

**AHU-1 SEQUENCE OF OPERATION:**  
 UNIT WILL BE PROVIDED WITH UNIT MANUFACTURER CONTROLLER WATTMASTER VCCX. ATC TO COMMUNICATE WITH CONTROLLER VIA BACNET.  
 A.OCCUPIED MODE: THE UNIT CONTROLLER SHALL INDEX THE SUPPLY FAN ON TO RUN CONTINUOUSLY WHILE IN OCCUPIED MODE, INDEX OPEN THE OUTSIDE AIR DAMPER TO ITS MINIMUM POSITION AND ENABLE UNIT. THE OPERATOR WILL BE ABLE TO ADJUST THE UNIT START/STOP TIMES USING THE UNIT CONTROLLER.  
 B.UNOCCUPIED MODE (TEMPERATURE SET-BACK) HEATING: IN THE UNOCCUPIED PERIOD THE UNIT SHALL OPERATE IN RESPONSE TO A ZONE SETBACK TEMPERING REQUIREMENT. OPERATION IN THE UNOCCUPIED MODE SHALL ENABLE AHU OPERATION WITH THE O/A DAMPER CLOSED AND THE HEATING COIL CONTROL VALVE SHALL MODULATE TO MAINTAIN SETBACK TEMPERATURE SETPOINT (ADJ.).  
 C.UNOCCUPIED MODE (TEMPERATURE SET-BACK) COOLING: IN THE UNOCCUPIED PERIOD THE UNIT SHALL OPERATE IN RESPONSE TO A ZONE SETBACK TEMPERING REQUIREMENT. OPERATION IN THE UNOCCUPIED MODE SHALL ENABLE AHU OPERATION WITH THE O/A DAMPER CLOSED AND THE COMPRESSOR(S) ENERGIZED TO MAINTAIN SETBACK TEMPERATURE SETPOINT (ADJ.).  
 D.LOW TEMPERATURE PROTECTION: THE UNIT CONTROLLER SHALL MONITOR DISCHARGE AIR TEMPERATURE AND SHUT DOWN THE UNIT AND GENERATE AN ALARM IF IT FALLS BELOW 37°F (ADJ.). THE SHUTDOWN SHALL BE A REMOTE RESET AND THE O/A DAMPER SHALL CLOSE.  
 E.FILTER DIFFERENTIAL PRESSURE: THE UNIT CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE ACROSS THE FILTERS AND GENERATE AN ALARM IF THE PRESSURE EXCEEDS A USER DEFINABLE LIMIT.  
 F.COOLING DEMAND: UPON MODULATION OF COOLING SHALL BE CONFIGURED SUBJECT TO USER ADJUSTABLE MINIMUM RUN TIMES, MINIMUM OFF TIMES, MODULATING UP AND MODULATING DOWN DELAYS.

1. COOLING IS ENABLED WHEN THE TEMPERATURE AT THE MODE ENABLE SPACE SENSOR RISES ONE DEGREE DEADBAND ABOVE THE COOLING SETPOINT. COOLING IS DISABLED WHEN THE MODE ENABLE TEMPERATURE FALLS ONE DEGREE DEADBAND BELOW THE COOLING SETPOINT. THE SETPOINT AND DEADBAND SHALL BE USER ADJUSTABLE.
2. ONCE IN THE COOLING MODE THE UNIT WILL MAINTAIN THE SUPPLY AIR TEMPERATURE AT THE ACTIVE SUPPLY AIR COOLING SETPOINT BY MODULATING THE DIGITAL COMPRESSOR (1.5 – 5.0 VDC OPERATION) WHERE APPLICABLE OR STAGE THE COOLING. A COOLING RELAY MUST BE CONFIGURED.
3. THE DIGITAL COMPRESSOR CONTINUES TO MODULATE WHERE APPLICABLE OR STAGE DURING THE ENTIRE COOLING OPERATION.
4. IF THE ECONOMIZER IS ENABLED IT WILL FUNCTION AS THE STAGE OF COOLING. DEAD BAND SET POINT TO BE ADJUSTABLE.
5. PROVIDE RESET SCHEDULE AS FOLLOWS:

- a. INPUT DEVICE: ELECTRONIC TEMPERATURE SENSOR IN RETURN AIR.
- b. INPUT DEVICE: ELECTRONIC TEMPERATURE SENSOR IN SUPPLY AIR.
- c. OUTPUT DEVICE: DDC SYSTEM IN STRAIGHT-LINE RELATIONSHIP FOR THE FOLLOWING CONDITIONS:

- 1) 60 DEG F WHEN RETURN-AIR TEMPERATURE IS 72 DEG F (ADJ.) OR LESS.
- 2) 55 DEG F WHEN RETURN-AIR TEMPERATURE IS 75 DEG F (ADJ.) OR LESS.

- d. ACTION: RESET SUPPLY-AIR TEMPERATURE SET POINT AS NOTED.
- e. UNIT SHALL MODULATE COOLING WITH CONSTANT AIRFLOW TO MEET SPACE TEMPERATURE COOLING LOADS.

- g. HEATING MODE WITH HEAT PUMP (REVERSING VALVE) AND SCR ELECTRIC AUXILIARY HEAT

1. HEATING IS ENABLED WHEN THE TEMPERATURE AT THE MODE ENABLE SENSOR FALLS ONE DEADBAND BELOW THE HEATING SETPOINT. HEATING IS DISABLED WHEN THE MODE ENABLE TEMPERATURE RISES ONE DEADBAND ABOVE THE HEATING SETPOINT.
2. IN THE HEATING MODE, AS THE SUPPLY AIR TEMPERATURE FALLS BELOW THE ACTIVE SUPPLY AIR HEATING SETPOINT (SEE SUPPLY AIR TEMPERATURE SETPOINT RESET SECTION FOR EXPLANATION), THE HEATING WILL BEGIN TO STAGE ON OR TO MODULATE. EACH STAGE MUST MEET ITS MINIMUM OFF TIME (ADJ.) BEFORE IT IS ALLOWED TO ENERGIZE AND SUCCESSIVE STAGES ARE SUBJECT TO A HEATING STAGE UP DELAY (ADJ.).
3. HEATING STAGES WILL CONTINUE TO RUN UNTIL THE SUPPLY AIR TEMPERATURE RISES ABOVE THE ACTIVE SUPPLY AIR TEMPERATURE SETPOINT PLUS THE HEATING STAGE CONTROL WINDOW AT WHICH POINT THE HEATING WILL BEGIN TO STAGE OFF. EACH STAGE MUST MEET ITS MINIMUM RUN TIME (ADJ.) BEFORE IT IS ALLOWED TO STAGE OFF, AND SUCCESSIVE STAGES ARE SUBJECT TO A HEATING STAGE DOWN DELAY (ADJ.).
4. MECHANICAL HEATING IS DISABLED IF THE OUTDOOR AIR TEMPERATURE (OAT) RISES 1° ABOVE THE HEATING LOCKOUT SETPOINT AND WILL REMAIN DISABLED UNTIL THE OAT FALLS 1° BELOW THE HEATING LOCKOUT SETPOINT. IF THE OAT DISABLES MECHANICAL HEATING WHILE IT IS CURRENTLY OPERATING, MECHANICAL HEATING WILL STAGE OFF AS MINIMUM RUN TIMES AND STAGE DOWN DELAYS ARE SATISFIED.

- h. DEHUMIDIFICATION: WHEN THE RETURN AIR HUMIDITY SENSOR GOES ABOVE 55% RH (ADJ.), BAS SHALL ENABLE HOT GAS RE-HEAT AND MODULATE OR ENABLE OR INDEX OR STAGE COMPRESSOR(S) TO MAINTAIN DISCHARGE AIR TEMPERATURE SETTING (ADJ.). LOGIC MUST BE SET TO MAKE COOLING OR DEHUMIDIFICATION THE PRIORITY.

