ADDENDUM NO. 02

April 29, 2022

LOPER ELEMENTARY SCHOOL RENOVATION

901 Loper Drive
Shelbyville, IN 46176

TO: ALL BIDDERS OF RECORD

This Addendum forms a part of and modifies the Bidding Requirements, Contract Forms, Contract Conditions, the Specifications, and the Drawings dated April 6, 2022, by Lancer+Beebe, LLC. Acknowledge receipt of the Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of Pages ADD 2-1 through ADD 2 – 3, Specification Section 00 31 00, Specification Section 01, 23, 00 and attached Lancer+Beebe. LLC, Addendum No. 2 dated April 27, 2022, consisting of 6 pages, Specification Sections 08 71 00 – Door Hardware, 23 09 13 – Instrumentation and Control Devices, 23 09 93 – Sequence of Operation for Controls, and Drawing Sheets: A601, A720, A766, E-501, E-502, ED101A, ED101B, ED101C, EL101A, EL101B, EP101A, EP101B, H-102, H-501, H-502, HD102.

A. SPECIFICATION SECTION 00 20 00 – INFORMATION AVAILABLE TO BIDDERS

Add Paragraph C.

C. 2021 Lead-Based Paint Screening Inspection Report for Loper Elementary School dated November 10, 2021 has been included as part of this Addendum.

B. SPECIFICATION SECTION 00 31 00 – BID FORM

1. DELETE entirety of this specification section and replace with 00 31 00 – BID FORM section included as part of this Addendum.

C. SPECIFICATION SECTION 00 12 00 – MULTIPLE CONTRACT SUMMARY

1. Paragraph 3.03 Bid Categories

A. Bid Category No. 1 – General Trades

DELETE the following specification section

09 97 00 – Special Coatings

Add the following Project Specific Clarification

15. Regarding Demolition Note 20 on Architectural Demolition Drawings, the General Trades Contractor is responsible for removal, storage, and reinstallation of vinyl wall mural. The Painting Contractor is responsible for painting the wall once the mural is removed.

C. Bid Category No. 3 – Flooring

Add the following Project Specific Clarification

4. In addition to the Contingency Allowance listed in 01 21 00 – Contract Allowances, Flooring Contractor is to include all labor and material required for installation of Mapei Planiseal VS Fast or equal product as an allowance. The area to be included is entirety of resilient flooring, carpet tile, and broadloom carpet locations.

D. Bid Category No. 4 – Painting

Add the following specification section

09 97 00 – Special Coatings

Add the following Project Specific Clarification

3. Regarding Demolition Note 20 on Architectural Demolition Drawings, the General Trades Contractor is responsible for removal, storage, and reinstallation of vinyl wall mural. The Painting Contractor is responsible for painting the wall once the mural is removed.

D. SPECIFICATION SECTION 01 23 00 – ALTERNATES

1. DELETE entirety of this specification section and replace with 01 23 00 – ALTERNATES section included as part of this Addendum.

CONTRACTOR'S BID FOR PUBLIC WORKS FORM NO. 96

Format (Revised 2013)
(Amended for SCS)

Loper Elementary School Renovation

Shelbyville Central Schools
(Shelby)

PART I

(To be completed for all bids. Please type or print)

Date (month, day, year):_____

BIDDER (Firm) _____

Address _____ P.O. Box _____

City/State/Zip ___

Telephone Number: _____ Email Address: _____

Person to contact regarding this Bid_____

Pursuant to notices given, the undersigned offers to furnish labor and/or materials necessary to complete the public works project of:

_____
Insert Category No. (s) and Name(s)

Of public works project, ***Loper Elementary School Renovation***, in accordance with Plans and Specifications prepared by ***Lancer+Beebe, 220 N. College Avenue, Indianapolis, IN 46202***, as follows:

BASE BID

For the sum of _____
(Sum in words)

_____DOLLARS ($_____)
(Sum in figures)

The undersigned acknowledges receipt of the following Addenda:
Receipt of Addenda No. (s) _____

PROPOSAL TIME

Bidder agrees that this Bid shall remain in force for a period of sixty (60) consecutive calendar days from the due date, and Bids may be accepted or rejected during this period. Bids not accepted within said sixty (60) consecutive calendar days shall be deemed rejected.

Attended pre-bid conference YES _____ NO_____

Has visited the jobsite YES _____ NO_____

The Bidder has reviewed the Guideline Schedule in Section 01 32 00 and the intent
Of the schedule can be met. YES _____ NO_____

Bidder has included their Written Drug Testing Plan that covers all employees of the bidder who will perform work on the public work project and meets or exceeds the requirements set in IC 4-13-18-5 or IC 4-13-18-6. YES _____ NO_____

The Skillman Corporation's diversity initiative is to create a program to encourage, assist and measure the active participation of Minority- Owned, Women-Owned, Veteran – Owned and Disabled Individual-Owned Businesses. The Program is to ensure that MWVDBEs are provided full and equal opportunity to participate in all Skillman Corporation's Projects.

Bidder has included:
DBE: YES _____% NO _____
MBE: YES _____% NO _____
WBE: YES _____% NO _____
VBE: YES _____% NO _____

The undersigned further agrees to furnish a bond or certified check with this Bid for an amount specified in the Notice to Bidders. If Alternate Bids apply, submit a proposal for each in accordance with the Plans and Specifications.

If additional units of material included in the contract are needed, the cost of units must be the same as that shown in the original contract if accepted by the governmental unit. If the bid is to be awarded on a unit bases, the itemization of the units shall be shown on a separate attachment.

The contractor and his subcontractors, if any, shall not discriminate against or intimidate any employee, or applicant for employment, to be employed in the performance of this contract, with respect to any matter directly or indirectly related to employment because of race, religion, color, sex, national origin or ancestry. Breach of this covenant may be regarded as a material breach of the contract.

CERTIFICATION OF USE OF UNITED STATES STEEL PRODUCTS
(if applicable)

I, the undersigned bidder, or agent as a contractor on a public works project, understand my statutory obligation to use steel products made in the United States (I.C. 5-16-8-2). I hereby certify that I and all subcontractors employed by me for this project will use U.S. steel on this project if awarded. I understand that violations hereunder may result in forfeiture of contractual payments.

ALTERNATE BIDS

A blank entry or an entry of "No Bid", "N/A", or similar entry on any Alternate will cause the bid to be rejected as non-responsive only if that Alternate is selected. If no change in the bid amount is required, indicate "No Change".

****MARK "ADD" OR "DEDUCT" FOR EACH ALTERNATE****

Alternate Bid No. 1 - Music Pit Infill

Change the Base Bid the sum of_____
(sum in words)

_____DOLLARS ($_____) ADD DEDUCT
(sum in figures)

Alternate Bid No. 2 – Upper Cabinets Above Cubbies

Change the Base Bid the sum of_____
(sum in words)

_____DOLLARS ($_____) ADD DEDUCT
(sum in figures)

Alternate Bid No. 3 – Activity Lab and Kindergarten Casework (including cabinets above cubbies)

Change the Base Bid the sum of_____
(sum in words)

_____DOLLARS ($_____) ADD DEDUCT
(sum in figures)

Alternate Bid No. 4 – Tuning Lights in Classrooms

Change the Base Bid the sum of_____
(sum in words)

_____DOLLARS ($_____) ADD DEDUCT
(sum in figures)

Alternate Bid No. 5- LED Scoreboard in Gym

Change the Base Bid the sum of_____
(sum in words)

_____DOLLARS ($_____) ADD DEDUCT
(sum in figures)

Alternate Bid No. 6 – Gym Acoustical Panel Ceiling Repaint

Change the Base Bid the sum of_____
(sum in words)

_____DOLLARS ($_____) ADD DEDUCT
(sum in figures)

Alternate Bid No. 7- Casework in Music Room

Change the Base Bid the sum of_____
(sum in words)

_____DOLLARS ($_____) ADD DEDUCT
(sum in figures)

Alternate Bid No. 8- HVAC Controls (Mandatory)

08A – Schneider Electric / EMCOR: Change the Base Bid the sum of_____
(sum in words)

_____DOLLARS ($_____) ADD DEDUCT

08B – Alerton / Open Control Systems: Change the Base Bid the sum of_____
(sum in words)

_____DOLLARS ($_____) ADD DEDUCT

08C – Distech / ERMCO: Change the Base Bid the sum of_____
(sum in words)

_____DOLLARS ($_____) ADD DEDUCT

08D – Distech / Jackson Systems: Change the Base Bid the sum of_____
(sum in words)

_____DOLLARS ($_____) ADD DEDUCT

08E – Honeywell International / ERMCO: Change the Base Bid the sum of_____
(sum in words)

_____DOLLARS ($_____) ADD DEDUCT

PART II

(For projects of $150,000 or more – IC 36-1-12-4)

These statements to be submitted under oath by each bidder with and as a part of his bid. (Attach additional pages for each section as needed.)

SECTION I EXPERIENCE QUESTIONNAIRE

1. What public works projects has your organization completed for the period of one (1) year prior to the date of the current bid?

Contract Amount	Class of Work	Completion Date	Name and Address of Owner

2. What public works projects are now in process of construction by your organization?

Contract Amount	Class of Work	Completion Date	Name and Address of Owner

3. Have you ever failed to complete any work awarded to you?_____If so, where and why?

_____

_____

_____

4. List references from private firms for which you have performed work.

_____

_____

_____

SECTION II PLAN AND EQUIPMENT QUESTIONNAIRE

1. Explain your plan or layout for performing proposed Work. (Examples could include a narrative of when you could begin, complete the project, number of workers, etc. and any other information which you believe would enable the governmental unit to consider your bid.)

2. Please list the names and addresses of all subcontractors (i.e. persons or firms outside your own firm who have performed part of the work) that you have used on public works projects during the past five (5) years along with a brief description of the work done by each subcontractor.

3. If you intend to sublet any portion of the work, state the name and addresses of each subcontractor, equipment to be used by the subcontractor, and whether you will required a bond. However, if you are unable to currently provide a listing, please understand a listing must be provided prior to contract approval. Until the completion of the proposed project, you are under a continuing obligation to immediately notify the governmental unit in the event that you subsequently determine that you will use a subcontractor on the proposed project.

4. What equipment do you have available to use for the proposed Project? Any equipment used by subcontractors may also be required to be listed by the governmental unit.

_____

_____

_____

_____

5. Have you into contracts or received offers for all materials which substantiate the prices used in preparing your proposal? If not, please explain the rationale used which corroborate the process listed.

_____

_____

_____

_____

SECTION III CONTRACTOR'S FINANCIAL STATEMENT

Attachment of Bidder's financial statement is mandatory. Any Bid submitted without said financial statement as required by statute shall thereby be rendered invalid. The financial statement provided hereunder to the governing body awarding the Contract must be specific enough in detail so that said governing body can make a proper determination of the Bidder's capability for completing the Project if awarded.

SECTION IV CONTRACTOR NON-COLLUSION AFFIDAVIT

The undersigned Bidder or agent, being duly sworn on oath, says that he has not, nor has any other member, representative, or agent of the firm, company, corporation or partnership represented by him, entered into any combination, collusion or agreement with any person relative to the price to be bid by anyone at such letting nor to prevent any person from bidding nor to induce anyone to refrain from bidding, and that this Bid is made without reference to any other bid and without any agreement, understanding or combination with any other person in reference to such bidding.

He further says that no person or persons, firms, or corporations has, have, or will receive directly or indirectly, any rebate, fee, gift, commission, or thing of value on account of such contract.

SECTION V OATH AND AFFIRMATION

I HEREBY AFFIRM UNDER THE PENALTIES OF PERJURY THAT THE FACTS AND INFORMATION CONTAINED IN THE FOREGOING BID FOR PUBLIC WORKS ARE TRUE AND CORRECT

Dated at _____this _____ day of _____, 20

_____
(Name of Organization)

By

_____

_____
(Title of Person Signing)

ACKNOWLEDGEMENT

STATE OF _____)
) SS:
COUNTY OF _____)

Before me, a Notary Public, personally appeared the above-named

_____

Swore that the statements contained in the foregoing document are true and correct.

Subscribed and sworn to before me this _____ day of _____,

_____
(Title)

_____
Notary Public

My Commission Expires: _____

County of Residence: _____

END OF SECTION 00 31 00

SECTION 01 23 00 - ALTERNATES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including amended General Conditions and other Division 1 Specification Sections, apply to work of this Section.

1.02 PURPOSE

A. The Bids for the Alternates described herein are required in order for the Owner to obtain information necessary for the proper consideration of the Project in its entirety.

1.03 ALTERNATES

A. Definitions: Alternates are defined as alternate products, materials, equipment, installations or systems for the Work, which may, at Owner's option and under terms established by Instructions to Bidders, be selected and recorded in the Owner-Contractor Agreement to either supplement or displace corresponding basic requirements of Contract Documents. Alternates may or may not substantially change scope and general character of the Work; and must not be confused with "allowances", "unit prices", "change orders", "substitutions", and other similar provisions.

1.04 SCHEDULE OF ALTERNATES

A. ALTERNATE NO. 1: Music Pit Infill

Base Bid: New flooring in this location.
Alternate: In Room E29, the alternate includes infilling the bottom three levels of the choral risers. Refer to Demolition Plan Note 29 on AD101A and Plan Note 2 on A101A.

B. ALTERNATE NO. 2: Upper Cabinets Above Cubbies

Base Bid: No upper cabinets above cubbies in classrooms. .
Alternate: This alternate includes placing new upper cabinets above all of the cubby locations in all classrooms. Refer to Casework Elevation Note 3 on Casework Elevation Drawings.

C. ALTERNATE NO. 3: Activity Lab and Kindergarten Casework (including cabinets above cubbies)

Base Bid: Replacement of countertops and sinks is included in Base Bid.
Alternate: This alternate includes replacing all the casework (including base cabinets, upper cabinets, wardrobes, cubbies, bookshelves, and island) complete in

Rooms B8, B9, B10, B11, B12, B13 and B14. This will include upper cabinets above the cubbies. Refer to Plan Note 14 on A101B.

D. ALTERNATE NO. 4: Tuning Lights in Classrooms

Base Bid: L1 fixtures in classrooms. Refer to E5.01 – Electrical Schedules.
Alternate: L1 ALT fixtures in classrooms. Refer to E5.01 – Electrical Schedules.

E. ALTERNATE NO. 5: LED Scoreboard in Gym

Base Bid: No Work related to LED scoreboards.
Alternate: This alternate includes replacing one LED scoreboard and adding one additional LED scoreboard in the gymnasium. Refer to Plan Note 13 on A101A and E Series Drawings.

F. ALTERNATE NO. 6: Gym Acoustical Panel Ceiling Repaint

Base Bid: No Work included in Base Bid.
Alternate: The alternate includes painting the acoustical tectum panels on the ceiling of the gymnasium the primary paint color (PT-1). Refer to Plan Note 7 on A121A.

G. ALTERNATE NO. 7: Casework in Music Room

Base Bid: No new casework in this room.
Alternate: This alternate includes all the new casework and shelving in Room E39.

H. ALTERNATE NO. 8: HVAC Controls (Mandatory)

Base Bid: No Work included in Base Bid.
Alternate 08A: Schneider Electric / EMCOR
Alternate 08B: Alerton / Open Control Systems
Alternate 08C: Distech / ERMCO
Alternate 08D: Distech / Jackson Systems
Alternate 08E: Honeywell International / ERMCO

PART 2 - PRODUCTS, PART 3 - EXECUTION (Not Used)

END OF SECTION 01 23 00

2021

Lead-Based Paint Screening Inspection Report

For

Loper Elementary School
901 Loper Drive
Shelbyville, Indiana 46176

Prepared For:

Shelbyville Central Schools
1121 East State Road 44
Shelbyville, Indiana 46176
Attn: Mr. Earsel Smith; Director of Buildings and Grounds

Prepared By:

Micro Air, Inc.
6320 La Pas Trail
Indianapolis, Indiana 46268

Micro Air, Inc. Job #40-18055-B

November 10th, 2021

TABLE OF CONTENTS

TAB 1

LEAD-BASED PAINT SUMMARY REPORT

micro air inc.

6320 LA PAS TRAIL, INDIANAPOLIS, INDIANA 46268
TELEPHONE: (317) 293-1533 FAX: (317) 290-3566

E-MAIL: microair@microair.com
WEB SITE: http://www.microair.com

November 10th, 2021

Mr. Earsel Smith
Director of Buildings and Grounds
Shelbyville Central Schools
1121 East State Road 44
Shelbyville, Indiana 46176

RE: Lead-Based Paint Screening Inspection
Loper Elementary School
901 Loper Drive, Shelbyville, IN
Micro Air Job #40-18055-B

Dear Mr. Smith:

Micro Air, Inc. was contracted to perform a lead-based paint screening inspection of Loper Elementary School located at 901 Loper Drive in Shelbyville, Indiana. Mr. Donald G. French of Micro Air, Inc. performed the inspection on October 19th and 20th, 2021 (State of Indiana Lead Inspector # IND000034, Expiration Date of 08/16/2022).

A lead-based paint inspection is a surface-by-surface investigation to determine the presence of lead-based paint and the provision of a report explaining the results of the investigation. In general, there are many building materials which can contain lead in the average building. When conducting construction or demolition activities which disturb lead in any amount or create an exposure to occupants and workers, the employer is required to provide worker protection and conduct exposure assessments. Employers should consult Federal OSHA Regulations at 29 CFR 1926.62, "Lead in Construction" standards for complete requirements prior to construction or demolition activities. All lead-based paint inspection work was conducted utilizing an Innov-X System, X-ray Fluorescence Spectrometer (Model # A-4000 Serial # 6253), (XRF), which measures the amount of lead on a painted surface in milligrams per square centimeter, mg/cm^2. Paint is classified as "lead-based paint" under regulations established by the U.S. Environmental Protection Agency (EPA 40 CFR 745 Subpart F) and Department of Housing and Urban Development (HUD 24 CFR 35), if the concentration of lead is equal to or greater than 1.0 mg/cm^2 as determined by x-ray fluorescence.

Loper Elementary School
901 Loper Drive
Shelbyville, Indiana

The building is single-story structure resting on a poured concrete slab. The building was apparently constructed in three phases. The original structure, which consists of the main offices, boiler room, gymnasium and "A" and "C" wing classrooms was apparently constructed between 1960 and 1965. The "D" and "E" wing classrooms and media center were constructed in 1981. The cafeteria and "B" wing classrooms are a 2000 addition. The building contains approximately 77,636 square feet of floor space.

The structure consists of unpainted brick, exterior finishing system and aluminum fascia and metal windows and entry doors. Structural steel and wood supports both a corrugated metal and tectum roof deck. Interior finishes consist of ceramic tile, carpet, sheet flooring and vinyl floor tile applied over concrete and terrazzo floors. A wood floor was identified in the gymnasium. Concrete block, ceramic block, plaster on masonry and drywall walls and drop acoustical tile ceilings were also identified at the interior of the structure. The building is heated and cooled by a heating water/chilled water forced air system. Non-suspect fiberglass and armaflex insulation was identified lining the piping systems throughout the 1981 and 2000 additions. Thermal cement pipe fittings applied to the joints, tees and valves of the fiberglass insulated domestic water and heating water lines were identified in the corridors and restroom pipe chases of the 1960-1965 construction. The pipe fitting insulation appears to be remnant insulation from previous abatement activities conducted within the building. Painted metal and stained wood doors were identified at the interior of the structure. All exterior and interior painted surfaces are in good condition.

During this inspection, lead-based paint as defined by EPA and HUD **WAS** identified within the structure. Typical building components confirmed to contain lead-based paint are listed as follows:

1) **Red primer applied to the awning support posts located at the southeast entry to the building.**
2) **Original paint applied to concrete block walls at 1960/1965 wing restrooms.**
3) **Tan paint applied to metal fire door at boiler room.**

Note: Lead-contaminated glaze was also identified applied to the "Standard" model porcelain toilets and urinals located in the restroom areas within 1960-1965 wing restrooms.

Following guidelines established under the Indiana Department of Environmental Management Office of Land Quality, demolition debris contaminated with lead (e.g. sinks, toilets) is classified as "non-residential lead-based paint waste" and may be disposed of at a State of Indiana permitted municipal solid waste landfill or construction/demolition without special packaging or labeling. If the lead-contaminated paint is removed from the substrate (e.g. walls, structural steel) during the course of building renovations, the waste would be classified as "concentrated" lead-based paint waste. The concentrated waste stream would need to be tested for lead content prior to disposal in order to determine if the material would need to be disposed of as "hazardous waste".

If removal of lead-contaminated paint is conducted during renovation/demolition activities, Micro Air, Inc. recommends that the work be conducted by an EPA-approved Lead Renovator. The work should be conducted utilizing "lead safe work practices" as defined under the EPA Lead Renovation, Repair and Painting Rule.

A report document specifying XRF sample locations, photographs of building components containing lead-based paint and personnel certifications have been included. Sample locations are identified using north, south, east and west to specify from which wall or side of the building samples were taken.

Please refer to the enclosed report for specific sample locations and building components tested. Thank you for the opportunity to provide our lead testing services. If you have any questions regarding this report or need additional information, please do not hesitate to contact me.

Sincerely,

Donald G. French
Lead Inspector/Risk Assessor
Micro Air, Inc.

TAB 2

XRF DATA

Pg. 1 of 7 Micro Air, Inc. INNOV-X Portable XRF & Visual Assessment Worksheet Job#: 40 - 18055 - B

Lead Inspector Name: Donald G. French Date: 10 / 20 / 2021 Lead Inspector License #: IND000034

Client Name: Shelbyville Central Schools, 1121 East State Road 44, Shelbyville, IN 46176

Property Address: Loper Elementary School, 901 Loper Drive, Shelbyville, Indiana 46176

Reading #	Room/Area	Wall	Component	Color	Substrate	XRF Reading (mg/cm^2)	Paint Condition	Classification
1	Exterior	N	Cooling Tower Wall	White	Block	0.00	Intact	Negative
2		N	Cooling Tower Wall	Blue	Block	0.00	Intact	Negative
3		N	Cooling Tower Wall	Orange	Block	0.00	Intact	Negative
4		N	Wall Cap	Blue	Metal	0.00	Intact	Negative
5		N	Awning	Blue	Metal	0.00	Intact	Negative
6		N	Awning Post	Blue	Metal	0.00	Intact	Negative
7		N	Awning Soffit	White	Plaster	0.00	Intact	Negative
8		N	\Door	Brown	Metal	0.00	Intact	Negative
9		N	Door Frame	Brown	Metal	0.00	Intact	Negative
10		N	Door Lintel	Grey	Metal	0.00	Intact	Negative
11		N	Window Lintel	Brown	Metal	0.03	Intact	Negative
12		E	1960's Awning	Blue	Metal	0.00	Intact	Negative
13		E	Awning Post	Blue	Metal	1.33	Intact	Positive
14		E	Awning Downspout	Blue	Metal	0.00	Intact	Negative
15		E	Awning Soffit	Tan	Metal	0.00	Intact	Negative
16		E	Door	Brown	Metal	0.00	Intact	Negative
17		E	Door Frame	Brown	Metal	0.69	Intact	Negative
18		E	Door Lintel	Grey	Metal	0.03	Intact	Negative
19		E	Window Lintel	Tan	Metal	0.01	Intact	Negative
20		E	Roof Trim	Blue	Metal	0.00	Intact	Negative
21	1960 East Corridor	-	Ceiling Deck	Grey	Metal	0.00	Intact	Negative
22		-	Ceiling I-Beam	Red	Structural Steel	0.00	Intact	Negative
23		-	Ceiling Cross-Brace	Black	Metal	0.00	Intact	Negative
24	1960 West Corridor	-	Ceiling Deck	Grey	Metal	0.00	Intact	Negative
25		-	Ceiling I-Beam	Red	Structural Steel	0.00	Intact	Negative
26		-	Ceiling Cross-Brace	Black	Metal	0.00	Intact	Negative
27	1983 North Corridor	-	Ceiling Deck	Grey	Metal	0.00	Intact	Negative
28		-	Ceiling Cross-Brace	Red	Metal	0.00	Intact	Negative
29	Cafeteria	N	Wall	White	Block	0.00	Intact	Negative
30		W	Wall	White	Drywall	0.00	Intact	Negative
31		-	Column	Blue	Metal	0.00	Intact	Negative
32		-	Column	Orange	Metal	0.00	Intact	Negative
33		N	Door	Brown	Metal	0.00	Intact	Negative
34		N	Door Frame	Brown	Metal	0.00	Intact	Negative
35		-	Bulkhead	Tan	Drywall	0.00	Intact	Negative
36	Serving Area	-	Floor	Tan	Ceramic	0.00	Intact	Negative
37		-	Counter	Blue	Metal	0.00	Intact	Negative
38		E	Sink	White	Porcelain	0.00	Intact	Negative
39	Kitchen	E	Wall	White	Block	0.00	Intact	Negative
40		E	Window Frame	Brown	Metal	0.00	Intact	Negative

Visual Assessment: **Damaged Component(s):**

Notes: **Shaded readings indicate positive XRF readings.**

INNOV-X Portable XRF **Model #: A-4000** **Serial #: 6253**

mg/cm^2 = milligrams per square centimeter **Shading - Indicates a result equal to or greater than 1.0 mg/cm^2**

Pg. 2 of 7 Micro Air, Inc. INNOV-X Portable XRF & Visual Assessment Worksheet Job#: 40 - 18055 - B

Lead Inspector Name: Donald G. French Date: 10 / 20 / 2021 Lead Inspector License #: IND000034

Client Name: Shelbyville Central Schools, 1121 East State Road 44, Shelbyville, IN 46176

Property Address: Loper Elementary School, 901 Loper Drive, Shelbyville, Indiana 46176

Reading #	Room/Area	Wall	Component	Color	Substrate	XRF Reading (mg/cm^2)	Paint Condition	Classification
41	Kitchen	E	Locker	Blue	Metal	0.00	Intact	Negative
42		N	Door	Brown	Metal	0.00	Intact	Negative
43		N	Door Frame	Brown	Metal	0.00	Intact	Negative
44		W	Sink	White	Porcelain	0.00	Intact	Negative
45	Mechanical	E	Wall	White	Block	0.00	Intact	Negative
46		W	Wall	White	Drywall	0.00	Intact	Negative
47		-	Ceiling Deck	Grey	Metal	0.00	Intact	Negative
48		-	Ceiling I-Beam	Grey	Structural Steel	0.00	Intact	Negative
49		-	Ceiling Cross-Brace	Brown	Metal	0.00	Intact	Negative
50		W	Support Post	Grey	Metal	0.00	Intact	Negative
51	B-Wing Corridor	N	Wall	White	Drywall	0.00	Intact	Negative
52		S	Wall	White	Drywall	0.00	Intact	Negative
53		NE	Radiator	Tan	Metal	0.00	Intact	Negative
54	Classroom B-8	N	Door	Brown	Wood	0.00	Intact	Negative
55		N	Door Frame	Brown	Metal	0.00	Intact	Negative
56		S	Wall	White	Block	0.00	Intact	Negative
57		S	Bookcase	Blue	Wood	0.00	Intact	Negative
58		W	Locker	Blue	Wood	0.00	Intact	Negative
59	B-8 Restroom	-	Floor	Tan	Ceramic	0.00	Intact	Negative
60		N	Toilet	White	Porcelain	0.00	Intact	Negative
61		E	Door	Brown	Wood	0.00	Intact	Negative
62		E	Door Frame	Brown	Metal	0.00	Intact	Negative
63		N	Wall	Tan	Drywall	0.00	Intact	Negative
64		S	Baseboard	Brown	Ceramic	0.00	Intact	Negative
65	Classroom B-11	N	Wall	Tan	Drywall	0.00	Intact	Negative
66		S	Wall	White	Block	0.00	Intact	Negative
67		E	Locker	Blue	Wood	0.00	Intact	Negative
68		S	Bookcase	Blue	Wood	0.00	Intact	Negative
69		N	Door	Brown	Wood	0.00	Intact	Negative
70		N	Door Frame	Brown	Metal	0.00	Intact	Negative
71	B-11 Restroom	-	Floor	Tan	Ceramic	0.00	Intact	Negative
72		W	Baseboard	Brown	Ceramic	0.00	Intact	Negative
73		N	Wall	Grey	Drywall	0.00	Intact	Negative
74		N	Toilet	White	Porcelain	0.00	Intact	Negative
75		W	Door	Brown	Wood	0.00	Intact	Negative
76		W	Door Frame	Brown	Metal	0.00	Intact	Negative
77	Classroom B-14	W	Wall	Orange	Block	0.00	Intact	Negative
78		S	Wall	White	Block	0.00	Intact	Negative
79		W	Lower Cabinet	Blue	Wood	0.00	Intact	Negative
80		W	Upper Cabinet	Blue	Wood	0.00	Intact	Negative

Visual Assessment: Damaged Component(s):

Notes: Shaded readings indicate positive XRF readings.

INNOV-X Portable XRF Model #: A-4000 Serial #: 6253

mg/cm^2 = milligrams per square centimeter Shading - Indicates a result equal to or greater than 1.0 mg/cm^2

Pg. 3 of 7 Micro Air, Inc. INNOV-X Portable XRF & Visual Assessment Worksheet Job#: 40 - 18055 - B

Lead Inspector Name: Donald G. French Date: 10 / 20 / 2021 Lead Inspector License #: IND000034

Client Name: Shelbyville Central Schools, 1121 East State Road 44, Shelbyville, IN 46176

Property Address: Loper Elementary School, 901 Loper Drive, Shelbyville, Indiana 46176

Reading #	Room/Area	Wall	Component	Color	Substrate	XRF Reading (mg/cm^2)	Paint Condition	Classification
81	Classroom B-14	N	Door	Brown	Wood	0.00	Intact	Negative
82		N	Door Frame	Brown	Metal	0.00	Intact	Negative
83	1981 W Corridor	W	Wall	Yellow	Block	0.00	Intact	Negative
84		W	Wall	Blue	Block	0.00	Intact	Negative
85		E	Wall	Orange	Block	0.00	Intact	Negative
86		E	Storage Door	White	Metal	0.00	Intact	Negative
87		E	Storage Door Frame	White	Metal	0.02	Intact	Negative
88	LGI Room C-17	N	Wall	Orange	Block	0.00	Intact	Negative
89		W	Wall	White	Block	0.00	Intact	Negative
90		E	Wall	Blue	Block	0.00	Intact	Negative
91		S	Door	White	Metal	0.00	Intact	Negative
92		S	Door Frame	White	Metal	0.00	Intact	Negative
93	Music Room E-39	W	Wall	Tan	Block	0.00	Intact	Negative
94		W	Column	Tan	Metal	0.00	Intact	Negative
95		E	Door	Brown	Wood	0.00	Intact	Negative
96		E	Door Window Frame	Tan	Metal	0.00	Intact	Negative
97		E	Door Frame	Tan	Metal	0.00	Intact	Negative
98		N	Window Frame	Tan	Metal	0.00	Intact	Negative
99	Classroom E-38	E	Wall	White	Block	0.00	Intact	Negative
100		E	Cabinet	Blue	Wood	0.00	Intact	Negative
101		W	Door Frame	Tan	Metal	0.04	Intact	Negative
102	Classroom E-35	N	Wall	White	Block	0.00	Intact	Negative
103		N	Bookcase	White	Metal	0.00	Intact	Negative
104		S	Door Window Frame	Tan	Metal	0.01	Intact	Negative
105		S	Door Frame	White	Metal	0.09	Intact	Negative
106	Classroom D-32	N	Wall	White	Block	0.00	Intact	Negative
107		N	Bookcase	White	Metal	0.00	Intact	Negative
108		W	Electrical Cover	White	Metal	0.00	Intact	Negative
109		S	Door Window Frame	Tan	Metal	0.01	Intact	Negative
110		S	Door Frame	White	Metal	0.05	Intact	Negative
111	Classroom C-26	W	Wall	White	Block	0.00	Intact	Negative
112		W	Bookcase	White	Metal	0.00	Intact	Negative
113		S	Lower Cabinet	Blue	Wood	0.00	Intact	Negative
114		E	Door Window Frame	Tan	Metal	0.01	Intact	Negative
115		E	Door Frame	White	Metal	0.03	Intact	Negative
116	C-26 Restroom	-	Floor	Tan	Ceramic	0.00	Intact	Negative
117		S	Lower Wall	Tan	Ceramic	0.00	Intact	Negative
118		S	Upper Wall	Tan	Plaster	0.00	Intact	Negative
119		S	Baseboard	Brown	Ceramic	0.00	Intact	Negative
120		E	Sink	White	Porcelain	0.00	Intact	Negative

Visual Assessment: **Damaged Component(s):**

Notes: **Shaded readings indicate positive XRF readings.**

INNOV-X Portable XRF **Model #: A-4000** **Serial #: 6253**

mg/cm^2 = milligrams per square centimeter **Shading - Indicates a result equal to or greater than 1.0 mg/cm^2**

Pg. 4 of 7 Micro Air, Inc. INNOV-X Portable XRF & Visual Assessment Worksheet Job#: 40 - 18055 - B

Lead Inspector Name: Donald G. French Date: 10 / 20 / 2021 Lead Inspector License #: IND000034

Client Name: Shelbyville Central Schools, 1121 East State Road 44, Shelbyville, IN 46176

Property Address: Loper Elementary School, 901 Loper Drive, Shelbyville, Indiana 46176

Reading #	Room/Area	Wall	Component	Color	Substrate	XRF Reading (mg/cm^2)	Paint Condition	Classification
121	C-26 Restroom	E	Toilet	White	Porcelain	0.00	Intact	Negative
122		N	Door Frame	White	Metal	0.00	Intact	Negative
123	1960's W Girl's RR	N	Wall	Red	Block	1.41	Intact	Positive
124		S	Wall	White	Block	0.00	Intact	Negative
125		-	Floor	Tan	Ceramic	0.00	Intact	Negative
126		W	Toilet	White	Porcelain	0.00	Intact	Negative
127	1960's W Boy's RR	N	Wall	Blue	Block	1.31	Intact	Positive
128		W	Wall	Yellow	Block	0.00	Intact	Negative
129		-	Floor	Tan	Ceramic	0.00	Intact	Negative
130		N	Urinal	White	Porcelain	0.10	Intact	Negative
131		E	Toilet	White	Porcelain	0.00	Intact	Negative
132		E	Partition	Yellow	Metal	0.00	Intact	Negative
133	W Family Restroom	E	Wall	Yellow	Block	0.00	Intact	Negative
134		E	Radiator	Tan	Metal	0.03	Intact	Negative
135		-	Floor	Tan	Ceramic	0.00	Intact	Negative
136		N	Sink	White	Porcelain	0.01	Intact	Negative
137		N	Toilet	White	Porcelain	0.00	Intact	Negative
138		S	Door Frame	Tan	Metal	0.00	Intact	Negative
139	1960-1965 Lobby	S	Wall	Grey	Drywall	0.00	Intact	Negative
140		S	Door	Grey	Wood	0.00	Intact	Negative
141		S	Door Frame	Grey	Metal	0.08	Intact	Negative
142		E	Door	Grey	Metal	0.00	Intact	Negative
143		W	Case Frame	White	Wood	0.00	Intact	Negative
144		S	Window Frame	White	Metal	0.00	Intact	Negative
145		W	Bulkhead	Blue	Drywall	0.00	Intact	Negative
146	Office	N	Wall	Grey	Drywall	0.00	Intact	Negative
147		N	Window Frame	Grey	Metal	0.00	Intact	Negative
148		S	Cabinet	Blue	Wood	0.00	Intact	Negative
149	Teachers Workroom	W	Locker	Yellow	Metal	0.00	Intact	Negative
150		E	Cabinet	Blue	Wood	0.00	Intact	Negative
151	Conference Room	N	Wall	White	Drywall	0.00	Intact	Negative
152		W	Window Frame	Grey	Metal	0.00	Intact	Negative
153		W	Wall	Orange	Drywall	0.00	Intact	Negative
154	Office Restroom	N	Lower Wall	Tan	Ceramic	0.00	Intact	Negative
155		N	Upper Wall	Grey	Drywall	0.00	Intact	Negative
156		N	Wall Stripe	Orange	Drywall	0.00	Intact	Negative
157		N	Baseboard	Brown	Ceramic	0.00	Intact	Negative
158		-	Floor	Tan	Ceramic	0.00	Intact	Negative
159		S	Sink	White	Porcelain	0.00	Intact	Negative
160		S	Toilet	White	Porcelain	0.00	Intact	Negative

Visual Assessment: Damaged Component(s):

Notes: Lead-based paint on block walls were only identified in the 1960's west-wing restrooms .

INNOV-X Portable XRF Model #: A-4000 Serial #: 6253

mg/cm^2 = milligrams per square centimeter Shading - Indicates a result equal to or greater than 1.0 mg/cm^2

Pg. 5 of 7 Micro Air, Inc. INNOV-X Portable XRF & Visual Assessment Worksheet Job#: 40 - 18055 - B

Lead Inspector Name: Donald G. French Date: 10 / 20 / 2021 Lead Inspector License #: IND000034

Client Name: Shelbyville Central Schools, 1121 East State Road 44, Shelbyville, IN 46176

Property Address: Loper Elementary School, 901 Loper Drive, Shelbyville, Indiana 46176

Reading #	Room/Area	Wall	Component	Color	Substrate	XRF Reading (mg/cm^2)	Paint Condition	Classification
161	Office Hallway	W	Wall	Grey	Drywall	0.00	Intact	Negative
162		E	Window Frame	Grey	Metal	0.00	Intact	Negative
163		E	Door Frame	Grey	Metal	0.00	Intact	Negative
164	Gym	S	Wall	White	Block	0.00	Intact	Negative
165		S	Wall Stripe	Orange	Block	0.00	Intact	Negative
166		S	Column	White	Structural Steel	0.29	Intact	Negative
167		-	Floor	Brown	Wood	0.00	Intact	Negative
168		-	Floor Stripe	Black	Wood	0.00	Intact	Negative
169		-	Floor Stripe	Yellow	Wood	0.00	Intact	Negative
170		N	Bleacher Fence	Black	Metal	0.00	Intact	Negative
171		N	Bleacher Floor	Grey	Wood	0.00	Intact	Negative
172		N	Bleacher Frame	Black	Metal	0.00	Intact	Negative
173		N	Wall	White	Concrete	0.00	Intact	Negative
174		N	Fire Box	Red	Metal	0.00	Intact	Negative
175		N	Bulkhead	White	Plaster	0.00	Intact	Negative
176		N	Door	Blue	Metal	0.00	Intact	Negative
177		N	Door Frame	Blue	Metal	0.00	Intact	Negative
178		-	Basketball Frame	Red	Metal	0.00	Intact	Negative
179	Gym Girl's RR	N	Wall	White	Block	0.00	Intact	Negative
180		S	Wall	White	Drywall	0.00	Intact	Negative
181		E	Partition	White	Metal	0.00	Intact	Negative
182		S	Sink	White	Porcelain	0.00	Intact	Negative
183		S	Toilet	White	Porcelain	0.00	Intact	Negative
184		S	Door Frame	White	Metal	0.00	Intact	Negative
185	Gym Boy's RR	S	Wall	White	Brick	0.00	Intact	Negative
186		N	Wall	White	Drywall	0.00	Intact	Negative
187		N	Door Frame	White	Metal	0.00	Intact	Negative
188		E	Partition	White	Metal	0.00	Intact	Negative
189		N	Sink	White	Porcelain	0.00	Intact	Negative
190		N	Toilet	White	Porcelain	0.00	Intact	Negative
191	1960 SE Hallway	W	Lower Wall	White	Ceramic	0.00	Intact	Negative
192		W	Upper Wall	White	Plaster	0.00	Intact	Negative
193		W	Fire Box	White	Metal	0.04	Intact	Negative
194		S	Wall	Orange	Drywall	0.00	Intact	Negative
195		S	Door	White	Metal	0.00	Intact	Negative
196		S	Door Frame	White	Metal	0.00	Intact	Negative
197	SE Girl's Restroom	E	Lower Wall	Pink	Ceramic	0.00	Intact	Negative
198		E	Upper Wall	White	Plaster	0.00	Intact	Negative
199		E	Basebo9ard	Brown	Ceramic	0.00	Intact	Negative
200		N	Radiator	Tan	Metal	0.00	Intact	Negative

Visual Assessment: Damaged Component(s):

Notes: Shaded readings indicate positive XRF readings.

INNOV-X Portable XRF Model #: A-4000 Serial #: 6253

mg/cm^2 = milligrams per square centimeter Shading - Indicates a result equal to or greater than 1.0 mg/cm^2

Pg. 6 of 7 Micro Air, Inc. INNOV-X Portable XRF & Visual Assessment Worksheet Job#: 40 - 18055 - B

Lead Inspector Name: Donald G. French Date: 10 / 20 / 2021 Lead Inspector License #: IND000034

Client Name: Shelbyville Central Schools, 1121 East State Road 44, Shelbyville, IN 46176

Property Address: Loper Elementary School, 901 Loper Drive, Shelbyville, Indiana 46176

Reading #	Room/Area	Wall	Component	Color	Substrate	XRF Reading (mg/cm^2)	Paint Condition	Classification
201	SE Girl's Restroom	W	Sink	White	Porcelain	0.00	Intact	Negative
202		W	Toilet	White	Porcelain	2.38	Intact	Positive
203		W	Partition	Tan	Metal	0.00	Intact	Negative
204		E	Door Frame	White	Metal	0.00	Intact	Negative
205	SE Janitor Closet	N	Wall	Grey	Plaster	0.40	Intact	Negative
206		N	Slop Sink	White	Porcelain	0.00	Intact	Negative
207	SE Boy's Restroom	S	Lower Wall	Pink	Ceramic	0.00	Intact	Negative
208		S	Upper Wall	White	Plaster	0.00	Intact	Negative
209		S	Baseboard	Brown	Ceramic	0.00	Intact	Negative
210		W	Radiator	Tan	Metal	0.00	Intact	Negative
211		S	Sink	White	Porcelain	0.00	Intact	Negative
212		N	Urinal	White	Porcelain	2.25	Intact	Positive
213		N	Toilet	White	Porcelain	3.25	Intact	Positive
214		N	Partition	Tan	Metal	0.00	Intact	Negative
215		E	Door Frame	Tan	Metal	0.04	Intact	Negative
216	Classroom A-2	S	Wall	Tan	Plaster	0.08	Intact	Negative
217		W	Bookcase	Grey	Metal	0.00	Intact	Negative
218		E	Door Window Frame	Tan	Metal	0.00	Intact	Negative
219		E	Door Frame	White	Metal	0.19	Intact	Negative
220	Classroom A-3	N	Wall	White	Plaster	0.00	Intact	Negative
221		-	HVAC Vent	Tan	Metal	0.00	Intact	Negative
222		E	Radiator	White	Metal	0.00	Intact	Negative
223	Classroom C-17	S	Wall	White	Plaster	0.12	Intact	Negative
224	C-17 Restroom	N	Lower Wall	Pink	Ceramic	0.00	Intact	Negative
225		N	Upper Wall	Grey	Plaster	0.00	Intact	Negative
226		W	Toilet	White	Porcelain	0.08	Intact	Negative
227		S	Door Frame	White	Metal	0.00	Intact	Negative
228	Southwest Hallway	E	Lower Wall	White	Ceramic	0.00	Intact	Negative
229		E	Upper Wall	Grey	Plaster	0.00	Intact	Negative
230		W	Upper Wall	White	Plaster	0.12	Intact	Negative
231	1960's W Boy's RR	W	Lower Wall	Grey	Ceramic	0.02	Intact	Negative
232		W	Lower Wall	Pink	Ceramic	0.00	Intact	Negative
233		W	Upper Wall	Yellow	Drywall	0.02	Intact	Negative
234		W	Upper Wall	White	Plaster	0.00	Intact	Negative
235		S	HVAC Duct	Grey	Metal	0.03	Intact	Negative
236		N	Urinal	White	Porcelain	4.32	Intact	Positive
237	Gym Mech. Rm	N	Wall	Tan	Block	0.00	Intact	Negative
238		N	Fire Door	Tan	Metal	>5.00	Intact	Positive
239		S	Cabinet	Grey	Wood	0.25	Intact	Negative
240		S	Slop Sink	White	Porcelain	0.00	Intact	Negative

Visual Assessment: Damaged Component(s):

Notes: Positive toilets have green "Standard" brand label. *(Not "American Standard")*

INNOV-X Portable XRF Model #: A-4000 Serial #: 6253

mg/cm^2 = milligrams per square centimeter Shading - Indicates a result equal to or greater than 1.0 mg/cm^2

Pg. 7 of 7 Micro Air, Inc. INNOV-X Portable XRF & Visual Assessment Worksheet Job#: 40 - 18055 - B

Lead Inspector Name: Donald G. French Date: 10 / 20 / 2021 Lead Inspector License #: IND000034

Client Name: Shelbyville Central Schools, 1121 East State Road 44, Shelbyville, IN 46176

Property Address: Loper Elementary School, 901 Loper Drive, Shelbyville, Indiana 46176

Reading #	Room/Area	Wall	Component	Color	Substrate	XRF Reading (mg/cm^2)	Paint Condition	Classification
241	Gym Mech. Rm	W	Door	Brown	Metal	0.09	Intact	Negative
242		W	Door Frame	Green	Metal	0.08	Intact	Negative
243	1960's EW Hallway	N	Window Frame	White	Metal	0.13	Intact	Negative
244		N	Wall	White	Block	0.00	Intact	Negative
245		N	Wall Stripe	Orange	Block	0.00	Intact	Negative
246		S	Lower Wall	White	Ceramic	0.00	Intact	Negative
247		S	Upper Wall	White	Plaster	0.06	Intact	Negative

Visual Assessment: Damaged Component(s):

Notes: **Shaded readings indicate positive XRF readings.**

INNOV-X Portable XRF Model #: A-4000 Serial #: 6253

mg/cm^2 = milligrams per square centimeter Shading - Indicates a result equal to or greater than 1.0 mg/cm^2

Micro Air Inc.
6320 La Pas Trail
Indianapolis, Indiana 46268
(317) 293-1533
FAX (317) 290-3566

E-MAIL: microair@microair.com
WEB SITE: http://www.microair.com

CALIBRATION CHECK TEST RESULTS

Address/Unit No. Loper Elementary School, Shelbyville, IN 46176 Job #: 40-18055-B

Device: INNOV-X Portable XRF

Date: 10/20/2021 XRF Serial No. 6253

Contractor: Micro Air, Inc.

Inspector Name: Donald G. French Signature: Donald G. French

NIST SRM Used 1.0 mg/cm^2 **Calibration Check Tolerance Used + - 0.1 mg/cm^2**

First Calibration Check Time: 09:21 am

First Reading	Second Reading	Third Reading	First Average	Difference Between Average and NIST SRM*
1.07	1.04	1.01	1.04	0.07

Second Calibration Check Time: 12:32 pm

First Reading	Second Reading	Third Reading	First Average	Difference Between Average and NIST SRM*
1.01	1.04	0.99	1.04	0.04

Third Calibration Check Time:

First Reading	Second Reading	Third Reading	First Average	Difference Between Average and NIST SRM*

Fourth Calibration Check (if required) Time:

First Reading	Second Reading	Third Reading	First Average	Difference Between Average and NIST SRM*

*If the difference of the Calibration Check Average from the NIST SRM film value is Greater than the specified Calibration Check Tolerance for this device, consult the manufacturer'

Performance Characteristic Sheet

EFFECTIVE DATE: **December 1, 2006** **EDITION NO.: 1**

MANUFACTURER AND MODEL:

Make: ***Innov-X Systems, Inc.***
Models: ***LBP4000 with software version 1.4 and higher***
Source: ***X-ray tube***

FIELD OPERATION GUIDANCE

OPERATING PARAMETERS:

Inspection mode, variable reading time.

XRF CALIBRATION CHECK LIMITS:

1.0 to 1.1 mg/cm^2 (inclusive)

SUBSTRATE CORRECTION:

Not applicable

INCONCLUSIVE RANGE OR THRESHOLD:

INSPECTION MODE READING DESCRIPTION	SUBSTRATE	INCONCLUSIVE RANGE (mg/cm^2)
Results not corrected for substrate bias on any substrate	Brick	0.6 to 1.1
	Concrete	0.6 to 1.1
	Drywall	0.6 to 1.1
	Metal	0.6 to 1.1
	Plaster	0.6 to 1.1
	Wood	0.6 to 1.1

BACKGROUND INFORMATION

EVALUATION DATA SOURCE AND DATE:

This sheet is supplemental information to be used in conjunction with Chapter 7 of the HUD *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing* ("HUD Guidelines"). Performance parameters shown on this sheet are calculated from the EPA/HUD evaluation using archived building components. Testing was conducted on 146 test locations, with two separate instruments, in December 2005.

OPERATING PARAMETERS:

Performance parameters shown in this sheet are applicable only when properly operating the instrument using the manufacturer's instructions and procedures described in Chapter 7 of the HUD Guidelines.

XRF CALIBRATION CHECK:

The calibration of the XRF instrument should be checked using the paint film nearest 1.0 mg/cm^2 in the NIST Standard Reference Material (SRM) used (e.g., for NIST SRM 2579, use the 1.02 mg/cm^2 film).

If the average (rounded to 1 decimal place) of three readings is outside the acceptable calibration check range, follow the manufacturer's instructions to bring the instrument into control before XRF testing proceeds.

SUBSTRATE CORRECTION VALUE COMPUTATION:

Chapter 7 of the HUD Guidelines provides guidance on correcting XRF results for substrate bias. Supplemental guidance for using the paint film nearest 1.0 mg/cm^2 for substrate correction is provided:

XRF results are corrected for substrate bias by subtracting from each XRF result a correction value determined separately in each house for single-family housing or in each development for multifamily housing, for each substrate. The correction value is an average of XRF readings taken over the NIST SRM paint film nearest to 1.0 mg/cm^2 at test locations that have been scraped bare of their paint covering. Compute the correction values as follows:

Using the same XRF instrument, take three readings on a bare substrate area covered with the NIST SRM paint film nearest 1 mg/cm^2. Repeat this procedure by taking three more readings on a second bare substrate area of the same substrate covered with the NIST SRM.

Compute the correction value for each substrate type where XRF readings indicate substrate correction is needed by computing the average of all six readings as shown below.

For each substrate type (the 1.02 mg/cm^2 NIST SRM is shown in this example; use the actual lead loading of the NIST SRM used for substrate correction):

Correction value = (1st + 2nd + 3rd + 4th + 5th + 6th *Reading*) / 6 - 1.02 mg/cm^2

Repeat this procedure for each substrate requiring substrate correction in the house or housing development.

EVALUATING THE QUALITY OF XRF TESTING:

Randomly select ten testing combinations for retesting from each house or from two randomly selected units in multifamily housing.

Conduct XRF re-testing at the ten testing combinations selected for retesting.

Determine if the XRF testing in the units or house passed or failed the test by applying the steps below.

Compute the Retest Tolerance Limit by the following steps:

Determine XRF results for the original and retest XRF readings. Do not correct the original or retest results for substrate bias. In single-family and multi-family housing, a result is defined as a single reading. Therefore, there will be ten original and ten retest XRF results for each house or for the two selected units.

Calculate the average of the original XRF result and the retest XRF result for each testing combination.

Square the average for each testing combination.

Add the ten squared averages together. Call this quantity C.

Multiply the number C by 0.0072. Call this quantity D.

Add the number 0.032 to D. Call this quantity E.

Take the square root of E. Call this quantity F.

Multiply F by 1.645. The result is the Retest Tolerance Limit.

Compute the average of all ten original XRF readings.

