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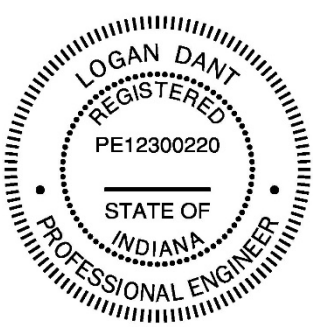

Addendum: **2**

Date: **11/04/2024**

Project: **Clinton Central Rooftop Unit Replacement**

Comm #: **24594**

The following items shall be incorporated into the specifications and drawings and are considered to be integral to the bid documents for the project. Acknowledgement of receipt of this addendum is required on the bid form.

Item #1: Clarifications:

A. Question: Who is responsible for the demolition of the six units that require conduit and wiring removal back to the source, as specified in "remark 2"? Will the Electrical Contractor handle this, or is it assigned to another Party?

Response: The units would be removed by the mechanical contractor. Associated electrical disconnection and circuitry removal would be by the electrical contractor.

B. Question: Could you clarify the purpose of requiring demolition back to the source? Is there a reason we can't reuse the existing raceway for feeding the new units?

Response: The purpose is to provide a new branch circuit from associated panel to the mechanical unit. During construction if it is deemed the electrical pathway can be used it will be taken under consideration.

C. Question: For demolition, is the Electrical Contractor expected to de-terminate and make-safe existing circuits and raceways, marking ends in green to indicate safe status (Air Gap) Or is the requirement for a full demolition from the source to load?

Response: The contractor shall make-safe all existing circuits that are to remain to allow for rework of the mechanical equipment.

D. Question: To accurately quote this work, we need the distance from each unit back to the panel. Could you provide approximate conduit lengths?

Response: The overall electrical drawing for indicate location of panels. This should be enough to develop approximate conduit lengths.

E. Question: Prints given are inadequate to accurately quote lengths for conduit and wire lengths. We can discuss this further if you would like.

Response: The contractor shall field verify routing if this seems to be a concern. The overall drawing give as accurate attempt at location of existing panels for estimation of lengths and routing. Any additional information need would be on the bidder to investigate.

F. Question: We need panel details, including voltage, model number, and specifications, to ensure we order the correct breaker for compatibility. Could you provide this information?

Response: The panels manufacturers were listed; the voltages should be able to be identified by the load serving the equipment. The model number if need would be something the bidder would need to verify if it was a concern.

G. Question: To confirm, are new conduits and feeds required for the following units: Elementary School RTU-4, RTU-5, RTU-6, HV-2, HV-3, and High School HP-1, per Sheets ES-E102 Note 2 and HS-E102 Note 2?

Response: Elementary School Equipment RTU-4, RTU-5, RTU-6, HV-2, and HV-3 require new circuits as indicated on equipment schedule and ES-E102. High School Equipment HP-1 require new circuits as indicated on equipment schedule and HS-E102

H. Question: Under the High School base bid, we see demolition of FCU-20/ACCU-20. However, the installation of the new equipment appears to be under alternate.

Response: All work for FCU-20/ACCU-20 will be under base bid.

I. Question: To provide fuse reducers for the 15-amp Fuse Box and correct fuses for RTU-B5, we need panel information. Could you provide these details?

Response: Switchboard “M1” is an existing General Electric “THFP Panelboard Unit”

J. Question: Is the Electrical Contractor responsible for both demolition and rough-in of temperature control wiring? No control prints were provided, so any clarification would be appreciated.

Response: The responsibility will be the mechanical contractor to handle the scope of the removal of the temperature control cabling and conduit. Refer to section 230900 1.3B and C for more information.

K. Question: Is the Electrical Contractor responsible for de-termination and re-termination of the fire alarm system? As we prepare our bid for Clinton Central, I

wanted to confirm the scope regarding fire alarm work. Our team is fully capable and experienced in handling fire alarm de-termination and re-termination, so if you would like us to manage this portion, we are more than equipped to do so.

Response: The fire alarm work will be under the electrical contractor's scope.

L. Question: Could you let us know if you'd prefer us to include the fire alarm work in our scope, or if you have a specific contractor in mind for this task? Either way, we're ready to accommodate your needs and ensure the project runs smoothly.

Response: The fire alarm work will be under the electrical contractor's scope.

M. Question: Does any unit require the specifications listed in Remark 3 of the ES-E001 panel schedule? Currently, no units are assigned under this remark.

Response: The remark 3 on the equipment schedule has been clarified in this addendum.

N. Question: For the new branch circuits requiring a 20-amp single-pole breaker as per Remark 3 on the Elementary ES-E201, there is a "WP (Weatherproof)" designation for an unspecified item. Could you clarify what this item is, and confirm if a new conduit run and wiring are necessary?

