

Anthony Esson, Architect  
PO Box 479  
Gaylord, Michigan 49734

West Branch Rose City Area Schools  
Ogemaw Heights High School HVAC Upgrades

March 5, 2021

Project No. 362-181

## ADDENDUM NO. 2

This Addendum is being issued for the purpose of modifying and/or clarifying the original Bidding Documents dated February 12, 21 and shall take precedence over them.

All work included herein shall be in accordance with the general requirements of the original bidding documents, except as specifically noted herein.

This Addendum is being sent to all known plan holders, suppliers, plan rooms, and governmental agencies having received Bidding Documents.

Supplemental Documents Issued:

Specifications Sections:

New Section 23 89 00 – Ductwork dated February 12, 2021

Drawings:

Revised Sheet A1.5 dated March 5, 2021  
Revised Sheet A2.8 dated March 5, 2021  
Revised Sheet A2.10 dated March 5, 2021  
Revised Sheet M1.8 dated March 5, 2021  
Revised Sheet M1.9 dated March 5, 2021  
Revised Sheet M5.1 dated March 5, 2021  
Revised Sheet M5.2 dated March 5, 2021

- Item No. 1: Refer to Specification Section 09 90 00 – Painting; Paragraph 3.6.A.3: Note that air handling units are factory finished and do not require painting. Paint only exposed to view ductwork in Pool 263 and Gymnasium 270.
- Item No. 2: Refer to NEW Specification Sections 23 89 00 – Ductwork for duct requirements and specifications.
- Item No. 3: Refer to Revised Sheet A1.5: Note revision to the Keyed Demolition Note in Art Room 247.
- Item No. 4: Refer to Revised Sheet A2.10:
- a. Note revised Keyed Construction Note at duct penetration into Mechanical 401B.
  - b. Note added Keyed Construction Note at duct penetration into Pool 263.
  - c. Note revisions to Keyed Construction Notes.
- Item No. 5: Refer to Revised Sheets A2.8 and M1.8: Note revised ductwork requirements at AHU's in Gymnasium 270.
- Item No. 6: Refer to Revised Sheet M1.9: Note added Keynote 14 regarding duct mounting height in

Pool 263.

Item No. 7: Refer to Revised Sheet M5.1: Note clarification to responsibility for supply of Starter/Disconnect on the Pool Air Handling Unit (AHU-10) and associated Fluid Cooler FCL-1.

Item No. 8: Refer to Revised Sheet M5.2:

- a. Refer to Curb Section detail: Angles for the support of RTU curbs are to be 4"x3"x1/4" angles LLV. Joist spacing is to be field verified at each location and is generally 4'-0".
- b. Note deletion of details not required, and removal of other structural reinforcement not required.

**END OF ADDENDUM NO. 2**

**SECTION 238900 - DUCTWORK**

**PART 1 - GENERAL**

**1.01 WORK INCLUDED**

- A. Low pressure ducts.
- B. Duct cleaning.

**1.02 RELATED WORK**

- A. Section 230010 – Basic Mechanical Materials and Methods.
- B. Section 230593 - Testing, Adjusting and Balancing.
- C. Section 230700 - Thermal Insulation.

**1.03 REFERENCES**

- A. ASHRAE - Handbook 1989 Fundamentals; Duct Design.
- B. ASHRAE - Handbook 1988 Equipment; Duct Construction.
- C. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- D. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems.
- E. SMACNA - Low Pressure Duct Construction Standards.
- H. UL 181 - Factory-Made Air Ducts and Connectors.

**1.04 DEFINITIONS**

- A. Duct Sizes: Inside clear dimensions. For lined ducts, maintain sizes inside lining.
- B. Low Pressure: Three pressure classifications: 1/2 inch WG positive or negative static pressure and velocities less than 2,000 fpm; 1 inch WG positive or negative static pressure and velocities less than 2,500 fpm and 2 inch WG positive or negative static pressure and velocities less than 2,500 fpm.

**1.05 REGULATORY REQUIREMENTS**

- A. Construct ductwork to NFPA 90A, NFPA 90B and NFPA 96 (if applicable) standards.

**1.06 SUBMITTALS**

- A. Submit shop drawings and product data under provisions of Section 230000.
- B. Indicate duct fittings, particulars such as gauges, sizes, welds, and configuration prior to start of work for low pressure systems.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. General: Non-combustible or conforming to requirements for Class 1 air duct materials, or UL 181.
- B. Steel Rectangular Ducts: ASTM A525 or ASTM A527 galvanized steel sheet, lock-forming quality, having zinc coating of 1.25 oz per square feet for each side in conformance with ASTM A90.
- C. Insulated Flexible Ducts: Flexible duct wrapped with flexible glass fiber insulation, enclosed by seamless aluminum pigmented plastic vapor barrier jacket; maximum 0.23 K value at 75 deg. F.
- D. Round Spiral Ducts: ASTM A-527-71, galvanized steel, spiral locking seam equal to United McGill Uni-Seal.
- E. Internal Insulated Round Spiral Ducts: ASTM A-527-71, galvanized steel, spiral locking seam equal to United McGill Uni-Rib k-27.

### **2.02 LOW PRESSURE DUCTWORK**

- A. Fabricate and support in accordance with SMACNA Low Pressure Duct Construction Standards and ASHRAE handbooks, except as indicated. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.
- B. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission.
- C. Construct tees, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.
- D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.
- E. Provide easements where low pressure ductwork conflicts with piping and structure. Where easements exceed 10 percent duct area, split into two ducts maintaining original duct area.
- F. Connect flexible ducts to metal ducts with adhesive plus sheet metal screws.

- G. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.
- H. Use double nuts and lock washers on threaded rod supports.

