

### MECHANICAL AND PLUMBING SYMBOL LIST

NOTE: THIS IS A MASTER SCHEDULE. NOT ALL SYMBOLS CONTAINED HEREIN MAY APPEAR ON THE DRAWINGS.

(X)	ITEM TO BE REMOVED	CHR	CHILLED WATER RETURN PIPING	
◆	POINT OF CONNECTION/DISCONNECTION	CHS	CHILLED WATER SUPPLY PIPING	
◇	SHEET NOTE	CR	CONDENSER WATER RETURN PIPING	
△	REVISION NUMBER	CS	CONDENSER WATER SUPPLY PIPING	
TAG UNIT	EQUIPMENT MARK	HWR	HEATING WATER RETURN PIPING	
TAG CFM	DIFFUSER TAG	HWS	HEATING WATER SUPPLY PIPING	
△	ACCESS PANEL	RL	REFRIGERANT LIQUID PIPING	
⊠/⊠	SUPPLY AIR DUCT UP/DOWN	RS	REFRIGERANT SUCTION PIPING	
⊠/⊠	RETURN AIR DUCT UP/DOWN	CD	CONDENSATE DRAIN PIPING	
⊠/⊠	EXHAUST AIR DUCT UP/DOWN	PC	PUMPED CONDENSATE DRAIN PIPING	
⊠	RETURN GRILLE	⊠	CIRCUIT SETTER	
⊠	EXHAUST GRILLE	⊠	2-WAY ELECTRONIC CONTROL VALVE	
⊠	4-WAY BLOW SUPPLY DIFFUSER	⊠	3-WAY ELECTRONIC CONTROL VALVE	
⊠	3-WAY BLOW SUPPLY DIFFUSER	⊠	2-WAY PNEUMATIC CONTROL VALVE	
⊠	2-WAY BLOW SUPPLY DIFFUSER	⊠	3-WAY PNEUMATIC CONTROL VALVE	
⊠	1-WAY BLOW SUPPLY DIFFUSER	⊠	SOLENOID VALVE	
→	AIRFLOW DIRECTION	⊠	BUTTERFLY VALVE	
∅	ROUND DUCTWORK (INCHES)	⊠	PLUG VALVE	
∅	RECTANGULAR DUCTWORK (INCHES)	⊠	BALL VALVE	
∅	HOSE END FLEXIBLE DUCT	⊠	CHECK VALVE	
∅	SQUARE TO ROUND TRANSITION	⊠	GATE VALVE	
∅	SINGLE LINE RIGID DUCT	⊠	HOSE END DRAIN VALVE	
∅	SINGLE LINE RIGID DUCT (ACOUSTICALLY LINED)	⊠	PRESSURE REDUCING VALVE	
∅	DOUBLE LINE RIGID DUCT	⊠	RELIEF VALVE	
∅	DOUBLE LINE RIGID DUCT (ACOUSTICALLY LINED)	⊠	TEMPERATURE PRESSURE RELIEF VALVE	
∅	EXISTING DUCTWORK	⊠	THERMOMETER	
∅	FIRE DAMPER	⊠	PRESSURE GAUGE WITH GAUGE COCK	
∅	SMOKE DAMPER	⊠	MANUAL AIR VENT	
∅	FIRE/SMOKE DAMPER	⊠	PRESSURE TEMPERATURE PORT	
∅	MOTORIZED DAMPER (OPPOSED BLADE TYPE)	⊠	Y-STRAINER WITH BLOWDOWN	
∅	MOTORIZED DAMPER (PARALLEL BLADE TYPE)	⊠	PIPE GUIDE	
∅	BACKDRAFT DAMPER	⊠	UNION	
∅	MANUAL VOLUME DAMPER	⊠	PIPE ANCHOR	
∅	REMOTE VOLUME DAMPER	⊠	FLEXIBLE CONNECTOR	
∅	SMOKE DETECTOR	⊠	PIPE CAP/STUB-OUT	
∅	THERMOSTAT	⊠	DIRECTION OF FLOW	
∅	HUMIDISTAT	⊠	PIPE DOWN	
∅	SENSOR	⊠	PIPE UP	
∅	CARBON DIOXIDE SENSOR	⊠	PIPE TEE UP	
∅	CARBON MONOXIDE SENSOR	⊠	PIPE TEE DOWN	
∅	DOOR UNDERCUT	⊠	MPG	MEDIUM PRESSURE GAS PIPING
∅	FLOW SWITCH			

### MECHANICAL AND PLUMBING ABBREVIATIONS

NOTE: THIS IS A MASTER SCHEDULE. NOT ALL ABBREVIATIONS CONTAINED HEREIN MAY APPEAR ON THE DRAWINGS.

AABC	AMERICAN AIR BALANCE COUNCIL	HWS	HEATING HOT WATER SUPPLY	SEER	SEASONAL ENERGY EFFICIENCY RATIO
ACD	AUTOMATIC CONTROL DAMPER	IBC	INTERNATIONAL BUILDING CODE	*SP	STATIC PRESSURE (INCHES OF)
AFF	ABOVE FINISHED FLOOR	IMC	INTERNATIONAL MECHANICAL CODE	SPECS	SPECIFICATIONS
AP	ACCESS PANEL	IPC	INTERNATIONAL PLUMBING CODE	SQ	SQUARE
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR CONDITIONING ENGINEERS	KW	KILOWATT	SQFT	SQUARE FEET
ASPE	AMERICAN SOCIETY OF PLUMBING ENGINEERS	LAT	LEAVING AIR TEMPERATURE	SS	STAINLESS STEEL
BFD	BACKFLOW PREVENTION DEVICE	LBS	POUNDS	T	TEMPERATURE
BFF	BELOW FINISHED FLOOR	LWT	LEAVING WATER TEMPERATURE	TAB	TEST AND BALANCE WORK AND REPORT
BHP	BRAKE HORSE POWER	MAX	MAXIMUM	TSP	TOTAL STATIC PRESSURE
BTUH	BRITISH THERMAL UNIT PER HOUR	MBH	ONE THOUSAND BTUH	TYP	TYPICAL
CFM	CUBIC FEET PER MINUTE	MCA	MINIMUM CIRCUIT AMPS	UBC	UNIFORM BUILDING CODE
CHAR	CHARACTERISTICS	MIN	MINIMUM	UMC	UNIFORM MECHANICAL CODE
CHR	CHILLED WATER RETURN	MOCPP	MAXIMUM OVER CURRENT PROTECTION	UON	UNLESS OTHERWISE NOTED
CHS	CHILLED WATER SUPPLY	MPG	MEDIUM PRESSURE GAS	UPC	UNIFORM PLUMBING CODE
CR	CONDENSER WATER RETURN	MVD	MANUAL VOLUME DAMPER	V/PH/Hz	VOLTAGE/PHASE/HERTZ
CS	CONDENSER WATER SUPPLY	N/A	NOT APPLICABLE	VFD	VARIABLE FREQUENCY DRIVE
D	DRAIN	NC	NORMALLY CLOSED	WB	WET BULB TEMPERATURE
DB	DRY BULB TEMPERATURE	NEBB	NATIONAL ENVIRONMENTAL BALANCING BUREAU	WG	WATER GAUGE
DDC	DIRECT DIGITAL CONTROL	NEC	NATIONAL ELECTRIC CODE	WMS	WIRE MESH SCREEN
DIA	DIAMETER	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION	(X)	EXISTING TO BE REMOVED
DN	DOWN	NIC	NOT IN CONTRACT		
DX	DIRECT EXPANSION	NO	NORMALLY OPEN		
(E)	EXISTING TO REMAIN	NTS	NOT TO SCALE		
EA	EXHAUST AIR	OA	OUTSIDE AIR		
EAT	ENTERING AIR TEMPERATURE	OAT	OUTSIDE AIR TEMPERATURE		
EER	ENERGY EFFICIENCY RATIO	OPD	OPPOSED BLADE DAMPER		
EFF	EFFICIENCY	OED	OPEN END DUCT		
ELEC	ELECTRICAL	OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED		
ESP	EXTERNAL STATIC PRESSURE	PD	PRESSURE DROP		
EWT	ENTERING WATER TEMPERATURE	PRV	PRESSURE REDUCING VALVE		
°F	FAHRENHEIT	PSI	POUNDS PER SQUARE INCH		
FD	FIRE DAMPER	PSIA	POUNDS PER SQUARE INCH ABSOLUTE		
FPM	FEET PER MINUTE	PSID	POUNDS PER SQUARE INCH DIFFERENTIAL		
FSD	FIRE/SMOKE DAMPER	PSIG	POUNDS PER SQUARE INCH GAUGE		
GAL	GALLONS	(R)	EXISTING TO BE RELOCATED		
GPM	GALLONS PER MINUTE	RA	RETURN AIR		
GR	GLYCOL RETURN	RH	RELATIVE HUMIDITY		
GS	GLYCOL SUPPLY	RL/S	REFRIGERANT LIQUID/SUCTION		
HD	HEAD	RPM	REVOLUTIONS PER MINUTE		
HP	HORSEPOWER	RPPA	REDUCED PRESSURE PRINCIPAL ASSEMBLY		
HR	HOUR	RVD	REMOTE VOLUME DAMPER		
HSPF	HEATING SEASONAL PERFORMANCE FACTOR	SA	SUPPLY AIR		
HWR	HEATING HOT WATER RETURN	SD	SMOKE DAMPER		

### DRAWING INDEX

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M5.1	MECHANICAL ROOF PLAN							
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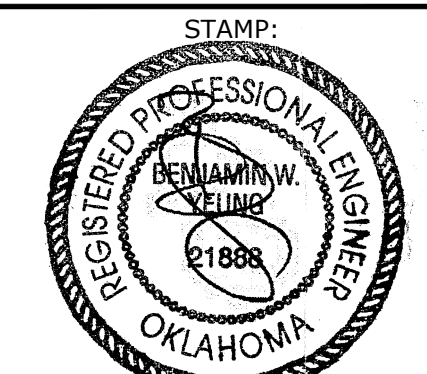
**HARD ROCK AHU REPLACEMENT**  
 308 N 193rd E AVE,  
 CATOOSA, OK 74015

ISSUE DATE: MM-DD-YEAR

REVISIONS:

#	DESCRIPTION	DATE

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FEB 23 2021

SHEET TITLE:

