

Ludington Area School District



SECTION 00 01 10
TABLE OF CONTENTS

DIVISION 00 – BIDDING & CONTRACT REQUIREMENTS

<u>Section</u>	<u>Description</u>
00 01 01	Cover Page
00 01 10	Table of Contents
00 11 16	Invitation to Bid
00 40 00	Bid Forms
00 21 13	Instructions to Bidders
00 65 00	Contract Close-out

DIVISION 27 – TECHNOLOGY SYSTEMS

<u>Section</u>	<u>Description</u>
27 41 16	Multimedia Systems
27 51 16	Public Address System
27 53 13	Clock System

DIVISION 28 – ELECTRONIC SAFETY & SECURITY

<u>Section</u>	<u>Description</u>
28 13 00	Building Access System
28 23 00	Video Monitoring System

APPENDICES

<u>Section</u>	<u>Description</u>
Appendix A	Technology Drawings
Appendix B	AV Equipment List Schedule
Appendix C	AV Connection Line Diagram
Appendix D	Proposed Construction Schedule
Appendix E	Door Hardware Sections and Schedules

END OF SECTION

SECTION 00 11 16
INVITATION TO BID

PART 1 - GENERAL

1.01 WORK INCLUDED: SECONDARY COMPLEX TECHNOLOGY RENOVATIONS

A. Ludington Area School District (Owner) is seeking bids for purchase and installation of new public address, clock, building access, video monitoring systems, multimedia systems associated equipment and installation. Proposed systems shall be configured and installed to service Owner's needs as described herein.

B. Project: SECONDARY COMPLEX TECHNOLOGY RENOVATIONS

C. Owner: Ludington Area School District
809 E. Tinkham Ave.
Ludington, Michigan 49431

D. Designer: Communications by Design, Inc.

E. Site(s) of Work:

1. Ludington High School
508 N. Washington
Ludington, Michigan 49431
2. OJ DeJonge Middle School
706 E. Tinkham Ave.
Ludington, Michigan 49431

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 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: September 6, 2022
2. Pre-Bid Meeting: September 21, 2022 at 3:00pm
3. Intent to Bids Due: September 22, 2022 by 5:00pm

4. Question and Clarification Deadline: September 23, 2022 by 5:00pm
5. Public Bids Due: October 3, 2022 at 10:00am

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: September 21, 2022 at 3:00pm
- C. Location: Ludington Area School District
Administration Board Room
809 E. Tinkham Ave.
Ludington, Michigan 49431
- D. Virtual Meeting Option:

Meeting ID meet.google.com/fpy-tjzs-osn
Phone Numbers +1 413-346-5722
PIN: 660 782 253#
- E. Any drawings identified in the table of contents herein will be distributed and reviewed at this conference.
- F. 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: October 3, 2022 at 10:00am

C. Location: Ludington Area School District
Administration Board Room
809 E. Tinkham Ave.
Ludington, Michigan 49431

D. Virtual Meeting Option:

Meeting ID meet.google.com/ttb-yink-shs
Phone Number [+1 302-515-2186](tel:+13025152186)
PIN: 194 896 675#

E. 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 PERFORMANCE BOND COVERAGE

A. Selected Contractor(s) will be required to provide a performance bond and payment bond in an amount equal to one hundred percent (100%) of the bid amount including any accepted alternates at the Owner's discretion. Such bonds shall be issued by surety licensed by the State of Michigan and acceptable to the Owner.

1.09 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.

1.10 DEFINITIONS

- A. “Owner” is intended to mean Ludington Area School District, 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 September 22, 2022. 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 Systems
- ☐ Section 27 51 16 - Public Address System
- ☐ Section 27 53 13 - Clock System
- ☐ Section 28 13 00 - Building Access System
- ☐ Section 28 23 00 - Video Monitoring System

Submit unaltered and completed form to:

Rebecca Szilagyi

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: Ludington Area School District
809 E. Tinkham Ave.
Ludington, Michigan 49431

BID FROM: _____

PROJECT: SECONDARY COMPLEX TECHNOLOGY RENOVATIONS
TECHNOLOGY BID #2722

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

DUE: October 3, 2022 at 10:00am

BID FORM

BID TO: Ludington Area School District
809 E. Tinkham Ave.
Ludington, Michigan 49431

BID FROM: _____

PROJECT: SECONDARY COMPLEX TECHNOLOGY RENOVATIONS
TECHNOLOGY BID #2722

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 (\$) _____).

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

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. Any Voluntary Alternates, in addition to the Mandatory Alternates identified herein, shown below are identified and described in detail on appropriate attachment(s) as referenced herein.

Mandatory

PA 5 Yr. Warranty: _____

Clock 5 Yr. Warranty: _____

Access 5 Yr. Warranty: _____

Access Annual Inspect: _____

Video 5 Yr. Warranty: _____

Video Annual Inspect: _____

Voluntary

Voluntary Alternate A: _____

Voluntary Alternate B: _____

Voluntary Alternate C: _____

Voluntary Alternate D: _____

Voluntary Alternate E: _____

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 _____, 2022.

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 Ludington Area School District 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>

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 51 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 53 13

[illegible]

SCHEDULE OF VALUES/BID FORM

(Bidder may submit version of fully 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:28 13 00

[illegible]

SCHEDULE OF VALUES/BID FORM

(Bidder may submit version of fully 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:28 23 00

[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 10 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 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

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 Ludington Area 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

MULTIMEDIA SYSTEMS

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.
- 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.
 - 2. Auxiliary Audio Cable shall be of commercial first-class quality manufacture and meet or exceed the following requirements:

- a. Copper conductors
 - b. Shielded
 - c. 18 gauge minimum
- D. Cable shall be extended from Contractor provided faceplate to projector or voice amplification.
- 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.
- 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. All cables originating from wall plate connectors, except speaker cables, shall terminate in a service loop eight (8) feet in length at projector or casework location.
- 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 receiver and include an HDMI Type A 19 pin plug connector to display device.
 - b. Terminate in a 568-compliant type female jack located on the face plate.
 - 2. Auxiliary Audio Cable
 - a. Terminate in a make 3.5mm male jack into Contractor provided voice lift system.
 - b. Terminate in a 3.5mm female jack located on the faceplate.
- 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 projector shall be provided for final connection to components installed in Owner provided wall box.
- 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.
 - b. Male 3.5 mm cable to Owner provided audio device.
- 2. Coordinate power cable relationship to connection bundle with Owner and Designer.

2.08 HDMI TRANSMISSION EQUIPMENT

- A. Equipment shall be provided and installed in all areas identified as receiving a new BrightLink 1485Fi projector. Contractor shall install unit provided with projector.
- B. Contractor shall supply and install shielded Category 6a cable for connection to projector.
- C. Contractor shall neatly mount transmitter/control pad at teacher desk location.
- D. Contractor shall supply all other necessary cables, accessories and adaptors for a fully functional and compliant system.
- E. Contractor shall supply one (1) 8' HDMI Cables to connect Owner provided device for each supplied HDMI transmission device.

2.09 SURGE PROTECTOR

- A. All classrooms receiving new 1485Fi projection systems 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.

MULTIMEDIA SYSTEMS

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.

2.10 ULTRA SHORT THROW INTERACTIVE PROJECTORS

- A. Ultra-short throw projectors, each with accompanying projector specific mount shall be provided. Please refer to Appendix B – AV Equipment List Schedule for quantities and locations.
- B. Acceptable Manufacturers (In alphabetical order):
 1. EPSON
 - a. Brightlink 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. Projector management software and/or access 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.
- E. 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.

- 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.

2.11 WIRELESS PRESENTATION SYSTEM

- A. Wireless Presentation System shall be provided in each as indicated. Please refer to Appendix B – AV Equipment List Schedule for quantities and locations.
 - 1. Acceptable Manufacturers (in alphabetical order):
 - a. APPLE
 - 1. Apple TV 4K
 - 2. Wireless Presentation System shall meet or exceed the following requirements:
 - a. HDMI output with support for up to 4K
 - b. Gigabit LAN and dual-band 802.11ax with MIMO Wireless connectivity
 - c. 32GB Storage
 - d. All other features currently a part of the manufacturer’s latest commercial release.
 - e. All necessary cables, mounting brackets and connectors to securely mount Wireless presentation system at Contractor provided projector.
 - 3. 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.
 - 4. 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.
 - 5. Contractor shall supply and install all necessary HDMI cables to connect wireless presentation device to interactive projection system.

2.12 VOICE AMPLIFICATION

MULTIMEDIA SYSTEMS

- A. Voice Amplification Systems shall be provided and installed in locations as indicated in Appendix B – AV Equipment List Schedule and as specified herein.
- B. Acceptable Manufacturers
 - 1. LIGHTSPEED
 - a. 975 ACCESS
- C. Major components of Voice Amplification System shall be installed at projector.
- 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 Flexmikes
 - 3. Contact closure functionality for integration with provided classroom PoE clock paging device via contact closure.
- E. Contractor shall provide one (1) cable for connectivity from audio output of projector to voice amplification system installed at 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 Contractor provided projector. As indicated in the provided line diagram, Contractor shall supply and install audio cabling from projector output to connect to provided Voice Amplification Systems.

2.13 AUDIO SPEAKERS

- A. Speakers shall be provided in each as indicated. Please refer to Appendix B – AV Equipment List Schedule for quantities and locations.
- B. Acceptable Manufacturer:

MULTIMEDIA SYSTEMS

1. LIGHTSPEED

2. Or Equal.

- C. Where classroom speakers are to be installed in drop ceilings, they shall be near flush mount and cleanly cut into available tiles for optimal and uniform audio fill of the relevant classroom space. Speakers shall meet or exceed the following minimum standard requirements:
 1. 6" driver; 1" horn per speaker
 2. Frequency response: 40 Hz – 20 kHz
 3. Impedance of 8 Ohms
 4. Power handling of 30 watts
 5. Speakers shall be mounted in fully enclosed, acoustically appropriate, metallic back boxes and fully supported by appropriate tile bridges.
- D. Where flush mounting is not possible or practical, Contractor shall install surface mounted speakers meeting or exceeding all requirements above.
- E. Where specific speaker location is in question, obtain Owner approval prior to any final installation activity.
- F. All speakers shall include attractive finished white grill.
- G. All speaker wire shall be 16 AWG high quality cable.
- H. Speakers shall be connected in two pairs for right and left stereo channels.
- I. All speaker cable shall be terminated at Contractor supplied Voice Amplification system at projector location.
- J. All speaker cable shall be protected in existing Owner raceway.

2.14 DOCUMENT CAMERAS

- A. Document cameras shall be provided and installed in locations as indicated in Appendix B.
 1. Acceptable Manufacturer(s)
 - a. IPEVO
 1. V4K PRO

2. Document cameras shall meet or exceed the following the following requirements:
 - a. 8 MP Image Sensor
 - b. Integral Microphone
 - c. Integral LED Light
 - d. USB connectivity and power

2.15 SPECIAL CONDITION LOCATIONS

A. SPECIAL CONFIGURATION A

1. Contractor shall supply one (1) of the specified configuration(s) in the following locations:
 - a. D135 – Conference Room
 - b. L133 – Conference Room
 - c. L139 – Conference Room
 - d. L149 – Conference Room
2. One (1) LED Monitor(s)
 - a. Acceptable Manufacturer(s)
 1. LG
 2. SAMSUNG
 - A QB75R
 - b. LED Monitor shall meet or exceed the following minimum requirements:
 1. 75” 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) tilt Peerless ST660P or Chief equivalent shall be provided.
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 4:2:0 Up to 130'
 3. HDCP 2.2
 - c. Contractor shall install HDMI transmitter at conference table and integrate into table pocket.
 - d. Contractor shall securely and neatly mount HDMI transmission equipment at table and monitor locations.
 - e. Contractor shall supply and install shielded cable and passthrough connector to integrate with floor box.
 - f. Contractor to supply 8' ultra-slim HDMI cable for device connection.
4. One (1) Wireless Presentation System
 - a. Acceptable Manufacturers (in alphabetical order):
 1. APPLE
 - A Apple TV 4K (2nd Generation)

- b. Wireless Presentation System shall meet or exceed the following requirements:
 - 1. HDMI output with support for up to 4K HDR
 - 2. Gigabit LAN and dual-band 802.11ax Wi-Fi 6 Wireless connectivity
 - 3. 32GB Storage
 - 4. All other features currently a part of the manufacturer's latest commercial release.
- c. Contractor shall securely mount wireless presentation system device at monitor location using wall mount bracket.
- 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 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.
- f. Contractor shall supply and install all necessary HDMI cables to connect wireless presentation device to monitor.

B. SPECIAL CONFIGURATION B

- 1. Contractor shall supply one (1) of the specified configuration(s) in the following locations:
 - a. Media Center B109
 - b. Collaboration Center L114
- 2. One (1) Projector
 - a. Acceptable Manufacturer(s)
 - 1. EPSON
 - A L630U
 - b. 6,300 Lumens

- c. Projector shall be installed and positioned for the projected image to completely fill Owner provided powered rollup screen.
 - d. 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 Contractor provided screen.
 - e. Provided white projector downpipe shall allow routing of projector cabling internally.
 - 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.
3. One (1) Multi-media Infrastructure Cable and Faceplate
- 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.
 - b. Infrastructure cable to connect projector to a 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.
 - C Wall plate provided shall be constructed of commercial grade stainless steel.
 - 2. Wall plate shall contain connection points for all specified cables
 - 3. Two (2) data outlet locations.
 - 4. Unpopulated data connections shall all have blank covers installed.

- 5. Any existing terminated category cabling should be securely locked into new plate and any existing labeling shall be transferred.
- d. All cables originating from wall plate connectors, except speaker cables, shall terminate in a service loop eight (8) feet in length at projector location.
- e. 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 receiver and include an HDMI Type A 19 pin plug connector to display device.
 - B Terminate in a 568-compliant type female jack located on the face plate.
- 4. One (1) Multimedia Input Location(s) shall be provided.
 - a. Acceptable Manufacturer(s)
 - 1. CRESTRON
 - A DM-TX-4KZ-101-1G-B
 - 2. QSC
 - b. Contractor shall supply stainless steel plate for fully finished installation.
 - c. Contractor shall supply correct in-plate DM transmit and receive equipment to extend input location to supplied projector.
 - d. Contractor to supply 8' ultra-slim HDMI cable for device connection.
- 5. One (1) Manual Rollup Projection Screen
 - a. Acceptable Manufacturer(s)
 - 1. DA-LITE
 - A Model C with CSR
 - 2. DRAPER

- b. Manual Rollup Projection Screen shall meet or exceed the following minimum requirements:
 - c. 65" x 116" – 133" Diagonal
 - d. White case
 - e. Controlled screen return
 - f. Matte white screen surface
 - g. Screen shall be mounted in from of library case work. Contractor shall supply all necessary mounting materials and labor for safe and fully functional installation.
6. One (1) Wireless Presentation System
- a. Acceptable Manufacturers (in alphabetical order):
 - 1. APPLE
 - A Apple TV 4K (2nd Generation)
 - b. Wireless Presentation System shall meet or exceed the following requirements:
 - 1. HDMI output with support for up to 4K HDR
 - 2. Gigabit LAN and dual-band 802.11ax Wi-Fi 6 Wireless connectivity
 - 3. 32GB Storage
 - 4. All other features currently a part of the manufacturer's latest commercial release.
 - c. Contractor shall securely mount wireless presentation system device at monitor location using wall mount bracket.
 - 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 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.

- f. Contractor shall supply and install all necessary HDMI cables to connect wireless presentation device to monitor.
- 7. One (1) Voice Amplification System shall be provided and installed.
 - a. Acceptable Manufacturer(s)
 - 1. LIGHTSPEED
 - A 975 ACCESS
 - b. Major components of the Voice Amplification System shall be carefully installed at projector 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
 - 3. Contact closure functionality for integration with provided classroom PoE clock paging device via contact closure.
 - d. Contractor shall provide one (1) cable for connectivity from audio output of projector to voice amplification system installed at projector location to support a fully functional and compliant system.
 - e. 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.
 - f. All other features currently a part of the manufacturer’s latest commercial release.
 - g. Voice Amplification Systems shall be neatly and securely mounted at Contractor provided projector. As indicated in the provided line diagram, Contractor shall supply and install audio cabling from projector output to connect to provided Voice Amplification Systems.
- 8. Six (6) Audio Speakers shall be provided.
 - a. Acceptable Manufacturer:

1. LIGHTSPEED
2. Or equal.
- b. Speakers shall meet or exceed the following minimum standard requirements:
 1. 6" driver; 1" horn per speaker
 2. Frequency response: 40 Hz – 20 kHz
 3. Impedance of 8 Ohms
 4. Power handling of 30 watts
 5. Speakers shall be mounted in fully enclosed, acoustically appropriate, metallic back boxes and fully supported by appropriate tile bridges.
- c. Where flush mounting is not possible or practical, Contractor shall install surface mounted speakers meeting or exceeding all requirements above.
- d. Where specific speaker location is in question, obtain Owner approval prior to any final installation activity.
- e. All speakers shall include attractive finished white grill.
- f. All speaker wire shall be 16 AWG high quality plenum rated cable.
- g. All speaker cable shall be terminated at amplification system mounted at or near projectors.
9. One (1) Document Camera shall be provided.
 - a. Acceptable Manufacturer(s)
 1. IPEVO
A V4K PRO
 - b. Document cameras shall meet or exceed the following the following requirements:
 1. 8 MP Image Sensor
 2. Integral Microphone

MULTIMEDIA SYSTEMS

27 41 00 - 55

3. Integral LED Light
4. USB connectivity and power

C. SPECIAL CONFIGURATION C

1. Contractor shall supply one (1) of the specified configuration(s) in the following locations:
 - a. Fitness/Weight Room N124
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. Twelve (12) Pendant Speakers shall be provided and installed – **S3** on Drawings
- a. Acceptable Manufacturer(s)
 - 1. BIAMP/COMMUNITY
 - 2. CRESTRON
 - 3. JBL PRO
 - 4. QSC
 - 5. Or Equal.
 - b. Passive 2-way full range speaker
 - c. 8” Low Frequency Driver, 1-inch Voice Coil
 - d. 8 ohms
 - e. 90 dB sensitivity
 - f. 52Hz-17kHz +/- 3dB
 - g. Speakers shall be placed in locations throughout weight room for even distribution of sound, final speaker locations to be reviewed by Owner and/or Designer.
 - h. Contractor shall safely and securely mount speakers to learning commons ceiling structure using manufacturer recommended and industry best practices.
 - i. Contractor shall supply and install properly sized speaker cabling to support supplied speakers. Each speaker shall be independently wired back to Owner provided rack.

- j. Speakers shall be black in color.
5. One (1) CD/Bluetooth Player shall be provided and installed
- a. Acceptable Manufacturer(s)
 - 1. DENON
 - A DN300Z
 - 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.
6. One (1) Mixer/DSP shall be provided and installed.
- a. Acceptable Manufacturer(s)
 - 1. BIAMP/COMMUNITY
 - 2. SYMETRIX
 - 3. QSC
 - 4. 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 Crestron 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.
- 7. One (1) Amplification System shall be provided and installed
 - a. Acceptable Manufacturer(s)
 - 1. Harman/JBL Pro
 - A CSA-2300Z
 - 2. Or Equal
 - b. Two (2) output channels
 - c. 300W maximum output per channel
 - d. S/N (20 Hz – 20kHz @ 8 Ohms) > 97 dB
 - e. Contractor shall supply all parts, cables and accessories to securely mount unit in provided cabinet.
- 8. One (1) Remote audio input location(s) shall be provided and installed
 - a. Remote audio input location shall provide 3.5mm connectivity in identified locations.
 - b. Contractor shall supply all cabling, faceplates and accessories for a complete installation.
 - c. Contractor shall integrate 3.5mm connection into provided Mixer/DSP system.
 - d. Contractor shall supply appropriate stainless-steel faceplate for remote audio connection and two (2) data cables.
- 9. Three (3) LED Monitor(s)
 - a. Acceptable Manufacturer(s)
 - 1. SAMSUNG
 - A QB75R
 - b. LED Monitor shall meet or exceed the following minimum requirements:

1. 75" 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, three (3) tilt Peerless ST660P or Chief equivalent shall be provided. See drawings for locations.
 - d. All monitors shall be controlled through supplied control system. If expansion of controller IO is necessary Contractor shall provide necessary IO expansion units.
 - e. Contractor shall supply appropriate NVX equipment for discrete output for each monitor pair and projector concurrently for a fully functional system.
 - f. Supplied Crestron NVX equipment shall scale images to optimal projector resolution.
10. One (1) Multimedia Processor
- a. Acceptable Manufacturer(s)
 1. CRESTRON
 - A CP4
 2. 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.

MULTIMEDIA SYSTEMS

27 41 00 - 60

- d. Contractor shall program Multimedia processor to integrate with Contractor provided monitors. 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 plate(s) and one (1) wireless presentation system(s). Cable shall meet or exceed Crestron requirements for NVX systems.
 - g. Contractor shall completely integrate control system and multimedia systems with provided audio system.
11. One (1) Multimedia Input Locations shall be provided.
- a. Acceptable Manufacturer(s)
 - 1. CRESTRON
 - A DM-NVX
 - 2. QSC
 - b. Input location(s) shall be installed into existing double gang box, contractor shall supply stainless steel plate for fully finished installation.
 - c. Contractor shall supply correct in-plate DM transmit and receive equipment to extend input location to supplied NVX encoder.
 - d. Contractor shall supply all necessary NVX 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. NVX units shall provide 4K60 4:4:4 resolution.

- h. NVX units shall properly scale input image to projector to optimal resolution.
12. One (1) Touch Screen(s) shall be provided
- a. Acceptable Manufacturer(s)
 - 1. CRESTRON
 - A TSW-770-B-S
 - 2. QSC
 - b. Touch Screen(s) shall be provided to control system operations.
 - 1. Connect touch screens to supplied NVX 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. Contractor shall provide protective plexiglass, lockable enclosure.
 - 4. 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
 - 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.

- d. Contractor shall program Multimedia Control System to integrate with Owner provided motorized electric screens.

13. One (1) Wireless Presentation System

- a. Acceptable Manufacturers (in alphabetical order):
 - 1. APPLE
 - A Apple TV 4K (2nd Generation)
- b. Wireless Presentation System shall meet or exceed the following requirements:
 - 1. HDMI output with support for up to 4K HDR
 - 2. Gigabit LAN and dual-band 802.11ax Wi-Fi 6 Wireless connectivity
 - 3. 32GB Storage
 - 4. All other features currently a part of the manufacturer's latest commercial release.
- c. Contractor shall securely mount wireless presentation system device at monitor location using wall mount bracket.
- 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 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.
- f. Contractor shall supply appropriate 4K60 4:4:4 encoder device to integrate with provided control system.
- g. Contractor shall supply and install all necessary HDMI cables to connect wireless presentation device to monitor.

D. SPECIAL CONFIGURATION D

- 1. Contractor shall supply one (1) of the specified configuration(s) in the following locations:

- a. Cafeteria F112 – Middle School
- b. Cafeteria M101 – High School
- 2. One (1) Projector
 - a. Acceptable Manufacturer(s)
 - 1. EPSON
 - A L630U
 - b. 6,300 Lumens
 - c. Projector shall be installed and positioned for the projected image to completely fill Owner provided powered rollup screen.
 - d. 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 Contractor provided screen.
 - e. Provided white projector downpipe shall allow routing of projector cabling internally.
 - 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.
 - g. Contractor shall supply appropriate 4K60 4:4:4 decoder device to integrate with provided control system.
- 3. One (1) Multimedia Processor
 - a. Acceptable Manufacturer(s)
 - 1. CRESTRON
 - A CP4
 - 2. 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.
 - d. Contractor shall program Multimedia processor to integrate with Contractor provided powered roll-up screen, monitor 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 Crestron requirements for NVX 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. CRESTRON
 - A DM-NVX
 - 2. QSC
 - b. Contractor shall supply correct in-plate DM transmit and receive equipment to extend input location to supplied NVX encoder.
 - c. Contractor supply all necessary NVX decoder equipment to connect supplied projector.
 - d. Valid video input into the system shall turn on system automatically.
 - e. System shall power down after ten (10) minutes of no video signal.
 - f. NVX units shall provide 4K60 4:4:4 resolution.

- g. NVX 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. CRESTRON
 - A TSW-770-B-S
 - 2. QSC
 - b. Touch Screen(s) shall be provided to control system operations.
 - 1. Connect touch screens to supplied NVX 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. Contractor shall provide protective plexiglass, lockable enclosure.
 - 4. 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, input 2 or wireless presentation system
 - D Control Provided LED Panels
 - 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.

- d. Contractor shall program Multimedia Control System to integrate with Contractor provided motorized electric screens.
- 6. One (1) Powered Rollup Projection Screen
 - a. Acceptable Manufacturer(s)
 - 1. DA-LITE
 - A Tensioned Cosmopolitan Electrol
 - 2. DRAPER
 - b. Powered Rollup Projection Screen shall meet or exceed the following minimum requirements:
 - c. 54" x 96" – Wide (16:9) Format - Cafeteria F112 – Middle School
 - d. 65" x 116" – Wide (16:9) Format - Cafeteria M101 – High School
 - e. White case
 - f. Surface mount
 - g. Matte white screen surface
 - h. Low voltage control RS-232 capable
- 7. 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).
8. One (1) Wireless Presentation System
- a. Acceptable Manufacturers (in alphabetical order):
 - 1. APPLE
 - A Apple TV 4K (2nd Generation)
 - b. Wireless Presentation System shall meet or exceed the following requirements:
 - 1. HDMI output with support for up to 4K HDR
 - 2. Gigabit LAN and dual-band 802.11ax Wi-Fi 6 Wireless connectivity
 - 3. 32GB Storage
 - 4. All other features currently a part of the manufacturer's latest commercial release.
 - c. Contractor shall securely mount wireless presentation system device at monitor location using wall mount bracket.
 - 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 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.
 - f. Contractor shall supply appropriate 4K60 4:4:4 encoder device to integrate with provided control system.
 - g. Contractor shall supply and install all necessary HDMI cables to connect wireless presentation device to monitor.
9. Two (2) 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.
10. Sixteen (16) Speakers shall be provided and installed – S2 on Drawings
- 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.
- k. Speakers shall be white in color.

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

- a. Acceptable Manufacturer(s)
 - 1. BIAMP/COMMUNITY
 - 2. HARMAN/JBL PRO
 - 3. QSC
 - 4. 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 Crestron 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.

12. 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
13. One (1) CD/Bluetooth Player shall be provided and installed
- a. Acceptable Manufacturer(s)
 - 1. DENON
 - A DN300Z
 - 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.
14. 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.

E. SPECIAL CONFIGURATION E

- 1. Contractor shall supply one (1) of the specified configuration(s) in the following locations:
 - a. Pool/Natatorium A101
- 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. Two (2) 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. Three (3) Performance Speaker(s) for main pool area. Speakers are identified on communications drawings as **S3**.

a. Acceptable Manufacturer(s)

1. BIAMP/Community

MULTIMEDIA SYSTEMS

27 41 00 - 72

A R.5-96MAX

- b. High Performances Coaxial 2-way full range speaker
 - c. 12" Low Frequency Driver, 1x1.4" Exit Compression Driver
 - d. 600W continuous @ 8 ohms
 - e. 103 dB sensitivity
 - f. Continuous Max Output – 130 dB
 - g. Operating Range - 70Hz-20kHz
 - h. 90°- horizontal, 60° vertical
 - i. Contractor shall safely and securely mount speakers to natatorium structure using manufacturer best practices.
 - j. Contractor shall provide final commissioning of natatorium sound to ensure a fully functional and optimized system.
 - k. Contractor shall supply and install properly sized speaker cabling to support supplied speakers. Cabling shall be enclosed in conduit or raceway provided by Others. No exposed cabling shall be allowable. Each speaker shall be independently wired back to audio system rack location..
 - l. Contractor shall supply all necessary cables, plates, accessories and connectors to connect speaker cabling to speakers using pathway provided by Others for a fully finished installation.
 - m. Speakers shall be white or light grey in color.
5. Four (4) Performance Speaker(s) for Upper Mezzanine Spectator Area. Speakers are identified on communications drawings as **S3**.
- a. Acceptable Manufacturer(s)
 - 1. BIAMP/Community

A R.35-3896

- b. Vari-Tilt yoke
- c. Ultra-Compact Horn-Loaded Triaxial 3-way full range speaker

- d. 8" Low Frequency Driver, 2x2.35" Multisource Waveguide Compression drivers and 1x1" Exit Compression Driver.
 - e. 400W continuous @ 8 ohms
 - f. 100 dB sensitivity
 - g. Continuous Max Output – 130 dB
 - h. Operating Range - 80Hz-16kHz
 - i. 90°- horizontal, 60° vertical
 - j. Contractor shall safely and securely mount speakers to natatorium bulkhead structure above spectator area using manufacturer recommended and industry best practices.
 - k. Contractor shall provide final commissioning of natatorium sound to ensure a fully functional and optimized system.
 - l. Contractor shall supply and install properly sized speaker cabling to support supplied speakers. Cabling shall be enclosed in conduit or raceway provided by Others. No exposed cabling shall be allowable. Each speaker shall be independently wired back to building MDF rack.
 - m. Contractor shall supply all necessary cables, plates, accessories and connectors to connect speaker cabling to speakers using pathway provided by Others for a fully finished installation.
 - n. Speakers shall be white or light grey in color.
6. One (1) Mixer/DSP shall be provided and installed.
- a. Acceptable Manufacturer(s)
 - 1. BIAMP/Community
 - 2. QSC
 - 3. Or equal.
 - b. System shall be populated with necessary accessories for 8 line-level output audio channels.
 - c. System shall be populated with necessary accessories for 8 line-mic or line-level input audio channels.

