

ADDENDUM NO. 1

September 8, 2026

PORTAGE HIGH SCHOOL: 2026 RENOVATIONS PROJECT
6450 U.S. Highway 6
Portage, IN 46368

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 August 14, 2026, by Fanning Howey Associates, Inc. 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 1-1 through ADD 1-3, and attached Addendum No. 1 from Fanning Howey Associates, Inc., dated September 4, 2026, and consisting of 3 pages, Specification Section 07 01 50.19 - Preparation for Re-Roofing, Specification Section 07 53 23 - Ethylene-Propylene-Diene-Monomer (EPDM), Specification Section 07 71 00 - Roof Specialties, Specification Section 07 72 00 - Roof Accessories, and 11 drawings.

A. SPECIFICATION SECTION 00 00 20 - TABLE OF CONTENTS

1. ADD:

Specification Section 07 01 50.19 - Preparation for Re-Roofing
Specification Section 07 53 23 - Ethylene-Propylene-Diene-Monomer (EPDM) Roofing
Specification Section 07 71 00 - Roof Specialties
Specification Section 07 72 00 - Roof Accessories

B. SPECIFICATION SECTION 00 31 00 - INDIANA BID FORM

1. REPLACE:

Specification Section 00 31 00 - Indiana Bid Form with the attached revised Bid Form.

C. SPECIFICATION SECTION 01 12 00 - MULTIPLE CONTRACT SUMMARY

Under 3.03 Bid Categories

A. BID CATEGORY NO. 1 - GENERAL TRADES

1. **ADD:**

Specification Section 07 01 50.19 - Preparation for Re-Roofing

Specification Section 07 53 23 - Ethylene-Propylene-Diene-Monomer (EPDM) Roofing

Specification Section 07 71 00 - Roof Specialties

Specification Section 07 72 00 - Roof Accessories

2. **REVISE:**

Clarification No. 8:

The **Bid Category No. 1 Contractor** is to provide all underground utilities (sanitary sewer, storm sewer, water lines) to within 5'-0" of the building perimeter. The **Bid Category No. 8 Contractor** is to provide cleanouts, excavation and backfill as required to make final connections. The **Bid Category No. 8 Contractor** shall also provide all downspout boots and final connections to downspouts. The **Bid Category No. 1 Contractor** is responsible for all underground utilities (sanitary sewer, storm sewer, water lines). All work associated with the Grease Interceptor shall be the responsibility of the **Bid Category No. 8 Contractor**, including, but not limited to, the grease interceptor, excavation, concrete work, backfill, restoration, piping, connections, and tie-in through the building.

H. BID CATEGORY NO. 8 - PLUMBING

1. **REVISE:**

Clarification No. 6:

The **Bid Category No. 1 Contractor** is to provide all underground utilities (sanitary sewer, storm sewer, water lines) to within 5'-0" of the building perimeter. The **Bid Category No. 8 Contractor** is to provide cleanouts, excavation and backfill as required to make final connections. The **Bid Category No. 8 Contractor** shall also provide all downspout boots and final connections to downspouts. The **Bid Category No. 1 Contractor** is responsible for all underground utilities (sanitary sewer, storm sewer, water lines). All work associated with the Grease Interceptor shall be the responsibility of the **Bid Category No. 8 Contractor**, including, but not limited to, the grease interceptor, excavation, concrete work, backfill, restoration, piping, connections, and tie-in through the building.

D. SPECIFICATION SECTION 01 23 00 – ALTERNATES

Under 1.04 SCHEDULE OF ALTERNATES

1. ADD:

- C. ALTERNATE NO. 3: State the cost to provide New EPDM Roof Membrane replacement as shown on Drawing AR-101. **Base Bid:** Roofing Restoration required for new improvements for the Unit B Kitchen Improvements.

E. SPECIFICATION SECTION 01 32 00 – SCHEDULES AND REPORTS

1. ADD:

Attached Guideline Schedule.

CONTRACTOR'S BID FOR PUBLIC WORKS FORM NO. 96

Format (Revised 2013)
(Amended for PTS)

Portage High School: 2026 Renovations Project
Portage, IN

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, ***Portage High School: 2026 Renovations Project***, in accordance with Plans and Specifications prepared by ***Fanning Howey Associates, Inc., 350 E. New York St., Suite 300, Indianapolis, IN 46204***, 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) _____

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.

Has visited the jobsite	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.

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.

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 – Epoxy Terrazzo Flooring and Terrazzo Base

Change the Base Bid the sum of _____
(sum in words)

_____ DOLLARS (\$) _____
(sum in figures) ADD
DEDUCT

Alternate Bid No. 2 – Mat Hoist

Change the Base Bid the sum of _____
(sum in words)

_____ DOLLARS (\$) _____
(sum in figures) ADD
DEDUCT

Alternate Bid No. 3 – New EPDM Roof Membrane

Change the Base Bid the sum of _____
(sum in words)

_____ DOLLARS (\$) _____
(sum in figures) 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 entered 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 include 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

Activity Name	Original Duration	Start	Finish	2026												2027															
				September	October	November	December	January	February	March	April	May	June	July	August	September	October	November	December	January	February	March	April	May	June	July	August	September			
				15	22	29	06	13	20	27	03	10	17	24	31	07	14	21	28	05	12	19	26	02	09	16	23	30	06		
Portage High School 2026 Renovations	268	Aug-05-2026	Aug-13-2027	Portage High School 2026 Renovations																											
Project Administration	268	Aug-05-2026	Aug-13-2027	Project Administration																											
Bid Phase	31	Aug-05-2026*	Sep-16-2026	Bid Phase																											
Pre-Bid Meeting	0	Aug-25-2026*		Pre-Bid Meeting																											
Bid Opening	0	Sep-16-2026*		Bid Opening																											
Recommend/Award	0	Sep-23-2026*		Recommend/Award																											
Submittals	50	Sep-28-2026	Dec-04-2026	Submittals																											
Notice to Proceed	0	Sep-28-2026*		Notice to Proceed																											
Start Construction	0	Oct-12-2026*		Start Construction																											
Substantial Completion	0		Jul-16-2027*	Substantial Completion																											
Final Punch List Completion	0		Aug-09-2027*	Final Punch List Completion																											
Project Completion	0		Aug-13-2027*	Project Completion																											
Media Center	55	Oct-12-2026	Dec-25-2026	Media Center																											
Demolition	10	Oct-12-2026	Oct-23-2026	Demolition																											
New Concrete Stairs	5	Oct-26-2026	Oct-30-2026	New Concrete Stairs																											
Drywall Repair & Paint	5	Nov-02-2026	Nov-06-2026	Drywall Repair & Paint																											
Corridor Ceiling	5	Nov-09-2026	Nov-13-2026	Corridor Ceiling																											
Corridor Lighting	5	Nov-16-2026	Nov-20-2026	Corridor Lighting																											
Aluminum Storefront Doors	5	Nov-23-2026	Nov-27-2026	Aluminum Storefront Doors																											
Casework & Base Installation	10	Nov-30-2026	Dec-11-2026	Casework & Base Installation																											
Built-In Countertop Installation	5	Dec-14-2026	Dec-18-2026	Built-In Countertop Installation																											
Punch List	5	Dec-21-2026	Dec-25-2026	Punch List																											
Cafeteria	60	Oct-12-2026	Jan-01-2027	Cafeteria																											
Demolition	10	Oct-12-2026	Oct-23-2026	Demolition																											
Above Ceiling Mechanical Work	10	Oct-26-2026	Nov-06-2026	Above Ceiling Mechanical Work																											
Painting	10	Nov-09-2026	Nov-20-2026	Painting																											
Ceiling Tiles	5	Nov-23-2026	Nov-27-2026	Ceiling Tiles																											
Decorative Flooring & Base	10	Nov-30-2026	Dec-11-2026	Decorative Flooring & Base																											
Doors & Hardware	5	Dec-14-2026	Dec-18-2026	Doors & Hardware																											
Aluminum Column Wrap	5	Dec-21-2026	Dec-25-2026	Aluminum Column Wrap																											
Acrylic Graphic Branding	5	Dec-28-2026	Jan-01-2027	Acrylic Graphic Branding																											
Kitchen	190	Oct-26-2026	Jul-16-2027	Kitchen																											
Underground Utilities	15	Oct-26-2026	Nov-13-2026	Underground Utilities																											

ADDENDUM NO. 1

Portage High School: 2026 Renovations

Portage Township School
Portage, Indiana

Project No. 226023.00

Index of Contents

Addendum No. 1, 4 items, 2 pages

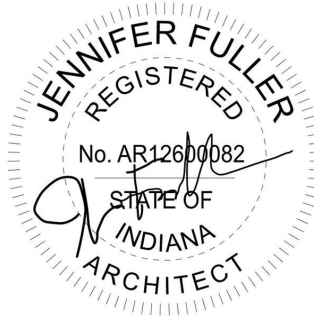
New Project Manual Sections: 07 01 50.19 Preparation for Re-Roofing, 07 53 23 Ethylene-Propylene-Diene-Monomer (EDPM) Roofing, 07 71 00 Roof Specialties, and 07 72 00 Roof Accessories

Revised Drawing Sheets: AR-101, ED11B, ED12C, E-101, EL11B, EL12C, E-11A, EP11B, EP12C, E-401, and E-601,

Date: September 4, 2026

I hereby certify that this Addendum was prepared by me or under my direct supervision and that I am a duly registered Architect/Engineer under the Laws of the State of Indiana.

FANNING/HOWEY ASSOCIATES, INC.
ARCHITECTS/ENGINEERS/CONSULTANTS



Jennifer Fuller, License No. AR12600082
Expiration Date: 12/31/2026

TO: ALL BIDDERS OF RECORD

ADDENDUM NO. 1 to Drawings and Project Manual, dated August 14, 2026, for the Portage High School: 2026 Renovations for Portage Township Schools, 6240 US Highway 6, Portage, Indiana 46368; as prepared by Fanning/Howey Associates, Inc., Indianapolis, Indiana. This Addendum shall hereby be and become a part of the Contract Documents the same as if originally bound thereto.

The following clarifications, amendments, additions, revisions, changes, and modifications change the original Contract Documents only in the amount and to the extent hereinafter specified in this Addendum.

Each bidder shall acknowledge receipt of this Addendum in his proposal or bid.

NOTE: Bidders are responsible for becoming familiar with every item of this Addendum. (This includes miscellaneous items at the very end of this Addendum.)

RE: ALL BIDDERS

ITEM NO. 1. NEW PROJECT MANUAL SECTIONS

- A. New Project Manual Section 07 01 50.19 Preparation for Re-Roofing is included with and hereby made a part of this Addendum.
- B. New Project Manual Section 07 53 23 Ethylene-Propylene-Diene-Monomer (EDPM) Roofing is included with and hereby made a part of this Addendum.
- C. New Project Manual Section 07 71 00 Roof Specialties is included with and hereby made a part of this Addendum.
- D. New Project Manual Section 07 72 00 Roof Accessories is included with and hereby made a part of this Addendum.

ITEM NO. 2. PROJECT MANUAL, SECTION 11 66 00 – ATHLETIC EQUIPMENT

- A. Article 2.5, A.: Add paragraph 6. as follows:
 - “6. Mat Hoist Safety Straps: Provide the manufacturer’s recommended mat hoist’s safety straps to eliminate any issues with location over existing bleachers.

ITEM NO. 3. ACCEPTABLE MANUFACTURERS

The following manufacturers are to be considered acceptable manufacturers (suppliers and fabricators) for the Sections of the Specifications listed. Listed manufacturers are required to bid on products equal in type and design, size, function, and quality to that originally specified. Final decision as to equality of products specified versus those proposed shall be made by the Architect.

Section 05 58 13 – Column Covers
- Moz Designs, Inc., Livermore, CA

Section 11 51 23 – Library Stack Systems
- Toledo Furniture, Stroudsburg, Pennsylvania

ITEM NO. 4. REVISED DRAWING SHEETS

Drawing Sheets: AR-101, ED11B, ED12C, E-101, EL11B, EL12C, E-11A, EP11B, EP12C, E-401, and E-601, have been revised, dated 9/4/26, and is included with and hereby made a part of this Addendum. These Drawings supersede the original documents.

END OF ADDENDUM

SECTION 07 01 50.19 - PREPARATION FOR RE-ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Tear-off of roof areas indicated.
 - 2. Temporary roofing membrane, only as required.
 - 3. Removal of flashings and counterflashings.
 - 4. Insulation and deck inspection and repair.
 - 5. Protection of existing roofing system that is not reroofed.
 - 6. Disposal.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
 - 2. Division 07 Section for roofing membrane, base flashings, substrate boards, roof insulation, cover boards, and roofing accessories.
 - 3. Division 07 Section "Sheet Metal Flashing and Trim" for metal roof penetration flashings, flashings, and counterflashings.
 - 4. Division 07 Section "Roof Specialties" and "Roof Accessories".

1.2 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. Existing Membrane Roofing System: Adhered EPDM roofing membrane. Refer to Drawings for additional information.
- C. Substrate Board: Rigid board or panel products placed over the roof deck that serve as thermal barriers, provide a smooth substrate, or serve as a component of a fire-resistance-rated roofing system.
- D. Partial Roof Tear-Off: Removal of existing membrane roofing system down to existing roof recovery board/insulation.
- E. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.
- F. Existing to Remain: Existing items of construction that are not indicated to be removed.

1.3 PREINSTALLATION MEETINGS

- A. Reroofing Meeting: Conduct meeting at Project site. Review methods and procedures related to roofing system including, but not limited to, the following:
 - 1. Meet with Owner; A/E; CM roofing system manufacturer's representative; deck Installer; roofing Installer including project manager, superintendent, and foreman; and installers whose work interfaces with or affects reroofing including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to reroofing preparation, including membrane roofing system manufacturer's written instructions, including but not limited to, the following:
 - a. Review temporary protection requirements for existing roofing system that is to remain, during and after installation.
 - b. Review roof drainage during each stage of reroofing and review roof drain plugging and plug removal procedures.
 - c. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

- d. Review existing deck removal procedures and Owner notifications.
- e. Review procedures to determine condition and acceptance of existing deck for reuse.
- f. Review structural loading limitations of deck during reroofing.
- g. Review base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect reroofing.
- h. Review HVAC shutdown and sealing of air intakes.
- i. Review shutdown of fire-suppression, -protection, and -alarm and -detection systems.
- j. Review procedures for unexpected discovery of asbestos-containing materials.
- k. Review governing regulations and requirements for insurance and certificates if applicable.
- l. Review existing conditions that may require notification of A/E before proceeding.
- m. Condition and acceptance of existing roof deck and base flashing substrate for reuse.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Comply with governing EPA notification regulations before beginning membrane roofing removal.
 - 2. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.5 FIELD CONDITIONS

- A. Owner will not occupy portions of building immediately below reroofing area.
 - 1. Conduct reroofing so Owner's operations will not be disrupted.
 - 2. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.
 - 3. Coordinate work activities daily with Owner, place protective dust or water leakage covers over sensitive equipment or furnishings, shut down HVAC and fire-alarm or -detection equipment if needed and approved by Owner. Evacuate occupants from below the work area if desired.
 - 4. Before working over structurally impaired areas of deck, notify Owner to evacuate occupants from below the affected area. Verify that occupants below the work area have been evacuated prior to proceeding with work over the impaired deck area.
- B. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.
 - 1. This includes but is not limited to protection of lawn areas, concrete walks, asphalt pavements where dumpsters placed or construction traffic occurs to access the Work.
- C. Where new components are noted to match existing dimensions and profile, document existing components to field verify profiles and dimensions required for new components prior to removal.
- D. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
- E. Owner assumes no responsibility for condition of areas to be reroofed.
 - 1. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.
- F. Limit construction loads to twenty pounds per square foot, unless otherwise indicated on the Drawings.
- G. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering into existing roofing system or building.
 - 1. Remove only as much roofing in one day as can be made watertight in the same day.

- H. Hazardous Materials: It is not expected that hazardous materials such as asbestos-containing materials will be encountered in the Work.
1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify A/E and Owner. Hazardous materials will be removed by Owner under a separate contract.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Deck Condition
1. Check deck for damage. Workers may have inadvertently damaged the deck using axes or power cutting tools during roof removal or repair.
 2. When roofing is removed, loosely attached decking may be observed. All loose decking must be properly attached using techniques appropriate to the construction.
 3. Areas of damaged deck should be properly repaired. Deteriorated deck should be removed, as necessary to eliminate the spread of deterioration. Appropriate treatments such as corrosion inhibitors should be applied.
 4. All deck replacement should be compatible with the original construction and should include an area sufficient to assure the structural integrity of the deck. The deck replacement should be fastened using techniques appropriate to the construction.
- B. Wind Resistance: Ensure the reroofing design considers wind resistance. Building height, location, and local geography all play a part in determining the proper design.
1. Were indicated to remain, ensure the existing perimeter wood nailers/blocking are adequately attached to the structure before adding additional blocking. In most cases, roof blow-offs originate at the perimeter edge; pay particular attention to its design. Use continuous cleats.
 - a. Nailers must be anchored to structural element to resist a minimum force of 300 pounds per lineal foot in any direction and shall be free of rot, excess moisture or deterioration.
- C. Flashings: Good roof design ensures that the minimum flashing height above the final roofing system is 8 inches, but 12 inches is highly recommended. Where required on Drawings, provide 12 inch high roof flashings.
1. Avoid termination bar flashings without the appropriate counterflashings.
 2. Refer to SMACNA guidelines for all formed sheet metal.
 3. Install appropriate flashing at all drains and plumbing vents.
 4. Avoid the use of pitch pans whenever possible. If pitch pans are unavoidable:
 - a. Combine service entries with equipment mounting.
 - b. Include a metal cover that seals to the projection and sheds water.
 5. Do not extend roof flashing above through-wall counterflashings.
 6. Do not block weep holes in walls.
- D. Mechanical and Electrical Equipment
1. Where indicated, lift, temporarily support and reset units as necessary to flash properly or add new supports.
 2. Disconnect and reconnect services as required by other operations.
 3. Coordinate with Owner any shut down of equipment to ensure acceptability of impact on existing building.

2.2 TEMPORARY PROTECTION MATERIALS

- A. Protection Sheet or Mat: Provide a sacrificial layer of matching membrane sheet extending a minimum 6 inches beyond insulation in all directions or a woven or nonwoven polypropylene, polyolefin, or polyester fabric, water permeable and resistant to UV degradation, type and weight recommended by roofing system manufacturer for application.
- B. Polyisocyanurate Insulation: ASTM C 1289, Type II.
- C. Sheathing: Provide one of the following:

1. Plywood: DOS PS1, Grade CD Exposure 1, minimum 1/2-inch thick.
2. OSB: DOS PS2, Exposure 1, minimum 7/16-inch thick.

- D. Air Filters: Filter medium with activated charcoal [such as CarbonWeb CW-90 by D-Mark (www.dmarkinc.com) or comparable products from www.5starfilter.com and www.airfilterUSA.com].

2.3 REPLACEMENT MATERIALS

- A. Wood blocking, curbs, and nailers are specified in Division 06 – Section "Rough Carpentry."
- B. Fasteners: Factory-coated steel fasteners with metal plates listed in FM Approvals' RoofNav, and acceptable to new roofing system manufacturer.

2.4 DECK MATERIALS

- A. Metal Roof Deck
1. Gauge, rib depth, rib configuration – match existing; three (3) span; lapped and stitched joints.
 2. ASTM A 653, Grade 33, with G90 coating (galvanized).
 3. Butt and Finish Strips: 0.0396-inch thick (fka 20-gauge) steel.

2.5 TEMPORARY ROOFING MATERIALS

- A. Design and selection of materials and design of temporary roofing is responsibility of Contractor.
1. Provide temporary roofing materials only as required by construction schedule and completion of removal and installation of new roof sequence. Maintain weathertight condition at all times.
- B. Air and Vapor Barrier/Temporary Roof: 40-mil composite consisting of 35 mils of self-adhering rubberized asphalt laminated to a 5-mil woven polypropylene film.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Carlisle Coatings and Waterproofing Inc.
 - b. Grace Construction Products
 - c. Henry Company
 - d. Polyguard Products, Inc.
 - e. Tremco Incorporated.
 - f. W.R. Meadows
 2. Physical and Performance Properties:
 - a. Air Permeance: Maximum 0.004 cfm/sq.ft. of surface area at 1.57-lbf/sq.ft. pressure difference; ASTM E 2178.
 - b. Tensile Strength: minimum 250 psi; ASTM D 412, Die C.
 - c. Ultimate Elongation: Minimum 200 percent; ASTM D 412 Die C.
 - d. Puncture Resistance: minimum 40 lbf; ASTM E 154.
 - e. Water Absorption: Maximum 0.15 percent weight gain after 48-hour immersion at 70 deg. F.
 - f. Vapor Permeance: Maximum 0.1 perm; ASTM E 96, Desiccant Method.
 - g. Adhesion to Substrate: Minimum 16 lbf/sq.in. when tested according to ASTM D 4541 as modified by ABAA.
 - h. UV Resistance: Can be exposed to sunlight for 60 days according to manufacturer's written instructions.
 3. Provide alternative temporary roof material if construction schedule dictates exposure time exceeds manufacturer's recommendations.

PART 3 - EXECUTION

3.1 PREPARATION

- A. General: Contractor shall install interior protection where roofing debris or reroofing operations has the potential for entering building. Contractor shall pay special attention to areas where occupation must be maintained and acoustical panel ceilings have been removed or do not exist. Contractor shall clean up any construction related dirt and debris that enters the building during reroofing operation.
- B. Protection of In-Place Construction:
 - 1. Protect existing membrane roofing system that is not to be reroofed.
 - a. Lay protection sheet or mat over existing roofing areas indicated and where vulnerable to damage during reroofing operations.
 - 1) Loose lay 1-inch minimum thick, polyisocyanurate insulation over protection sheet or mat. Extend mat past edges of a minimum of 6 inches. Loose lay 15/32-inch plywood or OSB panels over insulation.
 - b. Limit traffic and material storage to areas of existing roofing membrane that have been protected.
 - c. Maintain temporary protection and leave in place until replacement roofing has been completed.
 - d. Contractor shall be responsible to ballast the existing roof protection as necessary to prevent displacement by winds.
 - e. Comply with requirements of existing roof system manufacturer's warranty requirements.
- C. Coordinate with Owner to temporary shutdown air intake equipment in the vicinity of the Work. Cover air intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.
 - 1. When working with solvents, cleaners, or adhesives (high-or low-VOC) in the vicinity of air intakes, install filters over intake openings. Place two layers of filter material to completely cover opening and secure to mechanical unit or gravity ventilator.
- D. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.
- E. Field verify existing dimensions and profiles of any components indicated to be replaced with matching materials.
- F. Test existing roof drains to verify that they are not blocked or restricted.
 - 1. Immediately notify A/E for any blockages or restrictions.
- G. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday.
 - 1. Prevent debris from entering or blocking roof drains and conductors.
 - a. Use roof-drain plugs specifically designed for this purpose.
 - b. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.
 - 2. If roof drains will be temporarily blocked or unserviceable due to roofing system removal or partial installation of new membrane roofing system, provide alternative drainage method to remove water and eliminate ponding.
 - a. Do not permit water to enter into or under existing membrane roofing system components that are to remain.
- H. Verify that rooftop utilities and service piping have been shut off before commencing Work.
- I. Arrange work sequence to avoid use of newly constructed roofing for storage, walking surface, and equipment movement. Move equipment and ground storage areas as work progresses.
- J. Seal or isolate windows that may be exposed to air borne substances created in removal of existing materials.

- K. Where additional slope is added, verify the height of the new roof assembly relative to curbs, parapet walls, equipment supports, pipes, and all roof top equipment. In some cases curb heights will need to be increased to allow a minimum of 12 inch base flashing. Be sure to take into account any crickets at the high side of curbs. This may entail lengthening electrical connections.

3.2 ROOF TEAR-OFF

- A. General: Notify A/E and Owner each day of extent of roof tear-off proposed and obtain authorization to proceed.
- B. Lower removed roofing materials to ground and onto lower roof levels, using dust-tight chutes or other acceptable means of removing materials from roof areas.
- C. Roof Tear-Off: Where indicated, remove existing roofing membrane and other membrane roofing system components down to the existing recovery board/insulation. Remove only that amount of roofing and flashing which can be made weathertight with new materials during a one-day period or before the onset of inclement weather.
 - 1. Refer to drawing and details for specific demolition scope.

3.3 DECK PREPARATION – SEE ALLOWANCES

- A. Inspect deck after tear-off of membrane roofing system.
- B. If broken or loose fasteners that secure deck panels to one another or to structure are observed, or if deck appears or feels inadequately attached, immediately notify A/E.
 - 1. Do not proceed with installation until directed by A/E.
- C. All rusted or deteriorated decking, or if structural integrity of deck is suspect, immediately notify A/E to determine method of treatment or replacement.
 - 1. Do not proceed with installation until directed by A/E.

3.4 ROOF DECK REPAIRS - SEE ALLOWANCES

- A. Metal Roof Deck Repairs: Surface-only rusted metal shall be sanded and treated with rust-inhibiting paint. Sections that have rusted deeper than the surface or are not structurally sound shall be removed and replaced.
 - 1. Deck Reinforcement: Install sheet steel reinforcement profiled to existing decking configuration over all rusted opening 16 sq.in. or less. If two (2) or more rusted openings exist in same deck section, replace section.
 - 2. Deck Reattachment:
 - a. Mechanically reattach loose sections of deck to steel support members 12 inches o.c.
 - b. Side Laps:
 - 1) Nestable Side Lap: Mechanically fasten 18 inches o.c.
 - 2) Interlocking Side Lap: Button punch 18 inches o.c.
 - 3. Deck Replacement:
 - a. Remove defective metal decking. Examine supports. If unsound, contact Owner immediately for future action.
 - b. Install new metal decking in accordance with SDI, Design Manual for Composite Decks, Form Decks, Roof Decks and match existing. Attachment shall conform to local code requirements.
 - 4. Deck Protection: Apply rust inhibitive paint over surface rust in accordance with paint manufacturer's prep and installation instructions.
 - a. Comply with Steel Structure Paint Council (SSPC) preparation standards based on type of paint utilized, but not less than SSPC-SP2.

3.5 EXISTING BASE FLASHING REMOVAL

- A. Remove existing base flashings around parapets, curbs, walls, and penetrations.

1. Clean substrates of contaminants such as asphalt, sheet materials, dirt, and debris.
2. Refer to Drawings for curb and penetration locations where existing base flashing shall be cut and remain.

- B. Do not damage metal counterflashings that are to remain. Replace metal counterflashings damaged during removal with counterflashings of same metal, weight or thickness, and finish.

3.6 DISPOSAL

- A. Collect and place demolished materials in containers Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
 1. Storage or sale of demolished items or materials on-site will not be permitted.
- B. Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION 07 01 50

SECTION 07 53 23 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Adhered ethylene-propylene-diene-monomer (EPDM) roofing system.
 - 2. Roof insulation, see allowances.
 - 3. Cover board.
 - 4. Walkways.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
 - 2. Division 06 Section "Sheathing" for wood-based parapet sheathing.
 - 3. Division 07 Section "Preparation for Re-Roofing."
 - 4. Division 07 Section "Roof Accessories."
 - 5. Division 07 Section "Roof Specialties" for roof edge terminations.
 - 6. Division 07 Section "Joint Sealants."

1.2 REFERENCES

- A. American Society of Civil Engineers: Document ASCE 7, Minimum Design Loads for Buildings and Other Structures.
- B. American Society of Testing and Materials (ASTM)
 - 1. ASTM C168 – Standard Terminology Relating to Thermal Insulation.
 - 2. ASTM C177 – Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
 - 3. ASTM C209 – Methods of Testing Insulating Board, Structural and Decorative.
 - 4. ASTM C518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
 - 5. ASTM C1289 – Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
 - 6. ASTM C1303 – Standard Test Method for Estimating the Long Term Change in the Thermal Resistance of Unfaced Closed Cell Plastic Foams by Slicing and Scaling Under Controlled Laboratory Conditions.
 - 7. ASTM D1079 – Standard Terminology Related to Roofing and Waterproofing.
 - 8. ASTM D1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
 - 9. ASTM D2126 – Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
 - 10. ASTM D2842 – Standard Test Method for Water Absorption for Rigid Cellular Plastics.
 - 11. ASTM E84 – Flame spread.
 - 12. ASTM E96 – Water vapor transmission.
 - 13. ASTM E108 – Spread of Flame.
- C. National Roofing Contractors Association (NRCA) – Roofing and Waterproofing Manual.
- D. Sheet Metal and Air Conditioning Contractors National Association, Inc., (SMACNA) – Architectural Sheet Metal Manual.
- E. Underwriters Laboratories (UL) – Roofing Materials and Systems Annual Directory.
- F. ANSI/SPRI WD-1: Wind Design Standard Practice for Roofing Assemblies.

- G. ANSI/SPRI ES-1: Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.
- H. ANSI/SPRI RP-4: Wind Design Standard for Ballasted Single-Ply Roofing Systems.
- I. National Fire Protection Association (NFPA): NFPA 241-Safeguarding Building Construction Operations.
- J. Environmental Protection Agency (EPA): EPA Method 9045.