Response: The "WP" is indicated on the symbol schedule under receptacle types the items is a Ground fault circuit interrupter receptacle with while-in use cover. Specification Section 262726 indicated specification for receptacle and Specification section 26 0533.16 indicates the specifications for the "While-in-Use" cover. The construction documents indicated the circuit are new.

O. Question: Given the number and complexity of the questions, we kindly request an extension on the bid submission deadline to allow adequate time for your responses. This additional time would be invaluable in ensuring our proposal fully aligns with the project's needs and avoids any potential misunderstandings or scope discrepancies.

Response: The bid date will stay as spelled out in the front-end documents.

Item #2: Specification Section 230993, "Sequence of Operations for HVAC Controls"

A. Added safety controls for the unit ventilator and the air handler units to include the refrigerant detection output alarm.

Item #3: Specification Section 236313, "Air-Cooled Refrigerant Condensers"

A. Add Lennox as an approved manufacturer.

Item #4: Specification Section 237313.16, "Indoor, Semi-Custom Air-Handling Units"

A. Add Dunham-Bush as an approved manufacturer.

Item #5: Specification Section 237416.11, "Packaged, Small-Capacity, Rooftop Air-Conditioning Units"

A. Add Lennox as an approved manufacturer.

Item #6: Drawing Sheet HS-M501, "Mechanical Schedule Sheet"

A. Add plan note #9 to add factory mounted refrigerant leak detection to the air handler schedule.

B. Add plan note #9 to add factory mounted refrigerant leak detection to the unit ventilator schedule.

C. Added a refrigerant detection alarm to both the air handler and the unit ventilator on the points list.

Item #7: Drawing Sheet ES-001, "Electrical Information Sheet"

A. Equipment Schedule Remarks: Revise the first remark #6 form the top that reads

"6. REPLACE EXISTING CIRCUIT BREAKER IN EXISTING PANEL, AS INDICATED, WITH NEW 25A/2P CIRCUIT BREAKER IN EXISTING PANELBOARD. EXISTING PANEL BOARD IS A GENERAL ELECTRIC. PROVIDE BLANK INSERT, AS REQUIRED, IN OPENING

To be the following

3. REPLACE EXISTING CIRCUIT BREAKER IN EXISTING PANEL, AS INDICATED, WITH NEW 25A/2P CIRCUIT BREAKER IN EXISTING PANELBOARD. EXISTING PANEL BOARD IS A GENERAL ELECTRIC. PROVIDE BLANK INSERT, AS REQUIRED, IN OPENING

Item #8: Drawing Sheet HS-201," Electrical Plans – Units A, B, and C"

A. Plan #3: delete reference to plan note #4 on FCU-20.1

Item #9: Drawing Sheet HS-202," Partial Electrical Roof Plan"

A. Delete reference to plan note #4 on ACCU-20"

Section 23 0993 - Sequence Of Operations For Hvac Controls

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes control sequences for HVAC systems, subsystems, and equipment.

B. Related Sections include the following:
1. Division 23 Section "Instrumentation and Control for HVAC" for control equipment and devices and for submittal requirements.

1.2 DEFINITIONS

A. DDC: Direct digital control.

B. VAV: Variable air volume.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 ALARMS

A. Generate an alarm at the PC workstation when any space temperature is <50 def F for 15 minutes (adjustable) and an immediate alarm when any space temperature is <40 deg F (adjustable).

B. Coordinate with the owner to identify alarms as "general" or " critical". General alarms will only be displayed at the PC workstation. Critical alarms will be displayed at the PC workstation and dialed-out to pre-programmed telephone numbers through the internal PC modem.

3.2 MONITORING SEQUENCES

A. Monitor status of electrical power and each phase. On loss of any electrical phase, all 3-phase equipment shall be immediately shut down. Upon restoration of lost phase, all 3-phase equipment shall return to normal operation with the use of a ‘return to normal’ sequence to stage equipment on in order such that prerequisite systems are started in order. (Ex. Boiler and chiller plants shall be started before air handlers.)

3.3 HVAC ZONE CONTROL SEQUENCES

A. Provide software time clock and set-up schedule to place each HVAC system into occupied or unoccupied mode. Provide an override push button on each space temperature sensor to place the respective zone air handler into the occupied mode for a two-hour period (adjustable) when button is pushed. When the button is pushed again prior to the override time expiring, the zone air handler will revert to the scheduled operating mode.

B. Where carbon dioxide (CO2) sensors are present, the BMS shall monitor the space or return duct CO2 concentration and reset the outside air damper to increase ventilation rates to prevent high levels of CO2 in a space.
   1. If CO2 is above 900 ppm for a period of at least 5 minutes and the space in an occupied mode, increase OA damper position 5% every 5 minutes until the space CO2 decreases below 700 ppm, the resume normal OA setpoint.
   2. Maximum outside air damper position shall be determined if supply air temperature setpoint can not be maintained with 100% heating or cooling, depending on mode. Do not sacrifice supply air temperature upper and lower limits during CO2 reset mode.

