting.

3.07 SCHEDULE, MEETINGS AND PLANS

A. Schedule

1. Post bid Interviews: Week of January 27, 2025
2. Contractor Chosen: Week of February 10, 2025
3. Work Commences: April 1, 2025
4. Substantial Completion of Project (Hamilton Elementary): July 15, 2025
5. Substantial Completion of Project (Remainder): August 1, 2025
6. Project Close-out: October 1, 2025

B. Planned sequence of operations shall be established by the Contractor within the guidelines established by the Owner, as required herein and as required to meet schedules.

C. All work shall be coordinated with Owner's construction manager on site.

D. Project progress meetings shall be held, but not limited to, weekly at a site and time identified as convenient for Owner and as required herein. Meetings will be attended as required herein.

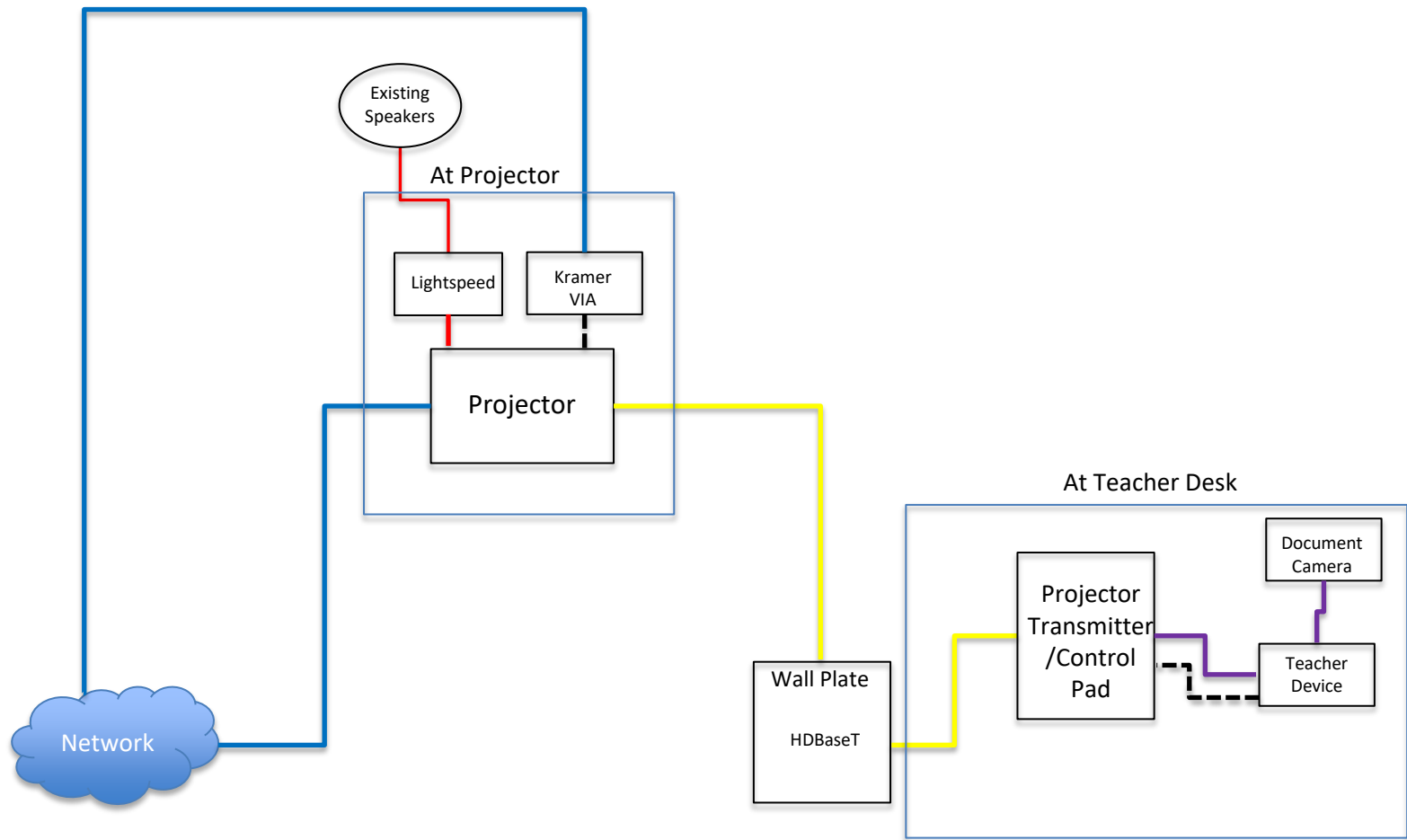
END OF SECTION

Kentwood Public Schools

Appendix A - Classroom AV Equipment Schedule

	Ultra Short Throw Interactive Projector	Owner Provided Ultra Short Throw Interactive Projector	Wireless Presentation System	Speakers - Qty 1	Voice Amplification	Voice Amplification - Replace Existing Lightspeed 975	Docking Station	Document Camera
East Kentwood High School	54	20	74	120	74	12	74	74
Hamilton Elementary and Early Childhood Center	30	0	30	120	30	0	30	30
Valleywood Middle School	32	0	32	0	32	4	32	32
TOTALS	116	20	136	240	136	16	136	136

Appendix B - KPS Classroom AV Connection Line Diagram



Legend

Network —

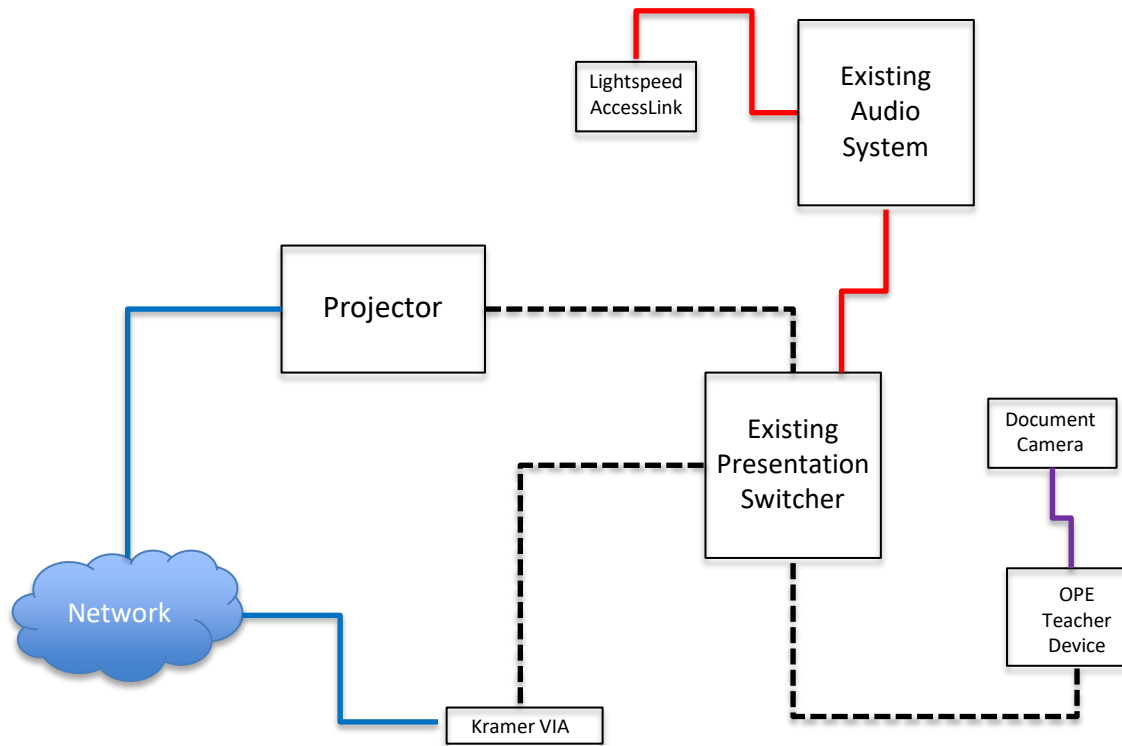
HDMI - - -

USB —

Audio —

Shielded Cat 6a —

Appendix B - Special Configuration – Fine Arts



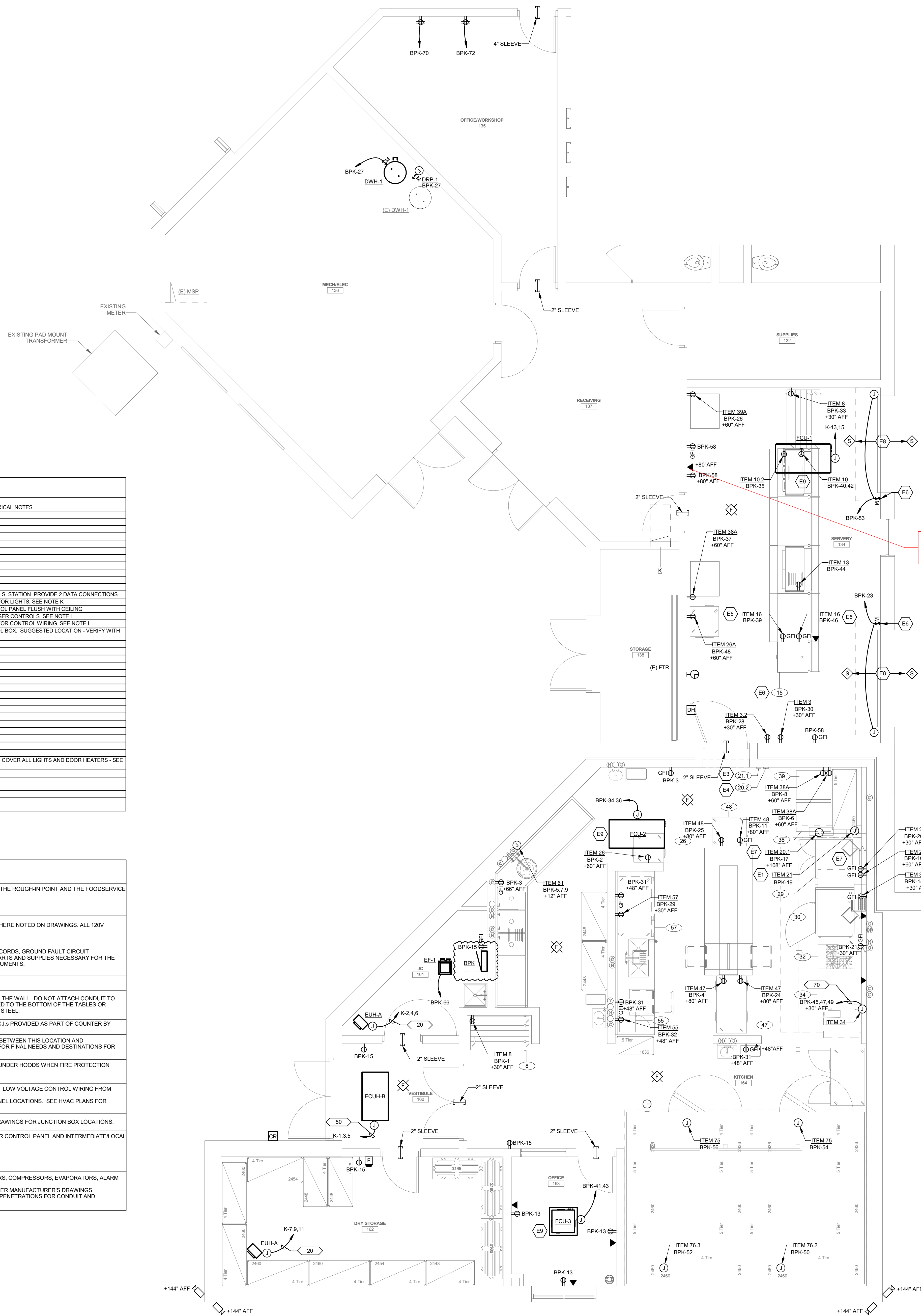
Legend

Network ———

HDMI - - - -

USB ———

Audio ———



POWER GENERAL NOTES

1. ALL RECEPTACLES ON EXTERIOR, IN KITCHEN, IN CONCESSION, IN LABORATORY, AND WITHIN 6'-0" OF SINK OR OTHER WATER SUPPLY SHALL BE READILY ACCESSIBLE GFCI TYPE RECEPTACLE.
2. REFER TO ARCHITECTURAL FLOOR PLANS AND ELEVATIONS TO VERIFY LOCATION OF DEVICES.
3. ALL CONDUITS SERVING 120 VOLTS OR GREATER SHALL INCLUDE A GROUND WIRE.
4. ALL CONDUITS SHALL BE ROUTED CONCEALED UNLESS NOTED OTHERWISE.
5. ALL 120 VOLT CIRCUITS SHALL UTILIZE A SEPARATE NEUTRAL.

ELECTRICAL ENLARGED KEYNOTES

- E1 FIRE SUPPRESSION SYSTEM ITEM 21. JUNCTION BOX LOCATED ABOVE CEILING FOR
E2 CONTROL WIRING. SEE NOTE 1.
E3 FOR FIRE SUPPRESSION SYSTEM ITEM 21.1. CONNECT TO FIRE SUPPRESSION
E4 CONTROL BOX SUGGESTED LOCATION - VERIFY WITH ARCHITECT.
E5 FOR VENTILATION HOSE USER CONTROLS ITEM 20.2. SUGGESTED RECESSED LOCATION
E6 FOR VENTILATION HOSE USER CONTROLS ITEM 20.2. SUGGESTED RECESSED LOCATION
E7 FOR VENTILATION HOSE USER CONTROLS ITEM 20.2. SUGGESTED RECESSED LOCATION
E8
E9 1) 120V 2WA FOR P.O.S. STATISTION 16. 1) DEDICATED CIRCUIT FOR P.O.S. PROVIDE 2
E10 DATA CONNECTIONS.
E11 PROVIDE POWER TO OVERHEAD COILING ROLLS. COORDINATE EXACT POWER AND
E12 CONTROL REQUIREMENTS WITH APPROVED SHOP DRAWINGS PRIOR TO ROLLOUT.
E13 120V 2WA - 108" AFF FOR VENTILATION HOSE CONTROL BOX ITEM 20.1. PROVIDE J-BOX IN
E14 CEILING MOUNT CONTROL PANEL FLUSH WITH CEILING.
E15 PROVIDE J-BOX IN CEILING MOUNT CONTROL PANEL FLUSH WITH CEILING.
E16 PROVIDE J-BOX IN CEILING MOUNT CONTROL PANEL FLUSH WITH CEILING SUCH THAT UPON DETECTION
E17 OF SMOKE THE DOOR CLOSURES AUTOMATICALLY AND SENDS A SIGNAL BACK TO THE FIRE
E18 ALARM CONTROL PANEL.
E19 PROVIDE 120V 2WA TO REUSE ITS POWER FROM ASSOCIATED OUTDOOR CU. E.C. TO PROVIDE
E20 24V 16122 IN 3/4" FROM OUTDOOR UNIT TO INDOOR UNIT.

ELECTRICAL SCHEDULE						
ITEM #	EQUIPMENT	VOLTS	PHASE	AMPS	NEMA	HEIGHT A.F.F.
3	COLD SERVING COUNTER	115	1	3.5	3P	
3.2	DOUBLE SIDED BREATH PROTECTION	120	2	2		30"
8	MILK COOLER	115	1	7.6	5-15P	30"
10	HOT SERVING COUNTER	208	1	15.9	6-20P	STUB-UP
10.2	BREATH PROTECTION	120	1	12		STUB-UP
10.3	FOLDING WORK SHELF					
11.12	FOLDING WORK SHELF	115	1	3.5	5-15P	
13	COLD SERVING COUNTER	115	1	3.5	5-15P	
13.2	BREATH PROTECTION	120	1	2	5-15P	STUB-UP
13.3	FOLDING WORK SHELF					
14.2	FOLDING WORK SHELF					
16	P.O.S. STATION	(2) 120	1	20		
20	VENTILATION HOOD	120	1	20		
20.1	VENTILATION HOOD CONTROL BOX	120	1	20		100"
20.2	VENTILATION HOOD USER CONTROLS					
21	FIRE SUPPRESSION SYSTEM	120	1	20		
21.1	FIRE SUPPRESSION CABINETS					
26	PASS-THRU REFRIGERATOR	115	1	5.5	5-15P	60"
26A	PASS-THRU REFRIGERATOR	115	1	5.5	5-15P	60"
29	DOUBLE CONVECTION OVEN	(2) 115	1	6	5-15P	30" & 60"
30	CHINA CABINETS	115	1	30"		
34	LT BRASSING PAN	208	3	63.8		30"
38	HOT HOLDING CABINET	120	1	16	5-20P	60"
38A	HOT HOLDING CABINETS	120	1	16	5-20P	60"
39	HOT HOLDING CABINET	120	1	16	5-20P	60"
39A	HOT HOLDING CABINET	120	1	16	5-20P	60"
47	PASS-THRU REFRIGERATOR	115	1	6.9	5-15P	60"
48	REACH-IN FREEZER	115	1	7.6	5-15P	80"
55	MICROWAVE	120	1	15	5-15P	48"
57	UNDER-COUNTER REFRIGERATOR	115	1	5.8	5-15P	30"
58	REACH-IN FREEZER	115	1	9.8	5-15P	68"
61	DISPOSER	208	3	6.6		12"
68	HANDSINK					
75	WALK-IN REFRIGERATOR / FREEZER	120	3	14.7		
75.1	WALK-IN FREEZER CONDENSING UNIT	208	3	15.7		
75.3	WALK-IN REFRIGERATOR CONDENSING UNIT	208	3	14.7		
76.2	WALK-IN REFRIGERATOR EVAPORATOR	115	1	2		
76.3	WALK-IN REFRIGERATOR EVAPORATOR	115	1	2		

STUB-UP - (1) DEDICATED CIRCUIT FOR P.O.S. STATION. PROVIDE 2 DATA CONNECTIONS JUNCTION BOX LOCATED ABOVE CEILING FOR LIGHTS. SEE NOTE K