1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.
- B. Positive Drainage: The drainage condition in which consideration has been made during design for all loading deflections of the deck, and additional roof slope has been provided to ensure drainage of the roof area within 48 hours of rainfall, during ambient drying conditions.
- C. Roof System: A system of interacting roof components generally consisting of a membrane, roof insulation and air or vapor retarder (if present) (not including the roof deck) designed to weatherproof a structure and improve thermal resistance.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Meeting: Conduct meeting at Project site after shop drawing review. Comply with requirements in Division 01 Section "Project Management and Coordination." A/E will schedule and conduct meeting. Review methods and procedures related to roofing system including, but not limited to, the following:
 - 1. Meet with Owner; A/E; CM, Owner's insurer if applicable; roofing Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Examine existing conditions and finishes for compliance with requirements, including flatness and fastening.
 - 5. Review structural loading limitations of roof deck during and after roofing.
 - 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
 - 7. Review governing regulations and requirements for insurance and certificates if applicable.
 - 8. Review temporary protection requirements for roofing system during and after installation.
 - 9. Review roof observation and repair procedures after roofing installation.

1.5 SEQUENCING

- A. Work shall begin only after openings and penetrations are in place and adjacent work required for a complete tie-in is in place. This includes masonry with special attention being given to roof-to-wall transitions. Work shall not begin:
 - 1. Before the "Preinstallation Meeting" has occurred
 - 2. Until conditions exist necessary for successful completion of roofing.
 - 3. Without presence and approval of manufacturer's representative
- B. Prior to and during application, all dirt, devices and dust shall be removed from surfaces by vacuuming, sweeping, blowing with compressed air or similar methods.

- C. Arrange work sequence to avoid use of newly constructed roofing as a walking surface of for equipment movement and storage. Where such access is absolutely required, the Applicator shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas.
 - 1. Work shall begin at the furthest point from the designated spot where materials are shipped to the roof.
- D. After work on roof is started, no traffic will be permitted on the roof other than necessary for the roofing application and inspection. Materials shall not be piled on to the roof to the extent that design live loads are exceeded. Roofing materials shall not be transported over unfinished or finished roofing or existing roofs.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Submit specifications, installation instructions, and general recommendations from roofing materials manufacturer for type of roofing required. Indicate data substantiating that materials comply with requirements of this specification, inclusive of accelerated weathering data.
 - 1. Storage and handling requirements and recommendations.
 - 2. For insulation and roof system component fasteners include copy of FM Approvals' RoofNav, SPRI's Directory of Roof Assemblies listing, or Directory of Roof Assemblies (DORA) for assemblies.
 - 3. Roof Assembly letter from roof membrane manufacturer.
- B. Shop Drawings: For roofing system must be issued or approved by manufacturer before being submitted to A/E. Include plans, elevations, sections, details, and attachments to other Work.
 - 1. Outline of roof and size.
 - 2. Location and type of all penetrations.
 - 3. Layout and thickness of insulation, fastener type and length.
 - 4. Perimeter and penetration details, including base flashings and membrane terminations.
 - 5. Tapered insulation, including slopes.
 - 6. Roof plan showing orientation of steel roof deck and orientation of membrane roofing and fastening spacings and patterns for mechanically fastened membrane roofing.
 - 7. Insulation fastening patterns for corners, perimeter, and field-of-roof locations.
 - 8. Flashing Conditions: Show all roofing conditions, including but not limited to drains perimeter conditions, roof penetrations conditions, expansion joints, etc. The shop drawings must be reviewed and approved by the roofing system manufacturer to assure the completed installation will meet the manufacturer's warranty requirements.
 - 9. Wind Uplift Securement: Provide roof plan(s) marked-up to include extent of roof corners and perimeter areas, inclusive of fastener spacing/density. This drawing must be reviewed and approved by the roofing system manufacturer to assure the completed installation will meet the manufacturer's warranty requirements and the "Performance Requirements" listed in this specification.
 - 10. Tie-in with air barriers, where air barrier is required.
 - 11. Wind Uplift Resistance Submittal: For roofing system including compliance with wind uplift performance requirements.

1.7 INFORMATIONAL/QUALITY ASSURANCE/CONTROL SUBMITTALS

- A. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install roofing system and qualified to receive manufacturer's 20 year, no-dollar-limit warranty (even if a lesser warranty is specified).
- B. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1. Submit evidence of meeting performance requirements, including uplift resistance.
 - 2. Submit insulation fastening patterns for corner, perimeter, and field-of-roof locations to meet performance requirements.

3. Submit a letter from the roof manufacturer certifying the proposed roofing assembly, compatibility of materials and total R-value of insulation.
 4. Submit intent to warrant, executed by authorized representative of system manufacturer, indicating that manufacturer has reviewed drawings, specifications, and conditions affecting the work and proposes to provide warranties as referenced herein without further stipulation.
- C. Sample Executable Warranty: Copy of manufacturer's warranty stating obligations, remedies, limitations, and exclusions before starting work.
1. Contractor shall submit manufacturers approved "Pre-Installation Notice" (PIN) to A/E.

1.8 CLOSEOUT SUBMITTALS:

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals.
1. Maintenance Data: For roofing system to include in maintenance manuals. When warranties are delivered to the Owner, cover letter shall be included directing the Owner to inform (copy) the manufacturer as well as the Contractor when reporting roof problems, regardless of when they occurred during the warranty period.
 - a. Roofing membrane manufacturer shall submit a Roof Maintenance and Inspection Manual with warranties and project closeout submittals. (Final payment will not be made until roof maintenance manual is submitted.)
 - b. Roof Maintenance and Inspection Manual shall include:
 - 1) Cover letter recommending to the Owner that two roof maintenance inspections should be conducted per year.
 - 2) Table of Contents.
 - 3) Visual observation checklist indicating specific flashings and details to be observed. Include items such as base flashing seams, reglets and counterflashings, roof edge flashings, roof penetration flashings, roof curb flashings, boot flashings, roof drain areas, parapet wall flashings, copings, roof membrane seams, skylight flashings, etc. All applicable items shall be listed per project.
 - 4) Copies of "Project Record" roofing details.
 - 5) Roof plan indicating penetrations detail locations, roof drains, and seams.
 - 6) Final inspection report.
 2. Warranties: Special executable warranties specified in this Section. When warranties are delivered to the Owner, a cover letter shall be included directing the Owner to inform (copy) the manufacturer as well as the Contractor, when reporting roofing problems, regardless of when they occurred during the warranty period, including any "Punch List" items.
 3. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

1.9 QUALITY ASSURANCE

- A. Qualifications
1. Manufacturer Qualifications: A qualified manufacture that is UL listed or listed in FM Approvals' RoofNav, listed in SPRI's Directory of Roof Assemblies or Directory of Roof Assemblies (DORA) for roofing system identical to that used for this Project.
 - a. Manufacturer must be in addition to attending Pre-Installation Meeting and final inspection participants in Field Quality Control inspections to verify products are being installed as recommended. Inspections shall be schedule at critical points to verify membrane perimeter and penetrations are properly terminated per written instructions and submittal documents. Refer to "Field Quality Control" article for additional manufacturers inspections.

- 1) Manufacturer's inspector shall be a field technical inspector employed by the manufacturer not engaged in the sale of products. Inspector shall be experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and to determine installer's compliance with the requirements for the Project and the manufacturer's warranty certification.
 - 2) Manufacturer's inspector services shall include examination of substrates and conditions prior to membrane installation including verification of fastening of substrate to structure. Inspections shall also include observation of membrane installation, detailing, flashing, in progress work, and complete portions of the work.
 - 3) Manufacturer's inspector may not approve a roof installation as warrantable or acceptable if any current condition of the application of the new system does not meet the current published manufacturer's standards or submittals without review by A/E. The warrantability issue is part of the Contract Documents and does not take precedent over all contract requirements.
 - 4) Manufacturer's inspector shall provide a written report to the A/E, roofing contractor, and CM existing conditions on day of inspection, work occurring, observation of work, workmanship and materials stored at the project site. A minimum of 5 pictures of roofing work shall be included in the reports. Reports shall be submitted within 7 days of the site visit.
2. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to install and receive a manufacturer's 20 year (or manufacturer longest period for specified product) no-dollar-limit warranty. Installer must verify this approval with a letter from manufacturer and supply letter even if a lesser warranty is specified.
- a. The Contractor shall obtain from the roofing manufacturer copies of each roof inspection and furnish a copy to the A/E. The Contractor shall inform the roofing manufacturer, with regard to warranties, that warranties shall be issued, based upon the acceptance of the roofing work, and that deficiencies noted on inspection reports have been corrected. The manufacturer shall not refuse or restrict the provisions of its warranty, based upon deficiencies noted on inspection reports, especially any report that may not have been furnished to the A/E. Inspections shall be a minimum of 3 and scheduled randomly (no prior notification) and selection of the roofing manufacturer's inspector(s) shall not be influenced by the roofing subcontractors preferences. The A/E will not approve final payment of roofing work until final and interim inspection reports and warranty are in hand. The A/E's representative shall accompany the manufacturer's inspector and Roofing Installer during final inspection prior to issuing manufacturer's warranty.
 - b. The roofing installer shall have on the job whenever roofing work is being done, a foreman/supervisor with a minimum 3 years experience in the type of roofing specified or the roofing manufacturer's technical field representative and provide adequate number of experienced workman regularly engaged in this type of work who are skilled in the application techniques of the materials specified.
3. Roofing and associated work shall be performed by a single firm called the "Installer" in this Section, so that there will be undivided responsibility for the specified performance of components parts including, but not limited to, the following (even though some parts may be subcontracted to others):
- a. Division 06 Section "Rough Carpentry": For wood insulation stops, wood nailers, and blocking required for installation of new roof and sheet metal.
 - b. Division 07 Section "Preparation for Reroofing": For general requirements for reroofing.
 - c. Division 07 Section "Sheet metal Flashing and Trim."
 - d. Division 07 Section "Roof Specialties."
- B. There shall be no deviations made from this specification or the shop drawings without prior written approval of A/E. Any deviation from the manufacturer's installation procedures must be supported by a written certification on the manufacturer's letterhead and presented for the A/E's consideration.

- C. Source Limitations: Obtain components for membrane roofing system from same manufacturer as roofing membrane or approved by roofing membrane manufacturer accompanied with a letter of endorsement.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
 - 1. All materials delivered from manufacturers and suppliers should be carefully inspected at the time of delivery and examined during unloading. Manufacturers' product labels should be intact. Any damaged or unsuitable material should be rejected. Material that has been exposed to weather in transit or storage should be examined carefully for deterioration and damage.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
 - 2. Lids should be secured on cans of stored material.
 - 3. Water-based materials such as asphalt emulsions, acrylic coatings and water-based adhesives should be protected from freezing.
 - 4. Solvents, adhesives, and sealants should be stored at proper temperature.
 - 5. Store seam tapes and adhesives above 60 degrees F, unless otherwise recommended by manufacturer.
 - a. Jobsite storage temperatures in excess of 90 deg F. may effect shelf life of curable materials.
 - b. When the temperature is expected to fall below 40 deg F., outside storage boxes should be provided on the roof for temporary storage of liquid adhesives, sealants, primers and accessories. Containers must be rotated to maintain their temperature above 40 deg F.
 - 1) Prolonged exposure of pressure-sensitive flashing and tape to temperatures below 40 deg F. will cause the tape to lose tack and in extreme cases, not to bond to the substrate.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
 - 1. When moisture-sensitive materials are stored outside, they shall be placed on pallets or platforms that are raised off the ground or roof deck (at least 4 inches). Materials sensitive to moisture should be covered with water-resistant coverings that have been properly secured. Coverings that are "breathable," such as water resistant canvas tarpaulins are preferred. Cover top and sides of materials and secure cover. Remove wet products from project site.
 - a. During inclement seasons, or extended periods (two weeks) it is suggested that moisture sensitive materials be stored in vans or enclosed areas protected from moisture or elevated humidity.
 - b. Materials determined by A/E to be damaged or to have been subjected to adverse conditions shall be removed and replaced at contractor's expense.
 - 2. Protect insulation against concentrated loads, and standing loads exerting a force in excess of 50 percent of the materials compressive strength.
 - 3. Do not expose foam core to excessive heat, sparks, or open flame.
- D. Single-ply sheet materials may be stored as shipped with rolls laying horizontally or as recommended by manufacturer.
 - 1. When rolled materials are stored, the storage substrate should be swept to rid the surface of loose gravel, share objects and other debris that could damage the membrane material.

2. Cover with tarps so moisture does not gather in the rolls. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weld ability.
- E. Provide continuous protection of products during delivery, storage, handling, and application.
- F. Do not store roofing materials in concentrated areas of roof deck.
 1. Stored material should be raised up off the roof surface out of any standing water.
- G. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.
 1. Average live loads on the roof during the work shall not exceed twenty pounds per square foot at any time.
- H. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Closely follow precautions/instructions outlined on container or supplied by manufacturer/supplier.
 1. Liquid propane (LP) gas containers shall be stored upright at all times.
 - a. Comply with NFPA 58 "Standard for the Storage and Handling of Liquefied Petroleum Gases" as well as appropriate publications of the National LP Gas Association.

1.11 FIELD CONDITIONS

- A. Weather Condition Limitations:
 1. Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.
 - a. Proceed only when the Installer is willing to guarantee the work as required and without additional reservations and restrictions.
 2. Apply in dry weather on a dry deck only. Where rain or inclement weather occurs during application, the Work shall stop and not resume until the weather has cleared and the deck is dry.
 - a. When membrane roofing materials are applied, entrapment of moisture should be prevented. Moisture in or on materials may cause membrane problems. If precipitation occurs before completely installing the roof membrane, the membrane surface in the immediate work area and the substrate should be dried or allowed to dry before work resumes.
 3. Only as much roofing as can be made weathertight each day, including all flashing and detail work, shall be installed.
 - a. Uninterrupted waterstops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated membrane shall be replaced at no cost to the Owner.
 4. Cold Weather
 - a. When outside temperature is below 40 degrees F, certain combinations of temperature and humidity may cause condensation on surface of adhesives and primers. If this condition occurs, discontinue the application. When the ambient air conditions no longer cause condensation on adhesive surfaces and the membrane is clean and dry then reapply additional adhesive or primer and proceed.
 - b. The consistency of sealants, adhesives, and primers will begin to thicken as the temperature drops. To minimize this, the following is recommended:
 - 1) Start work with sealants, adhesives, and primers that have been stored between 60 and 80 degrees F. Insulated and heated boxes may be helpful.
 - 2) Complete test areas to determine if conditions will cause problems such as condensation with the application of the materials.

- 3) Stop the operation or change to another warm container when material becomes too thick to properly apply.
- c. When the outside temperature is below 40 degrees F, installation of the roofing system may require additional application procedures, consult with manufacturer:
 - 1) Ensure that the roof surface is dry. Moisture, even trace amounts, may cause poor adhesion, and may lead to moisture entrapment within the roofing system.

B. Cautions and Warnings

1. Do not use bitumen base, oil base, or plastic roof cements with EPDM membrane.
2. Do not install EPDM membrane directly onto asphalt.
3. Do not expose membrane and accessories to a constant temperature in excess of 180 degrees F.
4. Splicing and bonding surfaces must be clean and dry.
5. Do not thin products.
6. Provide protection for all roof areas exposed to traffic during construction.
7. Roofing Contractor shall implement all necessary precautions to prevent debris or materials/equipment from becoming airborne due to wind conditions anticipated at site. Roofing Contractor shall conform to all regulations and precautions as required by applicable safety organizations.
8. All methods employed in performing the work, and all equipment, tools, machinery used for handling materials and executing any part of the work, shall be subject to the approval of the CM and A/E before the work is started, and whenever found unsatisfactory, shall be charged and improved as required.
9. Roofing System
 - a. Solvents, adhesives, and primers used in the application of single-ply roofing systems are extremely flammable and/or toxic. Provide any and all crew members with appropriate safety data information and training as provided by the roofing materials manufacturer. Provide each crew member with appropriate training as it relates to the specific chemical compound they may be expected to deal with. Each crew member shall be fully aware of first aid measures to be undertaken in case of accidents, etc.
10. Note some of the steps in a self-adhering EPDM roof system installation can generate static electricity, particularly in dry working conditions. To avoid igniting flammable vapors, keep adhesives, primers and cleaners out of direct sunlight and away from the immediate work area when not in use and tell workers to discharge built-up static charge from their bodies before opening containers. Make sure a fire extinguisher is always on hand, regularly contain and remove jobsite debris and rubbish, and establish a means of egress from the roof in the event of a fire.

C. Construction Traffic: Construction site traffic from all trades should be limited to designated areas and walkways. Completed roof membranes are not suitable as work platforms or staging areas for other trades. If construction traffic is anticipated or inevitable, the use of temporary roofs can act as a sacrificial traffic surface, allowing for construction traffic and abuse until the primary weatherproofing membrane is installed.

1. Coordination between various trades is essential to avoid unnecessary rooftop traffic over completed sections of the roof and to prevent subsequent damage to the membrane roofing system.

1.12 WARRANTY

A. Special Total System Warranty: Manufacturer's standard form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.

1. Special "total system" warranty includes roofing membrane, base flashings, roofing accessories, roof insulation, fasteners, cover boards, substrate board, vapor retarder, and other components of membrane roofing system as required to keep the system watertight, including metal work i.e. coping and roof-edge specialties.
2. Warranty Period: 20 years from date of Substantial Completion.

3. The warranty shall guarantee the roof membrane system at wind speeds up to 72 mph measured at 10 meters above ground.
4. The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

B. Pro-rated System Warranties are not acceptable.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 1. Products: Subject to compliance with requirements, provide one of the products specified.
 2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.
- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. The "Substitution Request Form" and complete technical data for evaluation must accompany requests for A/E's approval. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.
- C. Source Limitations: Obtain components for roofing system from Manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roofing and base flashings shall remain watertight.
 1. Accelerated Weathering: Roofing system shall withstand 2,000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 2. Impact Resistance: Roofing system shall resist impact damage when tested according to ASTM D 3746, ASTM D 4272 or the "Resistance to Foot Traffic Test" in Section 5.5 of FM 4470.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.
- C. Roofing System Design: Provide a membrane roofing system that is listed on IBC ES-Reports or is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE 7/SEI and also as tested in accordance with FM 4474, UL 580, or UL 1897.
 1. Fire/Windstorm Classification: Calculations shall not result in a roofing design less than FM Class 1A-60 requirements.
- D. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approval 4474, UL 580, or UL 1897;
 1. Low Roof Areas (below 30 feet):
 - a. Field-of-Roof Uplift Pressure (Zone 1): 31.1 lbf/sq.ft
 - b. Perimeter Uplift Pressure (Zone 2): 52.2 lbf/sq.ft.
 - c. Corner Uplift Pressure (Zone 3): 78.5 lbf/sq.ft.

2. Roof Areas (above 30 feet):
 - a. Field-of-Roof Uplift Pressure (Zone 1): 32.6 lbf/sq.ft
 - b. Perimeter Uplift Pressure (Zone 2): 54.8 lbf/sq.ft.
 - c. Corner Uplift Pressure (Zone 3): 82.4 lbf/sq.ft.

- E. FM Approvals' RoofNav Listing: Roof membrane, base flashings, and component materials shall comply with requirements in FM Approvals 4450 or FM Approvals 4470 as part of a roof system, and shall be listed in FM Approvals' RoofNav for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals Certification markings.
 1. Hail-Resistance Rating: FM Global Property Loss Prevention Data Sheet 1-34 SH.

- F. SPRI's Directory of Roof Assemblies Listing: Roof membranes, base flashings, and component materials shall comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a roofing system, and shall be listed in SPRI's Directory of Roof Assemblies for roof assembly identical to that specified for this Project.

- G. Polyisocyanurate Insulation, Refer to Allowances.
 1. Compressive Strength: 20 psi min.
 2. Dimensional Stability – maximum dimensional change after installation (inches).
 - a. Length: +/- 1/8
 - b. Width: +/- 1/8
 - c. Thickness: +/- 1/16
 - d. Squareness: 1/16
 - e. Flatness: 1/16
 3. Moisture Vapor Transmission: ASTM E96, <1 perm.
 4. Water Absorption: ASTM C209, <1 percent by volume.
 5. Flame Spread: ASTM E84, <50.
 6. Service Temperature: Minus 100 degrees to 250 degrees F.
 7. Smoke Developed: ASTM E84, <450.
 8. Acidity: EPA Method 9045, 6 pH minimum, 8 pH maximum.
 9. Aged R-Value per Inch: ASTM C177 and C518, 5.6 R.

- H. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.3 EPDM ROOFING MEMBRANE

- A. EPDM Roofing Membrane: ASTM D 4637, Type II, scrim or fabric internally reinforced uniform, flexible fire-retardant sheet made from EPDM, and as follows:
 1. Manufacturers:
 - a. Carlisle SynTec Incorporated.
 - b. Elevate (fka Firestone Building Products, Co.)
 - c. Johns Manville, Inc.
 2. Thickness: 60 mils, nominal.
 3. Exposed Face Color: Black.
 4. Performance Requirements:
 - a. Underwriters Laboratory: Roof system shall be a UL Class "A" roof.
 - b. Underwriters Laboratory: Roof system must have a UL 2218 Class 4 rating.

2.4 AUXILIARY MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
 1. Liquid-type auxiliary materials shall meet VOC limits of authorities having jurisdiction.

- B. Sheet Flashing: 60-mil thick EPDM, partially cured or cured, according to application.
 - 1. Provide manufacturers standard pre-molded pipe flashing and corners, where possible.
 - 2. Provide pressure-sensitive flashing, nominal 30 mil cured, pre-applied adhesive. Provide a minimum 6 inch wide roll to flash metal edging and seams where required herein.
 - 3. Exposed Face Color: Black.
- C. Protection Sheet (Chemical): Epichlorohydrin or neoprene non-reinforced flexible sheet, 55 to 60 mil thick, recommended by EPDM manufacturer for resistance to hydrocarbons, non-aromatic solvents, grease, and oil.
 - 1. Exposed Face Color: Black.
- D. Bonding Adhesive: Manufacturer's standard bonding adhesive., water-based bonding adhesive shall be utilized unless cold conditions require the use of solvent-based adhesives- and their use is approved by A/E.
- E. Low-Rise, Urethane, Fabric-Backed Membrane Adhesive: Roof system manufacturer's standard spray-applied, low rise, two-component urethane adhesive formulated for compatibility and use with fabric-backed membrane roofing.
- F. Seaming Material: Manufacturer's standard synthetic-rubber polymer primer and 3-inch wide minimum, butyl splice tape with release film or factory-applied seam tape, width as recommended by manufacturer.
- G. Lap Sealant: Manufacturer's standard single-component sealant.
 - 1. Color to match membrane if white-on-black membrane is used.
- H. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- I. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
 - 1. Use only where indicated. In areas where metal counterflashing or surface mounted reglets are used, they must be sealed with a sealant to prevent moisture migration behind the flashing.
- J. Fasteners: Membrane manufacturer to assure all warranty conditions are met and shall approve fasteners. The type of fastener shall be appropriate for the substrate to achieve maximum withdraw and anticorrosion characteristics. The membrane manufacturer approved fasteners shall also meet the following requirements.
 - 1. Mixing metal types and methods of contact shall be assembled in such a manner as to avoid galvanic corrosion. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins. All concrete fasteners and anchors shall have a minimum embedment of 1-1/4 inch and shall be approved for such use by the fastener manufacturer. All miscellaneous wood fasteners and anchors used for flashings shall have a minimum embedment of 1 inch and shall be approved or such use by the fastener manufacturer.
 - 2. Pullout Testing: Fastener shall provide a minimum pullout resistance of 450 pounds.
 - 3. Static Backout Resistance: Fastener shall provide a minimum static backout resistance of 10 inch pounds.
 - 4. Where fasteners will be in contact with wood treated with preservative chemicals, provide fasteners and anchorage with hot dip zinc coating of G90 complying with ASTM A153 or of Type 304 or 316 stainless steel.
- K. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.
 - 1. Provide white flashing accessories for white EPDM membrane roofing.

- L. Liquid coating, specifically formulated for coating EPDM membrane roofing, as follows:
 - 1. Type:
 - a. Acrylic emulsion complying with ASTM D 6083.
 - b. Chlorosulfonated polyethylene complying with ASTM D 3468.
 - 2. Color: Grey.
 - 3. Only utilize where required by project conditions and detailing requirements.
- M. Secondary Seal/Flexible Vapor Retarder: Continuous waterproof EPDM membrane ASTM D 4637, or Neoprene membrane within joint and attached to substrate on each side.
 - 1. Expansion joints
- N. Thermal Insulation/Compressible Insulation: Mineral-fiber blanket, ASTM C 665, to fill space above secondary seal/flexible vapor retarder.
 - 1. Maximum flame-spread and smoke-development indexes of 25 and 50 respectively, per ASTM E 84.
 - 2. Expansion joints.
- O. Flexible Foam Rod: Closed-cell support foam in configuration indicated on Drawings.
 - 1. Expansion joints.

2.5 ROOF INSULATION (see allowances)

- A. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.
 - 1. Insulation must be manufactured by or approved in writing by membrane manufacturer for system specified. Insulation must meet requirements for manufacturers total system warranty requirements and comply with FM 4450 or UL 1256.
 - a. Insulation shall be approved for use in FM Approval's RoofNav listed roof assemblies or approved for use in SPRI's Directory of Roof Assemblies listed roof assemblies.
- B. Polyisocyanurate Board Insulation: ASTM C 1289-11A, Type II, Class 2, Grade 2 min., coated polymer bonded glass fiber mat facer on both major surfaces. Facers shall be non-organic biological growth resistant. Provide Grade 3 when required by manufacturer to meet Performance and Warranty requirements.
 - 1. Thermal resistance of insulation shall be calculated as 5.6 per inch.
 - 2. Roof insulation assembly shall be a minimum thermal resistant value of R-20 average thickness.
 - 3. Bottom Layer: 2 inch, maximum.
 - 4. Size: Restrict boards installed in adhesive to 4 foot by 4 foot.
- C. Tapered Insulation (Field of Roof): Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48), unless otherwise indicated.
 - 1. Polyisocyanurate Insulation to match roof insulation.
 - a. Minimum Thickness: 1/2 inch at start of tapered sections, unless otherwise noted.
 - b. Average Thickness: calculated using the Volumetric Average Thickness method as required to achieve R-20 average.
- D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
 - 1. 1/2 inch per foot, unless otherwise indicated on Drawings.

2.6 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

- B. Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions in FM Approvals Corrosion Test, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer. The type of fastener shall be appropriate for the substrate to achieve maximum withdraw and anti-corrosion characteristics. The membrane manufacturer approved fasteners shall also meet the following requirements:
1. FM 4470 SPRI Corrosion Test Procedure and Guidelines for Roofing Fasteners. To pass, the fasteners shall not accumulate more than 15 percent red rust after the "required number cycles" in the Kesternich cabinet.
 - a. FM and SPRI recommended number, but in no case shall it be less than 15.
 2. Pullout Value: Fastener shall provide a minimum pullout of 450 lbs.
 3. Static Backout Resistance: Fastener shall provide a minimum static backout resistance of 10 inch pounds.
 4. Steel Deck
 - a. Fasteners to have self-drilling tip. Fastener tip shall be capable of cutting steel deck material of 20 gauge thickness at point of steel deck segment overlap without damage to the fastener tip.
 - b. Fasteners shall be installed in high flute of metal deck with a minimum of three-quarter inch (3/4") penetration. Fasteners shall not extend past the bottom of the metal deck.
- C. Bead-Applied Insulation Adhesive: Insulation manufacturer's recommended bead-applied, low-rise, multicomponent urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.
- D. Full-Spread Applied Insulation Adhesive: Insulation manufacturer's recommended spray-applied, low-rise, two-component urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.
- E. Cover Board: Provide one of the following coverboards as approved by roofing manufacturer for system specified:
1. ASTM C 1177, glass mat, water resistant gypsum substrate (primed). Facers shall be non-organic biological growth resistant).
 - a. Manufactures:
 - 1) DensDeck Prime with EONIC Technology; Georgia-Pacific Gypsum.
 - 2) DEXcell FA; National Gypsum.
 - 3) GlasRock Roof Board; CertainTeed Corporation.
 - 4) Securock UltraLight Coated Glass-Mat Roof Board; USG
 2. High-Density Polyisocyanurate: High-density polyisocyanurate technology bonded-in-line to mineral-surfaced, fiber glass reinforced facers with greater than 80 lbs. of compressive strength.
 - a. Thickness: 1/4-inch minimum. Provide 1/2-inch thickness where required to meet assembly and warranty requirements.
 - 1) R-Value: 1/2 inch, R-2.5.
 3. Fiber-Reinforced Cementitious Cover Board: ASTM C1325, fiber-mat-reinforced cementitious board.
 - a. Thickness: 1/2 inch.
 4. Not Acceptable: Do not substitute either cellulosic fiber (ASTM C208), Oriented Strand Board, or fiber-reinforced gypsum roof board (ASTM C1278).
- F. Sprayed-Polyurethane Foam Sealant: 1 or 2 component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb./cu.ft. density; flame spread index for 25 or less according to ASTM E 162; with primer and non corrosive substrate cleaner, if recommended by foam sealant manufacturer.
1. Provide single-component polyurethane sealant low-expansion sealing gaps less than 1/2 inch.
 2. Provide one component foam for voids from 1/4 to 2 inches.