C. If space has occupancy sensors present, BMS shall integrate them into controls for stand-by mode. TCC shall connect to auxiliary contacts on the sensor where possible, or provide a relay powered by the lighting circuit downstream of the occupancy sensor to indicate occupancy.
   1. If space is in occupied mode, but occupancy is not detected for more than 20 minutes (adj), the BMS shall place the space into standby mode. When occupancy is detected, the BMS shall immediately revert back to normal occupied mode.
   2. If a space is in standby mode and schedule changes to unoccupied mode, the system shall revert to unoccupied mode and discontinue the standby mode.
   3. If a space is placed into standby mode
      a. The outside air damper(s) shall close 100% for unit ventilators, fan coils, and single zone air handlers.
      b. VAV box zones shall set the box to minimum airflow setting.
      c. Maintain space temperature at an offset of 2 deg F (adj) below the current effective space setpoint in heating mode, and 2 deg F (adj) above the current effective space setpoint in cooling mode.

D. All systems and spaces shall be linked to a global room temperature setpoint value that the Owner can change a single value that effectively creates a single temperature setpoint with specified adjustment (+2 deg/-2 deg) that all systems and all spaces use for master control of the facility/campus temperature and energy control.

E. All heating hot water coils shall utilize the following for coil freeze protection if they are the primary heating coil for air handlers, unit ventilators, single zone duct coil, that has outside air to the equipment.
   1. If outside air temperature is less than 35 deg F (global adj.) the hot water coil shall never close 100%. Maintain coil a minimum of 10% open at all times, even with equipment fans turned off.
   2. If unit is shut off and outside air temperature is less than 35 deg (global adj.), mixed air temperature sensor and freezestat shall monitor temperature inside of air handler equipment such that if duct temperature less than 40 deg F is detected, BMS shall activate fan to circulate air through the unit at minimum speed until mixed air temperature is above 50 deg F and a minimum run time of 15 minutes (global adj).
   3. If mixed air temperature drops to below 30 deg F while the unit is off, BMS shall generate critical alarm and open hot water coil 100%.

3.4 UNIT VENTILATOR CONTROL SEQUENCE

A. Safety Controls:
   1. Provide an electric low limit thermostat element serpentined across the face of the leaving air side of the heating coil which will stop the supply fan, close the outside air damper and position heating control valve for full coil water flow.
   2. Low limit control shall be wired as a software point only and not hardwired to fan circuit. If low limit is detected, the BMS shall close the outside air damper, maintain supply fan on, display a low limit notification on the graphics, and wait 15 minutes. Reset to normal mode and open outside air damper.
   3. If low limit sensor trips 3 times within a 1 hour time frame, generate a critical low limit alarm and lock out the unit requiring a software reset before running. Close outside air damper to 0%, open return damper to 100%, stop all supply, return, and relief fans.
   4. Low limit capillary shall have 1 ft of tube for every 1 sq ft of coil surface.
   5. Monitor the refrigerant leak detection alarm output signal and generate an alarm to the PC if leak is detected. Energize the supply fan(s), open all dampers, turn off all electric resistance heating coils, activate all refrigerant safety shut off valves, and turn off all gas heat. System shall remain in this mode for 5 minutes past the alarm output signal has been reset.

B. UV-X: Heating, Cooling, & Ventilating
   1. Occupied Mode:
      a. Supply fan shall operate continuously. Open outside air damper to provide minimum ventilation.
      b. Modulate the hot water coil control valve and stages of DX cooling to maintain space temperature set point.
      c. If outside air dry bulb temperature is less than space and cooling is required, modulate outside and return air dampers for economizer cooling while maintaining a minimum discharge temperature based on the following reset schedule:

SPACE TEMPERATURE	DISCHARGE AIR TEMPERATURE
Set point + 4 deg F	55 deg F (adjustable)
Set point	65 deg F (adjustable)

      d. When outside air damper reaches 100% open, provide a signal to modulate stages of DX cooling to supplement economizer cooling. When outside air dry-bulb temperature rises above space, maintain minimum outside air volume with damper at minimum ventilation air position.
      e. If mixed air temperature drops below 35 deg F modulate hot water coil control valve 100% open and reduce outside air damper position by 10% (adjustable) for every 3 minutes (adjustable) that mixed air temperature remains below 35 deg F.
   2. Unoccupied Mode:
      a. Cycle fan and hot water coil control valve to full open to maintain reduced unoccupied space heating set point. Limit discharge air temperature to 30 degrees above space temperature. Outside air damper closed, return air damper open, chilled water control valve closed.

