

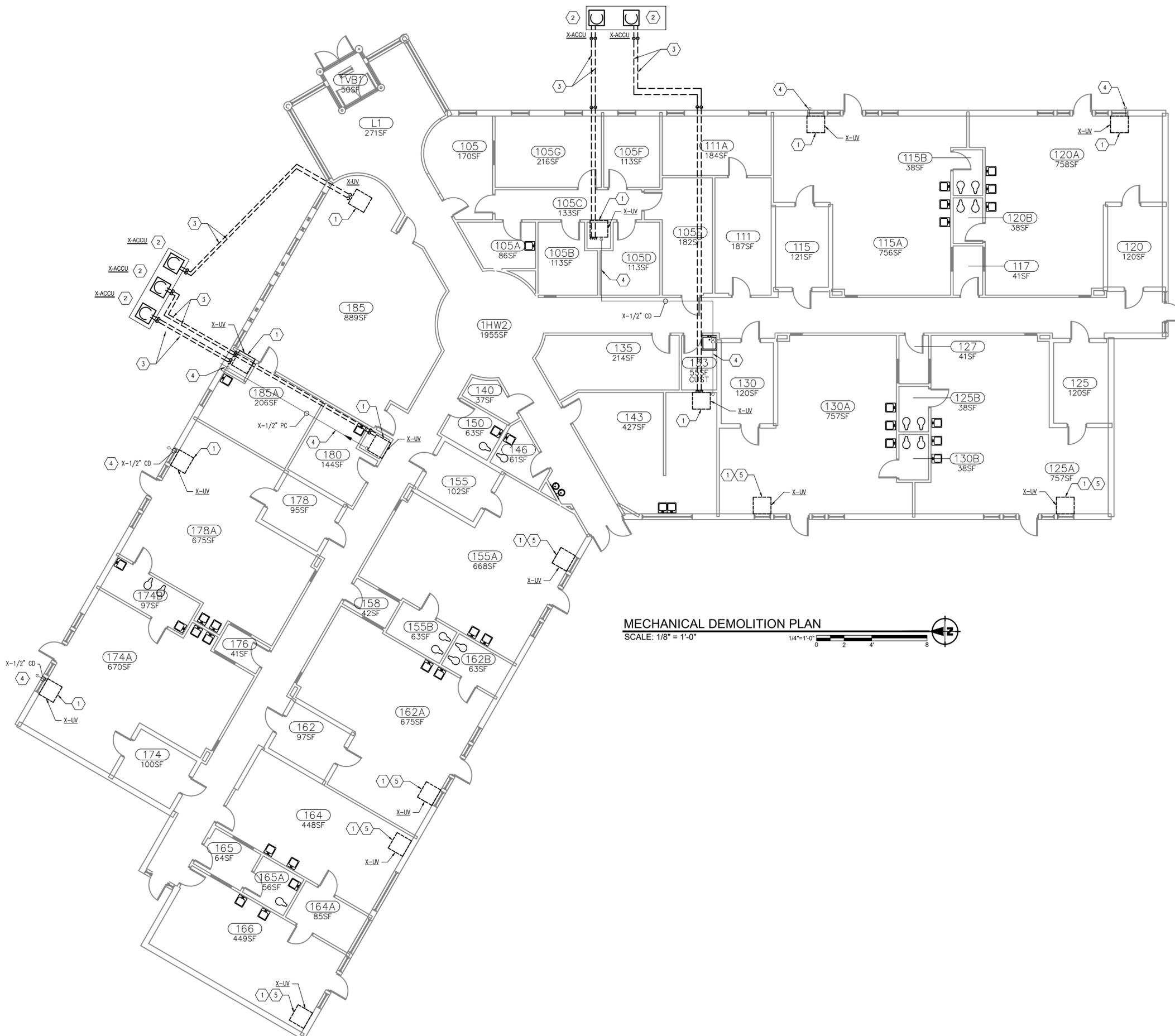
MSU PROJ. NO.	CP22043
PR. MGR.	CRUZ
ARCH.	CHARLAND
MECH.	AV/RW
ELEC.	HOWARD
CIVIL	
L.A.	
INT. DES.	
CONST. REP.	
APPR.	BONK
DATE	03/11/2024
SCALE	AS NOTED
ISSUED	
ISSUED FOR BID	4/10/2024