3. Manufacturers
 - a. Dow Chemical Company
 - 1) Great Stuff Pro Gaps and Cracks; gap $\leq$ 1/2 inch
 - 2) Froth Pak Foam Sealant; gap $\leq$ 1/2 inch
 - b. Convenience Products
 - 1) Home Seal; gap $\leq$ 1/2 inch
 - c. FOMO Products
 - 1) Extreme; gap $\leq$ 1/2 inch
 - 2) Handi Foam; gap $\leq$ 1/2 inch
 - d. Hilti Corporation
 - 1) CF810; gap $\leq$ 1/2 inch

2.7 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 30- to 39-inches wide by at least 0.072-inch thick, and acceptable to membrane roofing system manufacturer.
 1. Color: Contrasting with roof membrane.

2.8 SOURCE QUALITY CONTROL

- A. Test Cuts and Seam Samples
 1. Take three random samples for roof applied. Sampling shall be done in accordance with manufacturer's protocols.
 2. Test cuts or seam samples may not represent the overall membrane seam construction. If test cuts or seam samples indicate defects, further sampling must be performed to establish the scope of corrective action.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 1. Material manufacturers printed installation instructions are available for information and review.
 2. Safety precautions and safety data sheets (SDS's) are available during application. The applicator shall follow all safety regulations as recommended by OSHA and other agencies.
 3. Specified materials and specified quantities, as verified by on-site inspection of product labels, are at the project site and are visually suitable for application (e.g., packaging not damaged, labels intact).
 4. Materials are stored according to the manufacturer's recommendations (e.g., proper temperature, covered, off ground, on pallets).
 5. Equipment is in good working order and functioning properly.
 6. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
 7. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 8. Verify work required for complete tie-in is in place. This includes masonry with special attention given to roof to wall transitions.
 - a. Verify that all counterflashing receivers, curbs, etc., are constructed in such a manner as to provide a minimum 8 inch base flashing height measured from the finished roof's surface to the top of the base flashing membrane.
 9. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 05 Section "Steel Decking."
 10. Drainage patterns for proper roof membrane installation have been identified.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Start of roof insulation shall constitute acceptance of substrates by Contractor.

3.2 PREPARATION

- A. Review "Performance" and "Warranty" requirements with membrane manufacturer to ensure compliance before beginning roofing work.
- B. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
 - 1. All wall flashing areas must be smooth and dry. Irregular wall surfaces, old BUR, stucco, gypsum, rough stone, or masonry are not suitable for flashing. These surfaces must be covered with a minimum 3/4 inch exterior grade plywood fastened to resist a minimum 200 lb. pullout force.
- C. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
 - 1. Roof deck must be free of ponding water within 48 hours of rainfall. Use corrective measures to provide positive drainage.
- D. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
 - 1. When completion of flashings and terminations is not completed by the end of each workday, provisions must be provided to temporarily close the membrane to prevent water infiltration. Phased roofing is not acceptable.
 - 2. Temporarily seal loose membrane edge down slope so that the membrane edge will not buck water. Caution must be exercised to ensure that membrane is not temporarily sealed near drains in such a way as to promote water migration below membrane.
- E. Install acoustical roof deck rib insulation strips, specified in Division 05 Section "Steel Decking," according to acoustical roof deck manufacturer's written instructions, immediately before installation of overlying construction and to remain dry.

3.3 APPLICATION, GENERAL

- A. Application of the roofing products for installation shall be in accordance with the roofing material manufacturer's recommendations, FM Approvals' RoofNav or SPRI's Directory of Roof Assemblies assembly requirements, FM Global Property Loss Prevention Data Sheet 1-29 and additional requirements of the project specifications and drawings. Material manufacturer's recommendations related to weather (temperature, moisture, and humidity), surface preparation, and shelf life must be observed. The effect on the performance of materials, as well as installation costs and production, must be considered.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- C. Only install as much roofing as can be made weathertight each day, including all flashing work.
 - 1. Where possible, roof membrane panels shall be installed in such a fashion to create water-shedding seams.
- D. Metal deck surface to receive substrate board and insulation shall be thoroughly dry. Should surface moisture occur, the Contractor shall provide the necessary equipment to dry the deck surface prior to application of roofing components.

1. This is acceptable for the metal roof deck only. Drying of roofing components including substrate board, insulation, and cover boards is not acceptable. If any of these products have moisture in them, or have had moisture on them they shall be removed and replaced.
 2. Roof decks shall be rigid, tight, dry, and clean of dust or debris. No work shall start without testing of deck dryness at the beginning of each work day or period. It shall be the responsibility of the Contractor to maintain the deck in the proper and acceptable condition of application of the roof covering.
 - a. Installer shall verify that all roof drain lines are functioning correctly (not clogged or blocked) before starting work. Applicator shall report any such blockages.
- E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner, at all times, as to preclude wind blow-off or wind damage.
- F. Temporary water stops shall be installed at the end of each day's work, and shall be removed before proceeding with the next day's work. Temporary water stops shall be constructed to withstand protracted periods of inclement weather. Water stops shall be compatible with all materials and shall not emit dangerous or incompatible odors.
- G. The Contractor is cautioned that the roof membrane may be incompatible with certain substances. Such materials shall not come into contact with the roof membrane at any time. If such contacts occur, the material shall be cut out and discarded. The Contractor shall consult material manufacturer with respect to material compatibility precautions, and recommendations.
- H. Liquid materials such as solvents and adhesives shall be stored in accordance with requirements of the Safety Data Sheets provided by the respective manufacturer.
- I. Contaminants, such as grease, fats, oils and solvents, shall not be allowed to come into contact with the roofing membrane.
- J. If any unusual or concealed condition is discovered, stop the work and notify the CM immediately in writing.
- K. Coordinate installation and transition of roofing system component serving as an air barrier with air barrier specified.
- L. Quality Control (During Application) Checklist
1. Weather and job conditions are suitable for the application.
 2. Substrate is sufficiently dry and suitably prepared to receive the insulation and roof membrane.
 3. Insulation and cover boards, if applicable, are butted together, as required, with joints staggered and offset if more than one layer is being used.
 4. Insulation is firmly attached with specified type and number of fasteners, or embedded in adhesive to substrate or underlying insulation as specified.
 5. Temporary water cut-offs are installed at the end of each day's work as required.
 6. Membrane sheets are installed so side laps and end laps that buck water are minimized.
 7. Perimeter membrane fastening complies with specifications and manufacturer's requirements.
 8. Membrane flashings are installed along with each day's completed roof area.
 9. In high-traffic areas, protection board is being used over newly completed membrane.
 - a. Roof is not being abused by other trades.

3.4 INSULATION INSTALLATION

- A. Comply with roofing system manufacturer's written instructions for installing roof insulation, including warranty requirements for installing insulation.
1. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
 2. Size: Restrict boards installed in adhesive to 4 foot by 4 foot.

- B. Roof Insulation - General: Lay in multiple layers. Edges shall be butted to provide moderate contact but not deformed or placed in surface compression. Neatly cut and fit insulation around projections and vertical surfaces. Edges shall be mitered at ridges and elsewhere to prevent open joints or irregular surfaces. Stagger end joints 6 inches in adjoining courses of base course. Stagger joints in succeeding layers with joints of layer below.
1. Insulation shall be installed in multiple layers except a single layer may be used for one board width, around roof drains, if thickness at drain is 2-1/2 inches or less.
- C. Install tapered insulation under area of roofing to conform to slopes indicated. Tapered insulation combined with tapered saddles and drainage crickets shall achieve positive drainage. Tapered saddles at a 1/2 inch per foot slope shall be placed between drains, and crickets shall be placed on the up slope side of mechanical, skylight, and other curbs to provide positive drainage. Mechanical units should not restrict flow of runoff water.
1. Refer to NRCA Roofing and Waterproofing Manual - 2011, Figure 10-7, "Guide for Crickets and Saddles" and Figure 10-8, "Guide for Crickets."
 2. Tapered insulation shall be installed between the bottom and top layer of flat stock insulation. This will prevent stepped transitions from occurring at the edge of tapered insulation boards.
 3. Tapered insulation should originate at the valley line/low point of the roof in lieu of the center of the roof drains. The structure often causes the roof drains to be offset from the valley line/low point of the roof. Saddles/crickets shall provide positive slope towards drains and not allow ponding to occur in valley lines.
 4. Use tapered insulation to provide a 4 by 4 foot minimum, 8 by 8 foot square sump centered on drains is preferred, where possible.
 - a. Do not field taper insulation.
- D. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation or low-rise urethane adhesive.
1. Support the two opposite sides of each board on steel deck flanges, as close as practical to the center of the flange with a minimum bearing width of 1 inch. Trim board edges if they veer off the flange center.
 2. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
 3. Fill remaining gaps around projections, penetrations, and perimeters with low-rise urethane adhesive (foam), including but not limited to:
 - a. Between perimeter of insulation board and nailers.
 - b. Between nailers and vertical walls.
 - c. Between penetrations and insulation boards.
 - d. Between voids in insulation boards, inclusive of roof system slope transition conditions.
 4. All voids to be filled to match full thickness of insulation boards.
 5. Provide polyurethane foam sealant produced or acceptable to the roofing system/installation system manufacturer.
- E. Adhered Insulation over Metal Deck: Install each layer of insulation and/or cover boards adhere to substrate by one of the following methods as approved by membrane manufacturer:
1. Set each layer of insulation in adhesive. Provide one of the following as recommended by manufacturer:
 - a. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - b. Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
 2. Size: Boards shall not exceed 4 foot by 4 foot.
 3. Location: Acoustical deck locations with substrate board and air and vapor barrier.
- F. Mechanically Fastened and Adhered Insulation over Metal Deck: Install each layer of insulation and secure first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof. Where vapor-retarder is part of the roof assembly, provide a minimum of 1 fastener per 2 sq.ft.
 - a. Fasteners shall be installed in high flute of metal deck with a minimum of 1-inch penetration.
 - b. Fastener and plate setting shall be executed with an automatic setting device to ensure uniformity and correct setting torque.
2. Install subsequent layers of insulation and/or cover boards in one of the following methods:
 - a. Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - b. Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
3. Size: Restrict boards installed in adhesive to 4 foot by 4 foot.
4. Location: All locations with standard metal deck and air and vapor barrier.

3.5 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction.
 1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 2. At internal roof drains, conform to slope of drain sump.
 - a. Trim cover board so that water flow is unrestricted.
 3. Cut and fit cover board tight to nailers, projections, and penetrations.
 4. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav listed roof assembly requirements for specified Windstorm Resistance Classification and SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:
 - a. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
 - b. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
- B. Install slip sheet over cover board and immediately beneath roofing as required by roofing manufacturer.

3.6 ADHERED ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing according to membrane roofing system manufacturer's written instructions. In addition, the corner and perimeter areas shall have enhanced fastening in accordance with FM1-29.
 1. Unroll roofing membrane and allow to relax before installing.
 2. Install sheet according to ASTM D 5036.
- B. Start installation of roofing membrane in presence of membrane roofing system manufacturer's technical personnel, A/E, and testing laboratory representative, if required.
- C. Accurately align roofing membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply bonding adhesive to substrate and underside of roofing membrane at rate required by manufacturer and allow to partially dry before installing roofing membrane. Do not apply bonding adhesive to splice area of roofing membrane.

1. The membrane adhesive shall be installed per the membrane manufacturer's requirements. Note: Differing insulation facers require specific application methods and qualities of adhesives. Water-based adhesives should be utilized (unless cold conditions require the use of solvent-based adhesives); inclusive of manufacturer's required fasteners and additional fastener requirements as required meeting performance requirements.
 - a. Conversion to the solvent-based adhesive shall be only with permission from the A/E and manufacturer.
 - b. Bidder is cautioned to include the type of bonding adhesive that the membrane manufacturer will warrant based on the conditions under which the roof will be installed.
- E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing. The roof membrane shall be secured to nailers.
 1. Membrane shall be secured at the perimeter of each roof level, roof section, expansion joint curb, skylight, interior wall, penthouse, etc., at any angle change which exceeds 2 inches in one horizontal foot and at all other penetrations in accordance with manufacturer's details.
 2. Terminate membrane under a termination bar with counterflashing, metal fascia or coping, unless otherwise noted or approved as part of submittal process.
 3. Provide premolded accessories and corners, unless otherwise noted or approved as part of the submittal process.
 4. Membrane terminations shall occur vertically to wall and curb substrate at all locations where feasible. Avoid fastener penetration of roofing assembly to the greatest extent possible at all locations
- F. Apply roofing membrane with side laps shingled with slope of roof deck where possible, where not possible cover edge of sheet with a uniform fillet of sealant. Determine the direction of water drainage and the low point of the deck. The orientation of both ends and side laps shall be such that the direction of water flow (slope) changes to avoid backwater laps.
 1. Allow sufficient membrane to cover parapet walls and flashing details at roof edge.
- G. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping roofing membranes according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.
 1. Apply a 6 inch strip of sheet flashing over each seam and patch all T-seams.
- H. Factory-Applied Seam Tape Installation: Clean and prime surface to receive tape.
 1. Firmly roll side and end laps of overlapping roof membrane to ensure a weathertight seam installation.
 2. Apply lap sealant and seal exposed edges of roofing terminations.
- I. Repair tears, voids, and lapped seams in roofing that does not meet requirements.
- J. Spread sealant or mastic bed over deck drain flange at deck drains and securely seal roofing membrane in place with clamping ring.
- K. In-Splice Attachment: Secure one edge of roofing membrane using fastening plates or metal battens centered within membrane splice and mechanically fasten membrane to roof deck. Field-splice seam.
- L. Install roofing membrane and auxiliary materials to tie in to existing roofing to maintain weather tightness of transition and not void warranty of existing roof system, if applicable.
- M. Apply protection sheet directly over EPDM membrane for a minimum distance of 10 feet out from kitchen exhaust vents or clusters of vents in all directions. Comply with manufacturer's installation instructions.

3.7 BASE FLASHING INSTALLATION

- A. General: All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of A/E and membrane manufacturer. Approval shall only be for specific locations and dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed and replaced at the Contractor/Applicator's expense. Flashing shall be adhered to compatible dry, smooth, and solvent-resistant surfaces. Use caution to ensure adhesive fumes are not drawn into the building.
- B. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
 - 1. All flashing membrane should extend a minimum of 12 inches above roof level, unless otherwise noted. If in question, submit in writing (RFI) to A/E and membrane manufacturer's technical department for signed approval.
 - 2. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Clean and prime both faces of splice areas, apply splice tape, and roll side and end laps of overlapping roofing membranes according to manufacturers' written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of roofing membrane terminations.
 - 1. Apply a 6 inch strip of sheet flashing or manufactured T-joint cover at all T-seams (field splice installations).
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars, covered by counterflashing. Do not tightly butt the termination bars or cross expansion joints with a solid bar.
- F. Flashing
 - 1. Walls, Parapets, and curbs
 - a. Reinforced Universal Securement Strip
 - 1) Splice the EPDM deck membrane to the securement strip before bonding the membrane to the vertical surface. Membrane must be fully adhered to vertical surfaces.
 - 2. Metal Edge Terminations approved by ANSI/SPRI ES-1
 - a. The width of the perimeter wood nailer to which the metal edge is to be secured must extend beyond the width of the metal edge deck flange.
 - b. The metal edge must be secured to the wood nailer as specified by the manufacturer.
 - c. All perimeter wood nailers must be totally concealed by extending the deck membrane to completely cover the nailers and extend past the bottom edge of the nailers a minimum of 3/4 inches. Membrane shall lap onto adjacent wall cladding a minimum of 3/4 inches.
 - d. Prior to flashing, scrub the metal edge deck flange and membrane with splice cleaner to remove field contaminants.
 - 3. Expansion Joints
 - a. The EPDM deck membrane must be secured on both sides of expansion joints with reinforced universal securement strip. Refer to expansion joint details for proper securement details.
 - b. Membrane junctions at expansion joint intersections, expansion joint repairs, and intersections between expansion joints to wall or edging, must be flashed using 3 layers of uncured form flashing with each layer 3 inches larger than the previous layer in all directions.
 - 4. Roof Drains: Roof drain flashing shall be fully adhered, without seams located in tapered sump, and installed in strict accordance with the membrane manufacturer's requirements.

- a. During the flashing operation, drain openings shall be protected against debris, etc.
 - b. Provide a smooth transition from the roof surface to the drain-clamping ring. Prepare the substrate around each roof drain to avoid membrane bridging (Minimum 12 inch) at the sump area and possible distortion at the drain clamping ring.
 - c. The mating surfaces between the clamping ring and drain base must be clean and have a smooth finish.
 - d. Cut the membrane so it extends approximately 1/2 inch beyond the attachment points of the drain damping ring.
 - 1) Under no circumstances should the hole in the membrane restrict water flow or be smaller than the drain tube.
 - e. The seal between the membrane and the drain base must be provided by Water Cut-Off Mastic under compression.
 - f. Remove all existing flashing, cement, and lead in preparation for the membrane seal (application of Water Cut-Off Mastic).
 - g. All bolts and/or clamps must be in place to provide compression on the Water Cut-Off Mastic.
 - h. Upon completion of roofing activities, check drain pipe, to ensure that drain line is free of obstruction. Any obstructions shall be removed.
5. Vent Pipes: Refer to Division 07 Section "Roof Accessories" for preformed flashing sleeves.
- a. Flash pipes with Molded Pipe Flashing where their installation is possible.
 - 1) Use stainless steel clamps to seal at top.
 - b. Molded pipe flashing cannot be cut and patched; deck flanges cannot overlap or be installed over angle changes.
 - c. Where Molded Pipe Flashing cannot be installed, apply field fabricated pipe seals using uncured flashing.
 - 1) Never use a wrap around detail or molded pipe flashing on a warm or hot penetration.
6. Mechanical Units and other Raised Curbs
- a. Sheet metal counterflashing shall be installed to cover the top edge and overlap the upper portion of membrane base flashings unless the integral flange of the curb mounted with adequately covers the top of the membrane flashing.
 - 1) Provide a 4-inch coverage of roof flashings with counterflashings.
 - b. Refer to Division 07 Section "Roof Accessories."

3.8 WALKWAY INSTALLATION

- A. Flexible Walkways: Install walkway products in locations indicated. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.
- 1. Install walkways at all traffic concentration points such as roof hatches, access doors, and top and bottom of roof top ladders.
 - 2. Install walkway one full width of flexible walkway around serviceable rooftop equipment.
 - 3. As required by roof membrane manufacturer's warranty requirements.
 - 4. Provide 6 inch clearance between adjoining pads.
 - 5. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.9 FIELD QUALITY CONTROL

- A. Manufacturers Roof Inspections: Roofing Contractor shall notify roof manufacturer in writing of schedule for Work of this Section to allow sufficient time for inspecting. Do not modify details shown in the contract documents or shop drawings without consent of manufacturer's representative and A/E. Arrange for site inspections to verify conformance with written material manufacturer's instructions, submittals, and the Contract Documents including this section of the project specifications.
1. In addition to the pre-installation meeting and final roof inspection the manufacturer shall perform inspections at the following minimum rate:
 - a. Up to 10,000 sq.ft. of roof contract requires one (1) inspection.
 - b. 10,000 to 35,000 sq.ft. of roof contract requires two (2) inspections.
 - c. 35,001 to 75,000 sq.ft. of roof contract requires three (3) inspections.
 - d. 75,001 to 125,000 sq.ft. of roof contract requires four (4) inspections.
 - e. 125,001 to 200,000 sq.ft. of roof contract requires five (5) inspections.
 - f. 200,001 sq.ft. and over of roof contract requires six (6) inspections.
 2. Forward written reports to A/E within 10 working days of the inspection and any testing performed.
 3. If the inspection reveals any defects, promptly remove and replace defection work at no additional cost to Owner.
- B. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense will be performed to determine if replaced or additional work complies with specified requirements.

3.10 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to A/E and Owner.
1. Protect existing membrane roofing system and where continued construction traffic is anticipated.
 - a. Loosely lay 1-inch minimum thick, molded expanded polystyrene (MEPS) insulation over the roofing membrane in areas indicated. Loosely lay 15/32-inch plywood or OSB panels over MEPS. Extend MEPS past edges of plywood or OSB panels a minimum of 1 inch.
 - 1) Protection sheet or mat: Provide a sacrificial layer of matching membrane sheet extending minimum 6 inches beyond insulation in all directions or a woven or nonwoven polypropylene, polyolefin or polyester fabric, water permeable and resistant to UV degradation, type and weight as recommended by roofing system manufacturer for application.
 - b. Limit traffic and material storage to areas of roofing that have been protected.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.11 DEMONSTRATION

- A. Demonstration and Training: Provide instruction, including but not limited to the following items:
1. Review warranty requirements.
 2. Review maintenance data.

3. Review inspection procedures including:
 - a. Where to look, e.g., roof access points, walkways, rooftop mechanical units, and litter.
 - b. What to look for: cuts and punctures and compressed or crushed insulation.
 - c. Remedial actions, emergency repair procedures.
 - d. Preventative actions.

END OF SECTION 07 53 23

SECTION 07 71 00 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following manufactured roof specialties:
 - 1. Roof-edge specialties.
 - 2. Counterflashings and reglets.
- B. Related Sections include the following:
 - 1. Division 06 Section "Rough Carpentry" for wood nailers, curbs, and blocking.
 - 2. Division 06 Section "Sheathing."
 - 3. Division 07 Section "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim.
 - 4. Division 07 Section "Joint Sealants" for field-applied sealants.

1.2 DEFINITIONS

- A. Shop or Field Formed Sheet Metal: Includes components that will be formed or fabricated in the field or at the fabricator's shop. Fabrication of sheet metal flashing and trim roofing is predominantly by press brake forming.
 - 1. Shop or field formed roof membrane termination are not acceptable.
- B. Prefabricated or Manufactured Roof Specialties: Items that will be plant manufactured ready for installation on a roof or parapet. Edge securement for low-slope roofs shall demonstrate compliance with ANSI/SPRI ES-1.
- C. SPRI: Sheet membrane and component suppliers to the commercial roofing industry (address: 411 Waverly Oaks Road, Suite 331B, Waltham, MA 02452-8422, URL: www.spri.org, voice: 781-647-7026).

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate installation of manufactured roof specialties with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.
 - 1. Verify that other trades and related work are complete before mounting coping covers.
 - a. Ensure that information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.
 - b. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.
 - 2. Mounting surfaces shall be straight and secure; substrates shall be of proper width.
 - 3. Refer to the construction documents, shop drawings and manufacturer's installation instructions.
 - 4. Coordinate installation with roof membrane manufacturer's installation instructions before starting.
- B. Preinstallation Conference: Conduct conference at Project Site in conjunction with roofing conferences.
 - 1. Meet with Owner, CM, A/E, Installer, and installers whose work interfaces with or affects roof specialties including installers of roofing materials and accessories.
 - 2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
 - 3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 2. Include preparation instructions and recommendations, storage and handling requirements and recommendations and installation methods.
 3. For copings and roof edges, submit calculations and indications of ASNI-SPRI compliance for the different conditions and components. Indicate different requirements or conditions on shop drawings or roof plan.
- B. Shop Drawings: Show layouts of manufactured roof specialties, including plans and elevations. Identify factory- vs. field-assembled work. Include the following:
1. Details for fastening, joining, supporting, and anchoring manufactured roof specialties including fasteners, clips, cleats, and attachments to adjoining work.
 2. Details for expansion and contraction, locations of expansion joints, including direction of expansion and contraction.
 3. Details of termination points and assemblies, including fixed points.
 4. Details of special conditions, including accessory locations.
 5. Indicate profile and pattern of seams and layout of fasteners, cleats, clips, and other attachments.
- C. Samples for Initial Selection: For each type of manufactured roof specialty indicated with factory-applied color finishes.

1.5 CLOSEOUT SUBMITTALS:

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals.
1. Warranty: Special warranty specified in this Section.
 2. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are SPRI ES-1 tested to specified design pressure.
- B. Source Limitations: Obtain roof specialties approved by manufacturer providing roof-system warranty specified in Division 07.
- C. Mockups: Build mockups to verify selections made under sample submittals, to demonstrate aesthetic effects, and set quality standards for fabrication and installation.
1. Build mockup of typical roof edge.
 2. First-in-place, approximately 10 feet long or to first expansion joint of typical roof edge, including fascia, gutter, and downspout, including supporting construction, seams, attachments, underlayment, and accessories shall serve as mockup.
 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless A/E specifically approves such deviations in writing.
 4. Subject to compliance with requirements, approved mockups may become part of the completed work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.
- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.

- D. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof specialties installation.

1.8 SEQUENCING

- A. Ensure that information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.
- B. Ensure that products of this Section are supplied to affected trades in time to prevent interruption of construction progress.
- C. Coordinate installation with roof membrane manufacturer's installation instructions.

1.9 WARRANTY

- A. Roofing-System Warranty: Roof specialties associated with low-slope roof areas are included in warranty provisions in Division 07 Section "Thermoplastic Membrane Roofing".
- B. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace manufactured roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Products: Subject to compliance with requirements, provide one of the products specified and approved by roof membrane manufacturer for "Total System Warranty".
 - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified and approved by roof membrane manufacturer for "Total System Warranty".
- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. The "Substitution Request Form" and complete technical data for evaluation must accompany requests for A/E's approval. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested according to SPRI ES-1 and capable of resisting design pressures:

- C. Thermal Movements: Provide manufactured roof specialties that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- D. Water Infiltration: Provide manufactured roof specialties that do not allow water infiltration to building interior.
- E. Roof Specialties: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
 - 1. If there is a discrepancy between these references and the project specifications and drawings, the more stringent requirements shall govern as verified by the A/E.

2.3 EXPOSED METALS

- A. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
 - 1. Surface: Smooth, flat finish.
 - 2. Exposed Coil-Coated Finishes: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions
 - a. Two-Coat Fluoropolymer: AAMA 2605. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
 - b. Three-Coat Fluoropolymer: AAMA 2605. System consisting of primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent PVDF resin by weight.
 - c. Concealed Surface: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.
- B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:
 - 1. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.
 - b. Fluoropolymer 3-Coat System: Manufacturer's standard 3-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight, with a minimum total dry film thickness of 1.5 mil; complying with AAMA 2605.
- C. Stainless-Steel Sheet: ASTM A 240 or ASTM A 666, Type 304, No. 4 (fine reflective, polished directional satin) finish.

2.4 CONCEALED METALS

- A. Aluminum Sheet: ASTM B 209, alloy and temper recommended by manufacturer for use and structural performance indicated, mill finished.
- B. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.

- C. Stainless-Steel Sheet: ASTM A 240 or ASTM A 666, Type 304.
- D. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality.

2.5 UNDERLAYMENT MATERIALS

- A. Synthetic Underlayment: Laminated or reinforced, woven polyethylene or polypropylene, synthetic roofing underlayment; bitumen free; slip resistant; suitable for high temperatures over 220 deg F; and complying with physical requirements of ASTM D 226 for Type I and Type II felts.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Atlas Roofing Corporation; Summit
 - b. Kirsch Building Products, LLC; Sharkskin Comp or Sharkskin Ultra
 - c. SDP Advanced Polymer Products Inc; Palisade
- B. Self-Adhering, High Temperature Sheet: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Carlisle Residential, a division of Carlisle Construction Materials; WIP 300HT
 - b. GCP Applied Technology; Grace Ice and Water Shield HT or Ultra
 - c. Henry Company; Blueskin PE200 HT
 - d. Metal-Fab Manufacturing, LLC; MetShield
 - e. Owens Corning; WeatherLock Specialty Tile and Metal Underlayment
 - f. Polyguard Products, Inc.; Deck Guard HT
 - g. Protecto Wap Company; Protecto Jiffy Seal Ice & Water Guard HT
 - h. SDP Advanced Polymer Products Inc; Palisade SA-HT

2.6 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, separators, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to withstand design loads.
 - 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
 - 2. Fasteners: Series 300 stainless steel, unless otherwise noted.
- C. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.
- D. Elastomeric Sealant where indicated only; ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
 - 1. Provide where sealant will be exposed or movement exceeds butyl sealant movement capacity.
- E. Butyl Sealant unless otherwise noted: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.
- F. Bituminous Coating: Cold-applied asphalt mastic, ASTM D 1187 or SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
- G. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

- H. Laminated Metal: Roof membrane manufacturer's minimum 0.0247 inch thick (fka 25 gauge) galvanized steel with minimum 17-mil polyvinyl-chloride (PVC) coating.