- d. Contractor shall supply all parts, cables and accessories to install equipment at building MDF location.
 - e. System shall be capable of providing digital signal processing and equalization for two (2) discreet zones. Contractor shall supply all necessary labor to configure Mixer/DSP for even audio reproduction throughout the natatorium. Additional configuration shall be provided to integrate supplied DSP with leisure pool audio system to function as a fully independent space.
 - f. 7" touchscreen shall be provided and installed in provided AV rack location to allow discreet volume control for all inputs and master volume for entire system.
 - g. Contractor shall integrate and provide all necessary licensing for two (2) Owner provided Apple iPad devices to integrate with supplied DSP. Mobile device shall have the ability to adjust the master volume of the system as well as discreet control of each mixer interface, including mute of each zone individually and the system as a whole.
 - h. System shall be programmed and enabled to allow up to 3 individual speaker presets for various natatorium events. Presets must be changeable through Owner provided remote device application.
 - i. 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.
 - j. Contractor to prepare mockup of mobile device interface for review by the Owner before final programming.
 - k. Contractor shall supply all cables and accessories for a fully functional system.
7. One (1) Amplification System shall be provided and installed.
- a. Acceptable Manufacturer(s)
 - 1. BIAMP/Community
 - A ALC-1604D
 - 2. Or Equal.

- b. Four (4) input channels
 - c. Four (4) output channels – Hi-Z or Lo-Z
 - d. Input sensitivity @ 8 Ohms – 26 dB Gain – 4.91 Vrms
 - e. 1250W maximum output per channel at 8 Ohms.
 - f. S/N (20 Hz – 20kHz @ 8 Ohms) > 110 dB
8. One (1) Remote input location(s) shall be provided and installed in location identified on drawing (pool timing room).
- a. Remote input location shall provide XLR and 3.5mm connectivity in identified location.
 - 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. SPECIAL CONFIGURATION F

1. Contractor shall supply one (1) of the specified configuration(s) in the following locations:
 - a. Gymnasium A121 – MS Gym
2. One (1) Projector
 - a. Acceptable Manufacturer(s)
 1. Epson
 - A EB-PU1008W
 - b. 8,500 Lumens
 - c. Projector shall be provided with appropriate lens for an approximate 50' throw to fill a 16' wide front projection system with a 16:9 ratio projected image.
 - d. 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.

- e. Projector shall be connected to supplied Crestron control system to receive transmission of signal from supplied input locations.
- f. Contractor shall supply and install protective cage for projectors Chief model PG3AW or equal.

3. One (1) Multimedia Processor

a. Acceptable Manufacturer(s)

1. CRESTRON

A CP4

2. 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.
- d. Contractor shall program Multimedia processor to integrate with Contractor provided powered roll-up screen, monitor 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 two (2) input plates and one (1) wireless presentation system. Cable shall meet or exceed Crestron requirements for NVX systems.
- g. Contractor shall completely integrate control system and multimedia systems with provided audio system.

4. Two (2) multimedia input locations shall be provided (one in rack).
 - a. Acceptable Manufacturer(s)
 1. CRESTRON
A DM-NVX
 2. 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 shall supply correct in-plate DM transmit and receive equipment to extend input location to supplied NVX encoder.
 - d. Contractor supply all necessary NVX 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. NVX units shall provide 4K60 4:4:4 resolution.
 - h. NVX 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. CRESTRON
A TSW-770-B-S
 2. QSC
 - b. Touch Screen(s) shall be provided to control system operations.
 1. Connect touch screens to supplied NVX 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.

MULTIMEDIA SYSTEMS

3. Contractor shall provide protective plexiglass, lockable enclosure.
4. 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, input 2 or wireless presentation system
 - D Control Provided LED Panels
 - 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.
- d. Contractor shall program Multimedia Control System to integrate with Owner provided motorized electric screens.
6. One (1) Powered Rollup Projection Screen shall be provided and installed.
 - a. Acceptable Manufacturer(s)
 1. DA-LITE
 - A Tensioned Cosmopolitan Electrol
 2. DRAPER
 - b. Powered Rollup Projection Screen shall meet or exceed the following minimum requirements:
 - c. 108" x 192" – Wide (16:9) Format
 - d. White case
 - e. Surface mount

- f. Matte white screen surface
 - g. Low voltage control RS-232 capable
- 7. 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).
- 8. One (1) Wireless Presentation System
 - a. Acceptable Manufacturers (in alphabetical order):
 - 1. APPLE
 - A Apple TV 4K (2nd Generation)
 - b. Wireless Presentation System shall meet or exceed the following requirements:
 - 1. HDMI output with support for up to 4K HDR
 - 2. Gigabit LAN and dual-band 802.11ax Wi-Fi 6 Wireless connectivity
 - 3. 32GB Storage

4. All other features currently a part of the manufacturer's latest commercial release.
- c. Contractor shall securely mount wireless presentation system device at monitor location using wall mount bracket.
 - 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 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.
 - f. Contractor shall supply appropriate 4K60 4:4:4 encoder device to integrate with provided control system.
 - g. Contractor shall supply and install all necessary HDMI cables to connect wireless presentation device to monitor.
9. Two (2) 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.
10. Six (6) Speaker(s) in two (2) zones shall be provided and installed
 - a. Acceptable Manufacturer(s)
 1. BIAMP/COMMUNITY

2. ELECTROVOICE
 3. HARMON/JBL PRO
 4. QSC
 5. Or Equal
- b. Passive 2-way full range speaker
 - c. 12" Low Frequency Driver, 2.5-inch Voice Coil
 - d. 1.75" High Frequency Driver
 - e. 300W AES, 1200W peak
 - f. 8 ohms
 - g. 94 dB sensitivity
 - h. 34Hz-18kHz +/- 3dB, -10dB @ 50Hz
 - i. Contractor shall safely and securely mount speakers to cafeteria 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 where applicable.
 - 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.
11. One (1) Mixer/DSP shall be provided and installed.
- a. Acceptable Manufacturer(s)
 1. BIAMP/COMMUNITY
 2. HARMAN/JBL PRO
 3. QSC
 4. Or Equal.

- b. System shall be populated with necessary accessories for 8 line-level output audio channels.
 - c. System shall be populated with necessary accessories for 8 line-level input audio channels.
 - d. Contractor shall supply all parts, cables and accessories to securely mount unit in provided cabinet.
 - e. Contractor shall supply all necessary labor to configure Mixer/DSP.
 - f. Contractor shall integrate DSP with provided Crestron touchscreen and control system
 - g. System shall be capable of providing digital signal processing and equalization for two (2) discreet zones. Contractor shall supply all necessary labor to configure Mixer/DSP system for even audio reproduction throughout the gymnasium.
 - h. 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.
 - i. Contractor shall supply all cables and accessories for a fully functional system.
12. One (1) Amplification System shall be provided and installed.
- a. Acceptable Manufacturer(s)
 - 1. BIAMP/COMMUNITY
 - A ALC-1604D
 - 2. HARMAN/JBL PRO
 - 3. QSC
 - 4. Or Equal.
 - b. Four (4) input channels
 - c. Four (4) output channels – Hi-Z or Lo-Z

- d. Input sensitivity @ 8 Ohms – 26 dB Gain – 4.91 Vrms
 - e. 1250W maximum output per channel at 8 Ohms.
 - f. S/N (20 Hz – 20kHz @ 8 Ohms) > 110 dB
13. One (1) CD/Bluetooth Player shall be provided and installed
- a. Acceptable Manufacturer(s)
 - 1. DENON
 - A DN300Z
 - 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.
14. 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.

G. SPECIAL CONFIGURATION G

- 1. Contractor shall supply one (1) of the specified configuration(s) in the following locations:
 - a. Gymnasium A118 – MS Aux Gym
- 2. One (1) Rack System(s) shall be provided and installed
 - a. Acceptable Manufacturer(s)
 - 1. Middle Atlantic
 - A DWR-12-26PD

MULTIMEDIA SYSTEMS

- 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. One (1) Mixer shall be provided and installed.
- a. Acceptable Manufacturer(s)
 - 1. BIAMP/COMMUNITY
 - 2. HARMAN/JBL PRO

A CSM-28

3. POWERSOFT

4. QSC

5. Or Equal.

- b. System shall be populated with necessary accessories for 2 line-level output audio channels.
- c. System shall be populated with necessary accessories for 8 line-level input audio channels.
- d. Contractor shall supply all parts, cables and accessories to securely mount unit in provided cabinet.
- e. Contractor shall supply all necessary labor to configure Mixer/DSP.
- f. Contractor shall supply all necessary labor to configure Mixer/DSP system for even audio reproduction throughout the gymnasium.
- g. Contractor shall supply all cables and accessories for a fully functional system.

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

a. Acceptable Manufacturer(s)

1. BIAMP/COMMUNITY

2. HARMAN/JBL PRO

A CSA2300Z

3. POWERSOFT

4. QSC

5. Or Equal.

b. Two (2) input channels

c. Two (2) output channels

d. Input sensitivity @ 8 Ohms – 26 dB Gain – 5.03 Vrms

- e. 300W maximum output per channel at 8 Ohms
 - f. S/N (20 Hz – 20kHz @ 8 Ohms) > 111 dB
6. Two (2) Speaker(s) in One (1) zones shall be provided and installed
- a. Acceptable Manufacturer(s)
 - 1. BIAMP/COMMUNITY
 - 2. ELECTROVOICE
 - 3. HARMON/JBL PRO
 - 4. QSC
 - 5. Or Equal
 - b. Passive 2-way full range speaker
 - c. 12” Low Frequency Driver, 2.5-inch Voice Coil
 - d. 1.75” High Frequency Driver
 - e. 300W AES, 1200W peak
 - f. 8 ohms
 - g. 94 dB sensitivity
 - h. 34Hz-18kHz +/- 3dB, -10dB @ 50Hz
 - i. Contractor shall safely and securely mount speakers to cafeteria 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 where applicable.
 - k. Contractor shall supply and install properly sized speaker cabling to support supplied speakers. Each speaker shall be independently wired back to provided rack.
7. One (1) CD/Bluetooth Player shall be provided and installed
- a. Acceptable Manufacturer(s)

1. DENON

A DN-300Z

2. Or Equal.

- b. Extended range Bluetooth antenna
 - c. AM/FM Radio Tuner
 - d. USB media player connectivity
 - e. Contractor shall supply all parts, cables and accessories to securely mount unit in provided cabinet.
 - f. Contractor shall provide all audio cables and accessories to integrate CD/Bluetooth player with provided mixer/DSP system.
8. One (1) Remote input location(s) shall be provided and installed in location identified on drawing.
- a. Remote input location shall provide XLR and 3.5mm connectivity in identified location.
 - 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.

H. SPECIAL CONFIGURATION H

- 1. Contractor shall supply one (1) of the specified configuration(s) in the following locations:
 - a. Gymnasium M125 – HS Gym
- 2. Contractor shall move all existing AV equipment including existing rack to new audio system location.
- 3. Contractor shall run new audio cables as necessary to extend all audio system components to new location for a fully functional system.
- 4. Contractor shall run new audio inputs to locations identified on provided drawings.

I. SPECIAL CONFIGURATION I

MULTIMEDIA SYSTEMS

1. Contractor shall supply one (1) of the specified configuration(s) in the following locations:
 - a. Band – F113
 - b. Choir – F123
2. One (1) Manual Rollup Projection Screen
 - a. Acceptable Manufacturer(s)
 1. DA-LITE
 - A Model C with CSR
 2. DRAPER
 - b. Manual Rollup Projection Screen shall meet or exceed the following minimum requirements:
 - c. 65” x 116” – 133” Diagonal – Choir Room
 - d. 78 x 139” – 159” Diagonal – Band Room
 - e. White case
 - f. Controlled screen return
 - g. Matte white screen surface
 - h. Contractor shall supply all necessary mounting materials and labor for safe and fully functional installation.
3. One (1) Projector
 - a. Acceptable Manufacturer(s)
 1. EPSON
 - A L630U
 - b. 6,300 Lumens
 - c. Projector shall be installed and positioned for the projected image to completely fill Owner provided rollup screen.

- d. 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 Contractor provided screen.
 - e. Provided white projector downpipe shall allow routing of projector cabling internally.
 - 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.
 - g. Contractor shall supply and install audio cable to connect projector audio output to supplied DSP/Mixer system installed in provided rack.
4. One (1) Wireless Presentation System
- a. Acceptable Manufacturers (in alphabetical order):
 - 1. APPLE
 - A Apple TV 4K (2nd Generation)
 - b. Wireless Presentation System shall meet or exceed the following requirements:
 - 1. HDMI output with support for up to 4K HDR
 - 2. Gigabit LAN and dual-band 802.11ax Wi-Fi 6 Wireless connectivity
 - 3. 32GB Storage
 - 4. All other features currently a part of the manufacturer's latest commercial release.
 - c. Contractor shall securely mount wireless presentation system device at monitor location using wall mount bracket.
 - 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 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.
 - f. Contractor shall supply and install all necessary HDMI cables to connect wireless presentation device to projector.
5. One (1) Voice Amplification System shall be provided and installed.
- a. Acceptable Manufacturer(s)
 - 1. LIGHTSPEED
 - A 975 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
 - 3. Contact closure functionality for integration with provided classroom PoE clock paging device via contact closure.
 - d. Contractor shall provide one (1) cable for connectivity from audio output of projector to voice amplification system installed at rack location to support a fully functional and compliant system.
 - e. 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.
 - f. All other features currently a part of the manufacturer’s latest commercial release.
 - g. Voice Amplification Systems shall be neatly and securely mounted at Contractor provided rack. As indicated in the provided line diagram, Contractor shall supply and install audio cabling from Lightspeed device to provided DSP/Mixer.

MULTIMEDIA SYSTEMS

6. One (1) Multi-media Infrastructure Cable and Faceplate
 - 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.
 - b. Infrastructure cable to connect projector to a 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.
 - C Wall plate provided shall be constructed of commercial grade stainless steel.
 2. Wall plate shall contain connection points for all specified cables
 3. Two (2) data outlet locations.
 4. Unpopulated data connections shall all have blank covers installed.
 5. Any existing terminated category cabling should be securely locked into new plate and any existing labeling shall be transferred.
 - d. All cables originating from wall plate connectors, except speaker cables, shall terminate in a service loop eight (8) feet in length at projector location.
 - e. 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 receiver and include an HDMI Type A 19 pin plug connector to display device.
 - B Terminate in a 568-compliant type female jack located on the face plate.

7. 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 4:2:0 Up to 130'
 3. HDCP 2.2
 - c. Contractor shall install HDMI transmitter at conference table and integrate into table pocket.
 - d. Contractor shall securely and neatly mount HDMI transmission equipment at teacher station and projector locations.
 - e. Contractor shall supply and install shielded cable and passthrough connector to integrate with floor box or wall plate.
 - f. Contractor to supply 8' ultra-slim HDMI cable for device connection.
8. 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 15A eight (8) outlet power sequencer/PDU (Furman M-8S or equal).
9. One (1) Stereo Recording Microphone shall be provided and installed.
- a. Shure
 - 1. VP88
 - b. Microphone will be suspended in above conductor location for recording of choir and band performances for fast playback. Contractor to include all necessary cables and accessories to connect microphone back to provided DSP for recording.
10. One (1) Mixer/DSP shall be provided and installed.
- a. Acceptable Manufacturer(s)
 - 1. BIAMP/COMMUNITY
 - 2. HARMAN/JBL PRO
 - 3. POWERSOFT
 - 4. QSC
 - 5. SYMETRIX
 - A PRISM 8x8
 - 6. Or Equal.
 - b. System shall be populated with necessary accessories for 8 line-level output audio channels.
 - c. System shall be populated with necessary accessories for 8 line-level input audio channels.
 - d. Contractor shall supply all parts, cables and accessories to securely mount unit in provided cabinet.
 - e. Contractor shall supply all necessary labor to configure Mixer/DSP.

- f. System shall be capable of providing digital signal processing and equalization for band and choir room. Contractor shall supply all necessary labor to configure Mixer/DSP system for even audio reproduction throughout the space.
 - g. 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.
 - h. Contractor shall supply all cables and accessories for a fully functional system.
11. One (1) Solid State Recording Device shall be provided and installed.
- a. Acceptable Manufacturer(s)
 - 1. TASCAM
 - A SS-R250N
 - 2. Or Equal.
 - b. Ability to record to SD Card or USB media
 - c. Balanced analog I/O
 - d. Ethernet network connectivity, device shall have the ability to start and stop recording from an Apple mobile device and/or desktop computer. Contractor shall fully configure device on network and collaborate with staff to make functional remote recording and playback capability.
 - e. Contractor shall supply all necessary cabling and accessories to connect Solid State Recording Device to provided DSP/Mixer.

12. One (1) Multimedia Processor shall be provided and installed.

- a. Acceptable Manufacturer(s)
 - 1. CRESTRON
 - A RMC4
 - 2. QSC

- b. Contractor shall supply all parts, cables and accessories to securely mount unit in provided AV rack.
- c. Contractor shall provide all control, communication, and audio cables to connect input and output ports to all Contractor provided materials.
- d. Contractor shall program Multimedia processor to integrate with Contractor provided DSP/Mixer. 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.

13. One (1) Tabletop Touch Screen(s) shall be provided

- a. Acceptable Manufacturer(s)
 - 1. CRESTRON
 - A TS-770-B-S
 - 2. QSC
- b. Touch Screen(s) shall be provided to control system operations.
 - 1. Connect to DSP/Mixer system to provide discreet input and output control provided with system.
 - 2. Provide all necessary cabling, mounts and accessories to securely mount touch screen at teacher desktop location.
 - 3. Control touch screen shall be provided in locations specified herein that shall provide the following functions but not limited to.
 - A Audio Level Increase (for each input)
 - B Audio Level Decrease (for each output)
 - C Audio Mute (master and for each input/output)

- c. Contractor shall provide all control, communication, audio patch cables, transmitters and receivers to connect input and output ports to all Contractor and Owner provided materials in the space.

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

- a. Acceptable Manufacturer(s)
 - 1. BIAMP/COMMUNITY
 - 2. HARMAN/JBL PRO
 - 3. POWERSOFT
 - 4. QSC
 - A GX5
 - 5. Or Equal.
- b. Two (2) input channels
- c. Two (2) output channels
- d. Input sensitivity @ 8 Ohms – 26 dB Gain – 5.03 Vrms
- e. 500W maximum output per channel at 8 Ohms
- f. S/N (20 Hz – 20kHz @ 8 Ohms) > 100 dB

15. Two (2) Speakers shall be provided and installed

- a. Acceptable Manufacturer(s)
 - 1. BIAMP/COMMUNITY
 - A V2-1296
 - 2. ELECTROVOICE
 - 3. HARMON/JBL PRO
 - 4. QSC
 - 5. Or Equal
- b. Passive 2-way full range speaker

- c. 12" Low Frequency Driver
 - d. 1" High Frequency Driver
 - e. 300W AES, 1200W peak
 - f. 8 ohms
 - g. 98 dB sensitivity
 - h. 90x60 beamwidth
 - i. 34Hz-18kHz +/- 3dB, -10dB @ 50Hz
 - j. Contractor shall safely and securely mount speakers to choir and band room wall using manufacturer recommended and industry best practices.
 - k. Contractor shall supply and install properly sized speaker cabling to support supplied speakers. Each speaker shall be independently wired back to provided rack.
16. One (1) Remote Mixing and Microphone Kit shall be provided and installed.
- a. Acceptable Manufacturer(s)
 - 1. MACKIE Mixing Board
 - A ProFXv3
 - B Or Equal.
 - 2. AKG Instrument Microphone – Quantity - three (3)
 - A P170
 - B Or Equal.
 - 3. ATLAS Microphone Stand with Boom – Quantity – three (3)
 - A T3664
 - B Or Equal.
 - 4. Pelican Case

- A Protector with foam - Appropriately sized to hold remote recording kit.
- B Or Equal.

2.16 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 \$20,000.00 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. Contractor shall remove ALL abandoned AV cabling including VGA, Cable TV, unused speaker cables, shelves, brackets and blank any open locations in all rooms receiving new AV equipment.
- B. All existing AV equipment in rooms shall be delivered to Owner identified location for sorting, all equipment not identified by Owner to be retained 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. Contractor shall supply all necessary equipment to complete the installation as specified including appropriate lift equipment to access high ceiling areas.
- C. 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.
- D. All equipment and materials shall be installed in a neat and workmanlike manner. Best practices installation principles shall be used throughout the project.
- 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 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 teacher desk, 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

MULTIMEDIA SYSTEMS

- 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. Neatly configure all cables as directed by Owner.
- c. Attach projector to mount using manufacturer best practices.
- d. Connect AC power using cord provided to projector.
- e. 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.
- f. Contractor shall fully configure all projectors in Epson management software.
- g. Set keystone adjustment(s) as required.
- h. Zoom and focus projector as required.
- i. Secure all adjustment points.

15. LONG THROW 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. Neatly configure all cables as directed by Owner.
- c. Attach projector to mount using manufacturer best practices.

- d. Connect AC power using cord provided to projector.
- e. Align projector properly on provided screen.
- f. Contractor shall fully configure all projectors in Epson management software.
- g. Set keystone adjustment(s) as required.
- h. Zoom and focus projector as required.
- i. Secure all adjustment points.

16. WIRELESS PRESENTATION SYSTEM

- a. Provide and connect all audio and video input and output device cables.
- b. Secure mounting location at projector location with provided mount 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. 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.).
- g. Collaborate and coordinate with Owner or Others to fully configure wireless presentation system to function on Owner provided network equipment.

17. 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. Contractor shall work collaboratively with paging Contractor to connect relay input connectivity from classroom clock/paging combination device.
- f. Provide and install connection from audio output on Contractor supplied projection units.

18. DOCUMENT CAMERAS

- a. Neatly route all cabling and secure slack.
- 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. 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. Worksites include the following:
- 1. Ludington High School
508 N. Washington
Ludington, Michigan 49431
 - 2. OJ DeJonge Middle School
706 E. Tinkham Ave.
Ludington, Michigan 49431

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.
- 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 one (1), 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.
- C. Contractor shall provide end user training for classroom instructors district wide via the development of video training segments to be posted on an internal website for distribution. Training shall be available prior to substantial completion. End user video training segments shall include, but not limited to the following:
 - 1. System power up and power down.
 - 2. Source selection.
 - 3. Volume control.
 - 4. Voice amplification use.
 - 5. Document camera operation.
 - 6. System care and classroom maintenance best practices.
 - 7. Equipment cart relocation and adjustments.
 - 8. Screen operation and care.
 - 9. Problem reporting.

- D. “First day” training support shall be provided during the initial day of the resumption of classes after installation. This training support shall provide users with assistance in problem diagnostics and “first day” operations of installed equipment. Adequate numbers of qualified support trainers shall be deployed to provide users with thirty (30) minute or less response on all support training requests. Owner will designate the appropriate day for this training to take place.

3.07 SCHEDULE, MEETINGS AND PLANS

- A. Contractor shall work collaboratively with General Contractor, Owner and Consultant to plan and phase work as necessary. See appendix D for proposed construction schedule.
- 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

SECTION 27 51 16
PUBLIC ADDRESS AND PROGRAM SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION OF PROJECT

- A. Work described in this specification section pertains to a Public Address System component for Ludington Area School District. Work shall include, but not be limited to public address head end equipment, amplifier(s), cabling, ceiling and/or wall speakers, interface units and all other components and services required for a full and operational system.
- B. Contractor shall propose a system to be installed and connected to the owner's existing infrastructure.
- C. All head-end equipment shall be installed to the Owner's Main Distribution Frame (MDF) or designated IDF.
- D. The Contractor shall design, engineer, configure, supply, connect, test, document, train Owner representatives and warrant a fully operational and compliant system, complete and with full functionality as specified herein.
- E. 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.
- G. MANDATORY ALTERNATE: Contractor shall provide alternate for five (5) year warranty in lieu of the specified and required warranty. Such warranty shall maintain the same requirements for performance, but for five years rather than the specified base bid duration.

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 / Paging system shall be known and leading entity in the relevant communications

PUBLIC ADDRESS AND PROGRAM SYSTEM

field, and shall have been designing, manufacturing and installing similar systems for a period of no less than three (3) years.

1. Acceptable Manufacturers (In alphabetical order):

- a. Advanced Network Devices
- b. AtlasIED

B. System manufacturer shall support a centralized management software instance to collectively and centrally manage all speakers and all buildings throughout the scope of the project. Individually configured, managed, and controlled systems per facility with no central management and control will not be favorably considered.

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 shall be configured and installed to service Owner's worksites listed herein. Each facility shall be capable of independent administration of all program functions and meet or exceed all functional and performance requirements as established herein.
- B. Administration access to all system functions shall be by both computer via a web browser across the Owner's existing data network and by telephone from the Owner's system provided by others and shall be protected by unique and secure log on.
- C. System administrator shall be capable of complete system back-up and full system restoration from a previously saved configuration.
- D. In the event of a power failure, complete system shall automatically re-initialize and "become active" to the last configuration in use with no human intervention.
- E. New Interior PoE speakers shall be provided in locations identified on provided drawings. Quoted cost must include all cabling and labor to integrate speakers into provided Public Address system.

PUBLIC ADDRESS AND PROGRAM SYSTEM

- F. New weatherproof wide-angle sound dispersion PoE exterior horns and shall be provided in locations identified on provided drawings. Quoted cost must include all parts, cabling and labor to integrate into provided Public Address system. Exterior horns must be collapsible style in protected boxes with painted grill.

G. CENTRAL CONTROLLER

1. Contractor shall supply all necessary licensing and labor to add all paging devices to existing Singlewire Informacast Fusion system.
2. Central Controller shall provide for distribution of balanced audio that is free from distortion, clear of noise and intelligible.
3. Central Controller 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).
4. Central Controller 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 phone system over SIP protocol.
 - b. Interface to computer data network system over Owner provided Ethernet.
 1. Specific password protected authorization shall be required to authenticate any user attempting to broadcast or modify programming on the system.

PUBLIC ADDRESS AND PROGRAM SYSTEM

2. Access shall be by standard web browser (MS Edge, Safari, 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 (to be interfaced to by others), 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, hallway speakers, 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 two (2) physical external interfaces in addition to telephone (SIP 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 offices 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).

PUBLIC ADDRESS AND PROGRAM SYSTEM

1. 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.
5. Program System shall provide for, but not be limited to:
 - a. Integrated calendar for storage of various 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.

H. INTERIOR POWER OVER ETHERNET (PoE) IN-CEILING SPEAKERS

1. Acceptable Manufacturer(s)
 - a. ADVANCED NETWORK DEVICES
 1. IPSCM-RMe
 - b. ATLASIED
2. Interior Speakers shall be provided in corridors and/or other common public areas of the facility as identified on provided drawings and as provided for herein. See locations as identified on drawings as **S1**.
 - 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.

PUBLIC ADDRESS AND PROGRAM SYSTEM

3. Speakers shall provide balanced intelligible sound that is free of distortion, free from noise and evenly dispersed.
 4. Ceiling Mounted 8" high-efficiency speaker
 5. Frequency response – 60 Hz – 17kHz
 6. Built-in 8 W Class D amplifier
 7. PoE IEEE 802.3af/802.3af Type 1 Class 3 (max 12.95 W)
 8. Support for SIP integration with Voice over IP (VoIP) systems.
 9. Full multicast and broadcast support.
 10. Speaker baffles shall be installed with hardware matching the color of the baffle. Baffle color shall match finished ceiling color.
 11. All baffles shall be flush against the ceiling and enclosures shall be fully supported. All recessed speakers shall include a back box.
 12. 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.
 13. Each speaker shall be connected to central equipment using standard category 6 ethernet cabling provided by others. Contractor shall supply ethernet patch cables 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.
 14. Each speaker shall be volume adjustable at installation to accommodate specific acoustical properties of the intended coverage area.
 15. Coordinate final placement of speakers with Designer and/or Architect.
 - a. Area of coverage will be such that calls will be clearly audible in the operating area and surrounding space.
 16. Contractor shall include all parts and accessories for a fully functional and securely installed system using manufacturer and industry best practices.
 17. System shall produce audio at a peak level of approximately eighty-five (85) dBA at probable listener's positions.
- I. INTERIOR POWER OVER ETHERNET (PoE) WALL MOUNTED SPEAKERS

1. Acceptable Manufacturer(s)

PUBLIC ADDRESS AND PROGRAM SYSTEM

27 51 16 - 117

a. ADVANCED NETWORK DEVICES

1. IPSWS-SM

b. ATLASIED

2. Interior Speakers shall be provided in corridors and/or other common public areas of the facility as identified on provided drawings and as provided for herein. See locations as identified on drawings as **S4**.
 - 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 provide balanced intelligible sound that is free of distortion, free from noise and evenly dispersed.
4. Ceiling Mounted 8” high-efficiency speaker
5. Frequency response – 60 Hz – 17kHz
6. Built-in 8 W Class D amplifier
7. PoE IEEE 802.3af/802.3af Type 1 Class 3 (max 12.95 W)
8. Support for SIP integration with Voice over IP (VoIP) systems.
9. Full multicast and broadcast support.
10. Each speaker shall include necessary back box, accessories, and cables for a complete installation.
11. 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.
12. Each speaker shall be connected to central equipment using standard category 6 ethernet cabling provided by others. Contractor shall supply ethernet patch cables 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.
13. Each speaker shall be volume adjustable at installation to accommodate specific acoustical properties of the intended coverage area.
14. Coordinate final placement of speakers with Designer and/or Architect.
 - a. Area of coverage will be such that calls will be clearly audible in the operating area and surrounding space.