SYMBOL LIST AND ABBREVIATIONS

SHEET

**M0.0**

## MECHANICAL SPECIFICATIONS

### PART ONE - GENERAL

1. THE OWNER HAS CONTRACT LANGUAGE THAT NEEDS TO BE READ PRIOR TO BID SUBMISSION AS THERE ARE ITEMS THAT MAY SUPPLEMENT OR SUPERSEDE ITEMS NOTED HEREIN. THE OWNER'S CONTRACT DOCUMENTS HAS INFORMATION ON HOW WORK IS TO BE PERFORMED, HOW DOCUMENT SUBMITTALS ARE PROVIDED, RECORD DOCUMENTS ARE SUBMITTED, ETC. SEE THE ARCHITECTURAL DOCUMENTS FOR ADDITIONAL INFORMATION.
2. CODE USED IN DESIGN: IBC 2015, IMC 2015, IPC-2015, IECC-2006
3. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST ADOPTED EDITIONS OF THE APPLICABLE INTERNATIONAL BUILDING CODE (IBC), LOCAL MECHANICAL CODE (UMC, IMC, ETC.), LOCAL PLUMBING CODE (UPC, IPC, ETC.), NATIONAL ELECTRICAL CODES (NEC) AND ALL OTHER APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
4. THE CONTRACTOR MUST ARRANGE A VISIT TO THE WORK SITE PRIOR TO BID SUBMISSION TO FULLY UNDERSTAND THE EXISTING CONDITIONS. THE DRAWINGS ARE DIAGRAMMATIC AND SHOW THE WORK INTENT BUT NOT NECESSARILY ALL EXISTING OBSTRUCTIONS, PIPE OR DUCT BENDS. DETERMINING SITE CONDITIONS AND ADJUSTING THE INSTALLATION IS THE RESPONSIBILITY OF THE CONTRACTOR
5. THE CONTRACTOR SHALL PROVIDE THE WORK SHOWN ON THE DRAWINGS AND SPECIFIED FOR THEIR INDIVIDUAL SECTIONS OF WORK. THE WORD "WORK" SHALL MEAN ALL LABOR, TRANSPORTATION, MATERIAL, EQUIPMENT, TOOLS, INSTALLATION, SUPERVISION AND ANY OTHER INCIDENTAL ITEMS OR SERVICES NECESSARY FOR THE PROPER INSTALLATION AND OPERATION OF THE COMPLETE SYSTEMS, WHICH SHALL BE PROVIDED WHETHER OR NOT SPECIFICALLY INDICATED OR NOTED.
6. ALL GENERAL CONDITIONS, SPECIAL REQUIREMENTS OR GENERAL REQUIREMENTS OF THE CONSTRUCTION SPECIFICATIONS ARE MADE PART OF THIS SPECIFICATION AND HAVE THE SAME FORCE AND EFFECT AS IF COMPLETELY REPRODUCED.
7. THE WORD "PROVIDE" SHALL MEAN FURNISH AND INSTALL, MAKE ALL FINAL CONNECTIONS AND LEAVE IN AN APPROVED COMPLETE OPERATING CONDITION.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PAYING ALL FEES AND OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR THE WORK.
9. THE CONTRACTOR SHALL CAREFULLY EXAMINE ALL CONTRACT DOCUMENTS, THE CONTRACTOR SHALL COORDINATE THE WORK WITH ALL OTHER TRADES INCLUDING, BUT NOT LIMITED TO, THE CONTRACT DOCUMENTS, SHOP DRAWINGS, ETC. FOR ALL GENERAL CONSTRUCTION, STRUCTURAL, MECHANICAL, ELECTRICAL AND SPECIALTY CONTRACTOR WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER FITTING OF MATERIAL INTO THE BUILDING AS PLANNED, WITHOUT INTERFERENCE WITH OTHER WORK, AND SHALL MAKE REASONABLE MODIFICATIONS IN THE LAYOUTS NEEDED TO PREVENT CONFLICT WITH OTHER TRADES, TO PROVIDE ACCESS AND FOR THE PROPER EXECUTION OF THE WORK.
10. DRAWINGS ARE DIAGRAMMATIC AND SCHEMATIC IN NATURE, AND INDICATE THE TYPE, SIZE, ARRANGEMENT AND LOCATION OF MATERIALS AND EQUIPMENT. WORK INCLUDES CERTAIN COMPONENTS, APPURTENANCES AND RELATED SPECIALTIES THAT MAY NOT BE SHOWN. CONTRACTOR SHALL PROVIDE ALL NECESSARY ITEMS TO COMPLETE THE WORK ACCORDING TO INDUSTRY STANDARDS. IT IS THE INTENT OF THE DRAWINGS AND SPECIFICATIONS TO CALL OUT FOR FINISHED WORK, TESTED AND READY FOR OPERATION. DO NOT ASSUME ANY ARRANGEMENTS OF EQUIPMENT AND ROUTING OF PIPES AND DUCTWORK, ETC. INDICATED ON DRAWINGS SHALL BE ROUTED PLUMB AND AT RIGHT ANGLES TO BUILDING CONSTRUCTION AND MAINTENANCE. ALL WORK SHALL BE DONE UNDER UNLITENED CONDITIONS AND REQUIRE ON SITE REVISIONS DURING CONSTRUCTION. (SEE ALSO "BIDDING").
11. ALL WORK REQUIRED FOR IDENTICAL/SIMILAR ITEMS SHOWN ON THE DRAWINGS SHALL BE IDENTICAL, ALTHOUGH EACH SPECIFIC IDENTICAL/SIMILAR ITEM MAY NOT BE SHOWN IN DETAIL.
12. THE CONTRACTOR SHALL SUBMIT ELECTRONIC PDF SHOP DRAWINGS AND TECHNICAL DATA SHEETS FOR ALL EQUIPMENT AND MATERIALS SPECIFIED HEREIN TO THE ENGINEER FOR REVIEW. THE CONTRACTOR SHALL SUBMIT TECHNICAL DATA SHEETS FOR CONFORMANCE WITH THE CONTRACT DOCUMENTS AND ISSUE A WRITTEN ASSESSMENT TO THE OWNER PRIOR TO COMMENCEMENT OF WORK.
13. SPECIFIED EQUIPMENT SHALL BE CONSIDERED BASE BID. ANY APPROVED ALTERNATE EQUIPMENT SHALL BE LISTED AS SUCH. ANY CHANGES TO THE LISTED ADDITION/REDUCTION AS A SEPARATE LINE ITEM AT BID. A WRITTEN DESCRIPTION OF PRODUCT DIFFERENCES MUST BE PROVIDED FOR EVALUATION OR THE ALTERNATE PRODUCT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER FITTING OF MATERIAL INTO THE BUILDING AS PLANNED, WITHOUT INTERFERENCE WITH OTHER WORK, AND SHALL MAKE REASONABLE MODIFICATIONS IN THE LAYOUTS NEEDED TO PREVENT CONFLICT WITH OTHER TRADES, TO PROVIDE ACCESS AND FOR THE PROPER EXECUTION OF THE WORK.
14. SHOP DRAWING REVIEW DOES NOT RELIEVE THE CONTRACTOR FROM BASE BID, ALTERNATE OR SUBSTITUTE EQUIPMENT COORDINATION REQUIREMENTS.
15. UPON COMPLETION OF CONSTRUCTION,
  - 15.1. THE CONTRACTOR SHALL SUPPLY THE ENGINEER WITH AN ELECTRONIC CAD AND PDF SET OF AS-BUILT DIMENSIONS ACCURATELY SHOWING THE MATERIALS AND EQUIPMENT AS INSTALLED.
  - 15.2. THE CONTRACTOR SHALL PROVIDE THE BUILDING OWNER OR REPRESENTATIVE WITH AN ELECTRONIC (PDF) MANUAL WITH DETAILED OPERATING AND MAINTENANCE INSTRUCTIONS FOR EACH PIECE OF EQUIPMENT PROVIDED, WITH CONTENT MEETING THE REQUIREMENTS NOTED BELOW:
    - 15.2.1. SUBMITTAL DATA STATING EQUIPMENT SIZE AND SELECTED OPTIONS.
    - 15.2.2. MANUFACTURER'S OPERATION MANUALS AND MAINTENANCE MANUALS. REQUIRED ROUTINE MAINTENANCE ACTIONS SHALL BE CLEARLY IDENTIFIED.
    - 15.2.3. NAME, ADDRESS AND CONTACT NUMBER FOR AT LEAST ONE SERVICE AGENCY.
    - 15.2.4. HVAC AND SERVICE HOT WATER CONTROLS SYSTEM MAINTENANCE AND CALIBRATION INFORMATION, INCLUDING WIRING DIAGRAMS, SCHEMATICS AND CONTROL SEQUENCE DESCRIPTIONS. DESIRED OR FIELD DETERMINED SET-POINTS SHALL BE PERMANENTLY RECORDED ON A CONTROLS DRAWING AT CONTROL DEVICE OR ON SYSTEM PROGRAMMING INSTRUCTIONS.
    - 15.2.5. A NARRATIVE OF HOW EACH SYSTEM IS INTENDED TO OPERATE, INCLUDING RECOMMENDED SET-POINTS.
    - 15.2.6. COPIES OF GUARANTIES AND/OR WARRANTIES.
16. ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A MINIMUM OF ONE (1) YEAR FROM DATE OF ACCEPTANCE BY OWNER. REFRIGERATION COMPRESSORS SHALL BE GUARANTEED FOR A MINIMUM OF FIVE (5) YEARS FROM DATE OF OWNER'S ACCEPTANCE. IN ADDITION, THE CONTRACTOR SHALL GUARANTEE THAT THE INSTALLATION WHEN OPERATED IN ACCORDANCE WITH THE CONTRACTOR'S INSTRUCTIONS WILL DEVELOP CAPACITY AND CHARACTERISTICS AS SPECIFIED AND WILL FULFILL EACH AND EVERY REQUIREMENT OF THE DRAWINGS AND SPECIFICATIONS. SHOULD THE INSTALLATION IN ANY WAY FAIL TO DO SO, THE CONTRACTOR WILL, WITHOUT DELAY AND WITHOUT COST TO THE OWNER, PROVIDE WHATEVER ADDITIONAL EQUIPMENT, MATERIAL, AND LABOR REQUIRED TO CORRECT THE DEFICIENCY AND COMPLY WITH THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS.
17. CONTRACTOR SHALL CHECK AND VERIFY ALL SIZES, DIMENSIONS, AND CONDITIONS BEFORE STARTING ANY WORK. ANY DEVIATIONS OR PROBLEMS SHALL BE TRANSMITTED TO THE ENGINEER FOR REVIEW.
18. PROVIDE BASE AND COUNTER FLASHING FOR ITEMS PENETRATING THE ROOF OR EXTERIOR WALLS.
19. STARTERS, VFDs DISCONNECT SWITCHES AND CONTROLS FOR MOTORS IF NOT UNIT MOUNTED AND/OR SUPPLIED BY THE EQUIPMENT MANUFACTURER, UNLESS NOTED SPECIFICALLY OTHERWISE SHALL FOLLOW:
  - 19.1. VFDs TO BE SUPPLIED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR. FINAL LOCATIONS COORDINATED WITH THE ENGINEER. WIRING BETWEEN THE VFD AND THE MOTOR SHALL BE SHIELDED POWER CABLE DESIGNED FOR VFD APPLICATIONS, GROUNDED AT BOTH ENDS.
  - 19.2. UNLESS NOTED OTHERWISE, LOOSE MOTOR STARTERS, COMBINATION STARTERS, DISCONNECT SWITCHES, MOTOR RATED SWITCHES, TOGGLE SWITCHES, ETC. TO BE SUPPLIED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
  - 19.3. CONTROL AND INTERLOCKING WIRING SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR PERFORMING CONTROLS WORK. (SEE AUTOMATIC TEMPERATURE CONTROLS SECTION FOR ADDITIONAL INFORMATION WITH REGARD TO THIS WORK).
20. ALL WORK SHOWN IS NEW UNLESS NOTED OTHERWISE.
21. MAINTAIN OCCUPANCY AND FIRE WALL SEPARATION INTEGRITY AS REQUIRED. REFER TO ARCHITECTURAL PLANS FOR LOCATIONS OF ALL OCCUPANCY/FIREWALL SEPARATIONS AND SPECIFIC DETAILS FOR CONSTRUCTION. PROVIDE ALL NECESSARY FIRE AND SMOKE FIRE DAMPERS, ACCESS DOORS, CAULKING, ETC. FOR APPROVED INSTALLATION.
22. IECC COMPLIANCE: THE CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH AND PERFORMING ALL REQUIREMENTS AND WORK SET FORTH IN THE IECC COMPLIANCE CERTIFICATE THAT IS INCLUDED IN THESE DOCUMENTS.

### BIDDING

1. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING A BID TO BECOME FAMILIAR WITH THE EXISTING CONDITIONS. THE CONTRACTOR SHALL COMPARE THE WORK SPECIFIED IN THE CONTRACT DOCUMENTS WITH THE EXISTING CONDITIONS. THE CONTRACTOR SHALL IDENTIFY AND NOTATE ALL WORK OR CONDITIONS THAT ARE DIFFERENT FROM THE CONTRACT DOCUMENTS OR THEIR INTENT. THE CONTRACTOR SHALL, UPON DISCOVERY, IMMEDIATELY NOTIFY AND REPORT. IN WRITINGS, ANY DISCREPANCIES TO THE ENGINEER. NO EXTRAS OR VISIT CHARGES WILL BE ALLOWED FOR FAILURE TO PERFORM THE PRE-BID SITE VISIT.
2. BASE PROPOSAL ON MANUFACTURER NAMES LISTED UNLESS "OR EQUAL" IS INDICATED. PROVIDE SUBSTITUTION REQUESTS A MINIMUM OF FIVE (5) BUSINESS DAYS PRIOR TO BID DATE CLOSING TO ALLOW TIME FOR DUE CONSIDERATION OF PROPOSED ALTERNATE. DETERMINATION OF SUBSTITUTION OF EQUALITY RESTS SOLELY WITH THE ENGINEER.

### PART TWO - PRODUCTS

#### HVAC EQUIPMENT

1. PROVIDE HVAC EQUIPMENT AS SPECIFIED AND/OR SCHEDULED HEREIN AND IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS. EQUIPMENT SHALL OPERATE ACCORDING TO THE MANUFACTURER'S OWNERS' OPERATING AND MAINTENANCE MANUAL. TROUBLE-FREE PRIOR TO STARTING TEST AND BALANCE (TAB) WORK.

#### DUCTWORK

1. DUCTWORK, UNLESS LISTED OTHERWISE IN THIS SECTION, SHALL BE ASTM A653/A653M GALVANIZED SHEET METAL, LOCK-FORMING QUALITY HAVING A ZINC COATING OF 0.90 OZ PER SQ. FT. (G90) EQUALLY APPLIED TO EACH SURFACE. TESTED PER ASTM D390. DUCTWORK IS TO BE INSTALLED ACCORDING TO ASHRAE RECOMMENDATIONS AND SMACNA DUCT CONSTRUCTION STANDARDS. NO SHEETMETAL DUCTWORK TO BE LESS THAN 26 GA.
2. ROUND DUCTWORK: 8"Ø AND UNDER CAN BE SPIRAL OR SNAP-LOCK, >8"Ø TO BE SPIRAL CONSTRUCTION.
3. PROVIDE MANUAL VOLUME DAMPERS WITH LOCKING QUADRANTS AND IDENTIFYING RIBBONS AT DAMPER HANDLES FOR AIR BALANCING EACH BRANCH DUCT TAKE-OFF OR PIECE OF AIR DISTRIBUTION EQUIPMENT. NOT ALL DAMPERS MAY BE INDICATED ON THE DOCUMENTS.
4. SEAL ALL DUCT PENETRATIONS THROUGH WALLS, FLOOR AND ROOF. SEAL ALL TRANSVERSE DUCT SEAMS WITH APPROVED MASTIC. DUCT TAPES SHALL NOT BE ALLOWED FOR RIGID DUCTWORK.
5. SUPPLY, OUTSIDE AIR AND RETURN DUCTWORK SHALL BE INSULATED WITH FLEXIBLE GLASS FIBER INSULATION MEETING ANSI/ASTM C612, MAXIMUM "K" VALUE OF 0.29 AT 75°F, WITH FOIL-KRAFT FLAME RESISTANT VAPOR BARRIER, MINIMUM 3/4" /CUFT. DENSITY. BELOW ARE MINIMUM R VALUES FOR DUCTWORK INSULATION WHERE NOT OTHERWISE SPECIFICALLY SPECIFIED, PER ASHRAE 90.1-2016.
 

5.1. SUPPLY/RETURN - HEATING & COOLING	CLIMATE ZONE	EXTERIOR, ATTICS, UNCONDITIONED	INDIRECTLY CONDITIONED, & BURIED DUCTS	RETURN AIR PLENUM. (C) CRAWL SPACE. (NO INSUL. ON RETURN)
0 to 4	R-8	R-6	R-1.9	
5 to 8	R-12	R-6	R-1.9	

#### GENERAL NOTES

- A. INTERIOR RETURN DUCTWORK, IN INDIRECTLY CONDITIONED RETURN AIR PLENUM SPACE - NO INSULATION REQUIRED.
- B. EXTERIOR DUCTWORK TO BE INSULATED WITH URETHANE OR POLYSTYRENE FOIL FACED RIGID BOARD, TOP OF DUCT TO HAVE A WATERSHED DESIGN, A WEATHER PROOF COVER IS TO BE APPLIED USING MFM FLEXCLAD-400 (ALUMINUM).
- C. SUPPLY DUCTWORK TO HAVE A MINIMUM OF 1.5" OF INSTALLED THICKNESS INSULATION REGARDLESS OF LOCATION.
- D. IN HUMID LOCATIONS, SUCH AS POOLS, DUCT OVERLAPPING SHALL BE AP ARMARLEX (ASTM E 84 25/50 RATED), TWO LAYERS, OVERLAPPING SEAMS, 1.5" TO 2" TYPICAL THICKNESS).
6. ALL DUCTWORK SIZES SHOWN ARE FREE AREA DIMENSIONS. EXHAUST DUCTWORK SHALL BE UNINSULATED.
7. THE INTERIOR OF SUPPLY AND RETURN DUCTWORK VISIBLE BEHIND DEVICES (GRIDS) SHALL BE PAINTED FLAT BLACK.
8. LINE DUCTWORK FIFTEEN FEET UPSTREAM AND DOWNSTREAM OF ALL FANS AND WHERE INDICATED WITH 1" THICK, 1.5# DENSITY DUCT LINER. LINING SHALL BE APPLIED TO DUCTWORK WITH FIRE RESISTANT ADHESIVES, (FOSTER 85-10 OR EQUAL) AND COPPER OR CADMIUM PLATED MECHANICAL FASTENERS, (GRAHAM, OMARK OR EQUAL). ALL DUCT SIZES INDICATED ARE CLEAR INSIDE.
9. COMBINATION FIRE/SMOKE DAMPERS SHALL BE DYNAMIC (RATED TO SYSTEM VELOCITY) MEET UL 555S.
10. DUCTWORK GALVANIZED OR BLACK IRON DUCTWORK: WHEN NOT INSULATED, PER MANUFACTURERS INSTRUCTIONS APPLY AN ENAMEL PAINT, IN WHITE. GALVANIZED DUCTWORK MUST BE CLEANED OF ANY PROTECTIVE LAYER AND THE PASSIVATOR MUST BE REMOVED PRIOR TO PAINTING.
11. DUCTWORK TO BE CONSTRUCTED TO SMACNA AND ASHRAE DUCT CONSTRUCTION STANDARDS.

#### DUCTWORK SYSTEMS: (4)

CONSTANT VOLUME	SMACNA CLASS		LEAKAGE CLASS (5)	
	SEAL	ROUND	RECT.	
VARIABLE VOLUME (1)	2	A	2	4
VARIABLE VOLUME (2)	3	A	2	4
RETURN	2	B	4	8
EXHAUST (POSITIVE)	3	A	2	4

#### PRESSURE CLASS OPTIONS: 1/2", 1", 2", 3", 4", 6" 10"

NOTE (1): DOWNSTREAM OF VAV BOX

NOTE (2): UPSTREAM OF VAV BOX

NOTE (3): THESE ARE MINIMUMS, REFER TO EQUIPMENT SCHEDULES & SUBMITTAL DOCUMENTS, IF ESP MEETS OR EXCEEDS THESE FIGURES, INCREASE PRESSURE CLASS TO NEAREST CLASS THAT IS 0.5" W.C. OVER THE LISTED ESP. WHERE INFORMATION IS NOT PROVIDED THE CONTRACTOR MUST SUBMIT A RFI.