**GENERAL DEMOLITION NOTES:**

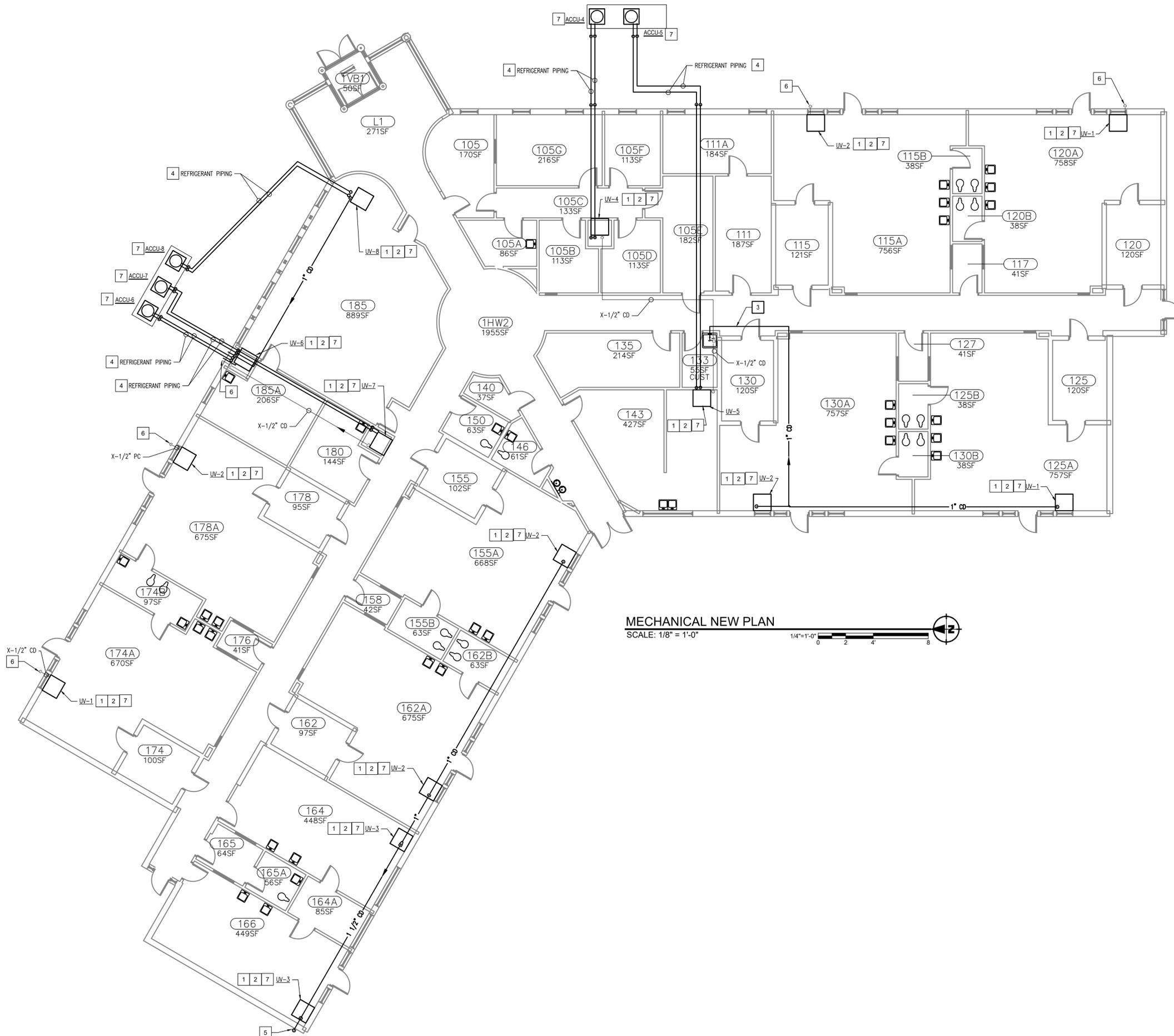
1. ANY INTERRUPTIONS OF EXISTING SERVICES AND/OR EQUIPMENT SHALL BE PERFORMED AT A TIME APPROVED IN ADVANCE BY THE OWNER'S REPRESENTATIVE SO AS NOT TO INTERFERE WITH THE PRESENT BUILDING'S OPERATION.
2. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT OF WORK TO BE PERFORMED. THE EXACT EXTENT OF DEMOLITION SHALL BE REQUIRED BY THE NEW WORK.
3. ALL MECHANICAL ITEMS TO BE REMOVED SHALL BE REMOVED COMPLETE WITH ALL RELATED ITEMS INCLUDING HANGERS, SUPPORTS, CONTROLS, ETC. CAP ALL OPEN ENDED PIPES AND DUCTWORK.
4. ALL DEMOLITION OF THE EXISTING MECHANICAL SYSTEMS, INCLUDING BUT NOT LIMITED TO PIPING, DUCTWORK, CONTROLS, SUPPORTS, HANGERS, AND EQUIPMENT SHALL BE UNDER SCOPE OF DIVISION 2 OF THE SPECIFICATIONS UNLESS OTHERWISE NOTED.
5. THE OWNER SHALL HAVE FIRST RIGHT TO REFUSAL ON ALL EQUIPMENT BEING REMOVED.
6. COORDINATE ABANDONED WALL AND CEILING PENETRATION PATCHING WITH PROJECT MANAGER.
7. CONTRACTOR TO CONDUCT TEST AND BALANCE OF EXISTING SPACE AIRFLOWS AND RECORD RESULTS.
8. RE-USE EXISTING CONTROLS/SEQUENCING IF POSSIBLE. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NEW CONTROLS TO INTEGRATE INTO EXISTING SYSTEM.