3.5 AIR HANDLING UNITS CONTROL SEQUENCES

A. Safety Controls:

1. Provide an electric low limit thermostat element serpentined across the face of the leaving air side of the heating coil which will stop the supply fan, close the outside air damper and position heating control valve for full coil water flow.
2. Low limit control shall be wired as a software point only and not hardwired to fan circuit. If low limit is detected, the BMS shall close the outside air damper, maintain supply fan on, display a low limit notification on the graphics, and wait 15 minutes. Reset to normal mode and open outside air damper.
3. If low limit sensor trips 3 times within a 1 hour time frame, generate a critical low limit alarm and lock out the unit requiring a software reset before running. Close outside air damper to 0%, open return damper to 100%, stop all supply, return, and relief fans.
4. Low limit capillary shall have 1 ft of tube for every 1 sq ft of coil surface.
5. Provide strap-on aquastat on the leaving water side of the hot water coil to stop the supply fan (return fan to operate if applicable), close the outside air damper (and relief dampers if applicable) and position control valve for full coil water flow (operate coil circulating pump if applicable) if leaving water temperature drops below 40 deg F (adjustable).
6. Provide a high-limit controller to prevent unit discharge air from rising above 125 deg F (adjustable). Sensor shall be located at the discharge of the unit.
7. Monitor the refrigerant leak detection alarm output signal and generate an alarm to the PC if leak is detected. Energize the supply fan(s), open all dampers, turn off all electric resistance heating coils, activate all refrigerant safety shut off valves, and turn off all gas heat. System shall remain in this mode for 5 minutes past the alarm output signal has been reset.

B. AHU-X (Constant Volume Supply)
   1. Occupied Mode:
      a. Supply fans shall operate continuously.
      b. Open outside air damper to provide minimum outside air. If outside air dry bulb temperature is less than interior and cooling is required, modulate outside air open to provide economizer cooling. A mixed air temperature controller shall maintain a minimum DAT of 55 deg F.
      c. If the outside air temperature is below 35 deg F (adjustable), provide full heating coil flow and modulate face and bypass dampers as required to maintain space set point. If outside air temperature is 35 deg F or higher (adjustable), provide full airflow to the face of the coil and modulate the hot water coil control valve and stages of DX cooling as required to maintain space set point.
      d. If space humidity rises above set point (65% RH, adjustable) at the space humidistat, stage DX to 100% and modulate face and bypass dampers to maintain space temperature. Dehumidification sequence shall continue until space humidity drops 5% (adjustable) below set point.
   2. Unoccupied Mode:
      a. Maintain outside air damper closed, cycle unit supply fans with maximum hot water flow to maintain reduced set point temperature. If space humidity exceeds set point, the unit shall be placed into occupied mode until the space humidity is 5% RH below set point.
      b. If space humidity rises above set point (65% RH, adjustable) at the space humidistat, stage DX to 100% and modulate face and bypass dampers to maintain space temperature. Dehumidification sequence shall continue until space humidity drops 5% (adjustable) below set point.

3. Morning Warm-Up/Cool-Down: BMS shall provide optimum start of unit supply fans with either full hot water flow or activate all stages of DX and outside air dampers closed until occupied space set point temperatures are reached, at which time the system shall revert back to its normal occupied mode.
4. Night Purge Cycle: The BMS shall initiate a night purge cycle during unoccupied hours to flush the building with outside air for free space cooling to bring space temperature down to cooling occupied set point or for indoor air quality control during unoccupied hours to flush the building with outside air for a predetermined time period or until any zone reaches its heating set point. During either purge mode, the air handling unit fans shall run and the economizer outside air damper shall be modulated to maintain a 50ºF (adjustable) discharge air temperature. A low limit mixed air sensor shall prevent mixed air temperature from falling below 45 deg F (adjustable). If enthalpy/humidity sensors indicate the outside air contains more heat of enthalpy than the interior space, the BMS shall over-ride the free cooling night purge cycle. If the outside air temperature is less than 35 deg F (adjustable), the BMS shall over-ride both night purge cycles.
5. Monitor Differential Pressure across air filter bank to indicate need for filter replacement when differential pressure reaches the loaded filter drop indicated in the air handler unit schedule. Actual pressure drop (in inches water column) shall be accessible through the workstation PC. A maintenance message reading "AHU-XX FILTER CHANGE REQUIRED" shall automatically be displayed on the workstation PC when loaded filter pressure drop is reached.

3.6 ROOFTOP UNIT SEQUENCES

A. RTU-X (Single Zone Cooling, and Ventilating with Relief fan)
   1. Occupied Mode:
      a. Open outside air damper to provide minimum outside air. Supply fan shall operate continuously. Activate stages of stages of DX cooling as required to maintain space temperature.
      b. Open relief air damper and modulate relief fans as required to maintain a positive building pressure of 0.05” w.c. (adjustable). If outside air dry bulb temperature is less than interior and cooling is required, modulate outside air open to provide economizer cooling. A mixed air temperature controller shall maintain a minimum DAT of 55 deg F.
      c. Relief fan shall be controlled to maintain the space differential pressure to exterior. When OA damper is open, enable relief fan to maintain positive building pressure of 0.05” w.c. (adjustable). When OA damper is closed, relief fan shall not operate and damper shall be closed.
   2. Unoccupied Mode:
      a. Outside air damper shall remain closed. Cycle supply fan and stages of cooling as required to maintain set back temperature.