Compute the average of all ten re-test XRF readings.

Find the absolute difference of the two averages.

If the difference is less than the Retest Tolerance Limit, the inspection has passed the retest. If the difference of the overall averages equals or exceeds the Retest Tolerance Limit, this procedure should be repeated with ten new testing combinations. If the difference of the overall averages is equal to or greater than the Retest Tolerance Limit a second time, then the inspection should be considered deficient.

Use of this procedure is estimated to produce a spurious result approximately 1% of the time. That is, results of this procedure will call for further examination when no examination is warranted in approximately 1 out of 100 dwelling units tested.

TESTING TIMES:

For the variable-time inspection paint test mode, the instrument continues to read until it has determined whether the result is positive or negative (with respect to the 1.0 mg/cm^2 Federal standard), with 95% confidence. The following table provides testing time information for this testing mode.

Testing Times Using Variable Reading Time Inspection Mode (Seconds)						
	All Data			Median for laboratory-measured lead levels (mg/cm^2)		
Substrate	25th Percentile	Median	75th Percentile	Pb < 0.25	0.25 ≤ Pb < 1.0	1.0 ≤ Pb
Wood, Drywall	2.1	2.3	5.4	2.2	5.4	2.2
Metal	2.6	3.2	5.3	2.7	5.1	5.1
Brick, Concrete, Plaster	3.1	4.0	5.7	3.2	4.0	5.9

CLASSIFICATION OF RESULTS:

When an inconclusive range is specified on the *Performance Characteristic Sheet*, XRF results are classified as positive if they are greater than the upper boundary of the inconclusive range, negative if they are less than the lower boundary of the inconclusive range, or inconclusive if in between. The inconclusive range includes both its upper and lower bounds. If the instrument reads "> x mg/cm^2", the value "x" should be used for classification purposes, ignoring the ">". For example, a reading reported as ">1.0 mg/cm^2" is classified as 1.0 mg/cm^2, or inconclusive. When the inconclusive range reported in this PCS is used to classify the readings obtained in the EPA/HUD evaluation, the following False Positive, False Negative and Inconclusive rates are obtained:

FALSE POSITIVE RATE: 2.5% (2/80)

FALSE NEGATIVE RATE: 1.9% (4/212)

INCONCLUSIVE RATE: 16.4% (48/212)

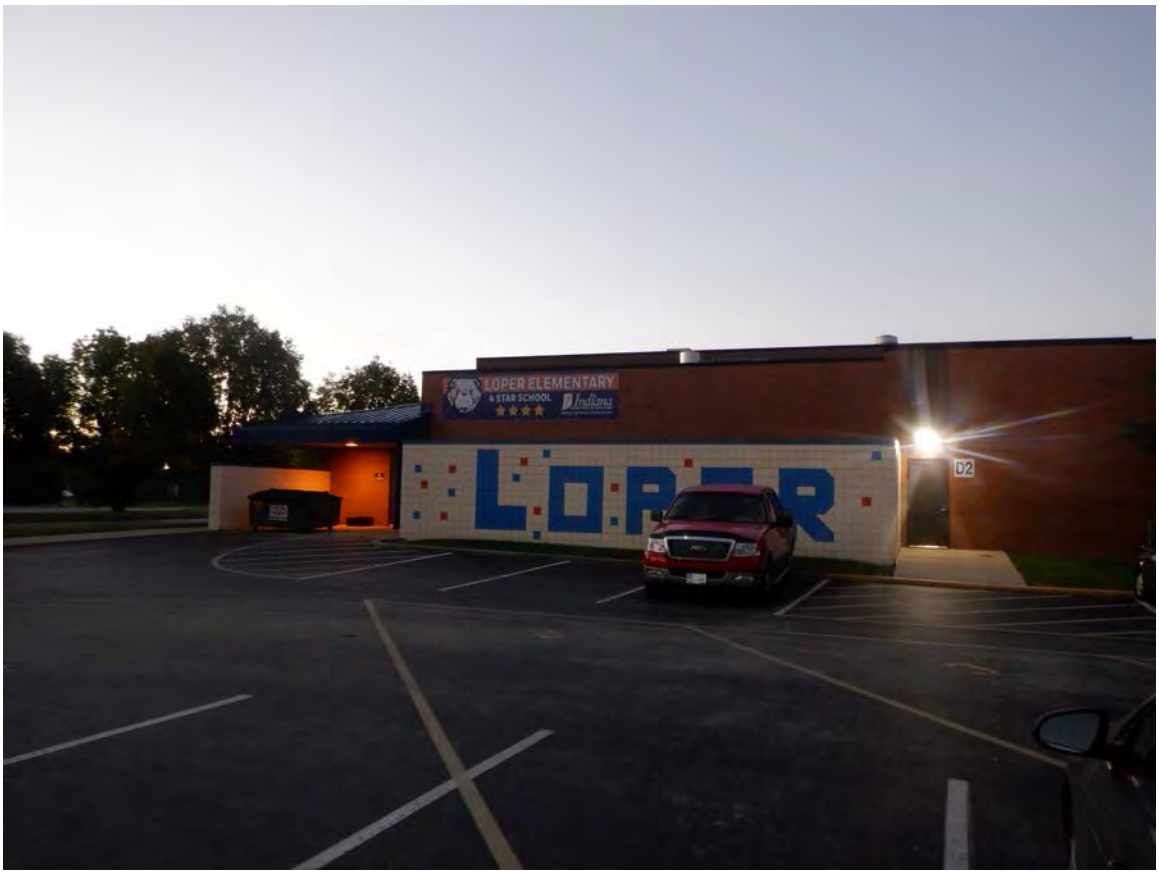
DOCUMENTATION:

A document titled *Methodology for XRF Performance Characteristic Sheets* provides an explanation of the statistical methodology used to construct the data in the sheets, and provides empirical results from using the recommended inconclusive ranges or thresholds for specific XRF instruments. For a copy of this document call the National Lead Information Center Clearinghouse at 1-800-424-LEAD.

This XRF Performance Characteristic Sheet was developed by the Midwest Research Institute (MRI) and QuanTech, Inc., under a contract between MRI and the XRF manufacturer. XRF Performance Characteristic Sheets were originally developed by the MRI under a grant from the U. S. Environmental Protection Agency and the U.S. Department of Housing and Urban Development. HUD has determined that the information provided here is acceptable when used as guidance in conjunction with Chapter 7, Lead-Based Paint Inspection, of HUD's *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*.

TAB 3

PHOTOGRAPHS



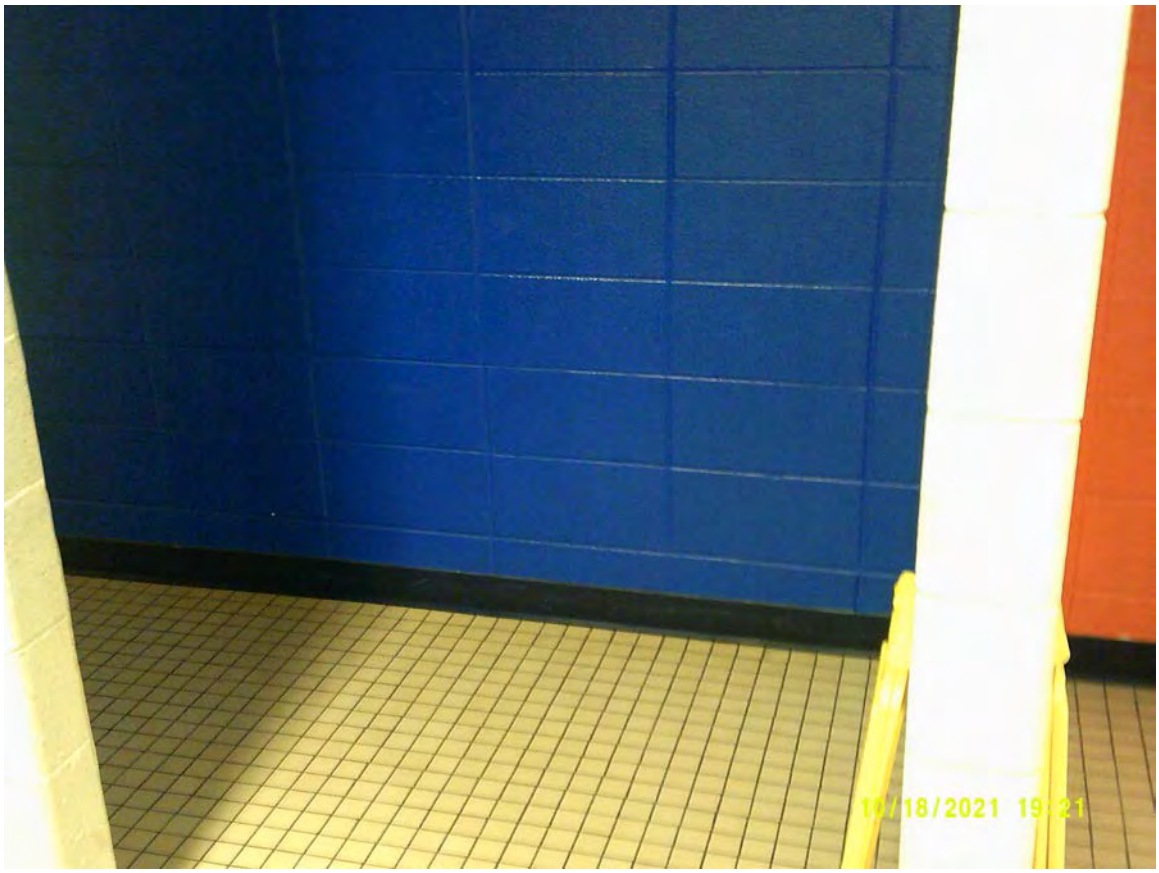
Loper Elementary School
901 Loper Drive
Shelbyville, Indiana 46176
Exterior Photo

1960's Exterior – East Side
Blue, Metal Awning Post
Known, Lead-Based Paint
(1.33 mg/cm^2)

Note: No lead-based paint was identified in the blue metal downspouts.

1960's West Girl's Restroom
Red, Concrete Block Wall
Known, Lead-Based Paint
(1.41 mg/cm^2)

Note: The actual lead-based paint is assumed to be covered with newer latex paint.



1960's West Boy's Restroom
Blue, Concrete Block Wall
Known, Lead-Based Paint
(1.31 mg/cm^2)

Note: The actual lead-based paint is assumed to be covered with newer latex paint.

1960's East Wing Boy's and Girl's Restrooms
White, Porcelain Toilet
Known, Lead-Containing Glazing
(2.38 mg/cm² - 3.25 mg/cm²)

Note: Lead-containing porcelain toilets all have the "Standard" label.

1960's Construction Boy's Restrooms
White, Porcelain Urinals
Known, Lead-Containing Glazing
(2.25 mg/cm² - 4.32 mg/cm²)

Note: Two styles of lead-containing porcelain toilets were identified. No brand label was identified on one style and the other had the "Standard" brand label.

Gym Mechanical Room
Tan, Metal Rolling Fire Door
Known, Lead-based Paint
(>5.00 mg/cm^2)

TAB 4

CERTIFICATIONS

August 9, 2019

Based upon the review of your license application, the Indiana Lead and Healthy Homes Program has determined that you have fulfilled the requirements of 410 IAC 32 and are eligible for licensing in the following lead-based discipline: Lead Inspector

Enclosed is your Lead Inspector license card. This card must be available for review at all times while you are implementing a lead-based project.

This license may be revoked, pursuant to 410 IAC 32-2-8, if you:

(1) Violate any requirements of these rules (410 IAC 32), or any other federal, state, or local regulation pertaining to lead-based paint activities.
(2) Falsify information on your application for licensing.
(3) Fail to meet any qualifications specified in 410 IAC 32.
(4) Conduct a lead-based paint project, or related lead-based activity, in a manner that is hazardous to the public health.

Your license is valid effective 08/16/2007, and will expire on 08/16/2022, as indicated on your card. We suggest that you attend the required training and submit an application for license renewal early to insure your license does not lapse. In order to avoid re-taking the initial training course, you must attend a refresher in the discipline you are seeking a license within three (3) years from the date of issuance of your last training course certificate.

Indiana State Department of Health

Donald G. French

Lead Inspector License # IND000034

Effective: 08/16/2007	Expiration: 08/16/2022
Birth Date: 07/16/1960	Gender: M
Height: 5-11	Eye Color: Green
Weight: 180	Hair Color: Brown

STATE FORM 49122 (R2 / 10-19)

Indiana State Department of Health
100 N. Senate Avenue, N865
Indianapolis, Indiana 46204

Lead Inspector

Certificate Number	Expiration Date
IND000034	08/16/2022

Donald G. French

Kristina Box, MD, FACOG

Kristina Box, MD, FACOG
State Health Commissioner
Indiana State Department of Health

STATE FORM 49122 (R2 / 10-19)

August 9, 2019

Based upon the review of your license application, the Indiana Lead and Healthy Homes Program has determined that you have fulfilled the requirements of 410 IAC 32 and are eligible for licensing in the following lead-based discipline: Lead Risk Assessor

Enclosed is your Lead Risk Assessor license card. This card must be available for review at all times while you are implementing a lead-based project.

This license may be revoked, pursuant to 410 IAC 32-2-8, if you:

(1) Violate any requirements of these rules (410 IAC 32), or any other federal, state, or local regulation pertaining to lead-based paint activities.
(2) Falsify information on your application for licensing.
(3) Fail to meet any qualifications specified in 410 IAC 32.
(4) Conduct a lead-based paint project, or related lead-based activity, in a manner that is hazardous to the public health.

Your license is valid effective 08/16/2007, and will expire on 08/16/2022, as indicated on your card. We suggest that you attend the required training and submit an application for license renewal early to insure your license does not lapse. In order to avoid re-taking the initial training course, you must attend a refresher in the discipline you are seeking a license within three (3) years from the date of issuance of your last training course certificate.

Indiana State Department of Health

Donald G. French

Lead Risk Assessor License # IND000033

Effective: 08/16/2007	Expiration: 08/16/2022
Birth Date: 07/16/1960	Gender: M
Height: 5-11	Eye Color: Green
Weight: 180	Hair Color: Brown

Indiana State Department of Health
100 N. Senate Avenue, N855
Indianapolis, Indiana 46204

Lead Risk Assessor

Certificate Number	Expiration Date
IND000033	08/16/2022

Donald G. French

Kristina Box, MD, FACOG
Kristina Box, MD, FACOG
State Health Commissioner
Indiana State Department of Health

STATE FORM 49122 (R2 / 10-18)

LANCER + BEEBE, LLC
Project # 21140

ADDENDUM NO. TWO

PROJECT: Shelbyville Central Schools – 2022 Loper Elementary Renovation

PROJECT NUMBER: 21140

DATE OF ADDENDUM: April 27, 2022

THIS ADDENDUM FORMS A PART OF THE CONTRACT DOCUMENTS AND IS ISSUED IN ACCORDANCE WITH THE INSTRUCTIONS TO BIDDERS. ACKNOWLEDGE RECEIPT OF THIS ADDENDUM BY SIGNING THE ADDENDUM ACKNOWLEDGMENT SECTION OF THE BID FORM.

QUESTIONS:

Q: Specifications indicate monolithic tops both plastic laminate and solid surface. This is all one piece countertop with integral coved backsplash. Can this be a loose set-on backsplash and non-monolithic for both the plastic laminate and solid surface tops?

A: Yes

Q: We need some clarification on the butcher block shelves that are called out in the section cut 7/A766. Are these supposed to be real wood butcher block?

A: Switch all of the butcher block to PL-1.

LANCER + BEEBE, LLC
Project # 21140

SPECIFICATIONS:

1. Spec Section: 12 32 16
   Spec Title: Plastic Laminate Casework

   Add preapproved manufacturers Midwest Cabinet Solutions

2. Spec Section: 08 11 13
   Spec Title: Steel Doors

   Add preapproved manufacturers De La Fontaine

3. Spec Section: 08 12 13
   Spec Title: Steel Frames

   Add preapproved manufacturers De La Fontaine

4. Spec Section: 09 84 10
   Spec Title: Fabric Wall Panels

   Add preapproved manufacturers J2 PET Felt Panels

5. Spec Section: 08 71 00
   Spec Title: Door Hardware and Index

   Replace entire spec sections with attached document

DRAWINGS:

1. Drawing Sheet Number: A601
   Drawing Sheet Title: Door Schedule
   Change:

   - Add OVT Hardware Set number for G1.1 and G15.1

2. Drawing Sheet Number: A720
   Drawing Sheet Title: Interior Finish Legend
   Change:

   - Add RS-1, RSB-1, and AP-4 to Finish Legend

3. Drawing Sheet Number: A766
   Drawing Sheet Title: Casework Details
   Change:

   - Change note on detail 7 from "3/4" Butcher Block" to be "3/4" Plastic Laminate Shelving"

   Attachments:

   Spec Section 08 71 00

   MEP Addendum Two Attachment

   END OF ADDENDUM NO. TWO

CIRCLE DESIGN GROUP

ADDENDUM NUMBER: 2

PROJECT NAME: Loper Elementary School

PROJECT NO.: 21102.B

ISSUED FROM	ISSUE DATE	BID DATE
Circle Design Group	April 26, 2022	05/11/2022

This Addendum No. 2 to the drawings and specification shall supplement, amend, and become a part of the bidding documents, plans, and specifications. All bids and construction contracts shall be based on these modifications to the original contract documents.

PART 1. BIDDING AND CONTRACT DOCUMENTS

1.01

A.

PART 2. SPECIFICATIONS

2.01 Division 23 Add the following sections to the Bidding Documents:
- A. 23 09 13 Instrumentation and Control Devices
- B. 23 09 93 Sequence of Operation

2.02 Section 23 62 23 Water Chillers
- A. ADD Smardt to the list of acceptable manufacturers.

2.03 Section 23 81 11 Ductless Split Systems
- A. ADD Daikin to the list of acceptable manufacturers.

2.04 Section 23 82 19 Fan Coil Units
- A. ADD Daikin to the list of acceptable manufacturers.

2.05 Section 28 31 00 Addressable Fire Alarm System
- A. Under 2.01 MANUFACTURERS, delete Simplex and add Siemens.

PART 3. DRAWINGS

3.01 ED101A – First Floor Electrical Demo Plan – Unit A
- A. Revise Sheet Plan Notes #2 and #3.
- B. Add Sheet Plan Notes #12 and #13

3.02 ED101B – First Floor Electrical Demo Plan – Unit B
- A. Revise Sheet Plan Notes #2 and #3.
- B. Add Sheet Plan Note #8.

3.03 ED101C – First Floor Electrical Demo Plan – Unit C
- A. Revise Sheet Plan Note #2.

3.04 EL101A – First Floor Lighting Plan – Area A
- A. Revise reflected ceiling plan background.
- B. Office G16: Change (2) light fixture type ‘L4’ to ‘L2’.
- C. Office G17: Change (2) light fixture type ‘L6’ to ‘L3’.
- D. Toilet G52: Add Sheet Plan Note #9.
- E. Toilet G50: Add Sheet Plan Note #9.

3.05 EL101B – First Floor Lighting Plan – Area B
- A. Vest G7: Change light fixture type ‘L3’ to ‘L6’ and add Sheet Plan Note #3.

3.06 EP101A – First Floor Power Plan – Area A

address
9229 Delegates Row, Suite 150
Indianapolis, IN 46240

phone
317.781.6200

A. Add Plan Note #28
B. Add HWP #2 to panel EMSB

3.07 EP101B – Electrical Power Plan – Area B
A. Add Plan Note #13

3.08 E-501 – Electrical Schedules
A. Luminaire Schedule
I. Revise Base Manufacturer information for light fixture type ‘L14-8”.
II. Revise Equal Manufacturer for light fixture types: ‘L17’, ‘S4’, ‘X1’ and ‘X2’.

3.09 E-502 – Electrical Schedules
A. Update equipment names, power requirements, feeder requirements of mechanical equipment on motorized equipment schedule
B. Update breaker sizes on EMSB

3.010 H-102 – OVERALL HVAC ROOF PLAN
A. Change RTU-A1, RTU-B1, RTU-B2 tags to DOAS-A1, DOAS-B1, DOAS-B2.
B. Revise Sheet Plan Note #5

3.011 HD102 – OVERALL HVAC ROOF PLAN
A. Identify existing roof curbs below EX-HEX on Unit B roof.
B. Add Sheet Plan Note #5.

3.012 H-501
A. Revise Air Handling Unit Schedule
I. Remove RTU-A1, RTU -B1, RTU -B2
II. Revise schedule notes
B. Add Air to Air Energy Recovery Unit Schedule.
C. Change RTU-A1, RTU-B1, RTU -B2 mark to DOAS-A1, -B1, -B2 and populate Air to Air Energy Recovery Unit Schedule
I. Note: Equipment does not change. Scheduled separately for clarity.
D. Revise Air-Cooled Chiller schedule.
E. Revise Pump Schedule
F. Revise Expansion Tank Schedule.
G. Revise Air Dirt Separator Schedule.
H. Add schedule note to Fan Schedule.

3.013 H-502
A. Add schedule note to Fan Coil Unit Schedule.
B. Revise Ductless Split Air Conditioner Schedule Notes.
C. Add schedule notes to Hydronic Convector Schedule.
D. Add schedule note to Radiant Ceiling Panel Schedule.

ATTACHMENTS

Specifications: 23 09 19 23 09 93

Drawings: ED101A, ED101B, ED101C, EL101A, EL101B, EP101A, EP101B, E-501, E-502, H-102, HD102, H-501, H-502

END OF ADDENDUM

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware
2. Electronic access control system components
3. Field verification, preparation and modification of existing doors and frames to receive new door hardware.

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section "Alternates" for alternates affecting this section.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:

    a. "Metal Doors and Frames"
    b. "Flush Wood Doors"
    c. "Aluminum-Framed Entrances and Storefronts"

6. Division 09 sections for touchup, finishing or refinishing of existing openings modified by this section.
7. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
8. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL - Underwriters Laboratories

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule
2. Recommended Locations for Builders Hardware
3. Keying Systems and Nomenclature
4. Installation Guide for Doors and Hardware

C. NFPA – National Fire Protection Association

1. NFPA 70 – National Electric Code
2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
3. NFPA 101 – Life Safety Code
4. NFPA 105 – Smoke and Draft Control Door Assemblies
5. NFPA 252 – Fire Tests of Door Assemblies

D. ANSI - American National Standards Institute

1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:

a. Comply with procedures for verifying existing door and frame compatibility for new hardware, as specified in PART 3, "EXAMINATION" article, herein.
b. Review drawings and Sections from related trades to verify compatibility with specified hardware.
c. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:

a. Wiring Diagrams: For power, signal, and control wiring and including:
1) Details of interface of electrified door hardware and building safety and security systems.
2) Schematic diagram of systems that interface with electrified door hardware.
3) Point-to-point wiring.
4) Risers.

3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.

    a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.

4. Door Hardware Schedule:

    a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
    b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
    c. Indicate complete designations of each item required for each opening, include:
        1) Door Index: door number, heading number, and Architect's hardware set number.
        2) Quantity, type, style, function, size, and finish of each hardware item.
        3) Name and manufacturer of each item.
        4) Fastenings and other pertinent information.
        5) Location of each hardware set cross-referenced to indications on Drawings.
        6) Explanation of all abbreviations, symbols, and codes contained in schedule.
        7) Mounting locations for hardware.
        8) Door and frame sizes and materials.
        9) Degree of door swing and handing.
        10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.

5. Key Schedule:

    a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
    b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
    c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
    d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
    e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
    f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.

C. Informational Submittals:

1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
2. Provide Product Data:

a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
b. Include warranties for specified door hardware.

D. Closeout Submittals:

1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:

a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
b. Catalog pages for each product.
c. Final approved hardware schedule edited to reflect conditions as installed.
d. Final keying schedule
e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:

a. fire door assemblies, in compliance with NFPA 80.
b. required egress door assemblies, in compliance with NFPA 101.

1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:

a. For door hardware: DHI certified AHC or DHC.
b. Can provide installation and technical data to Architect and other related subcontractors.
c. Can inspect and verify components are in working order upon completion of installation.
d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.

4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:

a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
b. Provide only items of door hardware that are listed products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.

2. Smoke and Draft Control Door Assemblies:

a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105
b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.

3. Electrified Door Hardware

a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.

4. Accessibility Requirements:

a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.

C. Pre-Installation Meetings

1. Keying Conference

a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
2) Preliminary key system schematic diagram.
3) Requirements for key control system.
4) Requirements for access control.
5) Address for delivery of keys.

2. Pre-installation Conference

a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
b. Inspect and discuss preparatory work performed by other trades.
c. Inspect and discuss electrical roughing-in for electrified door hardware.
d. Review sequence of operation for each type of electrified door hardware.

e. Review required testing, inspecting, and certifying procedures.
f. Review questions or concerns related to proper installation and adjustment of door hardware.

3. Electrified Hardware Coordination Conference:

a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

1.06 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.
E. Existing Openings: Where existing doors, frames and/or hardware are to remain, field verify existing functions, conditions and preparations and coordinate to suit opening conditions and to provide proper door operation.

1.07 WARRANTY

A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.

1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.

a. Mechanical Warranty

1) Locks: 3 Years
2) Exit Devices: 3 Years
3) Closers: 30 Years
4) Automatic Operators: 2 Years
5) Continuous Hinges: Lifetime

b. Electrical Warranty
1) Locks: 1 year
2) Exit Devices: 1 year

1.08 MAINTENANCE

A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
B. Turn over unused materials to Owner for maintenance purposes.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. The Owner requires use of certain products for their unique characteristics and project suitability to ensure continuity of existing and future performance and maintenance standards. After investigating available product offerings, the Awarding Authority has elected to prepare proprietary specifications. These products are specified with the notation: "No Substitute."

1. Where "No Substitute" is noted, submittals and substitution requests for other products will not be considered.

B. Approval of manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category shall be in accordance with QUALITY ASSURANCE article, herein.
C. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
D. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

2.02 MATERIALS

A. Fabrication

1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer's recognized installation standards for application intended.
2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.

3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with "Metal Doors and Frames", "Flush Wood Doors", "Stile and Rail Wood Doors" to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.

B. Modification and Preparation of Existing Doors: Where existing door hardware is indicated to be removed and reinstalled.

1. Provide necessary fillers, Dutchmen, reinforcements, and fasteners, compatible with existing materials, as required for mounting new opening hardware and to cover existing door and frame preparations.
2. Use materials which match materials of adjacent modified areas.
3. When modifying existing fire-rated openings, provide materials permitted by NFPA 80 as required to maintain fire-rating.

C. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.

1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.

2.03 HINGES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Ives (IVE) 5BB series

2. Acceptable Manufacturers and Products:

a. Hager BB series
b. McKinney TA/T4A series

B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. Hinge Height:

a. 1-3/4 inch (44 mm) thick doors up to 36 inches (914 mm) wide: 4-1/2 inches (114 mm) high
b. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide: 4-1/2 inches (114 mm) high
c. 2 inches or thicker doors: 5 inches (127 mm) high, regardless of door width

4. Hinge width: 4-1/2 inches (114 mm) wide typical. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
5. Hinge quantity: Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
6. Where new hinges are specified for existing doors or existing frames, provide new hinges of identical size to hinge preparation present in existing door or existing frame.
7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

a. Steel Hinges: Steel pins

b. Non-Ferrous Hinges: Stainless steel pins
c. Out-Swinging Exterior Doors: Non-removable pins
d. Out-Swinging Interior Lockable Doors: Non-removable pins
e. Interior Non-lockable Doors: Non-rising pins

8. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to Accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

2.04 CONTINUOUS HINGES

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives (IVE)

2. Acceptable Manufacturers:

a. Select
b. Pemko

B. Requirements:

1. Provide aluminum geared continuous hinges conforming to ANSI/BHMA A156.26, Grade 1.
2. Provide aluminum geared continuous hinges, where specified in the hardware sets, fabricated from 6063-T6 aluminum.
3. Provide split nylon bearings at each hinge knuckle for quiet, smooth, self-lubricating operation.
4. Provide hinges capable of supporting door weights up to 450 pounds, and successfully tested for 1,500,000 cycles.
5. On fire-rated doors, provide aluminum geared continuous hinges classified for use on rated doors by testing agency acceptable to authority having jurisdiction.
6. Provide aluminum geared continuous hinges with electrified option scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
7. Provide hinges 1 inch (25 mm) shorter in length than nominal height of door, unless otherwise noted or door details require shorter length and with symmetrical hole pattern.

2.05 ELECTRIC POWER TRANSFER

A. Manufacturers:

1. Scheduled Manufacturer and Product:

a. Von Duprin (VON) EPT-10

2. Acceptable Manufacturers and Products:

a. No Substitute

B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

2.06 FLUSH BOLTS

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives (IVE)

2. Acceptable Manufacturers:

a. Rockwood
b. Trimco

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide flush bolts designed, tested, and warrantied for door material and door manufacturer. Provide dust-proof strikes at each bottom flush bolt.

2.07 COORDINATORS

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives (IVE)

2. Acceptable Manufacturers:

a. Rockwood
b. Trimco

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes, or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

2.08 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Marshall Best Security (MBS) - RS Series

2. Acceptable Manufacturers and Products:

a. No Substitute

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.
2. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
3. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
4. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
5. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
6. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide a request to exit (RX) switch that is actuated with rotation of inside lever.
7. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.

a. Lever Design: Sentinel (S).

2.09 EXIT DEVICES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Von Duprin (VON) 99 series

2. Acceptable Manufacturers and Products:

a. No Substitute

B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide grooved touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.
4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.

5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide exit devices with weather resistant components that can withstand harsh conditions of various climates and corrosive cleaners used in outdoor pool environments.
7. Provide flush end caps for exit devices.
8. Provide exit devices with manufacturer's approved strikes.
9. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
10. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
11. Verify exit device functions with owner prior to ordering.
12. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
13. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
14. Provide electrified options as scheduled.
15. Top latch mounting: double- or single-tab mount for steel doors, face mount for aluminum doors eliminating requirement of tabs, and double tab mount for wood doors.
16. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

2.10 ELECTRIC STRIKES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Von Duprin 6000 Series

2. Acceptable Manufacturers and Products:

a. No Substitute

B. Requirements:

1. Provide electric strikes designed for use with type of locks shown at each opening.
2. Provide electric strikes UL Listed as burglary resistant that are tested to a minimum endurance test of 1,000,000 cycles.
3. Where required, provide electric strikes UL Listed for fire doors and frames.
4. Provide transformers and rectifiers for each strike as required. Verify voltage with electrical contractor.

2.11 POWER SUPPLIES

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Schlage Electronics (SCE) PS900 Series

2. Acceptable Manufacturers and Products:

a. No Substitute

B. Requirements:

1. Provide power supplies approved by manufacturer of supplied electrified hardware.
2. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.
3. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.
4. Provide power supplies with the following features:

a. 12/24 VDC Output, field selectable.
b. Class 2 Rated power limited output.
c. Universal 120-240 VAC input.
d. Low voltage DC, regulated and filtered.
e. Polarized connector for distribution boards.
f. Fused primary input.
g. AC input and DC output monitoring circuit w/LED indicators.
h. Cover mounted AC Input indication.
i. Tested and certified to meet UL294.
j. NEMA 1 enclosure.
k. Hinged cover w/lock down screws.
l. High voltage protective cover.

2.12 CYLINDERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. Marshall Best Security (MBS)

2. Acceptable Manufacturers and Products:

a. No Substitute

B. Requirements:

1. Provide cylinders/cores compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset; manufacturer's series as indicated. Refer to "KEYING" article, herein.
2. Provide cylinders in the below-listed configuration(s), distributed throughout the Project as indicated.

a. Match owner's existing system.
b. Cylinder/Core Type:
   1) Small Format Interchangeable Core (SFIC)

3. Replaceable Construction Cores.

a. Provide temporary construction cores replaceable by permanent cores, furnished in accordance with the following requirements.

1) 3 construction control keys
2) 12 construction change (day) keys.

4. Verify with Owner where permanent cores are to be shipped to.

2.13 KEYING

A. Provide a factory registered keying system, complying with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.
B. Requirements:

1. Provide keying system capable of multiplex masterkeying.
2. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.

a. Keying system as directed by the Owner.
b. Match Owner's existing system.
c. (Great)Grand Master Key System: Cylinders/cores operated by change(day) keys and subsequent masters (including grand/great grand) keys.

3. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
4. Provide keys with the following features:

a. Material: Nickel silver; minimum thickness of .107-inch (2.3mm)

5. Identification:

a. Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
b. Identification stamping provisions must be approved by the Architect and Owner.
c. Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
d. Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.

6. Quantity: Furnish in the following quantities.

a. Change (Day) Keys: 3 per cylinder/core.
b. Permanent Control Keys: 3 (only applicable to interchangeable core).
c. Master Keys: 6/ea (per master).
d. Unused balance of key blanks shall be provided to Owner with cut keys.

7. Verify with Owner where permanent keys are to be shipped to.

2.14 KEY CONTROL SYSTEM

A. Manufacturers:

1. Scheduled Manufacturer:

a. Telkee

2. Acceptable Manufacturers:

a. HPC
b. Lund

B. Requirements:

1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.

a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
b. Provide hinged-panel type cabinet for wall mounting.

2.15 DOOR CLOSERS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. LCN 4040XP series

2. Acceptable Manufacturers and Products:

a. No Substitute

B. Requirements:

1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory. ISO 9000 certify closers. Stamp units with date of manufacture code.
2. Provide door closers with fully hydraulic, full rack and pinion action with high strength cast iron cylinder, and full complement bearings at shaft.
3. Cylinder Body: 1-1/2-inch (38 mm) diameter with 5/8-inch (16 mm) diameter double heat-treated pinion journal.
4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
7. Provide closers with solid forged steel main arms and factory assembled heavy-duty forged forearms for parallel arm closers.
8. Pressure Relief Valve (PRV) Technology: Not permitted.
9. Finish for Closer Cylinders, Arms, Adapter Plates, and Metal Covers: Powder coating finish which has been certified to exceed 100 hours salt spray testing as described in ANSI Standard A156.4 and ASTM B117, or has special rust inhibitor (SRI).
10. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

2.16 ELECTRO-HYDRAULIC AUTOMATIC OPERATORS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:

a. LCN 4600 series

2. Acceptable Manufacturers and Products:

a. No Substitute

B. Requirements:

1. Provide low energy automatic operator units with hydraulic closer complying with ANSI/BHMA A156.19.
2. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
3. Provide units with conventional door closer opening and closing forces unless power operator motor is activated. Provide door closer assembly with adjustable spring size, back-check, and opening and closing speed adjustment valves to control door
4. Provide units with on/off switch for manual operation, motor start up delay, vestibule interface delay, electric lock delay, and door hold open delay.
5. Provide drop plates, brackets, and adapters for arms as required for details.
6. Provide actuator switches and receivers for operation as specified.
7. Provide weather-resistant actuators at exterior applications.
8. Provide complete assemblies of controls, switches, power supplies, relays, and parts/material recommended and approved by manufacturer of automatic operator for each individual leaf. Actuators control both doors simultaneously at pairs. Sequence operation of exterior and vestibule doors with automatic operators to allow ingress or egress through both sets of openings as directed by Architect. Locate actuators, key switches, and other controls as directed by Architect.
9. Provide units with vestibule inputs that allow sequencing operation of two units, and SPDT relay for interfacing with latching or locking devices.

2.17 PROTECTION PLATES

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives (IVE)

2. Acceptable Manufacturers:

a. Trimco
b. Rockwood

B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with countersunk sheet metal screws, finished to match plates.
2. Height of protection plates as shown in the sets. Adjust height as required for bottom rail of door or to avoid conflicts with other hardware.

3. Width of plates as shown in the sets. Adjust width as required to avoid conflicts with other hardware.
4. At fire rated doors, provide protection plates over 16 inches high with UL label.

2.18 OVERHEAD STOPS AND OVERHEAD STOP/HOLDERS

A. Manufacturers:

1. Scheduled Manufacturers:

a. Glynn-Johnson (GLY)

2. Acceptable Manufacturers:

a. No Substitute

B. Requirements:

1. Provide heavy duty overhead stop or holder at exterior, vestibule, and other heavy use interior applications.
2. Provide medium duty overhead stop or holder at low use interior applications.
3. Provide overhead stop at any door where conditions do not allow for a wall stop or floor stop presents tripping hazard.

2.19 DOOR STOPS AND HOLDERS

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives (IVE)

2. Acceptable Manufacturers:

a. Trimco
b. Rockwood

B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

2.20 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

A. Manufacturers:

1. Scheduled Manufacturer:

a. Zero International (ZER)

2. Acceptable Manufacturers:

a. National Guard
b. Reese
c. Pemko

B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size threshold width for full wall width when frames are recessed.
5. Cope thresholds at jambs and in front of mullions if thresholds project beyond door faces.
6. Furnish thresholds with non-ferrous stainless steel screws and lead anchors.

2.21 SILENCERS

A. Manufacturers:

1. Scheduled Manufacturer:

a. Ives (IVE)

2. Acceptable Manufacturers:

a. Rockwood
b. Trimco

B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Silencers required on all frames of openings without gasketing.

2.22 FINISHES

A. Provide finish for each item as indicated in the sets.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
B. Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.
C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
D. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Custom Steel Doors and Frames: HMMA 831.
3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
4. Installation Guide for Doors and Hardware: DHI TDH-007-20

B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
C. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
D. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
E. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
F. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
G. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
H. Lock Cylinders:

1. Install construction cores to secure building and areas during construction period.
2. Replace construction cores with permanent cores as indicated in keying section.

I. Wiring: Coordinate with Division 26 ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:

1. Conduit, junction boxes and wire pulls.
2. Connections to and from power supplies to electrified hardware.
3. Connections to fire/smoke alarm system and smoke evacuation system.
4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
5. Connections to panel interface modules, controllers, and gateways.
6. Testing and labeling wires with Architect's opening number.

J. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

K. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
L. Closer/Holders: Mount closer/holders on room side of corridor doors, inside of exterior doors, and stair side of stairway doors.
M. Power Supplies: Locate power supplies as indicated or, if not indicated, above accessible ceilings or in equipment room, or alternate location as directed by Architect.
N. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
O. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.
P. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
Q. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
R. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

3.03 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

    1. Electric Strikes: Adjust horizontal and vertical alignment of keeper to properly engage lock bolt.
    2. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

3.04 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.
B. Clean operating items per manufacturer's instructions to restore proper function and finish.
C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

3.05 DOOR HARDWARE SCHEDULE

A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
B. Discrepancies, conflicting hardware, and missing items are to be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application.

C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
D. Hardware Sets:

1. FOR OPENINGS WITH EXISTING DOORS AND/OR FRAMES: VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. VERIFY EXISTING HINGE TYPE/PREPS AND PROVIDE HINGES THAT EXISTING PREPS ACCOMMODATE. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE AND FILL/COVER UNUSED OR EXPOSED EXISTING PREPS.

66582 OPT0253101 Version 5

HARDWARE GROUP NO. 01

For use on Door #(s):
V5.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
2	EA	DUMMY PUSH BAR X PULL TRIM	330 X 990DT	626	VON
2	EA	SURFACE CLOSER (W/ STOP)	4040XP SCUSH	689	LCN
2	EA	MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN

HARDWARE GROUP NO. 02

For use on Door #(s):
V4.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
2	EA	DUMMY PUSH BAR X PULL TRIM	330 X 990DT	626	VON
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN
2	EA	WALL STOP	WS406/407CVX	630	IVE

HARDWARE GROUP NO. 03

For use on Door #(s):
C26.2 D28.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PRIVACY LOCK (W/ INDICATOR)	RS-19-S-PI	626	MBS
1	EA	OH STOP	450S	652	GLY
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 04

For use on Door #(s):
G8.1 G25.1 G28.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PRIVACY LOCK (W/ INDICATOR)	RS-19-S-PI	626	MBS
1	EA	SURFACE CLOSER	4040XP REG	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP/HOLDER	WS20/WS20X	626	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 05

For use on Door #(s):
G19.1 G21.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	ENTRY/OFFICE LOCK	RS-AT-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 06

For use on Door #(s):
G19.2A

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CLASSROOM LOCK	RS-05-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 07

For use on Door #(s):

C26.1	D28.1	D29.1	D31.1	D33.1	E34.1
E35.1	E36.1	E38.1	G23.1		

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	INTRUDER (CLASSROOM SECURITY) LOCK	RS-32-S	626	MBS
2	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER	4040XP REG	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS439	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 07A

For use on Door #(s):
G15.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	ENTRY/OFFICE LOCK	RS-AT-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER	4040XP REG	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS439	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 08

For use on Door #(s):
C24.1 D30.1 D32.1 E37.1 G19.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	INTRUDER (CLASSROOM SECURITY) LOCK	RS-32-S	626	MBS
2	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER	4040XP REG	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 09

For use on Door #(s):
C27.3

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	OH STOP	450S	652	GLY
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 10

For use on Door #(s):
G46.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	ELECTRIC STRIKE	6400 FSE 12/24 VAC/VDC	630	VON
1	EA	PUSH BUTTON RELEASE	BY DIV 28		B/O
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	POWER SUPPLY	PS902 120/240 VAC		VON

BALANCE OF HARDWARE EXISTING TO REMAIN.

DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER, OR PUSH BUTTON AT RECEPTION DESK, WILL UNLOCK OUTSIDE LEVER, ALLOWING ACCESS. DOOR REMAINS LOCKED WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 11

For use on Door #(s):
G3.1 G11.1 G24.1 G29.1 G40.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER	4040XP REG	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 11A

For use on Door #(s):
G1.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER (W/ DEAD STOP)	4040XP CUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 12

For use on Door #(s):
G5.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER (W/ DEAD STOP & HO)	4040XP HCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 13

For use on Door #(s):
G44.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	224XY	628	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	LOCK GUARD	LG10	630	IVE
1	EA	SURFACE CLOSER (W/ SPRING STOP & HO)	4040XP SHCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	WEATHERSTRIPPING	429AA-S	AA	ZER
1	EA	DOOR SWEEP, BRUSH W/ DRIP	8198AA	AA	ZER
1	EA	THRESHOLD, 1/2"	655A	A	ZER

HARDWARE GROUP NO. 14

For use on Door #(s):
E38.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CONST LATCHING BOLT	FB51T/FB61T (AS REQ'D)	630	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
2	EA	OH STOP	450S	652	GLY
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	SILENCER	SR64	GRY	IVE

HARDWARE GROUP NO. 15

For use on Door #(s):
G41.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	AUTO FLUSH BOLT	FB32/FB42 (AS REQ'D)	630	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	COORDINATOR	COR X FL (MB AS REQ'D)	628	IVE
2	EA	SURFACE TRACK CLOSER (W/ STOP)	4040XPT BUMP	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA (APPLY TO PERIMETER AND DOOR ASTRAGAL)	BK	ZER

HARDWARE GROUP NO. 16

For use on Door #(s):
G22.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	AUTO FLUSH BOLT	FB32/FB42 (AS REQ'D)	630	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	COORDINATOR	COR X FL (MB AS REQ'D)	628	IVE
2	EA	SURFACE CLOSER (W/ DEAD STOP)	4040XP CUSH	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
2	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA (APPLY TO PERIMETER AND DOOR ASTRAGAL)	BK	ZER
2	EA	AUTO DOOR BOTTOM	364AA-LS-Z49	AA	ZER

HARDWARE GROUP NO. 17

For use on Door #(s):
F17.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	DOOR CORD	788C-18	626	SCE
1	EA	FIXED FRAME MULLION	EXISTING		EXI
2	EA	Blank Plate	#050589	628	VON
2	EA	LATCH RETRACTION KIT	QEL KIT		VON
1	EA	MORTISE CYLINDER	MATCH EXISTING SYSTEM (FOR KEY SWITCH)	626	MBS
1	EA	90 DEG OFFSET PULL	8190EZHD 10" O (ONE LEAF ONLY)	630-316	IVE
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	KEY SWITCH, SPDT	653-04 L2 12/24 VDC (IN OFFICE)	630	SCE
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		VON

BALANCE OF HARDWARE EXISTING TO REMAIN.

DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER, OR REMOTE KEY SWITCH #2 IN OFFICE, RETRACTS EXIT DEVICE LATCH, ALLOWING ACCESS. EXIT DEVICE LATCH ALSO CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE OR VIA REMOTE KEY SWITCH #2 IN OFFICE. EXIT DEVICES LATCH AND LOCK WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 18

For use on Door #(s):
C27.2 G18.1 G18.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	FIRE EXIT HARDWARE	9975-L-F-2-06	626	VON
1	EA	MORTISE CYLINDER	MATCH EXISTING SYSTEM	626	MBS
1	EA	RIM CYLINDER	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

HARDWARE GROUP NO. 19

For use on Door #(s):
C27.1 E39.1 E39.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	FIRE EXIT HARDWARE	9975-L-F-2-06	626	VON
1	EA	MORTISE CYLINDER	MATCH EXISTING SYSTEM	626	MBS
1	EA	RIM CYLINDER	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	SOUND SEAL	870AA-S	AA	ZER
1	EA	AUTO DOOR BOTTOM	364AA-LS-Z49	AA	ZER
1	EA	SOUND SEAL BRACKET	870SPB (FOR MOUNTING CLOSER SHOE)		ZER

HARDWARE GROUP NO. 20

For use on Door #(s):
G45.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	224XY	628	IVE
1	EA	PANIC HARDWARE	LD-99-NL	626	VON
1	EA	RIM CYLINDER	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER (W/ STOP)	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	WEATHERSTRIPPING	429AA-S	AA	ZER
1	EA	DOOR SWEEP, BRUSH W/ DRIP	8198AA	AA	ZER
1	EA	THRESHOLD, 1/2"	655A	A	ZER

HARDWARE GROUP NO. 21

For use on Door #(s):
V6.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	DOOR CORD	788C-18	626	SCE
2	EA	Blank Plate	#050589	628	VON
2	EA	LATCH RETRACTION KIT	QEL KIT		VON
1	EA	MORTISE CYLINDER	MATCH EXISTING SYSTEM (FOR KEY SWITCH)	626	MBS
1	EA	SURF. AUTO OPERATOR	4642 WMS 120 VAC	689	LCN
1	EA	WEATHER RING	8310-801		LCN
1	EA	ACTUATOR	8310-853T (EXTERIOR, WALL MOUNT)	630	LCN
1	EA	DUAL ACTUATOR	8310-855 (VESTIBULE, WALL MOUNT)	630	LCN
2	EA	MOUNT BOX	8310-867S		LCN
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	KEY SWITCH, SPDT	653-04 L2 12/24 VDC (KEY SWITCH #1 IN OFFICE)	630	SCE
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		VON

BALANCE OF HARDWARE EXISTING TO REMAIN.

DOOR NORMALLY CLOSED AND LOCKED AND EXTERIOR ACTUATOR DISABLED. PRESENTING VALID CREDENTIAL TO READER, OR REMOTE KEY SWITCH #1 IN OFFICE, RETRACTS EXIT DEVICE LATCH AND ENABLES EXTERIOR ACTUATOR. PUSHING ENABLED EXTERIOR ACTUATOR SIGNALS AUTOMATIC OPERATOR TO OPEN DOOR. INTERIOR ACTUATOR ENABLED AT ALL TIMES. PUSHING INTERIOR ACTUATOR RETRACTS LATCH AND SIGNALS AUTOMATIC OPERATOR TO OPEN DOOR. EXIT DEVICE LATCH ALSO CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE OR VIA REMOTE KEY SWITCH #1 IN OFFICE. EXIT DEVICES LATCH AND LOCK WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 22

For use on Door #(s):
V6.3

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	DOOR CORD	788C-18	626	SCE
2	EA	Blank Plate	#050589	628	VON
2	EA	LATCH RETRACTION KIT	QEL KIT		VON
1	EA	SURF. AUTO OPERATOR	4642 WMS 120 VAC	689	LCN
1	EA	ACTUATOR	8310-853T (LOBBY, WALL MOUNT)	630	LCN
1	EA	MOUNT BOX	8310-867S		LCN
1	EA	ACTUATOR	SHARED WITH ADJACENT OPENING (VESTIBULE)		
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		VON

BALANCE OF HARDWARE EXISTING TO REMAIN.

DOOR NORMALLY CLOSED AND LOCKED AND EXTERIOR ACTUATOR DISABLED. PRESENTING VALID CREDENTIAL TO READER, OR REMOTE KEY SWITCH #1 IN OFFICE, RETRACTS EXIT DEVICE LATCH AND ENABLES EXTERIOR ACTUATOR. PUSHING ENABLED EXTERIOR ACTUATOR SIGNALS AUTOMATIC OPERATOR TO OPEN DOOR. INTERIOR ACTUATOR ENABLED AT ALL TIMES. PUSHING INTERIOR ACTUATOR RETRACTS LATCH AND SIGNALS AUTOMATIC OPERATOR TO OPEN DOOR. EXIT DEVICE LATCH ALSO CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE OR VIA REMOTE KEY SWITCH #1 IN OFFICE. EXIT DEVICE LATCHES AND LOCKS WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 23

For use on Door #(s):
V5.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY EPT	628	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-DT 24 VDC	626	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-NL 24 VDC	626	VON
1	EA	MORTISE CYLINDER	MATCH EXISTING SYSTEM	626	MBS
1	EA	RIM CYLINDER	MATCH EXISTING SYSTEM	626	MBS
2	EA	SURFACE CLOSER (W/ STOP)	4040XP SCUSH	689	LCN
2	EA	MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	EA	WEATHERSTRIPPING	BY DOOR/FRAME MANUFACTURER		B/O
2	EA	DOOR SWEEP, BRUSH W/ DRIP	8198AA	AA	ZER
1	EA	THRESHOLD, 1/2"	655A	A	ZER
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		VON

DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER RETRACTS EXIT DEVICE LATCH, ALLOWING ACCESS. EXIT DEVICE LATCH ALSO CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE. EXIT DEVICE LATCHES AND LOCKS WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 24

For use on Door #(s):
V4.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
1	EA	PANIC HARDWARE	LD-99-DT	626	VON
1	EA	PANIC HARDWARE	LD-99-NL	626	VON
1	EA	MORTISE CYLINDER	MATCH EXISTING SYSTEM	626	MBS
1	EA	RIM CYLINDER	MATCH EXISTING SYSTEM	626	MBS
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN
2	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	EA	WEATHERSTRIPPING	BY DOOR/FRAME MANUFACTURER		B/O
2	EA	DOOR SWEEP, BRUSH W/ DRIP	8198AA	AA	ZER
1	EA	THRESHOLD, 1/2"	655A	A	ZER

HARDWARE GROUP NO. 25

For use on Door #(s):
F1.1 V1.1 V2.1 V3.1 V6.4

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	DOOR CORD	788C-18	626	SCE
2	EA	Blank Plate	#050589	628	VON
2	EA	LATCH RETRACTION KIT	QEL KIT		VON
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		VON

EXIT DEVICE LATCH CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE, OR VIA REMOTE KEY SWITCH #1 IN OFFICE. EXIT DEVICE LATCHES AND LOCKS WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES.

HARDWARE GROUP NO. 26

For use on Door #(s):
V6.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	DOOR CORD	788C-18	626	SCE
2	EA	Blank Plate	#050589	628	VON
2	EA	LATCH RETRACTION KIT	QEL KIT		VON
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		VON

BALANCE OF HARDWARE EXISTING TO REMAIN.

EXIT DEVICE LATCH CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE, OR VIA REMOTE KEY SWITCH #1 IN OFFICE. EXIT DEVICE LATCHES AND LOCKS WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES.