**DEMOLITION PLAN NOTES:**

1. DISCONNECT AND REMOVE VERTICAL UNIT VENTILATOR (X-UV), EXISTING DUCTWORK, CONTROLS, EXHAUST/OUTSIDE AIR WALL SLEEVE, PIPING, AND ELECTRICAL TO REMAIN FOR REUSE UNLESS OTHERWISE NOTED.
2. DISCONNECT AND REMOVE AIR-COOLED CONDENSING UNIT (X-ACCU) MOUNTED ON CONCRETE PAD AT GRADE. CONCRETE PAD TO REMAIN FOR REUSE.
3. DISCONNECT AND ENTIRELY REMOVE UNDERGROUND REFRIGERANT LINE SET PIPING, TUBING, ASSOCIATED FITTINGS AND TRIM. CONTRACTOR TO RECLAIM REFRIGERANT PER EPA STANDARDS. PREP AREA FOR NEW BURIED PIPING.
4. EXISTING CONDENSATE DRAIN AND ASSOCIATED PUMPS SHALL REMAIN. PREP FOR CONNECTION TO NEW.
5. REMOVE EXISTING CONDENSATE DRAIN PIPING THROUGH WALL. INFILL ALL UNUSED PENETRATIONS THROUGH BUILDING EXTERIOR RESULTING FROM DEMOLITION WORK. PATCH, SEAL, AND PAINT PER MSU STANDARDS. PREP FOR NEW CONDENSATE DRAIN PIPING ROUTE ON NEW PLAN.



**MECHANICAL DEMOLITION PLAN**  
SCALE: 1/8" = 1'-0"  
1/4" = 1'-0"



**MECHANICAL NEW PLAN**  
SCALE: 1/8" = 1'-0"

**GENERAL NOTES:**

1. THESE DRAWINGS ARE DIAGRAMMATIC & INDICATE THE GENERAL EXTENT OF THE WORK. PROVIDE PIPING SYSTEMS COMPLETE AND PER SPECIFICATIONS, AND PER APPLICABLE CODES INCLUDING ALL NECESSARY OFFSETS, AND FITTING WHICH ARE REQUIRED DUE TO SPACE CONSTRAINTS OR OTHER CONDITIONS.
2. CONTRACTOR SHALL COORDINATE HIS WORK WITH THE WORK OF OTHER TRADES. VERIFY ALL CLEARANCES PRIOR TO THE FABRICATION OF ANY WORK.
3. PIPING SHALL NOT BE LOCATED OVER ELECTRICAL EQUIPMENT/PANELS. PROVIDE REQUIRED CLEARANCE IN FRONT OF ELECTRICAL EQUIPMENT. PIPING SHALL NOT INTERFERE WITH ELECTRICAL EQUIPMENT CLEARANCE.
4. THE CONTRACTOR SHALL PROVIDE ALL MISCELLANEOUS SUPPORTING STEEL, ETC. FOR THE PROPER INSTALLATION OF ALL MECHANICAL SYSTEMS.
5. COORDINATE FLOOR, WALL, AND ROOF PENETRATIONS WITH ARCHITECTURAL TRADES.
6. COORDINATE AND PROVIDE ACCESS DOORS IN HARD CEILING AREAS FOR ACCESS TO BALANCING DAMPERS, ETC. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
7. FOR EQUIPMENT VALVING, COMPONENT, AND PIPING ARRANGEMENT, REFER TO PIPING DIAGRAMS AND DETAILS.
8. HEATING HOT WATER BRANCH PIPING TO UNIT VENTILATORS SHALL BE MINIMUM 1".