2.7 ROOF EDGE SPECIALTIES

- A. Roof Edge Fascia (for Single-Ply Membrane Roofing): Manufactured, two-piece, roof edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet and a continuous formed- or extruded-aluminum anchor bar with integral drip edge cleat to engage fascia cover and secure single-ply roof membrane. Provide matching mitered and welded corner units.
 - 1. Products: Approved by roof manufacturer for "Total System Warranty".
 - a. Fascias with Formed Retainer:
 - 1) Econosnap Roof Edge System; OMG Edge Systems (fka W.P. Hickman)
 - 2) Perma-Tite System 200; Metal-Era
 - 3) Type SP Fascia; Architectural Products
 - 4) Presto-Tite; Johns Manville
 - 5) Edge-Lok 2 Fascia; ATAS International
 - 2. Fascia Cover: Fabricated from the following exposed metal:
 - a. Formed Aluminum: In thickness that will satisfy calculated wind-load requirements and NRCA guidelines.
 - 1) Minimum thickness: 0.040 inch.
 - 3. Surface: Smooth, flat.
 - 4. Fascia Cover Color: Custom color "Red" to match metal plate wall panel and school color.
 - 5. Corners: Factory mitered and continuously welded.
 - 6. Splice Plates: Concealed of same material, finish, and shape as fascia cover, not less than 8 inches long with butyl sealant.
 - 7. Receiver: Manufacturer's standard material and thickness.
 - 8. Waterdam: With fascias with formed retainer, provide a continuous galvanized steel waterdam to terminate single-ply roofing at perimeter.
 - a. Continuous 24 gauge, G-90 galvanized steel.
- B. Metal Drip Edge: Manufactured, "L" shaped with continuous cleat with pre-slotted fastening holes. Provide matching corners and splice plates.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Metal Era
 - b. OMG Edge Systems (fka Hickman Co., W.P).
 - c. Architectural Products Co.
 - d. Applied Fabricators, Inc.
 - e. Drip Edge; Dimensional Metals
 - f. Drip Edge Fascia; ATAS International
 - 2. Fabricate from the following exposed metal:
 - a. Formed Aluminum: Thickness as required to meet performance requirements and NRCA guidelines.
 - 3. Corners: Factory mitered and continuously welded or mechanically clinched and seal watertight.
 - 4. Color: As selected by A/E from manufacturer's full range.

2.8 COUNTERFLASHINGS AND REGLETS

- A. Manufacturers: Subject to compliance with requirements, provide one of the following:
 - 1. Cheney Flashing Company.
 - 2. Fry Reglet Corporation.
 - 3. OMG Edge Systems (fka Hickman, W. P. Company).
 - 4. Keystone Flashing Company.
 - 5. Merchant & Evans, Inc.
 - 6. Metal-Era, Inc.
 - 7. Castle Metal Products.
 - 8. Heckmann Building Products Inc.

- B. Counterflashings: Manufactured units in lengths not exceeding 12 feet designed to snap into reglets or through-wall-flashing receiver and compress against base flashings or roof membrane with joints lapped, from the following exposed metal in thickness indicated:
 - 1. Stainless Steel: 0.0187 inch thick
- C. Reglets/Receivers: Manufactured units formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashings indicated with factory-mitered and -welded corners or mechanically clinched and sealed watertight, and junctions, from the following exposed metal in thickness indicated:
 - 1. Stainless Steel: 0.0187 inch thick
 - 2. Corners: Factory mitered and continuously welded or mechanically clinched and seal watertight.
- D. Types
 - 1. Surface-mounted with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
 - 2. For stucco application, with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
 - 3. For concrete application with temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
 - 4. For masonry application, refer to Division 04 Section "Unit Masonry Assemblies".
 - 5. Multiuse, for embedment in cast-in-place concrete.
- E. Accessories:
 - 1. Counterflashing wind-restraint clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing louver edge.
 - 2. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where reglet is provided separate from metal counterflashing.

2.9 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of work.
 - 1. Examine walls, roof edges, and parapets for suitable conditions for manufactured roof specialties.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- B. If substrate preparation is the responsibility of another installer, notify A/E of unsatisfactory preparation before proceeding.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best results for the substrate under the project conditions.
- C. Verify the manufacturer's roof edge details for accuracy to fit the assembly prior to fabrication.

3.3 UNDERLAYMENT INSTALLATION

- A. Synthetic Underlayment: Install synthetic underlayment, wrinkle free, according to manufacturers' written instructions, and using adhesive where possible to minimize use of mechanical fasteners under sheet metal.
- B. Self-Adhering Sheet Underlayment: Install wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water. Overlap edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

3.4 INSTALLATION, GENERAL

- A. General: Install manufactured roof specialties according to manufacturer's written instructions. Anchor manufactured roof specialties securely in place and capable of resisting forces specified in performance requirements. Use fasteners, separators, sealants, and other miscellaneous items as required to complete manufactured roof specialty systems.
 - 1. Install manufactured roof specialties with provisions for thermal and structural movement.
 - 2. Torch cutting of manufactured roof specialties is not permitted.
 - 3. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
 - 4. Provide uniform, neat seams with minimum exposure of solder and sealant.
 - 5. Install roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
 - 6. Do not use graphite pencils to mark metal surfaces.
 - 7. Install water cut-offs, as recommended by membrane manufacturer, under the anchor bar.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Coat concealed side of uncoated aluminum or stainless-steel manufactured roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing exposed-to-view components of manufactured roof specialties directly on cementitious or wood substrates, install a course of felt/synthetic underlayment and cover with a slip sheet, or install a course of self-adhering, high temperature sheet underlayment.
 - 3. Bed flanges in thick coat of butyl sealant where required by manufacturers of roof specialties for waterproof performance.
- C. Expansion Provisions: Provide for thermal expansion of exposed manufactured roof specialties.
 - 1. Space movement joints at a maximum of 12 feet with no unplanned joints within 18 inches of corners or intersections.
 - 2. When ambient temperature at time of installation is between 40 and 70 degrees Fahrenheit, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fasteners: Use fasteners of type and size recommended by manufacturer but of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws or as recommended by fastener manufacturer to achieve maximum pull-out resistance.

- E. Seal joints with butyl sealant as required by manufacturer of roofing specialties.
- F. Seal joints as required for watertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 degrees Fahrenheit.
- G. Expansion-Joint Covers: Install expansion-joint covers at locations and of configuration indicated. Lap joints a minimum of 4 inches in direction of water flow.

3.5 ROOF EDGE FLASHING INSTALLATION

- A. Install cleats, cant dams, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor roof edgings to resist uplift and outward forces according to performance requirements.
- C. Install accessories, including but not limited to edge flashing miters, splice plates, and transitions as required for water tight installation.

3.6 COUNTERFLASHING AND REGLET INSTALLATION

- A. General: Coordinate installation of reglets and counterflashings with installation of base flashings.
- B. Embedded Reglets: Installation of reglets is specified in Division 04 Section "Unit Masonry".
- C. Surface-Mounted Reglets: Install reglets to receive flashings where flashing without embedded reglets is indicated on Drawings. Install at height so that inserted counterflashings overlap 4 inches over top edge of base flashings.
- D. Saw-Cut Reglet: Saw-cut reglet joint into installed masonry veneer wall surface. Install reglet into cut joint ready to receive counterflashings. Install at height so that inserted counterflashings overlap 4 inches over top edge of base flashings.
- E. Counterflashings: Coordinate installation of counterflashings with installation of base flashings. Insert counterflashings in reglets or receivers and fit tightly to base flashings. Extend counterflashings 4 inches over base flashings. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric or butyl sealant.

3.7 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as manufactured roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace manufactured roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 07 71 00

SECTION 07 72 00 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Preformed flashing sleeves.
- B. Related Sections:
 - 1. Division 05 Section "Structural Steel Framing" for:
 - a. Supplemental roof framing supporting equipment and pipe supports.
 - b. Supplemental roof framing for openings at:
 - 1) Roof curbs for HVAC equipment.
 - 2) Roof hatches.
 - 2. Division 06 Section "Rough Carpentry" for roof sheathing, wood cants, and wood nailers.
 - 3. Division 07 low-slope roofing Sections for roofing accessories.
 - 4. Division 22 ("Plumbing") sections for coordinating pipe supports furnished and installed in this Section with plumbing piping furnished and installed by Plumbing Contractor.
 - 5. Division 23 ("HVAC") sections for roof curbs furnished and installed by HVAC Contractor for HVAC equipment.
 - a. Coordinate roof curbs and equipment and pipe supports furnished and installed in this Section with equipment and piping furnished and installed by HVAC Contractor.

1.2 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
- B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of roof accessory indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 1. Include details showing mounting type, relationships to surrounding construction, hatch and vent type construction and locking features.
 - 2. Manufacturer's Installation Instructions: Indicate preparation, instructions, and installation requirements and rough openings.
- B. Shop Drawings: Show fabrication and installation details for roof accessories. Show layouts of roof accessories including plans and elevations. Indicate dimensions, weights, loadings, required clearances, method of field assembly, and components. Include plans, elevations, sections, details, and attachments to other work. Indicate procedures and accessories required for a complete installation.
 - 1. Hatch/Vent Units: Show types, elevations, thickness of metals, and full size profiles.
 - 2. Hardware: Show materials, finishes, locations of fasteners, types of fasteners, locations and types of operating hardware, and details of installation.

1.4 CLOSEOUT SUBMITTALS:

- A. General: Closeout Submittals are to be submitted with O and M Manuals only. Do not submit with other ACTION and INFORMATIONAL Submittals.
 - 1. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Sheet Metal Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" details for fabrication of units, including flanges and cap flashing to coordinate with type of roofing indicated.
- B. NRCA "Roofing and Waterproofing Manual" details for installation of units.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Pack, handle, and ship roof accessories properly labeled in heavy-duty packaging to prevent damage. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.
- B. Storage: Store materials under cover in a dry and clean location off the ground.
- C. Handling: Exercise proper care in handling of work so as not to disrupt finished surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers listed in other Part 2 articles.
- B. Products of other manufacturers will be considered for acceptance provided they equal or exceed the material requirements and functional qualities of the specified product. Requests for Architect/Engineer's approval must be accompanied by the "Substitution Request Form" and complete technical data for evaluation. All materials for evaluation must be received by the Project Manager and Specification Department at least 10 days prior to bid due date. Additional approved manufacturers will be issued by Addendum.

2.2 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

2.3 METAL MATERIALS

- A. Aluminum Sheet: ASTM B 209, manufacturer's standard alloy for finish required, with temper to suit forming operations and performance required.
 - 1. Mill Finish: As manufactured.
 - 2. Color Anodic Finish: AAMA 611, AA-M12C22A32/A34, Class II, 0.010 mm or thicker.
 - 3. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil.
- B. Aluminum Extrusions and Tubes: ASTM B 221, manufacturer's standard alloy and temper for type of use, finished to match assembly where used, otherwise mill finished.
- C. Stainless-Steel Sheet and Shapes: ASTM A 240 or ASTM A 666, Type 304.
- D. Steel Shapes: ASTM A 36, hot-dip galvanized according to ASTM A 123 unless otherwise indicated.
- E. Steel Tube: ASTM A 500, round tube.
- F. Galvanized-Steel Tube: ASTM A 500, round tube, hot-dip galvanized according to ASTM A 123.

- G. Steel Pipe: ASTM A 53, galvanized.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, thickness as indicated.
- C. Wood Nailers: Provide No. 2 grade Douglas Fir or Southern Yellow Pine nailers, treated wood
 - 1. Treatment: Use one of the following formulations of inorganic boron:
 - a. Sodium-octaborate (SBX) or disodium – octaborate-tetrahydrate (DOT).
 - b. Zinc borates (ZB) for treated engineered wood or wood composites during the manufacturing process.
- D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.
- E. Underlayment:
 - 1. Self-Adhering, High Temperature Sheet: Minimum 30 mils thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer according to written recommendations of underlayment manufacturer.
 - a. Products: Subject to compliance with requirements, provide one of the following:
 - 1) WIP 300HT; Carlisle Residential, a division of Carlisle Construction Materials.
 - 2) Grace Ice and Water Shield HT or Ultra; GCP, a unit of W. R. Grace & Co.-Conn.
 - 3) Blueskin PE200 HT; Henry Company.
 - 4) MetShield; Metal-Fab Manufacturing, LLC.
 - 5) WeatherLock Specialty Tile & Metal Underlayment; Owens Corning.
 - 6) Deck Guard HT; Polygaud Products, Inc.
 - 7) Protecto Jiffy Seal Ice & Water Guard HT; Protecto Wrap Company.
 - 8) Palisdae SA-HT; SDP Advanced Polymer Products Inc.
 - b. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F or higher.
 - c. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F or lower.
- F. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
 - 1. Fasteners for Aluminum Sheet: Series 300 stainless steel.
 - 2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
- G. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
- H. Elastomeric Sealant where indicated: ASTM C 920, elastomeric polyurethane or silicone polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.
 - 1. Provide where sealant is exposed or movement exceeds butyl sealant movement capacity.
- I. Butyl Sealant unless otherwise noted: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.

2.5 PREFORMED FLASHING SLEEVES

- A. Exhaust Vent Flashing: Double-walled metal flashing sleeve or boot, insulation filled, with integral deck flange, 12 inches high, with removable metal hood and slotted or perforated metal collar.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Custom Solution Roof and Metal Products.
 - b. Menzies Metal Products.
 - c. Thaler Metal USA Inc.
 - 2. Metal: Aluminum sheet, 0.063 inch thick.
 - 3. Diameter: As indicated.
 - 4. Finish: Manufacturer's standard.
- B. Vent Stack Flashing: Metal flashing sleeve, uninsulated, with integral deck flange.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Custom Solution Roof and Metal Products.
 - b. Menzies Metal Products.
 - c. Milcor Inc.; Commercial Products Group of Hart & Cooley, Inc.
 - d. Thaler Metal USA Inc.
 - 2. Metal: Aluminum sheet, 0.063 inch thick.
 - 3. Height: 12 inches minimum.
 - 4. Diameter: As indicated.
 - 5. Finish: Manufacturer's standard.

2.6 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Verify that deck, curbs, roof membrane, base flashing, and other items effecting work of this section are in place and positioned correctly.
- E. Verify tolerances and correct improper condition.
- F. Identify conditions detrimental to providing proper quality and timely completions of work.
- G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions.
 - 1. Install roof accessories level, plumb, true to line and elevation, and without warping, jogs in alignment, excessive oil canning, buckling, or tool marks. Separate metal from incompatible metal or corrosion substrates, including wood, by coating concealed surfaces, at locations of contact, with bituminous coating or providing other permanent separation.
 - 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
 - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
 - 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals. Coordinate installation of sealant with work of this section to ensure watertightness.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Coat concealed side of uncoated aluminum roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet, or install a course of polyethylene sheet.
 - 3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.
- C. Preformed Flashing-Sleeve Installation: Secure flashing sleeve to roof membrane according to flashing-sleeve manufacturer's written instructions; flash sleeve flange to surrounding roof membrane according to roof membrane manufacturer's instructions.
- D. Seal joints with butyl sealant as required by roof accessory manufacturer.

3.3 ADJUSTING

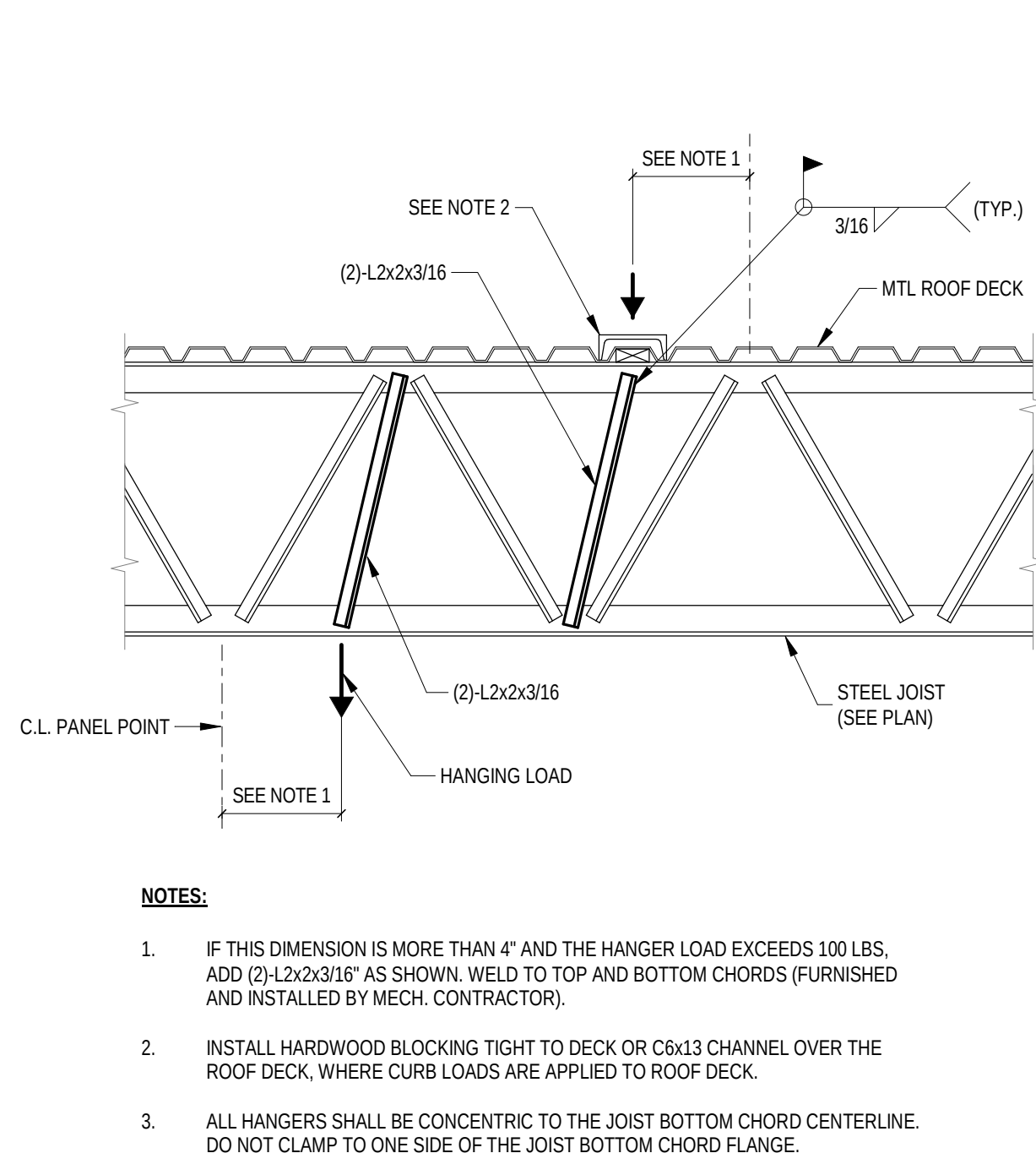
- A. Adjust moveable parts for smooth operation.
- B. Operational Units: Test-operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

3.4 REPAIR AND CLEANING

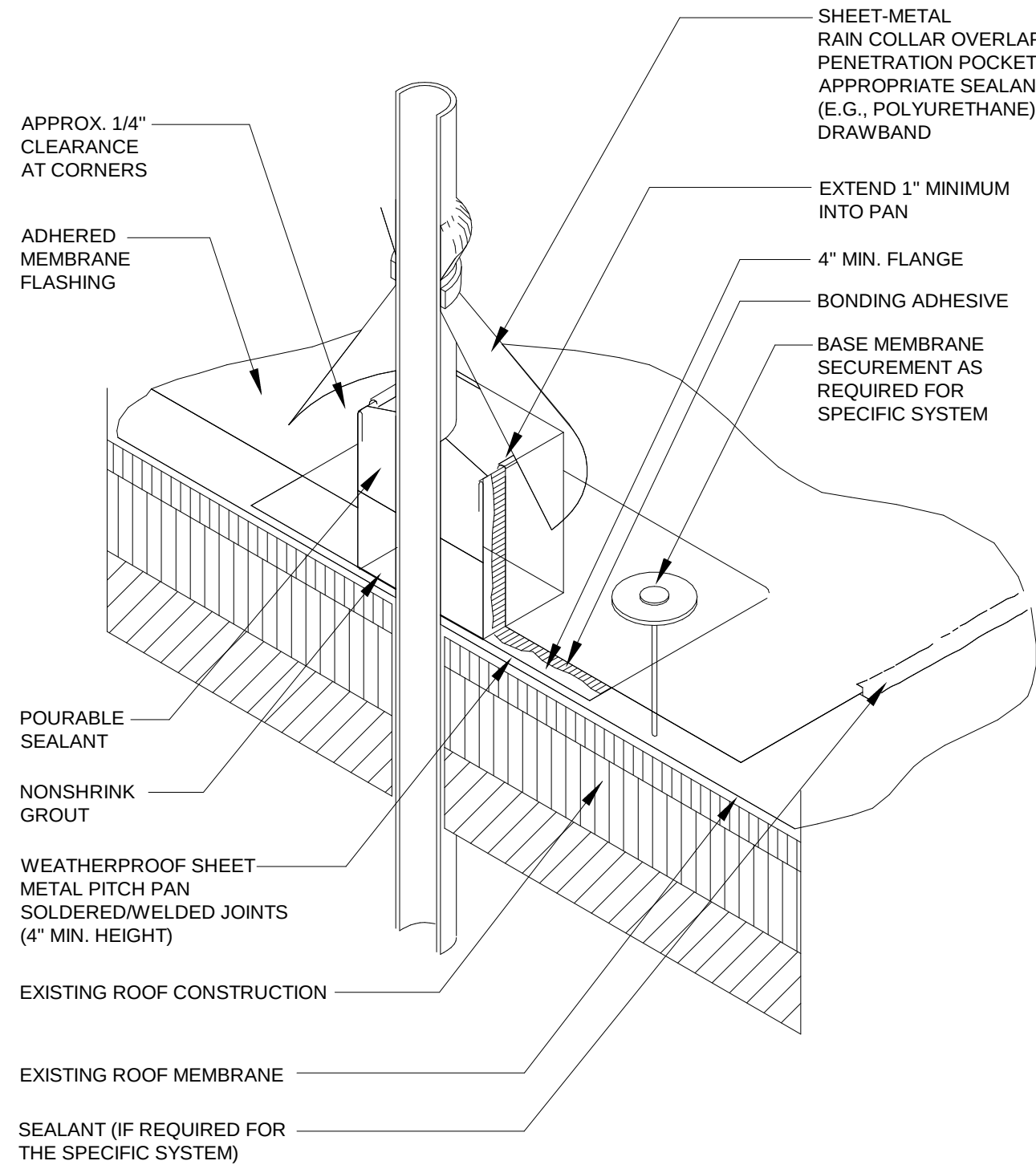
- A. Clean exposed surfaces according to manufacturer's written instructions.
- B. Clean off excess sealants.
- C. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 07 72 00

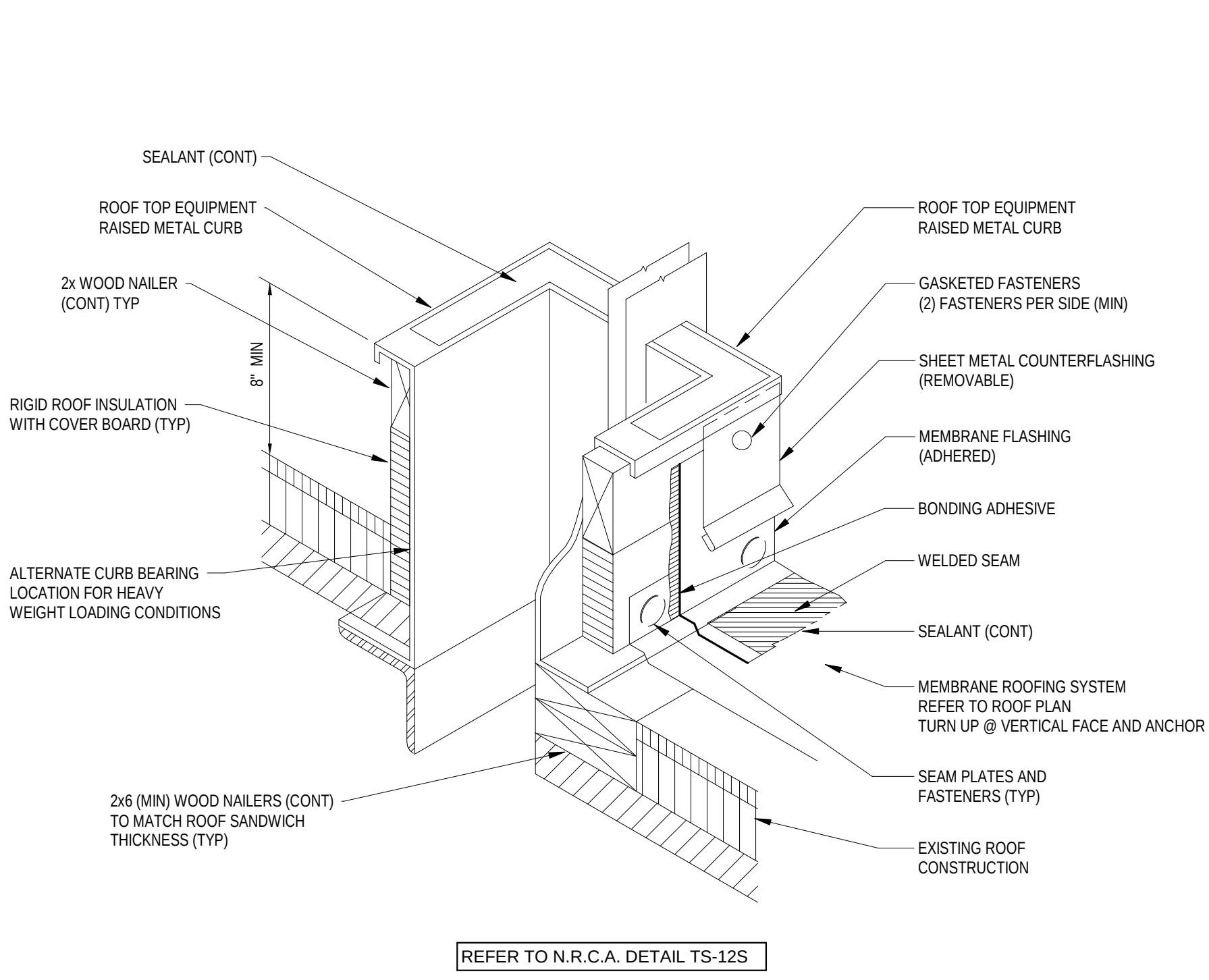
Autodesk Docs/Portage_HS_Cafeteria_Renov/2025_Arch_230223.00.rvt
9/4/2026 9:53:12 AM



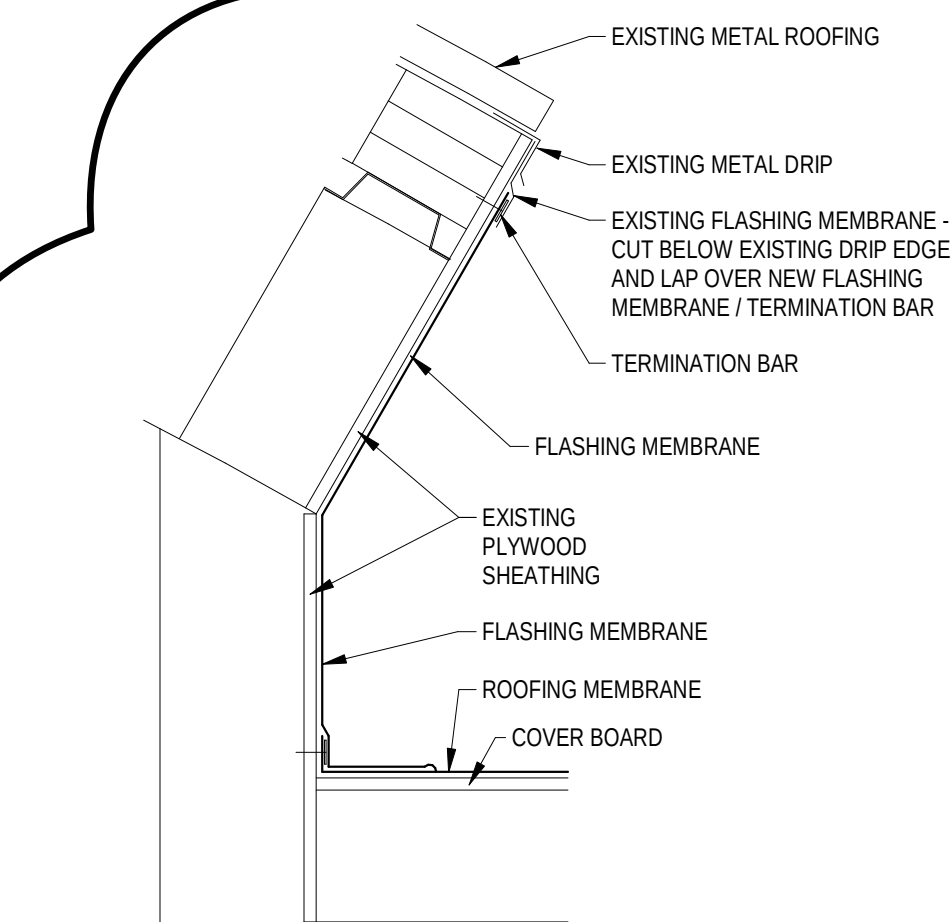
3 TYPICAL JOIST REINFORCING AT CONCENTRATED LOAD
SCALE: 1" = 1'-0"