NOTE (4): WHEN USED AS PART OF A SMOKE CONTROL OR REMOVAL SYSTEM SHALL AT A MINIMUM, BE SMACNA PRESSURE CLASS 3, SEAL CLASS A

NOTE (5): LEAKAGE CLASS IS CFM LEAKAGE/100 SQ.FT. @ 1" H<sub>2</sub>O

NOTE (6): UNLESS NOTED OTHERWISE FUME EXHAUST DUCTS AND SUPPORTS TO BE FABRICATED FROM 316 STAINLESS STEEL, MINIMUM 18-GA. SEAMS AND JOINTS TO BE WELDED LIQUID/AIR TIGHT.

#### DUCTWORK ELBOWS: MINIMUM

ROUND:	FPM	RADIUS/DIA RATIO
	TO 1000	0.75
	1,001 TO 1,500	1
	1,500+	1.5(2)

#### RECTANGULAR: R/D ASPECT RATIO, W/D

R/D	0.25	0.5	1	2	3	4
0.0 (3)	(1)	(1)	(1)	(1)	(1)	(1)
0.5	(1)	(1)	(1)	(1)	(1)	(1)
1.0	(1)	(1)	(1)	(1)	(1)	(1)
1.5 (2), (5)	(1)	(1)	(4)	(4)	(4)	(4)
2	(1)	(4)	(4)	(4)	(4)	(4)
3	(1)	(4)	(4)	(4)	(4)	(4)

NOTE (1): MUST HAVE AIRFOIL TURNING VANES

NOTE (2): STANDARD/DEFAULT CENTERLINE RADIUS

NOTE (3): MITRED ELBOW

NOTE (4): TURNING VANES NOT REQUIRED

NOTE (5): THIS R/D MUST BE USED FOR TYPE I GREASE DUCTS, TURNING VANES NOT ALLOWED

### MECHANICAL PRODUCTS

1. CONTROL DAMPERS: LEAKAGE CLASS 1A/1. EQUAL TO RUSKIN CD-60 (CD-50 IN WET LOCATIONS)
2. PIPE HANGERS: PIPE SIZES 1/2" TO 1 1/2"; MALLEABLE IRON, CARBON STEEL, ADJUSTABLE SWIVEL SPLIT RING. PIPE SIZES OVER 2" (UNLESS NOTED OTHERWISE): CARBON STEEL, ADJUSTABLE, CLEVIS. PIPE SIZES CHILLED WATER 8" AND OVER, HEATING WATER 6" AND OVER, STEAM (SUPPLY & CONDENSATE) 4" AND OVER: ADJUSTABLE STEEL YONG, CAST IRON ROLL, DOUBLE HANGER. SYSTEM LOAD (PIPE FULL OF DESIGN LIQUID OR GAS) ON HANGER MUST NOT EXCEED MORE THAN 85% OF HANGER CAPACITY.
3. PIPING:
  - 3.1. HYDRONIC WATER PIPING (ABOVE GROUND) - SCHEDULE 40 STEEL (ASTM A53), MALLEABLE IRON OR FORGED STEEL WELDED TYPE FITTINGS, SCREWED OR WELDED JOINTS; OR TYPE L HARD DRAWN COPPER TUBING (ASTM B88), CAST BRASS OR SOLDER WROUGHT COPPER FITTINGS, SOLDER GRADE 95A JOINTS. PIPING OVER 2" SHALL BE STEEL WITH WELDED JOINTS.
  - 3.2. EQUIPMENT DRAIN OVERFLOW/AND CONDENSATE DRAIN PIPING: TYPE "M" COPPER (ASTM B-88), WROUGHT FITTINGS (ASME B16.22), JOINTS: ANSI/ASTM B32, SOLDER: 95/5 TIN/ANTIMONY, 0.2% MAX LEAD
  4. VALVES: PROVIDE THE NAME OF MANUFACTURER AND GUARANTEED WORKING PRESSURE CAST OR STAMPED ON VALVE BODIES AND BE BY SINGLE MANUFACTURER FOR SIMILAR TYPE. ACCEPTABLE MANUFACTURERS: BRAY, MILWAUKEE, STOCKHAM, NIBCO, APOLLO. UNLESS NOTED OTHERWISE:
    - 4.1. CALIBRATED BALANCING VALVES: OVENTROP OR EQUAL.
    - 4.2. DYNAMIC BALANCING VALVES: HAYS MESURFLO 2524.
    - 4.3. PROVIDE A 20 MESH SCREEN Y-STRAINER BEFORE ANY CALIBRATED OR DYNAMIC BALANCING VALVE.
  5. PIPE INSULATION: GLASS FIBER INSULATION WITH A MAXIMUM K VALUE NOTED BELOW AT 75 DEGREES F. OUTDOOR INSULATION THICKNESS SHALL BE 2" THICK WITH METAL JACKETING, OR DOUBLE INDOOR THICKNESS WITH A MAXIMUM THICKNESS OF 5", WHICH EVER IS GREATER OF THE TWO. INTERIOR APPLICATIONS SHALL HAVE KRAFT REINFORCED FOIL VAPOR BARRIER WITH ONE PEECE PREMOULDED PVC JACKETS FOR FITTINGS. EXTERIOR APPLICATIONS SHALL HAVE STUCCO EMBOSSED ALUMINUM JACKETS. ACCEPTABLE MANUFACTURERS: OWENS CORNING, CERTAINTED, JOHNS MANVILLE, KNAUF.
  6. INSULATION THICKNESS
 

FLUID TEMP RANGE °F	INSUL. CONDUCTIVITY BTU-IN/(HR-SQ.FT.-°F)	NOMINAL PIPE SIZE (IN)
<1.5	1.5 & >	
> 350	0.32	5
251-350	0.29	4
201-250	0.27	2.5
141-200	0.25	1.5
<140	0.22	1

#### OUTER INSUL. MINIMUM ALUMINUM JACKET THICKNESS (INCHES)

DIAMETER	RIGID INSULATION	NON-RIGID INSULATION
≤ 8"	0.016	0.016
> 8"-11"	0.016	0.020
> 11"-24"	0.016	0.024
> 24"-36"	0.020	0.032
> 36"	0.024	0.040

- 6.1. CONDENSATE DRAIN PIPING TO BE INSULATED.
- 6.2. PROVIDE METAL SADDLES AND RIGID INSULATION AT HANGERS WHERE SYSTEM WEIGHT COMPRESSES INSULATION.
7. VARIABLE AIR VOLUME TERMINAL BOXES: UNIT SHALL BE 22-GAGE GALVANIZED STEEL WITH 1 3/16", 4 LBS./CU. FT. FOIL FACED DUCT BOARD INSULATION INTERIOR LINER WITH AN R VALUE OF 3.55(CU. FT. HBTU @ 75°F, CODE COMPLIANCE WITH UL 723 - FLAME/SMOKE (25/50), UL 181 AIR EROSION, MOLD GROWTH & HUMIDITY, ASTM 1338, G21, G22 FUNGI RESISTANCE. UNIT SHALL BE ARI 880 CERTIFIED. AIR VOLUME SHALL HAVE A MULTIPLE POINT AVERAGING FLOW SENSING DEVICE. IF SCHEDULED, THE ELECTRIC HEATING COIL SHALL BE FACTORY INSTALLED WITH AIRFLOW SWITCH, THERMAL PRIMARY CUTOFF, MANUAL RESET, DISCONNECT SWITCH, AND MAGNETIC CONTACTOR. PROVIDE SPACE TEMPERATURE SENSOR, CONTROLS WIRING AND TRANSFORMER. ACCEPTABLE MANUFACTURERS: TRANE, TITUS, ENVIROTECH, PRICE.
  - 8.1. DUCT MOUNTED SMOKE DETECTORS:
    - 8.1.1. WHEN THE DUCT TYPE SMOKE DETECTOR IS REQUIRED TO BE PART OF THE DESIGN BUILD FIRE ALARM SYSTEM: SHALL BE FURNISHED BY THE FIRE ALARM CONTRACTOR. INSTALLED BY THE MECHANICAL CONTRACTOR AND WIRED BY THE FIRE ALARM CONTRACTOR
    - 8.1.2. WHEN THE DUCT TYPE DETECTOR IS NOT PART OF THE FIRE ALARM SYSTEM: THE DUCT MOUNTED SMOKE DETECTOR SHALL BE FURNISHED, INSTALLED AND WIRED BY THE MECHANICAL CONTRACTOR. (NORMALLY PROVIDED AT 24 VAC.)
  - 8.2. DUCT MOUNTED SMOKE DETECTORS SHALL BE INSTALLED ON AIR MOVING EQUIPMENT THAT EXCEEDS 2,000 CFM AND ON AIR MOVING EQUIPMENT UNDER 2,000 CFM THAT SUPPLIES A COMMON SPACE AND THE TOTAL CFM CAPACITY OF THE EQUIPMENT SERVING THE SPACE EXCEEDS 2,000 CFM.
  - 8.3. DUCT MOUNTED DETECTORS SHALL BE WIRED TO SHUT DOWN THE ASSOCIATED AIR MOVING EQUIPMENT ON ALARM.
  - 8.4. DETECTORS TO BE MOUNTED IN THE SUPPLY AIR DUCTWORK, RETURN AIR DUCTWORK, UPSTREAM OF ANY FILTERS, EXHAUST OR OUTSIDE AIR CONNECTIONS.
9. FANS: EXTERIOR: PROVIDE WITH ROOF CURB WHERE APPLICABLE. PROVIDE DISCONNECT SWITCH - INTERIOR NEMA 1, EXTERIOR NEMA 4X. BELT DRIVEN FANS WITH NO VFD TO HAVE ADJUSTABLE PITCH SHEAVES. DIRECT DRIVE FANS TO HAVE A VFD OR EC MOTOR UNLESS NOTED OTHERWISE. ACCEPTABLE MANUFACTURERS: GREENHECK, COOK, TWIN CITY, ACME, PENN-BERRY.

#### AUTOMATIC TEMPERATURE CONTROLS

1. THE MECHANICAL CONTRACTOR SHALL PROVIDE A COMPLETE SYSTEM OF AUTOMATIC TEMPERATURE CONTROLS (INTEGRATED INTO THE EXISTING) - BUILDING AUTOMATION SYSTEM (BAS, BMS, ATC, DDC). THIS SYSTEM SHALL INCLUDE BUT NOT BE LIMITED TO: TEMPERATURE SENSORS, CONTROLLERS, TRANSFORMERS, EQUIPMENT INTERFACE DEVICES AND ALL REQUIRED RELAYS, WIRING AND CONDUIT - REGARDLESS OF VOLTAGE.
2. THE MECHANICAL CONTRACTOR SHALL PROVIDE AND INSTALL, IN ACCORDANCE WITH THE NEC AND THIS PROJECT ELECTRICAL SPECIFICATIONS, ALL CONDUIT, WIRE, JUNCTION BOXES, THERMOSTAT BACK BOXES AND CIRCUIT BREAKERS REQUIRED FOR A FULLY OPERATIONAL A/C SYSTEM. 120V POWER, IF NOT PROVIDED, SHALL BE OBTAINED FROM LOCATIONS PROVIDED ON THE ELECTRICAL DESIGN DOCUMENTS - IF NO INFORMATION IS PROVIDED THE CONTRACTOR MUST ISSUE AN RFI DURING THE BID PROCESS TO CLARIFY.
3. WHERE AN EXISTING OR NEW BAS SYSTEM IS UTILIZED THE CONTRACTOR SHALL PROVIDE A GUI PAGE FOR EACH SYSTEM. GRAPHICS MUST MATCH OR EXCEED THE EXISTING FOR DETAIL AND INFORMATION PROVIDED.
4. SUBMIT SHOP DRAWINGS OF TEMPERATURE CONTROL WIRING, LOCATION OF DEVICES AND INSTALLATION DATA FOR REVIEW PRIOR TO INSTALLATION.

#### TEST AND BALANCE (TAB)

1. BALANCE ALL DUCTS, DIFFUSERS, AND GRILLES TO OBTAIN THE AIR QUANTITIES AS SHOWN ON PLANS. TEST AND BALANCE WORK SHALL BE PERFORMED BY AN INDEPENDENT, APPROVED, AND CERTIFIED AABC OR NEBB CONTRACTOR.
2. THE CONTRACTOR IS RESPONSIBLE FOR ADJUSTING DIFFUSER THROWS. LINEAR DIFFUSERS IN A HORIZONTAL CEILING SYSTEM WILL GENERALLY THROW AIR HORIZONTAL - SEE DWGS FOR DIRECTION ARROW. IF NO DIRECTION ARROW IS ILLUSTRATED THE CONTRACTOR MUST DIRECT AN RFI TO THE ENGINEER TO OBTAIN PROPER THROW DIRECTIONS.
3. THE TEST AND AIR BALANCE (TAB) REPORT SHALL INCLUDE DESIGN AIR QUANTITIES AND AIR QUANTITIES (AFTER ADJUSTMENTS). FURNISH OWNER'S REPRESENTATIVE WITH A PDF COPY OF THE FINAL TAB REPORT.

#### NOTES

1. DIELECTRIC FITTINGS SHALL BE USED WHEREVER DISSIMILAR METALS ARE JOINED.
2. PROVIDE ACCESS PANELS IN CEILINGS & WALLS TO ACCESS MECHANICAL/PLUMBING EQUIPMENT AND APPURTENANCES WHERE REQUIRED. DRYWALL CEILINGS: GFRC OR BAUCO+PLUS II. DRYWALL WALLS: BAUCO+PLUS II. RATED DRYWALL WALLS OR CEILINGS: ACUDOR FW-5050 DW. MINIMUM SIZE FOR ACCESS OF EQUIPMENT: 24"x24" OR PER LOCAL CODE, WHICH EVER IS LARGER.
3. GAUGES: TEMPERATURE: INTERIOR - WEISS VARI-ANGLE DIGITAL WITH 316 SS THERMOWELL. EXTERIOR WITH DCV-4 OUTDOOR WATERPROOF COVER. PRESSURE:

- WEISS DIGITAL DUGY3-xxx-2L (PG - RFI FOR RANGE PER APPLICATION)
4. WHERE VICTAULIC SYSTEMS ARE APPROVED ON A PER-PROJECT BASIS, "ROUST-A-BOUT" FITTINGS ARE NOT ALLOWED.
  5. ALL EQUIPMENT SHALL BE RATED IN EXCESS OF THE AVAILABLE FAULT CURRENT AT THE POINT OF CONNECTION.
  6. WHERE VFDs (VSDs) AND MOTORS ARE PROVIDED BY THE MECHANICAL OR PLUMBING CONTRACTOR: VFD DRIVES SHALL MEET THE FOLLOWING MINIMUM STANDARDS: BUILT-IN BACNET MS/TP COMMUNICATIONS. PROVIDE WITH AN INTEGRAL FUSED DISCONNECT OR 100% RATED AIC CIRCUIT BREAKERS. LOW FOMR A/C POWER FLUCTUATIONS OF - 37%V FROM 480V, SAG TO 375V FROM 480V, FREQUENCY DEVIATION FROM 50 TO 65HZ, VOLTAGE SPIKES UP TO 2X NORMAL. MAXIMUM VOLTAGE FOR 1 MINUTE: 2% VOLTAGE UNBALANCE. VFDs TO BE DANFOSS VLT HVAC DRIVE FC102, ABB ACH550, YASKAWA 21000, MITSUBISHI FR-F800. EXTERIOR DRIVES RATED TO 50°C WITHOUT DE-RATING. INTERIOR DRIVES RATED TO 40°C WITHOUT DE-RATING. DRIVES MUST HAVE A 4/0:0 OUTPUT FILTER. BI-DIRECTIONAL COASTING MOTOR RESTART CAPABILITY. BROKEN BELT/LOAD ABNORMALITY DETECTION. ENCLOSURES TO BE RATED FOR THE INSTALLED LOCATION.
    - 6.1. OPTIONS:
      - 6.0.1. MANUAL BYPASS CONTROL
      - 6.0.2. AUTOMATIC BYPASS CONTROL
      - 6.0.3. COMPATIBLE WITH IPM (INTERIOR PERMANENT MAGNET) AND SPM (SURFACE PERMANENT MAGNET) MOTORS.
    7. ELECTRIC MOTORS - MOTORS ON VFD SERVICE, TO HAVE A SHAFT GROUNDING DEVICE, OVER 100 HP TO HAVE A SHAFT GROUNDING DEVICE AND AN INSULATED BEARING ON THE NON-DRIVEN END OF THE MOTOR. (OPPOSITE END OF THE MOTOR RELATIVE TO WHERE THE SHAFT GROUNDING DEVICE IS LOCATED.) MOTORS TO COMPLY WITH NEMA MG-1. MOTORS TO BE RATED FOR THE INSTALLED LOCATION.