**PLAN NOTES:**

1. PROVIDE NEW VERTICAL UNIT VENTILATOR (UV), RECONNECT ALL EXISTING UTILITY CONNECTIONS INCLUDING HYDRONIC HEATING PIPING, CONDENSATE DRAIN PIPING, DUCTWORK, ELECTRICAL, CONTROLS, AND ALL REQUIREMENTS FOR A FULLY OPERABLE SYSTEM.
2. RE-BALANCE SPACE AIRFLOW TO MATCH PRIOR UNIT PERFORMANCE. CONTRACTOR TO PROVIDE FULL TEST AND BALANCE REPORT AS PART OF PROJECT SCOPE.
3. PROVIDE 1" COPPER CONDENSATE DRAIN PIPING FROM UNIT VENTILATOR TO CUSTODIAN 133A AND INDIRECTLY WASTE TO DRAIN.
4. ROUTE REFRIGERANT LINE SET PIPING, TUBING, ASSOCIATED FITTINGS, AND TRIM UNDERGROUND BETWEEN ASSOCIATED REMOTE CONDENSER AND INDOOR UNIT VENTILATOR. SIZE ACCORDINGLY BASED ON MANUFACTURER REQUIREMENTS. VERIFY ALL PIPING INVERT ELEVATIONS IN FIELD PRIOR TO INSTALLATION.
5. ROUTE CONDENSATE OUT OF BUILDING SIDEWALL AND DOWN TO 12" ABOVE GRADE. PATCH AND SEAL ALL PIPING PENETRATION OPENINGS. CONDENSATE SHALL NOT TERMINATE ON CONCRETE OR OTHER MAN-MADE WALKING SURFACE.
6. VERIFY EXACT TERMINATION POINT OF CONDENSATE DRAIN IN THIS LOCATION. IF PIPING OUTLET IS ABOVE EXISTING CONCRETE PAD, RE-ROUTE PIPING TO DISCHARGE ABOVE EARTHEN FLOOR. NOTIFY PROJECT MANAGER IF WORK REQUIRES GREATER THAN 5'-0" OF PIPING.
7. ELECTRICAL CONTRACTOR TO VERIFY THE EXISTING CONDUCTORS TO BE RE-USED ARE THE FOLLOWING SIZES. PROVIDE NEW CONDUCTORS AS REQUIRED. ALL CONDUIT SIZES ARE 3/4".  
UV1 = 2#8+#12G, UV2-UV3 = 2#10+#12G, UV4-UV8 = 2#12+#12G.  
THE EXISTING CONDUCTORS FOR THE NEW CONDENSING UNITS SHALL BE RE-USED FOR THE REPLACEMENT OF THE SAME SIZE CONDENSERS. VERIFY CONDUCTOR SIZES OF NEW CONDENSERS WITH MANUFACTURER LITERATURE AND PROVIDE NEW IF REQUIRED.

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## UNIT VENTILATOR SCHEDULE

TAG	BASIS OF DESIGN		REFRIGERANT	AIR FLOW DATA			COOLING DATA					HEATING DATA					ELECTRICAL DATA				FILTER RATING	NOTES	
	MANUFAC.	MODEL OR SERIES		E.S.P.	SA	OA	TYPE	L.A.T. DB	L.A.T. WB	SENSIBLE MBH	TOTAL MBH	TYPE	MBH	GPM	E.W.T.	E.A.T.	L.A.T.	FLA	MCA	MOC			VOLTAGE
UV-1	AIREDALE	CLASSMATE CMD48	R-410A	0.5	1,500	375	DX	59.6	57.3	33.9	45.4	HOT WATER	93.0	5.0	180.0	50.0	105.0	32.3	37.6	50.0	208/1/60	MERV 13	①⑤⑥⑦⑧
UV-2	AIREDALE	CLASSMATE CMD36	R-410A	0.5	1,100	275	DX	60.2	57.4	24.2	33.4	HOT WATER	73.0	4.0	180.0	50.0	109.1	23.4	27.3	40.0	208/1/60	MERV 13	①⑤⑥⑦⑧
UV-3	AIREDALE	CLASSMATE CMD24	R-410A	0.5	800	200	DX	60.8	58.0	17.1	23.2	HOT WATER	65.0	3.5	180.0	50.0	122.0	19.5	22.4	30.0	208/1/60	MERV 13	①⑤⑥⑦⑧
UV-4	AIREDALE	CLASSMATE CMS60	R-410A	0.5	1,800	450	DX	60.0	58.3	44.8	60.0	HOT WATER	112.0	6.0	180.0	50.0	105.5	7.3	8.9	15.0	208/1/60	MERV 13	④⑦⑧
UV-5	AIREDALE	CLASSMATE CMS60	R-410A	0.5	2,000	1,000	DX	60.0	58.3	44.8	60.0	HOT WATER	148.0	9.0	180.0	43.0	100.4	7.3	8.9	15.0	208/1/60	MERV 13	④⑦⑧
UV-6	AIREDALE	CLASSMATE CMS48	R-410A	0.5	1,500	375	DX	60.0	58.3	35.8	48	HOT WATER	94.0	5.0	180.0	50.0	105.8	7.3	8.9	15.0	208/1/60	MERV 13	③⑦⑧
UV-7	AIREDALE	CLASSMATE CMS36	R-410A	0.5	1,100	300	DX	60.0	58.3	26.9	36	HOT WATER	74.0	4.0	180.0	48.2	108.1	4.0	4.8	15.0	208/1/60	MERV 13	②⑦⑧
UV-8	AIREDALE	CLASSMATE CMS36	R-410A	0.5	1,700	N/A	DX	60	58.3	35.8	48	HOT WATER	93.0	6.0	180.0	70.0	117.6	7.3	8.9	15.0	208/1/60	MERV 13	③⑦⑧