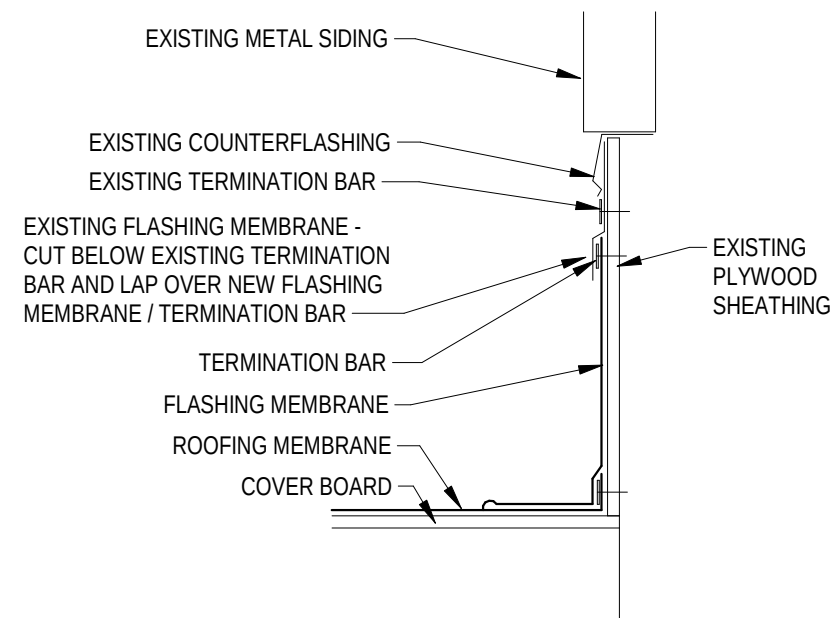
2 PENETRATION POCKET
SCALE: 12" = 1'-0"



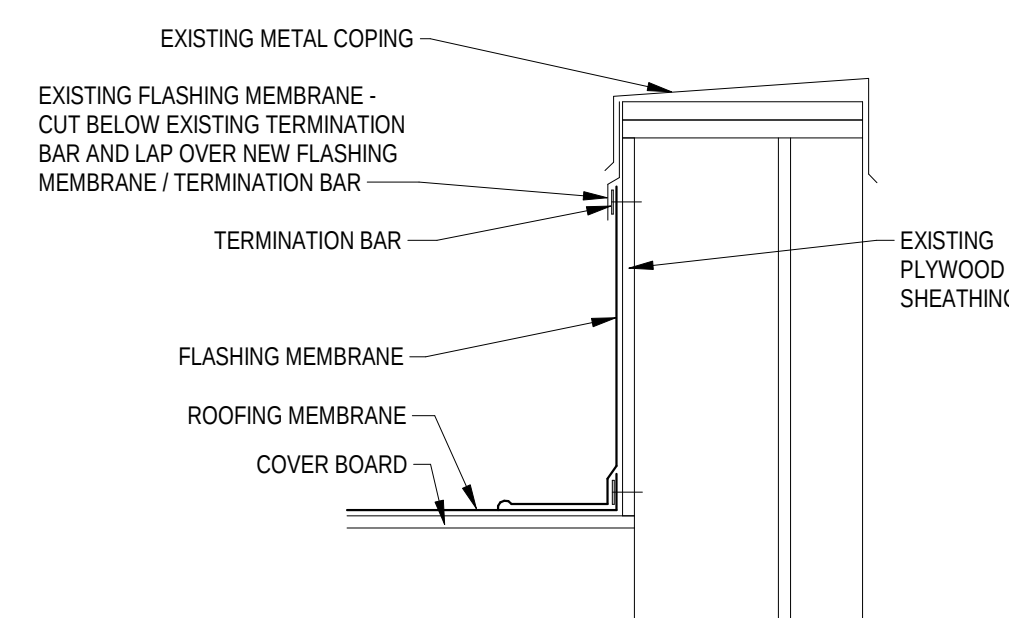
1 PREFABRICATED ROOF CURB
SCALE: 12" = 1'-0"



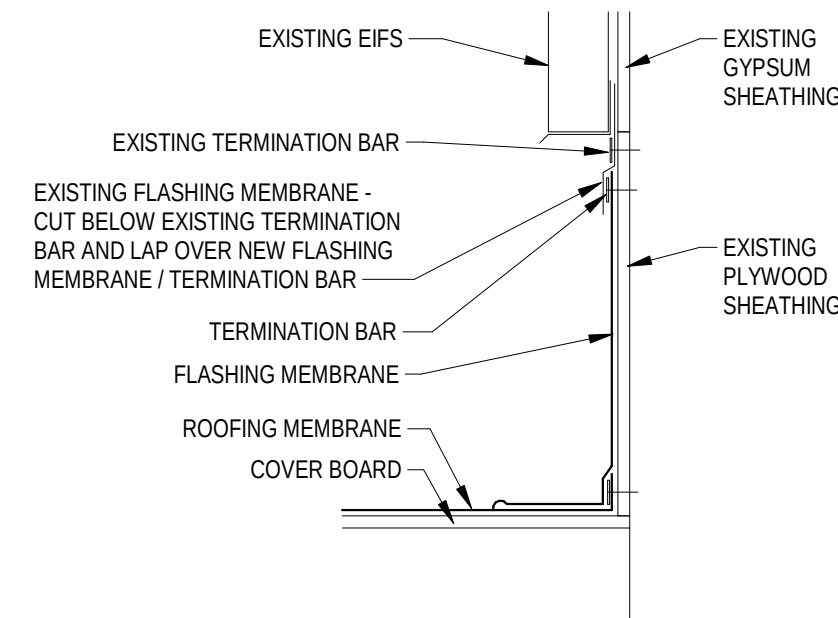
7 FLASHING
SCALE: 1 1/2" = 1'-0"



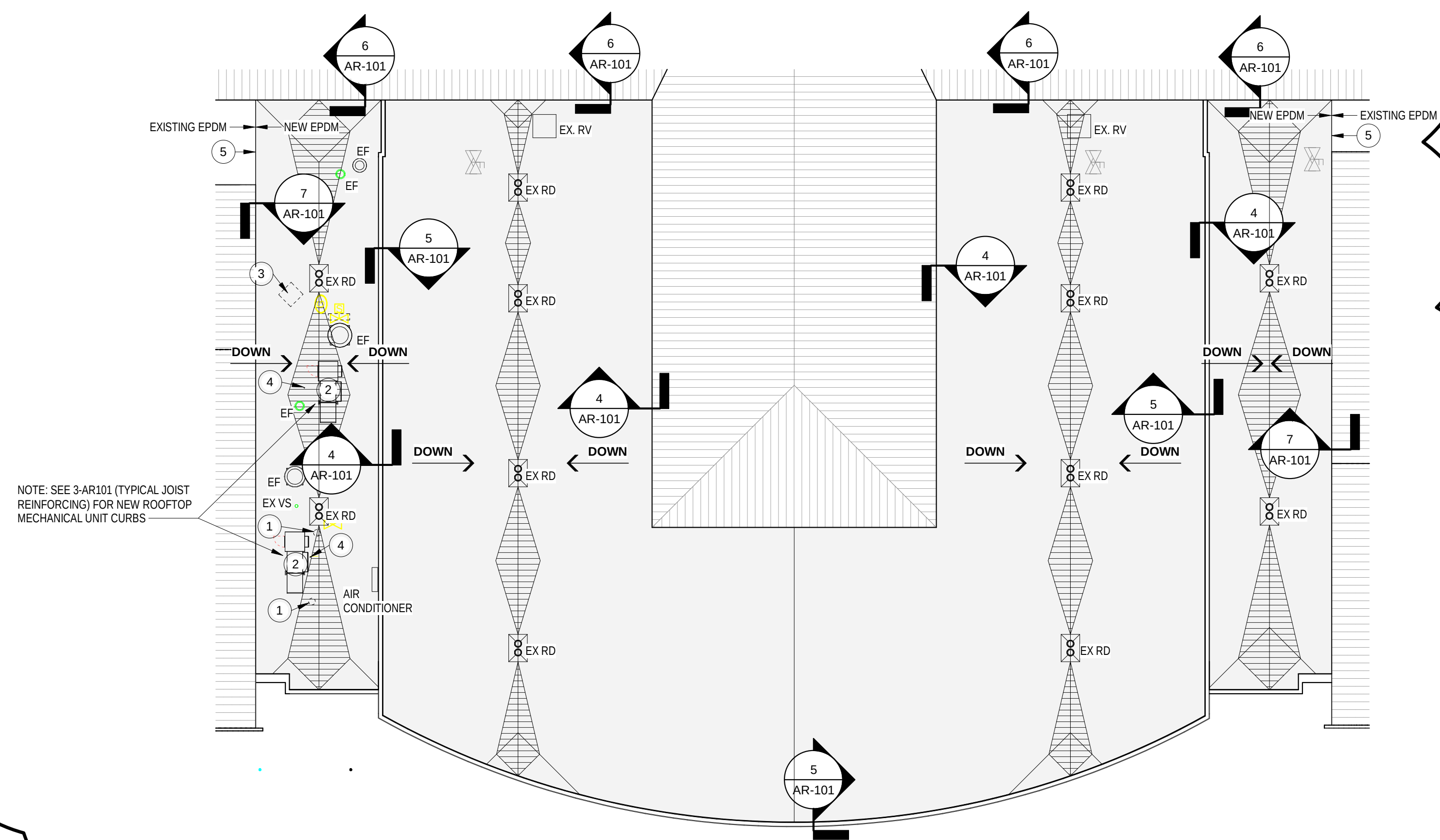
6 FLASHING
SCALE: 1 1/2" = 1'-0"



5 FLASHING
SCALE: 1 1/2" = 1'-0"



4 FLASHING
SCALE: 1 1/2" = 1'-0"



PARTIAL ROOF PLAN - UNIT B
SCALE: 1/16" = 1'-0"

ROOF SCOPE NOTE:
SHADED AREA INDICATES EXISTING EPDM ROOFING MEMBRANE TO BE REMOVED AND REPLACED WITH NEW EXISTING COVER BOARD TO REMAIN WHERE APPLICABLE AND NEW COVER BOARD TO BE INSTALLED UNDER ALL NEW ROOFING MEMBRANE.

- FLASHING AT EXISTING EQUIPMENT CURBS TO BE SIMILAR TO 5-AR101.
- REMOVE ROOF DRAIN STRAINERS AND CLAMPING RINGS AND INSTALL ROOFING MEMBRANE UNDERNEATH.

VERIFICATION NOTE
CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CLEARANCES AND ALL EXISTING FIELD CONDITIONS BEFORE STARTING CONSTRUCTION. COMMENCEMENT OF WORK CONSTITUTES ACCEPTANCE OF CONDITIONS.

SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED, CONTACT THE ARCHITECT BEFORE PROCEEDING WITH WORK.

ROOF PLAN GENERAL NOTES

- ALL DETAILS SHOWN ARE FOR GENERAL INFORMATION. ALL FINAL FLASHING CONDITIONS SHALL BE THE RESPONSIBILITY OF THE ROOF INSTALLER AND SHALL MEET APPROVAL OF ROOF MANUFACTURER.
- ALL DETAIL MODIFICATIONS MUST HAVE SHOP DRAWINGS APPROVAL. CONTRACTOR SHALL INSPECT AND VERIFY ALL EXISTING FIELD CONDITIONS, CLEARANCES, AND DIMENSIONS BEFORE STARTING CONSTRUCTION. COMMENCEMENT OF WORK CONSTITUTES ACCEPTANCE OF EXISTING CONDITIONS. SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED, CONTACT ARCHITECT BEFORE PROCEEDING WITH ANY FURTHER WORK.
- OPENINGS IN ROOF WILL BE CUT BY ROOF CONTRACTOR. MECHANICAL CONTRACTOR TO COORDINATE LOCATION OF OPENING IN ROOF WITH ROOF CONTRACTOR. CURB TO BE PROVIDED BY MECHANICAL CONTRACTOR AND INSTALLED BY ROOF CONTRACTOR.
- PROVIDE FLASHING AND SADDLES FOR ALL EQUIPMENT PROVIDED UNDER MECHANICAL.
- SADDLES AND TAPERED INSULATION SYMBOLS INDICATE DESIGN INTENT TO SLOPE TO DRAIN. CONTRACTOR SHALL PROVIDE SUBMITTAL DRAWINGS FOR TAPERED INSULATION AND SADDLES TO INSURE POSITIVE SLOPE. THE ROOF CONTRACTOR SHALL PROTECT ALL ROOF DRAINS, SCUPPERS, AND DOWNSPOUTS FROM DEBRIS CREATED DURING DEMOLITION AND CONSTRUCTION. THE ROOF CONTRACTOR SHALL INSPECT AND CLEAR ALL DRAINS, SCUPPERS, AND DOWNSPOUTS PRIOR TO COMPLETION OF WORK AND TO ENSURE THAT THEY ARE FREE OF DEBRIS AND ARE FUNCTIONING PROPERLY.
- MECHANICAL, ELECTRICAL AND PLUMBING INFORMATION SHOWN ON THIS PLAN IS GENERAL IN NATURE. REFER TO P, M AND E DRAWINGS FOR FURTHER INFORMATION AND COORDINATE ALL REQUIRED ROOF OPENINGS OR ROOF MOUNTED EQUIPMENT.

ROOF PLAN NOTES

(ALL NOTES MAY NOT BE INDICATED ON THIS SHEET)

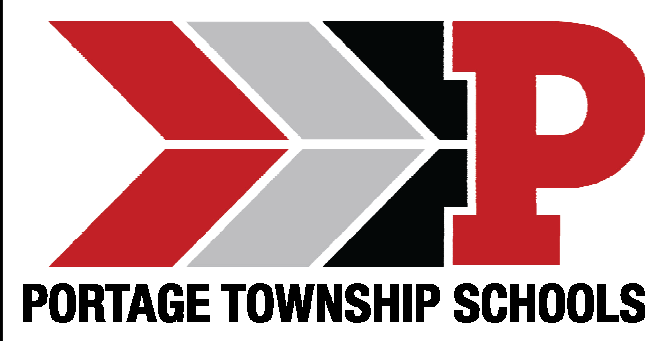
- EXISTING EXHAUST FAN TO BE REMOVED AND CAPPED - SEE MECHANICAL DRAWINGS
- ROOFTOP MECHANICAL UNIT - SEE MECHANICAL AND FOOD SERVICE DRAWINGS LOCATION FOR CURB (SEE 1-AR101).
- EXISTING ACCU TO BE REMOVED - SEE MECHANICAL DRAWINGS
- GAS LINE UP FROM KITCHEN - SEE 2-AR101
- LAP SPURCE PER ROOFING MANUFACTURER'S STANDARDS AND RECOMMENDATIONS WHERE NEW ROOF MEMBRANE AND EXISTING TO REMAIN MEET.

COPYRIGHT 2026 BY FANNINGHOWEY ASSOCIATES, INC.

PORTAGE HIGH SCHOOL - 2026 RENOVATIONS

6450 US Highway 6
Portage, IN 46368

PORTAGE TOWNSHIP SCHOOLS



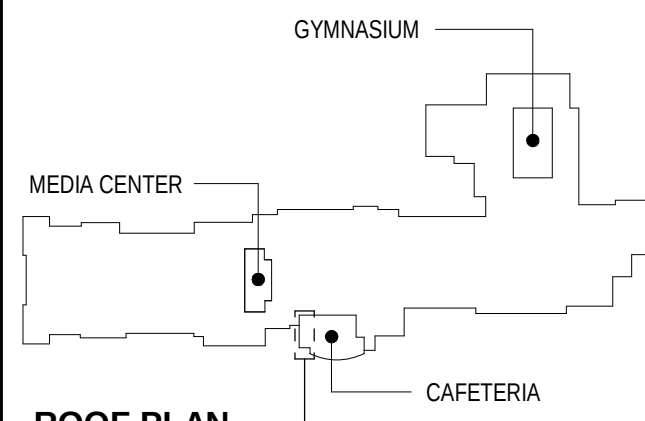
ARCHITECT

FANNING HOWEY

317.848.0966

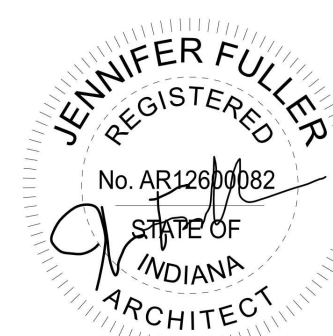
350 E. New York St.

WWW.FHAI.COM



KEY PLAN

CONSTRUCTION DOCUMENTS



PROJECT MANAGER: MKS

DRAWN BY: RLG

PROJECT NUMBER: 220203.00

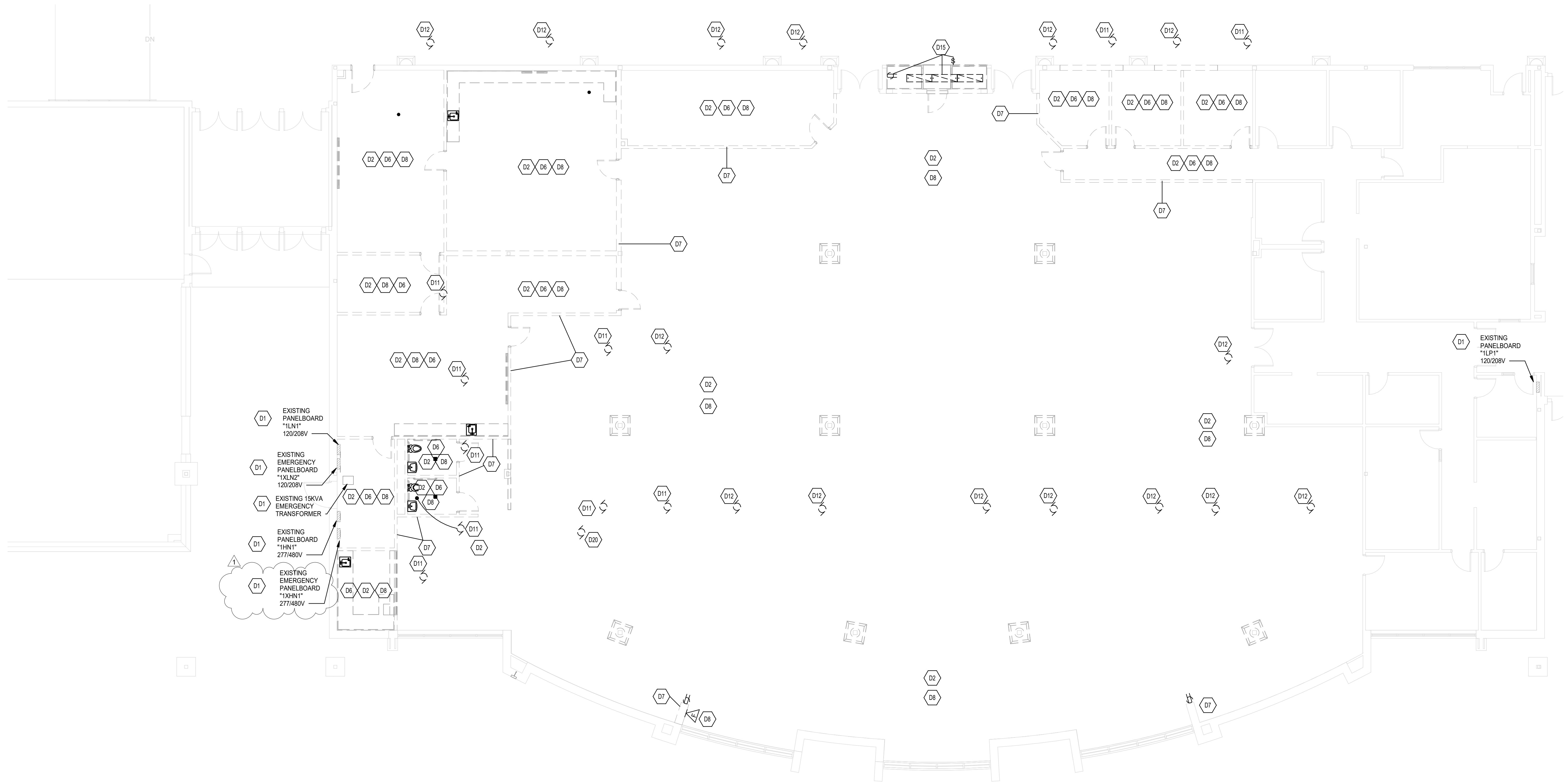
PROJECT ISSUE DATE: 8-14-2025

REV. NO.	DESCRIPTION	DATE
1	ADDENDUM 1	9-4-2026

ROOF PLAN

AR-101

Autodesk Docs/Portage TS_HS Cafeteria Renov/2025_ELEC_220203.rvt
9/4/2025 9:35:24 AM



MEDIA CENTER ELECTRICAL DEMOLITION PLAN

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

DEMOLITION PLAN GENERAL NOTES

1. REFER TO ELECTRICAL SPECIFICANTS SECTIONS 260005 "ELECTRICAL DEMOLITION" FOR ADDITIONAL REQUIREMENTS THAT APPLY TO THIS DRAWING SHEET. REMOVE ELECTRICAL EQUIPMENT COMPLETE.
- 2.

SHEET KEYNOTES

D1	EXISTING ELECTRICAL EQUIPMENT TO REMAIN IN PLACE.
D2	DISCONNECT AND REMOVE EXISTING LIGHT FIXTURES AND LIGHT SWITCHES IN THIS ROOM. EXISTING LIGHTING CIRCUIT IS TO REMAIN IN PLACE FOR NEW LIGHTING.
D6	DISCONNECT AND REMOVE ALL EXISTING ELECTRICAL DEVICES IN THIS ROOM.
D7	DISCONNECT AND REMOVE ALL EXISTING ELECTRICAL DEVICES IN THE PORTION OF THIS WALL THAT IS BEING REMOVED.
D8	DISCONNECT AND REMOVE ALL EXISTING FIRE ALARM DEVICES IN THIS ROOM.
D11	DISCONNECT POWER FROM THIS EXISTING MECHANICAL UNIT AND REMOVE BACK TO THE SOURCE.
D12	DISCONNECT POWER FROM THIS EXISTING MECHANICAL UNIT. EXISTING POWER IS TO REMAIN AND IS TO BE USED FOR NEW MECHANICAL UNIT AT THIS LOCATION. REFER TO DRAWING SHEET "EP11B" FOR ADDITIONAL REQUIREMENTS.
D15	DISCONNECT AND REMOVE EXISTING DISPLAY CASE LIGHT FIXTURES, LIGHT SWITCH, AND RECEPTACLES.
D20	DISCONNECT AND REMOVE POWER FROM THE EXISTING PROJECTION SCREEN AT THIS LOCATION. REMOVE ALL WIRING, CONTROLS, AND CONDUIT.

VERIFICATION NOTE

CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CLEARANCES AND ALL EXISTING FIELD CONDITIONS BEFORE STARTING CONSTRUCTION. COMMENCEMENT OF WORK CONSTITUTES ACCEPTANCE OF CONDITIONS.

SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED, CONTACT THE ARCHITECT BEFORE PROCEEDING WITH WORK.

COPYRIGHT 2026 BY FANNINGHOWEY ASSOCIATES, INC.

PORTAGE HIGH SCHOOL - 2026 RENOVATIONS

6450 US Highway 6
Portage, IN 46368

PORTAGE TOWNSHIP SCHOOLS



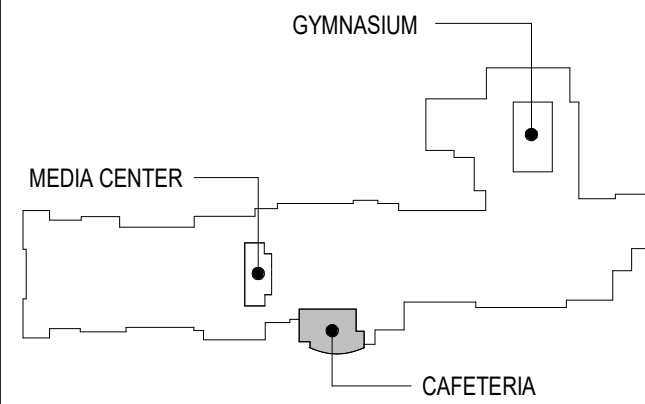
ARCHITECT

FANNING HOWEY

317.848.0966

350 E. New York St.

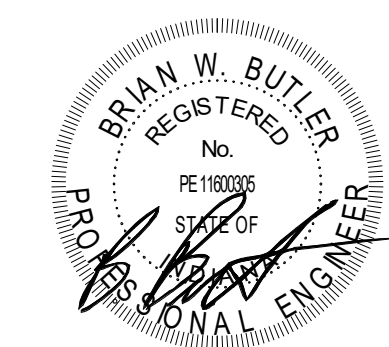
WWW.FHAI.COM



KEY PLAN



CONSTRUCTION DOCUMENTS



PROJECT MANAGER: MKS

DRAWN BY: MMS

PROJECT NUMBER: 220203.00

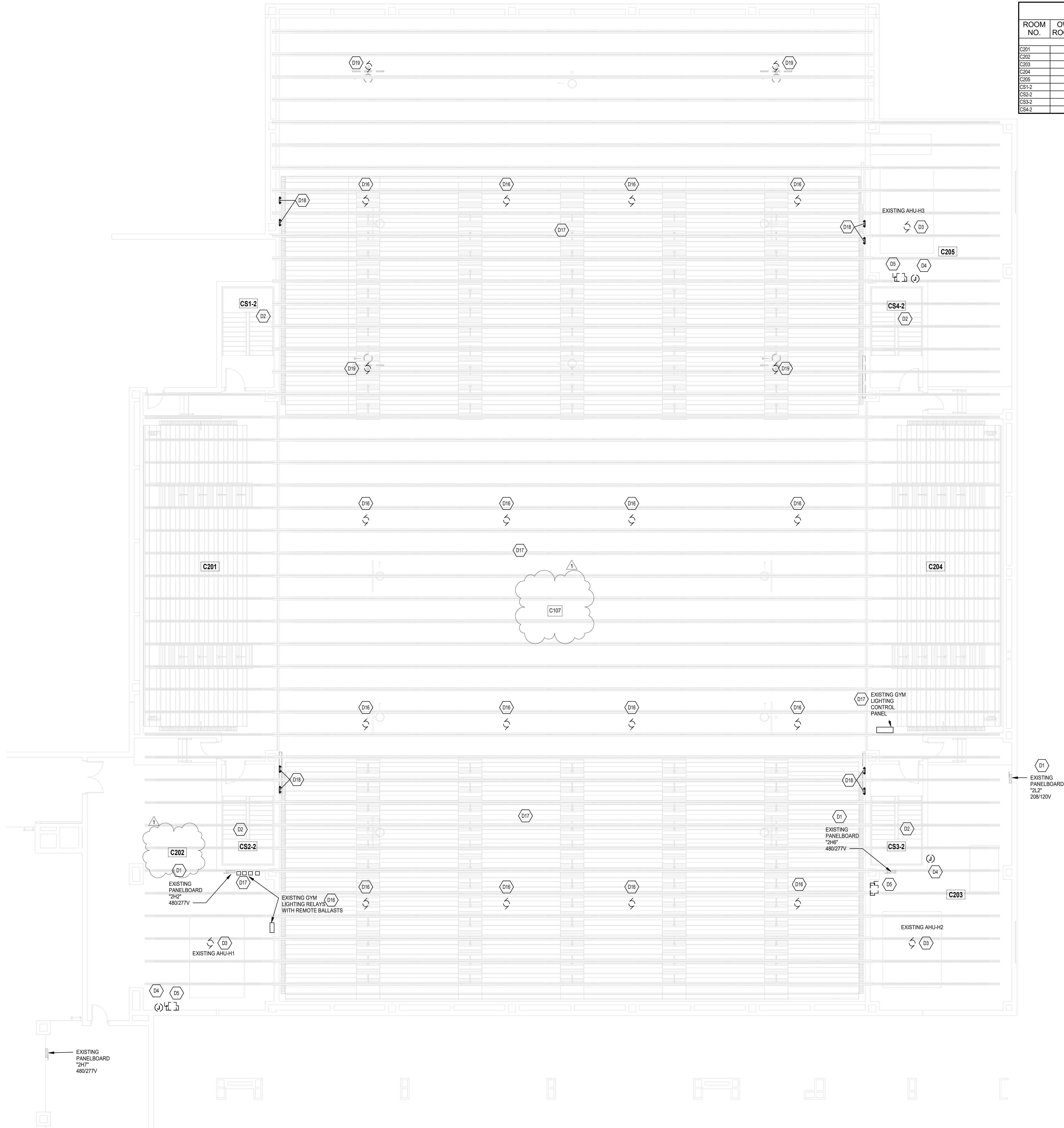
PROJECT ISSUE DATE: 8-14-2025

REV. NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	9-4-2026

FIRST FLOOR ELECTRICAL DEMOLITION PLAN - UNIT B

ED11B

Autodesk Docs\Portage_Ts_HS Cafeteria Renov\2025_ELEC_220203.rvt
9/4/2025 9:38:45 AM



ROOM LEGEND			
ROOM NO.	OWNER ROOM NO.	ROOM NAME	AREA (SF)
C201		BALCONY	1733 SF
C202		MECHANICAL	1532 SF
C203		MECHANICAL	1113 SF
C204		BALCONY	1887 SF
C205		MECHANICAL	1204 SF
CS1-2		STAIR	194 SF
CS2-2		STAIR	194 SF
CS3-2		STAIR	194 SF
CS4-2		STAIR	194 SF

DEMOLITION PLAN GENERAL NOTES

- REFER TO ELECTRICAL SPECIFICANTS SECTIONS 260005 "ELECTRICAL DEMOLITION" FOR ADDITIONAL REQUIREMENTS THAT APPLY TO THIS DRAWING SHEET.
- REMOVE ELECTRICAL EQUIPMENT COMPLETE.

