GENERAL ABBREVIATIONS

A	----------	L	----------
A/C	AIR CONDITIONING	LAT	LEAVING AIR TEMPERATURE
AD	ACCESS DOOR	LB	POUND
AFF	ABOVE FINISHED FLOOR	LBD	LINEAR BAR DIFFUSER
AFS	AIR FLOW MEASURING STATION	LBG	LINEAR BAR GRILLE
AHU	AIR HANDLING UNIT	LF	LINEAR FEET
AL	ACOUSTIC LINING	LFD	LAMINAR AIRFLOW DIFFUSER
AP	ACCESS PANEL	LLD	LINEAR LOUVER DIFFUSER
ATC	AUTOMATIC TEMPERATURE CONTROL	LLG	LINEAR LOUVER GRILLE
AVB	AIR VOLUME CONTROL BOX	LSD	LINEAR SLOT DIFFUSER
AWT	AVERAGE WATER TEMPERATURE	LSG	LINEAR SLOT GRILLE
		LVD	LINEAR VARIABLE VOLUME DIFFUSER
B	----------	LVG	LINEAR VARIABLE VOLUME GRILLE
BD	BAROMETRIC DAMPER	LWT	LEAVING WATER TEMPERATURE
BDD	BACKDRAFT DAMPER		
BFP	BACKFLOW PREVENTER	M	----------
BHP	BRAKE HORSEPOWER	MBH	THOUSAND BTU'S PER HOUR
BOD	BOTTOM OF DUCT	MH	MANHOLE
BOP	BOTTOM OF PIPE	MOD	MOTOR OPERATED DAMPER
BSC	BIO SAFETY CABINET		
BT	BUCKET TRAP	N	----------
BTU	BRITISH THERMAL UNITS	(N)	NEW
BTUH	BTU'S PER HOUR	NC	NORMALLY CLOSED
		NIC	NOT IN CONTRACT
C	----------	NO	NORMALLY OPEN
CC	COOLING COIL	NTS	NOT TO SCALE
CD	CEILING DIFFUSER		
CDR	CEILING DIFFUSER, ROUND	O	----------
CFM	CUBIC FEET PER MINUTE	OA	OUTSIDE AIR
CL	CENTERLINE	OAI	OUTSIDE AIR INTAKE
CUH	CABINET UNIT HEATER	OBD	OPPOSED BLADE DAMPER
CVE	CONSTANT VOLUME EXHAUST		
CVR	CONSTANT VOLUME RETURN	P	----------
CVS	CONSTANT VOLUME SUPPLY	PD	PANEL DIFFUSER
		PFD	PERFORATED FACE DIFFUSER
D	----------	PFG	PERFORATED FACE GRILLE
D	DEAERATOR	PHC	PREHEAT COIL
DB	DRY BULB	PRV	PRESSURE REDUCING VALVE
DIA	DIAMETER	PSI	POUNDS PER SQUARE INCH
DFD	DYNAMIC FIRE DAMPER WITH ACCESS DOOR		
DN	DOWN	R	----------
DPT	DIFFERENTIAL PRESSURE TRANSMITTER	(R)	REMOVE
DV	DRAIN VALVE	RA	RETURN AIR
		RG	RETURN GRILLE
E	----------	RFG	RECTANGULAR FILTER GRILLE
EA	EXHAUST AIR	RH	RELATIVE HUMIDITY
EAC	EXHAUST AIR CONTROLLER	RHC	REHEAT COIL
EAT	ENTERING AIR TEMPERATURE	RHP	RADIANT HEATING PANEL
EF	EXHAUST FAN	RPM	REVOLUTIONS PER MINUTE
EG	EXHAUST GRILLE	RR	RETURN REGISTER
EJ	EXPANSION JOINT		
EJB	EXPANSION JOINT, BELLOWS TYPE	S	----------
EJO	EXPANSION JOINT, OFFSET TYPE	SA	SUPPLY AIR
EL	ELEVATION	SAC	SUPPLY AIR CONTROLLER
ER	EXHAUST REGISTER	SAT	SOUND ATTENUATOR
ERV	EXHAUST ROOF VENTILATOR	SD	SMOKE DAMPER WITH ACCESS DOOR
ESP	EXTERNAL STATIC PRESSURE	SD/FD	COMBINATION SMOKE/FIRE DAMPER
ET	ELEPHANT TRUNK		WITH ACCESS DOOR
EWT	ENTERING WATER TEMPERATURE	SG	SUPPLY GRILLE
EXF	EXFILTRATION	SP	STATIC PRESSURE
EXH	EXHAUST	SR	STATIC REGISTER
		SS	STAINLESS STEEL
F	----------	SV	STEAM VENT
°F	DEGREE FAHRENHEIT		
FC	FLEXIBILE CONNECTION	T	----------
FCU	FAN COIL UNIT	TG	TRANSFER GRILLE
F.D.	FLOOR DRAIN	TOD	TOP OF DUCT
FD	FIRE DAMPER WITH ACCESS DOOR	TOP	TOP OF PIPE
FH	FUME HOOD	TSP	TOTAL STATIC PRESSURE
FHE	FUME HOOD EXHAUST	TT	THERMOSTATIC TRAP
FOB	FLAT ON BOTTOM	TYP	TYPICAL
FOT	FLAT ON TOP		
F&T	FLOAT & THERMOSTATIC TRAP	U	----------
FPM	FEET PER MINUTE	UH	UNIT HEATER
FTR	FINNED TUBE RADIATION	UTR	UP THRU ROOF
FZP	FREEZE PROTECTION PUMP		
		V	----------
G	----------	V	VENT
GAL	GALLONS	VAV	VARIABLE AIR VOLUME BOX
GPH	GALLONS PER HOUR	VD	VOLUME DAMPER
GPM	GALLONS PER MINUTE	VI	VIBRATION ISOLATOR
GR	GRILLE	VVE	VARIABLE VOLUME EXHAUST
GRV	GRAVITY ROOF VENT	VVF	VARIABLE VOLUME FAN POWERED
		VVR	VARIABLE VOLUME RETURN
H	----------	VVS	VARIABLE VOLUME SUPPLY
HC	HEATING COIL		
HP	HORSEPOWER	W	----------
HX	HEAT EXCHANGER	WB	WET BULB
		WG	WATER GAUGE
I	----------	WMS	WIRE MESH SCREEN
INF	INFILTRATION		

PIPING SYMBOLS

- AIR OR STEAM VENT WITH MANUAL SERVICE VALVE
- Ø DIAMETER
- DIRECTION OF FLOW
- EXPANSION JOINT, BELLOWS
- EXPANSION JOINT, OFFSET
- EXPANSION LOOP
- FLEXIBLE CONNECTION
- M FLOW METER
- DPT DIFFERENTIAL PRESSURE TRANSMITTER
- PIPE ANCHOR
- PIPE GUIDE
- PITCH OF PIPE, DOWN
- PRESSURE GAUGE AND VALVE
- P/T PRESSURE / TEMPERATURE PLUG
- REDUCER, CONCENTRIC
- REDUCER, ECCENTRIC STRAIGHT CROWN
- REDUCER, ECCENTRIC STRAIGHT INVERT
- RISER OR ELBOW DOWN
- RISER UP AND DOWN ELBOW UP
- STEAM TRAP
- STRAINER
- STRAINER W/GATE VALVE W/NIPPLE & CAP
- THERMOMETER
- THERMOMETER WELL
- THERMOSTAT
- UNION OR FLANGED CONNECTION
- VALVE, AUTOMATIC FLOW CONTROL
- VALVE, BALANCING
- VALVE, CHECK
- NS VALVE, CHECK NON-SLAM
- VALVE, DRAIN W/NIPPLE & CAP
- VALVE, NEEDLE
- VALVE, PRESSURE REGULATING
- VALVE, RELIEF (SAFETY)
- VALVE, SHUT-OFF
- VALVE, SHUT-OFF LOCK SHIELD
- S VALVE, SOLENOID
- VALVE, THROTTLING
- VALVE, THREE-WAY CONTROL
- VALVE, THREE-WAY CONTROL
- VALVE, TRIPLE DUTY
- VALVE, TWO-WAY CONTROL
- VALVE, TWO-WAY CONTROL

PIPING NOMENCLATURE

BBD	BOILER BLOW DOWN
CHF	CHEMICAL FEED
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
CWR	CONDENSER WATER RETURN (TO TOWER)
CWS	CONDENSER WATER SUPPLY (FROM TOWER)
CZR	CONTROLLED ZONE RETURN
CZS	CONTROLLED ZONE SUPPLY
D	DRAIN LINE
DTR	DUAL TEMPERATURE RETURN
DTS	DUAL TEMPERATURE SUPPLY
FOF	FUEL OIL FILL
FOG	FUEL OIL GAUGE
ECHWR	EMERGENCY CHILLED WATER RETURN
ECHWS	EMERGENCY CHILLED WATER SUPPLY
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FOV	FUEL OIL VENT
FW	BOILER FEED WATER
G	GAS
GR	GLYCOL RETURN
GS	GLYCOL SUPPLY
HPC	HIGH PRESSURE CONDENSATE
HPS	HIGH PRESSURE STEAM
HRR	HEAT RECOVERY RETURN
HRS	HEAT RECOVERY SUPPLY
HTWR	HIGH TEMPERATURE WATER RETURN
HTWS	HIGH TEMPERATURE WATER SUPPLY
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
LCHWR	LOW TEMPERATURE CHILLED WATER RETURN
LCHWS	LOW TEMPERATURE CHILLED WATER SUPPLY
LPC	LOW PRESSURE CONDENSATE
LPS	LOW PRESSURE STEAM
LPS*	LOW PRESSURE STEAM LINE RATED FOR MEDIUM PRESSURE INCLUDING ALL TRAPS AND ACCESSORIES
MPC	MEDIUM PRESSURE CONDENSATE
MPS	MEDIUM PRESSURE STEAM
MU	MAKE-UP WATER (FROM DOMESTIC COLD WATER)
PCHWR	PRIMARY CHILLED WATER RETURN
PCHWS	PRIMARY CHILLED WATER SUPPLY
PC	PUMPED CONDENSATE A/C DRAIN
PCR	PUMPED CONDENSATE STEAM CONDENSATE RETURN
RG	REFRIGERANT HOT GAS
RHR	REHEAT WATER RETURN
RHS	REHEAT WATER SUPPLY
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
V	VENT, ATMOSPHERIC

DRAWING INDEX

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494
SIZE: ANSI D

DESIGNED BY: WMF
DRAWN BY: RKG
CHECKED BY: WCJ
SUBMITTED BY: SK

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

HVAC INDEX SHEET

SHEET ID

M001

RTA SUBMISSION 2/11/2021

AIR DISTRIBUTION, GENERAL SYMBOLS & NOMENCLATURE

- TRANSFER DUCT, SEE DETAIL
- TRANSFER DUCT, SEE DETAIL W/RETURN/TRANSFER GRILLE
- TRANSFER DUCT, SEE DETAIL W/RETURN/TRANSFER GRILLE
- AIR CUSHION, 12" LONG MIN.
- AIR CUSHION, 12" LONG MIN.
- VOLUME DAMPER
- DAMPER (TYPE AS INDICATED; BD, BDD, MOD, FD, SD/FD, VD, ETC.)
- Ø DIAMETER
- DOOR LOUVER (FREE AREA IN SQ. FEET)
- DOOR UNDERCUT
- DUCT DROP (SLOPING)
- DUCT DROP (90°)
- DUCT RISE (SLOPING)
- DUCT RISE (90°) (RISE AND DROP IN DIRECTION OF AIR FLOW)
- TRANSFER AIR
- DUCT MOUNTED SMOKE DETECTOR
- FLEXIBLE CONNECTION
- FLEXIBLE DUCTWORK
- FLEXIBLE DUCTWORK
- HUMIDIFIER (DUCT MOUNTED)
- HUMIDIFIER (DUCT MOUNTED)
- HUMIDISTAT
- THERMOSTAT
- DUCT TRASITION (RECTANGULAR TO RECTANGULAR)
- DUCT TRASITION (RECTANGULAR TO ROUND)
- AIRFLOW MEASURING STATION
- AIRFLOW MEASURING STATION

AIR DEVICE DESIGNATION

( ) 8X8 CD-1 (3-3/4)
250 - 2W

- QUANTITY (IF MORE THAN ONE)
- CONNECTION SIZE, SINGLE DIMENSION INDICATES ROUND CONNECTION. FOR RECTANGULAR NECK, FIRST DIMENSION IS THE PLAN HORIZONTAL DIMENSION.
- TYPE IDENTIFICATION (SEE SCHEDULE)
- NO. & SIZE OF SLOTS (TYPE LPD ONLY)
- BLOW DIRECTION WHERE APPLICABLE (TYPE CD 4-WAY UNLESS NOTED OTHERWISE); (TYPE LPD 2-WAY UNLESS NOTED OTHERWISE)
- AIR QUANTITY - CFM

- 22 x 10 — RECTANGULAR DUCT (FIRST NUMBER INDICATES PLAN DIMENSION, SECOND NUMBER INDICATES DEPTH)
- 22 x 10 — FLAT OVAL DUCT
- 12" Ø — ROUND DUCT (12" Ø DIAMETER)
- RADIUS ELBOW (NO TURNING VANES)
- HARD ELBOW (WITH TURNING VANES)
- DUCT TRANSITION (RECTANGULAR TO RECTANGULAR)
- DUCT TRANSITION (RECTANGULAR TO ROUND)
- RECTANGULAR SUPPLY DUCT UP
- RECTANGULAR SUPPLY DUCT DOWN
- 22x10 B / 14x10 T — DUCT INDICATION FOR STACKING T= TOP; B= BOTTOM
- 22x10 T / 14x10 B — DUCT INDICATION FOR STACKING T= TOP; B= BOTTOM
- VOLUME DAMPER
- DAMPER (TYPE AS INDICATED; BD, BDD, MOD, FD, SD/FD, ETC.)
- SPLITTER DAMPER
- T/H — TEMP / HUMID SENSOR (DUCT MOUNTED)
- AV — AUDIO VISUAL ALARM
- 8X14 / LFD-1 300 — FLEXIBLE BRANCH DUCT CONNECTION TO DIFFUSER. CONICAL BELL MOUTH OR SQUARE/ROUND BOOT FITTING WITH VOLUME DAMPER.
- ROUND INLET CONNECTION TO LAMINAR FLOW DIFFUSER (CFM INDICATED)
- 14X10 — BRANCH DUCT CONNECTION TO DIFFUSER WITH VOLUME DAMPER.
- SQUARE INLET CONNECTION TO DIFFUSER
- SUPPLY DIFFUSER
- DIFFUSER (WITH BLANK-OFF) 3-WAY
- REGISTER OR GRILLE (EXHAUST, RETURN, TRANSFER)