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|--|---|
| <p>① BASED ON "AIREDALE" SELF-CONTAINED CLASSMATE VERTICAL UNIT</p> <p>② BASED ON "AIREDALE" SPLIT SYSTEM CLASSMATE VERTICAL UNIT. INSTALL WITH ASSOCIATED 3 TON CONDENSING UNIT</p> <p>③ BASED ON "AIREDALE" SPLIT SYSTEM CLASSMATE VERTICAL UNIT. INSTALL WITH ASSOCIATED 4 TON CONDENSING UNIT</p> <p>④ BASED ON "AIREDALE" SPLIT SYSTEM CLASSMATE VERTICAL UNIT. INSTALL WITH ASSOCIATED 5 TON CONDENSING UNIT</p> | <p>⑤ INCLUDE WITH HOT GAS REHEAT HUMIDITY CONTROL OPTIONS</p> <p>⑥ INCLUDE WITH REAR EXTENSIONS AS NEEDED. VERIFY REQUIREMENTS IN FIELD.</p> <p>⑦ NEEDLEPOINT BIPOLAR IONIZATION</p> <p>⑧ INCLUDE WITH ALL REQUIRED CONTROLS/ACCESSORIES FOR INTEGRATION INTO MSU CENTRAL CONTROL BUILDING MANAGEMENT SYSTEM AND EXISTING CONTROL SYSTEM.</p> |
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### UNIT VENTILATOR SEQUENCE OF OPERATION

**GENERAL:** THE UNIT WILL BE FITTED WITH FACTORY CONTROLS WIRED TO A TERMINAL STRIP FOR CONNECTION BY THE CONTROLS CONTRACTOR AND INTERFACE TO THE FACILITIES EXISTING BUILDING MANAGEMENT SYSTEM USING BACNET PROTOCOL. THE SYSTEM SHALL OPERATE ON A TIMED-PROGRAMMED BASIS AS DETERMINED BY THE SYSTEM OPERATOR (INITIALLY SET TO START AT 7:30 AM AND STOP AT 6:30 PM, MONDAY-FRIDAY), OR AS DETERMINED BY THE BUILDING OPERATOR.

CONTROLLER FOR EACH UNIT VENTILATOR SHALL BE INDEPENDENT AND FULLY PROGRAMMABLE IN THE FIELD BY THE TEMPERATURE CONTROL CONTRACTOR AND/OR OWNER NO APPLICATION BASED CONTROLLERS ARE ALLOWED.

DURING COMMISSIONING COORDINATE AND INTERFACE UNIT VENTILATOR CONTROLS WITH OPERATION AND CONTROL OF EXISTING IN FLOOR HEATING SYSTEMS TO AVOID SIMULTANEOUS HEATING AND COOLING.

**SYSTEM START:** WHEN THE UNIT VENTILATOR IS INDEXED TO OPERATE, THE SUPPLY FAN SHALL START, THE RETURN AIR DAMPER SHALL BE FULLY OPEN, (EXHAUST FAN IF APPLICABLE WILL BE OFF) AND THE OUTSIDE AIR DAMPER SHALL BE CLOSED. UPON PROOF OF SUPPLY FAN OPERATION, (EXHAUST FAN WHERE APPLICABLE), DAMPERS AND CONTROL VALVES SHALL BE INDEXED TO THEIR "SYSTEM RUN" CONDITIONS. THE UNIT VENTILATOR SHALL BE COMMANDED "ON" DURING THE UNOCCUPIED MODE WHEN THE ASSOCIATED ZONES IS OUTSIDE UNOCCUPIED SETPOINT TEMPERATURE. THE LATEST START TIME IS THE SCHEDULED OCCUPANCY FOR THE SPACE.

**UNOCCUPIED MODE:** THE SUPPLY FAN SHALL BE CYCLED TO MAINTAIN SPACE TEMPERATURE IN THE UNOCCUPIED HEATING OR COOLING MODE TO MAINTAIN THE UNOCCUPIED SPACE TEMPERATURE SETPOINT. THE (EXHAUST FAN WHERE APPLICABLE WILL BE OFF.) RETURN AIR DAMPER SHALL BE FULLY OPEN AND THE OUTDOOR AIR DAMPER CLOSED.

