GENERAL NOTES

A. THE CONTRACT DOCUMENTS ARE COMPLEMENTARY AND WHAT IS REQUIRED BY ONE SHALL BE AS BINDING AS IF REQUIRED BY ALL. IN THE CASE OF A CONFLICT, DISAGREEMENT, OR AMBIGUITY, PROVIDE THE BETTER QUALITY. IN THE CASE OF A CONFLICT, DISAGREEMENT, OR AMBIGUITY, PROVIDE THE GREATER QUANTITY OF WORK.

B. DRAWINGS ARE DIAGRAMMATIC AND INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY. DO NOT SCALE DRAWINGS. LOCATIONS OF ALL ITEMS INDICATED ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT DEFINITIVELY FIXED BY DIMENSIONS ARE APPROXIMATE. COORDINATE CONTRACT DOCUMENTS PROJECT REQUIREMENTS, WORK OF OTHERS, AND EQUIPMENT AND MATERIALS PURCHASED WITH FIELD DIMENSIONS. MANUFACTURER'S REQUIREMENTS FOR INSTALLATION, OPERATION, AND MAINTENANCE. CONTRACTOR'S INTENDED MEANS AND METHODS OF INSTALLATION; AND CONTRACTOR'S FABRICATED ITEMS TO ENSURE A PROPER FIT AND INSTALLATION.

C. MAINTAIN MAXIMUM HEADROOM AND SPACE CONDITIONS AT ALL POINTS. WHERE HEADROOM AND SPACE CONDITIONS APPEAR INADEQUATE, NOTIFY THE ARCHITECTS PRIOR TO PROCEEDING WITH INSTALLATION. MAINTAIN A MINIMUM OF 7'-0" CLEARANCE ABOVE FINISHED FLOOR TO UNDERSIDE OF PIPES, DUCTS, CONDUITS, SUSPENDED EQUIPMENT, ETC., THROUGHOUT ACCESS ROUTES IN MECHANICAL ROOMS.

D. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATION. MAKE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICT WITH WORK OF OTHER TRADES OR FOR PROPER EXECUTION OF THE WORK.

E. INSTALL ALL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.

F. COORDINATE LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS WITH ALL OTHER TRADES. COORDINATE ALL PIPING AND EQUIPMENT SUPPORTED FROM STRUCTURE WITH GENERAL CONSTRUCTION WORK.

G. PROVIDE TRAPPED DRAIN PIPING FROM DRAIN PANS OF ALL COOLING COILS, FANS AND OTHER ACTIVE DRAINS EXPOSED TO SYSTEM AIRSTREAM. PROVIDE TRAP AT CONNECTION WITH WATER SEAL DEPTH ONE INCH GREATER THAN UNIT OPERATING PRESSURE. DIRECT DRAINS TO NEAREST FLOOR DRAIN, MOP SINK, OR OTHER LOCATION APPROVED BY THE ARCHITECT.

H. INSTALL PIPING, DUCTWORK, AND CONDUIT CONCEALED IN AREAS HAVING CEILINGS AND/OR FURRED SPACES UNLESS OTHERWISE INDICATED.

I. ALL EQUIPMENT, VALVES, DAMPERS, DAMPER AND VALVE OPERATORS SHALL BE PROVIDED WITH ADEQUATE ACCESS FOR SERVICING, MAINTENANCE, AND REPLACEMENT.

J. SIZE ALL SPLIT-SYSTEM REFRIGERANT PIPING IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

K. DUCT DIMENSIONS MAY BE MODIFIED ONLY WITH PRIOR APPROVAL FROM ARCHITECT. DUCT DIMENSIONS ARE IN INCHES AND INSIDE CLEAR.

L. FOR LOCATION OF REGISTERS, GRILLES, AND DIFFUSERS WITHIN CEILING GRID, REFER TO ARCHITECTURAL REFLECTED CEILING PLANS.

M. ELEVATION INDICATED FOR RECTANGULAR DUCT, GRILLE AND LOUVER OPENINGS IS TO THE TOP OF ROUGH OPENING UNLESS OTHERWISE INDICATED. ELEVATION INDICATED FOR ROUND DUCTWORK AND PIPING IS TO CENTERLINE

N. REFER TO STRUCTURAL DRAWINGS FOR DETAILS AND MAXIMUM SPACING REQUIREMENTS REGARDING HANGER ATTACHMENTS TO STEEL BAR JOISTS.

EQUIPMENT ABBREVIATIONS

AHU	AIR-HANDLING UNIT
AS	AIR SEPARATOR
B	BOILER
BC	BUILDING AUTOMATION CONTROLLER
BP	BOILER PUMP
CH	CHILLER
CHWP	CHILLED WATER PUMP
CUH	CABINET UNIT HEATER
DS	DUCT SILENCER
ECH	ELECTRIC CEILING HEATER
ERU	ENERGY RECOVERY UNIT
ERV	ENERGY RECOVERY VENTILATOR
ET	EXPANSION TANK
EUH	ELECTRIC UNIT HEATER
F	FAN
FCU	FAN COIL UNIT
FF	FILTER FEEDER
HP	HEAT PUMP
HWP	HOT WATER PUMP
HX	HEAT EXCHANGER
IV	INTAKE GRAVITY VENTILATOR
MAU	MAKEUP AIR UNIT
OAU	OUTDOOR AIR UNIT
P	PUMP
RV	RELIEF GRAVITY VENTILATOR
SSI	SPLIT-SYSTEM INDOOR UNIT
SSO	SPLIT-SYSTEM OUTDOOR UNIT
UH	UNIT HEATER

CONTROLS ABBREVIATIONS

AF	AIRFLOW
AI	ANALOG INPUT TO CONTROLLER
ALM	ALARM
AMS	AIRFLOW MEASURING STATION
AO	ANALOG OUTPUT FROM CONTROLLER
ATS	AVERAGING TEMPERATURE SENSOR
BAS	BUILDING AUTOMATION SYSTEM
BI	BINARY INPUT TO CONTROLLER
BO	BINARY OUTPUT FROM CONTROLLER
CO2	CARBON DIOXIDE SENSOR
CSR	CURRENT-SENSING RELAY
DM	DAMPER MOTOR
DP	DIFFERENTIAL PRESSURE
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
FM	FLOW METER
FZ	FREEZESTAT
HS	HUMIDITY SENSOR
POS	POSITION
R	RELAY
SD	SMOKE DETECTOR
SPD	SPEED
SS	START/STOP
STS	STATUS
TS	TEMPERATURE SENSOR
VFD	VARIABLE-FREQUENCY DRIVE

ABBREVIATIONS

A	AMPERE(S)
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
ALT	ALTERNATE
APD	AIR PRESSURE DROP
BHP	BRAKE HORSEPOWER
BTUH	BRITISH THERMAL UNITS PER HOUR
CFM	CUBIC FEET PER MINUTE
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CLG	COOLING
COM	COMMON
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
D	DRAIN
DB	DRY BULB TEMPERATURE
dBA	A-WEIGHTED DECIBELS
DCW	DOMESTIC COLD WATER
DIA	DIAMETER
DN	DOWN
DS	DUCT SILENCER
DWG	DRAWING
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EER	ENERGY EFFICIENCY RATIO
EQ	EQUAL
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
EX	EXISTING
FC	FAIL CLOSED
FD	FIRE DAMPER
FLA	FULL LOAD AMPS
FO	FAIL OPEN
FPM	FEET PER MINUTE
FT	FOOT, FEET
GA	GAUGE
GAL	GALLON(S)
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
HP	HORSEPOWER
HPWR	HEAT PUMP WATER RETURN
HPWS	HEAT PUMP WATER SUPPLY
HTG	HEATING
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
HX	HEAT EXCHANGER
HZ	HERTZ
IN	INCH
IPLV	INTEGRATED PART-LOAD VALUE
KW	KILOWATT(S)
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	ONE THOUSAND BTUH
MCA	MINIMUM CIRCUIT AMPACITY
MFR	MANUFACTURER
MIN	MINIMUM
MOCP	MAXIMUM OVERCURRENT PROTECTION
MOD	MOTOR-OPERATED DAMPER
NC	NORMALLY CLOSED (FOR PLANS, DETAILS)
NC	NOISE CRITERIA (FOR SCHEDULES)
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OC	ON CENTER
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
PH	PHASE
PSIG	POUNDS PER SQUARE INCH GAUGE
RA	RETURN AIR
RD	REFRIGERANT DISCHARGE
RH	RELATIVE HUMIDITY
RL	REFRIGERANT LIQUID
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION
SA	SUPPLY AIR
SEER	SEASONAL ENERGY EFFICIENCY RATIO
TD	TRANSFER DUCT
TYP	TYPICAL
UNO	UNLESS NOTED (INDICATED) OTHERWISE
UPD	UNIT PRESSURIZATION DIFFERENTIAL
V	VOLTAGE, VOLTS
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
VIF	VERIFY IN FIELD
W	WATT(S)
W/	WITH
W/O	WITHOUT
WB	WET BULB TEMPERATURE
WC	WATER COLUMN
WPD	WATER PRESSURE DROP
WWM	WELDED WIRE MESH
°F	DEGREES FAHRENHEIT

CONTROL SYMBOL LEGEND

- CIRCULATOR OR PUMP
- MOTORIZED 2-WAY VALVE
- MOTORIZED 3-WAY VALVE
- VFD — VARIABLE FREQUENCY DRIVE
- DDC — DIRECT DIGITAL CONTROLLER
- T — THERMOSTAT
- FZ — FREEZESTAT
- C — CONTACTOR
- R — RELAY
- S — SPACE TEMPERATURE SENSOR
- T — LINE VOLTAGE THERMOSTAT
- HAND-OFF-AUTOMATIC SWITCH
- SD — DUCT-MOUNTED SMOKE DETECTOR
- TRANSFORMER
- FUSE
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- WIRING OR DEVICE PROVIDED UNDER DIVISION 23
- WIRING OR DEVICE NOT PROVIDED UNDER DIVISION 23
- WIRING CONNECTION BY DIVISION 23
- WIRING CONNECTION BY OTHERS
- NUMBER OF CONDUCTORS INDICATED BY SLASH MARKS
- MOTORIZED PARALLEL BLADE DAMPER
- MOTORIZED OPPOSED BLADE DAMPER
- MOTORIZED BUTTERFLY BLADE DAMPER
- SUPPLY, RETURN, OR EXHAUST FAN
- AIRFLOW DIRECTION
- CONTROL POINT INDICATOR — AI / TS — INPUT OR OUTPUT (ANALOG INPUT) — DEVICE TYPE (AIR TEMPERATURE SENSOR)
- CONTROL POINT INDICATOR — AI / TS — INPUT OR OUTPUT (ANALOG INPUT) — DEVICE TYPE (AIR TEMPERATURE SENSOR WITH AVERAGING ELEMENT)
- CONTROL POINT INDICATOR — AI / TS — INPUT OR OUTPUT (ANALOG INPUT) — DEVICE TYPE (WATER TEMPERATURE SENSOR WITH BULB TYPE ELEMENT IN PIPING WELL)
- CONTROL POINT INDICATOR — AI / CSR — INPUT OR OUTPUT (ANALOG INPUT) — DEVICE TYPE (CURRENT SENSING RELAY)

GRAPHIC SYMBOL LEGEND

- SPACE TAG: SPACE NAME; SPACE NUMBER; BUILDING "PART" NUMBER IN MULTI-PART BUILDING (e.g. CORRIDOR A101)
- EQUIPMENT TAG: EQUIPMENT NUMBER; EQUIPMENT ABBREVIATION (e.g. AHU-12)
- DIFFUSER, GRILLE OR REGISTER TAG: TAG, REFER TO DIFFUSER, GRILLE AND REGISTER SCHEDULE; AIRFLOW (CFM) (e.g. S1 / 325)
- DETAIL TAG: DETAIL NUMBER; DRAWING WHERE DETAIL IS INDICATED (e.g. 1 / M5.1)
- KEYNOTE (e.g. 15)
- STRUCTURAL GRID LINE WITH DESIGNATION (e.g. C)
- EXISTING TO BE REMOVED
- DETAIL TITLE (e.g. 1 / M5.1 / 1/4"=1'-0"; M2.2, M2.3, M2.4) — DETAIL NUMBER; DRAWING WHERE DETAIL IS INDICATED; DRAWING WHERE DETAIL IS REFERENCED; ADDITIONAL DRAWING REFERENCES
- SECTION TITLE (e.g. 1 / M4.1 / 1/4"=1'-0"; M2.2, M2.3, M2.4) — SECTION NUMBER; DRAWING WHERE SECTION IS INDICATED; DRAWING WHERE SECTION IS REFERENCED; ADDITIONAL DRAWING REFERENCES
- SECTION CALLOUT: SECTION NUMBER; DRAWING WHERE SECTION IS INDICATED (e.g. 1 / M4.1)
- ENLARGED PLAN CALLOUT: ENLARGED PLAN NUMBER; DRAWING WHERE ENLARGED PLAN IS INDICATED (e.g. 1 / M3.1)
- MECHANICAL EQUIPMENT WITH REQUIRED SERVICE CLEARANCE INDICATED

DUCTWORK LEGEND

- 18x8 — RECTANGULAR DUCT (FIRST DIMENSION REFERS TO SIDE VIEWED)
- 18ø — ROUND DUCT SIZE
- 18/12 — FLAT OVAL DUCT SIZE
- 18ø — DOUBLE WALL, EXPOSED DUCT
- 18ø — FABRIC DUCT
- FLEXIBLE DUCTWORK
- FLEXIBLE CONNECTOR
- SD — DUCT-MOUNTED SMOKE DETECTOR
- DUCT WITH DUCT LINER
- DUCT ACCESS DOOR
- DUCT WITH END CAP
- LINEAR SLOT DIFFUSER, LENGTH AS INDICATED
- LINEAR BAR GRILLE, LENGTH AS INDICATED
- SUPPLY DIFFUSER
- RETURN OR EXHAUST GRILLE
- SUPPLY DIFFUSER WITH DIRECTIONAL BLOW, SOLID HATCH INDICATES BLANK OFF PANEL
- POINT OF CONNECTION TO EXISTING
- LIMIT OF DEMOLITION
- SUPPLY AIRFLOW ARROW
- RETURN OR EXHAUST AIRFLOW ARROW
- UC — DOOR UNDERCUT
- DL — DOOR LOUVER
- SENSOR WELL
- MANUAL BALANCING DAMPER IN DUCT
- FIRE DAMPER IN DUCT
- SMOKE DAMPER IN DUCT
- COMBINATION FIRE/SMOKE DAMPER IN DUCT
- FIRE DAMPER WITH SECURITY BARS IN DUCT (SB)
- SMOKE DAMPER WITH SECURITY BARS IN DUCT (SB)
- COMBINATION FIRE/SMOKE DAMPER WITH SECURITY BARS IN DUCT (SB)
- M — MOTORIZED DAMPER IN DUCT
- SMOKE CONTROL MANUAL BALANCING DAMPER IN DUCT
- M — SMOKE CONTROL MOTORIZED DAMPER IN DUCT
- SB — SECURITY BARS IN DUCT
- AP — DUCT WITH ACCESS PANEL
- TO / AWAY — SUPPLY/MAKEUP AIR DUCT SECTIONS
- TO / AWAY — RETURN AIR DUCT SECTIONS
- TO / AWAY — EXHAUST AIR DUCT SECTIONS
- SD — SMOKE DETECTOR
- H — HUMIDITY SENSOR
- T — THERMOSTAT, LINE VOLTAGE
- T — THERMOSTAT, LOW VOLTAGE
- S — TEMPERATURE SENSOR
- C — CARBON DIOXIDE SENSOR
- CM — CARBON MONOXIDE SENSOR

PIPING LEGEND

- CO — END OF LINE CLEANOUT PLUG
- CO — CLEANOUT PLUG
- PRESSURE GAUGE WITH GAUGE COCK
- LIQUID FILLED THERMOMETER
- UNION
- STRAINER WITH BLOWDOWN VALVE AND 3/4" HOSE END CONNECTION
- FLEXIBLE PIPE CONNECTOR
- MA — MANUAL AIR VENT
- CHILLED WATER SUPPLY
- CHILLED WATER RETURN
- HOT WATER SUPPLY
- HOT WATER RETURN
- VALVE
- MANUAL BALANCING VALVE WITH FLOW TAPS
- AUTOMATIC BALANCING VALVE WITH FLOW TAPS
- SWING CHECK VALVE
- PRESSURE REDUCING VALVE
- TRIPLE DUTY VALVE
- GAS COCK
- P — PRESSURE-RELIEF VALVE
- M — TWO-WAY CONTROL VALVE
- M — THREE-WAY CONTROL VALVE
- DIRECTION OF FLOW

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043951 TIMOTHY WHITE
8/2/2024

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

LEGENDS, ABBREVIATIONS AND GENERAL NOTES

M0.1

8/2/2024 3:19:54 PM

AIR HANDLING UNIT SCHEDULE

TAG	MANUFACTURER	MODEL NUMBER	SERVING	SUPPLY FAN: DESIGN AIRFLOW (CFM)	SUPPLY FAN: ESP (IN WC)	SUPPLY FAN: FAN WHEEL: DIA (IN)	SUPPLY FAN: FAN WHEEL: TYPE	SUPPLY FAN: FAN WHEEL: FAN SPEED (RPM)	SUPPLY FAN: MOTOR SIZE (HP)	SUPPLY FAN: BHP (HP)	OUTSIDE AIRFLOW (CFM)	CO2 MIN AIRFLOW (CFM)	UPD (CFM)	HYDRONIC PRE-HEATING COIL: DESIGN AIRFLOW (CFM)	HYDRONIC PRE-HEATING COIL: SENSIBLE CAPACITY (BTUH)	HYDRONIC PRE-HEATING COIL: EAT (°F)	HYDRONIC PRE-HEATING COIL: LAT (°F)	HYDRONIC PRE-HEATING COIL: EWT (°F)	HYDRONIC PRE-HEATING COIL: LWT (°F)	HYDRONIC PRE-HEATING COIL: WATER FLOW RATE (GPM)	HYDRONIC PRE-HEATING COIL: WPD (FT WC)	HYDRONIC COOLING COIL: TOTAL CAPACITY (BTUH)	HYDRONIC COOLING COIL: SENSIBLE CAPACITY (BTUH)	HYDRONIC COOLING COIL: EAT (°F DB)	HYDRONIC COOLING COIL: EAT (°F WB)	HYDRONIC COOLING COIL: LAT (°F DB)	HYDRONIC COOLING COIL: LAT (°F WB)	HYDRONIC COOLING COIL: EWT (°F)	HYDRONIC COOLING COIL: LWT (°F)	HYDRONIC COOLING COIL: WATER FLOW RATE (GPM)	HYDRONIC COOLING COIL: WPD (FT WC)	HYDRONIC RE-HEATING COIL: DESIGN AIRFLOW (CFM)	HYDRONIC RE-HEATING COIL: SENSIBLE CAPACITY (BTUH)	HYDRONIC RE-HEATING COIL: EAT (°F)	HYDRONIC RE-HEATING COIL: LAT (°F)	HYDRONIC RE-HEATING COIL: EWT (°F)	HYDRONIC RE-HEATING COIL: LWT (°F)	HYDRONIC RE-HEATING COIL: WATER FLOW RATE (GPM)	HYDRONIC RE-HEATING COIL: WPD (FT WC)	ELECTRICAL DATA: SINGLE-POINT DATA: UNIT FLA (A)	SINGLE-POINT DATA: UNIT MCA (A)	SINGLE-POINT DATA: UNIT MOCP (A)	SERVICE: (V)	SERVICE: (PH)	SERVICE: (HZ)	WEIGHT (LBS)	NOTES	CONTROL DIAGRAM
AHU-A-21	TRANE	CSAA 012	MS MEDIA CENTER	5,950	2.00	20.00	DD PF	2260	10	7.9	2,225	600	600	5,950	247,790	51.6	90.0	140	110	17	15.0	349,050	185,180	80.1	70.5	52.0	51.9	44	60	44	15.0	2,975	58,070	52.0	70.0	140	110	4.0	5.0	14.2	17.7	30.0	480	3	60	3,000	1, 2, 3, 5	M7.1, DETAIL 1
AHU-B-11	TRANE	CSAA 017	MS DINING	8,850	1.75	22.25	DD PF	2190	15	12.0	5,100	900	900	8,850	453,020	42.8	90.0	140	110	31	15.0	612,760	301,790	82.6	74.7	52.0	51.9	44	60	84	15.0	5,100	99,560	52.0	70.0	140	110	7.0	5.0	21.2	26.5	45.0	480	3	60	3,500	1, 2, 3, 5	M7.1, DETAIL 1
AHU-B-12	TRANE	CSAA 014	ES DINING	7,000	1.75	22.25	DD PF	2140	15	8.9	4,600	700	700	7,000	385,650	39.2	90.0	140	110	26	15.0	520,730	246,870	83.7	74.5	52.0	51.9	44	60	65	15.0	4,600	89,800	52.0	70.0	140	110	6.0	5.0	21.2	26.5	45.0	480	3	60	3,500	1, 2, 3, 5	M7.1, DETAIL 1
AHU-B-13	TRANE	CSAA 008	KITCHEN	3,500	2.00	18.25	DD PF	2340	5	4.4	850		350	3,500	123,740	57.4	90.0	140	110	9	15.0	163,390	101,200	78.2	67.3	52.0	51.9	44	60	21	15.0	1,750	34,160	52.0	70.0	140	110	3.0	5.0	8.4	10.5	15.0	480	3	60	2,500	1, 2, 3, 5	M7.1, DETAIL 1
AHU-B-15	TRANE	CSAA 008	ES ART	3,900	2.00	18.25	DD PF	2500	7.5	5.2	700		700	3,900	126,460	60.1	90.0	140	110	9	15.0	164,170	108,750	77.3	66.0	52.0	51.9	44	60	21	15.0	1,950	42,500	52.0	70.0	140	110	3.0	5.0	11.2	14.0	20.0	480	3	60	2,500	1, 2, 3, 5	M7.1, DETAIL 1
AHU-C-11	TRANE	CSAA 012	PART C - 1ST FL	6,000	1.75	20.00	DD PF	2190	7.5	6.9	1,475		500									219,560	159,120	76.1	64.4	52.0	51.9	44	60	28	15.0	6,000	203,020	57.1	90.0	140	110	14.0	5.0	11.2	14.0	20.0	480	3	60	2,500	1, 2, 3, 4	M7.1, DETAIL 2
AHU-C-21	TRANE	CSAA 014	PART C - 2ND FL	6,800	1.75	20.00	DD PF	2315	10	8.2	1,676		500									308,100	181,660	76.2	66.9	52.0	51.9	44	60	39	15.0	6,800	227,360	55.1	90.0	140	110	18.0	5.0	14.2	17.7	30.0	480	3	60	3,000	1, 2, 3, 4	M7.1, DETAIL 2
AHU-D-11	TRANE	CSAA 012	PART D - 1ST FL - NORTH	6,200	2.00	22.25	DD PF	2020	10	8.0	2,200		600									312,490	169,340	76.7	68.3	52.0	51.9	44	60	39	15.0	6,200	252,150	52.5	90.0	140	110	17.0	5.0	14.2	17.7	30.0	480	3	60	2,600	1, 2, 3, 4	M7.1, DETAIL 2
AHU-D-12	TRANE	CSAA 006	PART D - 1ST FL - CORE	2,600	2.00	16.50	DD PF	2400	5	3.1	650		250									96,940	68,970	76.1	64.6	52.0	51.9	44	60	12	15.0	2,600	92,770	57.1	90.0	140	110	7.0	5.0	8.4	10.5	15.0	480	3	60	2,000	1, 2, 3, 4	M7.1, DETAIL 2
AHU-D-13	TRANE	CSAA 012	PART D - 1ST FL - SOUTH	5,900	2.00	22.25	DD PF	1960	10	7.2	2,200		600									282,280	161,640	76.8	67.6	52.0	51.9	44	60	36	15.0	5,900	245,060	51.7	90.0	140	110	17.0	5.0	14.2	17.7	30.0	480	3	60	2,800	1, 2, 3, 4	M7.1, DETAIL 2
AHU-D-21	TRANE	CSAA 012	PART D - 1ST FL - NORTH	6,400	2.00	22.25	DD PF	2045	10	8.3	1,900		650									306,090	175,380	77.0	67.7	52.0	51.9	44	60	38	15.0	6,350	241,720	54.9	90.0	140	110	17.0	5.0	14.2	17.7	30.0	480	3	60	2,600	1, 2, 3, 4	M7.1, DETAIL 2
AHU-D-22	TRANE	CSAA 006	PART D - 1ST FL - CORE	3,100	2.00	16.50	DD PF	2675	5	4.5	800		300									119,760	84,640	76.8	65.0	52.0	51.9	44	60	15	15.0	3,100	125,230	52.8	90.0	140	110	9.0	5.0	8.4	10.5	15.0	480	3	60	2,000	1, 2, 3, 4	M7.1, DETAIL 2
AHU-D-23	TRANE	CSAA 012	PART D - 1ST FL - SOUTH	6,350	2.00	22.25	DD PF	1915	10	8.2	2,150		650									294,470	173,180	76.7	67.2	52.0	51.9	44	60	37	15.0	6,350	253,430	53.2	90.0	140	110	17.0	5.0	14.2	17.7	30.0	480	3	60	2,800	1, 2, 3, 4	M7.1, DETAIL 2
AHU-E-11	TRANE	CSAA 014	PART E - 1ST FL - NORTH	6,500	2.00	20.00	DD PF	2255	10	7.6	2,425		650									325,350	177,370	76.7	68.2	52.0	51.9	44	60	41	15.0	6,500	269,990	51.7	90.0	140	110	18.0	5.0	14.2	17.7	30.0	480	3	60	2,800	1, 2, 3, 4	M7.1, DETAIL 2
AHU-E-12	TRANE	CSAA 006	PART E - 1ST FL - CORE	2,650	2.00	16.50	DD PF	2470	5	3.3	1,050		250									98,810	70,300	76.1	64.6	52.0	51.9	44	60	13	15.0	2,650	113,230	50.6	90.0	140	110	8.0	5.0	8.4	10.5	15.0	480	3	60	2,000	1, 2, 3, 4	M7.1, DETAIL 2
AHU-E-13	TRANE	CSAA 014	PART E - 1ST FL - SOUTH	6,650	2.00	20.00	DD PF	2320	10	8.3	2,425		650									315,760	181,430	76.7	67.5	52.0	51.9	44	60	40	15.0	6,650	274,050	52.0	90.0	140	110	18.0	5.0	14.2	17.7	30.0	480	3	60	2,800	1, 2, 3, 4	M7.1, DETAIL 2
AHU-E-21	TRANE	CSAA 014	PART E - 2ND FL - NORTH	7,000	2.00	22.25	DD PF	1975	10	8.6	2,425		700									342,650	190,320	76.6	67.9	52.0	51.9	44	60	43	15.0	7,000	282,400	52.8	90.0	140	110	19.0	5.0	14.2	17.7	30.0	480	3	60	2,800	1, 2, 3, 4	M7.1, DETAIL 2
AHU-E-22	TRANE	CSAA 006	PART E - 2ND FL - SOUTH	3,200	2.00	16.50	DD PF	2690	5	4.5	1,050		350									113,860	85,880	76.4	64.1	52.0	51.9	44	60	15	15.0	3,200	126,320	53.6	90.0	140	110	9.0	5.0	8.4	10.5	15.0	480	3	60	2,000	1, 2, 3, 4	M7.1, DETAIL 2
AHU-E-23	TRANE	CSAA 014	PART E - 2ND FL - CORE	7,200	2.00	22.25	DD PF	2060	15	10.4	2,425		700									331,440	196,330	76.7	67.1	52.0	51.9	44	60	42	15.0	7,200	287,350	53.2	90.0	140	110	20.0	5.0	21.2	26.5	45.0	480	3	60	2,800	1, 2, 3, 4	M7.1, DETAIL 2
AHU-F-11	TRANE	CSAA 010	ES MEDIA CENTER	4,400	1.75	20.00	DD PF	2120	7.5	5.0	1,550	450	450	4,400	178,470	52.6	90.0	140	110	12	15.0	289,480	142,610	81.2	72.3	52.0	51.9	44	60	36	15.0	2,200	42,950	52.0	70.0	140	110	3.0	5.0	11.2	14.0	20.0	480	3	60	2,700	1, 2, 3, 4	M7.1, DETAIL 1
AHU-F-12	TRANE	CSAA 008	ES MUSIC	3,500	1.75	18.25	DD PF	2330	7.5	4.2	1,375	350	350	3,500	148,790	50.8	90.0	140	110	10	15.0	212,230	107,860	79.8	71.0	52.0	51.9	44	60	27	15.0	1,750	34,160	52.0	70.0	140	110	3.0	5.0	11.2	14.0	20.0	480	3	60	2,500	1, 2, 3, 4	M7.1, DETAIL 1
AHU-F-13	TRANE	CSAA 008	ES GYM	4,000	1.75	18.25	DD PF	2470	7.5	5.0	1,550	900	400	4,000	169,180	51.0	90.0	140	110	12	15.0	156,740	124,040	80.2	65.2	52.0	51.9	44	60	20	15.0	2,000	39,040	52.0	70.0	140	110	3.0	5.0	11.2	14.0	20.0	480	3	60	2,500	1, 2, 3, 4	M7.1, DETAIL 1
AHU-G-11	TRANE	CSAA 008	PART G - 1ST FL - NORTH	3,800	2.00	18.25	DD PF	2450	7.5	4.9	1,125		425									180,490	99,520	75.7	67.5	52.0	51.9	44	60	23	15.0	3,800	144,240	55.0	90.0	140	110	10.0	5.0	11.2	14.0	20.0	480	3	60	2,300	1, 2, 3, 4	M7.1, DETAIL 2
AHU-G-13	TRANE	CSAA 010	PART G - 1ST FL - SOUTH	5,100	2.00	20.00	DD PF	2390	7.5	7.2	1,250		550									233,010	136,820	76.3	67.0	52.0	51.9	44	60	29	15.0	5,100	180,860	57.3	90.0	140	110	12.0	5.0	11.2	14.0	20.0	480	3	60	2,500	1, 2, 3, 4	M7.1, DETAIL 2
AHU-G-21	TRANE	CSAA 010	PART G - 2ND FL - NORTH	4,700	2.00	20.00	DD PF	2220	7.5	5.8	1,225		525									189,140	126,870	76.5	65.5	52.0	51.9	44	60	24	15.0	4,700	170,240	56.6	90.0	140	110	12.0	5.0	11.2	14.0	20.0	480	3	60	2,500	1, 2, 3, 4	M7.1, DETAIL 2
AHU-G-23	TRANE	CSAA 010	PART G - 2ND FL - SOUTH	5,400	2.00	20.00	DD PF	2080	7.5	6.3	1,230		530									187,960	130,800	76.0	64.8	52.0	51.9	44	60	24	15.0	5,400	171,780	58.0	90.0	140	110	12.0	5.0	11.2	14.0	20.0	480	3	60	2,500	1, 2, 3, 4	M7.1, DETAIL 2
AHU-H-11	TRANE	CSAA 008	PART H - 1ST FL - NORTH	4,100	2.00	18.25	DD PF	2550	7.5	5.5	1,075		500									168,400	110,260	76.4	65.7	52.0	51.9	44	60	21	15.0	4,100	152,510	55.7	90.0	140	110	11.0	5.0	11.2	14.0	20.0	480	3	60	2,300	1, 2, 3, 4	M7.1, DETAIL 2
AHU-H-13	TRANE	CSAA 012	PART H - 1ST FL - SOUTH	5,700	2.00	22.25	DD PF	1925	7.5	6.4	1,260		650									224,250	151,940	76.2	65.2	52.0	51.9	44	60	28	15.0	5,700	200,290	57.6	90.0	140	110	14.0	5.0	11.2	14.0	20.0	480	3	60	2,700	1, 2, 3, 4	M7.1, DETAIL 2
AHU-H-21	TRANE	CSAA 010	PART H - 2ND FL - NORTH	4,900	2.00	20.00	DD PF	2275	7.5	6.2	1,350		500									197,140	131,200	76.3	65.5	52.0	51.9	44	60	25	15.0	4,900	181,210	55.9	90.0	140	110	12.0	5.0	11.2	14.0	20.0	480	3	60	2,500	1, 2, 3, 4	M7.1, DETAIL 2
AHU-H-23	TRANE	CSAA 014	PART H - 2ND FL - SOUTH	6,650	2.00	20.00	DD PF	2300	10	8.1	1,615		650									265,580	178,760	76.4	65.4	52.0	51.9	44	60	33	15.0	6,650	237,270	57.1	90.0	140	110	16.0	5.0	14.2	17.7	30.0	480	3	60	2,800	1, 2, 3, 4	M7.1, DETAIL 2

NOTES:
1. PROVIDE MOTORS RATED FOR USE WITH VARIABLE FREQUENCY DRIVE. PROVIDE GROUNDING RING ON MOTOR. FACTORY MOUNT AND WIRE VARIABLE FREQUENCY DRIVE AND CABINET ON AIR HANDLING UNIT CABINET.
2. PROVIDE 2" THICK MERV-8 RATED PRE-FILTERS AND 4" THICK PLEATED MERV-13 FILTERS.
3. HEATING COIL AND COOLING COIL SELECTIONS BASED ON CLEAR WATER.
4. PRIMARY HEATING COIL IS IN RE-HEAT POSITION. REFER TO DETAILS AND CONTROLS SCHEMATICS FOR ADDITIONAL DETAILS.
5. PRIMARY HEATING COIL IS IN PRE-HEAT POSITION. REFER TO DETAILS AND CONTROLS SCHEMATICS FOR ADDITIONAL DETAILS.

AIR HANDLING UNIT WITH ENERGY RECOVERY WHEEL SCHEDULE

TAG	MFR	MODEL NUMBER	SERVING	SUPPLY FAN: DESIGN AIRFLOW (CFM)	SUPPLY FAN: ESP (IN WC)	SUPPLY FAN: FAN WHEEL: DIA (IN)	SUPPLY FAN: FAN WHEEL: TYPE	SUPPLY FAN: FAN WHEEL: FAN SPEED (RPM)	SUPPLY FAN: MOTOR SIZE (HP)	SUPPLY FAN: BHP (HP)	OUTSIDE AIR DESIGN AIRFLOW (CFM)	UPD (CFM)	EXHAUST FAN: DESIGN AIRFLOW (CFM)	EXHAUST FAN: ESP (IN WC)	EXHAUST FAN: FAN WHEEL: DIA (IN)	EXHAUST FAN: FAN WHEEL: TYPE	EXHAUST FAN: FAN WHEEL: FAN SPEED (RPM)	EXHAUST FAN: MOTOR SIZE (HP)	EXHAUST FAN: BHP (HP)	ENTHALPY WHEEL: OUTDOOR AIR: DESIGN AIRFLOW (CFM)	OUTDOOR AIR: SUMMER: EAT (°F) DB	OUTDOOR AIR: SUMMER: EAT (°F) WB	OUTDOOR AIR: SUMMER: LAT (°F) DB	OUTDOOR AIR: SUMMER: LAT (°F) WB	OUTDOOR AIR: WINTER: EAT (°F) DB	OUTDOOR AIR: WINTER: EAT (°F) WB	OUTDOOR AIR: WINTER: LAT (°F) DB	OUTDOOR AIR: WINTER: LAT (°F) WB	ENTHALPY WHEEL: EXHAUST AIR: DESIGN AIRFLOW (CFM)	EXHAUST AIR: SUMMER: EAT (°F) DB	EXHAUST AIR: SUMMER: EAT (°F) WB	EXHAUST AIR: SUMMER: LAT (°F) DB	EXHAUST AIR: SUMMER: LAT (°F) WB	EXHAUST AIR: WINTER: EAT (°F) DB	EXHAUST AIR: WINTER: EAT (°F) WB	EXHAUST AIR: WINTER: LAT (°F) DB	EXHAUST AIR: WINTER: LAT (°F) WB	ENTHALPY WHEEL: WHEEL MOTOR SIZE (HP)	HYDRONIC PRE-HEATING COIL: AIRFLOW (CFM)	HYDRONIC PRE-HEATING COIL: SENSIBLE CAPACITY (BTUH)	HYDRONIC PRE-HEATING COIL: EAT (°F)	HYDRONIC PRE-HEATING COIL: LAT (°F)	HYDRONIC PRE-HEATING COIL: EWT (°F)	HYDRONIC PRE-HEATING COIL: LWT (°F)	HYDRONIC PRE-HEATING COIL: WATER FLOW RATE (GPM)	HYDRONIC PRE-HEATING COIL: WPD (FT WC)	HYDRONIC COOLING COIL: TOTAL CAPACITY (BTUH)	HYDRONIC COOLING COIL: SENSIBLE CAPACITY (BTUH)	HYDRONIC COOLING COIL: EAT (°F DB)	HYDRONIC COOLING COIL: EAT (°F WB)	HYDRONIC COOLING COIL: LAT (°F DB)	HYDRONIC COOLING COIL: LAT (°F WB)	HYDRONIC COOLING COIL: EWT (°F)	HYDRONIC COOLING COIL: LWT (°F)	HYDRONIC COOLING COIL: WATER FLOW RATE (GPM)	HYDRONIC COOLING COIL: MAX WPD (FT WC)	HYDRONIC RE-HEATING COIL: SENSIBLE CAPACITY (BTUH)	HYDRONIC RE-HEATING COIL: EAT (°F)	HYDRONIC RE-HEATING COIL: LAT (°F)	HYDRONIC RE-HEATING COIL: EWT (°F)	HYDRONIC RE-HEATING COIL: LWT (°F)	HYDRONIC RE-HEATING COIL: WATER FLOW RATE (GPM)	HYDRONIC RE-HEATING COIL: MAX WPD (FT WC)	ELECTRICAL DATA: SERVICE: (V)	SERVICE: (PH)	SERVICE: (HZ)	WEIGHT (LBS)	NOTES
AHU-A-11	TRANE	PCC-21	MS GYM	9,450	1.50	25	DD PF	1835	15	12.1	8,700	950	7,750	0.75	22	DD PF	1900	10	7.6	8,700	88.3	79.8	79.3	69.4	24.2	20.3	52.8	42.4	7,750	75.0	62.5	84.6	75.1	68.0	52.0	36.4	30.8	3/4	8,700	381,650	52.8	90.0	140	110	26	5.0	512,810	285,580	79.3	69.4	52.0	51.9	44	60	64	15.0	169,830	52.0	70.0	140	110.00	12.0	5.0	480	3	60	7,200	1-5

NOTES:
1. PROVIDE MOTORS RATED FOR USE WITH VARIABLE FREQUENCY DRIVE. PROVIDE GROUNDING RING ON MOTOR.
2. PROVIDE 2" THICK MERV-8 PRE-FILTERS FOR RETURN AIR BEFORE THE ENTHALPY WHEEL. PROVIDE 2" THICK MERV-8 PRE-FILTERS AND 4" THICK MERV-13 FILTERS FOR THE OUTSIDE AIR BEFORE THE ENTHALPY WHEEL.
3. HEATING COIL AND COOLING COIL SELECTIONS BASED ON CLEAR WATER.
4. SCHEDULED OUTSIDE AIR AND EXHAUST AIR DO NOT INCLUDE ALLOWANCES FOR PURGE AIRFLOW OR SEAL LEAKING IN THE ENTHALPY WHEEL. FINAL EXHAUST SELECTION AND OUTSIDE AIRFLOW SETPOINT SHALL INCORPORATE ADJUSTED VALUES.
5. REFER TO CONTROL DIAGRAM SINGLE ZONE VAV AHU WITH ENERGY RECOVERY FOR DETAILS REGARDING CONTROLS.
6. CO2 MINIMUM OUTSIDE AIRFLOW SHALL BE 3,200 CFM.

EXPANSION TANK & FILTER FEEDER SCHEDULE

TAG	MANUFACTURER	MODEL NUMBER	SERVING	NUMBER	NAME	TYPE	TANK VOLUME (GAL)	ACCEPTANCE (GAL)	FILL PRESSURE (PSIG)	WEIGHT (LBS)	NOTES
ET-1	BELL & GOSSETT	B-100	CHILLED WATER SYSTEM	B119	MECHANICAL/ ELECTRICAL	BLADDER	26	26	35	350	1, 2
ET-2	BELL & GOSSETT	B-1200	HOT WATER SYSTEM	B119	MECHANICAL/ ELECTRICAL	BLADDER	317	317	35	3350	1, 2
FF-1	NEPTUNE	FTF-5DB	CHILLED WATER SYSTEM	B119	MECHANICAL/ ELECTRICAL	FILTER FEEDER	5	0	100	100	1, 2
FF-2	NEPTUNE	FTF-5DB	HOT WATER SYSTEM	B119	MECHANICAL/ ELECTRICAL	FILTER FEEDER	5	0	100	100	1, 2

NOTES:
1. WEIGHT LISTED IS INSTALLED FLOODED WEIGHT.
2. REFER TO SYSTEM SCHEMATICS FOR INSTALLATION DETAILS.

AIR SEPARATOR SCHEDULE

TAG	MANUFACTURER	MODEL NUMBER	SERVING	LOCATION	INLET (IN)	OUTLET (IN)	FLOW RATE (GPM)	WPD (FT WC)	DRAIN SIZE (IN)	WEIGHT (LBS)	NOTES
AS-1	SPIROTHERM	VDN-800FA	CHILLED WATER SYSTEM	B113-MECH/ELEC	8	8	984	1.00	1	1100	1
AS-2	SPIROTHERM	VDN-800FA	HOT WATER SYSTEM	B113-MECH/ELEC	8	8	288	3.00	1	1100	1

NOTES:
1. WEIGHT LISTED IS INSTALLED FLOODED WEIGHT.

GRAVITY VENT SCHEDULE

TAG	MANUFACTURER	MODEL NUMBER	SERVING	FUNCTION	AIRFLOW (CFM)	APD (IN WC)	ROOF OPENING SIZE (IN x IN)	WEIGHT (LBS)	NOTES
IV-A-11	COOK	GI	AHU-A-11	INTAKE	9,450	0.048	48x48	600	1, 2
IV-A-12	COOK	GI	AHU-A12	INTAKE	3,200	0.102	24x24	200	1, 2
IV-A-21	COOK	GI	AHU-A-21	INTAKE	5,950	0.063	36x36	300	1, 2
IV-B-11	COOK	GI	AHU-B-11	INTAKE	8,850	0.041	48x48	600	1, 2
IV-B-12	COOK	GI	AHU-B-12 THRU AHU-B-15	INTAKE	16,100	0.105	54x48	600	1, 2
IV-F-1	COOK	GI	AHU-F-11 THRU AHU-F-21	INTAKE	15,650	0.101	54x48	600	1, 2
RV-A-11	COOK	GR	AHU-A-11	RELIEF	7,750	0.000	48x48	600	1, 2
RV-A-12	COOK	GR	AHU-A12	RELIEF	2,900	0.100	24x24	200	1, 2

NOTES:
1. GRAVITY VENTILATOR SHALL BE HIGH WIND RATED WITH MIAMI-DADE CERTIFICATION.
2. PROVIDE GRAVITY VENTILATOR WITH ROOF CURB SLOPED TO MATCH SLOPE OF ROOF. PROVIDE ROOF CURB AND ACCESSORIES AS REQUIRED TO MAINTAIN WIND RATING.

FAN SCHEDULE

TAG	MANUFACTURER	MODEL NUMBER	SERVING	TYPE	AIRFLOW (CFM)	ESP (IN WC)	FAN WHEEL (RPM)	DRIVE TYPE	SONES	CONTROL METHOD	MOTOR (HP)	ELECTRICAL DATA: (V)	(PH)	(HZ)	WEIGHT (LBS)	NOTES
F-A-11	COOK	ACE-D VF 120C17D	MS GYM LOCKER	ROOF MTD. CENTRIFUGAL	1,000	0.50	1260	DIRECT	8.3	BAS SCHEDULE	1/4	120	1	60	100	1, 2, 3
F-A-12	COOK	ACE-D 165C08D	A152/A153-BATHROOMS	ROOF MTD. CENTRIFUGAL	1,650	0.50	860	DIRECT	7.0	BAS SCHEDULE	1/4	120	1	60	100	1, 2, 3
F-A-21	COOK	ACE-D VF 180C17D	AHU-A-21 RELIEF	ROOF MTD. CENTRIFUGAL	5,350	0.50	1575	DIRECT	29.0	AHU-A-21	3	480	3	60	350	1, 2, 3
F-B-11	COOK	ACE-D VF 195C17D	AHU-B-11 RELIEF	ROOF MTD. CENTRIFUGAL	7,250	0.50	1650	DIRECT	37.0	AHU-B-11	5	480	3	60	400	1, 2, 3
F-B-12	COOK	ACE-D VF 210C17D	AHU-B-12 RELIEF	ROOF MTD. CENTRIFUGAL	6,300	0.50	1190	DIRECT	24.0	AHU-B-12	3	480	3	60	400	1, 2, 3
F-B-13	COOK	ACE-D VF 150C17D	AHU-B-13 RELIEF	ROOF MTD. CENTRIFUGAL	2,750	0.75	1490	DIRECT	18.1	AHU-B-13	1 1/4	208	1	60	350	1, 2, 3
F-B-14	COOK	ACE-D VF 120C28D	AHU-B-14 RELIEF	ROOF MTD. CENTRIFUGAL	1,500	0.50	1645	DIRECT	14.0	AHU-B-14	1/2	120	1	60	100	1, 2, 3
F-B-15	COOK	ACE-D VF 165C17D	AHU-B-15 RELIEF	ROOF MTD. CENTRIFUGAL	3,200	0.75	1380	DIRECT	19.3	AHU-B-15	1 1/4	208	1	60	110	1, 2, 3
F-B-16	COOK	ACE-D VF 101C28D	A137, A138, A139	ROOF MTD. CENTRIFUGAL	700	0.50	1900	DIRECT	13.7	BAS SCHEDULE	1/3	120	1	60	100	1, 2, 3
F-B-17	COOK	ACE-D VF 101C17D	KITCHEN LOCKER/TOILET/JAN	ROOF MTD. CENTRIFUGAL	300	0.50	1725	DIRECT	12.0	BAS SCHEDULE	1/3	120	1	60	100	1, 2, 3
F-D-11	COOK	ACE-D VF 135C17D	D109-SCIENCE LAB	ROOF MTD. CENTRIFUGAL	1,200	0.50	1110	DIRECT	8.1	WALL SWITCH	1/2	120	1	60	100	1-4
F-D-12	COOK	ACE-D VF 135C17D	D107-SCIENCE LAB	ROOF MTD. CENTRIFUGAL	1,200	0.50	1110	DIRECT	8.1	WALL SWITCH	1/2	120	1	60	100	1-4
F-D-13	COOK	ACE-D VF 135C17D	D121-SCIENCE LAB	ROOF MTD. CENTRIFUGAL	1,200	0.50	1110	DI

GRILLE, REGISTER, & DIFFUSER SCHEDULE

TAG	MANUFACTURER	MODEL NUMBER	MOUNTING STYLE	NECK SIZE	FACE SIZE	MAX NC LEVEL	NOTES
S1	PRICE	ASCDA-4C	LAY-IN	6ø	24x24	18	1
S2	PRICE	ASCDA-4C	LAY-IN	8ø	24x24	18	1
S3	PRICE	ASCDA-4C	LAY-IN	10ø	24x24	18	1
S4	PRICE	ASCDA-4C	LAY-IN	12ø	24x24	18	1
S5	PRICE	620-F	SURFACE	8x8	10x10	18	-
S6	PRICE	620-F	SURFACE	12x12	14x14	18	-
S7	PRICE	HCD2	DUCT	18x6		25	2
S8	PRICE	LBP-15B	SURFACE	50x8	48x6	18	-
S9	PRICE	LBP-15A	SURFACE	62x8	60x6	18	-
R1	PRICE	635-TB	LAY-IN	22x22	24x24	18	3
R2	PRICE	635-F	SURFACE	8x8	10x10	18	3
R3	PRICE	635-F	SURFACE	22x22	24x24	18	3
R4	PRICE	635-TB	LAY-IN	32x24	34x26	18	3
R5	PRICE	96-F	SURFACE	72x40	74x42	18	3
R6	PRICE	635FF-TB	LAY-IN	22x22	24x24	18	3, 4
E1	PRICE	635-TB	LAY-IN	24x24	22x22	18	3
E2	PRICE	635-F	SURFACE	8x8	10x10	18	3
E3	PRICE	635-TB	LAY-IN	12x12	10x10	18	-
T1	PRICE	635-TB	LAY-IN	10x10	12x12	18	3
T2	PRICE	635-TB	LAY-IN	22x22	24x24	18	3

NOTES:
1. PROVIDE LAY-IN MOUNTING FRAME FOR DIFFUSERS LOCATED IN GYPSUM CEILINGS.
2. ADJUST HIGH CAPACITY DRUM LOUVER FOR EVEN AIR DISTRIBUTION IN SPACE. PROVIDE SPIRAL DUCT FRAME FOR MOUNTING ON DOUBLE WALL SPIRAL DUCT.
3. POSITION LOUVERED GRILLE SO BLADES ARE DIRECTED AT CLOSEST WALL, FLOOR, OR CEILING.
4. PROVIDE RETURN GRILLE WITH 1" FILTER RACK. PROVIDE 1" PLEATED MERV-8 RATED FILTERS.