END OF SECTION

Door#	HwSet#	Remarks
C24.1	08	
C26.1	07	
C26.2	03	
C27.1	19	
C27.2	18	
C27.3	09	
D28.1	07	
D28.2	03	
D29.1	07	
D30.1	08	
D31.1	07	
D32.1	08	
D33.1	07	
E34.1	07	
E35.1	07	
E36.1	07	
E37.1	08	
E38.1	07	
E38.2	14	
E39.1	19	
E39.2	19	
F1.1	25	CR
F17.1	17	CR
G1.1	**11A**	
G3.1	11	
G5.1	12	
G8.1	04	
G11.1	11	
G15.1	**07A**	
G18.1	18	
G18.2	18	
G19.1	05	
G19.2	08	
G19.2A	06	
G21.1	05	
G22.1	16	
G23.1	07	
G24.1	11	
G25.1	04	
G28.1	04	
G29.1	11	
G40.1	11	
G41.1	15	
G44.1	13	NO CR
G45.1	20	NO CR
G46.1	10	CR, PBR

Door#	HwSet#	Remarks
V1.1	25	CR
V2.1	25	CR
V3.1	25	CR
V4.1	24	
V4.2	02	
V5.1	23	CR
V5.2	01	
V6.1	21	CR, AO
V6.2	26	CONTROLLED
V6.3	22	CR, AO
V6.4	25	CONTROLLED

66582 OPT0253101 Version 5

FOR OPENINGS WITH EXISTING DOORS AND/OR FRAMES: VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. VERIFY EXISTING HINGE TYPE/PREPS AND PROVIDE HINGES THAT EXISTING PREPS ACCOMMODATE. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE AND FILL/COVER UNUSED OR EXPOSED EXISTING PREPS.

Hardware Group No. 01

For use on Door #(s):
V5.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
2	EA	DUMMY PUSH BAR X PULL TRIM	330 X 990DT	626	VON
2	EA	SURFACE CLOSER (W/ STOP)	4040XP SCUSH	689	LCN
2	EA	MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN

Hardware Group No. 02

For use on Door #(s):
V4.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
2	EA	DUMMY PUSH BAR X PULL TRIM	330 X 990DT	626	VON
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN
2	EA	WALL STOP	WS406/407CVX	630	IVE

Hardware Group No. 03

For use on Door #(s):
C26.2 D28.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PRIVACY LOCK (W/ INDICATOR)	RS-19-S-PI	626	MBS
1	EA	OH STOP	450S	652	GLY
1	**EA**	**KICK PLATE**	**8400 10" X 1 1/2" LDW B-CS**	**630**	**IVE**
1	**EA**	**MOP PLATE**	**8400 10" X 1" LDW B-CS**	**630**	**IVE**
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 04

For use on Door #(s):
G25.1 G28.1 G8.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	PRIVACY LOCK (W/ INDICATOR)	RS-19-S-PI	626	MBS
1	EA	SURFACE CLOSER	4040XP REG	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	**EA**	**MOP PLATE**	**8400 10" X 1" LDW B-CS**	**630**	**IVE**
1	EA	WALL STOP/HOLDER	WS20/WS20X	626	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

Hardware Group No. 05

For use on Door #(s):
G19.1 G21.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	ENTRY/OFFICE LOCK	RS-AT-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	**EA**	**KICK PLATE**	**8400 10" X 1 1/2" LDW B-CS**	**630**	**IVE**
1	**EA**	**MOP PLATE**	**8400 10" X 1" LDW B-CS**	**630**	**IVE**
1	EA	WALL STOP	WS406/407CVX	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 06

For use on Door #(s):
G19.2A

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CLASSROOM LOCK	RS-05-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 07

For use on Door #(s):

C26.1	D28.1	D29.1	D31.1	D33.1	E34.1
E35.1	E36.1	E38.1	G23.1		

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	INTRUDER (CLASSROOM SECURITY) LOCK	RS-32-S	626	MBS
2	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER	4040XP REG	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS439	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

Hardware Group No.07A

For use on Door #(s):
G15.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	ENTRY/OFFICE LOCK	RS-AT-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER	4040XP REG	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	FLOOR STOP	FS439	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

Hardware Group No. 08

For use on Door #(s):
C24.1 D30.1 D32.1 E37.1 G19.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	INTRUDER (CLASSROOM SECURITY) LOCK	RS-32-S	626	MBS
2	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER	4040XP REG	689	LCN
1	**EA**	**KICK PLATE**	**8400 10" X 1 1/2" LDW B-CS**	**630**	**IVE**
1	**EA**	**MOP PLATE**	**8400 10" X 1" LDW B-CS**	**630**	**IVE**
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

Hardware Group No. 09

For use on Door #(s):
C27.3

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	OH STOP	450S	652	GLY
1	**EA**	**KICK PLATE**	**8400 10" X 1 1/2" LDW B-CS**	**630**	**IVE**
1	**EA**	**MOP PLATE**	**8400 10" X 1" LDW B-CS**	**630**	**IVE**
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 10

For use on Door #(s):
G46.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	ELECTRIC STRIKE	6400 FSE 12/24 VAC/VDC	630	VON
1	EA	PUSH BUTTON RELEASE	BY DIV 28		B/O
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	POWER SUPPLY	PS902 120/240 VAC		VON

BALANCE OF HARDWARE EXISTING TO REMAIN.

DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER, OR PUSH BUTTON AT RECEPTION DESK, WILL UNLOCK OUTSIDE LEVER, ALLOWING ACCESS. DOOR REMAINS LOCKED WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES

Hardware Group No. 11

For use on Door #(s):
G11.1 G24.1 G29.1 G3.1 G40.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER	4040XP REG	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

Hardware Group No. 11A

For use on Door #(s):
G1.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER (W/ DEAD STOP)	4040XP CUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

Hardware Group No. 12

For use on Door #(s):
G5.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER (W/ DEAD STOP & HO)	4040XP HCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 13

For use on Door #(s):
G44.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	224XY	628	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
1	EA	LOCK GUARD	LG10	630	IVE
1	EA	SURFACE CLOSER (W/ SPRING STOP & HO)	4040XP SHCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	WEATHERSTRIPPING	429AA-S	AA	ZER
1	EA	DOOR SWEEP, BRUSH W/ DRIP	8198AA	AA	ZER
1	EA	THRESHOLD, 1/2"	655A	A	ZER

Hardware Group No. 14

For use on Door #(s):
E38.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	CONST LATCHING BOLT	FB51T/FB61T (AS REQ'D)	630	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	CYLINDER/CORE	MATCH EXISTING SYSTEM	626	MBS
2	EA	OH STOP	450S	652	GLY
2	**EA**	**KICK PLATE**	**8400 10" X 1" LDW B-CS**	**630**	**IVE**
2	**EA**	**MOP PLATE**	**8400 10" X 1" LDW B-CS**	**630**	**IVE**
2	EA	SILENCER	SR64	GRY	IVE

Hardware Group No. 15

For use on Door #(s):
G41.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	AUTO FLUSH BOLT	FB32/FB42 (AS REQ'D)	630	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	COORDINATOR	COR X FL (MB AS REQ'D)	628	IVE
2	EA	SURFACE TRACK CLOSER (W/ STOP)	4040XPT BUMP	689	LCN
2	**EA**	**MOP PLATE**	**8400 10" X 1" LDW B-CS**	**630**	**IVE**
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA (APPLY TO PERIMETER AND DOOR ASTRAGAL)	BK	ZER

Hardware Group No. 16

For use on Door #(s):
G22.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	AUTO FLUSH BOLT	FB32/FB42 (AS REQ'D)	630	IVE
1	EA	STOREROOM LOCK	RS-07-S	626	MBS
1	EA	COORDINATOR	COR X FL (MB AS REQ'D)	628	IVE
2	EA	SURFACE CLOSER (W/ DEAD STOP)	4040XP CUSH	689	LCN
2	**EA**	**MOP PLATE**	**8400 10" X 1" LDW B-CS**	**630**	**IVE**
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	GASKETING	488SBK PSA (APPLY TO PERIMETER AND DOOR ASTRAGAL)	BK	ZER
2	EA	AUTO DOOR BOTTOM	364AA-LS-Z49	AA	ZER

Hardware Group No.17

For use on Door #(s):
F17.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2~~1~~	EA	DOOR CORD	788C-18	626	SCE
1	EA	FIXED FRAME MULLION	EXISTING		EXI
2~~1~~	EA	Blank Plate	#050589	628	VON
2~~1~~	EA	LATCH RETRACTION KIT	QEL KIT		VON
1	EA	MORTISE CYLINDER	MATCH EXISTING SYSTEM (FOR KEY SWITCH)	626	MBS
1	EA	90 DEG OFFSET PULL	8190EZHD 10" O (ONE LEAF ONLY)	630-316	IVE
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	KEY SWITCH, SPDT	653-04 L2 12/24 VDC (IN OFFICE)	630	SCE
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		VON

BALANCE OF HARDWARE EXISTING TO REMAIN.

DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER, OR REMOTE KEY SWITCH #2 IN OFFICE, RETRACTS EXIT DEVICE LATCH, ALLOWING ACCESS. EXIT DEVICE LATCH ALSO CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE OR VIA REMOTE KEY SWITCH #2 IN OFFICE. EXIT DEVICES LATCH AND LOCK WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES.

Hardware Group No. 18

For use on Door #(s):
C27.2 G18.1 G18.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	FIRE EXIT HARDWARE	9975-L-F-2-06	626	VON
1	EA	RIM CYLINDER	MATCH EXISTING SYSTEM	626	MBS
1	EA	MORTISE CYLINDER	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	MOP PLATE	8400 10" X 1" LDW B-CS	630	IVE
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	GASKETING	488SBK PSA	BK	ZER

Hardware Group No. 19

For use on Door #(s):
C27.1 E39.1 E39.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 (NRP AS REQ'D)	652	IVE
1	EA	FIRE EXIT HARDWARE	9975-L-F-2-06	626	VON
1	EA	RIM CYLINDER	MATCH EXISTING SYSTEM	626	MBS
1	EA	MORTISE CYLINDER	MATCH EXISTING SYSTEM	626	MBS
1	EA	SURFACE CLOSER	4040XP EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	**EA**	**MOP PLATE**	**8400 10" X 1" LDW B-CS**	**630**	**IVE**
1	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	SOUND SEAL	870AA-S	AA	ZER
1	EA	AUTO DOOR BOTTOM	364AA-LS-Z49	AA	ZER
1	EA	SOUND SEAL BRACKET	870SPB (FOR MOUNTING CLOSER SHOE)		ZER

Hardware Group No. 20

For use on Door #(s):
G45.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
1	EA	CONT. HINGE	224XY	628	IVE
1	EA	PANIC HARDWARE	**LD-99-NL** ~~**(CD-99-NL)**~~	626	VON
1	EA	RIM CYLINDER	MATCH EXISTING SYSTEM	626	MBS
~~**1**~~	~~**EA**~~	~~**MORTISE CYLINDER**~~	~~**MATCH EXISTING SYSTEM**~~	~~**626**~~	~~**MBS**~~
1	EA	SURFACE CLOSER (W/ STOP)	4040XP SCUSH	689	LCN
1	EA	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	630	IVE
1	EA	RAIN DRIP	142AA	AA	ZER
1	EA	WEATHERSTRIPPING	429AA-S	AA	ZER
1	EA	DOOR SWEEP, BRUSH W/ DRIP	8198AA	AA	ZER
1	EA	THRESHOLD, 1/2"	655A	A	ZER

Hardware Group No. 21

For use on Door #(s):
V6.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	DOOR CORD	788C-18	626	SCE
2	EA	Blank Plate	#050589	628	VON
2	EA	LATCH RETRACTION KIT	QEL KIT		VON
1	**EA**	**MORTISE CYLINDER**	**MATCH EXISTING SYSTEM (FOR KEY SWITCH)**	**626**	**MBS**
1	EA	SURF. AUTO OPERATOR	4642 WMS 120 VAC	689	LCN
1	EA	WEATHER RING	8310-801		LCN
1	EA	ACTUATOR	8310-853T (EXTERIOR, WALL MOUNT)	630	LCN
1	EA	DUAL ACTUATOR	8310-855 (VESTIBULE, WALL MOUNT)	630	LCN
2	EA	MOUNT BOX	8310-867S		LCN
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	**EA**	**KEY SWITCH, SPDT**	**653-04 L2 12/24 VDC (KEY SWITCH #1 IN OFFICE)**	**630**	**SCE**
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		VON

BALANCE OF HARDWARE EXISTING TO REMAIN.

DOOR NORMALLY CLOSED AND LOCKED AND EXTERIOR ACTUATOR DISABLED. PRESENTING VALID CREDENTIAL TO READER, OR REMOTE KEY SWITCH #1 IN OFFICE, RETRACTS EXIT DEVICE LATCH AND ENABLES EXTERIOR ACTUATOR. PUSHING ENABLED EXTERIOR ACTUATOR SIGNALS AUTOMATIC OPERATOR TO OPEN DOOR. INTERIOR ACTUATOR ENABLED AT ALL TIMES. PUSHING INTERIOR ACTUATOR RETRACTS LATCH AND SIGNALS AUTOMATIC OPERATOR TO OPEN DOOR. EXIT DEVICE LATCH ALSO CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE OR VIA REMOTE KEY SWITCH #1 IN OFFICE. EXIT DEVICES LATCH AND LOCK WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES
~~**DOOR NORMALLY CLOSED AND LOCKED AND EXTERIOR ACTUATOR DISABLED. PRESENTING VALID CREDENTIAL TO READER RETRACTS EXIT DEVICE LATCH AND ENABLES EXTERIOR ACTUATOR. PUSHING ENABLED EXTERIOR ACTUATOR SIGNALS AUTOMATIC OPERATOR TO OPEN DOOR. INTERIOR ACTUATOR ENABLED AT ALL TIMES. PUSHING INTERIOR ACTUATOR RETRACTS LATCH AND SIGNALS AUTOMATIC OPERATOR TO OPEN DOOR. EXIT DEVICE LATCH ALSO CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE. EXIT DEVICE LATCHES AND LOCKS WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES.)**~~

Hardware Group No. 22

For use on Door #(s):
V6.3

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	DOOR CORD	788C-18	626	SCE
2	EA	Blank Plate	#050589	628	VON
2	EA	LATCH RETRACTION KIT	QEL KIT		VON
1	EA	SURF. AUTO OPERATOR	4642 WMS 120 VAC	689	LCN
1	EA	ACTUATOR	8310-853T (LOBBY, WALL MOUNT)	630	LCN
1	EA	MOUNT BOX	8310-867S		LCN
1	EA	ACTUATOR	SHARED WITH ADJACENT OPENING (VESTIBULE)		
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		VON

BALANCE OF HARDWARE EXISTING TO REMAIN.

DOOR NORMALLY CLOSED AND LOCKED AND EXTERIOR ACTUATOR DISABLED. PRESENTING VALID CREDENTIAL TO READER, OR REMOTE KEY SWITCH #1 IN OFFICE, RETRACTS EXIT DEVICE LATCH AND ENABLES EXTERIOR ACTUATOR. PUSHING ENABLED EXTERIOR ACTUATOR SIGNALS AUTOMATIC OPERATOR TO OPEN DOOR. INTERIOR ACTUATOR ENABLED AT ALL TIMES. PUSHING INTERIOR ACTUATOR RETRACTS LATCH AND SIGNALS AUTOMATIC OPERATOR TO OPEN DOOR. EXIT DEVICE LATCH ALSO CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE OR VIA REMOTE KEY SWITCH #1 IN OFFICE. EXIT DEVICE LATCHES AND LOCKS WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES
~~**DOOR NORMALLY CLOSED AND LOCKED AND EXTERIOR ACTUATOR DISABLED. PRESENTING VALID CREDENTIAL TO READER RETRACTS EXIT DEVICE LATCH AND ENABLES EXTERIOR ACTUATOR. PUSHING ENABLED EXTERIOR ACTUATOR SIGNALS AUTOMATIC OPERATOR TO OPEN DOOR. INTERIOR ACTUATOR ENABLED AT ALL TIMES. PUSHING INTERIOR ACTUATOR RETRACTS LATCH AND SIGNALS AUTOMATIC OPERATOR TO OPEN DOOR. EXIT DEVICE LATCH ALSO CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE. EXIT DEVICE LATCHES AND LOCKS WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES.)**~~

Hardware Group No. 23

For use on Door #(s):
V5.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY EPT	628	IVE
2	EA	POWER TRANSFER	EPT10	689	VON
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-DT 24 VDC	626	VON
1	EA	ELEC PANIC HARDWARE	QEL-99-NL 24 VDC	626	VON
1	EA	MORTISE CYLINDER	MATCH EXISTING SYSTEM	626	MBS
1	EA	RIM CYLINDER	MATCH EXISTING SYSTEM	626	MBS
2	EA	SURFACE CLOSER (W/ STOP)	4040XP SCUSH	689	LCN
2	EA	MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	CUSH SHOE SUPPORT	4040XP-30	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	EA	WEATHERSTRIPPING	BY DOOR/FRAME MANUFACTURER		B/O
2	EA	DOOR SWEEP, BRUSH W/ DRIP	8198AA	AA	ZER
1	EA	THRESHOLD, 1/2"	655A	A	ZER
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		VON

DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER RETRACTS EXIT DEVICE LATCH, ALLOWING ACCESS. EXIT DEVICE LATCH ALSO CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE. EXIT DEVICE LATCHES AND LOCKS WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES.

Hardware Group No. 24

For use on Door #(s):
V4.1

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	CONT. HINGE	112XY	628	IVE
1	EA	REMOVABLE MULLION	KR4954 STAB	689	VON
1	EA	PANIC HARDWARE	**LD-99-DT** ~~**(CD-99-DT)**~~	626	VON
1	EA	PANIC HARDWARE	**LD-99-NL** ~~**(CD-99-NL)**~~	626	VON
1	EA	RIM CYLINDER	MATCH EXISTING SYSTEM	626	MBS
1	EA	MORTISE CYLINDER	MATCH EXISTING SYSTEM	626	MBS
2	EA	SURFACE CLOSER	4040XP EDA	689	LCN
2	EA	MOUNTING PLATE	4040XP-18PA	689	LCN
2	EA	BLADE STOP SPACER	4040XP-61	689	LCN
2	EA	WALL STOP	WS406/407CVX	630	IVE
1	EA	MULLION SEAL	8780NBK PSA	BK	ZER
1	EA	WEATHERSTRIPPING	BY DOOR/FRAME MANUFACTURER		B/O
2	EA	DOOR SWEEP, BRUSH W/ DRIP	8198AA	AA	ZER
1	EA	THRESHOLD, 1/2"	655A	A	ZER

Hardware Group No. 25

For use on Door #(s):
F1.1 V1.1 V2.1 V3.1 V6.4

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	DOOR CORD	788C-18	626	SCE
2	EA	Blank Plate	#050589	628	VON
2	EA	LATCH RETRACTION KIT	QEL KIT		VON
1	EA	CREDENTIAL READER	BY DIV 28		B/O
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		VON

EXIT DEVICE LATCH CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE, OR VIA REMOTE KEY SWITCH #1 IN OFFICE. EXIT DEVICE LATCHES AND LOCKS WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES. ~~**(DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL TO READER RETRACTS EXIT DEVICE LATCH, ALLOWING ACCESS. EXIT DEVICE LATCH ALSO CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE. EXIT DEVICE LATCHES AND LOCKS WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES.)**~~

Hardware Group No. 26

For use on Door #(s):
V6.2

Provide each OPENING with the following:

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
2	EA	DOOR CORD	788C-18	626	SCE
2	EA	Blank Plate	#050589	628	VON
2	EA	LATCH RETRACTION KIT	QEL KIT		VON
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC		VON

BALANCE OF HARDWARE EXISTING TO REMAIN.

EXIT DEVICE LATCH CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE, OR VIA REMOTE KEY SWITCH #1 IN OFFICE. EXIT DEVICE LATCHES AND LOCKS WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES. ~~**(BALANCE OF HARDWARE EXISTING TO REMAIN. VERIFY/COORDINATE PREPS ON EXISTING DOORS AND FRAMES. PROVIDE FIELD MODIFICATIONS AND/OR FILLERS TO EXISTING DOORS AND FRAMES AS NECESSARY TO ACCEPT NEW SPECIFIED HARDWARE.**~~

~~**EXIT DEVICE LATCH CAPABLE OF BEING ELECTRONICALLY DOGGED DOWN (I.E. PUSH/PULL MODE) AS DESIGNATED BY ACCESS CONTROL SYSTEM SCHEDULE. EXIT DEVICE LATCHES AND LOCKS WITH LOSS OF POWER. FREE EGRESS AT ALL TIMES.)**~~

SECTION 23 09 13

INSTRUMENTATION AND CONTROL DEVICES

PART 1 - GENERAL

1.01 WORK ASSIGNMENT

A. Controls will be bid inclusively through the Mechanical Contractor. Mechanical Contractor shall bid each acceptable provider with an alternate price. After the bids are submitted a Temperature Controls package will be selected.

1.02 ACCEPTABLE PROVIDERS:

A. Schneider Electric / EMCOR (ALTERNATE BID)

B. Alerton / Open Control Systems (ALTERNATE BID)

C. Distech / ERMCO (ALTERNATE BID)

D. Distech / Jackson Systems (ALTERNATE BID)

E. Honeywell International / ERMCO (ALTERNATE BID)

1.03 QUALIFICATIONS

A. Temperature Control Contractor shall submit proof of having company-trained service men available to make regular service calls within four (4) hours of notification and twenty-four (24) hour emergency service capability, 365 days per year, is required and of having designed and installed five (5) projects of equal or greater size and complexity to this installation. Projects must have been within a radius of 100 miles of this project.

B. Submit immediately after award of contract a diagram of the proposed system architecture, including correct quantities of equipment controllers, cable types, etc. A typical unitary controller can be identified for each VAV, CUH, FCU or PUH.

C. Submit with the bid at least two (2) references of similar installations with the contact name and telephone number of the user.

D. The Owner intends to select the contractor on the basis of who submits and demonstrates a user friendly, trainable, easy to understand system, as a criteria. Initial cost will also be a primary criterion.

1.04 WORK INCLUDED

A. ***Complete removal of all existing pneumatic controls, control tubing, pneumatic drives, etc. To allow for a full conversion to ddc control of the new and/or existing equipment to remain within the building. No pneumatic controls shall remain once the project is complete.***

B. ***Contractor to familiarize self with site and existing and new equipment to ensure all equipment is accounted for within the new DDC controls and all pneumatic equipment is upgraded to be on the DDC system and controls architecture.***

C. Provide testing, calibration, adjustment and performance as intended by the sequences described in these specifications and as interpreted by the Engineer.

D. Provide coordination, interface and interlock control wiring between control system and equipment that is controlled by this project.

E. Provide all instrumentation to perform and demonstrate each sequence.

F. Provide coordination and rough-in of all concealed conduit and tubing within the structure. Provide cutting and patching of areas that have been completed to the satisfaction of the Architect/Engineer.

G. Upon obtaining successful testing and performance, schedule and conduct demonstration (commissioning) of all controls. Schedule this work with the Engineer.

H. Upon obtaining above successful demonstrations, schedule and conduct training session(s) with Owner's maintenance personnel.

1.05 WORK INCLUDED BUT SPECIFIED ELSEWHERE

A. General Provisions: Section 23 05 01

B. Assignments and Misc. Work: Section 23 05 02

C. Completion and Startup: Section 23 05 03

D. Demolition: Section 23 05 04

E. Concrete Pads and Curbs: Section 23 05 05

F. Common Motor Requirements: Section 23 05 13

G. Low Voltage Electrical Power Conductors and Cables: Section 26 05 19

H. Basic Piping Requirements: Section 23 05 29

I. Vibration and Seismic Controls for Piping and Equipment: Section 23 05 48

J. Identification of Piping and Equipment: Section 23 05 53

K. Control Dampers: Section 23 09 13.43

L. Sequence of Operations for Controls: Section 23 09 93

M. Raceways and Boxes for Electrical Systems: Section 26 05 33

1.06 RELATED WORK SPECIFIED ELSEWHERE

A. Testing, Adjusting and Balancing: Section 23 05 93

B. Air Handing Units: Section 23 73 00

C. Packaged Heating and Cooling Units: Section 23 81 00

D. Fan Coil Units: Section 23 82 19

E. Terminal Heating Units: Section 23 83 40

1.07 SUBMITTALS

A. Prepare and submit shop drawings and manufacturer's standard specification data sheets on all hardware and software to be provided. No work may begin on any segment of this project until submittals have been reviewed by the Engineer and Owner for conformity with the plan and specifications.

B. Quantities of items submitted will be reviewed by the Engineer and Owner. Such review shall not relieve the contractor from furnishing quantities required for completion.

C. Submit to the Engineer, any additional information or data which is deemed necessary to determine compliance with these specifications or which is deemed valuable in documenting the system to be installed.

D. Submittals to include the following:

1. A complete bill of materials of equipment to be used indicating quantity, manufacturer and model number.
2. A schedule of all control valves including the valve size, model number (including pattern and connections), flow, CV pressure rating, and location.
3. A schedule of all control dampers. This shall include the damper size, pressure drop, manufacturer and model number.

4. Manufacturers cut sheets for major system components. When manufacturer's cut sheets apply to a product series rather than a specific product, the data specifically applicable to the project shall be highlighted or clearly indicated by other means. Each submitted piece of literature and drawings shall clearly reference the specification and/or drawing that the submittals is being submitted to cover. Include:
    a. Building Controllers
    b. Custom Application Controllers
    c. Application Specific Controllers
    d. Operator Interface Computer
    e. Portable Operator Workstation
    f. Auxiliary Control Devices
    g. Proposed control system riser diagram showing system configuration, device locations, addresses, and cabling.
    h. Detailed termination drawings showing all required field and factory termination's. Terminal numbers shall be clearly labeled.
    i. Points lists showing all system objects, and the proposed English language object names.
    j. Sequence of operations for each system under control. This sequence shall be specific for the use of the Control System being provided for this project.
    k. Color prints of proposed graphics with a list of points for display.

E. Project Record Documents: Upon completion of installation, submit record documents. The documents shall be submitted for approval prior to final completion and include:

1. Project Record Drawings - these shall be "as built" versions of the submitted shop drawings.
2. Testing and Commissioning Reports
3. Operating and Maintenance Manual: These shall be "as built" versions of the submittals product data. In addition to that required for the submittals, the Operating and Maintenance Manual shall include:
    a. Names, address and 24 hour telephone numbers of Contractors installing equipment, and the control systems and service representative of each.
    b. Operators Manual with procedures of operating the control systems including logging on/off, alarm handling, producing point reports, trending data, overriding computer control, and changing set points and other variables.
    c. Programming manual with a description of the programming language including syntax, statement descriptions including algorithms and calculations used, point database creation and modification, program creation and modification, and use of the editor.

d. Engineering, Installation and Maintenance Manual(s) that explains how to design and install new points, panels, and other hardware; preventative maintenance and calibration procedures; how to debug hardware problems; and how to repair or replace hardware.
e. A listing and documentation of all custom software created using the programming language including the point database. One set of magnetic media containing files of the software and database shall also be provided.
f. One set of magnetic media containing files of all color-graphic screens created for the project.
g. A list of recommended spare parts with part numbers and supplier.
h. Complete documentation, installation and maintenance information for all third party hardware provided including computer equipment and sensors.
i. Provide complete CD with all software including operating systems, programming language, operator work-station software, and graphics software.
j. Licenses, Guarantee, and Warrantee documents for all equipment and systems.
k. Recommended preventive maintenance procedures for all system components including a schedule of tasks (inspection, cleaning, calibration, etc.) time between tasks, and task descriptions.

1.08 GUARANTEE

A. Labor and materials for control system specified shall be free from defects for a period of twelve (12) months after final completion and acceptance by the Owner. Control System failures during the warranty period shall be adjusted, repaired, or replaced at no charge or reduction in service to the Owner. The Contractor shall respond to the Owner's request for warranty service within 2 hours.

B. At the end of the final start-up/testing, if equipment and systems are operating satisfactorily to the Owner and Engineer, the Owner will sign certificates certifying that the control system's operation has been tested and accepted in accordance with the terms of this specification. The date of Owner's acceptance shall be the start of warranty.

C. Operator work-station software, project specific graphics, database and firmware updates shall be provided to the Owner at no charge during the warranty period. Written authorization by Owner must, however, be granted prior to the installation of such changes.

1.09 STANDARDS

A. Temperature control system shall be furnished and installed by a factory authorized representative of the manufacturer.

B. Materials and equipment shall be the catalogued products of manufacturers regularly engaged in production and installation of automatic direct digital temperature control systems and shall be manufacturer's latest standard design that complies with the specification requirements.

C. All controls shall be of one manufacturer. No mixing of suppliers will be permitted without prior confirmation of acceptability in writing.

D. All electronic equipment shall conform to the requirements of FCC Regulation, Part 15, Section 15, Governing Radio Frequency Electromagnetic Interference and be so labeled.

1.10 CODES AND STANDARDS

A. Meet requirements of all applicable standards and codes, except when more detailed or stringent requirements are indicated by the Control Documents, including requirements of this Section.

1. Underwriters Laboratories: Products shall be UL-916-PAZX listed.
2. National Electrical Code - NFPA 70.
3. Federal Communications Commission - Part J.
4. ASHRAE/ANSI 135-1995 (BACnet).

B. All control components and system layout and design shall be in full compliance with the requirements of UL-864UUKL listing. It is this contractor's responsibility to ensure that all aspects of any systems affected by UL-864UUKL requirements meet or exceed all applicable standards and/or guidelines. All necessary documents and information shall be supplied within the submittal package to show beyond a reasonable doubt that these requirements have been met to their full extent.

C. All products used in this installation shall be new, currently under manufacture, and shall be applied in similar installations for a minimum of (2) years. This installation shall not be used as a test site for any new products unless explicitly approved by the Owner's representative in writing prior to bid date. Spare parts shall be available for at least 5 years after completion of this contract.

1.11 SYSTEM PERFORMANCE STANDARDS

A. The system shall conform to the following:

1. Graphic Display. The system shall display a graphic with a minimum of (20) dynamic points. All current data shall be displayed within (10) seconds of the request.
2. Graphic Refresh. The system shall update all dynamic points with current data within (10) seconds.
3. Object Command. The maximum time between the command of a binary object by the operator and the reaction by the device shall be (10) seconds. Analog objects shall start to adjust within (10) seconds.

4. Object Scan. All changes of state and change of analog values shall be transmitted over the high-speed network such that any data used or displayed at a controller or workstation will be current, within the prior (60) seconds.
5. Alarm Response Time. The maximum time from when an object goes into alarm to when it is annunciated at the workstation shall not exceed (45) seconds.
6. Program Execution Frequency. Custom and standard applications shall be capable of running as often as once every (5) seconds. The Contractor shall be responsible for selecting execution times consistent with the mechanical process under control.
7. Performance. Programmable Controllers shall be able to execute DDC PID control loops at a selectable frequency from at least once every (5) seconds. The controller shall scan and update the process value and output generated by this calculation at this same frequency.
8. Multiple Alarm Annunciation. All workstations on the network shall receive alarms within (5) seconds of each other.

1.12 TRAINING

A. Temperature Control Contractor shall provide minimum 40 hours in maximum 4-hour blocks of time of services of manufacturer's technical representative for instruction of Owner's designated personnel in all areas of programming, operation and maintenance of electronic DDC/EMCS systems.

B. Training shall occur off-site at the control company’s training facilities.

C. Training shall include instructions on commissioning, changing parameters, and programming.

PART 2 - PRODUCTS

2.01 NARRATIVE OF CONTROL SYSTEM CONCEPT

A. It is the intent to provide a DDC control System which will interface for control and monitoring to all primary equipment such as air handling units, heating water system with electric actuation for terminal units such as VAVs, duct coils, etc.

B. The system will link by a network of fiber optic cable from the existing Campus BAS.

C. Direct Digital Control (DDC) technology shall be used to provide the functions necessary for control of mechanical systems on this project.

D. The control system shall accommodate simultaneous multiple user operation up to 10 users. Access to the control system data should be limited only by operator password. Multiple users shall have access to all valid system data. An operator shall be able to log onto any workstation on the control system and have access to all appropriate data, without loading any licensed software.

E. The control system shall be designed such that each mechanical system will be able to operate under standalone control with the exception of outside air temperature, pressure, and humidity. As such, in the event of a network communication failure, or the loss of any other controller, the control system shall continue to independently operate under control.

F. Communication between the network control panels and all workstations shall be over a high-speed network. All nodes on this network shall be peers. The operator shall not have to know the panel identifier or location to view or control an object. Application Specific Controllers shall be constantly scanned by the network controllers to update point information and alarm information.

2.02 GENERAL DESCRIPTION

A. The Building Management System (BMS) shall use an open architecture and fully support a multi-vendor environment. To accomplish this effectively, the BMS shall support open communication protocol standards and integrate a wide variety of third-party devices and applications. The system shall be designed for use on the Internet, or intranets using of-the- shelf, industry standard technology compatible with other owner provided networks.

B. The Building Management System shall consist of the following:

1. Standalone Network Automation Engine(s)
2. Field Equipment Controller(s)
3. Input/Output Module(s)
4. Local Display Device(s)
5. Portable Operator's Terminal(s)
6. Distributed User Interface(s)
7. Network processing, data storage and communications equipment
8. Other components required for a complete and working BMS

C. The system shall be modular in nature, and shall permit expansion of both capacity and function through the addition of sensors, actuators, controllers and operator devices, while re-using existing controls equipment.

D. System architecture design shall eliminate dependence upon any single device for alarm reporting and control execution. The failure of any single component or network connection shall not interrupt the execution of control strategies at other operational devices.

2.03 QUALIFICATION VERIFICATION

A. It is the intent of the Owner to preview the system architecture, components, and use methods of the proposed vendors.

B. Responsive and competitive bidders will be asked to demonstrate their system at the vendors facilities immediately after receipt of bids. The bidder(s) shall host a hands-on pre-training of the proposed system, allowing the Owner's personnel to gain realization and trust in the usability of the format.

C. Specific emphasis shall be given to use of the graphics to access system points for monitoring, trending and setpoint adjustment.

D. Acceptable Automation Systems

1. Invensys / Ultivist
2. Siemens / Insight
3. Johnson/Metasys
4. Trane/Tracer

Note: Contractor must physically demonstrate the above to the Owner and Owners representatives for prequalification before bidding this project. Pre-qualification must be completed at least 5 days prior to bid for the bid to be accepted.

E. Submit a technical proposal with the bid, outlining concurrence with all specification requirements. Discrepancies or non-compliance items shall be noted "line-by-line".

2.04 LOCAL AREA NETWORK

A. Operator workstations and DDC panels shall directly reside on a local area network such that communications may be executed directly between controllers, directly between workstations, and between controllers and workstations on a peer-to-peer basis. Field level tec device 38400 baud or 19200 baud. Ethernet connections should be compatible 10mb and be able to support faster connections.

B. Acceptable Technologies: ETHERNET Backbone and ARCNET, RS485 for field devices.

2.05 STANDALONE DDC PANELS

A. Standalone DDC panels shall be microprocessor based, multi-tasking, multi-user, digital control processor.

B. Memory: Each DDC panel shall have sufficient memory to support its own operating system and databases including: Control Processes, Energy Management Applications, Alarm Management, Trend Data, Maintenance Support Applications, Operator I/O and Manual Override Monitoring.

C. Expandability: The system shall be modular in nature, and shall permit easy expansion through the addition of field controllers, sensors, and actuators.

D. Serial Communication Ports: Standalone DDC panels shall provide at least one RS-232C serial data communication ports or USB port, for simultaneous operation of multiple operator I/O devices such as laptop computers, or portable DDC panel operator terminals.

E. Surge and Transient Protection: Isolation shall be provided at all network terminations, as well as all field point terminations to suppress induced voltage transients consistent with IEEE Standard 587-1980. Isolation levels shall be sufficiently high as to allow all signal wiring to be run in the same conduit as high voltage wiring where acceptable by electrical code. Provide UPS on any controller of emergency equipment.

F. Each Standalone DDC Controller shall be able to extend its performance and control through the use of standalone Application Specific Controllers (ASCs).

G. Acceptable Manufacturers

1. Honeywell Comfort Point Open System for LON and BACnet
2. Invensys IA Series
3. Invensys Multi Purpose Controller (MPC)
4. Johnson Controls, Inc. Network Automation Engine (NAE)
5. KMC Controls # KMD-5831, KMD-5801 (KMD-7400, KMD-7100, KMD-7000 Series)
6. Siemens Modular Equipment Controller (PXC)
7. Trane System Controller (SC)

2.06 SYSTEM SOFTWARE FEATURES

A. The supervisory controller shall be a fully user-programmable, supervisory controller. The supervisory controller shall monitor the network of distributed application-specific controllers, provide global strategy and direction, and communicate on a peer-to-peer basis with other Network Automation Engines.

1. Automation network -- The supervisory controller shall reside on the automation network and shall support a subnet of system controllers.
2. User Interface -- Each supervisory controller shall have the ability to deliver a web based User Interface (UI) as previously described. All computers connected physically or virtually to the automation network shall have access to the web based UI.
    a. The web based UI software shall be imbedded in the supervisory controller. Systems that require a local copy of the system database on the user's personal computer are not acceptable.
    b. The supervisory controller shall support up a minimum of four (4) concurrent users.
    c. The web based user shall have the capability to access all system data through one supervisory controller.

d. Remote users connected to the network through an Internet Service Provider (ISP) or telephone dial up shall also have total system access through one supervisory controller.
e. Systems that require the user to address more than one supervisory controller to access all system information are not acceptable.
f. The supervisory controller shall have the capability of generating web based UI graphics. The graphics capability shall be imbedded in the supervisory controller.
g. Systems that support UI Graphics from a central database or require the graphics to reside on the user's personal computer are not acceptable.
h. The web based UI shall support the following functions using a standard version of Microsoft Internet Explorer:
    < Configuration
    < Commissioning
    < Data Archiving
    < Monitoring
    < Commanding
    < System Diagnostics
i. Systems that require workstation software or modified web browsers are not acceptable.
j. The supervisory controller shall allow temporary use of portable devices without interrupting the normal operation of permanently connected modems.

3. Processor -- The supervisory controller shall be microprocessor-based with a minimum word size of 32 bits. The supervisory controller shall be a multi-tasking, multi-user, and real-time digital control processor. Standard operating systems shall be employed. Supervisory controller size and capability shall be sufficient to fully meet the requirements of this Specification.
4. Memory -- Each supervisory controller shall have sufficient memory to support its own operating system, databases, and control programs, and to provide supervisory control for all control level devices.
5. Hardware Real Time Clock --The supervisory controller shall include an integrated, hardware-based, real-time clock.
6. The supervisory controller shall include troubleshooting LED indicators to identify the following conditions:
    a. Power - On/Off
    b. Ethernet Traffic -- Ethernet Traffic/No Ethernet Traffic
    c. Ethernet Connection Speed -- 10 Mbps/100 Mbps
    d. FC Bus A -- Normal Communications/No Field Communications
    e. FC Bus B -- Normal Communications/No Field Communications
    f. Peer Communication -- Data Traffic Between NAE Devices
    g. Run -- NAE Running/NAE In Startup/NAE Shutting Down/Software Not Running

h. Bat Fault -- Battery Defective, Data Protection Battery Not Installed
i. 24 VAC -- 24 VAC Present/Loss Of 24VAC
j. Fault -- General Fault
k. Modem RX -- Supervisory controller Modem Receiving Data
l. Modem TX -- Supervisory controller Modem Transmitting Data

7. Communications Ports -- The supervisory controller shall provide the following ports for operation of Operator Input/Output (I/O) devices, such as industry-standard computers, modems, and portable Operator's terminals.
   a. Two (2) USB port
   b. One (1) URS-232 serial data communication port
   c. Three (3) RS-485 port
   d. Two (2) Ethernet port

8. Diagnostics -- The supervisory controller shall continuously perform self-diagnostics, communication diagnosis, and diagnosis of all panel components. The Network Automation Engine shall provide both local and remote annunciation of any detected component failures, low battery conditions, or repeated failures to establish communication.
9. Power Failure -- In the event of the loss of normal power, The supervisory controller shall continue to operate for a user adjustable period of up to 10 minutes after which there shall be an orderly shutdown of all programs to prevent the loss of database or operating system software.
   a. During a loss of normal power, the control sequences shall go to the normal system shutdown conditions. All critical configuration data shall be saved into Flash memory.
   b. Upon restoration of normal power and after a minimum off-time delay, the controller shall automatically resume full operation without manual intervention through a normal soft-start sequence.

10. Certification -- The supervisory controller shall be listed by Underwriters Laboratories (UL).
11. Controller network -- The supervisory controller shall support the following communication protocols on the controller network:
    a. The supervisory controller shall support BACnet Standard MS/TP Bus Protocol ASHRAE SSPC-135, Clause 9 on the controller network.
       < A BACnet Protocol Implementation Conformance Statement shall be provided for each controller device (master or slave) that will communicate on the BACnet MS/TP Bus.
       < The supervisory controller shall support a minimum of 100 control devices.

B. Trend Analysis: A data collection utility shall be provided to automatically sample, store, and display system data. Measured and calculated analog and binary data shall be assignable to user-definable trends for the purpose of collecting operator-specified performance data over extended periods of time. Standalone DDC panels shall have a dedicated buffer for trend data, and shall be capable of storing a minimum of 5,000 data samples.

C. Runtime Totalization: Standalone DDC panels shall automatically accumulate and store runtime hours for binary input and output points as specified in the Execution portion of this specification.

1. The Totalization routine shall have a sampling resolution of one minute.
2. The user shall have the ability to define a warning limit for Runtime Totalization. Unique, user-specified messages shall be generated when the limit is reached.

D. Pulse Totalization: Personal Computer shall automatically sample, calculate and store consumption totals on a daily, weekly, or monthly basis for user-selected analog and binary pulse input-type points.

1. Totalization shall provide calculation and storage of accumulations of up to 9,999,999 units (e.g. KWH, gallons, KBTU, tons, etc.)
2. The Totalization routine shall have a sampling resolution of one minute or less.
3. The user shall have the ability to define a warning limit. Unique, user-specified messages shall be generated when the limit is reached.

E. Event Totalization: Standalone DDC panels shall have the ability to count events such as the number of times a pump or fan system is cycled on and off.

1. The Event Totalization feature shall be able to store the records associated with a minimum of 9,999,999 events before reset.
2. The user shall have the ability to define a warning limit. Unique, user-specified messages shall be generated when the limit is reached.

F. Provide all new software versions for a period of 2 years from completion date.

2.07 APPLICATION SPECIFIC CONTROLLER - EXTENDED DIGITAL CONTROLLERS (EDC)

A. Each EDC shall operate as a standalone controller capable of performing its specified control responsibilities independently of other controllers in the network. Each EDC shall be a microprocessor-based, multi-tasking, real-time digital control processor.

B. Each EDC shall have sufficient memory to support its own operating system and data bases including:

1. Control Processes

2. Energy Management Applications
3. Operator I/O (Keypad and Display or Portable Service Terminal)

C. Powerfail Protection: All system set points, proportional bands, control algorithms, and any other programmable parameters shall be stored such that a power failure of any duration does not necessitate reprogramming the ASC.

D. EDC shall support, but not be limited to the following configurations of systems to address current requirements described in the Execution portion of this specification, and for future expansion.

1. Air handling units and rooftop units with complex control strategies
2. Single boiler or chiller plants with pump logic
3. Cooling towers
4. Zone pressurization of labs
5. Plant heating and cooling circuits
6. Heat exchangers

E. EDC shall support all the necessary point inputs and outputs to perform the specified control sequences in a totally standalone fashion. A minimum of 30 I/O points expandable to 94 shall be supported by the EDC.

F. EDC shall have a built-in status and adjust panel interface to allow for the local adjustment of all set points, temporary override of any input or output points and status of any points in alarm.

G. The EDC shall employ a finite state control engine to eliminate unnecessary conflicts between control functions at crossover points in their operational sequences. Suppliers using non-state based DDC shall provide separate control strategy diagrams for all controlled functions in their submittals.

H. Controllers shall be factory programmed with a continuous adaptive tuning algorithm that senses changes in the physical environment and continually adjusts loop tuning parameters appropriately. Controllers that require manual tuning of loops or perform automatic tuning on command only shall not be acceptable.

I. The EDC shall be assembled in a plenum-rated plastic housing with flammability rated to UL94-5VB.

J. The EDC shall include a removable base to allow pre-wiring without the controller.

K. The EDC shall include troubleshooting LED indicators to identify the following conditions:

1. Power On
2. Power Off
3. Download or Startup in progress, not ready for normal operation

4. No Faults
5. Device Fault

L. The EDC shall accommodate the direct wiring of analog and binary I/O field points.

M. The EDC shall support the following types of inputs and outputs:

1. Universal Inputs - shall be configured to monitor any of the following:
   Analog Input, Voltage Mode
   Analog Input, Current Mode
   Analog Input, Resistive Mode
   Binary Input, Dry Contact Maintained Mode
   Binary Input, Pulse Counter Mode

2. Binary Inputs - shall be configured to monitor either of the following:
   Dry Contact Maintained Mode
   Pulse Counter Mode

3. Analog Outputs - shall be configured to output either of the following
   Analog Output, Voltage Mode
   Analog Output, current Mode

4. Binary Outputs - shall output the following:
   24 VAC Triac

5. Configurable Outputs - shall be capable of the following:
   Analog Output, Voltage Mode
   Binary Output Mode

N. Acceptable Manufacturers

1. Honeywell Comfort Point Open SPC or IPC
2. Invensys
3. Johnson Controls, Inc. DX-9100
4. KMC Controls # KMD-5210 with KMD-5220 and KMD-5210
5. Schneider Electric AS Series, Installed by Havel Bros.
6. SCC300, UHC300, UHC 320, LDX-10
7. Siemens Modular Equipment Controller (MEC)
8. Trane Unit Controller (UC)

2.08 APPLICATION SPECIFIC CONTROLLER - TERMINAL UNIT CONTROLLERS (TUC)

A. Each TUC shall operate as a standalone controller capable of performing its specified control responsibilities independently of other controllers in the network. Each TUC shall be a microprocessor-based, multi-tasking, real-time digital control processor.

B. Each TUC shall have sufficient memory to support its own operating system and data bases including:

1. Control Processes
2. Energy Management Applications
3. Operator I/O (Portable Service Terminal)

C. Powerfail Protection: All system set points, proportional bands, control algorithms, and any other programmable parameters shall be stored such that a power failure of any duration does not necessitate reprogramming the TUC.

D. Terminal Unit Controllers shall support, but not be limited to, the following types of systems to address specific applications described in the "Execution" portion of this specification, and for future expansion:

1. Unit Vents (ASHRAE Cycle I, II, III, or W)
2. Heat Pumps (Air-to-Air, Water-To-Air)
3. Packaged Rooftops
4. Fan Coils (Two-Pipe, Four-Pipe)
5. Single Duct VAV (Cooling Only, or Cooling with Reheat)
6. Fan Powered VAV
7. Dual Duct (Constant Volume, Variable Volume)
8. Supply/Exhaust VAV Terminal Unit parallel control
9. Cabinet Unit heaters
10. Terminal Unit Controllers shall support the following types of point inputs and outputs:
    a. Analog and Binary inputs
    b. Heating and Cooling Outputs
    c. Radiation Outputs (Incremental, or time-based proportional)
    d. Fan Control Output (On/Off Logic, phase-cut proportional or 1 to 3 stages)

E. The modes of operation supported by the Terminal Unit Controllers shall include, but not be limited to, the following:

1. Startup Mode
2. Comfort/Occupancy Mode
3. Economy Mode (Standby Mode, Unoccupied, etc.)
4. Off Mode
5. Temporary Override Mode (Manual)

F. Each Terminal Unit Controller shall have a provision for occupancy sensing overrides. Based upon the contact status of either a manual wall switch or an occupancy sensing device, the Terminal Unit Controller shall automatically select either a Standby or Comfort mode to minimize the heating and cooling requirements while satisfying comfort conditions.

G. Each Terminal Unit Controller shall perform its own limit and status monitoring and analysis to maximize network performance by reducing unnecessary communications.

H. VAV Terminal Unit Controllers

1. The TUC shall have internal electrical isolation for AC power and DC inputs. An externally mounted isolation transformer shall not be acceptable.
2. The TUC shall be a configurable digital controller with integral differential pressure transducer and damper actuator. All components shall be connected and mounted as a single assembly that can be removed as one piece.
3. The TUC shall be assembled in a plenum-rated plastic housing with flammability rated to UL94-5VB.
4. The integral damper actuator shall be a fast response stepper motor capable of stroking 90 degrees in 30 seconds for quick damper positioning to speed commissioning and troubleshooting tasks.
5. Each controller shall continuously, adaptively tune the control algorithms to improve control and controller reliability through reduced actuator duty cycle.
6. The controller shall provide the ability to download and upload TUC configuration files, both locally and via the communications network. Controllers shall be able to be loaded individually or as a group using a zone schedule generated spreadsheet of controller parameters.
7. Control setpoint changes initiated over the network shall be written to TUC non-volatile memory to prevent loss of setpoint changes and to provide consistent operation in the event of communication failure.
8. The controller firmware shall be flash-upgradeable remotely via the communications bus to minimize costs of feature enhancements.
9. The controller shall interface with balancer tools that allow automatic recalculation of box flow pickup gain (“K” factor), and the ability to directly command the airflow control loop to the box minimum and maximum airflow setpoints.
10. Controller performance shall be self-documenting via on-board diagnostics. These diagnostics shall consist of control loop performance measurements executing at each control loop’s sample interval, which may be used to continuously monitor and document system performance. The TUC shall calculate exponentially weighted moving averages (EWMA) for each of the following. These metrics shall be available to the end user for efficient management of the VAV terminals.
    a. Absolute temperature loop error.
    b. Signed temperature loop error.
    c. Absolute airflow loop error.
    d. Signed airflow loop error.
    e. Average damper actuator duty cycle.

11. The controller shall detect system error conditions to assist in managing the VAV zones. The error conditions shall consist of:
    a. Unreliable space temperature sensor.
    b. Unreliable differential pressure sensor.
    c. Starved box.
    d. Actuator stall
    e. Insufficient cooling.
    f. Insufficient heating.

12. The controller shall provide a flow test function to view damper position vs. flow in a graphical format. The information would alert the user to check damper position. The TUC would also provide a method to calculate actuator duty cycle as an indicator of damper actuator runtime.
13. The controller shall comply with ASHRAE Standard 90.1 (energy efficiency) by preventing simultaneous heating and cooling, and where the control strategy requires reset of airflow while in reheat, by modulating the box reheat device fully open prior to increasing the airflow in the heating sequence.
14. Inputs:
    a. Analog inputs with user defined ranges shall monitor the following analog signals, without the addition of equipment outside the terminal controller cabinet:
        (1) 0-10 VDC Sensors
        (2) 10,000 ohm RTDs
        (3) NTC Thermistors
    b. Binary inputs shall monitor dry contact closures. Input shall provide filtering to eliminate false signals resulting from input “bouncing”.
    c. For noise immunity, the inputs shall be internally isolated from power, communications, and output circuits.
    d. Provide side loop application for humidity control.

15. Outputs
    a. Analog outputs shall provide the following control outputs:
    b. 0-10 VDC
    c. Binary outputs shall provide a SPST Triac output rated for 500mA at 24 VAC.
    d. For noise immunity, the outputs shall be internally isolated from power, communications, and other output circuits.