IN THE UNOCCUPIED HEATING MODE, THE DX COMPRESSOR WITH BE DE-ENERGIZED AND HEATING COIL CONTROL VALVE SHALL BE OPEN AND THE SUPPLY FAN SHALL BE CYCLED TO MAINTAIN UNOCCUPIED SPACE TEMPERATURE SETPOINT OF 55 DEG. F (ADJ.).

IN THE UNOCCUPIED COOLING MODE, THE HEATING HOT WATER CONTROL VALVE SHALL BE FULLY CLOSED, THE DX COMPRESSOR ENERGIZED AND THE SUPPLY FAN SHALL BE CYCLED TO MAINTAIN UNOCCUPIED COOLING SPACE TEMPERATURE SETPOINT OF 85 DEG. F (ADJ.). WHEN IN THE COOLING MODE, THE OUTDOOR AIR/RETURN AIR DAMPER POSITION AND COOLING COIL CONTROL VALVE SHALL BE OVERRIDDEN BY THE ECONOMIZER.

**WARM-UP MODE:** THE SUPPLY FAN IS STARTED AND RUNS CONTINUOUSLY. THE RETURN AIR DAMPER IS FULLY OPEN , (WHERE APPLICABLE THE EXHAUST FAN IS OFF.) THE INTAKE DAMPER IS CLOSED AND THE COOLING COIL CONTROL VALVE IS OFF. THE UNITS PACKAGED CONTROLS SHALL PLACE THE UNIT INTO FULL HEATING MODE. IF TIME REACHES THE LATEST START TIME DURING THE MORNING WARM-UP MODE, (WHERE APPLICABLE THE EXHAUST FAN IS STARTED AND) THE OUTDOOR AIR DAMPER OPENS TO ITS MINIMUM POSITION. THE UNIT SHALL BE PREVENTED FROM ENTERING THE WARM-UP MODE MORE THAN ONCE PER DAY.

**OCCUPIED:** THE SUPPLY FAN (AND WHERE APPLICABLE EXHAUST FAN ) IS STARTED OR CONTINUES TO RUN. THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY DURING THE OCCUPIED CYCLE. THE (EXHAUST FAN WHERE APPLICABLE,) RETURN AIR AND OUTSIDE AIR INTAKE DAMPERS SHALL BE ADJUSTED TO PROVIDE THE MINIMUM REQUIRED VENTILATION RATE (SEE DEMAND CONTROL VENTILATION BELOW).

IN THE OCCUPIED HEATING MODE THE HEATING HOT WATER CONTROL VALVE IS MODULATED TO MAINTAIN THE OCCUPIED HEATING DISCHARGE AIR TEMPERATURE SETPOINT OF 80 DEGREES F (ADJ.) AND THE COOLING CONTROL VALVE SHALL BE CLOSED.

IN THE OCCUPIED COOLING MODE THE HEATING HOT WATER CONTROL VALVE SHALL BE CLOSED. IF THE OUTSIDE TEMPERATURE IS BELOW THE COOLING SETPOINT THE ECONOMIZER DAMPER WILL MODULATE OPEN TOWARDS FREE COOLING OPERATION. IF FREE COOLING CANNOT MAINTAIN THE SPACE COOLING DEMAND, THE DX COMPRESSOR WILL BE ENERGIZED AND COOLING COIL VALVE MODULATED TO MAINTAIN THE COOLING SPACE TEMPERATURE SETPOINT AND THE OUTSIDE AIR DAMPER WILL RETURN TO ITS MINIMUM POSITION.

**DEMAND CONTROL VENTILATION:** THE OUTDOOR AIR DAMPER SHALL BE AT MINIMUM OUTDOOR AIR FLOW RATE AS THE CO2 LEVEL RISES ABOVE ABOVE 800 PPM, THE OUTDOOR AIR AND RETURN AIR DAMPERS SHALL BE MODULATED TO INCREASE OUTDOOR AIR RATE UNTIL THE CO2 LEVEL STABILIZES OR THE DESIGN VENTILATION RATE IS REACHED. ONCE THE CO2 LEVEL REACHES 1000 PPM THE OUTSIDE AIR DAMPER SHALL BE AT ITS MAXIMUM VENTILATION POSITION. IN UNITS WITH AN EXHAUST FAN THE FAN SHALL TRACK WITH OUTDOOR AIR DAMPER POSITION. MINIMUM POSITION SHALL BE ESTABLISHED DURING OX PROCESS.