PROVIDE J-BOX IN CEILING. MOUNT CONTROL PANEL 18" WITH CEILING SUGGESTED RECESSED LOCATION FOR USER CONTROLS. SEE NOTE L

JUNCTION BOX LOCATED ABOVE CEILING FOR CONTROL WIRING. SEE NOTE I

CONNECT TO FIRE SUPPRESSION CONTROL BOX. SUGGESTED LOCATION - VERIFY WITH ARCHITECT

PROVIDE ON 20A CIRCUIT

PROVIDE 70A CIRCUIT BREAKER

DROP CORD FROM ABOVE

PLUG ON BACKSPLASH

FROM ABOVE

PROVIDE 20A CIRCUIT FOR EACH DOOR TO COVER ALL LIGHTS AND DOOR HEATERS - SEE FS4 FOR DETAILS

PROVIDE 20A CIRCUIT

PROVIDE 20A CIRCUIT

FROM ABOVE

FROM ABOVE

ELECTRICAL TRADE NOTES

A.	ROUGH IN ELECTRICAL SERVICE THROUGH WALLS, FLOORS AND CEILINGS. MAKE ALL FINAL UTILITY CONNECTIONS BETWEEN THE ROUGH-IN POINT AND THE FOODSERVICE EQUIPMENT.
B.	ALL WORK MUST MEET ALL APPLICABLE STATE AND LOCAL CODES AND SITE CONDITIONS.
C.	FURNISH AND INSTALL ALL ELECTRICAL OUTLETS IN WALLS, FLOOR AND CEILING, AND IN OR ON FOODSERVICE EQUIPMENT WHERE NOTED ON DRAWINGS. ALL 120V DUPLEX RECEPTACLES SHALL BE MINIMUM 20 AMP CIRCUIT UNLESS NOTED OTHERWISE.
D.	FURNISH AND INSTALL ALL SAFETY CUT-OUTS, LINE DISCONNECT DEVICES, SHUNT-TRIP BREAKERS, POWER PANELS, POWER CORDS, GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLES, OUTLETS, CONDUIT, WIRE AND OTHER ELECTRICAL CONTROLS, AND ALL OTHER HARDWARE, PARTS AND SUPPLIES NECESSARY FOR THE PERFORMANCE OF WORK UNDER THIS CONTRACT, UNLESS SPECIFIED BY THE F.E.C. OR SPECIFIED OTHERWISE IN THESE DOCUMENTS.
E.	FURNISH AND INSTALL ALL CONDUIT AND WIRING BETWEEN REMOTE CONTROL PANELS AND THE FOODSERVICE EQUIPMENT.
F.	ALL CONDUIT SHALL BE RUN IN WALL AT A F.E.C. MINIMUM OR AS INDICATED. ALL EXPOSED CONDUIT SHALL BE RUN TIGHT TO THE WALL. DO NOT ATTACH CONDUIT ON ANY LEGS OR SHELVING BRACKET. ALL EXPOSED CONDUIT SHALL BE RIGID. FLEXIBLE METAL CONDUIT MAY ONLY BE SECURED TO THE BOTTOM OF THE TABLES OR OTHER STEEL SURFACES. ALL FLEXIBLE CONDUIT SHALL BE "SEALTITE" OR EQUAL. ALL COVER PLATES SHALL BE STAINLESS STEEL.
G.	PROVIDE FINAL CONNECTIONS TO PRE-WIRED COUNTERS. ALL WIRING, CONDUIT, RECEPTACLES, JUNCTION BOXES AND G.F.C.I.'S PROVIDED AS PART OF COUNTER BY F.E.C.
H.	PROVIDE (2) 120V DEDICATED CIRCUITS PER P.O.S. SYSTEM. PROVIDE DATA CONNECTIONS AND ANY CONDUIT CONNECTIONS WITH THIS LOCATION AND OFFICESHOPPER LOCATIONS NEEDED PER OTHERS DRAWINGS. IF NOT NOTED ON OTHERS DRAWINGS, VERIFY WITH OWNER FOR FINAL NEEDS AND DESTINATIONS FOR DATA CONNECTIONS.
I.	PROVIDE AND INTERWIRE SHUNT-TRIP BREAKER TO AUTOMATICALLY SHUT DOWN ELECTRIC EQUIPMENT AND RECEPTACLES UNDER HOODS WHEN FIRE PROTECTION SYSTEM IS ACTIVATED. INTERCONNECT FIRE PROTECTION SYSTEM WITH BUILDING ALARM SYSTEM.
J.	ROUGH IN, CONNECT AND INTERCONNECT ROOFTOP EQUIPMENT FOR FOODSERVICE VENTILATION SYSTEMS. INTERCONNECT LOW VOLTAGE CONTROL WIRING FROM ROOFTOP VENTILATION PACKAGE TO CONTROL PANEL. SEE MANUFACTURERS SHOP DRAWINGS FOR JUNCTION BOX AND CONTROL PANEL LOCATIONS. SEE HVAC PLANS FOR ROOFTOP.
K.	120V 1PH .5KW FOR HOOD LIGHTS. CONNECT TO JUNCTION BOX ON TOP OF EXHAUST HOOD. SEE MANUFACTURERS SHOP DRAWINGS FOR JUNCTION BOX LOCATIONS.
L.	PROVIDE CONTROL WIRING BETWEEN HOOD, MASTER CONTROL PANEL AND INTERMEDIATE/LOCAL HOOD CONTROLS. MASTER CONTROL PANEL AND INTERMEDIATE/LOCAL HOOD CONTROLS SHOWN ON HVAC DRAWINGS.
M.	OPEN NUMBER
	FURNISH AND INSTALL ALL INTERCONNECTING WIRING FOR WALK-IN REFRIGERATOR AND/OR FREEZER LIGHTS, DOOR HEATERS, COMPRESSORS, EVAPORATORS, ALARM SYSTEMS.
	HEATED PRESSURE RELIEF VALVES, WINDOW HEATERS, TIME CLOCKS, INTERLOCKS, ETC. UNITS ARE NOT PRE-WIRED. WIRE PER MANUFACTURERS DRAWINGS. CONDUIT OR WALK-IN LIGHTING SHALL BE RUN OVER TOP OF BOXES. INTERIOR CONDUIT RUNS ARE NOT ACCEPTABLE. ALL PENETRATIONS FOR CONDUIT AND REFRIGERATION LINES.



KALAMAZOO | CHELSEA | GRAND RAPIDS | ROYAL OAK

Strategic Energy Solutions®

4000 W. Eleven Mile Road Berkley, MI 48072
Phone 248.399.1900 Fax 248.399.1901

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SES Project # 22 0588 05

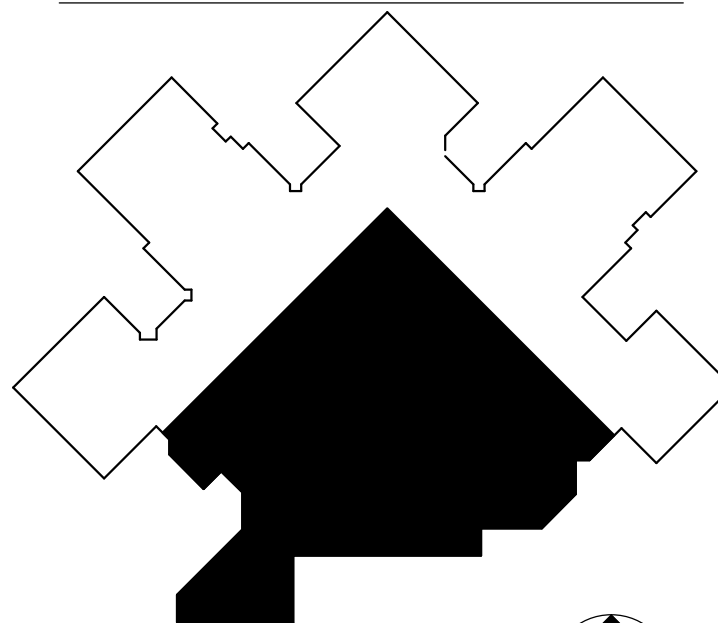
CHALLENGER ELEMENTARY KITCHEN ADDITION

KENTWOOD PUBLIC SCHOOLS

2475 52ND ST SE
KENTWOOD, MI 49508



ISSUANCES	DATE
CONSTRUCTION DOCUMENTS	01/31/2024
<u>ADDENDUM NO. 1</u>	02/20/2024
PR-03	06/27/2024



KEY PLAN

JOB NO. 2395-67

SHEET TITLE

POWER ENLARGED PLANS

SHEET NC

EP4.0

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KALAMAZOO, MICHIGAN



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



SCALE: 1/4" = 1'-0"



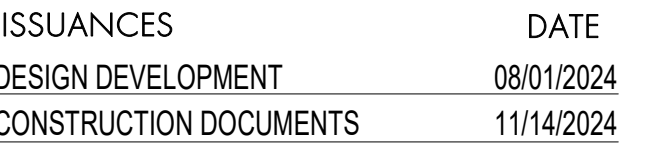
1. ALL RECEPTACLES ON EXTERIOR, IN KITCHEN, IN CONCESSION, IN LABORATORY, AND WITHIN 6' OF SINK OR OTHER WATER SUPPLY SHALL BE READILY ACCESSIBLE GFCI TYPE RECEPTACLE.
2. REFER TO ARCHITECTURAL FLOOR PLANS AND ELEVATIONS TO VERIFY LOCATION OF DEVICES.
3. ALL CONDUITS SERVING 120 VOLTS OR GREATER SHALL INCLUDE A GROUND WIRE.
4. ALL CONDUITS SHALL BE ROUTED CONCEALED UNLESS NOTED OTHERWISE.
5. ALL 120 VOLT CIRCUITS SHALL UTILIZE A SEPARATE NEUTRAL.
6. RECEPTACLES INSTALLED IN ELEVATOR HOISTWAYS, ELEVATOR MACHINE ROOMS, BOILER ROOMS, STAIRWELLS, MECHANICAL ROOMS, AND ELECTRICAL INTERLOCK TYPE (GFCI) WITH THE EXCEPTION OF A DESIGNATED SINGLE-PHASE RECEPTABLE SUPPLYING AN ELEVATOR PIT PUMP SHALL NOT BE A GFCI TYPE RECEPTABLE.
7. ALL 120 VOLT CIRCUITS SHALL BE PROTECTED BY OVERCURRENT TRIP AMP OUTLETS TO BE INSTALLED IN DWELLING UNIT FAMILY ROOMS, DINING ROOMS, LIVING ROOMS, PARLORS, LIBRARIES, RECREATION ROOMS, CLOSETS, HALLWAYS OR SIMILAR ROOMS OR AREAS AS SPECIFICALLY INDICATED ON THE DRAWINGS.
8. COMBINATION-TYPE, INSTALLED TO PROVIDE PROTECTION OF THE BRANCH CIRCUIT.

R1	FLIP-UP POWER OUTLET WITH USB CONNECTIONS INSTALLED IN TABLE. COORDINATE EXACT LOCATION WITH ARCHITECTURAL DETAILS. DEVICE IS EQUIPPED WITH A 72" FLEXIBLE CORD FOR CONNECTION TO LOWER OUTLET MOUNTED IN COLUMN. MOCKET PCS14 SERIES (OR EQUAL) WITH ALUMINUM HOUSING.
R2	UTILIZE EXISTING DEMOLISHED BRANCH CIRCUIT TO FEED NEW ELECTRICAL LOADS.
R3	INSTALL OUTLET HORIZONTALLY IN TOE KICK OF BENCH. REFER TO ARCHITECTURAL DETAILS FOR MOUNTING REQUIREMENTS.
R4	SURFACE MOUNT DUAL-CHANNEL RACEWAY DOWN FROM CEILING, OUTLETS INSTALLED WITHIN.



KENTWOOD PUBLIC SCHOOLS

2674 44 Street SE, Kentwood, MI 49512



OB NO. 2395-68

SHEET TITLE

FIRST FLOOR POWER PLAN - UNIT
200

SHEET NO.

EP1.2

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KALAMAZOO, MICHIGAN



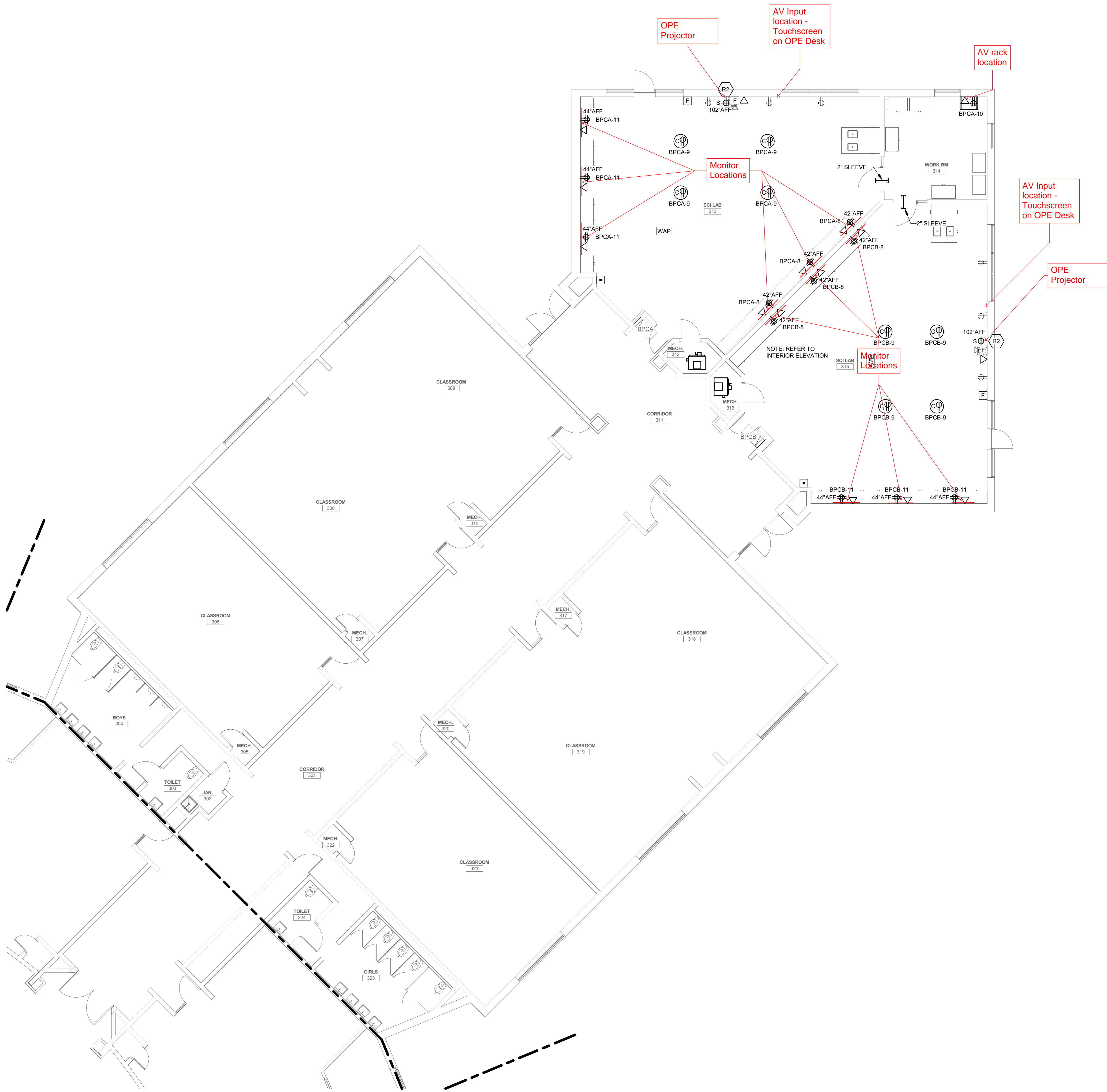
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SES Project # 22 0588 05



FIRST FLOOR POWER PLAN - UNIT 300
SCALE: 1/8" = 1'-0"

POWER GENERAL NOTES

- ALL RECEPTACLES ON EXTERIOR, IN KITCHEN, IN CONCESSION, IN LABORATORY, AND WITHIN 6'-0" OF SINK OR OTHER WATER SUPPLY SHALL BE READILY ACCESSIBLE GFCI TYPE RECEPTACLE.
- REFER TO ARCHITECTURAL FLOOR PLANS AND ELEVATIONS TO VERIFY LOCATION OF DEVICES.
- ALL CONDUITS SERVING 120 VOLTS OR GREATER SHALL INCLUDE A GROUND WIRE.
- ALL CONDUITS SHALL BE ROUTED CONCEALED UNLESS NOTED OTHERWISE.
- ALL 120 VOLT CIRCUITS SHALL UTILIZE A SEPARATE NEUTRAL.
- RECEPTACLES INSTALLED IN ELEVATOR HOISTWAYS, ELEVATOR MACHINE ROOMS, CONTROL ROOMS/SPACES SHALL BE GROUND FAULT CIRCUIT INTERRUPTER TYPE (GFCI) WITH THE EXCEPTION OF A DEDICATED SINGLE PHASE RECEPTACLE SUPPLYING AN ELEVATOR PIT SUMP PUMP SHALL NOT BE A GFCI TYPE RECEPTACLE.
- ALL BRANCH CIRCUITS THAT SUPPLY 120-V SINGLE PHASE, 15 AND 20 AMP OUTLETS TO BE INSTALLED IN DWELLING UNIT FAMILY ROOMS, DINING ROOMS, LIVING ROOMS, PARLORS, LIBRARIES, RECREATION ROOMS, CLOSETS, HALLWAYS OR SIMILAR ROOMS OR AREAS SHALL BE PROTECTED BY A LISTED ARC-FAULT CIRCUIT INTERRUPTER, COMBINATION-TYPE, INSTALLED TO PROVIDE PROTECTION OF THE BRANCH CIRCUIT.

POWER KEYNOTES

- R1 FLIP-UP POWER OUTLET WITH USB CONNECTIONS INSTALLED IN TABLE. COORDINATE EXACT LOCATION WITH ARCHITECTURAL DETAILS. DEVICE IS EQUIPPED WITH A 72' FLEXIBLE CORD FOR CONNECTION TO LOWER OUTLET MOUNTED IN COLUMN. MCKEY PC8114 SERIES (OR EQUAL) WITH ALUMINUM HOUSING.
- R2 UTILIZE EXISTING DEMOLISHED BRANCH CIRCUIT TO FEED NEW ELECTRICAL LOADS.
- R3 INSTALL OUTLET HORIZONTALLY IN TOE KICK OF BENCH. REFER TO ARCHITECTURAL DETAILS FOR MOUNTING REQUIREMENTS.
- R4 SURFACE MOUNT DUAL-CHANNEL RACEWAY DOWN FROM CEILING. OUTLETS INSTALLED WITHIN.