FAN COIL UNIT SCHEDULE

TAG	MANUFACTURER	MODEL NUMBER	SERVING	SUPPLY AIRFLOW (CFM)	ESP (IN WC)	HYDRONIC COOLING COIL: TOTAL CAPACITY (BTUH)	SENSIBLE CAPACITY (BTUH)	EAT (°F DB)	EAT (°F WB)	LAT (°F DB)	LAT (°F WB)	EWT (°F)	LWT (°F)	NUMBER OF ROWS	WATER FLOW RATE (GPM)	WPD (FT WC)	HYDRONIC HEATING COIL: CAPACITY (BTUH)	EAT (°F)	LAT (°F)	EWT (°F)	LWT (°F)	NUMBER OF ROWS	WATER FLOW RATE (GPM)	WPD (FT WC)	ELECTRICAL DATA: MOTOR SIZE (WATTS)	MCA (A)	MOP (A)	SERVICE (V)	SERVICE (PH)	SERVICE (HZ)	WEIGHT (LBS)	NOTES
FCU-A-11	TRANE	FCCB120	A103-LOBBY	1200	0.25	43,010	31,280	80.0	67.0	56.1	55.4	42	57	3	6.0	15.00	30,350	60.0	90.0	140	110	1	2.0	20.00	1/2	3.6	15.0	277	1	60	182	1, 2, 3, 4
FCU-A-12	TRANE	FCCB120	A103-LOBBY	1200	0.25	43,010	31,280	80.0	67.0	56.1	55.4	42	57	3	6.0	15.00	30,350	60.0	90.0	140	110	1	2.0	20.00	1/2	3.6	15.0	277	1	60	182	1, 2, 3, 4
FCU-A-13	TRANE	FCCB120	A179-LOBBY	1200	0.25	43,010	31,280	80.0	67.0	56.1	55.4	42	57	3	6.0	15.00	30,350	60.0	90.0	140	110	1	2.0	20.00	1/2	3.6	15.0	277	1	60	182	1, 2, 3, 4
FCU-A-14	TRANE	FCCB120	A179-LOBBY	1200	0.25	43,010	31,280	80.0	67.0	56.1	55.4	42	57	3	6.0	15.00	30,350	60.0	90.0	140	110	1	2.0	20.00	1/2	3.6	15.0	277	1	60	182	1, 2, 3, 4
FCU-A-15	TRANE	FCCB 040	A102-CONCESSIONS	400	0.25	13,510	10,140	80.0	67.0	56.8	56.1	44	57	3	2.0	10.00	11,500	60.0	86.5	140	125	1	1.5	6.00	1/3	2.0	15.0	277	1	60	109	1, 2, 3, 5
FCU-A-21	TRANE	FCJB 040	A210-MECHANICAL	400	0.05	14,210	10,140	80.0	67.0	56.7	55.5	44	60	3	3.0	15.00	8,720	60.0	80.1	140	131	1	2.0	1.00	1/4	2.0	15.0	277	1	60	125	1, 2, 3, 4
FCU-A-22	TRANE	FCJB 040	A211-MECHANICAL	400	0.05	14,210	10,140	80.0	67.0	56.7	55.5	44	60	3	3.0	15.00	8,720	60.0	80.1	140	131	1	2.0	1.00	1/4	2.0	15.0	277	1	60	125	1, 2, 3, 4
FCU-B-11	TRANE	FCJB 120	B119-MECHANICAL	1200	0.05	43,010	31,280	80.0	67.0	56.1	55.4	44	57	3	6.0	15.00	30,350	60.0	90.0	140	110	1	2.0	20.00	1/2	3.6	15.0	277	1	60	225	1, 2, 3, 4
FCU-B-12	TRANE	FCCB 120	B115-RECEIVING	1200	0.05	43,010	31,280	80.0	67.0	56.1	55.4	44	57	3	6.0	15.00	30,350	60.0	90.0	140	110	1	2.0	20.00	1/2	3.6	15.0	277	1	60	225	1, 2, 3, 5
FCU-B-13	TRANE	FCCB 120	B115-RECEIVING	1200	0.05	43,010	31,280	80.0	67.0	56.1	55.4	44	57	3	6.0	15.00	30,350	60.0	90.0	140	110	1	2.0	20.00	1/2	3.6	15.0	277	1	60	225	1, 2, 3, 5
FCU-C-11	TRANE	FCJB 040	C119-MECHANICAL	400	0.05	14,210	10,140	80.0	67.0	56.7	55.5	44	60	3	3.0	15.00	8,720	60.0	80.1	140	131	1	2.0	1.00	1/4	2.0	15.0	277	1	60	125	1, 2, 3, 4
FCU-C-21	TRANE	FCJB 040	C209-MECHANICAL	400	0.05	14,210	10,140	80.0	67.0	56.7	55.5	44	60	3	3.0	15.00	8,720	60.0	80.1	140	131	1	2.0	1.00	1/4	2.0	15.0	277	1	60	125	1, 2, 3, 4
FCU-C-31	TRANE	FCJB 040	MP01-MECH PLATFORM	400	0.05	14,210	10,140	80.0	67.0	56.7	55.5	44	60	3	3.0	15.00	8,720	60.0	80.1	140	131	1	2.0	1.00	1/4	2.0	15.0	277	1	60	125	1, 2, 3, 4
FCU-D-11	TRANE	FCJB 020	D120-MECHANICAL	200	0.05	6,780	4,850	80.0	67.0	57.7	56.1	44	60	3	1.5	5.00	5,040	60.0	83.2	140	130	1	1.0	1.00	1/4	2.0	15.0	277	1	60	100	1, 2, 3, 4
FCU-D-21	TRANE	FCJB 020	D220-MECHANICAL	200	0.05	6,780	4,850	80.0	67.0	57.7	56.1	44	60	3	1.5	5.00	5,040	60.0	83.2	140	130	1	1.0	1.00	1/4	2.0	15.0	277	1	60	100	1, 2, 3, 4
FCU-E-11	TRANE	FCJB 020	E125-MECHANICAL	200	0.05	6,780	4,850	80.0	67.0	57.7	56.1	44	60	3	1.5	5.00	5,040	60.0	83.2	140	130	1	1.0	1.00	1/4	2.0	15.0	277	1	60	100	1, 2, 3, 4
FCU-E-21	TRANE	FCJB 020	E229-MECHANICAL	200	0.05	6,780	4,850	80.0	67.0	57.7	56.1	44	60	3	1.5	5.00	5,040	60.0	83.2	140	130	1	1.0	1.00	1/4	2.0	15.0	277	1	60	100	1, 2, 3, 4
FCU-E-31	TRANE	FCJB 040	MP02-MECH PLATFORM	400	0.05	14,210	10,140	80.0	67.0	56.7	55.5	44	60	3	3.0	15.00	8,720	60.0	80.1	140	131	1	2.0	1.00	1/4	2.0	15.0	277	1	60	125	1, 2, 3, 4
FCU-F-11	TRANE	FCCB 040	F101-STAIR	400	0.25	14,210	10,140	80.0	67.0	55.0	55.5	44	60	3	3.0	15.00	8,720	60.0	80.1	140	131	1	2.0	1.00	1/4	2.0	15.0	277	1	60	109	1, 2, 3, 5
FCU-F-21	TRANE	FCJB 040	F205-MECHANICAL	400	0.05	14,210	10,140	80.0	67.0	56.7	55.5	44	60	3	3.0	15.00	8,720	60.0	80.1	140	131	1	2.0	1.00	1/4	2.0	15.0	277	1	60	125	1, 2, 3, 4
FCU-F-22	TRANE	FCCB 040	F204-STAIR	400	0.25	14,210	10,140	80.0	67.0	55.0	55.5	44	60	3	3.0	15.00	8,720	60.0	80.1	140	120	1	2.0	0.00	1/4	2.0	15.0	277	1	60	109	1, 2, 3, 5
FCU-G-11	TRANE	FCCB080	G102-STAIR	800	0.25	26,310	19,470	80.0	67.0	57.7	56.4	44	60	4	5.0	15.00	16,000	60.0	90.0	140	120	1	2.0	0.00	1/4	2.0	15.0	277	1	60	147	1, 2, 3, 5
FCU-G-12	TRANE	FCJB 020	G125-MECHANICAL	200	0.05	6,780	4,850	80.0	67.0	57.7	56.1	44	60	3	1.5	5.00	5,040	60.0	83.2	140	130	1	1.0	1.00	1/4	2.0	15.0	277	1	60	100	1, 2, 3, 4
FCU-G-21	TRANE	FCCB080	F101-STAIR	800	0.25	26,310	19,470	80.0	67.0	57.7	56.4	44	60	4	5.0	15.00	16,000	60.0	90.0	140	120	1	2.0	0.00	1/4	2.0	15.0	277	1	60	147	1, 2, 3, 5
FCU-G-22	TRANE	FCJB 040	G217-MECHANICAL	400	0.05	14,210	10,140	80.0	67.0	56.7	55.5	44	60	3	3.0	15.00	8,720	60.0	80.1	140	131	1	2.0	1.00	1/4	2.0	15.0	277	1	60	125	1, 2, 3, 4
FCU-G-31	TRANE	FCJB 040	MP03-MECH PLATFORM	400	0.05	14,210	10,140	80.0	67.0	56.7	55.5	44	60	3	3.0	15.00	8,720	60.0	80.1	140	131	1	2.0	1.00	1/4	2.0	15.0	277	1	60	125	1, 2, 3, 4
FCU-H-11	TRANE	FCCB080	F101-STAIR	800	0.25	26,310	19,470	80.0	67.0	57.7	56.4	44	60	4	5.0	15.00	16,000	60.0	90.0	140	120	1	2.0	0.00	1/4	2.0	15.0	277	1	60	147	1, 2, 3, 5
FCU-H-12	TRANE	FCJB 020	H126-MECHANICAL	200	0.05	6,780	4,850	80.0	67.0	57.7	56.1	44	60	3	1.5	5.00	5,040	60.0	83.2	140	130	1	1.0	1.00	1/4	2.0	15.0	277	1	60	100	1, 2, 3, 4
FCU-H-21	TRANE	FCCB080	F101-STAIR	800	0.25	26,310	19,470	80.0	67.0	57.7	56.4	44	60	4	5.0	15.00	16,000	60.0	90.0	140	120	1	2.0	0.00	1/4	2.0	15.0	277	1	60	147	1, 2, 3, 5
FCU-H-22	TRANE	FCJB 040	H211-MECHANICAL	400	0.05	14,210	10,140	80.0	67.0	56.7	55.5	44	60	3	3.0	15.00	8,720	60.0	80.1	140	131	1	2.0	1.00	1/4	2.0	15.0	277	1	60	125	1, 2, 3, 4
FCU-H-31	TRANE	FCJB 040	MP04-MECH PLATFORM	400	0.05	14,210	10,140	80.0	67.0	56.7	55.5	44	60	3	3.0	15.00	8,720	60.0	80.1	140	131	1	2.0	1.00	1/4	2.0	15.0	277	1	60	125	1, 2, 3, 4

NOTES:
1. HEATING AND COOLING COIL SELECTIONS BASED ON CLEAR WATER. HEATING COIL IS IN THE PRE-HEAT POSITION.
2. FAN SHALL BE DIRECT DRIVE WITH ELECTRICALLY COMMUTATED MOTOR (ECM).
3. PROVIDE WITH FACTORY MOUNTED DISCONNECT SWITCH.
4. PROVIDE WITH FACTORY FILTER RACK WITH 1" MERV-8 RATED FILTER.
5. UNIT IS SUPPLIED WITH RETURN FILTER GRILLE.

SPLIT SYSTEM HEAT PUMP INDOOR UNIT SCHEDULE

TAG	MANUFACTURER	MODEL NUMBER	LOCATION	SUPPLY AIR (CFM)	OUTSIDE AIR (CFM)	ESP (IN WC)	COOLING: TOTAL CAPACITY (BTUH)	COOLING: SENSIBLE CAPACITY (BTUH)	COOLING: INDOOR EAT DB (°F)	COOLING: INDOOR EAT WB (°F)	HEATING @ 17°F: CAPACITY (BTUH)	HEATING @ 17°F: EAT (°F)	ELECTRICAL DATA: MCA (A)	ELECTRICAL DATA: MOCP (A)	SERVICE: V	SERVICE: PH	SERVICE: HZ	WEIGHT (LBS)	NOTES
HP AHU-01	TRANE	TEM6A0C60H51SA	A121-CORRIDOR	1800	200	0.5	53277	38522	75.8	64.1	35800	67.0	9.0	15	208	1	60	144	1
HP AHU-02	TRANE	TEM6A0C60H51SA	A124-WORKROOM	1820	375	0.5	53277	38522	75.8	64.1	35800	67.0	9.0	15	208	1	60	144	1
HP AHU-03	TRANE	TEM6A0B30H21S	A121-CORRIDOR	1000	125	0.5	29178	20402	77.8	66.5	17500	61.9	5.0	15	208	1	60	118	1
HP AHU-04	TRANE	TEM6A0C36H31S	A166-CORRIDOR	1200	115	0.5	34800	28300	80.0	67.0	32400	70.0	5.0	15	208	1	60	160	1
HP AHU-05	TRANE	TEM6A0C36H31S	A166-CORRIDOR	1200	135	0.5	40300	28300	80.0	67.0	38500	70.0	5.0	15	208	1	60	160	1
HP AHU-06	TRANE	TEM6A0C60H51SA	A162-WORKROOM	1800	300	0.5	53277	38522	75.8	64.1	35800	67.0	9.0	15	208	1	60	144	1
HP AHU-07	TRANE	TEM6A0B30H21S	A166-CORRIDOR	1000	150	0.5	29178	20402	81.0	66.0	0	70.0	5.0	15	208	1	60	118	1

NOTES:
1. IF UNITS ARE NOT SHIPPED BY JANUARY 1, 2025 AND INSTALLED BY JANUARY 1, 2026, PROVIDE ALTERNATE REFRIGERANT AS APPROVED BY THE EPA.

SPLIT SYSTEM HEAT PUMP OUTDOOR UNIT SCHEDULE

TAG	MANUFACTURER	MODEL NUMBER	LOCATION	AMBIENT AIR TEMPERATURE (°F)	EER	SEER	HSPF	REFRIGERANT: TYPE	REFRIGERANT: CHARGE (LBS)	ELECTRICAL DATA: MCA (A)	ELECTRICAL DATA: MOCP (A)	SERVICE: V	SERVICE: PH	SERVICE: HZ	WEIGHT (LBS)	NOTES
HP-1	TRANE	4TWA7060	ROOF	95.0	13	15.6	7.8	R-410A	12.6	10	15	480	3	60	350	1, 2
HP-2	TRANE	4TWA7060	ROOF	95.0	13	15.6	7.8	R-410A	12.6	10	15	480	3	60	350	1, 2
HP-3	TRANE	4TWR4030	ROOF	95.0	12	14.6	7.8	R-410A	6.1	15	25	208	1	60	200	1, 2
HP-4	TRANE	4TWA7036	ROOF	95.0	13	15.6	7.8	R-410A	12.6	8	15	480	3	60	350	1, 2
HP-5	TRANE	4TWA7036	ROOF	95.0	13	15.6	7.8	R-410A	12.6	8	15	480	3	60	350	1, 2
HP-6	TRANE	4TWA7060	ROOF	95.0	13	15.6	7.8	R-410A	12.6	10	15	480	3	60	350	1, 2
HP-7	TRANE	4TWR4030	ROOF	95.0	12	14.6	7.8	R-410A	6.1	15	25	208	1	60	200	1, 2

NOTES:
1. PROVIDE WITH SEACOAST COATINGS ON CONDENSER COILS.
2. IF UNITS ARE NOT SHIPPED BY JANUARY 1, 2025 AND INSTALLED BY JANUARY 1, 2026, PROVIDE ALTERNATE REFRIGERANT AS APPROVED BY THE EPA.

ELECTRIC UNIT HEATER SCHEDULE

TAG	MANUFACTURER	MODEL NUMBER	NUMBER	NAME	TYPE	HEATING CAPACITY (KW)	AIRFLOW (CFM)	ELECTRICAL DATA: (V)	(PH)	(HZ)	WEIGHT (LBS)	NOTES
ECH-1	TRANE	UHCA 041A8A	FH01	CONCESSIONS	RECESSED CEILING	3.0	300	277	1	60	50	1, 2
ECH-2	TRANE	UHCA 041A8A	FH01	CONCESSIONS	RECESSED CEILING	3.0	300	277	1	60	50	1, 2
ECH-3	TRANE	UHCA 041A8A	FH02	GIRLS	RECESSED CEILING	3.0	300	277	1	60	50	1, 2
ECH-4	TRANE	UHCA 041A8A	FH03	BOYS	RECESSED CEILING	3.0	300	277	1	60	50	1, 2
ECH-5	TRANE	UHCA 041A8A	FH04	LOCKER ROOM	RECESSED CEILING	3.0	300	277	1	60	50	1, 2
ECH-6	TRANE	UHCA 041A8A	FH05	LOCKER ROOM	RECESSED CEILING	3.0	300	277	1	60	50	1, 2
ECH-7	TRANE	UHCA 041A8A	FH06	STORAGE	RECESSED CEILING	3.0	300	277	1	60	50	1, 2

NOTES:
1. PROVIDE WITH UNIT MOUNTED DISCONNECT SWITCH.
2. PROVIDE WITH UNIT MOUNTED THERMOSTAT.

DUCTLESS SPLIT SYSTEM INDOOR UNIT SCHEDULE

TAG	MANUFACTURER	MODEL NUMBER	LOCATION: NUMBER	LOCATION: NAME	SUPPLY AIR (CFM)	TOTAL CAPACITY (BTUH)	SENSIBLE CAPACITY (BTUH)	INDOOR EAT: DB (°F)	INDOOR EAT: WB (°F)	ELECTRICAL DATA: MCA (A)	ELECTRICAL DATA: MOCP (A)	SERVICE: (V)	SERVICE: (PH)	SERVICE: (HZ)	WEIGHT (LBS)	NOTES
SSI-A-11	TRANE	TPKA0A018	A132	EQUIP	400	18000	13140	80	67	1.0	15	208	1	60	23	1, 2, 3
SSI-A-12	TRANE	TPKA0A036	A135	DATA	400	36000	25200	80	67	1.0	15	208	1	60	23	1, 2, 3
SSI-A-13	TRANE	TPKA0A018	A136	ELEC	400	18000	13140	80	67	1.0	15	208	1	60	23	1, 2, 3
SSI-B-11	TRANE	TPKA0A036	B112	ELECTRICAL	400	36000	25200	80	67	1.0	15	208	1	60	23	1, 2, 3
SSI-B-12	TRANE	TPKA0A036	B113	EM ELEC	400	36000	25200	80	67	1.0	15	208	1	60	23	1, 2, 3
SSI-B-13	TRANE	TPKA0A036	B108	DRY STORAGE	400	36000	25200	80	67	1.0	15	208	1	60	23	
SSI-D-11	TRANE	TPKA0A018	D112	DATA	400	18000	13140	80	67	1.0	15	208	1	60	23	1, 2, 3
SSI-D-21	TRANE	TPKA0A018	D219	DATA	400	18000	13140	80	67	1.0	15	208	1	60	23	
SSI-E-11	TRANE	TPKA0A018	E121	DATA	400	18000	13140	80	67	1.0	15	208	1	60	23	1, 2, 3
SSI-E-21	TRANE	TPKA0A018	E221	DATA	400	18000	13140	80	67	1.0	15	208	1	60	23	1, 2, 3
SSI-F-11	TRANE	TPKA0A018	F111	EQUIP	400	18000	13140	80	67	1.0	15	208	1	60	23	1, 2, 3
SSI-G-11	TRANE	TPKA0A018	G124	DATA	400	18000	13140	80	67	1.0	15	208	1	60	23	1, 2, 3
SSI-G-21	TRANE	TPKA0A018	G218	DATA	400	18000	13140	80	67	1.0	15	208	1	60	23	1, 2, 3
SSI-H-11	TRANE	TPKA0A018	H129	DATA	400	18000	13140	80	67	1.0	15	208	1	60	23	1, 2, 3
SSI-H-21	TRANE	TPKA0A018	H216	DATA	400	18000	13140	80	67	1.0	15	208	1	60	23	1, 2, 3

NOTES:
1. PROVIDE WITH WALL MOUNTED WIRED THERMOSTAT. PROVIDE BACNET INTERFACE FOR CONNECTION TO BUILDING AUTOMATION SYSTEM.
2. PROVIDE WITH CONDENSATE PUMP WIRED FROM INDOOR UNIT POWER.
3. DIVISION 26 POWER WIRE INDOOR UNIT AND CONDENSATE PUMP FROM OUTDOOR UNIT.

DUCTLESS SPLIT SYSTEM OUTDOOR UNIT SCHEDULE

TAG	MANUFACTURER	MODEL NUMBER	LOCATION	AMBIENT AIR TEMPERATURE (°F)	EER2	SEER2	HSPF2	REFRIGERANT: TYPE	REFRIGERANT: CHARGE (LBS)	ELECTRICAL DATA: MCA (A)	ELECTRICAL DATA: MOCP (A)	SERVICE: V	SERVICE: PH	SERVICE: HZ	WEIGHT (LBS)	NOTES
SSO-A-11	TRANE	TRUYA018	ROOF	95.0	10.7	20.2	-	R-410A	10.0	11	20	208	1	60	96	1, 2
SSO-A-12	TRANE	TRUYA036	ROOF	95.0	10.8	19.4	-	R-410A	15.0	25	30	208	1	60	96	1, 2
SSO-A-13	TRANE	TRUYA018	ROOF	95.0	10.7	20.2	-	R-410A	10.0	11	20	208	1	60	96	1, 2
SSO-B-11	TRANE	TRUYA036	ON GRADE	95.0	10.8	19.4	-	R-410A	15.0	25	30	208	1	60	96	1, 2
SSO-B-12	TRANE	TRUYA036	ON GRADE	95.0	10.8	19.4	-	R-410A	15.0	25	30	208	1	60	96	1, 2
SSO-B-13	TRANE	TRUYA036	ON GRADE	95.0	10.8	19.4	-	R-410A	15.0	25	30	208	1	60	96	1, 2
SSO-D-11	TRANE	TRUYA018	ROOF	95.0	10.7	20.2	-	R-410A	10.0	11	20	208	1	60	96	1, 2
SSO-D-21	TRANE	TRUYA018	ROOF	95.0	10.7	20.2	-	R-410A	10.0	11	20	208	1	60	96	1, 2
SSO-E-11	TRANE	TRUYA018	ROOF	95.0	10.7	20.2	-	R-410A	10.0	11	20	208	1	60	96	1, 2
SSO-E-21	TRANE	TRUYA018	ROOF	95.0	10.7	20.2	-	R-410A	10.0	11	20	208	1	60	96	1, 2
SSO-F-11	TRANE	TRUYA018	ROOF	95.0	10.7	20.2	-	R-410A	10.0	11	20	208	1	60	96	1, 2
SSO-G-11	TRANE	TRUYA018	ROOF	95.0	10.7	20.2	-	R-410A	10.0	11	20	208	1	60	96	1, 2
SSO-G-21	TRANE	TRUYA018	ROOF	95.0	10.7	20.2	-	R-410A	10.0	11	20	208	1	60	96	1, 2
SSO-H-11	TRANE	TRUYA018	ROOF	95.0	10.7	20.2	-	R-410A	10.0	11	20	208	1	60	96	1, 2
SSO-H-21	TRANE	TRUYA018	ROOF	95.0	10.7	20.2	-	R-410A	10.0	11	20	208	1	60	96	1, 2

NOTES:
1. DIVISION 26 POWER WIRE INDOOR UNIT FROM OUTDOOR UNIT.
2. PROVIDE SEACOAST MODEL CONDENSING UNIT WITH ANTI-CORROSION COATINGS. PROVIDE LOW-AMBIENT KIT FOR COOLING DOWN TO 0°F AMBIENT.
3. IF UNITS ARE NOT SHIPPED BY JANUARY 1, 2025 AND INSTALLED BY JANUARY 1, 2026, PROVIDE ALTERNATE REFRIGERANT AS APPROVED BY THE EPA.

VARIABLE FREQUENCY DRIVE SCHEDULE

TAG	MANUFACTURER	ROOM LOCATION: NUMBER	ROOM LOCATION: NAME	SERVING	MOUNTING	ELECTRICAL DATA: MOTOR SIZE (HP)	(V)	(PH)	(HZ)	NOTES
VFD CHWP-1	ABB	B119	MECHANICAL/ ELECTRICAL	CWHP-1	WALL	20	480	3	60	1
VFD CHWP-2	ABB	B119	MECHANICAL/ ELECTRICAL	CHWP-2	WALL	20	480	3	60	1
VFD HWP-1	HONEYWELL	B119	MECHANICAL/ ELECTRICAL	HWP-1	WALL	10	480	3	60	1
VFD HWP-2	HONEYWELL	B119	MECHANICAL/ ELECTRICAL	HWP-2	WALL	10	480	3	60	1

GENERAL NOTES:
A. PROVIDE ALL VARIABLE FREQUENCY DRIVES WITH 5% IMPEDANCE REACTORS. VARIABLE FREQUENCY DRIVES FOR AIR HANDLING UNITS ARE NOT INCLUDED IN THIS SCHEDULE AS THEY ARE UNIT MOUNTED.

NOTES:
1. PROVIDE WITH HAND/OFF/AUTO MANUAL BYPASS.

MAKE-UP AIR UNIT SCHEDULE(GAS)

TAG	MANUFACTURER	MODEL	SERVING	AIR FLOW (CFM)	FAN SPEED (RPM)	MOTOR (HP)	ESP (IN WC)	DRIVE TYPE	SONES	DIRECT GAS BURNER: EAT (°F)	LAT (°F)	INPUT CAPACITY (BTUH)	OUTPUT CAPACITY (BTUH)	CONTROLLED BY	ELECTRICAL DATA: FLA (A)	MCA (A)	MOP (A)	SERVICE: (V)	SERVICE: (PH)	SERVICE: (HZ)	WEIGHT (LBS)	NOTES
MAU-1	CAPTIVEAIRE	A2-D.500-20D	KITCHEN HOODS MAKEUP	3,890	1480	3	0.50	BELT	13.7	18	65	212,202	195,226	KITCHEN HOODS	4.3	5.4	15	480	3	60	800	1, 2, 3

NOTES:
1. PROVIDE WITH UNIT MOUNTED NON-FUSED DISCONNECT SWITCH.
2. PROVIDE WITH DIRECT DRIVE FAN.
3. INTERLOCK POWER AND CONTROL WIRING WITH KITCHEN HOOD. MAKEUP AIR U

VENTILATION CALCULATIONS - FIRST FLOOR

NUMBER	NAME	VENTILATION UNIT	HVAC UNIT	OCCUPANCY CLASSIFICATION	AREA (SF)	OCCUPANT DENSITY (#/1000 SF)	CODE OCCUPANCY	NUMBER OF PEOPLE (#)	OA AREA RATE (CFM/SF)	OA PEOPLE RATE (CFM/#)	UNCORRECTED OA REQUIRED (CFM)	OA PROVIDED (CFM)	TOTAL SUPPLY AIR (CFM)	EA AREA RATE (CFM/SF)	EA PER FIXTURE (CFM/#)	EA REQUIRED (CFM)	EA PROVIDED (CFM)
A142	MS GYMNASIUM	AHU-A-12	AHU-A-11	MULTIUSE ASSEMBLY	10624	100	1062.4	1059	0.06	7.5	8580	8590	8650	0.00	0.0	0	0
A143	TOILET	AHU-A-12	AHU-A-11	TOILET ROOMS-PUBLIC	125	0	0.0	2	0.00	0.0	0	0	40	0.00	70.0	140	150
A144	GIRLS LOCKER ROOM	AHU-A-12	AHU-A-11	SPORTS LOCKER ROOMS	376	0	0.0	0	0.00	0.0	0	0	150	0.50	0.0	188	250
A145	OFFICE	AHU-A-12	AHU-A-11	OFFICE SPACES	128	5	0.6	1	0.06	5.0	13	20	100	0.00	0.0	0	0
A146	LAUNDRY	AHU-A-12	AHU-A-11	COMMERCIAL LAUNDRY	150	10	1.5	2	0.00	25.0	50	70	220	0.00	0.0	0	200
A147	OFFICE	AHU-A-12	AHU-A-11	OFFICE SPACES	128	5	0.6	1	0.06	5.0	13	20	100	0.00	0.0	0	0
A148	BOYS LOCKER ROOM	AHU-A-12	AHU-A-11	SPORTS LOCKER ROOMS	379	0	0.0	0	0.00	0.0	0	0	150	0.50	0.0	189	250
A149	TOILET	AHU-A-12	AHU-A-11	TOILET ROOMS-PUBLIC	125	0	0.0	2	0.00	0.0	0	0	40	0.00	70.0	140	150
A101	LOBBY/ COMMONS	AHU-A-12	AHU-A-12	LOBBIES/PREFUNCTION	1982	30	59.4	58	0.06	7.5	554	560	3200	0.00	0.0	0	0
A102	CONCESSIONS	AHU-A-12	AHU-A-12	KITCHENS (COOKING)	155	0	0.0	3	0.00	0.0	0	40	400	0.70	0.0	109	0
AHU-A-12: 10					14173						9209	9300	13050			766	1000
A137	BOYS	AHU-B-11	AHU-B-11	TOILET ROOMS-PUBLIC	222	0	0.0	4	0.00	0.0	0	0	0	0.00	70.0	280	300
A138	GIRLS	AHU-B-11	AHU-B-11	TOILET ROOMS-PUBLIC	222	0	0.0	4	0.00	0.0	0	0	0	0.00	70.0	280	300
A139	JANITOR	AHU-B-11	AHU-B-11	JANITOR CLOSETS, TRASH ROOMS, RECYCLING**	55	0	0.0	0	0.00	0.0	0	0	0	1.00	0.0	55	100
B101	MS DINING	AHU-B-11	AHU-B-11	CAFETERIA, FAST FOOD	5370	100	537.0	543	0.18	7.5	5039	5100	8850	0.00	0.0	0	0
AHU-B-11: 4					5870						5039	5100	8850			615	700
B117	ES DINING	AHU-B-12	AHU-B-12	CAFETERIA, FAST FOOD	4978	100	497.8	495	0.18	7.5	4609	4600	7000	0.00	0.0	0	0
AHU-B-12: 1					4978						4609	4600	7000			0	0
10	WI FREEZER	AHU-B-13	AHU-B-13	STORAGE*	729	0	0.0	0	0.00	0.0	0	0	0	0.00	0.0	0	0
B102	MS SERVING LINES	AHU-B-13	AHU-B-13	KITCHENS (COOKING)	602	0	0.0	12	0.00	0.0	0	170	460	0.70	0.0	421	0
B103	DISH ROOM	AHU-B-13	AHU-B-13	KITCHENS (COOKING)	243	0	0.0	2	0.00	0.0	0	50	220	0.70	0.0	170	0
B104	KITCHEN	AHU-B-13	AHU-B-13	KITCHENS (COOKING)	1816	0	0.0	20	0.00	0.0	0	330	5170	0.70	0.0	1271	0
B105	ES SERVING LINES	AHU-B-13	AHU-B-13	KITCHENS (COOKING)	574	0	0.0	12	0.00	0.0	0	150	460	0.70	0.0	402	0
B106	DISH ROOM	AHU-B-13	AHU-B-13	KITCHENS (COOKING)	256	0	0.0	2	0.00	0.0	0	50	170	0.70	0.0	179	0
B107	JANITOR	AHU-B-13	AHU-B-13	JANITOR CLOSETS, TRASH ROOMS, RECYCLING**	109	0	0.0	0	0.00	0.0	0	0	40	1.00	0.0	109	150
B108	DRY STORAGE	AHU-B-13	AHU-B-13	STORAGE*	690	0	0.0	0	0.00	0.0	0	0	220	0.00	0.0	0	0
B109	TOILET	AHU-B-13	AHU-B-13	TOILET ROOMS-PUBLIC	80	0	0.0	1	0.00	0.0	0	0	30	0.00	70.0	70	100
B110	LOCKER	AHU-B-13	AHU-B-13	EDUCATION: LOCKER/DRESSING ROOMS	64	0	0.0	0	0.00	0.0	0	0	30	0.25	0.0	16	50
B111	OFFICE	AHU-B-13	AHU-B-13	OFFICE SPACES	158	5	0.8	0	0.06	5.0	9	14	100	0.00	0.0	0	0
B114	CORR	AHU-B-13	AHU-B-13	CORRIDORS	108	0	0.0	0	0.06	0.0	6	8	90	0.00	0.0	0	0
B116	CORRIDOR	AHU-B-13	AHU-B-13	CORRIDORS	430	0	0.0	0	0.06	0.0	26	28	400	0.00	0.0	0	0
AHU-B-13: 13					5859						42	800	7390			2639	300
A140	PLATFORM	AHU-B-14	AHU-B-14	THEATERS: STAGES, STUDIOS	1161	70	81.3	82	0.06	10.0	890	900	1500	0.00	0.0	0	0
A140	RAMP	AHU-B-14	AHU-B-14	CORRIDORS	116	0	0.0	0	0.06	0.0	7	15	0	0.00	0.0	0	0
A141	RAMP	AHU-B-14	AHU-B-14	CORRIDORS	104	0	0.0	0	0.06	0.0	6	10	0	0.00	0.0	0	0
A150	GYM STORAGE	AHU-B-14	AHU-B-14	STORAGE*	428	0	0.0	0	0.00	0.0	0	0	100	0.00	0.0	0	0
A161	DINING STORAGE	AHU-B-14	AHU-B-14	STORAGE*	338	0	0.0	0	0.00	0.0	0	0	100	0.00	0.0	0	0
AHU-B-14: 5					2147						903	925	1700			0	0
A152	GIRLS	AHU-B-15	AHU-B-15	TOILET ROOMS-PUBLIC	314	0	0.0	5	0.00	0.0	0	0	170	0.00	70.0	350	375
A153	BOYS	AHU-B-15	AHU-B-15	TOILET ROOMS-PUBLIC	326	0	0.0	5	0.00	0.0	0	0	170	0.00	70.0	350	375
B118	CORRIDOR	AHU-B-15	AHU-B-15	CORRIDORS	708	0	0.0	0	0.06	0.0	42	50	470	0.00	0.0	0	0
B120	CORRIDOR	AHU-B-15	AHU-B-15	CORRIDORS	693	0	0.0	0	0.06	0.0	42	50	150	0.00	0.0	0	0
B121	STAIR	AHU-B-15	AHU-B-15	STAIR*	221	0	0.0	0	0.00	0.0	0	0	550	0.00	0.0	0	106
B122	ES ART	AHU-B-15	AHU-B-15	ART CLASSROOM	1101	20	22.0	30	0.18	10.0	498	520	1040	0.70	0.0	771	800
B123	KILN	AHU-B-15	AHU-B-15	ART CLASSROOM	66	20	1.3	2	0.18	10.0	32	40	100	0.70	0.0	46	100
B124	CORRIDOR	AHU-B-15	AHU-B-15	CORRIDORS	548	0	0.0	0	0.06	0.0	33	40	100	0.00	0.0	0	0
AHU-B-15: 8					5978						647	700	2750			1517	1650
A105	CONFERENCE	ERV-A-1	SSI-01	CONFERENCE ROOMS	285	50	14.2	15	0.06	5.0	92	95	500	0.00	0.0	0	0
A108	SECRETARY	ERV-A-1	SSI-01	OFFICE SPACES	144	5	0.7	1	0.06	5.0	14	15	180	0.00	0.0	0	0
A109	PRINCIPAL	ERV-A-1	SSI-01	OFFICE SPACES	196	5	1.0	1	0.06	5.0	17	19	260	0.00	0.0	0	0
A120	BOOKKEEPER	ERV-A-1	SSI-01	OFFICE SPACES	190	5	0.9	1	0.06	5.0	16	18	220	0.00	0.0	0	0
A123	A.P.	ERV-A-1	SSI-01	OFFICE SPACES	165	5	0.8	1	0.06	5.0	15	15	150	0.00	0.0	0	0
A128	GUID OFF	ERV-A-1	SSI-01	OFFICE SPACES	194	5	1.0	1	0.06	5.0	17	19	245	0.00	0.0	0	0
A129	GUID OFF	ERV-A-1	SSI-01	OFFICE SPACES	201	5	1.0	1	0.06	5.0	17	19	245	0.00	0.0	0	0
A106	CLINIC	ERV-A-1	SSI-02	OFFICE SPACES	231	5	1.2	2	0.06	5.0	24	30	115	0.00	0.0	0	200
A107	TOILET	ERV-A-1	SSI-02	TOILET ROOMS-PUBLIC	56	0	0.0	1	0.00	0.0	0	0	0	0.00	70.0	70	100
A110	TOILET	ERV-A-1	SSI-02	TOILET ROOMS-PUBLIC	48	0	0.0	1	0.00	0.0	0	0	0	0.00	70.0	70	100
A111	TOILET	ERV-A-1	SSI-02	TOILET ROOMS-PUBLIC	48	0	0.0	1	0.00	0.0	0	0	0	0.00	70.0	70	100
A112	STORAGE	ERV-A-1	SSI-02	STORAGE*	69	0	0.0	0	0.00	0.0	0	0	25	0.00	0.0	0	0
A113	CORRIDOR	ERV-A-1	SSI-02	STORAGE*	132	0	0.0	0	0.00	0.0	0	0	30	0.00	0.0	0	0
A117	SRO	ERV-A-1	SSI-02	OFFICE SPACES	149	5	0.7	1	0.06	5.0	14	15	50	0.00	0.0	0	0
A118	CORR.	ERV-A-1	SSI-02	CORRIDORS	1022	0	0.0	0	0.06	0.0	61	65	225	0.00	0.0	0	0
A119	RECORDS	ERV-A-1	SSI-02	STORAGE*	171	0	0.0	0	0.00	0.0	0	0	40	0.00	0.0	0	0
A122	BREAK AREA	ERV-A-1	SSI-02	OFFICE SPACES	228	5	1.1	2	0.06	5.0	24	25	200	0.00	0.0	0	0
A124	WORKROOM	ERV-A-1	SSI-02	OFFICE SPACES	208	5	1.0	1	0.06	5.0	17	20	170	0.00	0.0	0	0
A125	BOOK STORAGE	ERV-A-1	SSI-02	STORAGE*	207	0	0.0	0	0.00	0.0	0	0	50	0.00	0.0	0	0
A126	GUIDANCE	ERV-A-1	SSI-02	OFFICE SPACES	691	5	3.5	4	0.06	5.0	61	65	220	0.00	0.0	0	0
A127	G. STOR	ERV-A-1	SSI-02	OFFICE SPACES	121	5	0.6	1	0.06	5.0	12	15	0	0.00	0.0	0	0
A130	GUID CONF	ERV-A-1	SSI-02	CONFERENCE ROOMS	222	50	11.1	12	0.06	5.0	73	75	240	0.00	0.0	0	0
A131	GUID OFF	ERV-A-1	SSI-02	OFFICE SPACES	153	5	0.8	1	0.06	5.0	14	15	75	0.00	0.0	0	0
A133	STAIR	ERV-A-1	SSI-02	STAIR*	253	0	0.0	0	0.00	0.0	0	0	0	0.00	0.0	0	0
A134	CORRIDOR	ERV-A-1	SSI-02	CORRIDORS	822	0	0.0	0	0.06	0.0	49	50	380	0.00	0.0	0	0
A180	STAIR	ERV-A-1	SSI-02	STAIR*	89	0	0.0	0	0.00	0.0	0	0	0	0.00	0.0	0	0
A104	WAITING/ RECEPTION	ERV-A-1	SSI-03	RECEPTION AREAS	460	30	13.8	14	0.06	5.0	98	98	700	0.00	0.0	0	0
A121	CORR	ERV-A-1	SSI-03	CORRIDORS	449	0	0.0	0	0.06	0.0	27	27	300	0.00	0.0	0	0
ERV-A-1: 28					7202						663	700	4620			210	500
A157	GUID CONF	ERV-A-2	SSI-04	CONFERENCE ROOMS	212	50	10.6	11	0.06	5.0	68	70	480	0.00	0.0	0	0
A158	G. OFFICE	ERV-A-2	SSI-04	OFFICE SPACES	142	5	0.7	1	0.06	5.0	14	15	240	0.00	0.0	0	0
A159	A.P.	ERV-A-2	SSI-04	OFFICE SPACES	137	5	0.7	1	0.06	5.0	13	15	240	0.00	0.0	0	0
A164	A.P.	ERV-A-2	SSI-04	OFFICE SPACES	139	5	0.7	1	0.06	5.0	13	15	240	0.00	0.0	0	0
A165	BOOKKEEPER	ERV-A-2	SSI-05	OFFICE SPACES	131	5	0.7	1	0.06	5.0	13	15	230	0.00	0.0	0	0
A170	PRINCIPAL	ERV-A-2	SSI-05	OFFICE SPACES	194	5	1.0	1	0.06	5.0	17	20	260	0.00	0.0	0	0
A171	SECRETARY	ERV-A-2	SSI-05	OFFICE SPACES	148	5	0.7	1	0.06	5.0	14	15	230	0.00	0.0	0	0
A172	CONFERENCE	ERV-A-2	SSI-05	CONFERENCE ROOMS	244	50	12.2	13	0.06	5.0	80	85	480	0.00	0.0	0	0
A154	GUIDANCE	ERV-A-2	SSI-06	OFFICE SPACES	317	5	1.6	2	0.06	5.0	29	35	180	0.00	0.0	0	0
A155	G. STOR	ERV-A-2	SSI-06	OFFICE SPACES	71	5	0.4	1	0.06	5.0	9	15	40	0.00	0.0	0	0
A156	STUDENT SERVICES	ERV-A-2	SSI-06	CONFERENCE ROOMS	197	50	9.9	10	0.06	5.0	62	65	170	0.00	0.0	0	0
A160	G. OFFICE	ERV-A-2	SSI-06	OFFICE SPACES	142	5	0.7	1	0.06	5.0	14	15	100	0.00	0.0	0	0
A161	G. OFFICE	ERV-A-2	SSI-06	OFFICE SPACES	143	5	0.7	1	0.06	5.0	14	15	100	0.00	0.0	0	0
A162	WORK/ BREAK ROOM	ERV-A-2	SSI-06	OFFICE SPACES	304	5	1.5	0	0.06	5.0	18	25	300	0.00	0.0	0	0
A163	RECORDS	ERV-A-2	SSI-06	STORAGE*	168	0	0.0	0	0.00	0.0	0	0	90	0.00	0.0	0	0
A167	STORAGE	ERV-A-2	SSI-06	STORAGE*	65	0	0.0	0	0.00	0.0	0	0	40	0.00	0.0	0	0
A173	TOILET	ERV-A-2	SSI-06	TOILET ROOMS-PUBLIC	59	0	0.0	1	0.00	0.0	0	0	0	0.00	70.0	70	100
A174	CLINIC	ERV-A-2	SSI-06	OFFICE SPACES	325	5	1.6	2	0.06	5.0	30	30	140	0.00	0.0	0	200
A176	CORRIDOR	ERV-A-2	SSI-06	CORRIDORS	1381	0	0.0	0	0.06	0.0	83	100	640	0.00	0.0	0	0
A166	CORRIDOR	ERV-A-2	SSI-07	CORRIDORS	504	0	0.0	0	0.06	0.0	30	50	150	0.00	0.0	0	0
A168	TOILET	ERV-A-2	SSI-07	TOILET ROOMS-PUBLIC	48	0	0.0	1	0.00	0.0	0	0	0	0.00	70.0	70	100
A169	TOILET	ERV-A-2	SSI-07	TOILET ROOMS-PUBLIC	48	0	0.0	1	0.00	0.0	0	0	0	0.00	70.0	70	100
A175	WAITING/ RECEPTION	ERV-A-2	SSI-07	RECEPTION AREAS	450	30	13.5	14	0.06	5.0	97	100	850	0.00	0.0	0	0
ERV-A-2: 23					5570						616	700	5200			210	500
C101	STAIR	ERV-C	AHU-C-11	STAIR*	476	0	0.0	0	0.00	0.0	0	0	540	0.00	0.0	0	0
C108	MS MUSIC	ERV-C	AHU-C-11	MUSIC/THEATER/DANCE	1321	35	46.2	47	0.06	10.0	549	550	1180	0.00	0.0	0	0
C109	STORAGE	ERV-C	AHU-C-11	STORAGE*	249	0	0.0	0	0.00	0.0	0	0	60	0.00	0.0	0	0
C110	EXCEPTIONAL S/C	ERV-C	AHU-C-11	CLASSROOMS (AGE 9 PLUS)	1142	35	40.0	30	0.00	7.5	225	225	1100	0.00	0.0	0	0
C112	CALM	ERV-C	AHU-C-11	OFFICE SPACES	52	5	0.3	1	0.06	5.0	8	15	60	0.00	0.0	0	0
C112	BREAK	ERV-C	AHU-C-11	OFFICE SPACES	181	5	0.9	3	0.06	5.0	26	30	0	0.00	0.0	0	100
C113	CHANGING	ERV-C	AHU-C-11	STORAGE*	97	0	0.0	0	0.00	0.0	0	0	0	0.00	0.0	0	100
C114	TOILET	ERV-C	AHU-C-11	TOILET ROOMS-PUBLIC	75	0	0.0	1	0.00	0.0	0	0	100	0.00	70.0	70	100
C115	EXCEPTIONAL S/C	ERV-C	AHU-C-11	CLASSROOMS (AGE 9 PLUS)	1130	35	39.6	30	0.00	7.5	225	225	1000	0.00	0.0	0	0
C115A	CALM	ERV-C	AHU-C-11	OFFICE SPACES	52	5	0.3	1	0.06	5.0	8	10	60	0.00	0.0	0	0
C116	BOYS	ERV-C	AHU-C-11	TOILET ROOMS-PUBLIC	232	0	0.0	4	0.00	0.0	0	0	0	0.00	70.0	280	300
C117	GIRLS	ERV-C	AHU-C-11	TOILET ROOMS-PUBLIC	232	0	0.0	4	0.00	0.0	0	0	0	0.00	70.0	280	300
C118	CODDIDOR	ERV-C	AHU-C-11	CORRIDORS	2282	0	0.0	0	0.06	0.0	137	140	800	0.00	0.0	0	0
C120	HEALTH CLASSROOM	ERV-C	AHU-C-11	CLASSROOMS (AGE 9 PLUS)	721	35	25.2	30	0.00	7.5	225	225	700	0.00	0.0	0	0
C126	CORRIDOR	ERV-C	AHU-C-11	CORRIDORS	909	0	0.0	0	0.06	0.0	55	55	400	0.00	0.0	0	0
ERV-C: 15					9153						1458	1475	6000			630	900
C102	CLASSROOM	ERV-D-1	AHU-D-11	CLASSROOMS (AGE 9 PLUS)	767	35	26.9	30	0.00	7.5	225	225	780	0.00	0.0	0	0
D101	CLASSROOM	ERV-D-1	AHU-D-11	CLASSROOMS (AGE 9 PLUS)	795	35	27.8	30	0.00	7.5	225	225	680	0.00	0.0	0	0
D102	CLASSROOM	ERV-D-1	AHU-D-11	CLASSROOMS (AGE 9 PLUS)	802	35	28.1	30	0.00	7.5	225	225	700	0.00	0.0	0	0
D107	SCIENCE LAB	ERV-D-1	AHU-D-11	SCIENCE LABORATORIES	1116	25	27.9	30	0.18	10.0	501	525	820	1.00	0.0	1116	650
D108a	CORRIDOR-2	ERV-D-1	AHU-D-11	CORRIDORS	198	0	0.0	0	0.06	0.0	12	25	180	0.00	0.0	0	0
D109	SCIENCE LAB	ERV-D-1	AHU-D-11	SCIENCE LABORATORIES	1116	25	27.9	30	0.18	10.0	501	525	820	1.00	0.0	1116	650
D113	CLASSROOM	ERV-D-1	AHU-D-11	CLASSROOMS (AGE 9 PLUS)	802	35	28.1	30	0.00	7.5	225	225	680	0.00	0.0	0	0
D115	CLASSROOM	ERV-D-1	AHU-D-11	CLASSROOMS (AGE 9 PLUS)	796	35	27.9	30	0.00	7.5	225	225	800	0.00	0.0	0	0
D116	STAIR	ERV-D-1	AHU-D-11	STAIR*	482	0	0.0	25	0.00	0.0	0	0	740	0.00	0.0	0	0
C103	CORRIDOR	ERV-D-1	AHU-D-12	CORRIDORS	330	0	0.0	0	0.06	0.0	20	24	80	0.00	0.0	0	0
C104	RESOURCE	ERV-D-1	AHU-D-12	CLASSROOMS (AGE 9 PLUS)	461	35	16.2	17	0.00	7.5	128	130	380	0.00	0.0	0	0
C105	BOOK STORAGE	ERV-D-1	AHU-D-12	STORAGE*	89	0	0.0	0	0.00	0.0	0	0	40	0.00	0.0	0	0
C106	CORRIDOR	ERV-D-1	AHU-D-12	CORRIDORS	335	0	0.0	0	0.06	0.0	20	25	80	0.00	0.0	0	0
C127	TOILET	ERV-D-1	AHU-D-12	TOILET ROOMS-PUBLIC	49	0	0.0	1	0.00	0.0	0	0	0	0.00	70.0	70	100
D103	EXTENDED LEARNING AREA	ERV-D-1	AHU-D-12	CLASSROOMS (AGE 9 PLUS)	407	35	14.3	15	0.00	7.5	113	114	300	0.00	0.0	0	0
D104	JAN	ERV-D-1	AHU-D-12	JANITOR CLOSETS, TRASH ROOMS, RECYCLING**	38	0	0.0	0	0.00	0.0	0	0	0	1.00	0.0	38	100
D105	BOYS	ERV-D-1	AHU-D-12	TOILET ROOMS-PUBLIC	200	0	0.0	4	0.00	0.0	0	0	65	0.00	70.0	280	300
D106	GIRLS	ERV-D-1	AHU-D-12	TOILET ROOMS-PUBLIC	202	0	0.0	4	0.00	0.0	0	0	65	0.00	70.0	280	300
D108	CORRIDOR	ERV-D-1	AHU-D-12	CORRIDORS	1294	0	0.0	0	0.06	0.0	78	80	285	0.00	0.0	0	0
D110	PREP ROOM	ERV-D-1	AHU-D-12	SCIENCE LABORATORIES	154	25	3.9	0	0.18	10.0	28	50	100	1.00	0.0	154	200
D111	ELEC	ERV-D-1	AHU-D-12	ELECTRICAL*	78	0	0.0	0	0.00	0.0	0	0	100	0.00	0.0	0	0
D114	RESOURCE	ERV-D-1	AHU-D-12	TELEPHONE CLOSETS*	452	0	0.0	0	0.00	0.0	0	0	380	0.00	0.0	0	0
D117	EXTENDED LEARNING AREA	ERV-D-1	AHU-D-12	CLASSROOMS (AGE 9 PLUS)	400	35	14.0	14	0.00	7.5	105	106	260	0.00	0.0	0	0
D123	CORRDIOR	ERV-D-1	AHU-D-12	CORRIDORS	1290	0	0.0	0	0.06	0.0	77	78	285	0.00	0.0	0	0
D126	TEACHER WORKROOM/ LOUNGE	ERV-D-1	AHU-D-12	OFFICE SPACES	442	5	2.2	3	0.06	5.0	42	43	180	0.00	0.0	0	0
C107	CLASSROOM	ERV-D-1	AHU-D-13	CLASSROOMS (AGE 9 PLUS)	789	35	27.6	30	0.00	7.5	225	225	760	0.00	0.0	0	0
D118	CLASSROOM	ERV-D-1	AHU-D-13	CLASSROOMS (AGE 9 PLUS)	796	35	27.9	30	0.00	7.5	225	225	860	0.00	0.0	0	0
D119	CLASSROOM	ERV-D-1	AHU-D-13	CLASSROOMS (AGE 9 PLUS)	802	35	28.1	30	0.00	7.5	225	225	760	0.00	0.0	0	0
D121	SCIENCE LAB	ERV-D-1	AHU-D-13	SCIENCE LABORATORIES	1116	25	27.9	30	0.18	10.0	501	525	900	1.00	0.0	1116	650
D122	SCIENCE LAB	ERV-D-1	AHU-D-13	SCIENCE LABORATORIES	1116	25	27.9	30	0.18	10.0	501	525	900	1.00	0.0	1116	650
D123a	CORRDIOR	ERV-D-1	AHU-D-13	CORRIDORS	198	0	0.0	0	0.06	0.0	12	25	200	0.00	0.0	0	0
D124	CLASSROOM	ERV-D-1	AHU-D-13	CLASSROOMS (AGE 9 PLUS)	802	35	28.1	30	0.00	7.5	225	225	760	0.00	0.0	0	0

VENTILATION CALCULATIONS - FIRST FLOOR

NUMBER	NAME	VENTILATION UNIT	HVAC UNIT	OCCUPANCY CLASSIFICATION	AREA (SF)	OCCUPANT DENSITY (#/1000 SF)	CODE OCCUPANCY	NUMBER OF PEOPLE (#)	OA AREA RATE (CFM/SF)	OA PEOPLE RATE (CFM/#)	UNCORRECTED OA REQUIRED (CFM)	OA PROVIDED (CFM)	TOTAL SUPPLY AIR (CFM)	EA AREA RATE (CFM/SF)	EA PER FIXTURE (CFM/#)	EA REQUIRED (CFM)	EA PROVIDED (CFM)
D125	CLASSROOM	ERV-D-1	AHU-D-13	CLASSROOMS (AGE 9 PLUS)	795	35	27.8	30	0.00	7.5	225	225	760	0.00	0.0	0	0
ERV-D-1: 33					19512						4886	5050	14700			5286	3600
C121	CLASSROOM	ERV-E-1	AH