**DEHUMIDIFICATION AIR QUALITY MODE:** IN ORDER TO MAINTAIN INDOOR AIR QUALITY, WHEN THE INDOOR / RETURN AIR HUMIDITY REACHES 60% RH (ADJUSTABLE) DURING THE OCCUPIED MODE, THE UNIT VENTILATOR SHALL GO INTO A DEHUMIDIFICATION MODE. THE OUTDOOR AIR SHALL REMAIN CONSTANT (AS CONTROLLED BY THE NORMAL AIR QUALITY (CO2) CONTROL), THE UV FAN SPEED SHALL REDUCE TO 80% (ADJUSTABLE). THE DX COMPRESSOR SHALL BE ENERGIZED. THE HEATING CONTROL VALVE SHALL MODULATE OPEN TO MAINTAIN ROOM TEMPERATURE. WHEN INTERIOR/RETURN AIR HUMIDITY REACHES 50%RH (ADJUSTABLE) THE SYSTEM RETURNS TO "NORMAL" CONDITION.

**OCCUPIED MODE - DEAD BAND:** ROOM TEMPERATURE DURING OCCUPIED MODE SHALL BE ADJUSTABLE BETWEEN 70F AND 75F (ADJUSTABLE). A 3 DEGREE (ADJUSTABLE) DEADBAND SHALL BE SET BETWEEN THE HEATING AND COOLING SET POINT/CONTROLLING MODE. (SYSTEM TO MAINTAIN TEMPERATURE +/- 1.5DEGREES F.). FAN SPEED SHALL RAMP DOWN TO 80% SPEED (ADJUSTABLE) DURING THE DEADBAND CONDITION. AS THE SPACE TEMPERATURE APPROACHES THE UPPER (OR LOWER) DEADBAND LIMIT, THE FAN BEGINS TO INCREASE SPEED AND THE CONTROL VALVE BEGINS TO MODULATE TO MAINTAIN SPACE TEMPERATURE. AS THE SPACE REACHES THE 1.5 DEGREES F ABOVE (OR BELOW) THE SET POINT, THE FAN REACHES 100% AND THE APPROPRIATE CONTROL VALVE (HEATING OR COOLING) CONTINUES TO MODULATE OPEN TO MAINTAIN SPACE CONDITION. AS THE SPACE TEMPERATURE OVERSHOOTS THE SPACE CONDITION INTO THE OPPOSITE DEADBAND, THE SYSTEM REVERSES THE CONTROL SEQUENCE. THE SEQUENCE OF OPERATION, CONTROL PARAMETERS, VALVE POSITIONING AND FAN SPEED SHALL BE INCLUDED IN THE SUBMITTAL FOR REVIEW.

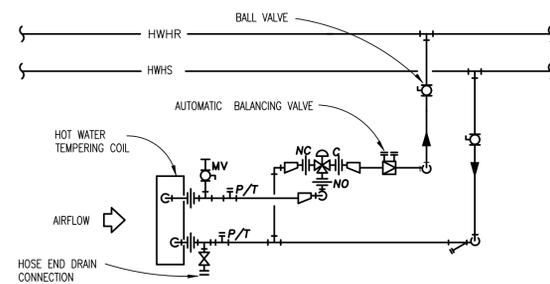
**BIPOLAR IONIZATION:** SUPPLIED WITH IN-LINE ON/OFF SWITCH, PROGRAMMABLE AUTO-CLEANING CYCLE, PLASMA ON INDICATION LIGHT, ALARM CONTACTS, MAGNETS FOR EASE OF INSTALLATION AND REPLACEABLE CARBON FIBER BRUSH EMITTERS. MANUFACTURER SUPPLIED BIPOLAR IONIZATION SYSTEM SHALL CONTINUALLY CREATE AND RELEASE IONS INTO THE AIRSTREAM TO SEEK OUT AND FORM BONDS WITH OTHER PARTICLES IN THE AIR THROUGH A PROCESS CALLED AGGLOMERATION. WHEN IN OPERATION, THE BIPOLAR IONIZATION PROCESS GENERATES LARGER PARTICLES THAT ARE EASIER TO FILTER OUT OF THE AIR.

**CONDENSATE PUMP:** THE PUMP SHALL BEGIN TO RUN ONCE THE CONDENSATE REACHES A SET LEVEL. THE PUMP COMES WITH AN INTERNAL SAFETY SWITCH THAT CAN BE WIRED EITHER NORMALLY OPEN OR NORMALLY CLOSED. THE SAFETY SWITCH SHALL BE WIRED SUCH THAT THE DX COMPRESSOR DE-ENERGIZES WHEN IT TRIPS. THE SWITCH SHALL BE WIRED NORMALLY CLOSED INTO A DIGITAL INPUT OF THE CONTROLLER. BOTH THE CONDENSATE PUMP LIMIT SWITCH AND CONDENSATE PAN FLOAT SWITCH SHALL BE WIRED IN SERIES.