PUBLIC ADDRESS AND PROGRAM SYSTEM

15. Contractor shall include all parts and accessories for a fully functional and securely installed system using manufacturer and industry best practices.

16. System shall produce audio at a peak level of approximately eighty-five (85) dBA at probable listener's positions.

J. INTERIOR/EXTERIOR POWER OVER ETHERNET (PoE) COMPRESSED HORNS

1. Acceptable Manufacturer(s)

a. ADVANCED NETWORK DEVICES

1. IPSWS-SM-O

b. ATLASIED

2. Exterior Speakers shall be provided at exterior common public areas of the facility as identified on provided drawings and as provided for herein. See locations as identified on drawings as **S5**.

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. PoE IEEE 802.3af/802.3af Type 1 Class 3 (max 12.95 W)

c. Support for SIP integration with Voice over IP (VoIP) systems.

d. Horns shall be installed in impact-resistant aluminum case.

e. Horns shall be IP54 rated.

f. Frequency response of 600Hz – 14 kHz.

g. Each speaker shall be connected to central equipment using standard category 6 ethernet cabling provided by others. Contractor shall supply ethernet patch cables 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 include all parts and accessories for a fully functional and securely installed system using manufacturer and industry best practices.

PUBLIC ADDRESS AND PROGRAM SYSTEM

4. Final placement of exterior horns shall be carefully coordinated with Designer and Architect.

K. COMPONENT INTERCONNECTION

1. All wiring not installed in conduit shall be plenum type cable and shall be so identified with continuous marking.
 2. No wiring installed shall be visible unless specifically and individually approved by Owner and Designer.
 3. Wiring color shall remain the same throughout the system. Colors used for coding shall be as directed by the system manufacturer, Owner and Architect.
 4. Wire shall be copper.
- L. Owner shall provide adequate PoE+ ports in the designated MDF and IDF locations for the connection of all devices required for system operation. Contractor shall remain responsible for all connection to switches, including, but not limited to patch cables at both the closet and device location. All patch cable colors must be coordinated with Owner to match Owner site standards.

2.05 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 contract services related to Owner directed infrastructure upgrades, installation and configuration.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Contractor shall conduct detailed walk-through examination 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. Contractor shall supply all necessary equipment to complete the installation as specified including appropriate lift equipment to access high ceiling areas.
- 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. Work includes extending cable bundles, as required, to Owner identified equipment installation locations at all locations.
- 9. 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. Contractor shall program all bells, alerts, and schedules into the system to support initial operations. No Owner programming shall be required for successful system cut-over in any building.
- G. Worksites include the following:
 - 1. Ludington High School
508 N. Washington
Ludington, Michigan 49431
 - 2. OJ DeJonge Middle School
706 E. Tinkham Ave.
Ludington, Michigan 49431
- H. 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.
- I. 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.
- J. 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 TESTING

- A. In an effort to ensure a smooth cut-over to 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:

1. 100% of all speakers
2. Paging and Public Address programming

- 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 cut-over, 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.

3.04 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. As built drawings for each building.

14. Complete inventory of installed station hardware and system software. Hardware inventory shall include set type (model number), Ethernet MAC address, serial number, location, software groups.

3.05 TRAINING

A. Training shall be conducted at the Owner's discretion and at times and places convenient to Owner personnel. Prior to any training being conducted, Contractor shall provide Owner and Designer with detailed training syllabus and schedule for proposed training event. Compliant syllabus and schedule shall be provided at least ninety-six 96 hours in advance. Owner reserves the right to postpone training if syllabus and/or schedule submitted are deemed inadequate. Training shall not be conducted until such time a syllabus and schedule submitted by Contractor are found to be acceptable to Owner.

B. Contractor shall provide training for the Owner designated system user(s). Owner shall designate up to four (4) administrators to be trained in each building where a system is installed. Training shall be a minimum of One (1), thirty (30) minute session in length, repeated in each building where a system is installed, 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. Zone and building public address functions.
2. Placing intercom calls in the system.
3. Emergency alerts.
4. Program manipulation.

C. 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 One (1), four (4) 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 and changes as well as device reconfiguration.
4. Program manipulation.

3.06 SCHEDULE, MEETINGS AND PLANS

- A. Contractor shall work collaboratively with General Contractor, Owner and Consultant to plan and phase work as necessary. See appendix D for proposed construction schedule.
- B. Sequence of operations shall be established by the Contractor within the guidelines established by the Owner, documented herein, required by Designer, Architect and/or Construction Manager and as required to meet schedules.
- C. 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.
- D. All work shall be coordinated with Owner's construction manager on site.
- E. 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

SECTION 27 53 13 CLOCK SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION OF PROJECT

- A. Work described in this specification section pertains to the purchase and installation of a new building wide clock/message display system. The Owner intends to install a flexible advanced clock/message system that is not limited to time display and is based on industry standards.
- B. Contractor shall advise, coordinate, and work cooperatively with Owner representatives and/or owner's designee related to any installation or special security provisions.
- C. The Contractor shall design, engineer, configure, supply, connect, test, document, train Owner representatives and warrant a fully operational and compliant system, complete and with full functionality as specified herein.
- D. 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 three (3) year. 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.
- 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. Eight (8) 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 for recommended maintenance programs for all equipment following the specified and included three (3) year period. 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.
- G. MANDATORY ALTERNATE: Contractor shall provide alternate for five (5) year warranty in lieu of the specified and required warranty. Such warranty shall maintain the same requirements for performance, but for five years rather than the specified base bid duration.

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 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. Microsoft Project is the software of choice for this schedule. 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. IEEE
 - 2. EIA/TIA Commercial and Administration Standards
 - 3. NEC
 - 4. FCC – All Applicable Rules and Regulations
 - 5. UL
 - 6. 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 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 security 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. Bid Proposal Form(s) may be duplicated as required to provide adequate space to list required number of reference installations for each division Bidder is responding to.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers (In alphabetical order):
 - 1. ADVANCED NETWORK DEVICES

2. ATLASIED

3. Or equal

- 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 System shall be comprised of interoperable components including, but not limited to, controller, credential sensors and management software integrated into a common working system.
- 2.05 System administrator shall be capable of complete system back-up and full system restoration from a previously saved configuration.
- 2.06 System shall be of a distributed processing design with a fully distributed database including, but not limited to time, date, valid codes, access levels and related data so that each Controller makes access control decisions for that location. If communications with central station equipment is lost, all transactions shall be buffered until the restoration of a connection to the central station.
- 2.07 In the event of a power failure, complete system shall automatically re-initialize and “become active” to the last configuration in use with no human intervention.
- 2.08 Contractor shall be responsible for final and working system. Use of existing components and materials provided by others during new construction shall be integral to system configuration and cost-effective installation. Bidders are encouraged to use all compatible and working components in system solution. See schedule(s) and reference files for additional detail.
- 2.09 MESSAGING ROOM CLOCKS WITH FLASHER – Identified as **C1** on drawings
- A. Acceptable Manufacturers

1. ADVANCED NETWORK DEVICES
2. ATLAS IED
 - a. IP-SDMF
- B. Contractor shall supply single sided factory assembled clock/message displays/speaker combo as indicated on provided drawings and specified herein.
- C. Clocks shall display time during normal operation.
- D. Clocks shall function as a scrolling message board during emergency notification operation.
- E. Clocks shall include all necessary hardware including back box to be surface mounted in identified locations.
- F. Clocks shall meet or exceed the following:
 1. Integrated flashers capable of multiple colors to draw visual attention.
 2. Function fully on PoE+ Power.
 3. Communicate to Owners existing NTP server
 4. Fully communicate over Owner's existing ethernet network.
 5. Viewable clock/message display shall be at least 12 inches by 3.75 inches in size.
 6. Clock/message display shall be a fully addressable, multi-color, high resolution display. Visible pixel-based displays shall not be acceptable.
 7. 8" coaxial speaker
 8. Aux audio line-in and line-out
 9. 2 – GPIO
 10. Surface mount enclosure
- G. Clocks shall be capable of changing the color of the display for viewer attention. Available colors shall include, but not be limited to Red, Green and Blue.
- H. Contractor shall provide protective cages in all gym locations.

2.10 DOUBLE SIDED MESSAGING CLOCKS WITH FLASHER – Identified as C2 on drawings

A. Acceptable Manufacturers

1. ADVANCED NETWORK DEVICES

2. ATLAS IED

a. IP-DDS

B. Contractor shall supply double face factory assembled clocks as indicated on provided drawings and specified herein.

C. Clocks shall display time during normal operation.

D. Clocks shall function as a scrolling message board during emergency notification operation.

E. Clocks shall meet or exceed the following:

1. Integrated flashers to draw visual attention.

2. Function fully on PoE+ Power.

3. Communicate to Owners existing NTP server

4. Fully communicate over Owner's existing ethernet network.

5. Viewable clock display shall be at least 8 inches by 2.25 inches in size.

6. Clock/message display shall be a fully addressable, multi-color, high resolution display. Visible pixel-based displays shall not be acceptable.

7. Dual sided speakers

F. Clocks shall be capable of changing the color of the display for viewer attention. Available colors shall include, but not be limited to Red, Green and Blue.

2.11 MESSAGE CONTROL SERVER

A. Contractor shall supply all licensing, labor and accessories to integrate all clock devices with existing Singlewire Informacast Fusion system.

B. Any server necessary for the operation of the system and for reliable and consistent distribution of messages to the clocks shall be provided. Such

server shall be configured with up to ten (10) standard messages as directed by Owner.

C. Such messages shall be initiated by any of the following means:

1. Contact closure

a. Fifty (50) separate contact closures available across the building

2. Telephone connection using SIP and DTMF codes

3. Web connection using standard web browser

D. Messages must be able to be directed to any combination of clock displays based on the initiating event.

E. Software shall provide standard communications capability with SIP based speakers as well as clocks and other network attached devices. Such communication may include changing clock messaging, providing messaging to telephones and playing pre-recorded messages on SIP speakers simultaneously.

F. Preference will be given to system architectures that provide for a central messaging server to be housed in the Owner's central data center to service the entire network of all clock displays.

2.12 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 contract services related to supply, installation and connection of special Owner materials.

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

CLOCK SYSTEM

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 and make every reasonable effort to minimize interference with Owner's or other contractor's activities.
- 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/or other contractor's work 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. Contractor shall supply all necessary equipment to complete the installation as specified including appropriate lift equipment to access high ceiling areas.
- 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 system devices to the Owner's intended use and need.
 - 6. Label all system devices as may be appropriate and required by Owner and Designer.

7. Complete end user and system administrator training programs as specified herein.
 8. Work shall be performed to meet local codes and industry standards including proper grounding and bonding of installed equipment.
- F. Contractor shall remove all existing clock devices as indicated in appendices herein. All removed devices must be fully removed including, but not limited to removal of cables and any surface housings. Contractor shall provide and install metal cover plates for all empty openings. Contractor shall not be responsible for painting but will coordinate painting of the metal cover plates installed with the Owner and its Construction Manager.
- G. Contractor shall install corridor and large room clocks as identified on drawings.
1. Contractor shall be responsible for connecting clocks to Owner's existing PoE+ switches, and as such will provide category 6 patch cables for both ends of the link.
 - a. The clock patch cable will not exceed 30' to the nearest data drop, must be plenum rated, properly supported and fully enclosed in raceway when in front of finished surfaces.
 - b. The network switch patch cable shall be color matched to the Owner standard and compliant with workmanship and standards existing when the work is completed.
- H. Any central server needed for the addressability and messaged distribution to the clock displays shall be installed in the building MDF, or the Owner's central data center at the Owner's direction. The system will be fully configured for specified operation prior to system cut-over.
- I. Preference will be given to platforms providing the option for virtual server installation. Contractor shall be responsible for system integration for all other network systems and components. Owner desires to react in emergency conditions such as but not limited to telephones, speakers, projectors, etc.
- J. Worksites include the following:
1. Ludington High School
508 N. Washington
Ludington, Michigan 49431
 2. OJ DeJonge Middle School
706 E. Tinkham Ave.
Ludington, Michigan 49431

- K. 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.
- L. 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.

3.03 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 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 “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.

3.04 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. As built drawings for each building.
14. System Configuration Report.
15. Complete inventory of installed hardware and system software. Hardware inventory shall include, but not be limited to, model numbers, serial number, physical installation location and software/firmware options.

3.05 TRAINING

- A. Training shall be conducted at the Owner's discretion and at times and places convenient to Owner personnel. Prior to any training being conducted, Contractor shall provide Owner and Designer with detailed training syllabus and schedule for proposed training event. Compliant syllabus and schedule shall be provided at least ninety-six 96 hours in advance. Owner reserves the right to postpone training if syllabus and/or schedule submitted are deemed inadequate. Training shall not be conducted until such time a syllabus and schedule submitted by Contractor are found to be acceptable to Owner.
- 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 one (1), four (4) hour session(s) 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. Review of system alerts, logs and monitoring of configuration parameters including, but not limited to, configuration changes and device status.

3.06 SCHEDULE, MEETINGS AND PLANS

- A. Contractor shall work collaboratively with General Contractor, Owner and Consultant to plan and phase work as necessary. See appendix D for proposed construction schedule.
- 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

SECTION 28 13 00
BUILDING ACCESS CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION OF PROJECT

- A. Work described in this specification section pertains to a new access control system for Ludington Areas School District High School and Middle School complex.
- B. Contractor shall advise, coordinate, and work cooperatively with Owner representatives and/or owner's designee related to any installation or special security provisions.
- C. The Contractor shall design, engineer, configure, supply, connect, test, document, train Owner representatives and warrant a fully operational and compliant system, complete and with full functionality as specified herein.
- D. Contractor shall coordinate their installation with other contractors, Designer and the Owner as is appropriate.
- E. Contractor shall retain integration functions of alarm system and alarm monitoring organization with access control system provided/upgraded, including, but not limited to, programmed alerts, notifications, alarm keypad arm and disarm functions, alarm disregard and all other current functions and operations of the alarm system existing at the High School / Middle School.
- F. Contractor shall fully coordinate and cooperate with door hardware vendor supplying the balance of items identified in section 08 71 00 as identified herein. All final connections, component integration, configuration, testing and programming functions to provide for a fully operational and functional system as specified shall remain the responsibility of Contractor selected for work in this section/division.

1.02 WARRANTY

- A. Complete installation shall be 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.
- 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.
- 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. Eight (8) 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 for recommended maintenance programs for all equipment following the specified and included one (1) year period. 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.
- G. MANDATORY ALTERNATE: Contractor shall provide alternate for five (5) year warranty in lieu of the specified and required warranty. Such warranty shall maintain the same requirements for performance, but for five years rather than the specified base bid duration.
- H. MANDATORY ALTERNATE: To facilitate continued satisfactory operation during warranty period, Contractor shall provide the following warranty services at least once each year during the warranty term:
 1. Inspection of all system components to ensure:
 - a. All doors physically lock and unlock as expected.
 - b. All REX devices physically operate as expected

- c. All door position indicators report correct door position as expected.
 - d. All card readers function correctly and as expected.
 - e. Lockdown buttons function correctly as expected and command correct integration functions with other related building systems.
- 2. Review of all central server and/or processor logs and files to address errors and/or system anomalies to ensure continued compliance with manufacturer recommended best practices.
 - 3. Application of latest versions of all applicable manufacturer firmware, software upgrades/updates and any manufacture recommended patches and/or system fixes to maintain the system in the most current configuration recommended by manufacturer for all components.
 - 4. Ensure all Owner documentation and record documents are updated with current and accurate information including, but not limited to controller, card reader and integrated door hardware models, serial numbers, Software and firmware versions, installation locations, Server configuration parameters.

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 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. Microsoft Project is the software of choice for this schedule. 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. IEEE

2. EIA/TIA Commercial and Administration Standards
 3. NEC
 4. FCC – All Applicable Rules and Regulations
 5. UL
 6. MOSHA Safety Standards
- B. Bidder shall be responsible for supply, configuration and installation of components identified in Section 087100 - Door Hardware, Part 5 “Hardware Schedule”.

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 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 security 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. Bid Proposal Form(s) may be duplicated as required in order to provide adequate space to list required number of reference installations for each division Bidder is responding to.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers (In alphabetical order):
1. AXIS
 2. GENETEC

3. HID

- B. Any access control software solution provided by Contractor must support all hardware provided for herein and on architectural door hardware schedules. Such support shall include, but not be limited to, integrated door hardware, PoE transfer hinges, wireless hubs, door position indicators, REX devices, card readers, mercury door controllers and other components for a fully integrated, functional, and operational system.

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 System shall be comprised of interoperable components including, but not limited to, controller, credential sensors and management software integrated into a common working system.

2.05 System administrator shall be capable of complete system back-up and full system restoration from a previously saved configuration.

2.06 System shall be of a distributed processing design with a fully distributed database including, but not limited to time, date, valid codes, access levels and related data so that each Controller makes access control decisions for that location. If communications with central station equipment is lost, all transactions shall be buffered until the restoration of a connection to the central station.

2.07 In the event of a power failure, complete system shall automatically re-initialize and “become active” to the last configuration in use with no human intervention.

2.08 Contractor shall be responsible for final and working system. Use of existing components and materials provided by others during new construction shall be integral to system configuration and cost-effective installation. Bidders are encouraged to use all compatible and working components in system solution. See schedule(s) and reference files for additional detail.

2.09 CENTRAL MANAGEMENT SOFTWARE

- A. Contractor shall supply all necessary licensing to add all door access devices and accessories to existing Genetec system (Education K12 Package)
- B. Central management software shall meet or exceed the following:
 - 1. System shall be accessed from a standard web browser by Owner designated personnel using their district issued devices.
 - 2. Capable of being fully administered from any web browser attached to the network, including, but not limited to viewing alarm notifications.
 - 3. Administration access shall be protected by unique and secure log on (User ID and Password) and fully integrated with any Owner's existing Microsoft Active Directory configuration.
 - 4. Update Controller(s) in real-time for changes including, but not limited to adding and deleting access levels, adding, and deleting card holders and deactivating card holders.
 - 5. Provide badge creation enabling Owner to create customized photo identification credentials. System shall be compatible with both real-time video camera to capture images, or with images taken with a standard digital camera and saved in a standard picture format.
 - a. System shall include all badge creation software, camera, card reader and one badge printer for Owner's central preparation and enrollment of valid credentials.
 - 6. Provide communication to credential readers, each with individual associated door interface hardware. See associated appendices herein.
 - 7. System reporting shall include, but not be limited to:
 - a. Access through entrance doors.
 - b. Attempted access per entrance.
 - c. Propped and unsecured door alerting.
 - 8. System shall provide for Owner definition of access groups, schedules and door groups that can be combined by Owner's system administrator into combinations of access policies for users.

2.10 CONTROLLER

A. Acceptable Manufacturer(s)

1. Genetec

a. LP1501

B. Door controllers shall be provided in locations at doors not containing integrated door hardware and as identified on provided drawings and specified herein.

C. Door controllers shall be provided in locations to support connection of supplied door contacts as identified on provided drawings and specified herein.

D. In identified locations where new integrated PoE hardware is not specified, and controllers and doors are to be added, a dedicated PoE+ door/entrance controller is to be provided at the opening. Controller(s) shall provide, but not be limited to:

1. Mercury hardware based to support multiple software vendor's systems. Proprietary hardware will not be favorably considered.

2. Capable of supporting multiple types and styles of credential readers.

3. New dedicated PoE+ door controllers:

a. Owner closet-based UPS/Generator shall provide required power back-up.

b. Controllers are to be housed in a surface mounted, lockable impact resistant enclosure to protect the controller and provide for cable termination and management above/behind the finished surface at the door location. Remote controllers located in other parts of the building away from the individual door(s) being controlled shall not be acceptable. Contractor shall provide all necessary patch cables to connect both ends of the link to the controller. Cabling contractor will supply a tested and certified category 6 cable outlet above the center of the door opening.

2.11 CREDENTIALS

A. Six hundred (600) credentials shall be provided.

B. Credentials shall be HID 13.56 MHz cards compatible with specified credential readers.

2.12 CREDENTIAL READERS

A. Where indicated on drawings, credential readers (CR) shall be provided that meet or exceed the following requirements:

1. HID R40 SE Smart Card Reader
2. Read Contractor supplied credentials.
3. DC powered from associated Controller.
4. Response time for passage requests of 800ms.
5. Sealed weatherproof shell enclosure rated for outdoor operation.
6. Surface mounted on exterior surface of structure.
7. LED or other type of visual indicator indicating request status.
8. Audible status indicator upon user prompt.
9. Range of four inches (4”).

B. See associated supplied drawings for location and quantity.

2.13 DOOR INTERFACE HARDWARE (INTEGRATED COMPONENTS)

A. All controllers shall be PoE Genetec Mercury door controllers and shall be mounted above the secure side of each entry requiring a controller. Where new door controllers are to be provided, the door interface hardware provided by others shall meet or exceed the following:

1. 12v PoE+ controller compliant strikes will be provided by others as part of Section 08700 work and shall be integrated into the door controller installation by Contractor.
2. Where new door controllers are to be provided, each door controlled by the system shall be equipped with PIR REX device and shall be integrated into the door controller installation by Contractor.
 - a. REX devices shall be Bosch DS160.
3. Where new door controllers are to be provided, each door shall be equipped with magnetic DPI sensors by others and shall be integrated into the door controller installation by Contractor.
 - a. DPI sensors shall be Bosch ISN-CMINI-10.

4. All door strike, REX and DPI cables shall of a sufficient length to be neatly routed by Contractor supplying material, to a location suitable to reach inside controller enclosure for door(s).

2.14 INTEGRATED PoE HARDWARE

- A. Where Owner has specified integrated hardware as identified in Section 08700 – Door Hardware, Part 5 “Hardware Schedule”, Contractor shall provide, install, configure, and attach ASSA-ABLOY Sargent IN220 Integrated Locks. Contractor shall include cables of a sufficient length to be neatly routed to a suitable location to reach Ethernet ports planned for connection to PoE integrated hardware.

2.15 INTEGRATED WIRELESS DOOR HARDWARE

- A. Where Owner has specified integrated hardware as identified in Section 08700 – Door Hardware, Part 5 “Hardware Schedule”, Contractor shall provide, install, configure, and attach ASSA-ABLOY APERIO IN100 Wireless Locks. Contractor shall supply all necessary APERIO wireless communication hubs in quantities provided including all necessary licensing, labor and accessories for a fully functional system.

2.16 HIDDEN DOOR RELEASE SWITCHES

- A. Door release switches are to be provided in locations identified on provided drawings as specified herein.
 1. Door release switches shall meet or exceed the following requirements:
 - a. ALLEGION 660-PB or ASSA ABLOY equal
- B. Hidden door release switches shall be programmed to provide door release capabilities for doors identified on provided drawings. Contractors shall supply all necessary cabling, labor and accessories to integrate hidden door release switches with Contractor provided door controllers.

2.17 LOCK DOWN BUTTONS

- A. Lock down buttons are to be provided in locations as identified on provided drawings and as specified herein. Provided buttons shall be located in each HS and MS office areas.
- B. New buttons shall be wall mounted and prominently located in an area promoting easy access by staff that may reasonably be required to initiate a lock down.

- C. New lockdown buttons shall be SS2242LD-EN STI Yellow Indoor/Outdoor Flush or approved equal.
- D. Lockdown buttons shall be programmed to provide all functionality defined by Owner, including, but not limited to the integration via contact closure with the PA/program system, video monitoring system and clock system. Such integration shall include both a lockdown and all clear integration.

2.18 NETWORK VIDEO DOOR STATIONS

- 1. Network Video Door Stations shall be provided at entrances of the facility as identified on provided drawings and as provided for herein. See locations as identified on drawings as IC.
- 2. AXIS A8105-E
 - a. Activity/motion detection
 - b. 30fps Maximum Frame Rate at full resolution
 - c. 10/100/1000 Ethernet (RJ-45) connector
 - d. Power over Ethernet IEEE 802.3af/802.3at Type 1 Class 3b
 - e. SIP Compatible
 - f. IP65- and NEMA 4X-rated
 - g. Operating temperature range from -25 °C to 55 °C (-13 °F to 131 °F)
 - h. Contractor shall be responsible to integrate new door stations with the Owner's telephone system for common office operations. No dedicated door station console will be used.

2.19 COMPONENT INTERCONNECTION

- A. All wiring not installed in conduit shall be plenum type cable and shall be so identified with continuous marking.
- B. Wiring color shall remain the same throughout the system. Colors used for coding shall be as directed by the system manufacturer, Owner and Designer.
- C. Wire shall be copper.

2.20 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 \$20,000.00 for contract services related to supply, installation, and connection of computer hardware for central management software.
2. Allowance shall be made in the amount of \$10,000.00 for contract services related to supply, installation, and connection of power supplies to support particular door hardware requiring greater than PoE power at the door location.

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 and make every reasonable effort to minimize interference with Owner's or other contractor's activities.
- 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/or other contractor's work and cannot be removed shall be flagged and cordoned off by the Contractor prior to their departure.
- C. Contractor shall supply all necessary equipment to complete the installation as specified including appropriate lift equipment to access high ceiling areas.

- D. All equipment and materials shall be installed in a neat and workmanlike manner. Best practices installation principles shall be used throughout the project.
- 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 system devices to the Owner's intended use and need.
 - 6. Label all system devices as may be appropriate and required by Owner and Designer.
 - 7. Complete end user and system administrator training programs as specified herein.
 - 8. Work shall be performed to meet local codes and industry standards including proper grounding and bonding of installed equipment.
- F. Worksites include the following:
 - 1. Ludington High School
508 N. Washington
Ludington, Michigan 49431
 - 2. OJ DeJonge Middle School
706 E. Tinkham Ave.
Ludington, Michigan 49431
- 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 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.

3.03 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 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 “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.

3.04 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 as built drawings for each building.
14. System Configuration Report.
15. Complete inventory of installed hardware and system software. Hardware inventory shall include, but not be limited to, model numbers, serial number, physical installation location and software/firmware options.

3.05 TRAINING

- A. Training shall be conducted at the Owner's discretion and at times and places convenient to Owner personnel. Prior to any training being conducted, Contractor shall provide Owner and Designer with detailed training syllabus and schedule for proposed training event. Compliant syllabus and schedule shall be provided at least ninety-six 96 hours in advance. Owner reserves the right to postpone training if syllabus and/or schedule submitted are deemed inadequate. Training shall not be conducted until such time a syllabus and schedule submitted by Contractor are found to be acceptable to Owner.
- 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), three (3) hour session(s) 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. Creating credentials
 2. Establishing, configuring, enrolling and issuing new users and credentials.
 3. Integration with any Owner's existing Microsoft Active Directory.
 4. Setting up new alerts within the system.
 5. Changing the actions taken by the system when a lock-down is initiated.

6. Basic trouble shooting of the installed system and components including diagnostic and problem resolution actions.
7. System back-up and restore functions and procedures for all system parameters and configurations.
8. Review of system alerts, logs and monitoring of configuration parameters including, but not limited to, configuration changes and device status.