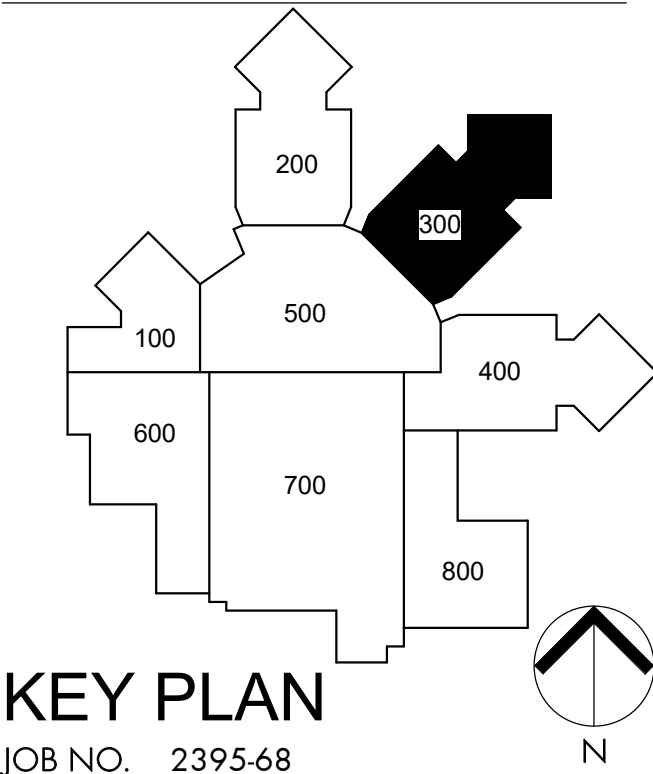
REFER TO ARCHITECTURAL AND INTERIORS ELEVATIONS FOR MOUNTING HEIGHTS AND LOCATION OF ELECTRICAL DEVICES



CRESTWOOD MIDDLE SCHOOL
PHASE 1
KENTWOOD PUBLIC SCHOOLS
2674 44 Street SE, Kentwood, MI 49512



ISSUANCES DATE
CONSTRUCTION DOCUMENTS 11/14/2024

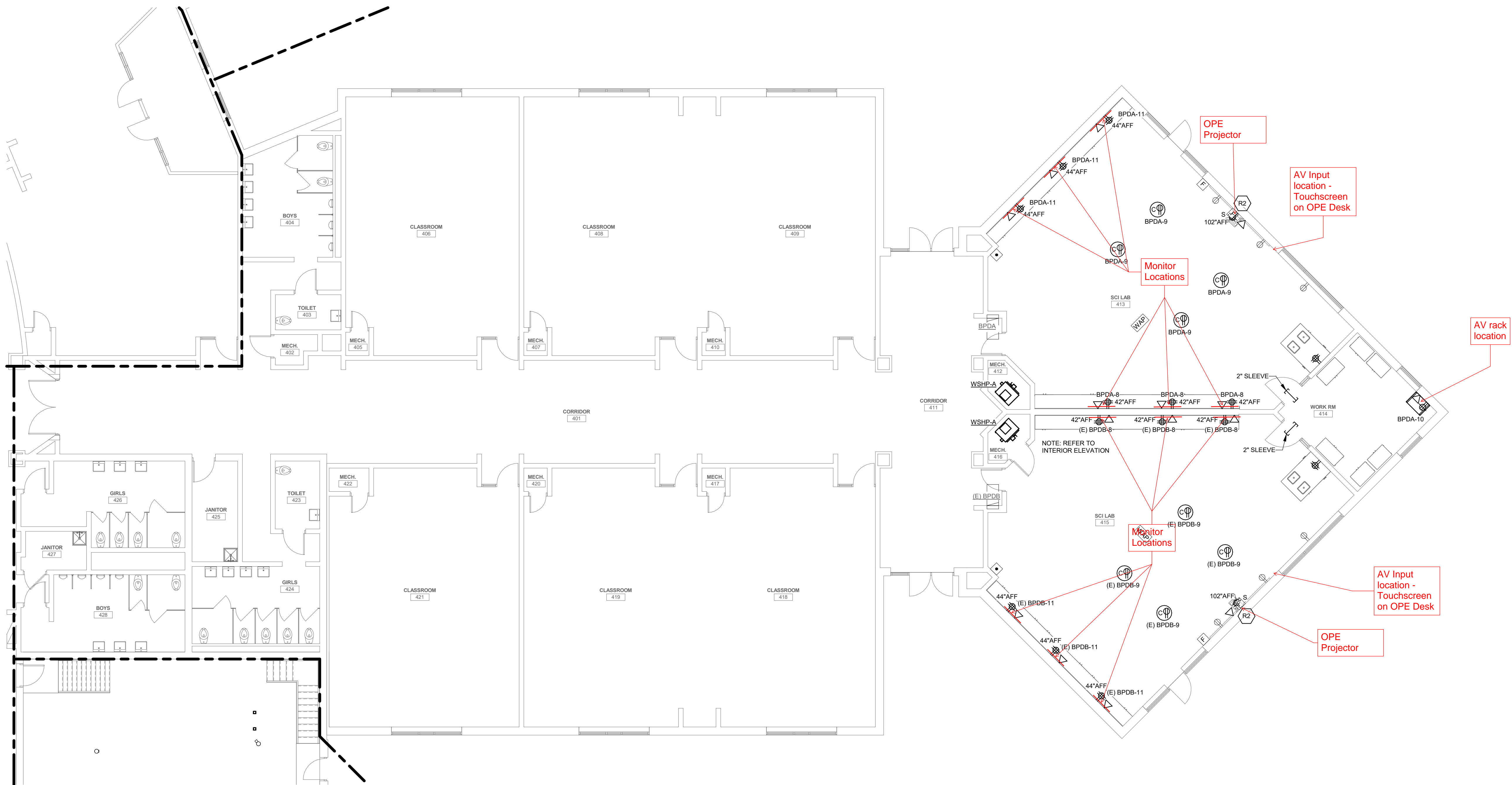


KEY PLAN
JOB NO. 2395-68
SHEET TITLE
FIRST FLOOR POWER PLAN - UNIT 300
SHEET NO.

EP1.3



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FIRST FLOOR POWER PLAN - UNIT 400
SCALE: 1/8" = 1'-0"

POWER GENERAL NOTES

1. ALL RECEPTACLES ON EXTERIOR, IN KITCHEN, IN CONCESSION, IN LABORATORY, AND WITHIN 6'-0" OF SINK OR OTHER WATER SUPPLY SHALL BE READILY ACCESSIBLE GFCI TYPE RECEPTACLE.
2. REFER TO ARCHITECTURAL FLOOR PLANS AND ELEVATIONS TO VERIFY LOCATION OF DEVICES.
3. ALL CONDUITS SERVING 120 VOLTS OR GREATER SHALL INCLUDE A GROUND WIRE.
4. ALL CONDUITS SHALL BE ROUTED CONCEALED UNLESS NOTED OTHERWISE.
5. ALL 120 VOLT CIRCUITS SHALL UTILIZE A SEPARATE NEUTRAL.
6. RECEPTACLES INSTALLED IN ELEVATOR HOISTWAYS(S), ELEVATOR MACHINE ROOM(S), CONTROL ROOM(S)/SPACE(S) SHALL BE GROUND FAULT CIRCUIT INTERRUPTER TYPE (GFCI) WITH THE EXCEPTION OF A DEDICATED SINGLE PHASE RECEPTACLE SUPPLYING AN ELEVATOR PIT PUMP PUMP SHALL NOT BE A GFCI TYPE RECEPTACLE.
7. ALL BRANCH CIRCUITS THAT SUPPLY 120-V SINGLE PHASE, 15 AND 20 AMP OUTLETS TO BE INSTALLED IN DWELLING UNIT FAMILY ROOMS, DINING ROOMS, LIVING ROOMS, PARLORS, LIBRARIES, RECREATION ROOMS, CLOSETS, HALLWAYS OR SIMILAR ROOMS OR AREAS SHALL BE PROTECTED BY A LISTED ARC-FAULT CIRCUIT INTERRUPTER. COMBINATION-TYPE, INSTALLED TO PROVIDE PROTECTION OF THE BRANCH CIRCUIT.

POWER KEYNOTES

- R1 FLIP-UP POWER OUTLET WITH USB CONNECTIONS INSTALLED IN TABLE. COORDINATE EXACT LOCATION WITH ARCHITECTURAL DETAILS. DEVICE IS EQUIPPED WITH A 7'2" FLEXIBLE CORD FOR CONNECTION TO LOWER OUTLET MOUNTED IN COLUMN. MCKEYTT PCS114 SERIES (OR EQUAL) WITH ALUMINUM HOUSING.
- R2 UTILIZE EXISTING DEMOLISHED BRANCH CIRCUIT TO FEED NEW ELECTRICAL LOADS.
- R3 INSTALL OUTLET HORIZONTALLY IN TOE KICK OF BENCH. REFER TO ARCHITECTURAL DETAILS FOR MOUNTING REQUIREMENTS.
- R4 SURFACE MOUNT DUAL-CHANNEL RACEWAY DOWN FROM CEILING, OUTLETS INSTALLED WITHIN.

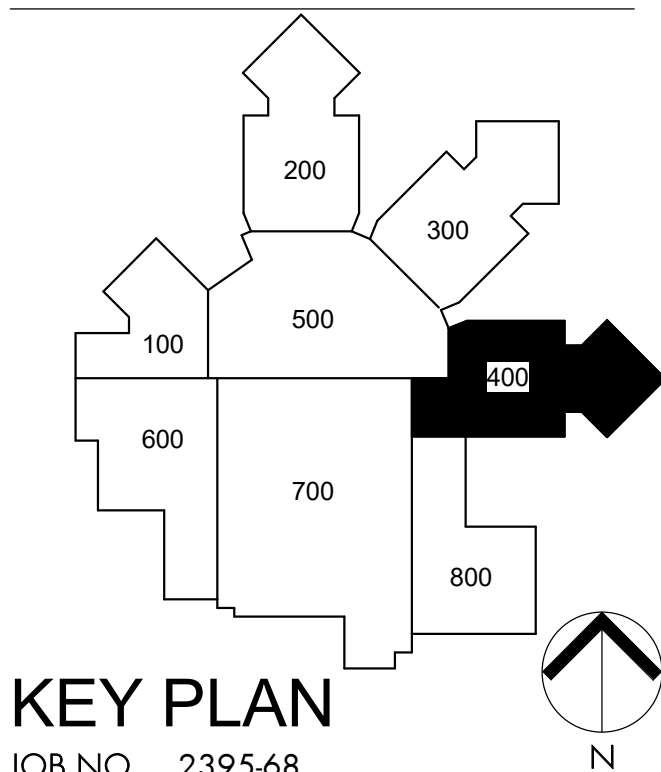
REFER TO ARCHITECTURAL AND INTERIORS ELEVATIONS FOR MOUNTING HEIGHTS AND LOCATION OF ELECTRICAL DEVICES



CRESTWOOD MIDDLE SCHOOL
PHASE 1
KENTWOOD PUBLIC SCHOOLS
2674 44 Street SE, Kentwood, MI 49512



ISSUANCES DATE
CONSTRUCTION DOCUMENTS 11/14/2024



KEY PLAN
JOB NO. 2395-68
SHEET TITLE
FIRST FLOOR POWER PLAN - UNIT 400

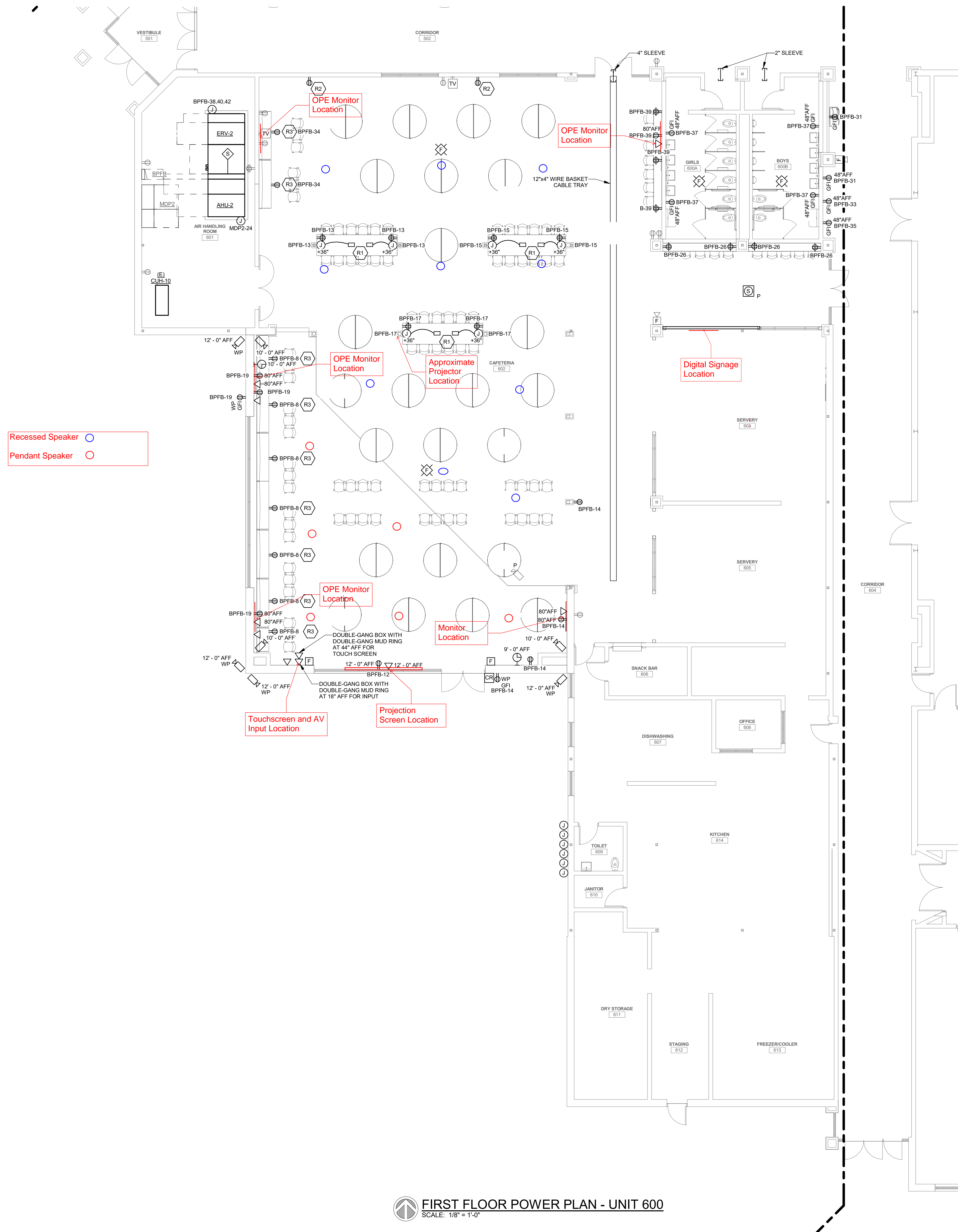
SHEET NO.

EP1.4

KINGS COTT ASSOCIATES INC. KALAMAZOO, MICHIGAN



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POWER GENERAL NOTES

1. ALL RECEPTACLES ON EXTERIOR, IN SHELPH, IN CONGRESSION, IN LABORATORY, AND WITHIN 6' OF SINK OR OTHER WATER SUPPLY, SHALL BE READILY ACCESSIBLE. GFCI RECEPTACLES SHALL BE INSTALLED.
2. REFER TO ARCHITECTURAL FLOOR PLANS AND ELEVATIONS TO VERIFY LOCATION OF DEVICES.
3. ALL CONDUITS SERVING 120 VOLTS OR GREATER SHALL INCLUDE A GROUND WIRE.
4. ALL CONDUITS SHALL BE ROUTED CONCENTRICALLY UNLESS NOTED OTHERWISE.
5. ALL 120 VOLT CIRCUITS SHALL UTILIZE A SEPARATE NEUTRAL.
6. RECEPTACLES (INSTALLED IN ELEVATOR HOSTWAYS), (ELEVATOR MACHINE ROOMS), (CONTROL ROOMS/SPACE), (ELEVATOR HOISTWAYS), (ELEVATOR INTERFERENCE) (GFCI) WITH THE EXCEPTION OF A DESIGNATED SINGLE PHASE RECEPTACLE SUPPLYING AN ELEVATOR RPT PUMP, SHALL NOT BE A GFCI RECEPTACLE.
7. ALL 120 VOLT CIRCUITS THAT SERVE THE FOLLOWING AREAS SHALL HAVE GFCI OUTLETS TO BE INSTALLED IN DWELLING UNIT FAMILY ROOMS, DINING ROOMS, LIVING ROOMS, PARLORS, LIBRARIES, RECREATION ROOMS, CLOSETS, HALLWAYS OR SIMILAR ROOMS OR AREAS SHALL BE PROTECTED BY A GFCI RECEPTACLE.
8. ALL 120 VOLT CIRCUITS THAT SERVE THE FOLLOWING AREAS SHALL HAVE GFCI OUTLETS TO BE INSTALLED IN DWELLING UNIT: KITCHEN, BATH, AND LAUNDRY ROOMS.
9. COMBINATION TYPE, INSTALLED TO PROVIDE PROTECTION OF THE BRANCH CIRCUIT.

POWER KEYNOTES

- R1 FLIP-UP POWER OUTLET WITH USB CONNECTIONS INSTALLED IN TABLE. COORDINATE EXACT LOCATION WITH ARCHITECTURAL DETAILS. DEVICE IS EQUIPPED WITH A 72" FLEXIBLE CORD FOR CONNECTION TO LOWER OUTLET MOUNTED IN COLUMN. MOCKET PCS114 SERIES (OR EQUAL) WITH ALUMINUM HOUSING.
- R2 UTILIZE EXISTING DEMOLISHED BRANCH CIRCUIT TO FEED NEW ELECTRICAL LOADS.
- R3 INSTALL OUTLET HORIZONTALLY IN TOE KICK OF BENCH. REFER TO ARCHITECTURAL DETAILS FOR MOUNTING REQUIREMENTS.
- R4 SURFACE MOUNT DUAL-CHANNEL RACEWAY DOWN FROM CEILING, OUTLETS INSTALLED WITHIN.



KINGSCOTT
KALAMAZOO | CHELSEA | GRAND RAPIDS | ROYAL OAK

CRESTWOOD MIDDLE SCHOOL

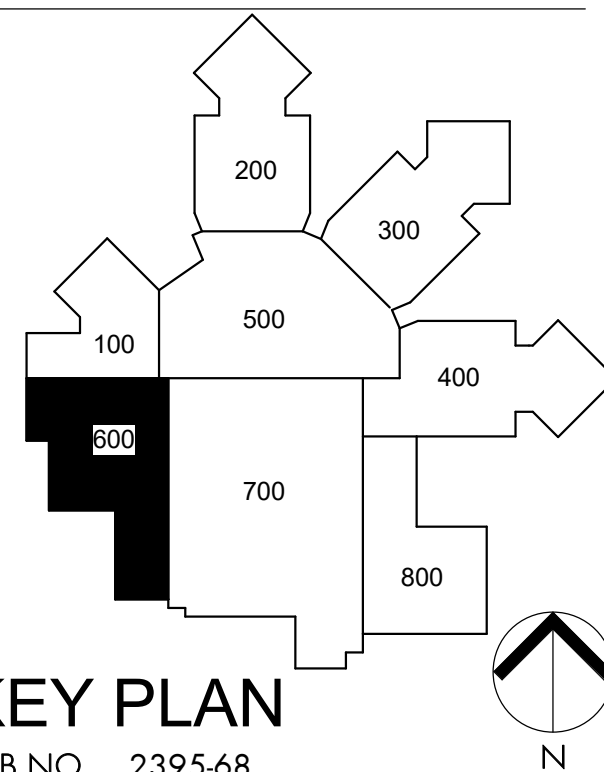
PHASE 1

KENTWOOD PUBLIC SCHOOLS

2674 44 Street SE, Kentwood, MI 49512



ISSUANCES	DATE
DESIGN DEVELOPMENT	08/01/2024
CONSTRUCTION DOCUMENTS	11/14/2024



KEY PLAN

JOB NO. 2395-68

SHEET TITLE

FIRST FLOOR POWER PLAN - UNIT
600

SHEET NO

EP1.6

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ELECTRICAL KEYNOTES	
P03	REPLACE EXISTING RECEPTACLES IN SPACE WITH NEW DEVICES AND NEW FACEPLATES
P05	EXTEND EXISTING CIRCUIT TO NEW RECEPTACLE
P09	NEW FLOW SWITCH AND TAMPER SWITCH AT EXISTING FIRE PROTECTION RISER. PROVIDE MONITORING BY EXISTING FIRE ALARM SYSTEM
P10	CIRCUIT TO SPARE 20A/1P CIRCUIT BREAKER IN EX. PANEL 'W'. DISCONNECTS AND RECEPTACLES SHALL BE INDEPENDENTLY MOUNTED TO FABRICATED UNISTRUT RACK OFF OF MECHANICAL EQUIPMENT RAILS. COORDINATE WITH MECH TRADES.
P11	DISCONNECTS AND RECEPTACLES SHALL BE INDEPENDENTLY MOUNTED TO FABRICATED UNISTRUT RACK OFF OF MECHANICAL EQUIPMENT RAILS. COORDINATE WITH MECH TRADES.
P12	PROVIDE NEW 20A/1P BREAKER FOR NEW CIRCUIT TO EX. PANEL 'T'
P13	REWORK AND EXTEND EXISTING 60A CIRCUIT FROM EX. MCC TO NEW AHU. EXISTING DRAWINGS SHOW 60A OCCP. FIELD VERIFY OCCP SIZING.
P14	REWORK AND EXTEND EXISTING 15A CIRCUIT FROM EX. MCC TO NEW EXHAUST FAN. EXISTING DRAWINGS SHOW 15A OCCP. FIELD VERIFY OCCP SIZING.