1. ONCE IN DEHUMIDIFICATION MODE, THE UNIT WILL MAINTAIN THE EVAPORATOR COIL SUCTION TEMPERATURE AT THE COIL SUCTION TEMPERATURE SETPOINT BY MODULATING THE DIGITAL COMPRESSOR (1.5 – 5.0 VDC OPERATION) OR STAGE COMPRESSOR.

2. REHEAT IS ALWAYS CONTROLLED TO THE ACTIVE SUPPLY AIR TEMPERATURE SETPOINT.

3. WITH MODULATING HOT GAS REHEAT, UNIT SHALL MODULATE COOLING AND HOT GAS REHEAT AS EFFICIENTLY AS POSSIBLE, TO MEET SPACE HUMIDITY LOADS AND PREVENT SUPPLY AIR TEMPERATURE SWINGS AND OVERCOOLING OF THE SPACE.

- i. COIL SUCTION TEMPERATURE SETPOINT RESET: DURING DEHUMIDIFICATION THE SYSTEM WILL AUTOMATICALLY RESET THE COIL SUCTION TEMPERATURE SETPOINT WITHIN A ± 5 DEG RANGE BASED ON THE SPACE OR RETURN AIR HUMIDITY SENSOR CONDITION CHANGING ± 5 % FROM THE HUMIDITY SETPOINT.

- j. OUTSIDE/RETURN AIR DAMPER: THE DAMPER SHALL MOVE TO MINIMUM OUTSIDE AIR POSITION ON OCCUPANCY. PROGRAM SEPARATE OCCUPANCY SCHEDULE FOR OA DAMPERS.

- k. ECONOMIZER: PROVIDE DIFFERENTIAL ENTHALPY SEQUENCE TO OPEN THE OA DAMPER FROM ITS MINIMUM POSITION UP TO 100% OPEN POSITION FOR FREE COOLING ONLY WHEN CONDITIONS WARRANT WHEN THERE IS A CALL FOR COOLING AND THE OA HUMIDITY IS BELOW RA HUMIDITY AND THE OA TEMP IS BETWEEN 45 DEG F AND 65 DEG F (ADJ.). THE OUTSIDE AIR DAMPER MODULATES BETWEEN ITS MINIMUM POSITION AND 100% OPEN TO CONTROL ECONOMIZER COOLING CAPACITY. WHEN THE OUTSIDE AIR TEMPERATURE RISES 5 DEGREES F ABOVE ECONOMIZER SETPOINT, THE ECONOMIZER RETURNS TO ITS MINIMUM POSITION IN CURRENT OCCUPANCY MODES.