ALTERATION/DEMOLITION SYMBOLS

- POINT OF CONNECTION, NEW TO EXISTING
- TERMINATION OF DEMOLITION, REMOVAL
- (E) EXISTING TO REMAIN
- (E) EXISTING TO REMAIN
- (R) EXISTING TO BE REMOVED
- (R) EXISTING TO BE REMOVED
- (RE) RELOCATE EXISTING
- (ER) EXISTING RELOCATED

BRANCH CONNECTIONS IN DOUBLE-LINE DUCTWORK

- RECTANGULAR PROPORTIONAL SPLIT
- BRANCH OFF BOTTOM 45° BOOT CONNECTION
- BRANCH OFF TOP 45° BOOT CONNECTION
- BRANCH OFF SIDE 45° BOOT CONNECTION
- BRANCH OFF SIDE CONICAL BELL MOUTH

BRANCH CONNECTIONS IN SINGLE-LINE DUCTWORK

- B — RECTANGULAR PROPORTIONAL SPLIT OFF BOTTOM
- RECTANGULAR PROPORTIONAL SPLIT OFF SIDE
- T — RECTANGULAR PROPORTIONAL SPLIT OFF TOP
- BRANCH OFF SIDE
- BRANCH OFF TOP
- BRANCH OFF BOTTOM
- RECTANGULAR PROPORTIONAL SPLIT

EQUIPMENT IDENTIFICATION

AHU 1
- SYMBOL OR TYPE (SEE SCHEDULE OR SPECIFICATIONS)
- IDENTIFICATION NUMBER (SEE SCHEDULE)

A
3.4
2'-0"
- FINNED TUBE RADIATION TYPE (SEE SCHEDULE OR SPECIFICATIONS)
- HEATING MBH
- APPROXIMATE LENGTH OF ELEMENT

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RTA SUBMISSION 2/11/2021

HVAC GENERAL NOTES AND REQUIREMENTS

1. ALL ABBREVIATIONS AND SYMBOLS MAY NOT APPEAR ON THE DRAWINGS.
2. DUE TO THE SMALL SCALE OF THE DRAWINGS, ALL WORK REQUIRED IS NOT SHOWN ON THE FLOOR PLANS. CERTAIN WORK IS SHOWN ON FLOW DIAGRAMS, DETAILS, AND CONTROL DIAGRAMS. INCLUDE ALL REQUIRED WORK SHOWN ON PLANS, FLOW DIAGRAMS, DETAILS, AND CONTROL DIAGRAMS.
3. PIPING AND DUCTWORK DRAWINGS ARE DIAGRAMMATIC AND MAY NOT INDICATE ALL OFFSETS, TRANSITIONS AND FITTINGS. PROVIDE ADDITIONAL OFFSETS, TRANSITIONS AND FITTINGS AS REQUIRED TO COORDINATE WITH OTHER TRADES AND TO SUIT FIELD CONDITIONS.
4. LOCATE ALL PIPING AND DUCTWORK TIGHT TO STRUCTURE UNLESS INDICATED OTHERWISE. LOCATE ALL PIPING AND DUCTWORK AS HIGH AS POSSIBLE. COORDINATE EXACT LOCATION AND ROUTING WITH ALL OTHER TRADES.
5. LOCATE EQUIPMENT ABOVE CEILINGS UNLESS NOTED OTHERWISE. EQUIPMENT MUST BE INSTALLED AS HIGH AS POSSIBLE WITHOUT NEGATIVELY IMPACTING EQUIPMENT SERVICEABILITY. ALL EQUIPMENT AND ALL THEIR RELATED COMPONENTS/DEVICES REQUIRING REGULAR SERVICE MUST BE ACCESSIBLE FROM A 10' STEP LADDER.
6. REFER TO FLOOR PLANS, RISER DIAGRAMS, DETAILS AND CONTROL DRAWINGS FOR DUCTWORK SIZES, ACCESSORIES AND OTHER REQUIREMENTS. PROVIDE DUCTWORK WITH EQUIVALENT FRICTION FACTOR AND VELOCITY WHERE CHANGES ARE REQUIRED TO ACCOMMODATE FIELD CONDITIONS. ALL DUCTWORK WHERE SIZE IS MISSING OR NOT CLEARLY LABELED MUST BE SIZED FOR A MAXIMUM ASPECT RATIO OF 5:1 AND A MAXIMUM FRICTION FACTOR OF F=0.10" WG PER 100 FT. IN NO CASE (EXCEPT EXHAUST DISCHARGE STACKS AND DUST COLLECTION SYSTEMS) MUST DUCT VELOCITY EXCEED 1500 FPM IN HIGH AND MEDIUM PRESSURE SYSTEMS AND 1000 FPM IN LOW PRESSURE SYSTEMS, AND 300 FPM IN TRANSFER DUCTS.
7. CLASSIFY AS HIGH PRESSURE AND CONSTRUCT FOR MINIMUM OF 6 INCH WG STATIC PRESSURE SEAL CLASS A, LEAKAGE CLASS 6 FOR RECTANGULAR DUCTWORK AND CLASS 3 FOR ROUND DUCTWORK THE FOLLOWING:
   a. ALL SUPPLY AIR DUCTWORK FOR VARIABLE AIR VOLUME SYSTEM(S) UP TO INLET SIDE OF AIR VOLUME CONTROL BOX(ES) CONNECTED TO AIR HANDLING UNITS SPECIFIED WITH EXTERNAL STATIC PRESSURES OF 3 TO 5 INCHES.
   b. ALL SUPPLY, RETURN AND EXHAUST SYSTEM DUCTWORK CONNECTED TO FANS SPECIFIED WITH EXTERNAL STATIC PRESSURES OF 3 TO 5 INCHES.
8. CLASSIFY AS MEDIUM PRESSURE AND CONSTRUCT FOR MINIMUM OF 4 INCH WG STATIC PRESSURE SEAL CLASS A, LEAKAGE CLASS 6 FOR RECTANGULAR DUCTWORK AND CLASS 3 FOR ROUND DUCTWORK THE FOLLOWING:
   a. ALL SUPPLY AIR DUCTWORK FOR VARIABLE AIR VOLUME SYSTEM(S) UP TO INLET SIDE OF AIR VOLUME CONTROL BOX(ES) CONNECTED TO AIR HANDLING UNITS SPECIFIED WITH EXTERNAL STATIC PRESSURES OF GREATER THAN 2" AND LESS THAN 3".
   b. ALL SUPPLY, RETURN AND EXHAUST SYSTEM DUCTWORK CONNECTED TO FANS SPECIFIED WITH EXTERNAL STATIC PRESSURES OF GREATER THAN 2" AND LESS THAN 3" CARRYING 75% OR MORE OF SYSTEM AIR.
9. CLASSIFY AS MEDIUM PRESSURE AND CONSTRUCT FOLLOWING WORK FOR MINIMUM 3 INCHES STATIC PRESSURE, SEAL CLASS A, LEAKAGE CLASS 6 FOR RECTANGULAR DUCTWORK AND CLASS 3 FOR ROUND DUCTWORK.
   a. ALL SUPPLY AIR DUCTWORK FOR VARIABLE AIR VOLUME SYSTEMS UP TO INLET SIDE OF AIR VOLUME CONTROL BOXES CONNECTED TO AIR HANDLING UNITS SPECIFIED WITH EXTERNAL STATIC PRESSURES OF 1 TO 2 INCHES.
   b. ALL SUPPLY, RETURN AND EXHAUST SYSTEM DUCTWORK CONNECTED TO FANS SPECIFIED WITH EXTERNAL STATIC PRESSURES OF 1 TO 2 INCHES CARRYING 75% OR MORE OF SYSTEM AIR.
   c. ALL SUPPLY, RETURN AND EXHAUST SYSTEM DUCTWORK CONNECTED TO FANS SPECIFIED WITH EXTERNAL STATIC PRESSURES OF GREATER THAN 2" AND LESS THAN 3" CARRYING 25% TO 75% OF SYSTEM AIR.
10. CLASSIFY THE REMAINDER OF THE DUCTWORK AS LOW PRESSURE AND ALL DUCTWORK AND CASINGS MUST BE CONSTRUCTED FOR MINIMUM OF 2 INCH WG STATIC PRESSURE AS RECOMMENDED IN SMACNA HVAC DUCT CONSTRUCTION STANDARDS, EXCEPT THAT ALL SEAMS, JOINTS, FASTENER PENETRATIONS AND CONNECTIONS IN ALL DUCTWORK MUST BE SEALED IN ACCORDANCE WITH SEAL CLASS A, LEAKAGE CLASS 6 FOR RECTANGULAR DUCTWORK AND CLASS 3 FOR ROUND DUCTWORK.
11. REFER TO FLOOR PLANS, FLOW DIAGRAMS, DETAILS AND CONTROL DRAWINGS FOR PIPE SIZES, VALVING, ACCESSORIES AND OTHER REQUIREMENTS. WHERE PIPE SIZES ARE MISSING OR UNCLEAR, SIZE PIPE FOR A MAXIMUM FRICTION FACTOR OF 3 FT PER 100 FT AND A MAXIMUM VELOCITY OF 3 FPS. MINIMUM PIPE SIZE TO BE 3/4".
12. ACCESS DOORS FOR FIRE DAMPERS INSTALLED IN FLOOR SLABS SHOULD BE LOCATED ON FLOOR ABOVE, UNLESS INDICATED OTHERWISE.
13. PROVIDE FLEXIBLE CONNECTIONS IN ALL DUCTWORK WHERE IT CROSSES BUILDING EXPANSION JOINTS. REFER TO STRUCTURAL DRAWINGS FOR EXPANSION JOINT LOCATIONS.
14. PROVIDE VOLUME DAMPERS IN BRANCH RUNOUTS TO EACH AIR DEVICE. LOCATE VOLUME DAMPER AS CLOSE TO MAIN AS POSSIBLE.
15. PROVIDE DUCT ACCESS DOORS UPSTREAM OF ALL DUCT MOUNTED EQUIPMENT SUCH AS, REHEAT COILS, FILTERS, CONTROL DAMPERS, SMOKE/FIRE DAMPERS ETC.
16. AUTOMATIC CONTROL DAMPERS LOCATED IN AIR HANDLING UNITS MUST BE PROVIDED BY AHU MANUFACTURER. SMOKE DAMPERS MUST BE PROVIDED AS A COMPLETE UL LISTED ASSEMBLY WITH DAMPER AND ACTUATOR. ALL OTHER DAMPER ACTUATORS MUST BE PROVIDED BY THE CONTRACTOR FOR SECTION 23 09 13. ALL OTHER CONTROL DAMPERS SHOWN ON THE DRAWINGS MUST BE FURNISHED BY THE CONTRACTOR FOR SECTION 23 09 13 FOR INSTALLATION IN DUCTWORK BY SHEET METAL CONTRACTOR.
17. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR CEILING TYPES, AND FOR EXACT LOCATIONS OF CEILING DIFFUSERS, GRILLES, REGISTERS AND OTHER DEVICES. PROVIDE BORDER STYLES SUITABLE FOR CEILING TYPE IN WHICH DEVICE IS INSTALLED. MECHANICAL CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL MOUNTING DETAILS AND REQUIREMENTS WITH CEILING CONTRACTOR.
18. PIPING, DUCTWORK AND EQUIPMENT FOREIGN TO ELECTRICAL EQUIPMENT ROOMS, OR SIMILAR ROOMS HOUSING ELECTRICAL EQUIPMENT (TELEPHONE/DATA), IS NOT PERMITTED TO BE INSTALLED IN THESE SPACES UNLESS IT DIRECTLY SERVES THE SPACE.
19. FOR ALL DUCT AND PIPE PENETRATIONS THROUGH INTERIOR NON-RATED FULL HEIGHT PARTITIONS (PARTITIONS EXTENDING TO STRUCTURE), EXTEND INSULATION THROUGH PENETRATION. MAINTAIN COMPLETE VAPOR SEAL.
20. EQUIPMENT ROOM LAYOUTS ARE BASED ON EQUIPMENT BASIS OF DESIGN MANUFACTURER. OTHER ACCEPTABLE MANUFACTURERS MAY BE PROVIDED AS LONG AS THEIR PHYSICAL DIMENSIONS DO NOT IMPACT THE EQUIPMENT LAYOUT AS SHOWN. IT MUST BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE THE LAYOUT TO ENSURE THAT PROPER ACCESS FOR MAINTENANCE AND EQUIPMENT REMOVAL CAN BE MAINTAINED. MAKE ALL NECESSARY PIPING AND DUCTWORK MODIFICATIONS AS REQUIRED AT NO COST TO GOVERNMENT.
21. OUTSIDE AIR PLENUMS AND RELIEF AIR PLENUMS MUST MATCH ASSOCIATED LOUVER SIZE. SLOPE BOTTOM OF PLENUMS TOWARD LOUVER TO ALLOW WATER TO DRAIN OUT OF PLENUM THROUGH LOUVER.
22. PROVIDE SHUT-OFF VALVES IN ACCESSIBLE LOCATIONS (AS CLOSE AS POSSIBLE TO TAKE-OFF) FOR ALL BRANCH PIPING SERVING MORE THAN FIVE COILS, IN ALL BRANCH PIPING CONNECTING DIRECTLY TO MAIN SERVICE, IN ALL RISERS, AND IN ALL BRANCHES LONGER THAN 100 FEET.
23. PROVIDE SHUT-OFF VALVES AT ALL CONNECTIONS TO MECHANICAL EQUIPMENT.
24. PROVIDE EXPANSION JOINTS IN ALL PIPING WHERE IT CROSSES BUILDING EXPANSION JOINTS. REFER TO STRUCTURAL DRAWINGS FOR EXPANSION JOINT LOCATIONS.
25. PROVIDE AN INDIVIDUAL DDC WALL MOUNTED TEMPERATURE SENSOR FOR EVERY REHEAT COIL, FAN COIL UNIT, TRANSFER FAN, AND AIR VOLUME CONTROL BOX, EXCEPT WHERE THE FLOOR PLANS OR CONTROL DIAGRAMS SPECIFICALLY INDICATE THAT A SINGLE SENSOR MUST SERVE MULTIPLE DEVICES.
26. OBTAIN USACE CONTRACTING OFFICER (USACE CO) APPROVAL FOR ALL SENSOR LOCATIONS PRIOR TO ROUGH-IN.
27. ROUTE EQUIPMENT DRAIN PIPING TO PREVENT TRIPPING HAZARDS. DO NOT INSTALL PIPING ON FLOOR IN ANY EQUIPMENT ACCESS AISLES.
28. ALL AIR HANDLING UNITS SUPPLYING 2000 CFM OR MORE MUST HAVE SMOKE DETECTORS LOCATED IN THEIR SUPPLY AND RETURN DUCTWORK. PROVIDE MULTIPLE DETECTORS AS REQUIRED TO PROTECT EVERY BRANCH DUCT AND AIR DEVICE. DIVISION 26 CONTRACTOR MUST FURNISH DUCT SMOKE DETECTORS, DIVISION 23 CONTRACTOR MUST INSTALL THEM AND CONTRACTOR FOR SECTION 23 09 00 MUST PROVIDE CONTROL WIRING. DIVISION 26 CONTRACTOR TO WIRE DUCT SMOKE DETECTORS TO FIRE ALARM SYSTEM.
29. PROVIDE DOUBLE WALL INSULATED ACCESS DOORS IN ALL INSULATED DUCTWORK AND SINGLE WALL ACCESS DOORS IN UNINSULATED DUCTWORK FOR FIRE DAMPER, SMOKE DAMPER, CONTROL DAMPER AND REHEAT COIL INSPECTION AND SERVICE.
30. ALL INDOOR FLOOR MOUNTED MECHANICAL EQUIPMENT MUST BE MOUNTED ON 6" MINIMUM FOUNDATION/HOUSEKEEPING PAD. INCREASE PAD HEIGHT AS REQUIRED TO ACCOMMODATE TRAP DEPTH ON AIR HANDLING UNITS (SEE CONDENSATE TRAP DETAIL).
31. ALL SUPPLY AND RETURN AIR DUCTWORK MUST BE INSULATED. ALL OUTSIDE & RELIEF AIR DUCTWORK MUST BE INSULATED. EXHAUST AIR DUCTWORK CARRYING MOISTURE LADEN AIR MUST BE INSULATED. EXPOSED DUCTWORK IN ALL AREAS MUST BE DOUBLE-WALL WITH INSULATION LINER. ALL EXPOSED (OR VISIBLE) INSULATED DUCTWORK IN ALL AREAS MUST BE WRAPPED IN AN 8 OUNCE WHITE CANVAS JACKET.
32. ALL EXPOSED (OR VISIBLE) INSULATED PIPING IN ALL AREAS MUST BE WRAPPED IN AN 8 OUNCE WHITE CANVAS JACKET.
33. ALL EXPOSED INDOOR MECHANICAL DUCTWORK AND PIPING MUST BE PAINTED WHITE IN MECHANICAL AND ELECTRICAL ROOMS. FOR EXPOSED INDOOR DUCTWORK & PIPING IN ALL OTHER AREAS, DOR TO SELECT COLOR. ALL NAMEPLATE DATA (TAGS & LABELS, ETC) MUST BE PROTECTED FROM PAINT SUCH THAT THE DATA REMAINS VISIBLE.
34. MOUNT MOTORS FOR IN-LINE FANS IN MOST ACCESSIBLE POSITION.
35. DIVISION 23 CONTRACTOR MUST PROVIDE WIRING BETWEEN FIRE ALARM SYSTEM RELAYS AND AIR HANDLING UNIT STARTERS FOR UNIT SHUTDOWN.
36. DIVISION 26 CONTRACTOR MUST PROVIDE WIRING BETWEEN FIRE ALARM SYSTEM RELAYS AND SMOKE DAMPERS.
37. PROVIDE FIRE DAMPERS IN SUPPLY, RETURN AND EXHAUST DUCTWORK WHERE THEY CROSS THROUGH FIREWALLS RATED 2 HRS OR MORE, EXIT/ENTER SHAFTS AND WHERE THEY CROSS THROUGH RATED FLOORS (AND ARE NOT PROTECTED BY RATED SHAFTS). PROVIDE FIRE DAMPERS IN ALL TRANSFER AIR DUCTS THAT PASS THROUGH ANY FIRE RATED ASSEMBLY.
38. PROVIDE DDC CONTROLS AND ELECTRIC OPERATORS FOR ALL MECHANICAL EQUIPMENT, VALVES, AND DAMPERS.
39. BEFORE ANY EQUIPMENT OR MATERIALS ARE RELEASED FOR FABRICATION, THE CONTRACTORS MUST PRODUCE CEILING COORDINATION DRAWINGS IN WHICH THE CONTRACTORS FOR ALL TRADES MUST SHOW PIPING, DUCTWORK, EQUIPMENT, CONDUIT, AND LIGHTING FIXTURE LOCATION, ROUTING, SIZE AND INSTALLATION HEIGHT. ALL CONFLICTS MUST BE COORDINATED ON THESE PLANS PRIOR TO THE INSTALLATION OF ANY IN OR ABOVE CEILING EQUIPMENT OR UTILITIES.
40. WHERE THERE IS A CONFLICT BETWEEN FLOOR PLANS, DETAILS, SCHEDULES, DIAGRAMS, OR SPECIFICATIONS, THE MORE STRINGENT CRITERIA MUST APPLY.
41. PIPING BETWEEN TWO INDICATED SIZES MUST BE MAINTAINED AT THE LARGER PIPE SIZE.
42. NOT ALL SHEET NOTES (OR ALL DEMO NOTES) ARE USED ON EVERY DRAWING - REFER TO FLOOR PLANS.
43. PROVIDE SWAY BRACING FOR ALL EQUIPMENT, DUCTWORK AND PIPING WHERE HANGER LENGTH EXCEEDS 36".
44. INTERNAL DUCT LINING IS PERMITTED IN ACOUSTICAL TRANSFER DUCTS ONLY - REFER TO DETAIL FOR ADDITIONAL REQUIREMENTS.
45. PROVIDE TEMPORARY COVERINGS OVER ALL PENETRATIONS OF EXISTING WALLS AND FLOORS AS REQUIRED TO MAINTAIN EXISTING FIRE RESISTANCE RATING UNTIL FINAL PENETRATION FIRE-STOP SYSTEM IS INSTALLED.
46. INSTALL MECHANICAL EQUIPMENT, DUCTWORK, PIPING, AND ACCESSORIES LEVEL, STRAIGHT, SQUARE, AND PARALLEL TO WALLS, FLOORS, ETC.
47. ALL CONTROLLERS, INCLUDING BUT NOT LIMITED TO, FACTORY MOUNTED CONTROLLERS PROVIDED BY EQUIPMENT MANUFACTURERS MUST BE LONWORKS DEVICES CERTIFIED BY THE LONMARK ASSOCIATION FOR THE HIGHEST LEVEL OF INTEROPERABILITY.
48. FLEX CONNECTORS ARE REQUIRED AT ALL DUCT CONNECTIONS TO EQUIPMENT WITH FANS.
49. TRIPLE DUTY VALVES ARE NOT PERMITTED. PROVIDE INDIVIDUAL VALVES (SHUT-OFF, CHECK, AND BALANCING).
50. ALL AIR DEVICE SUBMITTALS MUST INDICATE ALL AVAILABLE FINISHES AND PAINT COLORS FOR SELECTION BY THE DOR.
51. ALL OVERHEAD MECHANICAL FEATURES OVER 31 LBS. MUST BE MOUNTED SO THAT THEY RESIST FORCES OF 0.5 TIMES THE COMPONENT WEIGHT IN THE DOWNWARD DIRECTION.
52. COVER ALL OPEN-ENDED DUCTS WITH WIREMESH SCREENS UNLESS NOTED OTHERWISE. WIREMESH SCREENS MAY BE OMITTED ON TRANSFER AIR DUCTS (NOT DIRECTLY CONNECTED TO FANS) CONCEALED ABOVE CEILINGS.
53. ALL OUTSIDE DUCTWORK MUST BE DOUBLE WALL ALUMINIUM.
54. PITCH STEAM PIPE DOWN 0.2% IN DIRECTION OF FLOW. PITCH STEAM CONDENSATE PIPE DOWN 0.4% IN DIRECTION OF FLOW.
55. ALL STEAM, STEAM CONDENSATE, AND PUMPED STEAM CONDENSATE RETURN PIPING MUST BE FULLY WELDED.
56. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXITING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF THE SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