POWER & COMMUNICATION GENERAL NOTES

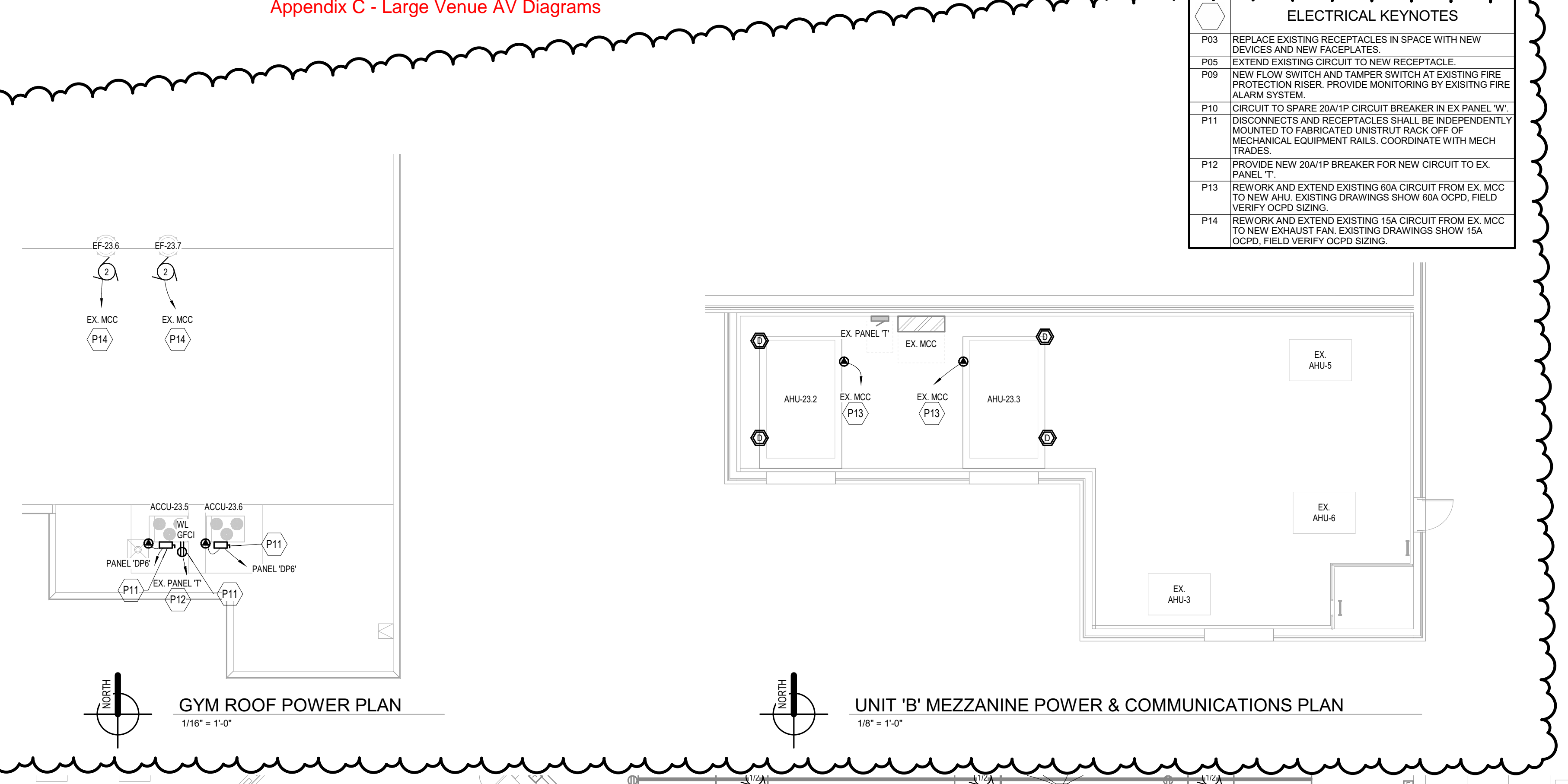
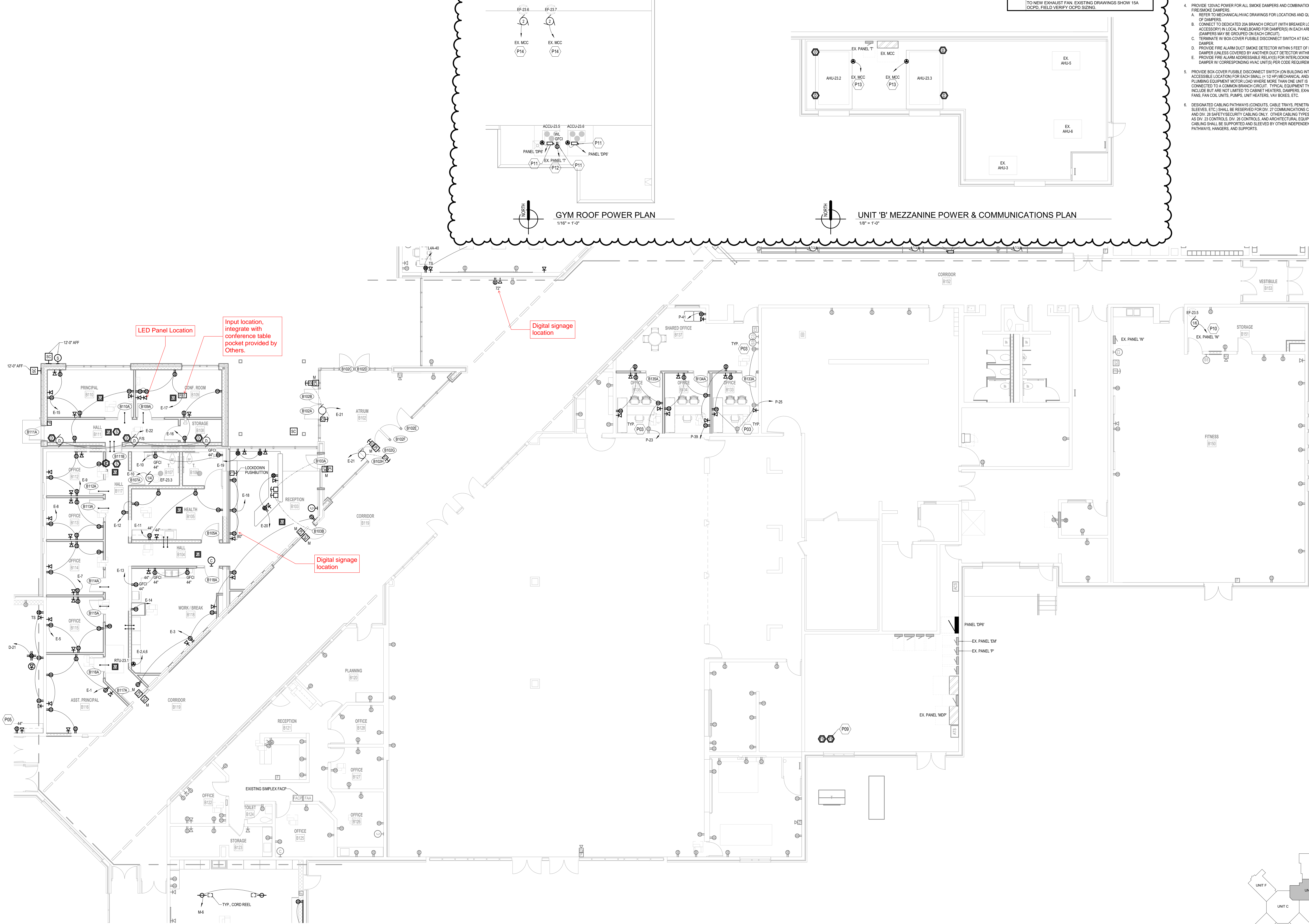
- REFER TO ELECTRICAL GENERAL NOTES ON SHEET E2.1B.
- REFER TO CODE COMPLIANCE PLAN FOR LOCATIONS AND RATINGS OF VERTICAL AND HORIZONTAL BUILDING ASSEMBLIES. PROVIDE APPROPRIATE FIRESTOPPING SYSTEMS PER SPECIFICATIONS TO MEET ALL APPLICABLE CODES.
- ALL 15- AND 20-AMPERE, 125- AND 250-VOLT NON-LOCKING RECEPTACLES SHALL BE TAMPER-RESISTANT TYPE. REFER TO NEC 408.12 AND SPECIFICATION SECTION 28.27.26.
- PROVIDE 120VAC POWER FOR ALL SMOKE DAMPERS AND COMBINATION FIRE/SMOKE DAMPERS.
 - REFER TO MECHANICAL/HVAC DRAWINGS FOR LOCATIONS AND QUANTITIES OF DAMPERS.
 - CONNECT TO DEDICATED 20A BRANCH CIRCUIT (WITH BREAKER LOCK-ON ACCESSORY) IN LOCAL PANELBOARD FOR DAMPERS IN EACH AREA (DAMPERS MAY BE GROUPED ON EACH CIRCUIT).
 - TERMINATE W/ BOX-COVER FUSIBLE DISCONNECT SWITCH AT EACH DAMPER.
 - PROVIDE FIRE ALARM DUCT SMOKE DETECTOR WITHIN 5 FEET OF EACH DAMPER UNLESS COVERED BY ANOTHER DUCT DETECTOR WITHIN 5 FEET.
 - PROVIDE FIRE ALARM ADDRESSABLE RELAYS FOR INTERLOCKING DAMPER W/ CORRESPONDING HVAC UNIT(S) PER CODE REQUIREMENTS.
- PROVIDE BOX-COVER FUSIBLE DISCONNECT SWITCH (ON BUILDING INTERIOR IN ACCESSIBLE LOCATION) FOR EACH SMALL (< 12 HP) MECHANICAL AND/OR PLUMBING EQUIPMENT MOTOR LOAD WHERE MORE THAN ONE UNIT IS CONNECTED TO A COMMON BRANCH CIRCUIT. TYPICAL EQUIPMENT TYPES INCLUDE BUT ARE NOT LIMITED TO CABINET HEATERS, DAMPERS, EXHAUST FANS, FAN COIL UNITS, PUMPS, UNIT HEATERS, VAV BOXES, ETC.
- DESIGNATED CABLEING PATHWAYS (CONDUITS, CABLE TRAYS, PENETRATION SLEEVES, ETC.) SHALL BE RESERVED FOR DIV. 27 COMMUNICATIONS CABLEING AND DIV. 28 SAFETY/SECURITY CABLEING ONLY. OTHER CABLEING TYPES, SUCH AS DIV. 23 CONTROLS, DIV. 26 CONTROLS, AND ARCHITECTURAL EQUIPMENT CABLEING SHALL BE SUPPORTED AND SLEEVED BY OTHER INDEPENDENT PATHWAYS, HANGERS, AND SUPPORTS.

ISSUANCES	
11.17.2022	BIDS & CONSTRUCTION
12.01.2022	ADDENDUM 001
12.14.2022	ADDENDUM 002
03.14.2023	BULLETIN 003
04.11.2023	BULLETIN 004
05.17.2023	BULLETIN 005
06.15.2023	BULLETIN 006
10.04.2023	BULLETIN 009

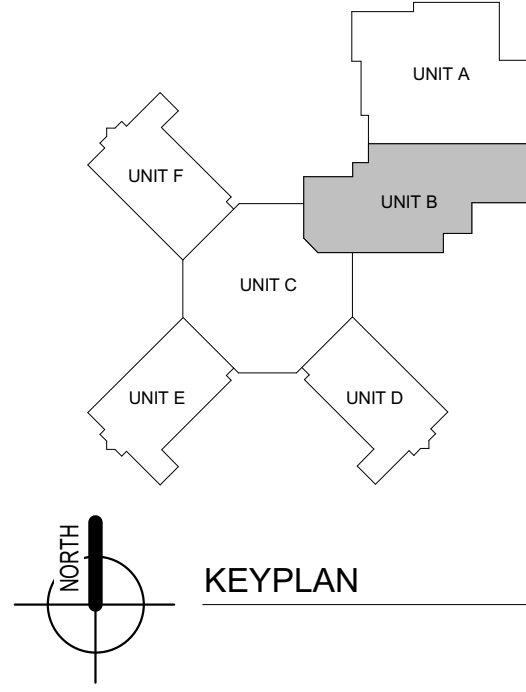
DRAWN	JFB
REVIEWED	JFB
PROJECT NO. 5-5522	
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UNIT 'B' FIRST FLOOR POWER & COMMUNICATIONS PLAN

E2.1B



UNIT 'B' FIRST FLOOR POWER & COMMUNICATIONS PLAN
1/8\"/>



FOODSERVICE ELECTRICAL GENERAL NOTES

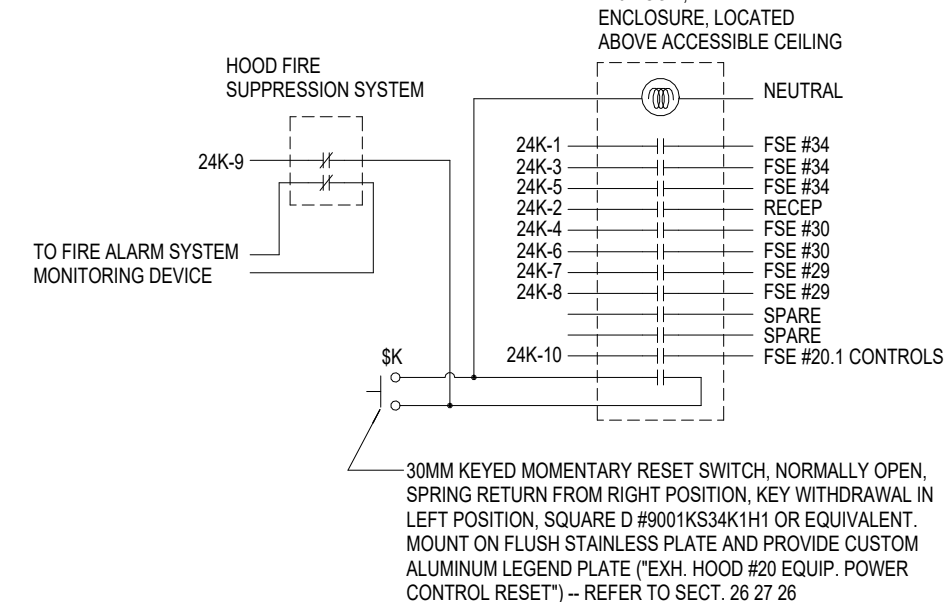
- ELEC. CONTRACTOR SHALL REVIEW FOODSERVICE EQUIPMENT DRAWINGS ("FSE" SERIES) AND FOOD SERVICE SPECIFICATIONS SECTION 11.61.00 FOR ADDITIONAL SCOPE OF WORK AND REQUIREMENTS. INCLUDE ALL WORK AND MATERIALS AS ASSIGNED TO THE ELEC. CONTRACTOR BY DRAWINGS, SPECIFICATIONS, CONSTRUCTION MANAGERS WORK CATEGORY DESCRIPTIONS, ETC.
- IF THERE IS A CONFLICT BETWEEN THE FOODSERVICE SPECIFICATIONS AND THIS DRAWING OR DIVISION 26 SPECIFICATIONS, THE ELEC. CONTRACTOR SHALL BID USING THE MORE STRINGENT AND GREATER-COST REQUIREMENTS. CLARIFICATIONS MAY BE REQUESTED IN WRITING PRIOR TO BID. COORDINATE WITH CONSTRUCTION MANAGERS PROCEDURES.
- THE WORK SHOWN ON THIS DRAWING AND THE DIVISION 26 SPECIFICATIONS SHALL SUPERCEDE THE FOOD SERVICE EQUIPMENT DRAWINGS SPECIFICATION.
- LABEL ALL RECEPTACLES IN KITCHEN AND SERVING AREAS WITH CORRESPONDING PANELBOARD, CIRCUIT NUMBER, AND FOODSERVICE EQUIPMENT ITEM NUMBER AS REFERENCED ON THE FOODSERVICE EQUIPMENT DRAWINGS.
- ELEC. CONTRACTOR SHALL VERIFY AND COORDINATE WITH THE FOODSERVICE EQUIPMENT VENDOR THAT ALL SINGLE-PHASE RECEPTACLES (150V, 1-Ø OR LESS, 50A OR LESS) AND THREE-PHASE RECEPTACLES (150V, 3-Ø OR LESS, 100A OR LESS) IN KITCHEN AND SERVING AREAS HAVE GFCI PROTECTION FOR PERSONNEL AS REQUIRED BY NEC 210.8(B)(2). EITHER AT THE DEVICE (GFCI RECEPTACLE) OR AT THE RESPECTIVE PANELBOARD (GFCI BREAKER FOR THE BRANCH CIRCUIT). FOR ANY SUCH RECEPTACLE LOCATIONS THAT ARE NOT READILY ACCESSIBLE (NEC DEFINITION), GFCI PROTECTION SHALL BE PROVIDED FOR THE BRANCH CIRCUIT AT THE PANELBOARD USING A GFCI BRANCH CIRCUIT BREAKER.
- PROVIDE CONCEALED ROUGH-IN FOR REMOTE MANUAL PULL STATIONS CONNECTED TO VENTILATION HOOD FIRE PROTECTION SYSTEMS. SURFACE-MOUNTED CONDUIT, PIPE, AND PULL STATIONS ARE NOT ACCEPTABLE. COORDINATE LOCATIONS WITH ENGINEERED SHOP DRAWINGS FOR SYSTEM.

POWER & COMMUNICATION GENERAL NOTES

- REFER TO ELECTRICAL GENERAL NOTES ON SHEET E2.01.
- REFER TO CODE COMPLIANCE PLAN FOR LOCATIONS AND RATINGS OF VERTICAL AND HORIZONTAL BUILDING ASSEMBLIES. PROVIDE APPROPRIATE PRESTRESSING SYSTEMS PER SPECIFICATIONS TO MEET ALL APPLICABLE CODES.
- ALL GENERAL USE 15- AND 20-AMPERE, 125- AND 250-VOLT NON-LOCKING RECEPTACLES SHALL BE TAMPER-RESISTANT TYPE. REFER TO NEC 406.12 AND SPECIFICATION SECTION 26.27.26.
- PROVIDE 120VAC POWER FOR ALL SMOKE DAMPERS AND COMBINATION FIRE/SMOKE DAMPERS.
 - REFER TO MECHANICAL/HVAC DRAWINGS FOR LOCATIONS AND QUANTITIES OF DAMPERS.
 - CONNECT TO DEDICATED 20A BRANCH CIRCUIT (WITH BREAKER LOCK-ON ACCESSORY) IN LOCAL PANELBOARD FOR DAMPERS (S) IN EACH AREA (DAMPERS MAY BE GROUPED ON EACH CIRCUIT).
 - TERMINATE W/ BOX-COVER FUSIBLE DISCONNECT SWITCH AT EACH DAMPER.
 - PROVIDE FIRE ALARM DUTY SMOKE DETECTOR WITHIN 5 FEET OF EACH DAMPER (UNLESS COVERED BY ANOTHER DUTY DETECTOR WITHIN 5 FEET).
 - PROVIDE FIRE ALARM ADDRESSABLE RELAYS FOR INTERLOCKING DAMPERS IN CORRESPONDING HVAC UNIT(S) PER CODE REQUIREMENTS.
- PROVIDE BOX-COVER FUSIBLE DISCONNECT SWITCH (ON BUILDING INTERIOR IN ACCESSIBLE LOCATION) FOR EACH SMALL (< 12 HP) MECHANICAL AND/OR PUMPING EQUIPMENT MOTOR LOAD WHERE MORE THAN ONE UNIT IS CONNECTED TO A COMMON BRANCH CIRCUIT. TYPICAL EQUIPMENT TYPES INCLUDE BUT ARE NOT LIMITED TO CABINET HEATERS, DAMPERS, EXHAUST FANS, FAN COIL UNITS, PUMPS, UNIT HEATERS, VAV BOXES, ETC.
- DESIGNATED CABLE PATHWAYS (CONDUITS, CABLE TRAYS, PENETRATION SLEEVES, ETC.) SHALL BE RESERVED FOR DIV. 27 COMMUNICATIONS CABLEING AND DIV. 28 SAFETY/SECURITY CABLEING ONLY. OTHER CABLEING TYPES, SUCH AS DIV. 23 CONTROLS, DIV. 26 CONTROLS, AND ARCHITECTURAL EQUIPMENT CABLEING SHALL BE SUPPORTED AND SLEAVED BY OTHER INDEPENDENT PATHWAYS, HANGERS, AND SUPPORTS.
- CONSOLIDATE ALL POWER SUPPLIES REQUIRED FOR ELECTRONIC DOOR HARDWARE (REF. SECTION 18.71.00 TO CENTRAL LOCATION(S) ADJACENT TO DESIGNATED ACCESS CONTROL EQUIPMENT LOCATION(S). CONNECT ALL POWER SUPPLIES TO DEDICATED LOCAL BRANCH CIRCUIT(S) AS DESIGNATED.