### **PART 3 - EXECUTION**

#### **3.01 PREPARATION/INSTALLATION**

- A. Before proceeding with fabrication and installation of ductwork, inspect the contract documents and determine that the location of work does not interfere with other work. In case of interference, notify the Engineer.
- B. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
- C. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- D. Connect diffusers or troffer boots to low pressure ducts with 5 feet maximum length of flexible duct in areas where a ceiling is installed. Hold in place with strap or clamp.
- E. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

#### **3.02 DUCTWORK APPLICATION SCHEDULE**

##### **AIR SYSTEM**

##### **MATERIAL**

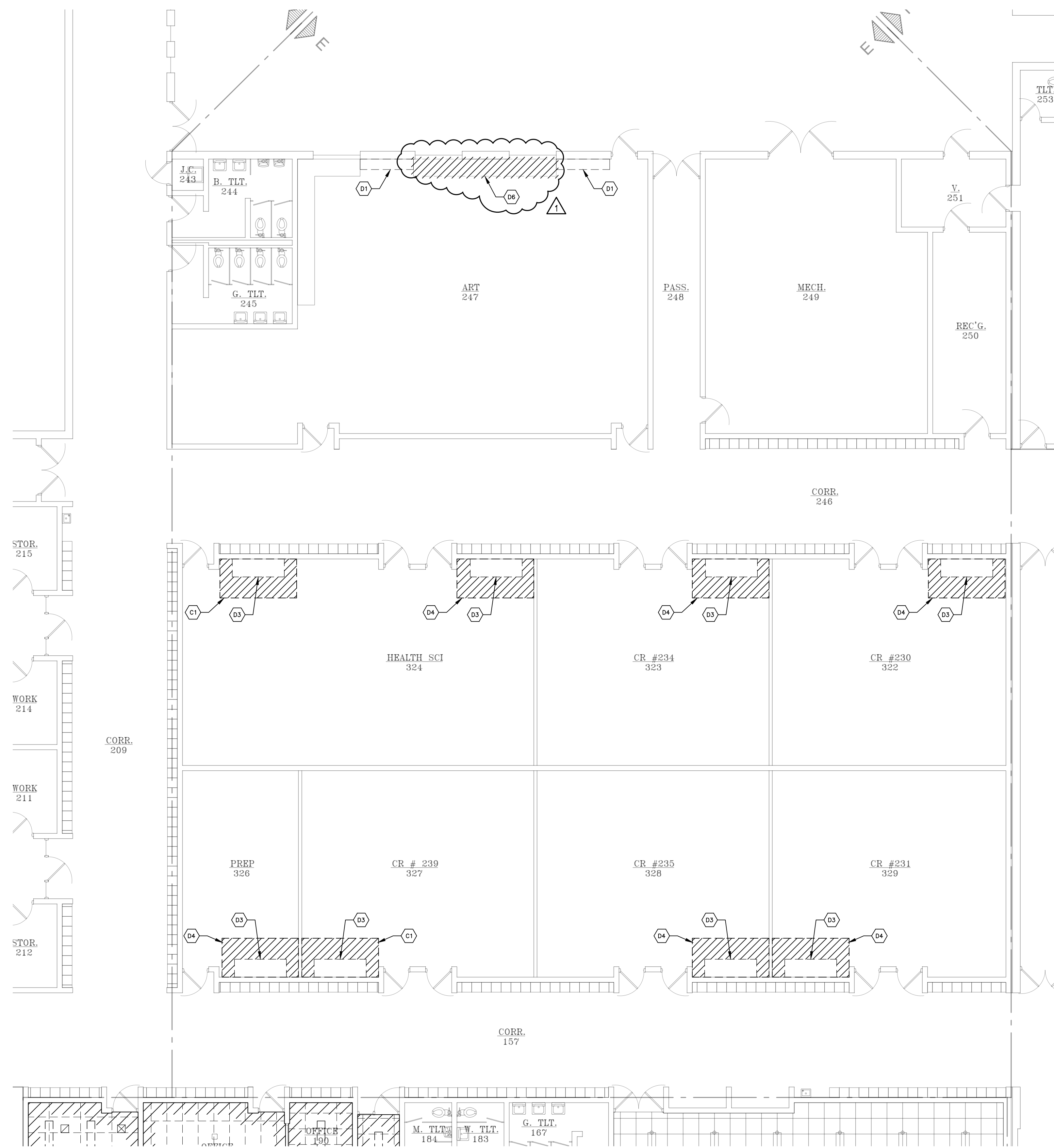
Low Pressure Supply	Rectangular or spiral round as indicated on drawings.
Return and Relief	Rectangular or spiral round as indicated on drawings.
Toilet Exhaust	Galvanized Steel
Outside Air Intake	Galvanized Steel
Acoustically Lined Supply	Internally insulated as indicated.

#### **3.03 ADJUSTING AND CLEANING**

- A. If air handling equipment is used to supply temporary heat during construction, clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment which may be harmed by excessive dirt with temporary filters, or bypass during cleaning.

- B. If air handling equipment is used to supply temporary heat during construction, clean duct systems with high power vacuum machines. Protect equipment which may be harmed by excessive dirt with filters, or bypass during cleaning. Provide adequate access into ductwork for cleaning purposes.