### PART THREE - EXECUTION

8. THE CONTRACTOR SHALL PROVIDE ALL SLEEVES, OPENINGS, CUTTING AND PATCHING NECESSARY FOR THE INSTALLATION OF THE WORK. CUTTING AND PATCHING SHALL BE DONE BY WORKMEN SKILLED IN THE TRADES REQUIRED AND PAID BY THE CONTRACTOR. ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE THROUGH WATER PROOFING OR DAMP PROOFING SHALL BE WATER TIGHT. SYSTEMS PASSING THROUGH FIRE RATED CONSTRUCTION SHALL BE FIRE PROOFED WITH THE MATERIAL APPROVED FOR THE FIRE AND TEMPERATURE RATING OF THE ASSEMBLY AND U.L. LISTED. (IF THE ARCHITECT HAS NOT PROVIDED A STANDARD DRAWING/ASSEMBLY FOR AN INSULATION AND ONE IS NOT AVAILABLE, THE CONTRACTOR IS RESPONSIBLE TO OBTAIN AN "ENGINEERING JUDGEMENT" AND ASSOCIATED DRAWING FOR THE APPLICATION.)
9. EQUIPMENT LOCATED ON A ROOF WHERE NO PARAPET OR GUARD RAIL, 42" HIGH OR GREATER, EXISTS, MUST BE INSTALLED A MINIMUM OF 10 FEET FROM THE ROOF EDGE, IF NOT POSSIBLE A STATIC LINE ANCHOR POINT PER ANSI/ASSE STANDARDS IS TO BE PROVIDED.
10. THE CONTRACTOR SHALL PROVIDE ALL RIGGING, HANDLING OF MATERIALS AND EQUIPMENT, AND THE NECESSARY PROTECTION FOR MATERIALS AND EQUIPMENT.
11. THE CONTRACTOR WILL PROTECT THE WORK AND MATERIAL AGAINST DIRT, DUST, INJURY OR DAMAGE TO THE WORK AND/OR EQUIPMENT. ALL WORK SHALL BE TURNED OVER TO OWNER CLEAN AND IN NEW CONDITION.
12. WHERE PIPES ARE INSTALLED THAT PASS THROUGH FLOORS THAT ARE NOT SLAB-ON-GRADE AND THE FLOOR IS A FIRE RATED ASSEMBLY, PER CODE, THE OPENING CREATED BY THE PIPING THROUGH THE FLOOR MUST BE PROTECTED BY USE A LISTED SYSTEM TO BE TEMPERATURE AND FIRE RATED TO MATCH THE RATING OF THE FLOOR (MIN 2 HOUR).
13. EQUIPMENT CONDENSATE DRAINS: AHU AND OTHER SIMILAR EQUIPMENT CONDENSATE DRAINS OR MAY BE REQUIRED TO BE INSTALLED ON THE PROJECT DRAWINGS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE CONDENSATE DRAINS TO AN APPROVED RECEIVER, SUMP DRAIN TO MATCH OR EXCEED CODE MINIMUMS. PROVIDE A CONDENSATE PUMP WHERE REQUIRED (IE: LITTLE GALT WATER).
14. EACH CONTRACTOR SHALL PROVIDE ALL FOUNDATIONS, HANGERS, AND SUPPORTS FOR ALL EQUIPMENT SUPPLIED AND/OR INSTALLED UNDER THEIR WORK. ANY EQUIPMENT WITH MOVING PARTS SHALL BE PROVIDED WITH VIBRATION ISOLATION AND FLEXIBLE CONNECTIONS TO PIPING AND/OR DUCTWORK IF APPLICABLE. MISCELLANEOUS STEEL AND ANCHORS REQUIRED FOR THE INSTALLATION OF THE CONTRACTOR'S EQUIPMENT IS THE RESPONSIBILITY OF THE CONTRACTOR AND THE RETENTION OF STRUCTURAL ENGINEERING DISCIPLINE. THE CONTRACTOR SHALL COMPLETE THE WORK IS THE RESPONSIBILITY OF THE CONTRACTOR. EG: THE USE OF CONCRETE ANCHORS WILL REQUIRE DOCUMENTATION APPROVAL FROM A STRUCTURAL ENGINEER. THE WORK SHALL BE RETAINED BY THE CONTRACTOR.
15. WHERE PIPES OR CONDUITS PASS THROUGH WALLS, FLOORS, OR CEILINGS IN FINISHED AREAS, THEY SHALL BE FURNISHED WITH ESCUTCHEON PLATES (COLOR PER ARCHITECT AND/OR INTERIOR DESIGNER).
16. PIPES AND/OR CONDUITS PASSING THROUGH WALL, FLOORS AND PARTITIONS SHALL BE PROVIDED WITH SLEEVES. SLEEVES PASSING THROUGH WATER PROOFING OR DAMP PROOFING SHALL BE WATER TIGHT. SLEEVES/PIPES PASSING THROUGH FIRE RATED CONSTRUCTION SHALL BE FIRE PROOFED WITH MATERIAL APPROVED FOR THE FIRE AND TEMPERATURE RATING OF THE ASSEMBLY AND U.L. LISTED. (IF THE ARCHITECT HAS NOT PROVIDED A STANDARD DRAWING/ASSEMBLY FOR AN APPLICATION AND ONE IS NOT AVAILABLE, THE CONTRACTOR IS RESPONSIBLE TO OBTAIN AN "ENGINEERING JUDGEMENT" AND ASSOCIATED DRAWING FOR THE APPLICATION.)
17. AT THE CONCLUSION OF THE JOB, EACH PIECE OF EQUIPMENT, VALVE, SWITCH, STARTER, PANEL, PIPE LINE, CONDUIT, DUCT, ETC., SHALL BE CLEARLY IDENTIFIED WHETHER EXPOSED OR CONCEALED, COVERED OR UNCOVERED, IN ACCORDANCE WITH THE ASHRAE AND AREA REGULATIONS. IDENTIFY PIPES AROUND EACH VALVE WITH "BRANDY-PERMA" CODE PIPE TAP" OR T. & B. WESTLINE "TEL-A-PIPE" INDICATING DIRECTION OF FLOW, SERVICE, ZONE, AND STATE. TAPE SHALL BE APPLIED TO PIPE, CONDUIT, VALVES, CONTROL VALVES, CONTROL VALVES AND DAMPERS SHALL BE IDENTIFIED WITH 2-INCH LACQUERED BRASS TAGS WITH STAMPED LETTERS FASTENED WITH "S" HOOKS OR CHAINS. INSULATION IS TO BE IDENTIFIED AS TO FUNCTION AND PURPOSE BY MEANS OF PERMANENTLY ATTACHED LAMINATED ENGRAVED PHENOLIC NAMEPLATES WITH BEVELED EDGES, AND WHITE LETTERS ON BLACK BACKGROUND. (NO ADHESIVE LABELS ALLOWED).
18. AT THE CONCLUSION OF THE WORK, ALL EQUIPMENT AND SYSTEMS SHALL BE BALANCED, ADJUSTED, AND TESTED TO PROVIDE A QUIET-OPERATING, STABLE, AND SAFELY OPERATING SYSTEM(S). DEMONSTRATE OPERATION OF ALL SYSTEMS TO THE OWNER'S DESIGNATED REPRESENTATIVE. THE TEST AND BALANCE WORK SHALL BE PERFORMED IN ACCORDANCE WITH NEBB OR AABC STANDARDS, BY AN INDEPENDENT, APPROVED, AND CERTIFIED TEST AND BALANCE PERSONNEL. THE TEST AND BALANCE SUBCONTRACTOR IS TO PROVIDE INSTRUMENT TEST PORT COVERS AT ALL TEST LOCATIONS ON OUTDOOR AIR HANDLING UNITS AND AT ALL OTHER OUTDOOR AIR HANDLING EQUIPMENT. TEST PORT COVERS SHALL BE VENTLOK MODEL #699, OR APPROVED EQUAL.
19. IN LOCATIONS WHERE SEISMIC DESIGN REQUIREMENTS EXIST, THE MECHANICAL/PLUMBING CONTRACTOR IS RESPONSIBLE FOR RETAINING AND PAYING FOR THE DESIGN SERVICES OF A STRUCTURAL ENGINEER TO CREATE THE DESIGN AND INSTALLATION DRAWINGS FOR MECHANICAL/PLUMBING SYSTEMS SEISMIC RESTRAINT SUPPORT. PER THE PROJECT BUILDING CODE PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SUBMIT MECHANICAL SYSTEMS SHOP DRAWINGS BASED UPON MULTI DISCIPLINE COORDINATION. INCLUDED WITH THE SHOP DRAWING SUBMISSION SHALL BE SEISMIC RESTRAINT DRAWINGS NOTING WHERE SEISMIC SUPPORT IS REQUIRED. FOR EACH AREA NOTED NEEDING SEISMIC SUPPORT FOR THE MECHANICAL SYSTEMS, THERE SHALL BE A SEISMIC DRAWING DETAILING THE REQUIRED SUPPORT. THE SEISMIC SUPPORT DRAWINGS SHALL BE SIGNED AND SEALED BY A REGISTERED STRUCTURAL ENGINEER IN THE SAME STATE AS THE PROJECT. IN ADDITION TO THE PROJECT DESIGN TEAM REVIEW, THE SEISMIC SUPPORT DRAWINGS WILL BE ISSUED TO THE LOCAL BUILDING DEPARTMENT FOR REVIEW AS PART OF A DEFERRED SUBMITTAL FOR THE BUILDING DOCUMENTS. COMMENCEMENT OF CONSTRUCTION PRIOR TO BUILDING DEPARTMENT REVIEW IS AT THE CONTRACTOR'S RISK.
20. CONTRACTOR SHALL REFER TO THE ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF GRILLES, REGISTERS AND DIFFUSERS.
21. PIPE HANGERS: PIPE SIZES 1/2" TO 1 1/2" - 5'-0" MAX SPACING, 3/8" MIN. ROD DIAMETER. PIPE SIZES

AIR HANDLING UNIT SCHEDULE																																	
MARK	GENERAL DATA				SUPPLY FAN							EXHAUST FAN							COOLING COIL														
	MANUFACTURER MODEL	LOCATION	SERVICE	OUTSIDE AIR (CFM)	SUPPLY AIR (CFM)	ESP (IN)	TSP (W/ DIRTY FILTERS) (IN)	OUTLET VEL. (FPM)	FAN		MOTOR			EXHAUST AIR (CFM)	ESP (IN)	FAN		MOTOR			TOTAL MBH	SENSIBLE MBH	EAT (DB)	EAT (WB)	LAT (DB)	LAT (WB)	MAX FACE VEL (FPM)	MAX AIR PD (IN WC)	EWT (°F)	LWT (°F)	GPM	MIN. ROWS	MAX. WATER PD FT HD
									TYPE	DIA. (IN)	RPM	BHP	HP			TYPE	DIA. (IN)	RPM	BHP	HP													
RTU 4	ANNEXAIR ERP-E-20-EW16-H-C-H-TB	ROOF	CASINO 1	22,606	22,000	1.0	4.0	450	BELT	(4) 19.7	2380	(4) 4.83	(4) 6.74	22,606	1.0	BELT	(3) 22.0	2380	(3) 5.35	(3) 6.74	896.73	549.48	74.6	65.5	51.98	51.78	484	0.82	42	55.74	130	6	11.64
RTU 7	ANNEXAIR ERP-E-16-EW-H-C-H-TB	ROOF	BOH	15,606	15,000	1.0	4.0	450	BELT	(2) 22.0	2750	(2) 6.68	(2) 12.8	15,606	1.0	BELT	(2) 22.0	2750	(2) 5.59	(2) 12.8	731.27	376.04	74.6	67.8	51.97	51.86	476	0.80	42	55.24	110	6	13.75
RTU 11	ANNEXAIR ERP-E-09-EW-H-C-H-TB	ROOF	BOH	11,457	11,000	1.0	4.0	450	BELT	(2) 19.7	2380	(2) 4.75	(2) 6.74	11,457	1.0	BELT	(2) 19.7	2380	(2) 3.89	(2) 6.74	529.19	287.91	75.6	67.6	51.95	51.81	466	0.78	42	55.34	79	6	9.74
RTU 12	ANNEXAIR AHU-E-09-H-C-H	ROOF	BOH	9,000	9,000	1.0	3.0	450	BELT	(2) 17.7	2740	(2) 3.07	(2) 4.4	9,000	1.0	BELT	(2) 17.7	2740	(2) 2.27	(2) 4.4	374.58	287.32	80.7	65.4	51.72	51.25	462	0.77	42	56.63	51	6	10.32
RTU 13	ANNEXAIR AHU-E-09-H-C-H	ROOF	BOH	9,000	9,000	1.0	3.0	450	BELT	(2) 17.7	2740	(2) 3.07	(2) 4.4	9,000	1.0	BELT	(2) 17.7	2740	(2) 2.27	(2) 4.4	374.58	287.32	80.7	65.4	51.72	51.25	462	0.77	42	56.63	51	6	10.32

AIR HANDLING UNIT SCHEDULE (CONTINUED)																																
MARK	RE-HEATING COIL (SUMMER)										PRE-HEATING COIL (WINTER)										ELECTRICAL				OPERATING WEIGHT (LBS)	REMARKS						
	TOTAL MBH	EAT °F DB	LAT °F DB	MAX FACE VEL (FPM)	MAX AIR PD (IN WC)	EWT (°F)	LWT (°F)	GPM	MIN. ROWS	MAX. WATER PD FT HD	TOTAL MBH	EAT °F DB	LAT °F DB	MAX FACE VEL (FPM)	MAX AIR PD (IN WC)	EWT (°F)	LWT (°F)	GPM	MIN. ROWS	MAX. WATER PD FT HD	FLA	MCA	MOCP	V/PH/Hz								
RTU 4	440.97	56.9	75.26	484	0.08	180	157.9	41	1	3.70	1064.54	56.9	101.22	484	0.19	180	159.76	108	2	4.05	55	57	60	460/3/60	14,700	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20						
RTU 7	399.84	49.8	74.26	476	0.09	180	158.4	38	1	2.11	850.27	49.8	101.82	476	0.20	180	159.22	84	2	3.87	46	49	60	460/3/60	12,100	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20						
RTU 11	327.94	49.6	76.96	466	0.09	180	157.5	30	1	6.39	631.10	49.6	102.26	466	0.20	180	159.76	64	2	5.26	26	28	30	460/3/60	10,200	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20						
RTU 12	239.12	50.4	74.78	462	0.08	180	158.6	23	1	4.62	487.77	50.4	100.13	462	0.18	180	160.7	52	2	5.97	17	18	20	460/3/60	4,900	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20						
RTU 13	239.12	50.4	74.78	462	0.08	180	158.6	23	1	4.62	487.77	50.4	100.13	462	0.18	180	160.7	52	2	5.97	17	18	20	460/3/60	4,900	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20						

1. PROVIDE 2" DEEP, MERV 13 FILTERS. FILTERS ARE REQUIRED ON BOTH SIDES OF THE WHEEL ON RTU-4,7, AND 11.  
2. PROVIDE CURB TO ALLOW NEW AHU TO FIT ON EXISTING UNIT CURB. COORDINATE HEIGHT WITH OWNER.  
3. PROVIDE UNITS WITH EC PERMANENT MAGNET MOTORS ON EACH FAN. EACH FAN BANK WILL BE CONTROLLED BY A SINGLE SPEED CONTROLLER.  
4. UNITS SHALL BE CONSTRUCTED OF BISOURCED ENGINEERED COMPOSITE MATERIAL USING 100% METAL FREE AND 100% RECYCLED GREEN FOAM R-14 INSULATION.  
5. PROVIDE AIR FOIL BY DIRECT DRIVE FANS.  
6. PROVIDE SMOKE DETECTORS IN SUPPLY AND RETURN (BY FIRE ALARM CONTRACTOR).  
7. PROVIDE INSULATED PIPING VESTIBULE MADE OF SAME CABINET CONSTRUCTION AS MAIN AIR HANDLER. PIPING VESTIBULE SHALL HAVE HINGED ACCESS DOORS FOR EACH COIL SECTION - MINIMUM DEPTH 30".  
8. PROVIDE 1 YEAR WARRANTY ON ALL PARTS, AND 5 YEAR PARTS WARRANTY ON ENERGY WHEELS.  
9. PROVIDE LIGHTS AND CONVENIENCE OUTLETS, WIRED SEPARATE FROM MAIN UNIT POWER, ELECTRICAL CONTRACTOR TO PROVIDE 120V POWER CONNECTION.  
10. PROVIDE INSULATED STAINLESS STEEL DRAIN PAN.  
11. ELECT CONNECTIONS - SINGLE POINT: 480/3 , SINGLE POINT: 120/1.