US Army Corps of Engineers ®

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US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

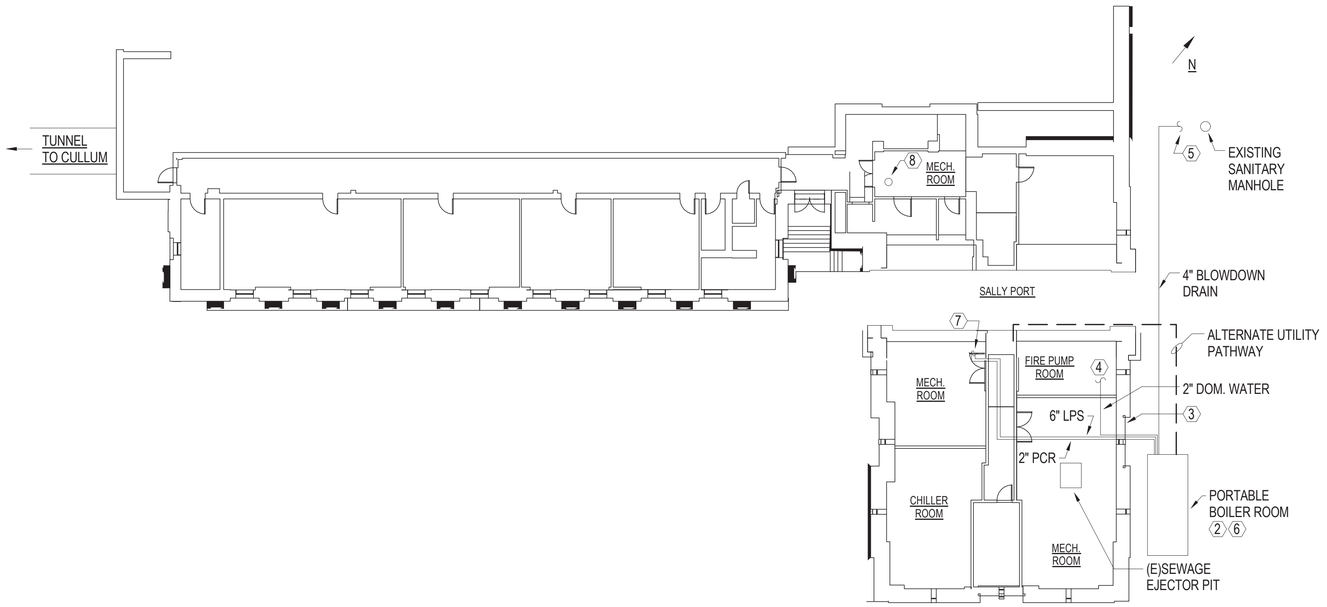
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

HVAC GENERAL NOTES

SHEET ID

M003

RTA SUBMISSION 2/11/2021

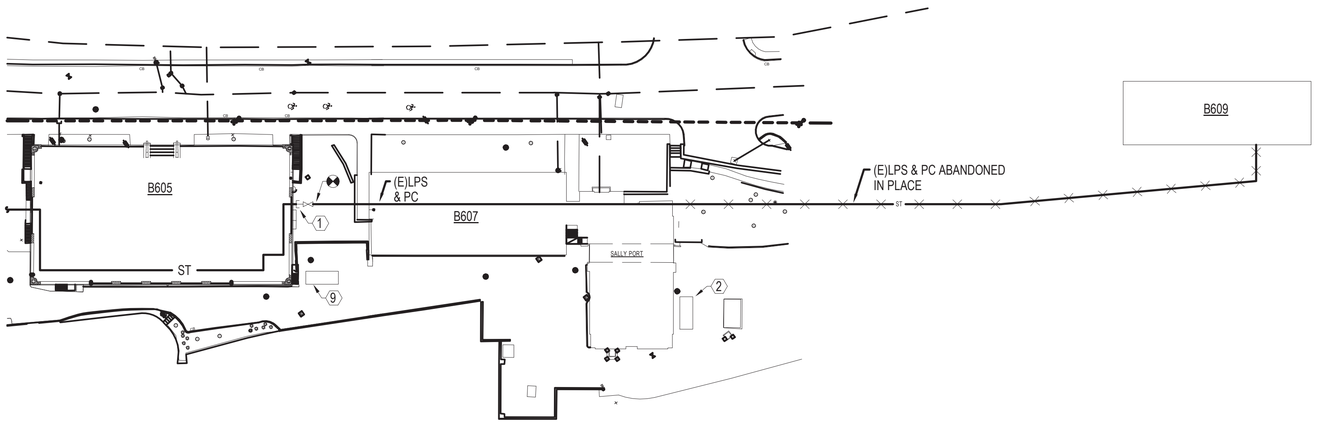


D2 LINCOLN (B607) BASEMENT B3 PLAN - HVAC LOGISTICS

SCALE: 1" = 30'-0"

SHEET NOTES:

1. CUT, CAP, AND VALVE LPS & PCR WHERE IT LEAVES CULLUM HALL AND ENTERS TUNNEL TO LINCOLN HALL.
2. PROVIDE TRAILER MOUNTED TEMPORARY STEAM BOILER SYSTEM. TRAILER TO BE FULLY ENCLOSED AND INCLUDE ALL THE COMPONENTS REQUIRED FOR A FULLY FUNCTIONAL STEAM BOILER SYSTEM.
3. REMOVE EXISTING EXHAUST LOUVER AND RECONFIGURE EXHAUST TERMINATIONS FOR TEMPORARY PIPING.
4. CONNECT 2" DOMESTIC WATER FROM TEMPORARY BOILER TO 3" DOMESTIC WATER IN FIRE PUMP ROOM WITH ISOLATION VALVE AND BACKFLOW PREVENTER. REMOVE PIPE AND CAP CONNECTION AT COMPLETION OF STEAM WORK IN CULLUM HALL.
5. CONNECT 4" DRAIN TO EXISTING SANITARY MANHOLE. BLOWDOWN DRAINAGE MUST BE COOLED BELOW 140°F PRIOR TO DISCHARGE. REMOVE ALL TEMPORARY PIPING AT COMPLETION OF STEAM WORK IN CULLUM HALL.
6. CONNECT FEED FOR TEMPORARY BOILER TO 460V-3PH PANEL OUTSIDE OF CHILLER ROOM.
7. CONNECT 6" LPS AND 2" PCR TO MAINS IN MECH. ROOM.
8. CONNECT EXISTING CONDENSATE RECEIVER PUMP DISCHARGE TO PUMP BACK TO TEMPORARY BOILER THROUGH (E)1-1/4" PCR LINE.
9. TEMPORARY CHILLER AND PUMP PACKAGE (BY OTHERS).