VENTILATION CALCULATIONS - SECOND FLOOR

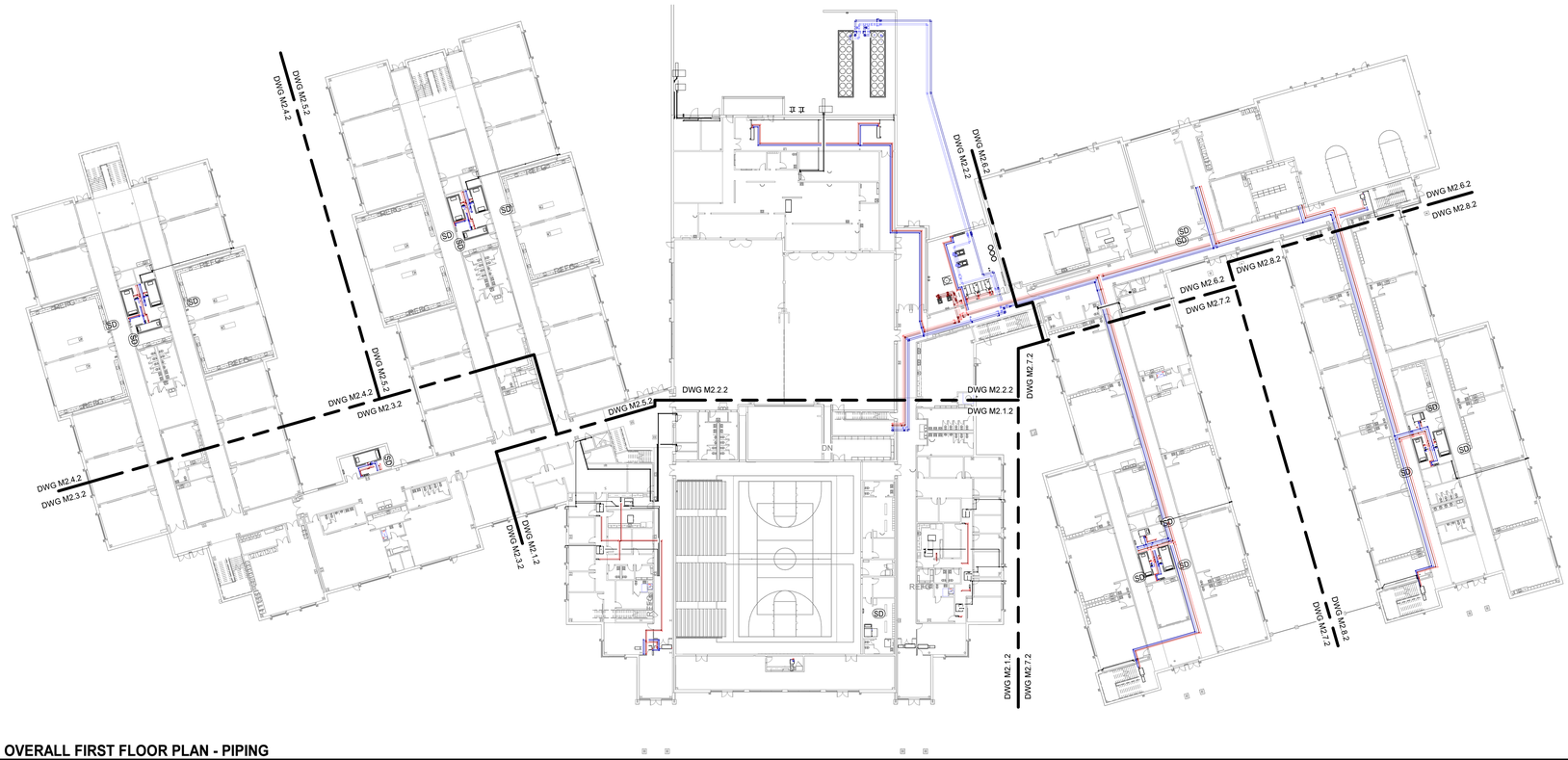
NUMBER	NAME	VENTILATION UNIT	HVAC UNIT	OCCUPANCY CLASSIFICATION	AREA (SF)	OCCUPANT DENSITY (#/1000 SF)	CODE OCCUPANCY	NUMBER OF PEOPLE (#)	OA AREA RATE (CFM/SF)	OA PEOPLE RATE (CFM/#)	UNCORRECTED OA REQUIRED (CFM)	OA PROVIDED (CFM)	TOTAL SUPPLY AIR (CFM)	EA AREA RATE (CFM/SF)	EA PER FIXTURE (CFM/#)	EA REQUIRED (CFM)	EA PROVIDED (CFM)
186	STAIR	AHU-A-21	AHU-A-21	STAIR*	432	0	0.0	0	0.00	0.0	0	0	0	0.00	0.0	0	0
A201	MS MEDIA CENTER	AHU-A-21	AHU-A-21	MEDIA CENTER	4395	25	109.9	115	0.12	10.0	1677	1700	2960	0.00	0.0	0	0
A202	WORKRM	AHU-A-21	AHU-A-21	OFFICE SPACES	404	5	2.0	4	0.06	5.0	44	45	270	0.00	0.0	0	0
A203	STOR.	AHU-A-21	AHU-A-21	STORAGE*	278	0	0.0	0	0.00	0.0	0	0	110	0.00	0.0	0	0
A204	CONFERENCE	AHU-A-21	AHU-A-21	CONFERENCE ROOMS	479	50	23.9	25	0.06	5.0	154	155	700	0.00	0.0	0	0
A205	MAKERS SPACE	AHU-A-21	AHU-A-21	MEDIA CENTER	481	25	12.0	12	0.12	10.0	178	180	960	0.00	0.0	0	0
A206	GREEN ROOM	AHU-A-21	AHU-A-21	OFFICE SPACES	81	5	0.4	1	0.06	5.0	10	15	80	0.00	0.0	0	0
A207	TV PROD	AHU-A-21	AHU-A-21	OFFICE SPACES	194	5	1.0	2	0.06	5.0	22	25	150	0.00	0.0	0	0
A208	CORRIDOR	AHU-A-21	AHU-A-21	CORRIDORS	1360	0	0.0	0	0.06	0.0	82	90	720	0.00	0.0	0	0
A209	CORRIDOR	AHU-A-21	AHU-A-21	CORRIDORS	144	0	0.0	0	0.06	0.0	9	15	0	0.00	0.0	0	0
AHU-A-21: 10					8249						2175	2225	5950			0	0
F201	STAIR	AHU-B-15	AHU-B-15	STAIR*	325	0	0.0	0	0.00	0.0	0	0	1150	0.00	0.0	0	0
F201a	STAIR	AHU-B-15	AHU-B-15	STAIR*	491	0	0.0	0	0.00	0.0	0	0	0	0.00	0.0	0	0
AHU-B-15: 2					815						0	0	1150			0	0
C201	STAIR	ERV-C	AHU-C-21	STAIR*	481	0	0.0	0	0.00	0.0	0	0	630	0.00	0.0	0	0
C202	MS DANCE/ DRAMA	ERV-C	AHU-C-21	CLASSROOMS (AGE 9 PLUS)	1555	35	54.4	55	0.00	7.5	413	415	1500	0.00	0.0	0	0
C203	MS ART	ERV-C	AHU-C-21	ART CLASSROOM	1227	20	24.5	30	0.18	10.0	521	525	1080	0.70	0.0	859	900
C204	MS STEM LAB	ERV-C	AHU-C-21	MEDIA CENTER	1460	25	36.5	37	0.12	10.0	545	550	1500	0.00	0.0	0	0
C205	GIRLS	ERV-C	AHU-C-21	TOILET ROOMS-PUBLIC	232	0	0.0	4	0.00	0.0	0	0	70	0.00	70.0	280	300
C206	BOYS	ERV-C	AHU-C-21	TOILET ROOMS-PUBLIC	232	0	0.0	4	0.00	0.0	0	0	70	0.00	70.0	280	300
C207	STAFF TOILET	ERV-C	AHU-C-21	CORRIDORS	65	0	0.0	0	0.06	0.0	4	5	100	0.00	0.0	0	0
C208	CORRIDOR	ERV-C	AHU-C-21	CORRIDORS	1425	0	0.0	0	0.06	0.0	86	100	920	0.00	0.0	0	0
C209	STOR.	ERV-C	AHU-C-21	STORAGE*	176	0	0.0	0	0.00	0.0	0	0	70	0.00	0.0	0	0
C210	A.P.	ERV-C	AHU-C-21	OFFICE SPACES	196	5	1.0	1	0.06	5.0	17	20	270	0.00	0.0	0	0
C211	CORR	ERV-C	AHU-C-21	CORRIDORS	92	0	0.0	0	0.06	0.0	5	5	30	0.00	0.0	0	0
C223	CORRIDOR	ERV-C	AHU-C-21	CORRIDORS	917	0	0.0	0	0.06	0.0	55	55	560	0.00	0.0	0	0
ERV-C: 12					8059						1645	1675	6800			1419	1500
C222	CLASSROOM	ERV-D-2	AHU-D-21	CLASSROOMS (AGE 9 PLUS)	767	35	26.9	30	0.00	7.5	225	225	820	0.00	0.0	0	0
D201	CLASSROOM	ERV-D-2	AHU-D-21	CLASSROOMS (AGE 9 PLUS)	795	35	27.8	30	0.00	7.5	225	225	760	0.00	0.0	0	0
D202	CLASSROOM	ERV-D-2	AHU-D-21	CLASSROOMS (AGE 9 PLUS)	802	35	28.1	30	0.00	7.5	225	225	760	0.00	0.0	0	0
D207	SCIENCE LAB	ERV-D-2	AHU-D-21	SCIENCE LABORATORIES	1111	25	27.8	30	0.18	10.0	500	500	940	1.00	0.0	1111	850
D208a	CORRIDOR	ERV-D-2	AHU-D-21	CORRIDORS	203	0	0.0	0	0.06	0.0	12	50	190	0.00	0.0	0	0
D209	CLASSROOM	ERV-D-2	AHU-D-21	CLASSROOMS (AGE 9 PLUS)	1134	35	39.7	30	0.00	7.5	225	225	940	0.00	0.0	0	250
D212	CLASSROOM	ERV-D-2	AHU-D-21	CLASSROOMS (AGE 9 PLUS)	802	35	28.1	30	0.00	7.5	225	225	760	0.00	0.0	0	0
D214	CLASSROOM	ERV-D-2	AHU-D-21	CLASSROOMS (AGE 9 PLUS)	796	35	27.9	30	0.00	7.5	225	225	880	0.00	0.0	0	0
D215	STAIR	ERV-D-2	AHU-D-21	STAIR*	492	0	0.0	0	0.00	0.0	0	0	350	0.00	0.0	0	0
C218	CORRIDOR	ERV-D-2	AHU-D-22	CORRIDORS	343	0	0.0	0	0.06	0.0	21	25	120	0.00	0.0	0	0
C219	BOOK STORAGE	ERV-D-2	AHU-D-22	STORAGE*	90	0	0.0	0	0.00	0.0	0	0	60	0.00	0.0	0	0
C220	RESOURCE	ERV-D-2	AHU-D-22	CLASSROOMS (AGE 9 PLUS)	461	35	16.2	16	0.00	7.5	120	125	340	0.00	0.0	0	0
C221	CORRIDOR	ERV-D-2	AHU-D-22	CORRIDORS	343	0	0.0	0	0.06	0.0	21	25	120	0.00	0.0	0	0
C224	TOILET	ERV-D-2	AHU-D-22	TOILET ROOMS-PUBLIC	48	0	0.0	1	0.00	0.0	0	0	0	0.00	70.0	70	100
D203	EXTENDED LEARNING AREA	ERV-D-2	AHU-D-22	CLASSROOMS (AGE 9 PLUS)	418	35	14.6	15	0.00	7.5	113	115	300	0.00	0.0	0	0
D204	JAN	ERV-D-2	AHU-D-22	JANITOR CLOSETS, TRASH ROOMS, RECYCLING**	38	0	0.0	0	0.00	0.0	0	0	0	1.00	0.0	38	100
D205	BOYS	ERV-D-2	AHU-D-22	TOILET ROOMS-PUBLIC	201	0	0.0	4	0.00	0.0	0	0	70	0.00	70.0	280	300
D206	GIRLS	ERV-D-2	AHU-D-22	TOILET ROOMS-PUBLIC	201	0	0.0	4	0.00	0.0	0	0	70	0.00	70.0	280	300
D208	CORRIDOR	ERV-D-2	AHU-D-22	CORRIDORS	1276	0	0.0	0	0.06	0.0	77	80	450	0.00	0.0	0	0
D210	PREP ROOM	ERV-D-2	AHU-D-22	SCIENCE LABORATORIES	154	25	3.9	4	0.18	10.0	68	70	110	1.00	0.0	154	200
D211	ELEC	ERV-D-2	AHU-D-22	ELECTRICAL*	78	0	0.0	0	0.00	0.0	0	0	100	0.00	0.0	0	0
D213	RESOURCE	ERV-D-2	AHU-D-22	CLASSROOMS (AGE 9 PLUS)	452	35	15.8	16	0.00	7.5	120	120	400	0.00	0.0	0	0
D216	EXTENDED LEARNING AREA	ERV-D-2	AHU-D-22	CLASSROOMS (AGE 9 PLUS)	392	35	13.7	15	0.00	7.5	113	115	300	0.00	0.0	0	0
D221	CORRIDOR	ERV-D-2	AHU-D-22	CORRIDORS	1276	0	0.0	0	0.06	0.0	77	80	450	0.00	0.0	0	0
D226	TEACHER WORKROOM/ LOUNGE	ERV-D-2	AHU-D-22	WORKROOMS: COMPUTER (WITHOUT PRINTING)	442	4	1.8	3	0.06	5.0	42	45	210	0.00	0.0	0	0
C217	CLASSROOM	ERV-D-2	AHU-D-23	CLASSROOMS (AGE 9 PLUS)	789	35	27.6	30	0.00	7.5	225	225	820	0.00	0.0	0	0
D217	CLASSROOM	ERV-D-2	AHU-D-23	CLASSROOMS (AGE 9 PLUS)	796	35	27.9	30	0.00	7.5	225	225	940	0.00	0.0	0	0
D218	CLASSROOM	ERV-D-2	AHU-D-23	CLASSROOMS (AGE 9 PLUS)	802	35	28.1	30	0.00	7.5	225	225	820	0.00	0.0	0	0
D221a	CORRIDOR	ERV-D-2	AHU-D-23	CORRIDORS	195	0	0.0	0	0.06	0.0	12	25	170	0.00	0.0	0	0
D222	SCIENCE LAB	ERV-D-2	AHU-D-23	SCIENCE LABORATORIES	1111	25	27.8	30	0.18	10.0	500	500	980	1.00	0.0	1111	575
D223	SCIENCE LAB	ERV-D-2	AHU-D-23	SCIENCE LABORATORIES	1111	25	27.8	30	0.18	10.0	500	500	980	1.00	0.0	1111	575
D224	CLASSROOM	ERV-D-2	AHU-D-23	CLASSROOMS (AGE 9 PLUS)	802	35	28.1	30	0.00	7.5	225	225	820	0.00	0.0	0	0
D225	CLASSROOM	ERV-D-2	AHU-D-23	CLASSROOMS (AGE 9 PLUS)	795	35	27.8	30	0.00	7.5	225	225	820	0.00	0.0	0	0
ERV-D-2: 33					19520						4768	4850	15850			4156	3250
C215	CLASSROOM	ERV-E-2	AHU-E-21	CLASSROOMS (AGE 9 PLUS)	793	35	27.7	30	0.00	7.5	225	225	760	0.00	0.0	0	0
E201	CLASSROOM	ERV-E-2	AHU-E-21	CLASSROOMS (AGE 9 PLUS)	796	35	27.9	30	0.00	7.5	225	225	760	0.00	0.0	0	0
E202	CLASSROOM	ERV-E-2	AHU-E-21	CLASSROOMS (AGE 9 PLUS)	803	35	28.1	30	0.00	7.5	225	225	760	0.00	0.0	0	0
E207	SCIENCE LAB	ERV-E-2	AHU-E-21	SCIENCE LABORATORIES	1109	25	27.7	30	0.18	10.0	500	525	920	1.00	0.0	1109	775
E209	SCIENCE LAB	ERV-E-2	AHU-E-21	SCIENCE LABORATORIES	1109	25	27.7	30	0.18	10.0	500	525	920	1.00	0.0	1109	775
E210-2	CORRIDOR-2	ERV-E-2	AHU-E-21	CORRIDORS	189	0	0.0	0	0.06	0.0	11	25	160	0.00	0.0	0	0
E211	CLASSROOM	ERV-E-2	AHU-E-21	CLASSROOMS (AGE 9 PLUS)	803	35	28.1	30	0.00	7.5	225	225	760	0.00	0.0	0	0
E212	CLASSROOM	ERV-E-2	AHU-E-21	CLASSROOMS (AGE 9 PLUS)	796	35	27.9	30	0.00	7.5	225	225	760	0.00	0.0	0	0
E213	CLASSROOM	ERV-E-2	AHU-E-21	CLASSROOMS (AGE 9 PLUS)	786	35	27.5	30	0.00	7.5	225	225	900	0.00	0.0	0	0
E214	STAIR	ERV-E-2	AHU-E-21	STAIR*	504	0	0.0	0	0.00	0.0	0	0	445	0.00	0.0	0	0
C212	RESOURCE	ERV-E-2	AHU-E-22	CONFERENCE ROOMS	425	50	21.3	22	0.06	5.0	136	150	400	0.00	0.0	0	0
C213	BOOK STORAGE	ERV-E-2	AHU-E-22	STORAGE*	90	0	0.0	0	0.00	0.0	0	0	50	0.00	0.0	0	0
C214	CORRIDOR	ERV-E-2	AHU-E-22	CORRIDORS	332	0	0.0	0	0.06	0.0	20	20	105	0.00	0.0	0	0
C225	TOILET	ERV-E-2	AHU-E-22	TOILET ROOMS-PUBLIC	48	0	0.0	1	0.00	0.0	0		0	0.00	70.0	70	100
E203	EXTENDED LEARNING AREA	ERV-E-2	AHU-E-22	CLASSROOMS (AGE 9 PLUS)	412	35	14.4	25	0.00	7.5	188	200	320	0.00	0.0	0	0
E204	JAN	ERV-E-2	AHU-E-22	JANITOR CLOSETS, TRASH ROOMS, RECYCLING**	37	0	0.0	0	0.00	0.0	0	0	0	1.00	0.0	37	100
E205	BOYS	ERV-E-2	AHU-E-22	TOILET ROOMS-PUBLIC	201	0	0.0	4	0.00	0.0	0	0	70	0.00	70.0	280	300
E206	GIRLS	ERV-E-2	AHU-E-22	TOILET ROOMS-PUBLIC	201	0	0.0	4	0.00	0.0	0	0	70	0.00	70.0	280	300
E208	PREP ROOM	ERV-E-2	AHU-E-22	SCIENCE PREP ROOMS	154	25	3.8	4	0.12	10.0	58	60	110	1.00	0.0	154	200
E210	CORRIDOR	ERV-E-2	AHU-E-22	CORRIDORS	1519	0	0.0	0	0.06	0.0	91	100	480	0.00	0.0	0	0
E215	EXTENDED LEARNING AREA	ERV-E-2	AHU-E-22	CLASSROOMS (AGE 9 PLUS)	374	35	13.1	14	0.00	7.5	105	200	145	0.00	0.0	0	0
E216	RESOURCE	ERV-E-2	AHU-E-22	CONFERENCE ROOMS	451	50	22.6	23	0.06	5.0	142	150	400	0.00	0.0	0	0
E220	ELEC	ERV-E-2	AHU-E-22	ELECTRICAL*	77	0	0.0	0	0.00	0.0	0	0	100	0.00	0.0	0	0
E222	CORRIDOR	ERV-E-2	AHU-E-22	CORRIDORS	1514	0	0.0	0	0.06	0.0	91	100	480	0.00	0.0	0	0
E227	TEACHER WORKROOM/ LOUNGE	ERV-E-2	AHU-E-22	OFFICE SPACES	449	5	2.2	3	0.06	5.0	42	50	220	0.00	0.0	0	0
E230	CORRIDOR	ERV-E-2	AHU-E-22	CORRIDORS	332	0	0.0	0	0.06	0.0	20	20	105	0.00	0.0	0	0
E217	CLASSROOM	ERV-E-2	AHU-E-23	CLASSROOMS (AGE 9 PLUS)	785	35	27.5	30	0.00	7.5	225	225	940	0.00	0.0	0	0
E218	CLASSROOM	ERV-E-2	AHU-E-23	CLASSROOMS (AGE 9 PLUS)	795	35	27.8	30	0.00	7.5	225	225	820	0.00	0.0	0	0
E219	CLASSROOM	ERV-E-2	AHU-E-23	CLASSROOMS (AGE 9 PLUS)	802	35	28.1	30	0.00	7.5	225	225	820	0.00	0.0	0	0
E222-2	CORRIDOR-2	ERV-E-2	AHU-E-23	CORRIDORS	189	0	0.0	0	0.06	0.0	11	25	160	0.00	0.0	0	0
E223	SCIENCE LAB	ERV-E-2	AHU-E-23	SCIENCE LABORATORIES	1108	25	27.7	30	0.18	10.0	499	525	1000	1.00	0.0	1108	800
E224	SCIENCE LAB	ERV-E-2	AHU-E-23	SCIENCE LABORATORIES	1094	25	27.4	30	0.18	10.0	497	525	1000	1.00	0.0	1094	800
E225	CLASSROOM	ERV-E-2	AHU-E-23	CLASSROOMS (AGE 9 PLUS)	802	35	28.1	30	0.00	7.5	225	225	820	0.00	0.0	0	0
E226	CLASSROOM	ERV-E-2	AHU-E-23	CLASSROOMS (AGE 9 PLUS)	795	35	27.8	30	0.00	7.5	225	225	820	0.00	0.0	0	0
E228	CLASSROOM	ERV-E-2	AHU-E-23	CLASSROOMS (AGE 9 PLUS)	792	35	27.7	30	0.00	7.5	225	225	820	0.00	0.0	0	0
ERV-E-2: 35					21470						5611	5900	17400			5242	4150
F204	CORRIDOR	ERV-F	AHU-F-21	CORRIDORS	2358	0	0.0	0	0.06	0.0	141	150	1640	0.00	0.0	0	0
F206	RESOURCE	ERV-F	AHU-F-21	CLASSROOMS (AGE 9 PLUS)	520	35	18.2	18	0.00	7.5	135	140	400	0.00	0.0	0	0
F207	BOOK STORAGE	ERV-F	AHU-F-21	STORAGE*	278	0	0.0	0	0.00	0.0	0	0	110	0.00	0.0	0	0
ERV-F: 3					3156						276	290	2150			0	0
G201	SECOND GRADE	ERV-G	AHU-G-21	CLASSROOMS (AGES 5-8)	906	25	22.6	25	0.00	7.5	188	200	720	0.00	0.0	0	350
G202	SECOND GRADE	ERV-G	AHU-G-21	CLASSROOMS (AGES 5-8)	956	25	23.9	25	0.00	7.5	188	200	740	0.00	0.0	0	350
G204	SECOND GRADE	ERV-G	AHU-G-21	CLASSROOMS (AGES 5-8)	793	25	19.8	25	0.00	7.5	188	200	820	0.00	0.0	0	0
G205	SECOND GRADE	ERV-G	AHU-G-21	CLASSROOMS (AGES 5-8)	979	25	24.5	25	0.00	7.5	188	200	810	0.00	0.0	0	0
G207	SECOND GRADE	ERV-G	AHU-G-21	CLASSROOMS (AGES 5-8)	972	25	24.3	25	0.00	7.5	188	200	810	0.00	0.0	0	0
G209	THIRD GRADE	ERV-G	AHU-G-21	CLASSROOMS (AGE 9 PLUS)	919	35	32.2	30	0.00	7.5	225	225	800	0.00	0.0	0	0
G203	RESOURCE	ERV-G	AHU-G-22	CLASSROOMS (AGE 9 PLUS)	455	35	15.9	16	0.00	7.5	120	125	400	0.00	0.0	0	0
G206	ELEC	ERV-G	AHU-G-22	ELECTRICAL*	66	0	0.0	0	0.00	0.0	0	0	100	0.00	0.0	0	100
G208	CORRIDOR	ERV-G	AHU-G-22	CORRIDORS	887	0	0.0	0	0.06	0.0	53	60	310	0.00	0.0	0	0
G212	RESOURCE	ERV-G	AHU-G-22	CONFERENCE ROOMS	406	50	20.3	21	0.06	5.0	129	130	360	0.00	0.0	0	0
G216	CORRIDOR	ERV-G	AHU-G-22	CORRIDORS	1894	0	0.0	0	0.06	0.0	114	115	630	0.00	0.0	0	0
G219	TEACHER WORKROOM/ LOUNGE	ERV-G	AHU-G-22	OFFICE SPACES	414	5	2.1	3	0.06	5.0	40	50	200	0.00	0.0	0	175
G223	CORRIDOR	ERV-G	AHU-G-22	CORRIDORS	216	0	0.0	0	0.06	0.0	13	15	100	0.00	0.0	0	0
F202	BOYS	ERV-G	AHU-G-23	TOILET ROOMS-PUBLIC	261	0	0.0	4	0.00	0.0	0	0	130	0.00	70.0	280	300
F203	JANITOR	ERV-G	AHU-G-23	JANITOR CLOSETS, TRASH ROOMS, RECYCLING**	55	0	0.0	0	0.00	0.0	0	0	0	1.00	0.0	55	100
G211	EXTENDED LEARNING AREA	ERV-G	AHU-G-23	CLASSROOMS (AGE 9 PLUS)	395	35	13.8	14	0.00	7.5	105	105	540	0.00	0.0	0	0
G213	THIRD GRADE	ERV-G	AHU-G-23	CLASSROOMS (AGE 9 PLUS)	984	35	34.4	30	0.00	7.5	225	225	1000	0.00	0.0	0	0
G214	THIRD GRADE	ERV-G	AHU-G-23	CLASSROOMS (AGE 9 PLUS)	954	35	33.4	30	0.00	7.5	225	225	900	0.00	0.0	0	0
G215	THIRD GRADE	ERV-G	AHU-G-23	CLASSROOMS (AGE 9 PLUS)	961	35	33.6	30	0.00	7.5	225	225	900	0.00	0.0	0	0
G220	THIRD GRADE	ERV-G	AHU-G-23	CLASSROOMS (AGE 9 PLUS)	961	35	33.6	30	0.00	7.5	225	225	900	0.00	0.0	0	0
G221	THIRD GRADE	ERV-G	AHU-G-23	CLASSROOMS (AGE 9 PLUS)	959	35	33.6	30	0.00	7.5	225	225	900	0.00	0.0	0	0
G222	GIRLS	ERV-G	AHU-G-23	TOILET ROOMS-PUBLIC	234	0	0.0	4	0.00	0.0	0	0	130	0.00	70.0	280	300
ERV-G: 22					15626						2861	2950	12200			615	1675
H201	THIRD GRADE	ERV-H	AHU-H-21	CLASSROOMS (AGE 9 PLUS)	905	35	31.7	30	0.00	7.5	225	225	800	0.00	0.0	0	550
H202	CLASSROOM 4-5	ERV-H	AHU-H-21	CLASSROOMS (AGE 9 PLUS)	867	35	30.4	30	0.00	7.5	225	225	820	0.00	0.0	0	0
H203	CLASSROOM 4-5	ERV-H	AHU-H-21	CLASSROOMS (AGE 9 PLUS)	887	35	31.0	30	0.00	7.5	225	225	820	0.00	0.0	0	0
H205	CLASSROOM 4-5	ERV-H	AHU-H-21	CLASSROOMS (AGE 9 PLUS)	887	35	31.0	30	0.00	7.5	225	225	820	0.00	0.0	0	0
H206	CLASSROOM 4-5	ERV-H	AHU-H-21	CLASSROOMS (AGE 9 PLUS)	887	35	31.0	30	0.00	7.5	225	225	820	0.00	0.0	0	0
H208	CLASSROOM 4-5	ERV-H	AHU-H-21	CLASSROOMS (AGE 9 PLUS)	845	35	29.6	30	0.00	7.5	225	225	820	0.00	0.0	0	0
H204	TEACHER WORKROOM/ LOUNGE	ERV-H	AHU-H-22	OFFICE SPACES	443	5	2.2	3	0.06	5.0	42	50	220	0.00	0.0	0	0
H210	CORRIDOR	ERV-H	AHU-H-22	CORRIDORS	1827	0	0.0	0	0.06	0.0	110	110	600	0.00	0.0	0	0
H212	BOYS	ERV-H	AHU-H-22	TOILET ROOMS-PUBLIC	169	0	0.0	4	0.00	0.0	0	0	0	0.00	70.0	280	300
H213	CORRIDOR	ERV-H	AHU-H-22	CORRIDORS	168	0	0.0	0	0.06	0.0	10	10	80	0.00	0.0	0	0
H214	GIRLS	ERV-H	AHU-H-22	TOILET ROOMS-PUBLIC	168	0	0.0	4	0.00	0.0	0	0	0	0.00	70.0	280	300
H215	ELEC	ERV-H	AHU-H-22	ELECTRICAL*	84	0	0.0	0	0.00	0.0	0	0	100	0.00	0.0	0	100
H221	CORRIDOR	ERV-H	AHU-H-22	CORRIDORS	1091	0	0.0	0	0.06	0.0	65	65	300	0.00	0.0	0	0
H222	CORRIDOR	ERV-H	AHU-H-22	CORRIDORS	255	0	0.0	0	0.06	0.0	15	15	100	0.00	0.0	0	0
H211	EXTENDED LEARNING AREA	ERV-H	AHU-H-23	CLASSROOMS (AGE 9 PLUS)	438	35	15.3	16	0.00	7.5	120	125	580	0.00	0.0	0	0
H218	CLASSROOM 4-5	ERV-H	AHU-H-23	CLASSROOMS (AGE 9 PLUS)	861	35	30.1	30	0.00	7.5	225	225	1000	0.00	0.0	0	0
H219	CLASSROOM 4-5	ERV-H	AHU-H-23	CLASSROOMS (AGE 9 PLUS)	857	35	30.0	30	0.00	7.5	225	225	900	0.00	0.0	0	0
H220	CLASSROOM 4-5	ERV-H	AHU-H-23	CLASSROOMS (AGE 9 PLUS)	857	35	30.0	30	0.00	7.5	225	225	900	0.00	0.0	0	0
H222	CLASSROOM 4-5	ERV-H	AHU-H-23	CLASSROOMS (AGE 9 PLUS)	857	35	30.0	30	0.00	7.5	225	225	800	0.00	0.0	0	0
H223	RESOURCE	ERV-H	AHU-H-23	CONFERENCE ROOMS	399	50	19.9	23	0.06	5.0	139	140	600	0.00	0.0	0	0
H224	CLASSROOM 4-5	ERV-H	AHU-H-23	CLASSROOMS (AGE 9 PLUS)	1025	35	35.9	30	0.00	7.5	225	225	990	0.00	0.0	0	0
H225	THIRD GRADE	ERV-H	AHU-H-23	CLASSROOMS (AGE 9 PLUS)	949	35	33.2	30	0.00	7.5	225	225	880	0.00	0.0	0	700

VENTILATION CALCULATIONS - SECOND FLOOR

| NUMBER | NAME | VENTILATION UNIT | HVAC UNIT | OCCUPANCY CLASSIFICATION | AREA (SF) | OCCUPANT DENSITY (#/1000 SF) | CODE OCCUPANCY | NUMBER OF PEOPLE (#) | OA AREA RATE (CFM/SF) | OA

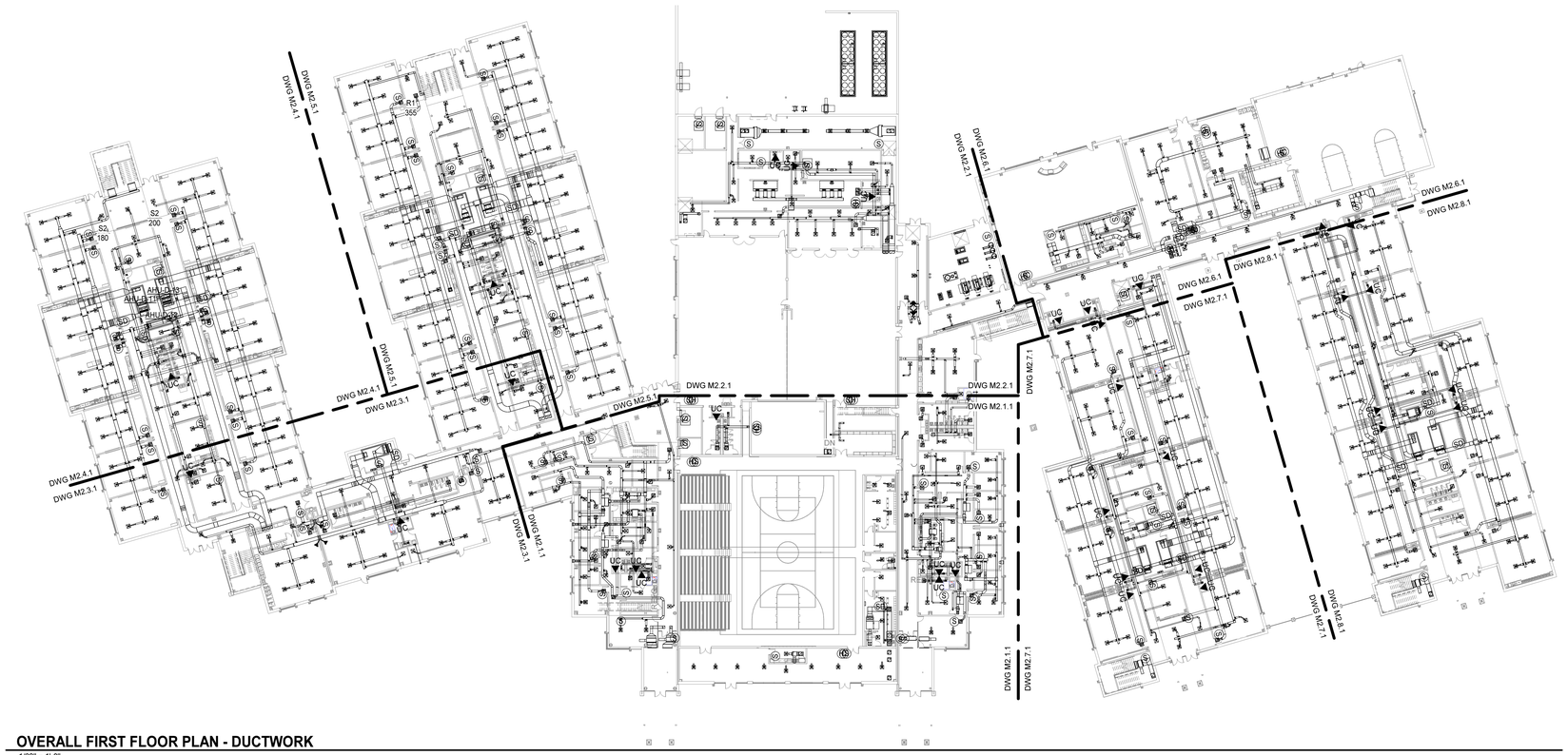
GENERAL NOTES

A. OVERALL PLAN PROVIDED FOR REFERENCE ONLY. REFER TO PART PLANS FOR ALL DETAILS.



OVERALL FIRST FLOOR PLAN - PIPING

1/32" = 1'-0"



OVERALL FIRST FLOOR PLAN - DUCTWORK

1/32" = 1'-0"

MOSELEY ARCHITECTS
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PHONE (919) 840-0091
MOSELEYARCHITECTS.COM

NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER BRITTNEY WHITE
8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310	
DATE:	AUGUST 2, 2024
REVISIONS	
DATE	DESCRIPTION

OVERALL FLOOR PLAN - FIRST FLOOR

0' 8' 16' 32' 64'
1/32" = 1'-0"

M2.0.1

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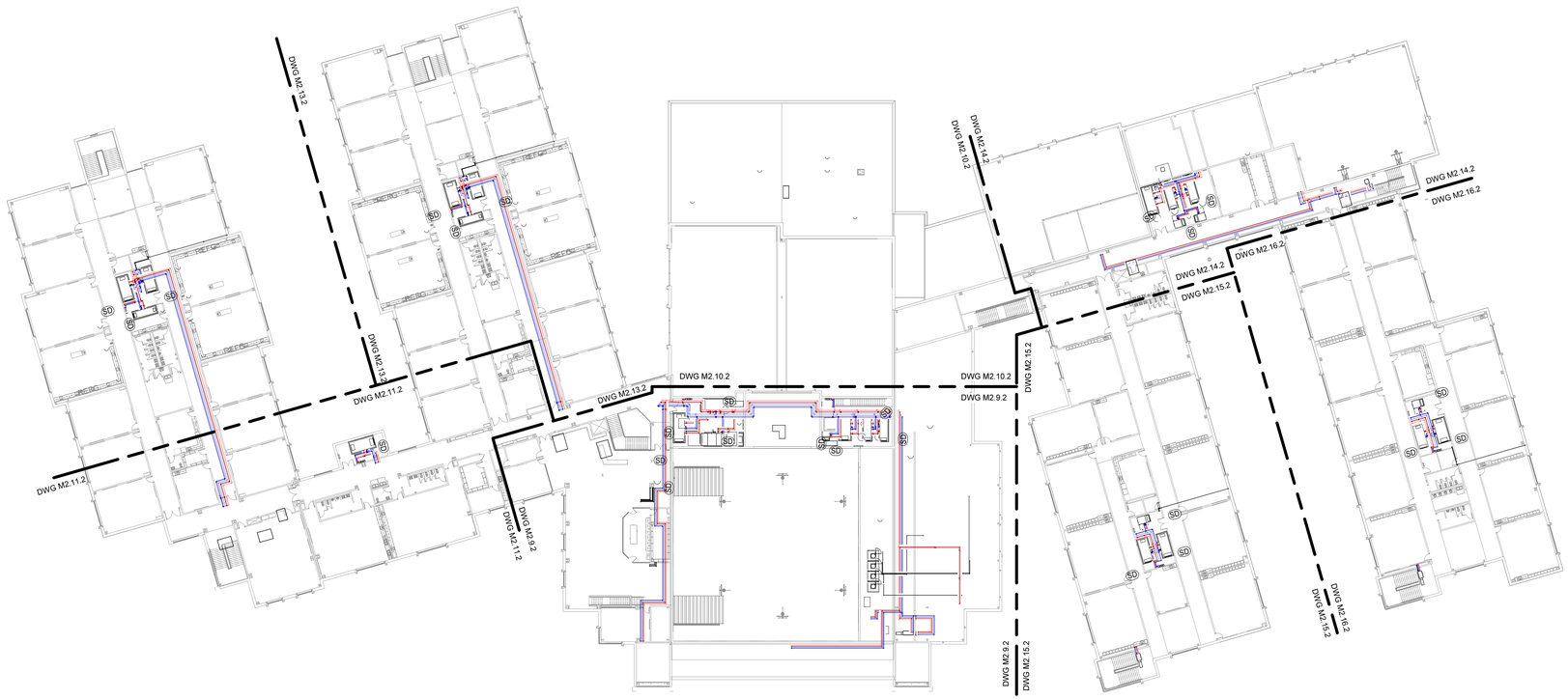
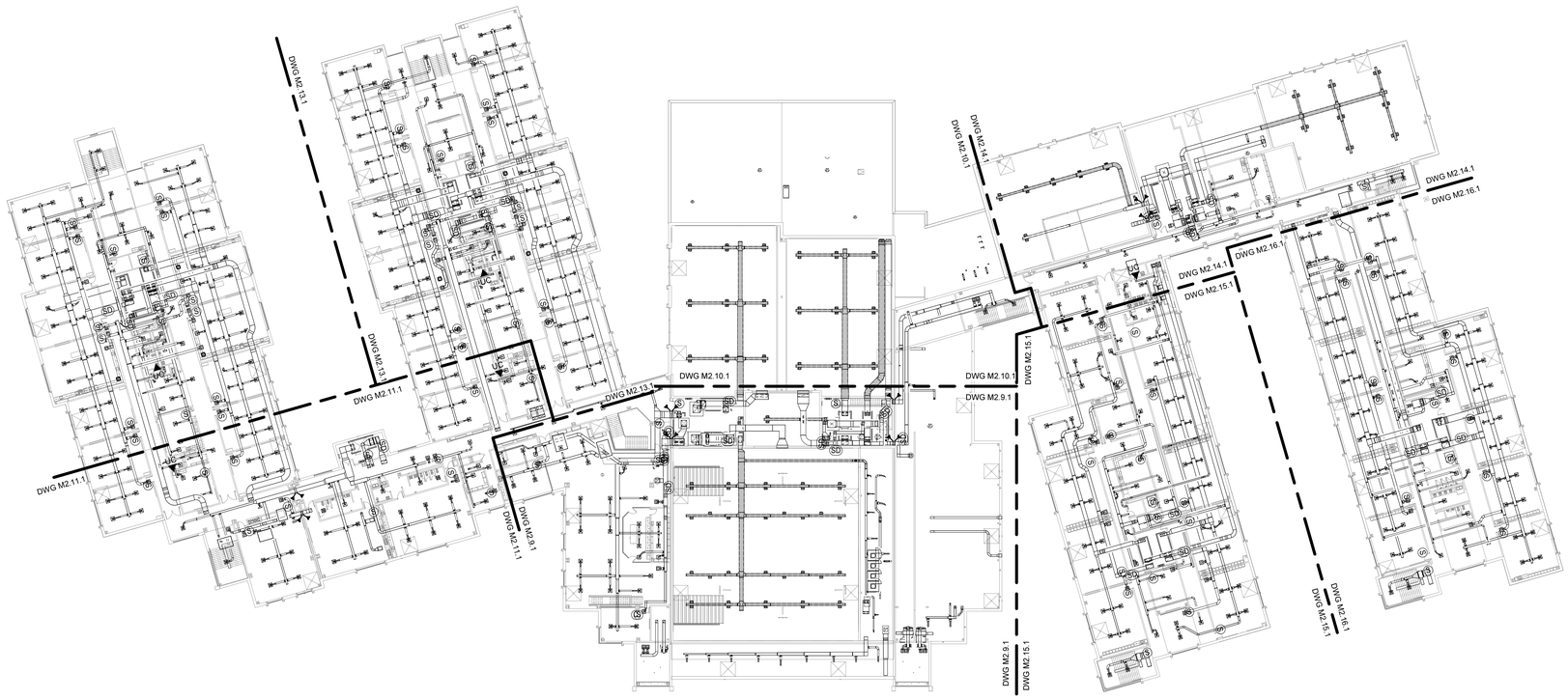
GENERAL NOTES

A. OVERALL PLAN PROVIDED FOR REFERENCE ONLY. REFER TO PART PLANS FOR ALL DETAILS.



OVERALL SECOND FLOOR PLAN - PIPING

1/32" = 1'-0"



OVERALL SECOND FLOOR PLAN - DUCTWORK

1/32" = 1'-0"

0' 8' 16' 32' 64'

1/32" = 1'-0"

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NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER KEITH T WHITE

8/ 2/ 2024

D E B F C A G H

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

OVERALL FLOOR PLAN - SECOND FLOOR

M2.0.2

8/2/2024 3:43:17 PM

KEYNOTES

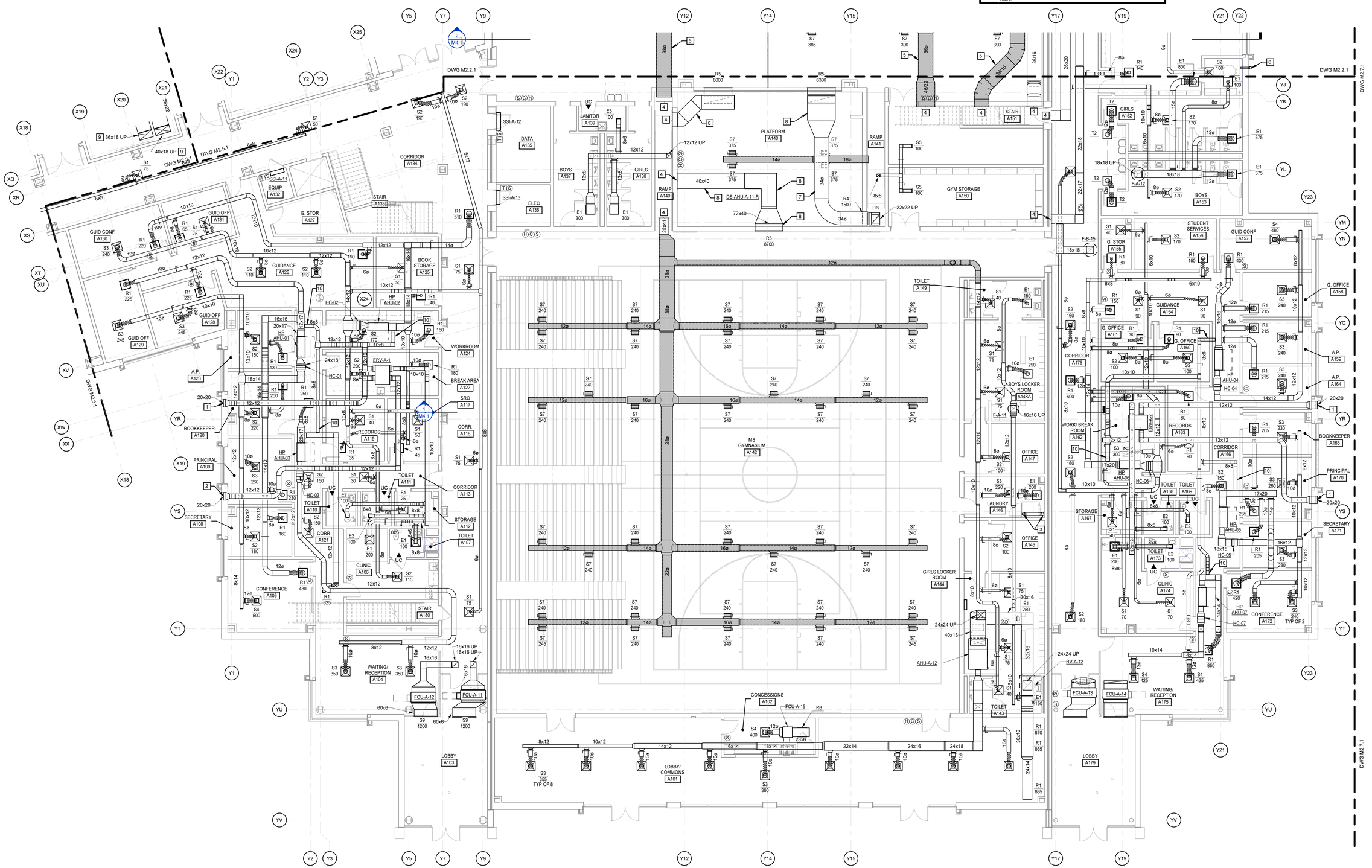
APPLIES TO THIS DRAWING

1. CONNECT DUCT TO LOUVER. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT SIZE AND LOCATION.
2. OPEN END DUCT, COVER WITH 1/2"x1/2" WELDED WIRE MESH.
3. 8" DRYER VENT UP TO DRYER VENT ON ROOF. ROOF PENETRATION SHALL BE A MINIMUM 4' FROM FIRE WALL. SIZE AND INSTALL IN ACCORDANCE WITH COMMERCIAL DRYER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
4. REFER TO ENLARGED PLAN FOR CONTINUATION.
5. ALL SUPPLY DUCTWORK EXPOSED IN SPACE TO BE 1" DOUBLE WALL DUCT WITH PERFORATED INNER LINER.
6. PROVIDE KILN EXHAUST BLOWER AND FLEXIBLE DUCT TO BOTTOM CONNECTION OF KILN. REFER TO DIVISION 11. PROVIDE VENT TERMINATION ON EXTERIOR WALL. MOUNT BLOWER ON WALL AND POWER WITH PLUG RECEPTACLE. INTERLOCK FAN CONTROLS WITH KILN.

KEYNOTES

APPLIES TO THIS DRAWING

7. WRAP ALL ROUND RETURN DUCTWORK EXPOSED IN THIS SPACE WITH ONE LAYER OF MASS-LOADED VINYL WRAP. REFER TO SECTION 230700 FOR ADDITIONAL DETAILS.
8. WRAP ALL RECTANGULAR RETURN DUCT EXPOSED IN THIS SPACE WITH TWO LAYERS OF MASS-LOADED VINYL WRAP. REFER TO SECTION 230700 FOR ADDITIONAL DETAILS.
9. DUCT PENETRATES UNRATED FLOOR. FILL THE ANNULAR SPACE AROUND THE PENETRATING DUCT WITH APPROVED NONCOMBUSTIBLE MATERIAL THAT RESISTS THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION IN ACCORDANCE WITH 607.6.3, EXCEPTION 2 OF THE NCMC.
10. BALANCE OUTSIDE AIR FOR SPLIT SYSTEM TO VALUE LISTED IN SPLIT SYSTEM SCHEDULE.



FIRST FLOOR PLAN - PART A - DUCTWORK

1/8" = 1'-0"

0' 2' 4' 8' 16'

1/8" = 1'-0"

8/2/2024 3:26:39 PM

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NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER BRITTNEY WHEELER
8/2/2024

A

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310	
DATE:	AUGUST 2, 2024
REVISIONS	
DATE	DESCRIPTION

FIRST FLOOR PLAN - PART A - DUCTWORK

M2.1.1

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1 SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

2 REFRIGERANT SUCTION AND LIQUID UP TO CONDENSING UNIT ON ROOF. ROUTE PIPING THROUGH PIPE CURB, REFER TO REFRIGERANT PIPE PENETRATION DETAIL - ROOF FOR ADDITIONAL DETAILS.

3 REFRIGERANT SUCTION AND LIQUID UP TO FLOOR ABOVE.

4 DISCHARGE CONDENSATE DRAIN 6" ABOVE GRADE ONTO SPLASH BLOCK.

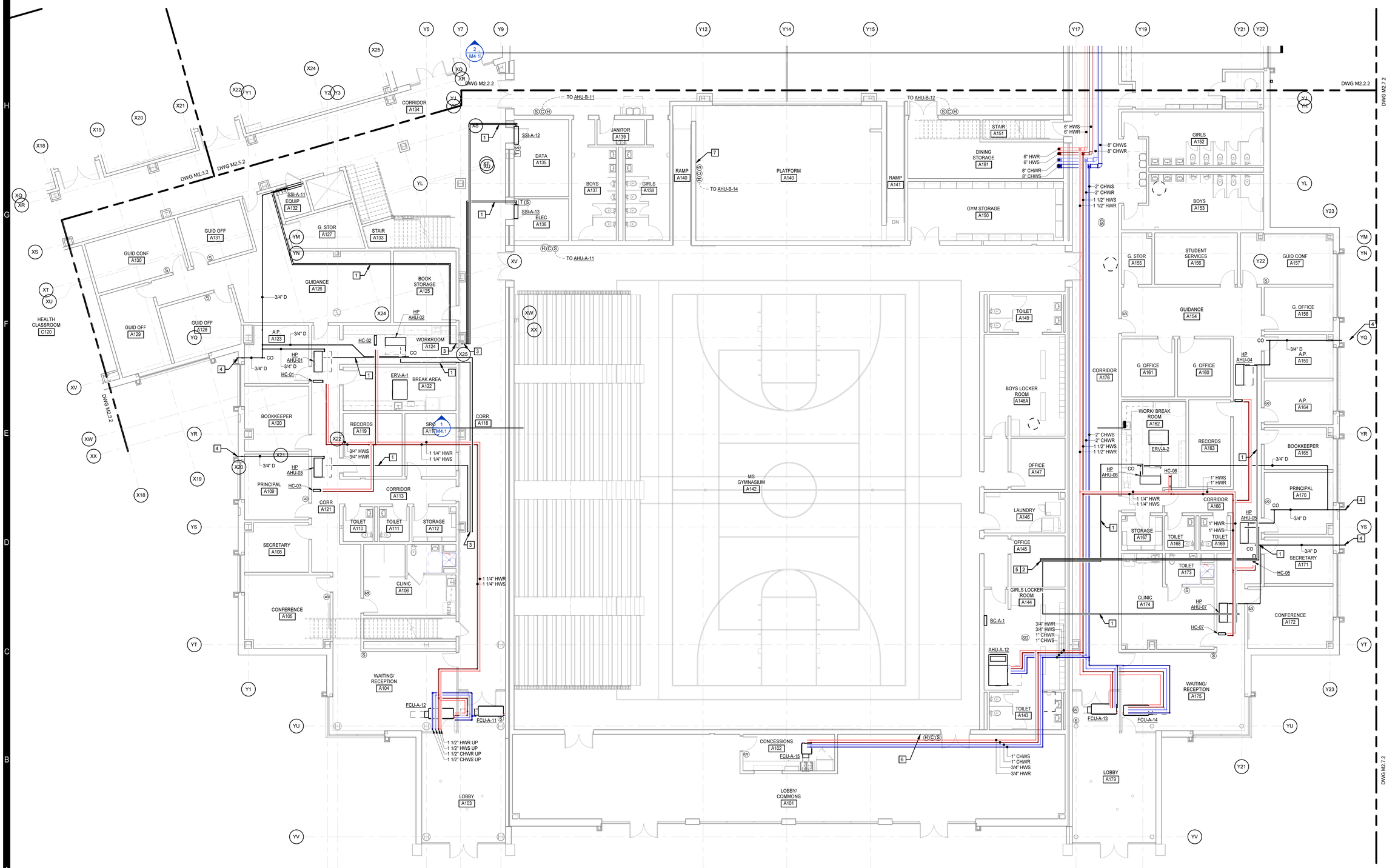
KEYNOTES

APPLIES TO THIS DRAWING

5 PIPE PENETRATION THROUGH ROOF MUST BE A MINIMUM 4 FEET AWAY FROM THE FIREWALL.

6 LOCATE DIFFERENTIAL PRESSURE SENSOR INDOOR INLET FOR AHU-A-12 AT THIS LOCATION.

7 LOCATE DIFFERENTIAL PRESSURE SENSOR INDOOR INLET FOR AHU-B-14 AT THIS LOCATION.



FIRST FLOOR PLAN - PART A - PIPING

1/8" = 1'-0"

0' 2' 4' 8' 16'
1/8" = 1'-0"

8/2/2024 3:26:53 PM

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8/2/2024

A

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

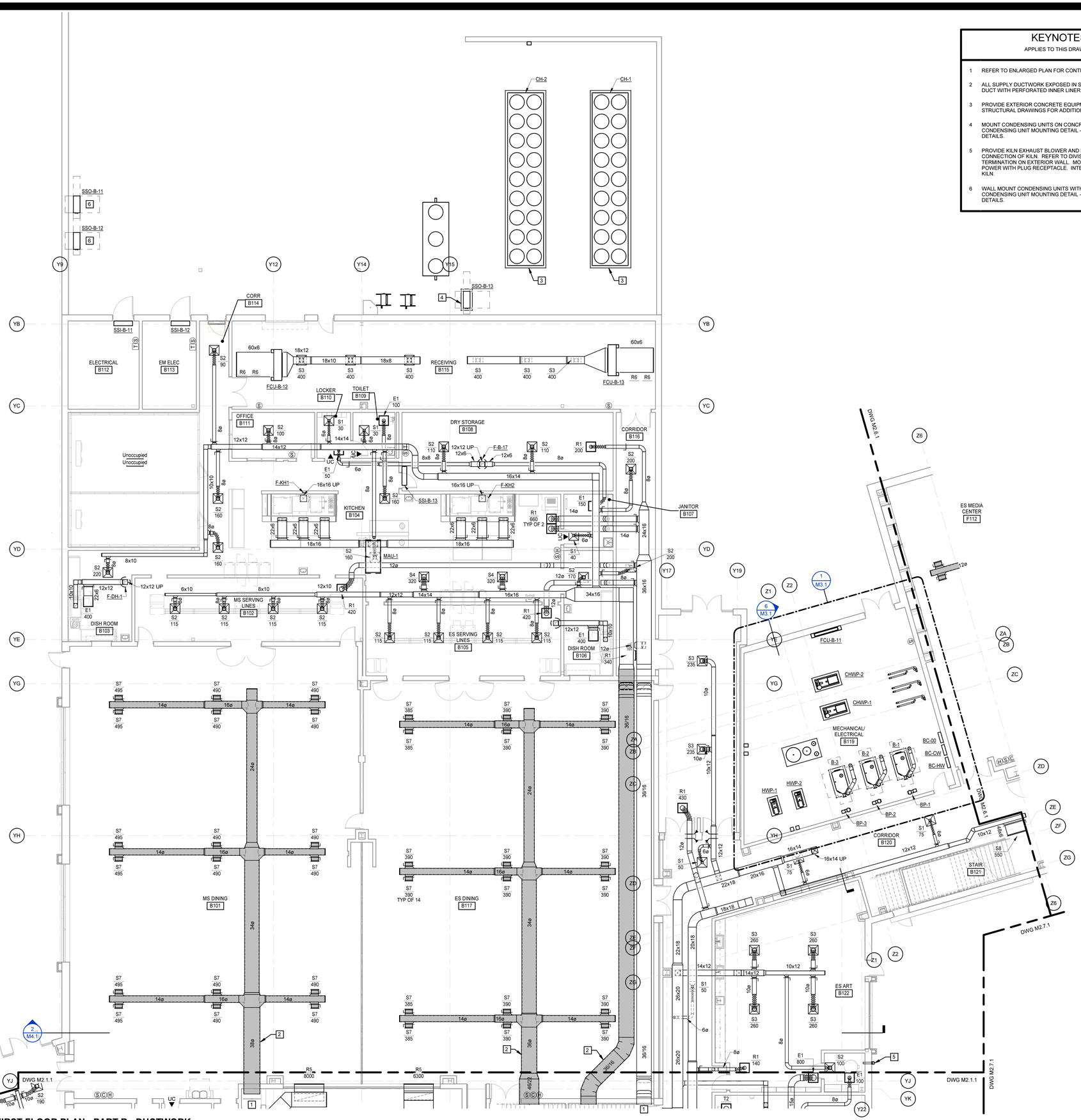
FIRST FLOOR PLAN - PART A - PIPING

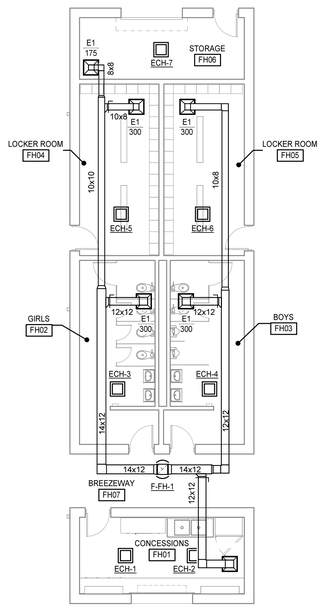
M2.1.2

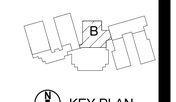
KEYNOTES

APPLIES TO THIS DRAWING

1. REFER TO ENLARGED PLAN FOR CONTINUATION.
2. ALL SUPPLY DUCTWORK EXPOSED IN SPACE TO BE 1" DOUBLE WALL DUCT WITH PERFORATED INNER LINER.
3. PROVIDE EXTERIOR CONCRETE EQUIPMENT PAD. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS.
4. MOUNT CONDENSING UNITS ON CONCRETE PADS. REFER TO THE CONDENSING UNIT MOUNTING DETAIL - ON GRADE FOR ADDITIONAL DETAILS.
5. PROVIDE KILN EXHAUST BLOWER AND FLEXIBLE DUCT TO BOTTOM CONNECTION OF KILN. REFER TO DIVISION 11. PROVIDE VENT TERMINATION ON EXTERIOR WALL. MOUNT BLOWER ON WALL AND POWER WITH PLUG RECEPTACLE. INTERLOCK FAN CONTROLS WITH KILN.
6. WALL MOUNT CONDENSING UNITS WITH WALL STAND. REFER TO CONDENSING UNIT MOUNTING DETAIL - ON WALL FOR ADDITIONAL DETAILS.