16. Application Configuration
    a. The TUC shall be configured with a software tool that provides a simple Question/Answer format for developing applications and downloading.

17. Sensor Support
    a. The TUC shall support an LCD display room sensor.

b. The TUC shall also support standard room sensors as defined by analog input requirements.
c. The TUC shall support humidity sensors defined by the AI side loop.

I. Acceptable Manufacturers

1. Honeywell International Comfort Point VAV-2A or FB22344R
2. Invensys (MNL)
3. Invensys (PUC)
4. Johnson Controls, Inc. MS-VMA1600, Terminal Equipment Controller (TEC)
5. KMC Controls #KMD-7001, KMD-7102/2, KMD-7101C/2C, KMD-7401, 7401C
6. SCC300, UHC 300, UHC 320
7. Schneider Electric CX9900 Series, Installed by Havel Bros.
8. Siemens Terminal Equipment Controller (TEC)
9. Trane Unit Controller (UC)

2.09 BACnet COMMUNICATION THERMOSTAT

A. An Application Specific Controller (ASP) BACnet communicating thermostat shall be specifically designed for zoning applications and control and shall be available in BACnet® MS/TP and ZigBee® wireless mesh protocols that can be easily integrated into building automation system based on the NiagaraA4® platform.

B. Typical applications include local hydronic reheat valve control and pressure dependent VAV with or without local reheat. The communicating thermostat shall incorporate a PI proportional control algorithm for accurate temperature control.

C. The communicating thermostat shall be available with 3 point floating and analog 0 to 10 Vdc control. In addition remote room sensing shall be available. Thermostats shall be equipped with an occupancy sensor to provide advanced active occupancy logic, which will automatically switch occupancy levels from Occupied to Stand-By and Unoccupied as required by local activity.

D. Provide the following features as specified or required by the control sequences:

1. Backlit LCD display with dedicated function menu keys for simple operation
2. Fully integrated advanced occupancy functionality with a PIR cover provides energy savings opportunity on select models; all other models are PIR ready and can have an optional occupancy sensor cover added at any time
3. Pre-configured sequences of operation means one model meets more application needs
4. Password protection to minimize parameter tampering with Four levels of keypad lockout to limit access to change user parameters such as setpoints, system mode, etc.

5. Available in 24 Vac on/off, floating or 0-10 Vdc analog control to meet advanced applications requirements with Three configurable inputs for monitoring and advanced functions
6. SPST auxiliary output that can be used for lighting or reheat All wiring connections are made to removable terminal blocks simplifying installation

E. Acceptable Manufacturers: Honeywell TB 7200, 7300, 7600 Series or equal.

2.10 INTEGRATION WITH THIRD PARTY MANUFACTURER'S EQUIPMENT

A. The Building Automation System (BAS) shall be capable of interoperating with multiple building systems supplied by different manufacturers. The BAS shall be able to receive, react to, and in some cases, return information from multiple building systems. Point inputs and outputs from the third-party controllers shall have real-time interoperability with BAS software features such as: Historical Data and Trend Analysis, Totalization, and Dial-Up and Local Area Network Communications, as mentioned earlier in the specification.

B. Networking/Communications

1. The BAS shall support any combination of third-party controllers (if more than one third party manufacturer is being integrated) on a single network.
2. A minimum of 100 third party controllers shall be supported on a single network.
3. Integration shall be by RS-232 or RS-485 Technologies.

C. Diagnostics/Verification: The installer/operator shall have the ability to verify and diagnose communication messages and point information between third party controllers and the Building Automation System.

D. Acceptable Manufacturers

1. Honeywell International Comfort Point Open System
2. Invensys (UNC)
3. Johnson Controls, Inc.- Metasys Integrator
4. KMC
5. NSX2000 with Field Server
6. Schneider Electric AS Series, Installed by Havel Bros.
7. Siemens Open Processor Driver
8. Trane Integration Panel

2.11 REMOTE OPERATOR WORKSTATION

A. Operators at remote web access workstations shall be able to perform all control functions and all database generation and modification functions as described for workstations connected via the local area network. Routines shall be provided to automatically answer calls, and either file or display information sent from remote DDC panels. The fact that communication is taking place with remote web access via internet shall be completely transparent to an operator.

B. Acceptable Manufacturers: Refer to BAS Manufacturer's minimal hardware standards for remote PC or laptop workstation.

2.12 REMOTE NOTIFICATION INTERFACE SOFTWARE

A. Interface shall link directly to an E-mail based system, to notify building maintenance personnel when critical events occur in the BAS. This interface shall detect which critical alarms require pages, creates an action statement for each page, and selects who should receive the page.

B. The system databases shall be protected from unauthorized users through a password protection feature.

C. TCC shall furnish, install and set-up the remote notification software and provide four (4) hours technical assistance for training and support.

D. Acceptable Manufacturers

1. Honeywell International
2. Johnson Controls, Inc. MMX Software Package
3. KMC
4. Schneider Electric AS Series, Installed by Havel Bros.
5. Trane

2.13 INPUT/OUTPUT INTERFACE

A. Hard-wired inputs and outputs may tie into the system through Building, Custom, or Application Specific Controllers.

B. All input points and outputs points shall be protected such that shorting of the point to itself, another point, or ground will cause no damage to the controller. All input and output points shall be protected from voltage up to 24V of any duration, such that contact with this voltage will cause no damage to the controller.

C. Binary inputs shall allow the monitoring of on/off signals from remote devices. The binary inputs shall provide a wetting current of at least 12 ma to be compatible with commonly available control devices.

D. Pulse accumulation input points. This type of point shall conform to all the requirements of Binary Input points, and also accept up to 2 pulses per second for pulse accumulation and shall be protected against effects of contact bounce and noise.

E. Analog inputs shall allow the monitoring of low voltage (0-10 Vdc), current (4-20ma), or resistance signals (thermistor, RTD). Analog inputs shall be compatible with, and field configurable to commonly available sensing devices.

F. Binary outputs shall provide for on/off operation, or a pulsed low voltage signal for pulse width modulation control. Binary outputs on custom and building controllers shall have 3-position (on/off/auto) override switches and status lights. Outputs shall be selectable for either normally open or normally closed operation.

G. Analog outputs shall provide a modulating signal for the control of end devices. Outputs shall provide either a 0-10Vdc or a 4-20 ma signal as required to provide proper control of the output device. Analog outputs shall be able to be manually overridden.

2.14 ELECTRONIC SPACE ANALOG TEMPERATURE SENSORS

A. Provide space temperature sensors of commercial grade quality located at the point of measurement and installed according to the manufacturer's recommendations.

B. Temperature sensors shall be of the 10k Type 3 such that the BAS shall be able to convert the resistive input signal available from the element into a digital signal for use by the BAS.

C. Provide temperature sensor of the ultra-precision type with a resistance tolerance of 75°F or no greater than ± 1.0% and an end-to-end (full scale) accuracy of ±0.5°F per 10,000 ohm; range: 55/80.6°F.

D. All space temperature sensors shall have concealed setpoint adjustment, but no temperature indication.

E. The sensors shall be maintenance free of batteries, drawing power from the controller.

F. Cover shall be standard as ABS with a white color or beige. Other finishes are required in certain areas of the facility. Review finishes with Engineer/Architect during submittal process. Submit samples for approval.

G. Acceptable Manufacturers

1. BAPI BA/1K Series
2. Honeywell International
3. Invensys MN-S Series
4. Invensys TS Series

5. Johnson Controls TE-6700
6. KMC STE-5200
7. Siemens Series 1000, 540-671B
8. Trane X137 Series

2.15 ELECTRONIC ANALOG OUTDOOR AIR TEMPERATURE SENSORS

A. Provide temperature sensors of commercial grade quality located at the point of measurement and installed according to the manufacturer's recommendations.

B. Temperature sensors shall be of the RTD type such that the BAS shall be able to convert the resistive input signal available from the element into a digital signal for use by the BAS.

C. Provide temperature sensor of the ultra-precision type with a resistance tolerance of 70°F or no greater than ± 1.0% and a end-to-end (full scale) accuracy of ±0.1°F, 1000 or 10,000 ohm; range: -50/250°F.

D. Outside air sensor shall be mounted in a weatherproof enclosure with a sun shield for protection against the outdoor elements.

2.16 ELECTRONIC DUCT AVERAGING ANALOG TEMPERATURE SENSORS

A. Provide temperature sensors of commercial grade quality located at the point of measurement and installed according to the manufacturer's recommendations.

B. Provide temperature sensor with a resistance tolerance of 70°F or no greater than ± 1.0% and an end-to-end (full scale) accuracy of + 1.0° F: 10k ohm

C. Acceptable Manufacturers

1. Honeywell International
2. Invensys TS-5700 and 8000 Series
3. Johnson Controls TE-6328P-1
4. KMC # STE-1400
5. Schneider Electric AS Series, Installed by Havel Bros.
6. Siemens 544-345
7. Trane 4190 Series

2.17 SPACE ANALOG HUMIDITY SENSORS

A. Humidity sensors shall utilize a solid-state humidity sensing element to measure the relative humidity (RH) over a range of 10% to 80% RH, and send a proportional signal to the system's controller.

B. Humidity sensor shall be resistant to corrosion in harsh environments and shall have no minimum air flow requirements.

C. Cover shall be standard as ABS with a white color. Other finishes are required in certain areas of the facility. Review finishes with Engineer/Architect during submittal process. Submit samples for approval. Other finishes include:

1. Custom Color
2. Brushed stainless steel
3. Brushed aluminum
4. Brushed brass

D. Acceptable Manufacturers

1. General Eastern 01-6013
2. Honeywell International, Intl.
3. KMC THE-1105
4. Vaisala

2.18 ELECTRONIC SPACE ANALOG HUMIDITY SENSORS

A. Humidity sensors shall utilize a capacitive humidity sensing element to measure the relative humidity (RH) over a range of 10% to 100% RH, and send a proportional output to the system's controller.

B. Accuracy shall be + 2% at room temperature.

C. Cover shall be white plastic.

D. Acceptable Manufacturers

1. General Eastern 01-6013
2. Siemens Q Series
3. Vaisala

2.19 DEW POINT SENSOR

A. Sensor shall employ a chilled mirror optically detected condensation technique to measure the dew point of the air and transmit this information in the form of a 4 to 20 mA signal to the DDC panel.

B. Accuracy shall be accurate to ± 1.0% with repeatability of 0.1°F.

C. Provide duct mount plate and gasket assembly to facilitate periodic removal and replacement of the sensor.

D. Acceptable Manufacturers

1. General Eastern #P3A-D
2. Honeywell International
3. Siemens 1070

2.20 ELECTRONIC LIQUID IMMERSION ANALOG TEMPERATURE SENSORS

A. Provide liquid immersion sensors of commercial grade quality located at the point of measurement and installed according to the manufacturer's recommendations.

B. 1000-ohm Platinum RTD sensors shall provide input for cost-effective, accurate temperature sensing (detecting) for the Automation System Modular Building Controller (MBC), Remote Building Controller (RBC), Unitary Controller (UC), and Modular Equipment Controller (MEC) via a 20 AWG twisted, shielded cable pair. The sensor resistance varies according to the temperature being measured or 10 K ohm.

C. Temperature Range/Mid-Range Accuracy: -40°F to 240°F/+ 0.8°F (-40°C to 116°C/+0.5C°)

D. Element Package: Stainless Steel 2-1/2" (6.4cm) Well

E. Acceptable Manufacturers

1. Automation Components Inc. (ACI)
2. Building Automation Products Inc. (BAP1)
3. Honeywell International
4. Invensys TS5721-901
5. Johnson Controls TE-631 AM-1 (Sensor), WZ1000-5 (Well)
6. KMC
7.
8. Schneider Electric AS Series, Installed by Havel Bros.
9. Siemens 544-577 (Sensor) 184-120 (Well)
10. Trane 4190 Series 10K Ohm

2.21 DUCT PRESSURE TRANSDUCERS/TRANSMITTERS

A. Provide pressure transducers/transmitters suitable for use in air duct systems, which sense differential or gauge air duct static pressures and convert the pressure difference to a proportional electrical output signal for unidirectional and bidirectional pressure ranges.

B. Suitable for pressures as low as 0.1 in. w.c. select range appropriate to application typically 0-5 in. w.c. for duct systems.

C. Accuracy of pressure transducers/transmitters shall be at least $\pm$ 1.0% full scale.

D. Acceptable Manufacturers:

1. Mamac
2. Schneider Electric EPP-102, installed by Havel Bros.
3. Setra Systems, Inc. Model 264
4. Siemens 590-5XX Series

2.22 WATER DIFFERENTIAL PRESSURE SENSORS AND TRANSMITTERS

A. Pressure Sensor Construction: Compatible with medium being measured.

B. All Pressure Sensors shall be sized to withstand two times (2 x) the overage without damage and to hold calibrated accuracy when subject to a momentary forty percent (40%) overrange input.

C. Pressure measurement accuracy within one percent (1%) of the span over ambient operating temperature of 30°F to 140°F.

D. Pressure transmitters shall utilize a 4-20 mA or 0-10 VDC transmission.

E. Differential Pressure Sensors and Transmitters Used for flow measurement shall be sized to the flow sensing device and be supplied with proper shutoff and bleed valves as required. Furnish a 3-valve manifold for these transmitters.

F. Acceptable Manufacturers for Differential Pressure Transmitter

1. Anderson Greenwood
2. Johnson Yokogawa Uni-Delta YA11
3. Mamac
4. Rosemount 1151 Alphaline. Isolation Valve Manifold
5. Schneider Electric EDW-105, installed by Havel Bros.
6. Setra
7. Sitran Series

G. Acceptable Manufacturers for Isolation Valve Manifold: Anderson Greenwood; or approved equal

2.23 AIR PRESSURE DIFFERENTIAL TRANSDUCERS/TRANSMITTERS

A. Provide very low differential pressure transducers/transmitters suitable for use in underfloor air pressure control and outdoor/indoor building static pressure control.

B. Transducer shall be unidirectional and bidirectional sensing differential pressure and converting to a proportional electric output.

C. Suitable for pressures as low as 0.1 in. w.c. select range appropriate to application. Underfloor 0 to 1 in. w.c. outdoor/indoor $\pm$ 1 in. w.c.

D. Accuracy of $\pm$ 0.25%.

E. Acceptable Manufacturers:

1. Setra Model 264
2. Schneider Electric EPP101, installed by Havel Bros.
3. Honeywell P7640 Series

2.24 AIR PRESSURE SENSORS AND SURGE DAMPENERS

A. Provide static air pressure sensors with surge dampeners for use with pressure transmitters.

B. Use total pressure sensors for proving airflow in ductwork.

1. Siemens Model 21121
2. Veris PX Series

C. Use outdoor static pressure sensors for building pressurization control

1. Siemens A-306-K
2. Veris PX Series

D. Use room static pressure sensors for underfloor plenum applications. Provide white plastic wall plate for installation on a standard electric box.

1. Siemens Model RPS-W
2. Veris PX Series

E. Use surge dampeners to absorb rapid pressure fluctuations.

1. Siemens Model SD-01
2. Veris PX Series

2.25 HANDHELD VAV BALANCING SENSOR OR SOFTWARE APP

A. Provide to the Test and Balance Contractor the following at a minimum, sensor of software APP for loading on their PC.

1. The sensor shall be a lightweight portable device.
2. The sensor/APP shall be capable of displaying data and setting balancing parameters for VAV control applications.
3. The sensor/APP shall be powered through a connection to either the temperature sensor or the Field TUC communication Bus or PC Laptop.
4. The sensor/APP shall be a menu driven device that shall modify itself automatically depending upon what type of application resides in the controller.
5. The sensor/APP shall provide an adjustable time-out parameter that will return the controller to normal operation if the balancing operation is aborted or abandoned.
6. The sensor shall include the following
   a. 5-foot retractable cable
      (1) Laminated user guide
      (2) Nylon carrying case
   b. The sensor shall be Underwriters Laboratory UL 916 listed and CSA certified C22.2 N. 205, CFR47.

2.26 AIR DIFFERENTIAL PRESSURE SWITCHES

A. Pressure switch shall have SPDT controls, adjustable set point, range scale plate and mounted in NEMA Type 1 enclosure. Contact shall be rated for ½ HP.

B. Range shall be from 0.15 to 12.0" w.c. with sensitivity at minimum setpoint of 0.07" w.c.

C. Acceptable Manufacturers

1. Cleveland Control
2. Honeywell International
3. Invensys PC301
4. Johnson Controls P32 Series
5. KMC # CSE-1102
6. Siemens SW141 Services.

2.27 WATER DIFFERENTIAL PRESSURE SWITCHES

A. Controller shall be utilized to prove flow in a closed water system by measuring pressure drop across two different points. Unit shall incorporate heavy-duty, low-profile elements to withstand unduly high overrun pressures.

B. The operation point of the control shall be readily adjusted by rotating an adjusting cam.

C. Acceptable Manufacturers

1. Dwyer
2. Johnson Controls P74 Series
3. UEC Delta Pro 24 Series
4. United Electric H100 Series

2.28 CARBON DIOXIDE SENSORS (DUCT)

A. CO_2 level tracer gas sensing shall be accomplished with a common detector employing duct air CO_2 concentration level detection and sampling techniques for OA, RA, and SA. The sensing technique shall provide consistent operating data, which for accuracy requirements is updated at least once per minute. The data gathering and dissemination technique shall also be arranged so as to maintain accurate detection and associated air flow control with a minimal need for calibration (through deployment of common sensing, without added maintenance costs attributable to other forms of multi device/multi location techniques). CO_2 sensing techniques shall be accurate to plus/minus 100 ppm per year and be suitable for use with typical HVAC system air flow station(s) etc., described elsewhere in this specification.

B. Overall HVAC system control strategies and associated equipment are those described elsewhere in this specification. The associated data gathering and dissemination algorithms necessary to achieve full and consistent BAS integration shall be incorporate with CO_2 tracer gas detection and associated air flow control techniques described above. Related BAS functions and configurations are those described above and elsewhere within the BAS specification.

C. The BAS ventilation control application functions shall also include capabilities for enhancement or expansion at some later date. The enhancement and expansion capabilities shall include but not be limited to the incorporation of high limit zone CO_2 sensing and associated zoned air flow control i.e., demand control, and others such as the indoor air quality procedure of ASHRAE 62-'89 or similar others. When implemented such enhancements shall be accomplished with minimal change to BAS configuration, and without obsolescence of need for replacement of any capabilities, which are provided under initial installation described herein.

D. Acceptable Manufacturers

1. Johnson Controls (EVC or CDS series)
2. Trane X137 Series

2.29 CARBON DIOXIDE SENSOR

A. Unit to be self-contained wall mounted type, have digital display, detect low level carbon dioxide, and activate alarm. Unit to operate on 110-volt power.

B. Manufacturers

1. BAPI BA Series
2. Nighthawk Industries Model 5U748
3. Telaire Ventostat Series

2.30 CARBON DIOXIDE SENSORS

A. Space Sensor

1. Suitable for wall mount in the finished space. Mount at 48" AFF adjacent to the room temperature sensor.
2. Factory setting range of 0-2000 ppm CO2 with accuracy of $\pm$ 40 ppm or $\pm$ 3% of reading, whichever is higher.
3. Lifetime guarantee of minimum 15-year calibration internal requirement.
4. Certification: FCC Part 15, Class B
5. Tamperproof locking screw on cover.
6. LCD display with see-through cover.
7. Manufacturer:
   a. Telaire Model 8002-K or equal
   b. Honeywell C7200 Series

B. Duct Mounted Sensor

1. Suitable for duct application
2. Factory setting 0-1000 ppm CO2 with accuracy of ± 40 ppm or ± 3% of reading, whichever is higher.
3. Lifetime guarantee of minimum 15-year calibration internal requirement.
4. Certification: FCC Part 15, Class B
5. Pitot tube style duct sampling (requires duct velocities greater than 600 fpm)
6. Installer to assure all openings into the enclosure are sealed, including, the interior of the conduit.
7. LCD display
8. Manufacturer
   a. BAPI BA Series
   b. Honeywell C7200 Series
   c. Siemens
   d. Telaire Model 8008

2.31 ROOM AIR QUALITY SENSORS

A. Room quality sensors to enable demand-controlled outside air. Sensors shall acquire CO2 and volatile organic compound (VOC) concentrations.

B. The sensor is to evaluate the CO2/VOC concentrations and transform to a linear proportional output signal.

C. Suitable for wall mount in the finished space. Mount at 48" AFF adjacent to the room temperature or humidity sensors.

D. Factory range of 0-2000 ppm CO2 with accuracy of ± 50 ppm or ± 2% of measured valve. VOC sensitivity level R2, normal.

E. Guarantee of minimum 8 years free of re-calibration.

F. Plastic white cover without display.

G. Manufacturer:
1. BAPI BA Series
2. Siemens QPA20
3. Telaire

2.32 FLOW SENSORS AND TRANSMITTERS

A. Magnetic Flowmeters:

1. Flowmeter system with a remote analog or microprocessor signal converter.
2. Carbon steel ANSI flanges meeting pressure rating of the installed system.

3. Flowrate measurement shall be independent of viscosity, density and temperature.
4. Standard NEMA 4X enclosure rating.
5. ISO 9001 certified
6. System accuracy of ± 1/2% or 1/4% of rate dependent on the signal converter chosen.
7. Meter spool of 304 stainless steel, liner of Teflon and Tefzel
8. The electrode material shall be 316 stainless steel.
9. The housing and connection box shall be cast aluminum.

B. Signal Converter:

1. Processor based converter for use with Magmeter flowtubes.
2. Empty pipe detection
3. External totalizer reset contact shall be software configurable.
4. Dual range system set for automatic switching.
5. User configurable unit: of push button design.
6. Bi-directional flow indication via directional contact or split 4-20 mA range.
7. Automatic system monitoring with error diagnostics and alarms.
8. All data stored in nonvolatile memory for 10 years without battery back-up.
9. Enclosure classification: NEMA 4X
10. Back lit 2 line x 16 characters liquid crystal display.

C. Acceptable Manufacturers

1. ABB Instrumentation 4000 Series Magmeter with 24-volt display
2. Badger Meter Magnetofow
3. Krohne Aquaflux Series
4. Liquid Controls LCMag
5. Onicon Turbine Meter
6. Rosemount 8742C Series Magmeter with 24-volt display.

2.33 REFRIGERANT LEAK DETECTOR

A. Refrigerant leak detector shall be a standalone device and capable of directly energizing the Central Plant exhaust ventilation fan. The detector shall include a sensor or sensors connected to a control panel. Two relay contacts at the control panel shall provide trouble and alarm indication to the Building Automation System. The alarm relay contact shall also directly energize the exhaust fan.

B. Refrigerant leak detector shall be manufactured specifically for sensing the type of refrigerant used in the specified chillers. Only one sensor shall be required to provide proper sensing coverage for the area of the Central Plant.

C. Quality and Accuracy Standard

1. Monitor shall be compound specific with a measurement and display range 0-1000 ppm.
2. The display accuracy shall be +/- 1 ppm.
3. Factory-set alarm level shall be provided, with a front panel light and a latching binary contact closure for the control of remote devices.
4. An analog output corresponding to the unit display is required for connection to a BAS.
5. A means to automatically re-zero the instrument must be included.
6. Regular maintenance of the unit shall be limited to recalibration once per year and monthly confirmation of clean air source for recalibration.
7. Ambient temperature operating range shall be 40 to 105 F.

D. Acceptable Manufacturers

1. Andover
2. MSA Instruments
3. Trane TruSense Model RMWG
4. Vulcain

2.34 RELAYS (ELECTRIC)

A. Snap acting, enclosed switching type, with built-in 120V to 24V/60 Hz transformer, 24-volt coil, and line voltage contacts as indicated, each rated minimum 7.4 amp running current at 120 VAC.

B. Snap acting NEMA 1 enclosed switching type with 120V/60 Hz coil and line voltage contacts, as indicated, each rated minimum 7.2 amp running current at 120 VAC.

C. Snap acting, rated for application, minimum 2 sets of Form C contacts, enclosed in dust-proof enclosure.

1. Contacts: Silver-cadmium with minimum life span rating of 1,000,000 operations.
2. Operating time: 20 milliseconds or less.
3. Release time: 10 milliseconds or less
4. All relays equipped with coil transient suppression devices to limit transients to non-damaging levels.

D. Acceptable Manufacturers

1. Functional Devices
2. Idec

2.35 CURRENT SENSING RELAYS

A. Sensing relay shall be a solid-state electronic device with split-core design to eliminate the need to remove power conductor for installation or servicing.

B. Amperage rating of 0 - 135 Amps.

C. Trip setpoint shall be adjustable to ± 1% of range. Provide a trip LED.

D. Sensor supply current is induced from monitored conductor. Minimum conductor current required is 2 amps. Provide a power LED to indicate that power is available at the current sensing relay.

E. Sensor shall have 600 VAC rms isolation.

F. Switch output contacts shall be rated for 0.5 amps @ 30 VAC/DC.

G. Acceptable Manufacturers

1. Nellsen - Kuljian,
2. Senva Series
3. Veris Industries H900 Series

2.36 TRANSFORMERS AND POWER SUPPLIES

A. Control transformers shall be UL listed, Class 2 current-limiting type, or shall be furnished with overcurrent protection in both primary and secondary circuits for Class 2 service.

B. Unit output shall match the required output current and voltage requirements. Current output shall allow for a 50% safety factor. Output ripple shall be 3.0 mV maximum Peak-to-Peak. Regulation shall be 0.10% line and load combined, with 50 microsecond response time for 50% load changes. Unit shall have built-in over-voltage protection.

C. Unit shall operate between 0° C and 40° C ambient.

D. Acceptable Manufacturers

1. Johnson Controls, Inc. Y6 Series Transformers
2. Kele RIB TR Series
3. Siemens

2.37 HYDRONIC CONTROL VALVES

A. All automatic control valves shall be fully proportioning with equal percentage modulating plug or V-port inner guides unless otherwise specified.

B. Valves shall be quiet in operation and fail-safe in either the normally open or normally closed position as indicated.

C. All control valves shall be sized to meet heating and cooling loads specified. Maximum pressure drop through the valve shall not exceed 5 psig unless otherwise indicated.

D. All control valves shall be suitable for the pressure conditions and shall close against the differential pressures involved. Valve body pressure rating (minimum 125 psig and connection type shall conform to the scheduled piping to which it is installed. Provide bubble-tight shut-off in the closed position.

E. Valves for heating or chilled water service shall be single seated with brass trim, stainless steel stem, and composition seats. Provide equal percentage flow characteristics for two-way valves and linear flow characteristics for three-way valves.

F. Valves between ½" and 2" shall be bronze with threaded end connection.

G. Acceptable Manufacturers

1. Belimo G Series
2. Honeywell International VBN/VBF
3. Invensys VB-7000-Series
4. Johnson Controls VG7000 series
5. KMC # VEP-11, # VEP-45
6. Siemens VP

2.38 ULTRASONIC TRANSMITTER LIQUID FLOW METER

A. Provide flow meters in hydronic systems to obtain non-intrusive flow measurement.

B. Suitable for non-wetted clamp-on to all nominal steel and copper pipe sizes stainless steel straps.

C. Accuracy of $\pm$ 1% to 2% of reading on pipe sizes exceeding 6", and $\pm$ 2% to 5% of reading on pipe sizes 6" and under.

D. Complete ultrasonic flow metering and flow transmitter utilizing a microprocessor receiving coded ultrasonic signals from a pair of transducer.

1. Enclosure for the microprocessor of epoxy-coated weatherproof aluminum, with backlit LCD display of up to four measurement parameters.
2. Output of measurement compatible with the building energy management system.

E. Manufacturer:

1. Badger
2. G.E. Model AT868

2.39 BUTTERFLY VALVES

A. Butterfly valves shall be used for modulating applications for 2-1/2" and above. Valves shall be lug type rated for 200 psig non-shock water service to 250 deg F.

B. Valve body shall be ductile iron with B-Nitrate (BUNA N) or EPDM molded seat and seals.

C. Disc material shall be cast bronze or aluminum-bronze with ASTM A-492 Type 416SS stainless steel stem and fittings.

D. Valves shall be tight close off suitable for end of line service.

E. Butterfly valves used for two position control shall be line sized. Valves used for modulating control shall be sized for a minimum 5 psig differential pressure at full flow.

F. Three way valve mixing or diverting configurations shall have factory provided linkage kits specifically manufactured for the piping arrangement and actuator used.

G. Acceptable Manufacturers

1. Belimo F Series
2. Bray
3. Delta RL Series
4. Honeywell VFF Series
5. Johnson Control VF Series
6. Siemens Resilient Seat

2.40 CONTROL VALVE ACTUATORS

A. All valve actuators used for modulating service shall be designed to afford the following:

1. 100 percent surplus power to move the actuator from full open to full closed travel at system operating pressure.
2. Adjustable stroke range, both at the starting point and span, to actual job operating range to be field adjusted.
3. Above requirements may be achieved through pilot positioning devices or oversized actuators.

B. All actuators shall be plenum rated where required by code.

C. Electric Actuators for Air Handling Units.

1. Valve operators shall be synchronous motor driven gear train type.
2. Provide valve operator to respond to a continuous control signal and drive to fail safe position on loss of signal or power.
3. Provide separate zero and span adjustments for setting valve stroke.
4. Acceptable Manufacturers
    a. Belimo AF series
    b. Honeywell International MS8100 or MS7500 Series
    c. Johnson Controls M9200 Series
    d. Schneider Electric AS Series, Installed by Havel Bros.
    e. Siemens 599 Series

D. Electric Actuators for Unitary Equipment

1. Provide for VAV terminal units, etc.
2. Valve operator shall be synchronous motor driven gear train type.
3. Provide valve operator to respond to a floating point or proportional control signal and remain in last position on loss of power.
4. Acceptable Manufacturers
    a. Belimo LR Series FR VAV
    b. Honeywell International MS8100 or MS7500 Series
    c. Johnson Controls VA-7150 or VA-7200.
    d. Schneider Electric AS Series, Installed by Havel Bros.
    e. Siemens 599 Series

2.41 DAMPER ACTUATORS

A. General: Furnish for each control damper a modulating or two position actuator as applicable. Provide spring return where required for fail safe operation.

B. Two-position actuators shall be equipped with an auxiliary end switch to make (close) the circuit at the powered end of stroke.

C. Furnish separate actuator for each 15 square feet of damper.

D. Electric Actuators for Control Dampers

1. Provide for dampers for outside, return, relief, and exhaust air streams.
2. Damper operators shall be synchronous motor driven gear train type.
3. Provide damper operator to respond to a continuous control signal and drive to fail safe position on loss of signal or power.
4. Provide separate zero and span adjustments for setting valve stroke.
5. Acceptable Manufacturers
    a. Andover
    b. Belimo AF Series
    c. Honeywell International MS7500 Series
    d. Johnson Controls M9200 Series
    e. KMC # MEP-1272, # MEP-5372, # MEP-7052
    f. Schneider Electric, installed by Havel Bros.
    g. Siemens Open Air

E. Electric Actuators for Unitary Equipment

1. Provide for VAV terminal units.
2. Damper operators shall be synchronous motor driven gear train type.
3. Provide damper operators to respond to a floating point or proportional control signal and remain in last position on loss of power.
4. Acceptable Manufacturers
    a. Belimo NM or SM series.
    b. Honeywell International ML61/71 Series
    c. Johnson Controls M-9100
    d. Schneider Electric, installed by Havel Bros.
    e. Siemens Open Air

2.42 LOW TEMPERATURE DETECTION THERMOSTATS

A. Unit-mounted low limit, line voltage, cutout thermostat, 4-wire, 2-circuit, manual reset, 20' element, 15'-55°F range. Main contacts shall open on temperature drop, and auxiliary contacts close simultaneously.

B. Acceptable Manufacturers

1. Honeywell L482A1004
2. Invensys TC5241 or Penn A70-HA-1
3. Johnson Controls A11 or A70 Series
4. KMC # CTE-3017
5. Penn # A70-HA-1
6. Siemens ET-134-1504
7. Schneider Electric TC-52 series, installed by Havel Bros.

2.43 COMPONENT CONTROL PANELS

A. Accommodate all ancillary controls and instruments, of each system; totally enclosed in a UL approved cabinet, factory fabricated of steel, aluminum, or high impact plastic, equipped with piano hinged locking-type front door; single cabinet or group of cabinets at one location for all controls for each system.

B. All control panels are not necessarily shown on Drawings. Individual panel size will depend upon controls and instruments involved and respective manufacturer's standards. TCC shall verify panel sizes and make necessary arrangements for mounting panel on wall or floor. Panels may be either securely attached to the wall, or on a floor stand, adjacent to respective system equipment. TCC to furnish floor stands where required.

C. Install all control devices in cabinets, except room type instruments and equipment mounted devices (automatic dampers, valves, etc.).

D. Provide a convenience 120VAC receptacle in each panel. Label the circuit of the power panel feed.

E. Factory wire electrical equipment to numbered terminal strip.

F. Number air lines. Label all wires (poly labeled)

G. All wiring and tubing within the panel shall be run in wiring tray in accordance with NEMA and UL standards and shall meet all local codes.

H. Install pressure electric (PE) switches and electric pneumatic (EP) solenoid air valves, not connected in any way to a device located within a cabinet, adjacent to devices to which they are wired.

I. Detailed drawings shall be submitted for each panel before beginning construction.

J. As-built control drawings for system being controlled and scaled panel layout drawings shall be mounted inside the panel door at completion of project.

K. Label panels in accordance with specification section.

L. Acceptable Manufacturers

1. Johnson Controls EN series
2. Kele
3. Hoffman Industrial Control type panels
4. Honeywell
5. Schneider Electric, installed by Havel Bros.
6. Siemens

2.44 ULTRASONIC LEVEL CONTROLLER

A. Electronics Specifications:

Supply voltage	120 VAC, 60 Hz
Power consumption	5 watts maximum
Output (controller)	Two (2) SPDT 120/240 VAC relays, adjustable differential, 10 A resistive
Output (transmitter)	4-20 mA isolated, maximum 100 ohm loop resistance
Failsafe (controller)	User selectable; on (energized) or off (de-energized)
Failsafe (transmitter)	User selectable; 4 mA, 20 mA, or hold last value
Time delay (controller)	1-120 seconds adjustable for each relay set point
Electronics	-40 degree to + 160 degree
Humidity	95% non-condensing (electronics)

B. Transducer Specifications:

Maximum range	25 feet from transducer face
Span	2 inches minimum
24 feet maximum	
Frequency	50 kHz
Minimum dead zone	12 inches from -20 degrees to 140-degree F
18 inches from +140-degree to +160-degree F	
Ambient temperature	-20 degree to +160-degree F
Temperature compensation operating temperature	Automatic over range of transducer
Operating pressure	-10 to + 50 psig
Beam angle	12E Conical
Cable length	100 feet maximum between transducer and electronics

C. Performance Specifications:

Response time	1 second minimum
Repeatability	± 0.125"
Accuracy	± 0.25% of full scale

D. Manufacturer

1. Magnetrol Model 350/351 with floor mounting flange, cast aluminum cover

PART 3 - EXECUTION

3.01 PROJECT MANAGEMENT

A. Provide a designated project manager who will be responsible for the following:

B. Construct and maintain project schedule

C. On-site coordination with all applicable trades and subcontractors

D. Authorized to accept and execute orders or instructions from owner/engineer

E. Attend project meetings as necessary to avoid conflicts and delays

F. Make necessary field decisions relating to this scope of work

G. Coordination/Single point of contact

3.02 GENERAL

A. Make all final adjustments to system as many times as necessary to obtain proper operation before turning over to Owner.

1. Check all instruments for proper location and operation and compliance with submittal diagrams. Check each system for sequence of operation.
2. Final check out shall be by a qualified person other than Installing Personnel.

B. Furnish installation instructions for equipment.

C. Provide wiring diagrams, check installation and furnish all controls and relays to accomplish electric control and interlocking of equipment.

D. Location, size, capacity, mounting arrangement and electrical characteristics of equipment shall be as noted on the drawings.

E. All wiring and conduit required for controls, interlock of control devices, components, equipment, etc. shall be provided by the Temperature Control Contractor.

F. Dampers, valves, pressure taps, and separable sockets shall be set by others.

G. Mount instruments where they can be easily read and where readings will be truly representative.

3.03 INSTALLATION OF ROOM INSTRUMENTS

A. Room instruments shall be installed to align vertically or horizontally with other wall type light switches, fire alarm devices, receptacles, etc. Review the instrument location with the electrical drawings and coordinate installation with Electrical Contractor. If unsure of intended alignment, consult the engineer.

B. Mount room instruments where their location will not interfere with the proposed furnishings, cabinetry, etc. layout. Review alternative location with Engineer.

C. Mount instruments at 48" above finished floor unless noted otherwise on the drawings.

D. Mount instruments on an insulating base on exterior walls or common walls to unconditioned spaces.

E. Install sensors in accordance with the manufacturer's recommendations.

F. Mount sensors rigidly and adequate for the environment within which the sensor operates.

G. Room temperature sensors shall be installed on concealed junction boxes properly supported by the wall framing.

H. All wires attached to sensors shall be air sealed in their conduits or in the wall to stop air transmitted from other areas affecting sensor readings.

I. Wiring for space sensors shall be concealed in building walls. EMT conduit is required within mechanical and service rooms.

3.04 INSTALLATION OF REMOTE DEVICES

A. Install duct static pressure tap with tube end facing directly down-stream of air flow.

B. Sensors used in mixing plenums, and hot and cold plenum shall be of the averaging type. Averaging sensors shall be installed in a serpentine manner horizontally across duct. Each bend shall be supported with a capillary clip. Provide 1 lineal foot of sensor for each one square foot of coil face.

C. All pipe mounted temperature sensors shall be installed in wells. Install all liquid temperature sensors with heat conducting fluid in thermal wells. Coordinate well installation and location with Mechanical Contractor.

D. Install outdoor air temperature sensors on north wall complete with sun shield at designated location.

E. Control and status relays are to be located in designated enclosures only. These relays may also be located within packaged equipment control panel enclosures. These relays shall not be located within Class 1 starter enclosures

3.05 INSTALLATION OF CONTROL WIRING

A. General

1. All control and interlock wiring shall comply with the national and local electrical codes and Division 26 of these specifications. Where the requirements of this section differ with those in Division 26, the requirements of this section shall take precedence.
2. Conceal wiring, except in machine rooms, service tunnels and similar unfinished areas. Rack together groups of wires so individual wires can be traced. Tag concealed cables at the end for easy identification.
3. Exposed: Contractor shall install all wires within conduit.
4. Concealed (Above Accessible Ceilings)
    a. Plenum cable, either individual or bundled, shall be installed in workmanlike manner securely fastened to fixed members of building structure at sufficient points to avoid excessive freedom of movement.
    b. Field fabricated bundles shall be tied together with sufficient number of nylon ties to present neat, uniform appearance.
5. Concealed (In All Inaccessible Areas): All cabling shall be run within enclosed trough or conduit.

B. Where Class 2 wires are in concealed and accessible locations including ceiling return air plenums, approved cables not in raceway may be used provided that:

1. Circuits meet NEC Class 2 (current-limited) requirements. (Low voltage power circuits shall be sub-fused when required to meet Class 2 current-limit).
2. All cables shall be UL listed for application, i.e. cables used in ceiling plenums shall be UL listed specifically for that purpose.

C. Do not install Class 2 wiring in conduit containing Class 1 wiring. Boxes and panels containing high voltage may not be used for low voltage wiring except for the purpose of interfacing the two (e.g. relays and transformers).

D. Class 2 wiring is run exposed, wiring shall be run parallel along a surface or perpendicular to it, and bundled, using approved wire tires at no greater than 3m (10ft) intervals. Such bundled cable shall be fastened to the structure, using specified fasteners, at 1.5 m (5 ft) intervals or more often to achieve a neat and workmanlike result.

E. All wire-to-device connections shall be made at terminal blocks or terminal strip. All wire-to-wire connections shall be at a terminal block, or with a crimped connector. All wiring within enclosures shall be neatly bundled and anchored to permit access and prevent restriction to devices and terminals.

F. Maximum allowable voltage for control wiring shall be 120V. If only higher voltages are available, the Control System Contractor shall provide step down transformers.

G. All wiring shall be installed as continuous lengths, where possible. Any required splices shall be made only within an approved accessible junction box or other approved protective device.

H. Install plenum rated wiring in sleeves where it passes through walls and floors. Maintain fire rating at all penetrations in accordance with other sections of this specification and local codes.

I. Size and type of wire shall be the design responsibility of the Control System Contractor, in keeping with the manufacturer's recommendation and NEC.

J. Follow manufacturer's installation recommendations for all communication and network cabling. Network or communication cabling shall be run separately from other wiring.

K. This Contractor shall terminate all control and/or interlock wiring and shall maintain updated "as built" wiring diagrams with termination's identified at the job site.

3.06 INSTALLATION OF ACTUATORS

A. Mount and link control damper actuators per manufacturer's instructions.

B. To compress the seals when spring return actuators are used on normally closed dampers, power actuator to approximately 5° open position, then manually close the damper and tighten the linkage.

C. Check operation of damper/actuator combination to confirm that actuator modulates damper smoothly throughout stroke to both open and closed position.

D. Valves - Actuators shall be mounted on valves with adapters approved by the actuator manufacturer. Actuators and adapters shall be mounted following manufacturer's recommendations.

3.07 IDENTIFICATION OF HARDWARE, WIRING AND CONDUIT

A. All wiring and cabling, including that within factory-fabricated panels, shall be labeled at each end within 2" of termination with a cable identifier and other descriptive information.

B. Permanently label or code each point of field terminal strips to show the instrument or item served.

C. Identify control panels with laminated plastic nameplates. See Specification Section 23 05 53 Identification of Piping and Equipment, for lettering height and color.

D. Identify all other control components with permanent labels. Identifiers shall match record documents. All plug-in components shall be labeled such that removal of the component does not remove the label.

E. Label all temperature control conduits.

3.08 INSTALLATION OF CONDUIT

A. General

1. Conceal conduit, except in machine rooms, service tunnels and similar unfinished areas. Rack together groups of conduit so individual conduit can be traced. Label conduit for identification.
2. Support away from cold walls, cold ducts or piping to prevent condensation.

B. Adhere to Division 26, Section 26 05 33, requirements for installation of raceway

C. Size of conduit shall be the design responsibility of the Control System Contractor, in keeping with the manufacturer's recommendation and NEC.

D. Label all temperature control conduit.

E. Flexible metal conduits and liquid-tight, flexible metal conduits shall not exceed 3'-0" in length and shall be supported at each end. Flexible metal conduit less than ½" electrical trade size shall not be used. In areas exposed to moisture, liquid-tight, flexible metal conduits shall be used.

F. Final connections to motors and equipment requiring vibration isolation (max length of 72”) shall be FMC, LFMC or MC conduit.

3.09 INSTALLATION OF TEMPERATURE CONTROL PANELS AND VARIABLE FREQUENCY DRIVES

A. Mount panels and variable frequency drives on wall surfaces.

B. Where not feasible to install panels and variable frequency drives on walls, provide a painted unistrut floor stand adjacent to the equipment suitable for support and rigidity.

3.10 POWER PROVISIONS

A. The electrical documents are prepared to provide 120V AC power to designated control panel locations on the floor plans. This is intended to provide power to a single control as specified herein.

B. Should auxiliary panels or remote devices, valves, or actuators require power in the successful Control Contractors system, they shall be fed from power in the system control panel by the Temperature Control Contractor.

C. The Control Contractor may arrange and pay for any ancillary power sources outside of the provisions shown on the electrical drawings. Coordinate with the Project Electrical Contractor.

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SECTION 23 09 93

SEQUENCE OF OPERATION FOR CONTROLS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide the engineering and documentation required to obtain the sequence of operation for each system as described herein.

B. Systems include:

1. Dedicated Outdoor Air Unit (DOAS)
2. Variable Air Volume Terminal Units (VAVs)
3. Indoor Air Handling Units (AHUs)
4. Fan Coil Units (FCUs)
5. Chilled Water Plant (CH, CHWP)
6. Heating Water Plant (BLR, HWP)
7. Ductless Split System (AC, ACU)
8. Electric Unit Heater (EUHs)

C. All instruments, room sensors, and thermostats shall be field calibrated.

1.02 WORK INCLUDED BUT SPECIFIED ELSEWHERE

A. Instrumentation and Control Devices: Section 23 09 13

PART 2 - PRODUCTS

2.01 BUILDING MANAGEMENT SYSTEM

A. Software Installation: Provide all labor necessary to install, initialize, start-up and debug all system software as described in this section. This includes any operating system software or other third-party software necessary for successful operation of the system.

B. Database Configuration: Provide all labor to configure those portions of the database that are required by the points list and sequences of operation.

C. Status Reports: Configure status reports for the owner including those listed below:

1. Building chilled water system report
2. Building heating water system report
3. Building steam system
4. Air handling units
5. Exhaust fans

6. Miscellaneous equipment and systems

D. Documentation: As built software documentation shall include the following:

1. Descriptive point lists
2. Application program listing
3. Application programs with comments
4. Printouts of all reports
5. Alarm list

E. Alarms: All monitors or control functions identified by the Owner as a critical alarm shall be programmed to report to the hard copy printers in the security office and control room, with instructions for appropriate action. Coordinate verbiage with Owner.

F. Graphics: complete color graphics are required. See requirements in sequences following.

2.02 GRAPHICS

A. Furnish custom color graphic of each system in this project. Graphic shall be unique to each system reflecting actual component makeup.

B. Graphic representation shall allow a “point and click” format to access each controlled or monitored activity for readout, trending or adjustment.

C. All point numbering of each system component shall include its location by room number, using the Architect’s floor plan number system.

2.03 PORTABLE OPERATOR TERMINALS (POT)

A. Provide two (2) Portable Operator Terminals to allow access to controller set points and analog values of the Terminal Controllers for the FPVAV/VAV Terminal Units.

B. One POT shall be given to the owner and one shall be provided to the successful Testing & Balancing Contractor for his use in balancing the terminal units. (Subsequently, the Testing and Balancing Contractor shall turn over the POT to the owner's representative after completion of the balancing work.

C. The POT may be connected into the Terminal Controller via a zone bus jack located in the space sensor, or at any equipment controller.

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS

A. Installation Requirements:

1. Each space thermostat and temperature sensor shall be labeled as to the terminal device controlled.
2. Labels shall be as specified in Section 23 05 53.
3. Label all variable frequency drives.

B. Review labeling nomenclature, letter and plate size and mounting location with Engineer.

3.02 COMPLETION REQUIREMENTS

A. The Temperature Control Contractor shall fully check out each system and component to ensure all sequences are working in accordance with the specification.

B. After the contractor has fully checked out each system and proven their operation, a letter shall be sent to the Engineer certifying this checkout and requesting a date to demonstrate the systems in front of the Engineer or Owner's representative.

C. Note that all air handling systems and terminal units shall be demonstrated to the full satisfaction of the Engineer/Owner.

D. Testing and Follow-up demonstration of Variable Air Volume Terminal Units

1. Operate the thermostat and unit actuator of each terminal unit through the full operating range.
2. Assure that absolute full primary air supply shutoff is obtained from thermostat operation when scheduled.
3. Assure heat operates correctly when sequenced.

E. Upon successful completion of demonstrations with the Engineer, schedule and perform training of the Owner's maintenance personnel.

PART 4 - SEQUENCES

4.01 GENERAL

A. Contractor shall provide all necessary time and materials to provide detailed system scheduling for the entire building. Controls system shall be capable of creating schedules for 365 days of the year and shall be programmed during initial training to meet the schedule requirements outlined by the owner.

B. Temperature controls contractor shall provide all necessary wiring and duct/space mounted control components not provided with equipment such as temperature sensors, humidity sensors, carbon dioxide sensors, damper actuators, valve actuators, etc.

4.02 DEDICATED OUTDOOR AIR UNIT (DOAS)

A. Constant volume units shall consist of a supply fan, exhaust fan, chilled water coil, hot water coil in reheat position and energy recovery wheel. Variable frequency drives are provided for balancing. The unit shall be controlled through a unit mounted DDC controller with BACNet card, factory installed by DOAS manufacturer.

B. The unit mounted controller shall control the unit as follows:

1. Occupied Mode:
   a. Supply and exhaust fans shall operate continuously at constant speed.
   b. Outside air and exhaust air dampers shall be open.
   c. Heating Mode:
      (1) In the heating mode the hot water valve associated with the heat coil shall modulate as required to maintain the supply air setpoint temperature of 72 deg. F. (adjustable)
   d. Cooling Mode:
      (1) When the air temperature leaving the energy recovery wheel is above 60 deg. F. (adjustable) the chilled water valve associated with the chilled water coil modulates to maintain a 55 deg. F. (adjustable) coil discharge temperature.
      (2) The hot water valve associated with the hot water coil shall modulate as required to maintain the unit discharge air temperature of 72 deg. F (adjustable).
   e. Energy Recovery Wheel:
      (1) The energy recovery wheel shall modulate speed as required to maintain the supply air temperature set point whenever the unit is in the occupied mode (unless the unit is in economizer mode). When conditions exist for frost on the energy recovery wheel, the speed of the wheel shall be slowed down via a variable speed drive on the wheel motor so that less enthalpy transfer occurs and frosting of the wheel is avoided. When the outdoor air temperature is less than 10 deg. F (adjustable).
   f. Economizer Mode:
      (1) An enthalpy-based economizer shall be enabled whenever outdoor air is suitable for free cooling. When in the economizer mode, the energy recovery wheel shall be off and the bypass dampers open.

2. Unoccupied Mode:
   a. Supply and exhaust fans shall be off.
   b. Energy recovery wheel shall be off.
   c. Outside air and exhaust air dampers shall be closed.

3. Safety Devices:
   a. When in heating mode, if the supply air temperature falls below 60 deg. F. (adjustable) the unit shall shut down, closing the outside air and exhaust air dampers, and signaling an alarm to the BAS.
   b. When smoke is detected by smoke detectors (by E.C.) in return air and discharge air of units greater than 2,000 CFM or upon sensing of supply air temperature exceeding the high limit:
      (1) Fan shall stop and outside air damper shall close (provide relays as required).
      (2) Provide alarm signal to fire alarm system by fire alarm contractor.
      (3) Provide alarm signal to DDC system.
   c. When exhaust air temperature drops below 5 deg. F. (adjustable) the energy recovery wheel shall be disabled. The unit shall then be disabled, and an alarm signaled through the BAS.

4.03 VARIABLE AIR VOLUME TERMINAL UNITS:

A. Variable Air Volume (VAV) controller shall be supplied (factory mounted and wired) by the VAV manufacturer.

1. Each VAV shall have a modulating air damper and modulating hot water two-way control valve.
2. In the cooling and heating mode:
   a. The air damper shall be open and maintain the scheduled airflow position.
   b. The two-way control valve shall modulate as required to maintain space temperature setpoint.
   c. Control of the VAV shall be via a remote temperature sensor with local set point adjustment.

4.04 INDOOR AIR HANDLING UNIT:

A. The variable volume unit consists of a supply fan, hot water coil, and chilled water coil. The supply fan is controlled by a variable frequency drive. The unit shall be controlled through the BAS as follows.