SHEET KEYNOTES

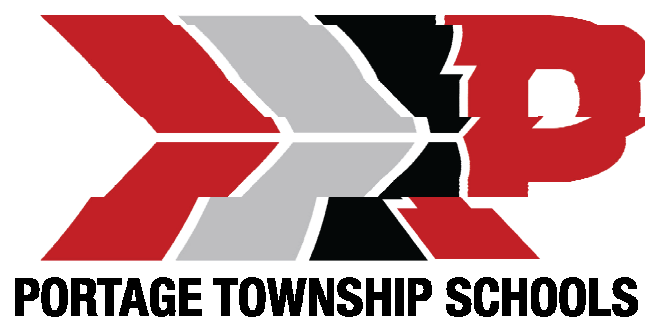
- EXISTING ELECTRICAL EQUIPMENT TO REMAIN IN PLACE.
- DISCONNECT AND REMOVE EXISTING LIGHT FIXTURES AND LIGHT SWITCHES IN THIS ROOM. EXISTING LIGHTING CIRCUIT IS TO REMAIN IN PLACE FOR NEW LIGHTING.
- DISCONNECT POWER FROM EXISTING AIR HANDLING UNIT AT THIS LOCATION.
- DISCONNECT POWER FROM EXISTING TEMPERATURE CONTROL PANEL AT THIS LOCATION.
- DISCONNECT POWER FROM EXISTING DISCONNECT SWITCH AT THIS LOCATION.
- DISCONNECT AND REMOVE POWER FROM THE EXISTING CEILING FAN AT THIS LOCATION. REMOVE POWER BACK TO SOURCE.
- EXISTING GYMNASIUM LIGHTING, LIGHTING CONTROL PANEL, LIGHTING RELAYS, AND REMOTE LIGHT BALLASTS ARE TO BE DISCONNECTED AND REMOVED. EXISTING CIRCUITS ARE TO REMAIN IN PLACE FOR NEW LIGHTING.
- DISCONNECT AND REMOVE EXISTING EMERGENCY LIGHT FIXTURES.
- DISCONNECT AND REMOVE POWER TO THE SOURCE FOR THIS EXISTING BASKETBALL BACK STOP.

COPYRIGHT 2025 BY FANNINGHOWEY ASSOCIATES, INC.

PORTAGE HIGH SCHOOL - 2026 RENOVATIONS

6450 US Highway 6
Portage, IN 46368

PORTAGE TOWNSHIP SCHOOLS



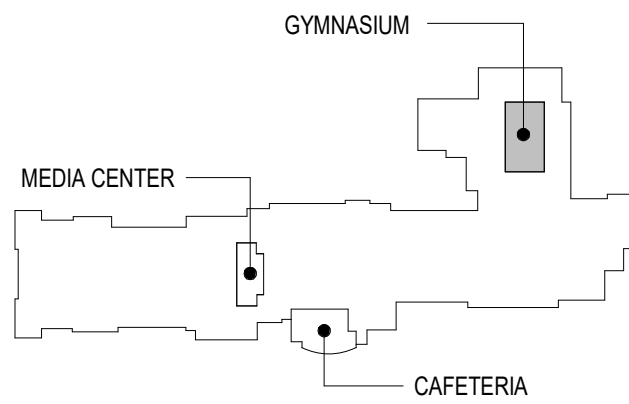
ARCHITECT

FANNING HOWEY

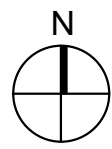
317.848.0966

WWW.FHAI.COM

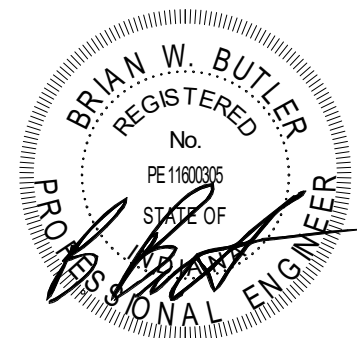
350 E. New York St.



KEY PLAN



CONSTRUCTION DOCUMENTS



PROJECT MANAGER: MKS
DRAWN BY: MKS
PROJECT NUMBER: 220203.00
PROJECT ISSUE DATE: 8-14-2025

REV. NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	9-4-2025

VERIFICATION NOTE

CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CLEARANCES AND ALL EXISTING FIELD CONDITIONS BEFORE STARTING CONSTRUCTION. COMMENCEMENT OF WORK CONSTITUTES ACCEPTANCE OF CONDITIONS.

SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED, CONTACT THE ARCHITECT BEFORE PROCEEDING WITH WORK.

SECOND FLOOR ELECTRICAL DEMOLITION PLAN - UNIT C

ED12C

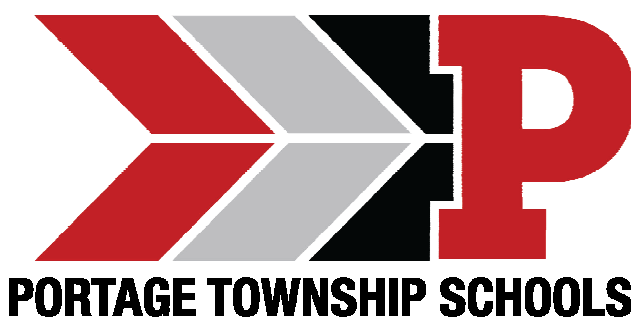
SECOND FLOOR ELECTRICAL DEMOLITION PLAN - UNIT C

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

PORTAGE HIGH SCHOOL - 2026 RENOVATIONS

6450 US Highway 6
Portage, IN 46368

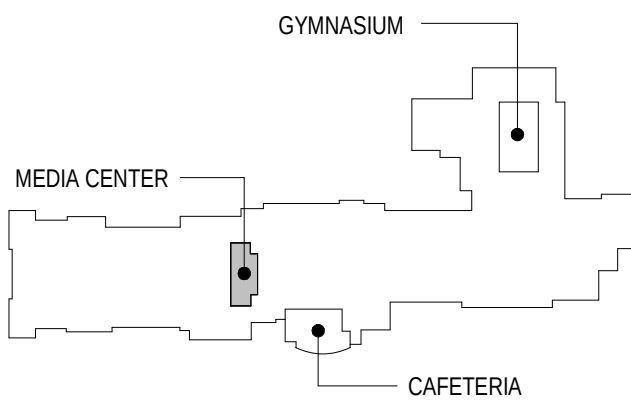
PORTAGE TOWNSHIP SCHOOLS



ARCHITECT

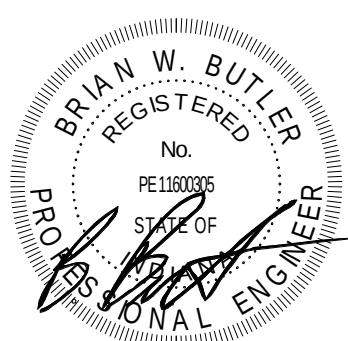
FANNING
HOWEY

317.848.0966 WWW.FHAI.COM
350 E. New York St.



KEY PLAN

CONSTRUCTION DOCUMENTS



PROJECT MANAGER: MKS
DRAWN BY: MMS
PROJECT NUMBER: 220203.00
PROJECT ISSUE DATE: 8-14-2025

REV. NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	9-4-2026

FIRST FLOOR OVERALL ELECTRICAL PLAN

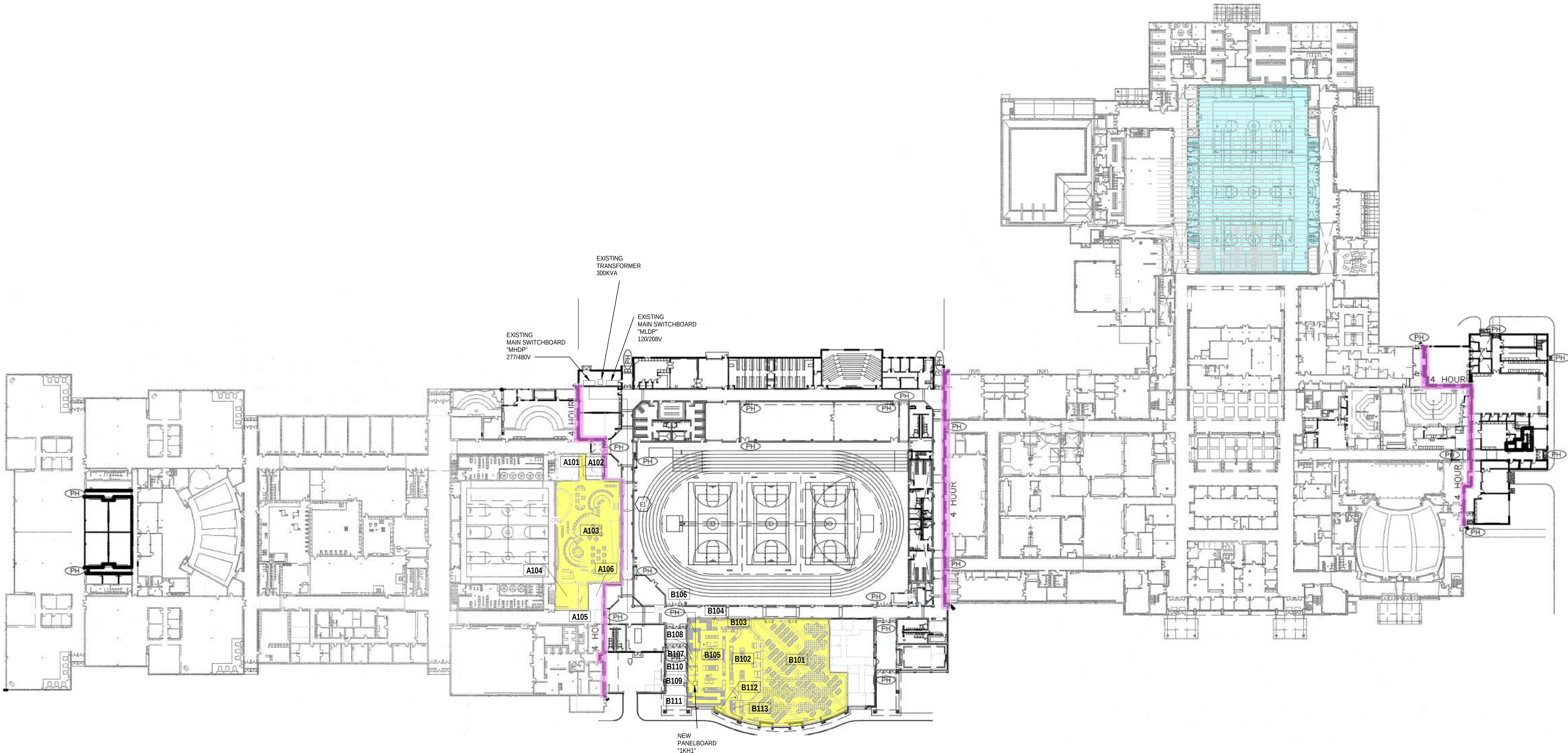
E-101

ROOM LEGEND			
ROOM NO.	OWNER ROOM NO.	ROOM NAME	AREA (SF)
		STAIR	47 SF
A101		STEM LAB	890 SF
A102		MEDIA WORKROOM	274 SF
A103		MEDIA CENTER	6571 SF
A104		MEDIA COMMONS	592 SF
A105		CORRIDOR	214 SF
A106		UTILITY	438 SF
B101		CAFETERIA	8749 SF
B102		SERVING	2419 SF
B103		WAREWASHING	371 SF
B104		CUSTODIAN	63 SF
B105		KITCHEN	1673 SF
B106		COOLER / FREEZER	901 SF
B107		LOCKERS	95 SF
B108		TOILET	54 SF
B109		RECEIVING	156 SF
B110		OFFICE	73 SF
B111		DRY STORAGE	519 SF
B112		TECH CLOSET	83 SF
B113		GRAB & GO	279 SF

ROOM LEGEND UNIT C			
ROOM NO.	OWNER ROOM NO.	ROOM NAME	AREA (SF)
C1		STAGE	Not Placed
C101		STORAGE	154 SF
C102		STORAGE	186 SF
C103		STORAGE	58 SF
C104		CORRIDOR	2862 SF
C105		STORAGE	64 SF
C106		ELECTRICAL	260 SF
C107		GYMNASIUM	21917 SF
C107		GYMNASIUM	Not Placed
C109		CORRIDOR	1837 SF
C109		STORAGE	218 SF
C110		STORAGE	64 SF
C111		CORRIDOR	3375 SF
C112		CUSTODIAN	56 SF
C113		STORAGE	158 SF
C114		STORAGE	190 SF

SHEET KEYNOTES

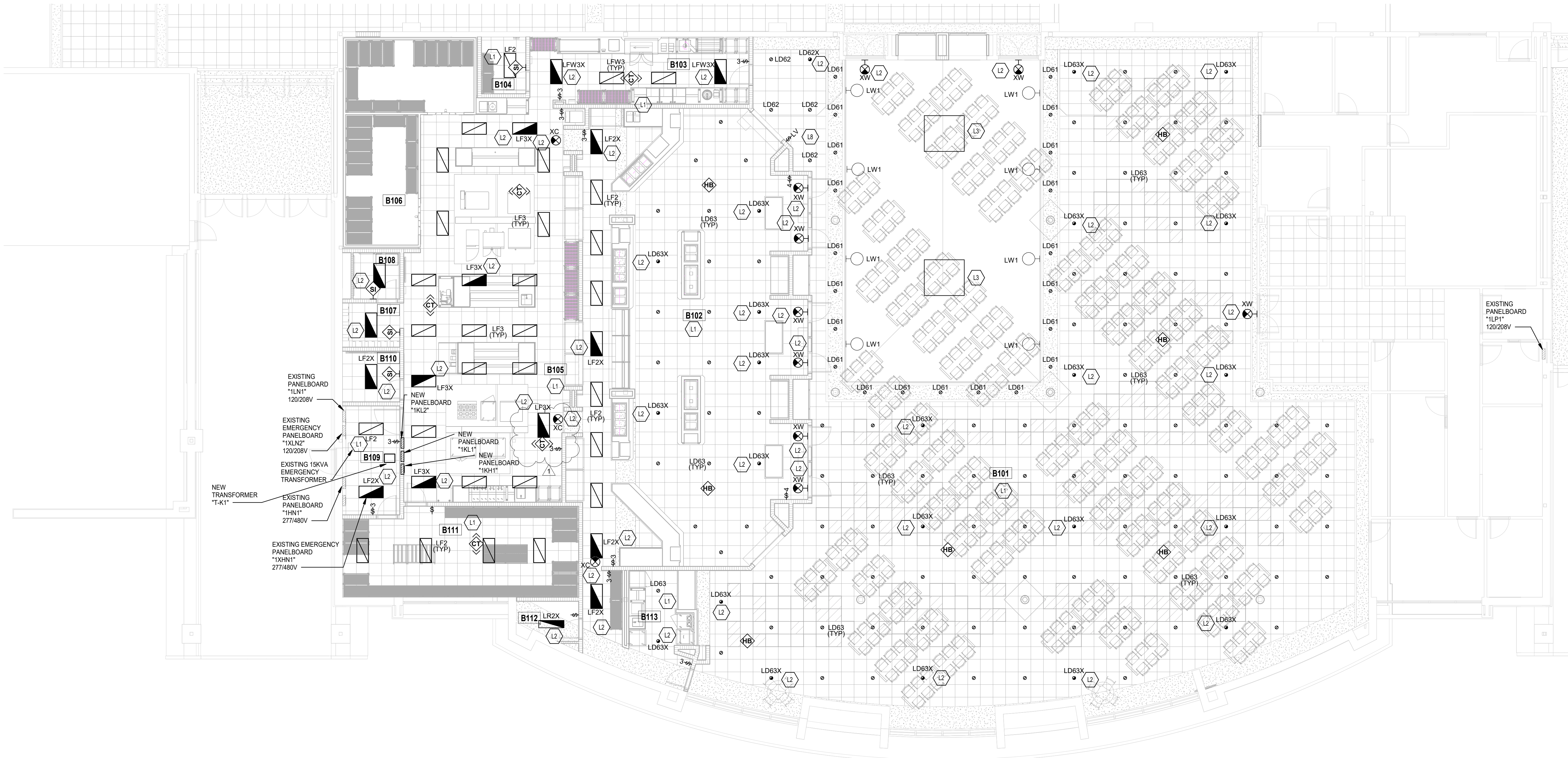
E1 RUN CONDUITS ABOVE EXISTING CEILINGS FROM THE EXISTING MAIN SWITCHBOARD "MHPD" TO NEW PANELBOARD "1KH1". REFER TO ONE-LINE DIAGRAM ON SHEET E-601 FOR ADDITIONAL REQUIREMENTS.



FIRST FLOOR OVERALL ELECTRICAL PLAN

SCALE: 1" = 50'-0"

Autodesk Docs\Portage TS_HS Cafeteria Renov\2025_ELEC_226023.rvt
9/3/2025 7:07:48 AM



CAFETERIA LIGHTING PLAN

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

ROOM LEGEND			
ROOM NO.	OWNER ROOM NO.	ROOM NAME	AREA (SF)
B101		CAFETERIA	8749 SF
B102		SERVING	2419 SF
B103		WAREWASHING	371 SF
B104		CUSTODIAN	83 SF
B105		KITCHEN	1873 SF
B106		COOLER / FREEZER	501 SF
B107		LOCKERS	66 SF
B108		TOILET	54 SF
B109		RECEIVING	158 SF
B110		OFFICE	73 SF
B111		DRY STORAGE	519 SF
B112		TECH CLOSET	52 SF
B113		GRAB & GO	279 SF

LIGHTING PLAN GENERAL NOTES

- GENERATOR TRANSFER DEVICE TO TAKE FIXTURE TO 100% IN EMERGENCY CONDITION.
- FINAL CONNECTION TO RECESSED LUMINAIRES SHALL BE WITH FLEXIBLE METALLIC CONDUIT, MC CABLE OR MANUFACTURED WIRING SYSTEM.
- REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR LOCATION OF LUMINAIRES. COORDINATE LOCATION OF LUMINAIRES, LOUDSPEAKERS, DIFFUSERS, GRILLES, AND OTHER CEILING INSTALLED ELEMENTS WITH THEIR RESPECTIVE INSTALLERS.
- REFER TO ARCHITECTURAL REFLECTED CEILING PLAN AND ROOM FINISH SCHEDULE TO DETERMINE PROPER TYPE OF LUMINAIRE TRIM REQUIRED FOR CEILING TYPE PRIOR TO ORDERING LUMINAIRES. PROVIDE LUMINAIRES COMPATIBLE WITH CEILING TYPE.
- RECESSED LUMINAIRE IN GRID CEILING SYSTEMS SHALL BE PROVIDED WITH SEISMIC CLIPS OR PROVIDE ATTACHMENT TO CEILING GRID SYSTEM AND SUPPORTED PER PROJECT MANUAL AND DETAIL "50E-501".
- WHERE TWO SWITCHES ARE SHOWN ON PLAN, CONNECTED TO THE SAME LIGHT FIXTURE, CONTRACTOR SHALL WIRE TO PROVIDE MULTI-LEVEL LIGHTING. ONE SWITCH SHALL ENERGIZE THE INBOARD LAMPS AND ONE SWITCH SHALL ENERGIZE THE OUTBOARD LAMPS. ALL ROOMS SHALL BE WIRED THE SAME.
- LUMINAIRE TYPE IS SHOWN ONLY ONCE, AS "TYP" IN EVERY ROOM. PROVIDE SAME TYPE OF LUMINAIRE THROUGH-OUT SAME ROOM UNLESS OTHERWISE INDICATED.
- PROVIDE NO. 10 AWG. MINIMUM CONDUCTORS FOR EXIT SIGNS AND SECURITY LIGHT CIRCUITS.

SHEET KEYNOTES

- | | |
|----|---|
| L1 | WIRE NEW LIGHTING IN THIS ROOM TO EXISTING LIGHT SWITCH AND EXISTING LIGHTING CIRCUIT IN THIS AREA. |
| L2 | WIRE THE EMERGENCY SIDE OF THIS LIGHT FIXTURE TO THE EMERGENCY LIGHTING CIRCUIT IN THIS AREA. |
| L3 | EXISTING LIGHT FIXTURE IS TO REMAIN. REPLACE THE HID LAMPS AND BALLAST WITH LED LAMPS AND DRIVER. |
| L8 | LIGHTING CONTROL SWITCH FOR CAFETERIA LIGHTING. REFER TO DETAIL "50E-501" FOR ADDITIONAL REQUIREMENTS. PROVIDE WITH A LOCKABLE CLEAR COVER. |

COPYRIGHT 2025 BY FANNINGHOWEY ASSOCIATES, INC.

PORTAGE HIGH SCHOOL - 2026 RENOVATIONS

6450 US Highway 6
Portage, IN 46368

PORTAGE TOWNSHIP SCHOOLS



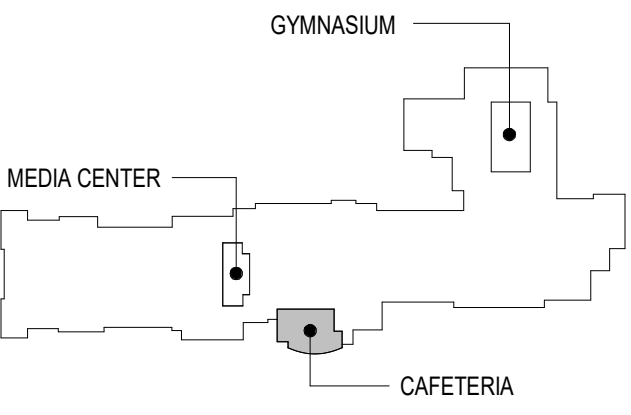
ARCHITECT

FANNING HOWEY

317.848.0966

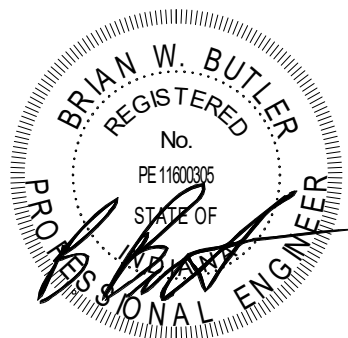
WWW.FHAI.COM

350 E. New York St.



KEY PLAN

CONSTRUCTION DOCUMENTS



PROJECT MANAGER: MKS
DRAWN BY: Author
PROJECT NUMBER: 220203.00
PROJECT ISSUE DATE: 8-14-2025

REV. NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	9-4-2025

VERIFICATION NOTE

CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CLEARANCES AND ALL EXISTING FIELD CONDITIONS BEFORE STARTING CONSTRUCTION. COMMENCEMENT OF WORK CONSTITUTES ACCEPTANCE OF CONDITIONS.

SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED, CONTACT THE ARCHITECT BEFORE PROCEEDING WITH WORK.

FIRST FLOOR LIGHTING PLAN - UNIT
B

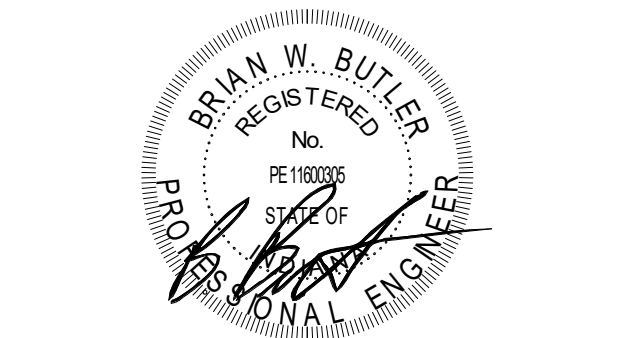
EL11B

**PORTAGE TOWNSHIP
SCHOOLS**

**FANNING
HOWEY**



CONSTRUCTION DOCUMENTS



PROJECT MANAGER: MKS
DRAWN BY: Author
PROJECT NUMBER: 226023.00
PROJECT ISSUE DATE: 8-14-2026

[illegible]

**SECOND FLOOR LIGHTING PLAN -
UNIT C**

EL12C

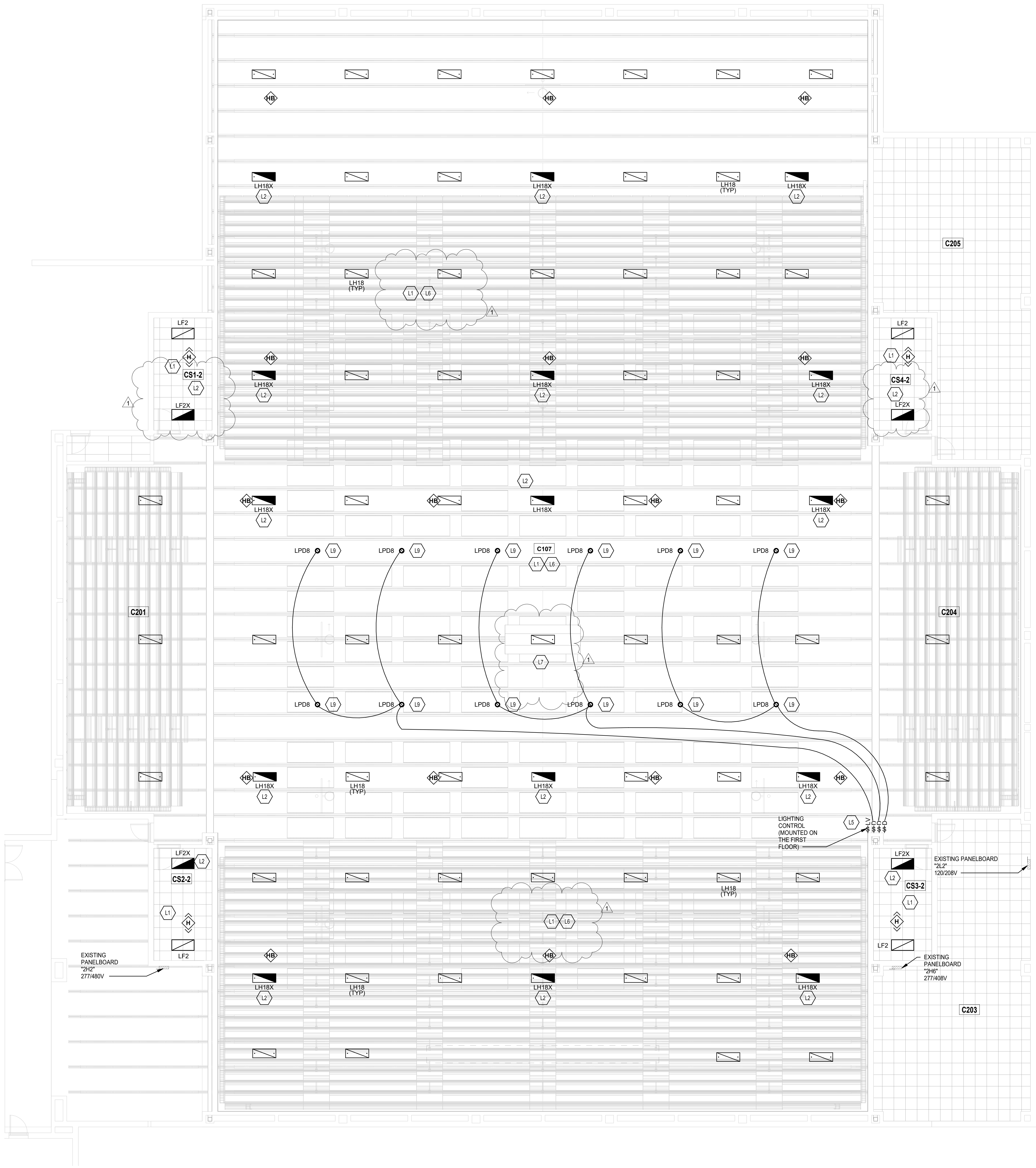
1. GENERATOR TRANSFER DEVICE TO TAKE FUTURE TO 100% IN EMERGENCY CONDITION
2. REFLECTED CEILING TO RECESSED LUMINAIRES SHALL BE WITH FLEXIBLE METALLIC CONDUIT, MC CABLE OR REFLECTED FLEXIBLE WIRING SYSTEM
3. REFER TO CEILING PLAN FOR MANUFACTURED CEILING PLANS FOR LOCATION OF LUMINAIRES. COORDINATE LOCATION OF LUMINAIRES, LUGGING, AND ELECTRICAL CONDUITS AND OTHER CEILING INSTALLED ELEMENTS WITH THEIR RESPECTIVE INSTALLERS
4. REFLECTED CEILING TO REFLECTED CEILING PLAN AND ROOM FINISH SCHEDULE TO DETERMINE PROPER TYPE OF LUMINAIRE TRIM REQUIRED FOR CEILING TYPE PRIOR TO INSTALLING LUMINAIRES
5. RECESSED LUMINAIRE IN GRID CEILING SYSTEMS SHALL BE COMPATIBLE WITH CEILING TYPE
6. RECESSED LUMINAIRE IN GRID CEILING SYSTEMS SHALL BE CONNECTED WITH SEISMICALLY RATED PROVIDE ATTACHMENT TO CEILING GRID SYSTEM AND SUPPORTED PER PROJECT SPECIFICATIONS AND METAL DECK
7. WHERE TWO SWITCHES ARE SHOWN ON PLAN CONNECTED TO THE SAME LIGHT FIXTURE, CONTRACTOR SHALL PROVIDE TWO SEPARATE SWITCHES. IF ONE SWITCH SHALL ENERGIZE THE OUTBOARD LAMPS AND ONE SWITCH SHALL ENERGIZE THE INBOARD LAMPS. ALL LAMPS SHALL BE WIRED TO THE SAME CIRCUIT
8. LUMINAIRE TYPE IS SHOWN ONLY ONCE AS "TYP" IN EVERY ROOM. PROVIDE SAME TYPE OF LUMINAIRE THROUGHOUT SAME ROOM UNLESS OTHERWISE INDICATED
9. PROVIDE 10 AWG MINIMUM CONDUCTORS FOR EXIT SIGNS AND SECURITY LIGHT CIRCUITS

3	WIRE NEW LIGHTING IN THIS ROOM TO EXISTING LIGHT SWITCH AND EXISTING LIGHTING CIRCUIT IN THIS AREA.
4	WIRE THE EMERGENCY SUDGE OF THIS LIGHT FIXTURE TO THE EMERGENCY LIGHTING CIRCUIT IN THIS AREA.
5	INSTALL LIGHT FIXTURES IN THE GYMNASIUM LIGHTING. PROVIDE TO DETAIL "90-501" FOR ADDITIONAL REQUIREMENTS. PROVIDE WITH A LOCKABLE CLEAR COVER.
6	MOUNT THE L1818M AND L1818X LIGHT FIXTURES IN THIS AREA, SO THAT THE BOTTOM OF THE LIGHT FIXTURES ARE AT THE SAME HEIGHT AS THE TOP OF THE EXISTING MECHANICAL DUCTWORKS LOWEST POINT IN THIS AREA.
7	LIGHT FIXTURE AT THIS LOCATION IS TO BE REMOVED FROM THE PLAN IF THE CENTER HUNG SCOREBOARD IS ACCEPTED.
8	MOUNT THE LP08 LIGHT FIXTURE AT THE SAME HEIGHT AS THE OTHER LIGHT FIXTURES IN THIS AREA. WIRE TO THE EXISTING LIGHTING CIRCUIT IN THIS AREA, BUT CONTROLLED SEPARATELY FROM THE GYMNASIUM LIGHTING.

CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CLEARANCES AND ALL EXISTING FIELD CONDITIONS BEFORE STARTING CONSTRUCTION. COMMENCEMENT OF WORK CONSTITUTES ACCEPTANCE OF CONDITIONS.

SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED, CONTACT THE ARCHITECT BEFORE PROCEEDING WITH WORK.

ROOM LEGEND			
ROOM NO.	OWNER ROOM NO.	ROOM NAME	AREA (SF)
C201		BALCONY	1733 SF
C202		MECHANICAL	1532 SF
C203		MECHANICAL	1113 SF
C204		BALCONY	1687 SF
C205		MECHANICAL	1204 SF
CS1-2		STAIR	194 SF
CS2-2		STAIR	194 SF
CS3-2		STAIR	194 SF
CS4-2		STAIR	194 SF



SECOND FLOOR LIGHTING PLAN - UNIT C

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

PORTAGE TOWNSHIP
SCHOOLS

**FANNING
HOWEY**

[illegible]

E-11A

3. GENERATOR TRANSFER DEVICE TO TAKE FUTURE TO 100% IN EMERGENCY CONDITION.
4. FINAL CONNECTION TO RECESSED LUMINAIRES SHALL BE WITH FLEXIBLE METALLIC CABLE, NOT MC CABLE OR MANUFACTURED WIRING SYSTEM.
5. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR LOCATION OF LUMINAIRE, REFLECTED CEILING LOCATION OF LUMINAIRES, LOUDSPEAKERS, DIFFUSERS, GLASS, AND OTHER CEILING INSTALLED ELEMENTS WITH THEIR RESPECTIVE DIMENSIONS.
6. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN AND ROOM FINISH SCHEDULE TO DETERMINE PROPER TYPE OF LUMINAIRE TYPE REQUIRED FOR CEILING TYPE TO PROVIDE DESIRED AMBIANCE.
7. COMPATIBLE WITH CEILING TYPE.
8. RECESSED LUMINAIRE IN GRID CEILING SYSTEMS SHALL BE PROVIDED WITH RECESSED LUMINAIRE ATTACHMENT TO CEILING GRID SYSTEM AND SUPPORTED PER PROJECT MANUAL AND DETAIL "35-601".
9. LUMINAIRE IS SHOWN ONLY ONCE AS "TYP" IN EVERY ROOM. PROVIDE SAME TYPE OF LUMINAIRE THROUGHOUT SAME ROOM UNLESS OTHERWISE INDICATED.
10. PROVIDE 10 AWG MINIMUM MINIMUNATOR FOR EXT GNS AND SECURITY LIGHT CIRCUITS.

1. REFER TO ELECTRICAL SPECIFICANTS SECTIONS 260005 "ELECTRICAL DEMOLITION" FOR ADDITIONAL REQUIREMENTS THAT APPLY TO THIS DRAWING SHEET.
2. REMOVE ELECTRICAL EQUIPMENT COMPLETE.

1. ALL NEW FIRE ALARM DEVICES TO BE CONNECTED TO THE EXISTING FIRE ALARM SYSTEM.
2. COORDINATE WITH EXISTING EQUIPMENT. PROVIDE PROGRAMMING AND TESTING AS REQUIRED.
3. FIRE ALARM LAYOUT IS SHOWN FOR COVERAGE AREA ONLY. CONTRACTOR SHALL PROVIDE DEVICES AS REQUIRED FOR COMPLETE COVERAGE.

1. PROVIDE REVERSED TYPED PANELBOARD DIRECTORIES FOR EACH PANELBOARD ABOVE OR MODIFIED DURING CONSTRUCTION. FIELD VERIFY THE CORRECT CIRCUIT INFORMATION WITH OWNER'S ASSISTANCE TO ENSURE FIELD DIRECTORY IS ACCURATE. UNUSUED SPACE PREPARED MUST BE IDENTIFIED BY THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CLEARANCES AND ALL EXISTING FIELD CONDITIONS BEFORE ANY MODIFICATION. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING THE PERMIT OF WORK CONSTITUTES ACCEPTANCE OF CONDITIONS. SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED CONTRACTOR NOTIFIED IMMEDIATELY WITH WORK ORDER.
2. LABEL EACH RECEPTACLE WITH THE PANEL NAME AND CIRCUIT NUMBER ON THE FACE OF EACH COVER PLATE WITH A TYPED LAMINATED LABEL.
RECEPTACLE PROTECTED BY LABEL ON COVER PLATE FOR ANY GFCI PROTECTED DEVICE.
CONTRACTOR SHALL INCREASE CIRCUIT CONDUCTOR SIZE TO ALLOW FOR VOLTAGE DROP. VERIFY ALL CONDUCTOR LENGTHS. IN NO CASE SHALL VOLTAGE DROP EXCEED 1% TO E. C. REQUIREMENTS
3. VERIFY ALL MECHANICAL PLANS AND CONNECTION OF MECHANICAL EQUIPMENT. DISCONNECT DISCONNECT SWITCHES PER NEC.
4. REEVALUATE ALL WIRING SCHEMATICS. MECHANICAL DRAWINGS FOR ADDITIONAL CONTROL WIRING AND CONTROL CONNECTIONS.
5. ALL MECHANICAL EQUIPMENT, FIXTURES, AND THE LIKE SHALL BE BONDED WITH A PROPERLY SIZED EQUIPMENT GROUNDING CONDUCTOR. MAINTAIN MECHANICAL/ELECTRICAL BOND OF METALLIC RACEWAY SYSTEM.

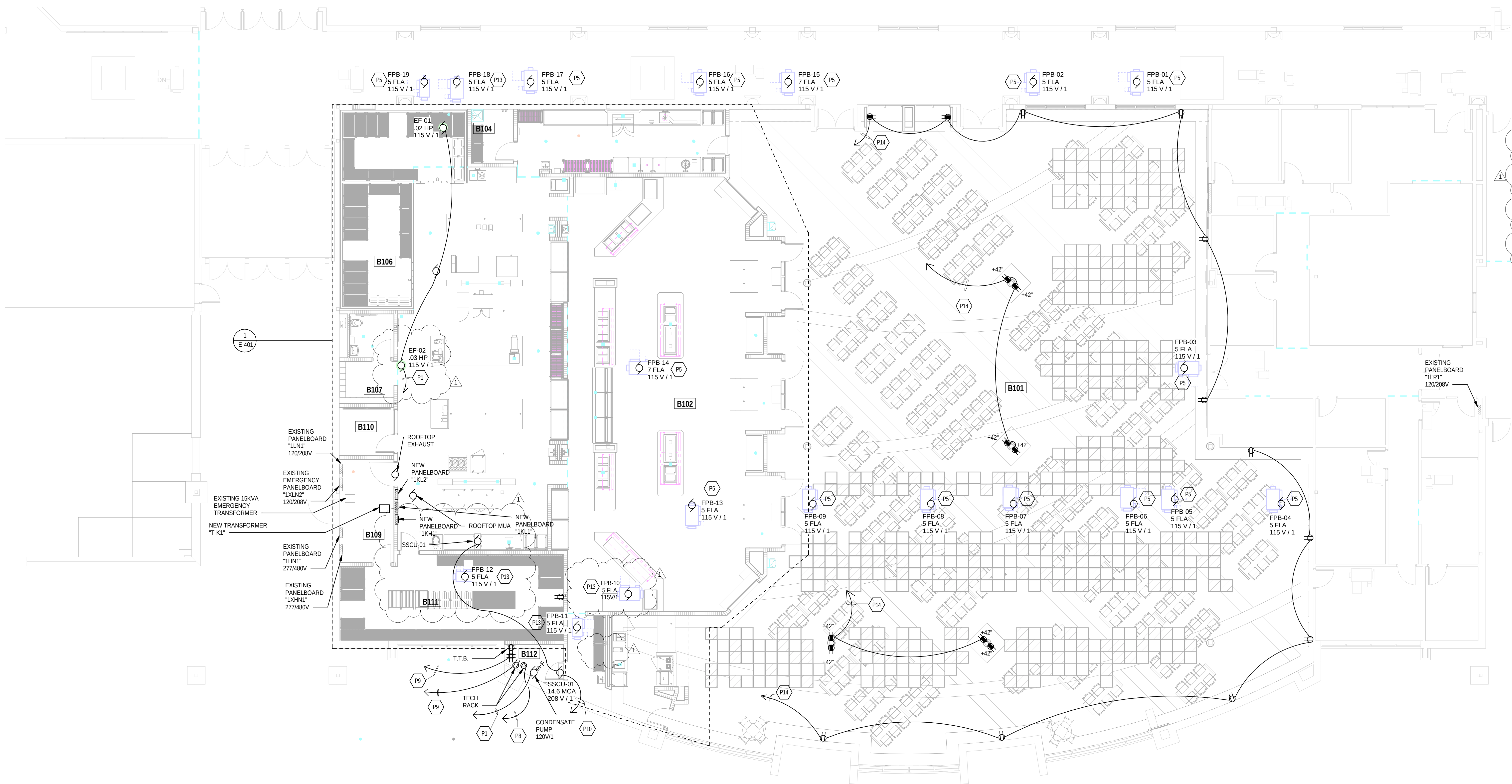
01 EXISTING ELECTRICAL EQUIPMENT TO REMAIN IN PLACE.
02 DISCONNECT AND REMOVE EXISTING LIGHT FIXTURES.
03 DISCONNECT AND REMOVE EXISTING LIGHT FIXTURES.
04 DISCONNECT IT TO REMAIN IN PLACE FOR NEW LIGHTING.
05 DISCONNECT AND REMOVE EXISTING RECEPTACLE AT
06 THIS LOCATION AND REMOVE WIRING BACK TO THE
07 MAIN PANEL.
08 EXISTING PROJECTION SCREEN AND SWITCH TO BE
09 RELOCATED. REFER TO THE POWER PLAN ON THIS
10 SHEET FOR RELOCATION AND ADDITIONAL
11 REQUIREMENTS.
12 EXISTING LIGHT FIXTURES IN THIS ROOM ARE TO REMAIN
13 AS SHOWN ON THIS SHEET.
14 NO NEW SWITCHING REQUIREMENTS.
15 WIRE NEW LIGHTING IN THIS ROOM TO EXISTING LIGHT
16 SWITCHES AND EXISTING LIGHTING CIRCUITS.
17 WIRE THE EMERGENCY OF THIS LIGHT FIXTURE TO
18 THE EMERGENCY LIGHTING CIRCUIT IN THIS AREA.
19 NEW LIGHT SWITCH TO CONTROL NEW AND EXISTING
20 LIGHTING IN ROOM WHERE THE SWITCH IS TO BE
21 LOCATED.
22 WIRE TO A SPARE 20 AMP, 1-PHASE CIRCUIT BREAKER IN
23 THE ELECTRICAL ROOM.
24 NEW LOCATION OF EXISTING PROJECTION SCREEN AND
25 SWITCH. EXTEND EXISTING CIRCUITRY TO THIS NEW
26 LOCATION.
27 RUN POWER AND DATA CONDUITS UNDERSLAB FROM
28 EXISTING CHASE TO NEW LOW WALL.

CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CLEARANCES AND ALL EXISTING FIELD CONDITIONS BEFORE STARTING CONSTRUCTION. COMMENCEMENT OF WORK CONSTITUTES ACCEPTANCE OF CONDITIONS.

SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED, CONTACT THE ARCHITECT BEFORE PROCEEDING WITH WORK.



Autodesk Docs/Portage_T5_HS Cafeteria Renovation/2025_ELEC_226023.rvt
9/20/2025 1:35:54 PM



CAFETERIA POWER PLAN

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

ROOM LEGEND			
ROOM NO.	OWNER ROOM NO.	ROOM NAME	AREA (SF)
B101		CAFETERIA	8749 SF
B102		SERVING	2419 SF
B103		WAREWASHING	371 SF
B104		CUSTODIAN	83 SF
B105		KITCHEN	1873 SF
B106		COOLER / FREEZER	501 SF
B107		LOCKERS	66 SF
B108		TOILET	54 SF
B109		RECEIVING	158 SF
B110		OFFICE	73 SF
B111		DRY STORAGE	519 SF
B112		TECH CLOSET	52 SF
B113		GRAB & GO	279 SF

POWER PLAN GENERAL NOTES

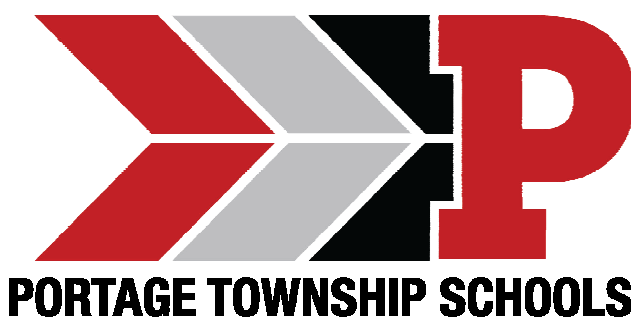
- PROVIDE REVISED TYPED PANELBOARD DIRECTORIES FOR EACH PANELBOARD ADDED OR MODIFIED DURING CONSTRUCTION. FIELD VERIFY EXISTING CIRCUIT INFORMATION WITH OWNER'S ASSISTANCE TO ENSURE FINAL DIRECTORY IS ACCURATE. UNUSED SPARE BREAKERS SHALL BE IN THE OFF POSITION.
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CLEARANCES AND ALL EXISTING FIELD CONDITIONS BEFORE STARTING CONSTRUCTION. COMMENCEMENT OF WORK CONSTITUTES ACCEPTANCE OF CONDITIONS. SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED, CONTACT THE ARCHITECT BEFORE PROCEEDING WITH WORK.
- LABEL EACH RECEPTACLE WITH THE PANEL NAME AND CIRCUIT NUMBER ON THE FACE OF EACH COVER PLATE WITH A TYPED LAMINATED LABEL.
- PROVIDE "GFCI PROTECTED" LABEL ON COVER PLATE FOR ANY GFCI PROTECTED DEVICE.
- CONTRACTOR SHALL INCREASE CIRCUIT CONDUCTOR SIZE TO COMPENSATE FOR VOLTAGE DROP DUE TO EXCESSIVE CIRCUIT LENGTHS. IN NO CASE SHALL VOLTAGE DROP EXCEED NFPA 70 (N.E.C.) REQUIREMENTS.
- REFER TO MECHANICAL PLANS FOR LOCATION OF MECHANICAL EQUIPMENT. LOCATE DISCONNECT SWITCHES PER NEC.
- REFER TO "CONTROL SCHEMATICS" MECHANICAL DRAWINGS FOR ADDITIONAL CONTROL WIRING AND CONTROL CONNECTIONS.
- ALL DEVICES, EQUIPMENT, FIXTURES, AND THE LIKE, SHALL BE BONDED WITH A PROPERLY SIZED EQUIPMENT GROUNDING CONDUCTOR. MAINTAIN MECHANICAL/ELECTRICAL BONDS OF METALLIC RACEWAY SYSTEM.

COPYRIGHT 2026 BY FANNINGHOWEY ASSOCIATES, INC.

PORTAGE HIGH SCHOOL - 2026 RENOVATIONS

6450 US Highway 6
Portage, IN 46368

PORTAGE TOWNSHIP SCHOOLS



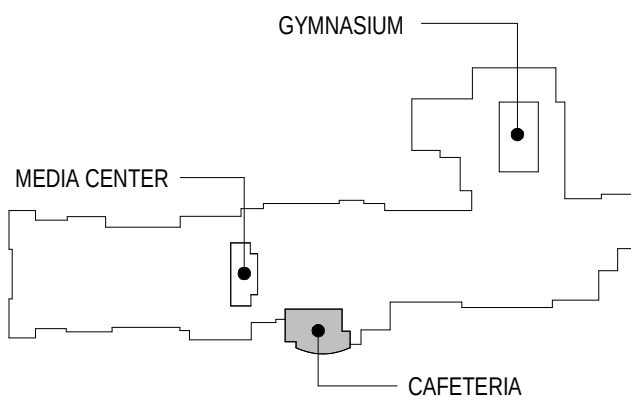
ARCHITECT

**FANNING
HOWEY**

317.848.0966

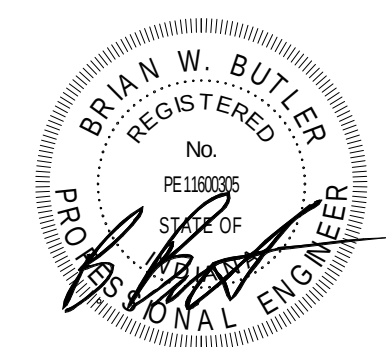
350 E. New York St.

WWW.FHAI.COM



KEY PLAN

CONSTRUCTION DOCUMENTS



PROJECT MANAGER: MKS

DRAWN BY: Author

PROJECT NUMBER: 229023.00

PROJECT ISSUE DATE: 8-14-2025

REV. NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	9-4-2026

VERIFICATION NOTE

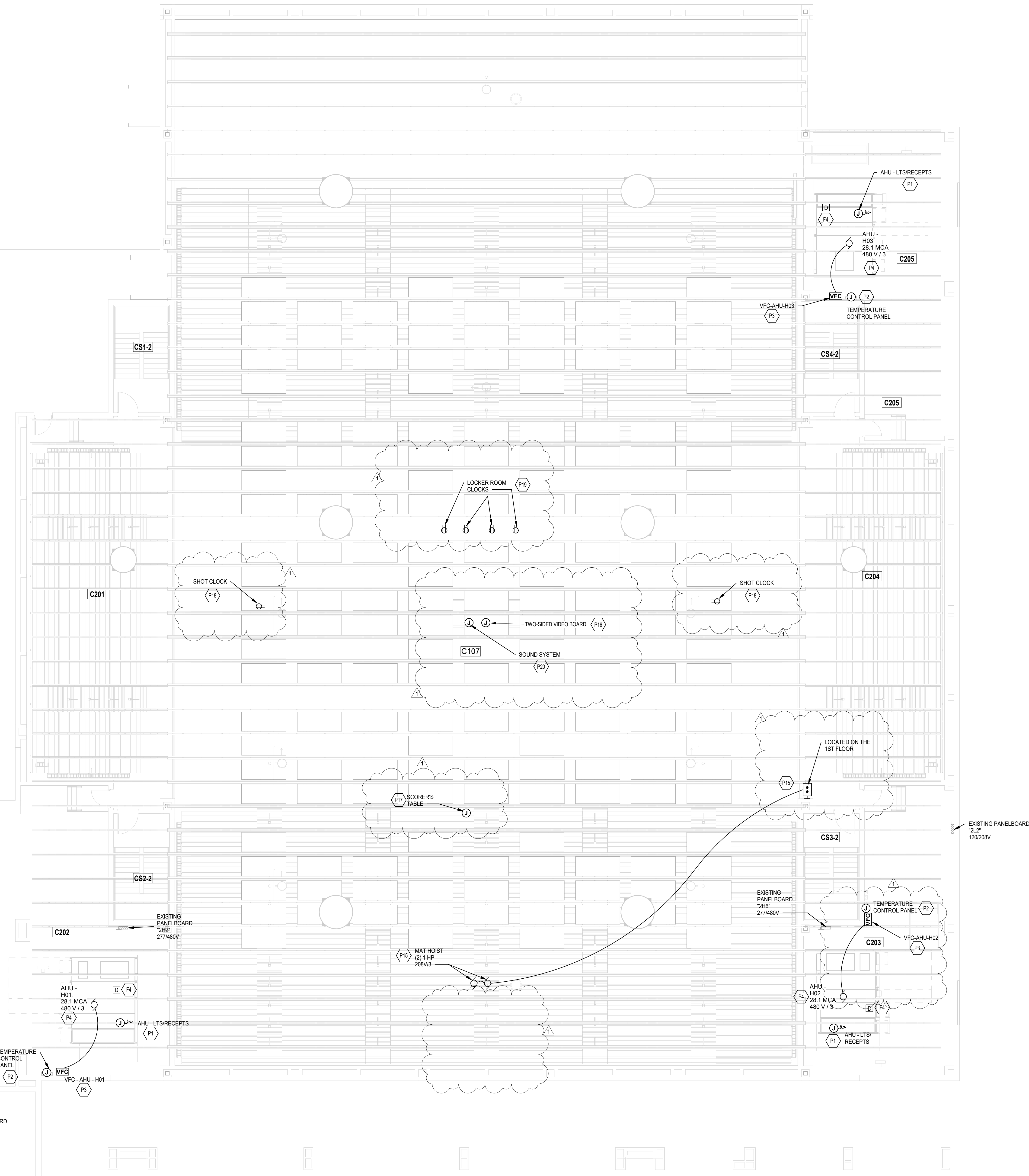
CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CLEARANCES AND ALL EXISTING FIELD CONDITIONS BEFORE STARTING CONSTRUCTION. COMMENCEMENT OF WORK CONSTITUTES ACCEPTANCE OF CONDITIONS.

SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED, CONTACT THE ARCHITECT BEFORE PROCEEDING WITH WORK.

FIRST FLOOR POWER PLAN - UNIT B

EP11B

Autodesk Docs\Portage TS_HS Cafeteria Renov\2025_ELEC_226023.rvt
9/3/2026 7:17:43 AM



SECOND FLOOR POWER PLAN - UNIT C

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

ROOM LEGEND			
ROOM NO.	OWNER ROOM NO.	ROOM NAME	AREA (SF)
C201		BALCONY	1733 SF
C202		MECHANICAL	1532 SF
C203		MECHANICAL	1113 SF
C204		BALCONY	1687 SF
C205		MECHANICAL	1284 SF
CS1-2		STAIR	194 SF
CS2-2		STAIR	194 SF
CS3-2		STAIR	194 SF
CS4-2		STAIR	194 SF

POWER PLAN GENERAL NOTES

- PROVIDE REVISED TYPED PANELBOARD DIRECTORIES FOR EACH PANELBOARD ADDED OR MODIFIED DURING CONSTRUCTION. FIELD VERIFY EXISTING CIRCUIT INFORMATION WITH OWNER'S ASSISTANCE TO ENSURE FINAL DIRECTORY IS ACCURATE. UNUSED SPARE BREAKERS SHALL BE IN THE OFF POSITION.
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CLEARANCES AND ALL EXISTING FIELD CONDITIONS BEFORE STARTING CONSTRUCTION. COMMENCEMENT OF WORK CONSTITUTES ACCEPTANCE OF CONDITIONS. SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED, CONTACT THE ARCHITECT BEFORE PROCEEDING WITH WORK.
- LABEL EACH RECEPTACLE WITH THE PANEL NAME AND CIRCUIT NUMBER ON THE FACE OF EACH COVER PLATE WITH A TYPED LAMINATED LABEL.
- PROVIDE "GFCI PROTECTED" LABEL ON COVER PLATE FOR ANY GFCI PROTECTED DEVICE.
- CONTRACTOR SHALL INCREASE CIRCUIT CONDUCTOR SIZE TO COMPENSATE FOR VOLTAGE DROP DUE TO EXCESSIVE CIRCUIT LENGTHS. IN NO CASE SHALL VOLTAGE DROP EXCEED NFPA 70 (N.E.C.) REQUIREMENTS.
- REFER TO MECHANICAL PLANS FOR LOCATION OF MECHANICAL EQUIPMENT. LOCATE DISCONNECT SWITCHES PER NEC.
- REFER TO "CONTROL SCHEMATICS" MECHANICAL DRAWINGS FOR ADDITIONAL CONTROL WIRING AND CONTROL CONNECTIONS.
- ALL DEVICES, EQUIPMENT, FIXTURES, AND THE LIKE, SHALL BE BONDED WITH A PROPERLY SIZED EQUIPMENT GROUNDING CONDUCTOR. MAINTAIN MECHANICALELECTRICAL BONDS OF METALLIC RACEWAY SYSTEM.