FIRST FLOOR PLAN - FIELD HOUSE - DUCTWORK
1/8" = 1'-0"

FIRST FLOOR PLAN - PART B - DUCTWORK
1/8" = 1'-0"

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NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER SCOTT T WHITE
8/2/2024

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

FIRST FLOOR PLAN - PART B - DUCTWORK

M2.2.1

8/2/2024 3:27:06 PM

GENERAL NOTES

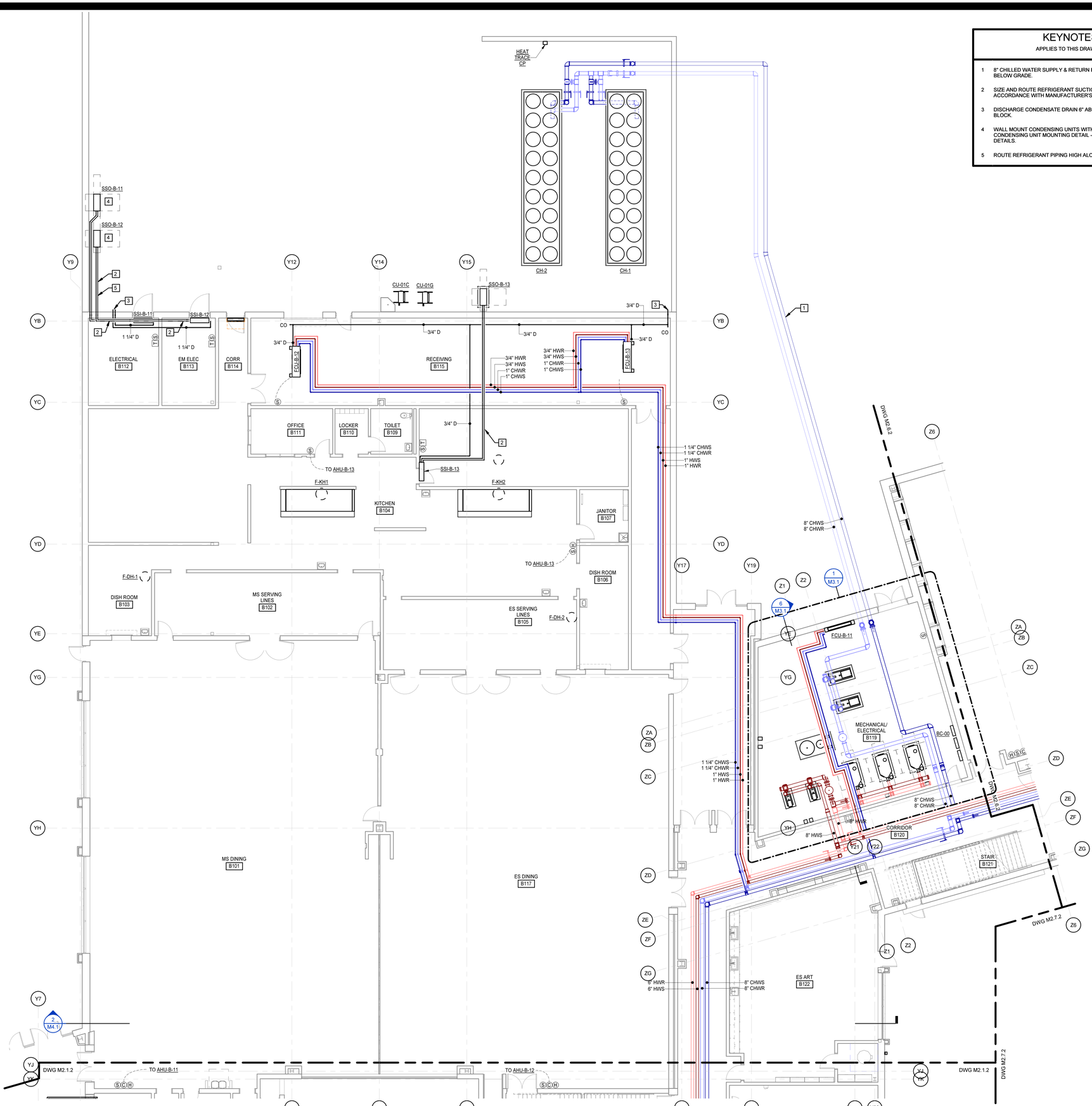
A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1. 8" CHILLED WATER SUPPLY & RETURN BELOW GRADE MINIMUM 3'-0" BELOW GRADE.
2. SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
3. DISCHARGE CONDENSATE DRAIN 6" ABOVE GRADE ONTO SPLASH BLOCK.
4. WALL MOUNT CONDENSING UNITS WITH WALL STAND. REFER TO CONDENSING UNIT MOUNTING DETAIL - ON WALL FOR ADDITIONAL DETAILS.
5. ROUTE REFRIGERANT PIPING HIGH ALONG WALL.



FIRST FLOOR PLAN - PART B - PIPING

1/8" = 1'-0"

MOSELEY ARCHITECTS
911 N. WEST STREET, SUITE 205 RALEIGH, NORTH CAROLINA 27603
PHONE (919) 840-0091
MOSELEYARCHITECTS.COM

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043951 SCOTT T. WHITE
8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS

DATE	DESCRIPTION

FIRST FLOOR PLAN - PART B - PIPING

M2.2.2

8/2/2024 3:44:39 PM

KEYNOTES

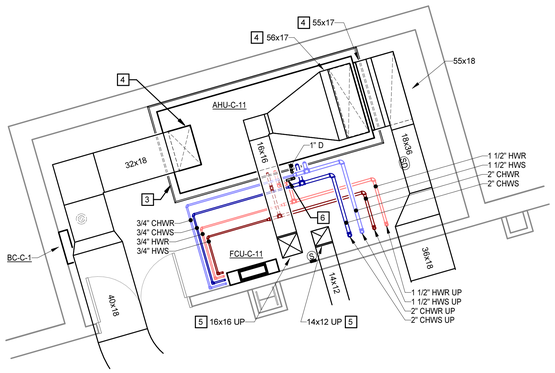
APPLIES TO THIS DRAWING

1. 4" DOWN TO DRYER VENT WALL BOX. MOUNT AT HEIGHT TO ALIGN WITH DRYER EXHAUST VENT. PROVIDE NAMEPLATE ON WALL LISTING DRYER VENT EQUIVALENT LENGTH AS INSTALLED. REFER TO SECTION 233113 FOR ADDITIONAL DETAILS.
2. SIDEWALL DRYER VENT TERMINATION IN ACCORDANCE WITH DRYER MANUFACTURER'S INSTRUCTIONS. REFER TO SECTION 233113 FOR ADDITIONAL DETAILS. PAINT TO MATCH WALL COLOR.
3. PROVIDE 6" THICK HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS.
4. CONNECT TO UNIT FULL SIZE OF UNIT CONNECTION.
5. DUCT PENETRATES UNRATED FLOOR. FILL THE ANNULAR SPACE AROUND THE PENETRATING DUCT WITH APPROVED NONCOMBUSTIBLE MATERIAL THAT RESISTS THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION IN ACCORDANCE WITH 607.6.3, EXCEPTION 2 OF THE NCMC.
6. DISCHARGE CONDENSATE DRAIN INTO OPEN SITE FLOOR DRAIN.

GENERAL NOTES

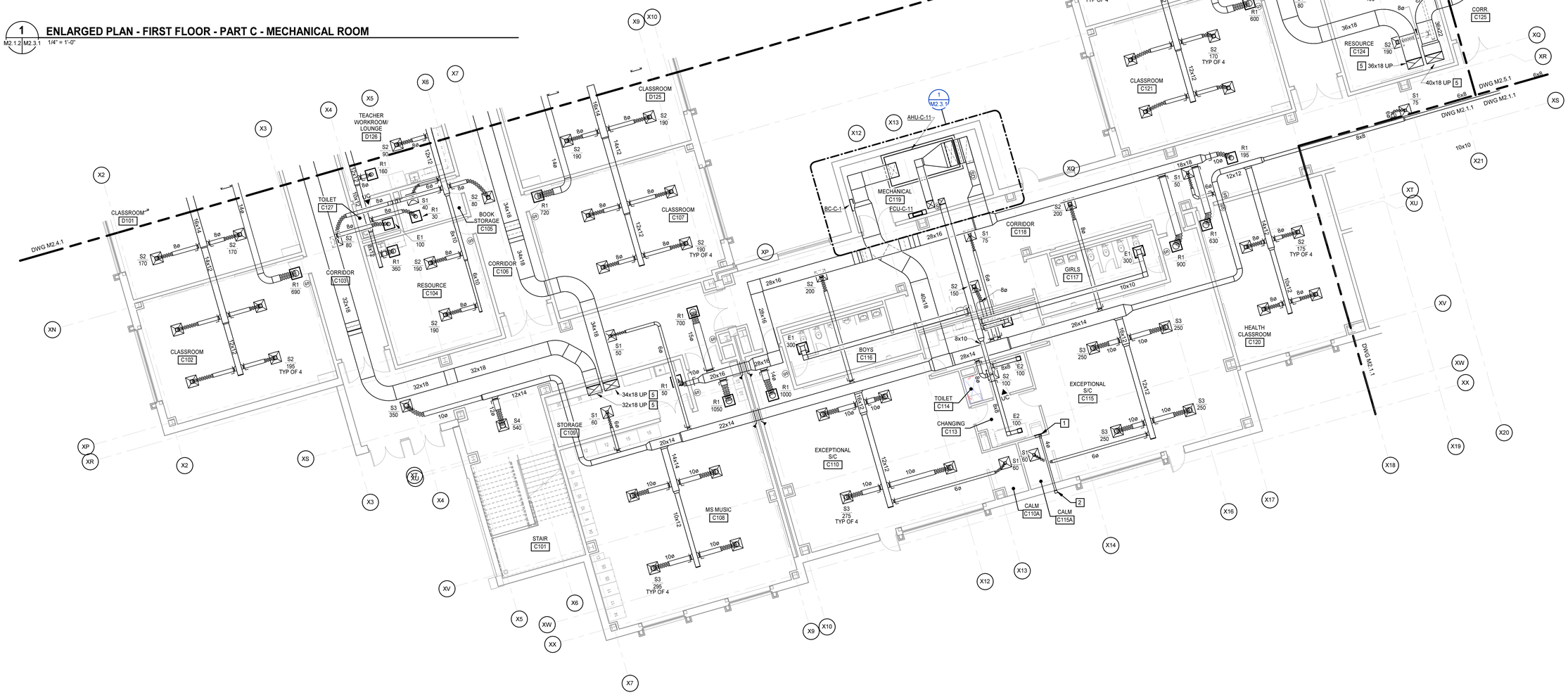
A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM



1 ENLARGED PLAN - FIRST FLOOR - PART C - MECHANICAL ROOM

M2.1.2 M2.3.1 1/4" = 1'-0"



FIRST FLOOR PLAN - PART C - DUCTWORK

1/8" = 1'-0"

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NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER BRITT WHITE 8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS

DATE	DESCRIPTION

FIRST FLOOR PLAN - PART C - DUCTWORK

M2.3.1

1/4" = 1'-0"

1/8" = 1'-0"

8/2/2024 3:27:26 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

FIRST FLOOR PLAN - PART C - PIPING

1/8" = 1'-0"

0' 2' 4' 8' 16'

1/8" = 1'-0"

8/2/2024 3:27:31 PM

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8/ 2/ 2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

FIRST FLOOR PLAN - PART C - PIPING

M2.3.2

GENERAL NOTES

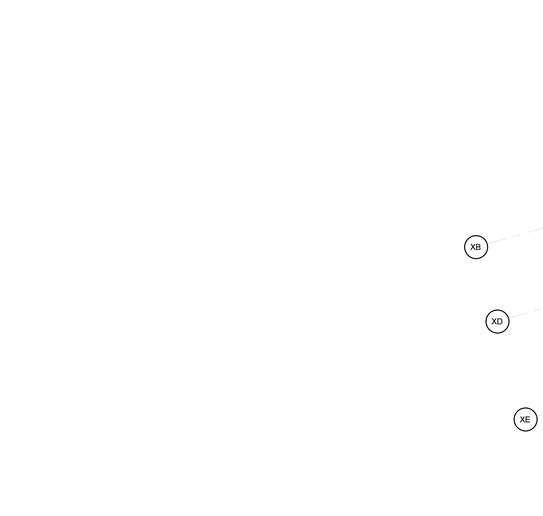
A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1. PROVIDE 6" THICK HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS.
2. CONNECT TO UNIT FULL SIZE OF UNIT CONNECTION.
3. DUCT PENETRATES UNRATED FLOOR. FILL THE ANNULAR SPACE AROUND THE PENETRATING DUCT WITH APPROVED NONCOMBUSTIBLE MATERIAL THAT RESISTS THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION IN ACCORDANCE WITH 607.6.3, EXCEPTION 2 OF THE NCMC.
4. DISCHARGE CONDENSATE DRAIN INTO OPEN SITE FLOOR DRAIN.
5. SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
6. REFRIGERANT SUCTION AND LIQUID UP TO FLOOR ABOVE.



2 M2.1.2 M2.4.1 **ENLARGED PLAN - FIRST FLOOR - PART D - MECHANICAL ROOM**

1/4" = 1'-0"

FIRST FLOOR PLAN - PART D - DUCTWORK

1/8" = 1'-0"

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8/2/2024

D

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

FIRST FLOOR PLAN - PART D - DUCTWORK

M2.4.1

0' 1' 2' 4' 8'
1/4" = 1'-0"

0' 2' 4' 8' 16'
1/8" = 1'-0"

8/2/2024 3:27:41 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1 SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

2 DISCHARGE CONDENSATE DRAIN 6" ABOVE GRADE ONTO SPLASH BLOCK.

FIRST FLOOR PLAN - PART D - PIPING
1/8" = 1'-0"

0' 2' 4' 8' 16'
1/8" = 1'-0"

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NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER ROBERT T WHITE
8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

FIRST FLOOR PLAN - PART D - PIPING

M2.4.2

8/2/2024 3:27:46 PM

GENERAL NOTES

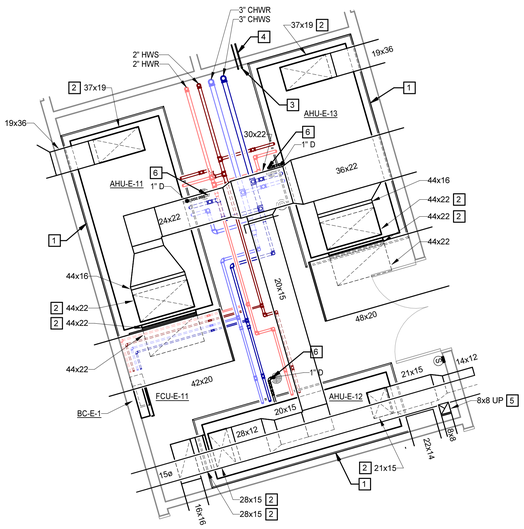
A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

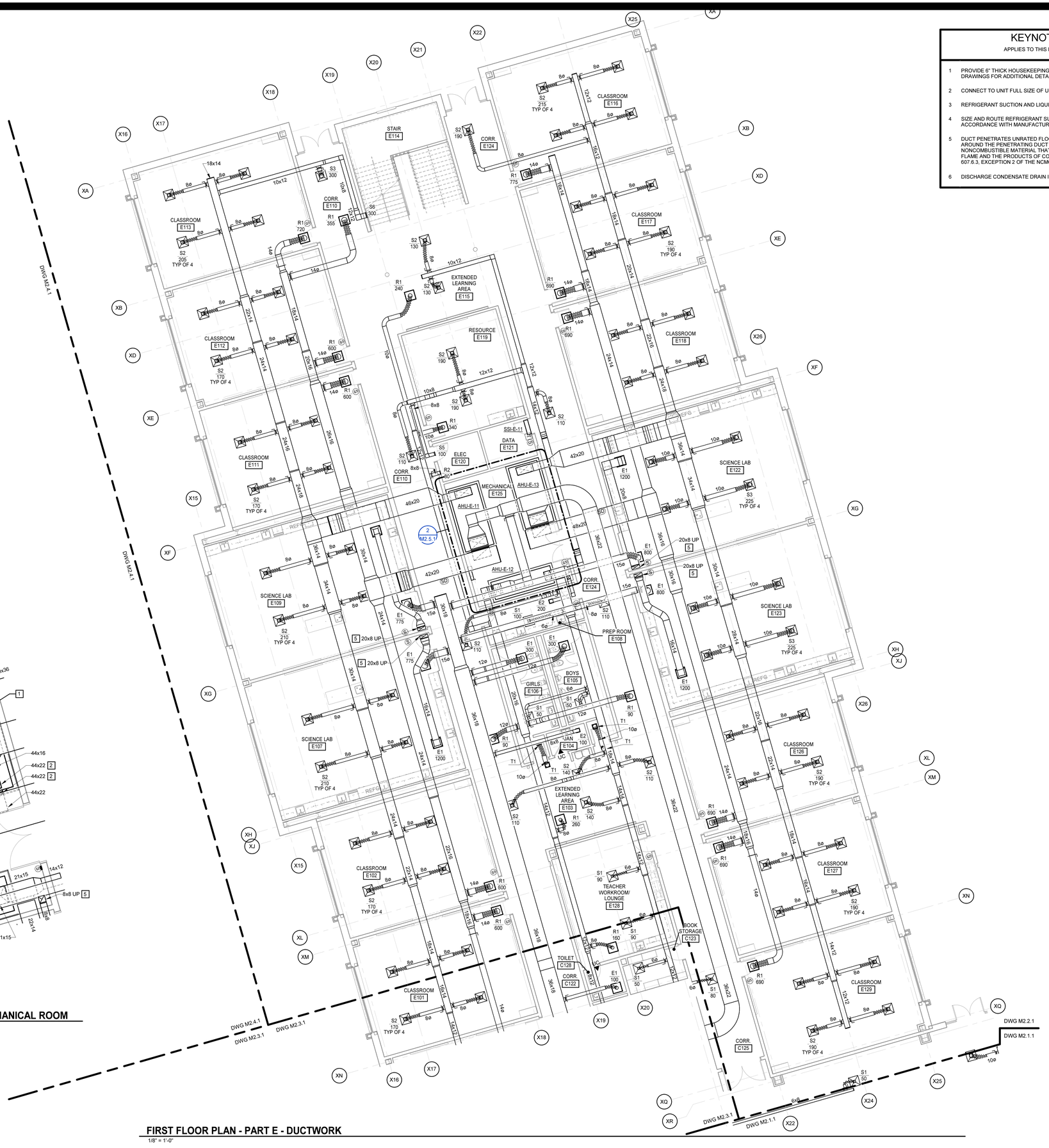
KEYNOTES

APPLIES TO THIS DRAWING

1. PROVIDE 6" THICK HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS.
2. CONNECT TO UNIT FULL SIZE OF UNIT CONNECTION.
3. REFRIGERANT SUCTION AND LIQUID UP TO FLOOR ABOVE.
4. SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
5. DUCT PENETRATES UNRATED FLOOR. FILL THE ANNULAR SPACE AROUND THE PENETRATING DUCT WITH APPROVED NONCOMBUSTIBLE MATERIAL THAT RESISTS THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION IN ACCORDANCE WITH 607.6.3, EXCEPTION 2 OF THE NCMC.
6. DISCHARGE CONDENSATE DRAIN INTO OPEN SITE FLOOR DRAIN.



2 M2.1.2 M2.5.1 **ENLARGED PLAN - FIRST FLOOR - PART E - MECHANICAL ROOM**
1/4" = 1'-0"



FIRST FLOOR PLAN - PART E - DUCTWORK
1/8" = 1'-0"

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PHONE (919) 840-0091
MOSELEYARCHITECTS.COM

NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER BRITTNEY T WHITE
8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

FIRST FLOOR PLAN - PART E - DUCTWORK

M2.5.1

0' 1' 2' 4' 8'
1/4" = 1'-0"
0' 2' 4' 8' 16'
1/8" = 1'-0"

8/2/2024 3:27:57 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1 SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

2 DISCHARGE CONDENSATE DRAIN 6" ABOVE GRADE ONTO SPLASH BLOCK.

FIRST FLOOR PLAN - PART E - PIPING

1/8" = 1'-0"

0' 2' 4' 8' 16'

1/8" = 1'-0"

MOSELEY ARCHITECTS
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PHONE (919) 840-0091
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NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER SCOTT T WHITE

8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

FIRST FLOOR PLAN - PART E - PIPING

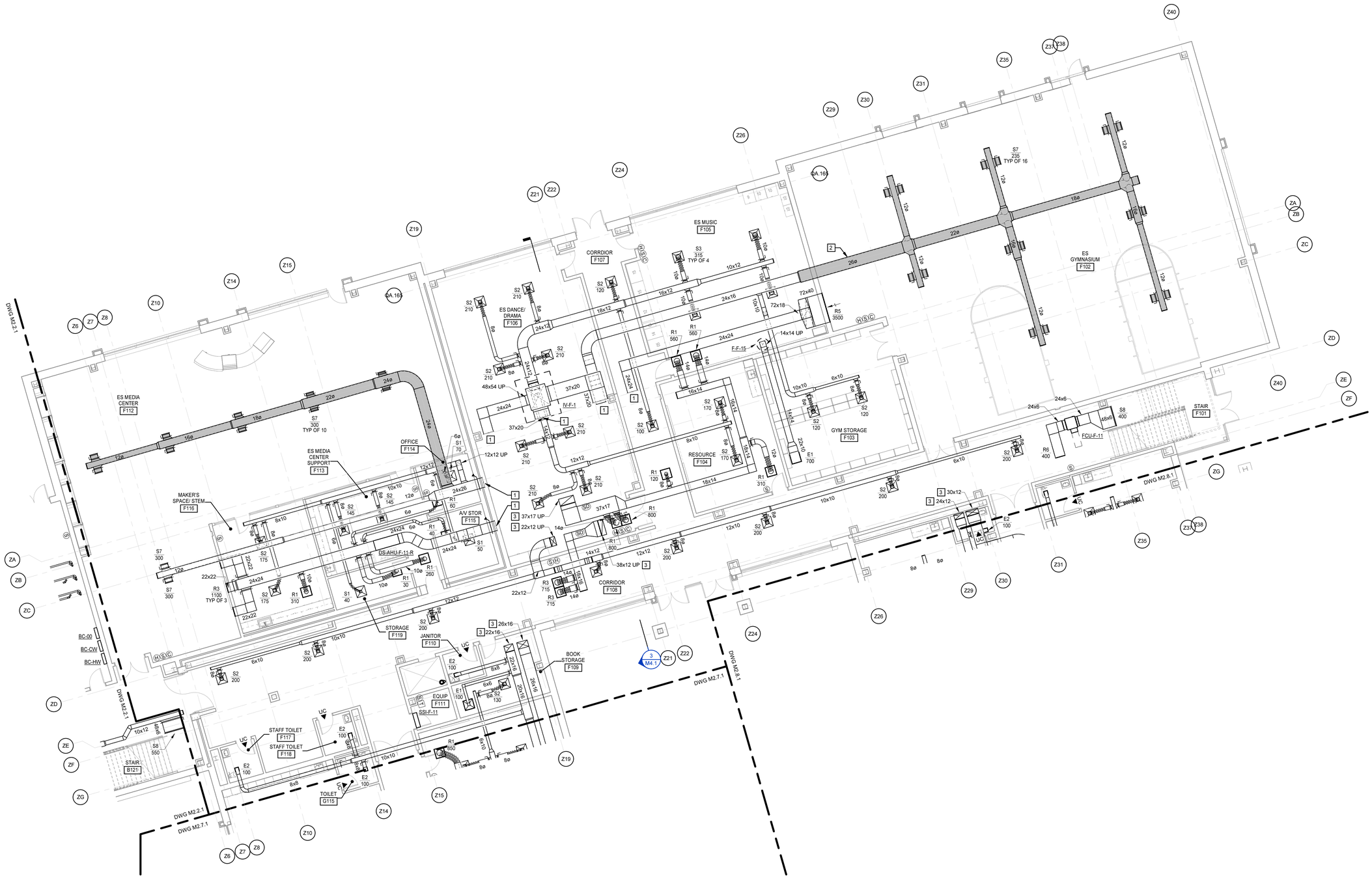
M2.5.2

8/2/2024 3:28:03 PM

KEYNOTES

APPLIES TO THIS DRAWING

1. REFER TO ENLARGED PLAN FOR CONTINUATION.
2. ALL SUPPLY DUCTWORK EXPOSED IN SPACE TO BE 1" DOUBLE WALL DUCT WITH PERFORATED INNER LINER.
3. DUCT PENETRATES UNRATED FLOOR. FILL THE ANNULAR SPACE AROUND THE PENETRATING DUCT WITH APPROVED NONCOMBUSTIBLE MATERIAL THAT RESISTS THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION IN ACCORDANCE WITH 607.6.3, EXCEPTION 2 OF THE NCMC.



FIRST FLOOR PLAN - PART F - DUCTWORK

1/8" = 1'-0"

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NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER BRITTON T WHITLEY
8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

FIRST FLOOR PLAN - PART F - DUCTWORK

M2.6.1

1/4" = 1'-0"
1/8" = 1'-0"

8/2/2024 3:28:14 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

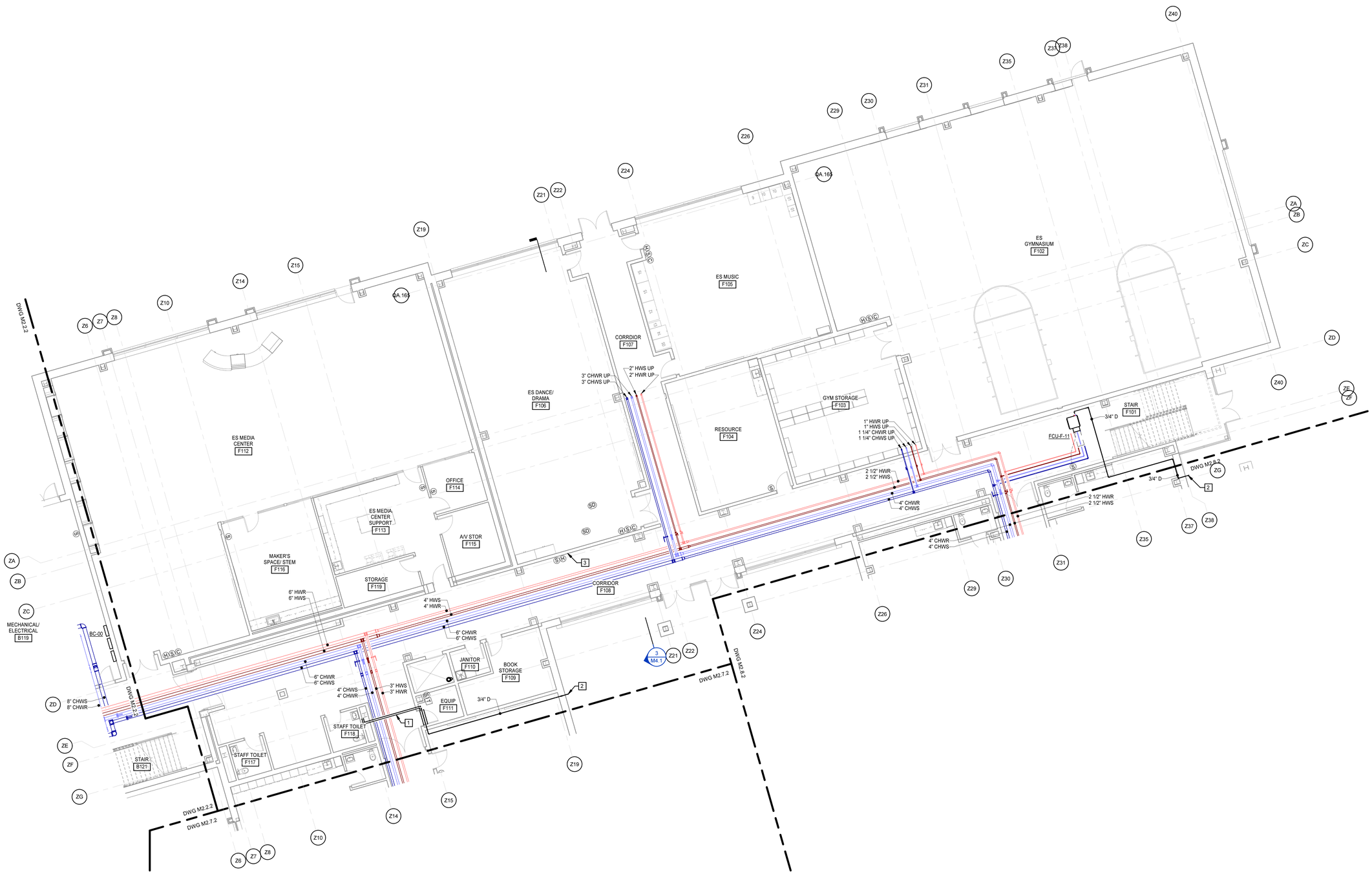
KEYNOTES

APPLIES TO THIS DRAWING

1 SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

2 DISCHARGE CONDENSATE DRAIN 6" ABOVE GRADE ONTO SPLASH BLOCK.

3 LOCATE DIFFERENTIAL PRESSURE SENSOR INDOOR INLET FOR AHU-F-14 AT THIS LOCATION.



FIRST FLOOR PLAN - PART F - PIPING

1/8" = 1'-0"

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PHONE (919) 840-0091
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NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER BRITTON T WHITE

8/ 2/ 2024

F

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

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DATE	DESCRIPTION

FIRST FLOOR PLAN - PART F - PIPING

M2.6.2

0' 2' 4' 8' 16'
1/8" = 1'-0"

8/2/2024 4:02:11 PM

GENERAL NOTES

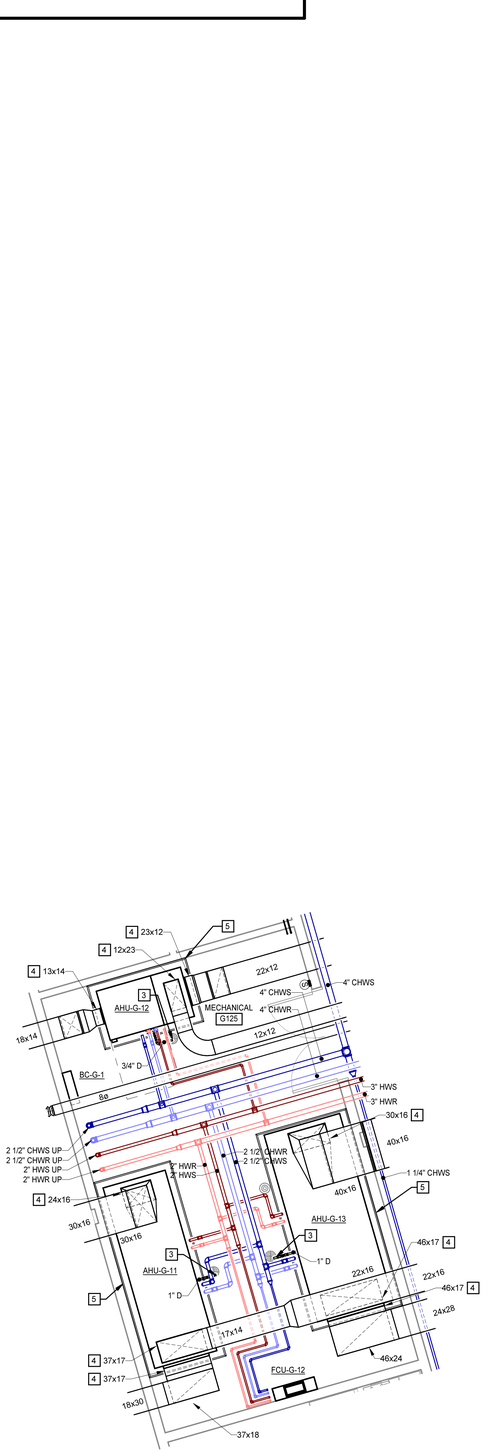
A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1. 4" DOWN TO DRYER VENT WALL BOX. MOUNT AT HEIGHT TO ALIGN WITH DRYER EXHAUST VENT. PROVIDE NAMEPLATE ON WALL LISTING DRYER VENT EQUIVALENT LENGTH AS INSTALLED. REFER TO SECTION 233113 FOR ADDITIONAL DETAILS.
2. SIDEWALL DRYER VENT TERMINATION IN ACCORDANCE WITH DRYER MANUFACTURER'S INSTRUCTIONS. REFER TO SECTION 233113 FOR ADDITIONAL DETAILS. PAINT TO MATCH WALL COLOR.
3. DISCHARGE CONDENSATE DRAIN INTO OPEN SITE FLOOR DRAIN.
4. CONNECT TO UNIT FULL SIZE OF UNIT CONNECTION.
5. PROVIDE 6" THICK HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS.



2 M2.1.2 M2.7.1 **ENLARGED PLAN - FIRST FLOOR - PART G - MECHANICAL ROOM**
1/4" = 1'-0"

FIRST FLOOR PLAN - PART G - DUCTWORK
1/8" = 1'-0"

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043951 TIMOTHY T WHITE
8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310	
DATE:	AUGUST 2, 2024
REVISIONS	
DATE	DESCRIPTION

FIRST FLOOR PLAN - PART G - DUCTWORK

0' 1' 2' 4' 8'
1/4" = 1'-0"
0' 2' 4' 8' 16'
1/8" = 1'-0"

M2.7.1

8/2/2024 3:28:31 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1 DISCHARGE CONDENSATE DRAIN 6" ABOVE GRADE ONTO SPLASH BLOCK.

FIRST FLOOR PLAN - PART G - PIPING

1/8" = 1'-0"

0' 2' 4' 8' 16'

1/8" = 1'-0"

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043951 SCOTT WHITE

8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

FIRST FLOOR PLAN - PART G - PIPING

M2.7.2

8/2/2024 3:28:38 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

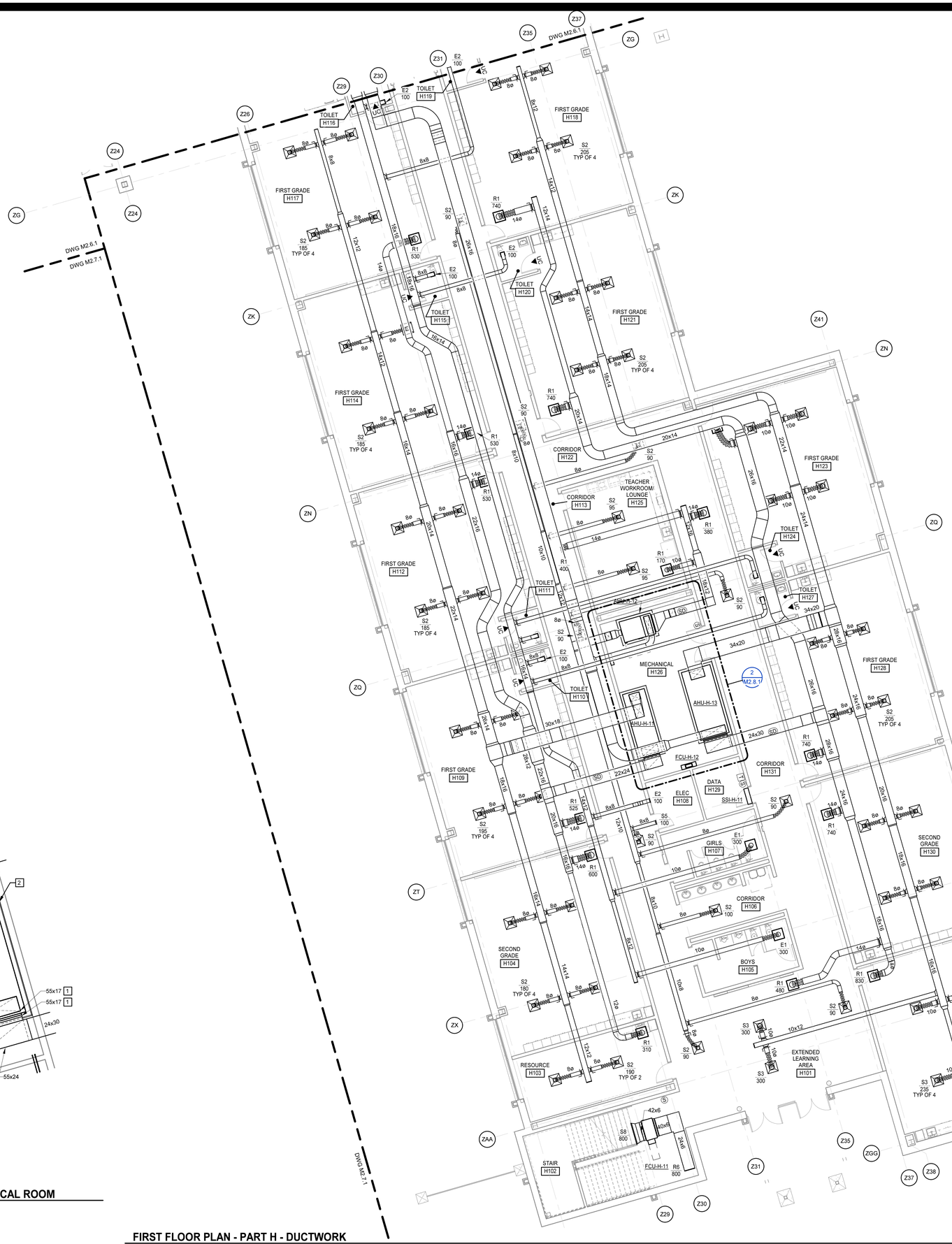
KEYNOTES

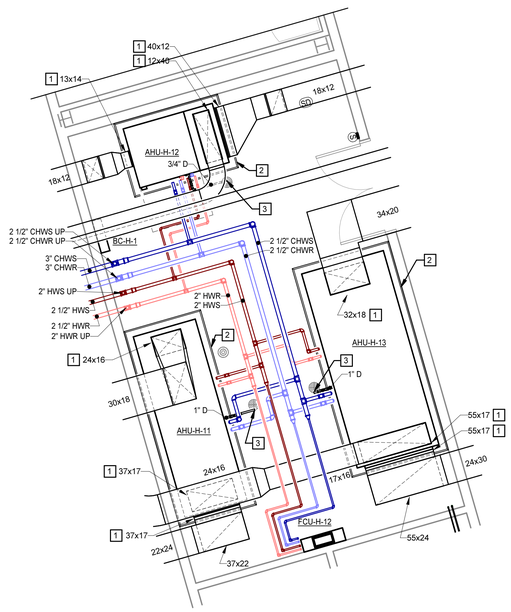
APPLIES TO THIS DRAWING

1 CONNECT TO UNIT FULL SIZE OF UNIT CONNECTION.

2 PROVIDE 6" THICK HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS.

3 DISCHARGE CONDENSATE DRAIN INTO OPEN SITE FLOOR DRAIN.





2 M2.1.2 | M2.8.1 **ENLARGED PLAN - FIRST FLOOR - PART H - MECHANICAL ROOM**
1/4" = 1'-0"

FIRST FLOOR PLAN - PART H - DUCTWORK
1/8" = 1'-0"

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PHONE (919) 840-0091
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NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER TIMOTHY WHITE
8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 831310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

FIRST FLOOR PLAN - PART H - DUCTWORK

M2.8.1

1/4" = 1'-0"
1/8" = 1'-0"

8/2/2024 3:28:47 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1. DISCHARGE CONDENSATE DRAIN 6" ABOVE GRADE ONTO SPLASH BLOCK.
2. SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
3. REFRIGERANT SUCTION AND LIQUID UP TO FLOOR ABOVE.
4. LOCATE DIFFERENTIAL PRESSURE SENSOR FOR HOT WATER SYSTEM AT THIS LOCATION.
5. LOCATE DIFFERENTIAL PRESSURE SENSOR FOR CHILLED WATER SYSTEM AT THIS LOCATION.

FIRST FLOOR PLAN - PART H - PIPING
1/8" = 1'-0"

0' 2' 4' 8' 16'
1/8" = 1'-0"

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PHONE (919) 840-0091
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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043951 MATTHEW T WHITE
8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

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DATE	DESCRIPTION

FIRST FLOOR PLAN - PART H - PIPING

M2.8.2

8/2/2024 3:28:54 PM

KEYNOTES

APPLIES TO THIS DRAWING

1. DUCT PENETRATES UNRATED FLOOR. FILL THE ANNULAR SPACE AROUND THE PENETRATING DUCT WITH APPROVED NONCOMBUSTIBLE MATERIAL THAT RESISTS THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION IN ACCORDANCE WITH 607.6.3, EXCEPTION 2 OF THE NCMC.
2. CONNECT DUCT TO LOUVER. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT SIZE AND LOCATION.
3. ALL SUPPLY DUCTWORK EXPOSED IN SPACE TO BE 1" DOUBLE WALL DUCT WITH PERFORATED INNER LINER.
4. REFER TO ENLARGED PLAN FOR CONTINUATION.
5. 8" DRYER VENT UP TO DRYER VENT ON ROOF. ROOF PENETRATION SHALL BE A MINIMUM 4' FROM FIRE WALL. SIZE AND INSTALL IN ACCORDANCE WITH COMMERCIAL DRYER MANUFACTURER'S INSTALLATION INSTRUCTIONS.

DWG M2.10.1
DWG M2.15.1
DWG M2.11.1
DWG M2.13.1

GREEN ROOM A206
CORRIDOR A208
CORRIDOR A209
MECH EQUIP PLATFORM A210
PLATFORM A140
MECH EQUIP PLATFORM A211
TV PROD A207
MAKERS SPACE A205
MS MEDIA CENTER A201
WORKRM A202
CONFERENCE A204
STOR A203
MS GYMNASIUM A142
LOBBY A103
LOBBY A179

AHU-A-11 AHU-A-21 AHU-B-11 AHU-B-12 AHU-B-13 AHU-B-14 AHU-B-15
DS-AHU-A-11-R DS-AHU-B-11-R DS-AHU-B-11-S DS-AHU-B-12-S
FCU-A-21 FCU-A-22 FCU-A-13 FCU-A-14
F-A-11 F-A-12 F-A-21 F-B-15
HP-4 HP-5 HP-6 HP-7

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043951 BRITTNEY WHITE
8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

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DATE	DESCRIPTION

SECOND FLOOR PLAN - PART A - DUCTWORK

M2.9.1

SECOND FLOOR PLAN - PART A - DUCTWORK

1/8" = 1'-0"

1/4" = 1'-0"
1/8" = 1'-0"

8/2/2024 3:29:03 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

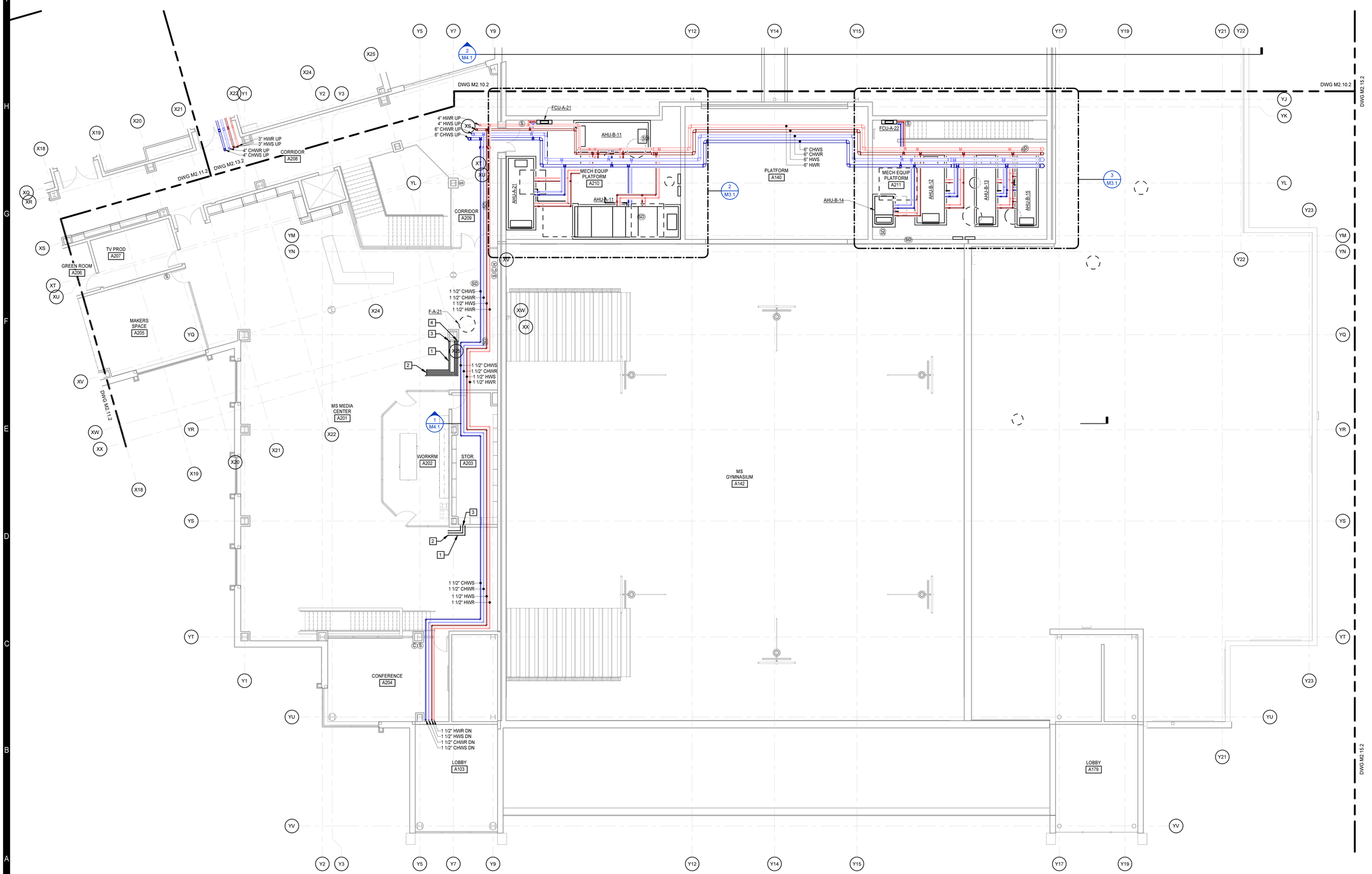
APPLIES TO THIS DRAWING

1 SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

2 REFRIGERANT SUCTION AND LIQUID UP TO CONDENSING UNIT ON ROOF. ROUTE PIPING THROUGH PIPE CURB. REFER TO REFRIGERANT PIPE PENETRATION DETAIL - ROOF FOR ADDITIONAL DETAILS.

3 REFRIGERANT SUCTION AND LIQUID DOWN TO FLOOR BELOW.

4 REFRIGERANT SUCTION AND LIQUID DOWN TO FLOOR BELOW. ROUTE PIPING THROUGH PIPE CURB. REFER TO REFRIGERANT PIPE PENETRATION DETAIL - ROOF FOR ADDITIONAL DETAILS.