12. BAS CONTRACTOR TO PROVIDE ALL FREEZE STATS, WHICH SHALL BE LOCATED ON THE INSIDE OF ALL AIR HANDLERS UNITS BY AHU MANUFACTURER. MIN 20' ELEMENT, MANUAL RESET-CONTROLLER LOCATED INSIDE UNIT, AND INSTALLED AT THE FACTORY BY AHU MANUFACTURER.  
13. PROVIDE RECIRCULATING DAMPER FOR FREEZE PROTECTION.  
14. EXTERNALLY MOUNTED DISCONNECT (BY CONTRACTOR).  
15. BAS CONTRACTOR TO PROVIDE EBTRON GT116 SERIES OUTSIDE AIR AIR-FLOW MEASURING STATION WITH CONTROL INTERFACE, AND INSTALLED IN THE AHU AT THE FACTORY.  
16. BAS CONTRACTOR TO PROVIDE EBTRON GT108 SERIES SUPPLY AND EXHAUST FAN INLET AIR-FLOW MEASURING STATIONS, AND INSTALLED IN THE AHU AT THE FACTORY.  
17. PROVIDE A 16" ACCESS SECTION BETWEEN THE FIRST HEATING COIL AND THE COOLING COIL.  
18. PROVIDE WITH ENERGY RECOVERY WHEEL PER SCHEDULE ON THIS SHEET.  
19. PROVIDE ENTIRE CONTROLS SYSTEM UNDER ONE WARRANTY.  
20. HEATING COIL TO BE LOCATED DOWNSTREAM OF THE COOLING COIL (IN REHEAT POSITION).

ENERGY RECOVERY WHEEL SCHEDULE													
MARK	OUTSIDE AIR			SUPPLY AIR			EXHAUST AIR			RETURN AIR			REMARKS
	CFM	EAT °F SUMMER DB/WB	EAT °F WINTER DB	CFM	LAT °F SUMMER DB/WB	LAT °F WINTER DB	CFM	LAT °F SUMMER DB/WB	LAT °F WINTER DB	CFM	EAT °F SUMMER DB/WB	EAT °F WINTER DB	
RTU 4	15,606	85/77	0°	15,000	75.7/67.8	49.8/45.4	14,606	81.3/70.8	22.2/22.2	15,606	72.0/60.0	72.0/60.0	1, 2, 3, 4
RTU 7	15,606	85/77	0°	15,000	75.7/67.8	49.8/45.4	14,606	81.3/70.8	22.2/22.2	15,000	72.0/60.0	72.0/60.0	1, 2, 3, 4
RTU 11	11,457	85/77	0°	11,000	75.7/67.6	49.6/45.6	10,457	81.4/71.0	22.4/22.4	11,000	72.0/60.0	72.0/60.0	1, 2, 3, 4

1. ANNEXAIR 8" ALUMINUM WHEEL WITH SILICA GEL DESSICANT.  
2. WHEEL SEAL TO BE MADE FROM DUAL BAND ULTRA-HIGH MOLECULAR WEIGHT POLYETHYLENE AND SELF LUBRICATING.  
3. DATA SHOWN IS FOR A SINGLE (1) WHEEL.  
4. PROVIDE WHEEL MOTOR WITH VFD.

**HARD ROCK AHU REPLACEMENT**  
 308 N 193rd E AVE,  
 CATOOSA, OK 74015

ISSUE DATE: MM-DD-YEAR

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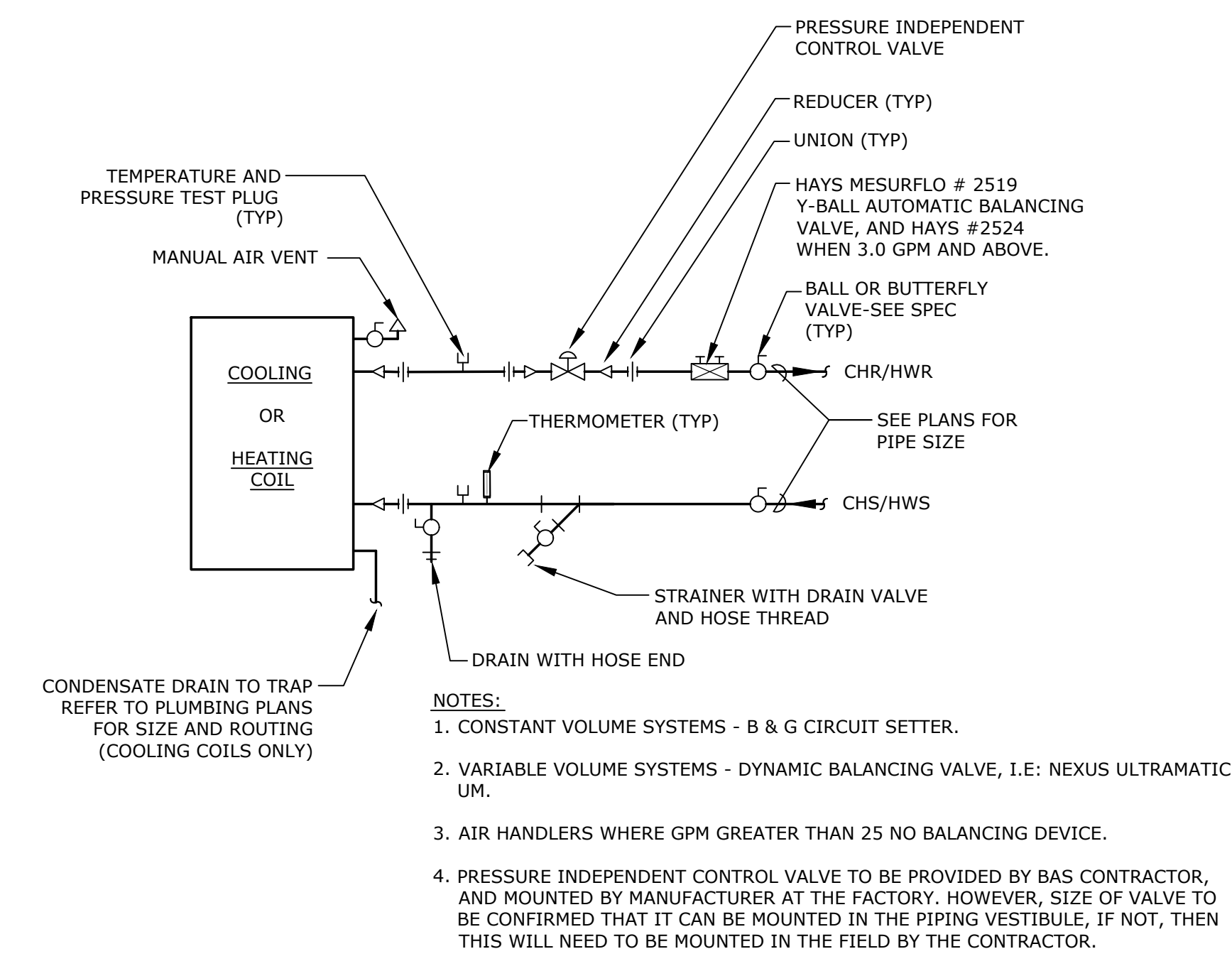


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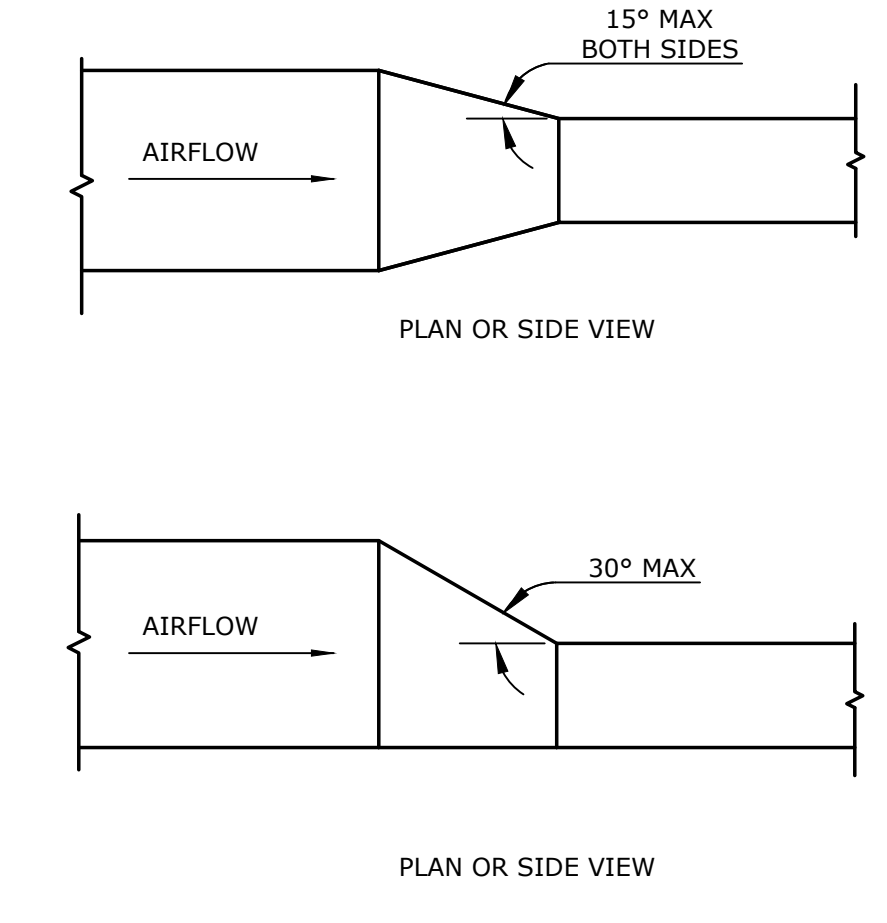
SCHEDULES

SHEET

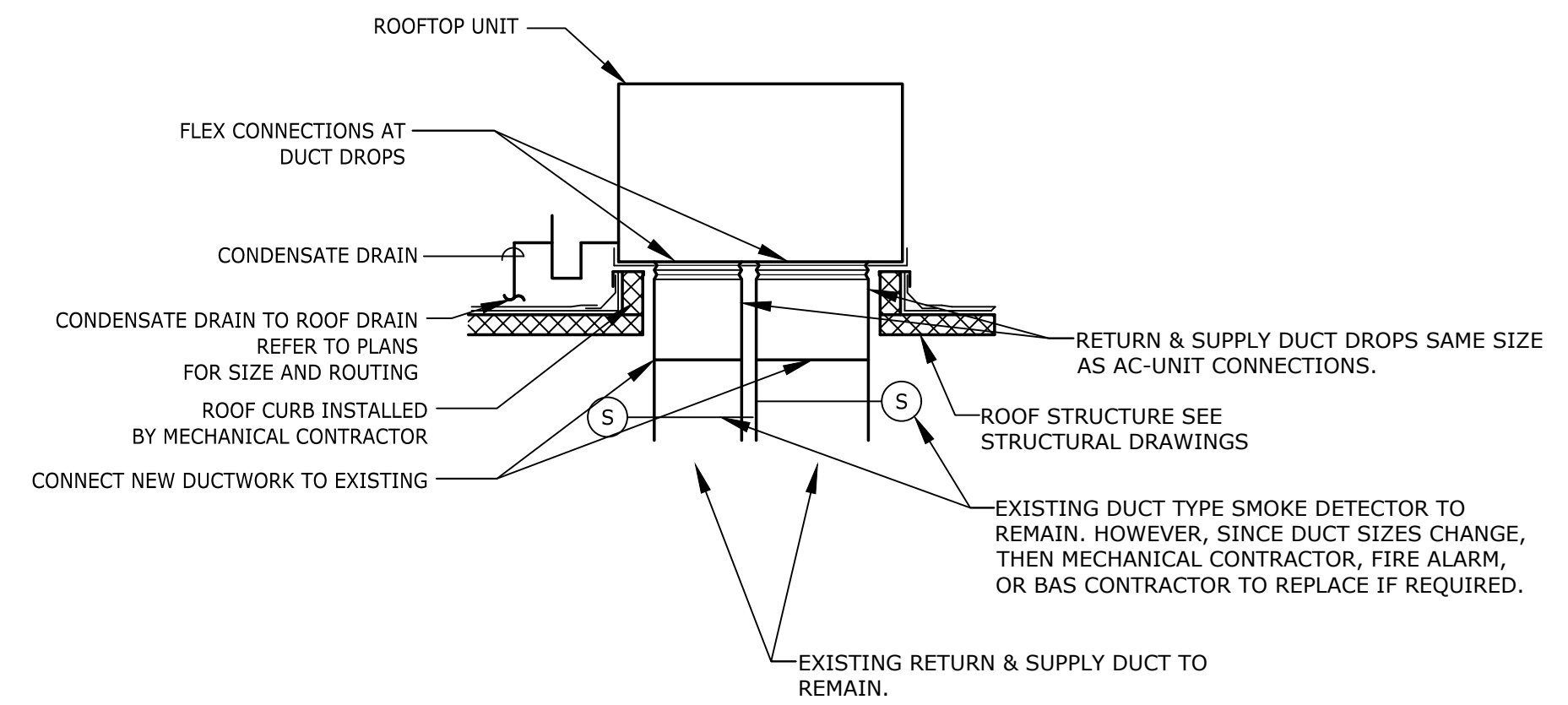
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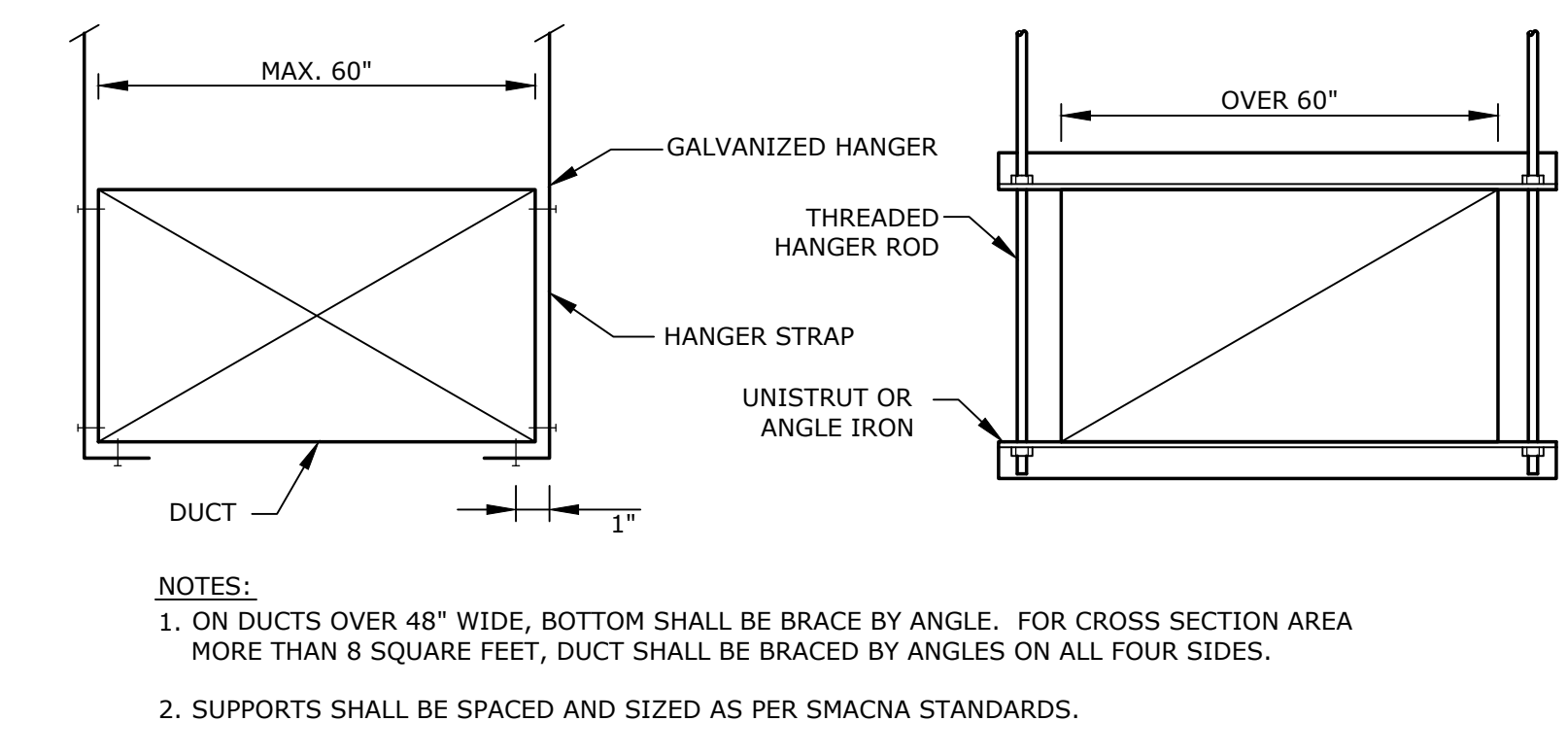
**A** 2-WAY COOLING OR HEATING COIL  
 M0.3 NTS