SHEET KEYNOTES

- F4 EXISTING DUCT DETECTORS ARE TO BE DISCONNECTED AND REMOVED FROM EXISTING DUCTWORK, THEN RE-INSTALLED IN THE NEW DUCTWORK.
- P1 WIRE TO A SPARE 20 AMP, 1-POLE CIRCUIT BREAKER IN THE NEAREST EXISTING 120/208V PANELBOARD.
- P2 WIRE NEW TEMPERATURE CONTROL PANEL TO THE EXISTING CIRCUIT AT THIS LOCATION.
- P3 VFC BRANCH/FEEDER CIRCUIT PROTECTION AND CONDUCTORS ARE SIZED FOR BID PURPOSE ONLY. ACTUAL REQUIREMENTS WILL BE BASED ON THE MANUFACTURER'S REQUIREMENTS AND IN COMPLIANCE WITH THE NATIONAL ELECTRIC CODE NFPA 70. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY REQUIREMENTS WITH THE SUBMITTED MANUFACTURER OF THE EQUIPMENT AND PROVIDE THE NECESSARY CIRCUIT PROTECTION AND CONDUCTOR SIZE. VFC IS PROVIDED BY THE DIVISION 23 CONTRACTOR.
- P4 WIRE TO A NEW 40 AMP, 3-POLE CIRCUIT BREAKER IN THE EXISTING 480/277V PANELBOARD THAT FED THE EXISTING REMOVED AHU.
- P11 DISCONNECT POWER FOR THE EXISTING LIGHT FIXTURES AND RECEPTACLES IN THE EXISTING AHU SECTION THAT IS TO BE REMOVED AND CONNECT THE NEW LIGHT FIXTURES AND RECEPTACLES TO THE EXISTING POWER SOURCE WHEN THE NEW AHU SECTION IS INSTALLED.
- P12 WIRE TO A NEW 20AMP, 2-POLE CIRCUIT BREAKER IN NEAREST 120/208V PANELBOARD WITH SPARE CAPACITY.
- P15 WIRE NEW MAT HOIST TO A NEW 20 AMP, 3-POLE CIRCUIT BREAKER IN THE NEAREST 120/208V PANELBOARD WITH SPARE CAPACITY. RUN A 3/4" INCH FROM THE MOTORS TO THE CONTROL SWITCH LOCATION. PROVIDE ALL WIRING BETWEEN MOTORS AND CONTROL SWITCH.
- P16 TWO-SIDE VIDEO BOARD POWER REQUIREMENTS. PROVIDE A 60 AMP, 3-POLE CIRCUIT BREAKER IN THE NEAREST 120/208V PANELBOARD WITH SPARE CAPACITY AND WIRE WITH 4/0, 1F0, 1FC. VERIFY ADDITIONAL WIRING REQUIREMENTS WITH THE UNIT MANUFACTURER PRIOR TO ROUGH-IN.
- P17 SCORER'S TABLE POWER REQUIREMENTS. PROVIDE TWO DEDICATED 20 AMP CIRCUITS FROM THE NEAREST 120/208V PANELBOARD WITH SPARE CAPACITY. VERIFY EXACT LOCATION AND MOUNTING REQUIREMENTS IN THE FIELD.
- P18 SHOT CLOCK POWER REQUIREMENTS. PROVIDE A DUPLEX RECEPTACLE WIRING TO THE NEAREST 120/208V PANELBOARD WITH SPARE CAPACITY. VERIFY EXACT LOCATION AND MOUNTING REQUIREMENTS IN THE FIELD.
- P19 LOCKER ROOM CLOCKS POWER REQUIREMENTS. PROVIDE A DUPLEX RECEPTACLE WIRING TO THE EXISTING DUPLEX RECEPTACLE CIRCUIT IN EACH OF THE FOUR LOCKER ROOMS. VERIFY EXACT LOCATION AND MOUNTING REQUIREMENTS IN THE FIELD.
- P20 SOUND SYSTEM POWER REQUIREMENTS. PROVIDE A DEDICATED 20 AMP, 1-POLE CIRCUIT IN THE NEAREST 120/208V PANELBOARD WITH SPARE CAPACITY.

COPYRIGHT 2026 BY FANNINGHOWEY ASSOCIATES, INC.

PORTAGE HIGH SCHOOL - 2026 RENOVATIONS

6450 US Highway 6
Portage, IN 46368

PORTAGE TOWNSHIP SCHOOLS



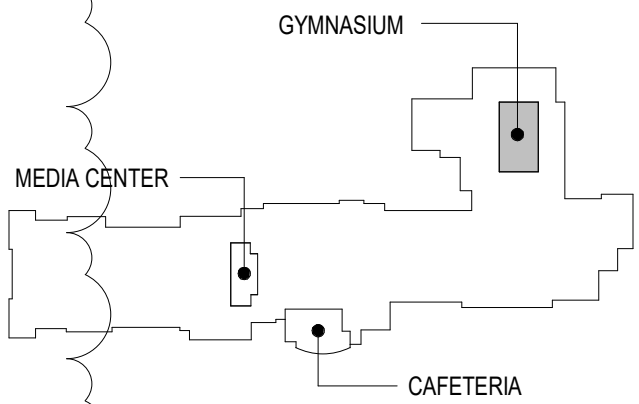
ARCHITECT

FANNING HOWEY

317.848.0966

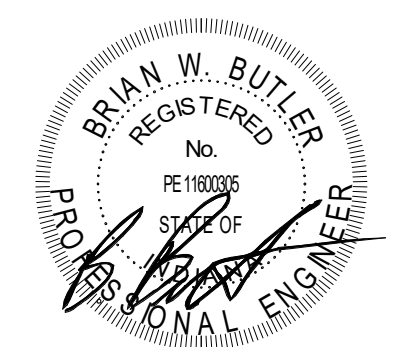
WWW.FHAI.COM

350 E. New York St.



KEY PLAN

CONSTRUCTION DOCUMENTS

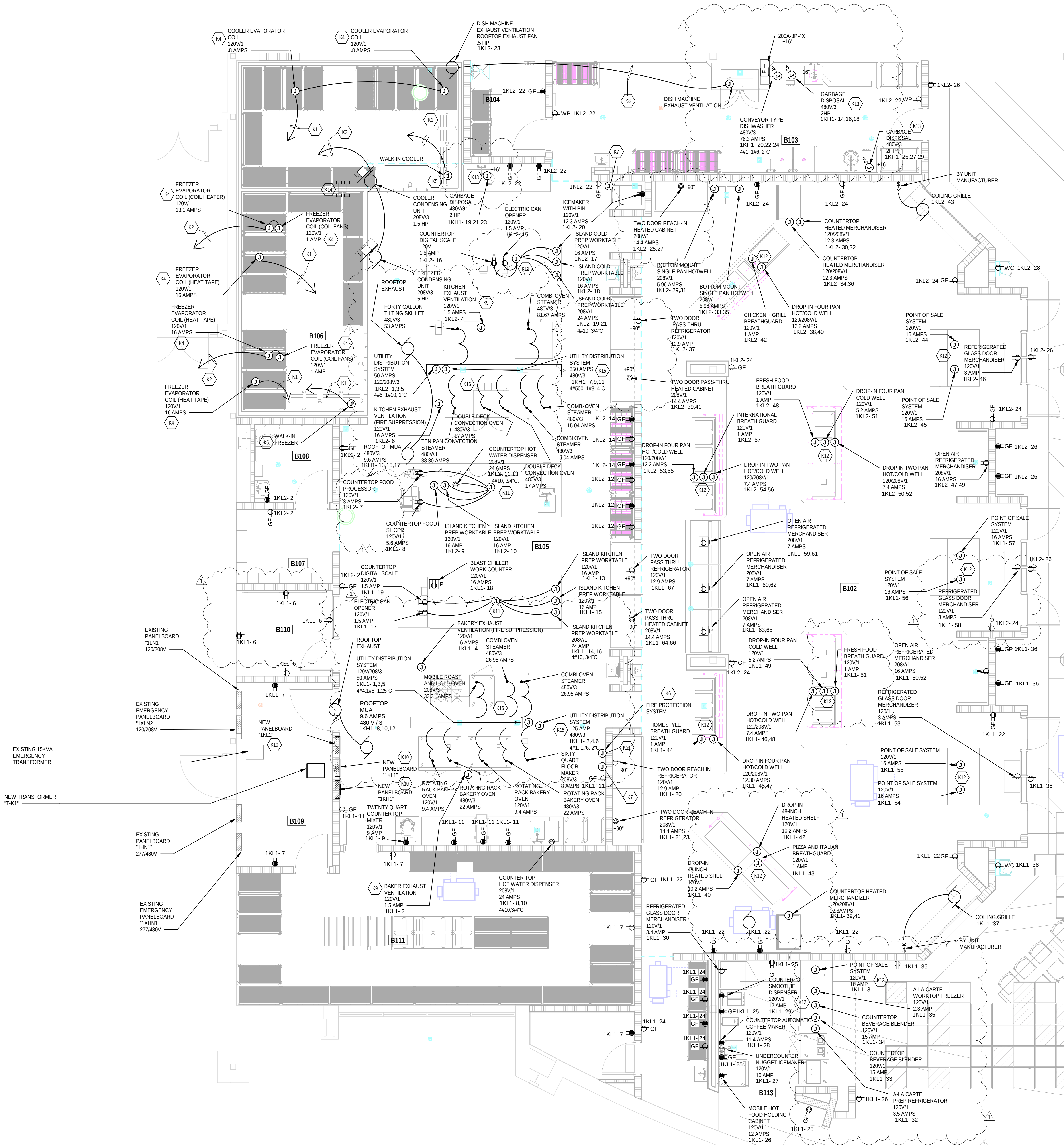


PROJECT MANAGER: MKS
DRAWN BY: Author
PROJECT NUMBER: 226023.00
PROJECT ISSUE DATE: 8-14-2026

REV. NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	9-4-2026

SECOND FLOOR POWER PLAN - UNIT C

EP12C



KITCHEN POWER PLAN

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

ROOM LEGEND			
ROOM NO.	OWNER ROOM NO.	ROOM NAME	AREA (SF)
B101		CAFETERIA	9780 SF
B102		SERVING	2429 SF
B103		WAREWASHING	371 SF
B104		CUSTODIAN	83 SF
B105		KITCHEN	1873 SF
B106		COOLER/FREEZER	501 SF
B107		LOCKERS	66 SF
B108		TOILET	54 SF
B109		RECEIVING	156 SF
B110		OFFICE	73 SF
B111		DRY STORAGE	519 SF
B112		TECH CLOSET	32 SF
B113		GRAB & GO	279 SF

KITCHEN PLAN GENERAL NOTES

- EXPOSED CONDUIT SHALL BE THREADED, GALVANIZED, RIGID STEEL, OR INTERMEDIATE METAL. CONDUIT SHALL BE MOUNTED TO WALLS WITH ONE-HOLE STRAPS. STRAPS WITH SHARP EDGES PROTRUDING FROM THE WALL SHALL NOT BE PERMITTED.
- FLEXIBLE CONNECTIONS SHALL BE MADE WITH NEOPRENE JACKETED, FLEXIBLE METAL.
- COORDINATE ROUGH-IN LOCATIONS, MOUNTING HEIGHT AND CONFIGURATIONS WITH KITCHEN EQUIPMENT SHOP DRAWING PRIOR TO ROUGH-IN.
- ALL EXPOSED WIRING IN KITCHEN SHALL BE INSTALLED IN LIQUID TIGHT FLEXIBLE METAL CONDUIT. ALL JUNCTION BOXES AND FITTING CONNECTIONS SHALL BE WATER PROOF.
- FIELD VERIFY THE RATING AND NEMA CONFIGURATION OF ALL SPECIAL PURPOSE RECEPTACLE OUTLETS WITH PLUG PROVIDED WITH KITCHEN EQUIPMENT.
- REFER TO TS' (FOOD SERVICE PLANS) ARCHITECTURAL ELECTRICAL, MECHANICAL, AND PLUMBING PLANS FOR ALL ADDITIONAL ELECTRICAL REQUIREMENTS.
- ALL WFT TYPE DISCONNECTS SHOWN IN KITCHEN AREA SHALL BE NEMA TYPE 4.

SHEET KEYNOTES

- WIRE TO A SPARE 20AMP, 1-POLE CIRCUIT BREAKER IN THE NEAREST 120/208V EXISTING EMERGENCY PANELBOARD WITH SPARE CAPACITY.
- WIRE TO A NEW 20AMP, 2-POLE CIRCUIT BREAKER IN THE NEAREST 120/208V EXISTING EMERGENCY PANELBOARD WITH SPARE CAPACITY.
- WIRE TO A NEW 40AMP, 3-POLE CIRCUIT BREAKER IN THE NEAREST 120/208V EXISTING EMERGENCY PANELBOARD WITH SPARE CAPACITY. WIRE WITH #10, 3/4".
- PROVIDE CONDUIT AND WIRING TO THERMOSTAT, SOLENOID, DRAIN LINE HEATER AND REMOTE TIMER ON COMPRESSOR. REFER TO THE WIRING DIAGRAMS ON THE FOOD SERVICE DRAWINGS.
- PROVIDE BRANCH CIRCUIT WIRING TO THE UNIT MOUNTED JUNCTION BOX FROM JUNCTION BOX TO LIGHT FIXTURES, PERIMETER DOOR HEATERS, AND AIR RELIEF VENT HEATERS. WIRING SHALL BE INSTALLED OUTSIDE OF THE COOLER/FREEZER WALLS AND CEILING. FINAL CONNECTION PENETRATIONS SHALL BE PROVIDED WITH SEAL-OFFS.
- LOCATION OF THE FIRE PROTECTION SYSTEM. REFER TO THE FOOD SERVICE DRAWINGS FOR ADDITIONAL REQUIREMENTS AND LOCATIONS.
- PROVIDE A 4-INCH OCTAGON JUNCTION BOX, FLUSH MOUNTED AT 54-INCHES A.F.F. PROVIDE A 1/2" CONDUIT STUBBED UP 8-INCHES ABOVE THE LAY-IN CEILING FOR USE BY OTHERS. VERIFY THE EXACT LOCATION OF THE BOX WITH THE FOOD SERVICE EQUIPMENT CONTRACTOR PRIOR TO ROUGH-IN.
- WIRE EXHAUST FAN TO THE DISHWASHER CONTROL PANEL. REFER TO DRAWING SHEET "FS-4-01" FOR ADDITIONAL REQUIREMENTS.
- PROVIDE WIRING FROM JUNCTION BOX TO THE CANOPY LIGHT FIXTURES AND TO THE LIGHT SWITCH.
- KITCHEN PANELBOARD IS TO BE PROVIDED WITH A STAINLESS STEEL COVER.
- EXTEND BRANCH CIRCUIT WIRING FROM A CONDUIT STUBBED UP FROM THE FLOOR TO THE PREMOUNTED JUNCTION BOX ON THE TABLE AND CONNECT TO THE PREWIRED TABLE MOUNTED RECEPTACLES.
- EXTEND BRANCH CIRCUIT WIRING FROM A CONDUIT STUBBED UP FROM THE FLOOR TO THE PREMOUNTED JUNCTION BOX ON THE FOOD SERVICE EQUIPMENT AND CONNECT TO THE PREWIRED EQUIPMENT MOUNTED JUNCTION BOXES OR RECEPTACLES.
- PROVIDE WIRING FROM JUNCTION BOX, TO THE CONTROL PANEL AND TO THE SOLENOID DISPOSER.
- STUB A 3/4" CONDUIT FROM THE FREEZER COMPRESSOR AND A 3/4" CONDUIT FROM THE COOLER/FREEZER TO THE INSIDE OF THE BUILDING ABOVE CEILING FOR WARNING ALARMS.
- PROVIDE WIRING AND CONDUIT FROM THE CONTROL PANEL OF THE VENTILATION HOOD TO THE SUPPLY/EXHAUST SYSTEM ON THE ROOF. REFER TO THE FOOD SERVICE DRAWINGS FOR ADDITIONAL REQUIREMENTS.
- ELECTRICAL DEVICES UNDER THE VENTILATION HOOD ARE TO BE MOUNTED TO THE UTILITY CABINET.

VERIFICATION NOTE

CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CLEARANCES AND ALL EXISTING FIELD CONDITIONS BEFORE STARTING CONSTRUCTION. COMMENCEMENT OF WORK CONSTITUTES ACCEPTANCE OF CONDITIONS.

SHOULD DIFFERENT CONDITIONS BE ENCOUNTERED, CONTACT THE ARCHITECT BEFORE PROCEEDING WITH WORK.

PORTAGE HIGH SCHOOL - 2026 RENOVATIONS

6450 US Highway 6
Portage, IN 46368

PORTAGE TOWNSHIP SCHOOLS



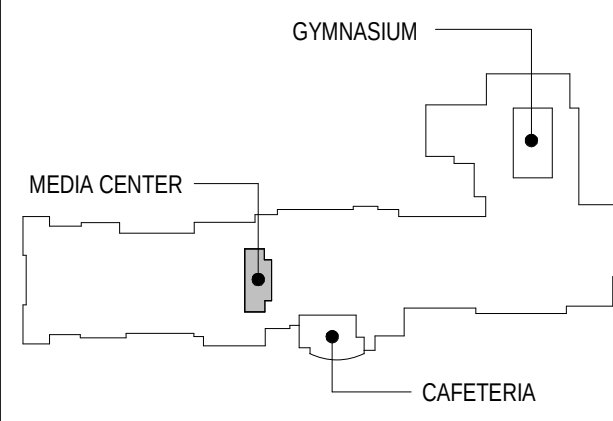
ARCHITECT

FANNING HOWEY

317.848.0966

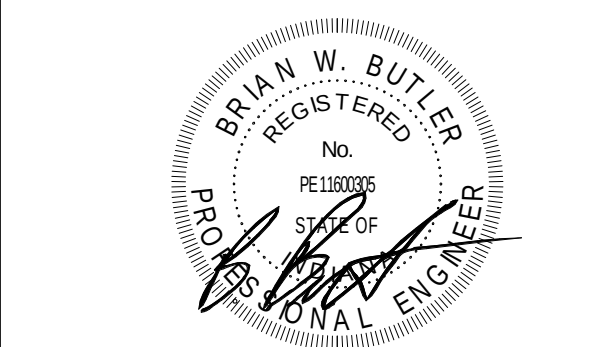
350 E. New York St.

WWW.FHAI.COM



KEY PLAN

CONSTRUCTION DOCUMENTS



PROJECT MANAGER: MKS

DRAWN BY: Author

PROJECT NUMBER: 226023.00

PROJECT ISSUE DATE: 8-14-2025

REV. NO.	DESCRIPTION	DATE
1	ADDENDUM NO. 1	9-4-2026

KITCHEN POWER PLAN

E-401

**PORTAGE TOWNSHIP
SCHOOLS**

**FANNING
HOWEY**

WWW.FHAI.COM

**LUMINAIRE SCHEDULES AND
PANELBOARD SCHEDULES,
ONE-LINE DIAGRAM**

E-601

LUMINAIRE SCHEDULE - GENERAL NOTES	
1.	SEE SPECIFICATIONS FOR BALLAST REQUIREMENTS.
2.	FOR ALL DOWNLIGHTING FIXTURES, PROVIDE REQUIRED MOUNTING HARDWARE FOR MOUNTING IN-LAY-IN TYPE CEILING.
3.	CONTRACTOR TO VERIFY TYPES AND QUANTITY OF LIGHT FIXTURES REQUIRING EMERGENCY TRANSFER DEVICES AND PROVIDE REQUIRED QUANTITY OF EMERGENCY TRANSFER DEVICES, LABOR, MATERIAL, ETC. THE PROJECT BID FOR FIELD INSTALLATION OF EMERGENCY TRANSFER DEVICES.
4.	LIGHT FIXTURE SUBMITTALS TO INCLUDE DATA SHEETS FOR ALL FIXTURE TYPES, INCLUDING ADDITIONAL REQUIREMENTS FOR BALLAST COMBINATIONS REQUIRED TO MEET THE INSTALLATION REQUIREMENTS OF THE VARIOUS FIXTURE TYPES AND INDICATE THE NEAREST COLUMN OF THE FIXTURE SCHEDULE.
5.	COLOR TEMPERATURE FOR ALL LIGHT FIXTURES TO BE 4000K UNLESS OTHERWISE NOTED.

Branch Panel: 1KL2

Location: KITCHEN B105

Supply From: Mounting: Enclosure: Recessed
Type: 19" x 19" x 1.5" T-K1

Volts: 120/208 Wye

Phases: 3

Wires: 4

AIC, Rating: MCB

Main Type: MCB

Main Rating: 400 A

MCB Rating: 400 A

Notes:

CKT	Circuit Description	Trip	Poles	A	B	C	Poles	Trip	Circuit Description	CKT
1	UTILITY DISTRIBUTION SYSTEM 28.8 KW RM...	50 A	3	5997... 720 VA				1	20 A RECEPTS RM. B105, B107, B108	2
3	--	--	--		5997 VA 180 VA			1	20 A KITCHEN EXHAUST VENTILATION RM. B105	4
5	--	--	--			5997 VA 1920...		1	20 A KITCHEN EXHAUST VENTILATION FIRE SUPPRESSION RM. B105	6
7	COUNTERTOP GOOD PROCESSOR RM. B105	20 A	1	360 VA 360 VA				1	20 A COUNTERTOP FOOD SLICER RM. B105	8
9	ISLAND KITCHEN PREP WORKTABLE RM. B105	20 A	1		1920 VA 1920 VA			1	20 A ISLAND KITCHEN PREP WORKTABLE RM. B105	10
11	COUNTERTOP HOT WATER DISPENSER RM. B105	30 A	2			2496 VA 540 VA	1/2	20 A RECEPTS RM. B105	12	
13	--	--	--	2496... 540 VA				1	20 A RECEPTS RM. B105	14
15	ELECTRIC CAN OPENER RM. B105	20 A	1		180 VA 180 VA			1	20 A COUNTERTOP DIGITAL SCALE RM. B105	16
17	ISLAND COLD PREP WORKTABLE RM. B105	20 A	1			1920 VA 1920...		1	20 A ISLAND COLD PREP WORKTABLE RM. B105	18
19	ISLAND COLD PREP WORKTABLE RM. B105	30 A	2	2496... 1440 VA				1	20 A ICEMAKER WITH BIN RM. B105	20
21	--	--	--		2496 VA 1080 VA			1	20 A RECEPTS RM. B103, B104, B105	22
23	DISH MACHINE EXHAUST VENTILATION BIN	20 A	1			1127 VA 1260...		1	20 A RECEPTS RM. B102	24
25	TWO DOOR REACH-IN HEATED CABINET...	20 A	2	1498... 900 VA				1	20 A RECEPTS RM. B101	26
27	--	--	--		1498 VA 180 VA			1	20 A WATERCOOLER RM. B101 (NOTE1)	28
29	BOTTOM MOUNT SINGLE PAN HOTWELL RM. B102	20 A	2			620 VA 1279...		2	20 A COUNTERTOP HEATED MERCHANDISER RM. B102	30
31	--	--	--	620 VA 1279 VA				--	--	32
33	BOTTOM MOUNT SINGLE PAN HOTWELL RM...	20 A	2		620 VA 1279 VA			2	20 A COUNTERTOP HEATED MERCHANDISER RM. B102	34
35	--	--	--			620 VA 1279...		--	--	36
37	TWO DOOR PASS-THRU REFRIG. RM. B102	20 A	1	1548... 1269 VA				2	20 A DROP IN FOUR PAN HOT/COLD WELL RM. B102	38
39	TWO DOOR PASS-THRU HEATED CABINET RM. B102	20 A	2		1498 VA 1269 VA			2	20 A DROP IN FOUR PAN HOT/COLD WELL RM. B102	40
41	--	--	--			1498 VA 120 VA		1	20 A CHICKEN+GRILL, BREATHGUARD RM. B102	42
43	COILING GRILLE RM. B102	20 A	1	1840... 1920 VA				1	20 A POINT OF SALE SYSTEM RM. B102	44
45	POINT OF SALE SYSTEM RM. B102	20 A	1		1920 VA 360 VA			1	20 A REFRIGERATED GLASS DOOR MERCHANDISER RM. B102	46
47	OPEN AIR REFRIGERATOR MERCHANDISER RM. B102	20 A	2			1664 VA 120 VA		1	20 A FRESH FOOD BREATHGUARD RM. B102	48
49	--	--	--	1664... 770 VA				2	20 A DROP-IN FOUR PAN COLD WELL RM. B102	50
51	DROP-IN FOUR PAN COLD WELL RM. B102	20 A	1		624 VA 770 VA			--	--	52
53	DROP-IN FOUR PAN HOT/COLD WELL RM. B102	20 A	2			770 VA 1269...	2	20 A DROP-IN TWO PAN HOT/COLD WELL RM. B102	54	
55	--	--	--	770 VA 1269 VA				--	--	56
57	INTERNATIONAL BREATHGUARD RM. B102	20 A	1		120 VA 0 VA			1	20 A Spare	58
59	Spare	20 A	1			0 VA 0 VA	1	20 A Spare		60
				Total Load:	29754 VA	24080 VA	26418 VA			
				Total Amps:	251 A	201 A	223 A			

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals
Motor	2967 VA	115.50%	5336 VA	
Other	5336 VA	100.00%	5336 VA	Total Conn. Load: 80261 VA
Receptacle - Convenience	12976 VA	80.00%	10381 VA	Total Est. Demand: 75929 VA
Receptacle - Special	10982 VA	80.00%	8786 VA	Total Conn.: 223 A
				Total Est. Demand: 211 A

Notes:

1. GFCI BREAKER 50A

Notes:						

ONE LINE DIAGRAM SYMBOLS						
ONLY REAKER PANELBOARD, E8 SERIES DRAWINGS BOARD SCHEDULES		DIGITAL ELECTRONIC POWER METER		COMBINATION MAGNETIC MOTOR STARTER WITH FUSED SWITCH		FUSE SWITCH
		KIRK KEY INTERLOCK				DISC SWITCH
REAKER IN REAKER PANELBOARD, E8 SERIES DRAWINGS BOARD SCHEDULES		UTILITY METER		COMBINATION MAGNETIC MOTOR STARTER WITH CIRCUIT BREAKER		FUSE SWITCH WITH SPD
		MAIN BREAKER IN CIRCUIT BREAKER PANELBOARD WITH SUB-FEED BREAKER. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES				TRANSFER SWITCH
FEED LUGS REAKER PANELBOARD, E8 SERIES DRAWINGS BOARD SCHEDULES		MAIN BREAKER IN CIRCUIT BREAKER PANELBOARD WITH INTEGRAL BUS CONNECTED SPD. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES		COMBINATION MAGNETIC MOTOR STARTER WITH MOTOR CIRCUIT PROTECTOR		DISC SWITCH
		MAIN BREAKER IN CIRCUIT BREAKER PANELBOARD WITH INTEGRAL BUS CONNECTED SPD. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES				DISC SWITCH
FEED LUGS REAKER PANELBOARD, E8 SERIES DRAWINGS BOARD SCHEDULES		MAIN BREAKER IN CIRCUIT BREAKER PANELBOARD WITH INTEGRAL BUS CONNECTED SPD. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES		COMBINATION MAGNETIC MOTOR STARTER WITH VARIABLE SPEED CONTROLLER		MAGNETRON
		MAIN BREAKER IN CIRCUIT BREAKER PANELBOARD WITH INTEGRAL BUS CONNECTED SPD. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES				MAGNETRON
FEED LUGS REAKER PANELBOARD, E8 SERIES DRAWINGS BOARD SCHEDULES		MAIN BREAKER IN CIRCUIT BREAKER PANELBOARD WITH SPD MOUNTED ADJACENT WITH CLOSED WIPPLE. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES		COMBINATION MAGNETIC MOTOR STARTER WITH ELECTRONIC OVERLOADS		MAGNETRON
		MAIN BREAKER IN CIRCUIT BREAKER PANELBOARD WITH SPD MOUNTED ADJACENT WITH CLOSED WIPPLE. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES				MAGNETRON

ONE LINE DIAGRAM SYMBOLS				1. GFCI BREAKER Sma	
	MAIN LUG ONLY CIRCUIT BREAKER PANELBOARD. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES		DIGITAL ELECTRONIC POWER METER		KIRK KEY INTERLOCK
	MAIN BREAKER IN CIRCUIT BREAKER PANELBOARD. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES		UTILITY METER		MAIN BREAKER IN CIRCUIT BREAKER PANELBOARD WITH SUB-FED BREAKER. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES
	THROUGH FEED LUGS CIRCUIT BREAKER PANELBOARD. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES		MAIN BREAKER IN CIRCUIT BREAKER PANELBOARD WITH INTEGRAL BUS CONNECTED SPD. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES		MAIN BREAKER IN CIRCUIT BREAKER PANELBOARD WITH SPD MOUNTED ADJACENT WITH CLOSED NIPPLE. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES
	MAIN DOUBLE LUG CIRCUIT BREAKER PANELBOARD. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES		MAIN BREAKER IN CIRCUIT BREAKER PANELBOARD WITH SPD MOUNTED ADJACENT WITH CLOSED NIPPLE. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES		MAIN BREAKER IN CIRCUIT BREAKER PANELBOARD WITH SPD MOUNTED ADJACENT WITH CLOSED NIPPLE. REFER TO E8 SERIES DRAWINGS FOR PANELBOARD SCHEDULES
	COMBINATION MAGNETIC MOTOR STARTER WITH FUSED SWITCH		COMBINATION MAGNETIC MOTOR STARTER WITH CIRCUIT BREAKER		COMBINATION MAGNETIC MOTOR STARTER WITH MOTOR CIRCUIT PROTECTOR
	COMBINATION MAGNETIC MOTOR STARTER WITH VARIABLE SPEED CONTROLLER		COMBINATION MAGNETIC MOTOR STARTER WITH ELECTRONIC OVERLOADS		FUSED SWITCH IN SWITCHBOARD, 3P UNO
	DISCONNECT SWITCH IN SWITCHBOARD, 3P UNO		FUSED BOLTED PRESSURE SWITCH WITH GROUND FAULT AND SINGLE PHASE PROTECTION, 3P UNO		TRANSFER SWITCH
	MOLDED CASE CIRCUIT BREAKER, 3P UNO		CIRCUIT BREAKER IN SWITCHBOARD, 3P UNO		INSULATED CASED POWER CIRCUIT BREAKER WITH L.I.S.G. PROTECTION FEATURES, 3P UNO
	DRAWOUT CIRCUIT BREAKER, 3P UNO		SHUNT TRIP OPERATED CIRCUIT BREAKER		FUSED POTENTIAL TRANSFORMER
	CURRENT TRANSFORMERS, 3 UNO		CAPACITOR		EARTH GROUND
	LIGHTNING ARRESTER		PLUG AND RECEPTACLE OR DRAWOUT DEVICE		POWER TRANSFORMER
	3 PHASE MOTOR. X INDICATES HORSEPOWER OR KILOWATTS		CONTROL PANEL FURNISHED UNDER DIVISION 25		GENERATOR