A3 PARTIAL SITE PLAN - HVAC LOGISTICS

NTS

HVAC LOGISTICS NOTES AND REQUIREMENTS

1. CONTRACTOR IS TO PROVIDE TEMPORARY HEATING PLANT FOR LINCOLN HALL, INCLUDING ALL COMPONENTS AND CONNECTIONS REQUIRED TO BACKFEED THE EXISTING LINCOLN HALL STEAM LOOP WITH 2500 PPH OF 8 PSI STEAM.

2. TEMPORARY HEATING MUST BE SUPPLIED AS REQUIRED TO MAINTAIN UNINTERRUPTED STEAM SERVICE TO LINCOLN HALL FROM OCTOBER 15TH THROUGH APRIL 15TH THROUGHOUT CULLUM HALL CONSTRUCTION.
   - THE CONTRACTOR IS REQUIRED TO FILL THE FUEL TANK AS FREQUENTLY AS NEEDED TO ENSURE STEAM IS AVAILABLE THROUGHOUT THE SPECIFIED TIME FRAME.
   - THE CONTRACTOR MUST MONITOR ALL TEMPORARY BOILER ALARMS AND STATUS.

3. TEMPORARY HEATING PLANT IS TO BE PROVIDED WITH ALL EQUIPMENT REQUIRED TO SUPPORT STEAM SERVICE TO LINCOLN HALL, INCLUDING, BUT NOT LIMITED TO:
   - OIL FIRED STEAM BOILER (MINIMUM SIZE = 80 BHP)
   - INTEGRAL FUEL STORAGE AND TRANSFER SYSTEM (MINIMUM SIZE = 500 GALLONS)
   - STEAM BLOW-DOWN SYSTEM WITH DISCHARGE TEMPERING
   - AUTOMATIC WATER FILL SYSTEM
   - CHEMICAL TREATMENT AND WATER SOFTENING SYSTEM
   - BOILER SURGE TANK AND FEED WATER SYSTEM
   - CONDENSATE RECEIVER AND PUMPING SYSTEMS
   - ALL CODE REQUIRED SAFETY CONTROLS AND DEVICES INCLUDING EMERGENCY BOILER SHUTDOWN SWITCHES AND PRESSURE RELIEF VALVES
   - HEAT TRACING OUTDOOR PIPING

4. TEMPORARY CHILLED WATER SERVICE (BY OTHERS) MUST BE SUPPLIED TO CULLUM HALL WHEN NEW CHILLED WATER SYSTEM WITHIN THE BUILDING IS READY TO BE FILLED AND TESTED. THE TEMPORARY CHILLED WATER SERVICE MUST BE MAINTAINED UNTIL THE CENTRAL CHILLER PLANT (B604) SITE DISTRIBUTION IS EXTENDED TO CULLUM HALL UNDER A SEPARATE PROJECT. TEMPORARY CHILLED WATER SERVICE MUST INCLUDE (FOR INFORMATION ONLY):
   - 120 TONS OF COOLING (AVAILABLE YEAR ROUND) DELIVERING 42°F CHILLED WATER.
   - LEAD/LAG (N+1) PUMPS WITH VFDS.
   - PACKAGED CONTROLS.
   - GLYCOL IS NOT PERMITTED.

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JACOBS / EWING COLE *A Joint Venture*

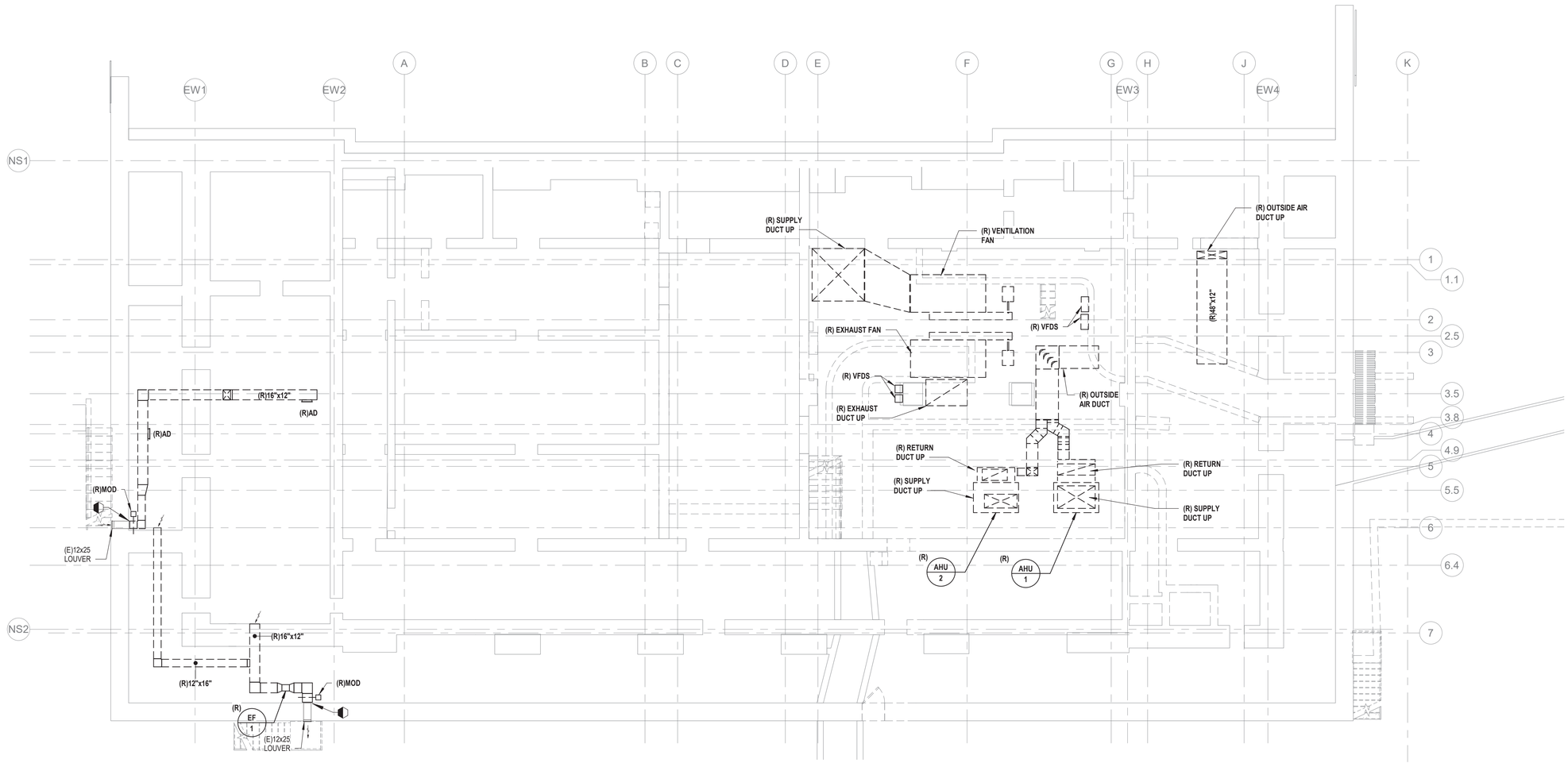
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

HVAC LOGISTICS AND TEMPORARY SERVICES

SHEET ID

M004

RTA SUBMISSION 2/11/2021



B4 BASEMENT B3 FLOOR PLAN - DUCTWORK - DEMOLITION

SCALE: 1/8" = 1'-0"

GENERAL DEMOLITION NOTES:

1. REMOVE ALL HVAC DUCTWORK, AIR DEVICES, PIPING, CONTROLS, AND EQUIPMENT NO LONGER REQUIRED DUE TO NEW WORK. PERFORM ALL DEMOLITION REQUIRED TO COORDINATE WITH NEW WORK. REFER TO NEW WORK PLANS.
2. OFFER ALL REMOVED EQUIPMENT TO GOVERNMENT AND DELIVER TO A LOCATION AS DIRECTED BY GOVERNMENT.
3. REMOVE ALL DEMOLISHED DUCTWORK, PIPING, EQUIPMENT (REFUSED BY GOVERNMENT) AND ACCESSORIES FROM SITE AND PROPERLY DISPOSE OF MATERIALS IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES.
4. REMOVE ALL STEAM AND CONDENSATE PIPING THROUGHOUT CULLUM HALL.
5. REMOVE ALL STEAM RADIATORS, STEAM CONVECTORS, AND STEAM COILS THROUGHOUT CULLUM HALL. REMOVE ALL ASSOCIATED STEAM TRAPS, ACCESSORIES, AND TRIM.
6. REMOVE ALL CONTROL PANELS, CONTROL WIRING, TUBING, AND DEVICES NO LONGER REQUIRED DUE TO EQUIPMENT REMOVALS. PROPERLY SEAL OPENINGS IN CONTROL TUBING SERVING EXISTING AREAS TO REMAIN. REWIRE BAS SERIAL NETWORKS TO MAINTAIN CONTINUITY. T-TAPS & SPLICES ARE NOT PERMITTED IN BAS NETWORKS.
7. FOR ALL DUCTWORK SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED HANGERS, SUPPORTS, INSULATION, VOLUME DAMPERS AND FIRE DAMPERS.
8. FOR ALL EQUIPMENT SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED EQUIPMENT SUPPORTS, CURBS, PADS, AND RAILS.
9. REMOVE AND REPLACE EXISTING HANGERS WITH NEW HANGERS AND MISCELLANEOUS HARDWARE AS REQUIRED TO ACCOMMODATE NEW WORK.
10. PROVIDE FILTRATION EQUIPMENT, FILTERS, FANS, ETC. REQUIRED TO PREVENT CONSTRUCTION DEBRIS FROM SPREADING TO CLEAN AREAS OR TO BUILDING AIR HANDLING EQUIPMENT.

8 4 0 8 16

SCALE: 1/8"=1'-0"

PLAN NORTH

US Army Corps of Engineers ®

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JACOBS / EWING COLE A Joint Venture

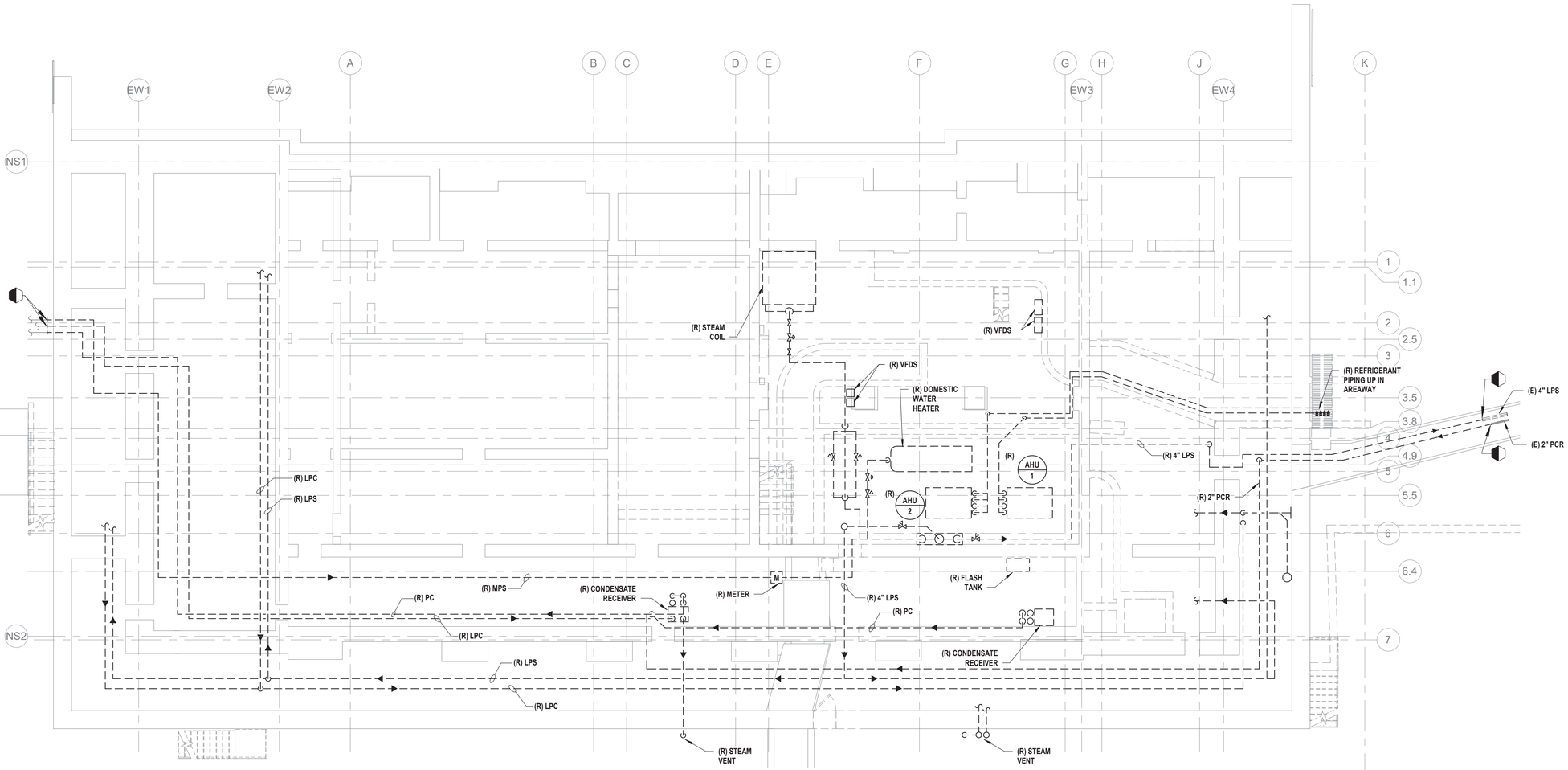
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

BASEMENT FLOOR PLAN B3 - DUCTWORK - DEMOLITION

SHEET ID

MDH1B3

RTA SUBMISSION 2/11/2021



B4 BASEMENT B3 FLOOR PLAN - PIPING - DEMOLITION

SCALE: 1/8" = 1'-0"

GENERAL DEMOLITION NOTES:

1. REMOVE ALL HVAC DUCTWORK, AIR DEVICES, PIPING, CONTROLS, AND EQUIPMENT NO LONGER REQUIRED DUE TO NEW WORK. PERFORM ALL DEMOLITION REQUIRED TO COORDINATE WITH NEW WORK. REFER TO NEW WORK PLANS.
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4. REMOVE ALL STEAM AND CONDENSATE PIPING THROUGHOUT CULLUM HALL.
5. REMOVE ALL STEAM RADIATORS, STEAM CONVECTORS, AND STEAM COILS THROUGHOUT CULLUM HALL. REMOVE ALL ASSOCIATED STEAM TRAPS, ACCESSORIES, AND TRIM.
6. REMOVE ALL CONTROL PANELS, CONTROL WIRING, TUBING, AND DEVICES NO LONGER REQUIRED DUE TO EQUIPMENT REMOVALS. PROPERLY SEAL OPENINGS IN CONTROL TUBING SERVING EXISTING AREAS TO REMAIN. REWIRE BAS SERIAL NETWORKS TO MAINTAIN CONTINUITY. T-TAPS & SPLICES ARE NOT PERMITTED IN BAS NETWORKS.
7. FOR ALL PIPING SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED HANGERS, INSULATION, AND SUPPORTS.
8. FOR ALL EQUIPMENT SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED EQUIPMENT SUPPORTS, CURBS, PADS, AND RAILS.
9. REMOVE AND REPLACE EXISTING HANGERS WITH NEW HANGERS AND MISCELLANEOUS HARDWARE AS REQUIRED TO ACCOMMODATE NEW WORK.
10. PROVIDE FILTRATION EQUIPMENT, FILTERS, FANS, ETC. REQUIRED TO PREVENT CONSTRUCTION DEBRIS FROM SPREADING TO CLEAN AREAS OR TO BUILDING AIR HANDLING EQUIPMENT.