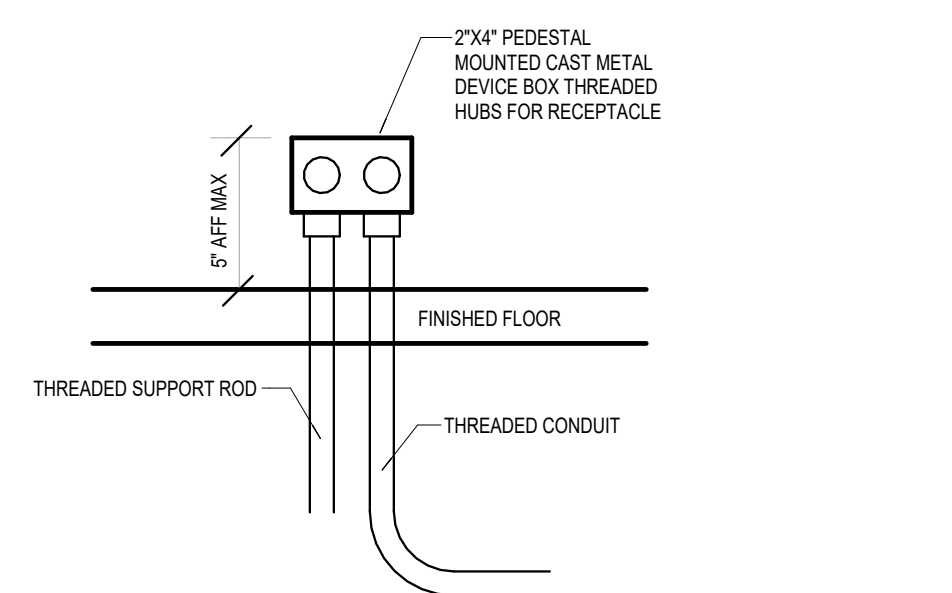
ELECTRICAL KEYNOTES

- PROVIDE SINGLE-GANG CAST METAL DEVICE BOX WITH THREADED HUBS WITH DECORA FACEPLATE FOR LOW-VOLTAGE CONNECTIONS FOR POS STATION. COORDINATE REQUIREMENTS WITH POS SYSTEM PROVIDER. INSTALL AT SAME HEIGHT AS RECEPTACLE BOX.
- LOCATION OF HOOD CONTROL STATION AND ANAL SYSTEM PULL STATION. COORDINATE ROUGH-IN REQUIREMENTS WITH FSE DRAWINGS.
- LOCATE DISCONNECT UNDER COUNTER.
- E.C. SHALL INTERVIEW ALL COMPONENTS OF MAKE-UP AIR UNIT, EXHAUST FAN, HOOD LIGHTS, AND HOOD CONTROLS AS SHOWN ON FOODSERVICE EQUIP. DRAWINGS AND AS REQUIRED BY EQUIPMENT MANUFACTURER. VERIFY WITH EQUIPMENT SHOP DRAWINGS.
- EXHAUST HOOD FIRE PROTECTION SYSTEM, INTERCONNECT WITH FIRE ALARM INITIATION CIRCUIT FOR SUPERVISORY MONITORING AND FIRE CODES AND CONTROL CONTRACTOR FOR SHUTDOWN OF EQUIPMENT ELEC. SUPPLY UNDER HOOD UPON RELEASE OF EXTINGUISHING AGENT. REFER TO DETAIL ON FSE SHEETS AND CONTROL DETAIL.
- PENDANT CORD DROPS FROM CEILING. USE TYPE 3/00W JUNIOR HARD SERVICE CORD, TERMINATED AT FLUSH STAINLESS STEEL CEILING PLATE AND RECEPTACLE BOX WITH STAINLESS STEEL MESH GRID DRIPS AND LIQUID-TIGHT FITTINGS. BOX AT END OF CORD SHALL BE EQUAL TO HUBBELL HBLRPOB WITH (2) HUBBELL 20A SINGLE RECEPTACLE WEATHERPROOF COVER PLATES AND (2) SINGLE 20A RECEPTACLES AS SPECIFIED. BOTTOM OF BOX SHALL BE INSTALLED AT 4" AFF. OWNER MAY ADJUST CORD DROP TO LENGTH AFTER INSTALLATION WITH W/CON CABLES. ASSEMBLY SHALL BE CLEANABLE PER HEALTH DEPARTMENT REQUIREMENTS.
- E.C. SHALL INTERVIEW ALL COMPONENTS OF WALK-IN COOLER OR FREEZER AS SHOWN ON DRAWINGS AND REQUIRED BY EQUIPMENT MANUFACTURER. COORDINATE WITH SHOP DRAWINGS.
- SUPPLY 5-EMPTY CONDUIT FROM CASH REGISTER LOCATION TO JUNCTION BOX IN OFFICE DATA CABLE TO BE SUPPLIED AND INSTALLED BY OTHERS.
- ROLLING FIRE SHUTTER IN CONTROL PANEL AND FLUSH-MOUNTED CONTROL SWITCHES, UNIFORMS AND INSTALLED BY ARCH. TRADES. DIV. 26 SHALL PROVIDE 120VAC POWER FOR MOTOR UNIT. ROUGH-IN FIRE ALARM SYSTEM INTERCONNECTION, AND INTERVIEW W/AL SWITCHES AND DOOR SENSORS FOR PROPER OPERATION. VERIFY CONTROL SWITCH BACKBOX REQUIREMENTS W/DOOR CONTRACTOR PRIOR TO WALL ROUGH-IN. POWER DISCONNECT SWITCH SHALL BE MOUNTED ABOVE SUSPENDED CEILING. ROUGH-IN ONLY FOR FUTURE SERVING LOCATION. ROUTE CONDUITS BACK TO NEW WALLS AND INTO ACCESSIBLE CEILING SPACE FOR FUTURE USE.



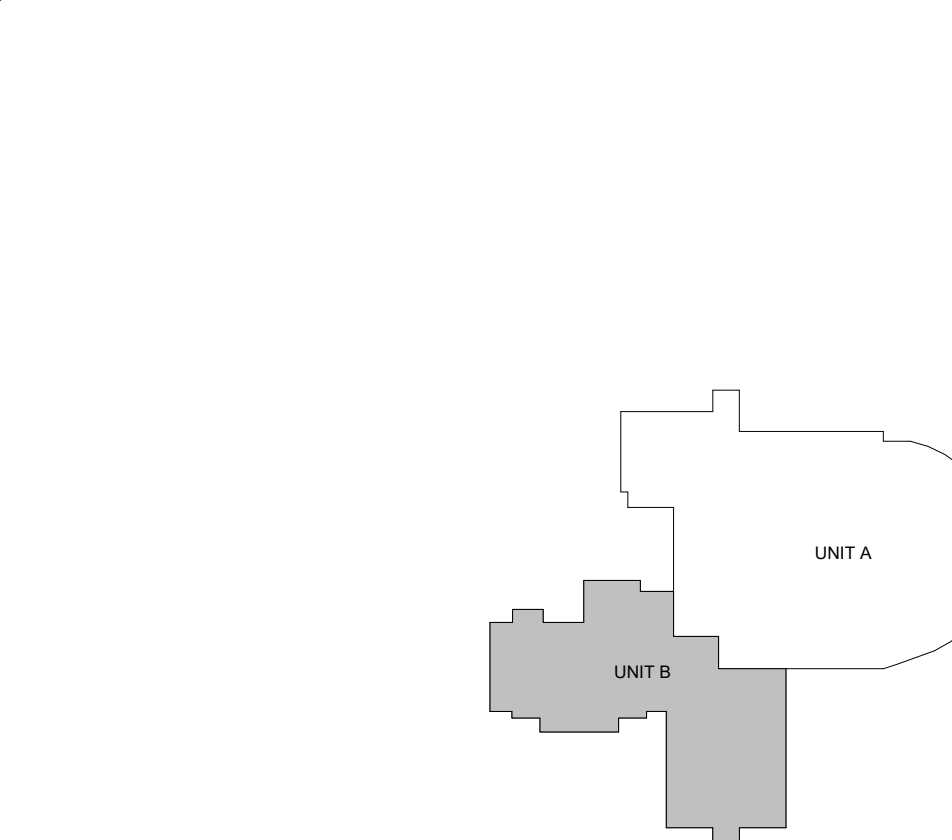
2 FOODSERVICE EQUIP. ELEC SHUTDOWN DETAIL

NOT TO SCALE



1 FSE FREE-STANDING RECEPTACLE DETAIL

NOT TO SCALE



ISSUANCES

11.16.2023 BIDS & CONSTRUCTION
04.02.2024 BULLETIN 002DRAWN JFB
REVIEWED JFB

PROJECT NO. 5-6178

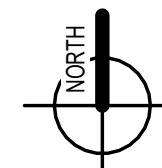
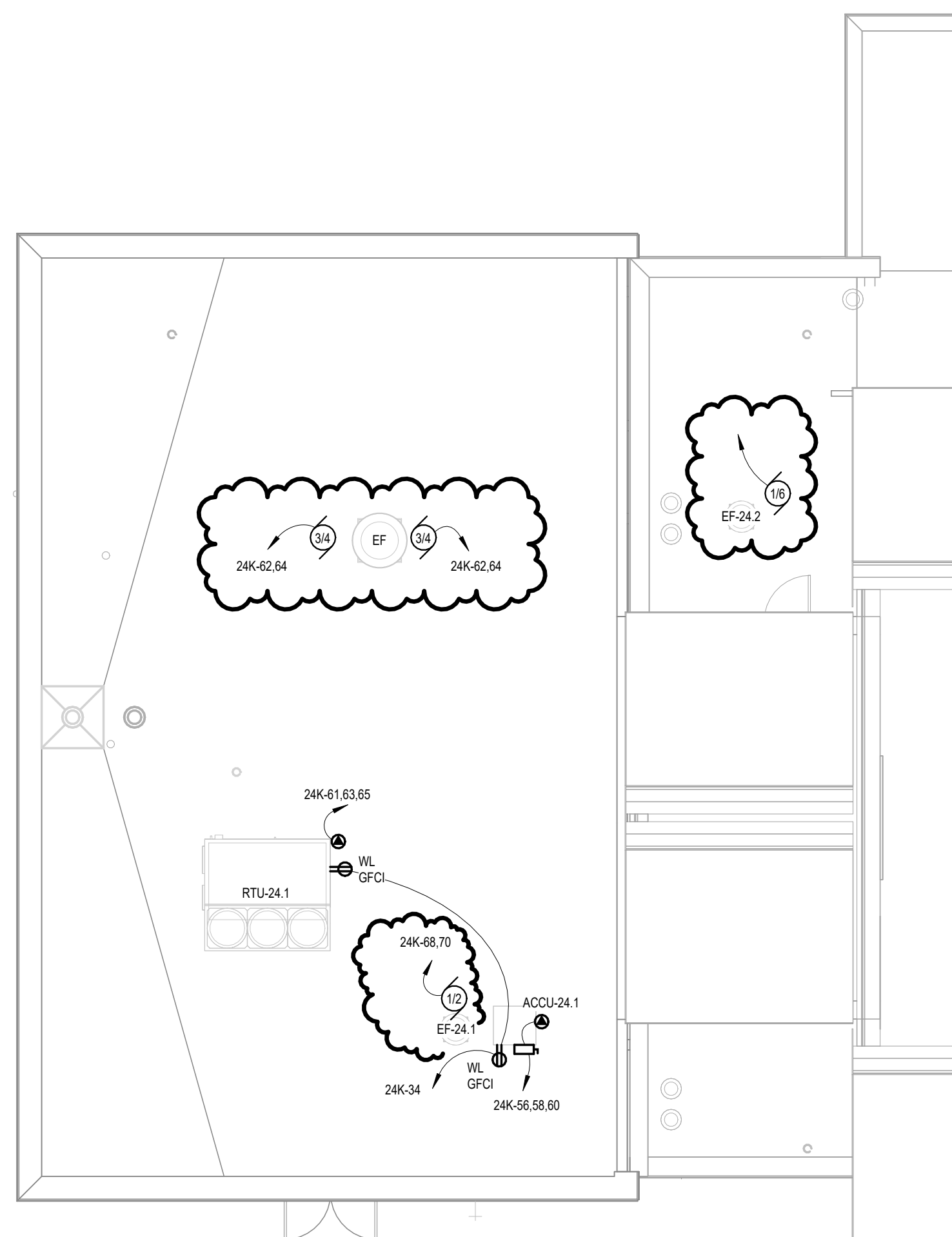
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ENLARGED KITCHEN POWER & COMMUNICATION PLAN

E2.80

PANELBOARD: PANEL '24K'				DISTRIBUTION SYSTEM: 208Y/120V 3PH 4W				MAINS TYPE: MAIN LUG			
LOCATION: JANITOR B106				SCCR: 10KA				MAINS RATING: 400 A			
MOUNTING: SURFACE				SUPPLY FROM: EX. MDP							
ENCLOSURE: TYPE 1											
PROVIDE WITH THE FOLLOWING: INTEGRAL SPD											
CIRCUIT	CIRCUIT DESCRIPTION	TRIP	POLES	A	B	C	POLES	TRIP	CIRCUIT DESCRIPTION	CIRCUIT	
24K-1				7,653	180			1	20 A	(GFCI) RECEPTACLE KITCHEN B102	24K-2
24K-3	(GFCI) FSE #34 - TILT PAN	70 A	3		7,653	1,560		2	20 A	(GFCI) FSE #30 COMBI OVEN	24K-4
24K-5						7,653	1,560	2	20 A	(GFCI) FSE #29 - OVEN	24K-8
24K-7	(GFCI) FSE #29 - OVEN	20 A	1	180	180			1	20 A	FSE #20.1 - HOOD CTRL BOX	24K-10
24K-9	FSE #21 - FIRE SUPPRESSION	20 A	1		1,200	1,200		1	20 A	(GFCI) FSE #48 - FREEZER	24K-12
24K-11						792	912	1	20 A	(GFCI) FSE #47 - PASS THRU FRIDGE	24K-14
24K-13	FSE #61 - DISPOSAL	20 A	3	792	828			1	20 A	(GFCI) CORD DROP RECEPTACLE...	24K-16
24K-15					792	180		1	20 A	RECEPTACLE KITCHEN B102	24K-18
24K-17	RECEPTACLE ROOM B102	20 A	1			540	360	1	20 A	(GFCI) FSE #57 - UNDERCOUNTER FRIDGE	24K-20
24K-19	RECEPTACLE ROOM B102	20 A	1	720	576			1	20 A	(GFCI) FSE #58 - REACH IN FREEZER	24K-22
24K-21	(GFCI) FSE #55 - MICROWAVE	20 A	1		1,800	1,176		1	20 A	(GFCI) - FSE #38A - HOT HOLDING...	24K-24
24K-23	(GFCI) - FSE #38A - HOT HOLDING...	20 A	1			1,800	1,800	1	20 A	(GFCI) CORD DROP RECEPTACLE...	24K-26
24K-25	(GFCI) FSE #26 - PASS THRU FRIDGE	20 A	1	660	180			1	20 A	FSE #75.3/4 - WALK-IN FRIDGE CONDVEAP	24K-28
24K-27	FSE #75 - WALK-IN COOLER/FREEZER	20 A	1		0	1,919		3	20 A	FSE #75.3/4 - WALK-IN FRIDGE CONDVEAP	24K-30
24K-29						2,375	1,919				24K-32
24K-31	FSE #75.1/2 - WALKIN FREEZER CONDEVEAP	20 A	3	2,375	1,919			1	20 A	ROOFTOP RECEP	24K-34
24K-33					2,375	360		1	20 A	(GFCI) FSE #16 - POS STATION	24K-36
24K-35	(GFCI) FSE #3 - COLD SERVING COUNTER	20 A	1			420	1,200	1	20 A	(GFCI) FSE #8 - MILK COOLER	24K-38
24K-37	(GFCI) FSE #13 - COLD SERVING COUNTER	20 A	1	420	912			2	20 A	(GFCI) FSE#10 - HOT SERVING COUNTER	24K-40
24K-39	(GFCI) FSE#10 - HOT SERVING COUNTER	20 A	2		1,664	1,664		1	20 A	(GFCI) FSE #39 - MILK COOLER	24K-42
24K-41						1,664	1,664	2	20 A	RECEPTACLE SERVERY B101	24K-44
24K-43	RECEPTACLE OFFICE B103	20 A	1	900	912			1	20 A	ROLLING DOOR	24K-46
24K-45	RECEPTACLE DRY STORAGE B104	20 A	1		720	540		2	20 A	UV-24.1	24K-48
24K-47	ROLLING DOOR	20 A	1			1,176	1,176	1	20 A	CUH-24.1P-24.1	24K-50
24K-49	ROLLING DOOR	20 A	1	1,176	728			2	20 A	ACCU-24.1	24K-52
24K-51	DISPLAY RECEPTACLES	20 A	1		360	728		3	20 A		24K-54
24K-53	EF-24.2	15 A	1			528	768	1	20 A		24K-56
24K-55	ROLLING DOOR	20 A	1	1,176	1,080			3	20 A		24K-58
24K-57	ROLLING DOOR	20 A	1		1,176	1,080					24K-60
24K-59	LIGHTING - KITCHEN ADDITION	20 A	1			1,471	1,080				24K-62
24K-61				9,596	1,643			2	20 A	HOOD EXHAUST FANS	24K-64
24K-63	RTU-24.1	110 A	3		9,596	1,643					24K-66
24K-65						9,596	25	1	20 A	LIGHTING - EXTERIOR WALL PACK	24K-68
24K-67	--	--	1	--	582			2	15 A	EF-24.1	24K-70
24K-69	--	--	1	--	--	582					24K-72
24K-71	--	--	1	--	--	--	0	1	20 A	SPARE	24K-74
24K-73	SPARE	20 A	1	0	0			1	20 A	SPARE	24K-76
24K-75	SPARE	20 A	1		0	0		1	20 A	SPARE	24K-78
24K-77	SPARE	20 A	1			0	0	1	20 A	SPARE	24K-80
24K-79	SPARE	20 A	1	0	0			1	20 A	SPARE	24K-82
24K-81	SPARE	20 A	1		0	0		1	20 A	SPARE	24K-84
24K-83	SPARE	20 A	1			0	0	1	20 A	SPARE	24K-86
PHASE LOAD:				35,367 VA	39,967 VA	40,478 VA					
LOAD CLASSIFICATION				CONNECTED LOAD		DEMAND FACTOR		ESTIMATED DEMAND		PANEL TOTALS	
Equipment				0 VA		0.00%		0 VA			
HVAC				33,722 VA		100.00%		33,722 VA		TOTAL CONNECTED LOAD: 115.8 kVA	
Kitchen Equipment - Non-Dwelling Unit				64,167 VA		84.69%		54,342 VA		TOTAL ESTIMATED LOAD: 106.4 kVA	
Lighting - General				1,496 VA		100.00%		1,496 VA		TOTAL CONNECTED CURRENT: 321 A	
Motor				11,387 VA		103.61%		11,798 VA		TOTAL EST. DEMAND CURRENT: 295 A	
Receptacle				5,040 VA		100.00%		5,040 VA			
NOTES											