END OF SECTION



**DEMOLITION PLAN - PART "E"**  
SCALE: 1/8" = 1'-0"

**GENERAL DEMOLITION NOTES**

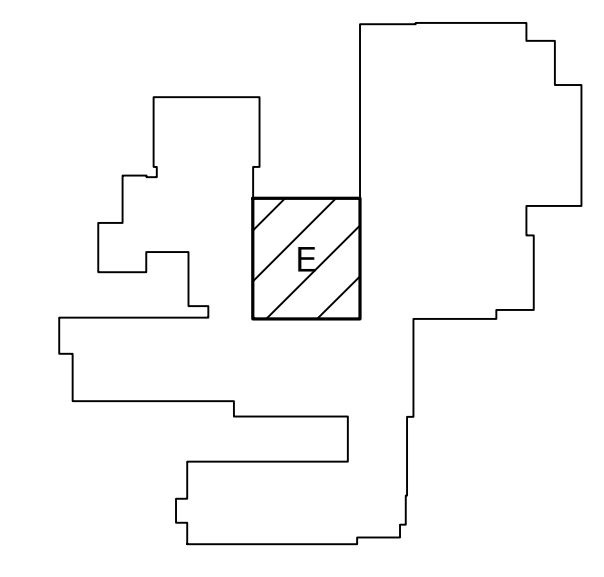
REMOVE EX'G ASSEMBLIES TO THE EXTENT REQUIRED FOR THE INSTALLATION OF NEW WORK, AND TO ALLOW FOR CONNECTION OF NEW WORK TO EX'G ADJACENT CONSTRUCTION. ALL EX'G CONDITIONS ARE TO BE FIELD VERIFIED. CONTRACTOR SHALL MAKE NECESSARY ADJUSTMENTS TO DEMOLITION AS REQ'D TO ACHIEVE THE OVERALL DESIGN INTENT.

CONTRACTOR SHALL FIELD VERIFY THE EXTENT OF CEILING REMOVAL AND REINSTALLATION NECESSARY TO INSTALL NEW WORK AS DEPICTED.

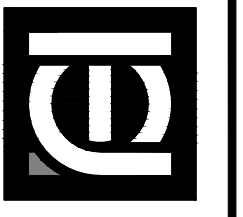
MODIFICATION OF BUILDING STRUCTURAL LOAD BEARING MEMBERS EXCEPT AS DESCRIBED HEREIN OR APPROVED BY THE ARCHITECT IN WRITING IS STRICTLY PROHIBITED. STRUCTURAL MODIFICATIONS DEPICTED HEREIN ARE BASED UPON INFORMATION DERIVED FROM THE OWNERS RECORD. CONTRACTOR SHALL REMOVE FINISHES FROM FRAMING AND SHALL CONSULT ARCHITECT FOR DIRECTION ON MODIFICATION OR REMOVAL OF LOAD BEARING STRUCTURAL ITEMS (WALLS, COLUMNS, BEAMS, JOISTS, AND TRUSSES) NOT SPECIFICALLY INDICATED HEREIN.