B. RTU-X (Single Zone Heating, Cooling, and Ventilating)
   1. Occupied Mode:
      a. Open outside air damper to provide minimum outside air. Supply fan shall operate continuously. Activate stages of electric heat and stages of DX cooling as required to maintain space temperature.
      b. If outside air dry bulb temperature is less than interior and cooling is required, modulate outside air open to provide economizer cooling. A

mixed air temperature controller shall maintain a minimum DAT of 55 deg F.

2. Unoccupied Mode:
   a. Outside air damper shall remain closed. Cycle supply fan and stages of heating and cooling as required to maintain set back temperature.

3.7 INDOOR AND OUTDOOR VRF SEQUENCES

A. BMS shall send occupancy schedule via BACNET to VRF Master Controller. BMS shall monitor equipment status, equipment alarms, space temperature, and setpoint. Intent is for the VRF Master Controller to provide control and logic to both indoor and outdoor VRF units.

END OF SECTION 23 0993

ROOFTOP UNIT SCHEDULE

				SUPPLY FAN						RELIEF FAN		HEATING					COOLING											
TAG	MFR.	MODEL	SERVICE	AIRFLOW (CFM)	ESP (IN WC)	MIN. O.A. (CFM)	DRIVE TYPE	SUPPLY MOTOR (HP)	SUPPLY MOTOR (BHP)	SUPPLY RPM	RELIEF AIRFLOW (CFM)	RELIEF MOTOR (HP)	INPUT (KW)	EAT/LAT (DEG F)	STAGES	ELEC (V/PH)	MCA	MOCP	TOTAL (TONS)	SENS. (MBH)	TONS	EDB/EWB (DEG F)	LDB/LWB (DEG F)	AMBIENT TEMP (DEG F)	STAGES	EER	ELEC (V/PH)	MCA	MOCP	FILTER TYPE	OP. WEIGHT (LBS)	REFRIGERANT	REMARKS
HP-1	TRANE	4TCC4024E1	FACILTY	800	0.60	200	DIRECT	1/3	-	1050		-	10	50/89	1	208/1	52	60	23.2	16.0	2	80/67	60/58	95	2	11.0	208/1	17	25	2" MERV 13	358	R-410a	1, 2, 3, 4, 5, 6, 7, 8, 9
RTU-B5	TRANE	THH036A4S	BAND PRACTICE ROOMS	1200	0.80	360	DIRECT	3/4	0.39	962	800	0.33	-	-	-	-	-	-	37.7	27.7	3	80/67	58/56	95	3	13.0	460/3	12	15	2" MERV 13	787	R-454B	1, 2, 3, 4, 5, 6, 7, 8, 9, 10

REMARKS:
1. PROVIDE AND INSTALL WITH FULLY MODULATING ECONOMIZER DAMPER AND LISTED ECONOMIZER AIRFLOW POWERED EXHAUST.
2. PROVIDE WITH PHASE LOSS MONITOR TO SHUT DOWN UNIT ON LOSS OF ANY PHASE.
3. MANUFACTURER TO PROVIDE INTEGRAL COMPARATIVE DRY BULB ECONOMIZER CONTROLLER.
4. PROVIDE WITH OUTSIDE INTAKE HOOD WITH INLET SCREEN.
5. PROVIDE WITH FACTORY INSTALLED SINGLE POINT POWER AND NON-FUSED DISCONNECT SWITCH.
6. PROVIDE AND INSTALL WITH LOUVERED HAIL GUARDS ON ALL CONDENSER COILS. SHIP WITH COIL PROTECTION PANELS TO PREVENT DAMAGE DURING SHIPPING, RIGGING, INSTALLATION.
7. PROVIDE AND INSTALL WITH STAINLESS STEEL HEAT EXCHANGER.
8. PROVIDE WITH PACKAGED BACNET CONTROLLER FOR INTEGRATION OF DATA INTO BMS.
9. PROVIDE AND INSTALL WITH CUSTOM TRANSITION CURB TO ALIGN TO EXISTING ROOF CURB. CONTRACTOR SHALL FIELD VERIFY EXISTING ROOF CURB DIMENSIONS PRIOR TO ORDERING NEW TRANSITION CURB.
10. UNDER AN ALTERNATE BID.