1. Occupied Mode:
   a. The supply fan shall operate continuously.
   b. The outside air damper shall modulate as required to maintain the CO2 level set point of 1100 ppm (adjustable). CO2 sensor shall be located in return air duct.

c. Heating Mode: In the heating mode, the two-way valve associated with the hot water coil shall modulate as required to maintain the supply air discharge temperature set point of 90□ F. (adjustable) and the variable frequency drive shall modulate the supply fan airflow as required to maintain the space set point temperature of 72˚ F. (adjustable). The two-way valve associated with the cooling coil shall be fully closed.

d. Cooling Mode: In the cooling mode, the two-way valve associated with the chilled water coil shall modulate as required to maintain the supply air discharge temperature set point of 55□ F. (adjustable) and the variable frequency drive shall modulate the supply fan airflow as required to maintain the space temperature set point of 75˚ (adjustable). The two-way valve associated with the heating water coil shall be fully closed.

e. An enthalpy-based economizer shall be engaged whenever outdoor air conditions permit. In the economizer mode, excess outdoor air shall be relieved through the unit.

2. Unoccupied Mode:

a. Heating Mode: Outside air damper and the two-way control valves associated with the hot water coil and chilled water coil shall be fully closed. The supply fan shall cycle on as required to maintain a reduced space temperature of 60°F (adjustable). When supply fan is on, the two-way control valve associated with the hot water coil shall modulate as required to maintain the supply air discharge temperature of 90˚ F. (adjustable). Provide optimize start to transition from unoccupied mode to occupied mode.

b. Cooling Mode: Outside air damper and the two-way control valves associated with the hot water coil and chilled water coil shall be fully closed. The supply fan shall cycle on as required to maintain an elevated space temperature of 80°F (adjustable). When supply fan is on, the two-way control valve associated with the chilled water coil shall modulate as required to maintain the supply air discharge temperature of 55˚ F. (adjustable). Provide optimize start to transition from unoccupied mode to occupied mode.

3. Safeties:

a. When mixed air temperature falls below 35˚ F. (adjustable), freezestat shall shut down supply and return fan, close outside air damper, open return air damper, fully open two-way heating valve and signal an alarm.

b. When smoke is detected, the unit will shut down.

4.05 FAN COIL UNIT:

A. The fan coil unit consists of a supply fan, hot water coil, and chilled water coil. The unit shall be controlled through the BAS as follows.

1. Occupied Mode:
   a. The supply fan shall operate continuously to maintain a space temperature setpoint of 72° F (adjustable).
   b. Heating Mode: In the heating mode, the two-way valve associated with the hot water coil shall modulate as required to maintain the supply air discharge temperature set point of 90° F. (adjustable). The two-way valve associated with the cooling coil shall be fully closed.
   c. Cooling Mode: In the cooling mode, the two-way valve associated with the chilled water coil shall modulate as required to maintain the supply air discharge temperature set point of 55° F. (adjustable). The two-way valve associated with the heating water coil shall be fully closed.

2. Unoccupied Mode:
   a. Heating Mode: The supply fan shall cycle on as required to maintain a reduced space temperature of 60°F (adjustable). When supply fan is on, the two-way control valve associated with the hot water coil shall modulate as required to maintain the supply air discharge temperature of 90˚ F. (adjustable). Provide optimize start to transition from unoccupied mode to occupied mode.
   b. Cooling Mode: The two-way control valves associated with the hot water coil and chilled water coil shall be fully closed. The supply fan shall cycle on as required to maintain an elevated space temperature of 80°F (adjustable). When supply fan is on, the two-way control valve associated with the chilled water coil shall modulate as required to maintain the supply air discharge temperature of 55˚ F. (adjustable). Provide optimize start to transition from unoccupied mode to occupied mode.

3. Safeties:
   a. When smoke is detected, the unit will shut down.

4.06 CHILLED WATER PLANT:

A. Chiller and associated Primary and Secondary Circulating Pumps:

1. The chiller shall be enabled either locally or through the BAS. Once enabled, the chiller shall stage on as required to maintain a leaving chilled water temperature of 50°F (adjustable). Before being energized the primary chilled water pump (either CHWP-P1 or CHWP-P2) shall be enabled and flow must be proven via a flow switch provided by the chiller manufacturer.

2. The BAS shall monitor outdoor air temperature and enable the secondary chilled water pumps (either CHWP-S1 or CHWP-S2) whenever outdoor air temperature rises above 65°F (adjustable) or any preset number of units are calling for cooling. Should the selected pump fail to operate, the standby pump shall be energized. The pump operation shall be alternated to evenly distribute run time. The BAS shall monitor system differential set point. The bypass valve shall be sized for maximum flow of 50% of the chilled water pump flow rate. The bypass valve shall modulate open as required to maintain the system minimum differential setpoint during low flow conditions. Provide temperature sensor in the bypass piping, downstream of the bypass valve, to monitor water temperature in the bypass piping, for verification that the bypass valve is fully closed unless commanded open.

4.07 HEATING WATER PLANT:

A. Hot Water Boilers and associated Circulating Pumps:

1. The hot water boilers (BLR-1 or 2) shall be enabled locally or through the BAS. The BAS shall monitor outdoor air temperature and enable the hot water boiler (BLR-1 or 2) when outdoor air temperature drops below 65˚ F. (adjustable) or any preset number of units (adjustable) are calling for heat. On a call for heating, the lead boiler shall be enabled at low fire. The boiler control panel shall modulate the burner on the lead boiler as required to meet the discharge water temperature of 110 deg. F. (adjustable)for the heating water loop. The boiler operation shall be alternated to evenly distribute run time.
2. The primary circulating pumps shall be energized whenever there is a call for heat. Flow shall be proven via a flow switch before the burner is enabled. Once heating load has been satisfied within the system the primary circulating pumps shall continue and the associated boiler shutoff valve shall remain open for 5 minutes (adjustable) after burner is shut off to dissipate boiler heat.

B. Heating Water System Pumps:

1. The BAS shall monitor outdoor air temperature and enable the hot water pump (either HWP-1 or HWP-2) whenever outdoor air temperature drops below 65˚ F. (adjustable) or an adjustable number of units are calling for heat.
2. Should the selected pump fail to operate, the standby pump shall be energized, and an alarm sent through the BAS.
3. The pump operation shall be alternated to evenly distribute run time.

4. The BAS shall monitor system differential pressure and vary pump speed as required to maintain the minimum system differential set point. The bypass valve shall modulate open as required to maintain the maximum system differential pressure set point (adjustable). The bypass valve shall be sized for maximum flow of 15% of the hot water pump flow rate. Provide temperature sensor in the bypass piping downstream of the bypass valve to monitor water temperature in the bypass piping for verification that bypass valve is fully closed unless commanded open.
5. Once heating load has been satisfied within the system the primary circulation pumps shall continue and the associated boiler shutoff valve shall remain open for 5 minutes (adjustable) after the burner is shutoff to dissipate boiler heat.

4.08 DUCTLESS SPLIT SYSTEM:

A. Wired space temperature thermostat shall cycle fan and associated condensing unit as required to maintain space temperature setpoint (adjustable).

B. BAS shall connect via BACnet to the system BAS shall signal an alarm if space temperature exceeds 90 deg. F. (adjustable).

4.09 ELECTRIC UNIT HEATER:

A. Integral thermostat shall cycle fan and electric coil as required to maintain space setpoint temperature (adjustable).

END OF SECTION

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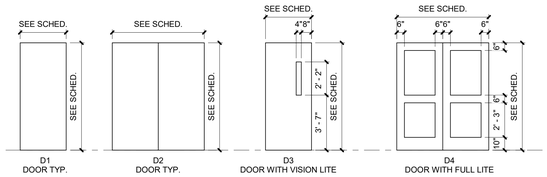
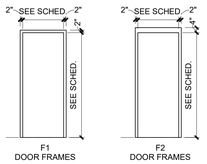
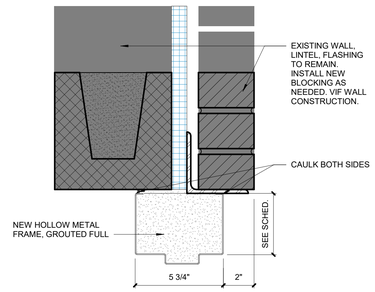




DOOR SCHEDULE

DR #	ROOM NAME	ROOM #	OVT Hardware Set	DOOR					FRAME		GLAZING	FIRE RATING	NOTES
				HEIGHT	WIDTH	ELEV	MATERIAL	SIZE	ELEV	MATERIAL			
C24.1	3RD GRADE	C24	08	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
C26.1	LIFE SKILLS	C26	07	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
C26.2	TOILET	C26.1	03	7' - 0"	3' - 0"	D1	WOOD	36" x 84"	EX	HM	-	-	
C27.1	L.G.I.	C27	19	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
C27.2	L.G.I.	C27	18	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
C27.3	STORAGE	C27.1	09	7' - 0"	3' - 0"	D1	WOOD	36" x 84"	EX	HM	-	-	
D28.1	5TH GRADE	D28	07	7' - 0"	3' - 0"	D1	WOOD	36" x 84"	EX	HM	-	20 MIN	
D28.2	TOILET	D28.1	03	7' - 0"	3' - 0"	D1	WOOD	36" x 84"	EX	HM	-	-	
D29.1	5TH GRADE	D29	07	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
D30.1	5TH GRADE	D30	08	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
D31.1	5TH GRADE	D31	07	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
D32.1	5TH GRADE	D32	08	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
D33.1	4TH GRADE	D33	07	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
E34.1	4TH GRADE	E34	07	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
E35.1	4TH GRADE	E35	07	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
E36.1	4TH GRADE	E36	07	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
E37.1	4TH GRADE	E37	08	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
E38.1	COMPUTER LAB	E38	07	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
E38.2	CLOSET	E38.1	14	7' - 0"	6' - 0"	D2	WOOD	72" x 84"	EX	HM	-	-	
E39.1	MUSIC	E39	19	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
E39.2	MUSIC	E39	19	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
E47.1	CORRIDOR	E46	17	7' - 0"	6' - 0"	ETR	ALUM	ETR	EX	ALUM	EXT	-	EXISTING DOOR WITH NEW ACCESS CONTROL. SEE ELECTRICAL FOR DETAILS
G1.1	MECHANICAL	G1	11A	7' - 0"	3' - 0"	D1	HM	36" x 84"	EX	HM	-	-	
G5.4	CORRIDOR	F2	11A	7' - 0"	3' - 0"	D1	WOOD	36" x 84"	F1	HM	-	20 MIN	
G5.1	JAN. CLOSET	G5	12	7' - 0"	3' - 0"	D1	WOOD	36" x 84"	F1	HM	-	-	
G8.1	TOILET	G8	04	7' - 0"	3' - 0"	D1	WOOD	36" x 84"	EX	HM	-	-	
G14.1	JAN. CLOSET	G14	12	7' - 0"	3' - 0"	D1	WOOD	36" x 84"	F1	HM	-	20 MIN	
G15.1	WORK	G15	07A	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	-	20 MIN	
G16.1	MEDIA CENTER	G16	18	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
G18.2	MEDIA CENTER	G18	18	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
G19.1	SOCIAL WORK	G19.1	05	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	-	
G19.2	CORRIDOR	F7	08	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
G19.2A	CALM ROOM	G19.2	06	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	-	
G21.1	HEADEND	G21	05	7' - 0"	3' - 0"	D1	WOOD	36" x 84"	EX	HM	-	-	
G22.1	MECH.	G22	16	7' - 0"	6' - 0"	D2	HM	72" x 84"	EX	HM	-	20 MIN	
G23.1	RESOURCE	G23	07	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
G24.1	STORAGE	G24	11	7' - 0"	3' - 0"	D1	WOOD	36" x 84"	EX	HM	-	20 MIN	
G25.1	TOILET	G25	04	7' - 0"	3' - 0"	D1	WOOD	36" x 84"	EX	HM	-	20 MIN	
G28.1	TOILET	G28	04	7' - 0"	3' - 0"	D1	WOOD	36" x 84"	EX	HM	-	20 MIN	
G29.1	STORAGE	G29	11	7' - 0"	3' - 0"	D1	WOOD	36" x 84"	EX	HM	-	20 MIN	
G40.1	STORAGE	G40	11	7' - 0"	3' - 0"	D3	WOOD	36" x 84"	EX	HM	TEMP	20 MIN	
G41.1	STORAGE	G41	15	7' - 0"	6' - 0"	D2	HM	72" x 84"	EX	HM	-	20 MIN	
G44.1	P.E. STORAGE & OFFICE	G44	13	7' - 0"	3' - 0"	D1	HM	36" x 84"	F2	HM	-	-	
G45.1	GYMNASIUM	G45	20	7' - 0"	3' - 0"	D1	HM	36" x 84"	F1	HM	-	-	
G46.1	LOBBY	F17	10	7' - 0"	3' - 0"	ETR	WOOD	ETR	EX	HM	EXT	-	EXISTING DOOR WITH NEW ACCESS CONTROL. SEE ELECTRICAL FOR DETAILS
V1.1	VESTIBLE	V1	25	7' - 0"	6' - 0"	ETR	ALUM	ETR	EX	ALUM	EXT	-	EXISTING DOOR WITH NEW ACCESS CONTROL. SEE ELECTRICAL FOR DETAILS
V2.1	VESTIBLE	V2	25	7' - 0"	6' - 0"	ETR	ALUM	ETR	EX	ALUM	EXT	-	EXISTING DOOR WITH NEW ACCESS CONTROL. SEE ELECTRICAL FOR DETAILS
V3.1	VESTIBLE	V3	25	7' - 0"	6' - 0"	ETR	ALUM	ETR	EX	ALUM	EXT	-	EXISTING DOOR WITH NEW ACCESS CONTROL. SEE ELECTRICAL FOR DETAILS
V4.1	VESTIBLE	V4	24	7' - 0"	6' - 0"	D4	ALUM	GLASS	EX	ALUM	TEMP	-	
V4.2	VESTIBLE	V4	02	7' - 0"	6' - 0"	D4	ALUM	GLASS	EX	ALUM	TEMP	-	
V5.1	VESTIBLE	V5	23	7' - 0"	6' - 0"	D4	ALUM	GLASS	EX	ALUM	TEMP	-	NEW ACCESS CONTROL SEE ELECTRICAL FOR DETAILS
V5.2	VESTIBLE	V5	01	7' - 0"	6' - 0"	D4	ALUM	GLASS	EX	ALUM	TEMP	-	
V6.1	VESTIBLE	V6	21	7' - 0"	6' - 0"	ETR	ALUM	ETR	EX	ALUM	EXT	-	EXISTING DOOR WITH NEW ACCESS CONTROL. SEE ELECTRICAL FOR DETAILS
V6.2	VESTIBLE	V6	26	7' - 0"	6' - 0"	ETR	ALUM	ETR	EX	ALUM	EXT	-	EXISTING DOOR WITH NEW ACCESS CONTROL. SEE ELECTRICAL FOR DETAILS
V6.3	LOBBY	F17	22	7' - 0"	6' - 0"	ETR	ALUM	ETR	EX	ALUM	EXT	-	EXISTING DOOR WITH NEW ACCESS CONTROL. SEE ELECTRICAL FOR DETAILS
V6.4	LOBBY	F17	25	7' - 0"	6' - 0"	ETR	ALUM	ETR	EX	ALUM	EXT	-	EXISTING DOOR WITH NEW ACCESS CONTROL. SEE ELECTRICAL FOR DETAILS



1 CMU/BRICK EXISTING WALL NEW FRAME HEAD

SCALE: 3" = 1'-0"

LANCER + BEEBE, LLC
ARCHITECTURE | PLANNING | INTERIORS
220 N. COLLEGE AVE
INDIANAPOLIS, IN 46202

SHELBYVILLE CENTRAL SCHOOLS
LOPER ELEMENTARY SCHOOL RENOVATIONS
901 LOPER DRIVE
SHELBYVILLE, IN 46176

REVISIONS:

#	Date	Desc.
1	4.20.2022	Revision 1
2	4.27.2022	Revision 2

100% CONSTRUCTION DOCUMENTS

PROJECT: #21140
DATE: 04.06.2022
DRAWN BY: Author

DOOR SCHEDULE

N
TRUE NORTH

A601

PLOT DATE/TIME:4/27/2022 6:27:19 PM

FINISH LEGEND

NOTES

ETR EXISTING TO REMAIN

FLOOR COVERING

CARPET TILE

CPT-1: MFG: INTERFACE
TYPE: 50CM X 50CM CARPET TILE
PATTERN: HUMAN CONNECTIONS, FLAGSTONE
COLOR: 105578 FLINT
INSTALL: QUARTER TURN REF. PLAN FOR PATTERN
LOCATION: PRIMARY CPT

CPT-2: MFG: INTERFACE
TYPE: 50CM X 50CM CARPET TILE
PATTERN: HUMAN CONNECTIONS, KERBSTONE
COLOR: 105574 FLINT
INSTALL: QUARTER TURN REF. PLAN FOR PATTERN
LOCATION: ACCENT

CPT-3: MFG: INTERFACE
TYPE: 50CM X 50CM CARPET TILE
PATTERN: HUMAN CONNECTIONS, SETT IN STONE
COLOR: 105570 FLINT
INSTALL: QUARTER TURN REF. PLAN FOR PATTERN
LOCATION: ACCENT

CPT-4: MFG: INTERFACE
TYPE: 50CM X 50CM CARPET TILE
PATTERN: HUMAN CONNECTIONS, MOSS IN STONE
COLOR: 105566 FLINT EDGE
INSTALL: QUARTER TURN REF. PLAN FOR PATTERN
LOCATION: LIBRARY

CPT-5: MFG: INTERFACE
TYPE: 50CM X 50CM CARPET TILE
PATTERN: HUMAN CONNECTIONS, MOSS
COLOR: 105562 FLINT/MOSS
INSTALL: QUARTER TURN REF. PLAN FOR PATTERN
LOCATION: LIBRARY

CPT-6: MFG: INTERFACE
TYPE: CUSTOM BROADLOOM
PATTERN: HUMAN CONNECTIONS, FLAGSTONE
COLOR: 105578 FLINT
INSTALL: PROVIDE CUSTOM BROADLOOM WITH SPECIFIED PATTERN AND COLOR WHERE REQUIRED AT STAIR TREAD & RISER- "UNBACKED 2 METER WIDE AT STAIRS". PROVIDE CARPET TILE AND MATCH UP WITH BROADLOOM AT OTHER LOCATIONS
LOCATION: MUSIC

WOM-1: MFG: INTERFACE
TYPE: 50CM X 50CM WALK-OFF CARPET
PATTERN: STEP REPEAT, SR899
COLOR: 104940 IRON
INSTALL: QUARTER TURN
LOCATION: VESTIBULES

RESILIENT FLOOR

LVT-1: MFG: INTERFACE
TYPE: 50CM X 50CM LUXURY VINYL TILE
PATTERN: A003 TEXTURED STONES
COLOR: A00309 MEDIUM CONCRETE
INSTALL: MONOLITHIC
LOCATION: PRIMARY LVT

LVT-2: MFG: INTERFACE
TYPE: 25CM X 1M LUXURY VINYL PLANK
PATTERN: A007 STUDO SET
COLOR: A00702 PEWTER
INSTALL: ASHLAR
LOCATION: CORRIDORS + CAFETERIA

LVT-3: MFG: INTERFACE
TYPE: 25CM X 1M LUXURY VINYL PLANK
PATTERN: A007 STUDO SET
COLOR: A00721 ELECTRIC BLUE
INSTALL: ASHLAR
LOCATION: CORRIDORS + CAFETERIA

LVT-4: MFG: INTERFACE
TYPE: 25CM X 1M LUXURY VINYL PLANK
PATTERN: A007 STUDO SET
COLOR: A00716 ORANGE
INSTALL: ASHLAR
LOCATION: CORRIDORS + CAFETERIA

EPX-1: MFG: SHERWIN WILLIAMS GENERAL POLYMERS
TYPE: DECO FLAKE MOSAIC EPOXY
COLOR: 1/8" FLAKES, CRESCENT MOON
INSTALL: 4" INTEGRAL COVE BASE REF. SPECS
LOCATION: RESTROOMS, STORAGE

RS-1: MFG: SHERWIN WILLIAMS GENERAL POLYMERS
TYPE: FASTOP MULTI TOPFLOOR SL45 AT 1/4" NOMINAL WITH 40-60 MESH DRY SILICA SAND BROADCAST TO REJECTION
COLOR: #53 CHARCOAL, FASTOP T100 TOPCOAT AT 10-15 MILS DFT
INSTALL: 4" INTEGRAL COVE BASE REF. SPECS
LOCATION: KITCHEN

2

WALL BASE

RUBBER BASE

RB-1: MFG: JOHNSONITE
TYPE: 4" VINYL WALL BASE
COLOR: 63 BURNT UMBER
LOCATION: STANDARD

EPOXY/RESINOUS BASE

EB-1: MFG: SHERWIN WILLIAMS GENERAL POLYMERS
TYPE: 4" DECORATIVE MOSAIC EPOXY WALL BASE
COLOR: 1/8" FLAKES, CRESCENT MOON
INSTALL: INTEGRAL BASE, REF. SPECS
LOCATION: RESTROOMS, STORAGE CLOSETS

RSB-1: MFG: SHERWIN WILLIAMS GENERAL POLYMERS
TYPE: 4" INTEGRAL FASTOP WALL BASE, REF RS-1 AND SPECS
COLOR: #53 CHARCOAL
INSTALL: INTEGRAL BASE, REF. SPECS
LOCATION: KITCHEN

2

PAINT/WALL FINISH

PAINT

PT-1: MFG: SHERWIN WILLIAMS
TYPE: REF. SPECS
COLOR: SW7570 EGRET WHITE
LOCATION: STANDARD

PT-2: MFG: SHERWIN WILLIAMS
TYPE: REF. SPECS, EGGSHELL FINISH
COLOR: SW7069 IRON ORE
LOCATION: ACCENT, HM DOOR AND WINDOW FRAMES

PT-3: MFG: SHERWIN WILLIAMS
TYPE: REF. SPECS, EGGSHELL FINISH
COLOR: SW 6797 JAY BLUE
LOCATION: ACCENT

PT-4: MFG: SHERWIN WILLIAMS
TYPE: REF. SPECS, EGGSHELL FINISH
COLOR: SW6718 OVERT GREEN
LOCATION: ACCENT

PT-5: MFG: SHERWIN WILLIAMS
TYPE: REF. SPECS, EGGSHELL FINISH
COLOR: SW6677 GOLDENROD
LOCATION: ACCENT

WALL TILE

WT-1: MFG: CROSSVILLE TILE
TYPE: 3"X12" GLAZED CERAMIC WALL TILE
PATTERN: SWATCHES
COLOR: COTTON
INSTALL: HORIZONTAL BRICK, REF. ELEVATIONS
REMARKS: AT RESTROOM WALL LOCATIONS, USE EB-1. BEGIN WT-1 AT 4" AFF

WT-2: MFG: CROSSVILLE TILE
TYPE: 2"X8" GLAZED CERAMIC WALL TILE
PATTERN: SWATCHES
COLOR: SHADOW
INSTALL: VARIES, REF. ELEVATIONS

WT-3: MFG: CROSSVILLE TILE
TYPE: 2"X8" GLAZED CERAMIC WALL TILE
PATTERN: SWATCHES
COLOR: COTTON
INSTALL: HORIZONTAL STACKED, REF. ELEVATIONS
REMARKS: AT WATER FOUNTAIN LOCATIONS, OMIT EB-1 AND USE SCHLUTER DILEX-AHKA AT FINISHED FLOOR

PLASTIC LAMINATE/SOLID SURFACE

PLASTIC LAMINATE

PL-1: MFG: FORMICA
TYPE: PLASTIC LAMINATE
COLOR: 05794-NG BEIGE ELM (NATURAL GRAIN FINISH)
INSTALL: MONOLITHIC, HORIZONTAL GRAIN

PL-2: MFG: FORMICA
TYPE: PLASTIC LAMINATE
COLOR: 6698-46 PALOMA POLAR (MATTE FINISH)
INSTALL: MONOLITHIC

SOLID SURFACE

SS-1: MFG: FORMICA
TYPE: 1/2" SOLID SURFACE
COLOR: 758 BIANCO MINERAL
INSTALL: MONOLITHIC
REMARKS: SOLID SURFACE COUNTER TO GO WHERE SINKS ARE LOCATED

MISCELLANEOUS

ACOUSTIC PANELS

AP-1 MFG: MDC ZINTRA
TYPE: ZINTRA 1/2" WALL SHEETS
SHAPE: 4'X9' SHEETS, CUT TO SHAPE AND SIZE. REF ELEVATIONS
COLOR: PEBBLE
LOCATION: CAFETERIA
REMARKS: DIRECT GLUE DOWN. REF SPECS

AP-2 MFG: MDC ZINTRA
TYPE: ZINTRA 1/2" WALL SHEETS
SHAPE: 4'X9' SHEETS, CUT TO SHAPE AND SIZE. REF ELEVATIONS
COLOR: FOSSIL
LOCATION: CAFETERIA
REMARKS: DIRECT GLUE DOWN. REF SPECS

AP-3 MFG: MDC ZINTRA
TYPE: ZINTRA 1/2" WALL SHEETS
SHAPE: 4'X9' SHEETS, CUT TO SHAPE AND SIZE. REF ELEVATIONS
COLOR: SLATE
LOCATION: CAFETERIA
REMARKS: DIRECT GLUE DOWN. REF SPECS

AP-4 MFG: MDC ZINTRA
TYPE: ZINTRA 1/2" WALL SHEETS
SHAPE: 4'X9' SHEETS
COLOR: DIGITAL PRINT, DESIGNER TO APPROVE FINAL DESIGN
LOCATION: CAFETERIA
REMARKS: DIRECT GLUE DOWN. REF SPECS

2

CORNER GUARDS

CG-1: MFG: ACROVYN
TYPE: VA SERIES - FULL HEIGHT CORNER GUARD
COLOR: TO MATCH PT-1, DESIGNER TO APPROVE
LOCATION: PROVIDE AT ALL EXTERIOR DRYWALL CORNERS

WALL PROTECTION

WP-1: MFG: ACROVYN
TYPE: 4'H WALL COVERING
COLOR: TO MATCH PT-1, DESIGNER TO APPROVE, SUEDE TEXTURE
INSTALL: KINDERGARTEN RESTROOMS
REMARKS: USE TRIM PIECES AS REQUIRED BY MANUFACTURER

LANCER + BEEBE, LLC
ARCHITECTURE | PLANNING | INTERIORS
220 N. COLLEGE AVE
INDIANAPOLIS, IN 46202

SHELBYVILLE CENTRAL SCHOOLS
LOPER ELEMENTARY SCHOOL RENOVATIONS
901 LOPER DRIVE
SHELBYVILLE, IN 46176

REVISIONS:

#	Date	Desc.

100% CONSTRUCTION DOCUMENTS

PROJECT: #21140
DATE: 04.06.2022
DRAWN BY: Author

INTERIOR FINISH LEGEND

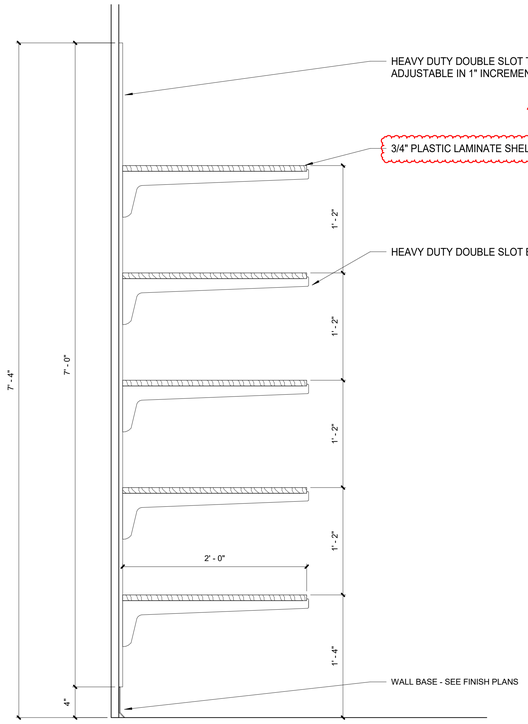
N
TRUE NORTH

A720

PLOT DATE/TIME:4/27/2022 6:27:19 PM

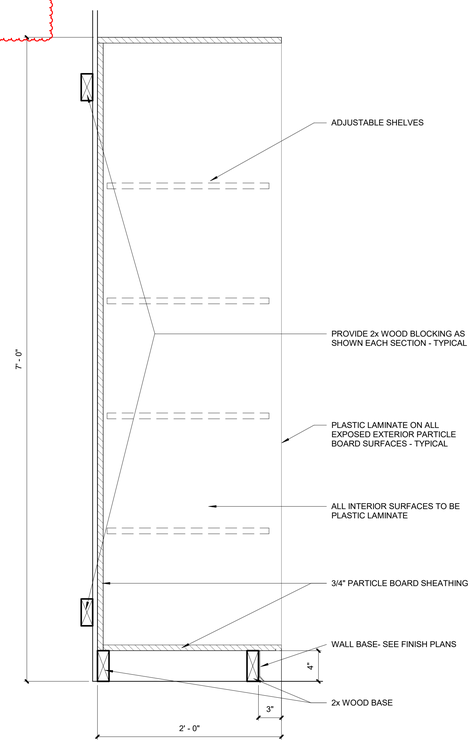
GENERAL CASEWORK NOTES

1. FABRICATE WOODWORK/ MILLWORK ITEMS TO ACTUAL FIELD DIMENSIONS. CONTRACTOR SHALL SUBMIT FOR DESIGNERS APPROVALS SHOP DRAWING SAMPLES OR MANUFACTURER'S LITERATURE FOR ALL ITEMS. SHOP DRAWINGS SHALL SHOW SUFFICIENT DETAIL TO DETERMINE COMPLIANCE WITH STANDARDS AND DESIGN INTENT.
2. PROVIDE ALL NECESSARY FURRING AND GROUNDS FOR WOODWORK AND FINISH ITEMS. COORDINATE LOCATION OF BLOCKING WITHIN FRAMED WALLS AS NECESSARY FOR ITMES TO BE SECURED TO SURFACE. ALL FASTENERS SHALL BE CONCEALED.
3. FINISH ALL SIDES AND BACK OF MILLWORK/ CASEWORK
4. PROVIDE GROMMETS IN COUNTERTOPS ABOVE ALL ELECTRICAL RECPETICALS AND TELEPHONE DATA ROUTINGS.
5. ALL PULLS TO BE 4" SATIN NICKEL SOLID WIRE PULL
6. PROVIDE LOCKS FOR ALL STORAGE BASE CABINETS/ TALL STORAGE CABINETS, ALL DRAWERS AND DOORS, ALL UPPER WALL CABINETS AND ALL DISPLAY CASE SLIDING GLASS PANELS.
7. ALL VERTICAL PLASTIC LAMINATE SURFACES AND SHELVES TO BE PL-1. ALL COUNTERTOPS THAT ARE PLASTIC LAMINATE TO BE PL-2 UNLESS OTHERWISE NOTED. REF FINISH LEGEND.
8. ALL INTERIORS BEHIND DOORS/ DRAWERS AND NOT VISIBLE SHALL BE WHITE.
9. ALL NEW SOLID SURFACE COUNTERTOPS TO BE SS-1. SOLID SURFACE COUNTERS LOCATED AT SINKS. REF FLOOR PLAN AND FINISH LEGEND.
10. SEE ELEC. DWGS FOR ELECTRICAL DEVICES.
11. VERIFY ALL DIMENSIONS IN FIELD AND PROVIDE COMPLETE SHOP DRAWINGS.
12. PROVIDE BLIND CORNER BASE AND UPPER CABINETS - TYPICAL.



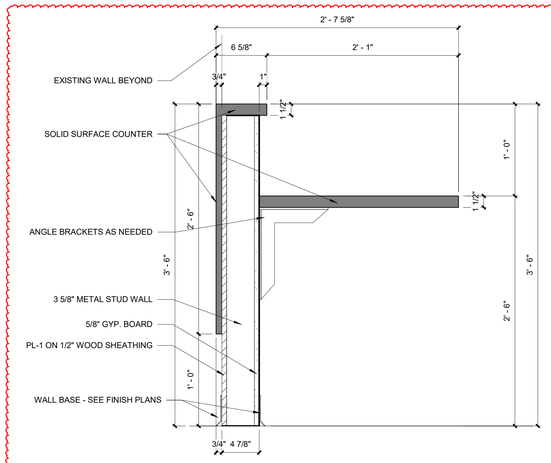
7 CASEWORK TYP. SECTION - TRACK SHELVING

SCALE: 1 1/2" = 1'-0" REF. 13 / A762



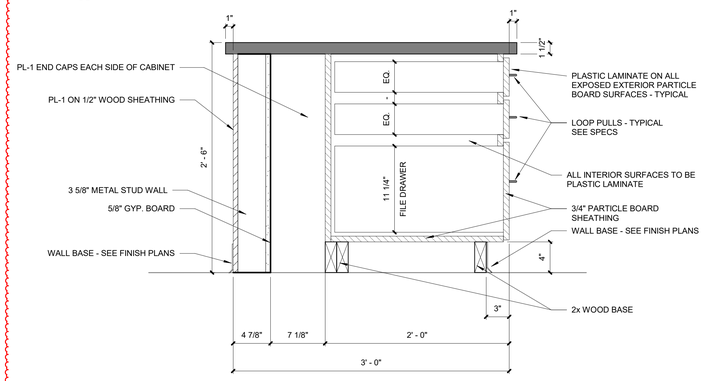
3 CASEWORK TYP. SECTION - TALL OPEN SHELVING

SCALE: 1 1/2" = 1'-0" REF. 8 / A764



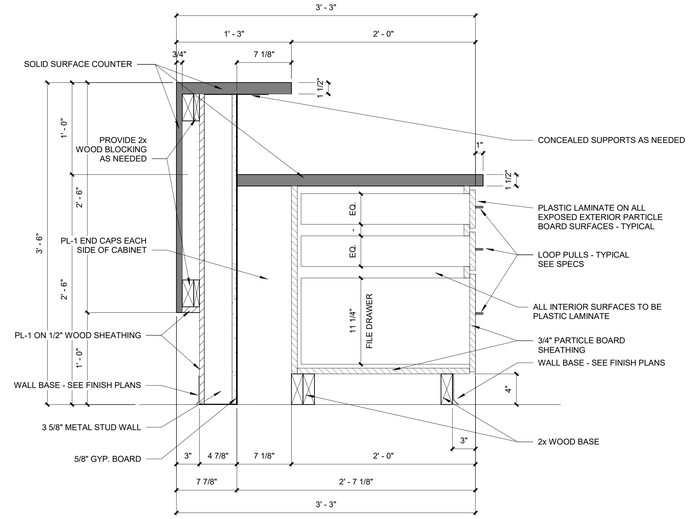
6 CASEWORK SECTION - MEDIA CIRCULATION N/S

SCALE: 1 1/2" = 1'-0" REF. 4 / A112



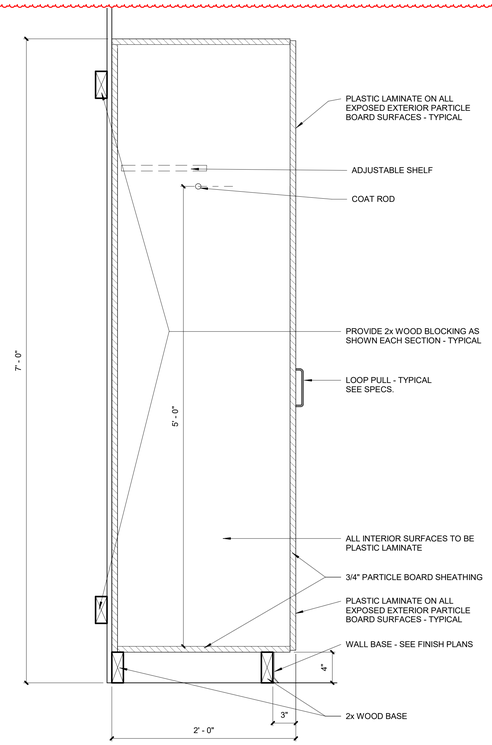
5 CASEWORK SECTION - MEDIA CIRCULATION E/W AT SHORT WALL

SCALE: 1 1/2" = 1'-0" REF. 4 / A112



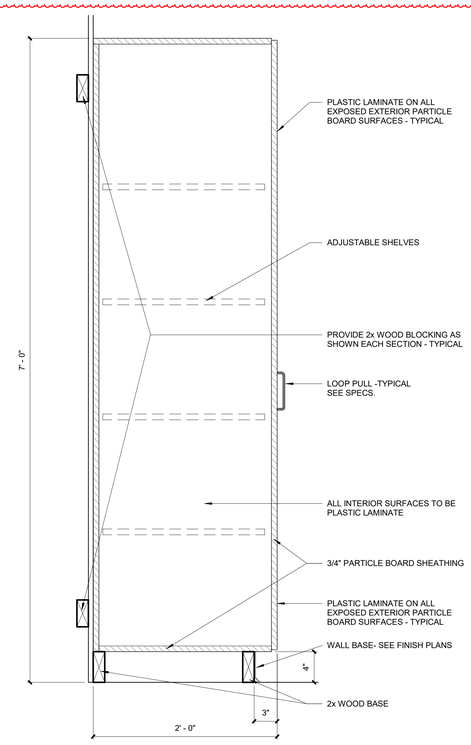
4 CASEWORK SECTION - MEDIA CIRCULATION E/W AT TALL WALL

SCALE: 1 1/2" = 1'-0" REF. 4 / A112



2 CASEWORK TYP. SECTION - TALL WARDROBE COAT ROD

SCALE: 1 1/2" = 1'-0" REF. 1 / A761



1 CASEWORK TYP. SECTION - TALL SHELVING

SCALE: 1 1/2" = 1'-0" REF. 1 / A761

LANCER + BEEBE, LLC
ARCHITECTURE | PLANNING | INTERIORS
220 N. COLLEGE AVE
INDIANAPOLIS, IN 46202

SHELBYVILLE CENTRAL SCHOOLS
LOPER ELEMENTARY SCHOOL RENOVATIONS
901 LOPER DRIVE
SHELBYVILLE, IN 46176

NOT FOR CONSTRUCTION

REVISIONS:

#	Date	Desc.
1	4.20.2022	Revision 1
2	4.27.2022	Revision 2

100% CONSTRUCTION DOCUMENTS

PROJECT:	#21140
DATE:	04.06.2022
DRAWN BY:	Author

CASEWORK DETAILS

N
TRUE NORTH

A766

PLOT DATE/TIME: 4/27/2022 1:27:12 PM

LUMINAIRE SCHEDULE

FIXTURE TYPE	BASE MANUFACTURER	EQUAL MANUFACTURER	WATTAGE TOTAL	LAMP TYPE	VOLTAGE	MOUNT	DESCRIPTION
L1	COLUMBIA: CFP24-55-35	LITHONIA: CPANL METALUX: FP ABOVE ALL: SFLP	55	LED 6000LM 3500K	120	RECESSED	2'x4' EDGE LIT FLAT PANEL WITH 0-10V DIMMING TO 10%. PROVIDE DRYWALL GRID ADAPTER KIT WHERE MOUNTED IN GYP. CEILING. (CLASSROOMS)
L1 ALT	COLUMBIA: LCAT24-2750T-HL-G-ED-U-X	LITHONIA: 2BLT4-TUNWH METALUX: 24CZ-W2A1 ORACLE: OVHP	55	LED 6000LM TUWH	120	RECESSED	2'x4' ARCHITECTURAL TROFFER WITH SMOOTH CURVED LENS. 80CRI MIN, 6000LM MIN. 0-10V DIMMINGTO 10%. TUNABLE WHITE COLOR RANGE FROM 2700K TO 5000K. (CLASSROOMS)
L2	COLUMBIA: LCAT24-35-ML-G-ED-U-X	LITHONIA: 2BLT4 METALUX: 24CZ HEW: LT	35	LED 4800LM 3500K	120	RECESSED	2'x4' ARCHITECTURAL TROFFER WITH SMOOTH CURVED LENS AND 0-10V DIMMING TO 10%. (CORRIDORS)
L3	COLUMBIA: LCAT22-35-VL-G-ED-U-X	LITHONIA: 2BLT2 METALUX: 24CZ HEW: LT	38	LED 4800LM 3500K	120	RECESSED	2'x2' ARCHITECTURAL TROFFER WITH SMOOTH CURVED LENS AND 0-10V DIMMING TO 10%. (CORRIDORS)
L4	COLUMBIA: CFP24-41-35	LITHONIA: CPANL METALUX: FP ABOVE ALL: SFLP	55	LED 4000LM 3500K	120	RECESSED	2'x4' EDGE LIT FLAT PANEL WITH 0-10V DIMMING TO 10%. PROVIDE DRYWALL GRID ADAPTER KIT WHERE MOUNTED IN GYP. CEILING. (STORAGE)
L5	COLUMBIA: CFP14-41-35	LITHONIA: CPANL METALUX: FP ABOVE ALL: SFLP	50	LED 4400LM 3500K	120	RECESSED	1'x4' EDGE LIT FLAT PANEL WITH 0-10V DIMMING TO 10%. PROVIDE DRYWALL GRID ADAPTER KIT WHERE MOUNTED IN GYP. CEILING. (RESTROOMS, STORAGE)
L6	COLUMBIA: CFP22-40-35	LITHONIA: CPANL METALUX: FP ABOVE ALL: SFLP	40	LED 4400LM 3500K	120	RECESSED	2'x2' EDGE LIT FLAT PANEL WITH 0-10V DIMMING TO 10%. PROVIDE DRYWALL GRID ADAPTER KIT WHERE MOUNTED IN GYP. CEILING. (CLASSROOMS, RESTROOMS, STORAGE)
L7	COLUMBIA: CFP24-75-35	LITHONIA: EPANL METALUX: ABOVE ALL:	56	LED 7000LM 3500K	120	RECESSED	2'x4' HIGH LUMEN EDGE LIT FLAT PANEL WITH 0-10V DIMMING TO 10%. PROVIDE DRYWALL GRID ADAPTER KIT WHERE MOUNTED IN GYP. CEILING. (KITCHEN)
L8	COLUMBIA: MPS-4-35-HL-C-W-E-U-X	LITHONIA: CLX METALUX: SNLED HEW: 75R	42	LED 5000LM 3500K	120	SURFACE/SUSPENDED	4' LINEAR STRIP WITH ROUND DIFFUSE LENS. PROVIDE ALL REQUIRED MOUNTING HARDWARE. PROVIDE AIRCRAFT CABLE WHERE SUSPENDED. (STORAGE, EQUIPMENT ROOMS)
L9	COLUMBIA: PED-4-35-ML-F-W-ED-U-X	LITHONIA: IBL METALUX: VHB HEW: GH	100	LED 12,000LM 3500K	120	SURFACE	13"x46" LED HIGH-BAY WITH WIDE DISTRIBUTION AND DIFFUSE LENS. 0-10V DIMMING TO 10%. PROVIDE ALL REQUIRED MOUNTING HARDWARE TO SURFACE MOUNT TO EXISTING BEAM STRUCTURE. FINISH SELECTED BY ARCHITECT. (GYM).
L10	ALPHABET: ECONU4-RD-SW-15LM-H40-35K-80-X-X-X	LITHONIA: LDN4 HALO: H04 HEW: 4D	20	LED 1500LM 3500K	120	RECESSED	4" RECESSED DOWNLIGHT WITH MEDIUM DISTRIBUTION. (GENERAL)
L11E	GREEN CREATIVE: TBD	LITHONIA HALO GE: LUMINATION	32	LED 3000LM 4000K	120	RECESSED	8" SQUARE LED REMODEL DOWNLIGHT WITH MEDIUM DISTRIBUTION AND INTEGRAL BATTERY BACKUP. TRIM FINISH PER ARCHITECT. EC TO VERIFY OPENING AND PROVIDE TRIM EXTENDER AS REQUIRED. LISTED FOR WET LOCATIONS UNDER COVERED CEILING. (EXISTING ENTRANCE CANOPIES)
L12-4	FINELITE: HPX-R-D-4-V-835-F-X-X-FC10-CX-SW-X	PRUDENTIAL: BPRO2 LUMENWERX: VIA2	8.5W/LFT	LED 1032LM/FT 3500K	120	RECESSED	2 1/2" W BY 4' L RECESSED LINEAR FIXTURE WITH EXTRUDED ALUMINUM HOUSING. 0-10V DIMMING TO 10%. LENS TO APPEAR CONTINUOUS WITH NO LIGHT LEAKS. (CORRIDORS/CAFETERIA)
L12-8	FINELITE: HPX-R-D-8-V-835-F-X-X-FC10-CX-SW-X	PRUDENTIAL: BPRO2 LUMENWERX: VIA2	8.5W/LFT	LED 1032LM/FT 3500K	120	RECESSED	2 1/2" W BY 8' L RECESSED LINEAR FIXTURE WITH EXTRUDED ALUMINUM HOUSING. 0-10V DIMMING TO 10%. LENS TO APPEAR CONTINUOUS WITH NO LIGHT LEAKS. (CORRIDORS)
L13-8	FINELITE: HPX-R-D-8-H-835-F-X-X-FC10-CX-SW-X	PRUDENTIAL: BPRO2 LUMENWERX: VIA2	6.5W/LFT	LED 800LM/LFT 3500K	120	RECESSED	2 1/2" W BY 8' L RECESSED LINEAR FIXTURE WITH EXTRUDED ALUMINUM HOUSING. 0-10V DIMMING TO 10%. LENS TO APPEAR CONTINUOUS WITH NO LIGHT LEAKS. (CORRIDORS)
L13-12	FINELITE: HPX-R-D-12-H-835-F-X-X-FC10-CX-SW-X	PRUDENTIAL: BPRO2 LUMENWERX: VIA2	6.5W/LFT	LED 800LM/LFT 3500K	120	RECESSED	2 1/2" W BY12' L RECESSED LINEAR FIXTURE WITH EXTRUDED ALUMINUM HOUSING. 0-10V DIMMING TO 10%. LENS TO APPEAR CONTINUOUS WITH NO LIGHT LEAKS. (CORRIDORS)
2 L14-8	FINELITE: HPX-R-D-8-B-835-F-X-X-FC10-CX-SW-X	PRUDENTIAL: BPRO2 LUMENWERX: VIA2	4.5W/LFT	LED 800LM/LFT 3500K	120	RECESSED	2 1/2" W BY 8' L RECESSED LINEAR FIXTURE WITH EXTRUDED ALUMINUM HOUSING. 0-10V DIMMING TO 10%. LENS TO APPEAR CONTINUOUS WITH NO LIGHT LEAKS. (CORRIDORS)
L14-10	FINELITE: HPX-R-D-10-B-835-F-X-X-FC10-CX-SW-X	PRUDENTIAL: BPRO2 LUMENWERX: VIA2	4.5W/LFT	LED 530LM/LFT 3500K	120	RECESSED	2 1/2" W BY 10' L RECESSED LINEAR FIXTURE WITH EXTRUDED ALUMINUM HOUSING. 0-10V DIMMING TO 10%. LENS TO APPEAR CONTINUOUS WITH NO LIGHT LEAKS. (CORRIDORS)
L14-12	FINELITE: HPX-R-D-12-B-835-F-X-X-FC10-CX-SW-X	PRUDENTIAL: BPRO2 LUMENWERX: VIA2	4.5W/LFT	LED 530LM/LFT 3500K	120	RECESSED	2 1/2" W BY12' L RECESSED LINEAR FIXTURE WITH EXTRUDED ALUMINUM HOUSING. 0-10V DIMMING TO 10%. LENS TO APPEAR CONTINUOUS WITH NO LIGHT LEAKS. (CORRIDORS)
L14-14	FINELITE: HPX-R-D-14-B-835-F-X-X-FC10-CX-SW-X	PRUDENTIAL: BPRO2 LUMENWERX: VIA2	4.5W/LFT	LED 530LM/LFT 3500K	120	RECESSED	2 1/2" W BY14' L RECESSED LINEAR FIXTURE WITH EXTRUDED ALUMINUM HOUSING. 0-10V DIMMING TO 10%. LENS TO APPEAR CONTINUOUS WITH NO LIGHT LEAKS. (CORRIDORS)
L15-8	FINELITE: HPX-P-ID-8-B-H-835-WSO-X-X-FC1-FAX-CX-FE-X	PRUDENTIAL: BPRO2 LUMENWERX: VIA2	11W/LFT	LED 1321LM/LFT 3500K	120	SUSPENDED	2 1/2" W BY 8' L DIRECT (60%) / INDIRECT (40%) SUSPENDED LINEAR FIXTURE WITH EXTRUDED ALUMINUM HOUSING AND WIDESPREAD INDIRECT OPTICS. 0-10V DIMMING TO 10%. LENS TO APPEAR CONTINUOUS WITH NO LIGHT LEAKS. FINISH SELECTED BY ARCHITECT.
L15-12	FINELITE: HPX-P-ID-12-B-H-835-WSO-X-X-FC1-FAX-CX-FE-X	PRUDENTIAL: BPRO2 LUMENWERX: VIA2	11W/LFT	LED 1321LM/LFT 3500K	120	SUSPENDED	2 1/2" W BY 12' L DIRECT (60%) / INDIRECT (40%) SUSPENDED LINEAR FIXTURE WITH EXTRUDED ALUMINUM HOUSING AND WIDESPREAD INDIRECT OPTICS. 0-10V DIMMING TO 10%. LENS TO APPEAR CONTINUOUS WITH NO LIGHT LEAKS. FINISH SELECTED BY ARCHITECT.
L16	COLUMBIA: MPS-4-35-XW-C-W-E-U-X	LITHONIA: CLX METALUX: SNLED HEW: 75R	20	LED 2600LM 3500K	120	WALL	4' LINEAR STRIP WITH ACRYLIC ROUND DIFFUSE LENS. PROVIDE ALL MOUNTING HARDWARE FOR WALL MOUNT ABOVE DOOR. (SMALL STORAGE ROOMS)
L17	COLUMBIA: CWM-4-35-LW-SR-FR-FP 2	BROWNLEE: 5180	32	LED 4000LM 3500K	120	SURFACE WALL	4' RECTILINEAR WALL MOUNT FIXTURE WITH FROSTED ACRYLIC LENS. FINISH SELECTED BY ARCHITECT. (CLINIC, ABOVE BEDS)
L18	ALPHABET: NU6-RD-SW-30-40-80-D40-X-X-NC-X-X	LITHONIA: LDN6 HALO: H06 HEW: 6D	32	LED 3000LM 4000K	120	RECESSED	ROUND LENSED DOWNLIGHT WITH MEDIUM DISTRIBUTION. UL LISTED FOR WET LOCATIONS UNDER COVERED AREA. TRIM FINISH SELECTED BY ARCHITECT. (CANOPY)
L18E	ALPHABET: NU6-RD-SW-30-40-80-D40-X-X-NC-X-X-EM 12			LED 3000LM 4000K	120	RECESSED	SAME AS TYPE L18 WITH INTEGRAL BATTERY BACKUP.
S1	HUBBELL: ASL2-320L-210-4K7-3-X-X-XX	LITHONIA: RSX LUMARK: PRV HEW: VA1	210	LED 30,000LM 4000K	MVOLT	25' POLE	AREA LIGHT WITH TYPE III DISTRUBUTION MOUNTED ATOP A 25' ROUND STRAIGHT STEEL POLE. FULL CUT-OFF. ARCHITECT TO SELECT FINISH.
S2	HUBBELL: ASL2-320L-210-4K7-4W-X-X-XX	LITHONIA: RSX LUMARK: PRV HEW: VA1	210	LED 30,000LM 4000K	MVOLT	25' POLE	AREA LIGHT WITH TYPE IV DISTRUBUTION MOUNTED ATOP A 25' ROUND STRAIGHT STEEL POLE. FULL CUT-OFF. ARCHITECT TO SELECT FINISH.
S3	HUBBELL: ASL2(2)-320L-210-4K7-4W-X-X-XX	LITHONIA: RSX LUMARK: PRV HEW: VA1	420	LED 60,0000LM 4000K	MVOLT	25' POLE	DOUBLE HEADED AREA LIGHT WITH TYPE IV DISTRIBUTION MOUNTED ATOP A 25' ROUND STRAIGHT POLE. FULL CUT-OFF. FIXTURES MOUNTED AT 180 DEGREES. ARCHITECT TO SELECT FINISH.
S4	LIGMAN UMI-50381-29W-N-W40-X-X-A50231 2	HYDREL: TPS FC LIGHTING	30	LED 3000LM 4000K	120	STANCHION	STANCHION MOUNT FLOOD LIGHT WITH DIE-CAST ALUMINUM HOUSING AND 14 DEGREE BEAM.ARCHITECT TO SELECT FINISH. (FLAGPOLE)
W1	HUBBEL: RWL1-48L-25-4K7-4W-X-X	LITHONIA: ARC LUMARK HEW: VWP	30	LED 3000LM 4000K	120	SURFACE WALL	EXTERIOR LED WALL PACK WITH TYPE 4W DISTRIBUTION. FINISH SELECTED BY ARCHITECT. (BUILDING MOUNTED)
W1E	HUBBEL: RWL1-48L-25-4K7-4W-X-EH	LITHONIA: ARC LUMARK HEW: VWP	30	LED 3000LM 4000K	120	SURFACE WALL	SAME AS TYPE W1 WITH INTEGRAL EMERGENCY BATTERY W/ HEATER. (EGRESS DOORS)
W2	HUBBEL: RWL1-48L-45-4K7-4W-X-X	LITHONIA: ARC LUMARK HEW: VWP	45	LED 5500LM 4000K	120	SURFACE WALL	EXTERIOR LED WALL PACK WITH TYPE 4W DISTRIBUTION . FINISH SELECTED BY ARCHITECT. (EXTERIOR GENERATOR)
X1	COMPASS: CERG	LITHONIA: EXRG-EL-M6 SURELITES	2			UNIVERSAL	UNIVERSAL MOUNT WHITE THERMOPLASTIC LED EXIT SIGN WITH FIELD SELECTABLE LETTERING COLOR AND NICAD BATTERY BACKUP. FACES AND ARROWS AS INDICATED ON DRAWINGS.
X2	COMPASS: CERG-WGEL 2	LITHONIA: EXRG-EL-M6-WG SURELITES	2			WALL	WALL MOUNT WHITE THERMOPLASTIC LED EXIT SIGN WITH FIELD SELECTABLE LETTERING COLOR AND NICAD BATTERY BACKUP. PROVIDE WIREGUARD. (GYM).