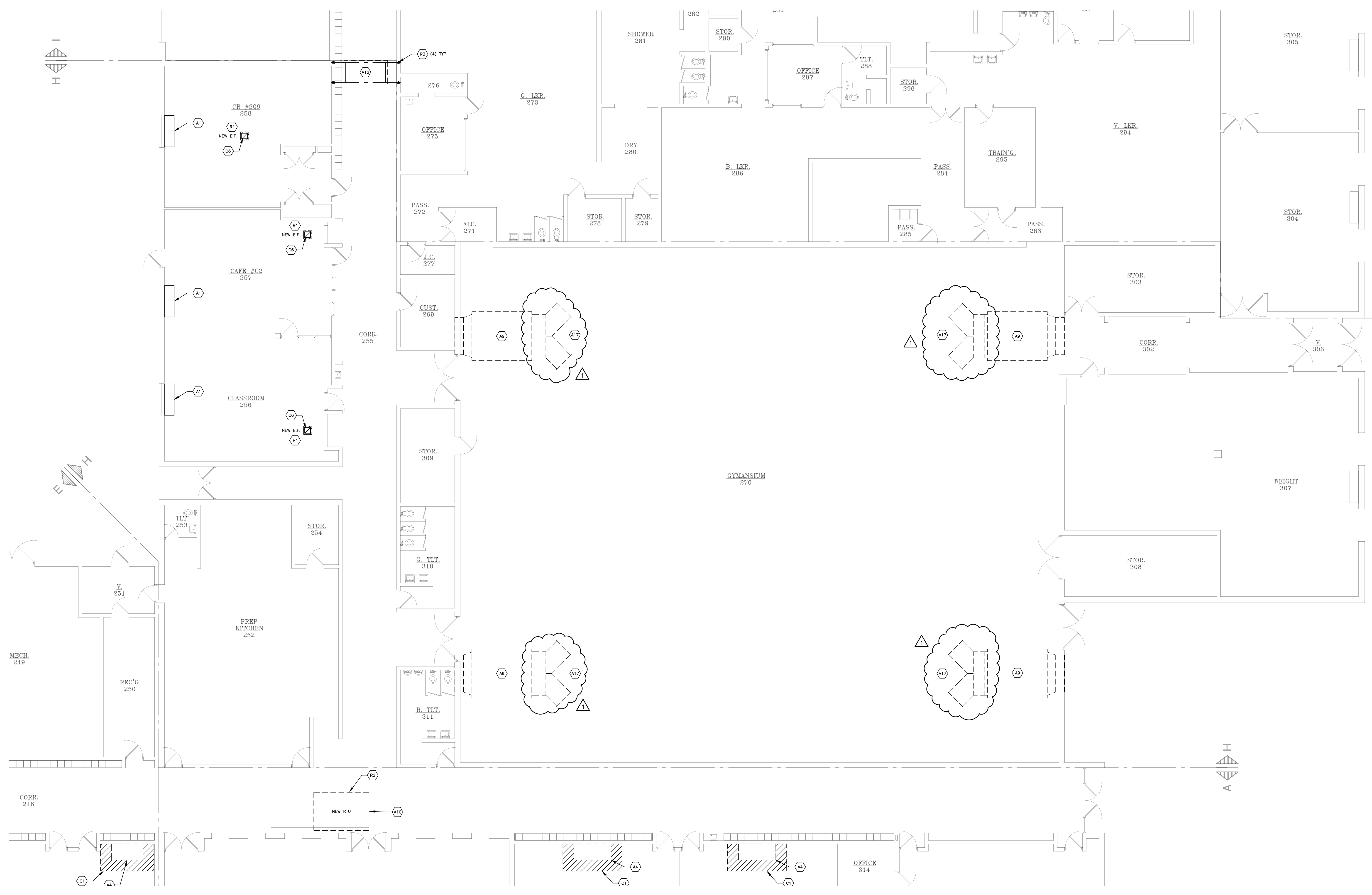
**KEYED DEMOLITION NOTES**

- (D1) EX'G. VERT. FLOOR MOUNTED UNIT VENTILATOR TO BE REMOVED - SEE MECH.
- (D2) RELOCATE EX'G. SURFACE MOUNT RACEWAY - SEE ELEC.
- (D3) EX'G. CEILING UNIT VENTILATOR TO BE REMOVED AND REPLACED - SEE MECH.
- (D4) REMOVE EX'G. CLNG., GRID, AND WALL ANGLE TO BE REPLACED w/ NEW.
- (D5) REMOVE EX'G. METAL CABINERY ASSOCIATED WITH UNIT VENTILATOR.
- (D6) REMOVE EX'G. WORK TABLES.
- (D7) REMOVE EX'G. TILE CARPETING.
- (D8) EX'G. CEILING UNIT VENTILATOR TO BE REMOVED - SEE MECH.
- (D9) EX'G. TRUSS MTD. AHU TO BE REMOVED AND REPLACE - SEE MECH. PROTECT GYMNASIUM FLOOR FROM DAMAGE DURING REMOVAL AND HANDLING.
- (D10) EX'G. RTU TO BE REMOVED AND REPLACED - SEE MECH.
- (D11) EX'G. TRUSS MTD. AHU TO BE REMOVED AND REPLACED - SEE MECH.
- (D12) REMOVE EX'G. WOOD STUD FRG. WIRE MESH PARTITION FULL LENGTH OF AHU MEZZANINE ON WOOD SHOP SIDE.
- (D13) REMOVE EX'G. CLNG. PADS AND GRID AS REQ'D. FOR REMOVAL OF EX'G. MECH. EQPM. AND INSTALLATION OF NEW DUCT WORK.
- (D14) EX'G. AHU TO BE REMOVED - SEE MECH.
- (D15) EX'G. AHU TO BE REMOVED AND REPLACED - SEE MECH.