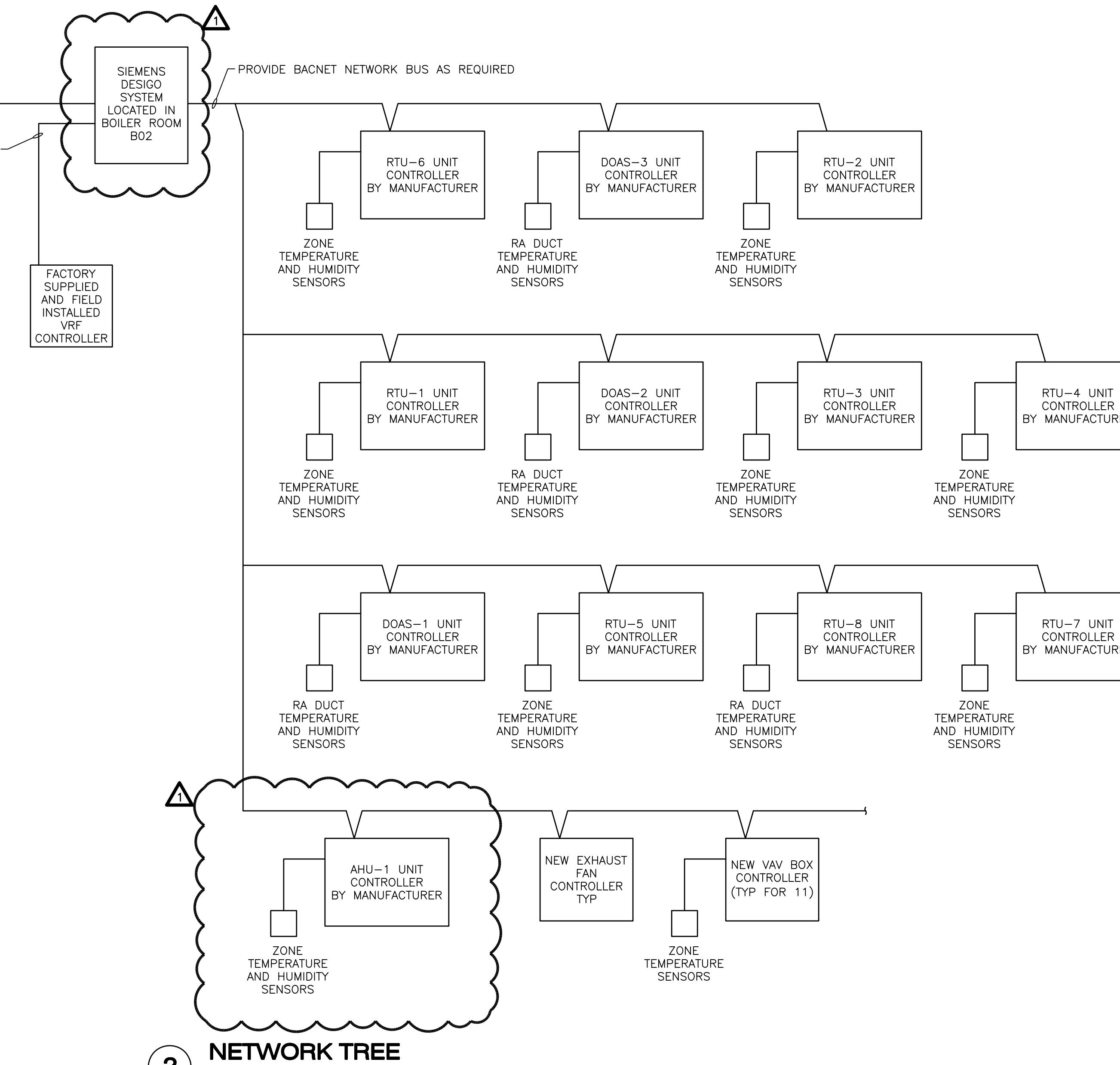
- l. CONDENSATE OVERFLOW: THE BAS SHALL MONITOR THE STATUS OF THE CONDENSATE OVERFLOW SWITCH. WHEN LIQUID LEVEL IN DRAIN PAN REACHES A PREDETERMINED LEVEL, THE BAS SHALL SHUT DOWN THE AIR HANDLING UNIT AND GENERATE AN ALARM AT THE FRONT END.