**B** DUCT TRANSITION  
 M0.3 NTS



**C** ROOFTOP AIR CONDITIONING UNIT  
 M0.3 NTS



**D** DUCT HANGER SUPPORT  
 M0.3 NTS

**HARD ROCK AHU REPLACEMENT**  
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ISSUE DATE:		MM-DD-YEAR
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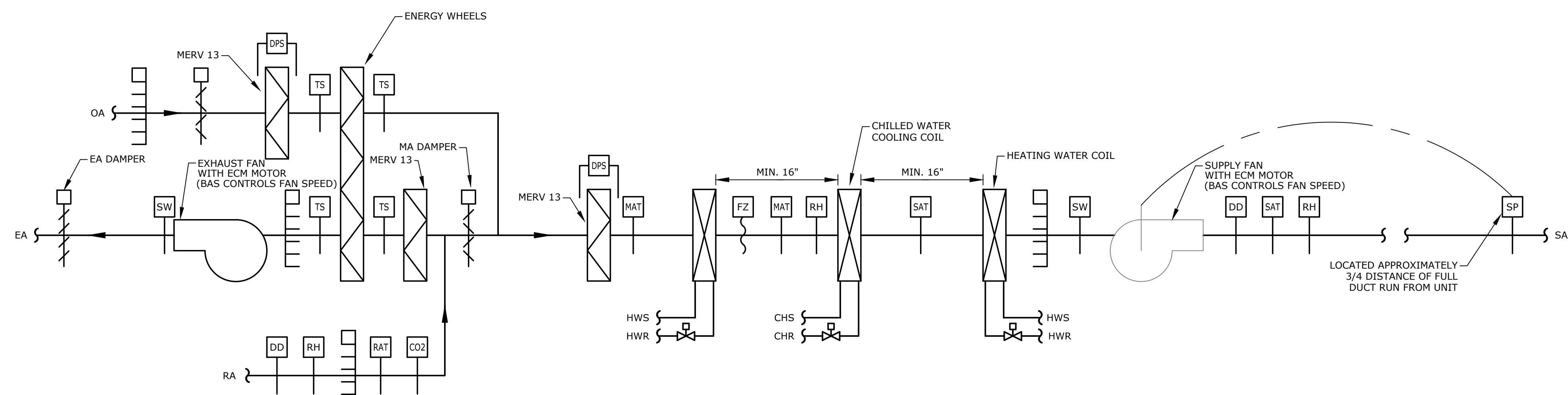


FEB 23 2021  
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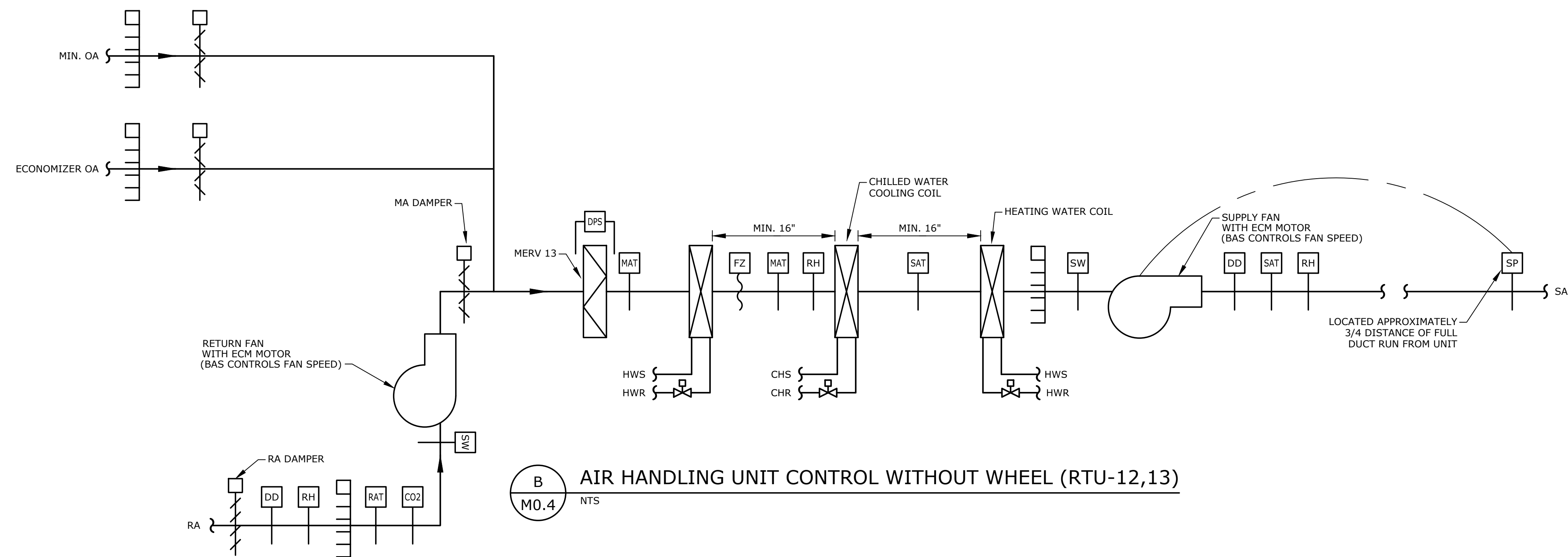
DIAGRAMS

SHEET

**M0.3**



**A**  
M0.4  
NTS  
**AIR HANDLING UNIT CONTROL WITH WHEEL (RTU-4,7,11)**



**B**  
M0.4  
NTS  
**AIR HANDLING UNIT CONTROL WITHOUT WHEEL (RTU-12,13)**

**CONTROL SYMBOLS AND ABBREVIATIONS**

NOTE: THIS IS A MASTER SCHEDULE. NOT ALL SYMBOLS CONTAINED HEREIN MAY APPEAR ON THE DRAWINGS.

CO2	DUCT MOUNTED CARBON DIOXIDE SENSOR
DD	DUCT TYPE SMOKE DETECTOR
EAT	EXHAUST AIR TEMPERATURE SENSOR
FZ	FREEZE STAT (CAPILLARY TUBE)
HKT	HEAT EXCHANGER AIR TEMPERATURE SENSOR
LAT	LEAVING AIR TEMPERATURE SENSOR
MAT	MIXED AIR TEMPERATURE SENSOR
OAT	OUTDOOR AIR TEMPERATURE SENSOR
RH	DUCT MOUNTED RELATIVE HUMIDITY SENSOR
RAT	RETURN AIR TEMPERATURE SENSOR
SP	DUCT MOUNTED STATIC PRESSURE SENSOR
SPH	DUCT MOUNTED STATIC PRESSURE HIGH LIMIT
SPL	DUCT MOUNTED STATIC PRESSURE LOW LIMIT
SAT	SUPPLY AIR TEMPERATURE SENSOR
TS	TEMPERATURE SENSOR
ASP	AIR SAMPLING PROBE
—/—/—	BACKDRAFT DAMPER
□/—/—/—	AUTOMATIC TEMPERATURE CONTROL DAMPER (PARALLEL BLADE TYPE)
□/—/—/—	AUTOMATIC TEMPERATURE CONTROL DAMPER (OPPOSED BLADE TYPE)
□/□/□/□	AIRFLOW MEASURING STATION
⊙	SPACE MOUNTED CARBON DIOXIDE SENSOR
⊕	SPACE MOUNTED RELATIVE HUMIDITY SENSOR
⊙	SPACE MOUNTED TEMPERATURE SENSOR
⊖	SPACE MOUNTED THERMOSTAT
SP	SPACE MOUNTED STATIC PRESSURE SENSOR
SW	LOW/HIGH PRESSURE SWITCH
DPS	DIFFERENTIAL PRESSURE SENSOR
CT	CURRENT TRANSDUCER
VFD	VARIABLE FREQUENCY DRIVE
FS	FLOW SWITCH
⊙	PUMP
⊕	PRESSURE GAUGE
⊖	THERMOMETER
⊖	RELIEF VALVE
⊖	3-WAY ELECTRIC CONTROL VALVE
⊖	2-WAY ELECTRIC CONTROL VALVE
⊖	TRUMPET VALVE
ACD	AUTOMATIC CONTROL DAMPER
EA	EXHAUST AIR
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
RA	RETURN AIR
SA	SUPPLY AIR

**NOTES:**  
1. NOT ALL CONTROL ACCESSORIES REQUIRED ARE SHOWN. SEE SEQUENCE OF OPERATIONS FOR DETAILS.

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SHEET TITLE:

CONTROL DIAGRAMS

SHEET

**M0.4**









**DEMOLITION NOTES:**

- EQUIPMENT AND PIPING LOCATIONS SHOWN FROM BEST AVAILABLE INFORMATION. CONTRACTOR SHALL FIELD VERIFY SIZES AND LOCATIONS.
- EQUIPMENT THAT IS BEING REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE JOB SITE, EXCEPT EQUIPMENT SELECTED BY OWNER. OWNER SELECTED EQUIPMENT WILL BE TAGGED AND SHALL BE MOVED BY CONTRACTOR TO OWNER'S STORAGE ON SITE.
- WHERE DUCTWORK IS TO BE CUT OFF AT A POINT, IT SHALL BE CAPPED OR BLANKED OFF AT THAT POINT. INSULATION ON REMAINING DUCT TO BE REPAIRED TO NEW CONDITION.
- PIPING CONNECTED TO EQUIPMENT THAT IS BEING REMOVED SHALL BE CUT AND CAPPED IN WALLS, FLOORS OR CEILING SO AS NOT TO INTERFERE WITH NEW CONSTRUCTION OR EQUIPMENT.

**SHEET NOTES:**

- REMOVE EXISTING RTU, AND PREPARE ROOF FOR INSTALLATION OF NEW RTU.
- DISCONNECT EXISTING SUPPLY DUCT FROM RTU CONNECTION, AND PREPARE FOR RECONNECTION TO NEW RTU. FIELD VERIFY EXACT LOCATION OF EXISTING.
- DISCONNECT EXISTING RETURN DUCT FROM RTU CONNECTION, AND PREPARE FOR RECONNECTION TO NEW RTU. FIELD VERIFY EXACT LOCATION OF EXISTING.
- DISCONNECT EXISTING 1" COLD WATER PIPING (MAKE-UP WATER) BACK TO MAIN FROM REMOVED RTU, AND CAP. FIELD VERIFY EXACT LOCATION OF EXISTING.