NOTES:



ROOFTOP POWER PLAN

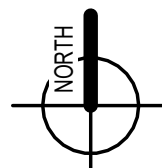
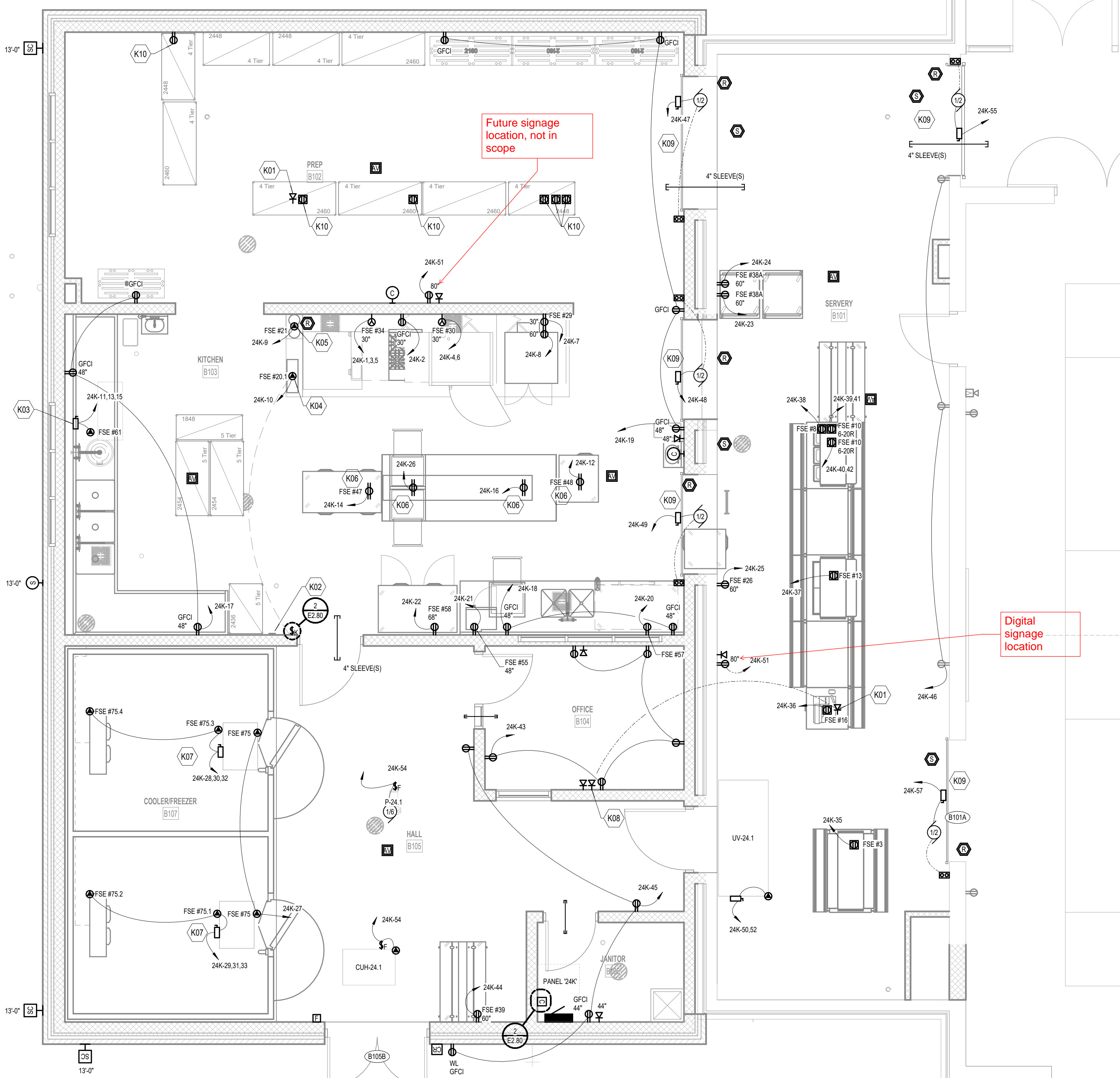
1/8" = 1'-0"

4 TYPICAL ROUGH-IN FOR DOORS WITH ELECTRONIC ACCESS CONTROL / MONITORING

NOT TO SCALE

3 TYPICAL COMMUNICATION OUTLET

NOT TO SCALE



ENLARGED KITCHEN POWER & COMMUNICATION PLAN

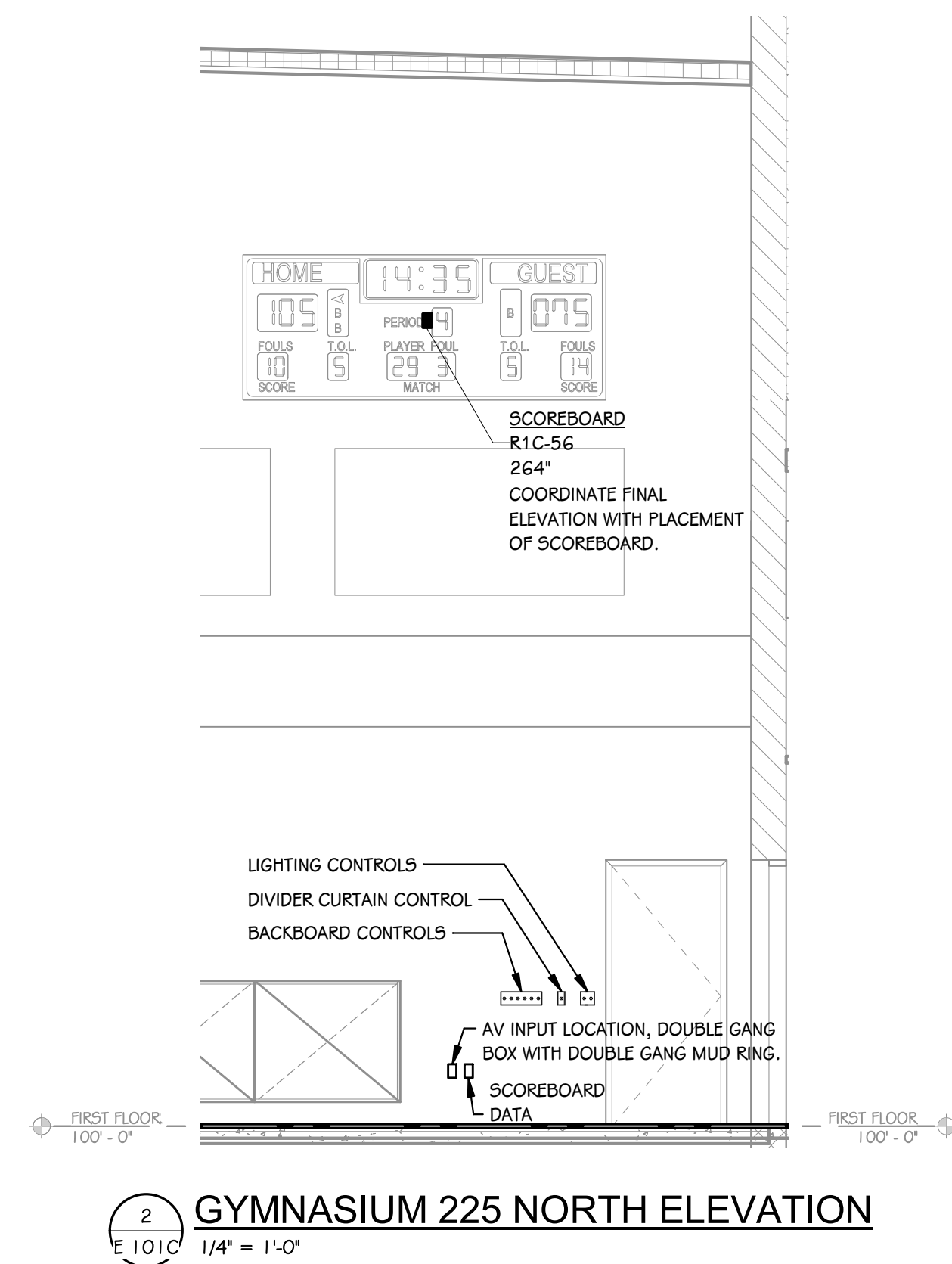
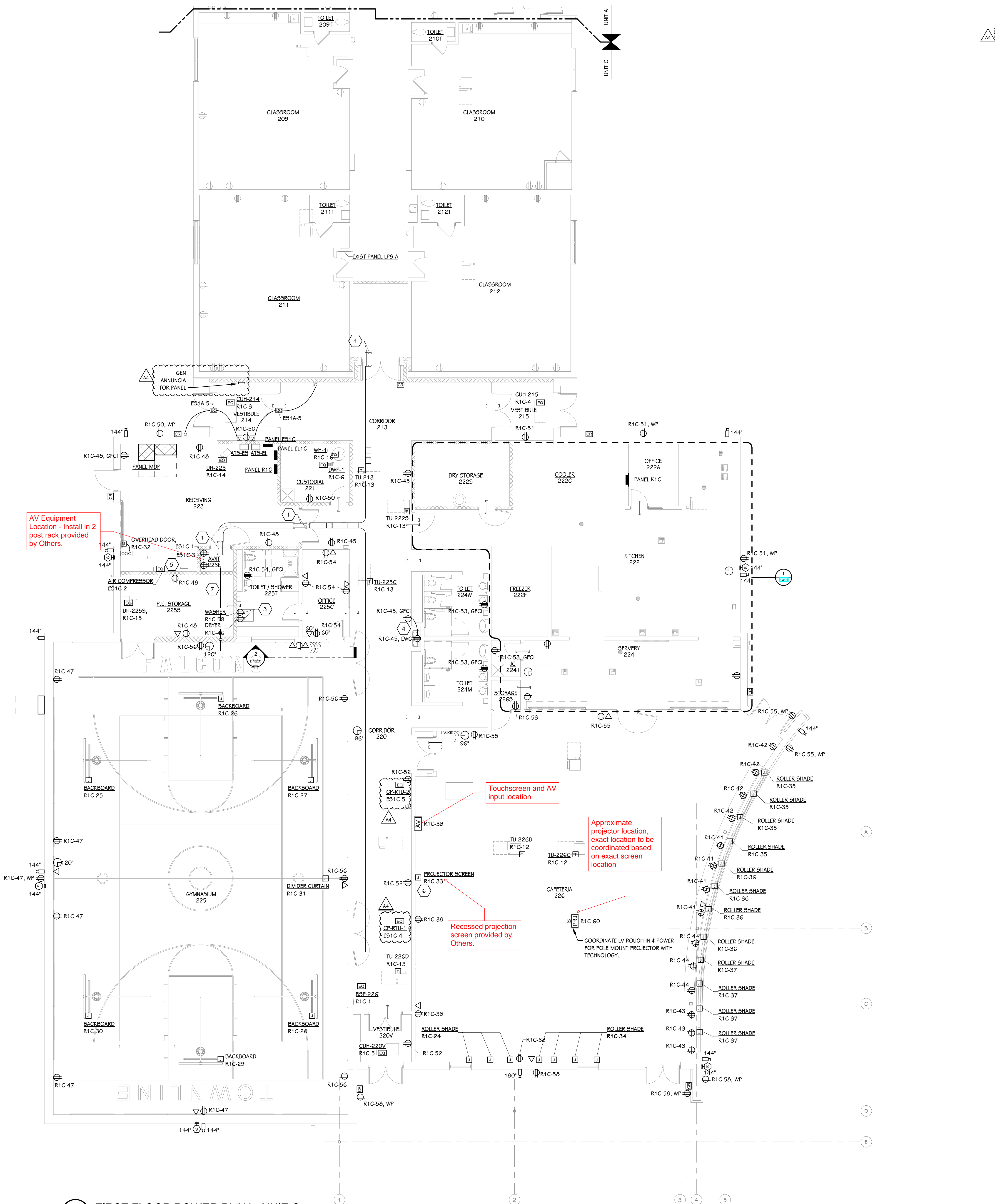
1/4" = 1'-0"

KEYPLAN

UNIT A

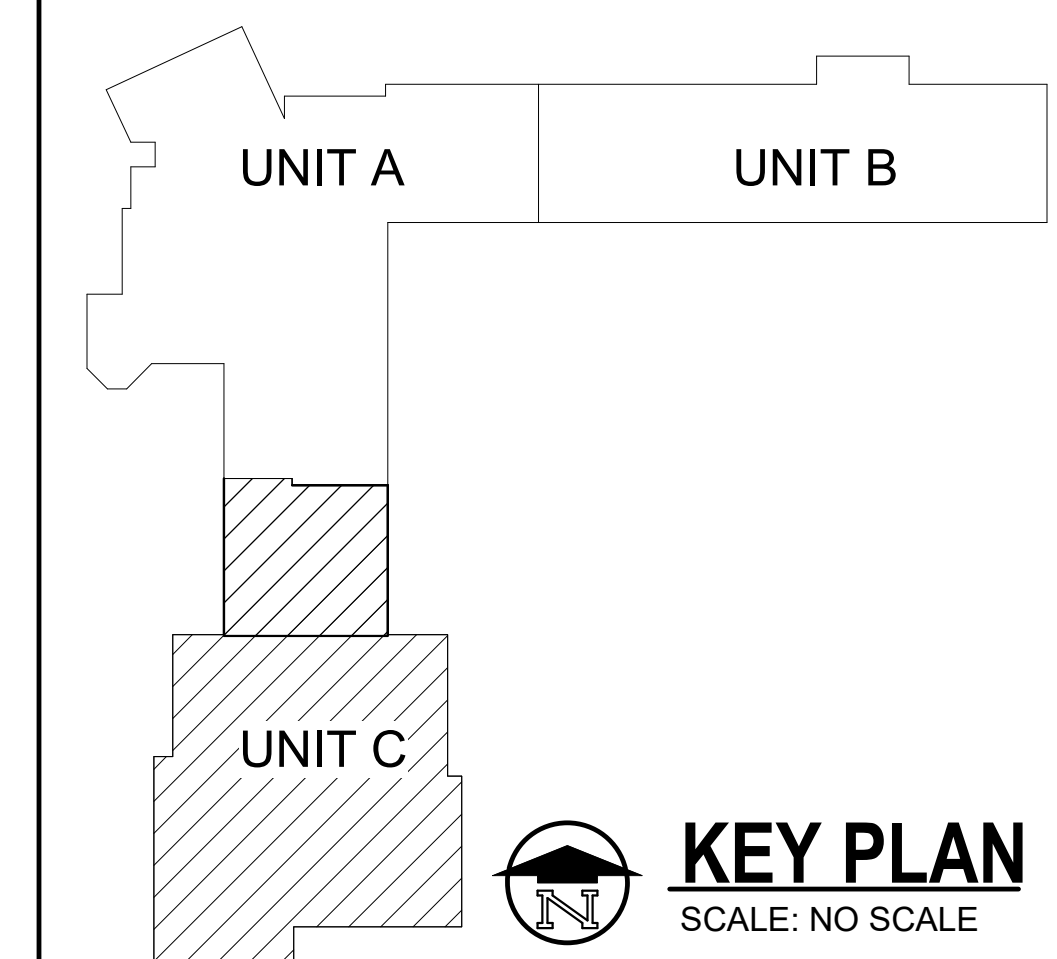
UNIT B

ELECTRICAL KEYED NOTES	
1	4" CONDUIT SLEEVE.
2	NOT USED
3	OWNER PROVIDED WASHER/DRYER. VERIFY CONNECTION TYPES WITH OWNER.
4	ELECTRIC WATER COOLER SHALL BE FED FROM LOAD SIDE OF ACCESSIBLE GFCI PROTECTED RECEPTACLE. ELECTRIC WATER COOLER RECEPTACLE SHALL BE MOUNTED AT MANUFACTURER RECOMMENDED HEIGHT. COORDINATE IN FIELD WITH MECHANICAL.
5	DRY PIPE AIR COMPRESSOR. COORDINATE CONNECTION WITH FIRE PROTECTION CONTRACTOR.
6	VERIFY FINAL LOCATION WITH TECHNOLOGY CONTRACTOR IN FIELD.
7	PROVIDE 4" CONDUIT DATA PATHWAY FROM AVIT 223E TO GYMNASIUM 225. ROUTE TIGHT TO DECK WHILE MAINTAINING CODE CLEARANCES.

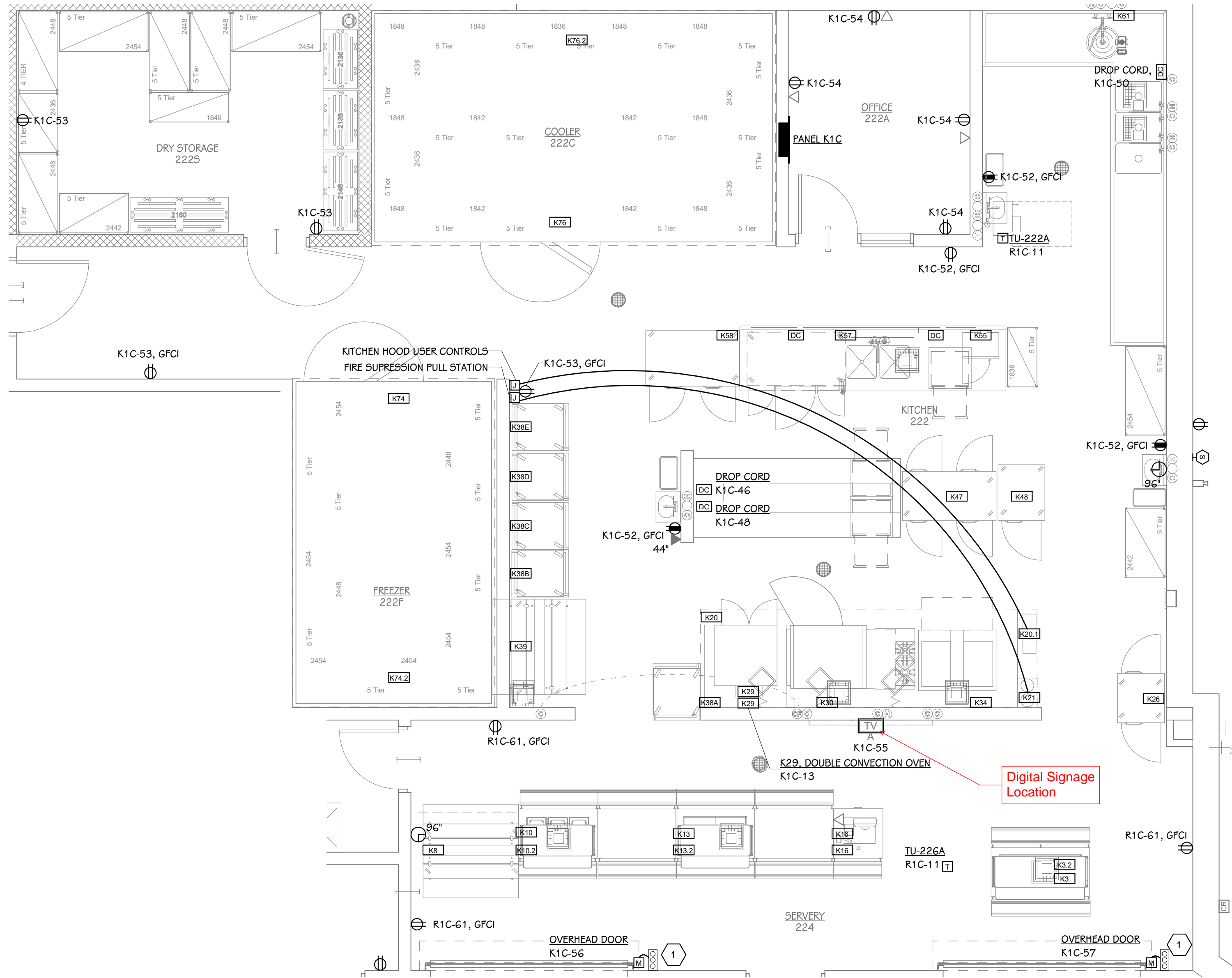


 **FIRST FLOOR POWER PLAN - UNIT C**
1/8" = 1'-0"

TOWNLIN E ELEMENTARY ADDITION



 **KEY PLAN**
SCALE: NO SCALE

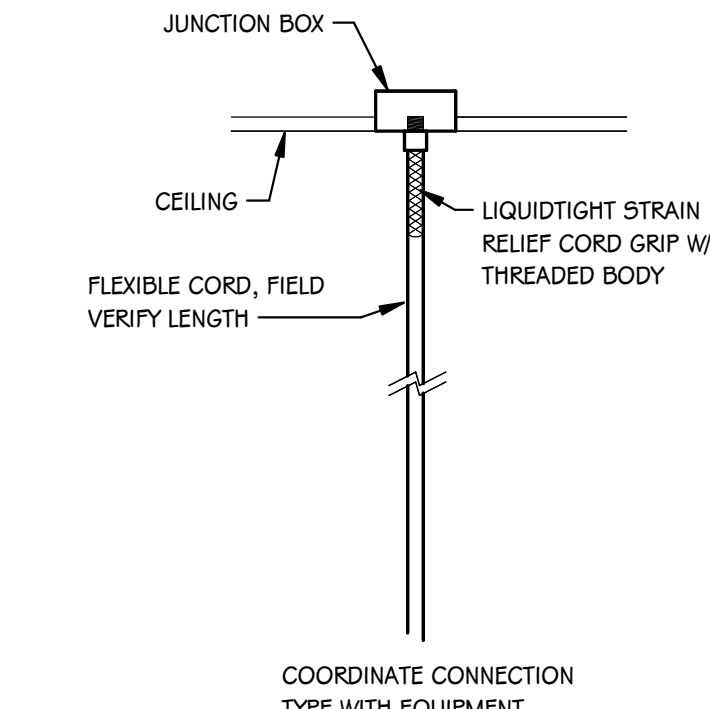


ENLARGED KITCHEN PLAN
1/4" = 1'-0"