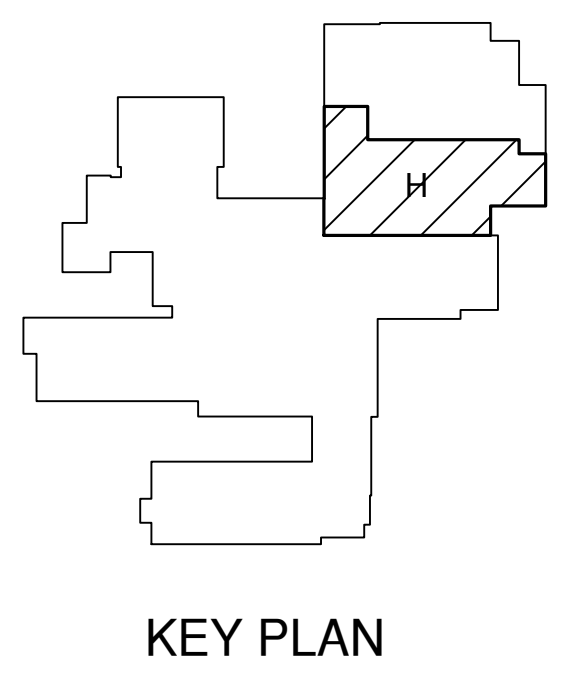


**KEY PLAN**





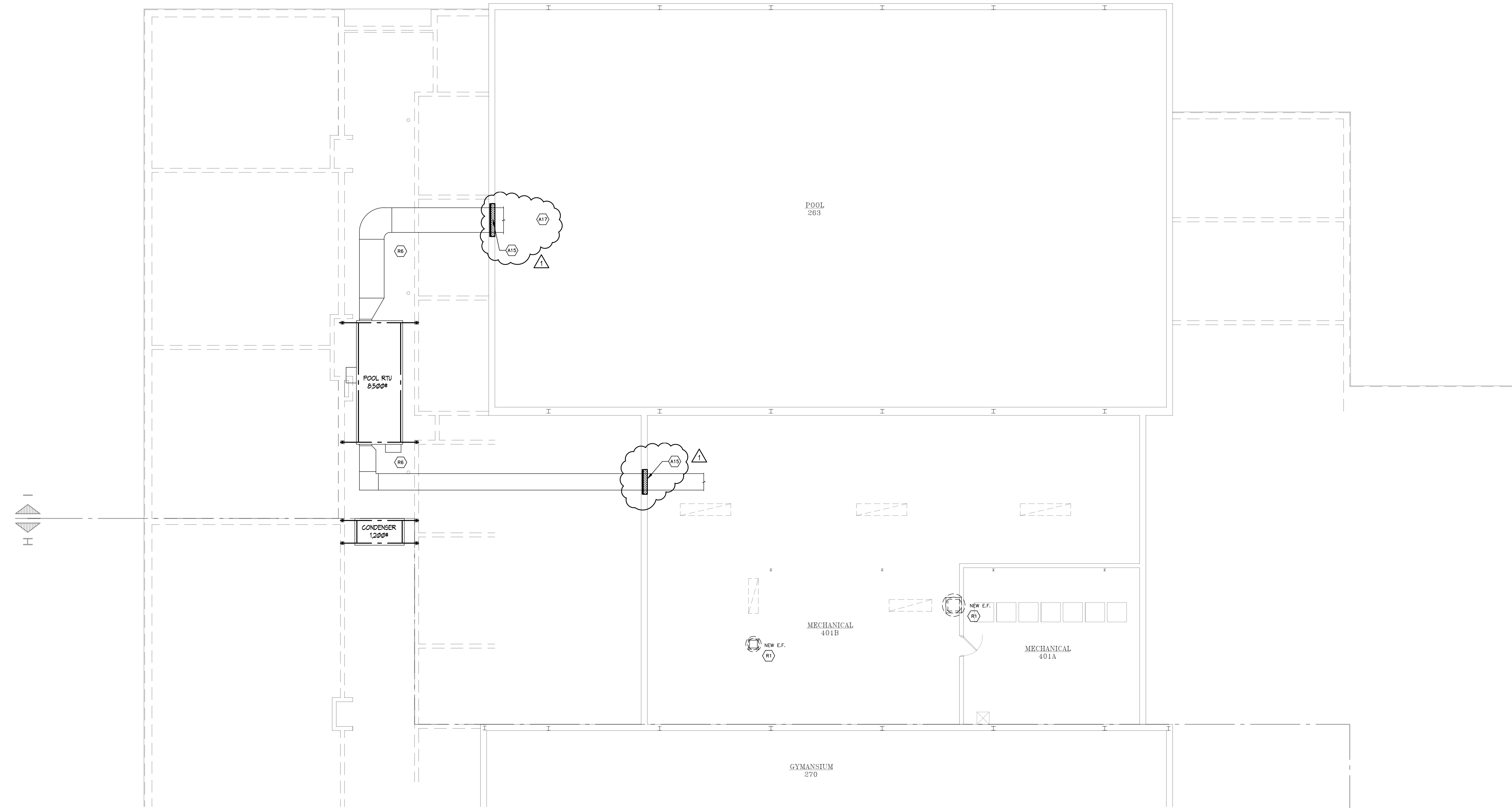
**FLOOR PLAN - PART "H"**  
 SCALE: 1/8" = 1'-0"



**KEYED CONSTRUCTION NOTES**

- A1 NEW VERTICAL UNIT VENTILATOR - SEE MECH.
- A2 INSTALL NEW CASEWORK AND COUNTER TOP (NO BACKSPLASH) - SEE ELEVATIONS AND DETAILS.
- A3 PATCH/EXTEND EX'G. VCT FLOORING TO FACE OF NEW KICK W/ NEW VCT MATCHING EX'G.
- M4 NEW HORIZ. UNIT VENTILATOR - SEE MECH.
- A5 NEW HORIZ. BLOWER COIL ABOVE CEILING - SEE MECH.
- A6 INFILL EX'G MASONRY OPENING (APPROX. 24" w. x 18" h.) w/ CMU AND FACE BRICK MATCHING EX'G. MATERIALS. TOOTH BACK EX'G. BRICK AND INSTALL FULL BRICK UNITS. PAINT INTERIOR CMU SURFACES IPS-1 TO MATCH EX'G.
- A7 INFILL EX'G MASONRY OPENING w/ CMU, RIGID INSUL., AND FACE BRICK TO MATCH EX'G. MATERIALS (APPROX. SIZE 42" x 18" h.) TOOTH BACK EX'G. BRICK AND INSTALL FULL BRICK UNITS. PAINT INTERIOR CMU SURFACES IPS-1 TO MATCH EX'G.
- A8 INFILL EX'G MASONRY OPENING (APPROX. 36" w. x 108" h.) w/ CMU AND FACE BRICK MATCHING EX'G. MATERIALS. TOOTH BACK EX'G. BRICK AND INSTALL FULL BRICK UNITS. PAINT INTERIOR CMU SURFACES IPS-1 TO MATCH EX'G.
- A9 NEW TRUSS MTD. AHU - SEE MECH. PROTECT GYMNASIUM FLOOR FROM DAMAGE DURING HANDLING AND INSTALLATION.
- A10 NEW RTU - SEE MECH.
- A11 NEW ROOF TOP DEHUMIDIFICATION UNIT (SEE MECH.) ON STEEL STRUCTURAL FRAME - SEE DETAILS ON SHT. A3.1.
- A12 NEW ROOF TOP DEHUMIDIFICATION CONDENSER (SEE MECH.) ON STEEL STRUCTURAL FRAME - SEE DETAILS.
- A13 NEW MEZZANINE MOUNTED AHU - SEE MECH.
- CONSTRUCT NEW 2x4 WOOD STUD PARTITION w/ 2x4'S 16 INCHES O.C. AND 1/2" O.S.B. SHEATHING ON SHOP SIDE. EXTEND PARTITION FROM TOP OF SLAB TO UNDERSIDE OF ROOF JUST ABOVE AND CLIP TO BOTTOM CHORD w/ ANGLE AND SLIP JOINT CONNECTOR (SIMPSON DTC OR EQUAL). PROVIDE 30" x 48" IN-SWING ACCESS DOOR w/ CONTINUOUS HINGE AND PADLOCK HASP. POSITION ACCESS DOOR TO ACCOMMODATE AHU AND DUCTWORK.
- CONSTRUCT NEW OPENING FOR DUCT PENETRATION. INSTALL NEW LINTEL 8" CMU BOND BM. w/ (2) #4 BODS. AND APPROX. 30" x 36" CMU, BRICK ANGLE SEAL AND FLASH DUCT PENETRATION WATERTIGHT. COORDINATE SIZE AND LOCATION w/ MECH. TRADES.
- A14 INSTALL NEW TILE CARPETING.
- A15 FLOOR DUCTWORK IPS-2 - SEE MECHANICAL FOR EXTENT.
- C1 PATCH/EXTEND EX'G. SUSPENDED CEILING TO NEW NEW UNIT VENTILATOR.
- C2 PATCH/REINSTALL SUSPENDED CEILING AND SUPPLEMENT CEILING PADS AS REQUIRED w/ NEW.
- C3 NEW SUSPENDED ACOUSTICAL CEILING. CEILING ELEVATION TO MATCH EX'G.
- CONSTRUCT NEW BULKHEAD w/ 3/8" MTL. STUDS AND 1/2" GYP. BD. SUSPENDED FROM STRUCTURE ABOVE AT TRANSITION FROM LIBRARY CLING. TO LOWER CHECK-OUT DESK CLING. APPROX. EXPOSED FACE OF BULKHEAD IS 16" BOTTOM ELEV. TO MATCH CLING. OVER CHECK-OUT DESK. FINISH GYP. BD. AND PAINT IPS-1 TO MATCH EX'G SURFACES.
- C4 NEW SUSPENDED ACOUSTICAL CEILING. CEILING ELEVATION TO BE 1" BELOW EX'G. ELEVATION.
- C5 NEW EXHAUST GRILLE - SEE MECH. ADJUST LOCATION OF EF AND EG TO ACCOMMODATE EX'G GRID LAYOUT. CENTER EG IN CEILING TILE.
- R1 NEW CURB AND EXH. FAN BY MECH. TRADES - FLASH INTO EX'G ROOF MEMBRANE BY ROOFING TRADES.
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- R3 NEW STRUCTURAL FRAME SUPPORT FOR ROOF TOP MECH. UNIT - FLASH NEW SUPPORT INTO EX'G ROOF MEMBRANE BY ROOFING TRADES. ROOFING MEMBRANE IS DUROLAST PVC.
- R4 NEW ROOF MOUNTED CONDENSER BY MECH. TRADES - PROVIDE OVERSIZED REINFORCED MEMBRANE PAD UNDER CONDENSER BASE.
- R5 EX'G. ROOF MOUNTED CONDENSER BY MECH. TRADES - PATCH ROOF PENETRATION.
- R6 PROVIDE REINFORCED MEMBRANE WALK PADS AT ALL NEW EQUIPMENT, DUCT, AND GAS LINE SUPPORT BEARING LOCATIONS (TYP.).