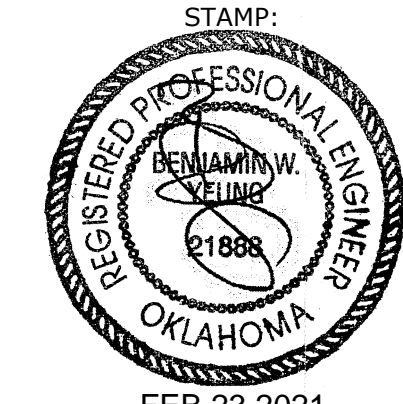


**HARD ROCK AHU REPLACEMENT**  
308 N 193rd E AVE,  
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FEB 23 2021

SHEET TITLE:

**MECHANICAL DEMOLITION PLAN - LEVEL 1**

SHEET

**MD2.1**

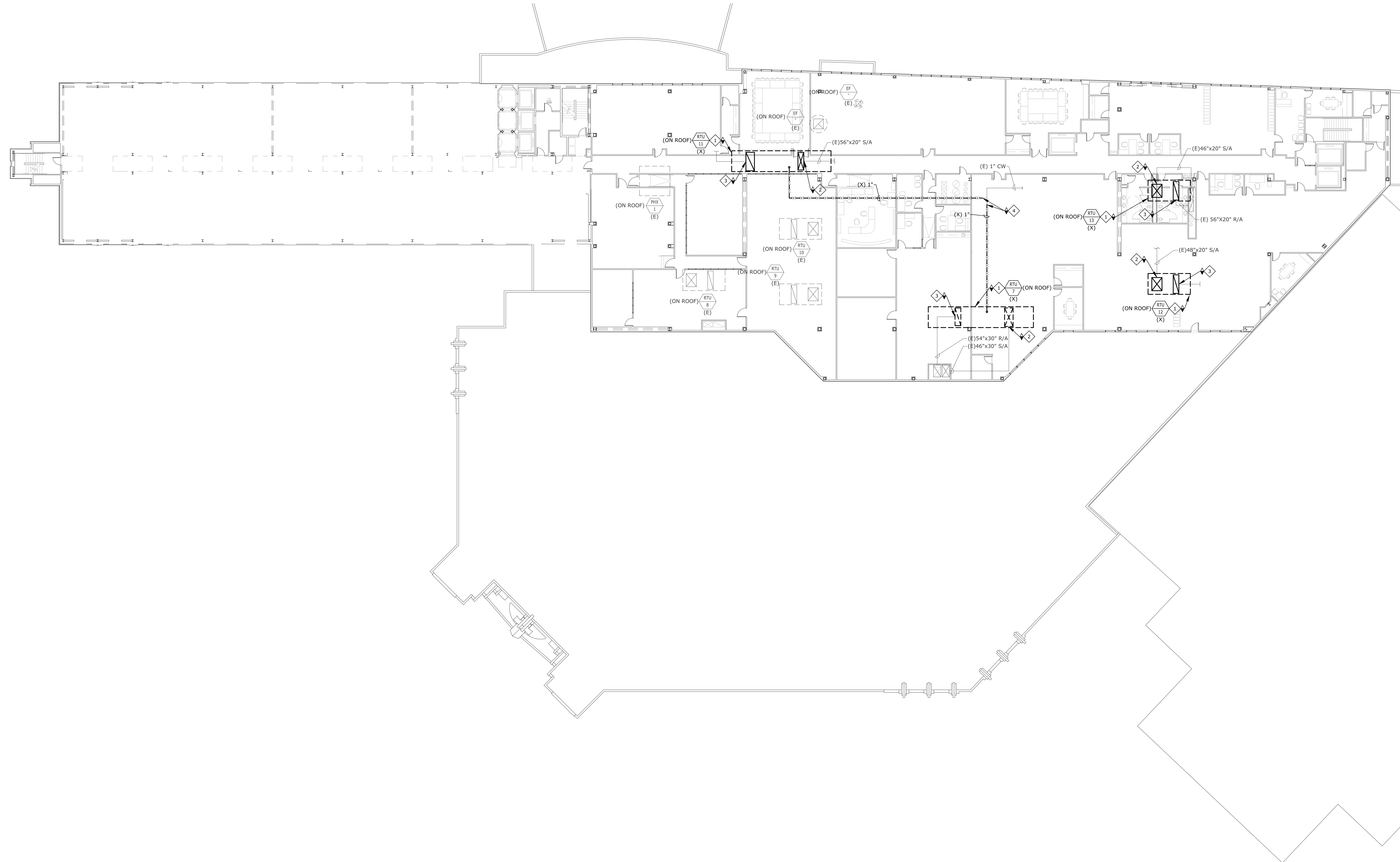


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- WHERE DUCTWORK IS TO BE CUT OFF AT A POINT, IT SHALL BE CAPPED OR BLANKED OFF AT THAT POINT. INSULATION ON REMAINING DUCT TO BE REPAIRED TO NEW CONDITION.
- PIPING CONNECTED TO EQUIPMENT THAT IS BEING REMOVED SHALL BE CUT AND CAPPED IN WALLS, FLOORS OR CEILING SO AS NOT TO INTERFERE WITH NEW CONSTRUCTION OR EQUIPMENT.

**SHEET NOTES:**

- REMOVE EXISTING RTU ON ROOF, AND PREPARE ROOF FOR INSTALLATION OF NEW RTU.
- DISCONNECT EXISTING SUPPLY DUCT FROM RTU CONNECTION, AND PREPARE FOR RECONNECTION TO NEW RTU. FIELD VERIFY EXACT LOCATION OF EXISTING.
- DISCONNECT EXISTING RETURN DUCT FROM RTU CONNECTION, AND PREPARE FOR RECONNECTION TO NEW RTU. FIELD VERIFY EXACT LOCATION OF EXISTING.
- DISCONNECT EXISTING 1" COLD WATER PIPING (MAKE-UP WATER) BACK TO MAIN FROM REMOVED RTU, AND CAP. FIELD VERIFY EXACT LOCATION OF EXISTING.



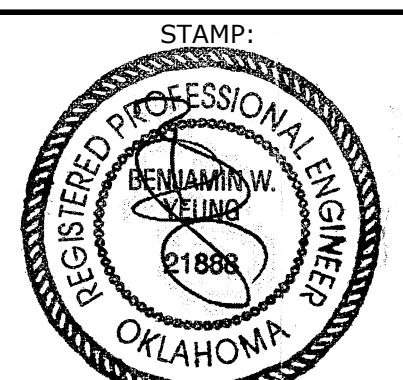
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SHEET TITLE:

**MECHANICAL DEMOLITION PLAN - LEVEL 3**

SHEET

**MD2.2**



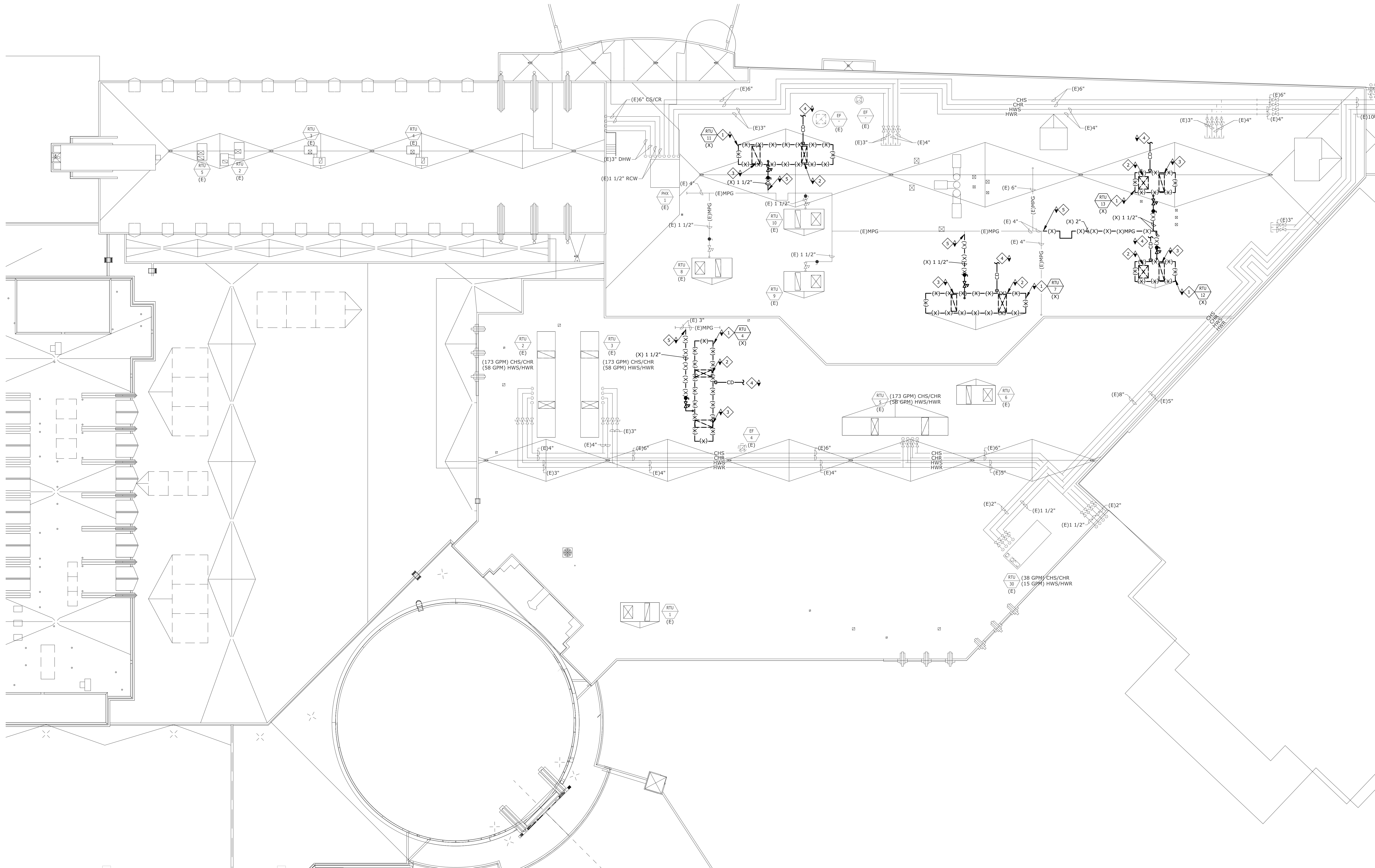
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- WHERE DUCTWORK IS TO BE CUT OFF AT A POINT, IT SHALL BE CAPPED OR BLANKED OFF AT THAT POINT. INSULATION ON REMAINING DUCT TO BE REPAIRED TO NEW CONDITION.
- PIPING CONNECTED TO EQUIPMENT THAT IS BEING REMOVED SHALL BE CUT AND CAPPED IN WALLS, FLOORS OR CEILING SO AS NOT TO INTERFERE WITH NEW CONSTRUCTION OR EQUIPMENT.

**SHEET NOTES:**

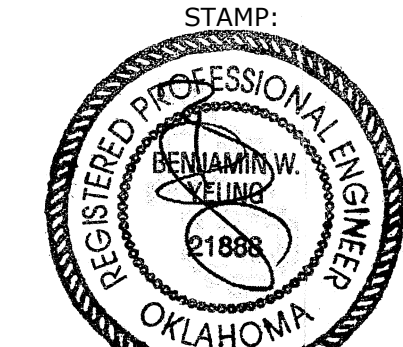
- REMOVE EXISTING RTU, AND PREPARE ROOF FOR INSTALLATION OF NEW RTU.
- DISCONNECT EXISTING SUPPLY DUCT FROM RTU CONNECTION, AND PREPARE FOR RECONNECTION TO NEW RTU. FIELD VERIFY EXACT LOCATION OF EXISTING.
- DISCONNECT EXISTING RETURN DUCT FROM RTU CONNECTION, AND PREPARE FOR RECONNECTION TO NEW RTU. FIELD VERIFY EXACT LOCATION OF EXISTING.
- DISCONNECT EXISTING CONDENSATE DRAIN PIPING FROM REMOVED RTU BACK TO POINT OF TERMINATION. FIELD VERIFY EXACT LOCATION OF EXISTING.
- DISCONNECT EXISTING MEDIUM PRESSURE GAS PIPING BACK TO MAIN FROM REMOVED RTU, AND CAP. FIELD VERIFY EXACT LOCATION OF EXISTING.



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FEB 23 2021  
SHEET TITLE:

**MECHANICAL  
DEMOLITION ROOF  
PLAN**

SHEET

**MD5.1**

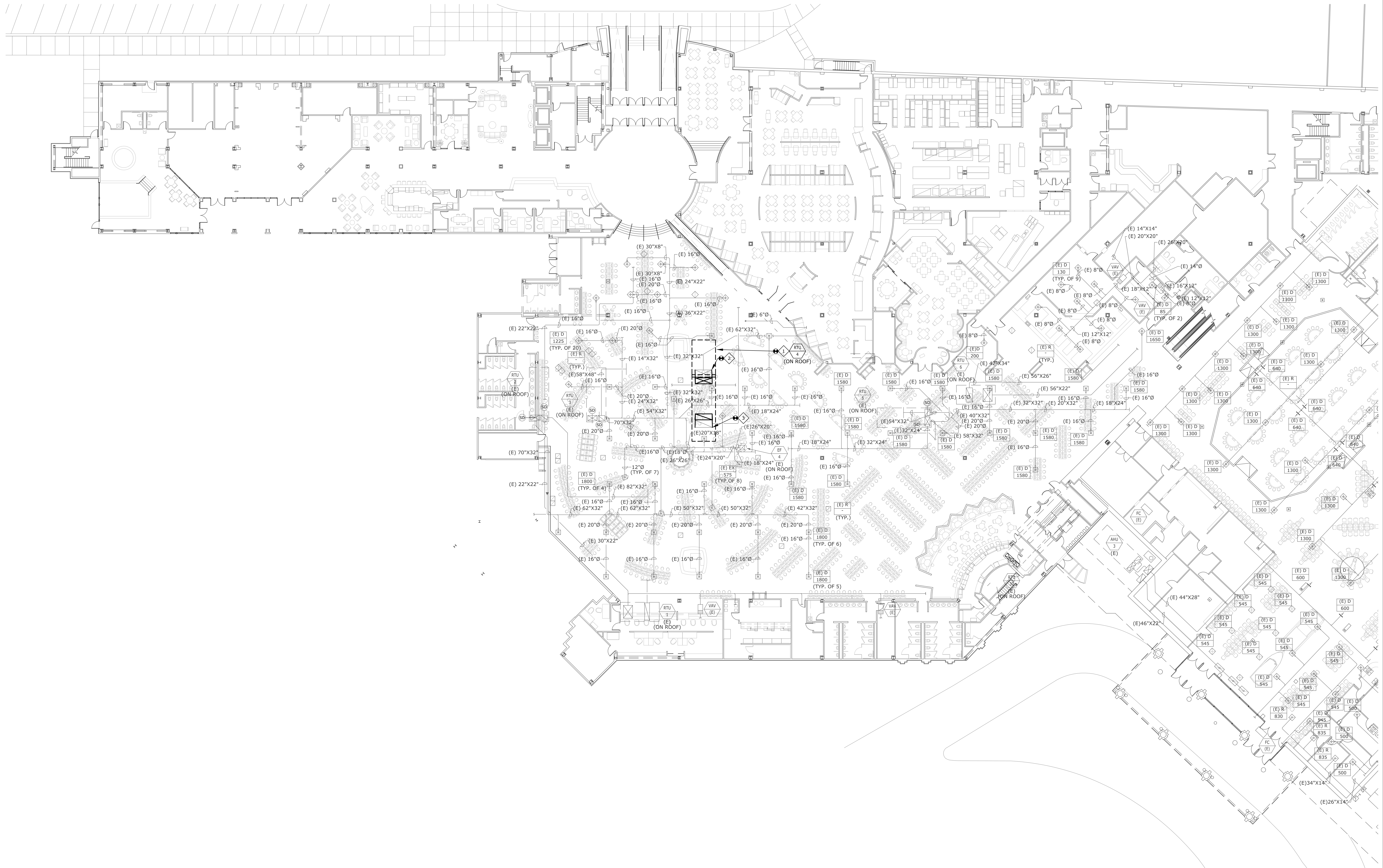
**A MECHANICAL DEMOLITION ROOF PLAN**  
1/16" = 1'-0"  
0' 4' 8' 16' 32'  
NORTH

**GENERAL NOTES:**

- ACCESS DOORS ARE REQUIRED FOR ALL DAMPERS INSTALLED ABOVE INACCESSIBLE CEILING. COORDINATE EXACT LOCATION OF ALL ACCESS DOORS WITH ARCHITECT PRIOR TO INSTALLATION.
- VERIFY LOCATION OF ALL THERMOSTATS WITH ARCHITECT PRIOR TO INSTALLATION. MOUNT ALL THERMOSTATS @48" A.F.F. IN ACCORDANCE WITH ADA STANDARDS. PROVIDE LOCKING COVERS FOR T-STATS.
- VERIFY AND COORDINATE FRAME AND BORDER TYPE REQUIREMENTS FOR AIR DEVICES WITH ARCHITECTURAL CEILING PLANS PRIOR TO ORDERING.
- DUCT SIZES SHOWN ARE THE CLEAR INSIDE DIMENSIONS.
- THE MECHANICAL CONTRACTOR SHALL VERIFY THE LOCATION OF ALL ROOF MOUNTED EQUIPMENT AND ROOF PENETRATIONS WITH ARCHITECT AND STRUCTURAL ENGINEER PRIOR TO COMMENCING WORK.
- THE MECHANICAL CONTRACTOR SHALL COORDINATE LOCATION AND ROUTING OF HVAC EQUIPMENT AND DUCTWORK WITH OTHER TRADES PRIOR TO COMMENCING WORK.
- ALL EXHAUST OUTLETS SHALL BE LOCATED MIN. OF 10'-0" FROM ANY OUTSIDE AIR INTAKES.
- THE CUTTING, NOTCHING AND BORING OF HOLES IN FLOOR JOIST AND WALL STUDS SHALL BE IN ACCORDANCE WITH THE LATEST APPROVED EDITION OF THE INTERNATIONAL BUILDING CODE.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING AS REQUIRED TO ACCOMMODATE HIS WORK.
- REFER TO THE MECHANICAL DIAGRAMS THAT APPLY TO THE WORK ON THIS DRAWING. THESE DIAGRAMS PROVIDE GUIDANCE AS TO INSTALLATION INTENT AND DO NOT NECESSARILY SHOW ALL COMPONENTS REQUIRED.