8 4 0 8 16

SCALE: 1/8"=1'-0"

PLAN NORTH

US Army Corps of Engineers ®

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SUBMITTED BY: RJ
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US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

BASEMENT FLOOR PLAN B3 - PIPING - DEMOLITION

SHEET ID

MDP1B3

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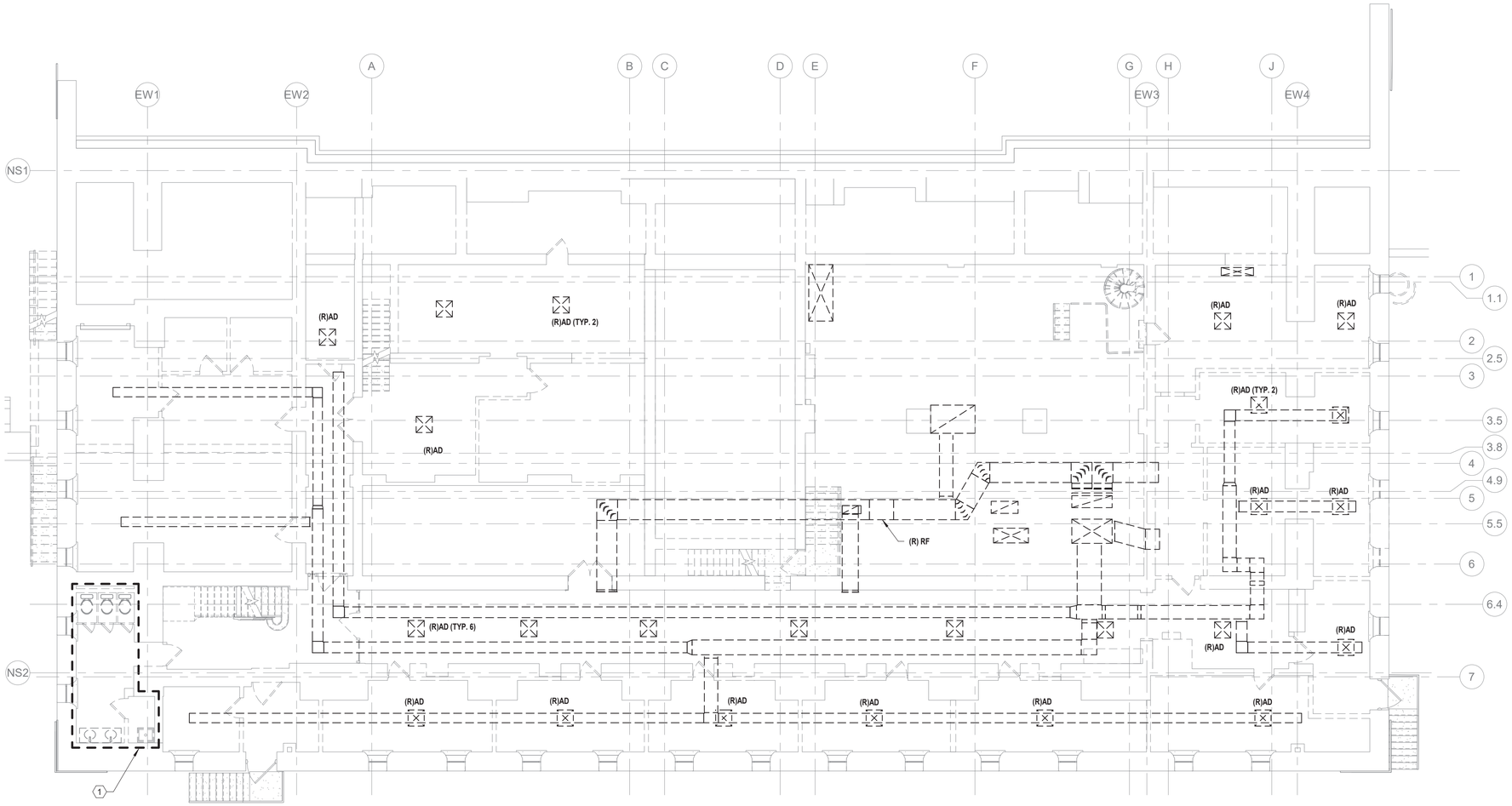

B4 BASEMENT B2 FLOOR PLAN - DUCTWORK - DEMOLITION

SCALE: 1/8" = 1'-0"

GENERAL DEMOLITION NOTES:

1. REMOVE ALL HVAC DUCTWORK, AIR DEVICES, PIPING, CONTROLS, AND EQUIPMENT NO LONGER REQUIRED DUE TO NEW WORK. PERFORM ALL DEMOLITION REQUIRED TO COORDINATE WITH NEW WORK. REFER TO NEW WORK PLANS.
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9. REMOVE AND REPLACE EXISTING HANGERS WITH NEW HANGERS AND MISCELLANEOUS HARDWARE AS REQUIRED TO ACCOMMODATE NEW WORK.
10. PROVIDE FILTRATION EQUIPMENT, FILTERS, FANS, ETC. REQUIRED TO PREVENT CONSTRUCTION DEBRIS FROM SPREADING TO CLEAN AREAS OR TO BUILDING AIR HANDLING EQUIPMENT.

SHEET NOTES:

(1) REMOVE ALL EXHAUST DUCTWORK AND FANS. REMOVE ALL ASSOCIATED POWER, CONTROLS, AND SUPPORTS

8 4 0 8 16

SCALE: 1/8"=1'-0"

PLAN NORTH

US Army Corps of Engineers ®

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SUBMITTED BY:
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US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

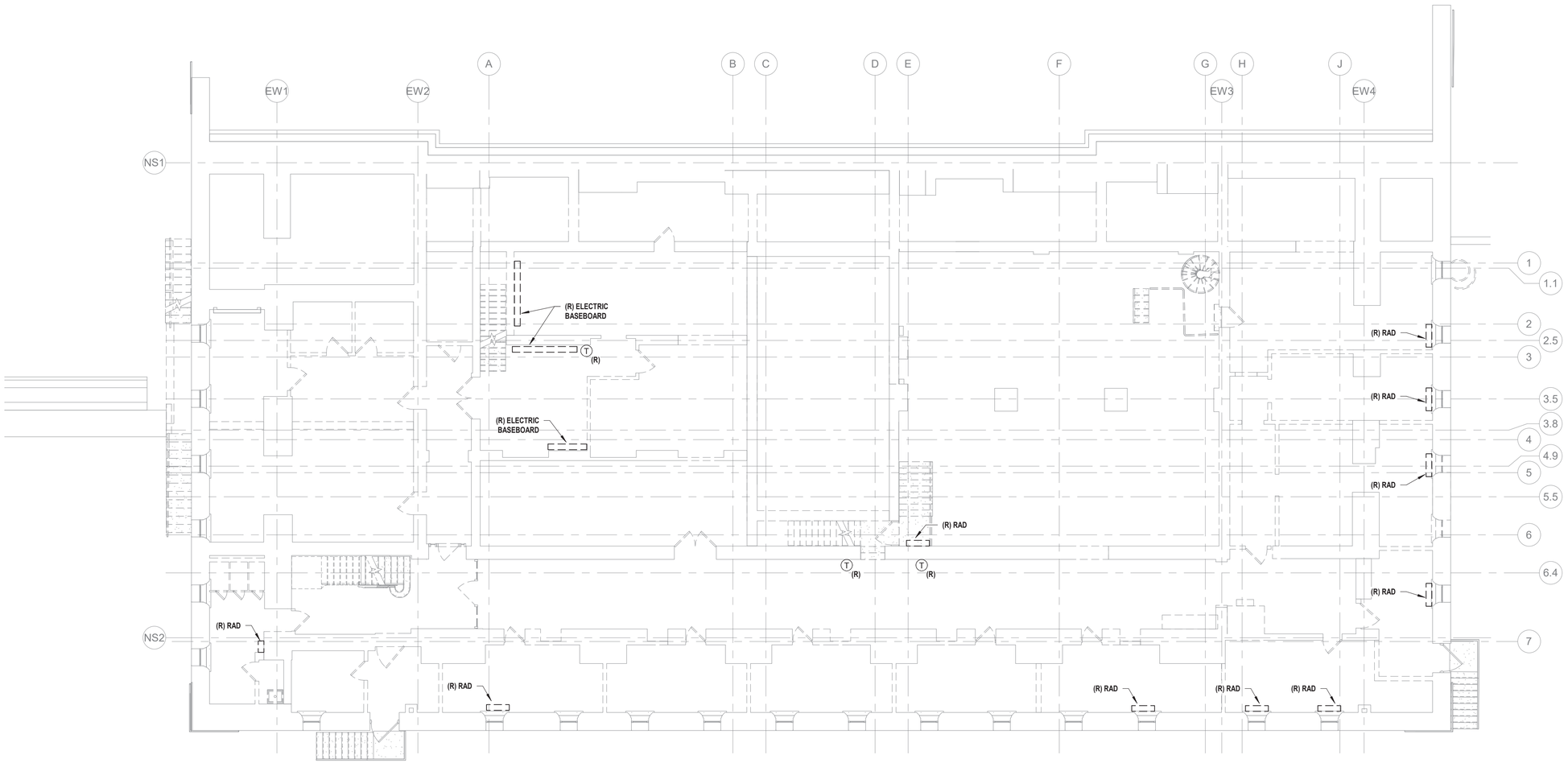
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

BASEMENT FLOOR PLAN B2 - DUCTWORK - DEMOLITION

SHEET ID

MDH1B2

RTA SUBMISSION 2/11/2021



B4 BASEMENT B2 FLOOR PLAN - PIPING - DEMOLITION

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SCALE: 1/8"=1'-0"

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BASEMENT FLOOR PLAN B2 - PIPING - DEMOLITION

SHEET ID

MDP1B2

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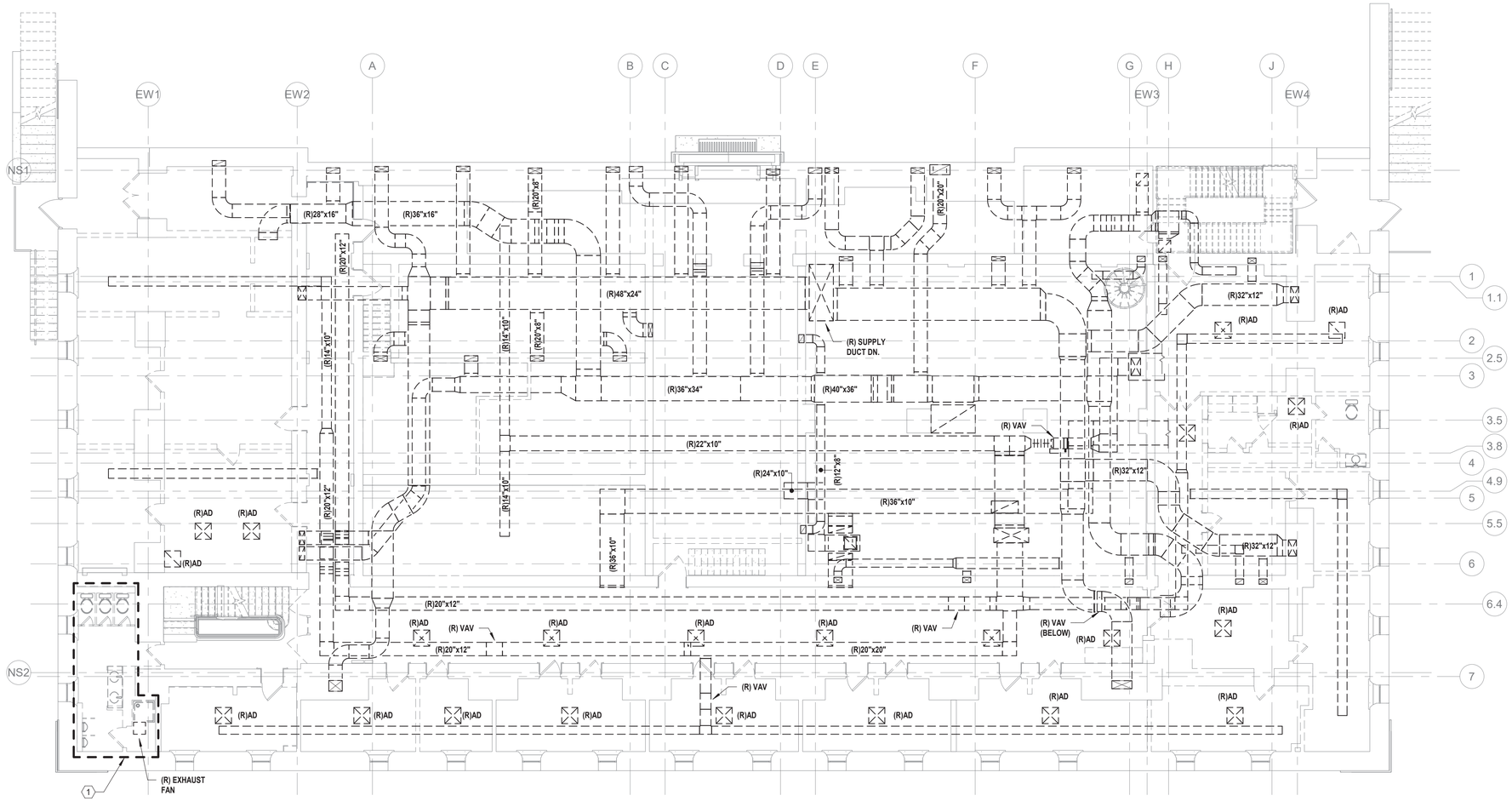

B4 BASEMENT B1 FLOOR PLAN - DUCTWORK - DEMOLITION

SCALE: 1/8" = 1'-0"

GENERAL DEMOLITION NOTES:

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10. PROVIDE FILTRATION EQUIPMENT, FILTERS, FANS, ETC. REQUIRED TO PREVENT CONSTRUCTION DEBRIS FROM SPREADING TO CLEAN AREAS OR TO BUILDING AIR HANDLING EQUIPMENT.