SECOND FLOOR PLAN - PART A - PIPING

1/8" = 1'-0"

0' 2' 4' 8' 16'

1/8" = 1'-0"

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8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310	
DATE:	AUGUST 2, 2024
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DATE	DESCRIPTION

SECOND FLOOR PLAN - PART A - PIPING

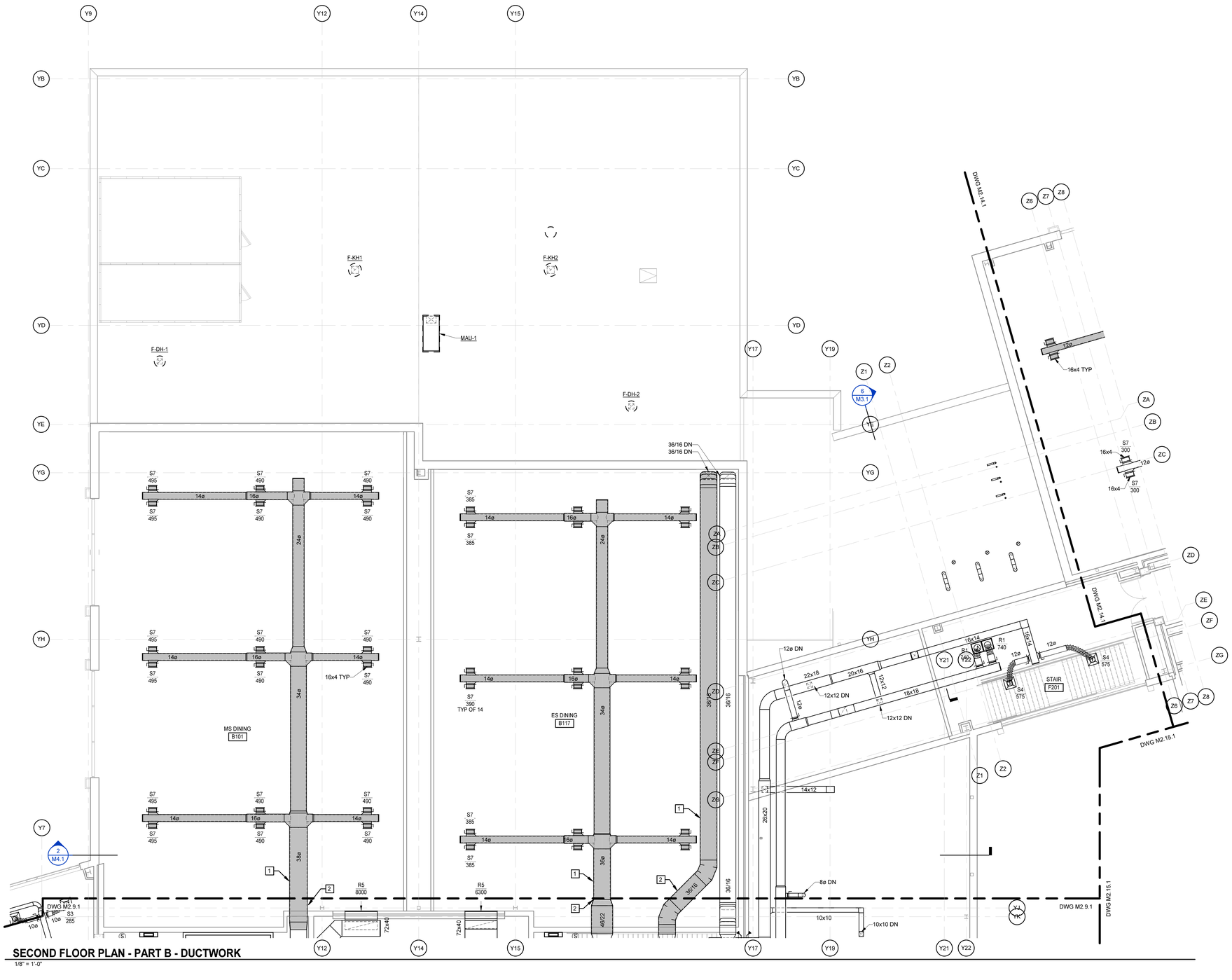
M2.9.2

8/2/2024 3:29:12 PM

KEYNOTES

APPLIES TO THIS DRAWING

1. ALL SUPPLY DUCTWORK EXPOSED IN SPACE TO BE 1" DOUBLE WALL DUCT WITH PERFORATED INNER LINER.
2. REFER TO ENLARGED PLAN FOR CONTINUATION.



SECOND FLOOR PLAN - PART B - DUCTWORK

1/8" = 1'-0"

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NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER SCOTT T WHITFIELD

8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO:	631310
DATE:	AUGUST 2, 2024

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DATE	DESCRIPTION

SECOND FLOOR PLAN - PART B - DUCTWORK

M2.10.1

8/2/2024 3:29:17 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

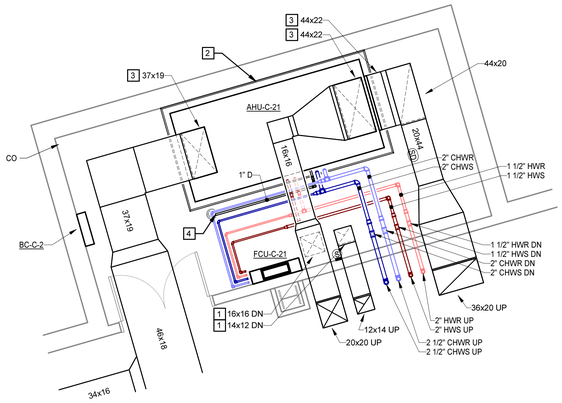
APPLIES TO THIS DRAWING

1 DUCT PENETRATES UNRATED FLOOR. FILL THE ANNULAR SPACE AROUND THE PENETRATING DUCT WITH APPROVED NONCOMBUSTIBLE MATERIAL THAT RESISTS THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION IN ACCORDANCE WITH 607.6.3, EXCEPTION 2 OF THE NCMC.

2 PROVIDE 6" THICK HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS.

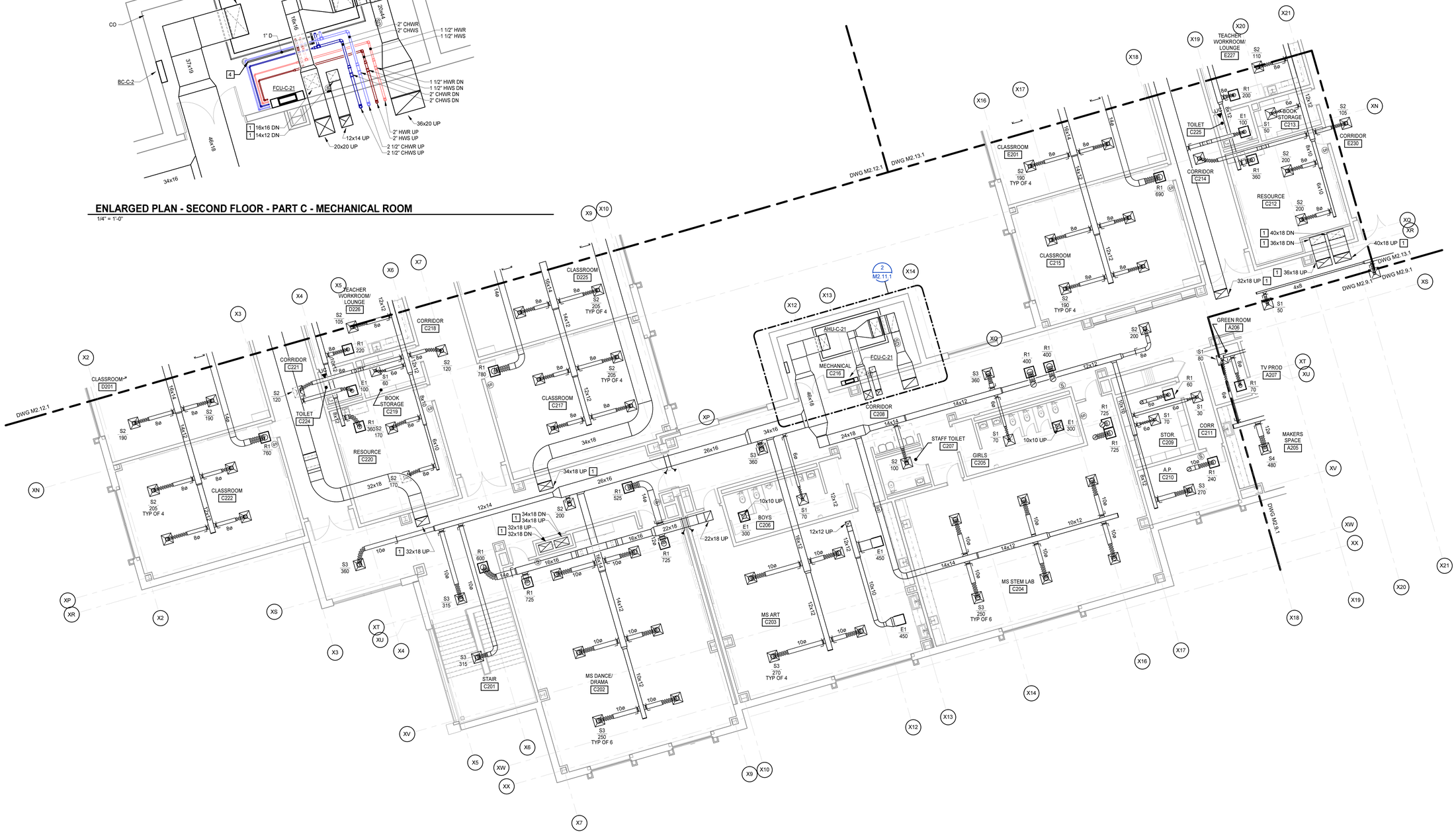
3 CONNECT TO UNIT FULL SIZE OF UNIT CONNECTION.

4 DISCHARGE CONDENSATE DRAIN INTO OPEN SITE FLOOR DRAIN.



ENLARGED PLAN - SECOND FLOOR - PART C - MECHANICAL ROOM

1/4" = 1'-0"



SECOND FLOOR PLAN - PART C - DUCTWORK

1/8" = 1'-0"

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8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

SECOND FLOOR PLAN - PART C - DUCTWORK

M2.11.1

1/4" = 1'-0"
1/8" = 1'-0"

8/2/2024 3:29:27 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1 LOCATE DIFFERENTIAL PRESSURE SENSOR FOR CHILLED WATER SYSTEM AT THIS LOCATION.

2 LOCATE DIFFERENTIAL PRESSURE SENSOR FOR HOT WATER SYSTEM AT THIS LOCATION.

SECOND FLOOR PLAN - PART C - PIPING

1/8" = 1'-0"

0' 2' 4' 8' 16'
1/8" = 1'-0"

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043951 BRITTANY WHITFIELD
8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 831310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

SECOND FLOOR PLAN - PART C - PIPING

M2.11.2

8/2/2024 3:29:33 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1 PROVIDE 6" THICK HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS.

2 CONNECT TO UNIT FULL SIZE OF UNIT CONNECTION.

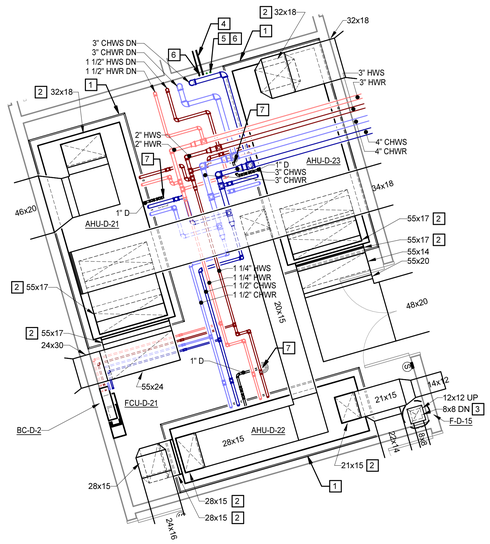
3 DUCT PENETRATES UNRATED FLOOR. FILL THE ANNULAR SPACE AROUND THE PENETRATING DUCT WITH APPROVED NONCOMBUSTIBLE MATERIAL THAT RESISTS THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION IN ACCORDANCE WITH 607.6.3, EXCEPTION 2 OF THE NCMC.

4 SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

5 REFRIGERANT SUCTION AND LIQUID DOWN TO FLOOR BELOW.

6 REFRIGERANT SUCTION AND LIQUID UP TO CONDENSING UNIT ON ROOF. ROUTE PIPING THROUGH PIPE CURB, REFER TO REFRIGERANT PIPE PENETRATION DETAIL - ROOF FOR ADDITIONAL DETAILS.

7 DISCHARGE CONDENSATE DRAIN INTO OPEN SITE FLOOR DRAIN.



1 M2.9.2 M2.12.1 **ENLARGED PLAN - SECOND FLOOR - PART D**
1/4" = 1'-0"

SECOND FLOOR PLAN - PART D - DUCTWORK
1/8" = 1'-0"

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043951 BRITTNEY WHITE
8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024
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DATE	DESCRIPTION

SECOND FLOOR PLAN - PART D - DUCTWORK

0' 1' 2' 4' 8'
1/4" = 1'-0"
0' 2' 4' 8' 16'
1/8" = 1'-0"

M2.12.1

8/2/2024 3:51:56 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

SECOND FLOOR PLAN - PART D - PIPING

1/8" = 1'-0"

KEYNOTES

APPLIES TO THIS DRAWING

1 SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

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8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

SECOND FLOOR PLAN - PART D - PIPING

M2.12.2

8/2/2024 3:29:49 PM

GENERAL NOTES

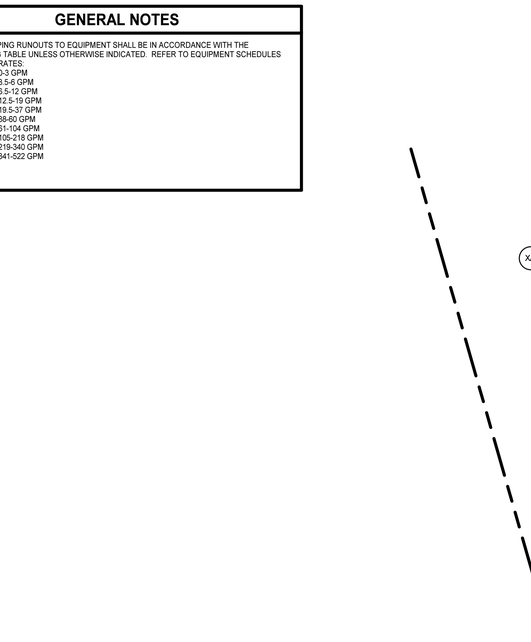
A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1. DUCT PENETRATES UNRATED FLOOR. FILL THE ANNULAR SPACE AROUND THE PENETRATING DUCT WITH APPROVED NONCOMBUSTIBLE MATERIAL THAT RESISTS THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION IN ACCORDANCE WITH 607.6.3, EXCEPTION 2 OF THE NCMC.
2. PROVIDE 6" THICK HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS.
3. CONNECT TO UNIT FULL SIZE OF UNIT CONNECTION.
4. REFRIGERANT SUCTION AND LIQUID DOWN TO FLOOR BELOW.
5. SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
6. REFRIGERANT SUCTION AND LIQUID UP TO CONDENSING UNIT ON ROOF. ROUTE PIPING THROUGH PIPE CURB, REFER TO REFRIGERANT PIPE PENETRATION DETAIL - ROOF FOR ADDITIONAL DETAILS.
7. DISCHARGE CONDENSATE DRAIN INTO OPEN SITE FLOOR DRAIN.



ENLARGED PLAN - SECOND FLOOR - PART E - MECHANICAL ROOM

1/4" = 1'-0"

SECOND FLOOR PLAN - PART E - DUCTWORK

1/8" = 1'-0"

DWG M2.12.1
DWG M2.11.1
DWG M2.11.1
DWG M2.11.1
DWG M2.9.1
DWG M2.10.1
DWG M2.9.1

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NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER KEITH T WHITE

8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

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SECOND FLOOR PLAN - PART E - DUCTWORK

M2.13.1

8/2/2024 3:29:59 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1 SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

SECOND FLOOR PLAN - PART E - PIPING
1/8" = 1'-0"

0' 2' 4' 8' 16'
1/8" = 1'-0"

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043951 BRITTNEY WHITE
8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

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SECOND FLOOR PLAN - PART E - PIPING

M2.13.2

8/2/2024 3:30:06 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES.

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1 PROVIDE 6" THICK HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS.

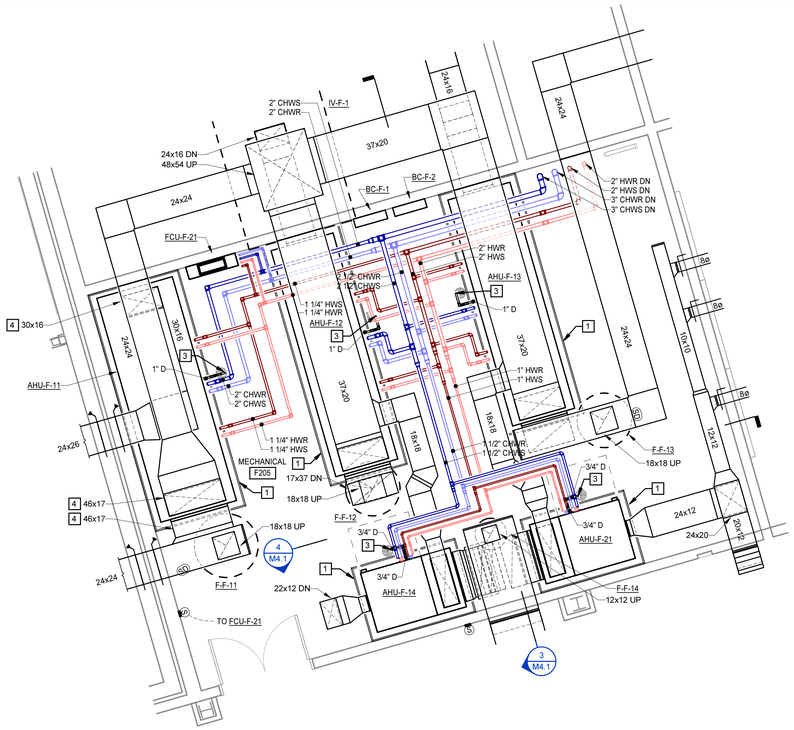
2 DUCT PENETRATES UNRATED FLOOR. FILL THE ANNULAR SPACE AROUND THE PENETRATING DUCT WITH APPROVED NONCOMBUSTIBLE MATERIAL THAT RESISTS THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION IN ACCORDANCE WITH 607.6.3, EXCEPTION 2 OF THE NCMC.

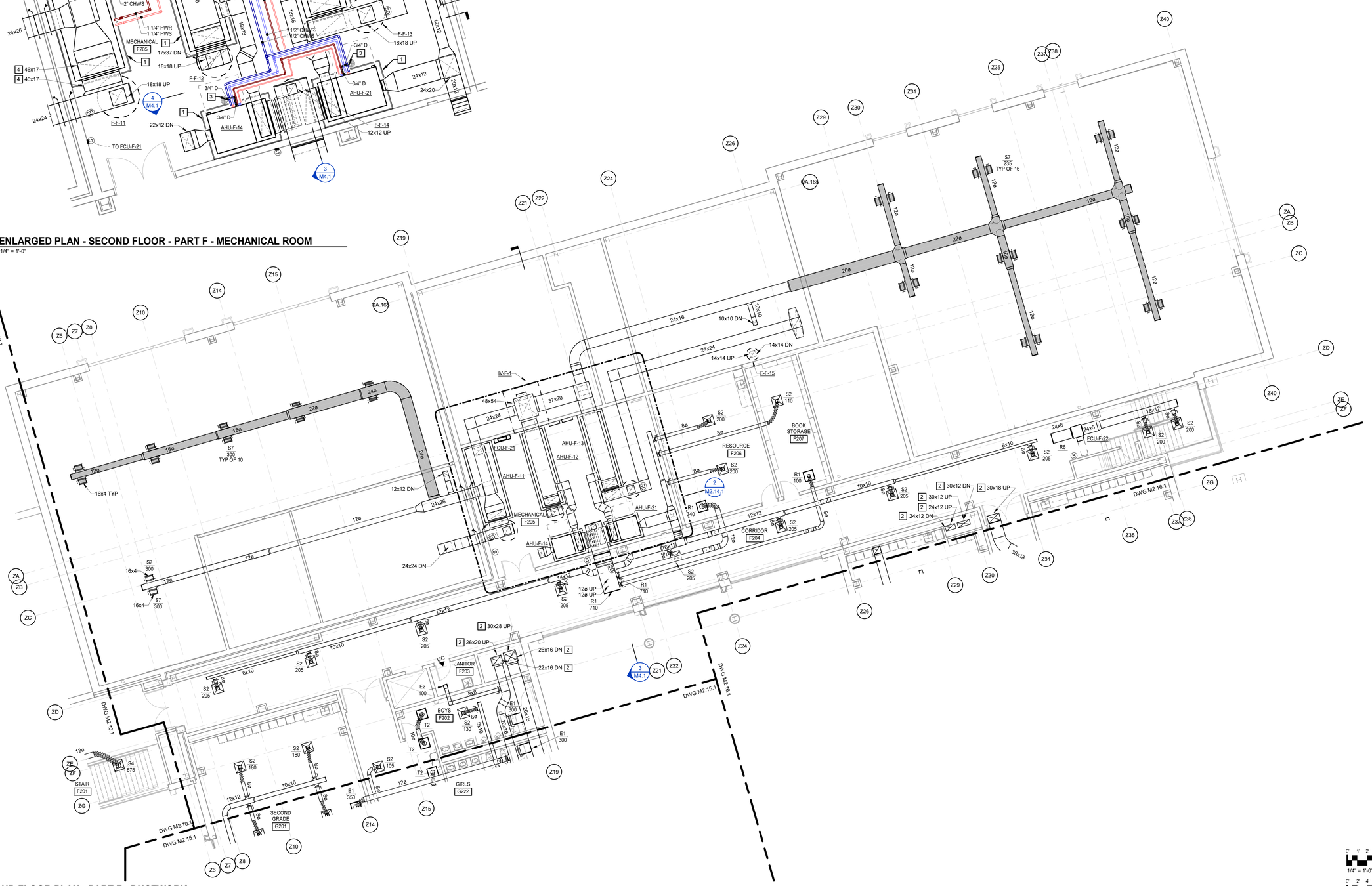
3 DISCHARGE CONDENSATE DRAIN INTO OPEN SITE FLOOR DRAIN.

4 CONNECT TO UNIT FULL SIZE OF UNIT CONNECTION.

2 ENLARGED PLAN - SECOND FLOOR - PART F - MECHANICAL ROOM

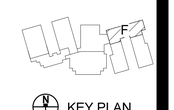
M2.9.2 | M2.14.1 1/4" = 1'-0"





SECOND FLOOR PLAN - PART F - DUCTWORK

1/8" = 1'-0"



KEY PLAN

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043951 BRITT WHITE

8/2/2024

MOSELEY ARCHITECTS

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PHONE (919) 840-0091
MOSELEYARCHITECTS.COM

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

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SECOND FLOOR PLAN - PART F - DUCTWORK

M2.14.1

0' 1' 2' 4' 8'
1/4" = 1'-0"

0' 2' 4' 8' 16'
1/8" = 1'-0"

8/2/2024 3:30:17 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1 LOCATE DIFFERENTIAL PRESSURE SENSOR INDOOR INLET FOR AHU-F-21 AT THIS LOCATION.

SECOND FLOOR PLAN - PART F - PIPING

1/8" = 1'-0"

0' 2' 4' 8' 16'

1/8" = 1'-0"

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NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER SCOTT T WHITFIELD

8/2/2024

F

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 831310
DATE: AUGUST 2, 2024

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SECOND FLOOR PLAN - PART F - PIPING

M2.14.2

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1 PROVIDE 6" THICK HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS.

2 CONNECT TO UNIT FULL SIZE OF UNIT CONNECTION.

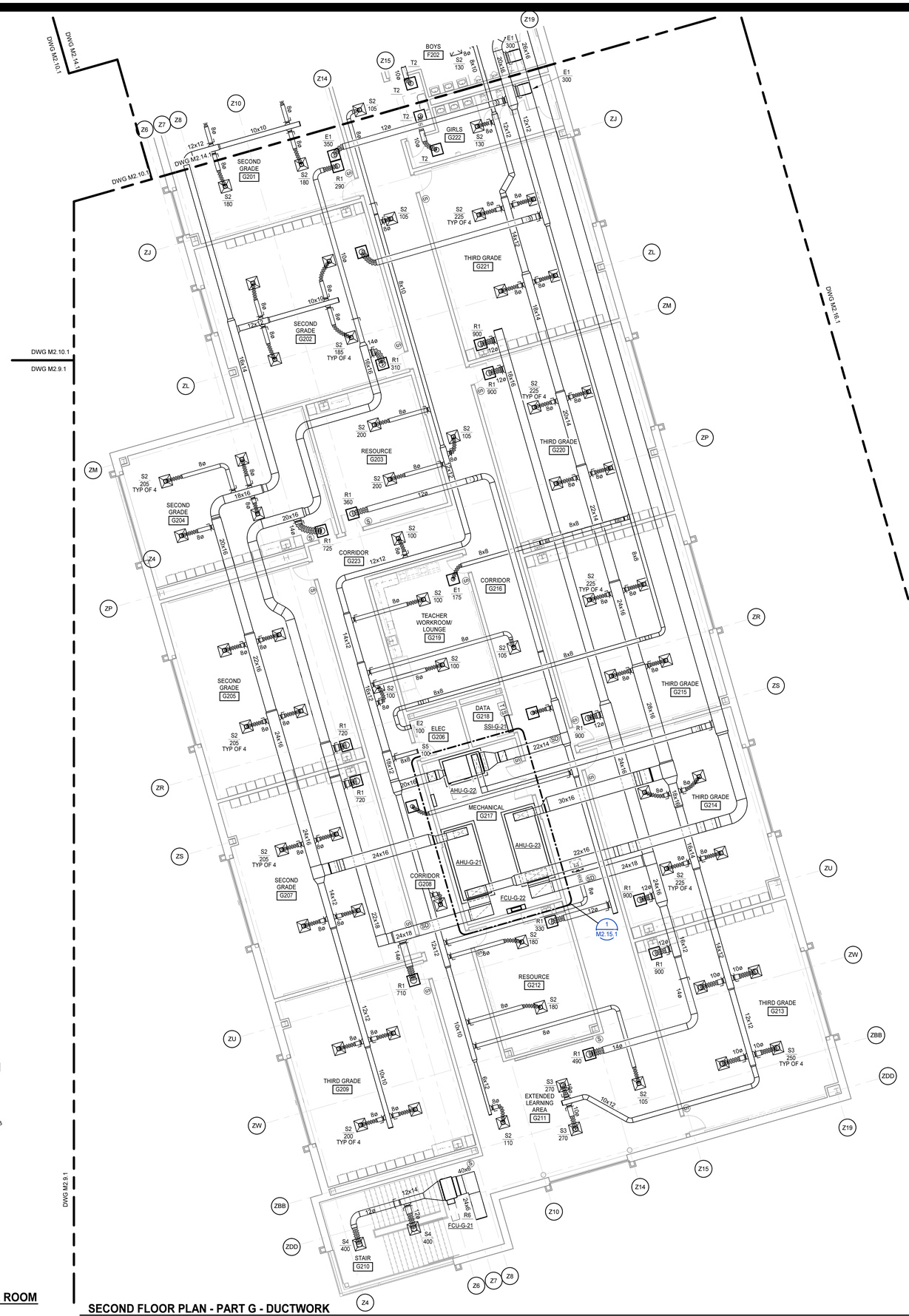
3 REFRIGERANT SUCTION AND LIQUID UP TO CONDENSING UNIT ON ROOF. ROUTE PIPING THROUGH PIPE CURB, REFER TO REFRIGERANT PIPE PENETRATION DETAIL - ROOF FOR ADDITIONAL DETAILS.

4 SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

5 REFRIGERANT SUCTION AND LIQUID DOWN TO FLOOR BELOW.

6 DISCHARGE CONDENSATE DRAIN INTO OPEN SITE FLOOR DRAIN.

1 M2.9.2 M2.15.1 **ENLARGED PLAN - SECOND FLOOR - PART G - MECHANICAL ROOM**
1/4" = 1'-0"



SECOND FLOOR PLAN - PART G - DUCTWORK
1/8" = 1'-0"

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8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

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SECOND FLOOR PLAN - PART G - DUCTWORK

M2.15.1

1/4" = 1'-0"
1/8" = 1'-0"

8/2/2024 3:30:34 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

SECOND FLOOR PLAN - PART G - PIPING

1/8" = 1'-0"

KEYNOTES

APPLIES TO THIS DRAWING

1 SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

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8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

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SECOND FLOOR PLAN - PART G - PIPING

M2.15.2

0' 2' 4' 8' 16'
1/8" = 1'-0"

8/2/2024 3:30:39 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1 PROVIDE 6" THICK HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS.

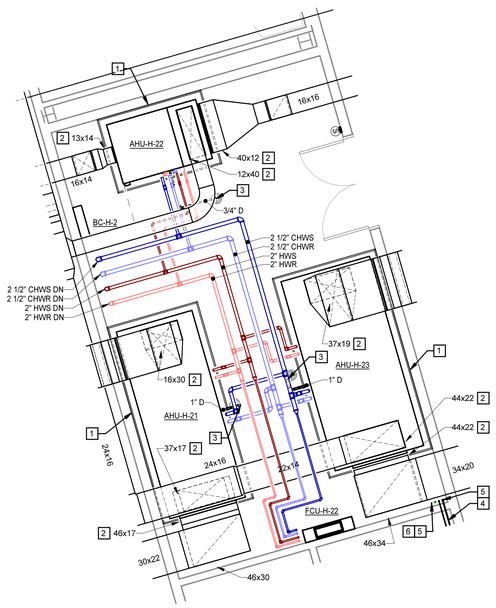
2 CONNECT TO UNIT FULL SIZE OF UNIT CONNECTION.

3 DISCHARGE CONDENSATE DRAIN INTO OPEN SITE FLOOR DRAIN.

4 SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

5 REFRIGERANT SUCTION AND LIQUID UP TO CONDENSING UNIT ON ROOF. ROUTE PIPING THROUGH PIPE CURB. REFER TO REFRIGERANT PIPE PENETRATION DETAIL - ROOF FOR ADDITIONAL DETAILS.

6 REFRIGERANT SUCTION AND LIQUID DOWN TO FLOOR BELOW.



1 M2.9.2 M2.16.1 **ENLARGED PLAN - SECOND FLOOR - PART H - MECHANICAL ROOM**
1/4" = 1'-0"

SECOND FLOOR PLAN - PART H - DUCTWORK
1/8" = 1'-0"

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NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER PATRICK T WHITE
8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
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SECOND FLOOR PLAN - PART H - DUCTWORK

1/4" = 1'-0"
1/8" = 1'-0"

M2.16.1

8/2/2024 3:30:47 PM

GENERAL NOTES

A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES:

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

APPLIES TO THIS DRAWING

1 SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

SECOND FLOOR PLAN - PART H - PIPING

1/8" = 1'-0"

0' 2' 4' 8' 16'

1/8" = 1'-0"

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8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

SECOND FLOOR PLAN - PART H - PIPING

M2.16.2

8/2/2024 3:30:52 PM

KEYNOTES

APPLIES TO THIS DRAWING

1 SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

2 REFRIGERANT SUCTION AND LIQUID DOWN TO FLOOR BELOW. ROUTE PIPING THROUGH PIPE CURB, REFER TO REFRIGERANT PIPE PENETRATION DETAIL - ROOF FOR ADDITIONAL DETAILS.

F-D-23

2" HWR DN
2" HWS DN
2 1/2" CHWR DN
2 1/2" CHWS DN

3" HWS
3" HWR

4" CHWR
4" CHWS

3" HWR DN
3" HWS DN
4" CHWR DN
4" CHWS DN

3" HWR DN
3" HWS DN
4" CHWR DN
4" CHWS DN

4" HWR DN
4" HWS DN

6" CHWS DN
6" CHWR DN

ERV-C
ERV-D-1
ERV-D-2
ERV-E-1
ERV-E-2

1 M3.2
2 M3.2
1 M4.1
2 M4.1

F-A-21

SSC-A-11
SSC-A-13
SSC-A-12

HP-3
HP-2
HP-1

PENTHOUSE FLOOR PLAN - PART A & C - PIPING PLANS

1/8" = 1'-0"

0' 2' 4' 8' 16'
1/8" = 1'-0"

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8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

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PENTHOUSE FLOOR PLAN - PART A & C - PIPING

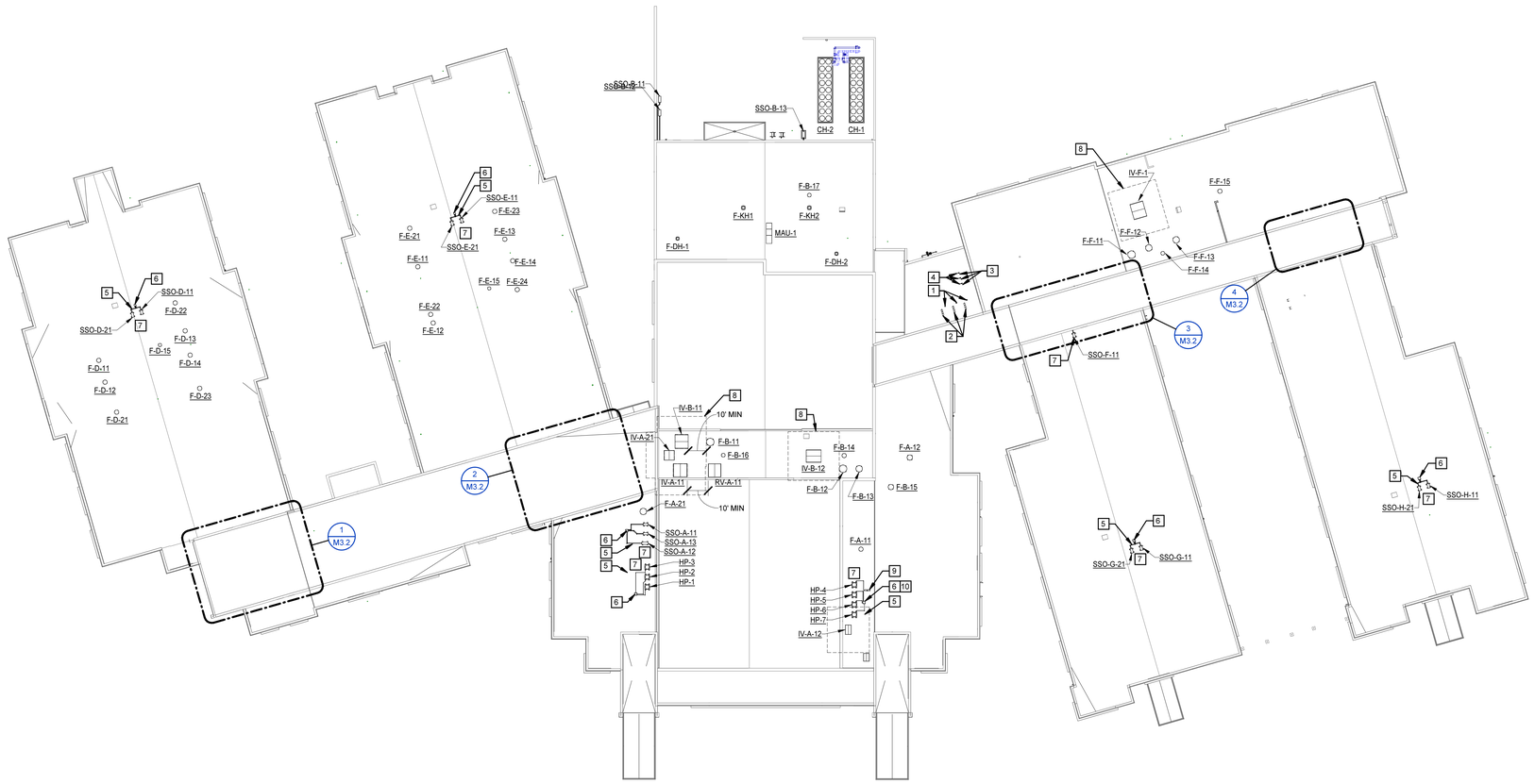
M2.17.2

8/2/2024 4:06:46 PM

KEYNOTES

APPLIES TO THIS DRAWING

1. BOILER VENT TERMINATION THRU ROOF. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND BOILER FLUE TERMINATION DETAIL.
2. BOILER COMBUSTION AIR TERMINATION THRU ROOF. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
3. DOMESTIC WATER HEATER VENT TERMINATION THRU ROOF. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND BOILER FLUE TERMINATION DETAIL.
4. DOMESTIC WATER HEATER COMBUSTION AIR TERMINATION THRU ROOF. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
5. SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
6. REFRIGERANT SUCTION AND LIQUID DOWN TO FLOOR BELOW. ROUTE PIPING THROUGH PIPE CURB. REFER TO REFRIGERANT PIPE PENETRATION DETAIL - ROOF FOR ADDITIONAL DETAILS.
7. MOUNT CONDENSING UNIT ON ROOF ON EQUIPMENT CURBS. REFER TO CONDENSING UNIT MOUNTING DETAIL - ROOF FOR ADDITIONAL DETAILS.
8. 10' OUTSIDE AIR INTAKE CLEARANCE. NO EXHAUST OR VENTS ALLOWED IN THIS AREA.
9. 8" DRYER VENT UP TO DRYER VENT ON ROOF. ROOF PENETRATION SHALL BE A MINIMUM 4' FROM FIRE WALL. SIZE AND INSTALL IN ACCORDANCE WITH COMMERCIAL DRYER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
10. PIPE PENETRATION THROUGH ROOF MUST BE A MINIMUM 4 FEET AWAY FROM THE FIREWALL.



ROOF
1/32" = 1'-0"

0' 8' 16' 32' 64'
1/32" = 1'-0"

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8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

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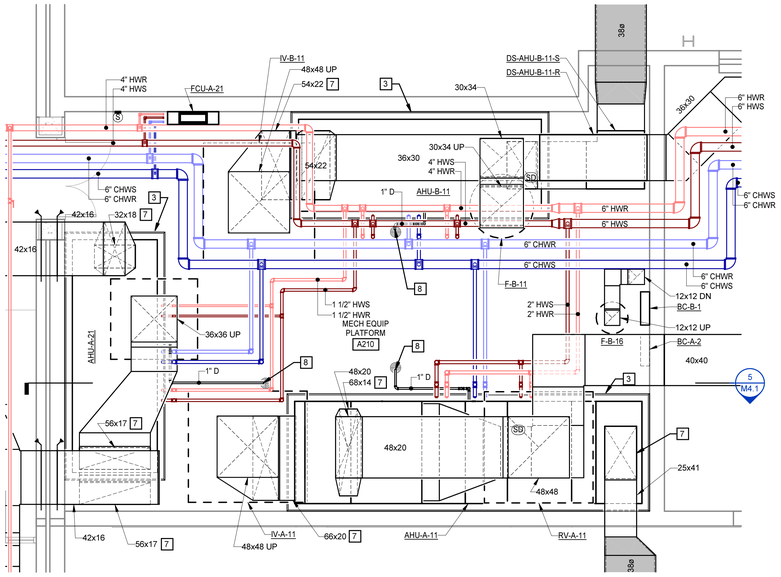
ROOF PLAN

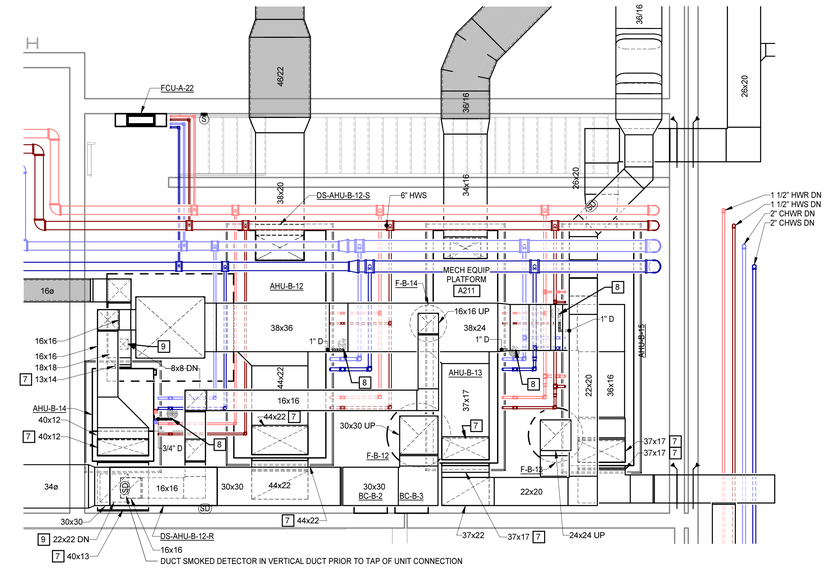
M2.18

8/2/2024 3:31:08 PM



2 ENLARGED PLAN - SECOND FLOOR - PART A - A210

M2.9.1 M3.1 — 1/4" = 1'-0"



3 ENLARGED PLAN - SECOND FLOOR - PART A - A211

M2.9.1 M3.1 — 1/4" = 1'-0"

GENERAL NOTES

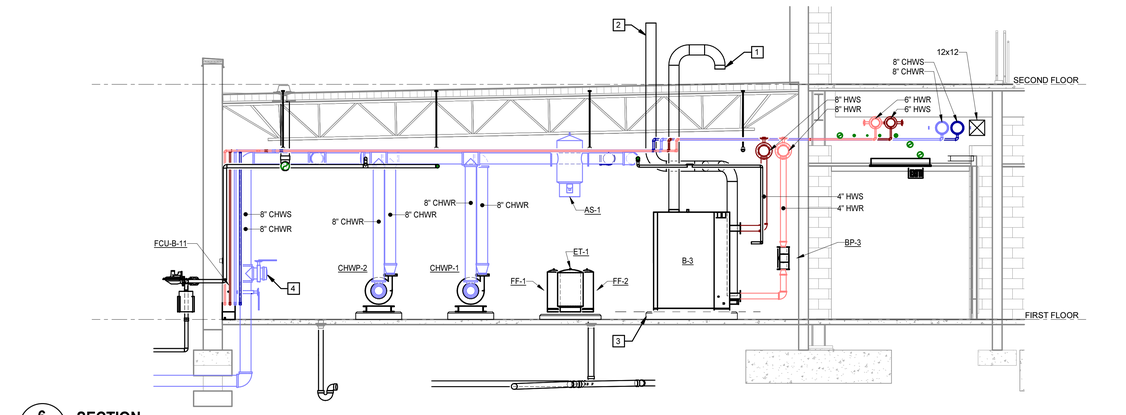
A. BRANCH PIPING RUNOUTS TO EQUIPMENT SHALL BE IN ACCORDANCE WITH THE FOLLOWING TABLE UNLESS OTHERWISE INDICATED. REFER TO EQUIPMENT SCHEDULES FOR FLOW RATES.

3/4":	0-3 GPM
1":	3.5-6 GPM
1-1/4":	6.5-12 GPM
1-1/2":	12.5-19 GPM
2":	19.5-37 GPM
2-1/2":	38-60 GPM
3":	61-104 GPM
4":	105-218 GPM
5":	219-340 GPM
6":	341-522 GPM

KEYNOTES

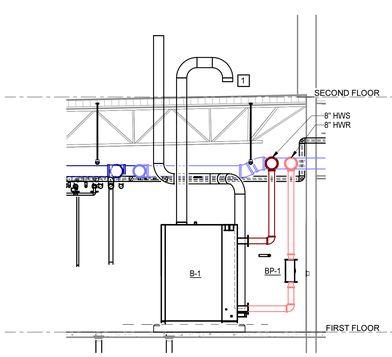
APPLIES TO THIS DRAWING

1. BOILER COMBUSTION AIR TERMINATION THRU ROOF. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. BOILER VENT TERMINATION THRU ROOF. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND BOILER FLUE TERMINATION DETAIL.
3. PROVIDE 6" THICK HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS.
4. 8" TEMPORARY CHILLER TAPS.
5. DOMESTIC WATER HEATER VENT TERMINATION THRU ROOF. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND BOILER FLUE TERMINATION DETAIL.
6. DOMESTIC WATER HEATER COMBUSTION AIR TERMINATION THRU ROOF. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
7. CONNECT TO UNIT FULL SIZE OF UNIT CONNECTION.
8. DISCHARGE CONDENSATE DRAIN INTO OPEN SITE FLOOR DRAIN.
9. DUCT PENETRATES UNRATED FLOOR. FILL THE ANNULAR SPACE AROUND THE PENETRATING DUCT WITH APPROVED NONCOMBUSTIBLE MATERIAL THAT RESISTS THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION IN ACCORDANCE WITH 607.6.3, EXCEPTION 2 OF THE NCMC.



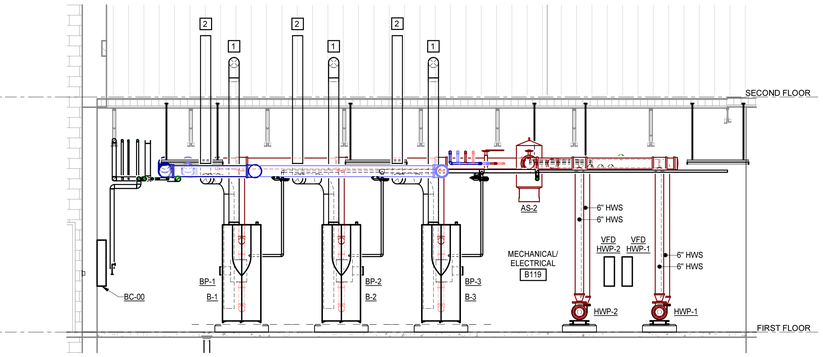
6 SECTION

M2.2.1 M3.1 — 1/4" = 1'-0"



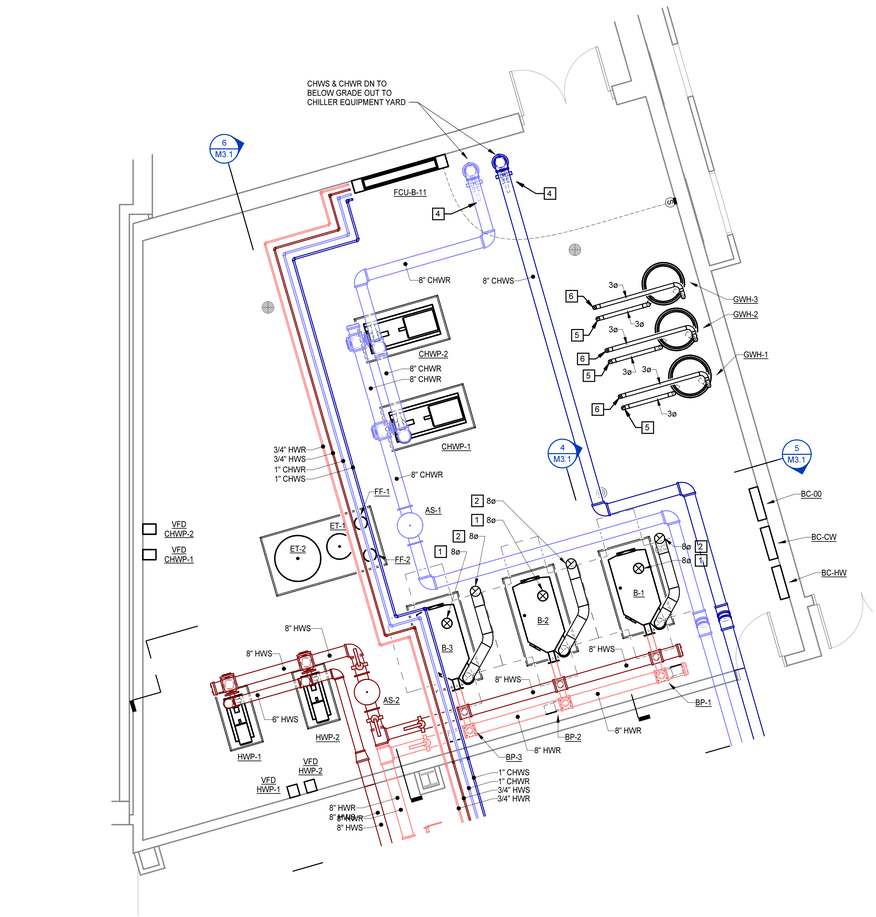
4 SECTION

M3.1 M3.1 — 1/4" = 1'-0"



5 SECTION

M3.1 M3.1 — 1/4" = 1'-0"



1 ENLARGED PLAN - FIRST FLOOR - PART B - MECHANICAL ROOM

M2.1.2 M3.1 — 1/4" = 1'-0"

0' 1' 2' 4' 8'
1/4" = 1'-0"

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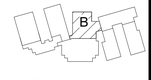
8/2/2024



KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

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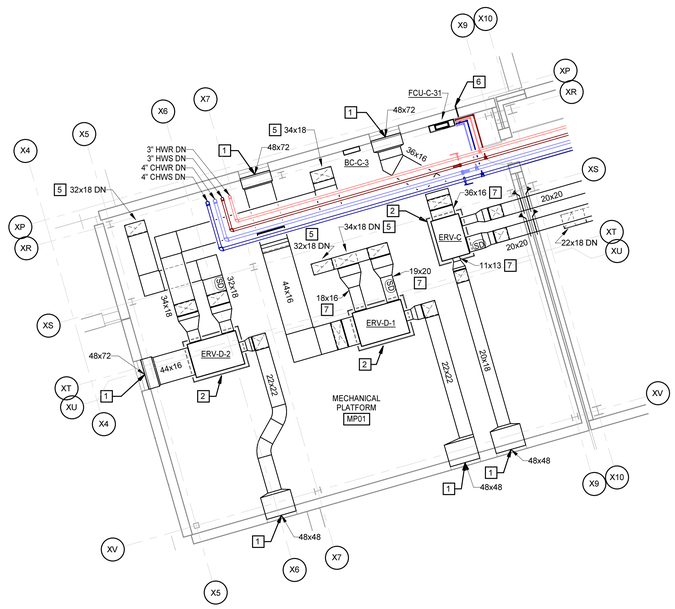
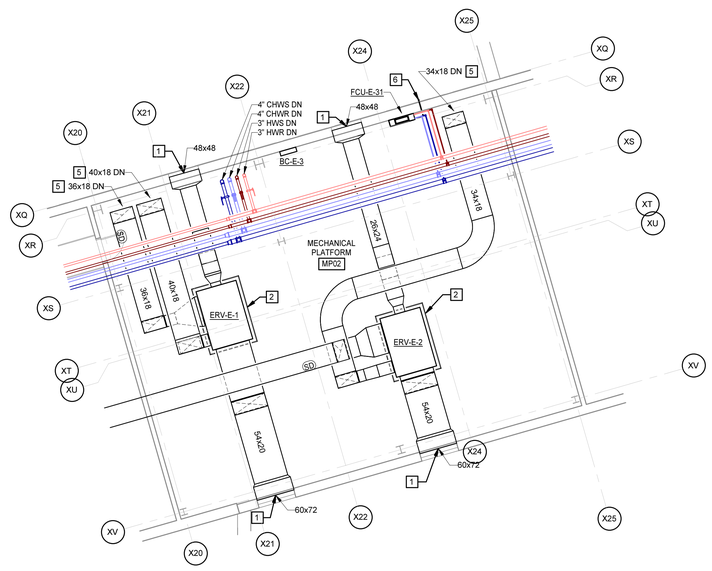
ENLARGED PLANS

M3.1

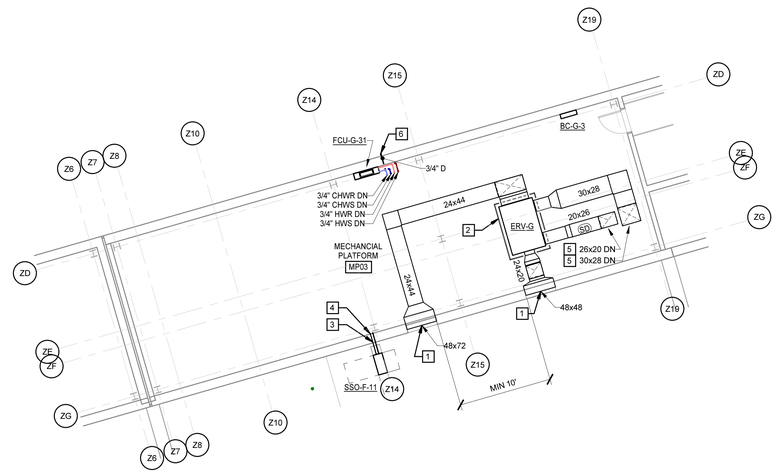
8/2/2024 3:31:22 PM



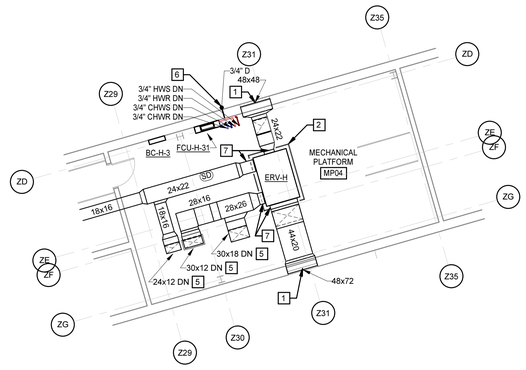
1 ENLARGED PLAN - PENTHOUSE - PART C
M2.17.2 M3.2 1/8" = 1'-0"



2 ENLARGED PLAN - PENTHOUSE - PART E
M2.17.2 M3.2 1/8" = 1'-0"



3 ENLARGED PLAN - PENTHOUSE - PART F&G
M2.18 M3.2 1/8" = 1'-0"



4 ENLARGED PLAN - PENTHOUSE - PART F&H
M2.18 M3.2 1/8" = 1'-0"

KEYNOTES

APPLIES TO THIS DRAWING

1. CONNECT DUCT TO LOUVER. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT SIZE AND LOCATION.
2. PROVIDE 6" THICK HOUSEKEEPING PAD. REFER TO STRUCTURAL DRAWINGS FOR ADDITIONAL DETAILS.
3. SIZE AND ROUTE REFRIGERANT SUCTION AND LIQUID IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
4. REFRIGERANT SUCTION AND LIQUID DOWN TO FLOOR BELOW.
5. DUCT PENETRATES UNRATED FLOOR. FILL THE ANNULAR SPACE AROUND THE PENETRATING DUCT WITH APPROVED NONCOMBUSTIBLE MATERIAL THAT RESISTS THE FREE PASSAGE OF FLAME AND THE PRODUCTS OF COMBUSTION IN ACCORDANCE WITH 607.6.3, EXCEPTION 2 OF THE NCMC.
6. DISCHARGE CONDENSATE DRAIN 6" ABOVE ROOF ONTO SPLASH BLOCK.
7. CONNECT TO UNIT FULL SIZE OF UNIT CONNECTION.