**CONDENSATE PAN FLOAT SWITCH:** A CONDENSATE PAN FLOAT SWITCH, THE NORMALLY CLOSED SWITCH SHALL BE WIRED SUCH THAT THE DX COMPRESSOR DE-ENERGIZES. THE SWITCH SHALL BE WIRED NORMALLY CLOSED INTO A DIGITAL INPUT OF THE CONTROLLER. BOTH THE CONDENSATE PUMP LIMIT SWITCH AND CONDENSATE PAN FLOAT SWITCH SHALL BE WIRED IN SERIES.

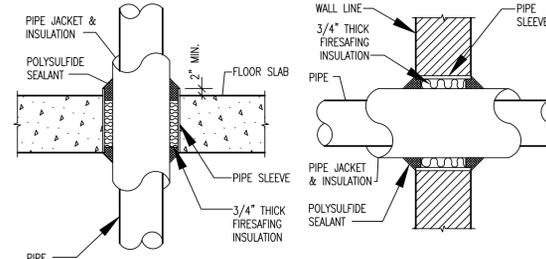
- SAFETIES AND ALARMS:**
- LOW LIMIT FREEZE STAT: MANUAL RESET LOW LIMIT THERMOSTAT SHALL STOP THE SUPPLY FAN (EXHAUST FAN), CLOSE THE OUTDOOR AIR DAMPER, FULLY OPEN THE RETURN DAMPER , DE-ENERGIZE THE DX COMPRESSOR AND MODULATE THE HOT WATER HEATING CONTROL VALVE FULL OPEN TO COIL AND CLOSE THE BYPASS, AND ANNUNCIATE ALARM SHOULD THE COIL DISCHARGE AIR TEMPERATURE FALL BELOW 40 DEGREES F.
  - RETURN AIR CO2 SHALL OVERRIDE OUTDOOR AIR DAMPER IF RETURN AIR CO2 SETPOINT IS EXCEEDED. ALARM SHALL BE ANNUNCIATED.
  - FILTER CONDITION: MONITOR DIFFERENTIAL PRESSURE ACROSS FILTER AND ANNUNCIATE ALARM WHEN DIFFERENTIAL PRESSURE SETPOINT (ADJ.) IS EXCEEDED.
  - BIPOLAR IONIZATION SYSTEM ALARM CONTACTS SHALL BE USED TO GENERATE AN ALARM THROUGH THE BMS IF THE PACKAGED SYSTEM FAILS TO START OR OPERATE.

- FAILURE MODES:**
- IF THE SUPPLY (OR EXHAUST) FAN FAILS TO OPERATE, THE UNIT SHALL BE SHUT DOWN AND AN ALARM GENERATED. FANS, MOTORS AND DAMPERS AND CONTROL VALVE SHALL BE INDEXED TO THEIR "SYSTEM OFF" CONDITIONS.
  - UPON THE FAILURE OF AN ANALOG SENSOR, ASSOCIATED DAMPERS AND CONTROL VALVE SHALL REMAIN AT THEIR LAST POSITION AND ALARM SHALL BE ANNUNCIATED.
  - UPON RESTORATION OF POWER FOLLOWING A POWER FAILURE, THE SUPPLY FAN SHALL START AFTER AN ADJUSTABLE DELAY TO PROVIDE A STAGGERED START OF ALL BUILDING LOADS.
  - OUTDOOR AIR DAMPERS SHALL FAIL TO A CLOSED POSITION.
  - CHILLED WATER CONTROL VALVE SHALL FAIL CLOSED.
  - HOT WATER HEATING CONTROL VALVE SHALL FAIL OPEN TO COIL AND CLOSED TO BYPASS.



**UNIT VENTILATOR HOT WATER HEATING COIL WITH THREE WAY CONTROL VALVE PIPING DIAGRAM**

- NO SCALE
- NOTES:
- ISOLATION VALVES SHALL BE LOCATED WITHIN 10"-0" OF COIL AND AS INDICATED ON DRAWINGS.
  - PROVIDE ISOLATING NIPPLE (WCTALIC WATERWAYS OR EQUAL) BETWEEN DISSIMILAR METALS. DIELECTRIC UNIONS NOT ALLOWED.
  - COMBINATION DEVICES, SUCH AS COIL HOOK-UP KITS, FOR BALL VALVE, STRAINER, P/T PORT, ETC. MAY BE USED IN LIEU OF SEPARATE DEVICES.
  - IF COIL HAS VENT AND/OR DRAIN CONNECTIONS, THEY ARE TO BE USED IN LIEU OF INSTALLING IN PIPING AS INDICATED.
  - OFFSET PIPING TO PROVIDE CLEARANCE FOR COIL REMOVAL.



**PIPE PENETRATION DETAIL**

NO SCALE

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