3.06 SCHEDULE, MEETINGS AND PLANS

- A. 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.
- B. Contractor shall work collaboratively with General Contractor, Owner and Consultant to plan and phase work as necessary. See appendix D for proposed construction schedule.
- 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

SECTION 28 23 00
VIDEO MONITORING SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION OF PROJECT

- A. Work described in this specification section pertains to a Video Monitoring System for Ludington Area School District.
- B. Owner intends to install an IEEE Ethernet compliant Video Monitoring System covering the sites referred herein. Owner intends cameras installed to provide for monitoring both within the building and outside the site indicated.
- C. Contractor shall propose a System to be deployed using IEEE Ethernet technology. The system components shall be installed and connected to the owner's Ethernet infrastructure and as specified herein. System shall be of a "network" architecture using Ethernet cameras and centrally located Ethernet server(s).
 - 1. Owner will provide adequate IEEE 802.3at 10/100/1000 Ethernet switch ports for the number of devices specified herein.
- D. The centralized server recording equipment will be installed by others in Owner's data center and as required. Contractor shall identify the needed hardware and operating system software needed for the central server(s) and storage of the proposed system. Owner will procure and cause to have installed and configured the equipment for the Contractor to install their control software on.
- E. 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 Ethernet infrastructure (VLAN configuration, QoS mapping, routing, Firewall security provisions etc.).
- F. The Contractor shall design, engineer, configure, supply, connect, test, document, train Owner representatives and warrant a fully operational and compliant network video monitoring system, complete and with full functionality as specified herein.
- 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 three (3) years. Any replacement, upgrade or fix, including labor for any non-conforming, unsupportable or non-operational part of the system shall be fixed and/or replaced at no cost to the Owner. System shall qualify for manufacturer support at all times during the warranty period.
- B. Manufacturer's warranty shall be provided for all components of the system.
 - 1. System integrator or local vendor warranty, without underlying manufacturer's warranty/extended warranty will not be considered an acceptable base bid.
 - 2. 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.
 - 3. 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.
- 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 and without additional charge for any offending components.
- 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. MANDATORY ALTERNATE: Contractor shall provide alternate for five (5) year warranty in lieu of the specified and required warranty. Such warranty shall maintain the same requirements for performance, but for three years rather than the specified base bid duration.
- F. MANDATORY ALTERNATE: To facilitate continued satisfactory operation during warranty period, Contractor shall provide the following warranty services at least once each year during the warranty term:

1. Inspection of all system cameras to ensure:
 - a. Domes (inside and out), lenses and shields are clean and clear of dust and debris for proper and clear image transmission.
 - b. Focus of camera is correct for optimal viewing and recording of image target area within the camera view.
 2. Review of all central server and/or processor logs and files to address errors and/or system anomalies to ensure continued compliance with manufacturer recommended best practices.
 3. Application of latest versions of all applicable manufacturer firmware, software upgrades/updates and any manufacturer recommended patches and/or system fixes to maintain the system in the most current configuration recommended by manufacturer.
 4. Ensure all Owner documentation and record documents are updated with current and accurate information including, but not limited to camera models, serial numbers, Software and firmware versions, installation locations, recording settings (motion, FPS, resolution), Server configuration parameters and days storage available.
- G. Bidder shall provide current annual maintenance contract pricing for recommended maintenance programs for all equipment following the specified and included warranty. This information will be considered by Owner and Designer as part of the bid evaluation process.
- H. 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 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 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. 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 – All Applicable Rules and Regulations
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 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 video monitoring 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. Bid Proposal Form(s) may be duplicated as required in order to provide adequate space to list required number of reference installations for each division Bidder is responding to.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers (In alphabetical order):

1. AXIS
2. GENETEC

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 System shall be comprised of interoperable components including, but not limited to, control software resident on Owner provided centrally located server, Ethernet attached cameras, camera mounting brackets and housings, patch cords and management software integrated into a common working system.

2.05 CENTRAL VIDEO MONITORING CONTROL SOFTWARE

- A. Contractor shall provide and install Genetec Omnicast licensing for all provided devices and an additional ten (10) more cameras without additional software investment required (actual camera and mounting hardware cost excluded) for a fully functional system.
- B. Contractor shall integrate new camera devices into existing Genetec software installation on Owner provided servers.

2.06 CAMERAS

A. Ethernet cameras shall be provided in location on drawings provided herein. Cameras shall meet or exceed the following specified capabilities:

1. Interior Standard Resolution – Identified on drawings as **SC1**

- a. Axis P3265-LV or approved Axis equal
- b. 90+ degree horizontal viewing angle
- c. Remote focus
- d. Activity/motion detection
- e. 0.1 lux at 50 IRE, F1.8 minimum illumination (Color)
- f. 1920 x 1080 Image Size (1080p Resolution)
- g. H.264 Compression
- h. H.265 Compression
- i. Motion JPEG Compression
- j. 25fps Maximum Frame Rate at 1080p resolution
- k. 10/100 Ethernet (RJ-45) connector
- l. IEEE 802.3at Power over Ethernet
- m. Operating temperature range from 35 – 120 degrees Fahrenheit.
- n. Internal image memory for motion-based buffering
- o. Cameras shall be installed in mechanical flush mounted, integrated, tamper and impact resistant dome enclosure mount adapter to facilitate installation either directly on walls, to a ceiling or to a single gang electrical box providing 10/100/1000 PoE+ UTP connection for installed camera. Domes shall also meet or exceeding the following requirements:
 - 1. Optically correct polycarbonate lower dome with light loss not greater than 11.5 f-stops.
 - 2. Dust and water protection based.
 - 3. Puncture resistant with capability to withstand a pointed impact force of 35 foot-pounds without creating an internal depression greater than .2 inches.
 - 4. Impact resistant with capability to withstand repeated multiple blunt impact forces up to 100 foot-pounds.

VIDEO MONITORING SYSTEM

28 23 00 - 164

5. Camera shall include all necessary mounting hardware and accessories for a fully supported installation.
6. Contractor shall include appropriate protective cage in gym location(s).

2. Interior High-Resolution Cameras – Identified on drawings as **SC2**

- a. Axis P3267-LV or approved Axis equal
- b. Activity/motion detection
- c. 0.18 lux at 50 IRE, F1.7 minimum illumination (Color)
- d. 2592 x 1944 Image Size (5MP Resolution)
- e. H.264 Compression
- f. Motion JPEG Compression
- g. 25fps Maximum Frame Rate at 5MP resolution
- h. 10/100 Ethernet (RJ-45) connector
- i. IEEE power over Ethernet 802.3at compliance
- j. Internal image memory for motion-based buffering
- k. Operating temperature range from -35 – +120 degrees Fahrenheit.
- l. Cameras shall be installed in integrated, tamper and impact resistant, environmentally controlled dome enclosure meeting or exceeding the following requirements:
 1. Optically correct acrylic or polycarbonate lower dome with integral UV protection.
 2. Dust and water protection based on EN60529 standard of IP66.
 3. Optically correct acrylic or polycarbonate lower dome with light loss not greater than 11.5 f-stops and integral UV protection.
 4. Integral sun shroud when mounted outside.

5. Impact resistant with capability to withstand repeated multiple blunt impact forces up to 100 foot-pounds.
 6. Camera shall include all necessary mounting hardware and accessories for a fully supported installation.
 7. Contractor shall include appropriate protective cage in gym location(s).
3. Interior/Exterior Panoramic - Identified on drawings as **SC3**
- a. Axis P3807-PVE or approved Axis equal
 - b. 180° horizontal and 90° vertical coverage
 - c. Activity/motion detection
 - d. 0.17 lux at 50 IRE F2.2 minimum illumination (Color)
 - e. 4320 x 1920 max video resolution
 - f. H.264 Compression
 - g. H.265 Compression
 - h. Motion JPEG Compression
 - i. 25fps Frame Rate at full resolution in 360-degree Overview mode
 - j. 10/100 Ethernet (RJ-45) connector
 - k. IEEE power over Ethernet (802.3at) compliance
 - l. Internal image memory for motion-based buffering
 - m. Operating temperature range from -35 – 120 degrees Fahrenheit.
 - n. Cameras shall be installed in integrated, tamper and impact resistant, environmentally controlled dome enclosure meeting or exceeding the following requirements:
 1. Optically correct acrylic or polycarbonate lower dome.
 2. Dust and water protection based.

3. Integrated enclosure mount adapter to facilitate installation either directly on walls, to a ceiling or to a single gang electrical box providing 10/100/1000 PoE+ UTP connection for installed camera.
 4. Impact resistant with capability to withstand repeated multiple blunt impact forces up to 100 foot-pounds.
 5. Contractor shall include appropriate protective cage in gym location(s).
4. Interior Multidirectional – Dual Sensor – Identified on drawings as **SC4**
- a. P3715-PLVE or approved Axis equal
 - b. Two (2) lenses in a single camera housing with combined horizontal angle of view of 180 degrees
 - c. Activity/motion detection
 - d. 0.17 lux at 50 IRE F1.8 minimum illumination (Color)
 - e. 1920 x 1080 Image Size per image sensor (lens) (x2)
 - f. H.264 Compression
 - g. H.265 Compression
 - h. Motion JPEG Compression
 - i. 25fps Maximum Frame Rate at full resolution
 - j. 10/100 Ethernet (RJ-45) connector
 - k. IEEE power over Ethernet (802.3at) compliance
 - l. Internal image memory for motion-based buffering
 - m. Operating temperature range from -22 – +112 degrees Fahrenheit.
 - n. Cameras shall be installed in integrated, tamper and impact resistant, environmentally controlled dome enclosure meeting or exceeding the following requirements:
 1. Optically correct acrylic or polycarbonate lower dome with integral UV protection.

VIDEO MONITORING SYSTEM

28 23 00 - 167

2. Dust and water protection based on EN60529 standard of IP66.
 3. Integral sun shroud where installed outdoors
 4. Available integrated enclosure or “Gooseneck” and “Corner” wall mount adapter to comply with installation either directly on exterior walls or to a single gang electrical box and as identified herein, providing 10/100/1000 PoE+ UTP connection for installed camera.
 5. Impact resistant with capability to withstand repeated multiple blunt impact forces up to 100 foot-pounds.
5. Interior Multidirectional – Quad Sensor - Identified on drawings as **SC5**
- a. Axis P3719-PLE or approved Axis equal
 - b. Four (4) lenses in a single camera housing with combined horizontal angle of view of 360 degrees
 - c. Activity/motion detection
 - d. 0.2 lux at 50 IRE F1.8 minimum illumination (Color)
 - e. 15 MP, 360 degree multidirectional
 - f. H.264 Compression
 - g. H.265 Compression
 - h. Motion JPEG Compression
 - i. 25fps Maximum Frame Rate at full resolution
 - j. 10/100 Ethernet (RJ-45) connector
 - k. IEEE power over Ethernet (802.3at) compliance
 - l. Internal image memory for motion-based buffering
 - m. Operating temperature range from -22 – +112 degrees Fahrenheit.
 - n. Cameras shall be installed in integrated, tamper and impact resistant, environmentally controlled dome enclosure meeting or exceeding the following requirements:

VIDEO MONITORING SYSTEM

28 23 00 - 168

1. Optically correct acrylic or polycarbonate lower dome with integral UV protection.
 2. Dust and water protection based on EN60529 standard of IP66.
 3. Integral sun shroud where installed outdoors
 4. Available integrated enclosure or “Gooseneck” and “Corner” wall mount adapter to comply with installation either directly on exterior walls or to a single gang electrical box and as identified herein, providing 10/100/1000 PoE+ UTP connection for installed camera.
 5. Impact resistant with capability to withstand repeated multiple blunt impact forces up to 100 foot-pounds.
6. Exterior Standard Resolution - Identified on drawings as **SC6**
- a. Axis P3265-LVE or approved Axis equal
 - b. Activity/motion detection
 - c. 0.18 lux at 50 IRE, F1.7 minimum illumination (Color)
 - d. 1920 x 1080 Image Size
 - e. H.264 Compression
 - f. Motion JPEG Compression
 - g. 25fps Maximum Frame Rate at 5MP resolution
 - h. 10/100 Ethernet (RJ-45) connector
 - i. IEEE power over Ethernet 802.3at compliance
 - j. Internal image memory for motion-based buffering
 - k. Operating temperature range from -35 – +120 degrees Fahrenheit.
 - l. Cameras shall be installed in integrated, tamper and impact resistant, environmentally controlled dome enclosure meeting or exceeding the following requirements:
 1. Optically correct acrylic or polycarbonate lower dome with integral UV protection.

VIDEO MONITORING SYSTEM

2. Dust and water protection based on EN60529 standard of IP66.
 3. Optically correct acrylic or polycarbonate lower dome with light loss not greater than 11.5 f-stops and integral UV protection.
 4. Integral sun shroud when mounted outside.
 5. Impact resistant with capability to withstand repeated multiple blunt impact forces up to 100 foot-pounds.
 6. Camera shall include all necessary mounting hardware and accessories for a fully supported installation.
7. Exterior High Resolution - Identified on drawings as **SC7**
- a. P3267-LVE or approved Axis equal
 - b. Activity/motion detection
 - c. 0.18 lux at 50 IRE, F1.7 minimum illumination (Color)
 - d. 2592 x 1944 Image Size (5MP Resolution)
 - e. H.264 Compression
 - f. Motion JPEG Compression
 - g. 25fps Maximum Frame Rate at 5MP resolution
 - h. 10/100 Ethernet (RJ-45) connector
 - i. IEEE power over Ethernet 802.3at compliance
 - j. Internal image memory for motion-based buffering
 - k. Operating temperature range from -35 – +120 degrees Fahrenheit.
 - l. Cameras shall be installed in integrated, tamper and impact resistant, environmentally controlled dome enclosure meeting or exceeding the following requirements:
 1. Optically correct acrylic or polycarbonate lower dome with integral UV protection.

2. Dust and water protection based on EN60529 standard of IP66.
3. Optically correct acrylic or polycarbonate lower dome with light loss not greater than 11.5 f-stops and integral UV protection.
4. Integral sun shroud when mounted outside.
5. Impact resistant with capability to withstand repeated multiple blunt impact forces up to 100 foot-pounds.
6. Camera shall include all necessary mounting hardware and accessories for a fully supported installation.

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 \$10,000.00 for contract services related to supply, installation, and connection of Ethernet switch upgrades to support video monitoring system.
 2. Allowance shall be made in the amount of \$20,000.00 for contract services related to the supply and installation of server/SAN equipment to support new video monitoring system.

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. Owner and Designer shall approve a written final installation plan prior to commencement of installation activity.

- C. 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. In locations where camera devices are wall mounted, Contractor shall be responsible for making any final penetrations through walls.
- B. 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.
- C. 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/or other contractor's work and cannot be removed shall be flagged and cordoned off by the Contractor prior to their departure.
- D. All equipment and materials shall be installed in a neat and workmanlike manner. Best practices installation principles shall be used throughout the project.
- E. Contractor shall supply all necessary equipment to complete the installation as specified including appropriate lift equipment to access high ceiling areas.
- F. 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 all system devices as may be appropriate and required by Owner and Designer.

7. Complete end user and system administrator training programs as specified herein.
8. Work shall be performed to meet local codes and industry standards including proper grounding and bonding of installed equipment.
9. Work includes extending Ethernet from installed equipment, as required, to Owner identified connection outlets at all locations.
 - a. Work includes supply and connection of Ethernet patch cables. Cables for some cameras may be in air plenum spaces, above finished ceilings, or in other ways require special care and suitable tools to complete.
 - b. Camera patch cables shall not exceed twenty (30) feet in length.
 - c. Patch cables colors shall be coordinated with Owner.
 - d. Network switch patch cables shall be provided and installed by Contractor. Existing work and material standards at the time of installation must be strictly followed.

G. Worksites include the following:

1. Ludington High School
508 N. Washington
Ludington, Michigan 49431
2. OJ DeJonge Middle School
706 E. Tinkham Ave.
Ludington, Michigan 49431

H. 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.

- I. 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.

3.03 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 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 “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.

3.04 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. As-built drawings for each building with camera IP addresses and names.
14. System Configuration Report.
15. Complete inventory of installed hardware and system software. Hardware inventory shall include, but not be limited to, Camera version and type, IP address, Ethernet MAC address, camera serial number, physical installation location and software options.

3.05 TRAINING

- A. Training shall be conducted at the Owner's discretion and at times and places convenient to Owner personnel. Prior to any training being conducted, Contractor shall provide Owner and Designer with detailed training syllabus and schedule for proposed training event. Compliant syllabus and schedule shall be provided at least ninety-six 96 hours in advance. Owner reserves the right to postpone training if syllabus and/or schedule submitted are deemed inadequate. Training shall not be conducted until such time a syllabus and schedule submitted by Contractor are found to be acceptable to Owner.
- B. Contractor shall provide training for the Owner designated system administrator(s). Owner shall designate up to three (3) administrators to be trained. Training shall be a minimum of two (2), three (3) 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. Camera additions, moves, changes and reconfiguration.
 4. Review of system alerts, logs and monitoring of configuration parameters including, but not limited to, camera configuration changes, video transmission changes and camera status.

- C. Contractor shall provide Key Operator Training for Owner designated personnel. Owner shall identify up to ten (10) persons for such training. Training shall be conducted for a minimum of two (2) hours at the convenience of Owner personnel, and of sufficient duration to satisfactorily complete training on all system functions necessary, including, but not limited to:

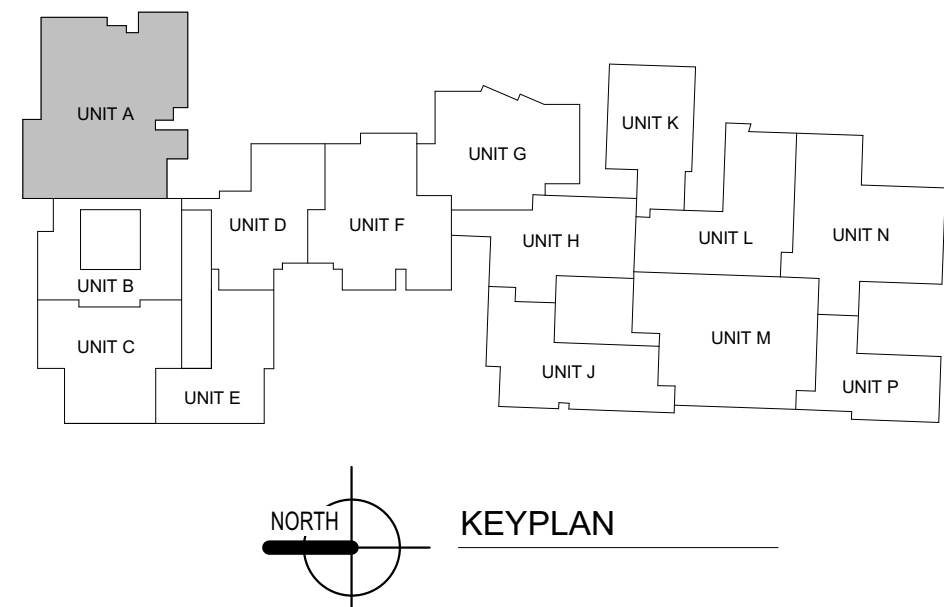
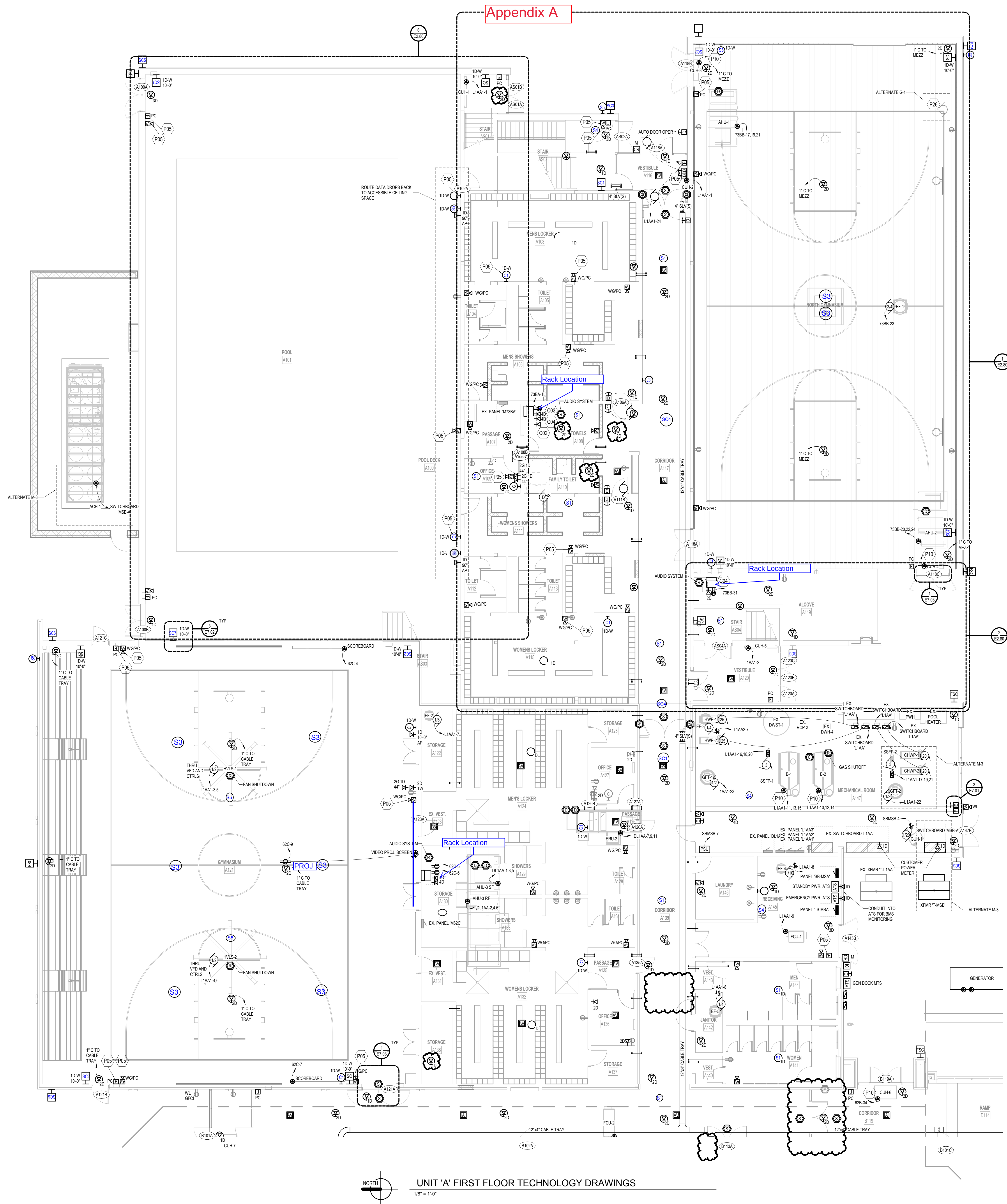
1. Live camera monitoring
2. Review of archived video
3. Identification of archived video for removal of a copy
4. Extracting a time stamped copy of video from the system

3.06 SCHEDULE, MEETINGS AND PLANS

- A. 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.
- B. Contractor shall work collaboratively with General Contractor, Owner and Consultant to plan and phase work as necessary. See appendix D for proposed construction schedule.
- 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.

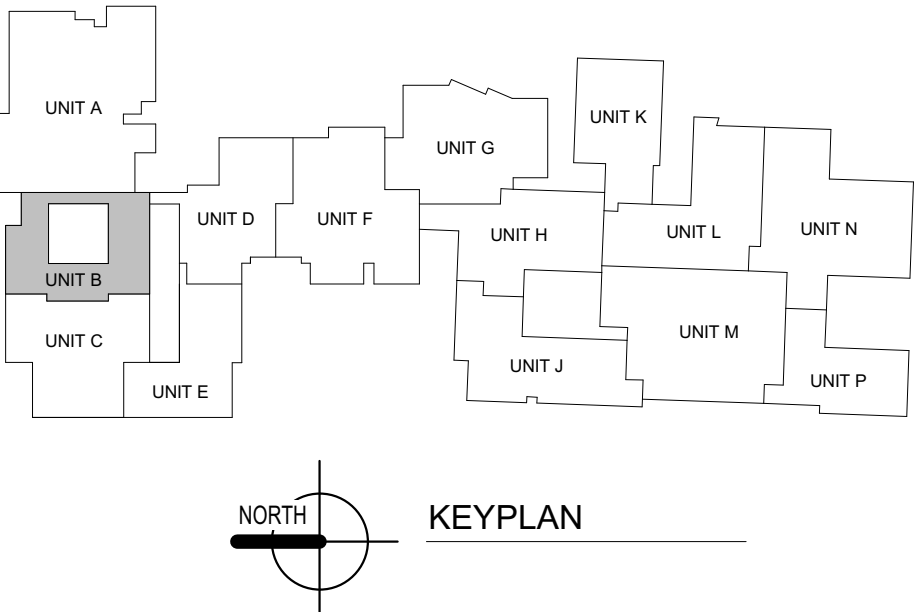
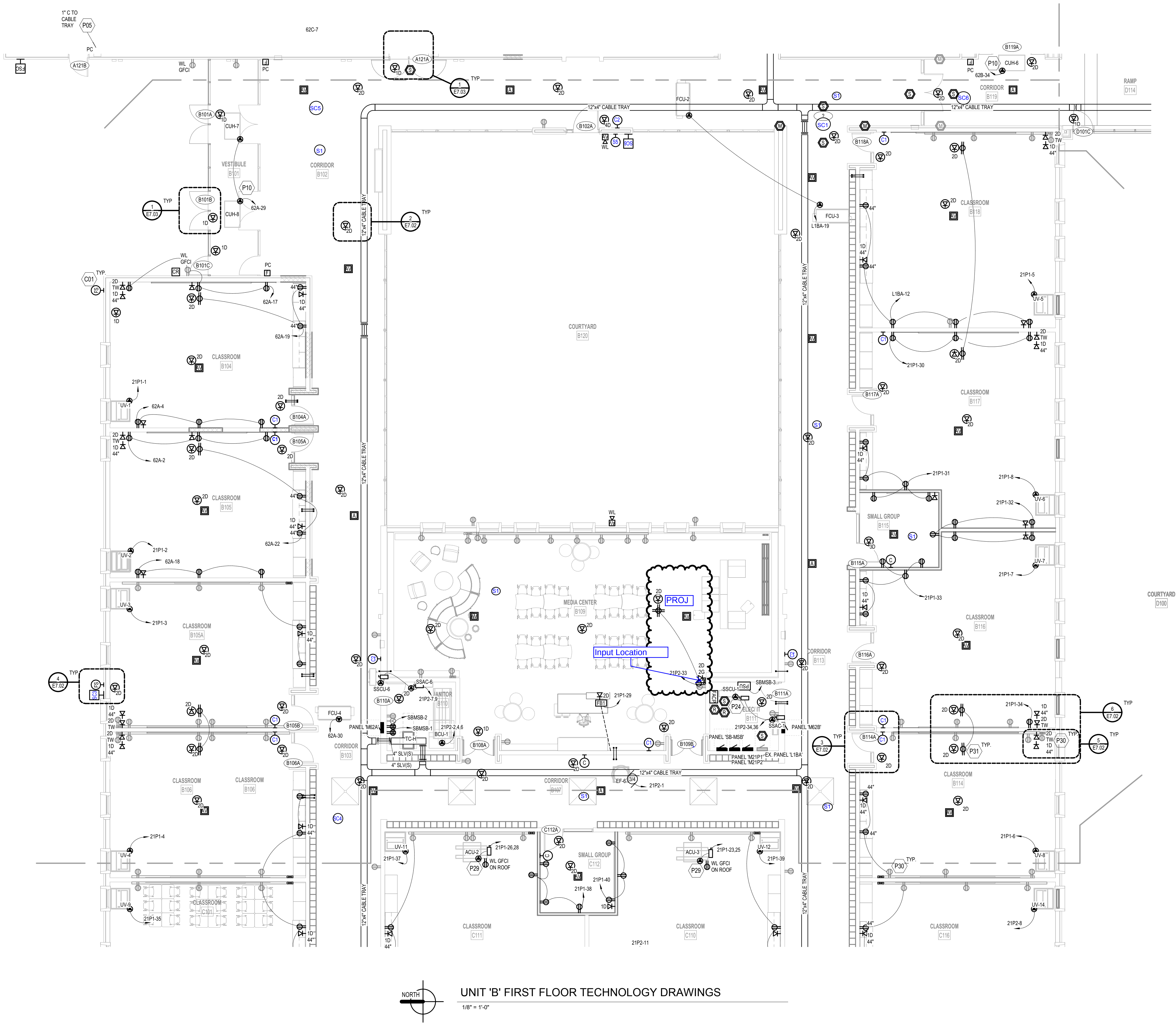
END OF SECTION

BM 38015-4851 Ludington Area School High School Middle School Improvements-4851 E 2019.vrt
7/17/2022 7:49:27 AM