Clinton Central Rooftop Unit Replacement
High School

INPUT/OUTPUT SUMMARY TABLE

HARDWARE: OUTPUT (O) DGTAL / ANALOG; INPUT (I, D, V, C) DIGITAL / ANALOG; ALARMS DGTAL / ANALOG; SOFTWARE EMCS FUNCTIONS

Point Description	Control Relay/Contactor	Floating Point Control	Solenoid Valve	Resistive Transducer	Electrical Transducer	4-20 ma or 0-10 VDC	Pressure Switch	Flow Switch	Space Occupancy Sensor	Current Switch	Over-ride button	Contact Closure	Photocell	Aquastat	KW Meter Contact	Temperature	Relative Humidity	Set Point Adjustment	Carbon Dioxide Level (ppm)	Carbon Monoxide (ppm)	Lighting Level (Foot candles)	Pressure (in H2O, ft H2O, DP)	Flow Measurement (gpm/cfm)	Power Input (KW, Watt, kWH)	Position Feedback	Trending	Equipment Alarm	Freezestat Alarm	Maintenance Notification	High Limit	Low Limit (Temperature)	Run Time Alarm	Power Failure Alarm	Command: Start/Stop	Command: On/Off	Totalization	O.A. Reset	Lead/Lag Control	BACNET software point	Lighting Control Integration	Color Graphics Item
Outside Air																■	■									■															■
SZ Rooftop Units w/ DX (RTU-B5)																																	■								■
Supply fan(s)						■																			■				■												■
OA damper						■																															■				■
RA damper																																									■
Stages of DX cooling	■																																								■
Return air																■	■		■																						■
Mixed air																■	■																								■
Supply air																														■										■
Freezestat sensor																■	■														■										■
Relief fan(s)						■																			■				■												■
Relief damper	■																																								■
Zone differential pressure																					■																				■
Space																■		■																							■
SZ Rooftop Units w/ DX (HP-1)																																	■								■
Supply fan(s)						■																			■				■												■
OA damper						■																															■				■
RA damper																																									■
Stages of electric heat	■																																								■
Stages of DX cooling	■																																								■
Return air																■	■		■																						■
Mixed air																■	■																								■
Supply air																														■										■
Freezestat sensor																■	■														■										■
Space																■		■																							■
VRF split system (FCU, ACCU)																																	■								■
Unit status																									■				■												■
Alarm status																														■										■	■
Space																■	■																								■
Air Handler SZ w/ DX and reheat (AHU-C1)																																	■								■
Supply fan(s)						■																			■				■												■
OA damper						■																															■				■
RA damper																																									■
Face and Bypass damper						■																															■				■
Heating coil valve (preheat)																																									■
Stages of DX cooling	■																																								■
Return air																■	■		■																						■
Mixed air																■	■																								■
Supply air																														■										■
Freezestat sensor																■	■														■										■
Space																■		■																							■
Refrigerant Detection Alarms																																■									■
Unit Ventilator w/ DX and reheat (UV-B4)																																	■								■
Supply fan						■																			■				■												■
OA/RA dampers						■																															■				■
Heating coil valve (preheat)																																									■
Stages of DX cooling	■																																								■
Mixed air																■	■																								■
Supply air																														■										■
Freezestat sensor																■	■														■										■
Space																■		■																							■
Refrigerant Detection Alarms																																■									■

UNIT VENTILATOR SCHEDULE (DX COOLING)

				DX COOLING										HEATING											
TAG	MFR.	MODEL	SERVICE	AIRFLOW (CFM)	MIN O.A. (CFM)	FAN SPEED (RPM)	FAN (HP)	ESP (IN. W.C.)	TOTAL CAP. (MBH)	SENS. CAP. (MBH)	EDB/EWB (DEG F)	LDB/LWB (DEG F)	TOTAL CAP. (MBH)	EAT/LAT (DEG F)	EWT/LWT (DEG F)	FLOW (GPM)	WPD (FT)	ROWS	CONTROL VALVE	ELEC (V/PH)	MCA	MAX FUSE SIZE	FILTER TYPE	REMARKS
UV-B4	TRANE	HUVC15020	CHOIR	1500	450	1050	1	-	37.7	29.9	75/63	57/55	111.7	60/136	180/150	7.5	4.9	1	2-WAY	208/1	8.7	15	1" MERV 8	1, 2, 3, 4, 5, 6, 7, 8, 9