ELECTRICAL KITCHEN FEEDER SCHEDULE

DESCRIPTION	FED FROM	LOAD (VA)	BREAKER / POLES	# OF SETS	FEEDER WIRE	GROUND	EMT	NOTES
208 V								
KITCHEN EQUIPMENT - K61 - DISPOSAL	K1C-32,34,36	2378 VA	20 A / 3	1 SET	4 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K74.1 - DIRECT WIRE, ON ROOF - WALK IN FREEZER CONDENSING UNIT	K1C-35,37,39	7133 VA	30 A / 3	1 SET	4 #10	#10 GND.	3/4"	
KITCHEN EQUIPMENT - K76.1 - CONDENSING UNIT	K1C-43,45,47	5800 VA	30 A / 3	1 SET	4 #10	#10 GND.	3/4"	
208 V								
KITCHEN EQUIPMENT - K10 - HOT SERVING COUNTER	K1C-4,6	3307 VA	30 A / 2	1 SET	3 #10	#10 GND.	3/4"	
KITCHEN EQUIPMENT - K30 - COMBI OVEN	K1C-17,19	3120 VA	20 A / 2	1 SET	3 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K34 - TILT BRAISING PAN	K1C-18,20	22985 VA	90 A / 2	1 SET	3 #3	#8 GND.	1 1/4"	
KITCHEN EQUIPMENT - K74.2 - WALK IN FREEZER EVAPORATOR	K1C-38,40	1976 VA	20 A / 2	1 SET	3 #12	#12 GND.	3/4"	
120 V								
KITCHEN EQUIPMENT - DROP CORD	K1C-46	180 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - DROP CORD	K1C-48	180 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - DROP CORD	K1C-49	180 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - DROP CORD	K1C-42	180 VA	20 A / 1	1 SET	2			
KITCHEN EQUIPMENT - K3 - COLD SERVING COUNTER	K1C-1	420 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K3.2 - BREATH PROTECTION	K1C-2	240 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K8 - MILK COOLER	K1C-3	912 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K10.2 - BREATH PROTECTION	K1C-5	1680 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K13 - COLD SERVING	K1C-7	420 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K13.2 - BREATH PROTECTION	K1C-8	240 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K16 - P.O.S STATION	K1C-9	360 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K16 - P.O.S STATION	K1C-10	180 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K20 - VENTILATION HOOD	K1C-11	500 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K20.1 - KITCHEN HOOD CONTROL PANEL	K1C-12	2400 VA	30 A / 1	1 SET	2 #10	#10 GND.	3/4"	
KITCHEN EQUIPMENT - K21 - FIRE SUPPRESSION SYSTEM	K1C-59	2400 VA	30 A / 1	1 SET	2 #10	#10 GND.	3/4"	
KITCHEN EQUIPMENT - K26 - PASS THROUGH REFRIGERATOR	K1C-14	660 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K29 - DOUBLE CONVECTION OVEN	K1C-13	720 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K29 - DOUBLE CONVECTION OVEN	K1C-16	720 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K38A - HOT HOLDING CABINET	K1C-21	1920 VA	30 A / 1	1 SET	2 #10	#10 GND.	3/4"	
KITCHEN EQUIPMENT - K38B - HOT HOLDING CABINET	K1C-51	1920 VA	30 A / 1	1 SET	2 #10	#10 GND.	3/4"	
KITCHEN EQUIPMENT - K38C - HOT HOLDING CABINET	K1C-58	1920 VA	30 A / 1	1 SET	2 #10	#10 GND.	3/4"	
KITCHEN EQUIPMENT - K38D - HOT HOLDING CABINET	K1C-24	1920 VA	30 A / 1	1 SET	2 #10	#10 GND.	3/4"	
KITCHEN EQUIPMENT - K38E - HOT HOLDING CABINET	K1C-25	1920 VA	30 A / 1	1 SET	2 #10	#10 GND.	3/4"	
KITCHEN EQUIPMENT - K39 - MILK COOLER	K1C-26	780 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K47 - PASS THROUGH REFRIGERATOR	K1C-27	794 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K48 - REACH-IN FREEZER	K1C-28	756 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K55 - MICROWAVE	K1C-29	1800 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K57 - UNDERCOUNTER REFRIGERATOR	K1C-30	576 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K58 - REACH-IN FREEZER	K1C-31	1176 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K74 - WALK IN FREEZER	K1C-33	600 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K76 - WALK IN COOLER	K1C-41	600 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	
KITCHEN EQUIPMENT - K76.2 - WALK IN COOLER EVAPORATOR	K1C-44	240 VA	20 A / 1	1 SET	2 #12	#12 GND.	3/4"	

NOTE: REFER TO KITCHEN DRAWINGS, KITCHEN EQUIPMENT SHOP DRAWINGS AND KITCHEN DETAILS FOR MORE INFORMATION. COORDINATE WITH KITCHEN EQUIPMENT INSTALLER AND COORDINATE AND VERIFY ALL CONNECTION TYPES AND MOUNTING HEIGHTS WITH EQUIPMENT ORDERED PRIOR TO ORDERING ANY ELECTRICAL DEVICES OR EQUIPMENT.



DROP CORD MOUNTING DETAIL
SCALE: NONE

ELECTRICAL GENERAL NOTES

- COORDINATE REQUIREMENTS AND DETAILS WITH FOOD SERVICE DRAWINGS.
- PROVIDE GFCI RECEPTACLES AS REQUIRED PER THE NEC.
- ALL CIRCUIT BREAKERS FOR POWER UNDER A HOOD SHALL HAVE SHUNT TRIPS TO SHUT DOWN POWER ONCE THE FIRE SUPPRESSION SYSTEM IS ACTIVATED.

ELECTRICAL KEYED NOTES

- OVERHEAD DOOR CONTROL SHALL BE KEY OPERATED.

PROJECT TITLE
TOWNLINE ELEMENTARY ADDITION &
RENOVATION

OWNER
KENTWOOD PUBLIC SCHOOLS

SHEET TITLE
ENLARGED KITCHEN POWER PLAN

Kentwood, Michigan

DATE
MAY 17, 2023

SHEET NUMBER
E 410
21-703.00

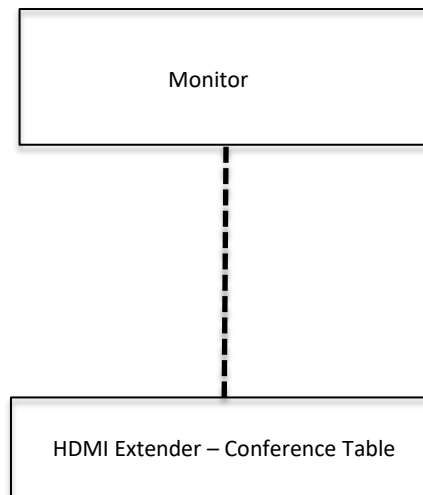
PRELIMINARY
NOT FOR CONSTRUCTION

ISSUED FOR

DATE

Appendix D – AV Connection Line Diagrams

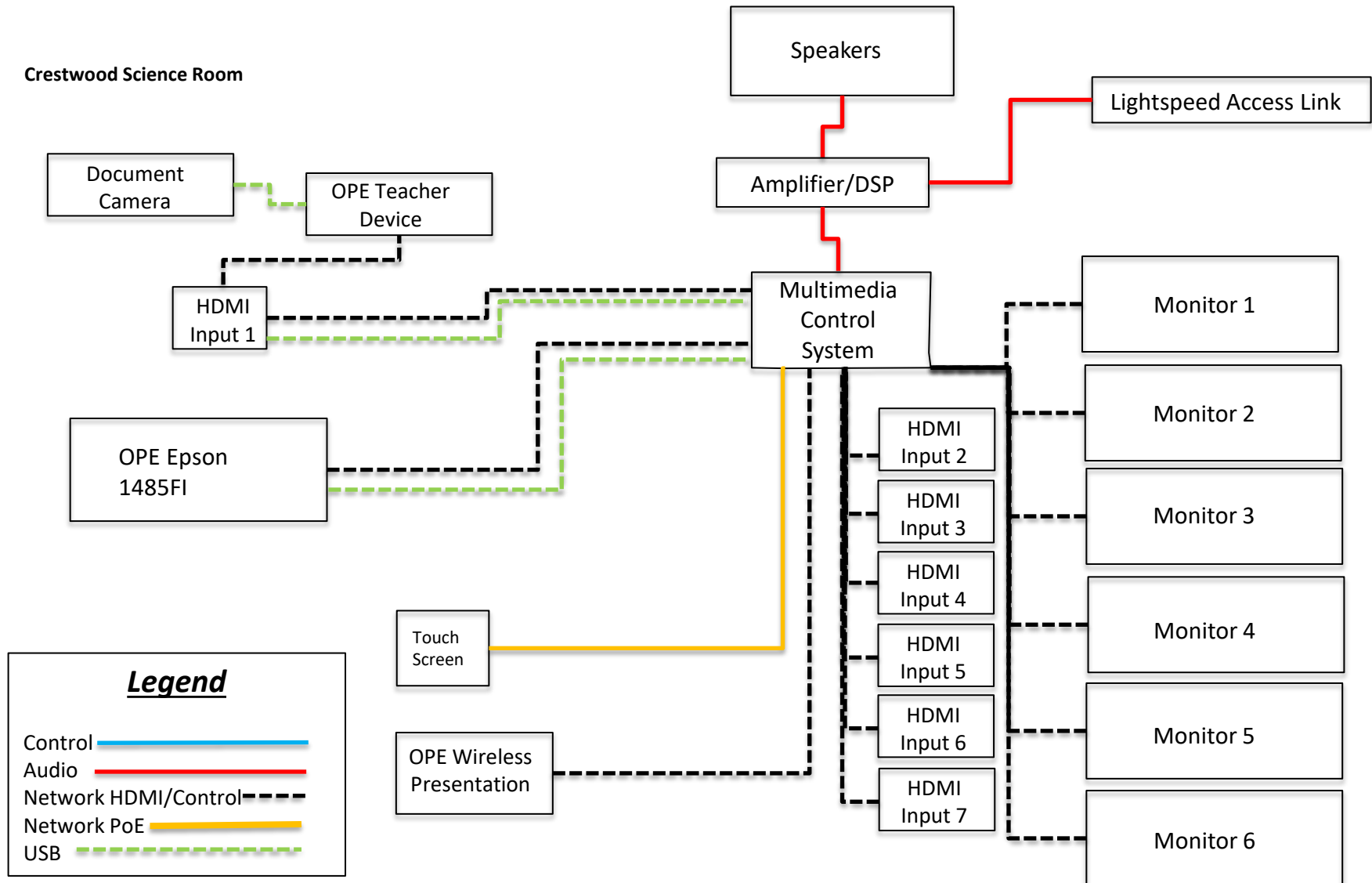
Conference Room



Legend

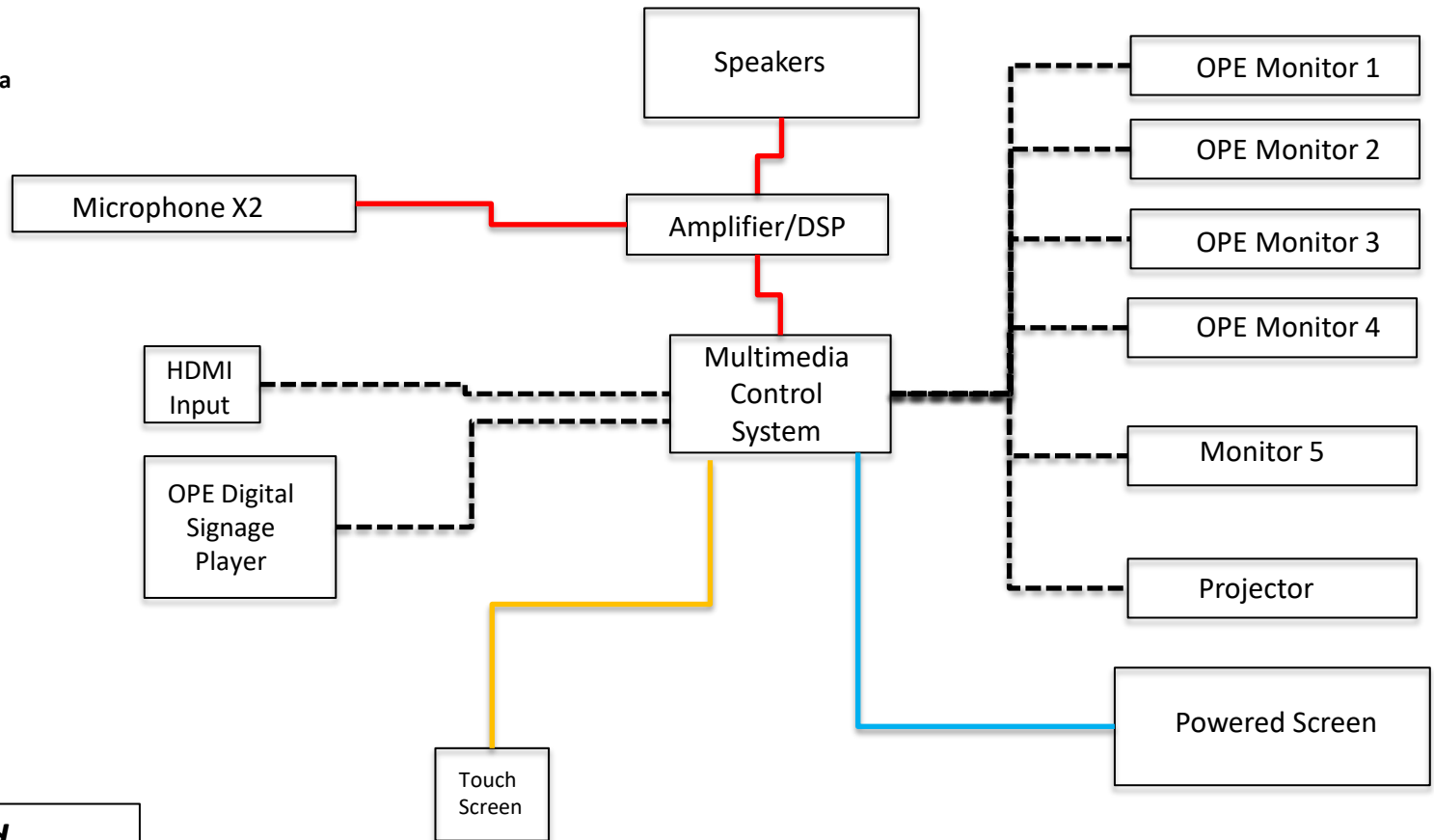
Control	
Audio	
HDMI	
Network PoE	

Appendix D – AV Connection Line Diagrams



Appendix D – AV Connection Line Diagrams

Crestwood Cafeteria

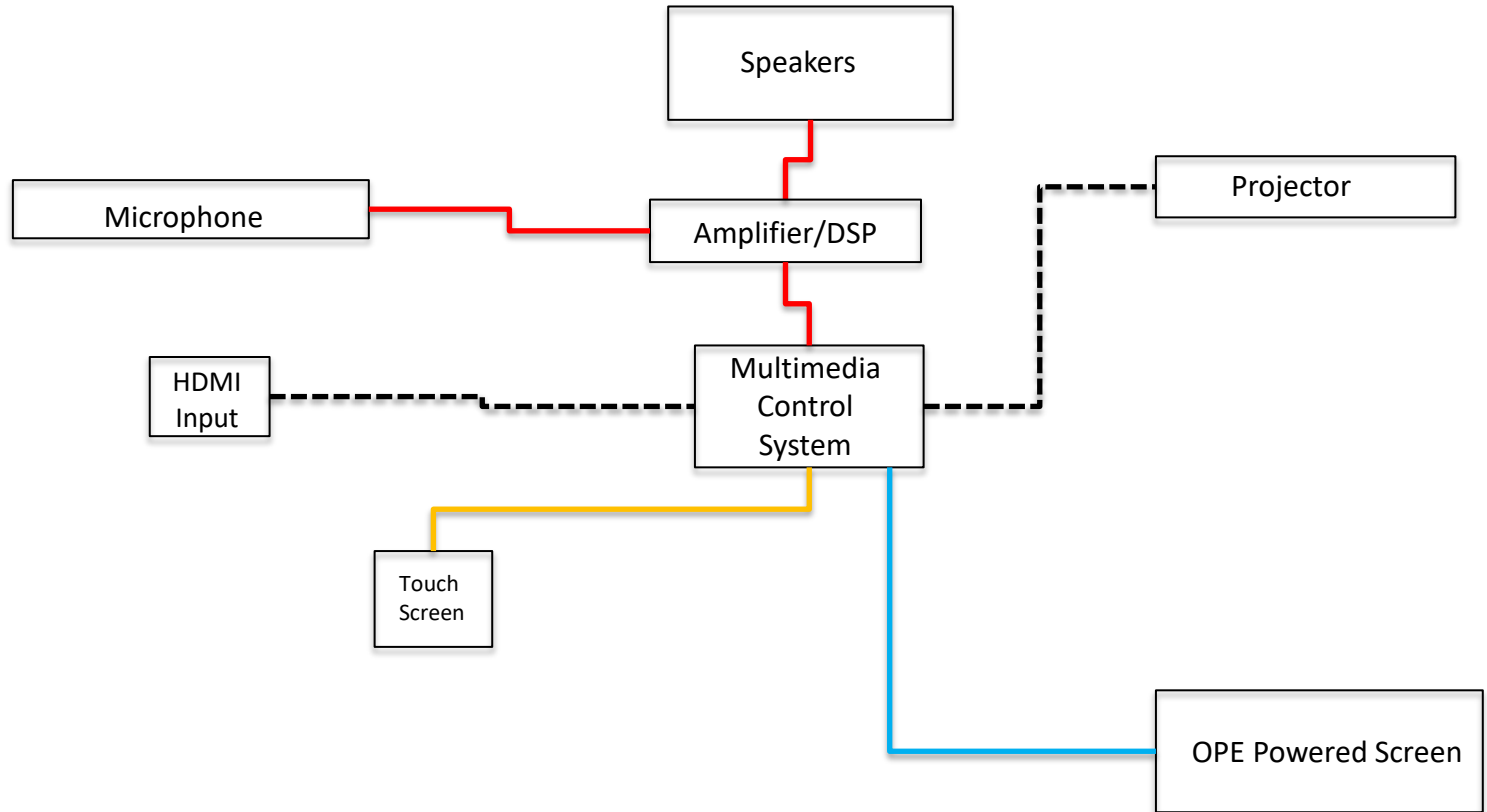


Legend






Control —————
Audio —————
Network HDMI/Control - - - - -
Network PoE —————
USB - - - - -