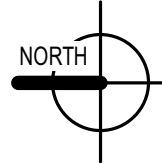
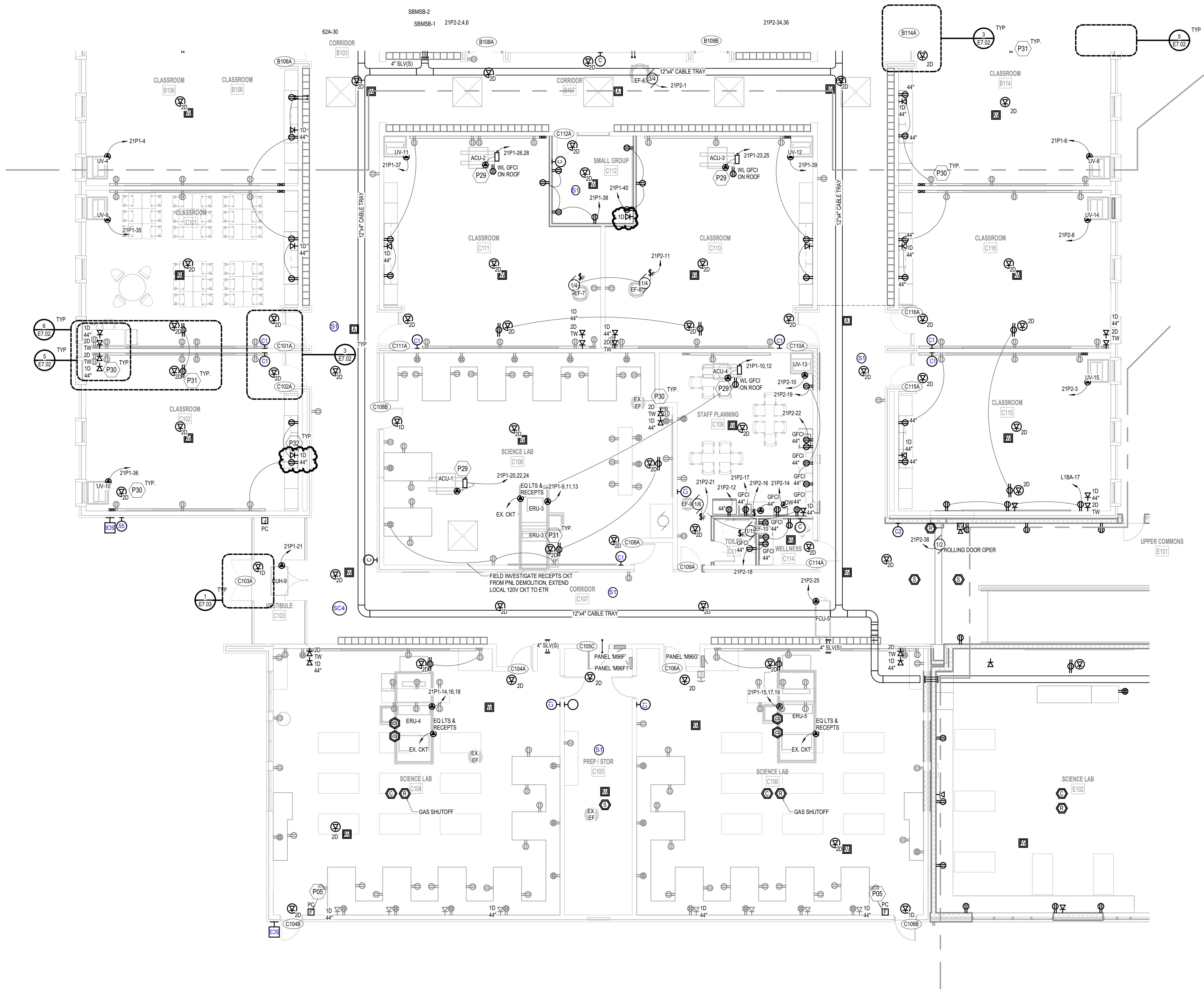


LUDINGTON MIDDLE & HIGH SCHOOL ADDITIONS & REMODELING
LUDINGTON AREA SCHOOLS
LUDINGTON, MICHIGAN

Appendix A

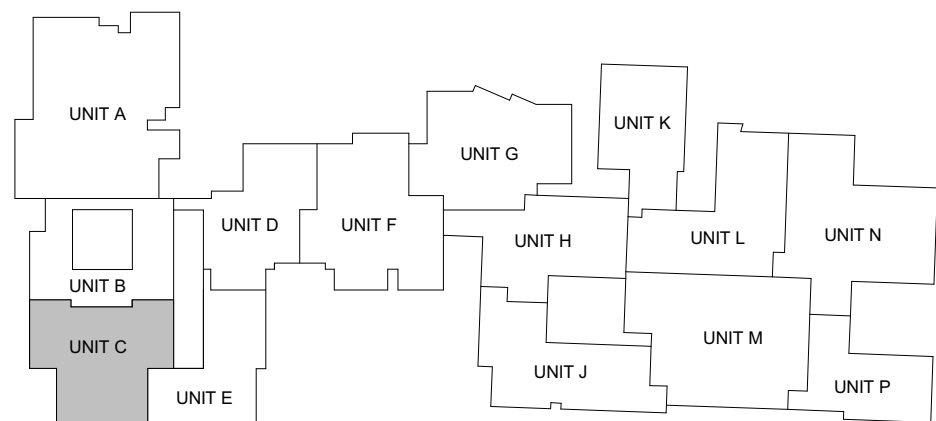


Appendix A

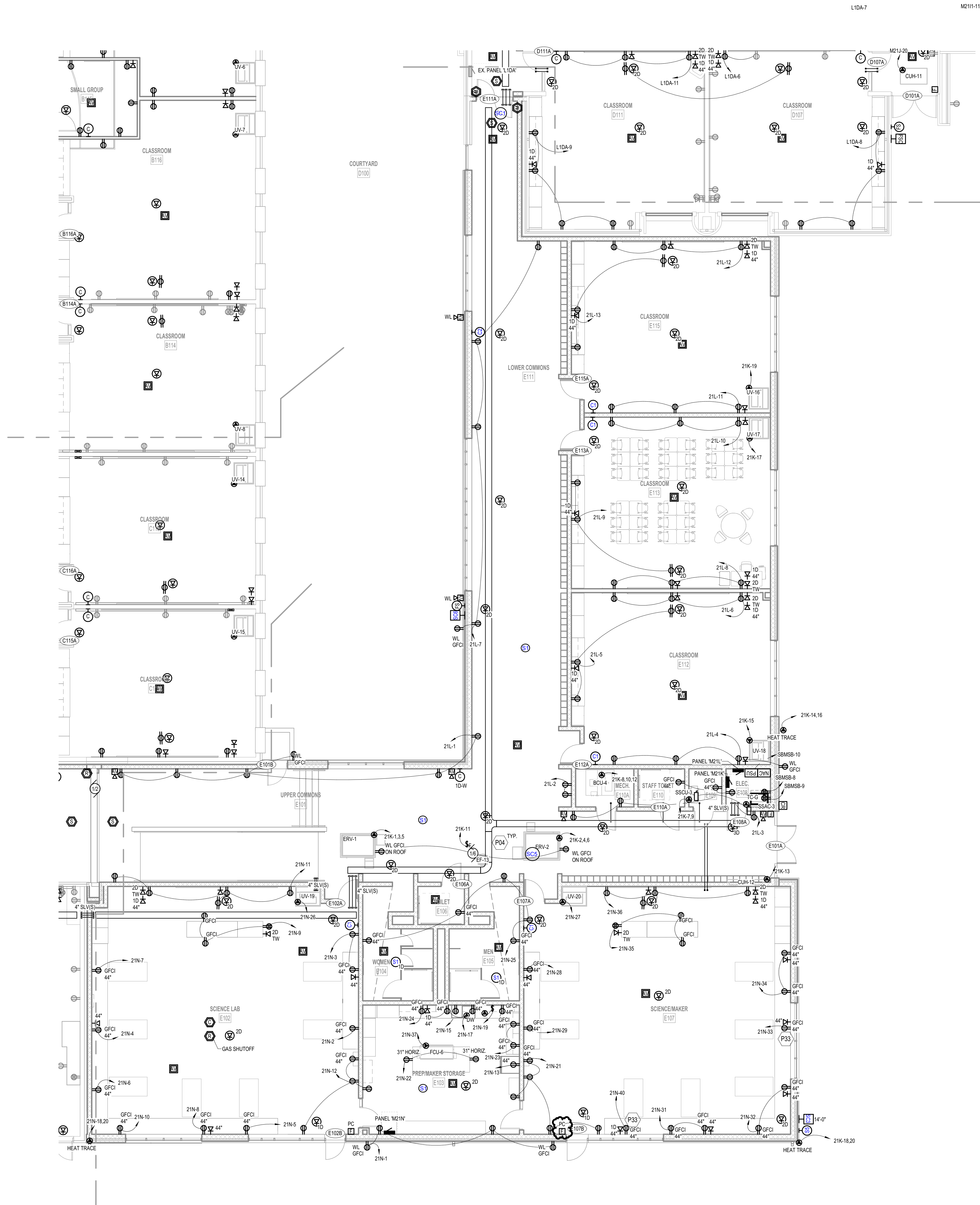


UNIT 'C' FIRST FLOOR TECHNOLOGY DRAWINGS

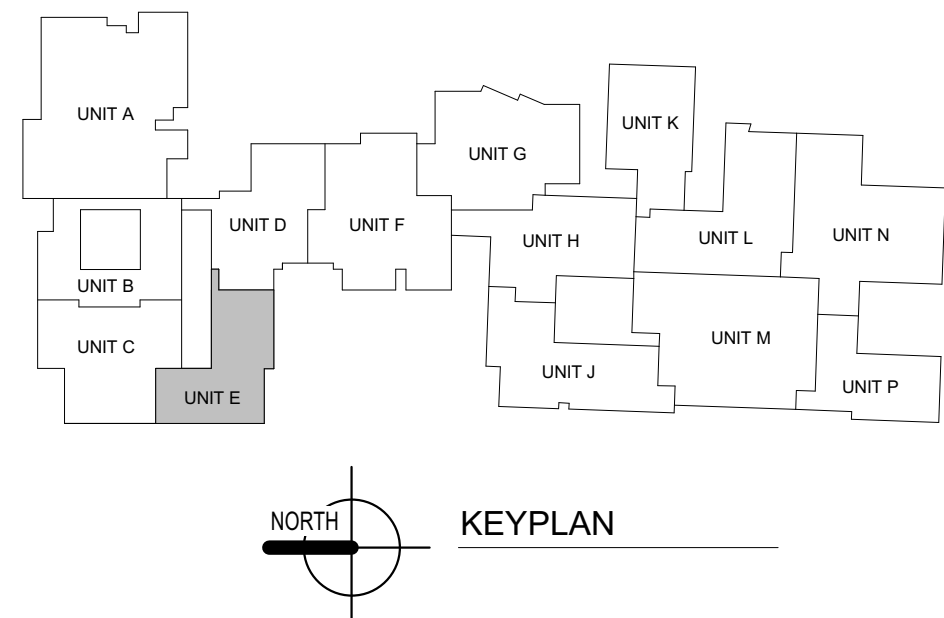
1/8" = 1'-0"



KEYPLAN



NORTH
UNIT 'E' FIRST FLOOR TECHNOLOGY DRAWINGS
1/8" = 1'-0"



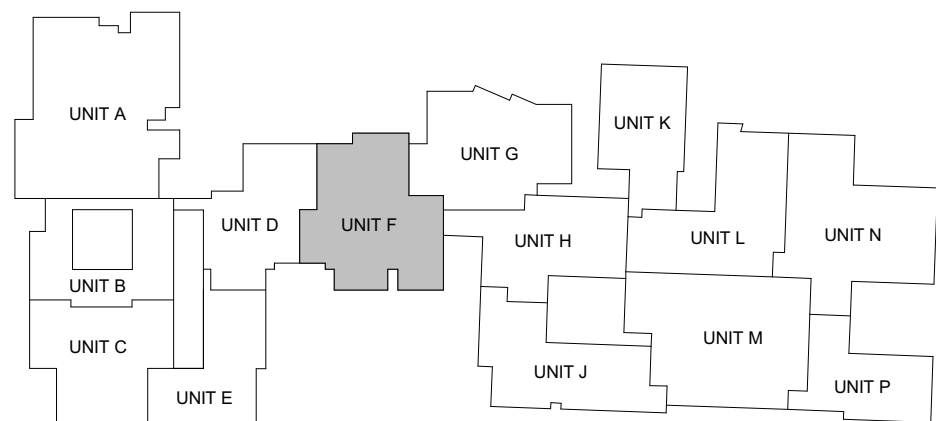
BM 30015-481 Ludington Area School High School Middle School Improvements-481 E 2019.rvt
7/13/2022 10:25:24 AM

Appendix A

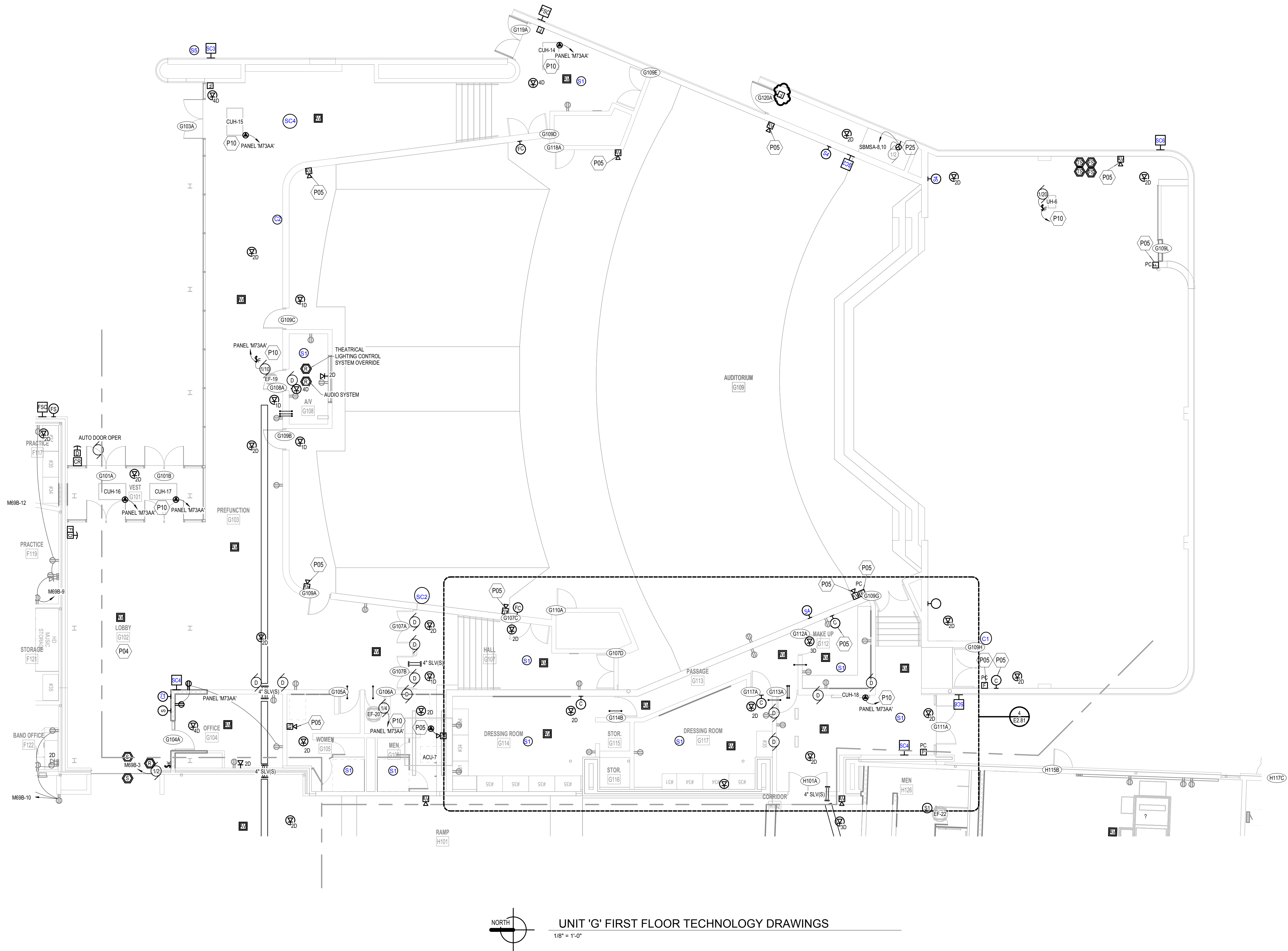


UNIT 'F' FIRST FLOOR TECHNOLOGY DRAWINGS

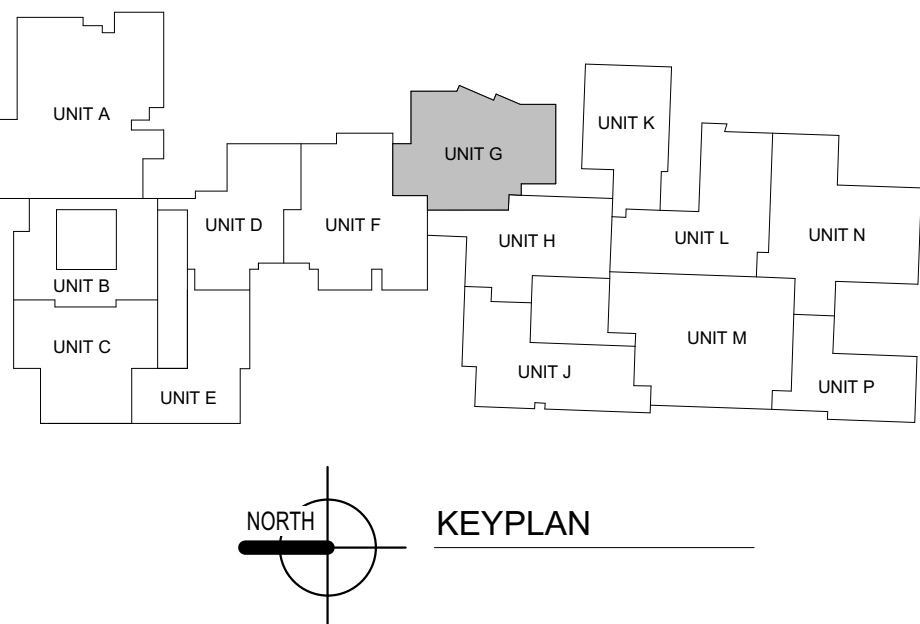
1/8" = 1'-0"



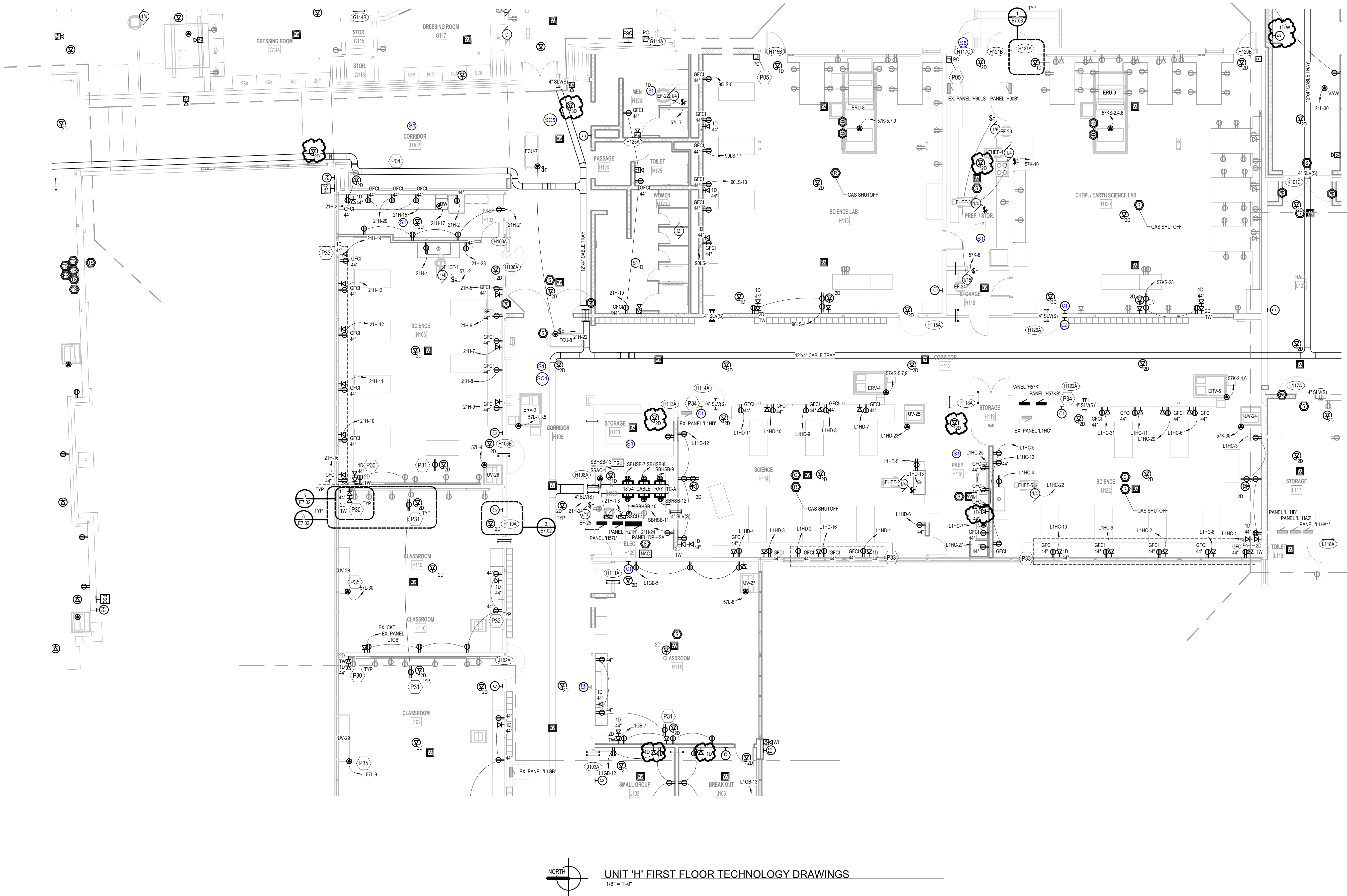
KEYPLAN



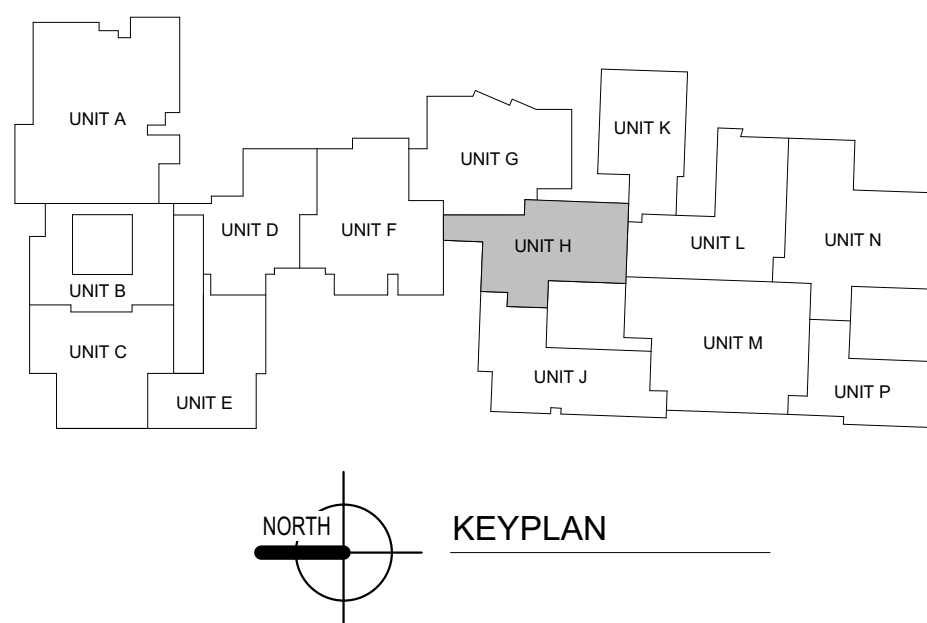
NORTH
UNIT 'G' FIRST FLOOR TECHNOLOGY DRAWINGS
1/8" = 1'-0"

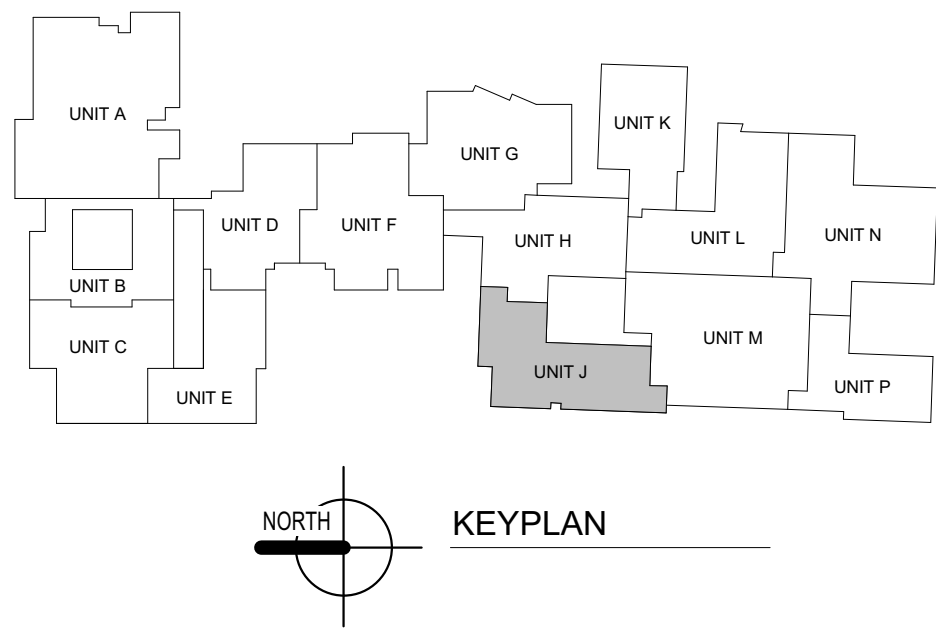
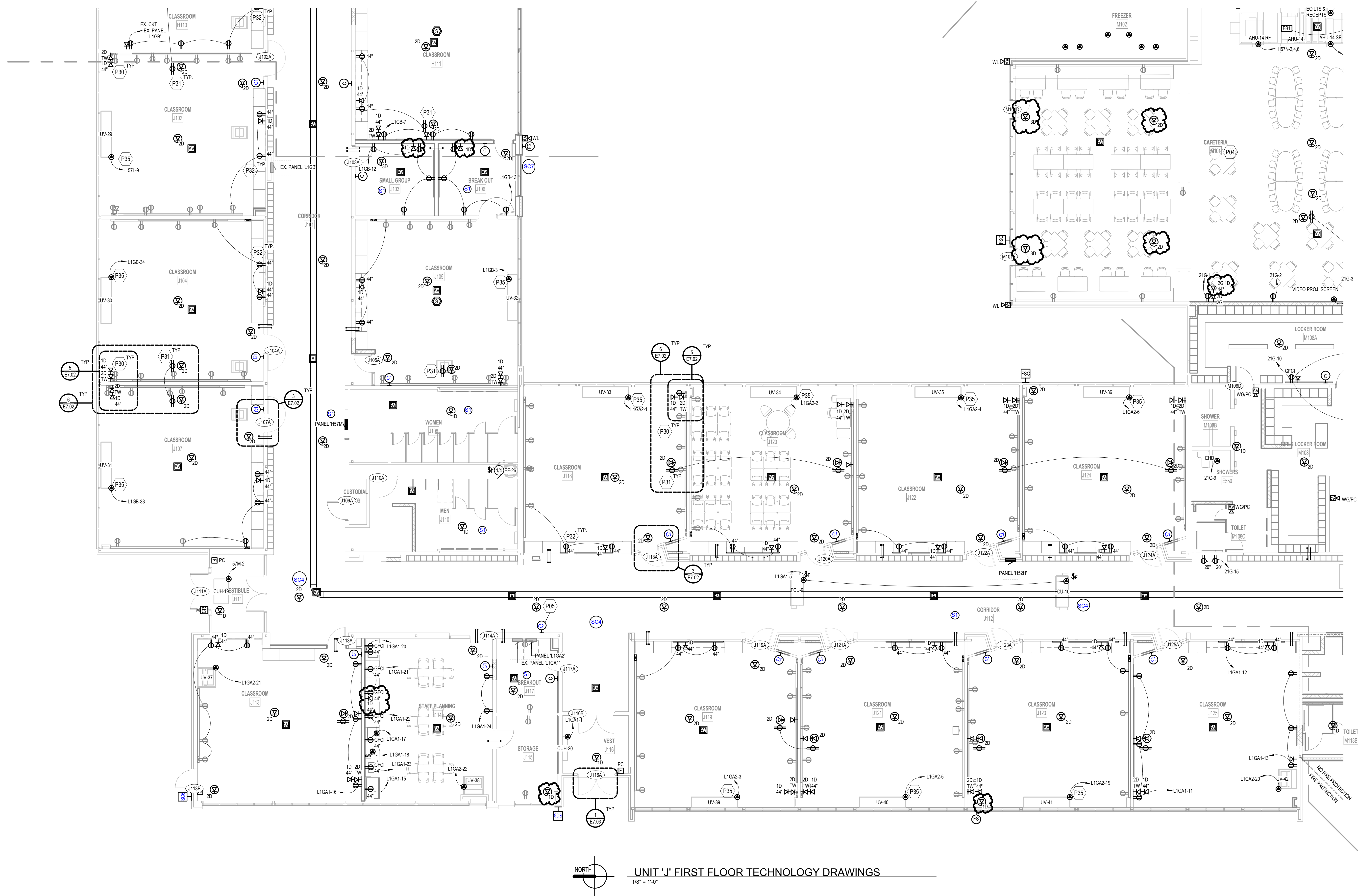