REMARKS:
1. PROVIDE AND INSTALL WITH FACTORY WIRED ELECTRICAL DISCONNECT AT UNIT WIRING CONTROL BOX.
2. SUPPLY FAN SHALL BE ECM WITH 4-20 mA INPUT FROM BMS FOR SPEED CONTROL WITH FULL RANGE SPEED CONTROL.
3. ALL ACCESS DOORS SHALL BE HINGED WITH INTEGRAL DOOR POWER KILL SWITCH.
4. MANUFACTURER SHALL FACTORY INSTALL TCC FURNISHED CONTROL VALVES, ACTUATORS, SENSORS, AND CONTROLS. COORDINATE WITH TCC.
5. FAN SPEED SHALL NOT EXCEED 1500 RPM UNLESS SPECIFICALLY NOTED.
6. PROVIDED WITH EXTENDED SIDE PIPE CHASE.
7. PROVIDE AND INSTALL WITH STAINLESS STEEL DRAIN PAN.
8. UNDER AN ALTERNATE BID.
9. PROVIDE AND INSTALL FACTORY MOUNTED REFRIGERANT LEAK DETECTION SYSTEM INTEGRAL TO UNIT. (2)

NOTES:
1. ALL TRIM PIECES AND ACCESSORIES SHALL HAVE FACTORY FINISH MATCHING TO UNIT VENTILATOR FINISH, INCLUDING EXACT PAINT COLOR, SHEEN, AND TEXTURE.

VRF OUTDOOR HEAT PUMP UNIT SCHEDULE

TAG	MODULE #	MFR.	MODEL	EQUIP. SERVED	COOLING CAP (MBH) AT 115 DEG F	SENS COOLING CAP (MBH)	CAPACITY TURNDOWN	HEATING CAP (MBH) AT -10 DEG F	# OF MODULES	MAX REF LINE LENGTH (FT)	COOLING EER	HEATING COP	REFRIG	REFRIG CHARGE (LBS)	ELEC (V/PH)	MCA/UNIT	MOP/UNIT	WT/UNIT (LBS)	REMARKS
ACCU-20	1	MITSUBISHI	NTXSST24A112AA	-	22.4	22.4	3.1	27.6	1	100	12.5	3.4	R410A	5	208/1	17	20	140	1, 2, 3, 4, 5, 6

REMARKS:
1. UNIT SHALL BE INSTALLED ON FACTORY PROVIDED 12" TALL EQUIPMENT STANDS.
2. REFRIGERANT LINE SETS SHALL BE INSULATED WITH 1/2" AEROCEL EPDM OR ARMAFLEX UT SOLAR EPDM CLOSED CELL INSULATION WITH ALUMINUM JACKET OUTDOOR.
3. TCC SHALL PROVIDE AND INSTALL TRANSFORMER, MANUFACTURER SHALL PROVIDE PIGTAIL.
4. TIE INTO EXISTING MASTER CONTROLLER FOR FULL INTEGRATION WITH BACNET TO BMS. MFR SHALL ASSIST THE TCC WITH INTEGRATION AS NEEDED WITH ONSITE SUPPORT.
5. PROVIDE AND INSTALL WIND BAFFLE, FOR LOW AMBIENT COOLING APPLICATIONS DOWN TO 0 DEG F.
6. PROVIDE AND INSTALL WITH LOUVERED HAIL GUARDS ON ALL CONDENSER COILS. SHIP WITH COIL PROTECTION PANELS TO PREVENT DAMAGE DURING SHIPPING, RIGGING, INSTALLATION.

VRF INDOOR UNITS

TAG	MFR.	MODEL	TYPE	LOCATION	COOLING CAP. (MBH)	HEATING CAP. (MBH)	CFM	REFRIG.	CONTROL TYPE	ELEC (V/PH)	MCA (A)	REMARKS
FCU-20.1	MITSUBISHI	NTXWST24A112AA	WALL	IDF	22.4	27.6	388	410A	WIRED WALL	208/1	1.00	1, 2, 3, 4, 5, 6

REMARKS:
1. PROVIDE WITH REMOTE WALL MOUNTED THERMOSTAT EQUAL TO TAC-VTS3CRAU-J AND WIRED TO BMS GATEWAY, INSTALLED BY TEMPERATURE CONTROLS CONTRACTOR.
2. EACH SYSTEM TO ALLOW BMS TO ENABLE/DISABLE AND MONITOR THIS EQUIPMENT. COORDINATE WITH TCC FOR INTEGRATION.
3. PROVIDE WITH GOBI INTEGRAL CONDENSATE PUMP TO LIFT CONDENSATE. WIRE TO COOLING UNIT WITH ALARM INTERLOCKS.
4. PROVIDE WITH WHITE PVC "LINE HIDE" CONDUIT SYSTEM TO CONCEAL ALL PIPING/WIRING IN EXPOSED LOCATIONS.
5. REFRIGERANT LINE SETS AND CONDENSATE LINES SHALL BE INSULATED WITH 1/2" AEROCEL EPDM OR ARMAFLEX UT SOLAR EPDM TO INCLUDE CONDENSATE TUBING.
6. E.C. SHALL PROVIDE AND INSTALL DISCONNECT SWITCH. COORDINATE LOCATION PRIOR TO ROUGH-IN.