Appendix D – AV Connection Line Diagrams

Townline Cafeteria

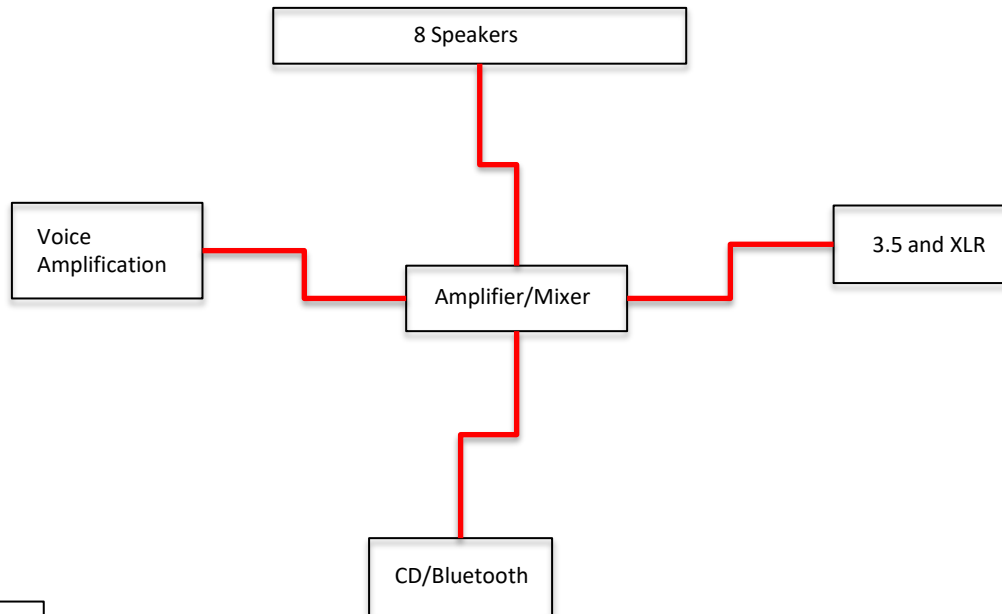


Legend





Control 
Audio 
Network HDMI/Control 
Network PoE 
USB 

Appendix D – AV Connection Line Diagrams

Townline Gymnasium

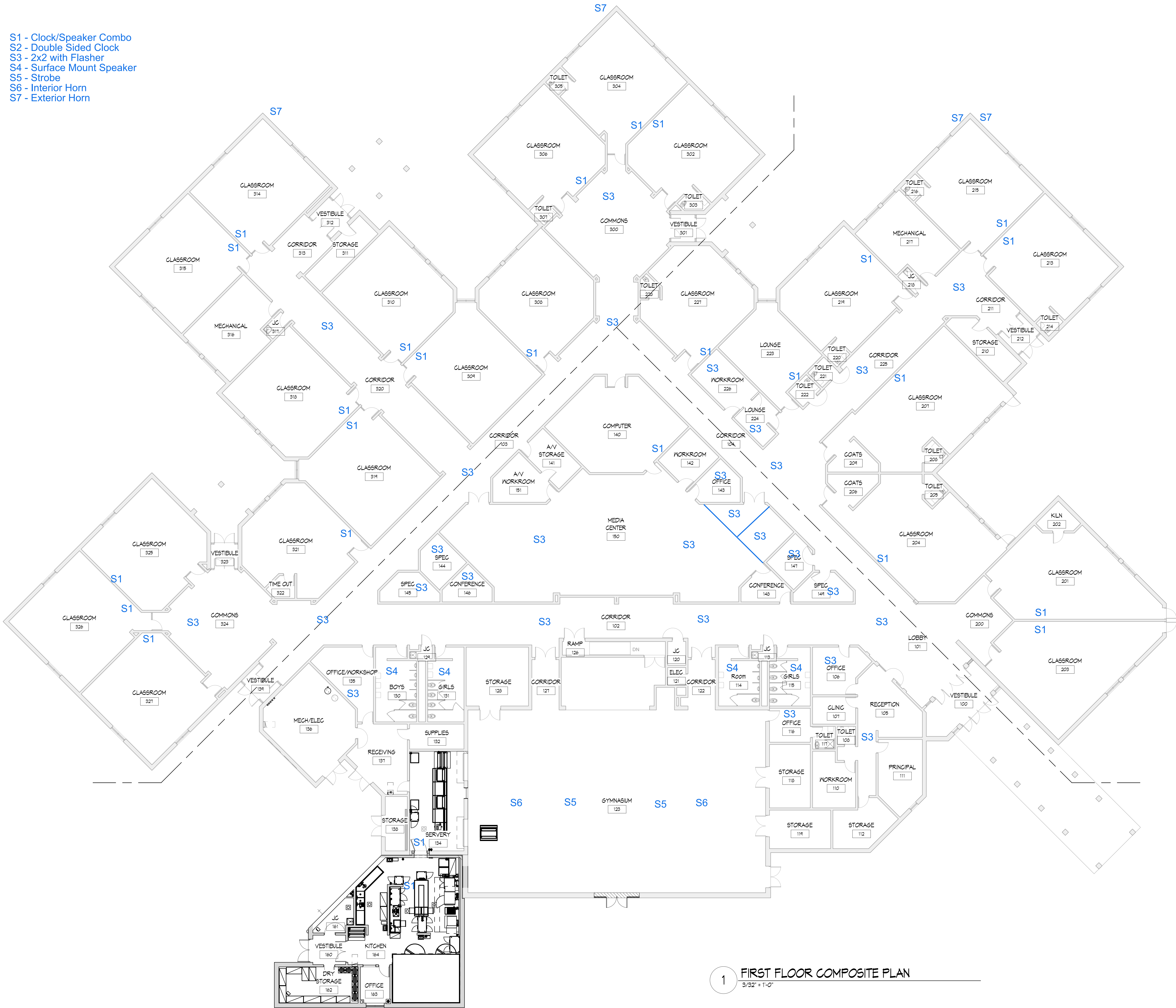


Legend

Control	
Audio	
Network HDMI	
Network PoE	



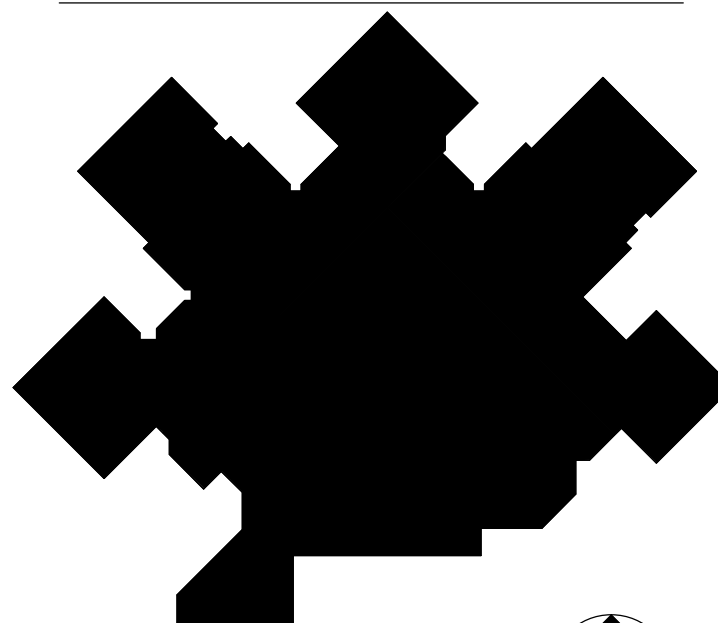
- S1 - Clock/Speaker Combo
- S2 - Double Sided Clock
- S3 - 2x2 with Flasher
- S4 - Surface Mount Speaker
- S5 - Strobe
- S6 - Interior Horn
- S7 - Exterior Horn



CHALLENGER ELEMENTARY KITCHEN ADDITION

KENTWOOD PUBLIC SCHOOLS

2475 52ND ST SE
KENTWOOD, MI 49508

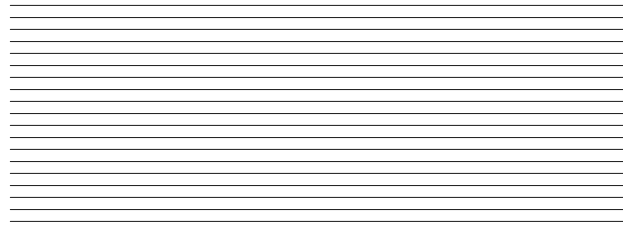


KEY PLAN

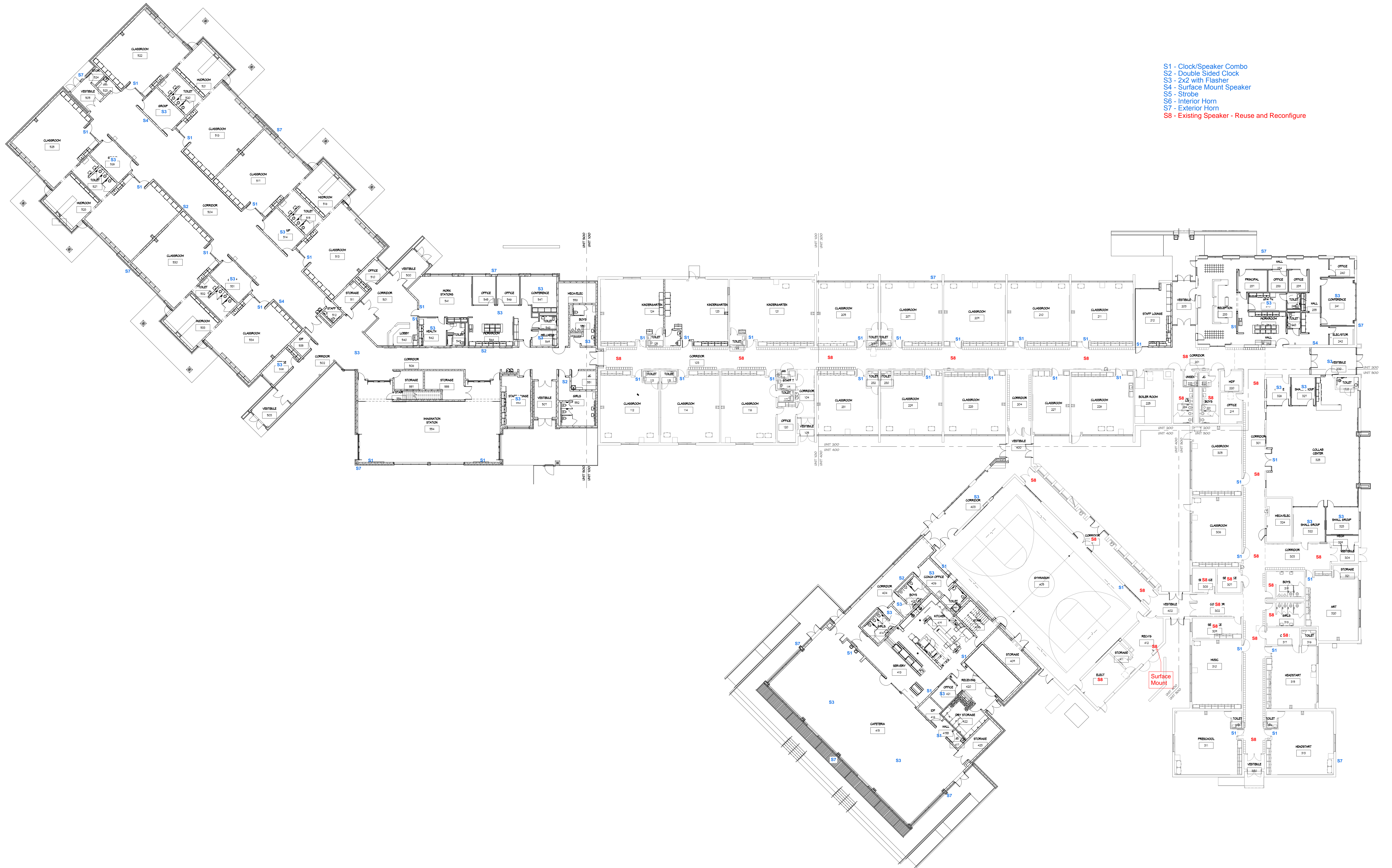
JOB NO.

SHEET TITLE

SHEET NO.



KINGS COTT ASSOCIATES INC. KALAMAZOO, MICHIGAN



- S1 - Clock/Speaker Combo
- S2 - Double Sided Clock
- S3 - 2x2 with Flasher
- S4 - Surface Mount Speaker
- S5 - Strobe
- S6 - Interior Horn
- S7 - Exterior Horn
- S8 - Existing Speaker - Reuse and Reconfigure

REFERENCES

WED

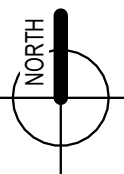
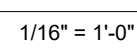
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PART OF THIS DRAWING

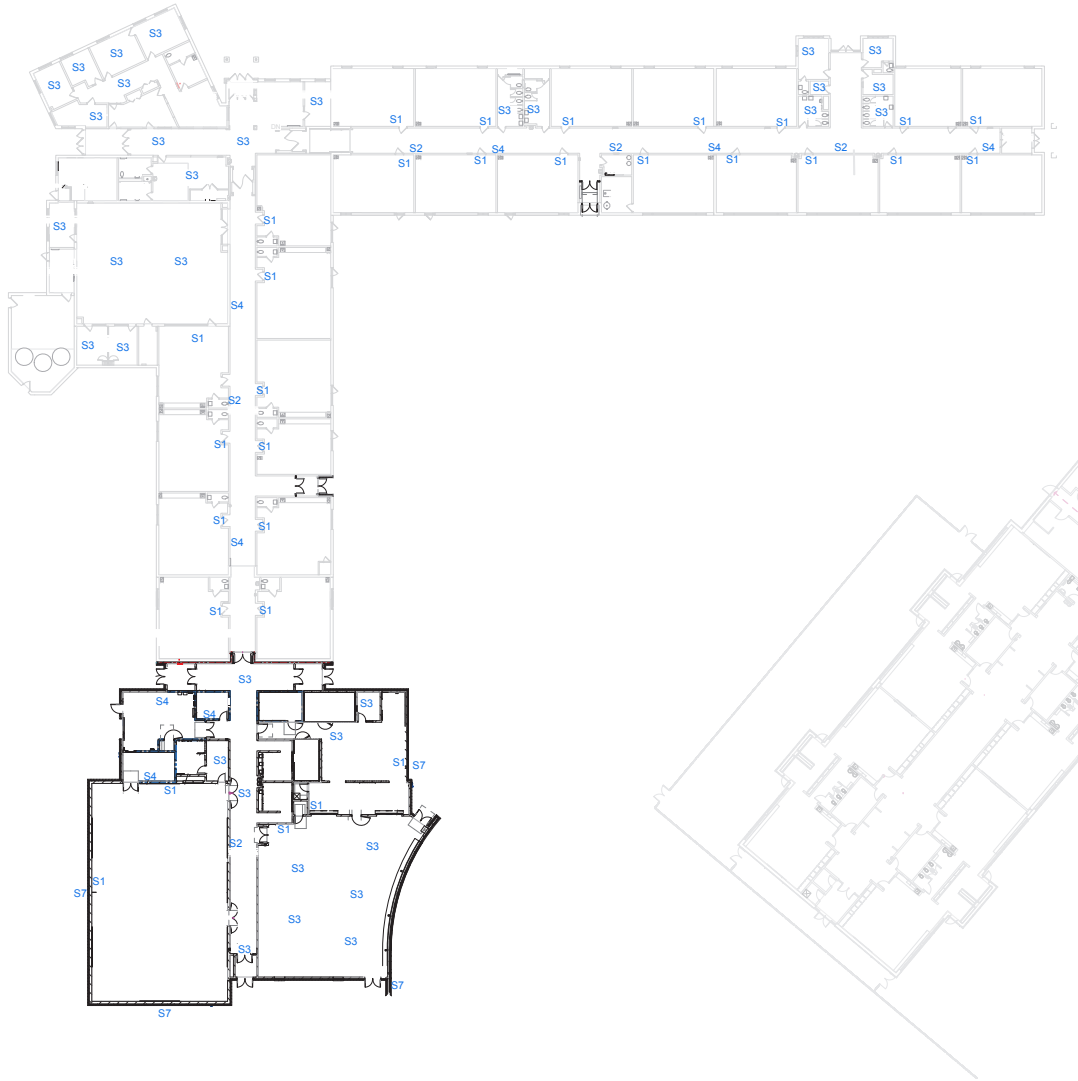
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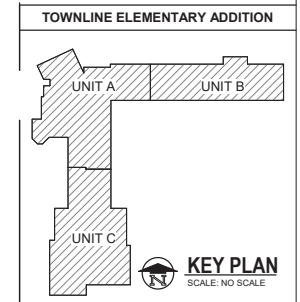
Architectural floor plan of a building with various rooms and speaker locations marked with labels like S1, S3, S4, S5, S6, and S7. The plan includes a large central hall, several smaller rooms, and a circular area. The labels indicate the placement of different types of speakers: S1 (Interior Horn), S3 (Surface Mount Speaker), S4 (Strobe), S5 (Strobe), S6 (Strobe), and S7 (Strobe). The plan also shows a legend for the speaker types: S1 (Interior Horn), S3 (Surface Mount Speaker), S4 (Strobe), S5 (Strobe), S6 (Strobe), and S7 (Strobe).



KEYPLAN



- S1 - Clock/Speaker Combo
- S2 - Double Sided Clock
- S3 - 2x2 with Flasher
- S4 - Surface Mount Speaker
- S5 - Strobe
- S6 - Interior Horn
- S7 - Exterior Horn



PROJECT TITLE
TOWNLINE ELEMENTARY ADDITION &
RENOVATION

OWNER
KENTWOOD PUBLIC SCHOOLS

Kentwood, Michigan

- S1 - Clock/Speaker Combo
- S2 - Double Sided Clock
- S3 - 2x2 with Flasher
- S4 - Surface Mount Speaker
- S5 - Strobe
- S6 - Interior Horn
- S7 - Exterior Horn