SHEET NOTES:

1. REMOVE ALL EXHAUST DUCTWORK AND FANS. REMOVE ALL ASSOCIATED POWER, CONTROLS, AND SUPPORTS

PLAN NORTH

8 4 0 8 16

SCALE: 1/8"=1'-0"

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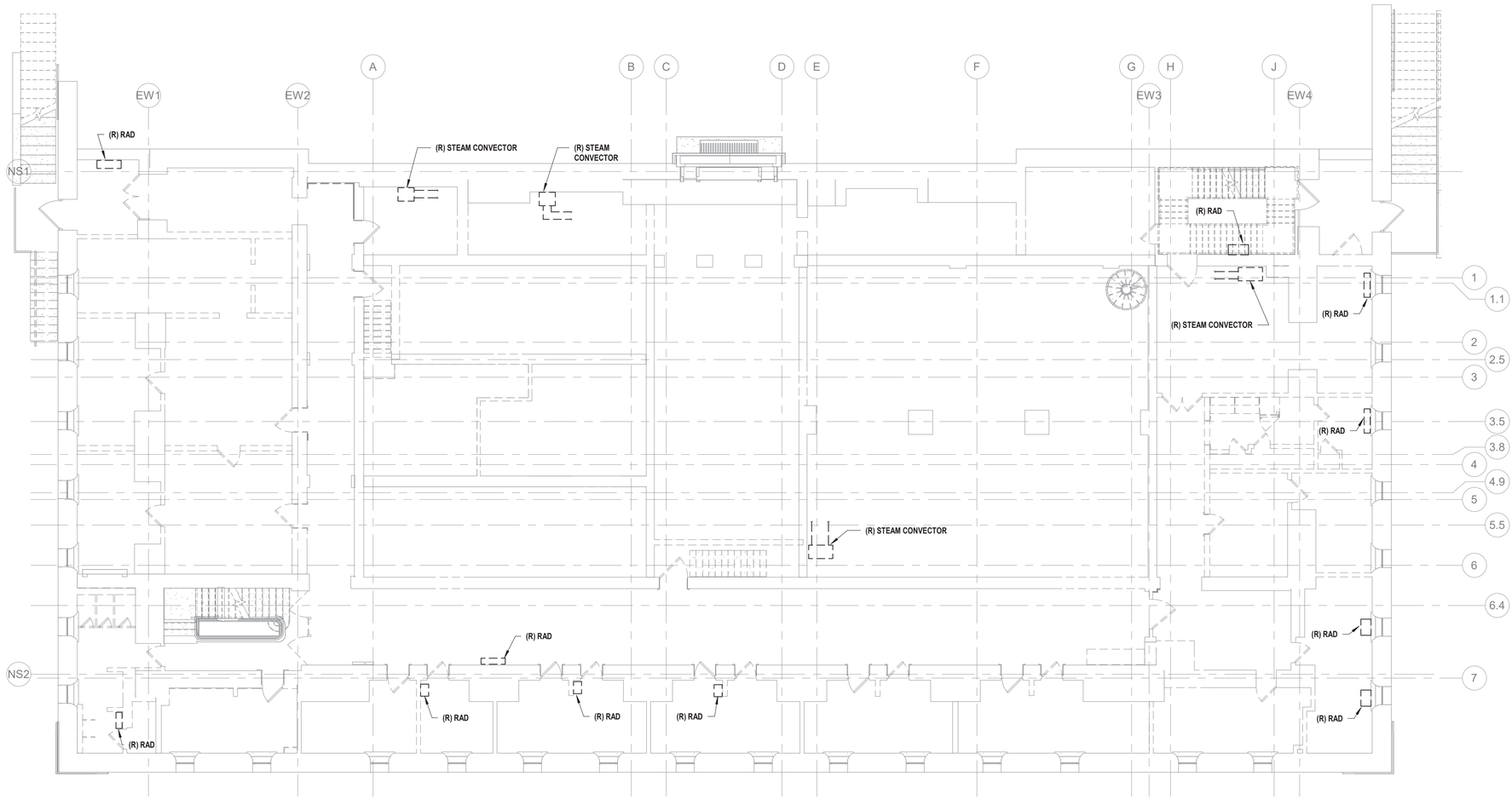
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

BASEMENT FLOOR PLAN B1 - DUCTWORK - DEMOLITION

SHEET ID

MDH1B1

RTA SUBMISSION 2/11/2021



B4 BASEMENT B1 FLOOR PLAN - PIPING - DEMOLITION

SCALE: 1/8" = 1'-0"

GENERAL DEMOLITION NOTES:

1. REMOVE ALL HVAC DUCTWORK, AIR DEVICES, PIPING, CONTROLS, AND EQUIPMENT NO LONGER REQUIRED DUE TO NEW WORK. PERFORM ALL DEMOLITION REQUIRED TO COORDINATE WITH NEW WORK. REFER TO NEW WORK PLANS.
2. OFFER ALL REMOVED EQUIPMENT TO GOVERNMENT AND DELIVER TO A LOCATION AS DIRECTED BY GOVERNMENT.
3. REMOVE ALL DEMOLISHED DUCTWORK, PIPING, EQUIPMENT (REFUSED BY GOVERNMENT) AND ACCESSORIES FROM SITE AND PROPERLY DISPOSE OF MATERIALS IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES.
4. REMOVE ALL STEAM AND CONDENSATE PIPING THROUGHOUT CULLUM HALL.
5. REMOVE ALL STEAM RADIATORS, STEAM CONVECTORS, AND STEAM COILS THROUGHOUT CULLUM HALL. REMOVE ALL ASSOCIATED STEAM TRAPS, ACCESSORIES, AND TRIM.
6. REMOVE ALL CONTROL PANELS, CONTROL WIRING, TUBING, AND DEVICES NO LONGER REQUIRED DUE TO EQUIPMENT REMOVALS. PROPERLY SEAL OPENINGS IN CONTROL TUBING SERVING EXISTING AREAS TO REMAIN. REWIRE BAS SERIAL NETWORKS TO MAINTAIN CONTINUITY. T-TAPS & SPLICES ARE NOT PERMITTED IN BAS NETWORKS.
7. FOR ALL PIPING SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED HANGERS, INSULATION, AND SUPPORTS.
8. FOR ALL EQUIPMENT SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED EQUIPMENT SUPPORTS, CURBS, PADS, AND RAILS.
9. REMOVE AND REPLACE EXISTING HANGERS WITH NEW HANGERS AND MISCELLANEOUS HARDWARE AS REQUIRED TO ACCOMMODATE NEW WORK.
10. PROVIDE FILTRATION EQUIPMENT, FILTERS, FANS, ETC. REQUIRED TO PREVENT CONSTRUCTION DEBRIS FROM SPREADING TO CLEAN AREAS OR TO BUILDING AIR HANDLING EQUIPMENT.

PLAN NORTH

8 4 0 8 16

SCALE: 1/8"=1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY: SK
SIZE: ANSI D

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

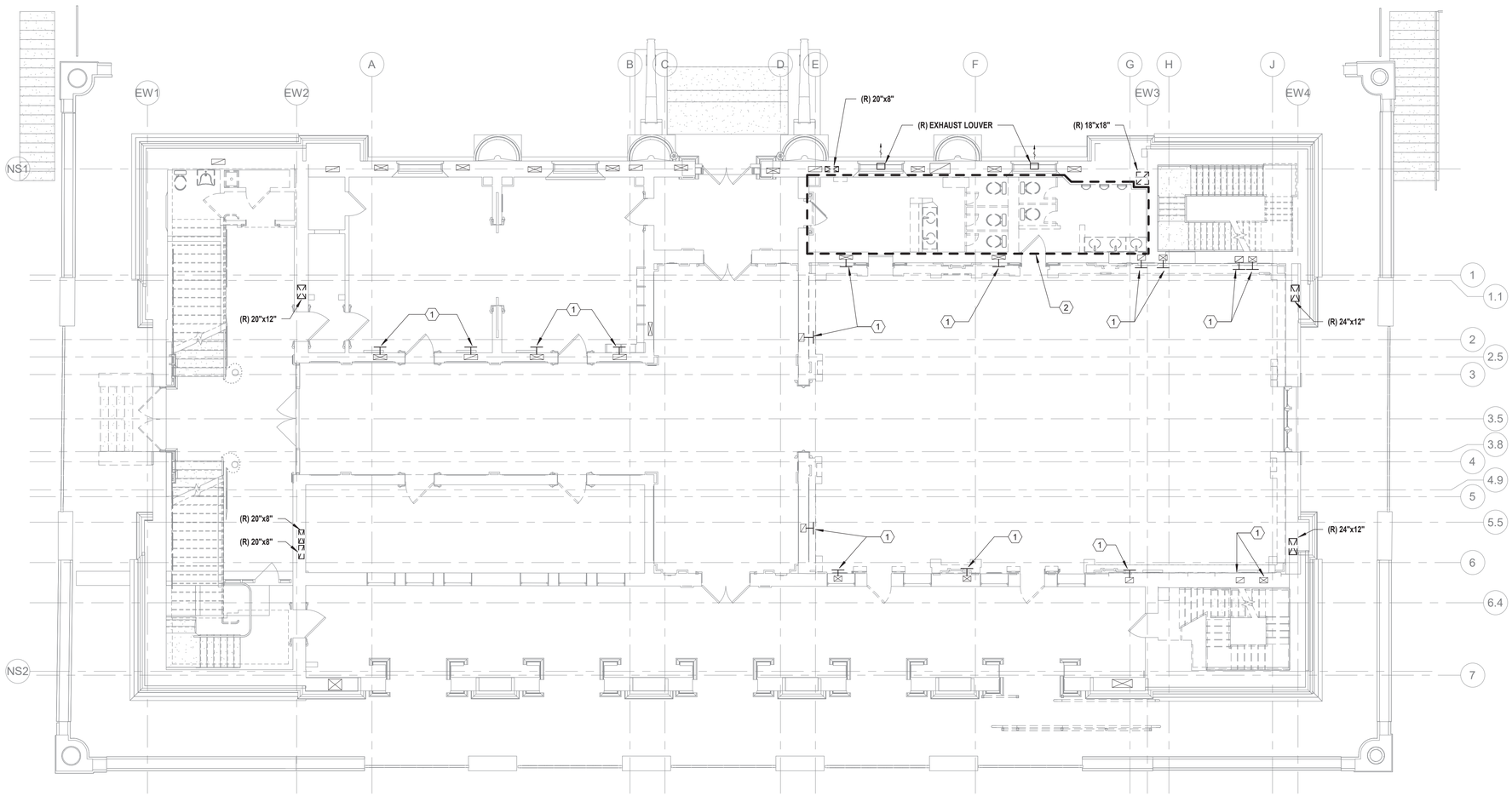
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

BASEMENT FLOOR PLAN B1 - PIPING - DEMOLITION

SHEET ID

MDP1B1

RTA SUBMISSION 2/11/2021



B4 FIRST FLOOR PLAN - DUCTWORK - DEMOLITION

SCALE: 1/8" = 1'-0"

GENERAL DEMOLITION NOTES:

1. REMOVE ALL HVAC DUCTWORK, AIR DEVICES, PIPING, CONTROLS, AND EQUIPMENT NO LONGER REQUIRED DUE TO NEW WORK. PERFORM ALL DEMOLITION REQUIRED TO COORDINATE WITH NEW WORK. REFER TO NEW WORK PLANS.
2. OFFER ALL REMOVED EQUIPMENT TO GOVERNMENT AND DELIVER TO A LOCATION AS DIRECTED BY GOVERNMENT.
3. REMOVE ALL DEMOLISHED DUCTWORK, PIPING, EQUIPMENT (REFUSED BY GOVERNMENT) AND ACCESSORIES FROM SITE AND PROPERLY DISPOSE OF MATERIALS IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES.
4. REMOVE ALL STEAM AND CONDENSATE PIPING THROUGHOUT CULLUM HALL.
5. REMOVE ALL STEAM RADIATORS, STEAM CONVECTORS, AND STEAM COILS THROUGHOUT CULLUM HALL. REMOVE ALL ASSOCIATED STEAM TRAPS, ACCESSORIES, AND TRIM.
6. REMOVE ALL CONTROL PANELS, CONTROL WIRING, TUBING, AND DEVICES NO LONGER REQUIRED DUE TO EQUIPMENT REMOVALS. PROPERLY SEAL OPENINGS IN CONTROL TUBING SERVING EXISTING AREAS TO REMAIN. REWIRE BAS SERIAL NETWORKS TO MAINTAIN CONTINUITY. T-TAPS & SPLICES ARE NOT PERMITTED IN BAS NETWORKS.
7. FOR ALL DUCTWORK SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED HANGERS, SUPPORTS, INSULATION, VOLUME DAMPERS AND FIRE DAMPERS.
8. FOR ALL EQUIPMENT SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED EQUIPMENT SUPPORTS, CURBS, PADS, AND RAILS.
9. REMOVE AND REPLACE EXISTING HANGERS WITH NEW HANGERS AND MISCELLANEOUS HARDWARE AS REQUIRED TO ACCOMMODATE NEW WORK.
10. PROVIDE FILTRATION EQUIPMENT, FILTERS, FANS, ETC. REQUIRED TO PREVENT CONSTRUCTION DEBRIS FROM SPREADING TO CLEAN AREAS OR TO BUILDING AIR HANDLING EQUIPMENT.

SHEET NOTES:

(1) REMOVE EXISTING GRILLE, CAP DUCT BEHIND OPENING, PROVIDE FIRE RATED PATCH IN OPENING AND FINISH TO MATCH ADJACENT WALL.