CONDENSING UNIT SCHEDULE

TAG	MFR.	MODEL	EQUIP. SERVED	REFRIG	TOTAL CAP. (MBH)	SENS CAP. (MBH)	SUCTION TEMP (DEG F)	AMBIENT TEMP (DEG F)	EVAP CFM	EVAP EDB/EWB (DEG F)	CAPACITY STEPS	MIN EER	ELEC (V/PH)	MCA	MOP	WEIGHT (LBS)	REMARKS
ACCU-C1	TRANE	RAUJC30	AHU-C1	R-454B	360	-	45	95	8000	80/67	2	10.5	460/3	74	90	2100	1, 2, 3
ACCU-B4	TRANE	4TTA4042A	UV-B4	R-410a	24	-	45	95	800	80/67	2	11.0	208/1	17	25	450	1, 2, 3, 4

REMARKS:
1. UNIT SHALL BE INSTALLED ON FLASHED IN ROOF RAILS.
2. PROVIDE WITH COIL HAIL GUARDS ON ALL SIDES.
3. PROVIDE AND INSTALL LOW AMBIENT KIT FOR COOLING DOWN TO 20 DEG F.
4. UNDER AN ALTERNATE BID.

AIR HANDLER SCHEDULE - REV. 11/4/2024

TAG	AHU-C1
SPACE SERVED	MULTI-PURPOSE
MFR.	TRANE
MODEL	CSAA017
UNIT DIM WxLxH (IN)	72x138x55
UNIT WIEGHT (LBS)	2550
FILTER AREA (S.F.)	18.89
FILTER APD (IN W.C.)	0.62
FILTER TYPE	2" MERV 8
SUPPLY FAN	
AIRFLOW (CFM)	8000
OUTSIDE AIR (CFM)	1600
TSP (IN W.C.)	4.43
ESP (IN W.C.)	2.00
RPM	2174
FAN TYPE	PLENUM
FAN QUANTITY	1
DRIVE TYPE	DIRECT
MOTOR (HP)	10
MOTOR (BHP)	9.3
ELECTRICAL (V / PH)	460/3
MODULATION	VSD
DX COOLING COIL	
TOTAL CAP (MBH)	360.0
SENS CAP (MBH)	235.8
EAT DB/WB (DEG F)	80/67
LAT DB/WB (DEG F)	53/52
REFRIGERANT	R-454B
APD (IN W.C.)	0.72
ROWS	6
FINS/FT	143
DRAW THRU TRAP DEPTH	9.6
HOT WATER COIL (PREHEAT)	
TOTAL CAP (MBH)	425.1
EAT / LAT (DEG F)	46/95
EWT (DEG F)	180
LWT (DEG F)	150
COIL FLOW (GPM)	28
WPD (FT)	1.7
APD (IN W.C.)	0.12
ROWS	2
FINS/FT	74
TUBE WALL THICK (IN)	0.016
CONTROL VALVE	2-WAY
REMARKS:	1, 2, 3, 4, 5, 6, 7, 8, 9

REMARKS:
1. ALL SECTIONS SHALL BE DOUBLE WALL CONSTRUCTION WITH INJECTED FOAM INSULATION.
2. PROVIDE AND INSTALL ON 2.5" HIGH FULL LENGTH BASE RAIL (MINIMUM).
3. MOTOR SHALL BE MULTI-TAP 460/240/208 BALDOR SUPER-E WITH INTEGRAL SHAFT GROUNDING RING AND COMPLY WITH NEMA MG1 FOR VARIABLE SPEED OPERATION.
4. MOTOR SHALL HAVE CLASS F INSULATION FOR USE WITH VARIABLE SPEED DRIVE.
5. COIL HEADERS SHALL BE COPPER OR RED BRASS AND FULLY DRAINABLE. STEEL HEADERS ARE NOT ALLOWED.
6. ALL COOLING COIL CASING SHALL BE STAINLESS STEEL.
7. PROVIDE EACH ACCESS DOOR WITH A FACTORY INSTALLED AIR PRESSSURE PORT WITH SCREW ON CAP FOR TAB USE.
8. PROVIDE UNIT WITH FULL 18" TALL INSULATED ROOF CURB.
9. PROVIDE AND INSTALL FACTORY MOUNTED REFRIGERANT LEAK DETECTION SYSTEM INTEGRAL TO UNIT. (2)

** REFER TO DRAWINGS FOR DETAILS ON MODULE CONFIGURATIONS **

2 ADDENDUM #2 11/04/2024

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CERTIFICATION:
LOGAN DANT REGISTERED PE12300220 STATE OF INDIANA PROFESSIONAL ENGINEER

DATE: 10-16-2024
COMM: 24594

SCHOOL: Clinton Central Jr/Sr High
815 IN-29
Michigantown, IN 46057

TITLE: MECHANICAL SCHEDULE SHEET

SHEET: HS-M501