Appendix A



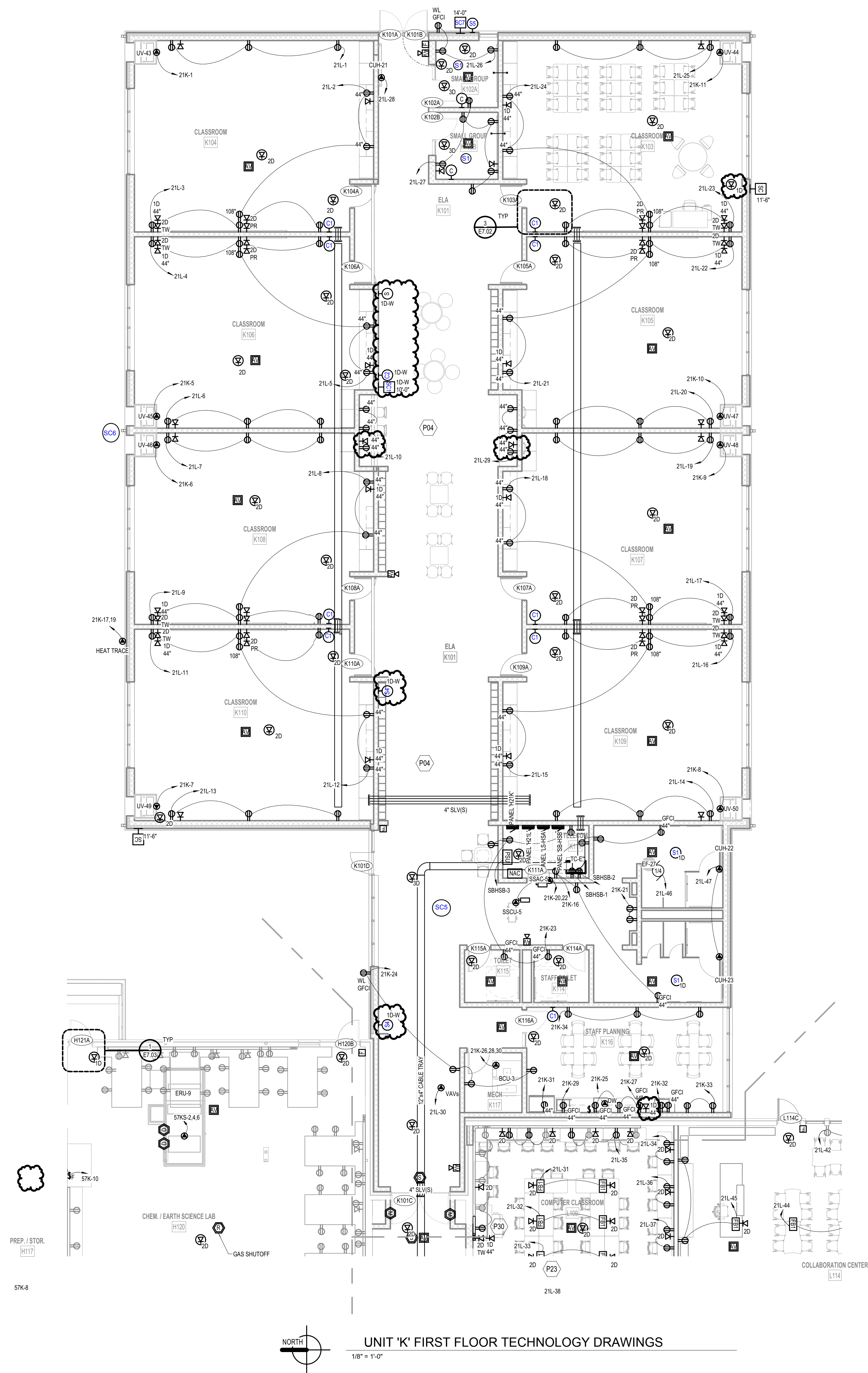
NORTH
UNIT 'H' FIRST FLOOR TECHNOLOGY DRAWINGS
1/8" = 1'-0"





BM 300105-4851 Ludington Area School High School Middle School Improvements-4851 E 2019.rvt
7/7/2022 7:51:48 AM

Appendix A

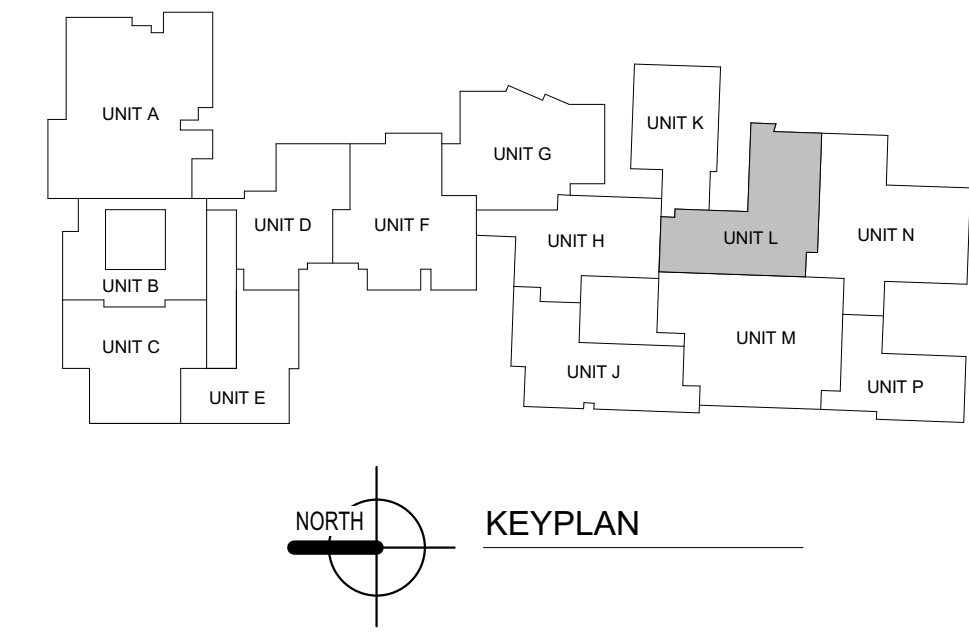


BM 38015-4851 Ludington Area School High School Middle School Improvements-4851 E 2019.vrt
7/13/2022 10:28:30 AM

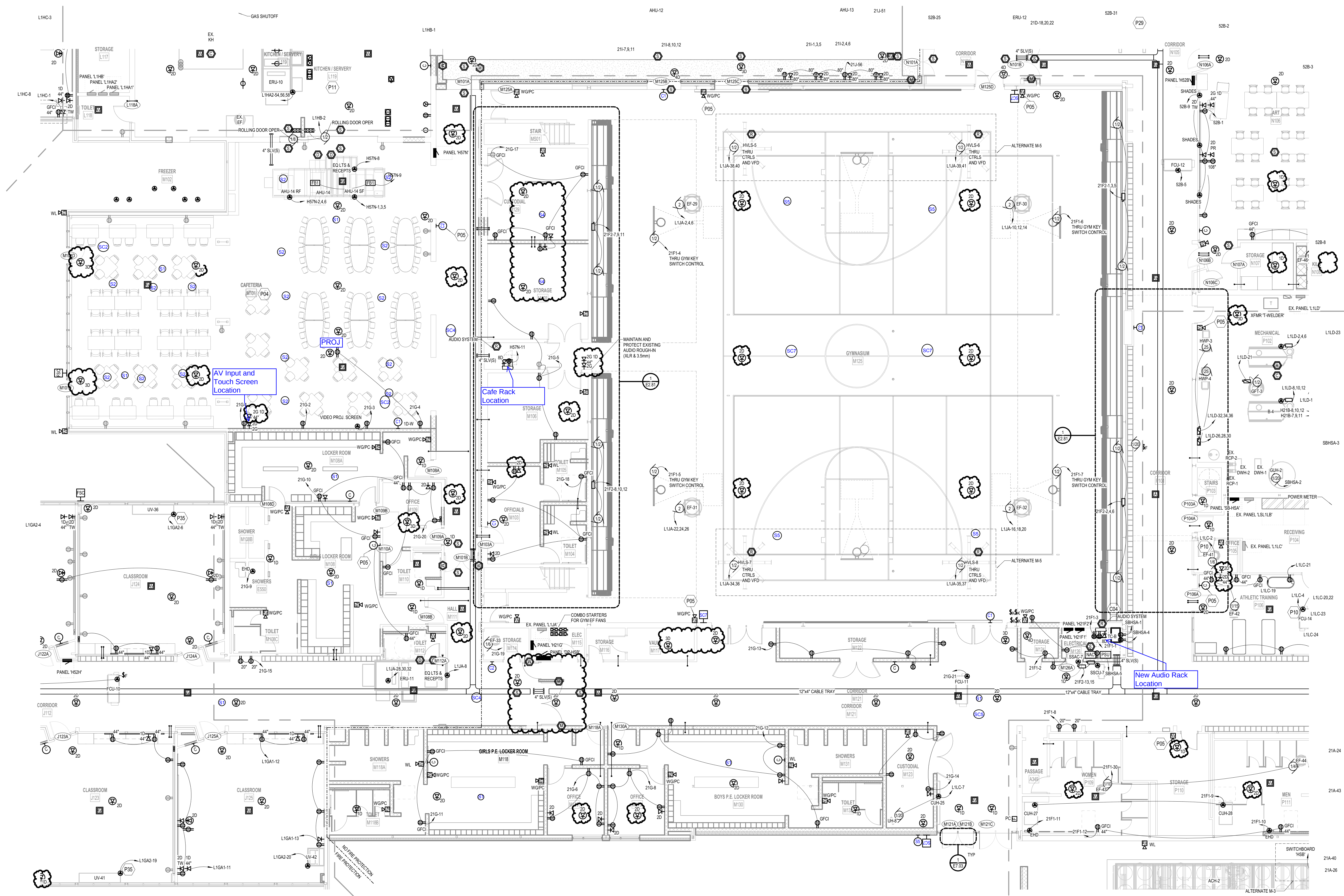


Appendix A

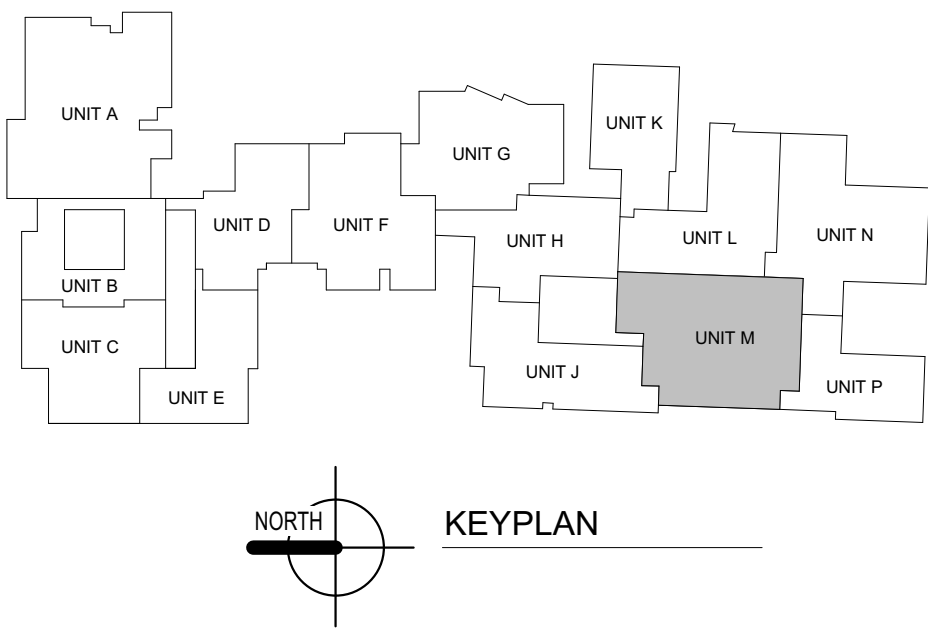
NORTH
UNIT 'L' FIRST FLOOR TECHNOLOGY DRAWINGS
1/8" = 1'-0"

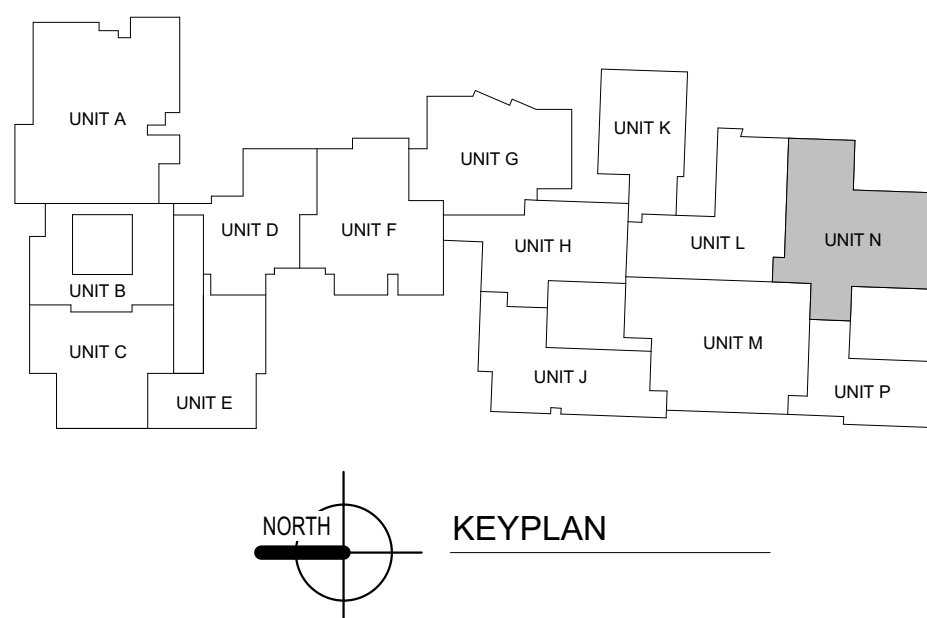
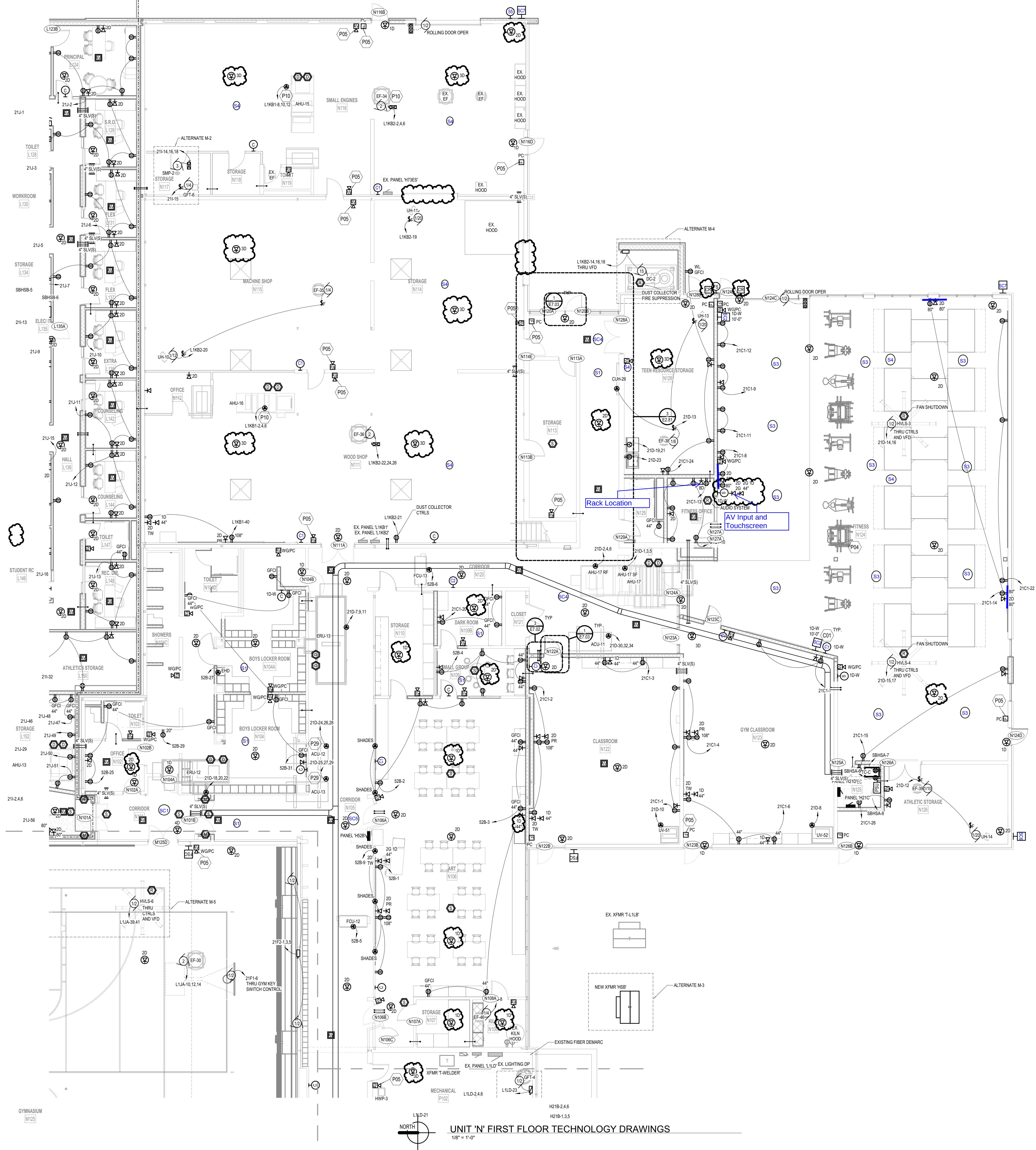


Appendix A

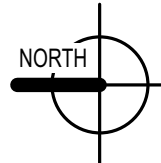


UNIT 'M' FIRST FLOOR TECHNOLOGY DRAWINGS
1/8" = 1'-0"

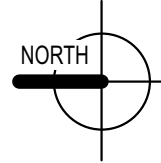




Appendix A



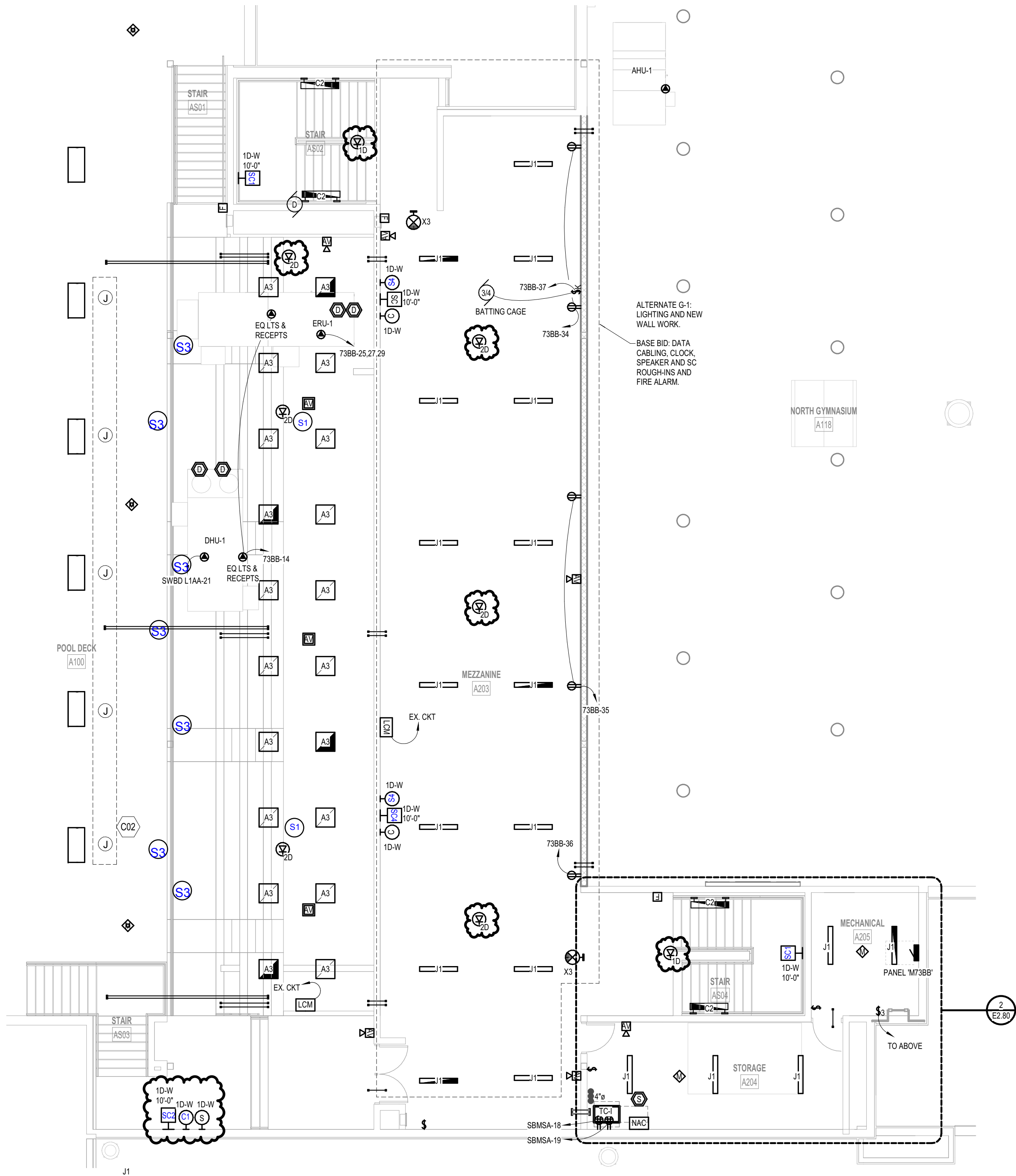
UNIT 'P' FIRST FLOOR TECHNOLOGY DRAWINGS

$$1/8^{\circ} = 1'-0''$$


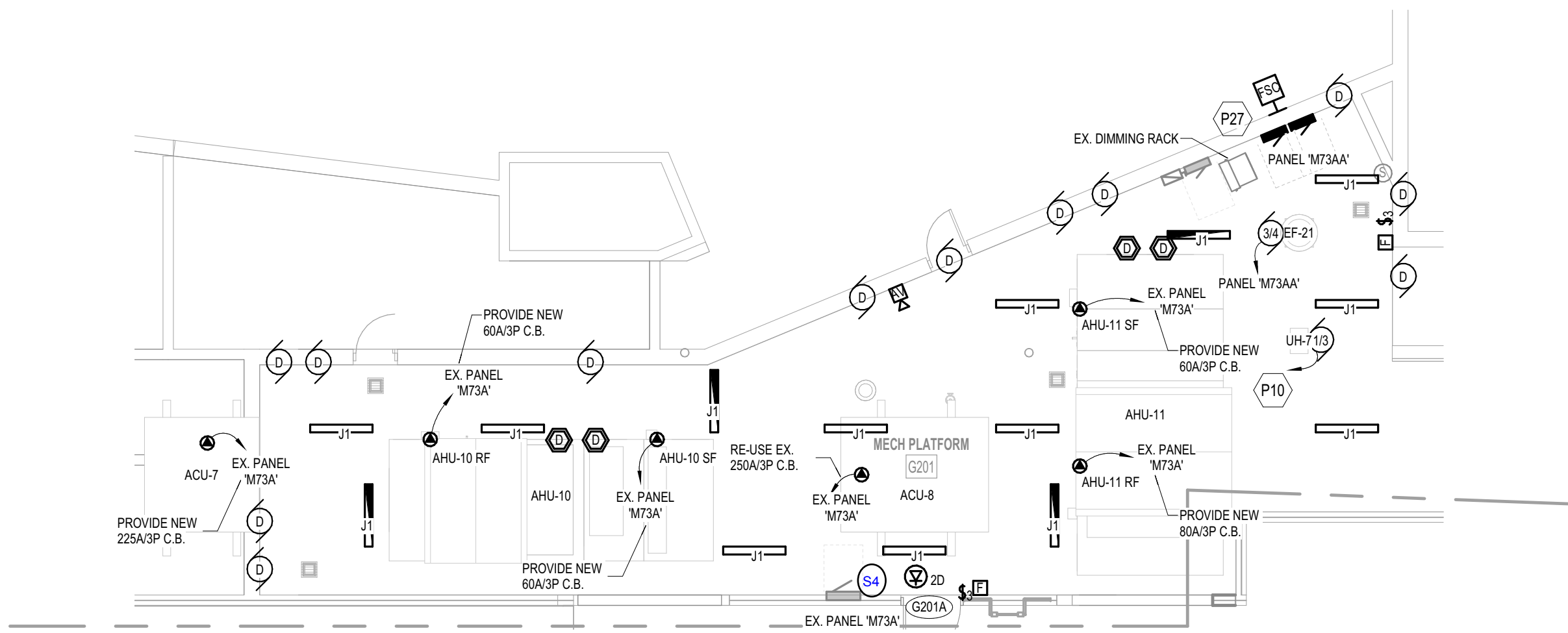
KEYPLAN

BM 38015-4851 Ludington Area School High School Middle School Improvements-4851 E 2019.rvt
7/7/2022 7:53:40 AM

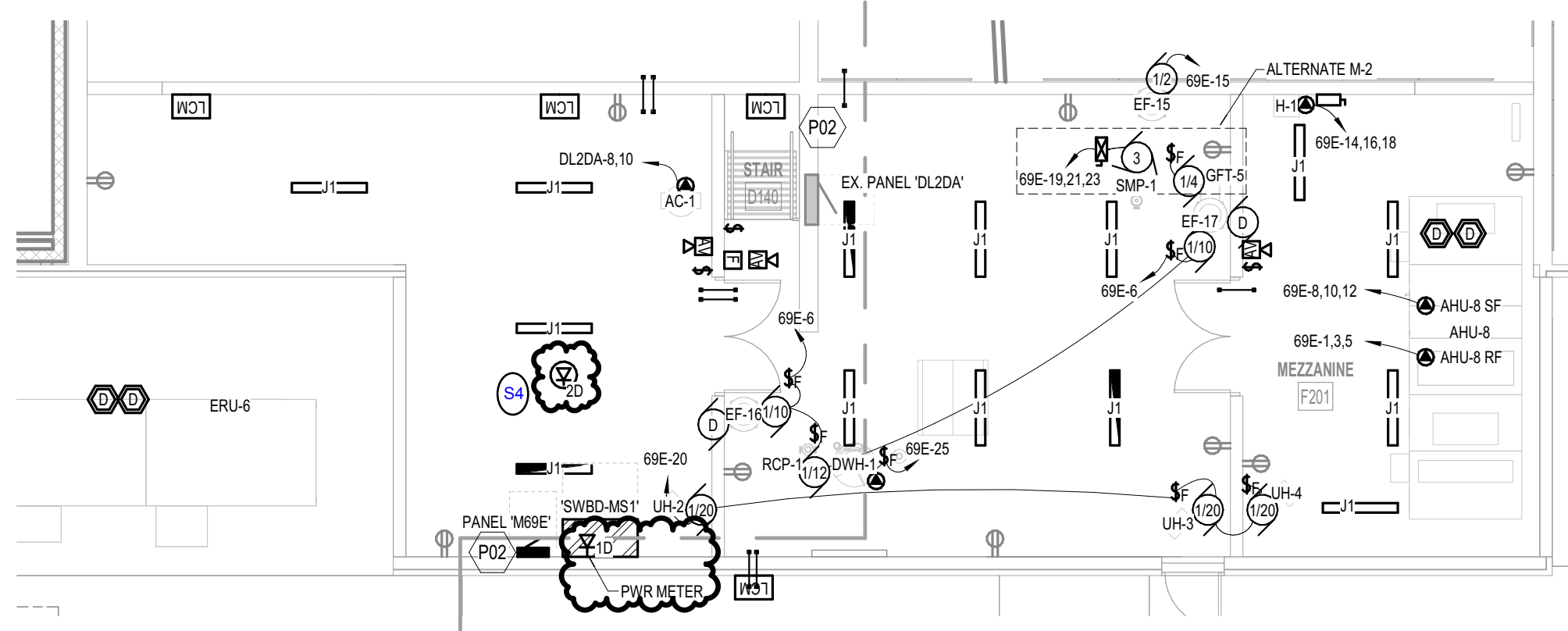
Appendix A



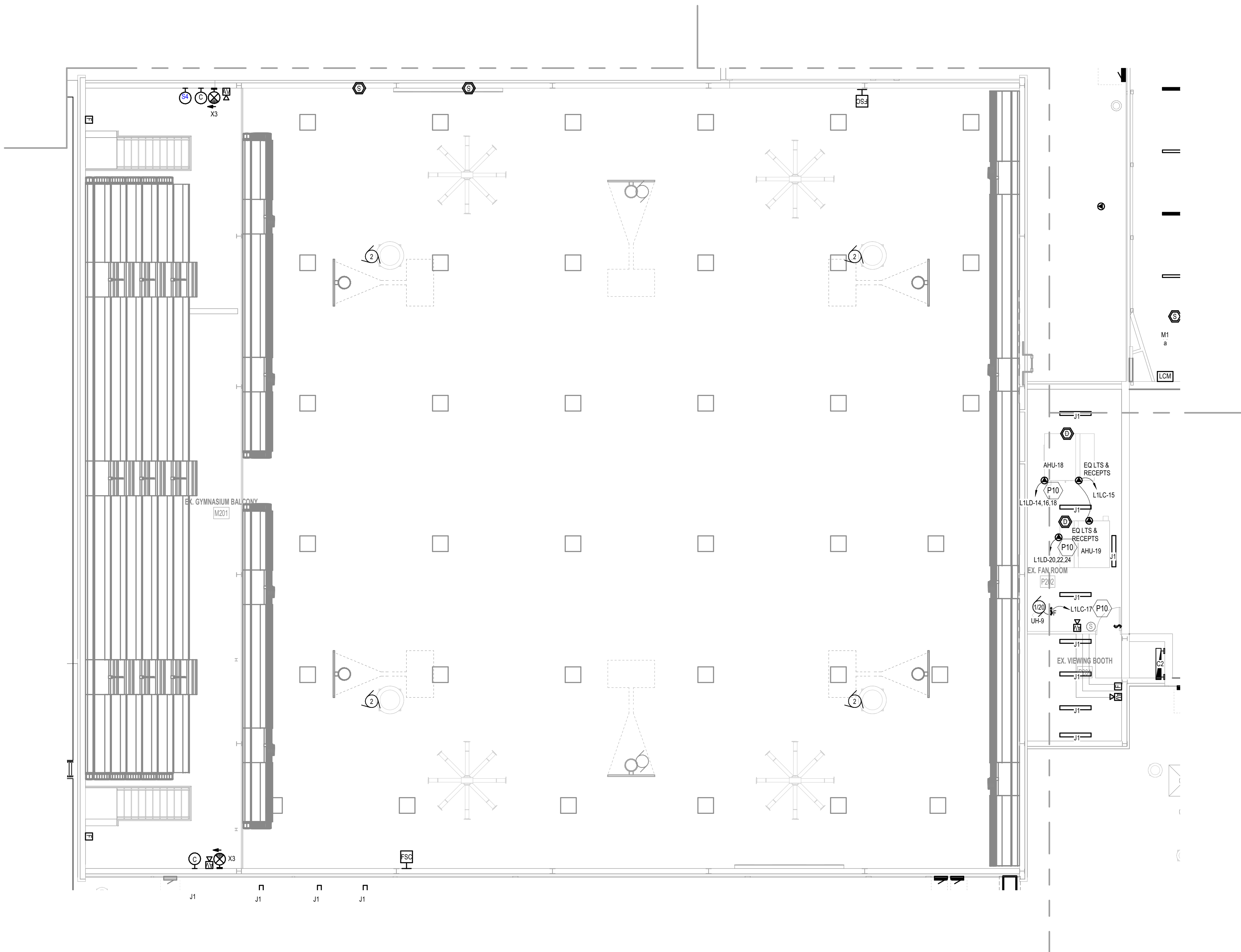
1
E2.80 UNIT 'A' POOL/NOTH GYM BALCONY TECHNOLOGY DRAWINGS
1/8" = 1'-0"