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043951 BRITTNEY WHITE
8/2/2024

KEY PLAN

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

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ENLARGED PLANS - PENTHOUSE PLANS

M3.2

0' 1' 2' 4' 8'
1/4" = 1'-0"

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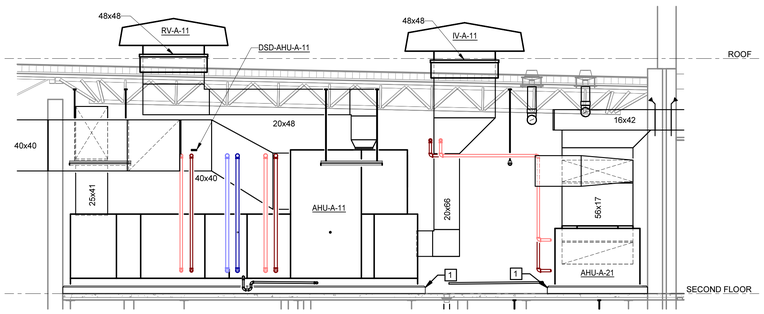
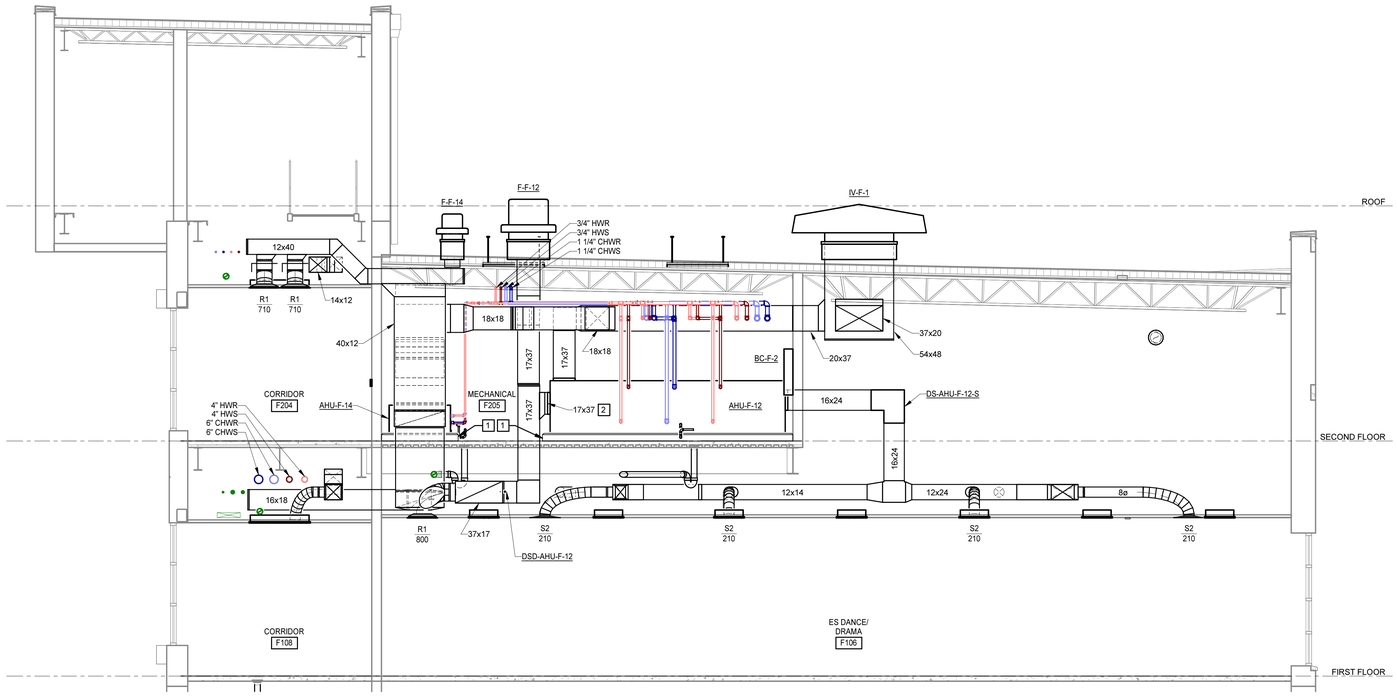
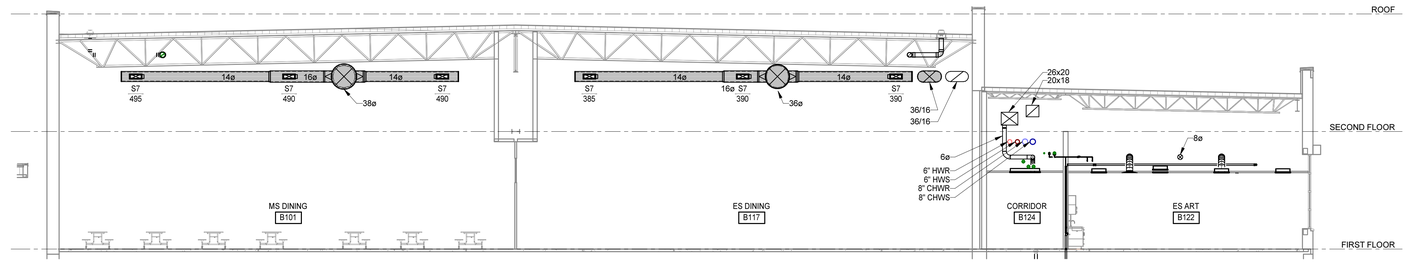


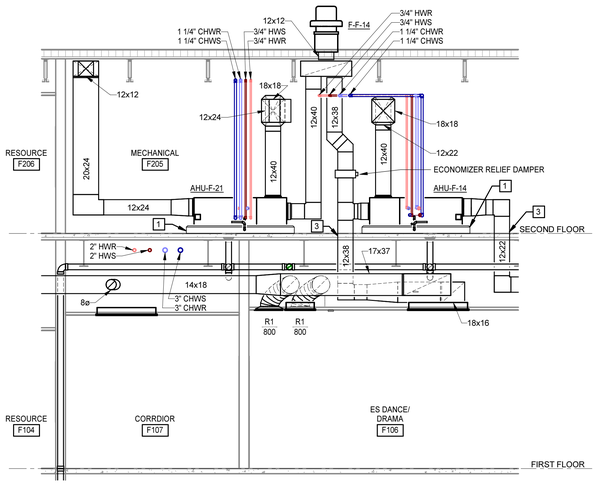
5 SECTION
M3.1 | M4.1
1/4" = 1'-0"



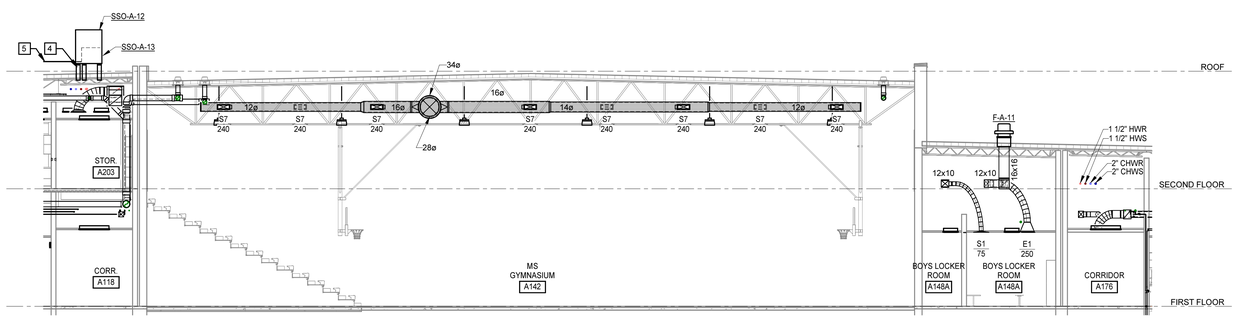
3 SECTION
M2.6.1 | M4.1
1/4" = 1'-0"



2 SECTION
M2.1.1 | M4.1
1/8" = 1'-0"



4 SECTION
M2.14.1 | M4.1
1/4" = 1'-0"



1 SECTION
M2.1.1 | M4.1
1/8" = 1'-0"

0' 1' 2' 4' 8'
1/4" = 1'-0"

0' 2' 4' 8' 16'
1/8" = 1'-0"

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NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER SCOTT WHITFIELD
8/2/2024

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

SECTIONS

M4.1

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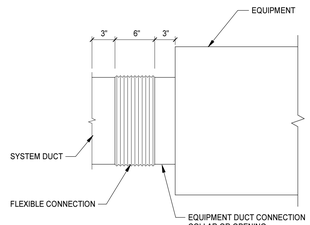
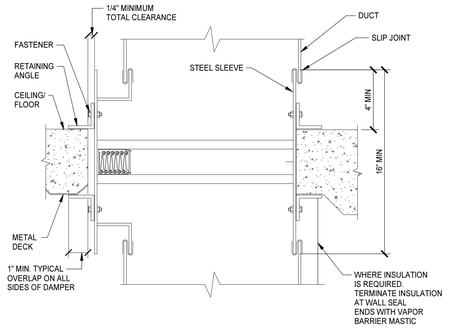


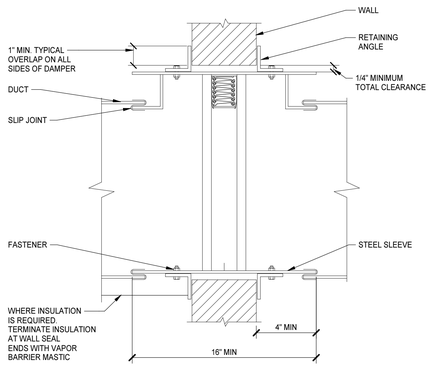
NOTE: THIS DETAIL APPLIES TO ALL DUCT CONNECTIONS TO AIR HANDLING UNITS AND FANS UNLESS OTHERWISE INDICATED

1 EQUIPMENT DUCT CONNECTION DETAIL
NO SCALE



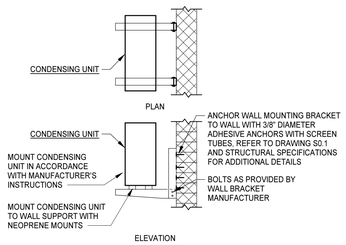
NOTE: THIS DETAIL IS BASED ON GREENHECK MODEL FD150. ALL FIRE DAMPERS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR THE MODEL USED.

2 FIRE DAMPER INSTALLATION DETAIL - TYPE B (HORIZONTAL)
NO SCALE

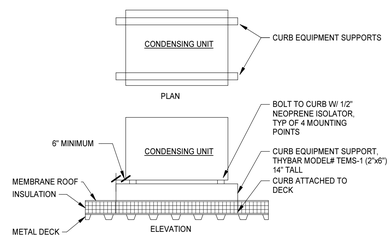


NOTE: THIS DETAIL IS BASED ON GREENHECK MODEL FD150. ALL FIRE DAMPERS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR THE MODEL USED.

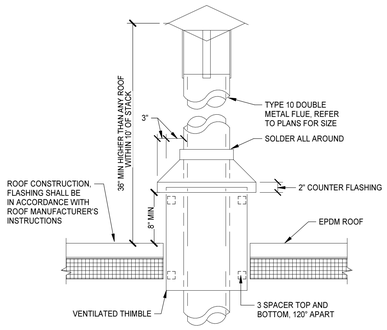
3 FIRE DAMPER INSTALLATION DETAIL - TYPE B (VERTICAL)
NO SCALE



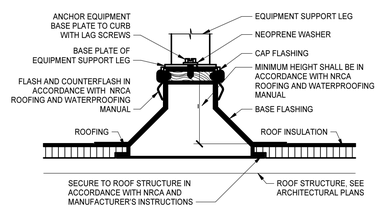
4 CONDENSING UNIT MOUNTING DETAIL - WALL
NO SCALE



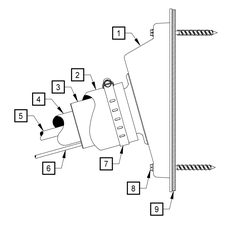
5 CONDENSING UNIT MOUNTING DETAIL - ROOF
NO SCALE



6 BOILER FLUE TERMINATION DETAIL
NO SCALE

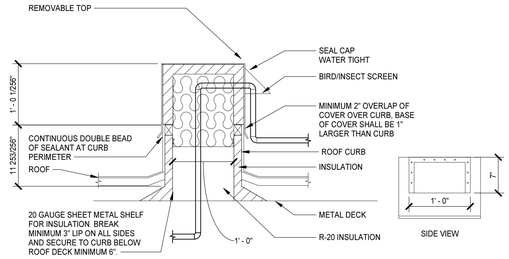


7 ROOF EQUIPMENT SUPPORT RAIL DETAIL
NO SCALE

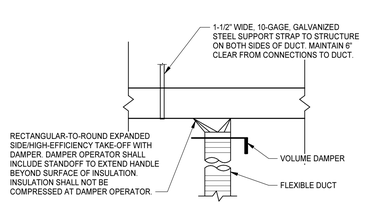


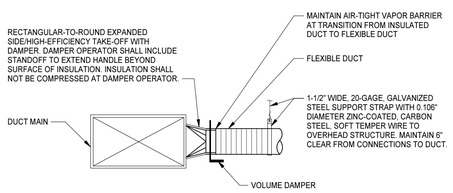
1. EXTERIOR WALL OR PARAPET WALL SEAL PENETRATION OUTLET WITH ELASTOMERIC LINE-SET COMPRESSION SLEEVE TYPE "TITAN GS" BY AIREX MANUFACTURING, INC. OR EQUAL. SIZE PER MANUFACTURER'S RECOMMENDATIONS
2. INSULATION PROTECTIVE PVC COVER TYPE "E-FLEX GUARD" BY AIREX MANUFACTURING ING. OR EQUAL.
3. ELASTOMERIC LINE-SET COMPRESSION & ANTI-VIBRATION SLEEVE
4. INSULATION FOR REFRIGERANT SUCTION LINE.
5. REFRIGERANT SUCTION LINE.
6. REFRIGERANT LIQUID LINE.
7. MECHANICAL CONNECTION SECURED WITH STAINLESS STEEL CLAMP.
8. WALL FASTENERS SELF-TAPPING 3/8" HEX HEAD 1/4" DIAMETER ALL MATERIAL ANCHOR SCREWS WITH ELASTOMERIC WASHERS.
9. WALL SURFACE SEAL ELASTOMERIC GASKET.

8 REFRIGERANT PIPE PENETRATION DETAIL - WALL
NO SCALE



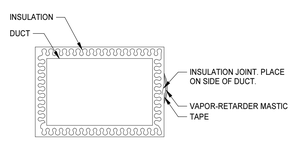
9 REFRIGERANT PIPE PENETRATION DETAIL - ROOF
NO SCALE





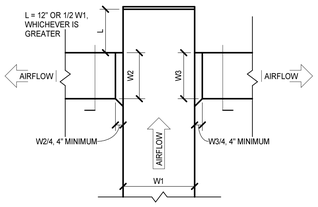
NOTES:
1. FLEXIBLE DUCT SHALL BE INSTALLED OVER METAL DUCT (BEAD/LIP ON METAL DUCT) AND ANCHORED WITH NYLON MECHANICAL BANDS OR PANDUIT STRAP.
2. IN EXPOSED AREAS, PROVIDE RIGID GALVANIZED STEEL BRANCH DUCT TO DIFFUSERS IN LIEU OF FLEXIBLE DUCT UNLESS INDICATED OTHERWISE. SUPPORT IN ACCORDANCE WITH REQUIREMENTS SPECIFIED FOR METAL DUCTS.

10 BRANCH CONNECTION TO DIFFUSER DETAILS
NO SCALE



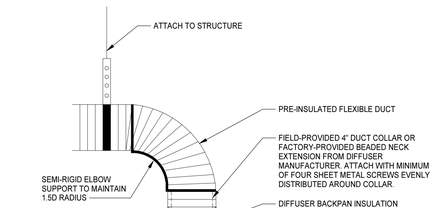
REFER TO SPECIFICATION SECTION 230700 FOR ADDITIONAL INFORMATION.

11 DUCT INSULATION JOINT DETAIL
NO SCALE

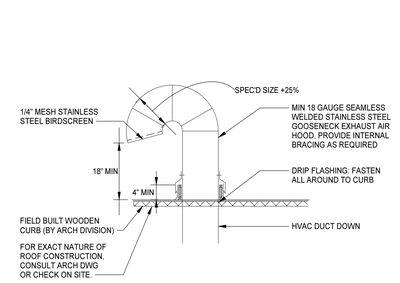


NOTE:
1. REFER TO *BRANCH CONNECTION TO DIFFUSER DETAILS* FOR BRANCH TAKE-OFF REQUIREMENTS.

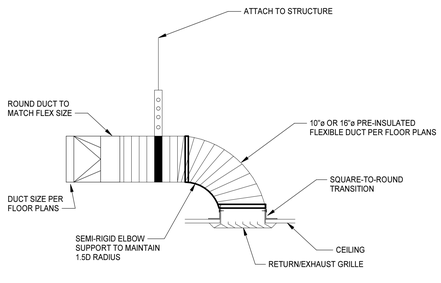
12 END OF DUCT MAIN DETAIL
NO SCALE



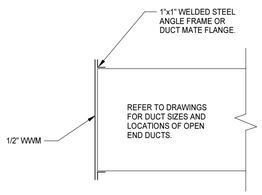
13 FLEXIBLE DUCT TO DIFFUSER CONNECTION DETAIL
NO SCALE



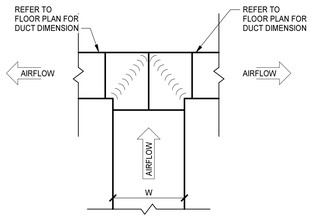
14 GOOSENECK DETAIL
NO SCALE



15 RETURN/EXHAUST AIR CONNECTION DETAIL
NO SCALE

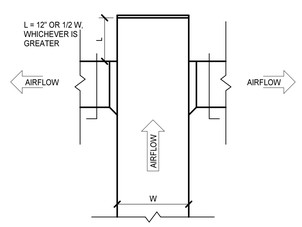


16 OPEN END DUCT DETAIL
NO SCALE



NOTES:
1. APPLIES WHERE "W" EXCEEDS 24" OR WHEN AIRFLOW EXCEEDS 1,500 CFM.

17 DIVIDED FLOW BRANCH DETAILS
NO SCALE



NOTES:
1. REFER TO *BRANCH CONNECTION TO DIFFUSER DETAILS* FOR BRANCH TAKE-OFF REQUIREMENTS.
2. APPLIES TO:
   A. WHERE "W" IS LESS THAN 24"
   B. ROUND DUCT BRANCHES TO DIFFUSERS
   C. WHEN AIRFLOW IS EQUAL TO OR LESS THAN 1,500 CFM.

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043951 KEITH T WHITLEY
8/2/2024

PENDER COUNTY SCHOOLS K-8 SCHOOL
Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

DETAILS

M5.1

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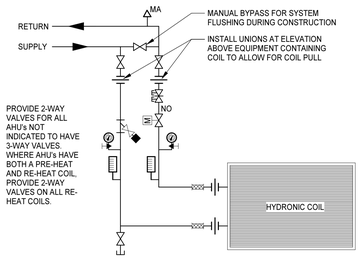
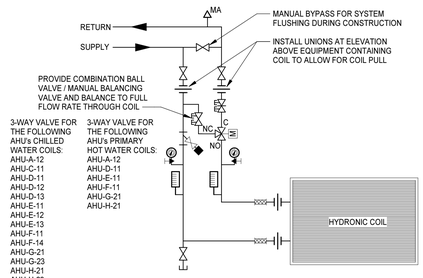
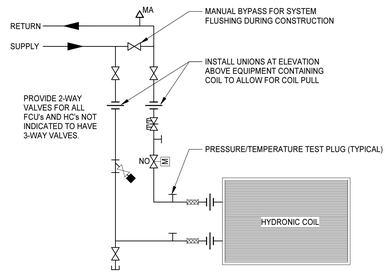


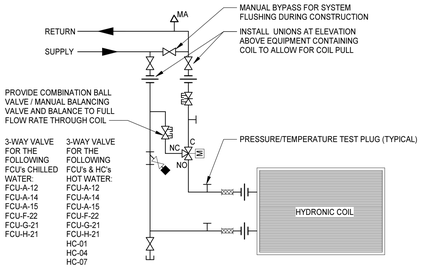
1 HYDRONIC COIL PIPING DIAGRAM - AHU
NO SCALE



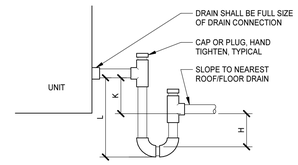
2 HYDRONIC COIL PIPING DIAGRAM - AHU
NO SCALE



3 HYDRONIC COIL PIPING DIAGRAM - TERMINAL EQUIPMENT
NO SCALE



4 HYDRONIC COIL PIPING DIAGRAM - TERMINAL EQUIPMENT
NO SCALE

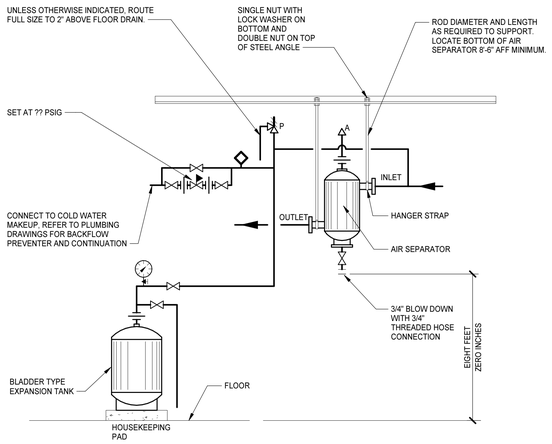


K = 1" FOR EACH 1" OF MAXIMUM NEGATIVE STATIC PRESSURE + 1"
H = 1/2K
L = H + K + PIPE DIAMETER + INSULATION

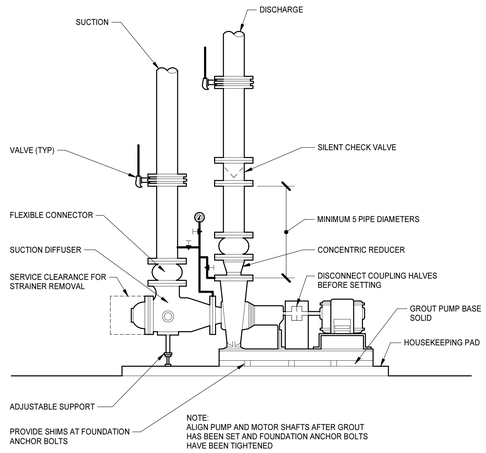
NOTES:

1. LOCATE TRAP AS CLOSE AS POSSIBLE TO UNIT OUTLET WITH BOTTOM BELOW SUPPORT STRUCTURE.
2. COORDINATE MOUNTING/CURB HEIGHT AS REQUIRED TO PROVIDE PROPER CONDENSATE DRAINAGE/TRAP HEIGHT.
3. NOTIFY ARCHITECT BEFORE FABRICATION IF PHYSICAL CONDITIONS PREVENT INSTALLATION OF DEPTH INDICATED.

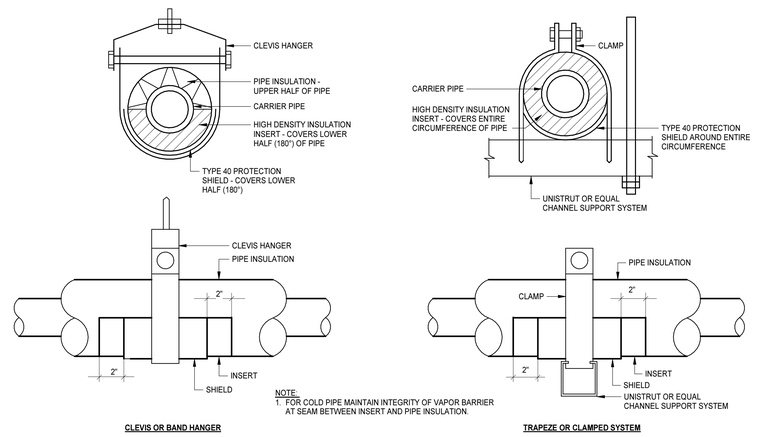
5 NEGATIVE PRESSURE CONDENSATE DRAIN DETAIL
NO SCALE



6 AIR SEPARATOR AND EXPANSION/COMPRESSION TANK DETAIL
NO SCALE



7 PUMP DETAIL
NO SCALE

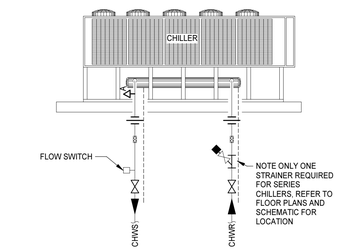


NOTE:
1. FOR COLD PIPE MAINTAIN INTEGRITY OF VAPOR BARRIER AT SEAM BETWEEN INSERT AND PIPE INSULATION.

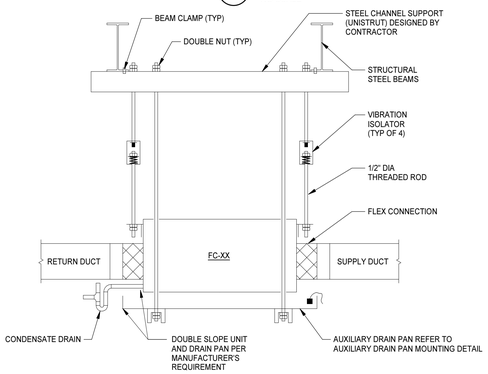
CLEVIS OR BAND HANGER

TRAPEZE OR CLAMPED SYSTEM

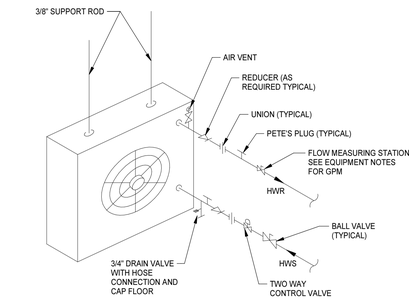
8 PIPE SUPPORT AND THERMAL SHIELD DETAILS
NO SCALE



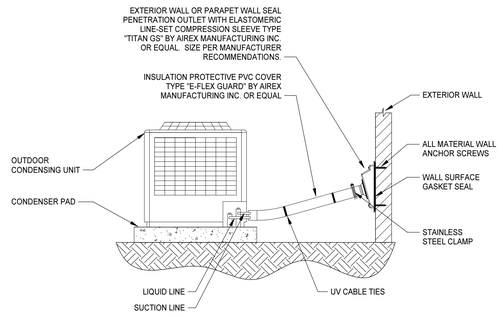
9A CHILLER PIPING DETAIL
NO SCALE



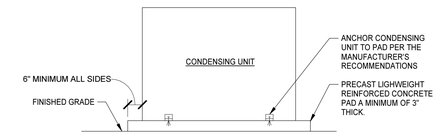
10 FAN COIL UNIT DETAIL (FC-XX)
NO SCALE



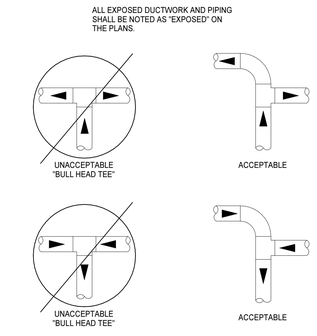
11 HORIZONTAL UNIT HEATER PIPING DIAGRAM
NO SCALE



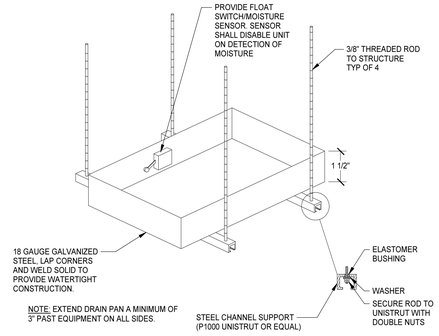
12 CONDENSING UNIT - REFRIGERANT PIPING DETAIL
NO SCALE



13 CONDENSING UNIT MOUNTING DETAIL - ON GRADE
NO SCALE



14 PIPE TEE CONFIGURATION DETAIL
NO SCALE



15 AUXILIARY DRAIN PAN MOUNTING DETAIL
NO SCALE

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043951 BRITT T WHITE
8/2/2024

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

DETAILS

M5.2

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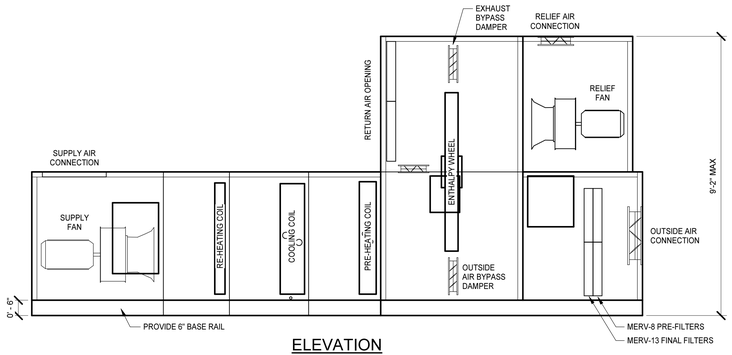
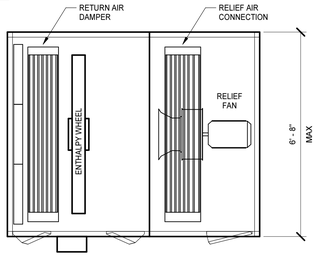
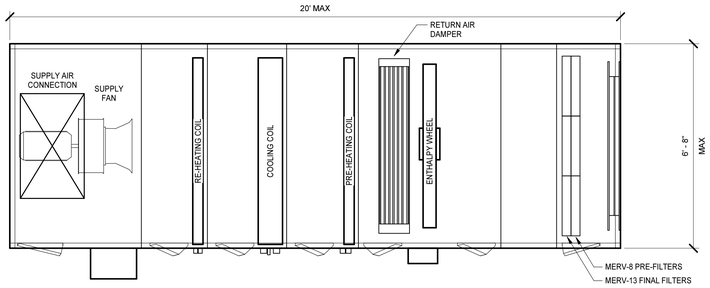


ELEVATION

NOTE: CONTRACTOR TO PROVIDE SHIPPING SPLITS AS REQUIRED TO RIG AND INSTALL UNIT IN EXISTING OPENINGS AND MECHANICAL ROOMS.



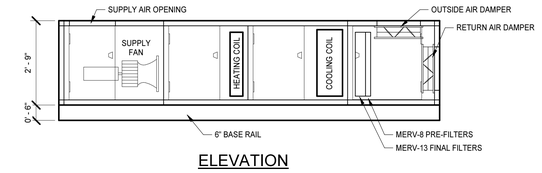
PLAN - TOP



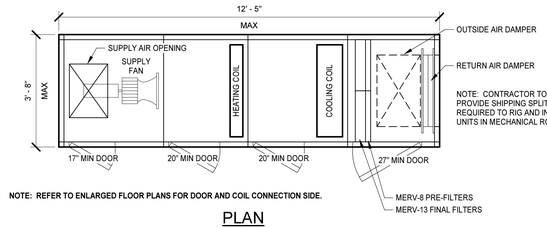
PLAN - BOTTOM

UNIT LAYOUT DETAIL - AHU WITH ENERGY RECOVERY WHEEL (AHU-A-11)

1 1/2" = 1'-0"



ELEVATION

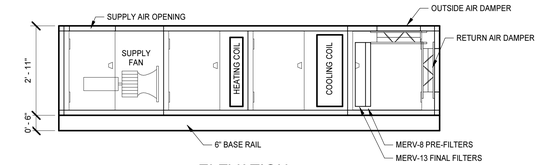


NOTE: REFER TO ENLARGED FLOOR PLANS FOR DOOR AND COIL CONNECTION SIDE.

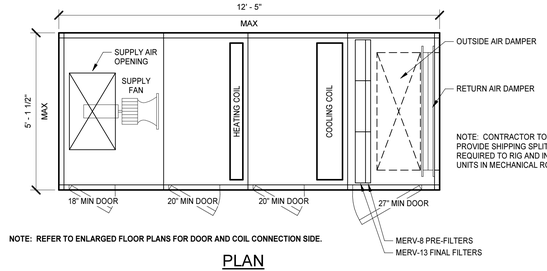
PLAN

UNIT LAYOUT DETAIL - SZ VAV W/ REHEAT COIL (SIZE 06) (AHU-D-12, AHU-D-22, AHU-E-12, AHU-E-22)

2 1/2" = 1'-0"



ELEVATION

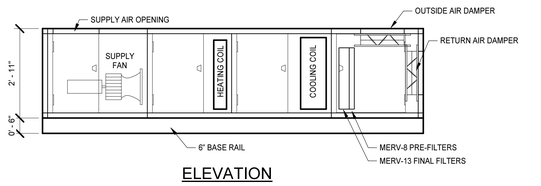


NOTE: REFER TO ENLARGED FLOOR PLANS FOR DOOR AND COIL CONNECTION SIDE.

PLAN

UNIT LAYOUT DETAIL - SZ VAV W/ REHEAT COIL (SIZE 10) (AHU-G-13, AHU-G-21, AHU-G-23, AHU-H-21)

4 1/2" = 1'-0"



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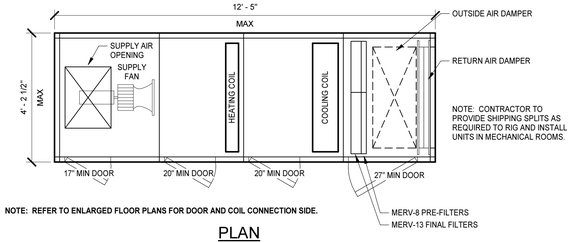
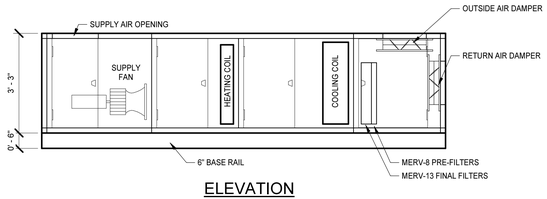


NOTE: REFER TO ENLARGED FLOOR PLANS FOR DOOR AND COIL CONNECTION SIDE.

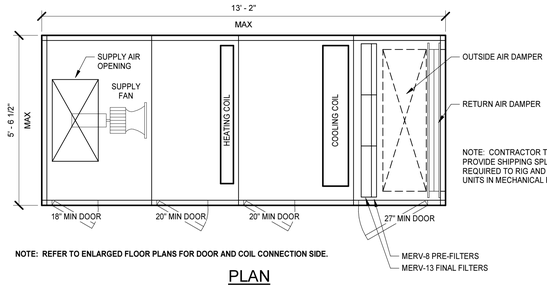
PLAN

UNIT LAYOUT DETAIL - SZ VAV W/ REHEAT COIL (SIZE 08) (AHU-G-11, AHU-H-11)

3 1/2" = 1'-0"



ELEVATION

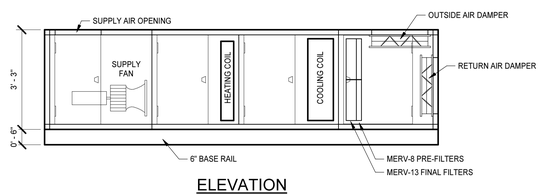


NOTE: REFER TO ENLARGED FLOOR PLANS FOR DOOR AND COIL CONNECTION SIDE.

PLAN

UNIT LAYOUT DETAIL - SZ VAV W/ REHEAT COIL (SIZE 12) (AHU-C-11, AHU-D-11, AHU-D-13, AHU-D-21, AHU-D-23, AHU-H-13)

5 1/2" = 1'-0"



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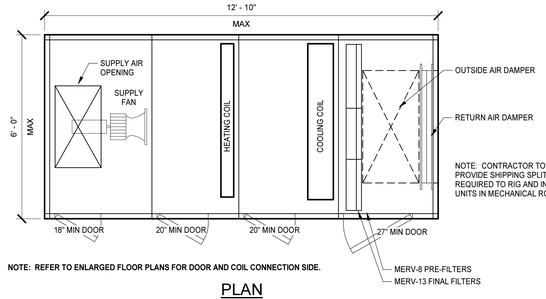
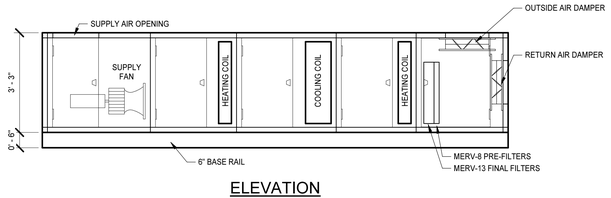


NOTE: REFER TO ENLARGED FLOOR PLANS FOR DOOR AND COIL CONNECTION SIDE.

PLAN

UNIT LAYOUT DETAIL - SZ VAV W/ REHEAT COIL (SIZE 14) (AHU-C-21, AHU-E-11, AHU-E-13, AHU-E-21, AHU-E-23, AHU-H-23)

6 1/2" = 1'-0"



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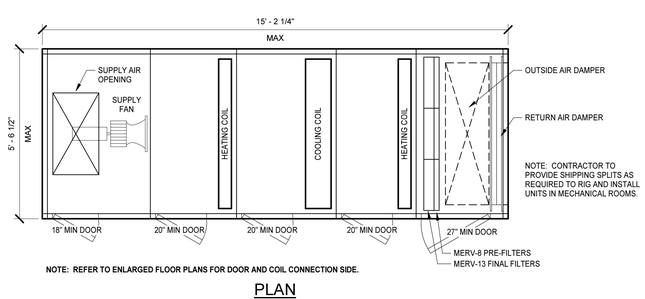
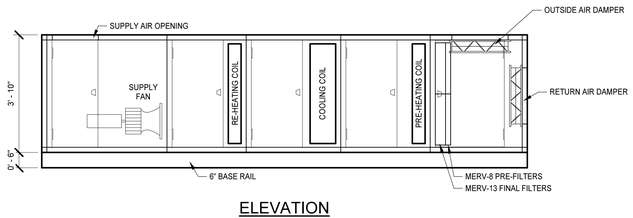


NOTE: REFER TO ENLARGED FLOOR PLANS FOR DOOR AND COIL CONNECTION SIDE.

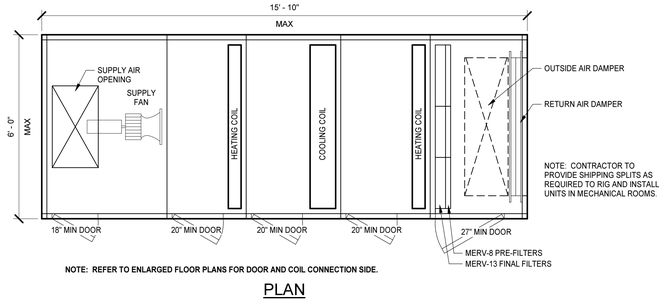
PLAN

UNIT LAYOUT DETAIL - SZ VAV W/ PREHEAT COIL (SIZE 12) (AHU-A-21)

7 1/2" = 1'-0"



ELEVATION



NOTE: REFER TO ENLARGED FLOOR PLANS FOR DOOR AND COIL CONNECTION SIDE.

PLAN

UNIT LAYOUT DETAIL - SZ VAV W/ PREHEAT COIL (SIZE 17) (AHU-B-11)

8 1/2" = 1'-0"

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043951 SCOTT T WHEELER
8/2/2024

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

DETAILS

M5.3

0' 6" 1' 2' 4'
1/2" = 1'-0"

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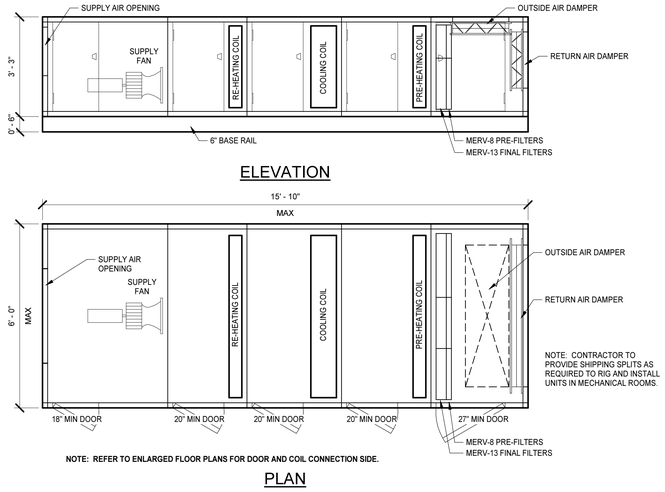
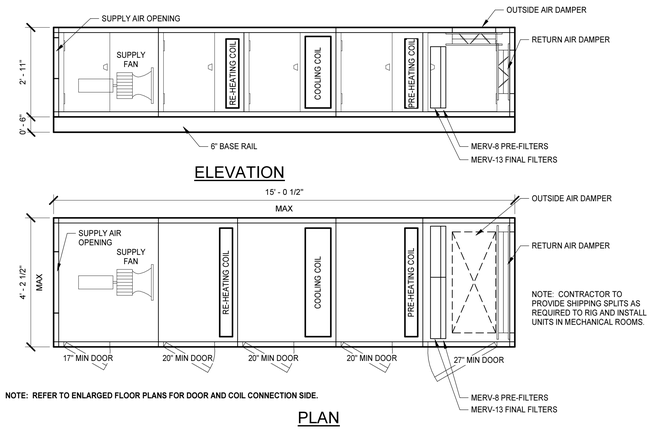


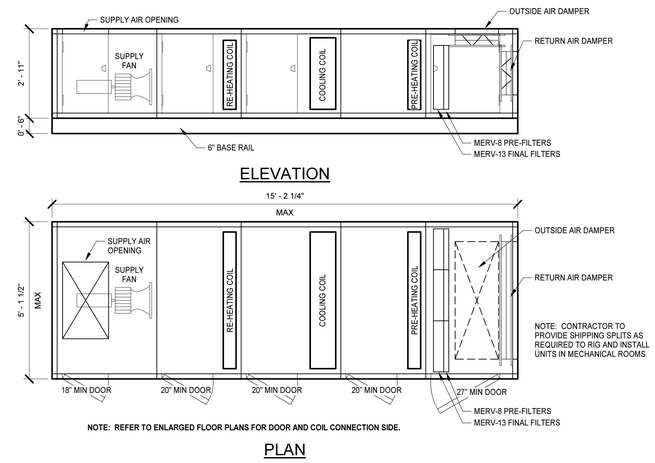
UNIT LAYOUT DETAIL - SZ VAV W/ PREHEAT COIL (SIZE 14) (AHU-B-12)

1 1/2" = 1'-0"



UNIT LAYOUT DETAIL - SZ VAV W/ REHEAT COIL (SIZE 08) (AHU-B-13, AHU-B-15, AHU-F-12, AHU-F-13)

2 1/2" = 1'-0"



UNIT LAYOUT DETAIL - SZ VAV W/ PREHEAT COIL (SIZE 10) (AHU-F-11)

3 1/2" = 1'-0"

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PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

DETAILS

M5.4

0' 6" 1' 2' 4'
1/2" = 1'-0"

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CONTROL PANEL SCHEDULE

TAG	NUMBER	NAME	SERVING	NOTES
BC-00	B119	MECHANICAL/ ELECTRICAL	BAS HEAD END	
BC-A-1	A144	GIRLS LOCKER ROOM	AHU-A-12	
BC-A-2	A210	MECHANICAL	AHU-A-11	
BC-B-1	A210	MECHANICAL	AHU-A-21, B-11	
BC-B-2	A211	MECHANICAL	AHU-B-12, B-14	
BC-B-3	A211	MECHANICAL	AHU-B-13, B-15	
BC-C-1	C119	MECHANICAL	AHU-C-11	
BC-C-2	C216	MECHANICAL	AHU-C-21	
BC-C-3	MP01	MECHANICAL PLATFORM	ERV-C, D-1, D-2	
BC-CW	B119	MECHANICAL/ ELECTRICAL	CHILLED WATER SYSTEM	
BC-D-1	D120	MECHANICAL	AHU-D-11, D-12, D-13	
BC-D-2	D220	MECHANICAL	AHU-D-21, D-22, D-23	
BC-E-1	E125	MECHANICAL	AHU-E-11, E-12, E-13	
BC-E-2	E229	MECHANICAL	AHU-E-21, E-22, E-23	
BC-E-3	MP02	MECHANICAL PLATFORM	ERV-E-1, E-2	
BC-F-1	F205	MECHANICAL	AHU-F-11, F-12	
BC-F-2	F205	MECHANICAL	AHU-F-13, F-14, F-21	
BC-G-1	G125	MECHANICAL	AHU-G-11, G-12, G-13	
BC-G-2	G217	MECHANICAL	AHU-G-21, G-22, G-23	
BC-G-3	MP03	MECHANICAL PLATFORM	ERV-G	
BC-H-1	H126	MECHANICAL	AHU-H-11, H-12, H-13	
BC-H-2	H217	MECHANICAL	AHU-H-21, H-22, H-23	
BC-H-3	MP04	MECHANICAL PLATFORM	ERV-H	
BC-HW	B119	MECHANICAL/ ELECTRICAL	HOT WATER SYSTEM	
HEAT TRACE CP				

GENERAL NOTES:
A. PROVIDE A CONTROLLER FOR EACH AIR HANDLING UNIT. MULTIPLE CONTROLLERS MAY BE INSTALLED IN EACH CONTROL ENCLOSURE. CONTROL PANELS INDICATED FOR POWER. CONTROLS CONTRACTOR SHALL PROVIDE CONTROL PANELS AND CONTROLLERS AS REQUIRED PER 230900.

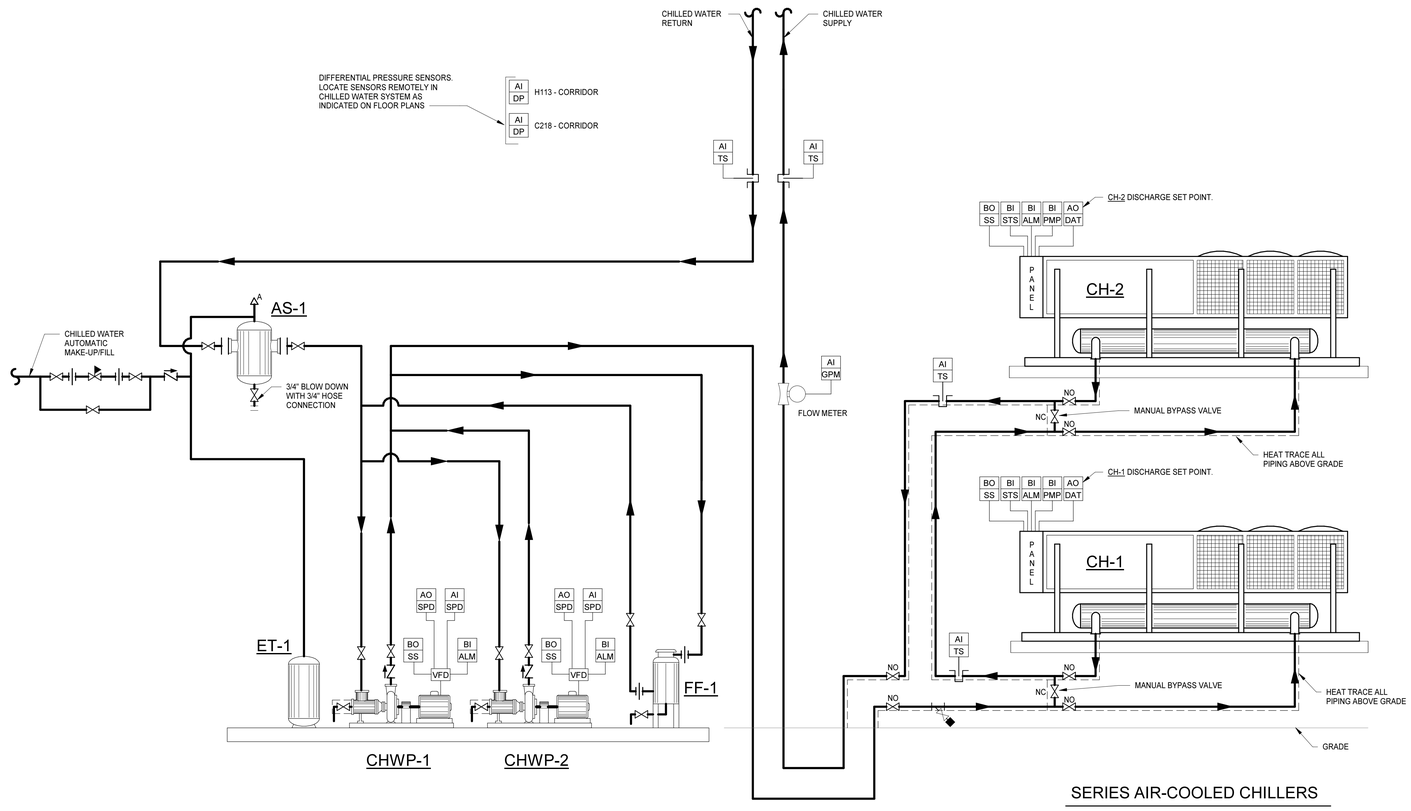
SEQUENCES OF CONTROL

CHILLER PLANT

A. General: The intent is to allow chiller operation year-round. Individual chillers may be shut down for maintenance periodically, but chilled water production shall be available at all times. Scheduled operation of the chillers shall be controlled by the BAS.
B. Control of the chillers' starting, stopping, capacity modulation, supply water temperature control, compressor staging, VFD modulation, etc. shall be controlled by the chiller unit-mounted controller. The BAS shall enable/disable the chillers, provide supply water temperature setpoints, and receive chiller alarms.
C. The chiller plant shall be controlled through software interlocking as follows:
   1. When any one of the air handling units call for cooling, the BAS shall enable the lead chiller.
   2. Once started, the BAS shall call for chilled water until none of the air handling units call for cooling.
   3. The BAS shall shut down the chiller plant with no call for cooling. Individual chillers may start and stop at any time based on building load or other parameters in the unit controller.
D. Power Failure
   1. Upon detection of a power failure, all chilled water pumps and chillers will be inoperative. The BAS shall reset all control programs to a restart sequence. The BAS shall re-enable the plant when power is restored.
E. Phase Loss
   1. Upon detection of a phase loss, the BAS shall stop the pumps and chiller plant and reset all control programs to a restart sequence. The BAS shall re-enable the plant when full power is restored.
F. System Monitoring and Alarming
   1. Should, at any time, a chiller safety or loss of water flow in the primary loop be registered, the chiller plant shall be shut down and the appropriate alarm recorded on the chiller UCP.
   2. The BAS shall monitor chiller and pump operations including but not limited to: individual chiller chilled water supply and return temperatures, chiller alarms, pump status, etc.
   3. The BAS system shall accumulate run time for the chillers.
G. Initial Set Points:
   1. Chiller lead lag time period: Two weeks (adjustable).
   2. Pump lead lag time period: Two weeks (adjustable).
   3. Chilled water system temperature set point: 42 degrees F.
   4. Chiller lead lag: Change chiller start order each time period.
   5. Chilled water pump lead lag: There are two chilled water pumps. The BAS shall alternate the two pumps in the lead position.
H. Chilled water enable/disable: On a call for cooling by any piece of equipment, the chilled water sequence shall be enabled. If there is no call for cooling by any piece of equipment for more than 30 minutes, or the chilled water temperature falls to two degrees below set point and there is no call for cooling by any equipment, the BAS shall disable the chiller plant.
I. System Startup: On startup, the lead chiller shall start. The lead chilled water pump shall be started. The chiller shall confirm chilled water flow via its flow sensor. The chiller controller shall modulate the cooling capacity as required to provide chilled water at the chilled water set point.
J. Chiller Sequencing:
   1. The chillers are piped in series. Chiller 1 is the upstream chiller, and Chiller 2 is the downstream chiller.
   2. The lead chiller shall run by itself (time determined by manufacturer) prior to enabling the lag chiller to allow time to cool the chilled water loop. The chiller's set point shall be the chilled water system set point.
   3. If the lead chiller is in alarm, fails to start, or is not producing chilled water, the BAS shall enable the lag chiller and index it to the lead position.
   4. On a rise in demand such that the lead chiller cannot maintain chilled water supply at set point for and adjustable period, the BAS shall start the lag chiller.
      a. The intent is to equalize the load on both chillers. When both chillers are operating, the BAS shall set different setpoints for each chiller.
      b. The upstream chiller set point shall be reset to about halfway between the system return temperature and the chilled water system set point (= (chilled water return temp – ((chilled water return temp – chilled water system supply set point)/2)).
      c. The downstream chiller set point shall be the chilled water system set point.
   5. On a fall in demand, the BAS shall stage off the lag chiller. When both chillers reach 40% loading based on RLA, the BAS shall shut down the lag chiller and reset the chilled water set point of the lead chiller to the system chilled water set point.
K. Chilled Water Temperature Reset: The chilled water temperature shall be maintained such that a minimum of one chilled water valve is 85% open. If all chilled water valves are less than 85% open the chilled water temperature shall be reset up 1 degree F. every 10 minutes until one valve reaches 85% open. Maximum chilled water temperature shall be 8 degrees above chilled water temperature set point. If any valve reaches 95% open, the chilled water temperature shall be reset down 1 degree F. every 10 minutes until no valve is more than 95 % open. Whenever there is a need for dehumidification, the chilled water temperature shall be returned to set point until dehumidification is no longer required. When humidity levels are returned to set point, the chilled water temperature reset sequence shall resume.
L. System Monitoring
   1. The BAS shall monitor the chiller controllers for alarms. When a chiller generates an alarm, the BAS shall receive the alarm signal and indicate the alarm and the chiller on the head end graphics.
   2. The following points shall be passed from the chiller controllers to the BAS head end graphics:
      a. Chilled water request to start
      b. Chilled water system supply temperature
      c. Chilled water system return temperature
      d. Chiller 1 RLA
      e. Chiller 2 RLA
      f. Chiller 1 chilled water supply/return temperature
      g. Chiller 2 chilled water supply/return temperature
      h. Chilled water flow rate
      i. Chiller 1 alarm
      j. Chiller 2 alarm

CHILLED WATER PUMPS

A. The pumps are in a duty/standby configuration. The BAS shall rotate the lead pump to equalize run times.
B. The BAS shall start the lead pump on a call for cooling and an operating chiller. If cooling is not required and the chillers shutdown, then the BAS shall stop the pumps.
C. Chilled Water Pump Speed Control:
   1. Loop Differential Pressure
      a. The BAS shall modulate the speed of the pumps to maintain the chilled water differential pressure set point as transmitted by two remote pressure differential transmitters (indicated on drawings).
      b. The BAS shall have field-programmable, independent set points, the value of which shall be the optimum differential pressure at each remote location to provide the design flow to the remaining hydronic system. The differential pressure set point shall be determined during testing and balancing and programmed into the BAS.
      c. The BAS shall monitor all three differential pressure values and control the pump speed based on the value furthest from set point.
   2. Minimum Pump Speed
      a. Minimum pump speed shall be set to provide the minimum flow rate required by the chiller. Flow rate will be monitored by the chilled water loop flow meter. The minimum flow required by the chiller shall be programmed into the BAS as the minimum pump flow rate.
D. Pump Failure: Upon detection of pump failure via a pump current switch or VFD fault, the BAS shall start the other pump and issue an alarm at the BAS head end.
E. General:
   1. The chilled water pump control systems shall include semi-automatic and manual modes of operation. The operator shall be capable of starting each pump manually but allow the automatic control to adjust the pump speed to maintain system differential pressure. The operator shall also have the option of starting each pump and controlling its speed manually. This shall be accomplished by utilizing the hand-off-auto switch and manual speed control on each variable frequency drive control panel.
   2. The control system shall include a failure alarm for each pump. Upon a pump failure alarm, the pump shall be stopped and locked-out of service until the alarm is manually reset. A pump failure alarm shall automatically replace the failed pump with the next pump in the sequence.
F. System Monitoring:
   1. Temperatures for chiller supply/return and building chilled water supply/return sensed by temperature sensors shall be indicated on the BAS head end graphics along with available points from the chiller control panel.
   2. The following points shall be passed from the pump system to the BAS head end graphics:
      a. Chilled water pump 1 speed
      b. Chilled water pump 2 speed
      c. Chilled water pump on/off 1 status
      d. Chilled water pump on/off 2 status
      e. Chilled water pump 1 alarm
      f. Chilled water pump 2 alarm
      g. Chilled water zone differential pressure 1
      h. Chilled water zone differential pressure 2



1 **CHILLED WATER SYSTEM SCHEMATIC AND CONTROLS**
NO SCALE

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 043951 ROBERT T WHITE
8/2/2024

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

CHILLED WATER SYSTEM SCHEMATIC & CONTROLS

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SEQUENCES OF CONTROL

BOILER PLANT CONTROL

A. General: The system consists of three condensing type, gas-fired, hot water boilers with variable speed primary pumps and two variable speed hot water secondary pumps. The BAS shall control secondary system pumping, enable the boiler manufacturers' Boiler Management System (BMS) panel to operate the boilers, and provide a Hot Water Supply setpoint signal. The BMS shall stage boilers and modulate primary hot water pumps as recommended by boiler manufacturer to optimize efficiency and equalize run time on boilers.