NOTES:
1. PROVIDE QANTITY OF 15 ADDITIONAL TYPE X1 FIXTURES TO REPLACE EXISTING EXIT SIGNS NOT SHOWN ON LIGHTING PLANS. UNUSED FIXTURES TO BE RETURNED TO OWNER FOR ATTIC STOCK.
2. EC TO PROVIDE FIELD VERIFICATION AS NOTED PER DRAWINGS FOR EXISTING CONDITIONS. EC TO ISSUE RFI FOR ANY ISSUES OR DEVIATION FROM WHAT IS SHOWN ON PLAN.
3. ALL EQUAL NANUFACTURERS LISTED MUST MEET OR EXCEED PERFORMANCE, QUALITY AND APPEARANCE OF THE BASE MANUFACTURER PRODUCT.

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LIGHTING CONTROL SEQUENCE

NOTES:
1. LIGHTING CONTROL WILL BE IN COMPLIANCE WITH ASHRAE 90.1-2007 REQUIRED LIGHTING CONTROL.
2. AREAS NOT COVERED IN CONTROL SEQUENCE TO MAINTAIN EXISTING LIGHTING CONTROL. ISSUE RFI FOR ANY AREAS IN QUESTION WITH REFERENCE TO ROOM NAME/NUMBER.
3. FACEPLATE/FINISH OF LIGHTING CONTROLS TO BE PROVIDED BY ARCHITECT.
4. ALL ALTERNATE FIXTURES/COMPONENTS MUST MEET OR EXCEED THE PERFORMANCE, QUALITY, AND APPEARANCE OF BASE BID PRODUCT.

DESIGNATION	AREA TYPE	CONTROL INTENT	COMPONENTS	EMERGENCY	MANUFACTURER	ACCEPTABLE ALTERNATE MANUFACTURERS
LC1	CLASSROOM	LIGHTS COME ON WHEN OCCUPANCY IS DETECTED BY OCCUPANCY SENSOR AND OFF WHEN OCCUPANCY IS NOT DETECTED FOR 15 MINUTES. LIGHT INTENSITY ADJUSTED BY (2) WALL BOX DIMMERS. (1) DIMMER TO CONTROL GENERAL LIGHTING AND (1) TO CONTROL LIGHTING AT TEACHING WALL/ PRESENTATION BOARD. WALL BOX DIMMER TO HAVE ON/OFF RAISE/LOWER FUNCTION. EC TO VERIFY TEACHING WALL.	(2) WALL BOX DIMMERS & 360 DEGREE DUAL TECHNOLOGY OCCUPANCY SENSOR(S)	UPON LOSS OF NORMAL POWER NEW GENERATOR TRANSFER DEVICE TO FORCE EMERGENCY FIXTURES ON	ACUITY: CM-PDT-10 & NPODMA-1SB-X / WSPODA1GNG-X	THE FOLLOWING MANUFACTURERS HAVE BEEN APPROVED FOR THE SPECIFIED EQUIPMENT UNLESS OTHERWISE INDICATED: 1. HUBBELL CONTROLS 2. LEVITON 3. LUTRON 4. GREENGATE 5. WATT STOPPER 6.CRESTRON
LC1 ALT	CLASSROOM	LIGHTS COME ON WHEN OCCUPANCY IS DETECTED. LIGHT LEVEL AND COLOR TEMPERATURE ADJUSTED SEPARATELY BY 4 BUTTON SCENE CONTROLLER WITH 4 PRESET SCENES TO BE COORDINATED WITH OWNER. LIGHTS AT FRONT OF CLASSROOM TO BE CONTROLLED SEPARATE FROM GENERAL LIGHTING. TOTAL OF (2) ZONES. LIGHTS TURN OFF WHEN OCCUPANCY HAS NOT BEEN DETECTED FOR 30 MINUTES. EC TO VERIFY TEACHING WALL.	COLOR TUNING, ENGRAVED 4 BUTTON SCENE CONTROLLER W/ RAISE LOWER, OCCUPANCY SENSOR, & CAT 5 CABLING	UPON LOSS OF NORMAL POWER NEW GENERATOR TRANSFER DEVICE TO FORCE EMERGENCY FIXTURES ON	ACUITY: NPODM-EDU4-TW & CM-PDT-10	
LC2	CORRIDOR & TRANSITION SPACES	LIGHT FIXTURES COME ON WHEN OCCUPANCY IS DETECTED BY 360 DEGREE DUAL TECHNOLOGY OCCUPANCY SENSOR AND TURN OFF WHEN MOTION IS NOT DETECTED FOR 30 MINUTES. FIXTURES DESIGNATED AS NL TO BE ON 24/7.	360 DEGREE DUAL TECHNOLOGY HALLWAY OCCUPANCY SENSOR	UPON LOSS OF NORMAL POWER NEW GENERATOR TRANSFER DEVICE TO FORCE EMERGENCY FIXTURES ON	ACUITY: CM-PDT-11	
LC3	RESTROOMS & LOCKER ROOMS	LIGHT FIXTURES COME ON WHEN OCCUPANCY IS DETECTED BY OCCUPANCY SENSOR. LIGHTS TURN OFF AFTER 30 MINUTE TIME DELAY. OVERRIDE SWITCH TO BE MAINTAINED AT ENTRY TO LOCKER ROOMS.	360 DEGREE DUAL TECHNOLOGY OCCUPANCY SENSOR	UPON LOSS OF NORMAL POWER NEW GENERATOR TRANSFER DEVICE TO FORCE EMERGENCY FIXTURES ON	ACUITY: CM-PDT-10	
LC3	CONFERENCE & LAB	LIGHTING COMES TO FULL ON UPON DETECTION OF MOTION. LIGHTING TURNS OFF AFTER MOTION IS FAILED TO BE DETECTED FOR 15 MINUTES. WALL BOX DIMMER TO HAVE ON/OFF & RAISE/LOWER FUNCTION. PROVIDE 3-WAY CONTROL AS INDICATED PER DRAWING.	CEILING MOUNTED OCCUPANCY SENSOR & WALL BOX DIMMER (S)	UPON LOSS OF NORMAL POWER NEW GENERATOR TRANSFER DEVICE TO FORCE EMERGENCY FIXTURES ON	ACUITY: CM-PDT-10 & NPODMA-1SB-X / WSPODA1GNG-X	
LC4	CONFERENCE, TEACHERS LOUNGE & PRIVATE OFFICES	LIGHTING COMES ON AND ADJUSTED BY WALL MOUNTED COMBINATION VACANCY SENSOR / WALL BOX DIMMER. LIGHT FIXTURES TURN OFF WHEN MOTION HAS NOT BEEN DETECTED FOR 30 MINUTES. PROVIDE 3-WAY CONTROL AS INDICATED PER DRAWING.	COMBINATION WALL BOX DIMMER / VACANCY SENSOR	UPON LOSS OF NORMAL POWER NEW GENERATOR TRANSFER DEVICE TO FORCE EMERGENCY FIXTURES ON	ACUITY: WSX-PDT-EZ-D-VA-X	
LC5	STORAGE & JANITOR	LIGHTS SWITCH ON WHEN OCCUPANCY IS DETECTED BY WALL MOUNTED SENSOR / CEILING MOUNTED SENSOR AND SWITCH OFF WHEN OCCUPANCY HAS NOT BEEN DETECTED FOR PRESET AMOUNT OF TIME.	DUAL TECHNOLOGY OCCUPANCY SENSOR	UPON LOSS OF NORMAL POWER NEW GENERATOR TRANSFER DEVICE TO FORCE EMERGENCY FIXTURES ON	ACUITY: WSX-X	
LC6	ELECTRICAL/ MECHANICAL	LIGHT FIXTURES SWITCH ON/OFF USING MANUAL TOGGLE SWITCH.	EXISTING SNAP SWITCH	UPON LOSS OF NORMAL POWER NEW GENERATOR TRANSFER DEVICE TO FORCE EMERGENCY FIXTURES ON	NA	
LC7	STAIRS	LIGHTS SWITCH TO FULL ON WHEN OCCUPANCY IS DETECTED. LIGHTS DIM TO 10% WHEN OCCUPANCY HAS NOT BEEN DETECTED FOR PRESET AMOUNT OF TIME. EACH STAIRWELL TO BE CONTROLLED AS A UNIT.	OCCUPANCY SENSOR INTEGRAL TO FIXTURE	UPON LOSS OF NORMAL POWER NEW GENERATOR TRANSFER DEVICE TO FORCE EMERGENCY FIXTURES ON	NA	
LC8	GYM	LIGHTING COMES TO FULL ON UPON DETECTION OF MOTION BY HIGH MOUNT OCCUPANCY SENSOR. LIGHTING TURNS OFF AFTER MOTION IS FAILED TO BE DETECTED FOR 15 MINUTES. WALL BOX DIMMER TO HAVE ON/OFF & RAISE/LOWER FUNCTION. PROVIDE 3-WAY CONTROL AS INDICATED PER DRAWING.	CEILING MOUNTED OCCUPANCY SENSOR & WALL BOX DIMMER (S)	UPON LOSS OF NORMAL POWER NEW GENERATOR TRANSFER DEVICE TO FORCE EMERGENCY FIXTURES ON	ACUITY: NPODMA-1SB-X / WSPODA1GNG-X, & CM-PDT-6-LT	
LC9	CAFETERIA	LIGHTING COMES TO FULL ON UPON DETECTION OF MOTION AND TURNS OFF AFTER MOTION NOT DETECTED FOR 30 MINUTES. WALL BOX DIMMER TO HAVE ON/OFF & RAISE/LOWER FUNCTION. PROVIDE 3-WAY CONTROL AS INDICATED PER DRAWING.	CEILING MOUNTED OCCUPANCY SENSOR & WALL BOX DIMMER (S)	UPON LOSS OF NORMAL POWER NEW GENERATOR TRANSFER DEVICE TO FORCE EMERGENCY FIXTURES ON	ACUITY: CM-PDT-10 & NPODMA-1SB-X / WSPODA1GNG-X	
LC10	BUILDING MOUNTED LIGHTING	NORMAL EXTERIOR LIGHTING CONTROLLED BY DUSK TO DAWN CONTACTOR. EMERGENCY EGRESS LIGHTING TO BE CONTROLLED BY PHOTOCELL. UPON LOSS OF NORMAL POWER EMERGENCY EGRESS LIGHTS TO COME ON.	CONTACTOR & WIRELESS NODE INTERFACE	UPON LOSS OF NORMAL POWER NEW GENERATOR TRANSFER DEVICE TO FORCE EMERGENCY FIXTURES ON	NA	
LC11	SITE LIGHTING	LIGHTING CONTROLED BY PHOTOCELL & CONTACTOR - MATCH EXISTING SITE LIGHTING CONTROL.	PHOTOCELL & CONTACTOR	NA	NA	NA

DEMOLITION NOTES

NOTES:
1. IT IS THE ELECTRICAL CONTRACTORS RESPONSIBILITY TO VERIFY AS BUILT CONDITIONS AGAINST DEMOLITION DRAWINGS. ELECTRICAL CONTRACTOR TO ISSUE RFI FOR ANY AREAS CONFLICTING WITH DRAWINGS.
2. REPLACE ALL EXIT SIGNS 1 FOR 1 AND ADD ADDITIONAL EXIT SIGNS AS SHOWN ON LIGHTING PLANS.

ALTERNATE #	AREA TYPE	NOTES
LIGHTING		
BASE BID	CLASSROOM	REMOVE EXISTING LIGHT FIXTURES AND PROVIDE NEW LIGHT FIXTURES AS SHOWN ON LIGHTING PLANS. REMOVE EXISTING LIGHT SWITCHES AND MAINTAIN LOCATION FOR FUTURE WALL BOX DIMMERS. CONNECT TO EXISTING CIRCUITRY.
BASE BID	CORRIDOR & TRANSITION SPACES	REMOVE EXISTING LIGHT FIXTURES AND PROVIDE NEW LIGHT FIXTURES AS SHOWN ON LIGHTING PLANS. REMOVE EXISTING LIGHT SWITCHES COMPLETE EXCEPT FOR THOSE TIED TO DISPLAY CASEWORK LIGHTING. PROVIDE COVER FOR UNUSED SWITCH LOCATIONS AND REPAIR WALL TO OWNER'S SATISFACTION (INCLUDING DRYWALL REPAIR AND PAINT). CONNECT TO EXISTING CIRCUITRY.
BASE BID	STAIRS	REMOVE EXISTING LIGHT FIXTURES AND PROVIDE NEW LIHT FIXTUES AS SHOWN ON LIGHTING PLANS. NEW FIXTURE TO HAVE INTEGRAL OCCUPANCY SENSOR. DEMO ALL SWITCHING IN STAIRWELLS, PROVIDE COVER FOR UNUSED SWITCH LOCATIONS AND REPAIR WALL TO OWNER'S SATISFACTION (INCLUDING DRYWALL REPAIR AND PAINT). CONNECT TO EXISTING CIRCUITRY.
BASE BID	RESTROOMS, LOCKER ROOMS, & STORAGE ROOMS	REMOVE EXISTING LIGHT FIXTURES AND PROVIDE NEW LIGHT FIXTURES AS SHOWN ON LIGHTING PLANS. REMOVE LIGHT SWITCHES COMPLETE. PROVIDE COVER FOR UNUSED SWITCH LOCATIONS AND REPAIR WALL TO OWNER'S SATISFACTION. MAINTAIN SINGLE OVERRIDE SWITCH FOR LOCKER ROOMS AS INDICATED PER PLAN. CONNECT TO EXISTING CIRCUITRY.
BASE BID	CONFERENCE, OFFICES, & LOUNGE	REMOVE EXISTING LIGHT FIXTURE AND PROVIDE NEW LIGHT FIXTURE AS SHOWN ON LIGHTING PLANS. REMOVE EXISTING LIGHT SWITCH(S) AND MAINTAIN LOCATION FOR FUTURE LIGHTING CONTROL AS INDICATED PER LIGHTING PLANS. PROVIDE COVER FOR ANY UNUSED SWITCH LOCATIONS AND REPAIR WALL TO OWNER'S SATISFACTION. CONNECT TO EXISTING CIRCUITRY.
BASE BID	GYM	REMOVE EXISTING LIGHT FIXTURES AND PROVIDE NEW HIGHBAY FIXTURES AS SHOWN ON LIGHTING PLANS. REMOVE EXISTING LIGHT SWITCHES AND MAINTAIN LOCATION FOR FUTURE LIGHTING CONTROL AS INDICATED PER PLAN. CONNECT TO EXISTING CIRCUITRY.
BASE BID	CAFETERIA	REMOVE EXISTING LIGHT FIXTURES AND PROVIDE NEW LIGHT FIXTURES AS SHOWN ON LIGHTING PLANS. REMOVE EXISTING SWITCHING FOR LIGHTING AND MAINTAIN LOCATION FOR NEW LIGHTING CONTROL AS INDICATED PER PLAN. CONNECT TO EXISTING CIRCUITRY.
BASE BID	MEDIA CENTER	REMOVE EXISTING LIGHT FIXTURES AND PROVIE NEW LED FIXTURES AS SHOWN ON LIGHTING PLANS. REMOVE EXISTING SNAP SWITCHES AND MAINTAIN LOCATION FOR FUTURE LIGHTING CONTROL. CONNECT TO EXSTING CIRCUITRY.
BASE BID	ELECTRICAL/ MECHANICAL	REMOVE EXISTING LIGHT FIXTURES AND PROVIDE NEW LIGHT FIXTURES AS SHOWN ON LIGHTING PLANS. CONNECT TO EXISTING CIRCUITRY AND SWITCHING.
BASE BID	EXTERIOR LIGHTING	REPLACE EXISTING BUILDING MOUNTED EXTERIOR LIGHT FIXTURES AND PROVIDE NEW LIGHT FIXTURE AS SHOWN ON LIGHTING PLANS. CONNECT TO EXISTING LIGHTING CONTROL FOR EXTERIOR.
ALTERNATE	CLASSROOM	PROVIDE NEW TUNABLE WHITE LED RECESSED TROFFERS IN SAME LOCATIONS AS BASE BID TYPE 'L1' FIXTURES. REMOVE EXISTING SWITCHES AND MAINTAIN FOR FUTURE TUNABLE WHITE LIGHTING CONTROLLER. CONNECT TO EXISTING CIRCUITRY.
POWER		
BASE BID	ALL AREAS MARKED WITH NEW POWER DEVICES. SEE 'ELECTRICAL POWER' SERIES SHEETS.	POWER: PARTIAL REMOVAL. FOR REMOVAL SCOPE OF WORK REFER TO 'ELECTRICAL POWER' SERIES SHEETS FOR LOCATIONS OF NEW DEVICES. EXISTING DEVICES WILL BE REMOVED IN GENERAL AREA WHERE NEW DEVICES ARE SHOWN. GENERAL POWER DEMO NOTES: COORDINATE THE REMOVAL OF EXISTING ELECTRICAL POWER DEVICES AND EQUIPMENT WITH ARCHITECTURAL DEMOLITION PLANS. SOME BUT NOT ALL OF THE EXISTING ELECTRICAL DEVICES AND EQUIPMENT TO BE REMOVED CAN BE FOUND ON THE ELECTRICAL DEMOLITION SERIES SHEETS. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATIONS OF EXISTING ELECTRICAL DEVICES AND EQUIPMENT TO BE REMOVED WITHIN SCOPE OF WORK. REMOVAL OF EXISTING ELECTRICAL POWER DEVICES AND EQUIPMENT SHALL INCLUDE THE REMOVAL OF THE DEVICE OR EQUIPMENT, THE WIRING BACK TO THE SOURCE PANEL, ALL SURFACE MOUNTED AND EXPOSED CONDUIT BOXES,ETC. FOR CONDUIT CONCEALED IN THE FLOOR, CUT OFF CONDUIT BELOW FINISHED FLOOR AND CAP WITH WATER TIGHT PLUG. FOR CONDUIT CONCEALED IN EXISTING WALL TO REMAIN CUT CONDUIT AT FIRST ACCESSIBLE LOCATION AND CAP. INSTALL BLANK COVER TO ALL ABANDONED BOXES. ANY EXISTING REMAINING DEVICES OR EQUIPMENT THAT DO NOT CONTRIBUTE TO THE COMPLETED OPERATIONAL FACILITY SHALL BE REMOVED AT THE DIRECTION OF THE OWNER. ALL EXISTING ELECTRICAL PANELS ARE TO REMAIN UNLESS NOTED OTHERWISE ON DRAWINGS. EXISTING ELECTRICAL PANELS ARE TO BE REUSED FOR NEW CONSTRUCTION. REUSE EXISTING CIRCUIT BREAKERS MADE SPARE DURING DEMOLITION.
SYSTEMS		
BASE BID	ALL AREAS MARKED WITH NEW SYSTEM DEVICES. SEE 'ELECTRICAL POWER' SERIES SHEETS.	PUBLIC ADDRESS: COMPLETE REMOVAL OF ENTIRE EXISTING PUBLIC ADDRESS SYSTEM THROUGHOUT FACILITY. FOR REMOVAL SCOPE OF WORK REFER TO 'ELECTRICAL POWER' SERIES SHEETS FOR LOCATIONS OF NEW DEVICES. EXISTING DEVICES WILL BE REMOVED IN GENERAL AREA WHERE NEW DEVICES ARE SHOWN. FIRE ALARM: EXISTING FIRE ALARM SYSTEM TO REMAIN. EXISTING FIRE ALARM CEILING MOUNTED DEVICES WILL BE DISCONNECTED AND RELOCATED AS SHOWN ON 'ELECTRICAL POWER' SERIES SHEETS. TELA/DATA: PARTIAL REMOVAL. FOR REMOVAL SCOPE OF WORK REFER TO 'ELECTRICAL POWER' SERIES SHEETS FOR LOCATIONS OF NEW DEVICES. EXISTING DEVICES WILL BE REMOVED IN GENERAL AREA WHERE NEW DEVICES ARE SHOWN. GENERAL SYSTEMS DEMO NOTES: COORDINATE THE REMOVAL OF EXISTING ELECTRICAL SYSTEM DEVICES WITH ARCHITECTURAL DEMOLITION PLANS. SOME BUT NOT ALL OF THE EXISTING SYSTEMS DEVICES TO BE REMOVED CAN BE FOUND ON THE ELECTRICAL DEMOLITION SERIES SHEETS. CONTRACTOR SHALL FIELD VERIFY EXACT LOCATIONS OF EXISTING ELECTRICAL DEVICES AND EQUIPMENT TO BE REMOVED WITHIN SCOPE OF WORK. ANY EXISTING REMAINING DEVICES OR EQUIPMENT THAT DO NOT CONTRIBUTE TO THE COMPLETED OPERATIONAL FACILITY SHALL BE REMOVED AT THE DIRECTION OF THE OWNER.

N
TRUE NORTH

LANCER + BEEBE, LLC
ARCHITECTURE | PLANNING | INTERIORS
220 N. COLLEGE AVE
INDIANAPOLIS, IN 46202

CIRCLE
DESIGN GROUP
INDIANAPOLIS, IN | 317.781.6200
CIRCLEDESIGNGROUP.COM

SHELBYVILLE CENTRAL SCHOOLS CORPORATION
LOPER ELEMENTARY RENOVATIONS & ADDITIONS
901 LOPER DRIVE

No. PE11800357
STATE OF INDIANA
04/26/2022

REVISIONS:

#	Date	Desc.
2	04/26/2022	Addendum #2

100% CONSTRUCTION DOCUMENTS

CDG PROJECT: #21102B
DATE: 04.06.2022
DRAWN BY: KTS

ELECTRICAL SCHEDULES

E-501

MOTORIZED EQUIPMENT SCHEDULE

TAG	QUAN	FURN. BY	HP	AMPS	KW	VOLT	PHASE	STARTER DATA TYPE	STARTER DATA NEMC. ENCL	STARTER DATA CONTROLS	STARTER DATA BY	DISCONNECT SWITCH TYPE	DISCONNECT SWITCH NEMA ENCL	DISCONNECT SWITCH BY	CONTROLS TYPE	CONTROLS BY	REMARKS	FEEDER	PANEL/CIRCUIT BREAKER
AC-1		MC	--	23	4.784	208	1					UNIT MTD	3R	MF	MA	MF		EXISTING	DISCONNECT/RECONNECT
AHU-A1		MC	--	21.8	7.848	208	3	VFD			MC	INTEGRAL	--	MF				EXISTING	35A/3P
AHU-A2		MC	--	10	3.600	208	3	VFD			EC	30A/3P	3R	EC				EXISTING	15A/3P
AHU-A3		MC	--	23	8.280	208	3	VFD			EC	40A/3P	3R	EC				EXISTING	40A/3P
AHU-L2		MC	--	21.8	7.848	208	3	VFD			MC	INTEGRAL	--	MF				EXISTING	35A/3P
CH-1		MC	--	959	345	208	3	VFD			MC	INTEGRAL	3R	MF	CP	MC		3#500 W/ #2/0 GND IN 4"C	1000A/3P
CUH-F1		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CUH-F19		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CUH-G2		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CUH-G4		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CUH-G12		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CUH-G13		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CUH-G26		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CUH-G27		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CUH-G42		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CUH-G43		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CUH-V1		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CUH-V2		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CUH-V3		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CUH-V4		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CUH-V5		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CUH-V6		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	CP	MC		EXISTING	DISCONNECT/RECONNECT
CWP-1		MC	20	62.1	22.356	208	3					80A/3P	1	EC				EXISTING	DISCONNECT/RECONNECT
CWP-2		MC	20	62.1	22.356	208	3					80A/3P	1	EC				EXISTING	DISCONNECT/RECONNECT
DOAS-A1		MC	--	87.2	31.392	208	3					UNIT MTD	--	MF				EXISTING	90A/3P
DOAS-B1		MC	--	95.4	34.344	208	3					UNIT MTD	--	MF				EXISTING	100A/3P
DOAS-B2		MC	--	87.2	31.392	208	3					UNIT MTD	--	MF				EXISTING	90A/3P
EF-A1		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	BMS	EXISTING		EXISTING	DISCONNECT/RECONNECT
EF-A2		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	BMS	EXISTING		EXISTING	DISCONNECT/RECONNECT
EF-A3		MC	1/15	1.62	0.194	120	1					INTEGRAL	--	MF	BMS	EXISTING		EXISTING	DISCONNECT/RECONNECT
EF-A4		MC	1/3	7.2	0.864	120	1					INTEGRAL	--	MF	BMS	EXISTING		EXISTING	DISCONNECT/RECONNECT
EF-A5		MC	1/15	1.62	0.194	120	1					INTEGRAL	--	MF	BMS	EXISTING		EXISTING	DISCONNECT/RECONNECT
EF-A6		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	BMS	EXISTING		EXISTING	DISCONNECT/RECONNECT
EF-A7		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	BMS	EXISTING		EXISTING	DISCONNECT/RECONNECT
EF-A8		MC	--	0.17	0.0204	120	1					INTEGRAL	--	MF	BMS	EXISTING		EXISTING	DISCONNECT/RECONNECT
EF-B1		MC	1/4	5.8	0.696	120	1					INTEGRAL	--	MF	BMS	EXISTING		EXISTING	DISCONNECT/RECONNECT
FCU-A1		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-A2		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-A3		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-A4		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-A5		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-A6		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-A7		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-B8		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-B9		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-B10		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-B11		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-B12		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-B13		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-B14		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-C15		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-C16		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-C17		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-C18		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-C19		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-C20		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-C21		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-C22		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-C23		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-C24		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-C26		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-D28		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-D29		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-D30		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-D31		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-D32		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-D33		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-E34		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-E35		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-E36		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-E37		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-E38-1		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-E38-2		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-G15		MC	1/4	3.6	0.748	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
FCU-G23		MC	1/6	2.25	0.468	208	1					INTEGRAL	--	MF				2#12 w/ #12 GND IN 3/4"C	20A/2P
HUH-G22		MC	1/12	1.9	0.228	120	1					INTEGRAL	--	MF				EXISTING	DISCONNECT/RECONNECT
HUH-G30		MC	1/8	2.9	0.348	120	1					INTEGRAL	--	MF				EXISTING	DISCONNECT/RECONNECT
HUH-G44		MC	1/8	2.9	0.348	120	1					INTEGRAL	--	MF				EXISTING	DISCONNECT/RECONNECT
HWP-1		MC	15	48.3	17.4	208	3					100A/3P	1	EC				3#3 W/ #8 GND IN 1-1/4" C	90A/3P
HWP-2		MC	15	48.3	17.4	208	3					100A/3P	1	EC				3#3 W/ #8 GND IN 1-1/4" C	90A/3P

AS	AQUA SWITCH	MSS	MANUAL MOTOR STARTER
AUX	AUXILIARY CONTACTS	NA	NOT APPLICABLE
CB	CIRCUIT BREAKER	NF	NON-FUSED
CM	COMBINATION MAGNETIC	PB	PUSH BUTTON
CP	CONTROL PACKAGE	PE	PNEUMATIC/ELECTRIC SWITCH
EP	ELECTRI/PNEUMATIC SWITCH	PL	PILOT LIGHT
ES	END SWITCH	PS	PUMP SEQUENCER
F	FUSED	PEV	REVERSING
FL	FLOW SWITCH	SD	SMOKE DETECTOR
FS	FREEZE STAT	SO	SOLENOID VALVE
HD	HEAT DETECTOR	SS	START/STOP PUSH BUTTON
HOA	HAND/OFF/AUTO SWITCH	T	CONTROL CIRC TRANS (120V)
HS	HUMIDISTAT	TC	TIME CLOCK
INT	INTERLOCKED TO	TS	THERMOSTAT
LL	LEAD-LAG SWITCH	2S	TWO SPEED
MC	MECHANICAL CONTRACTOR	VFD	VARIABLE FREQUENCY DRIVE
MCC	MOTOR CONTROL CENTER	BMS	BUILDING MANAGEMENT SYSTEM
MF	MANFACTURER		
DS	DOOR SWITCH		

Panel: EME

Location: HEADEND G21 **Supply From:** ATS-1 **Mounting:** Recessed **Enclosure:** Type 1

Volts: 120/208 Wye **Phases:** 3 **Wires:** 4

A.I.C. Rating: 22,000 **Mains Type:** MLO **Mains Rating:** 150 A

Circuit Number	Load Name	Rating	Number of Poles	A	B	C	Number of Poles	Rating	Load Name	Circuit Number
1	EMERGENCY LTG	20 A	1	1200 / 1200			1	20 A	EMERGENCY LTG	2
3	EMERGENCY LTG	20 A	1		1200 / 1200		1	20 A	EMERGENCY LTG	4
5	EMERGENCY LTG	20 A	1			1200 / 1200	1	20 A	EMERGENCY LTG	6
7	EMERGENCY LTG	20 A	1	1200 / 460			1	20 A	EMERGENCY LTG	8
9	SPARE	20 A	1		0 / 0		1	20 A	SPARE	10
11	SPARE	20 A	1			0 / 0	1	20 A	SPARE	12
13	SPARE	20 A	1	0 / 0			1	20 A	SPARE	14
15	SPARE	20 A	1		0 / 0		1	20 A	SPARE	16
17	SPARE	20 A	1			0 / 0	1	20 A	SPARE	18
19	SPARE	20 A	1	0 / 0			1	20 A	SPARE	20
21	SPARE	20 A	1		0 / 0		1	20 A	SPARE	22
23	SPARE	20 A	1			0 / 0	1	20 A	SPARE	24
25	SPARE	20 A	1	0 / 0			1	20 A	SPARE	26
27	SPARE	20 A	1		0 / 0		1	20 A	SPARE	28
29	SPARE	20 A	1			0 / 0	1	20 A	SPARE	30
			Total...	4060 VA	2400 VA	2400 VA				
			Total...	34 A	20 A	20 A				

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Power	8860 VA	100.00%	8860 VA		
				Total Conn. Load:	8860 VA
				Total Est. Demand:	8860 VA
				Total Conn. Current:	25 A
				Total Est. Demand Current:	25 A

Notes:

Panel: EMSB

Location: HEADEND G21 **Supply From:** ATS-2 **Mounting:** Recessed **Enclosure:** Type 1

Volts: 120/208 Wye **Phases:** 3 **Wires:** 4

A.I.C. Rating: 22,000 **Mains Type:** MLO **Mains Rating:** 150 A

Circuit Number	Load Name	Rating	Number of Poles	A	B	C	Number of Poles	Rating	Load Name	Circuit Number
1	REFRIGERATOR	20 A	1	500 / 500			1	20 A	FREEZER	2
3	EXISTING IT EQUIP	20 A	1		180 / 180		1	20 A	EXISTING IT EQUIP	4
5	EXISTING IT EQUIP	20 A	1			180 / 5667	3	90 A	HWP-1	6
7	DATA CLOSET	20 A	1	360 / 5667			--	--	--	8
9	BLR-1	20 A	1		500 / 5667		--	--	--	10
11	HOT WATER CTRL PANEL	20 A	1			500 / 5667	3	90 A	HWP-2	12
13	B.A.S. CONTROL PANEL	20 A	1	500 / 5667			--	--	--	14
15	ACU-2	20 A	2		0 / 5667		--	--	--	16
17	--	--	--			0 / 0	--	--	--	18
19	SPARE	20 A	1	0 / 0			1	20 A	SPARE	20
21	SPARE	20 A	1		0 / 0		1	20 A	SPARE	22
23	SPARE	20 A	1			0 / 0	1	20 A	SPARE	24
25	SPARE	20 A	1	0 / 0			1	20 A	SPARE	26
27	SPARE	20 A	1		0 / 0		1	20 A	SPARE	28
29	SPARE	20 A	1			0 / 0	1	20 A	SPARE	30
			Total...	13193 VA	12193 VA	12013 VA				
			Total...	110 A	102 A	100 A				

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Motor	34500 VA	100.00%	34500 VA		
Power	1900 VA	100.00%	1900 VA	Total Conn. Load:	37400 VA
Equipment	1000 VA	100.00%	1000 VA	Total Est. Demand:	37400 VA
O	0 VA	0.00%	0 VA	Total Conn. Current:	104 A
				Total Est. Demand Current:	104 A

Notes:

LANCER + BEEBE, LLC
ARCHITECTURE | PLANNING | INTERIORS
220 N. COLLEGE AVE
INDIANAPOLIS, IN 46202

CIRCLE DESIGN GROUP
INDIANAPOLIS, IN | 3177814200
CIRCLEDESIGNGROUP.COM

SHELBYVILLE CENTRAL SCHOOL CORPORATION
LOPER ELEMENTARY RENOVATIONS & ADDITIONS
901 LOPER DRIVE

REVISIONS:

#	Date	Desc.
2.	04/26/2022	Addendum #2

100% CONSTRUCTION DOCUMENTS

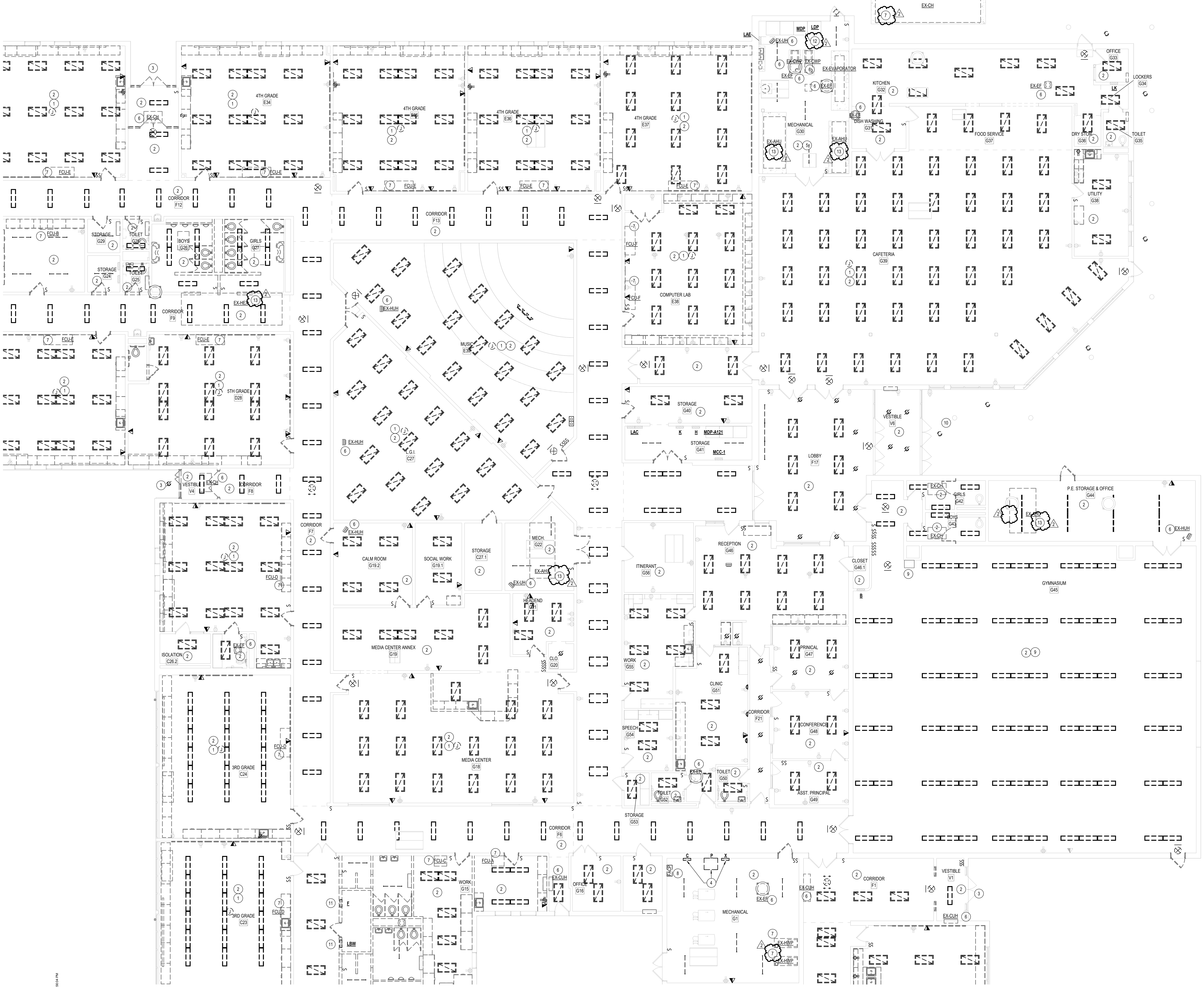
CDG PROJECT: #21102B
DATE: 04.06.2022
DRAWN BY: KTS

ELECTRICAL SCHEDULES

N
TRUE NORTH

E-502

PLOT DATE/TIME:4/26/2022 4:27:51 PM



1 FIRST FLOOR POWER DEMO PLAN - UNIT A

1/8" = 1'-0"

FIELD VERIFY
EXISTING ELECTRICAL EQUIPMENT, LIGHTING FIXTURES AND DEVICE INFORMATION WAS OBTAINED FROM EXISTING DRAWINGS AND CURSORY FIELD OBSERVATION. AS-BUILT DRAWINGS WERE NOT AVAILABLE FOR ALL SPACES INCLUDED IN THE SCOPE OF THE PROJECT. CERTAIN INFORMATION CONCERNING THE LOCATION, MOUNTING, AND PLACEMENT OF ELECTRICAL EQUIPMENT, DEVICES, AND LIGHTING FIXTURES MUST BE VERIFIED IN THE FIELD TO DETERMINE EXACT LOCATIONS, SIZING, AND ANY OTHER PERTINENT INFORMATION. THE EC MUST VERIFY PRIOR TO CONSTRUCTION AND NOTE ANY CONFLICTS BETWEEN PLANS AND ACTUAL CONDITIONS IMMEDIATELY TO DESIGN TEAM FOR VERIFICATION, CORRECTION, OR REVIEW. ANY ISSUES DUE TO LACK OF COORDINATION ON FRONT END OF PROJECT TO BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.

GENERAL SHEET NOTES

A. ALL EXISTING ELECTRICAL INSTALLATIONS ARE NOT NECESSARILY SHOWN. REMOVAL OF EXISTING INSTALLATIONS ARE SHOWN DASHED OR TO BE RELCATED PER PLAN NOTE. ANY EXISTING REMAINING ITEMS WHICH DO NOT CONTRIBUTE TO OR INHIBIT THE COMPLETED OPERATIONAL FACILITY SHALL BE REMOVED AT THE DIRECTION OF THE OWNER'S ENGINEER.
B. CONTRACTOR SHALL SCHEDULE AND PERFORM ALL WORK TO MINIMIZE THE DISTURBANCE TO FACILITY NORMAL OPERATION.
C. ELECTRICAL CONTRACTOR IS NOT RESPONSIBLE FOR THE PATCHING OF AREAS, FLOORS, CEILINGS, ROOFING MATERIALS, ETC. AFTER THE REMOVAL OF EXISTING EQUIPMENT.
D. INDIVIDUAL SUBCONTRACTORS ARE RESPONSIBLE FOR REMOVING AND REINSTALLAING ANY COMPONENTS NOTED TO BE REINSTALLED THAT FALL WITHIN THEIR TRADES.
E. DISPOSE OF ALL MATERIALS REMOVED AND NOT REUSED AS DIRECTED BY OWNER'S ENGINEER.
F. EXISTING ELECTRICAL EQUIPMENT AND COMPONENTS NOTED TO REMAIN SHALL BE PROTECTED DURING DEMOLITION OF OTHER ITEMS. ANY EQUIPMENT DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED OR REPLACED TO OWNER'S SATISFACTION AT CONTRACTOR'S COST.
G. CONTRACT DOCUMENTS CONSIST OF BOTH PROJECT MANUAL / SPECIFICATIONS AND DRAWINGS. DOCUMENTS ARE COMPLEMENTARY AND ANY INFORMATION INCLUDED ON EITHER SHALL BE EXECUTED AS IF SHOWN ON BOTH.
H. CONTRACTOR SHALL THOUROUGHLY INSPECT THE WORK OF OTHER TRADES IN ADDITION TO THEIR OWN PRIOR TO SUBMITTING A BID PROPOSAL.
I. CONTRACTOR SHALL PROVIDE UPDATED CIRCUIT DIRECTORIES FOR EXISTING PANEL BOARDS WITHIN THE PROJECT SCOPE IDENTIFYING THE PROPER LOAD TYPES FED BY THE CIRCUITS (NEW AND EXISTING) UPON THE COMPLETION OF WORK.
J. EXISTING EQUIPMENT NOTED TO BE `REMOVED COMPLETE' SHALL INCLUDE THE REMOVAL OF THE DEVICE/EQUIPMENT, WIRING BACK TO THE SOURCE/PANEL, REMOVAL OF ANY SURFACE MOUNTED / EXPOSED CONDUIT, AND BOXES.
K. WORK IN THIS DRAWING IS IN CONJUNCTION WITH ARCHITECTURAL DEMOLITION DRAWINGS. FOR ADDITIONAL WORK SEE ARCHITECTURAL PLANS.
L. EXISTING FIRE ALARM SYSTEM TO BE REMOVED COMPLETE. KEEP BUILDING FIRE ALARM OPERATIONAL FOR OCCUPIED PORTIONS OF THE DURING TENURE OF CONSTRUCTION. SEE ET100 SERIES FOR APPROXIMATE FIRE ALARM DEVICE LOCATIONS AND COUNTS ON PLANS.
M. EXISTING INTERCOM SPEAKERS TO BE REMOVED COMPLETE. EXISTING WIRING TO REMAIN. PREPARE ROUGH-INS FOR INSTALLATION OF NEW SPEAKERS. SEE ET100 SERIES FOR APPROXIMATE SPEAKER LOCATIONS AND COUNTS ON PLANS.
N. DEMOLISH ALL EXISTING DATA AND SURFACE MOUNTED DATA RACEWAYS AND BOXES IN CLASSROOM. REMOVE DATA CABLE BACK TO WAP DEVICE ABOVE CEILING.
O. REMOVE ALL EXISTING WIRING DEVICES IN CLASSROOMS AND PREPARE TO REPLACE WITH NEW.
P. REMOVE WIRELESS ACCESS POINT DEVICES IN ALL CLASSROOMS AND RETURN TO OWNER. COIL DATA CABLE CONNECTED TO WAP AND LEAVE ABOVE CEILING.
Q. DEMOLISH WIRE FEEDING DEMOLISHED RECEPTACLES BACK TO NEAREST ACCESSIBLE JUNCTION BOX. CONFIRM JUNCTION BOX WILL BE ACCESSIBLE POST CONSTRUCTION.
R. REFER TO SHEET E-501 FOR DEMOLITION NOTES SCHEDULE FOR ADDITIONAL DEMOLITION INFORMATION.

SHEET DEMO PLAN NOTES

1 DEMOLISH PROJECTOR AND PROJECTOR MOUNT. RETURN PROJECTOR TO OWNER AFTER REMOVAL. DEMOLISH WIRE AND CONDUIT BACK TO NEAREST JUNCTION BOX.
2 REMOVE ALL LIGHT FIXTURES AND LIGHTING CONTROLS WITHIN THIS AREA.
3 REMOVE ALL EXTERIOR WALL SCONCES AND CANOPY LIGHTING.
4 DEMOLISH ORIGINAL CLEVELAND PANELBOARDS. PREPARE AREA FOR REPLACEMENT OF GEAR AND RECONNECTION OF CIRCUITRY. SEE E-401 FOR GEAR SIZE.
5 EXISTING TIMECLOCK TC.1 AND EXISTING CONTACTOR C.1 LOCATED IN THIS ROOM.
6 DISCONNECT CIRCUITRY FROM MECHANICAL EQUIPMENT TO BE REPLACED. PREPARE CIRCUIT FOR RECONNECTION TO NEW EQUIPMENT IN SIMILAR LOCATION. EXTEND CIRCUITRY AS REQUIRED.
7 DEMOLISH WIRE FROM MECHANICAL UNIT BACK TO SOURCE. PREPARE EXISTING CONDUIT TO BE RE-USED AS POSSIBLE FOR NEW CIRCUITRY.
8 DEMOLISH EXISTING FACP AND PREPARE FOR REPLACEMENT.
9 DEMOLISH EXISTING GYMNASIUM SOUND EQUIPMENT AND SPEAKERS AND RETURN TO OWNER.
10 REMOVE ALL EXTERIOR RECESSED DOWNLIGHTS IN SOFFIT AND RETURN FIXTURES TO OWNER. REFER TO SHEET EL101A FOR RETROFIT DOWNLIGHT.
11 DEMOLISH EXISTING PANELBOARD. PREPARE EXISTING CIRCUITRY TO BE CONNECTED TO NEW PANELBOARD. SEE NEW LOCATIONS ON EP101A.
12 DEMOLISH (2) 800A BUCKETS FEEDING EXISTING CHILLER. SPACE TO BE MADE AVAILABLE FOR NEW DISCONNECT FOR NEW CHILLER.
13 DISCONNECT CIRCUITRY FROM MECHANICAL EQUIPMENT TO BE REPLACED. PREPARE CIRCUIT FOR RECONNECTION TO NEW EQUIPMENT IN SIMILAR LOCATION. EXTEND CIRCUITRY AS REQUIRED. REMOVE BREAKER FEEDING UNIT AND PREPARE TO REPLACE WITH BREAKER SIZE AS SHOWN ON MOTORIZED EQUIPMENT SCHEDULE ON E-502 FOR EQUIPMENT WHICH IS REPLACING DEMOLISHED UNIT.

LANCER + BEEBE, LLC
ARCHITECTURE | PLANNING | INTERIORS
220 N. COLLEGE AVE
INDIANAPOLIS, IN 46202

CIRCLE DESIGN GROUP

SHELBYVILLE CENTRAL SCHOOLS CORPORATION
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PROFESSIONAL ENGINEER

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100% CONSTRUCTION DOCUMENTS

CDG PROJECT: #21102B
DATE: 04.06.2022
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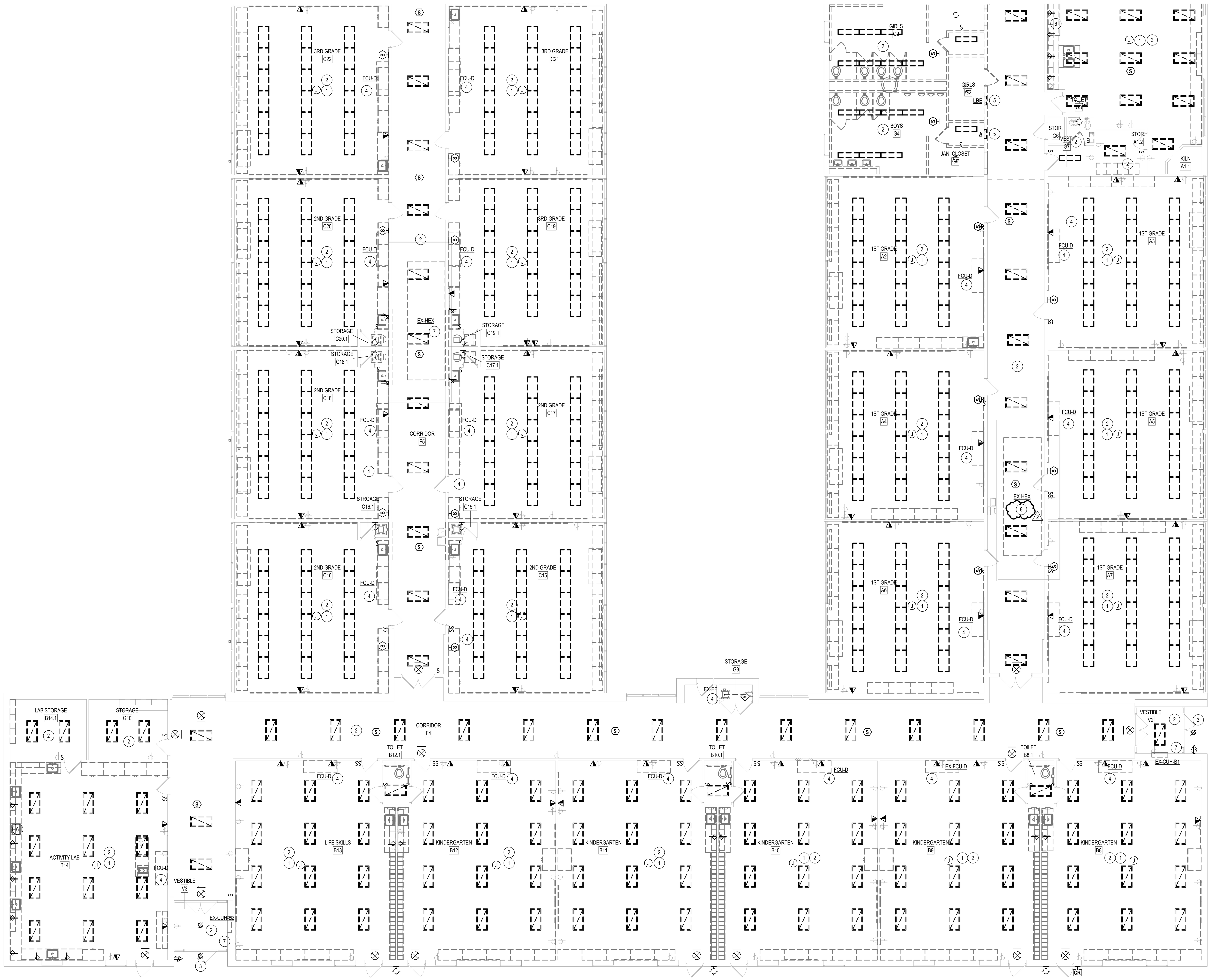
FIRST FLOOR ELECTRICAL DEMO PLAN - UNIT A

N
TRUE NORTH

ED101A



1 FIRST FLOOR POWER DEMO PLAN - UNIT B

1/8" = 1'-0"

GENERAL SHEET NOTES

A. ALL EXISTING ELECTRICAL INSTALLATIONS ARE NOT NECESSARILY SHOWN. REMOVAL OF EXISTING INSTALLATIONS ARE SHOWN DASHED OR TO BE RELCATED PER PLAN NOTE. ANY EXISTING REMAINING ITEMS WHICH DO NOT CONTRIBUTE TO OR INHIBIT THE COMPLETED OPERATIONAL FACILITY SHALL BE REMOVED AT THE DIRECTION OF THE OWNER'S ENGINEER.