4 UNIT 'G' AUDITORIUM MEZZANINE TECHNOLOGY DRAWING
1/8" = 1'-0"



2 UNIT 'D' CONNECTOR MEZZANINE TECHNOLOGY DRAWING
1/8" = 1'-0"



1 UNIT 'M' GYM BALCONY TECHNOLOGY DRAWING
1/8" = 1'-0"

Appendix B - AV Equipment Schedule

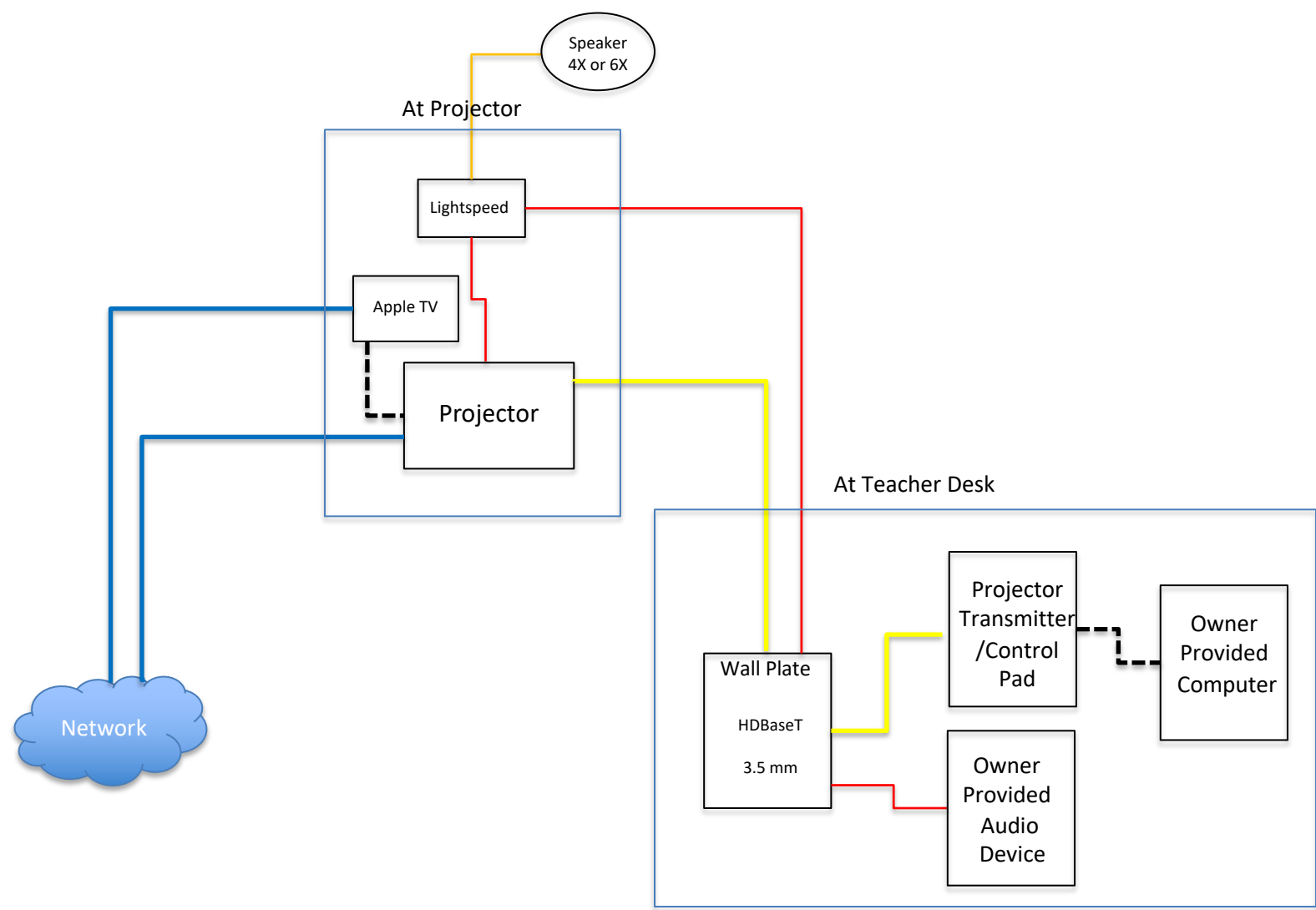
Drawing ID	Location ID	Location Type	Ultra Short Throw Interactive Projector	Audio Speakers	Voice Amplification	Apple TV	Document Camera	Special Condition Location
2.1A	A101	Pool	0	0	0	0	0	Special Configuration E
2.1A	A118	Gymnasium	0	0	0	0	0	Special Configuration G
2.1A	A121	Gymnasium	0	0	0	0	0	Special Configuration F
2.1B	B104	Classroom	1	4	1	1	1	
2.1B	B105	Classroom	1	4	1	1	1	
2.1B	B105A	Classroom	1	4	1	1	1	
2.1B	B106	Classroom	1	4	1	1	1	
2.1B	B109	Media Center	0	0	0	0	0	Special Configuration B
2.1B	B114	Classroom	1	4	1	1	1	
2.1B	B116	Classroom	1	4	1	1	1	
2.1B	B117	Classroom	1	4	1	1	1	
2.1B	B118	Classroom	1	4	1	1	1	
2.1C	C101	Classroom	1	4	1	1	1	
2.1C	C102	Classroom	1	4	1	1	1	
2.1C	C104	Science Lab	1	4	1	1	1	
2.1C	C106	Science Lab	1	4	1	1	1	
2.1C	C108	Science Lab	1	4	1	1	1	
2.1C	C109	Staff Planning	0	0	0	0	0	
2.1C	C110	Classroom	1	4	1	1	1	
2.1C	C111	Classroom	1	4	1	1	1	
2.1C	C112	Small Group	0	0	0	0	0	
2.1C	C115	Classroom	1	4	1	1	1	
2.1C	C116	Classroom	1	4	1	1	1	
2.1D	D102	Art	1	4	1	1	1	
2.1D	D107	Classroom	1	4	1	1	1	
2.1D	D108	Classroom	1	4	1	1	1	
2.1D	D109	Classroom	1	4	1	1	1	
2.1D	D111	Classroom	1	4	1	1	1	
2.1D	D112	Classroom	1	4	1	1	1	
2.1D	D113	Classroom	1	4	1	1	1	
2.1D	D118	Reception	0	0	0	0	0	

2.1D	D127	Flex Office/Conference	0	0	0	0	0	
2.1D	D135	Conference Room	0	0	0	0	0	Special Configuration A
2.1D	D136	Industrial Art	1	4	1	1	1	
2.1E	E102	Science Lab	1	4	1	1	1	
2.1E	E107	Science Maker	1	4	1	1	1	
2.1E	E112	Classroom	1	4	1	1	1	
2.1E	E113	Classroom	1	4	1	1	1	
2.1E	E115	Classroom	1	4	1	1	1	
2.1F	F102	Oriole Academy	1	4	1	1	1	
2.1F	F103	Classroom	1	4	1	1	1	
2.1F	F105	Classroom	1	4	1	1	1	
2.1F	F106	Staff Planning	0	0	0	0	0	
2.1F	F112	Cafeteria	0	0	0	0	0	Special Configuration D
2.1F	F113	Band	0	0	0	0	0	Special Configuration I
2.1F	F123	Choir	0	0	0	0	0	Special Configuration I
2.1G	G109	Auditorium	0	0	0	0	0	
2.1H	H106	Science	1	4	1	1	1	
2.1H	H110	Classroom	1	4	1	1	1	
2.1H	H111	Classroom	1	4	1	1	1	
2.1H	H114	Science Lab	1	4	1	1	1	
2.1H	H115	Science Lab	1	4	1	1	1	
2.1H	H120	Chem/Earth Science Lab	1	4	1	1	1	
2.1H	H122	Science	1	4	1	1	1	
2.1J	J102	Classroom	1	4	1	1	1	
2.1J	J104	Classroom	1	4	1	1	1	
2.1J	J105	Classroom	1	4	1	1	1	
2.1J	J107	Classroom	1	4	1	1	1	
2.1J	J113	Classroom	1	4	1	1	1	
2.1J	J114	Staff Planning	0	0	0	0	0	
2.1J	J117	Breakout	0	0	0	0	0	
2.1J	J118	Classroom	1	4	1	1	1	
2.1J	J119	Classroom	1	4	1	1	1	
2.1J	J120	Classroom	1	4	1	1	1	
2.1J	J121	Classroom	1	4	1	1	1	
2.1J	J122	Classroom	1	4	1	1	1	

2.1J	J123	Classroom	1	4	1	1	1	
2.1J	J124	Classroom	1	4	1	1	1	
2.1J	J125	Classroom	1	4	1	1	1	
2.1K	K102A	Small Group	0	0	0	0	0	
2.1K	K102B	Small Group	0	0	0	0	0	
2.1K	K103	Classroom	1	4	1	1	1	
2.1K	K104	Classroom	1	4	1	1	1	
2.1K	K105	Classroom	1	4	1	1	1	
2.1K	K106	Classroom	1	4	1	1	1	
2.1K	K107	Classroom	1	4	1	1	1	
2.1K	K108	Classroom	1	4	1	1	1	
2.1K	K109	Classroom	1	4	1	1	1	
2.1K	K110	Classroom	1	4	1	1	1	
2.1K	K116	Staff Planning	0	0	0	0	0	
2.1L	L109	Computer Classroom	1	4	1	1	1	
2.1L	L114	Collaboration Center	0	0	0	0	0	Special Configuration B
2.1L	L120/L121	Lobby	0	0	0	0	0	
2.1L	L122	Reception	0	0	0	0	0	
2.1L	L133	Conference	0	0	0	0	0	Special Configuration A
2.1L	L139	Conference	0	0	0	0	0	Special Configuration A
2.1L	L145	Attendance	0	0	0	0	0	
2.1L	L149	Conference	0	0	0	0	0	Special Configuration A
2.1M	M101	Cafeteria	0	0	0	0	0	Special Configuration D
2.1M	M125	Gym - HS	0	0	0	0	0	Special Configuration H
2.1N	N101	Corridor - Hall of Fame	0	0	0	0	0	
2.1N	N106	Art	1	6	1	1	1	
2.1N	N109	Small Group	0	0	0	0	0	
2.1N	N111	Wood Shop	1	4	1	1	1	
2.1N	N115	Machine Shop	0	0	0	0	0	
2.1N	N116	Small Engines	0	0	0	0	0	
2.1N	N122	Classroom	1	4	1	1	1	
2.1N	N123	Gym Classroom	1	4	1	1	1	
2.1N	N124	Fitness/Weight Room	0	0	0	0	0	Special Configuration C
2.1P	P112	Trailblazers	1	4	1	1	1	
2.1P	P116	Horizons	1	4	1	1	1	

2.1P	P119	Culinary Lab	1	4	1	1	1	
2.1P	P120	Breakout Room	0	0	0	0	0	
2.1P	P122	Classroom	1	4	1	1	1	
		Total	70	282	70	70	70	

Appendix C - LASD Classroom Multimedia Connection Line Diagram



Legend

Network ———

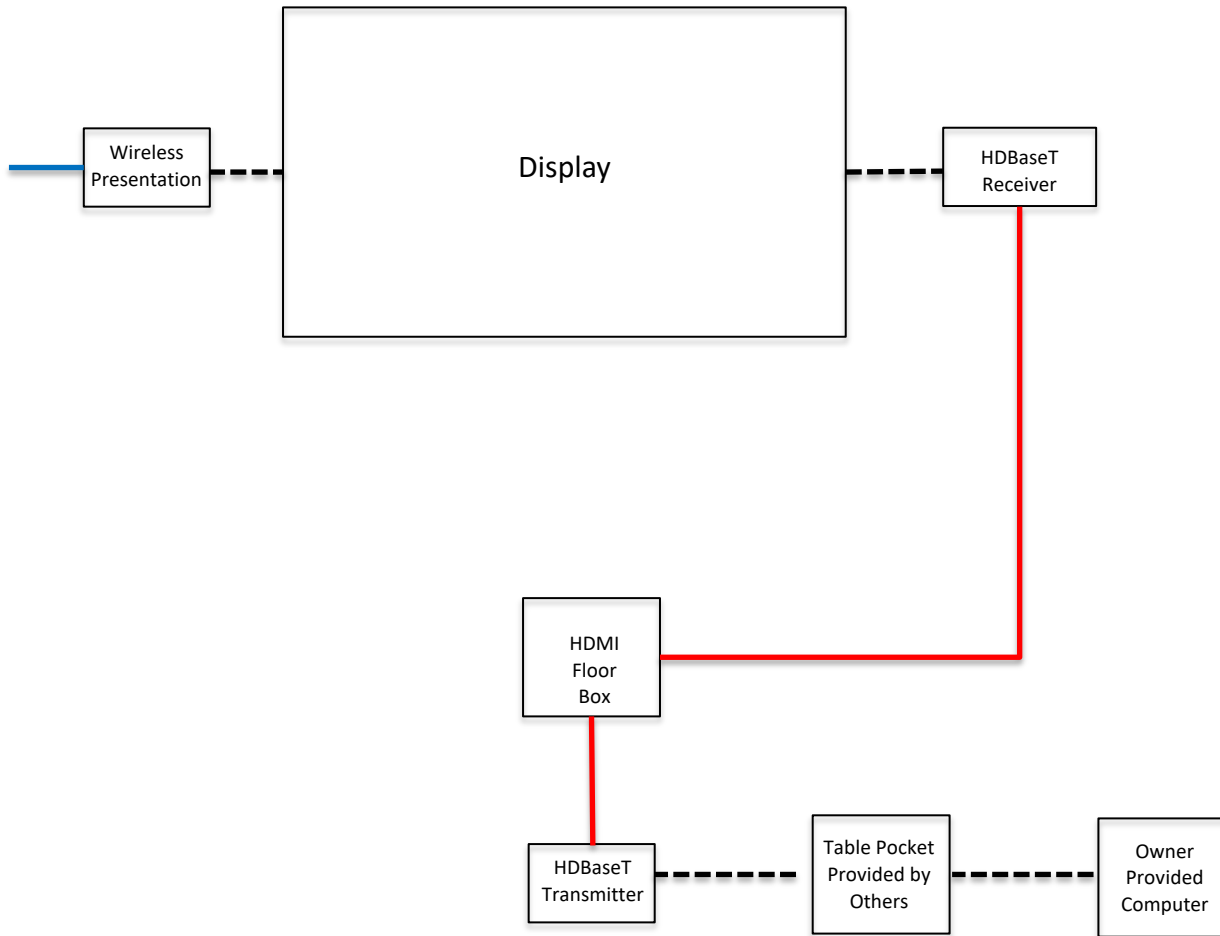
HDMI - - - -

Speaker Cable ———

Audio ———

Shielded Cat 6a ———

Appendix C - Conference Room Line Diagram



Legend

Network Cable (To LAN)