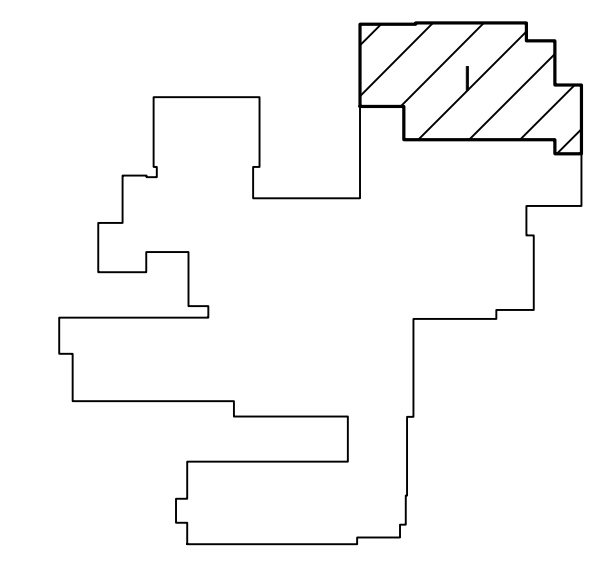




**KEYED CONSTRUCTION NOTES**

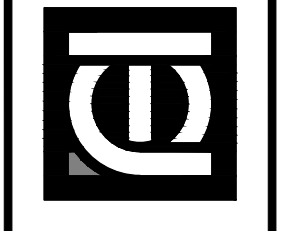
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- (A7) INFILL EX'G MASONRY OPENING w/ CMU, RIGID INSUL., AND FACE BRICK TO MATCH EX'G. MATERIALS (APPROX. SIZE 42" w. x 16" h.). TOOTH BACK EX'G. BRICK AND INSTALL FULL BRICK UNITS. PAINT INTERIOR CMU SURFACES IPS-1 TO MATCH EX'G.
- (A8) INFILL EX'G MASONRY OPENING (APPROX. 36" w. x 18" h.) w/ CMU AND FACE BRICK MATCHING EX'G. MATERIALS. TOOTH BACK EX'G. BRICK AND INSTALL FULL BRICK UNITS. PAINT INTERIOR CMU SURFACES IPS-1 TO MATCH EX'G.
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- (A10) NEW RTU - SEE MECH.
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- (A16) INSTALL NEW TILE CARPETING.
- (A17) PAINT DUCTWORK IPS-2 - SEE MECHANICAL FOR EXTENT.
- (C1) PATCH/EXTEND EX'G. SUSPENDED CEILING TO NEW UNIT VENTILATOR.
- (C2) PATCH/REINSTALL SUSPENDED CEILING AND SUPPLEMENT CEILING PADS AS REQUIRED w/ NEW.
- (C3) NEW SUSPENDED ACOUSTICAL CEILING. CEILING ELEVATION TO MATCH EX'G.
- (C4) CONSTRUCT NEW BULKHEAD w/ 3" MTL. STUDS AND 1" GYP. BD. SUSPENDED FROM STRUCTURE ABOVE AT TRANSITION FROM LIBRARY CLING. TO LOWER CHECK-OUT DESK CLING. APPROX. EXPOSED FACE OF BULKHEAD IS 16" BOTTOM ELEV. TO MATCH CLING. OVER CHECK-OUT DESK. FINISH GYP. BD. AND PAINT IPS-1 TO MATCH EX'G SURFACES.
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**FLOOR PLAN - PART "I" MEZZANINE**  
SCALE: 1/8" = 1'-0"