B. Pump Selection
1. Pumps HWP-1 and HWP-2 shall be controlled through the BAS with Active/Stand-by rotation. The Active/Stand-by status of the pumps shall be rotated through the BAS automatically based on a program to equalize pump run times. Pump Active/Standby status shall be automatically rotated weekly.
   a. This rotation shall be schedules as determined by the owner. The initial schedule shall be Mondays at 8:00 am.
   b. To prevent a boiler from shutting down on due to a loss of flow, if a pump is already running the Standby pump shall be engaged and proof On prior to shutting down one of the active pumps.
2. Pumps BP-1, BP-2, and BP-3 are variable speed boiler pumps and shall operate when their respective boiler is enabled through the BMS control panel.

C. Boiler Plant Control
1. Enable/Disable Control Parameters
   a. The BAS system shall be programmed with the following parameters to enable the boiler plant:
      1. The BAS shall enable the boiler plant anytime the outdoor air temperature is 50°F (adj) or below. While the outside air temperature is 50°F or below, the boiler plant shall remain in constant operation.
      2. The BAS system shall monitor all HVAC equipment (AHUs and FCUs) served by this boiler plant. While the outside air temperature is above 50°F, a call for Hot Water from any one (1) AHU or any three (3) fan coil units or duct heating coils shall trigger the BAS system to enable the boiler plant (Start the pumps and send the Enable command to the BMS).
      3. While the outside air temperature is above 50°F, if none of the HVAC equipment (AHUs, Fan Coil Units, or Duct Heating Coils) call for Hot Water for a minimum of 15 minutes (adj.) the BAS shall disable the BMS and shut down the pumps.
2. Hot Water Setpoint Reset Control
   a. The Hot Water setpoint is to be reset between 140°F and 100°F based on outside air temperature.
      1. When the Outside Air Temperature is 50°F or greater the Hot Water setpoint shall be 100°F.
      2. When the Outside Air Temperature is between 50°F and 30°F the BAS shall linearly reset the Hot Water setpoint from 100°F to 140°F.
      3. When the Outside Air Temperature is 30°F or less the Hot Water setpoint shall be 140°F.
      4. When the Outside Air Temperature is 10°F or less the Hot Water setpoint shall be 160°F to provide additional capacity at below design outside air conditions.
3. Pump Speed Control
   a. Loop Differential Pressure
      1. The BAS shall monitor the Differential Pressure Transmitters on the HW loop piping. The BAS system shall be programmed to modulate the speed of the pump to maintain the HW loop differential pressure.
      2. The BAS shall monitor the remote DP transducers, each DP shall be provided with its own setpoint. This setpoint shall be established with coordination from the TAB contractor. The setpoint value shall be the optimum differential pressure for that portion of the system.
      3. The differential pressure sensors shall be calibrated to record pressure in PSI and Feet of Water Column.
      4. The BAS shall simultaneously monitor all DP values and run separate pump speed calculations for each based on its individual setpoint and pressure value. The BAS shall pass the maximum calculated pump speed signal to the pump control output.
   b. Pump Minimum Speed/GPM
      1. Minimum pump speed shall be limited to the minimum operating flow rate of the boilers or the minimum pump flow rate, whichever is greater as monitored by the Hot Water Loop Flow meter.
4. Pump Failure
   a. Upon detection of pump failure via a pump current switch or VFD Fault status, the BAS shall initiate a "Pump Failure" sequence.
      1. When the BAS detects a pump failure the BAS shall start the stand-by pump.
      2. The failed active pump shall remain "On" for 60 seconds.
      3. If the failed active pump run status is picked up again (the pump was shut down for a brief period) the BAS shall shut down the standby pump and resume operation of the active pump.
      4. If the failed active pump run status is not picked up again (the pump was shut down or failed) the BAS shall shut down the failed active pump and continue operation of the stand-by pump.
      5. A message shall be recorded to indicate a problem was detected and the automatic pump rotation was sequenced to continue operation.
   b. Should both hot water pumps fail to operate a "Heating System Failure" alarm shall be recorded.

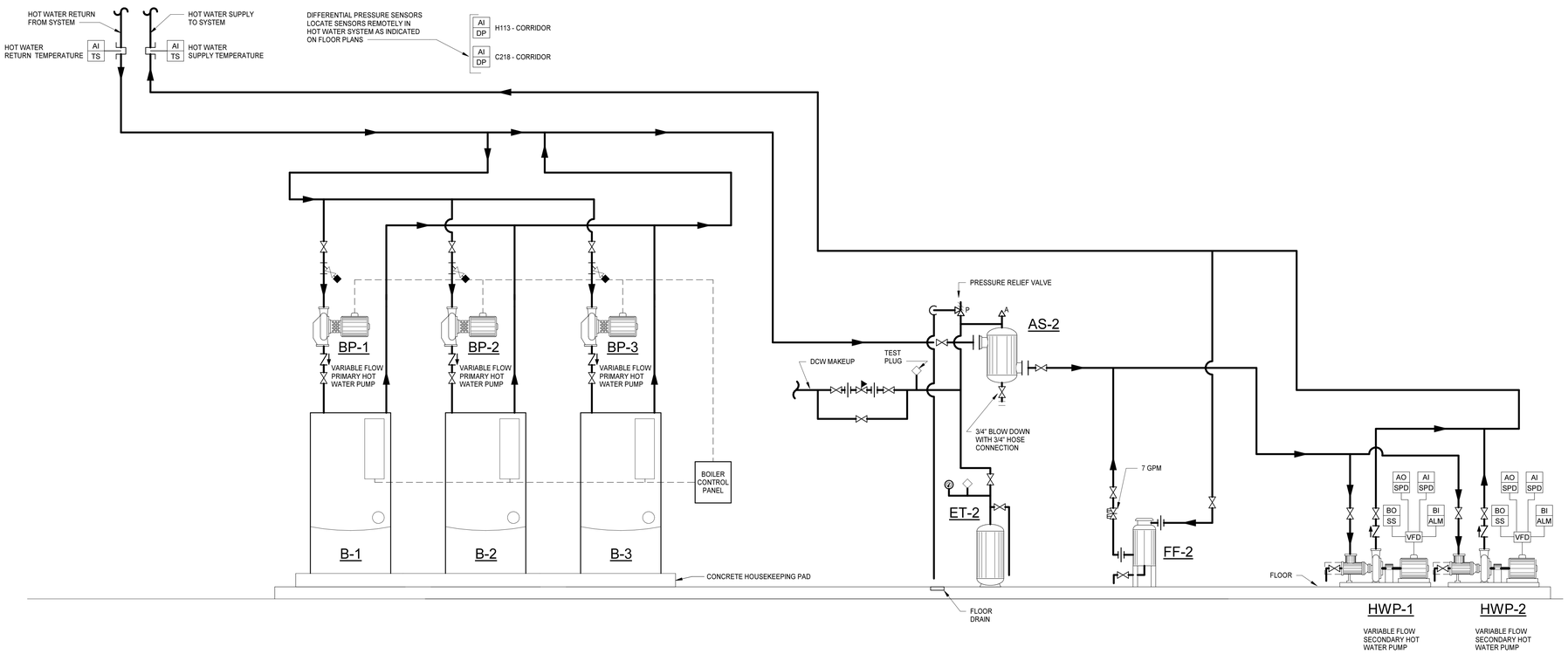
D. Power Failure
1. Upon detection of a power failure the BAS shall reset all boiler plant and pump control programs to a restart sequence. The BAS shall restart the pumps as defined above when power is restored.

E. Phase Loss
1. Upon detection of a phase loss the BAS shall stop the pumps and reset all pump control programs to a restart sequence. The BAS shall restart the pumps as defined above when full power is restored.

F. Commissioning and Performance Testing
1. For testing purposes, provide programming that allows simple override of all Pump Active/Stand-by selections. In addition provide a simple and convenient method of overriding all control valve positions on a per zone basis to observe pump reactions.

G. Network Interface
1. The BAS is to be interface to the boiler controls with a direct data communication network, BACnet or LONtalk or approved other, for additional points. The BAS contractor shall provide a list of available monitoring that the interface can support and coordinate with PWCS for which points are be used on the Graphics for the operators to review.

H. System Monitoring and Alarming
1. The BAS shall monitor all pump status, drive speed feedback, drive faults, pump run times and the HW loop differential pressure.
2. The BAS system shall accumulate run time for the pump motors.
3. The BAS system shall accumulate run time for the individual boilers (Isolation Valve Open = Boiler Running)
4. HW Loop alarm conditions:
   a. The BAS shall report any detected sensor failure.
   b. The BAS shall monitor the building HW loop differential pressure. The BAS shall have a 5 min. initial delay after pump startup or Active/Standby rotation to allow the system to stabilize. After this initial delay all pressure alarms shall be immediately triggered. The BAS shall disable the alarm when the HW pumps are not operating. The BAS shall signal an alarm anytime any building loop DP sensor is 5 psi below the setpoint for more than 5 minutes.
   c. The BAS shall monitor the Fault status for the pumps. The BAS shall trigger an alarm "HW Pump VFD Fault Alarm" when the VFD Fault input is activated.
   d. The BAS shall monitor the speed feedback for the HW pumps. The BAS shall trigger an alarm "HW Pump Speed Alarm" when the feedback signal is not ± 2% of the command signal.
5. Boiler system alarm conditions:
   a. The BAS shall report any detected sensor failure.
   b. The BAS shall alarm any hot water system temperature sensor that is less than 35°F.
   c. The BAS shall alarm any time the Building HW supply temperature is less than 5°F (adj.) below setpoint for more than 20 min. (adj.) and the BMS has been enabled.
6. In the event the boiler system is inoperable (all boilers have failed or been disabled or any other system failure) the BAS shall record "Boiler System Failure" alarm. The BAS shall signal this alarm condition over the building automation system indicating an immediate need for service. This alarm shall also be transmitted across BAS system network and any equipment requiring HW for dehumidification modes shall also be disabled due to a lack of available HW.



1 **HOT WATER SYSTEM SCHEMATIC AND CONTROLS**
NO SCALE

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Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

HOT WATER SYSTEM SCHEMATIC & CONTROLS

M6.2

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SEQUENCES OF CONTROL: SINGLE ZONE VARIABLE AIR VOLUME (VAV) AIR HANDLING UNIT (AHU), OUTSIDE AIR DIRECT

A. DESCRIPTION: Commercial variable volume modular indoor unit with 100% economizer capability, variable speed supply fan(s), chilled water cooling coil located upstream of a hot water re-heating coil serving multiple spaces.

B. Graphics: A system graphic similar to the proposed equipment layout shall be developed and shall be readable from the BAS head end.

C. Sensed points shall be displayed on the graphic and shall readable from the BAS head end.

D. Fan operation shall be displayed on the graphic and shall be readable from the BAS head end.

E. In all modes of operation, commanded and reported position values for all control devices shall be displayed on the graphic and shall readable from the BAS head end.

F. Initial Set Points:
1. Occupied Mode:
   a. Space Cooling Temperature: 75°F (Adj).
   b. Space Heating Temperature: 70°F (Adj).
   c. Space Relative Humidity: 50% RH (Adj).
   d. Carbon Dioxide Setpoint: 1000 PPM (Adj).
   e. Supply Fan(s) Start/Stop Position: Start
   f. Maximum Supply Fan(s) Motor Speed: As required under section "Testing, Adjusting, and Balancing" to supply design maximum airflow.
   g. Minimum Supply Fan(s) Motor Speed: As required by unit manufacturer.
   h. Return Damper (D-2) Position: Modulating inversely with outdoor air dampers.
   i. Outdoor Air Damper Position (D-1): Modulating inversely with return air dampers and as required to maintain outside airflow at set point.
   j. Minimum Unit Leaving Air Temperature: 55°F
   k. Maximum Unit Leaving Air Temperature: 90°F
   l. Maximum Unit Leaving Air Temperature During Morning Warm Up: 90°F
   m. High Return Air Relative Humidity: 55%
   n. Outside Air (CFM): Refer to Schedule on Drawings.
   o. Unit Pressurization Differential (CFM): Refer to Schedule on Drawings.
   p. Space Static Pressurization: 0.05" wc (Adj)
   q. Economizer high limit temperature: 68°F
2. Unoccupied Mode:
   a. Space Cooling Temperature: 80°F (Adj).
   b. Space Heating Temperature: 65°F (Adj).
   c. Space Relative Humidity: 60% RH (Adj).
   d. Supply Fan Start/Stop Position: Stop
   e. Maximum Supply Fan(s) Motor Speed: As required under section "Testing, Adjusting, and Balancing" to supply design maximum airflow.
   f. Minimum Supply Fan Motor Speed: As required by unit manufacturer.
   g. Return Damper (D-2) Position: Fully Open
   h. Outdoor Air Damper Position (D-1): Fully Closed
   i. Minimum Unit Leaving Air Temperature: 55°F
   j. Maximum Unit Leaving Air Temperature: 90°F
   k. Maximum Unit Leaving Air Temperature During Morning Warm Up: 90°F
   l. High Return Air Relative Humidity: 60%
   m. Outside Air (CFM): 0
   n. Unit Pressurization Differential (CFM): N/A
   o. Space Static Pressurization: 0" wc
   p. Economizer high limit temperature: 68°F

G. Start/Stop:
1. Start: The unit shall be started in stages as follows:
   a. Stage 1: D-2 return damper shall be positioned fully open. Provide 30 Seconds for this to occur.
   b. Stage 2: The supply fan(s) shall be ramped up to operating speed and then speed shall modulate in accordance with applicable sequences.
   c. Stage 3: Operation of the entire unit shall be turned over to applicable sequences.
2. Stop: The unit shall be stopped in stages as follows:
   a. Stage 1: Operation of the entire unit shall be taken from applicable sequences
   b. Stage 2: The supply fans shall be ramped down over 15 seconds.
   c. Stage 3: The supply fans shall be stopped.
   d. Stage 4: D-1 outdoor air damper shall be positioned fully closed. Provide 30 Seconds for this to occur
   e. Stage 5: D-2 recirculation damper shall remain fully open.
   f. Stage 6: Operation of the entire unit shall be turned over to applicable sequences.
3. Emergency stop: Perform all stop stages at once.
4. Occupied Mode Operation: During occupied hours the unit shall be started, the supply fan(s) shall be running, the cooling and heating coils shall be active with their valves modulating in accordance with applicable sequences below, and dampers shall modulate in accordance with applicable sequences below.
5. Unoccupied Mode: During unoccupied hours, the unit shall be stopped, the supply fan(s) shall be de-energized, the heating coil control valve shall continue to modulate in accordance with applicable sequences below, the cooling coil control valve shall be closed, the return damper (D-2) shall be open, and the outdoor air damper (D-1) shall be closed.

H. Space Temperature Averaging:
1. Refer to floor plans for number of space temperature sensors. All space temperature sensors in rooms served by an associated unit shall be averaged together. The BAS shall control to the average of all sensors to determine the heating, cooling, and airflow requirements sequenced below. If any space temperature sensor indicates a temperature of 10°F (adj) outside of the rest of the sensors, the BAS shall automatically remove this sensor from the averaging calculation and report an alarm to the BAS head end "Check space temperature sensor" with the associated room location.

I. Operational Overrides:
1. Unoccupied Heating: During unoccupied mode operation should two or more spaces require heating the BAS shall start the air handling unit with the supply air temperature at maximum set point until all space temperature sensors indicate that space temperature has risen to 5°F above the unoccupied heating space temperature set point, at which time the BAS shall return the air handling unit to normal unoccupied mode operation.
2. Unoccupied Cooling: During unoccupied mode operation should two or more spaces require cooling, the BAS shall start the air handling unit with the supply air temperature at minimum set point until all the space temperature sensors indicate that space temperature has fallen to 5°F below the unoccupied cooling space temperature set point, at which time the BAS shall return the air handling unit to normal unoccupied mode operation.
3. Morning Warm up Operation: The BAS shall optimize early start of the unit in warm-up mode. The unit shall be started early enough for spaces to reach their occupied space heating set points a minimum of 30 minutes prior to occupied time. During warm up the supply fan shall be ramped up to satisfy all spaces, the return damper fully open and all other dampers shall remain closed. Leaving air temperature shall be reset to its maximum morning warm up set point until occupied time when the BAS shall place the unit in occupied mode operation.
4. Morning Cool down Operation: The BAS shall optimize the early start of the unit in cool-down mode. The unit shall be started early enough for spaces to reach their occupied space cooling set points a minimum of 30 minutes prior to the occupied time. During cool down the supply fan shall be ramped up to satisfy all spaces, the return damper fully open and all other dampers shall remain closed. Leaving air temperature shall be reset to its minimum set point until occupied time when the BAS shall place the unit in occupied mode operation.
5. Unoccupied Dehumidification: During unoccupied mode operation should any of the space humidity sensors rise above the unoccupied humidity setpoint (60% RH adjustable), then the air handling unit shall run in the dehumidification mode. The outdoor air dampers shall remain closed during unoccupied dehumidification mode, unless economizer conditions exist. Refer to Dehumidification mode sequence for additional details.

J. Supply Fan(s) Control:
1. During unoccupied hours, the fan(s) shall be cycled as necessary to maintain worst case zone set points. When fan is cycled on, control shall be similar to occupied operation.
2. During occupied hours, the BAS shall start the supply fan at its minimum speed. The required speed shall be determined by the equipment manufacturer and shall be instituted as the minimum fan speed.
3. Speed Control:
   a. The fan speed shall be modulated from 50% to 100% to control space temperature while maintaining a constant heating or cooling leaving air temperature depending on mode of operation in accordance with applicable sequences. If outside airflow is required above 50%, than the outside airflow is the operational minimum airflow.
      1. If the unit is in the dead band (no call for heating or cooling), the unit shall operate at the minimum airflow.
      2. If cooling is required the chilled water valve shall modulate and control to leaving air temperature at set point. If additional cooling is required the supply airflow will be slowly ramped up while leaving air temperature is maintained at set point. When the airflow has reached 100% of design, and additional cooling is required the cooling coil control valve shall continue to open to control to space temperature (allowing the leaving air temperature to go below the leaving air temperature control set point).
      3. If heating is required the hot water pre-heating coil shall activate and control to leaving air temperature at set point. The unit shall remain at 50% airflow in heating and the leaving air temperature shall be adjusted to maintain space at heating setpoint. If additional heating is required and the unit leaving air temperature is at maximum, the supply airflow will be slowly ramped up while leaving air temperature is maintained at maximum set point. If the hot water pre-heat valve is full open and the unit is not maintaining the maximum discharge air temperature, then the hot water re-heat coil shall be modulated open to maintain leaving air temperature at setpoint.
4. Motor Speed Percentage: Fan motor speed shall be reported to the BAS as a percentage of full speed and it shall be indicated on the head end graphics.
5. Drive Malfunction: Should the VFD malfunction as indicated by drive alarm circuit, an alarm shall be sent to the head end. The fan shall continue to operate unless deactivated by the VFD protection circuitry.
6. Fan Failure Alarm: Should the supply fan fail (sensed by the VFD), the unit shall be disabled, and an alarm shall be sent to the head end identifying the unit and stating that the supply fan has failed.

K. Relief Fan Control:
1. Unoccupied: If the fan is already stopped it shall remain stopped. Otherwise the BAS shall ramp the fan down to minimum speed over 30 seconds before the stop command is issued.
2. During occupied mode, the BAS shall ramp the fan up to minimum speed over 30 seconds and then shall modulate fan speed as indicated. When stopping, the fan shall be ramped down to minimum speed over 30 seconds before the stop command is issued.
3. During economizer mode operation, the BAS shall ramp the fan up to minimum speed over 30 seconds and then shall modulate fan speed as indicated. When stopping, the fan shall be ramped down to minimum speed over 30 seconds before the stop command is issued.
4. Speed Control: The BAS shall modulate relief fan speed to maintain relief airflow at set point based on the following:
   a. Relief fan control airflow setpoint = measured outside airflow minus unit pressurization differential set point
      - For example, AHU-A-21's measured outside air is 2,225 CFM and the unit pressurization differential set point is 600 CFM, therefore the relief fan shall be controlled to 1,625 CFM.
5. CO2 Minimum Control: When the outdoor air and subsequent exhaust flow rate fall below the relief fan minimum flow (as determined by unit manufacturerer), the relief fan shall be staged on at it's minimum to maintain space static pressure setpoint. The enthalpy wheel shall be disabled.
6. Motor Speed Percentage: Fan motor speed shall be reported to the BAS as a percentage of full speed and shall be indicated on head end graphics.
7. Drive Malfunction: Should the VSD malfunction as indicated by drive alarm circuit, an alarm shall be sent to the head end. The fan shall continue to operate unless deactivated by the VSD's protection circuitry.
8. Fan Failure Alarm: Should the relief fan fail (as sensed by its current sensing relay), an alarm shall be sent to the head end identifying the unit and stating that the relief fan has failed or air flow has ceased. The unit shall be placed in unoccupied mode and maintain occupied temperature set points.
9. Relief Air Flow Measuring: Relief airflow shall be reported to the BAS in total CFM the unit outlet or relief fan is moving shall be indicated on the head end graphics.

L. Pre-Heating Coil Control Valve:
1. If the pre-heating coil control valve is commanded open the chilled water coil control valve shall be closed.
2. The valve shall modulate to maintain unit leaving air temperature at set point. On a rise in unit discharge air temperature the valve will modulate towards closed. On a fall in unit discharge air temperature the valve will modulate towards open. The BAS shall adjust the leaving air temperature setpoint as required to maintain space temperature sensors at set point.
3. Unit Leaving Air Temperature: Leaving air temperature shall be sensed by a temperature sensor located in the unit discharge or in the supply air duct.

M. Cooling Coil Control Valve:
1. If the cooling coil control valve is commanded open the pre-heat hot water coil control valve shall be closed.
2. The valve shall modulate to maintain unit leaving air temperature at set point. On a rise in unit discharge air temperature the valve will modulate towards open. On a fall in unit discharge air temperature the valve will modulate towards closed.
3. Unit Leaving Air Temperature: Leaving air temperature shall be sensed by a temperature sensor located in the unit discharge or in the supply air duct. The BAS shall adjust the leaving air temperature setpoint as required to maintain space temperature sensors at set point.

N. Re-Heating Coil Control Valve:
1. The valve shall modulate to maintain space air temperature at setpoint during dehumidification mode. On a rise in space air temperature the valve will modulate towards closed. On a fall in unit space air temperature the valve will modulate towards open.

O. Dehumidification Mode: During occupied or unoccupied operation when the space humidity (as sensed by any of the space sensors) rises above set point, the unit shall be placed in dehumidification mode. The BAS shall reset the control of the cooling coil valve to maintain the cooling coil discharge air temperature set point to 52°F. The unit shall remain in dehumidification mode until the space relative humidity drops to 5% RH below set point for all sensors at which time the BAS shall return to normal leaving air temperature control or unoccupied operation. Unit airflow shall be set to 50% of design airflow, unless additional cooling is required in the space. The re-heat hot water valve shall modulate to maintain space temperatures at set point. The re-heating valve shall only be available during minimum airflow (50% max). Refer to applicable paragraphs for operation of valves, dampers, and fans.

P. Outdoor Air Damper (D-1):
1. Unoccupied: Damper shall be fully closed.
2. Occupied: The damper shall modulate to open inversely with the return air damper (D-2) to maintain scheduled outdoor air (as sensed by the outdoor air flow measuring station).
3. Economizer Mode with outdoor air temperature equal to or higher than supply air temperature set point: The BAS shall fully open the damper.
4. Economizer Mode with outdoor air temperature lower than the supply air temperature set point: The BAS shall modulate the damper inversely with the return air damper (D-2) to maintain the leaving air temperature set point.
5. CO2 Minimum (Only for units indicated to have space CO2 sensors): The scheduled minimum CFM setting of the air handling unit will be overriden to allow the air handling unit to provide the minimum airflow necessary to maintain the CO2 level at set point (as sensed by the space CO2 sensor). On a fall in CO2 sensors below set point, the outside air damper shall be modulated closed until the CO2 minimum setpoint is reached. On a rise in CO2 above set point, the outside air damper shall be modulated open until the CO2 setpoint is reached or until the scheduled minimum CFM is reached.
6. Air Flow Measuring: Outdoor airflow shall be reported to the BAS in total CFM the intake is bringing in and it shall be indicated on the head end graphics.

Q. Return Air Damper (D-2):
1. Unoccupied: Damper shall be fully open.
2. Occupied: The damper shall modulate to close inversely with the outdoor air damper (D-1) to maintain scheduled outdoor air (as sensed by the outdoor air flow measuring station).
3. Economizer Mode with outdoor air temperature equal to or higher than supply air temperature set point: The BAS shall fully close the damper.
4. Economizer Mode with outdoor air temperature lower than the supply air temperature set point: The BAS shall modulate the damper inversely with the outside air damper (D-1) to maintain the leaving air temperature set point.

R. Life Safety: Smoke detector(s) located in the return air duct(s), shall upon detection of products of combustion, signal the building fire alarm system, perform an emergency stop on the unit and send an alarm to the head end. This function shall be manually reset from the site and shall be so identified on the head end graphics. Life safety interlocks shall be hard-wired to the fan circuits.

S. Freeze Protection: If the temperature falls below 38°F (as sensed by a freezestat with an averaging bulb located upstream of the cooling coil(s)) the fans shall stop and the outdoor air damper shall be closed and return air dampers shall open. A high level alarm should be issued to the head end BAS graphics. Hot water valve shall spring open upon loss of power. Hardwire interlock for freeze protection for supply fans, outdoor air damper and hot water valve actuators.

T. System Safety: When the supply fan(s) is stopped or airflow ceases for any reason other than a controlled stop (as sensed by a current sensing relay) the BAS shall perform an emergency stop.

U. Mixed Air Temperature: The BAS shall monitor mixed air temperature downstream of the filters and shall display the temperature on the head end.

V. Supply Air Temperature: The BAS shall monitor supply air temperature downstream of the supply fan and shall display the temperature on the head end.

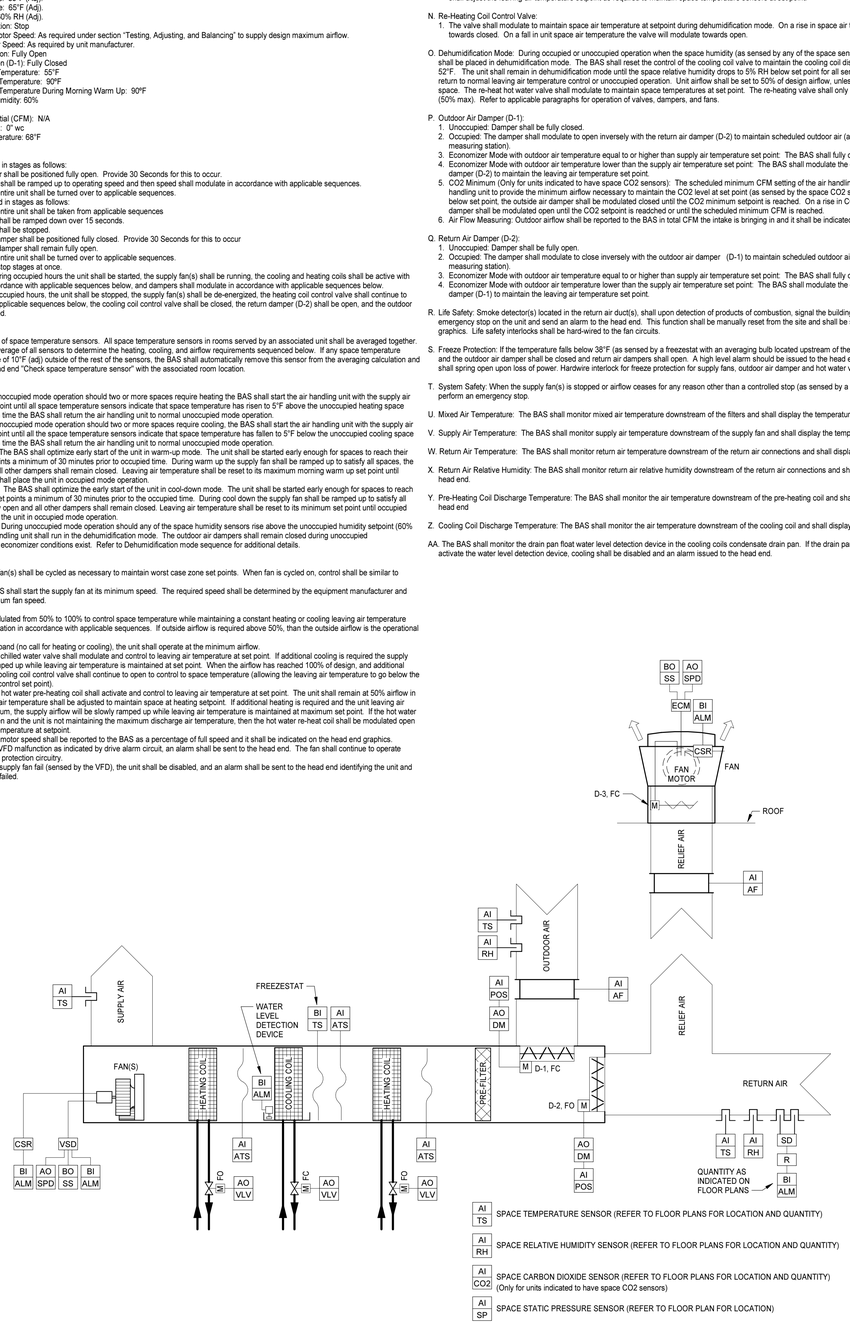
W. Return Air Temperature: The BAS shall monitor return air temperature downstream of the return air connections and shall display the temperature on the head end.

X. Return Air Relative Humidity: The BAS shall monitor return air relative humidity downstream of the return air connections and shall display the temperature on the head end.

Y. Pre-Heating Coil Discharge Temperature: The BAS shall monitor the air temperature downstream of the pre-heating coil and shall display the temperature on the head end

Z. Cooling Coil Discharge Temperature: The BAS shall monitor the air temperature downstream of the cooling coil and shall display the temperature on the head end.

AA. The BAS shall monitor the drain pan float water level detection device in the cooling coils condensate drain pan. If the drain pan is not draining properly and raises to activate the water level detection device, cooling shall be disabled and an alarm issued to the head end.



1 SINGLE ZONE VAV AHU, OUTSIDE AIR DIRECT
NO SCALE

SEQUENCES OF CONTROL: SINGLE ZONE VARIABLE AIR VOLUME (VAV) AIR HANDLING UNIT (AHU), OUTSIDE AIR FROM ENERGY RECOVERY VENTILATOR (ERV)

A. Description: Commercial variable volume modular indoor unit with 100% economizer capability, variable speed supply fan(s), chilled water cooling coil located upstream of a hot water re-heating coil serving multiple spaces. The AHU shall be on the same occupied/unoccupied command as the associated ERV such that outside air is available from the ERV when the AHU goes into the occupied mode.

B. Graphics: A system graphic similar to the proposed equipment layout shall be developed and shall be readable from the BAS head end.

C. Sensed points shall be displayed on the graphic and shall readable from the BAS head end.

D. Fan operation shall be displayed on the graphic and shall be readable from the BAS head end.

E. In all modes of operation, commanded and reported position values for all control devices shall be displayed on the graphic and shall readable from the BAS head end.

F. Initial Set Points:
1. Occupied Mode:
   a. Space Cooling Temperature: 75°F (Adj).
   b. Space Heating Temperature: 70°F (Adj).
   c. Space Relative Humidity: 50% RH (Adj).
   d. Supply Fan(s) Start/Stop Position: Start
   e. Maximum Supply Fan(s) Motor Speed: As required under section "Testing, Adjusting, and Balancing" to supply design maximum airflow.
   f. Minimum Supply Fan(s) Motor Speed: As required by unit manufacturer.
   g. Return Damper (D-2) Position: Modulating inversely with outdoor air dampers.
   h. Outdoor Air Damper Position (D-1): Modulating inversely with return air dampers and as required to maintain outside airflow at set point.
   i. Minimum Unit Leaving Air Temperature: 55°F
   j. Maximum Unit Leaving Air Temperature: 90°F
   k. Maximum Unit Leaving Air Temperature During Morning Warm Up: 90°F
   l. High Return Air Relative Humidity: 55%
   m. Outside Air (CFM): Refer to Schedule on Drawings.
   n. Unit Pressurization Differential (CFM): Refer to Schedule on Drawings.
   o. Economizer high limit temperature: 68°F
2. Unoccupied Mode:
   a. Space Cooling Temperature: 80°F (Adj).
   b. Space Heating Temperature: 65°F (Adj).
   c. Space Relative Humidity: 60% RH (Adj).
   d. Supply Fan Start/Stop Position: Stop
   e. Maximum Supply Fan(s) Motor Speed: As required under section "Testing, Adjusting, and Balancing" to supply design maximum airflow.
   f. Minimum Supply Fan Motor Speed: As required by unit manufacturer.
   g. Return Damper (D-2) Position: Fully Open
   h. Outdoor Air Damper Position (D-1): Fully Closed
   i. Minimum Unit Leaving Air Temperature: 55°F
   j. Maximum Unit Leaving Air Temperature: 90°F
   k. Maximum Unit Leaving Air Temperature During Morning Warm Up: 90°F
   l. High Return Air Relative Humidity: 60%
   m. Outside Air (CFM): 0
   n. Unit Pressurization Differential (CFM): N/A
   o. Economizer high limit temperature: 68°F

G. Start/Stop:
1. Start: The unit shall be started in stages as follows:
   a. Stage 1: D-2 return damper shall be positioned fully open. Provide 30 Seconds for this to occur.
   b. Stage 2: The supply fan(s) shall be ramped up to operating speed and then speed shall modulate in accordance with applicable sequences.
   c. Stage 3: Operation of the entire unit shall be turned over to applicable sequences.
2. Stop: The unit shall be stopped in stages as follows:
   a. Stage 1: Operation of the entire unit shall be taken from applicable sequences
   b. Stage 2: The supply fans shall be ramped down over 15 seconds.
   c. Stage 3: The supply fans shall be stopped.
   d. Stage 4: D-1 outdoor air damper shall be positioned fully closed. Provide 30 Seconds for this to occur
   e. Stage 5: D-2 recirculation damper shall remain fully open.
   f. Stage 6: Operation of the entire unit shall be turned over to applicable sequences.
3. Emergency stop: Perform all stop stages at once.
4. Occupied Mode Operation: During occupied hours the unit shall be started, the supply fan(s) shall be running, the cooling and heating coils shall be active with their valves modulating in accordance with applicable sequences below, and dampers shall modulate in accordance with applicable sequences below.
5. Unoccupied Mode: During unoccupied hours, the unit shall be stopped, the supply fan(s) shall be de-energized, the heating coil control valve shall continue to modulate in accordance with applicable sequences below, the cooling coil control valve shall be closed, the return damper (D-2) shall be open, and the outdoor air damper (D-1) shall be closed.

H. Space Temperature Averaging:
1. Refer to floor plans for number of space temperature sensors. All space temperature sensors in rooms served by an associated unit shall be averaged. The BAS shall control to the average of all sensors to determine the heating, cooling, and airflow requirements sequenced below. If any space temperature sensor indicates a temperature of 10°F (adj) outside of the rest of the sensors, the BAS shall automatically remove this sensor from the averaging calculation and report an alarm to the BAS head end "Check space temperature sensor" with the associated room location.

I. Operational Overrides:
1. Unoccupied Heating: During unoccupied mode operation should two or more spaces require heating the BAS shall start the air handling unit with the supply air temperature at maximum set point until all space temperature sensors indicate that space temperature has risen to 5°F above the unoccupied heating space temperature set point, at which time the BAS shall return the air handling unit to normal unoccupied mode operation.
2. Unoccupied Cooling: During unoccupied mode operation should two or more spaces require cooling, the BAS shall start the air handling unit with the supply air temperature at minimum set point until all the space temperature sensors indicate that space temperature has fallen to 5°F below the unoccupied cooling space temperature set point, at which time the BAS shall return the air handling unit to normal unoccupied mode operation.
3. Morning Warm up Operation: The BAS shall optimize early start of the unit in warm-up mode. The unit shall be started early enough for spaces to reach their occupied space heating set points a minimum of 30 minutes prior to occupied time. During warm up the supply fan shall be ramped up to satisfy all spaces, the return damper fully open and all other dampers shall remain closed. Leaving air temperature shall be reset to its maximum morning warm up set point until occupied time when the BAS shall place the unit in occupied mode operation.
4. Morning Cool down Operation: The BAS shall optimize the early start of the unit in cool-down mode. The unit shall be started early enough for spaces to reach their occupied space cooling set points a minimum of 30 minutes prior to the occupied time. During cool down the supply fan shall be ramped up to satisfy all spaces, the return damper fully open and all other dampers shall remain closed. Leaving air temperature shall be reset to its minimum set point until occupied time when the BAS shall place the unit in occupied mode operation.
5. Unoccupied Dehumidification: During unoccupied mode operation should any of the space humidity sensors rise above the unoccupied humidity setpoint (60% RH adjustable), then the air handling unit shall run in the dehumidification mode. The outdoor air dampers shall remain closed during unoccupied dehumidification mode, unless economizer conditions exist. Refer to Dehumidification mode sequence for additional details.

J. Supply Fan(s) Control:
1. During unoccupied hours, the fan(s) shall be cycled as necessary to maintain worst case zone set points. When fan is cycled on, control shall be similar to occupied operation.
2. During occupied hours, the BAS shall start the supply fan at its minimum speed. The required speed shall be determined by the equipment manufacturer and shall be instituted as the minimum fan speed.
3. Speed Control:
   a. The fan speed shall be modulated from 50% to 100% to control space temperature while maintaining a constant heating or cooling leaving air temperature depending on mode of operation in accordance with applicable sequences.
      1. If the unit is in the dead band (no call for heating or cooling), the unit shall operate at the minimum airflow.
      2. If cooling is required the chilled water coil shall activate and control to leaving air temperature at set point. If additional cooling is required the supply airflow will be slowly ramped up while leaving air temperature is maintained at set point. When the airflow has reached 100% of design, and additional cooling is required the cooling coil control valve shall continue to open to control to space temperature (allowing the leaving air temperature to go below the leaving air temperature control set point).
      3. If heating is required the hot water re-heating coil shall activate and control to leaving air temperature at set point. The unit shall remain at 50% airflow in heating and the leaving air temperature shall be adjusted to maintain space at heating setpoint. If additional heating is required and the unit leaving air temperature is at maximum, the supply airflow will be slowly ramped up while leaving air temperature is maintained at maximum set point. If the unit is at full heating airflow, and the maximum unit leaving air temperature and the space is still not at setpoint, the hot water valve shall be allowed to modulate open to 100%.
4. Motor Speed Percentage: Fan motor speed shall be reported to the BAS as a percentage of full speed and it shall be indicated on the head end graphics.
5. Drive Malfunction: Should the VFD malfunction as indicated by drive alarm circuit, an alarm shall be sent to the head end. The fan shall continue to operate unless deactivated by the VFD protection circuitry.
6. Fan Failure Alarm: Should the supply fan fail (sensed by the VFD), the unit shall be disabled, and an alarm shall be sent to the head end identifying the unit and stating that the supply fan has failed

K. Cooling Coil Control Valve:
1. If the cooling coil control valve is commanded open the hot water coil control valve shall be closed, except for when required by dehumidification sequence.
2. The valve shall modulate to maintain unit leaving air temperature at set point. On a rise in unit discharge air temperature the valve will modulate towards open. On a fall in unit discharge air temperature the valve will modulate towards closed.
3. Unit Leaving Air Temperature: Leaving air temperature shall be sensed by a temperature sensor located in the unit discharge or in the supply air duct. The BAS shall adjust the leaving air temperature setpoint as required to maintain space temperature sensors at set point.

L. Heating Coil Control Valve:
1. If the heating coil control valve is commanded open the chilled water coil control valve shall be closed, except for when required by dehumidification sequence.
2. The valve shall modulate to maintain unit leaving air temperature at set point. On a rise in unit discharge air temperature the valve will modulate towards closed. On a fall in unit discharge air temperature the valve will modulate towards open. The BAS shall adjust the leaving air temperature setpoint as required to maintain space temperature sensors at set point.
3. Unit Leaving Air Temperature: Leaving air temperature shall be sensed by a temperature sensor located in the unit discharge or in the supply air duct.

M. Dehumidification Mode: During occupied or unoccupied operation when the space humidity (as sensed by any of the space sensors) rises above set point, the unit shall be placed in dehumidification mode. The BAS shall reset the control of the cooling coil valve to maintain the cooling coil discharge air temperature set point to 52°F. The unit shall remain in dehumidification mode until the space relative humidity drops to 5% RH below set point for all sensors at which time the BAS shall return to normal leaving air temperature control or unoccupied operation. Unit airflow shall be set to 50% of design airflow, unless additional cooling is required in the space. The hot water valve shall modulate to maintain space temperatures at set point. The re-heating valve shall only be available during minimum airflow (50% max). Refer to applicable paragraphs for operation of valves, dampers, and fans.

N. Outdoor Air Damper (D-1):
1. Unoccupied: Damper shall be fully closed.
2. Occupied: The damper shall modulate to open inversely with the return air damper (D-2) to maintain scheduled outdoor air (as sensed by the outdoor air flow measuring station).
3. Air Flow Measuring: Outdoor airflow shall be reported to the BAS in total CFM the intake is bringing in and it shall be indicated on the head end graphics.

O. Return Air Damper (D-2):
1. Unoccupied: Damper shall be fully open.
2. Occupied: The damper shall modulate to close inversely with the outdoor air damper (D-1) to maintain scheduled outdoor air (as sensed by the outdoor air flow measuring station).

P. Life Safety: Smoke detector(s) located in the return air duct(s), shall upon detection of products of combustion, signal the building fire alarm system, perform an emergency stop on the unit and send an alarm to the head end. This function shall be manually reset from the site and shall be so identified on the head end graphics. Life safety interlocks shall be hard-wired to the fan circuits.

Q. Freeze Protection: If the temperature falls below 38°F (as sensed by a freezestat with an averaging bulb located upstream of the cooling coil(s)) the fans shall stop and the outdoor air damper shall be closed and return air dampers shall open. A high level alarm should be issued to the head end BAS graphics. Hot water valve shall spring open upon loss of power. Hardwire interlock for freeze protection for supply fans, outdoor air damper and hot water valve actuators.

R. System Safety: When the supply fan(s) is stopped or airflow ceases for any reason other than a controlled stop (as sensed by a current sensing relay) the BAS shall perform an emergency stop.

S. Mixed Air Temperature: The BAS shall monitor mixed air temperature downstream of the filters and shall display the temperature on the head end.

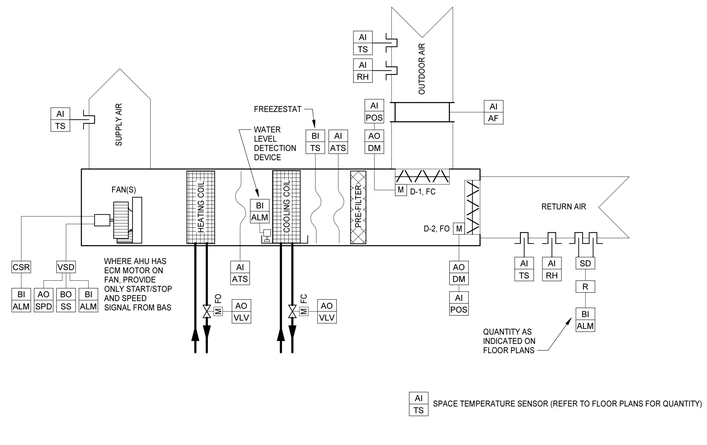
T. Supply Air Temperature: The BAS shall monitor supply air temperature downstream of the supply fan and shall display the temperature on the head end.

U. Return Air Temperature: The BAS shall monitor return air temperature downstream of the return air connections and shall display the temperature on the head end.

V. Return Air Relative Humidity: The BAS shall monitor return air relative humidity downstream of the return air connections and shall display the temperature on the head end.

W. Cooling Coil Discharge Temperature: The BAS shall monitor the air temperature downstream of the cooling coil and shall display the temperature on the head end.

X. The BAS shall monitor the drain pan float water level detection device in the cooling coils condensate drain pan. If the drain pan is not draining properly and raises to activate the water level detection device, cooling shall be disabled and an alarm issued to the head end.



2 SINGLE ZONE VAV AHU, OUTSIDE AIR FROM ERV
NO SCALE

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NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER MATTHEW WHEELER
8/2/2024

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

CONTROLS

M7.1

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SEQUENCES OF CONTROL: SINGLE ZONE VARIABLE AIR VOLUME (VAV) AIR HANDLING UNIT (AHU) WITH ENERGY RECOVERY WHEEL (AHU-B-14)

A. DESCRIPTION: Commercial variable volume modular indoor unit with 100% economizer capability, variable speed supply fan(s), chilled water cooling coil located upstream of a hot water re-heating coil serving multiple spaces.

B. Graphics: A system graphic similar to the proposed equipment layout shall be developed and shall be readable from the BAS head end.

C. Sensed points shall be displayed on the graphic and shall readable from the BAS head end.

D. Fan operation shall be displayed on the graphic and shall be readable from the BAS head end.

E. In all modes of operation, commanded and reported position values for all control devices shall be displayed on the graphic and shall readable from the BAS head end.

F. Initial Set Points:
1. Occupied Mode:
   a. Space Cooling Temperature: 75°F (Adj).
   b. Space Heating Temperature: 70°F (Adj).
   c. Space Relative Humidity: 50% RH (Adj).
   d. Space Carbon Dioxide Setpoint: 1000 PPM (Adj).
   e. Supply Fan(s) Start/Stop Position: Start
   f. Maximum Supply Fan(s) Motor Speed: As required under section "Testing, Adjusting, and Balancing" to supply design maximum airflow.
   g. Minimum Supply Fan(s) Motor Speed: As required by unit manufacturer.
   h. Return Damper (D-2) Position: Modulating inversely with outdoor air dampers.
   i. Outdoor Air Damper Position (D-1): Modulating inversely with return air dampers and as required to maintain outside airflow at set point.
   j. Minimum Unit Leaving Air Temperature: 55°F
   k. Maximum Unit Leaving Air Temperature: 90ºF
   l. Maximum Unit Leaving Air Temperature During Morning Warm Up: 90ºF
   m. High Return Air Relative Humidity: 55%
   n. Outside Air (CFM): Refer to Schedule on Drawings.
   o. Unit Pressurization Differential (CFM): Refer to Schedule on Drawings.
   p. Economizer high limit temperature: 68°F
2. Unoccupied Mode:
   a. Space Cooling Temperature: 80°F (Adj).
   b. Space Heating Temperature: 65°F (Adj).
   c. Space Relative Humidity: 60% RH (Adj).
   d. Supply Fan Start/Stop Position: Stop
   e. Maximum Supply Fan(s) Motor Speed: As required under section "Testing, Adjusting, and Balancing" to supply design maximum airflow.
   f. Minimum Supply Fan Motor Speed: As required by unit manufacturer.
   g. Return Damper (D-2) Position: Fully Open
   h. Outdoor Air Damper Position (D-1): Fully Closed
   i. Minimum Unit Leaving Air Temperature: 55°F
   j. Maximum Unit Leaving Air Temperature: 90ºF
   k. Maximum Unit Leaving Air Temperature During Morning Warm Up: 90ºF
   l. High Return Air Relative Humidity: 60%
   m. Outside Air (CFM): 0
   n. Unit Pressurization Differential (CFM): N/A
   o. Economizer high limit temperature: 68°F

G. Start/Stop:
1. Start: The unit shall be started in stages as follows:
   a. Stage 1: D-2 return damper shall be positioned fully open. Provide 30 Seconds for this to occur.
   b. Stage 2: The supply fan(s) shall be ramped up to operating speed and then speed shall modulate in accordance with applicable sequences.
   c. Stage 3: Operation of the entire unit shall be turned over to applicable sequences.
2. Stop: The unit shall be stopped in stages as follows:
   a. Stage 1: Operation of the entire unit shall be taken from applicable sequences
   b. Stage 2: The supply fans shall be ramped down over 15 seconds.
   c. Stage 3: The supply fans shall be stopped.
   d. Stage 4: D-1 outdoor air damper shall be positioned fully closed. Provide 30 Seconds for this to occur
   e. Stage 5: D-2 recirculation damper shall remain fully open.
   f. Stage 6: Operation of the entire unit shall be turned over to applicable sequences.
3. Emergency stop: Perform all stop stages at once.
4. Occupied Mode Operation: During occupied hours the unit shall be started, the supply fan(s) shall be running, the cooling and heating coils shall be active with their valves modulating in accordance with applicable sequences below, and dampers shall modulate in accordance with applicable sequences below.
5. Unoccupied Mode: During unoccupied hours, the unit shall be stopped, the supply fan(s) shall be de-energized, the heating coil control valve shall continue to modulate in accordance with applicable sequences below, the cooling coil control valve shall be closed, the return damper (D-2) shall be open, and the outdoor air damper (D-1) shall be closed.