HDMI

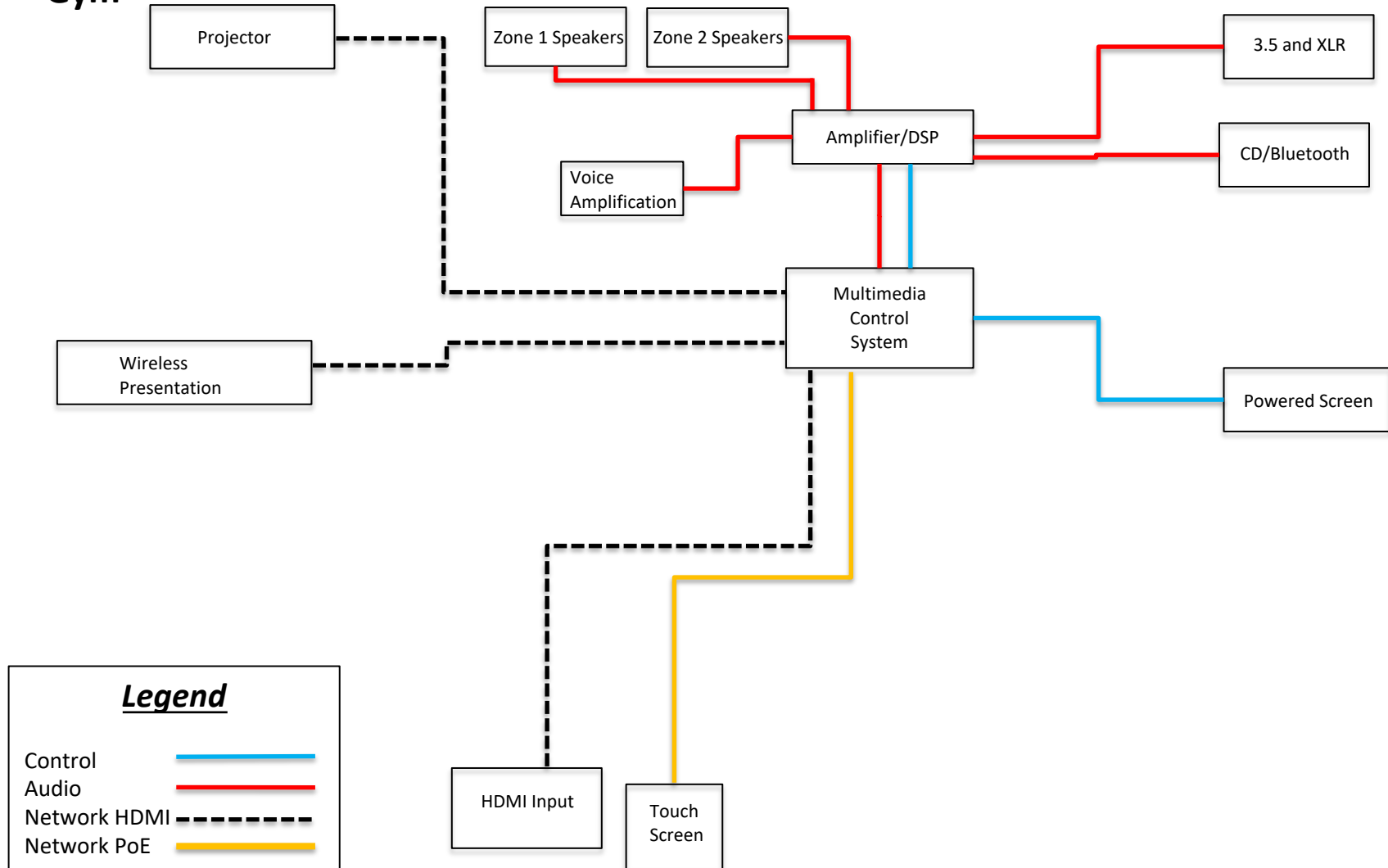


Shielded Category 6a



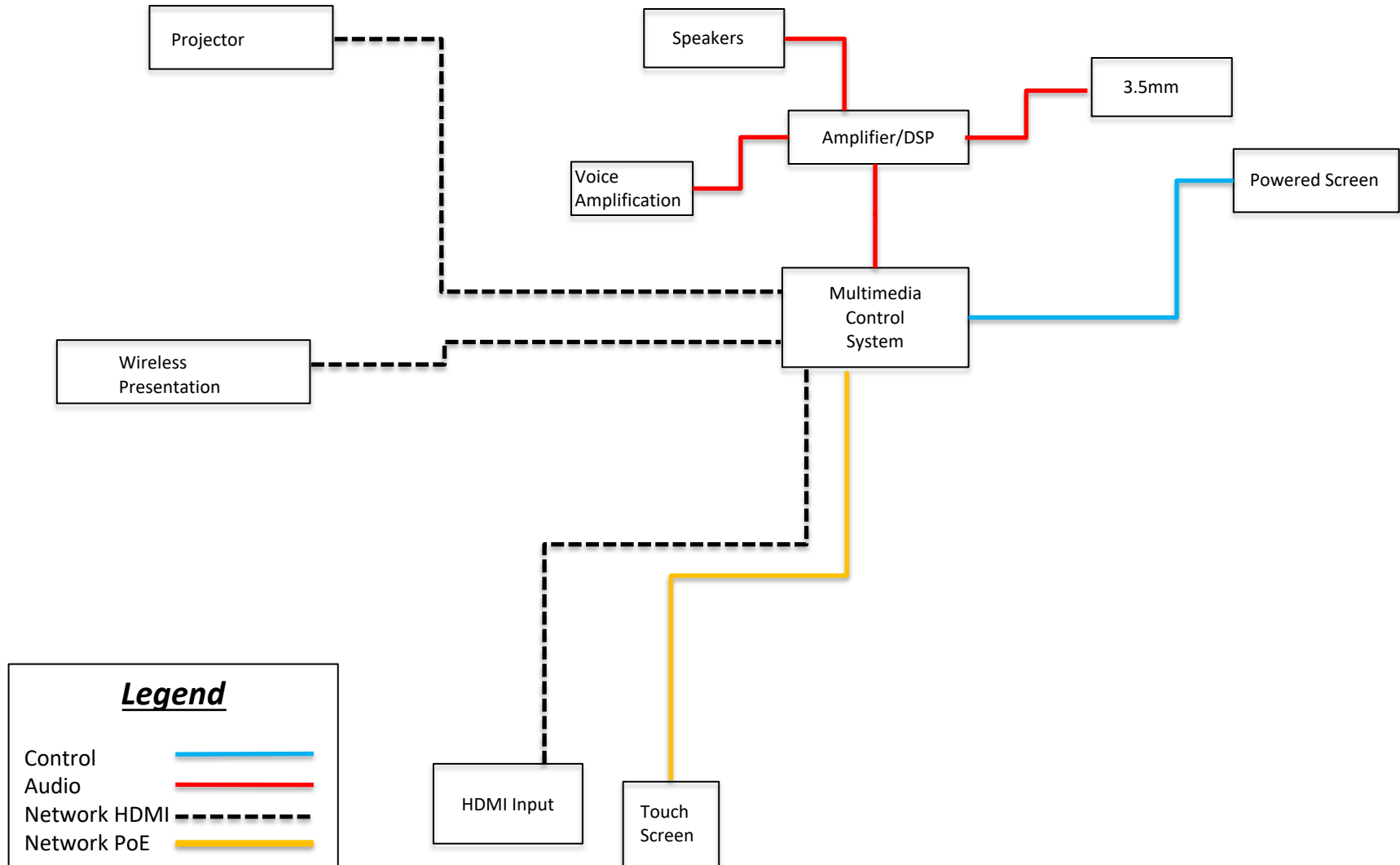
Gymnasium
A121 – MS
Gym

Ludington Area School District
Appendix A – AV Connection Line Diagrams



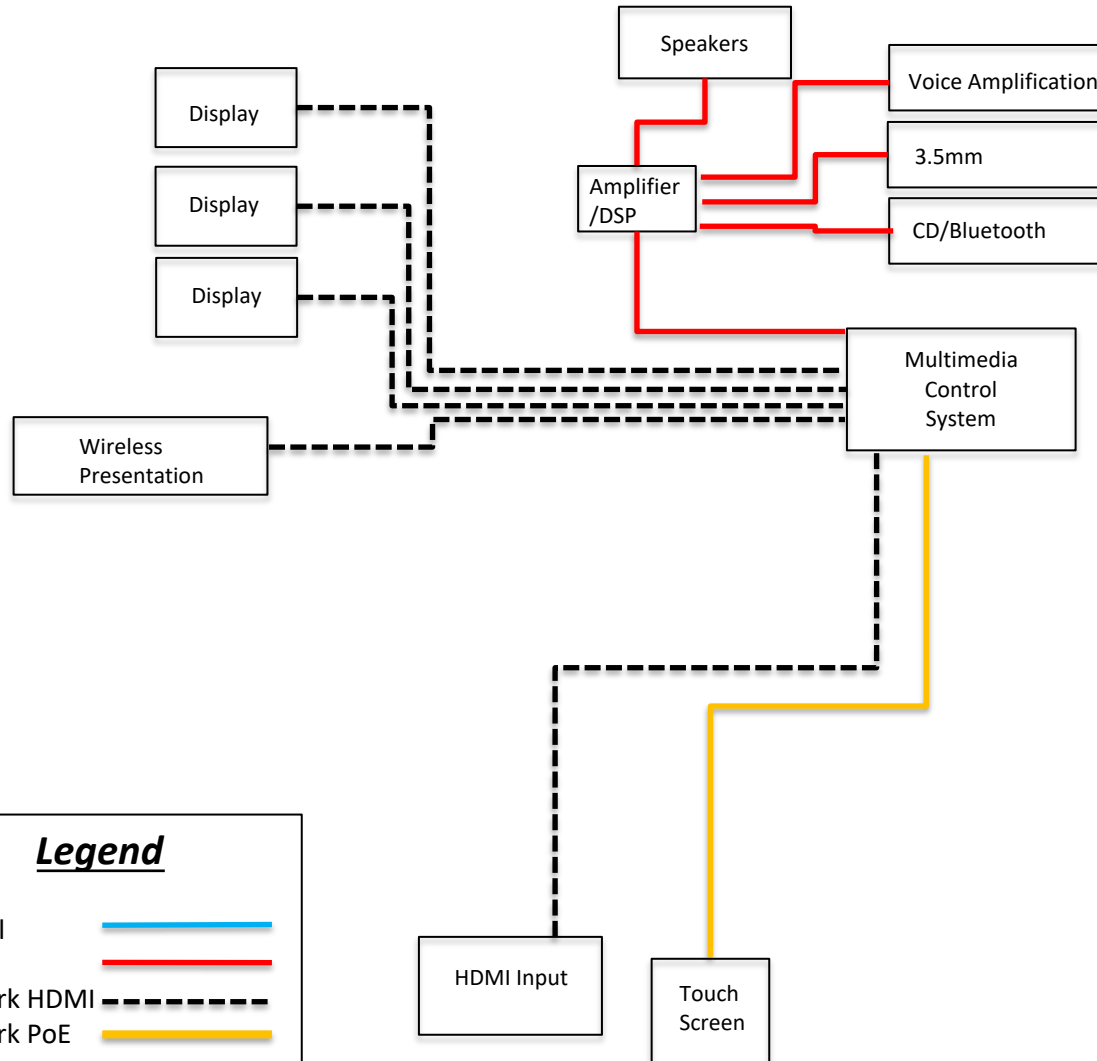
Cafeteria F112 and M101 – HS and MS

Ludington Area School District Appendix A – AV Connection Line Diagrams



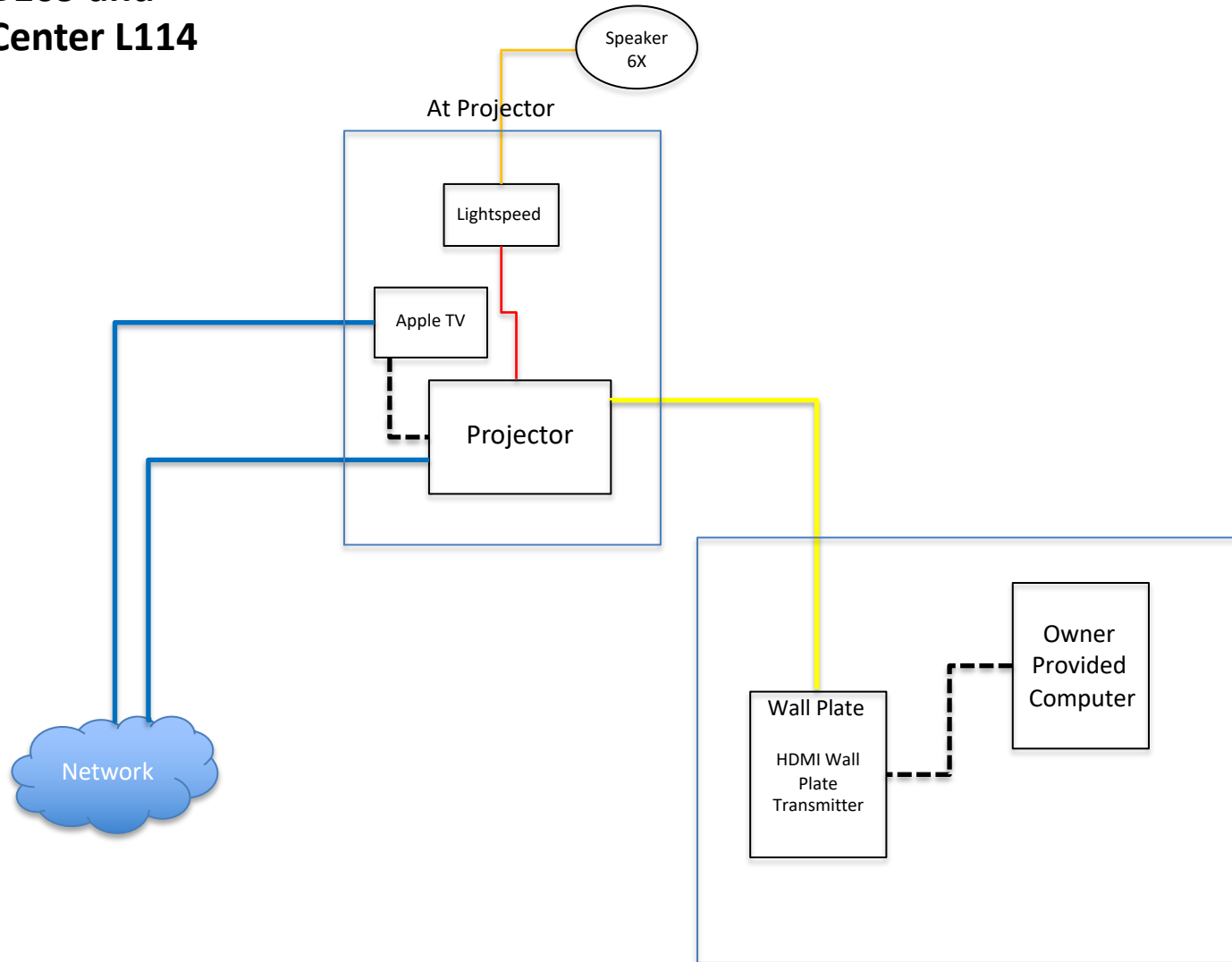
Fitness/Weight Room – N124

Ludington Area School District Appendix A – AV Connection Line Diagrams



Appendix C - LASD Classroom Multimedia Connection Line Diagram

Media Center B109 and Collaboration Center L114



Legend

Network ———

Speaker Cable ———

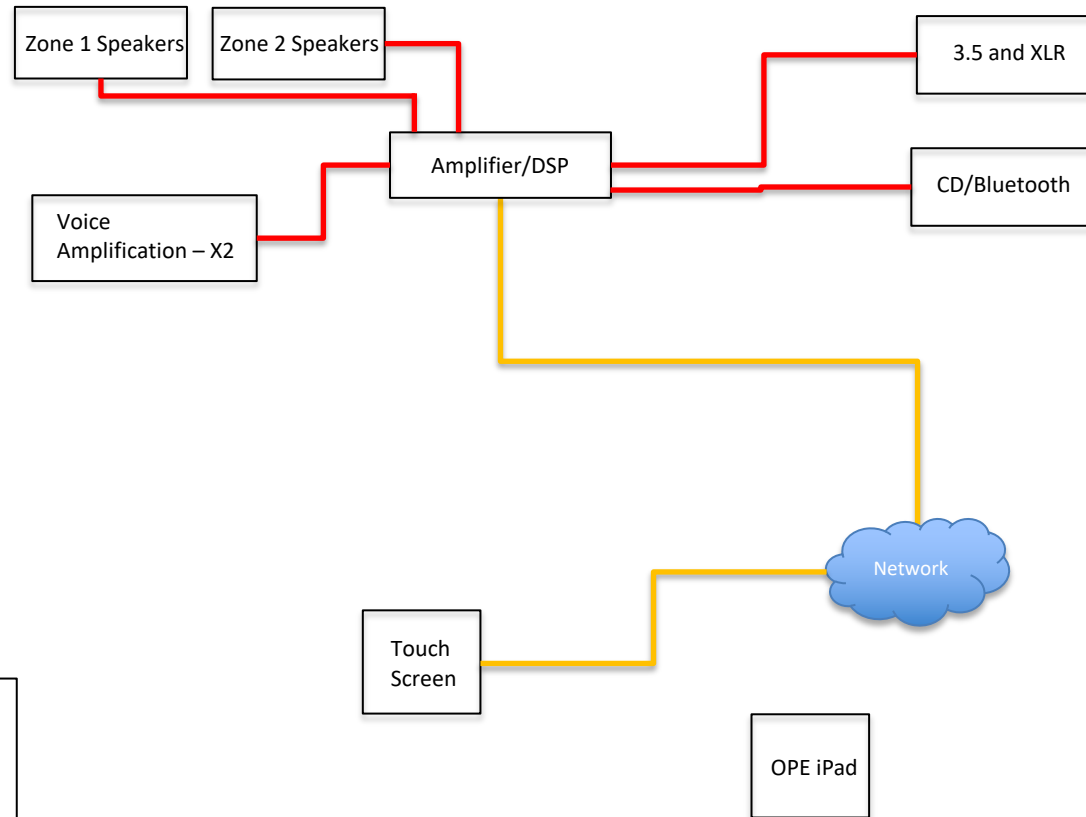
HDMI - - - -

Audio ———

Shielded Cat 6a ———

Natatorium – A101

Ludington Area School District Appendix A – AV Connection Line Diagrams

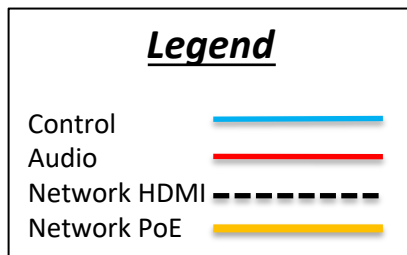
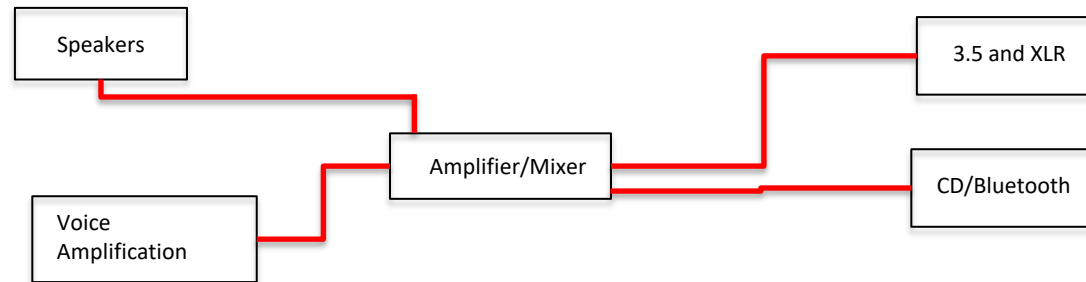


Legend

Control	
Audio	
Network HDMI	
Network PoE	

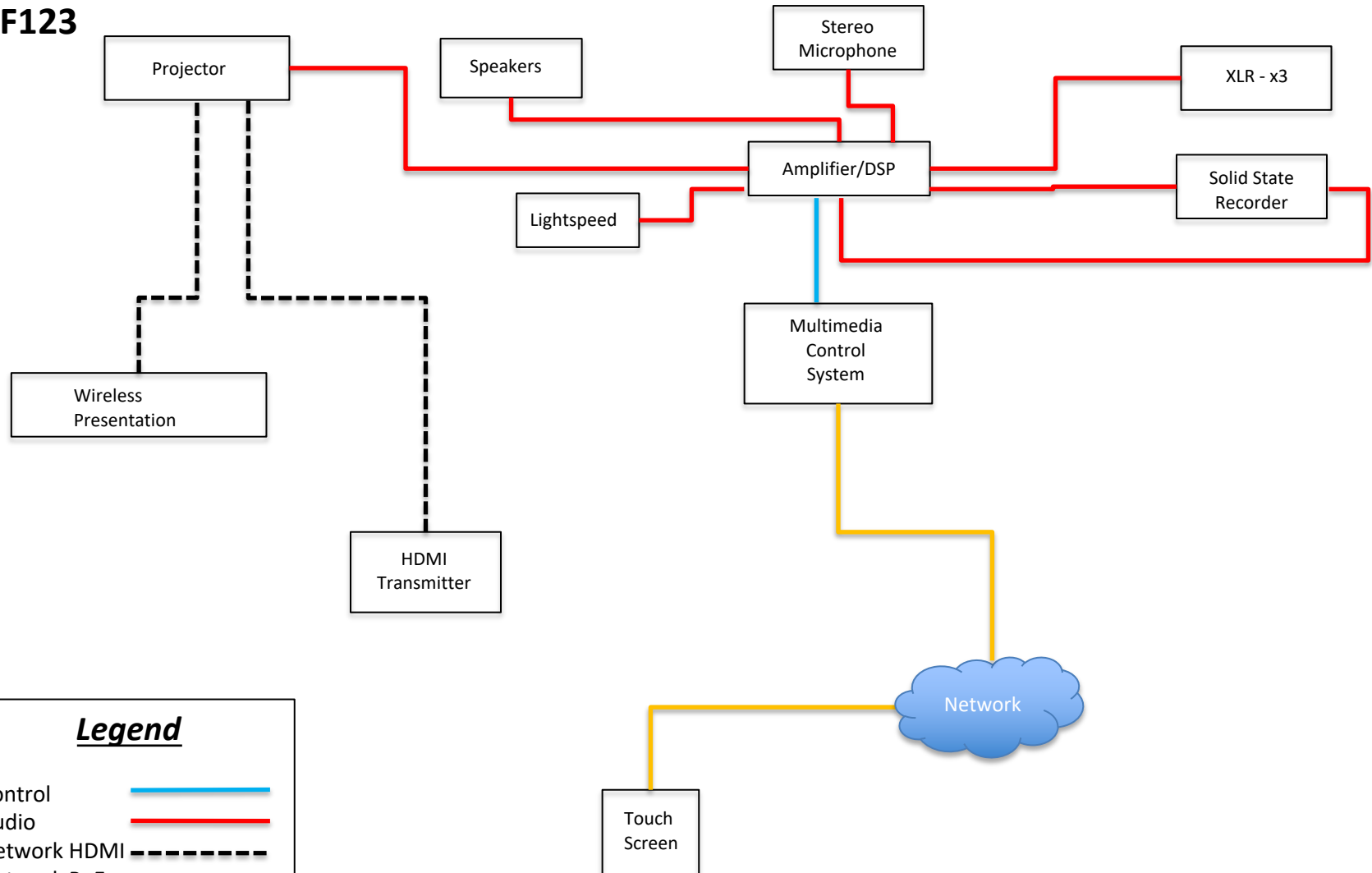
**Gymnasium
A118 – Aux
Gym**

**Ludington Area School District
Appendix A – AV Connection Line Diagrams**

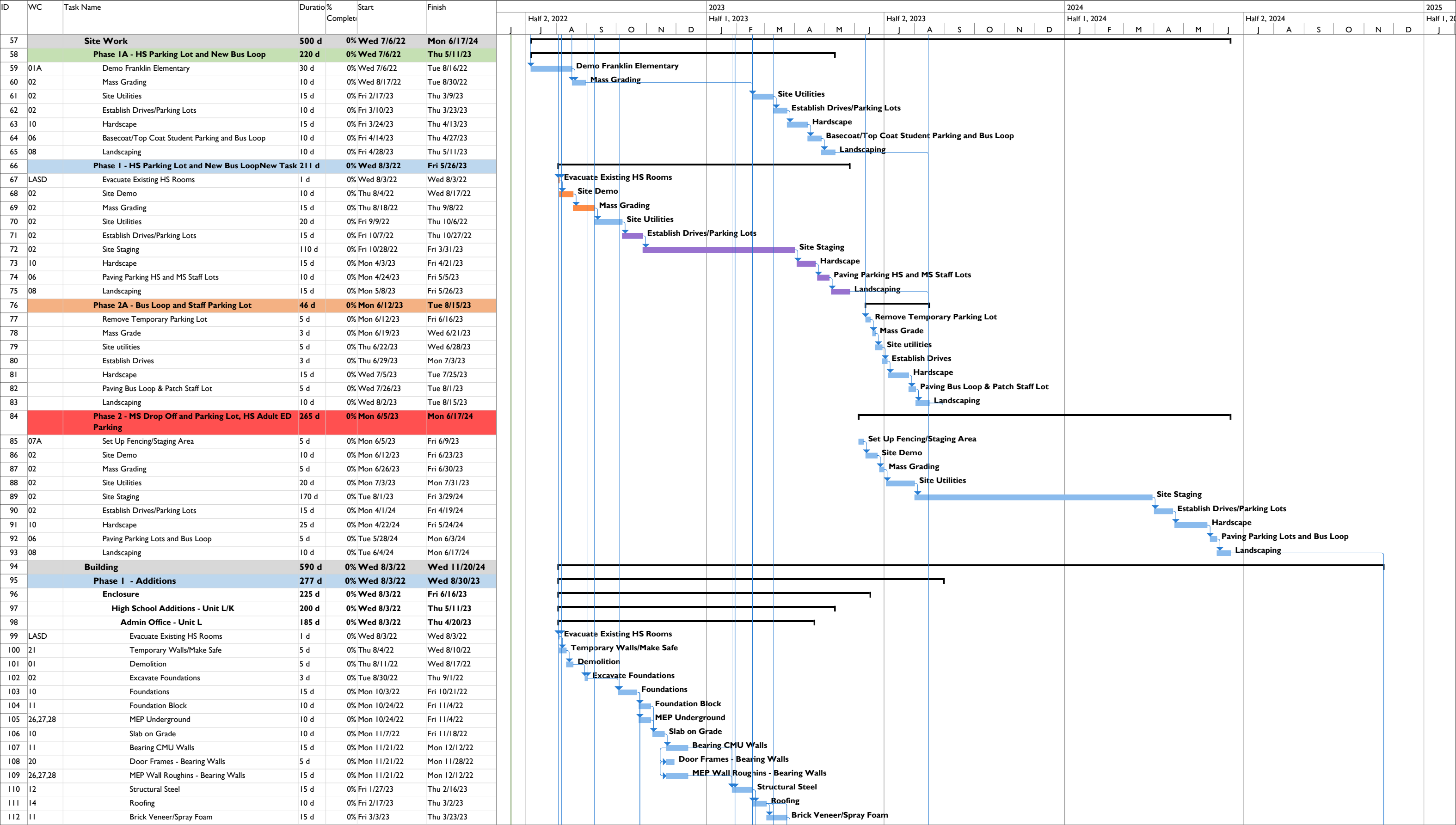


**Band F113
and Choir
F123**

**Ludington Area School District
Appendix A – AV Connection Line Diagrams**



File: Ludington MSHS Additions and Reno Schedule 22.06.15 Page 1 of 10 Current Date: Tue 6/28/22
 Status Date: Wed 6/15/22





File: Ludington MSHS Additions and Reno Schedule 22.06.15 Page 3 of 10 Current Date: Tue 6/28/22
 Status Date: Wed 6/15/22



ID	WC	Task Name	Duration	% Complete	Start	Finish	2022														2023														2024														2025																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
							Half 2, 2022							Half 1, 2023							Half 2, 2023							Half 1, 2024							Half 2, 2024							Half 1, 2025																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
							J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
170	26,27,28	Devices, Fixtures, Trims, Toilet Access.	10 d	0%	Tue 7/11/23	Mon 7/24/23																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																

ID	WC	Task Name	Duration	% Complete	Start	Finish								2023							2024							2025						
								Half 2, 2022						Half 1, 2023					Half 2, 2023					Half 1, 2024					Half 2, 2024					Half 1, 2025
								J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
283		MS Offices and Entry	299 d	0%	Mon 6/5/23	Mon 8/5/24																												
284	21	Temporary Walls/Make Safe	5 d	0%	Mon 6/5/23	Fri 6/9/23																												
285	01	Demolition	15 d	0%	Mon 6/12/23	Fri 6/30/23																												
286	02	Excavate Foundations	5 d	0%	Mon 7/3/23	Mon 7/10/23																												
287	10	Foundations	10 d	0%	Tue 7/11/23	Mon 7/24/23																												
288	11	Bearing CMU Walls	15 d	0%	Tue 7/25/23	Mon 8/14/23																												
289	20	Door Frames - Bearing Walls	15 d	0%	Tue 8/15/23	Tue 9/5/23																												
290	26,27,28	Mechanical Wall Roughins - Bearing Walls	15 d	0%	Wed 9/6/23	Tue 9/26/23																												
291	12	Structural Steel	15 d	0%	Wed 9/27/23	Tue 10/17/23																												
292	26,27,28	MEP Underground	15 d	0%	Wed 10/18/23	Tue 11/7/23																												
293	10	Slab on Grade	10 d	0%	Wed 11/8/23	Tue 11/21/23																												
294	24	Roofing	10 d	0%	Wed 11/22/23	Wed 12/6/23																												
295	11	Brick Veneer/Spray Foam	5 d	0%	Thu 12/7/23	Wed 12/13/23																												
296	18	Curtainwall	20 d	0%	Thu 12/14/23	Fri 1/12/24																												
297	15	Nichiha Siding	15 d	0%	Mon 1/15/24	Fri 2/2/24																												
298	11	Interior Masonry Walls	10 d	0%	Wed 11/22/23	Wed 12/6/23																												
299	21	Interior Layout Framing	5 d	0%	Thu 12/7/23	Wed 12/13/23																												
300	26,27,28	MEP Inwall Roughin	10 d	0%	Thu 12/14/23	Thu 12/28/23																												
301	26,27,28	MEP Overhead Roughin	10 d	0%	Fri 12/29/23	Fri 1/12/24																												
302	21	Drywall Hang and Finish	10 d	0%	Mon 1/15/24	Fri 1/26/24																												
303	24	Prime and First Coat	10 d	0%	Mon 1/29/24	Fri 2/9/24																												
304	21	Ceiling Grid	5 d	0%	Mon 2/12/24	Fri 2/16/24																												
305	26,27,28	Lights, Heads, Diffusers, Etc.	10 d	0%	Mon 2/19/24	Fri 3/1/24																												
306	10	Polished Flooring	10 d	0%	Mon 3/4/24	Fri 3/15/24																												
307	20	Casework	10 d	0%	Mon 3/18/24	Fri 3/29/24																												
308	21	Ceilings Tiles	15 d	0%	Mon 4/1/24	Fri 4/19/24																												
309	23	Carpet	10 d	0%	Mon 4/22/24	Fri 5/3/24																												
310	24	Finish Paint	15 d	0%	Mon 5/6/24	Fri 5/24/24																												
311	20	Doors & Hardware	10 d	0%	Tue 5/28/24	Mon 6/10/24																												
312	20,26,27,2	Devices, Fixtures, Trims, Toilet Accessories	10 d	0%	Tue 6/11/24	Mon 6/24/24																												
313	25	Signage	3 d	0%	Tue 5/28/24	Thu 5/30/24																												
314	CBD	Technology	3 d	0%	Thu 6/27/24	Mon 7/1/24																												
315	TCC	Final Clean	2 d	0%	Tue 6/25/24	Wed 6/26/24																												
316	26,27,28	TAB, Commissioning, Final Connections	15 d	0%	Thu 6/27/24	Thu 7/18/24																												
317	TCC	Final BCC and BFS Inspections	10 d	0%	Fri 7/19/24	Thu 8/1/24																												
318	TCC	Substantial Completion	1 d	0%	Fri 8/2/24	Fri 8/2/24																												
319	GMB	Punchlist	15 d	0%	Thu 6/27/24	Thu 7/18/24																												
320	LASD	Furniture Install	10 d	0%	Thu 6/27/24	Thu 7/11/24																												
321	LASD	Occupancy	1 d	0%	Mon 8/5/24	Mon 8/5/24																												
322		Phase 2 - MS Café, HS/MS Classrooms, HS Varsity Locker Rooms	133 d	0%	Fri 6/23/23	Tue 1/2/24																												
323		MS Café	103 d	0%	Fri 6/23/23	Thu 11/16/23																												
324	21	Temporary Walls/Make Safe	2 d	0%	Fri 6/23/23	Mon 6/26/23																												
325	26,27,28	MEP Cut/Cap Make Safe	3 d	0%	Tue 6/27/23	Thu 6/29/23																												
326	01	Demolition	13 d	0%	Fri 6/30/23	Wed 7/19/23																												
327	27,28	MEP Underground - Saw Cut	10 d	0%	Thu 7/20/23	Wed 8/2/23																												
328	10	Concrete Patching	3 d	0%	Thu 8/3/23	Mon 8/7/23																												
329	11	CMU Walls	12 d	0%	Tue 8/8/23	Wed 8/23/23																												
330	26,27,28	MEP Inwall Roughin	10 d	0%	Tue 8/8/23	Mon 8/21/23																												
331	12	Structural Steel	5 d	0%	Tue 8/22/23	Mon 8/28/23																												
332	26,27,28	MEP Overhead Roughin	14 d	0%	Wed 8/16/23	Tue 9/5/23																												
333	24	Prime and First Coat	8 d	0%	Wed 9/6/23	Fri 9/15/23																												
334	21	Ceiling Grid	8 d	0%	Mon 9/18/23	Wed 9/27/23																												
335	26,27,28	Lights, Heads, Diffusers, Etc.	8 d	0%	Mon 9/25/23	Wed 10/4/23																												
336	10	Polished Flooring	7 d	0%	Thu 10/5/23	Fri 10/13/23																												
337	20	Casework	8 d	0%	Mon 10/16/23	Wed 10/25/23																												
338	21	Ceilings Tiles	8 d	0%	Thu 10/26/23	Mon 11/6/23																												



ID	WC	Task Name	Duration	% Complete	Start	Finish	2022							2023							2024														2025																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
							Half 2, 2022							Half 1, 2023							Half 2, 2023							Half 1, 2024								Half 2, 2024							Half 1, 2025																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
396	LASD	Furniture Install	10 d	0%	Thu 11/30/23	Wed 12/13/23																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														</

[illegible]



ID	WC	Task Name	Duration	% Complete	Start	Finish								2023						2024						2025							
														Half 1, 2023						Half 2, 2023						Half 1, 2024						Half 2, 2024	Half 1, 2025
							J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S
508	20	Door Frames	8 d	0%	Mon 8/5/24	Wed 8/14/24																											
509	26,27,28	MEP In-Wall Roughin	8 d	0%	Mon 8/5/24	Wed 8/14/24																											
510	26,27,28	MEP Overhead Roughin	8 d	0%	Mon 8/5/24	Wed 8/14/24																											
511	24	Paint Ceilings/Walls/Structure	5 d	0%	Thu 8/15/24	Wed 8/21/24																											
512	21	Acoustical Spray Ceilings	5 d	0%	Thu 8/22/24	Wed 8/28/24																											
513	21	Ceiling Grid and Cuts	3 d	0%	Thu 8/15/24	Mon 8/19/24																											
514	23	Flooring	10 d	0%	Thu 8/29/24	Thu 9/12/24																											
515	20	Casework	5 d	0%	Thu 8/29/24	Thu 9/5/24																											
516	23	Carpet	10 d	0%	Fri 9/6/24	Thu 9/19/24																											
517	24	Finish Paint	5 d	0%	Fri 9/20/24	Thu 9/26/24																											
518	20	Doors & Hardware	5 d	0%	Fri 9/20/24	Thu 9/26/24																											
519	26,27,28	Devices, Fixtures, Trims, Toilet Access.	3 d	0%	Fri 9/27/24	Tue 10/1/24																											
520	25	Signage	2 d	0%	Fri 9/27/24	Mon 9/30/24																											
521	CBD	Technology	3 d	0%	Fri 9/27/24	Tue 10/1/24																											
522	TCC	Final Clean	2 d	0%	Wed 10/2/24	Thu 10/3/24																											
523	26,27,28	TAB, Commissioning, Final Connections	5 d	0%	Fri 9/27/24	Thu 10/3/24																											
524	TCC	Final BCC and BFS Inspections	5 d	0%	Wed 10/2/24	Tue 10/8/24																											
525	TCC	Substantial Completion	1 d	0%	Wed 10/9/24	Wed 10/9/24																											
526	GMB	Punchlist	10 d	0%	Tue 10/1/24	Mon 10/14/24																											
527	LASD	Furniture Install	5 d	0%	Fri 10/4/24	Thu 10/10/24																											
528	LASD	Classroom Stocking	5 d	0%	Fri 10/4/24	Thu 10/10/24																											
529	LASD	Occupancy	1 d	0%	Tue 10/15/24	Tue 10/15/24																											
530		Balance of MS/HS Classrooms	111 d	0%	Mon 6/17/24	Wed 11/20/24																											
531	26,27,28	MEP Cut/Cap Make Safe	3 d	0%	Mon 6/17/24	Wed 6/19/24																											
532	01	Demolition	10 d	0%	Thu 6/20/24	Wed 7/3/24																											
533	27,28	MEP Underground - Saw Cut	8 d	0%	Fri 7/5/24	Tue 7/16/24																											
534	10	Concrete Patching	8 d	0%	Wed 7/17/24	Fri 7/26/24																											
535	11	CMU Walls	10 d	0%	Mon 7/29/24	Fri 8/9/24																											
536	26,27,28	MEP Inwall Roughin	10 d	0%	Mon 7/29/24	Fri 8/9/24																											
537	26,27,28	MEP Overhead Roughin	15 d	0%	Mon 7/29/24	Fri 8/16/24																											
538	24	Prime and First Coat	7 d	0%	Mon 8/19/24	Tue 8/27/24																											
539	21	Ceiling Grid	7 d	0%	Wed 8/28/24	Fri 9/6/24																											
540	26,27,28	Lights, Heads, Diffusers, Etc.	7 d	0%	Mon 9/9/24	Tue 9/17/24																											
541	22	Terrazzo Patching	12 d	0%	Wed 9/18/24	Thu 10/3/24																											
542	20	Casework	13 d	0%	Mon 9/9/24	Wed 9/25/24																											
543	21	Ceilings Tiles	8 d	0%	Wed 9/18/24	Fri 9/27/24																											
544	23	Carpet	8 d	0%	Thu 9/26/24	Mon 10/7/24																											
545	24	Finish Paint	8 d	0%	Mon 9/30/24	Wed 10/9/24																											
546	20	Doors & Hardware	8 d	0%	Fri 10/4/24	Tue 10/15/24																											
547	20,26,27,2	Devices, Fixtures, Trims, Toilet Accessories	8 d	0%	Thu 10/10/24	Mon 10/21/24																											
548	25	Signage	1 d	0%	Thu 10/10/24	Thu 10/10/24																											
549	CBD	Technology	8 d	0%	Fri 11/1/24	Tue 11/12/24																											
550	TCC	Final Clean	8 d	0%	Tue 10/22/24	Thu 10/31/24																											
551	26,27,28	TAB, Commissioning, Final Connections	5 d	0%	Fri 11/1/24	Thu 11/7/24																											
552	TCC	Final BCC and BFS Inspections	7 d	0%	Fri 11/8/24	Mon 11/18/24																											
553	TCC	Substantial Completion	1 d	0%	Tue 11/19/24	Tue 11/19/24																											
554	GMB	Punchlist	10 d	0%	Fri 11/1/24	Thu 11/14/24																											
555	LASD	Furniture Install	3 d	0%	Fri 11/1/24	Tue 11/5/24																											
556	LASD	Occupancy	1 d	0%	Wed 11/20/24	Wed 11/20/24																											
557		Project Completion	1 d	0%	Thu 11/21/24	Thu 11/21/24																											

APPENDIX E

UPDATED DOOR SCHEDULE TO BE PROVIDED WITH FUTURE ADDENDUM