**KEY PLAN**

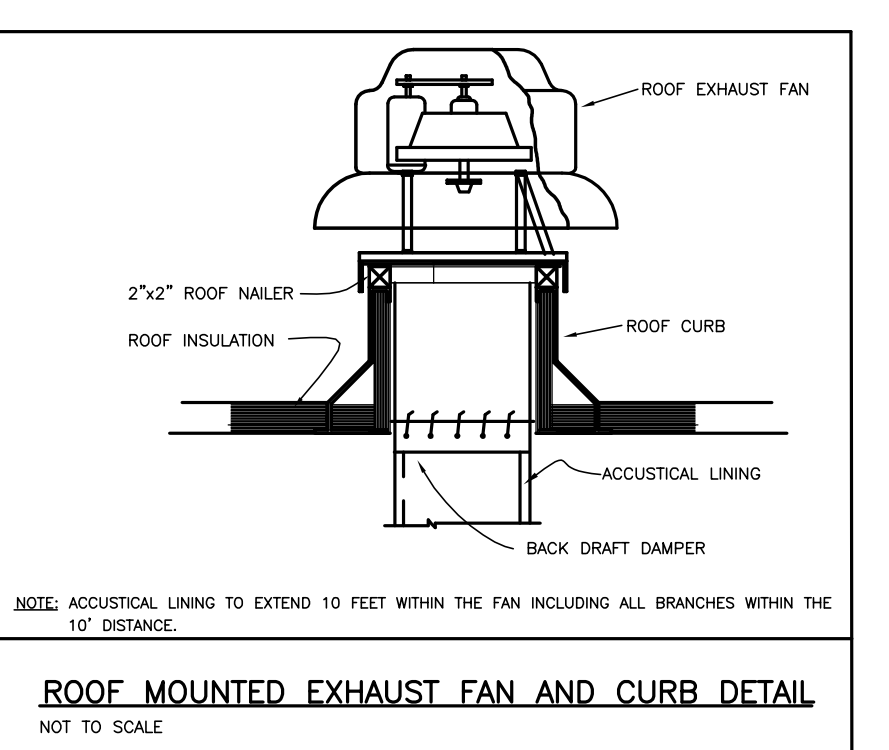
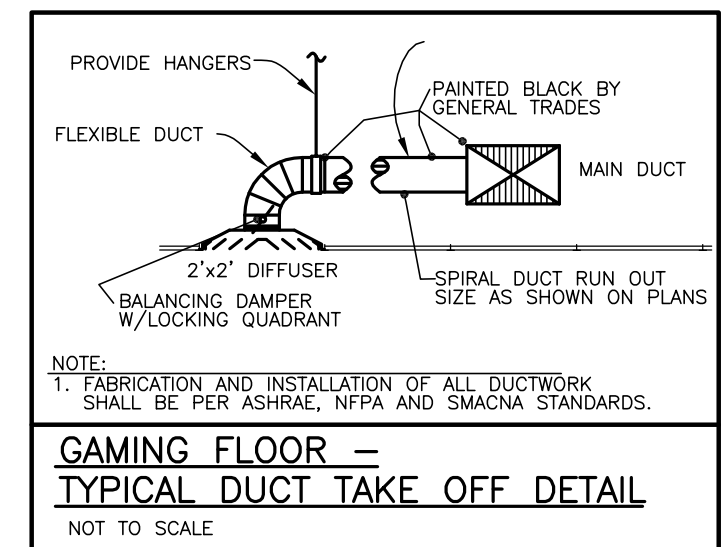
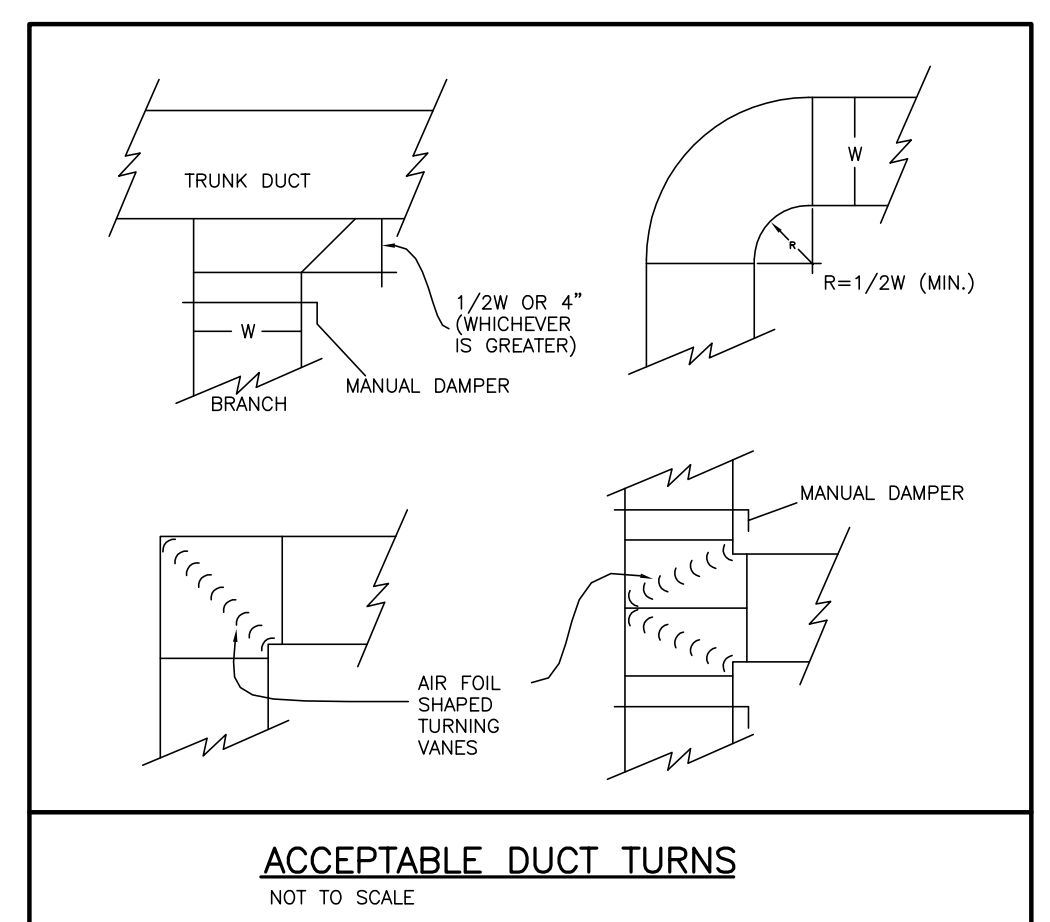
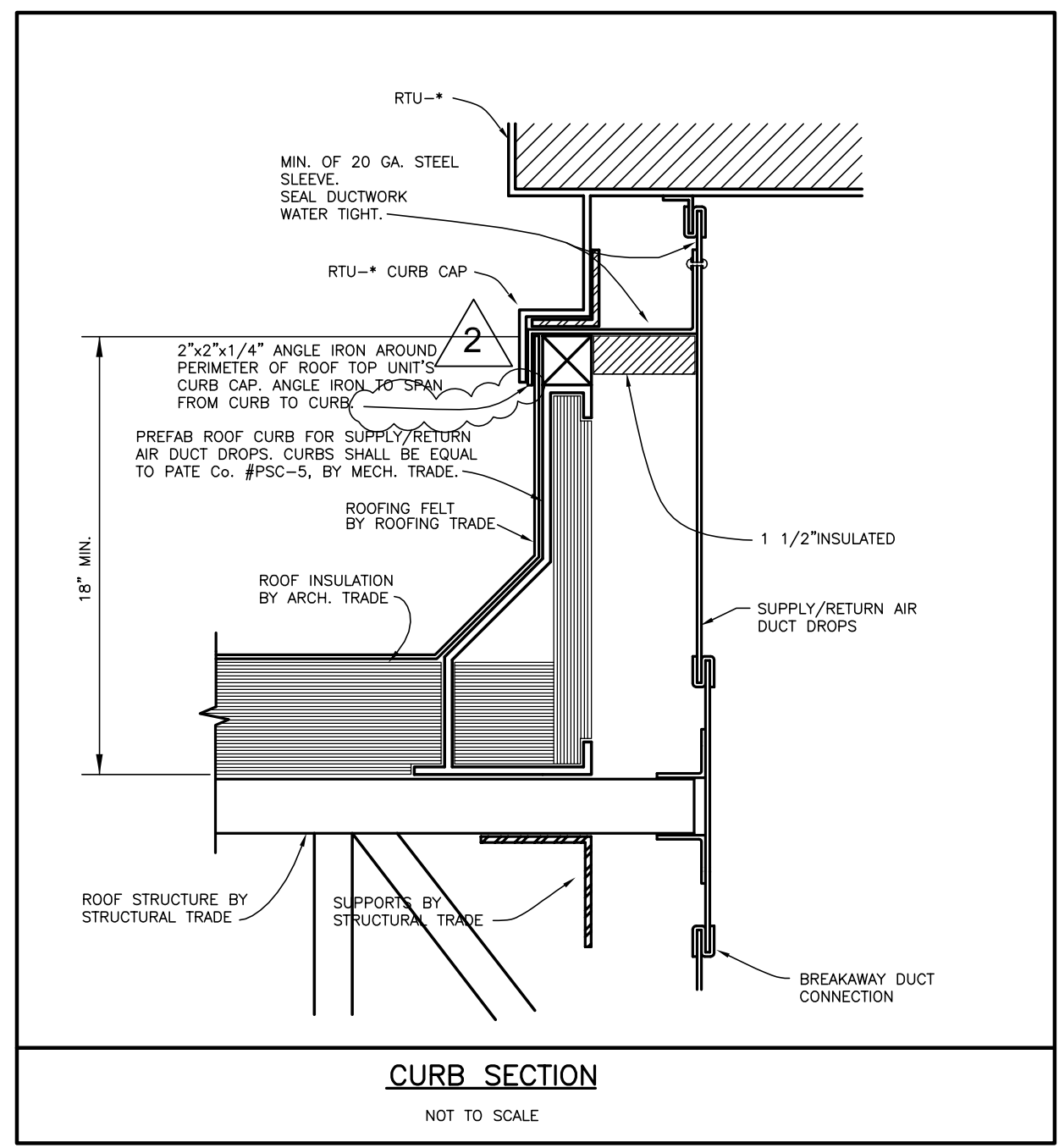
▲ ADDENDUM NO. 2 - MARCH 5, 2021











**MECHANICAL LEGEND**

	CONNECT TO EXISTING
	AHU AIR HANDLING UNIT
	UV UNIT VENTILATOR
	REF ROOF EXHAUST FAN
	EF EXHAUST FAN
	BRB BASEBOARD RADIATION
	S.A. SUPPLY AIR
	R.A. RETURN AIR
	O.A. OUTDOOR AIR
	HWS/HWR HIT WATER SUPPLY/RETURN
	THERMOMETER
	R.S. ROOM SENSOR
	P.G. PRESSURE GAUGE
	M.D. MOTORIZED DAMPER
	PUMP
	BALL VALVE
	GATE VALVE
	GLOBE VALVE
	BUTTERFLY VALVE
	UNION
	FLDV FLOW CONTROL VALVE
	AIR VENT
	CIRCUIT SETTER
	STRAINER
	3-WAY VALVE - PNEUMATIC
	CHECK VALVE
	PRESSURE RELIEF VALVE
	CONTROL VALVE - PNEUMATIC