H. Space Temperature Averaging:
1. Refer to floor plans for number of space temperature sensors. All space temperature sensors in rooms served by an associated unit shall be averaged together. The BAS shall control to the average of all sensors to determine the heating, cooling, and airflow requirements sequenced below. If any space temperature sensor indicates a temperature of 10°F (adj) outside of the rest of the sensors, the BAS shall automatically remove this sensor from the averaging calculation and report an alarm to the BAS head end "Check space temperature sensor" with the associated room location.

I. Operational Overrides:
1. Unoccupied Heating: During unoccupied mode operation should two or more spaces require heating the BAS shall start the air handling unit with the supply air temperature at maximum set point until all space temperature sensors indicate that space temperature has risen to 5°F above the unoccupied heating space temperature set point, at which time the BAS shall return the air handling unit to normal unoccupied mode operation.
2. Unoccupied Cooling: During unoccupied mode operation should two or more spaces require cooling, the BAS shall start the air handling unit with the supply air temperature at minimum set point until all the space temperature sensors indicate that space temperature has fallen to 5°F below the unoccupied cooling space temperature set point, at which time the BAS shall return the air handling unit to normal unoccupied mode operation.
3. Morning Warm up Operation: The BAS shall optimize early start of the unit in warm-up mode. The unit shall be started early enough for spaces to reach their occupied space heating set points a minimum of 30 minutes prior to occupied time. During warm up the supply fan shall be ramped up to satisfy all spaces, the return damper fully open and all other dampers shall remain closed. Leaving air temperature shall be reset to its maximum morning warm up set point until occupied time when the BAS shall place the unit in occupied mode operation.
4. Morning Cool down Operation: The BAS shall optimize the early start of the unit in cool-down mode. The unit shall be started early enough for spaces to reach their occupied space cooling set points a minimum of 30 minutes prior to the occupied time. During cool down the supply fan shall be ramped up to satisfy all spaces, the return damper fully open and all other dampers shall remain closed. Leaving air temperature shall be reset to its minimum set point until occupied time when the BAS shall place the unit in occupied mode operation.
5. Unoccupied Dehumidification: During unoccupied mode operation should any of the space humidity sensors rise above the unoccupied humidity setpoint (60% RH adjustable), then the air handling unit shall run in the dehumidification mode. The outdoor air dampers shall remain closed during unoccupied dehumidification mode, unless economizer conditions exist. Refer to Dehumidification mode sequence for additional details.

J. Supply Fan(s) Control:
1. During unoccupied hours, the fan(s) shall be cycled as necessary to maintain worst case zone set points. When fan is cycled on, control shall be similar to occupied operation.
2. During occupied hours, the BAS shall start the supply fan at its minimum speed. The required speed shall be determined by the equipment manufacturer and shall be instituted as the minimum fan speed.
3. Speed Control:
   a. The fan speed shall be modulated from 50% to 100% to control space temperature while maintaining a constant heating or cooling leaving air temperature depending on mode of operation in accordance with applicable sequences.
      1. If the unit is in the dead band (no call for heating or cooling), the unit shall operate at the minimum airflow.
      2. If cooling is required the chilled water coil shall modulate open and control to leaving air temperature at set point. If additional cooling is required the supply airflow will be slowly ramped up while leaving air temperature is maintained at set point. When the airflow has reached 100% of design, and additional cooling is required the cooling coil control valve shall continue to open to control to space temperature (allowing the leaving air temperature to go below the leaving air temperature control set point).
      3. If heating is required the hot water pre-heating coil shall activate and control to leaving air temperature at set point. The unit shall remain at 50% airflow in heating and the leaving air temperature shall be adjusted to maintain space at heating setpoint. If additional heating is required and the unit leaving air temperature is at maximum, the supply airflow will be slowly ramped up while leaving air temperature is maintained at maximum set point. If the hot water pre-heat valve is full open and the unit is not maintaining the maximum discharge air temperature, then the hot water re-heat coil shall be modulated open to maintain leaving air temperature at setpoint.
4. Motor Speed Percentage: Fan motor speed shall be reported to the BAS as a percentage of full speed and it shall be indicated on the head end graphics.
5. Drive Malfunction: Should the VFD malfunction as indicated by drive alarm circuit, an alarm shall be sent to the head end. The fan shall continue to operate unless deactivated by the VFD protection circuitry.
6. Fan Failure Alarm: Should the supply fan fail (sensed by the VFD), the unit shall be disabled, and an alarm shall be sent to the head end identifying the unit and stating that the supply fan has failed.

K. Relief Fan Control:
1. Unoccupied: If the fan is already stopped it shall remain stopped. Otherwise the BAS shall ramp the fan down to minimum speed over 30 seconds before the stop command is issued.
2. During occupied mode, the BAS shall ramp the fan up to minimum speed over 30 seconds and then shall modulate fan speed as indicated. When stopping, the fan shall be ramped down to minimum speed over 30 seconds before the stop command is issued.
3. During economizer mode operation, the BAS shall ramp the fan up to minimum speed over 30 seconds and then shall modulate fan speed as indicated. When stopping, the fan shall be ramped down to minimum speed over 30 seconds before the stop command is issued.
4. Speed Control: The BAS shall modulate relief fan speed to maintain relief airflow at set point based on the following:
   a. Relief fan control airflow setpoint = measured outside airflow minus unit pressurization differential set point
      - For example, AHU-A-11's measured outside air is 7,000 CFM and the unit pressurization differential set point is 950 CFM, therefore the relief fan shall be controlled to 6,050 CFM.
5. CO2 Minimum Control: When the outdoor air and subsequent exhaust flow rate fall below the relief fan minimum flow (as determined by unit manufacturerer), the relief fan shall be staged on at it's minimum to maintain space static pressure setpoint. The enthalpy wheel shall be disabled.
6. Motor Speed Percentage: Fan motor speed shall be reported to the BAS as a percentage of full speed and shall be indicated on head end graphics.
7. Drive Malfunction: Should the VSD malfunction as indicated by drive alarm circuit, an alarm shall be sent to the head end. The fan shall continue to operate unless deactivated by the VSD's protection circuitry.
8. Fan Failure Alarm: Should the relief fan fail (as sensed by its current sensing relay), an alarm shall be sent to the head end identifying the unit and stating that the relief fan has failed or air flow has ceased. The unit shall be placed in unoccupied mode and maintain occupied temperature set points.
9. Relief Air Flow Measuring: Relief airflow shall be reported to the BAS in total CFM the unit outlet or relief fan is moving shall be indicated on the head end graphics.

L. Pre-Heating Coil Control Valve:
1. If the pre-heating coil control valve is commanded open the chilled water coil control valve shall be closed.
2. The valve shall modulate to maintain unit leaving air temperature at set point. On a rise in unit discharge air temperature the valve will modulate towards closed. On a fall in unit discharge air temperature the valve will modulate towards open. The BAS shall adjust the leaving air temperature setpoint as required to maintain space temperature sensors at set point.
3. Unit Leaving Air Temperature: Leaving air temperature shall be sensed by a temperature sensor located in the unit discharge or in the supply air duct.

M. Cooling Coil Control Valve:
1. If the cooling coil control valve is commanded open the pre-heat hot water coil control valve shall be closed.
2. The valve shall modulate to maintain unit leaving air temperature at set point. On a rise in unit discharge air temperature the valve will modulate towards open. On a fall in unit discharge air temperature the valve will modulate towards closed.
3. Unit Leaving Air Temperature: Leaving air temperature shall be sensed by a temperature sensor located in the unit discharge or in the supply air duct. The BAS shall adjust the leaving air temperature setpoint as required to maintain space temperature sensors at set point.

N. Re-Heating Coil Control Valve:
1. The valve shall modulate to maintain space air temperature at setpoint during dehumidification mode. On a rise in space air temperature the valve will modulate towards closed. On a fall in unit space air temperature the valve will modulate towards open.

O. Dehumidification Mode: During occupied or unoccupied operation when the space humidity (as sensed by any of the space sensors) rises above set point, the unit shall be placed in dehumidification mode. The BAS shall reset the control of the cooling coil valve to maintain the cooling coil discharge air temperature set point to 52°F. The unit shall remain in dehumidification mode until the space relative humidity drops to 5% RH below set point for all sensors at which time the BAS shall return to normal heating air temperature control or unoccupied operation. Unit airflow shall be set to 50% of design airflow, unless additional cooling is required in the space. The re-heat hot water valve shall modulate to maintain space temperatures at set point. The re-heating valve shall only be available during minimum airflow (50% max). Refer to applicable paragraphs for operation of valves, dampers, and fans.

P. Outdoor Air Damper (D-1):
1. Unoccupied: Damper shall be fully closed.
2. Occupied: The damper shall modulate to open inversely with the return air damper (D-2) to maintain scheduled outdoor air (as sensed by the outdoor air flow measuring station).
3. Economizer Mode with outdoor air temperature equal to or higher than supply air temperature set point: The BAS shall fully open the damper.
4. Economizer Mode with outdoor air temperature lower than the supply air temperature set point: The BAS shall modulate the damper inversely with the return air damper (D-2) to maintain the leaving air temperature set point.
5. CO2 Minimum: The scheduled minimum CFM setting of the air handling unit will be overriden to allow the air handling unit to provide the minimum airflow necessary to maintain the CO2 level at set point (as sensed by the space CO2 sensor). On a fall in CO2 sensors below set point, the outside air damper shall be modulated closed until the CO2 minimum setpoint is reached. On a rise in CO2 above set point, the outside air damper shall be modulated open until the CO2 setpoint is reached or until the scheduled minimum CFM is reached.
6. Air Flow Measuring: Outdoor airflow shall be reported to the BAS in total CFM the intake is bringing in and it shall be indicated on the head end graphics.

Q. Return Air Damper (D-2):
1. Unoccupied: Damper shall be fully open.
2. Occupied: The damper shall modulate to close inversely with the outdoor air damper (D-1) to maintain scheduled outdoor air (as sensed by the outdoor air flow measuring station).
3. Economizer Mode with outdoor air temperature equal to or higher than supply air temperature set point: The BAS shall fully close the damper.
4. Economizer Mode with outdoor air temperature lower than the supply air temperature set point: The BAS shall modulate the damper inversely with the outside air damper (D-1) to maintain the leaving air temperature set point.

R. Relief Air Damper (D-3):
1. Unoccupied: Damper shall be fully closed.
2. Occupied: Damper shall be fully open.
3. Economizer Mode: Damper shall be fully open.

S. Wheel Outdoor Air Bypass Damper (D-4)
1. Unoccupied: Damper shall be closed.
2. Occupied: Damper shall be closed.
3. Economizer: Damper shall be open.
4. Frost Control: The BAS shall monitor wheel exhaust discharge air temperature. The outside air enthalpy wheel bypass damper shall be modulated to maintain minimum exhaust air discharge temperature of 33°F (adjustable) or the frost control setpoint provided by enthalpy wheel manufacturer.

T. Wheel Outdoor Air Bypass Damper (D-5)
1. Unoccupied: Damper shall be closed.
2. Occupied: Damper shall be closed.

U. Economizer: Damper shall be open.
Life Safety: Smoke detector(s) located in the return air duct(s), shall upon detection of products of combustion, signal the building fire alarm system, perform an emergency stop on the unit and send an alarm to the head end. This function shall be manually reset from the site and shall be so identified on the head end graphics. Life safety interlocks shall be hard-wired to the fan circuits.

V. Freeze Protection: If the temperature falls below 38°F (as sensed by a freezestat with an averaging bulb located upstream of the cooling coil(s)) the fans shall stop and the outdoor air damper shall be closed and return air dampers shall open. A high level alarm should be issued to the head end BAS graphics. Hot water valve shall spring open upon loss of power. Hardwire interlock for freeze protection for supply fans, outdoor air damper and hot water valve actuators.

W. System Safety: When the supply fan(s) is stopped or airflow ceases for any reason other than a controlled stop (as sensed by a current sensing relay) the BAS shall perform an emergency stop.

X. Mixed Air Temperature: The BAS shall monitor mixed air temperature downstream of the filters and shall display the temperature on the head end.

Y. Supply Air Temperature: The BAS shall monitor supply air temperature downstream of the supply fan and shall display the temperature on the head end.

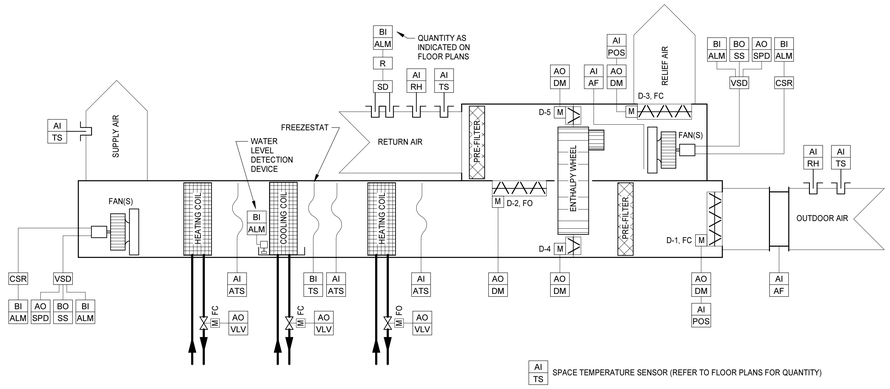
Z. Return Air Temperature: The BAS shall monitor return air temperature downstream of the return air connections and shall display the temperature on the head end.

AA. Return Air Relative Humidity: The BAS shall monitor return air relative humidity downstream of the return air connections and shall display the temperature on the head end.

BB. Cooling Coil Discharge Temperature: The BAS shall monitor the air temperature downstream of the cooling coil and shall display the temperature on the head end.

CC. Pre-Heating Coil Discharge Temperature: The BAS shall monitor the air temperature downstream of the pre-heating coil and shall display the temperature on the head end

DD. The BAS shall monitor the drain pan float water level detection device in the cooling coils condensate drain pan. If the drain pan is not draining properly and raises to activate the water level detection device, cooling shall be disabled and an alarm issued to the head end.



AI TS — SPACE TEMPERATURE SENSOR (REFER TO FLOOR PLANS FOR QUANTITY)

AI RH — SPACE RELATIVE HUMIDITY SENSOR (REFER TO FLOOR PLANS FOR QUANTITY)

AI CO2 — SPACE CARBON DIOXIDE SENSOR (REFER TO FLOOR PLANS FOR QUANTITY)

1 SINGLE ZONE VAV AHU WITH ENERGY RECOVERY (AHU-B-14)
NO SCALE

SEQUENCES OF CONTROL: SINGLE ZONE VARIABLE AIR VOLUME (VAV) AIR HANDLING UNIT (AHU) WITH DIRECT OUTSIDE AIR CONNECTION

A. DESCRIPTION: Commercial variable volume modular indoor unit with 100% economizer capability, variable speed supply fan(s), chilled water cooling coil located upstream of a hot water re-heating coil serving multiple spaces.

B. Graphics: A system graphic similar to the proposed equipment layout shall be developed and shall be readable from the BAS head end.

C. Sensed points shall be displayed on the graphic and shall readable from the BAS head end.

D. Fan operation shall be displayed on the graphic and shall be readable from the BAS head end.

E. In all modes of operation, commanded and reported position values for all control devices shall be displayed on the graphic and shall readable from the BAS head end.

F. Initial Set Points:
1. Occupied Mode:
   a. Space Cooling Temperature: 75°F (Adj).
   b. Space Heating Temperature: 70°F (Adj).
   c. Space Relative Humidity: 50% RH (Adj).
   d. Supply Fan(s) Start/Stop Position: Start
   e. Maximum Supply Fan(s) Motor Speed: As required under section "Testing, Adjusting, and Balancing" to supply design maximum airflow.
   f. Minimum Supply Fan(s) Motor Speed: As required by unit manufacturer.
   g. Return Damper (D-2) Position: Modulating inversely with outdoor air dampers.
   h. Outdoor Air Damper Position (D-1): Modulating inversely with return air dampers and as required to maintain outside airflow at set point.
   i. Minimum Unit Leaving Air Temperature: 55°F
   j. Maximum Unit Leaving Air Temperature: 90ºF
   k. Maximum Unit Leaving Air Temperature During Morning Warm Up: 90ºF
   l. High Return Air Relative Humidity: 55%
   m. Outside Air (CFM): Refer to Schedule on Drawings.
   n. Unit Pressurization Differential (CFM): Refer to Schedule on Drawings.
   o. Economizer high limit temperature: 68°F
2. Unoccupied Mode:
   a. Space Cooling Temperature: 80°F (Adj).
   b. Space Heating Temperature: 65°F (Adj).
   c. Space Relative Humidity: 60% RH (Adj).
   d. Supply Fan Start/Stop Position: Stop
   e. Maximum Supply Fan(s) Motor Speed: As required under section "Testing, Adjusting, and Balancing" to supply design maximum airflow.
   f. Minimum Supply Fan Motor Speed: As required by unit manufacturer.
   g. Return Damper (D-2) Position: Fully Open
   h. Outdoor Air Damper Position (D-1): Fully Closed
   i. Minimum Unit Leaving Air Temperature: 55°F
   j. Maximum Unit Leaving Air Temperature: 90ºF
   k. Maximum Unit Leaving Air Temperature During Morning Warm Up: 90ºF
   l. High Return Air Relative Humidity: 60%
   m. Outside Air (CFM): 0
   n. Unit Pressurization Differential (CFM): N/A
   o. Economizer high limit temperature: 68°F

G. Start/Stop:
1. Start: The unit shall be started in stages as follows:
   a. Stage 1: D-2 return damper shall be positioned fully open. Provide 30 Seconds for this to occur.
   b. Stage 2: The supply fan(s) shall be ramped up to operating speed and then speed shall modulate in accordance with applicable sequences.
   c. Stage 3: Operation of the entire unit shall be turned over to applicable sequences.
2. Stop: The unit shall be stopped in stages as follows:
   a. Stage 1: Operation of the entire unit shall be taken from applicable sequences
   b. Stage 2: The supply fans shall be ramped down over 15 seconds.
   c. Stage 3: The supply fans shall be stopped.
   d. Stage 4: D-1 outdoor air damper shall be positioned fully closed. Provide 30 Seconds for this to occur
   e. Stage 5: D-2 recirculation damper shall remain fully open.
   f. Stage 6: Operation of the entire unit shall be turned over to applicable sequences.
3. Emergency stop: Perform all stop stages at once.
4. Occupied Mode Operation: During occupied hours the unit shall be started, the supply fan(s) shall be running, the cooling and heating coils shall be active with their valves modulating in accordance with applicable sequences below, and dampers shall modulate in accordance with applicable sequences below.
5. Unoccupied Mode: During unoccupied hours, the unit shall be stopped, the supply fan(s) shall be de-energized, the heating coil control valve shall continue to modulate in accordance with applicable sequences below, the cooling coil control valve shall be closed, the return damper (D-2) shall be open, and the outdoor air damper (D-1) shall be closed.

H. Space Temperature Averaging:
1. Refer to floor plans for number of space temperature sensors. All space temperature sensors in rooms served by an associated unit shall be averaged together. The BAS shall control to the average of all sensors to determine the heating, cooling, and airflow requirements sequenced below. If any space temperature sensor indicates a temperature of 10°F (adj) outside of the rest of the sensors, the BAS shall automatically remove this sensor from the averaging calculation and report an alarm to the BAS head end "Check space temperature sensor" with the associated room location.

I. Operational Overrides:
1. Unoccupied Heating: During unoccupied mode operation should two or more spaces require heating the BAS shall start the air handling unit with the supply air temperature at maximum set point until all space temperature sensors indicate that space temperature has risen to 5°F above the unoccupied heating space temperature set point, at which time the BAS shall return the air handling unit to normal unoccupied mode operation.
2. Unoccupied Cooling: During unoccupied mode operation should two or more spaces require cooling, the BAS shall start the air handling unit with the supply air temperature at minimum set point until all the space temperature sensors indicate that space temperature has fallen to 5°F below the unoccupied cooling space temperature set point, at which time the BAS shall return the air handling unit to normal unoccupied mode operation.
3. Morning Warm up Operation: The BAS shall optimize early start of the unit in warm-up mode. The unit shall be started early enough for spaces to reach their occupied space heating set points a minimum of 30 minutes prior to occupied time. During warm up the supply fan shall be ramped up to satisfy all spaces, the return damper fully open and all other dampers shall remain closed. Leaving air temperature shall be reset to its maximum morning warm up set point until occupied time when the BAS shall place the unit in occupied mode operation.
4. Morning Cool down Operation: The BAS shall optimize the early start of the unit in cool-down mode. The unit shall be started early enough for spaces to reach their occupied space cooling set points a minimum of 30 minutes prior to the occupied time. During cool down the supply fan shall be ramped up to satisfy all spaces, the return damper fully open and all other dampers shall remain closed. Leaving air temperature shall be reset to its minimum set point until occupied time when the BAS shall place the unit in occupied mode operation.
5. Unoccupied Dehumidification: During unoccupied mode operation should any of the space humidity sensors rise above the unoccupied humidity setpoint (60% RH adjustable), then the air handling unit shall run in the dehumidification mode. The outdoor air dampers shall remain closed during unoccupied dehumidification mode, unless economizer conditions exist. Refer to Dehumidification mode sequence for additional details.

J. Supply Fan(s) Control:
1. During unoccupied hours, the fan(s) shall be cycled as necessary to maintain worst case zone set points. When fan is cycled on, control shall be similar to occupied operation.
2. During occupied hours, the BAS shall start the supply fan at its minimum speed. The required speed shall be determined by the equipment manufacturer and shall be instituted as the minimum fan speed.
3. Speed Control:
   a. The fan speed shall be modulated from 50% to 100% to control space temperature while maintaining a constant heating or cooling leaving air temperature depending on mode of operation in accordance with applicable sequences.
      1. If the unit is in the dead band (no call for heating or cooling), the unit shall operate at the minimum airflow.
      2. If cooling is required the chilled water coil shall modulate open and control to leaving air temperature at set point. If additional cooling is required the supply airflow will be slowly ramped up while leaving air temperature is maintained at set point. When the airflow has reached 100% of design, and additional cooling is required the cooling coil control valve shall continue to open to control to space temperature (allowing the leaving air temperature to go below the leaving air temperature control set point).
      3. If heating is required the hot water re-heating coil shall activate and control to leaving air temperature at set point. The unit shall remain at 50% airflow in heating and the leaving air temperature shall be adjusted to maintain space at heating setpoint. If additional heating is required and the unit leaving air temperature is at maximum, the supply airflow will be slowly ramped up while leaving air temperature is maintained at maximum set point. If the unit is at full heating airflow, and the maximum unit leaving air temperature and the space is still not at setpoint, the hot water valve shall be allowed to modulate open to 100%.
4. Motor Speed Percentage: Fan motor speed shall be reported to the BAS as a percentage of full speed and it shall be indicated on the head end graphics.
5. Drive Malfunction: Should the VFD malfunction as indicated by drive alarm circuit, an alarm shall be sent to the head end. The fan shall continue to operate unless deactivated by the VFD protection circuitry.
6. Fan Failure Alarm: Should the supply fan fail (sensed by the VFD), the unit shall be disabled, and an alarm shall be sent to the head end identifying the unit and stating that the supply fan has failed.

K. Relief Fan Control: (AHU-B-14, AHU-F-14 & AHU-F-21 only)
1. Unoccupied: If the fan is already stopped it shall remain stopped. Otherwise the BAS shall ramp the fan down to minimum speed over 30 seconds before the stop command is issued.
2. During occupied mode, the BAS shall ramp the fan up to minimum speed over 30 seconds and then shall modulate fan speed as indicated below. When stopping, the fan shall be ramped down to minimum speed over 30 seconds before the stop command is issued. When outside airflow matches the unit pressurization differential, the relief fan shall be off, other than economizer mode.
3. Speed Control:
   a. Occupied (Normal Operation): The BAS shall maintain the fan at the set speed (as determined during system testing and balancing).
   b. Occupied (Economizer Operation): The BAS shall modulate relief fan speed to maintain building static pressure at set point.
   c. Unoccupied: The fan shall be off.
4. Motor Speed Percentage: Fan motor speed shall be reported to the BAS as a percentage of full speed and shall be indicated on head end graphics.
5. Drive Malfunction: Should the VFD/ECM malfunction as indicated by drive alarm circuit, an alarm shall be sent to the head end. The fan shall continue to operate unless deactivated by the VFD/ECM's protection circuitry.
6. Fan Failure Alarm: Should the relief fan fail (as sensed by its current sensing relay), an alarm shall be sent to the head end identifying the unit and stating that the relief fan has failed or air flow has ceased. The unit shall be placed in unoccupied mode and maintain occupied temperature set points.

L. Relief Damper Control: (AHU-A-12 only)
1. During unoccupied hours, the damper shall be fully closed.
2. During unoccupied hours, the damper shall be fully closed.
3. During economizer operation, the damper shall be modulated open to maintain the space static pressure at setpoint.

M. Cooling Coil Control Valve:
1. If the cooling coil control valve is commanded open the hot water coil control valve shall be closed, except for when required by dehumidification sequence.
2. The valve shall modulate to maintain unit leaving air temperature at set point. On a rise in unit discharge air temperature the valve will modulate towards open. On a fall in unit discharge air temperature the valve will modulate towards closed.
3. Unit Leaving Air Temperature: Leaving air temperature shall be sensed by a temperature sensor located in the unit discharge or in the supply air duct. The BAS shall adjust the leaving air temperature setpoint as required to maintain space temperature sensors at set point.

N. Heating Coil Control Valve:
1. If the heating coil control valve is commanded open the chilled water coil control valve shall be closed, except for when required by dehumidification sequence.
2. The valve shall modulate to maintain unit leaving air temperature at set point. On a rise in unit discharge air temperature the valve will modulate towards closed. On a fall in unit discharge air temperature the valve will modulate towards open. The BAS shall adjust the leaving air temperature setpoint as required to maintain space temperature sensors at set point.
3. Unit Leaving Air Temperature: Leaving air temperature shall be sensed by a temperature sensor located in the unit discharge or in the supply air duct.

O. Outdoor Air Damper (D-1):
1. Unoccupied: Damper shall be fully closed.
2. Occupied: The damper shall modulate to open inversely with the return air damper (D-2) to maintain scheduled outdoor air (as sensed by the outdoor air flow measuring station).
3. Air Flow Measuring: Outdoor airflow shall be reported to the BAS in total CFM the intake is bringing in and it shall be indicated on the head end graphics.

P. Return Air Damper (D-2):
1. Unoccupied: Damper shall be fully open.
2. Occupied: The damper shall modulate to close inversely with the outdoor air damper (D-1) to maintain scheduled outdoor air (as sensed by the outdoor air flow measuring station).

Q. Life Safety: Smoke detector(s) located in the return air duct(s), shall upon detection of products of combustion, signal the building fire alarm system, perform an emergency stop on the unit and send an alarm to the head end. This function shall be manually reset from the site and shall be so identified on the head end graphics. Life safety interlocks shall be hard-wired to the fan circuits.

R. Freeze Protection: If the temperature falls below 38°F (as sensed by a freezestat with an averaging bulb located upstream of the cooling coil(s)) the fans shall stop and the outdoor air damper shall be closed and return air dampers shall open. A high level alarm should be issued to the head end BAS graphics. Hot water valve shall spring open upon loss of power. Hardware interlock for freeze protection for supply fans, outdoor air damper and hot water valve actuators.

S. System Safety: When the supply fan(s) is stopped or airflow ceases for any reason other than a controlled stop (as sensed by a current sensing relay) the BAS shall perform an emergency stop.

T. Mixed Air Temperature: The BAS shall monitor mixed air temperature downstream of the filters and shall display the temperature on the head end.

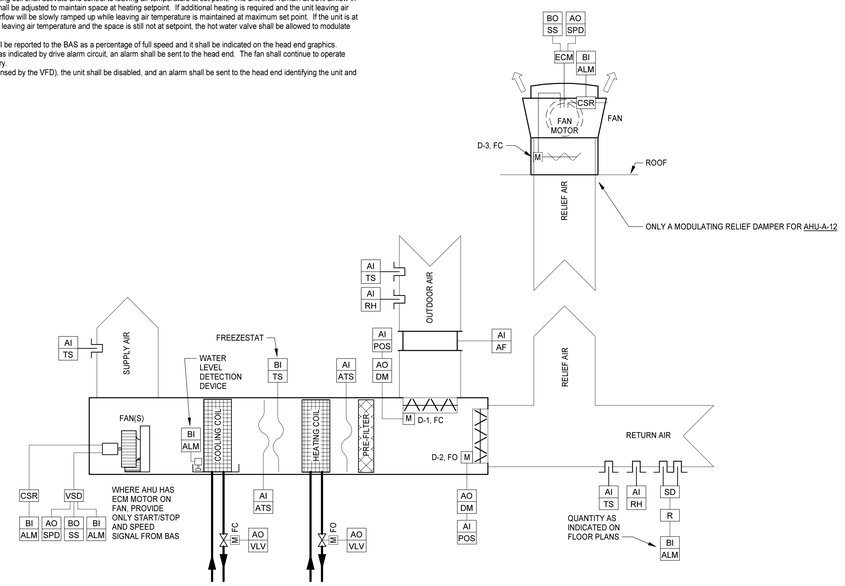
U. Supply Air Temperature: The BAS shall monitor supply air temperature downstream of the supply fan and shall display the temperature on the head end.

V. Return Air Temperature: The BAS shall monitor return air temperature downstream of the return air connections and shall display the temperature on the head end.

W. Return Air Relative Humidity: The BAS shall monitor return air relative humidity downstream of the return air connections and shall display the temperature on the head end.

X. Pre-Heating Coil Discharge Temperature: The BAS shall monitor the air temperature downstream of the pre-heating coil and shall display the temperature on the head end.

Y. The BAS shall monitor the drain pan float water level detection device in the cooling coils condensate drain pan. If the drain pan is not draining properly and raises to activate the water level detection device, cooling shall be disabled and an alarm issued to the head end.



AI TS — SPACE TEMPERATURE SENSOR (REFER TO FLOOR PLANS FOR QUANTITY)

AI CO2 — SPACE CARBON DIOXIDE SENSOR (REFER TO FLOOR PLANS FOR QUANTITY)

AI SP — SPACE STATIC PRESSURE SENSOR (REFER TO FLOOR PLAN FOR LOCATION)

2 SINGLE ZONE VAV AHU PRE-HEAT, OUTSIDE AIR DIRECT
NO SCALE

MOSELEYARCHITECTS
911 N. WEST STREET, SUITE 205 RALEIGH, NORTH CAROLINA 27603
PHONE (919) 840-0091
MOSELEYARCHITECTS.COM

NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER BRITT WHEELER
8/2/2024

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310	
DATE:	AUGUST 2, 2024
REVISIONS	
DATE	DESCRIPTION

CONTROLS

M7.2

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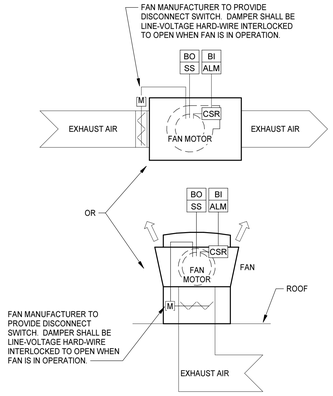


SEQUENCE OF OPERATION: EXHAUST FANS (BAS SCHEDULE)

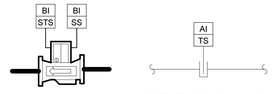
A. Description: Exhaust fan mounted inline or on the roof. Ductwork connects to the inlet of the fan. The fan shall be equipped with a damper (mounted on fan inlet) and actuator located at the inlet of the fan motor such that the damper opens when the fan starts, however the damper actuator is not required to be directly controlled under this section (No control wiring to damper actuator).

B. Set Points
1. Occupied Mode:
   a. Fan Commanded Position: On
2. Unoccupied:
   a. Fan Commanded Position: Off

C. Start/Stop:
   a. The fan shall be Started and Stopped by the BAS on an occupancy schedule to be provided by the Owner's representative.

D. Monitoring points: The following information shall be sent to the BAS and subsequently displayed on the head end graphics.
1. Fan alarm status:
   a. The BAS shall place the fan in alarm when the fan is commanded on, and the CSR indicates less than 66% of design power is being delivered.
   b. Examples:
      1. A broken belt.
      2. Loss of air flow.
      3. Loss of motor.

2 EXHAUST FAN - CONTROLLED BY BAS SCHEDULE
NO SCALE



SEQUENCES OF OPERATION: DOMESTIC CIRCULATING PUMPS

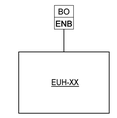
A. Initial Set Points:
   1. Occupied hours: Pump On
B. Unoccupied hours: Pump Off

C. During occupied and unoccupied hours the BAS shall command the pump to set point. A separate schedule should be adjustable at the head end graphics to vary circulating pump operation hours.

SEQUENCES OF OPERATION: DOMESTIC HOT WATER TEMPERATURE

A. Description: The domestic hot temperature shall be monitored downstream of the thermostatic mixing valve. If the temperature rises above the high limit set point an alarm should be indicated on the head end graphics.
B. Initial Set Points:
   a. Alarm: 140°F (Adjustable)

3 DOMESTIC WATER PUMP AND TEMPERATURE MONITORING
NO SCALE



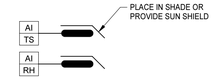
SEQUENCES OF CONTROL: ELECTRIC UNIT HEATERS

A. The Electric Unit Heaters shall operate with their own integral thermostat. The integral thermostat shall be set to 55°F.

B. The BAS shall disable all Electric Unit Heaters if the outside air temperature is above 55°F (adj).

C. Electric Unit Heaters in Stairwells with Fan Coil Units shall be disabled if the Fan Coil Unit is in cooling mode based on it's temperature sensor.

4 ELECTRIC UNIT HEATERS
NO SCALE



SEQUENCES OF OPERATION: OUTSIDE AIR SENSORS

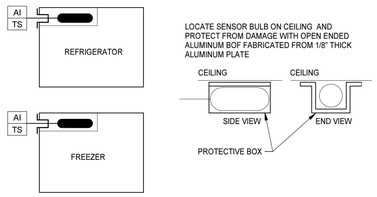
A. Graphics:
   1. A system graphic similar to control diagram shall be developed and readable from the BAS head end.

B. Temperature: The BAS shall monitor outside air temperature as sensed by the outside air temperature sensor.

C. Relative Humidity: The BAS shall monitor outside air relative humidity as sensed by the outside air humidity sensor.

D. Wet Bulb:
   1. Wet bulb temperature shall be calculated based on outside dry bulb temperature and relative humidity.

5 OUTDOOR AIR SENSORS
NO SCALE



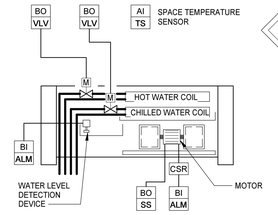
SEQUENCES OF OPERATION: WALK-IN FREEZER/COOLER TEMPERATURE MONITORING

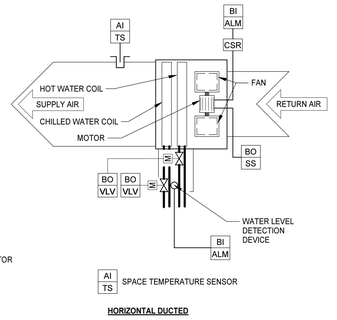
A. General: The temperature sensor in each freezer and cooler shall monitor the unit space temperature.

B. Set Points:
   1. Freezer High Limit: 10°F (adjustable)
   2. Cooler High Limit: 40°F (adjustable)

C. The BAS shall monitor the temperature sensors. Should the temperature in either unit rise above the high limit set-point, an alarm shall be sent to the BAS and indicated on the head end graphics.

6 WALK IN FREEZER REFRIGERATOR MONITORING
NO SCALE





SEQUENCES OF CONTROL: FAN COIL UNIT

A. General: These units are provided to control conditions in stairwells and consist of a fan, cooling coil and heating coil.

B. Initial Set Points:
   1. Space Temperature:
      a. Occupied:
         1. Cooling: 75°F.
         2. Heating: 70°F.
      b. Unoccupied:
         1. Cooling: 85°F.
         2. Heating: 55°F.

C. Space Temperature Control:
   1. Cooling: On a rise in space temperature above set point (as sensed by the space temperature sensor), the BAS shall start the fan and modulate the cooling coil control valve open. On a fall to set point, the valve shall close and the fan shall stop.
   2. Heating: On a fall in space temperature below set point (as sensed by the space temperature sensor), the BAS shall start the fan and modulate the heating coil control valve open. On a rise to set point, the valve shall close and the fan shall stop.

D. The BAS shall monitor the drain pan float water level detection device in each fan coil units' condensate drain pan. If the drain pan is not draining properly and raises to activate the water level detection device, cooling shall be disabled and an alarm issued to the head end.

E. Fan Failure Alarm: Should the supply fan fail (as sensed by its current sensing relay), an alarm shall be sent to the head end identifying the unit and stating that the supply fan has failed or air flow has ceased. The unit shall be disabled.

7 FAN COIL UNIT
NO SCALE

SEQUENCES OF OPERATION: ENERGY RECOVERY VENTILATOR

A. Description: Commercial indoor energy recovery ventilator with enthalpy wheel, supply and exhaust fans to precondition outside air to air handling units. The energy recovery units provide ventilation and general exhaust to the bathrooms and similar spaces. Occupied/Unoccupied sequences shall be coordinated between the ERV and the associated AHU's so that they go into occupied/unoccupied mode as a group.

B. Graphics: A system graphic similar to the proposed equipment layout shall be developed and shall be readable from the BAS head end.

C. Sensed points shall be displayed on the graphic and shall readable from the BAS head end.

D. Fan operation shall be displayed on the graphic and shall be readable from the BAS head end.

E. In all modes of operation, commanded and reported position values for all control devices shall be displayed on the graphic and shall readable from the BAS head end.

F. Initial Set Points:
1. Occupied Mode:
   a. Supply Fan Start/Stop Position: Start.
   b. Maximum Supply Fan Motor Speed: As required under section "Testing, Adjusting, and Balancing" to supply design maximum airflow.
   c. Minimum Supply Fan Motor Speed: As required by unit manufacturer.
   d. Relief Fan Start/Stop Position: Start.
   e. Maximum Relief Fan Motor Speed: As required to maintain the unit pressurization differential cfm at set point. Set point shall be determined by a calculated differential from the measured outdoor air intake cfm and measured relief cfm.
   f. Minimum Relief Fan Motor Speed: As required by unit manufacturer.
   g. Outdoor Air Damper Position (D-1): Fully Open.
   h. Relief Air Damper Position (D-2): Fully Open.
   i. Economizer high limit temperature: 68°F.
2. Unoccupied Mode:
   a. Supply Fan Start/Stop Position: Stop
   b. Relief Fan Start/Stop Position: Stop
   c. Outdoor Air Damper Position (D-1): Fully Closed
   d. Relief Air Damper Position (D-2): Fully Closed
   e. Outside Air (CFM): 0.

G. Start/Stop:
1. Start: The unit shall be started in stages as follows:
   a. Stage 1: D-1 outside air damper and D-2 exhaust air damper shall be positioned fully open. Provide the manufacturer provided time delay for this to occur.
   b. Stage 2: The supply fan and exhaust fan shall be ramped up to operating speed and then speed shall modulate in accordance with applicable sequences.
   c. Stage 3: Operation of the entire unit shall be turned over to applicable sequences.
2. Stop: The unit shall be stopped in stages as follows:
   a. Stage 1: Operation of the entire unit shall be taken from applicable sequences
   b. Stage 2: The supply and relief fans shall be stopped.
   c. Stage 3: D-1 outdoor air damper and D-2 exhaust air damper shall be positioned fully closed.
   d. Stage 4: Operation of the entire unit shall be turned over to applicable sequences.
3. Occupied Mode Operation: During occupied hours the unit shall be started, the supply and relief fans shall be running, the enthalpy wheel shall operate in accordance with applicable sequences below.
4. Unoccupied Mode: During unoccupied hours, the unit shall be stopped, the supply and relief fans shall be de-energized, the exhaust air damper (D-2) shall be closed, and the outdoor air damper (D-1) shall be closed.

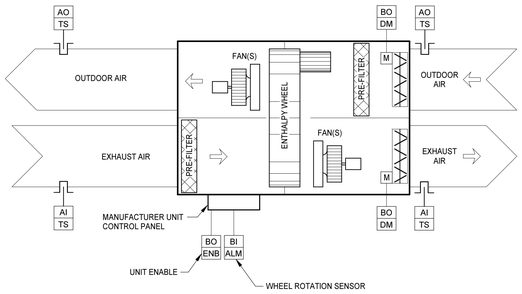
H. Supply Fan Control:
1. During unoccupied hours, the fan(s) shall be off. During occupied times the fan shall be on.
2. Speed Control:
   a. The ERV unit is constant volume. The fan shall be started to its fixed constant speed. Speed shall be determined during system balancing.

I. Exhaust Fan Control:
1. During unoccupied hours, the fan(s) shall be off. During occupied times the fan shall be on.
2. Speed Control:
   a. The ERV unit is constant volume. The fan shall be started to its fixed constant speed. Speed shall be determined during system balancing.

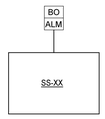
J. Enthalpy Wheel: (Enthalpy core units will be not be provided without rotation sensor)
1. Occupied Mode: On
   a. BAS should monitor outside air conditions to prevent over recovery, where between 75°F (adjustable) and the supply air temperature set point the wheel shall be disabled to prevent unnecessary pre-heating.
2. Unoccupied: Off
3. Economizer: Off
4. Wheel Rotation Sensor Alarm: Should the enthalpy wheel motor fail (as sensed by the unit sensor) an alarm shall be sent to the head end identifying the unit and stating that the enthalpy wheel motor has failed.

K. Outdoor Air Damper (D-1):
1. Unoccupied: Damper shall be fully closed.
2. Occupied: Damper shall be fully open.
3. Economizer Mode: Damper shall be fully open.

L. Exhaust Air Damper (D-2):
1. Unoccupied: Damper shall be fully closed.
2. Occupied: Damper shall be fully open.
3. Economizer Mode: Damper shall be fully open.



1 ENERGY RECOVERY VENTILATOR
NO SCALE

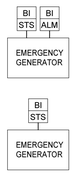


SEQUENCES OF CONTROL: DUCTLESS SPLIT AIR CONDITIONERS

A. The BAS shall monitor the Ductless Split system controls for alarm status. If the system controls report an alarm (common alarm output), the BAS shall forward that alarm to the head end identifying the unit and stating that the Ductless Split system controls have reported an alarm.

B. The BAS shall monitor the space temperature in the rooms served by Ductless Split Systems. These sensors are used for monitoring purposes and shall alarm if they deviate more from the below set points:
1. Alarm High Limit Temperature: 85°F.

8 DUCTLESS SPLIT SYSTEM UNIT
NO SCALE

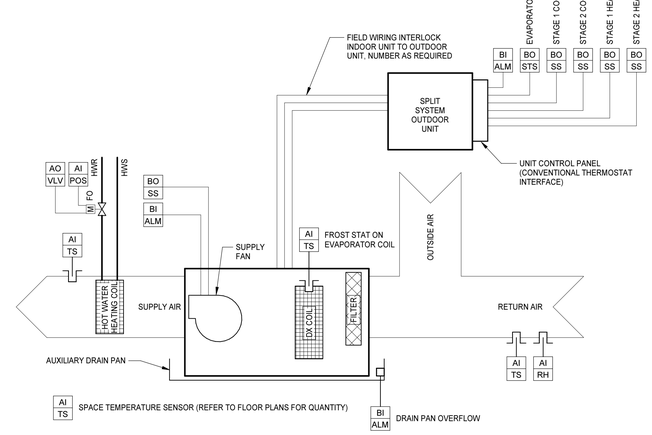


SEQUENCES OF OPERATION: EMERGENCY GENERATOR & TRANSFER SWITCH MONITORING

A. The BAS shall monitor a set of contacts on the emergency generator and docking station to monitor its status. Generator status shall be indicated on the head end graphics. If the generator is operating, the BAS graphics shall indicate so on the graphics. If the generator is in alarm, the BAS shall issue and alarm at the head end graphics.

B. The BAS contractor shall monitor the position of the Transfer Switch. The BAS shall toggle the status of the "Emergency Power" data point. When the position of the Transfer Switch indicates the Emergency Generator is powering the building the "Emergency Power" data point shall be On. When the position of the Transfer Switch indicates the building is running on Utility Power the "Emergency Power" data point shall be Off. See the HVAC equipment sequences for how the "Emergency Power" data point alters unit operation.

10 EMERGENCY GENERATOR MONITORING
NO SCALE



SEQUENCES OF CONTROL: SPLIT SYSTEM HEAT PUMP WITH HOT WATER BACKUP HEAT

A. General: These units are provided to control conditions in administration areas and consist of a split system DX unit, and duct mounted auxiliary heating coil.

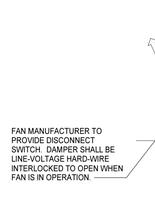
B. Initial Set Points:
1. Space Temperature:
   a. Occupied:
      1. Cooling: 75°F.
      2. Heating: 70°F.
   b. Unoccupied:
      1. Cooling: 85°F.
      2. Heating: 55°F.

C. Space Temperature Averaging:
1. Refer to floor plans for number of space temperature sensors. All space temperature sensors in rooms served by an associated unit shall be averaged together. The BAS shall control to the average of all sensors to determine the heating, cooling, and airflow requirements sequenced below. If any space temperature sensor indicates a temperature of 10°F (adj) outside of the rest of the sensors, the BAS shall automatically remove this sensor from the averaging calculation and report an alarm to the BAS head end "Check space temperature sensor" with the associated room location.

D. Enable/Disable
1. Occupied Operation: During occupied periods the BAS shall start the indoor unit supply fan and it shall run continuously.
   a. Cooling: On a rise in temperature above space cooling set point, the BAS shall stage the associated condensing unit on to maintain cooling set point. On a drop in space temperature to below space cooling set point, the condensing unit shall be disabled.
   b. Heating: Space heating control shall be two-tiered as indicated below
      1. On a drop in temperature below space heating set point, the BAS shall enable the associated heat pump in heating mode
      2. On a continued drop in space temperature below space heating set point, the BAS shall modulate the hot water valve open to maintain space heating set point. The hot water heat shall function as an additional stage of heat for the heat pump and for maintaing space temperature during heat pump defrost mode.
   c. Dehumidification: If at any time the average space relative humidity (as sensed by the return duct relative humidity sensor) rises 5% above setpoint, cooling shall be enabled and the space temperature set point shall be lowered by 3°F (Adjustable) until the return duct relative humidity returns to set point. When the space returns to humidity setpoint the space temperature set point shall be reset.
2. Unoccupied Operation: During night setback periods the indoor unit's supply fan shall be off, cooling shall be disabled, heat pump heating disabled, and the hot water valve closed.
   a. Unoccupied Cooling: On a rise in space temperature above the space cooling set point, the BAS shall start the associated indoor unit's supply fan, and enable cooling in the associated condensing unit. The unit shall operate until the space temperature reaches 5° F(adj) below night setback cooling set point.
   b. Unoccupied Heating: Space heating control shall be two-tiered as indicated below
      1. On a drop in temperature below space heating set point, the BAS shall enable the associated heat pump in heating mode. The unit shall operate until the space temperature reaches 5° F(adj) above night setback cooling set point.
      2. On a continued drop in space temperature below space heating set point, the BAS shall modulate the hot water valve open to maintain space heating set point. The hot water heat shall function as an additional stage of heat for the heat pump.
   c. Dehumidification: If at any time the average space relative humidity (as sensed by the return duct relative humidity sensor) rises 5% above setpoint, cooling shall be enabled and the space temperature set point shall be lowered by 3°F (Adjustable) until return duct relative humidity returns to set point. When the space returns to humidity setpoint the space temperature set point shall be reset.

E. Unit Monitoring and Alarming
1. The BAS shall signal an alarm any time the space temperature greater than 5° F(adj) above the space cooling set point or 5° F(adj) below the space heating set point.
2. Discharge Air Temperature: Indicate temperature at the head end.
3. The condensate drain pan overflow shall disable the heat pump on a detection of moisture in the auxiliary drain pan. The BAS shall monitor the Condensate Alarm Sensor and generate a "Condensate Overflow Alarm" anytime the BAS records an alarm status from the sensor.
4. Fan Failure Alarm: Should the supply fan fail (as sensed by its current sensing relay), an alarm shall be sent to the head end identifying the unit and stating that the supply fan has failed or air flow has ceased. The unit shall be disabled.

11 SPLIT SYSTEM HEAT PUMP WITH HOT WATER BACKUP
NO SCALE



SEQUENCES OF OPERATION: EXHAUST FANS (ALWAYS ON)

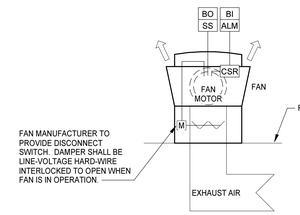
A. Description: Exhaust fan mounted on the roof. Ductwork connects to the inlet of the fan.

B. Set Points
1. Occupied Mode:
   a. Fan Commanded Position: On
2. Unoccupied:
   a. Fan Commanded Position: On

C. Start/Stop:
   a. The fan shall be always on to exhaust the science prep rooms.

D. Monitoring points: The following information shall be sent to the BAS and subsequently displayed on the head end graphics.
1. Fan alarm status:
   a. The BAS shall place the fan in alarm when the fan is commanded on, and the CSR indicates less than 66% of design power is being delivered.
   b. Examples:
      1. A broken belt.
      2. Loss of air flow.
      3. Loss of motor.

12 EXHAUST FAN - ALWAYS ON
NO SCALE



SEQUENCE OF OPERATION: EXHAUST FANS (WALL SWITCH)

A. Description: Exhaust fan mounted inline or on the roof. Ductwork connects to the inlet of the fan. The fan shall be equipped with a damper (mounted on fan inlet) and actuator located at the inlet of the fan motor such that the damper opens when the fan starts, however the damper actuator is not required to be directly controlled under this section (No control wiring to damper actuator).

B. Start/Stop:
   a. The fan shall be Started and Stopped by the wall switch in the associated science classroom.

C. Monitoring points: The following information shall be sent to the BAS and subsequently displayed on the head end graphics.
1. Fan alarm status:
   a. The BAS shall place the fan in alarm when the fan is commanded on, and the CSR indicates less than 66% of design power is being delivered.
   b. Examples:
      1. A broken belt.
      2. Loss of air flow.
      3. Loss of motor.

13 EXHAUST FAN - CONTROLLED BY WALL SWITCH
NO SCALE

SEQUENCES OF OPERATION: ELEVATOR SUMP PUMP MONITORING

A. The BAS shall monitor a set of alarm contacts from the sump pump control panel. When an alarm is issued, it shall be forwarded to the head-end.

14 ELEVATOR SUMP PUMP
NO SCALE

MOSELEYARCHITECTS
911 N. WEST STREET, SUITE 205 RALEIGH, NORTH CAROLINA 27603
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MOSELEYARCHITECTS.COM

NORTH CAROLINA PROFESSIONAL SEAL 043951 ENGINEER BRITTANY T WHITLEY
8/2/2024

PENDER COUNTY SCHOOLS K-8 SCHOOL

Pender County Schools
Highway 210, Hampstead, NC 28443

PROJECT NO: 631310
DATE: AUGUST 2, 2024

REVISIONS	
DATE	DESCRIPTION

CONTROLS

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