**SHEET NOTES:**

- NEW RTU. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
- ROUTE NEW RTU CONNECTION SIZE SUPPLY DUCT TO EXISTING SUPPLY DUCT AT POINT OF CONNECTION AS SHOWN. TRANSITION AS REQUIRED. FIELD VERIFY EXACT LOCATION OF EXISTING.
- ROUTE NEW RTU CONNECTION SIZE RETURN DUCT TO EXISTING RETURN DUCT AT POINT OF CONNECTION AS SHOWN. TRANSITION AS REQUIRED. FIELD VERIFY EXACT LOCATION OF EXISTING.



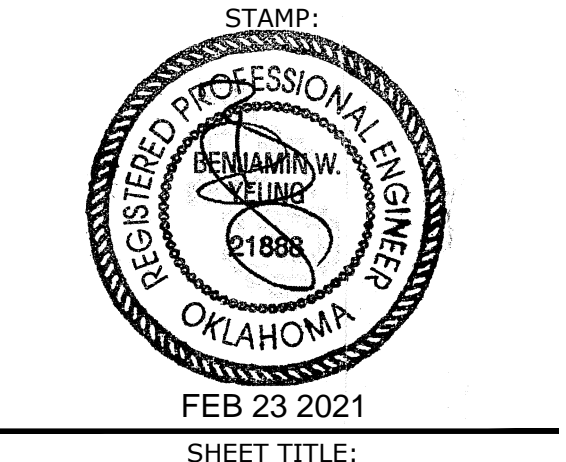
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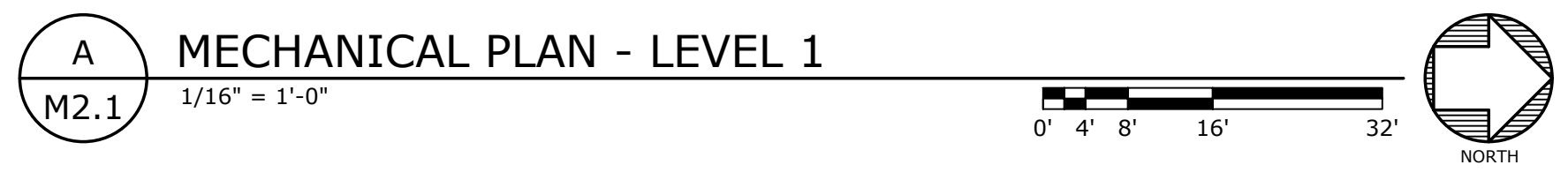
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SHEET TITLE:  
**MECHANICAL PLAN - LEVEL 1**

SHEET  
**M2.1**

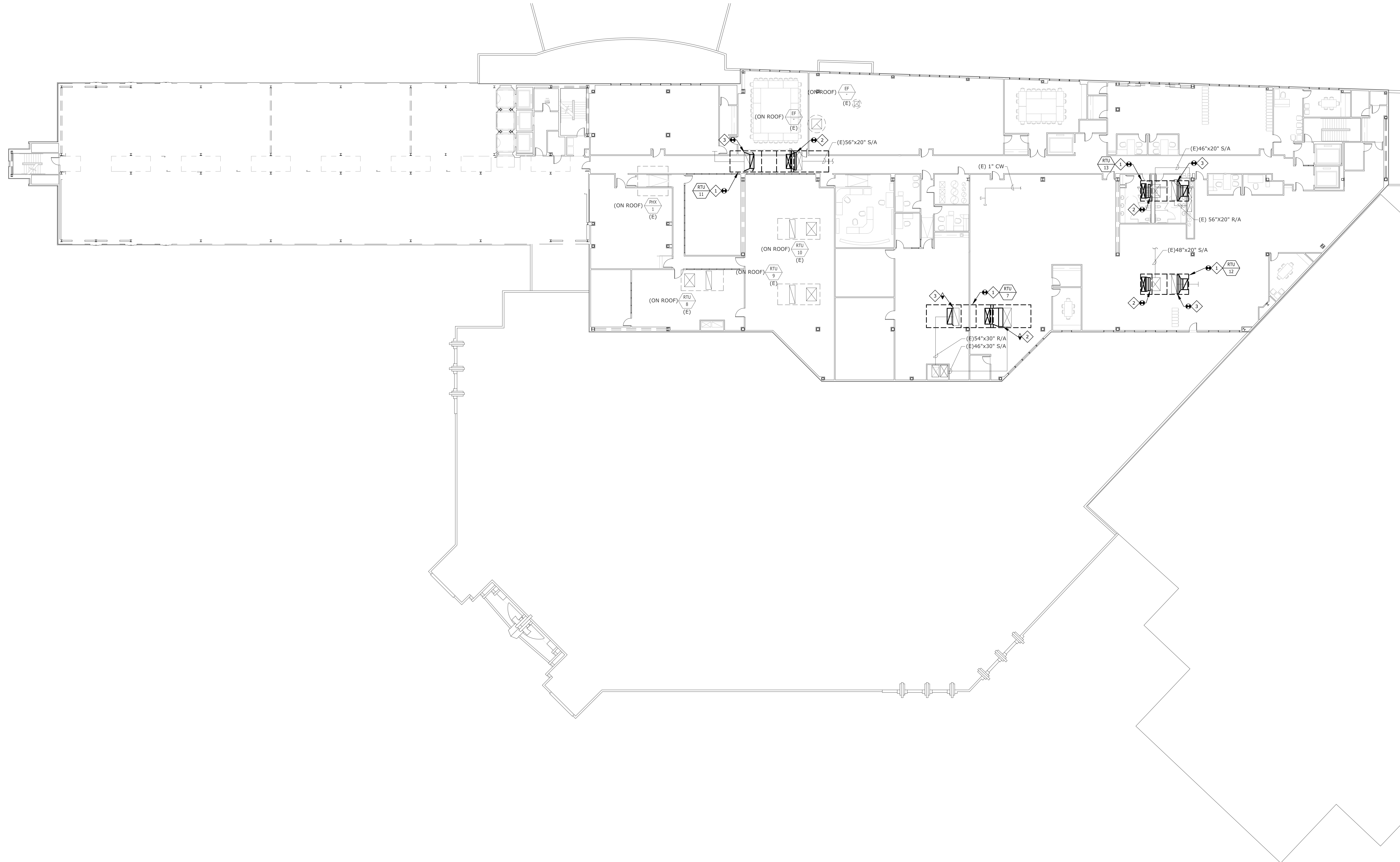


**GENERAL NOTES:**

- ACCESS DOORS ARE REQUIRED FOR ALL DAMPERS INSTALLED ABOVE INACCESSIBLE CEILINGS. COORDINATE EXACT LOCATION OF ALL ACCESS DOORS WITH ARCHITECT PRIOR TO INSTALLATION.
- VERIFY LOCATION OF ALL THERMOSTATS WITH ARCHITECT PRIOR TO INSTALLATION. MOUNT ALL THERMOSTATS @48" A.F.F. IN ACCORDANCE WITH ADA STANDARDS. PROVIDE LOCKING COVERS FOR T-STATS.
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- THE MECHANICAL CONTRACTOR SHALL COORDINATE LOCATION AND ROUTING OF HVAC EQUIPMENT AND DUCTWORK WITH OTHER TRADES PRIOR TO COMMENCING WORK.
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- REFER TO THE MECHANICAL DIAGRAMS THAT APPLY TO THE WORK ON THIS DRAWING. THESE DIAGRAMS PROVIDE GUIDANCE AS TO INSTALLATION INTENT AND DO NOT NECESSARILY SHOW ALL COMPONENTS REQUIRED.

**SHEET NOTES:**

- NEW RTU LOCATED ON ROOF. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
- ROUTE NEW RTU CONNECTION SIZE SUPPLY DUCT TO EXISTING SUPPLY DUCT AT POINT OF CONNECTION AS SHOWN. TRANSITION AS REQUIRED. FIELD VERIFY EXACT LOCATION OF EXISTING.
- ROUTE NEW RTU CONNECTION SIZE RETURN DUCT TO EXISTING RETURN DUCT AT POINT OF CONNECTION AS SHOWN. TRANSITION AS REQUIRED. FIELD VERIFY EXACT LOCATION OF EXISTING.



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SHEET TITLE:  
**MECHANICAL PLAN - LEVEL 3**

A  
 M2.2  
 1/16" = 1'-0"  
 0' 4' 8' 16' 32'  
 NORTH

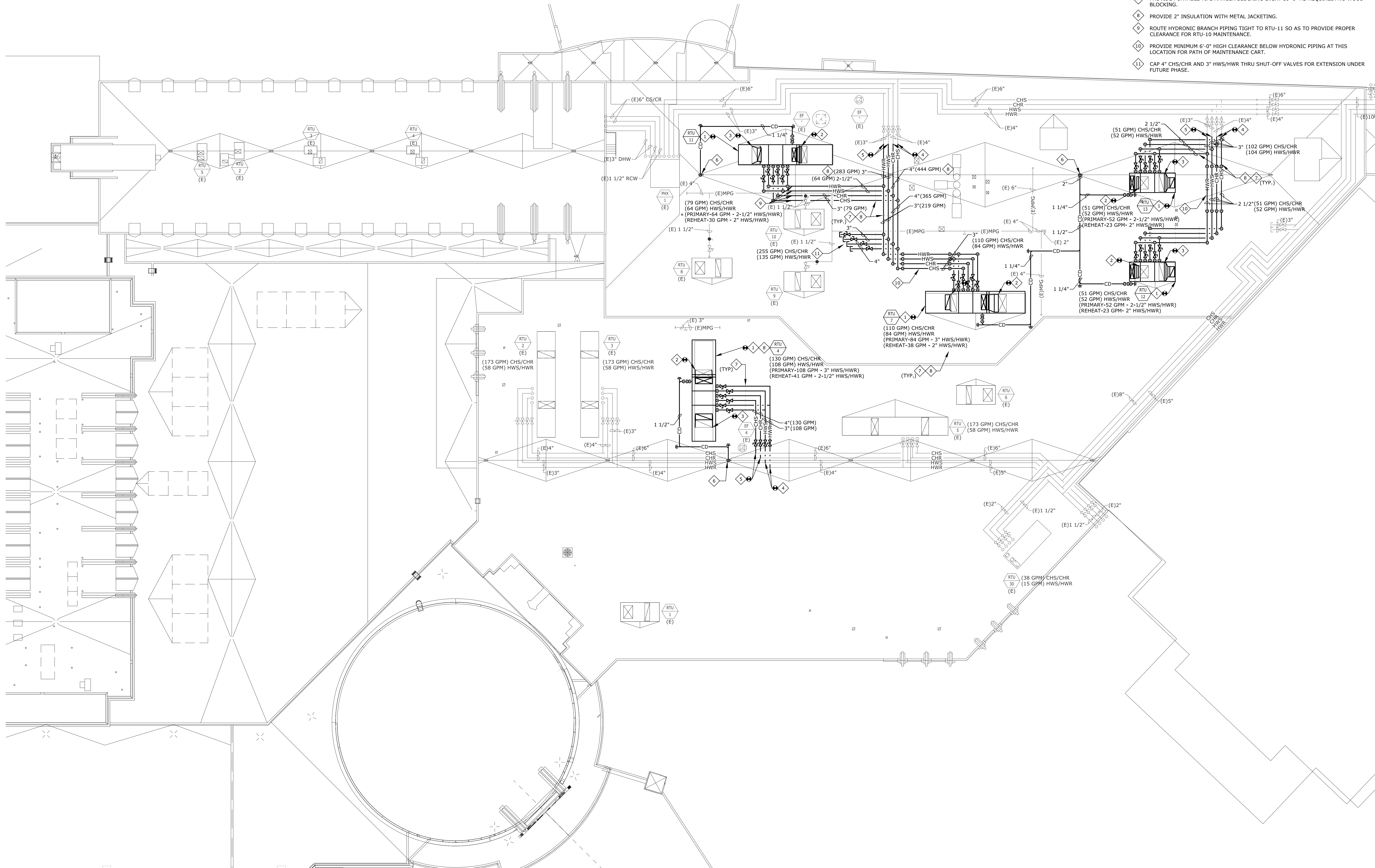
SHEET  
**M2.2**

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- THE MECHANICAL CONTRACTOR SHALL COORDINATE LOCATION AND ROUTING OF HVAC EQUIPMENT AND DUCTWORK WITH OTHER TRADES PRIOR TO COMMENCING WORK.
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- ROUTE NEW RTU CONNECTION SIZE RETURN DUCT TO EXISTING RETURN DUCT AT POINT OF CONNECTION AS SHOWN. TRANSITION AS REQUIRED. FIELD VERIFY EXACT LOCATION OF EXISTING.
- CONNECT NEW CHS/CHR TO EXISTING AT POINT OF CONNECTION AS SHOWN. FIELD VERIFY EXACT LOCATION OF EXISTING.
- CONNECT NEW HWS/HWR TO EXISTING AT POINT OF CONNECTION AS SHOWN. FIELD VERIFY EXACT LOCATION OF EXISTING.
- ROUTE CONDENSATE DRAIN TO ABOVE ROOF DRAIN WITH AIR GAP.
- PROVIDE PORTABLE PIPE HANGER BLOCKING EVERY 10'-0" AS REQUIRED. NO WOOD BLOCKING.
- PROVIDE 2" INSULATION WITH METAL JACKETING.
- ROUTE HYDRONIC BRANCH PIPING TIGHT TO RTU-11 SO AS TO PROVIDE PROPER CLEARANCE FOR RTU-10 MAINTENANCE.
- PROVIDE MINIMUM 6'-0" HIGH CLEARANCE BELOW HYDRONIC PIPING AT THIS LOCATION FOR PATH OF MAINTENANCE CART.
- CAP 4" CHS/CHR AND 3" HWS/HWR THRU SHUT-OFF VALVES FOR EXTENSION UNDER FUTURE PHASE.



**HARD ROCK AHU REPLACEMENT**  
308 N 193rd E AVE,  
CATOOSA, OK 74015

ISSUE DATE:		MM-DD-YEAR
#	DESCRIPTION	DATE

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SHEET TITLE:  
**MECHANICAL ROOF PLAN**