B. CONTRACTOR SHALL SCHEDULE AND PERFORM ALL WORK TO MINIMIZE THE DISTURBANCE TO FACILITY NORMAL OPERATION.

C. ELECTRICAL CONTRACTOR IS NOT RESPONSIBLE FOR THE PATCHING OF AREAS, FLOORS, CEILINGS, ROOFING MATERIALS, ETC. AFTER THE REMOVAL OF EXISTING EQUIPMENT.

D. INDIVIDUAL SUBCONTRACTORS ARE RESPONSIBLE FOR REMOVING AND REINSTALLAING ANY COMPONENTS NOTED TO BE REINSTALLED THAT FALL WITHIN THEIR TRADES.

E. DISPOSE OF ALL MATERIALS REMOVED AND NOT REUSED AS DIRECTED BY OWNER'S ENGINEER.

F. EXISTING ELECTRICAL EQUIPMENT AND COMPONENTS NOTED TO REMAIN SHALL BE PROTECTED DURING DEMOLITION OF OTHER ITEMS. ANY EQUIPMENT DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED OR REPLACED TO OWNER'S SATISFACTION AT CONTRACTOR'S COST.

G. CONTRACT DOCUMENTS CONSIST OF BOTH PROJECT MANUAL / SPECIFICATIONS AND DRAWINGS. DOCUMENTS ARE COMPLEMENTARY AND ANY INFORMATION INCLUDED ON EITHER SHALL BE EXECUTED AS IF SHOWN ON BOTH.

H. CONTRACTOR SHALL THOUROUGHLY INSPECT THE WORK OF OTHER TRADES IN ADDITION TO THEIR OWN PRIOR TO SUBMITTING A BID PROPOSAL.

I. CONTRACTOR SHALL PROVIDE UPDATED CIRCUIT DIRECTORIES FOR EXISTING PANEL BOARDS WITHIN THE PROJECT SCOPE IDENTIFYING THE PROPER LOAD TYPES FED BY THE CIRCUITS (NEW AND EXISTING) UPON THE COMPLETION OF WORK.

J. EXISTING EQUIPMENT NOTED TO BE `REMOVED COMPLETE' SHALL INCLUDE THE REMOVAL OF THE DEVICE/EQUIPMENT, WIRING BACK TO THE SOURCE/PANEL, REMOVAL OF ANY SURFACE MOUNTED / EXPOSED CONDUIT, AND BOXES.

K. WORK IN THIS DRAWING IS IN CONJUNCTION WITH ARCHITECTURAL DEMOLITION DRAWINGS. FOR ADDITIONAL WORK SEE ARCHITECTURAL PLANS.

L. EXISTING FIRE ALARM SYSTEM TO BE REMOVED COMPLETE. KEEP BUILDING FIRE ALARM OPERATIONAL FOR OCCUPIED PORTIONS OF THE DURING TENURE OF CONSTRUCTION. SEE ET100 SERIES FOR APPROXIMATE FIRE ALARM DEVICE LOCATIONS AND COUNTS ON PLANS.

M. EXISTING INTERCOM SPEAKERS TO BE REMOVED COMPLETE. EXISTING WIRING TO REMAIN. PREPARE ROUGH-INS FOR INSTALLATION OF NEW SPEAKERS. SEE ET100 SERIES FOR APPROXIMATE SPEAKER LOCATIONS AND COUNTS ON PLANS.

N. DEMOLISH ALL EXISTING DATA AND SURFACE MOUNTED DATA RACEWAYS AND BOXES IN CLASSROOM. REMOVE DATA CABLE BACK TO WAP DEVICE ABOVE CEILING.

O. REMOVE ALL EXISTING WIRING DEVICES IN CLASSROOMS AND PREPARE TO REPLACE WITH NEW.

P. REMOVE WIRELESS ACCESS POINT DEVICES IN ALL CLASSROOMS AND RETURN TO OWNER. COIL DATA CABLE CONNECTED TO WAP AND LEAVE ABOVE CEILING.

Q. DEMOLISH WIRE FEEDING DEMOLISHED RECEPTACLES BACK TO NEAREST ACCESSIBLE JUNCTION BOX. CONFIRM JUNCTION BOX WILL BE ACCESSIBLE POST CONSTRUCTION.

R. REFER TO SHEET E-501 FOR DEMOLITION NOTES SCHEDULE FOR ADDITIONAL DEMOLITION INFORMATION.

SHEET DEMO PLAN NOTES

1 DEMOLISH PROJECTOR AND PROJECTOR MOUNT. RETURN PROJECTOR TO OWNER AFTER REMOVAL. DEMOLISH WIRE AND CONDUIT BACK TO NEAREST JUNCTION BOX.

2 REMOVE ALL LIGHT FIXTURES AND LIGHTING CONTROLS WITHIN THIS AREA.

3 REMOVE ALL EXTERIOR WALL SCONCES AND CANOPY LIGHTING.

2

4 DEMOLISH WIRE FROM MECHANICAL UNIT BACK TO SOURCE. PREPARE EXISTING CONDUIT TO BE RE-USED AS POSSIBLE FOR NEW CIRCUITRY.

5 DEMOLISH EXISTING PANELBOARD. PREPARE EXISTING CIRCUITRY TO BE CONNECTED TONEW PANELBOARD. SEE NEW LOCATIONS ON EP101B

6 CASEWORK TO BE REPLACED. DEMOLISH RECEPTACLES AND PREPARE CIRCUIT TO BE RECONNECTED TO NEW RECEPTACLES IN SIMILAR LOCATION.

7 DISCONNECT CIRCUITRY FROM MECHANICAL EQUIPMENT TO BE REPLACED. PREPARE CIRCUIT FOR RECONNECTION TO NEW EQUIPMENT IN SIMILAR LOCATION. EXTEND CIRCUITRY AS REQUIRED.

8 DISCONNECT CIRCUITRY FROM MECHANICAL EQUIPMENT TO BE REPLACED. PREPARE CIRCUIT FOR RECONNECTION TO NEW EQUIPMENT IN SIMILAR LOCATION. EXTEND CIRCUITRY AS REQUIRED. REMOVE BREAKER FEEDING UNIT AND PREPARE TO REPLACE WITH BREAKER SIZE AS SHOWN ON MOTORIZE

2

FIELD VERIFY
EXISTING ELECTRICAL EQUIPMENT, LIGHTING FIXTURES AND DEVICE INFORMATION WAS OBTAINED FROM EXISTING DRAWINGS AND CURSORY FIELD OBSERVATION. AS-BUILT DRAWINGS WERE NOT AVAILABLE FOR ALL SPACES INCLUDED IN THE SCOPE OF THE PROJECT. CERTAIN INFORMATION CONCERNING THE LOCATION, MOUNTING, AND PLACEMENT OF ELECTRICAL EQUIPMENT, DEVICES, AND LIGHTING FIXTURES MUST BE VERIFIED IN THE FIELD TO DETERMINE EXACT LOCATIONS, SIZING, AND ANY OTHER PERTINENT INFORMATION. THE EC MUST VERIFY PRIOR TO CONSTRUCTION AND NOTE ANY CONFLICTS BETWEEN PLANS AND ACTUAL CONDITIONS IMMEDIATELY TO DESIGN TEAM FOR VERIFICATION, CORRECTION, OR REVIEW. ANY ISSUES DUE TO LACK OF COORDINATION ON FRONT END OF PROJECT TO BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.

LANCER + BEBE, LLC
ARCHITECTURE | PLANNING | INTERIORS
220 N. COLLEGE AVE
INDIANAPOLIS, IN 46202

CIRCLE DESIGN GROUP
INDIANAPOLIS, IN | 317.761.6200
CIRCLEDESIGNGROUP.COM

SHELBYVILLE CENTRAL SCHOOLS CORPORATION
LOPER ELEMENTARY RENOVATIONS & ADDITIONS
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PROFESSIONAL ENGINEER

REVISIONS:

#	Date	Desc.
2	04/26/2022	Addendum #2

100% CONSTRUCTION DOCUMENTS

CDG PROJECT: #21102B
DATE: 04.06.2022
DRAWN BY: KTS

FIRST FLOOR ELECTRICAL DEMO PLAN - UNIT B

N
TRUE NORTH

ED101B

GENERAL SHEET NOTES

A. ALL EXISTING ELECTRICAL INSTALLATIONS ARE NOT NECESSARILY SHOWN. REMOVAL OF EXISTING INSTALLATIONS ARE SHOWN DASHED OR TO BE RELCATED PER PLAN NOTE. ANY EXISTING REMAINING ITEMS WHICH DO NOT CONTRIBUTE TO OR INHIBIT THE COMPLETED OPERATIONAL FACILITY SHALL BE REMOVED AT THE DIRECTION OF THE OWNER'S ENGINEER.
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D. INDIVIDUAL SUBCONTRACTORS ARE RESPONSIBLE FOR REMOVING AND REINSTALLAING ANY COMPONENTS NOTED TO BE REINSTALLED THAT FALL WITHIN THEIR TRADES.
E. DISPOSE OF ALL MATERIALS REMOVED AND NOT REUSED AS DIRECTED BY OWNER'S ENGINEER.
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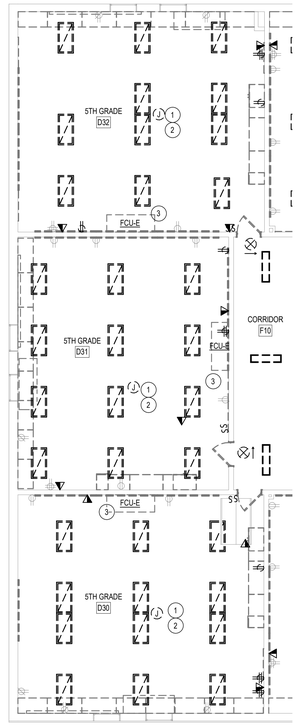
J. EXISTING EQUIPMENT NOTED TO BE 'REMOVED COMPLETE' SHALL INCLUDE THE REMOVAL OF THE DEVICE/EQUIPMENT, WIRING BACK TO THE SOURCE/PANEL, REMOVAL OF ANY SURFACE MOUNTED / EXPOSED CONDUIT, AND BOXES.
K. WORK IN THIS DRAWING IS IN CONJUNCTION WITH ARCHITECTURAL DEMOLITION DRAWINGS. FOR ADDITIONAL WORK SEE ARCHITECTURAL PLANS.
L. EXISTING FIRE ALARM SYSTEM TO BE REMOVED COMPLETE. KEEP BUILDING FIRE ALARM OPERATIONAL FOR OCCUPIED PORTIONS OF THE DURING TENURE OF CONSTRUCTION. SEE ET100 SERIES FOR APPROXIMATE FIRE ALARM DEVICE LOCATIONS AND COUNTS ON PLANS.
M. EXISTING INTERCOM SPEAKERS TO BE REMOVED COMPLETE. EXISTING WIRING TO REMAIN. PREPARE ROUGH-INS FOR INSTALLATION OF NEW SPEAKERS. SEE ET100 SERIES FOR APPROXIMATE SPEAKER LOCATIONS AND COUNTS ON PLANS.
N. DEMOLISH ALL EXISTING DATA AND SURFACE MOUNTED DATA RACEWAYS AND BOXES IN CLASSROOM. REMOVE DATA CABLE BACK TO WAP DEVICE ABOVE CEILING.
O. REMOVE ALL EXISTING WIRING DEVICES IN CLASSROOMS AND PREPARE TO REPLACE WITH NEW.
P. REMOVE WIRELESS ACCESS POINT DEVICES IN ALL CLASSROOMS AND RETURN TO OWNER. COIL DATA CABLE CONNECTED TO WAP AND LEAVE ABOVE CEILING.
Q. DEMOLISH WIRE FEEDING DEMOLISHED RECEPTACLES BACK TO NEAREST ACCESSIBLE JUNCTION BOX. CONFIRM JUNCTION BOX WILL BE ACCESSIBLE POST CONSTRUCTION.
R. REFER TO SHEET E-501 FOR DEMOLITION NOTES SCHEDULE FOR ADDITIONAL DEMOLITION INFORMATION.

SHEET DEMO PLAN NOTES

1. DEMOLISH PROJECTOR AND PROJECTOR MOUNT. RETURN PROJECTOR TO OWNER
2. REMOVE ALL LIGHT FIXTURES AND LIGHTING CONTROLS WITHIN THIS AREA
3. DEMOLISH WIRE FROM MECHANICAL UNIT BACK TO SOURCE. PREPARE EXISTING CONDUIT TO BE RE-USED AS POSSIBLE FOR NEW CIRCUITRY.



1 FIRST FLOOR POWER DEMO PLAN - UNIT C
1/8" = 1'-0"
0 4' 8' 16'

FIELD VERIFY
EXISTING ELECTRICAL EQUIPMENT, LIGHTING FIXTURES AND DEVICE INFORMATION WAS OBTAINED FROM EXISTING DRAWINGS AND CURSORY FIELD OBSERVATION. AS-BUILT DRAWINGS WERE NOT AVAILABLE FOR ALL SPACES INCLUDED IN THE SCOPE OF THE PROJECT. CERTAIN INFORMATION CONCERNING THE LOCATION, MOUNTING, AND PLACEMENT OF ELECTRICAL EQUIPMENT, DEVICES, AND LIGHTING FIXTURES MUST BE VERIFIED IN THE FIELD TO DETERMINE EXACT LOCATIONS, SIZING, AND ANY OTHER PERTINENT INFORMATION. THE EC MUST VERIFY PRIOR TO CONSTRUCTION AND NOTE ANY CONFLICTS BETWEEN PLANS AND ACTUAL CONDITIONS IMMEDIATELY TO DESIGN TEAM FOR VERIFICATION, CORRECTION, OR REVIEW. ANY ISSUES DUE TO LACK OF COORDINATION ON FRONT END OF PROJECT TO BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.

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100% CONSTRUCTION DOCUMENTS

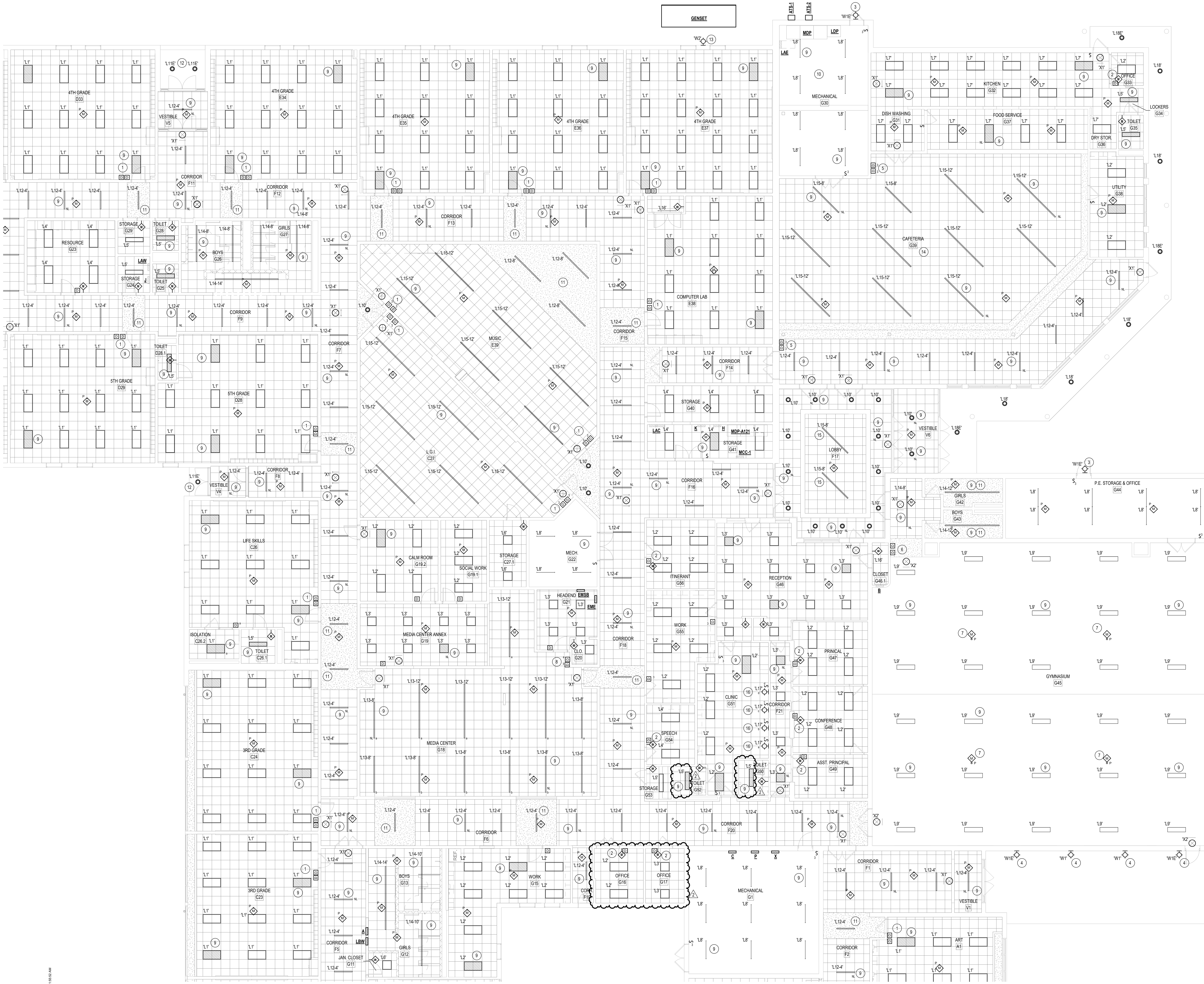
CDG PROJECT: #21102B
DATE: 04.06.2022
DRAWN BY: KTS

FIRST FLOOR ELECTRICAL DEMO PLAN - UNIT C

N
TRUE NORTH

ED101C

PLOT DATE/TIME: 4/26/2022 11:55:50 AM



1 FIRST FLOOR LIGHTING PLAN - UNIT A
1/8" = 1'-0"

GENERAL SHEET NOTES

A. SEE SHEET E-000 FOR SYMBOLS AND ABBREVIATIONS.
B. SEE E-500 SERIES SHEETS FOR ELECTRICAL SCHEDULES.
C. SEE ED100 SERIES SHEETS FOR ELECTRICAL DEMOLITION PLANS.
D. COORDINATE INSTALLATION OF LIGHTING FIXTURES WITH ARCHITECTURAL REFLECTED CEILING PLANS, ARCHITECTURAL ELEVATIONS, MECHANICAL EQUIPMENT, DIFFUSERS, SUPPORTS, PIPING, DUCTWORK AND STRUCTURAL PLANS PRIOR TO ROUGH-IN AND INSTALLATION OF LIGHTS.
E. ALL MOUNTING HEIGHTS NOTED ON THE PLANS ARE TO THE BOTTOM OF THE FIXTURE UNLESS NOTED OTHERWISE.
F. LOCATE CEILING MOUNTED OCCUPANCY SENSORS TO PROVIDE COMPLETE AREA COVERAGE OF THE SPACE THEY ARE INSTALLED IN. SELECT PROPER SENSOR COVERAGE PATTERN FROM MANUFACTURER'S PRODUCT DATA TO DETERMINE COVERAGE. ADDITIONAL SENSORS REQUIRED DUE TO LACK OF COVERAGE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND THE MANUFACTURER. SENSORS SHALL INCLUDE ALL POWER SUPPLIES AND RELAYS NECESSARY FOR PROPER OPERATION.
G. WIRING SYSTEM SHALL BE CONDUIT AND CONDUCTOR UNLESS NOTED OTHERWISE. USE SOLID CONDUCTOR FOR SIZE #10 AWG AND SMALLER. USE STRANDED CONDUCTOR FOR LARGER SIZES.
H. ALL COVER PLATES FOR ELECTRICAL DEVICES SHALL BE OF A COLOR TO MATCH THE AREA COLOR SCHEME AS DIRECTED BY THE INTERIOR DESIGNER.
I. LABEL ALL RELAYS AND POWER SUPPLIES (ON THE DEVICE OR ON THE BOX THEY ARE CONNECTED TO) WITH THE AREA THE DEVICES SERVES, THE BRANCH CIRCUIT IT CONTROLS AND THE DEVICE ADDRESS (IF APPLICABLE).
J. EMERGENCY LIGHTING SHOWN ON THIS DRAWING INDICATES CODE REQUIRED EMERGENCY LIGHTING FED FROM THE 'EMERGENCY BRANCH' OF THE ESSENTIAL ELECTRICAL SYSTEM.
K. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS, ROOM AND AREA FINISHES, CEILING PLANS, DOOR SWINGS, FIRE-RATED PARTITIONS, CABINET AND CASEWORK AND BUILT-IN DETAILS.
L. ALL WORK SHALL COMPLY WITH ALL NATIONAL, STATE AND LOCAL CODES AND ORDINANCES PERTAINING TO THE WORK IN THIS PROJECT.
M. EXPOSED CONDUIT SHALL BE RUN PARALLEL TO AND AT RIGHT ANGLES TO BUILDING LINES.
N. REFER TO ARCHITECTURAL DRAWINGS FOR DESIGNATION AND LISTING OF FIRE RATED ASSEMBLIES. COORDINATE ALL DESIGN EFFORTS WITH FIRE RESISTANCE OF MATERIALS AND CONSTRUCTION.
O. ALL EXTERIOR EQUIPMENT AND DEVICES SHALL BE WEATHER PROOF AND RAIN TIGHT.
P. CONNECT ALL NEW LIGHTING TO EXISTING CIRCUITS PRESENTLY SERVING THE RESPECTIVE ROOM OR SPACE.

SHEET PLAN NOTES

1 SET OF (2) WALL BOX DIMMERS.(1) TO CONTROL LIGHTING AT FRONT OF ROOM/WHITEBOARD AND (1) TO CONTROL GENERAL ILLUMINATION. EC SHALL VERIFY WHICH SIDE OF ROOM IS CONSIDERED 'FRONT' AND WIRE DIMMERS ACCORDINGLY.
2 COMBINATION OCCUPANCY SENSOR/WALL BOX DIMMER.
3 MOUNT LIGHT FIXTURE AT 6" ABOVE FINISHED DOOR FRAME.
4 MOUNT LIGHT FIXTURE IN SAME LOCATION AS EXISTING LIGHT FIXTURE.
5 LIGHTING CONTROL FOR CAFETERIA. PROVIDE LOCKABLE COVER FOR WALL BOX DIMMERS. PREVIOUS SWITCH/CONTROL ZONES TO BE MAINTAINED.
6 LIGHTING CONTROL FOR GYMNASIUM. PROVIDE LOCKABLE COVER FOR WALL BOX DIMMERS. PREVIOUS SWITCH/CONTROL ZONES TO BE MAINTAINED.
7 HIGH BAY PIR 360 OCCUPANCY SENSOR.
8 LIGHTING CONTROL FOR MEDIA CENTER. PROVIDE LOCKABLE COVER FOR WALL BOX DIMMERS. PREVIOUS SWITCH/CONTROL ZONES TO BE MAINTAINED.
9 PROVIDE BODINE GTD 20A GENERATOR TRANSFER DEVICE OR EQUAL PRODUCT AS APPROVED BY ENGINEER FOR LIGHTING LOAD. FIXTURE CONNECTED TO NORMALLY TO LOCAL CIRCUIT. PROVIDE CIRCUIT FROM EMERGNCY PANEL EME ALONG WITH UNWITCHED CIRCUIT MINIMUM WIRE SIZE 2#12 COPPER W/ #12 GND. SIZE WIRE AS REQUIRED FOR VOLTAGE DROP. MAXIMUM OF (25) EMERGENCY FIXTURES PER 120V/1P CIRCUIT.
10 EXISTING TIMECLOCK TC.1 AND EXISTING CONTACTOR C.1 LOCATED IN THIS ROOM.
11 PROVIDE SPACKLE FLANGE MOUNTING HARDWARE FOR MOUNTING FIXTURE IN HARD CEILING.
12 EC TO VERIFY APERATURE, CEILIN PLENUM AND COSTRUCTION OF OVERHANG FOR ALL EXISTING DOWNLIGHTS. EC RESPONSIBLE FOR FIELD VERIFICATION.
13 MOUNT LIGHT FIXTURE AT 13' ABOVE FINISHED GRADE.
14 MOUNT LIGHT FIXTURE AT 10' AFF TO BOTTOM OF LIGHT FIXTURE. TYPICAL FOR ALL TYPE 'L15' IN THIS ROOM.
15 MOUNT LIGHT FIXTURE AT APPROXIMATELY 8'-6" AFF TO BOTTOM OF LIGHT FIXTURE. BOTTOM OF LIGHT FIXTURE TO ALIGN WITH BOTTOM OF ADJACENT BULKHEADS.
16 MOUNT LIGHT FIXTURE IN SAME LOCATION AS EXISTING LIGHT FIXTURE.

LANCER + BEEBE, LLC
ARCHITECTURE | PLANNING | INTERIORS
220 N. COLLEGE AVE
INDIANAPOLIS, IN 46202

CIRCLE DESIGN GROUP
INDIANAPOLIS, IN | 317.781.6200
CIRCLEDESIGNGROUP.COM

SHELBYVILLE CENTRAL SCHOOLS CORPORATION
LOPER ELEMENTARY RENOVATIONS & ADDITIONS
901 LOPER DRIVE

REVISIONS:

#	Date	Desc.
2	04/26/2022	Addendum #2

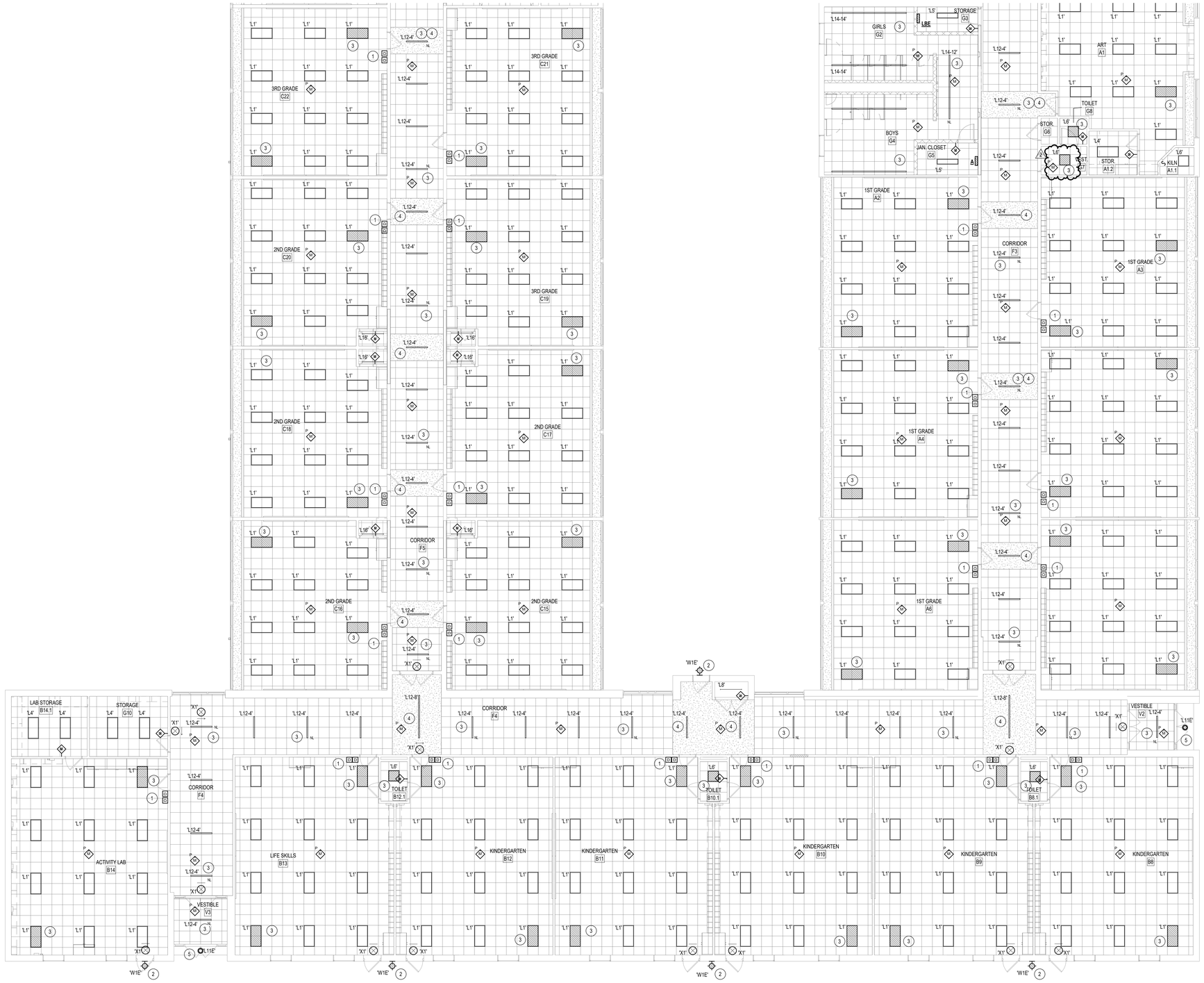
100% CONSTRUCTION DOCUMENTS

CDG PROJECT:	#21102B
DATE:	04.06.2022
DRAWN BY:	KTS

FIRST FLOOR LIGHTING PLAN - UNIT A

N
TRUE NORTH

EL101A



GENERAL SHEET NOTES

A. SEE SHEET E-000 FOR SYMBOLS AND ABBREVIATIONS.
B. SEE E-500 SERIES SHEETS FOR ELECTRICAL SCHEDULES.
C. SEE ED100 SERIES SHEETS FOR ELECTRICAL DEMOLITION PLANS.
D. COORDINATE INSTALLATION OF LIGHTING FIXTURES WITH ARCHITECTURAL REFLECTED CEILING PLANS, ARCHITECTURAL ELEVATIONS, MECHANICAL EQUIPMENT, DIFFUSERS, SUPPORTS, PIPING, DUCTWORK AND STRUCTURAL PLANS PRIOR TO ROUGH-IN AND INSTALLATION OF LIGHTS.
E. ALL MOUNTING HEIGHTS NOTED ON THE PLANS ARE TO THE BOTTOM OF THE FIXTURE UNLESS NOTED OTHERWISE.
F. LOCATE CEILING MOUNTED OCCUPANCY SENSORS TO PROVIDE COMPLETE AREA COVERAGE OF THE SPACE THEY ARE INSTALLED IN. SELECT PROPER SENSOR COVERAGE PATTERN FROM MANUFACTURER'S PRODUCT DATA TO DETERMINE COVERAGE. ADDITIONAL SENSORS REQUIRED DUE TO LACK OF COVERAGE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND THE MANUFACTURER. SENSORS SHALL INCLUDE ALL POWER SUPPLIES AND RELAYS NECESSARY FOR PROPER OPERATION.
G. WIRING SYSTEM SHALL BE CONDUIT AND CONDUCTOR UNLESS NOTED OTHERWISE. USE SOLID CONDUCTOR FOR SIZE #10 AWG AND SMALLER. USE STRANDED CONDUCTOR FOR LARGER SIZES.
H. ALL COVER PLATES FOR ELECTRICAL DEVICES SHALL BE OF A COLOR TO MATCH THE AREA COLOR SCHEME AS DIRECTED BY THE INTERIOR DESIGNER.
I. LABEL ALL RELAYS AND POWER SUPPLIES (ON THE DEVICE OR ON THE BOX THEY ARE CONNECTED TO) WITH THE AREA THE DEVICES SERVES, THE BRANCH CIRCUIT IT CONTROLS AND THE DEVICE ADDRESS (IF APPLICABLE).
J. EMERGENCY LIGHTING SHOWN ON THIS DRAWING INDICATES CODE REQUIRED EMERGENCY LIGHTING FED FROM THE 'EMERGENCY BRANCH' OF THE ESSENTIAL ELECTRICAL SYSTEM.
K. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS, ROOM AND AREA FINISHES, CEILING PLANS, DOOR SWINGS, FIRE-RATED PARTITIONS, CABINET AND CASEWORK AND BUILT-IN DETAILS.
L. ALL WORK SHALL COMPLY WITH ALL NATIONAL, STATE AND LOCAL CODES AND ORDINANCES PERTAINING TO THE WORK IN THIS PROJECT.
M. EXPOSED CONDUIT SHALL BE RUN PARALLEL TO AND AT RIGHT ANGLES TO BUILDING LINES.
N. REFER TO ARCHITECTURAL DRAWINGS FOR DESIGNATION AND LISTING OF FIRE RATED ASSEMBLIES. COORDINATE ALL DESIGN EFFORTS WITH FIRE RESISTANCE OF MATERIALS AND CONSTRUCTION.
O. ALL EXTERIOR EQUIPMENT AND DEVICES SHALL BE WEATHER PROOF AND RAIN TIGHT.
P. CONNECT ALL NEW LIGHTING TO EXISTING CIRCUITS PRESENTLY SERVING THE RESPECTIVE ROOM OR SPACE.

SHEET PLAN NOTES

1 SET OF (2) WALL BOX DIMMERS (1) TO CONTROL LIGHTING AT FRONT OF ROOM/WHITEBOARD AND (1) TO CONTROL GENERAL ILLUMINATION. EC SHALL VERIFY WHICH SIDE OF ROOM IS CONSIDERED 'FRONT' AND WIRE DIMMERS ACCORDINGLY.
2 MOUNT LIGHT FIXTURE AT 9'-0" AFG TO BOTTOM OF LIGHT FIXTURE. CONNECT TO EXISTING BUILDING MOUNTED CIRCUITRY AND CONTROLS.
3 PROVIDE BODINE GTD 20A GENERATOR TRANSFER DEVICE OR EQUAL PRODUCT AS APPROVED BY ENGINEER FOR LIGHTING LOAD. FIXTURE CONNECTED NORMALLY TO LOCAL CIRCUIT. PROVIDE CIRCUIT FROM EMERGENCY PANEL EME ALONG WITH UNSWITCHED CIRCUIT. MINIMUM WIRE SIZE 2 #12 COPPER W/ #12 GND. SIZE WIRE AS REQUIRED FOR VOLTAGE DROP.
4 PROVIDE SPACKLE FLANGE MOUNTING HARDWARE FOR MOUNTING FIXTURE IN HARD CEILING.
5 EC TO VERIFY APERATRE OF ALL EXISTING DOWNLIGHTS. EC RESPONSIBLE FOR FIELD VERIFICATION.

1 FIRST FLOOR LIGHTING PLAN - UNIT B
1/8" = 1'-0"
0 4' 8' 16'

LANCER + BEEBE, LLC
ARCHITECTURE | PLANNING | INTERIORS
220 N. COLLEGE AVE
INDIANAPOLIS, IN 46202

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REVISIONS:

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2	04/26/202	Addendum #2

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CDG PROJECT: #21102B
DATE: 04.06.2022
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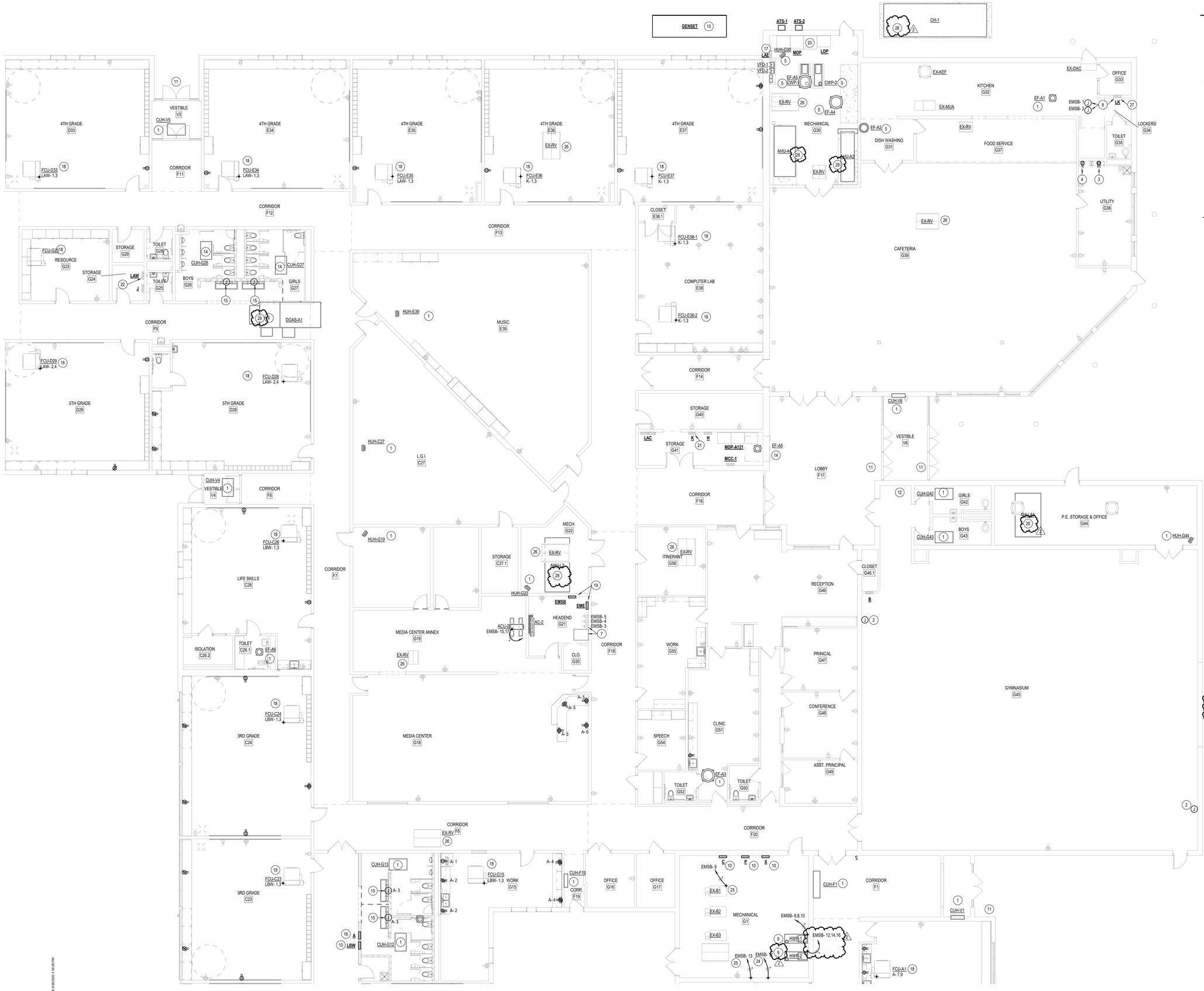
FIRST FLOOR LIGHTING PLAN - UNIT B

N
TRUE NORTH

EL101B

PLOT DATE/TIME 4/25/2022 11:55:54 AM



1 FIRST FLOOR POWER PLAN - UNIT A
1/8" = 1'-0"
0 4' 8' 16'

GENERAL SHEET NOTES

A. SEE SHEET E-000 FOR SYMBOLS AND ABBREVIATIONS.
B. SEE SHEET E-401 FOR ONE-LINE DIAGRAM.
C. SEE SHEET E-502 FOR MOTORIZED EQUIPMENT SCHEDULE AND PANEL SCHEDULES.
D. SEE SHEETS E-601 AND E-602 FOR ELECTRICAL DETAILS.
E. WIRING SYSTEM SHALL BE CONDUIT AND CONDUCTOR UNLESS NOTED OTHERWISE. USE SOLID CONDUCTOR FOR SIZE #10 AWG AND SMALLER. USE STRANDED CONDUCTOR FOR LARGER SIZES.
F. ALL COVER PLATES FOR ELECTRICAL DEVICES SHALL BE OF A COLOR TO MATCH THE AREA COLOR SCHEME AS DIRECTED BY THE INTERIOR DESIGNER.
G. ALL WORK SHALL COMPLY WITH ALL NATIONAL, STATE AND LOCAL CODES AND ORDINANCES PERTAINING TO THE WORK IN THIS PROJECT.
H. EXPOSED CONDUIT SHALL BE RUN PARALLEL TO AND AT RIGHT ANGLES TO BUILDING LINES.
I. REFER TO ARCHITECTURAL DRAWINGS FOR DESIGNATION AND LISTING OF FIRE RATED ASSEMBLIES. COORDINATE ALL DESIGN EFFORTS WITH FIRE RESISTANCE OF MATERIALS AND CONSTRUCTION.
J. ALL EXTERIOR EQUIPMENT AND DEVICES SHALL BE WEATHER PROOF AND RAIN TIGHT.
K. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL INTERCONNECT WIRING FOR MECHANICAL AND PLUMBING EQUIPMENT FURNISHED BY OTHERS.
L. REPLACE ALL WIRING DEVICES AND COVER PLATES IN CLASSROOMS WITH NEW.
M. CONNECT NEW WIRING DEVICES IN CLASSROOMS TO NEAREST AVAILABLE CIRCUIT WITH AVAILABLE AMPACITY UNLESS OTHERWISE NOTED. SURFACE MOUNT NEW DEVICES AS REQUIRED. WIREMOLD 4000 SERIES RACEWAY OR APPROVED EQUIVALENT.
N. DASHED CIRCLES AND X'S DENOTE PRIMARY AND SECONDARY TEACHER'S DESK LOCATIONS. CIRCLE IS PRIMARY LOCATION AND 'X' IS SECONDARY LOCATION. POWER IS REQUIRED AT THESE LOCATIONS AS SHOWN.

SHEET PLAN NOTES

1 EXTEND EXISTING CIRCUITRY AS REQUIRED FROM DEMOLISHED MECHANICAL UNIT TO CONNECT TO NEW UNIT.
2 SCOREBOARDS: PROVIDE POWER FOR (2) LED SCOREBOARDS PER MANUFACTURERS INSTRUCTIONS. CONFIRM EXACT LOCATIONS WITH ARCHITECT PRIOR TO ROUGH IN.
3 FURNISH AND INSTALL 14-30R TYPE RECEPTACLE FOR DRYER. POWER FROM NEW 30A/2P 208V BREAKER IN PANEL LK.
4 FURNISH AND INSTALL DEDICATED 20A RECEPTACLE FOR WASHER. POWER FROM SPARE 20A/1P 120V BREAKER IN PANEL LK.
5 RECONNECT EXISTING CIRCUITRY TO NEW MECHANICAL UNIT.
6 EQUIPMENT IS LOCATED ON ROOF. CONNECT NEW UNIT TO EXISTING CIRCUITRY. EXTEND CIRCUITRY AS REQUIRED. MATCH EXISTING WIRE SIZE.
7 EXISTING I.T. EQUIPMENT TO BE POWERED BY NEW STANDBY POWER PANEL EMSB. PROVIDE (3) DEDICATED 120V/1P CIRCUIT TO EQUIPMENT. NEW RECEPTACLES ARE SHOWN FOR REFERENCE. POWER EXISTING EQUIPMENT AND RECEPTACLES AS REQUIRED.
8 KITCHEN FREEZER & REFRIGERATOR TO BE POWERED BY NEW STANDBY POWER PANEL. DISCONNECT FREEZER AND REFRIGERATOR FROM PANEL LK AND CONNECT TO PANEL EMSB. MATCH EXISTING CIRCUIT SIZE. COORDINATE SPECIFIC FRIDGE AND FREEZER WITH OWNER.
9 PUMP TO BE POWERED BY NEW STANDBY POWER PANEL EMSB. SEE MOTORIZED EQUIPMENT SCHEDULE FOR CIRCUIT SIZING.
10 REPLACE DEMOLISHED PANELBOARD. MATCH EXISTING BREAKER SIZES. PANEL CONTAINS 8 SPARE 20A/1P BREAKERS. USE SPARES TO FEED NEW FAN COIL UNITS AS REQUIRED. EXTEND FEEDER AS REQUIRED WITH SAME WIRE SIZE. RECONNECT EXISTING CIRCUITRY TO NEW PANELBOARD. SEE PANELBOARD SIZES ON E-401.
11 PROVIDE 120V/1PH CIRCUIT TO DOOR CONTROLLER FOR DOOR FROM NEAREST AVAILABLE 120V CIRCUIT WITH AVAILABLE AMPACITY. MINIMUM WIRE SIZE #12.
12 PROVIDE DEDICATED 120V/1P CIRCUIT FROM PANEL B TO ADA PUSHBUTTONS. MINIMUM WIRE SIZE #12.
13 SEE E-401 FOR GENERATOR SIZE AND RATIGS. GENERATOR TO BE CONNECTED TO NATURAL GAS UTILITY. PROVIDE 60A/3P CIRCUIT TO GENERATOR FROM PANEL LAE IN MECHANICAL ROOM. WIRE SIZE TO BE #6 W/ #10 GND IN 1"C.
14 PROVIDE 120V/1P EQUIPMENT FROM NEAREST AVAILABLE UNSWITCHED CIRCUIT WITH AVAILABLE AMPACITY. MINIMUM WIRE SIZE #12.
15 PROVIDE 120V/1P CIRCUIT TO LAVATORY STATION. COORDINATE FINAL JUNCTION BOX LOCATION WITH LAVATORY SHOP DRAWINGS. MINIMUM WIRE SIZE #12.
16 REPLACE DEMOLISHED PANELBOARD. MATCH EXISTING BREAKER SIZES. EXTEND FEEDER AS REQUIRED WITH SAME WIRE SIZE. RECONNECT EXISTING CIRCUITRY TO NEW PANELBOARD. NOTE NEW CIRCUITS REQUIRED IN WORK ROOM G15.
17 FURNISH AND INSTALL 60A/3P BREAKER IN PANEL LAE FOR GENERATOR ON-BOARD PANEL.
18 PROVIDE 208V/1P CIRCUIT TO UNIT FROM NEAREST AVAILABLE PANEL. NEW BREAKERS TO BE INSTALLED IN PANELS TO ACCOMODATE 208V/1P UNITS. MINIMUM WIRE SIZE 2#12 W/ #12 GND IN 3/4" CONDUIT. RE-USE EXISTING CONDUIT AS POSSIBLE. NEW FAN COIL UNITS HAVE LARGER HORSEPOWER THAN EXISTING DEMOLISHED UNITS. (4) FAN COIL UNITS PER 20A, 208V/1P CIRCUIT BREAKER. PANEL AND CIRCUIT NUMBERING ARE SHOWN FOR SUGGESTED GROUPING PURPOSES ONLY.
19 FURNISH AND INSTALL NEW EMERGENCY EGRESS AND EMERGENCY STANDBY PANELS. SEE E-502 FOR PANEL SCHEDULES.
20 FURNISH AND INSTALL SWITCHED BUCKETS IN MDP FOR PANEL EME AND EMSB. SEE E-401 FOR SWITCH AND FUSE SIZING. CORE WALL AS REQUIRED TO CONNECT TO AUTOMATIC TRANSFER SWITCHES.
21 FURNISH AND INSTALL NEW 20A, 208V/1P BREAKERS IN PANEL TO FEED NEW FAN COIL UNITS. ADJUST BREAKERS IN PANEL AS REQUIRED TO FIT NEW BREAKERS. (4) FAN COIL UNITS PER BREAKER. PANEL CONTAINS 4 SPARES/SPACES.
22 FURNISH AND INSTALL NEW 20A, 208V/1P BREAKERS IN PANEL TO FEED NEW FAN COIL UNITS. ADJUST BREAKERS IN PANEL AS REQUIRED TO FIT NEW BREAKERS. (4) FAN COIL UNITS PER BREAKER. PANEL CONTAINS 2 SPARES/SPACES.
23 EXISTING BOILER TO BE POWERED BY NEW STANDBY POWER PANEL EMSB. MINIMUM WIRE SIZE 2#12 W #12 GND IN 3/4" C.
24 PROVIDE CIRCUIT TO NEW HOT WATER CONTROL PANEL FROM PANEL EMSB. COORDINATE FINAL CONTROL PANEL LOCATION WITH TEMPERATURE CONTROLS CONTRACTOR. MINIMUM WIRE SIZE 2#12 W #12 GND IN 3/4" C.
25 PROVIDE CIRCUIT TO NEW BUILDING AUTOMATION SYSTEM CONTROL PANEL FROM PANEL EMSB. COORDINATE FINAL CONTROL PANEL LOCATION WITH TEMPERATURE CONTROLS CONTRACTOR. MINIMUM WIRE SIZE 2#12 W #12 GND IN 3/4" C.
26 PROVIDE 120V/1P CIRCUIT FROM NEAREST AVAILABLE UNSWITCHED CIRCUIT WITH AVAILABLE AMPACITY FOR NEW MOTORIZED GRAVITY DAMPER ON ROOF. COORDINATE GRAVITY DAMPER REPLACEMENT WITH MECHANICAL CONTRACTOR. MINIMUM WIRE SIZE #12.
27 FURNISH AND INSTALL NEW 30A/2P 208V BREAKER TO FEED NEW DRYER IN
28 FURNISH AND INSTALL NEW BREAKER SIZED ACCORDING TO MOTORIZED EQUIPMENT SCHEDULE ON E-501 IN PANEL WHICH SERVES UNIT. RECONNECT EXISTING FEEDER TO NEW MECHANICAL UNIT. EXTEND CIRCUITRY AS REQUIRED.