(2) REMOVE ALL EXHAUST DUCTWORK AND FANS. REMOVE ALL ASSOCIATED POWER, CONTROLS, AND SUPPORTS

8 4 0 8 16

SCALE: 1/8"=1'-0"

PLAN NORTH

US Army Corps of Engineers ®

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DESIGNED BY: WMF
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SUBMITTED BY:
SIZE: ANSI D

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SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

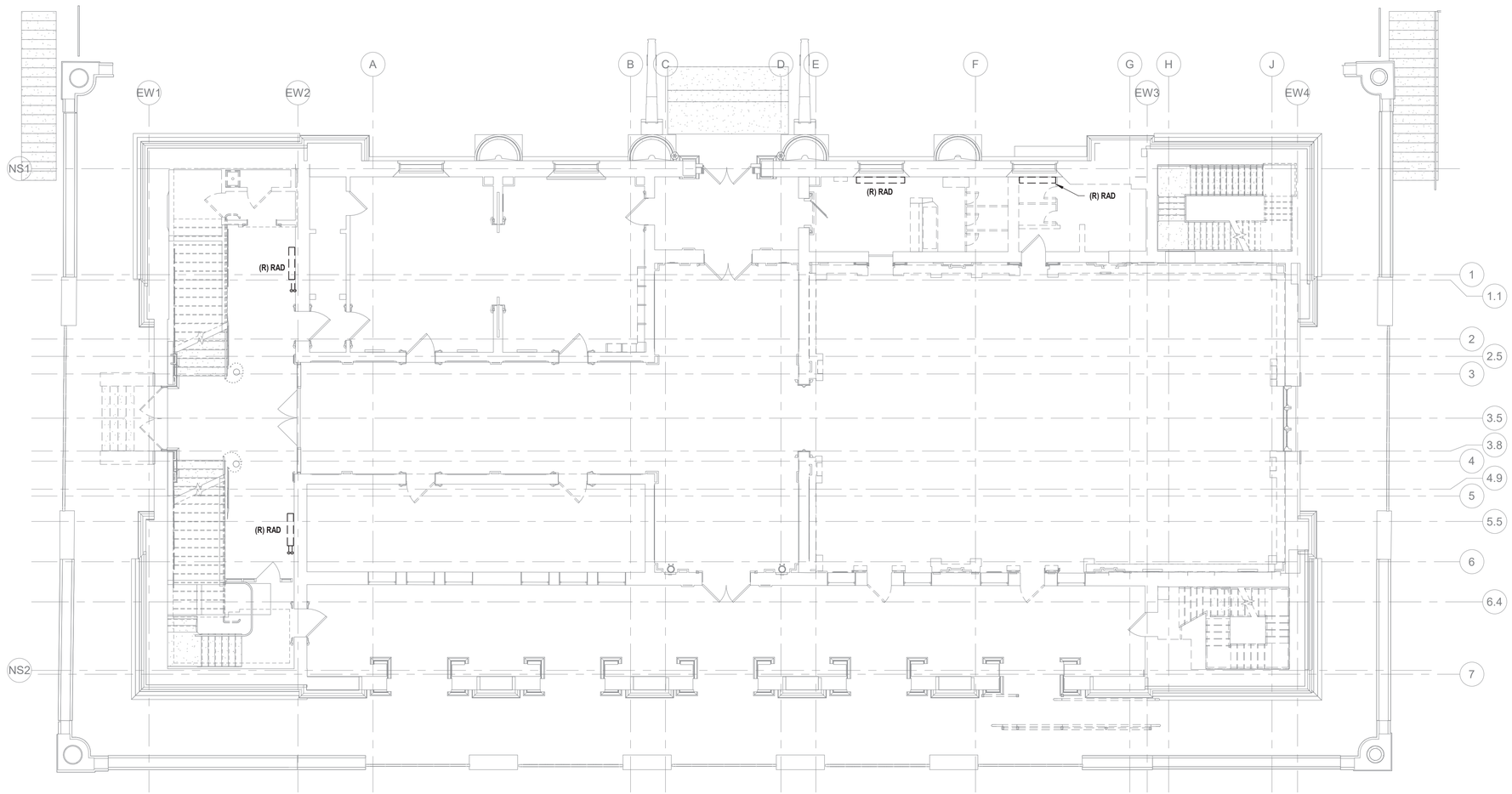
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

FIRST FLOOR PLAN - DUCTWORK - DEMOLITION

SHEET ID

MDH110

RTA SUBMISSION 2/11/2021



B4 FIRST FLOOR PLAN - PIPING - DEMOLITION

SCALE: 1/8" = 1'-0"

GENERAL DEMOLITION NOTES:

1. REMOVE ALL HVAC DUCTWORK, AIR DEVICES, PIPING, CONTROLS, AND EQUIPMENT NO LONGER REQUIRED DUE TO NEW WORK. PERFORM ALL DEMOLITION REQUIRED TO COORDINATE WITH NEW WORK. REFER TO NEW WORK PLANS.
2. OFFER ALL REMOVED EQUIPMENT TO GOVERNMENT AND DELIVER TO A LOCATION AS DIRECTED BY GOVERNMENT.
3. REMOVE ALL DEMOLISHED DUCTWORK, PIPING, EQUIPMENT (REFUSED BY GOVERNMENT) AND ACCESSORIES FROM SITE AND PROPERLY DISPOSE OF MATERIALS IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES.
4. REMOVE ALL STEAM AND CONDENSATE PIPING THROUGHOUT CULLUM HALL.
5. REMOVE ALL STEAM RADIATORS, STEAM CONVECTORS, AND STEAM COILS THROUGHOUT CULLUM HALL. REMOVE ALL ASSOCIATED STEAM TRAPS, ACCESSORIES, AND TRIM.
6. REMOVE ALL CONTROL PANELS, CONTROL WIRING, TUBING, AND DEVICES NO LONGER REQUIRED DUE TO EQUIPMENT REMOVALS. PROPERLY SEAL OPENINGS IN CONTROL TUBING SERVING EXISTING AREAS TO REMAIN. REWIRE BAS SERIAL NETWORKS TO MAINTAIN CONTINUITY. T-TAPS & SPLICES ARE NOT PERMITTED IN BAS NETWORKS.
7. FOR ALL PIPING SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED HANGERS, INSULATION, AND SUPPORTS.
8. FOR ALL EQUIPMENT SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED EQUIPMENT SUPPORTS, CURBS, PADS, AND RAILS.
9. REMOVE AND REPLACE EXISTING HANGERS WITH NEW HANGERS AND MISCELLANEOUS HARDWARE AS REQUIRED TO ACCOMMODATE NEW WORK.
10. PROVIDE FILTRATION EQUIPMENT, FILTERS, FANS, ETC. REQUIRED TO PREVENT CONSTRUCTION DEBRIS FROM SPREADING TO CLEAN AREAS OR TO BUILDING AIR HANDLING EQUIPMENT.

8 4 0 8 16

SCALE: 1/8"=1'-0"

PLAN NORTH

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY: WK
SIZE: ANSI D

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

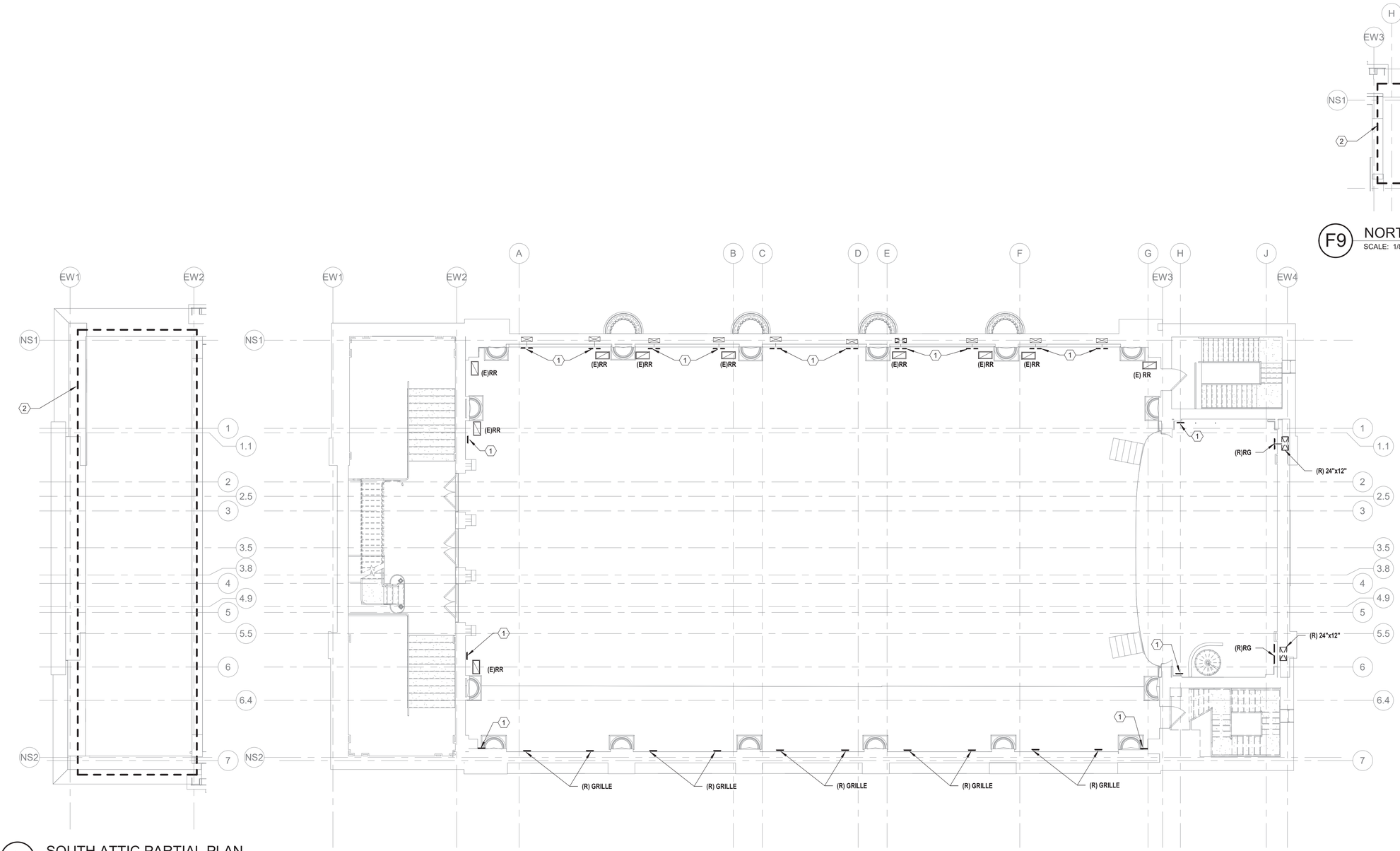
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

FIRST FLOOR PLAN - PIPING - DEMOLITION

SHEET ID

MDP110

RTA SUBMISSION 2/11/2021



F9 NORTH ATTIC PARTIAL PLAN
SCALE: 1/8" = 1'-0"

B1 SOUTH ATTIC PARTIAL PLAN
SCALE: 1/8" = 1'-0"

B4 SECOND FLOOR PLAN - DUCTWORK - DEMOLITION
SCALE: 1/8" = 1'-0"

GENERAL DEMOLITION NOTES:

1. REMOVE ALL HVAC DUCTWORK, AIR DEVICES, PIPING, CONTROLS, AND EQUIPMENT NO LONGER REQUIRED DUE TO NEW WORK. PERFORM ALL DEMOLITION REQUIRED TO COORDINATE WITH NEW WORK. REFER TO NEW WORK PLANS.
2. OFFER ALL REMOVED EQUIPMENT TO GOVERNMENT AND DELIVER TO A LOCATION AS DIRECTED BY GOVERNMENT.
3. REMOVE ALL DEMOLISHED DUCTWORK, PIPING, EQUIPMENT (REFUSED BY GOVERNMENT) AND ACCESSORIES FROM SITE AND PROPERLY DISPOSE OF MATERIALS IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL CODES AND ORDINANCES.
4. REMOVE ALL STEAM AND CONDENSATE PIPING THROUGHOUT CULLUM HALL.
5. REMOVE ALL STEAM RADIATORS, STEAM CONVECTORS, AND STEAM COILS THROUGHOUT CULLUM HALL. REMOVE ALL ASSOCIATED STEAM TRAPS, ACCESSORIES, AND TRIM.
6. REMOVE ALL CONTROL PANELS, CONTROL WIRING, TUBING, AND DEVICES NO LONGER REQUIRED DUE TO EQUIPMENT REMOVALS. PROPERLY SEAL OPENINGS IN CONTROL TUBING SERVING EXISTING AREAS TO REMAIN. REWIRE BAS SERIAL NETWORKS TO MAINTAIN CONTINUITY. T-TAPS & SPLICES ARE NOT PERMITTED IN BAS NETWORKS.
7. FOR ALL DUCTWORK SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED HANGERS, SUPPORTS, INSULATION, VOLUME DAMPERS AND FIRE DAMPERS.
8. FOR ALL EQUIPMENT SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED EQUIPMENT SUPPORTS, CURBS, PADS, AND RAILS.
9. REMOVE AND REPLACE EXISTING HANGERS WITH NEW HANGERS AND MISCELLANEOUS HARDWARE AS REQUIRED TO ACCOMMODATE NEW WORK.
10. PROVIDE FILTRATION EQUIPMENT, FILTERS, FANS, ETC. REQUIRED TO PREVENT CONSTRUCTION DEBRIS FROM SPREADING TO CLEAN AREAS OR TO BUILDING AIR HANDLING EQUIPMENT.

SHEET NOTES:

1. REMOVE EXISTING GRILLE, CAP DUCT BEHIND OPENING, PROVIDE FIRE RATED PATCH IN OPENING AND FINISH TO MATCH ADJACENT WALL.
2. REMOVE ALL DUCTWORK IN THIS AREA.