POINT TAG	POINT DESCRIPTION	INPUTS		OUTPUTS		FUNCTION	REMARKS
		DIGITAL	ANALOG	DIGITAL	ANALOG		
DI-1	DIRTY FILTER SENSOR	X					
DI-2	SAFETY SHUT DOWN	X					
DI-3	SUPPLY PROOF OF FLOW	X					
DI-4	OCCUPANCY OVERRIDE		X				
DO-1	SUPPLY FAN ENABLE			X			
DO-2	DEHUMIDIFICATION ENABLE			X			
DO-3	DX HEAT PUMP CIRCUIT 1 ENABLE			X			
DO-4	DX HEAT PUMP CIRCUIT 2, STAGE 1 ENABLE			X			
DO-5	DX HEAT PUMP CIRCUIT 2, STAGE 2 ENABLE						
DO-6	AUXILIARY HEAT ENABLE				X		
DO-7	REVERSING VALVE				X		
AI-1	OA/RA DAMPER FEEDBACK	X					
AI-2	MIXED AIR TEMPERATURE		X				
AI-3	AHU SUPPLY AIR TEMPERATURE		X				
AI-4	HOT WATER VALVE FEEDBACK	X					
AI-5	AHU RETURN AIR TEMPERATURE		X				
AI-6	RETURN AIR HUMIDITY		X				
AI-7	SUCTION PRESSURE		X				
AI-8	OUTSIDE AIR TEMPERATURE	X					
AI-9	OUTSIDE AIR HUMIDITY		X				
AI-10	ZONE TEMPERATURE	X					
AO-1	OA/RA DAMPER ACTUATOR			X	X		
AO-2	DX HEAT PUMP – CIRCUIT 1			X			
AO-4	SCR ELECTRIC HEAT			X			
AO-5	HOT GAS REHEAT			X			

### 1 SPLIT AIR HANDLING UNIT CONTROLS DIAGRAM

SCALE: NOT TO SCALE

CONTROL DIAGRAMS SYMBOL LEGEND	
	CONTACTOR
	DAMPER ACTUATOR
	MOTOR STARTER
	PRESSURE SENSOR
	HUMIDITY SENSOR
	TEMPERATURE SENSOR
	CURRENT SWITCH



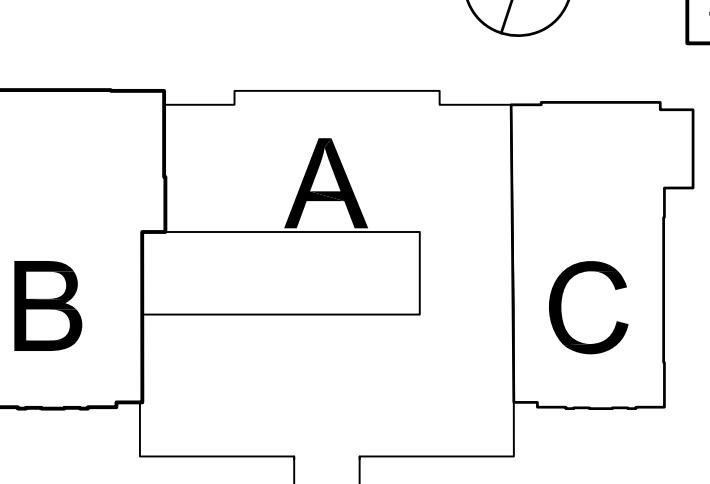
### 2 NETWORK TREE

SCALE: NOT TO SCALE

**M/E/P Engineer:**  
  
**SCHILLER AND HERSH ASSOCIATES, INC.**  
 Consulting M/E/P Engineers  
 636 Skippack Pike, Suite 200  
 Blue Bell, PA 19422  
 Certificate of Authorization: 24GA28014000  
 S&H JOB #2528A

**RICHARD L. DELP, PE**  
 NEW JERSEY PROFESSIONAL  
 ENGINEER  
 LICENSE NO.: GE45368

KEY PLAN:



1 12/23/25 ADDENDUM 1  
 12/08/25 OUT TO BID  
 12/03/25 DCA Submission

No. Date Description

Revisions / Issues

DO NOT SCALE. DRAWING MAY BE PRINTED AT REDUCED SCALE. CONSULT WITH ARCHITECT FOR DIMENSIONS.

Client:

Rowan University

201 Mullica Hill Rd.

Glassboro, NJ 08028

Project:

Alterations to Facility Located at 202 Delsea Drive  
 BLOCK 29, LOT 412  
 202 Delsea Dr.  
 Glassboro, NJ 08028

Drawing Information:

Project No.: 25.024

Date:

Drawn By: TMW

Checked By: RLD

Sheet Name:

**MECH CONTROL DIAGRAMS**

Sheet No:

**M-502**  
Sheet 0 of 000