LANCER + BEEBE, LLC
ARCHITECTURE | PLANNING | INTERIORS
220 N. COLLEGE AVE
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REVISIONS:

#	Date	Desc
1	04/20/2022	Addendum #1
2	04/26/2022	Addendum #2

100% CONSTRUCTION DOCUMENTS

CDG PROJECT: #21102B
DATE: 04.06.2022
DRAWN BY: KTS

FIRST FLOOR POWER PLAN - UNIT A

N
TRUE NORTH

EP101A

PLOT DATE/TIME: 4/26/2022 4:06:06 PM

LANCER + BEBE, LLC
ARCHITECTURE | PLANNING | INTERIORS
220 N. COLLEGE AVE
INDIANAPOLIS, IN 46202

CIRCLE DESIGN GROUP

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LOPER ELEMENTARY RENOVATIONS & ADDITIONS
901 LOPER DRIVE

GENERAL SHEET NOTES

A. SEE SHEET E-000 FOR SYMBOLS AND ABBREVIATIONS.
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G. ALL WORK SHALL COMPLY WITH ALL NATIONAL, STATE AND LOCAL CODES AND ORDINANCES PERTAINING TO THE WORK IN THIS PROJECT.
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I. REFER TO ARCHITECTURAL DRAWINGS FOR DESIGNATION AND LISTING OF FIRE RATED ASSEMBLIES. COORDINATE ALL DESIGN EFFORTS WITH FIRE RESISTANCE OF MATERIALS AND CONSTRUCTION.
J. ALL EXTERIOR EQUIPMENT AND DEVICES SHALL BE WEATHER PROOF AND RAIN TIGHT.
K. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL INTERCONNECT WIRING FOR MECHANICAL AND PLUMBING EQUIPMENT FURNISHED BY OTHERS.
L. REPLACE ALL WIRING DEVICES AND COVER PLATES IN CLASSROOMS WTH NEW.
M. CONNECT NEW WIRING DEVICES IN CLASSROOMS TO NEAREST AVAILABLE CIRCUIT WITH AVAILABLE AMPACITY UNLESS OTHERWISE NOTED. SURFACE MOUNT NEW DEVICES AS REQUIRED. WIREMOLD 4000 SERIES RACEWAY OR APPROVED EQUIVALENT.
N. DASHED CIRCLES AND X'S DENOTE PRIMARY AND SECONDARY TEACHER'S DESK LOCATIONS. CIRCLE IS PRIMARY LOCATION AND 'X' IS SECONDARY LOCATION. POWER IS REQUIRED AT THESE LOCATIONS AS SHOWN.

SHEET PLAN NOTES

1 EXTEND EXISTING CIRCUITRY AS REQUIRED FROM DEMOLISHED MECHANICAL UNIT TO CONNECT TO NEW UNIT.
2 REPLACE DEMOLISHED PANELBOARD. MATCH EXISTING BREAKER SIZES. RECONNECT EXISTING CIRCUITRY TO NEW PANELBOARD. NOTE ANY NEW REQUIRED CIRUITS SHOWN ON THE FLOOR PLANS.
3 EQUIPMENT LOCATED ON ROOF.
4 NEW RECEPTACLES TO BE MOUNTED IN SURFACED MOUNTED RACEWAY. WIREMOLD 4000 OR APPROVED EQUIVALENT.
5 PROVIDE 120V/1PH CIRCUIT TO DOOR CONTROLLER FOR DOOR FROM NEAREST AVAILABLE 120V CIRCUIT WITH AVAILABLE AMPACITY. MINIMUM WIRE SIZE #12.
6 PROVIDE 208V/1P CIRCUIT TO UNIT FROM NEAREST AVAILABLE PANEL. NEW BREAKERS TO BE INSTALLED IN PANELS TO ACCOMODATE 208V/1P UNITS. MINIMUM WIRE SIZE 2#12 W/ #12 GND IN 3/4" CONDUIT. RE-USE EXISTING CONDUIT AS POSSIBLE. NEW FAN COIL UNITS HAVE LARGER HORSEPOWER THAN EXISTING DEMOLISHED UNITS. (4) FAN COIL UNITS PER 20A, 208V/1P CIRCUIT BREAKER. PANEL AND CIRCUIT NUMBERING ARE SHOWN FOR SUGGESTED GROUPING PURPOSES ONLY.
7 PROVIDE 120V/1P CIRCUIT TO LAVATORY STATION. COORDINATE FINAL JUNCTION BOX LOCATION WITH LAVATORY SHOP DRAWINGS. MINIMUM WIRE SIZE #12.
8 PROVIDE CIRCUIT FROM STANDBY POWER PANEL FOR DATA CLOSET.
9 PROVIDE NEW 208V/1P CIRCUIT TO ACU-1 FROM PANEL LSB. MINIMUM WIRE SIZE #12.
10 INDOOR UNIT POWER FROM OUTDOOR UNIT.
11 FURNISH AND INSTALL NEW 20A, 208V/1P BREAKERS IN PANEL TO FEED NEW FAN COIL UNITS. (4) FAN COIL UNITS PER BREAKER. PROVIDE (3) NEW 20A, 208V/1P BREAKERS IN ADDITION TO MATCHING EXISTING BRANCH CIRCUIT BREAKERS FOR NEAREST NEW FAN COIL UNITS.
12 FURNISH AND INSTALL NEW 20A, 208V/1P BREAKERS IN PANEL TO FEED NEW FAN COIL UNITS. ADJUST BREAKERS IN PANEL AS REQUIRED TO FIT NEW BREAKERS. (4) FAN COIL UNITS PER BREAKER. PANEL CONTAINS 6 SPARES/SPACES.
13 FURNISH AND INSTALL NEW BREAKER SIZED ACCORDING TO MOTORIZED EQUIPMENT SCHEUDLE ON E-501 IN PANEL WHICH SERVES UNIT. RECONNECT EXISTING FEEDER TO NEW MECHANICAL UNIT. EXTEND CIRCUITRY AS REQUIRED.

2

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

#	Date	Desc.
2	04/26/2022	Addendum #2

REVISIONS:

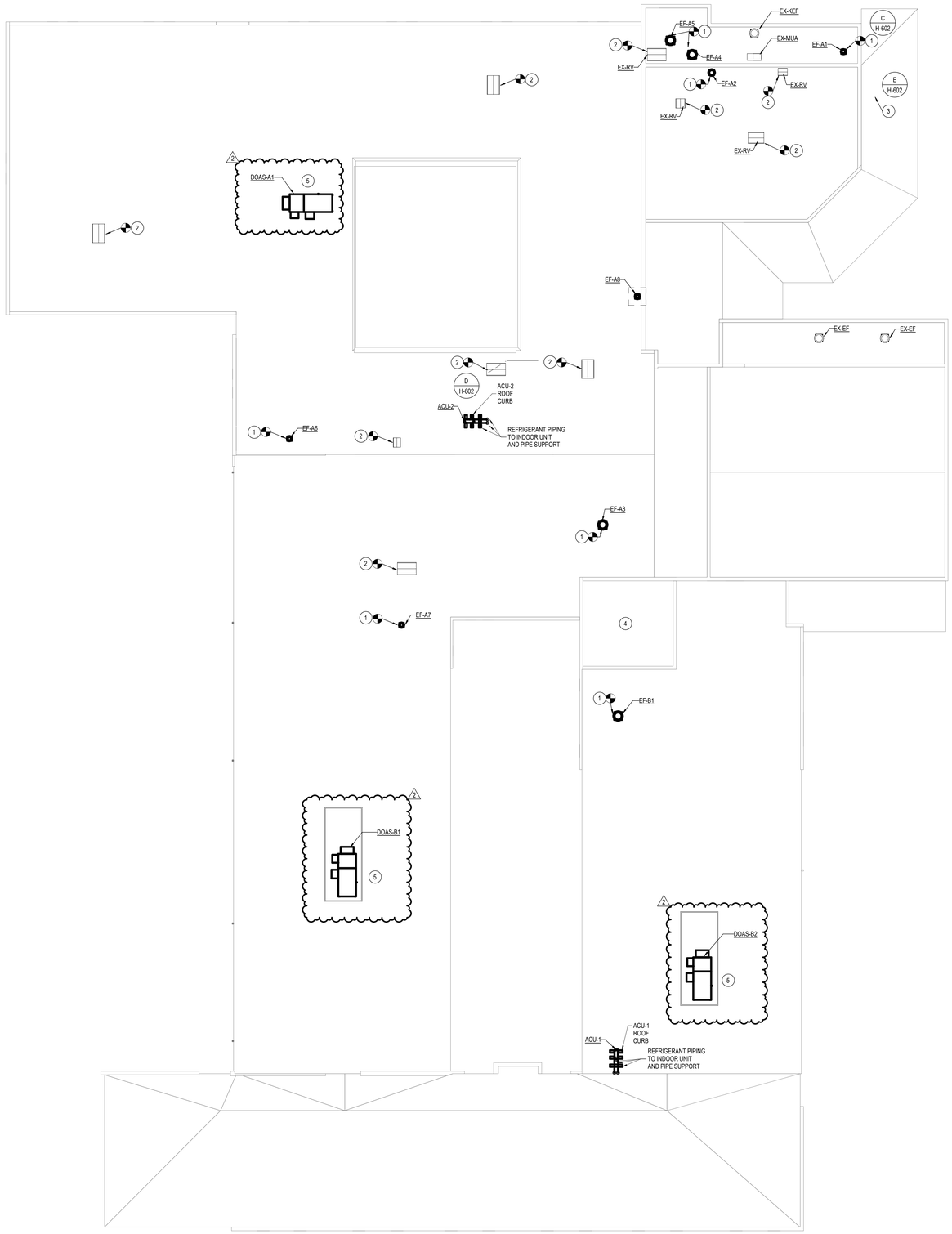
100% CONSTRUCTION DOCUMENTS

CDG PROJECT: #21102B
DATE: 04.06.2022
DRAWN BY: KTS

FIRST FLOOR POWER PLAN - UNIT B

N
TRUE NORTH

EP101B



1 OVERALL HVAC ROOF PLAN
1/16" = 1'-0"

0 8' 16' 32'

N

GENERAL MECHANICAL NOTES:

A. REFERENCE SHEET M-000 FOR MECHANICAL SYMBOLS, LEGENDS, ABBREVIATIONS AND ADDITIONAL GENERAL NOTES.
B. ALL NEW HORIZONTAL 4 PIPE FAN COIL UNITS ARE LOCATED ABOVE NEW LAY-IN CEILING.
C. ALL FAN COIL UNITS SHALL UTILIZE A FILTERED RETURN GRILLE IN NEW CEILING WITH HINGED ACCESS DOOR.
D. ALL PNEUMATIC CONTROLS, TUBING, AND ASSOCIATED APPURTENANCES TO BE REMOVED AND REPLACED WITH NEW DDC CONTROLS.
E. ALL FAN COIL UNITS ARE TO BE INSTALLED WITH PERFORATED FACE FILTER RETURN GRILLES.

SHEET PLAN NOTES

1 CONNECT NEW EXHAUST FAN INTO EXISTING EXHAUST DUCT (SEE FLOOR PLANS). MOUNT EXHAUST FANS ON ROOF CURB AS PER DETAIL.
2 PROVIDE NEW MOTORIZED DAMPER WITHIN EXISTING ROOF CURB, VERIFYING SIZE PRIOR TO SUBMITTING/ORDERING. INSTALL EXISTING GRAVITY VENTILATOR ATOP EXISTING CURB ONCE MOTORIZED DAMPER INSTALLATION IS COMPLETE. SEAL GRAVITY VENTILATOR TO EXISTING CURB WEATHER TIGHT.
3 4" DRYER EXHAUST DUCT UP THROUGH ROOF. TERMINATE WITH GOOSE NECK EXHAUST VENT.
4 EXISTING MECHANICAL ROOF EQUIPMENT ABOVE MECH ROOM G1 TO REMAIN. NO WORK IS THIS PROJECT.
5 LOCATE NEW UNIT AT EXISTING LOCATION. PROVIDE WITH SOLID BOTTOM ROOF CURB ADAPTER WITH SEPARATE SUPPLY AND RETURN PLENUMS TO ALLOW FOR REUSE OF EXISTING DUCT CONNECTIONS. FIELD VERIFY EXACT DIMENSIONS PRIOR TO BID.

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ARCHITECTURE | PLANNING | INTERIORS
220 N. COLLEGE AVE
INDIANAPOLIS, IN 46202

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SHELBYVILLE CENTRAL SCHOOLS
CORPORATION
LOPER ELEMENTARY RENOVATIONS & ADDITIONS
901 LOPER DRIVE

I HEREBY CERTIFY THAT I AM A REGISTERED ARCHITECT IN THE STATE OF INDIANA
No. 11700201 STATE OF INDIANA
DATE SIGNED 04/06/22
DATE EXPIRES 07/31/22

REVISIONS:

#	Date	Desc.
2	04.29.2022	ADDENDUM #2

100% CONSTRUCTION DOCUMENTS

CDG PROJECT: #21102B
DATE: 04.06.2022
DRAWN BY: Author

OVERALL HVAC ROOF PLAN

N
TRUE NORTH

H-102

PLOT DATE/TIME: 4/26/2022 4:19:59 PM

AIR TO AIR ENERGY RECOVERY UNIT SCHEDULE

MARK	LOCATION	AIR CAPACITY		SUMMER DESIGN CONDITIONS					WINTER DESIGN CONDITIONS						SUPPLY FAN DATA							RETURN FAN DATA (EA)							FILTER DATA				HYDRONIC COOLING COIL SELECTION DATA									HYDRONIC REHEAT COIL SELECTION DATA								ELECTRICAL DATA				UNIT WEIGHT (LBS.)	MANUFACTURER WITH MODEL NUMBER	NOTES
		SUPPLY CFM	EXHAUST CFM	EAT		LAT		ENTHALPY RECOVERY RATIO (%)	EAT		LAT		ENTHALPY RECOVERY RATIO (%)	TOTAL EA WHEEL EFFECTIVE	TYPE	ESP	TSP	BHP	RPM	MOTOR			TYPE	ESP	TSP	BHP	RPM	MOTOR		PRE-FILTER		FINAL FILTER		TOTAL MBH	SENS MBH	EAT		LAT		ROWS	FINS/ INCH	MAX APD	MAX VEL	EWT	GPM	MAX WPD	MIN MBH	EAT	LAT	ROWS	FINS/ INCH	MAX APD	MAX VEL	EWT	GPM	MAX WPD	MCA	MOCP	VOLTS	PH			
				DB	WB	DB	WB		DB	WB	DB	WB							HP	VOLTS	PH						HP	VOLTS	PH	TYPE	MERV	TYPE	MERV			DB	WB	DB	WB																							
DOAS-A1	UNIT A ROOF	4600	4150	95	76	81.0	67.5	72.9	77.4	-10	-11	44.4	39.4	68.2	77.4	PLENUM	2	3.269	3.71	1760	5	208	3	PLENUM	2	2.844	3.1	1760	5	208	3	2"	8	2"	13	197.5	136.9	81	67.5	54	53.6	4	10	0.229	245	42	28.1	3	193.1	44.4	83.2	2	10	0.045	265	130	13	0.5	87.2	90	208	3	3477	VALENT VXE-212-58-40H	1,2,3,4,5
DOAS-B1	UNIT B ROOF	5350	4100	95	76	82.8	68.7	64.4	79.5	-10	-11	37.5	34.4	59.5	79.5	PLENUM	2	3.561	4.7	1770	7.5	208	3	PLENUM	2	2.833	3.04	1760	5	208	3	2"	8	2"	13	241.1	164.5	82.8	68.7	54.8	54.4	4	10	0.282	285	42	34.3	4.5	236.9	37.5	78.4	2	10	0.056	308	130	16	0.7	95.4	100	208	3	3524	VALENT VXE-212-58-40H	1,2,3,4,5
DOAS-B2	UNIT B ROOF	4850	3400	95	76	83.6	69.1	61	81.2	-10	-11	34.4	32.1	55.8	81.2	PLENUM	2	3.365	4.02	1760	5	208	3	PLENUM	2	2.685	2.36	1760	5	208	3	2"	8	2"	13	233.3	156.3	83.6	69.1	54.3	54	4	10	0.248	260	42	33.2	4.2	232	34.4	78.6	2	10	0.048	280	130	100	0.7	87.2	90	208	3	3477	VALENT VXE-212-58-40H	1,2,3,4,5

NOTES:

1. FACTORY PROVIDED DDC CONTROLLER.
2. FACTORY PROVIDED DISCONNECT FOR SINGLE POINT POWER AND INTEGRAL VFD'S FOR THE SUPPLY FAN, EXHAUST FAN, AND ENERGY RECOVERY WHEEL.
3. CONTROLS CONTRACTOR TO PROVIDE HOT AND CHILLED WATER VALVES AND WIRE TO UNIT DDC CONTROLLER.
4. UNIT PROVIDED WITH ALUMINUM 3A WHEEL, ELECTRIC PREHEATER UPSTREAM OF WHEEL FOR DEFROST, AND TEMPERATURE SENSOR BETWEEN ENERGY RECOVERY WHEEL AND COOLING COIL.
5. PROVIDE SOLID BOTTOM ROOF CURB ADAPTOR WITH SEPARATE SUPPLY AND RETURN PLENUMS TO ALLOW EXISTING SUPPLY AND RETURN DUCT RISERS TO BE REUSED.

AIR HANDLING UNIT SCHEDULE

MARK	LOCATION	AIR CAPACITY			SUPPLY FAN DATA							FILTER DATA				HYDRONIC COOLING COIL SELECTION DATA								HYDRONIC HEATING COIL SELECTION DATA								ELECTRICAL DATA				UNIT WEIGHT (LBS.)	MANUFACTURER WITH MODEL NUMBER	NOTES
		SUPPLY CFM	MIN. CFM	MIN OA CFM	TYPE	ESP	TSP	BHP	RPM	MOTOR			PRE-FILTER		FINAL FILTER		TOTAL MBH	SENS MBH	EAT		LAT		ROWS	FINS/ INCH	MAX APD	MAX VEL	EWT	GPM	MAX WPD	MIN MBH	EAT	LAT	ROWS	FINS/ INCH	MAX APD	MAX VEL	EWT	GPM	MAX WPD	MCA	MOCP	VOLTS	PH			
										HP	VOLTS	PH	TYPE	MERV	TYPE	MERV			DB	WB	DB	WB																							
AHU-A1	MECH G30	4630	-	2100	DIRECT	1.5	5.84	6.5	3344	7.5	208	3	2" MINIHELIC	8	2" MINIHELIC	14	226	145	85.3	70.3	55	54.3	5	10	0.81	503	42	32.3	6.4	340	30.9	95.7	3	12	0.43	503	130	23	3.5	21.8	35	208	3	2250	PACE PAI-39x57	1,2
AHU-A2	MECH G30	1715	-	150	DIRECT	1.5	4.62	1.88	2959	3	208	3	2" MINIHELIC	8	2" MINIHELIC	14	53	46	80.5	63.9	54.9	53	4	11	0.49	440	42	7.5	3	71	59.1	97.5	3	10	0.26	440	130	4.8	0.8	10	17.5	208	3	1565	PACE PAI-33x36	1,3
AHU-A3	PE STORAGE & OFFICE G44	5000	-	2250	DIRECT	1.5	5.15	6.53	3208	7.5	208	3	2" MINIHELIC	8	2" MINIHELIC	14	249	160	85.4	70.2	54.8	53.9	4	12	0.80	472	42	35.4	7.6	381	30.9	98.2	3	12	0.39	472	130	25.9	5.7	23	40	208	3	3401	PACE PAI-39x57	1,3
AHU-L2	MECH G22	9000	-	1860	DIRECT	1.5	4.94	5.81	3431	7.5	208	3	2" MINIHELIC	8	2" MINIHELIC	14	329	253	81.8	66.1	54.9	53.6	5	9	0.64	506	42	46.8	5.7	399	55	96	3	10	0.33	506	130	27.1	3.3	21.8	35	208	3	2859	PACE PAI-57x66	1,2

NOTES:

1. 100% ECONOMIZER MODE OPTION.
2. UNIT PROVIDED WITH FUSED DISCONNECT SWITCH.
3. DISCONNECT SWITCH AND VFD TO BE FIELD PROVIDED.

GRILLE AND DIFFUSER SCHEDULE

DRAWING LEGEND

DIFFUSER: TYPE / CFM / NECK SIZE — GRILLE: TYPE / CFM / SIZE — SLOT/LINEAR DIFFUSER: TYPE / CFM / NO. OF SLOTS - LENGTH — LINEAR BAR DIFFUSER: TYPE / CFM / WIDTH - LENGTH

TYPE	DESCRIPTION	SPECIAL NOTES & FINISHES
B	24"X24" SQUARE CONE CEILING DIFFUSER	
C	12"X12" SQUARE PLAQUE SUPPLY	ROUND NECK
D	24" X 24" SQUARE PLAQUE CEILING DIFFUSER	ROUND NECK
FR	FILTER RETURN GRILLE	
G	LOUVERED RETURN GRILLE	
H	LOUVERED EXHAUST GRILLE	OPPOSED BLADE DAMPER
K	PLENUM SLOT DIFFUSER	
R	SQUARE RETURN GRILLE	ALUMINUM CONSTRUCTION
EX	EXISTING GRILLE/DIFFUSER	BALANCE TO CFM LISTED

AIR-COOLED CHILLER SCHEDULE

MARK	CAPACITY DATA													COMPRESSOR			CONDENSER DATA		ELECTRICAL DATA					UNIT WEIGHT (LBS)	MANUFACTURER WITH MODEL NUMBER	NOTES
	NAME	NOM. TONS	TONS	REFRIG.	IPLV	DESIGN EER	DESIGN AMB TEMP	EWT	LWT	GPM	MAX WPD	CAPACITY STEPS	FLUID	QTY	TONS EACH	RLA EA.	QTY FANS	FLA EA.	RATED KW	MCA	MOCP	VOLTS	PH			
CH-1	CHILLER NO.1	225	218.4	410A	17.57	10.10	95	56.0	42.0	372.4	9.39	-	WATER	6	37.5	139	12	7.6	259.5	959	1000	208	3	9,956	QUANTECH QTC3205THE17XFBS	1 THRU 8

NOTES

1. MOUNT REMOTE EVAPORATOR ON EXISTING CONCRETE HOUSEKEEPING PAD IN MECHANICAL ROOM.
2. SINGLE POINT POWER CONNECTION.
3. CHILLED WATER SYSTEM CONTAINS WATER.
4. UNIT MOUNTED ACROSS THE LINE STARTER.
5. COORDINATE POWER REQUIREMENTS WITH DIV.26.
6. UNIT SHALL HAVE FACTORY MOUNTED DDC CONTROLLER, NEOPRENE ISOLATION PADS, FLOW SWITCHES, CONTROL TRANSFORMER, LOW SOUND FANS WITH VFD CONTROL, COMPRESSOR SOUND BLANKETS, LOUVERED COIL GUARD, SCROLL-HERMETIC COMPRESSOR TYPE.
7. ADDITIONAL CHARGE BY CONTRACTOR PER MANUFACTURER'S RECOMMENDATIONS. INSULATE PIPING BETWEEN CHILLER AND REMOTE EVAPORATOR.
8. BACnet MS/TP CONTROLS INTERFACE CARD.

PUMP SCHEDULE

MARK	LOCATION	SYSTEM	TYPE	ENERGY EFFICIENCY RATINGS		DESIGN CAPACITY (GPM)	DESIGN CAPACITY (FT. HD)	MIN EFF.	PUMP DATA			MOTOR DATA					WEIGHT (LBS.)	MANUFACTURER WITH MODEL NUMBER	NOTES
				PUMP & MOTOR PEIcl	PUMP/MOTOR/DRIVE PEIvl				IMP SIZE (IN)	SUCT. (IN)	DISCH (IN)	HP	BHP	RPM	VOLTS	PH			
HWP-1	MECH G1	HEATING WATER	BASE MOUNTED END SUCTION	0.9	0.46	300	100	76.5	5.5	3	2.5	15	9.98	3550	208	3	346	BELL & GOSSETT e-1510 2.5AC	1
HWP-2	MECH G1	HEATING WATER	BASE MOUNTED END SUCTION	0.9	0.46	300	100	76.5	5.125	3	2.5	15	9.98	3550	208	3	346	BELL & GOSSETT e-1510 2.5AC	1
CWP-1	MECH G30	CHILLED WATER	BASE MOUNTED END SUCTION	0.9	0.46	410	125	79.6	6.5	3	2.5	20	16.2	3400	208	3	463	BELL & GOSSETT e-1510 2.5AC	1
CWP-2	MECH G30	CHILLED WATER	BASE MOUNTED END SUCTION	0.9	0.46	410	125	79.6	6.5	3	2.5	20	16.2	3400	208	3	463	BELL & GOSSETT e-1510 2.5AC	1

NOTES

1. VFD CONTROLS

HYDRONIC UNIT HEATER SCHEDULE

MARK	LOCATION	TYPE	FAN DATA		HYDRONIC HEATING COIL SELECTION DATA								ELECTRICAL DATA			ACCESSORIES		MANUFACTURER WITH MODEL NUMBER	NOTES
			CFM	RPM	MIN MBH	EAT	LAT	ROWS	MAX APD	EWT	GPM	MAX WPD	HP	VOLTS	PH	DISCONNECT SWITCH	WALL BRACKET		
HUH-C27	LGI C27	UNIT HEATER	1150	1075	60	60	113	-	-	130	6.8	2.6	1/6	120	1	YES	YES	MODINE HCH67	5,6
HUH-E39	MUSIC E39	UNIT HEATER	1150	1075	60	60	113	-	-	130	6.8	2.6	1/6	120	1	YES	YES	MODINE HCH67	5,6
CUH-F1	CORRIDOR F1	CABINET	450	-	1.5	70	149	2	-	130	2.5	-	0.25	120	1	YES	NO	MODINE CW004	1,2
CUH-F19	CORRIDOR F19	CABINET	140	-	0.5	70	156	2	-	130	2	-	0.25	120	1	YES	NO	MODINE CW002	1,2
CUH-G2	GIRLS G2	CABINET	450	-	1.5	70	149	2	-	130	2.5	-	0.25	120	1	YES	NO	MODINE CW004	1,4
CUH-G4	BOYS G4	CABINET	450	-	1.5	70	149	2	-	130	2.5	-	0.25	120	1	YES	NO	MODINE CW004	1,4
CUH-G12	GIRLS G12	CABINET	265	-	1	70	159	2	-	130	4	-	0.25	120	1	YES	NO	MODINE CW003	1,4
CUH-G13	BOYS G13	CABINET	265	-	1	70	159	2	-	130	4	-	0.25	120	1	YES	NO	MODINE CW003	1,4
HUH-G19	MEDIA CENTER ANNEX G19	UNIT HEATER	1150	1075	60	60	113	-	-	130	6.8	2.6	1/6	120	1	YES	YES	MODINE HCH67	5,6
HUH-G22	MECH G22	UNIT HEATER	450	1000	12	60	107	-	-	130	3.2	0.4	1/12	120	1	YES	YES	MODINE HSB47	5,6
CUH-G26	BOYS G26	CABINET	265	-	1	70	159	2	-	130	4	-	0.25	120	1	YES	NO	MODINE CW003	1,4
CUH-G27	GIRLS G27	CABINET	265	-	1	70	159	2	-	130	4	-	0.25	120	1	YES	NO	MODINE CW003	1,4
HUH-G30	MECH G30	UNIT HEATER	370	1550	21	60	113	-	-	130	2.2	4.9	1/25	120	1	YES	YES	MODINE HCH22	5,6
CUH-G42	GIRLS G42	CABINET	140	-	0.5	70	156	2	-	130	2	-	0.25	120	1	YES	NO	MODINE CW002	1,4
CUH-G43	BOYS G43	CABINET	140	-	0.5	70	156	2	-	130	2	-	0.25	120	1	YES	NO	MODINE CW002	1,4
HUH-G44	PE STORAGE G44	UNIT HEATER	370	1550	21	60	113	-	-	130	2.2	4.9	1/25	120	1	YES	YES	MODINE HCH22	5,6
CUH-V1	VESTIBULE V1	CABINET	140	-	2.1	70	156	2	-	130	2	-	0.25	120	1	YES	NO	MODINE CW002	1,2
CUH-V2	VESTIBULE V2	CABINET	140	-	3.6	70	156	2	-	130	2	-	0.25	120	1	YES	NO	MODINE CW002	1,3
CUH-V3	VESTIBULE V3	CABINET	140	-	3.6	70	156	2	-	130	2	-	0.25	120	1	YES	NO	MODINE CW002	1,3
CUH-V4	VESTIBULE V4	CABINET	150	-	2.1	70	110	1	-	130	0.5	-	0.25	120	1	YES	NO	MODINE CW002	1,4
CUH-V5	VESTIBULE V5	CABINET	140	-	3.8	70	156	2	-	130	2	-	0.25	120	1	YES	NO	MODINE CW002	1,2
CUH-V6	VESTIBULE V6	CABINET	265	-	7.5	70	159	2	-	130	4	-	0.25	120	1	YES	NO	MODINE CW003	1,3

NOTES

1. PROVIDE UNIT WITH EC MOTOR WITH THREE SPEED SWITCH OPTION.
2. WALL MOUNTED UNIT.
3. RECESSED WALL MOUNTED UNIT.
4. RECESSED CEILING MOUNTED UNIT.
5. HYDRONIC UNIT HEATER.
6. CFM VALUE IS ENTERING CFM.

FAN SCHEDULE

MARK	LOCATION	SERVES	FAN DATA							ELECTRICAL				MANUFACTURER-PROVIDED ACCESSORIES					UNIT WEIGHT (LBS)	MANUFACTURER WITH MODEL NUMBER	NOTES
			DESCRIPTION	DRIVE TYPE	CFM	ESP	BHP	RPM	SONES	HP	MCA	VOLTS	PH	ROOF CURB	DISCONNECT SWITCH	GRAVITY BACKDRAFT DAMPER	VIBRATION ISOLATORS	BIRD SCREEN			
EF-A1	UNIT A ROOF	G30 - RESTROOM	CENTRIFUGAL	DIRECT	150	0.5"	0.04	1175	5.1	1/4	-	115	1	YES	YES	YES	NO	YES	38	GREENHECK G-097-VG	1
EF-A3	UNIT A ROOF	G51 - CLINIC	CENTRIFUGAL	DIRECT	390	0.5"	0.07	1230	7.7	1/15	-	115	1	YES	YES	YES	NO	YES	29	GREENHECK G-090-D	1
EF-A4	UNIT A ROOF	G30 - MECHANICAL	CENTRIFUGAL	BELT	2000	0.5"	0.32	1295	7.2	1/3	-	115	1	YES	YES	YES	NO	YES	87	GREENHECK GB-180	1,3
EF-A5	UNIT A ROOF	G30 - MECHANICAL	CENTRIFUGAL	DIRECT	350	0.5"	0.07	1550	7.7	1/15	-	115	1	YES	YES	YES	NO	YES	29	GREENHECK G-090-D	1
EF-A6	UNIT A ROOF	C26 - LIFE SKILLS	CENTRIFUGAL	DIRECT	100	0.5"	0.03	1132	4.6	1/4	-	115	1	YES	YES	YES	NO	YES	38	GREENHECK G-097-VG	1
EF-A7	UNIT A ROOF	G12/G13 - RESTROOMS	CENTRIFUGAL	DIRECT	610	0.62	0.2	1725	11.3	1/4	-	115	1	YES	YES	YES	NO	YES	49	GREENHECK G-098-A	1
EF-A8	UNIT A ROOF	G41 - STORAGE	CENTRIFUGAL	DIRECT	75	0.2"	0.01	900	0.3	0.17 FLA	-	115	1	YES	YES	YES	NO	YES	12	GREENHECK SP-A90	1
EF-B1	UNIT B ROOF	G2/G4 - RESTROOMS	CENTRIFUGAL	BELT	750	0.5"	0.15	1280	6.3	1/4	-	115	1	YES	YES	YES	NO	YES	51	GREENHECK GB-100	1

NOTES:

1. PROVIDE BACNET CONTROLLER FOR INTEGRATION TO BMS AND UNIT MOUNTED SPEED CONTROLLER OPTION.
2. PROVIDE CONTROL INTERLOCK TO REFRIGERANT SENSOR.

HOT WATER REHEAT TERMINAL UNIT SCHEDULE

MARK	LOCATION	AIRFLOW DATA		UNIT INLET SIZE	MAX PRESS LOSS IN. WG	MAX DIS NC	HYDRONIC HEATING COIL DATA								MANUFACTURER WITH MODEL NUMBER	NOTES
		DESIGN CFM	MIN CFM	HEAT CFM			MIN MBH	EAT	LAT	ROWS	EWT	LWT	GPM	MAX WPD		
VAV-C27	L.G.I.	1700	510	1020	14"	0.45	25	42.7	55	93.6	3	130	100	2.8	0.6	TRANE VCWF 14	1
VAV-E39-1	MUSIC	1150	345	690	12"	0.44	25	26.6	55	90.5	3	130	100	1.8	0.6	TRANE VCWF 12	1
VAV-E39-2	MUSIC	1150	345	690	12"	0.44	25	26.6	55	90.5	3	130	100	1.8	0.6	TRANE VCWF 12	1
VAV-G18	MEDIA CENTER	1300	390	780	14"	0.29	25	34.9	55	96.2	3	130	100	2.3	0.6	TRANE VCWF 14	1
VAV-G19	MEDIA CENTER ANNEX	1300	390	780	14"	0.29	25	34.9	55	96.2	3	130	100	2.3	0.6	TRANE VCWF 14	1
VAV-G46	RECEPTION	480	240	290	8"	0.39	25	10.7	55	89	3	130	100	0.8	0.6	TRANE VCWF 8	1
VAV-G47	PRINCIPAL	130	70	80	4"	0.04	25	3.3	55	92.7	1	130	100	0.5	0.6	TRANE VCWF 4	1
VAV-G48	CONFERENCE	225	115	135	4"	0.12	25	5.7	55	94.2	2	130	100	0.5	0.6	TRANE VCWF 4	1
VAV-G49	ASST. PRINCIPAL	100	50	60	4"	0.03	25	2.9	55	99.1	1	130	100	0.5	0.6	TRANE VCWF 4	1
VAV-G51	CLINIC	235	120	145	5"	0.14	25	5.9	55	92.7	2	130	100	0.5	0.6	TRANE VCWF 5	1
VAV-G54	WORK	150	75	90	4"	0.04	25	3.5	55	90.3	1	130	100	0.5	0.6	TRANE VCWF 4	1
VAV-G55	WORK	400	200	240	8"	0.29	25	9.25	55	90.5	3	130	100	0.7	0.6	TRANE VCWF 8	1
VAV-G56	ITINERANT	230	115	140	5"	0.130	25	5.8	55	93.4	2	130	100	0.5	0.6	TRANE VCWF 5	1

NOTES:

1. MANUFACTURER PROVIDED DISCONNECT SWITCH.

EXPANSION TANK SCHEDULE

MARK	LOCATION	SYSTEM	CONFIGURATION	ESTIMATED SYSTEM VOLUME	TANK VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	PRECHARGE PRESSURE (PSIG)	MAXIMUM PRESSURE	CONNECTIONS	MANUFACTURER WITH MODEL NUMBER	NOTES
									SYSTEM (IN.)		
ET-1	MECH G30	HEATING HOT WATER	VERTICAL BLADDER	1870	44	44	40	125 PSI	0.75/1.5	BELL & GOSSETT B165	

NOTES:

1.

AIR DIRT SEPARATOR SCHEDULE

MARK	SYSTEM	SIZE	DESIGN FLOW (GPM)	WPD	MANUFACTURER WITH MODEL NUMBER	NOTES
ADS-1	CHILLED WATER	6"	425	1.33'	BELL & GOSSETT CRSN-6F	1-3

NOTES:

1. 6" FLANGED COALESCING STYLE AIR & SEDIMENT COMBO SEPARATOR.

LANCER + BEEBE, LLC
ARCHITECTURE | PLANNING | INTERIORS
220 N. COLLEGE AVE
INDIANAPOLIS, IN 46202

CIRCLE DESIGN GROUP
INDIANAPOLIS, IN | 317.781.6200
CIRCLEDESIGNGROUP.COM

SHELBYVILLE CENTRAL SCHOOLS
CORPORATION
LOPER ELEMENTARY RENOVATIONS & ADDITIONS
901 LOPER DRIVE

REGISTERED ARCHITECT No. 11700201 STATE OF INDIANA

DATE SIGNED 04/06/22
DATE EXPIRES 07/31/22

REVISIONS:

#	Date	Desc.
2	04.26.2022	ADDENDUM #2

100% CONSTRUCTION DOCUMENTS

CDG PROJECT: #21102B
DATE: 04.06.2022
DRAWN BY: Author

HVAC SCHEDULES

H-501

PLOT DATE/TIME: 4/26/2022 4:29:00 PM

FAN COIL UNIT SCHEDULE (4-PIPE)

MARK	LOCATION	CONFIGURATION	SUPPLY FAN DATA										HYDRONIC HEATING COIL SELECTION DATA									HYDRONIC COOLING COIL SELECTION DATA											FILTER DATA		UNIT WEIGHT (LBS)	MANUFACTURER WITH MODEL NUMBER	NOTES
			SUPPLY CFM	OA CFM	ESP	QTY	RPM	DRIVE TYPE	HP	MCA	VOLTS	PH	MIN MBH	EAT	LAT	ROWS	FINS/ INCH	EWT	LWT	GPM	MAX WPD	TOTAL MBH	SENS MBH	EAT DB	EAT WB	LAT DB	LAT WB	ROWS	FINS/INCH	EWT	GPM	MAX WPD	TYPE	EFF			
FCU-A1	ART	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-A2	1ST GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-A3	1ST GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-A4	1ST GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-A5	1ST GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-A6	1ST GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-A7	1ST GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-B8	KINDERGARTEN	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-B9	KINDERGARTEN	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-B10	KINDERGARTEN	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-B11	KINDERGARTEN	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-B12	KINDERGARTEN	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-B13	KINDERGARTEN	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-B14	ACTIVITY LAB	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-C15	2ND GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-C16	2ND GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-C17	2ND GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-C18	2ND GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-C19	3RD GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-C20	2ND GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-C21	3RD GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-C22	3RD GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-C23	3RD GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-C24	3RD GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-C26	LIFE SKILLS	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-D28	5TH GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-D29	5TH GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-D30	5TH GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-D31	5TH GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-D32	5TH GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-D33	4TH GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-E34	4TH GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-E35	4TH GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-E36	4TH GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-E37	4TH GRADE	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-E38-1	COMPUTER LAB	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-E38-2	COMPUTER LAB	HORIZONTAL HIDEAWAY	1200	480	0.32	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	37.9	70	99.2	3	10	130	100	2.4	0.96	30.4	23.1	75	64	57.5	55.4	4	10	42	4.7	5.95	1" PLEATED	MERV 8	224	KRUEGER KHGP 14	1,2,3
FCU-G15	WORK	HORIZONTAL HIDEAWAY	800	50	0.68	2	1000 EA	DIRECT	1/4 EA	3.6	208	1	22.1	70	95	2	10	130	100	1.4	0.91	13.5	10	75	64	55	53.1	4	10	42	3.6	3.29	1" PLEATED	MERV 8	213	KRUEGER KHGP 14	1,2,3
FCU-G23	RESOURCE	HORIZONTAL HIDEAWAY	400	140	0.85	2	1075 EA	DIRECT	1/6 EA	2.25	208	1	7.7	70	95	1	10	130	100	0.6	2.31	4.8	3.6	75	64	55	53.1	3	10	42	1.9	3.24	1" PLEATED	MERV 8	177	KRUEGER KHGP 12	1,2,3

NOTES:

1. SINGLE POINT POWER CONNECTION.
2. MANUFACTURER PROVIDED TOGGLE DISCONNECT SWITCH.
3. PROVIDE ECM MOTOR.

DUCTLESS SPLIT AIR CONDITIONER SCHEDULE

MARK	LOCATION	CFM		COOLING BTU/H	ELECTRICAL DATA				SEER	REFRIG.	WEIGHT (LBS)	MANUFACTURER WITH MODEL NUMBER (INDOOR/OUTDOOR)	NOTES
		HIGH	LOW		MCA	MOCP	VOLTS	PH					
AC-1	STORAGE G9	1095	600	33	23	30	208	1	18.5	R410A	-	LG LSN363HLV3 / LG LSU363HLV3	1,2,3,4,5,6,7,8
AC-2	HEADEND G21	3401	95	12	10	15	208	1	22.7	R410A	-	LG LSN120HSV5 / LG LSU120HSV5	1,2,3,4,5,6,7,8

NOTES:

1. INDOOR UNIT POWERED FROM OUTDOOR UNIT.
2. WIND BAFFLE FOR LOW AMBIENT COOLING, WB-PA4, WB-SD4, AND WB-RE4.
3. INDOOR AND OUTDOOR UNITS TO BE FACTORY MATCHED.
4. PROVIDE CONDENSTATE PUMP FOR INSTALLATION IN THE FIELD.
5. DISCONNECT PROVIDED BY EC
6. MANUFACTURER TO SIZE RS/RL PIPING LINE SET. RS/RL PIPING TO BOTH BE INSULATED. SEE DETAIL M/H-601.
7. MOUNT UNIT TO ROOF EQUIPMENT SUPPORT CURBS.
8. PROVIDE BACNET CONTROLLER FOR INTEGRATION TO BMS

RADIANT CEILING PANEL SCHEDULE

SPECIFICATION SECTION 23 82 39

MARK	LOCATION	PANEL LENGTH	PANEL WIDTH	CAPACITY BUTH/LIN. FT.	# OF PASSES	# OF TUBES	AVERAGE WATER TEMP. °F	GPM	WATER PRESSURE DROP PER 100 FT	HWS-R RUNOUT SIZE (IN)	MANUFACTURER WITH MODEL NUMBER	NOTES
RCP-B14	ACTIVITY LAB B14	16'	12"	78	4	1	115	0.1	0.5	5/8	VULCAN LRP 16	1
RCP-B14.1	LAB STORAGE B14.1	14'	24"	167	8	1	115	0.2	0.5	5/8	VULCAN LRP 14	1
RCP-G10	STORAGE G10	14'	24"	167	8	1	115	0.2	0.5	5/8	VULCAN LRP 14	1
RCP-G38-1	UTILITY G38	10'	24"	167	8	1	115	0.1	0.5	5/8	VULCAN LRP 10	1
RCP-G38-2	UTILITY G38	10'	24"	167	8	1	115	0.1	0.5	5/8	VULCAN LRP 10	1
RCP-G39-1	CAFETERIA G39	10'	30"	200	10	1	115	0.15	0.5	5/8	VULCAN LRP 10	1
RCP-G39-2	CAFETERIA G39	10'	30"	200	10	1	115	0.15	0.5	5/8	VULCAN LRP 10	1
RCP-G39-3	CAFETERIA G39	15'	30"	200	10	1	115	0.2	0.5	5/8	VULCAN LRP 15	1
RCP-G39-4	CAFETERIA G39	15'	30"	200	10	1	115	0.2	0.5	5/8	VULCAN LRP 15	1
RCP-F4-1	CORRIDOR F4	10'	24"	167	8	1	115	0.1	0.5	5/8	VULCAN LRP 10	1
RCP-F4-2	CORRIDOR F4	15'	24"	167	8	1	115	0.2	0.5	5/8	VULCAN LRP 15	1
RCP-F4-3	CORRIDOR F4	15'	24"	167	8	1	115	0.2	0.5	5/8	VULCAN LRP 15	1
RCP-F4-4	CORRIDOR F4	15'	24"	167	8	1	115	0.2	0.5	5/8	VULCAN LRP 15	1

NOTES

1. PROVIDE WALL MOUNTED THERMOSTAT.

HYDRONIC CONVECTOR SCHEDULE

MARK	LOCATION	CABINET TYPE	HEATING ELEMENT SELECTION DATA						MANUFACTURER WITH MODEL NUMBER	NOTES
			MIN MBH	EAT	AVG EWT	ROWS	GPM	MAX WPD		
CONV-G8	TOILET G8	SLOPE TOP CONVECTOR	1.5	70	115	2	0.1	-	MODINE SL043618	1,2
CONV-G25	TOILET G25	SLOPE TOP CONVECTOR	1.5	70	115	2	0.1	-	MODINE SL043618	1,2
CONV-G28	TOILET G28	SLOPE TOP CONVECTOR	1.5	70	115	2	0.1	-	MODINE SL043618	1,2
CONV-G33	OFFICE G33	SLOPE TOP CONVECTOR	1.5	70	115	2	0.1	-	MODINE SL043618	1,2
CONV-G35	TOILET G35	SLOPE TOP CONVECTOR	1.5	70	115	2	0.1	-	MODINE SL043618	1,2

NOTES:

1. FINAL COLOR TO BE CHOSEN BY ARCHITECT.
2. PROVIDE WALL MOUNTED THERMOSTAT.

LANCER + BEEBE, LLC
ARCHITECTURE | PLANNING | INTERIORS
220 N. COLLEGE AVE
INDIANAPOLIS, IN 46202

CIRCLE DESIGN GROUP
INDIANAPOLIS, IN | 317.781.6200
CIRCLEDESIGNGROUP.COM

SHELBYVILLE CENTRAL SCHOOLS CORPORATION
LOPER ELEMENTARY RENOVATIONS & ADDITIONS
901 LOPER DRIVE

JOSEPH R. BOLYARD
REGISTERED No. 11700201
STATE OF INDIANA
PROFESSIONAL ENGINEER

DATE SIGNED 04/06/22
DATE EXPIRES 07/31/22

REVISIONS:

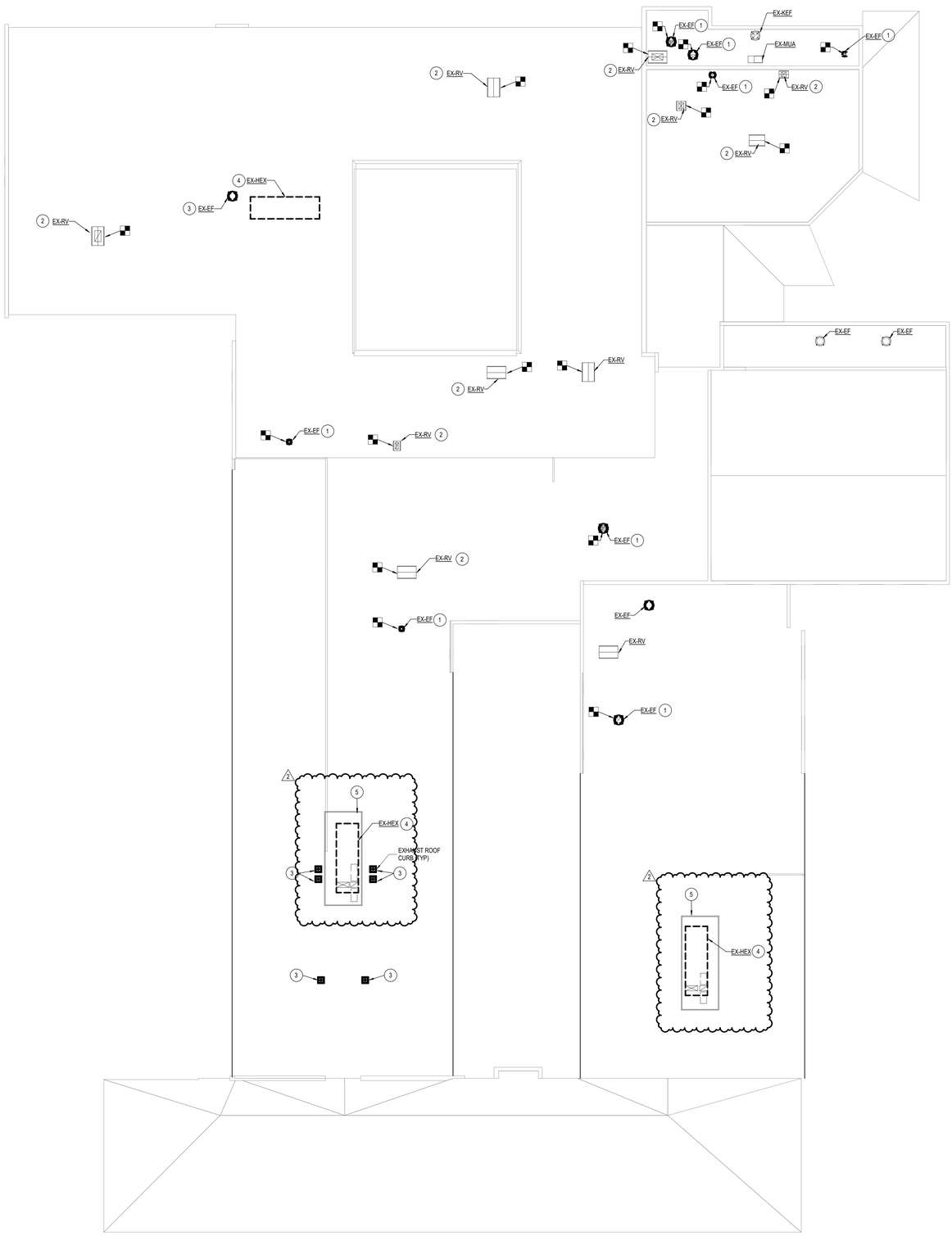
#	Date	Desc.
2	04.26.2022	ADDENDUM #2

100% CONSTRUCTION DOCUMENTS

CDG PROJECT: #21102B
DATE: 04.06.2022
DRAWN BY: TC

HVAC SCHEDULES

H-502



1 OVERALL HVAC ROOF DEMO PLAN
1/16" = 1'-0"

0 8' 16' 32'

N

MECHANICAL DEMO GENERAL NOTES:

A. REFERENCE SHEET M-000 FOR MECHANICAL SYMBOLS, LEGENDS, ABBREVIATIONS AND ADDITIONAL GENERAL NOTES.
B. FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO BID. DRAWING INFORMATION SHOW FROM EXISTING PROJECT INFORMATION.

SHEET DEMO PLAN NOTES

1. REMOVE EXISTING ROOF MOUNTED EXHAUST FAN FROM EXISTING CURB. READY CURB FOR NEW FAN AND PROVIDE ADAPT-A-CURB AS REQUIRED. ASSOCIATED DUCTWORK TO REMAIN FOR FUTURE RE-CONNECTION. COORDINATE WITH DIV. 26.
2. REMOVE AND RETAIN EXISTING ROOF MOUNTED GRAVITY VENTILATOR. GRAVITY VENTILATOR TO BE REUSED IN NEW WORK. CLEAN AND REPAIR ALL DAMAGED AREAS AND PROVIDE NEW ALUMINUM BIRD SCREEN OVER OPENINGS. DISCONNECT AND REMOVE EXISTING GRAVITY DAMPER WITHIN UNIT.
3. REMOVE EXISTING ROOF MOUNTED EXHAUST DUCT TERMINATION AND ASSOCIATED ROOF CURB COMPLETE. REMAINING ROOF PENETRATION TO BE PATCHED BY OTHERS.
4. DISCONNECT AND REMOVE EXISTING ROOF MOUNTED HEAT EXCHANGER AND ASSOCIATED ROOF CURB. REMOVE EXISTING CHS/CHR AND HS/HR PIPING AND DUCTWORK AS REQUIRED TO ALLOW FOR NEW UNIT INSTALLATION.
5. LARGER EXISTING ROOF CURB BENEATH EXISTING ROOFTOP HEAT EXCHANGER TO REMAIN. ONLY DEMOLISH CURB ASSOCIATED WITH UNIT.

2

LANCER + BEEBE, LLC
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LOPER ELEMENTARY RENOVATIONS & ADDITIONS
901 LOPER DRIVE

I HEREBY CERTIFY THAT I AM A DULY REGISTERED ARCHITECT IN THE STATE OF INDIANA
No. 11700201 STATE OF INDIANA
DATE SIGNED 04/06/22
DATE EXPIRES 07/31/22

REVISIONS:

#	Date	Desc.
2	04.29.2022	ADDENDUM #2

100% CONSTRUCTION DOCUMENTS

CDG PROJECT: #21102B
DATE: 04.06.2022
DRAWN BY: TC

OVERALL HVAC ROOF DEMO PLAN

N
TRUE NORTH

HD102

PLOT DATE/TIME // 4/6/2022 4:29:02 PM