8 4 0 8 16
SCALE: 1/8"=1'-0"

PLAN NORTH

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE:	2/11/2021
SOLICITATION NO.:	W912DS-19-R-0014
CONTRACT NO.:	W912DS-19-C0031
PROJECT NO:	20190494
DESIGNED BY:	WMF
DRAWN BY:	SCB
CHECKED BY:	WCJ
SUBMITTED BY:	
SIZE:	ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

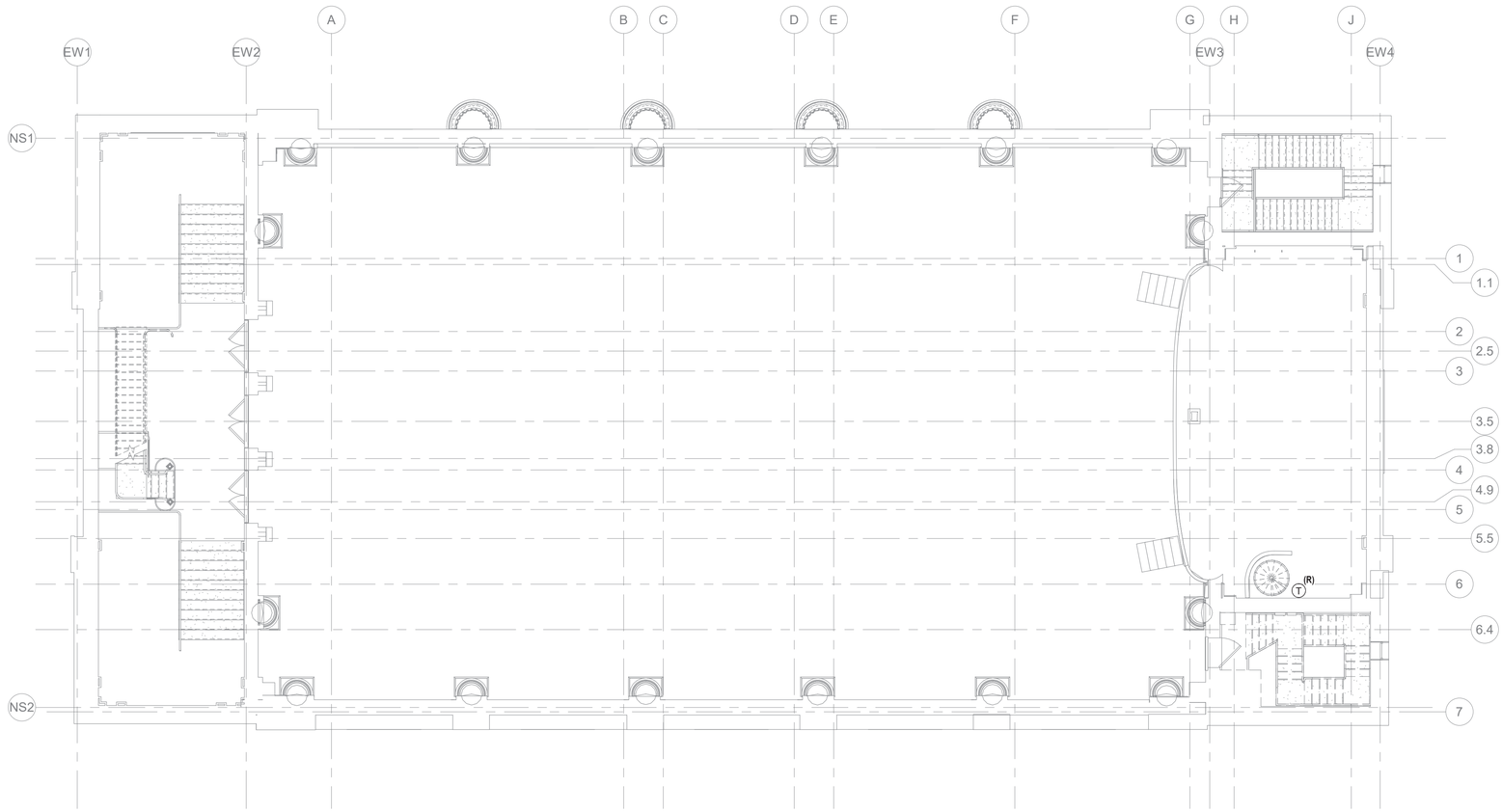
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

SECOND FLOOR PLAN AND ATTIC PARTIAL PLANS - DUCTWORK - DEMOLITION

SHEET ID

MDH120

RTA SUBMISSION 2/11/2021



B4 SECOND FLOOR PLAN - PIPING - DEMOLITION

SCALE: 1/8" = 1'-0"

GENERAL DEMOLITION NOTES:

1. REMOVE ALL HVAC DUCTWORK, AIR DEVICES, PIPING, CONTROLS, AND EQUIPMENT NO LONGER REQUIRED DUE TO NEW WORK. PERFORM ALL DEMOLITION REQUIRED TO COORDINATE WITH NEW WORK. REFER TO NEW WORK PLANS.
2. OFFER ALL REMOVED EQUIPMENT TO GOVERNMENT AND DELIVER TO A LOCATION AS DIRECTED BY GOVERNMENT.
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4. REMOVE ALL STEAM AND CONDENSATE PIPING THROUGHOUT CULLUM HALL.
5. REMOVE ALL STEAM RADIATORS, STEAM CONVECTORS, AND STEAM COILS THROUGHOUT CULLUM HALL. REMOVE ALL ASSOCIATED STEAM TRAPS, ACCESSORIES, AND TRIM.
6. REMOVE ALL CONTROL PANELS, CONTROL WIRING, TUBING, AND DEVICES NO LONGER REQUIRED DUE TO EQUIPMENT REMOVALS. PROPERLY SEAL OPENINGS IN CONTROL TUBING SERVING EXISTING AREAS TO REMAIN. REWIRE BAS SERIAL NETWORKS TO MAINTAIN CONTINUITY. T-TAPS & SPLICES ARE NOT PERMITTED IN BAS NETWORKS.
7. FOR ALL PIPING SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED HANGERS, INSULATION, AND SUPPORTS.
8. FOR ALL EQUIPMENT SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED EQUIPMENT SUPPORTS, CURBS, PADS, AND RAILS.
9. REMOVE AND REPLACE EXISTING HANGERS WITH NEW HANGERS AND MISCELLANEOUS HARDWARE AS REQUIRED TO ACCOMMODATE NEW WORK.
10. PROVIDE FILTRATION EQUIPMENT, FILTERS, FANS, ETC. REQUIRED TO PREVENT CONSTRUCTION DEBRIS FROM SPREADING TO CLEAN AREAS OR TO BUILDING AIR HANDLING EQUIPMENT.

8 4 0 8 16

SCALE: 1/8"=1'-0"

PLAN NORTH

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

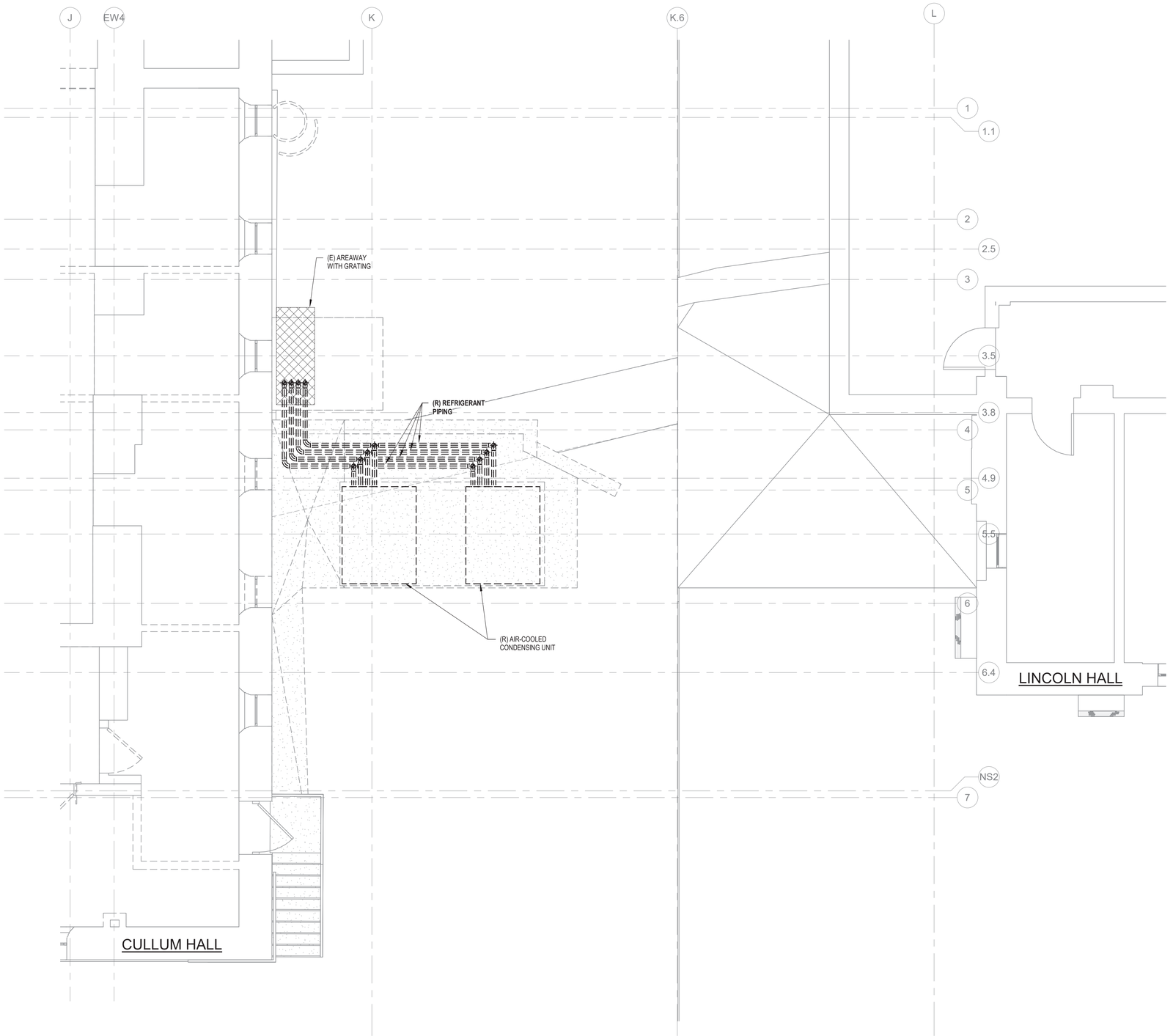
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

SECOND FLOOR PLAN - PIPING - DEMOLITION

SHEET ID

MDP120

RTA SUBMISSION 2/11/2021



GENERAL DEMOLITION NOTES:

1. REMOVE ALL HVAC DUCTWORK, AIR DEVICES, PIPING, CONTROLS, AND EQUIPMENT NO LONGER REQUIRED DUE TO NEW WORK. PERFORM ALL DEMOLITION REQUIRED TO COORDINATE WITH NEW WORK. REFER TO NEW WORK PLANS.
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7. FOR ALL DUCTWORK SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED HANGERS, SUPPORTS, INSULATION, VOLUME DAMPERS AND FIRE DAMPERS.
8. FOR ALL PIPING SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED HANGERS, SUPPORTS, AND INSULATION.
9. FOR ALL EQUIPMENT SHOWN TO BE REMOVED, REMOVE ALL ASSOCIATED EQUIPMENT SUPPORTS, CURBS, PADS, AND RAILS.
10. REMOVE AND REPLACE EXISTING HANGERS WITH NEW HANGERS AND MISCELLANEOUS HARDWARE AS REQUIRED TO ACCOMMODATE NEW WORK.
11. PROVIDE FILTRATION EQUIPMENT, FILTERS, FANS, ETC. REQUIRED TO PREVENT CONSTRUCTION DEBRIS FROM SPREADING TO CLEAN AREAS OR TO BUILDING AIR HANDLING EQUIPMENT.

A5 SERVICE YARD - HVAC - DEMOLITION
SCALE: 1/4" = 1'-0"

PLAN NORTH

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

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

DESIGNED BY: WMF
DRAWN BY: DRJ
CHECKED BY: WCJ
SUBMITTED BY: BJ
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

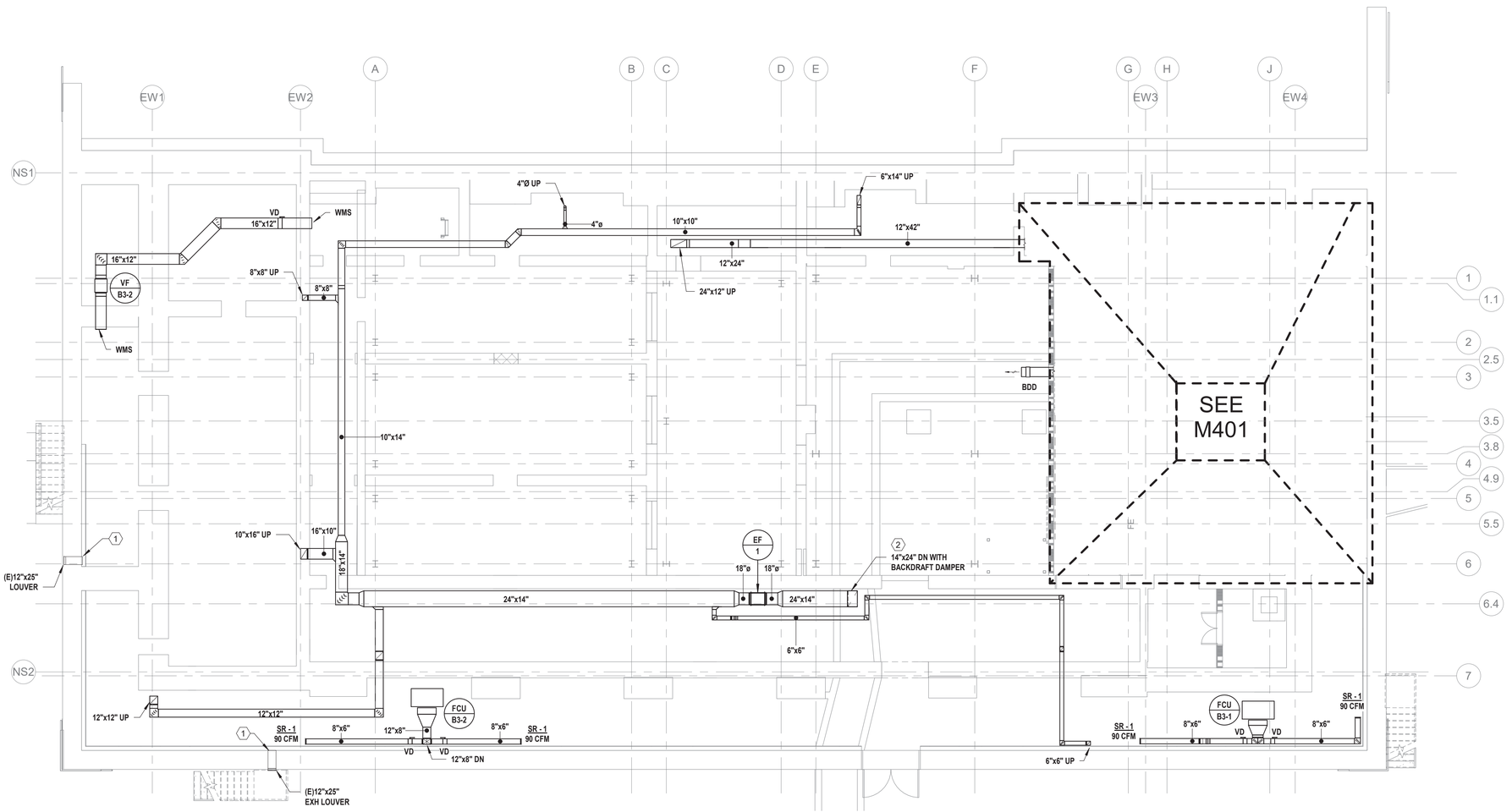
JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

CULLUM SERVICE YARD PLAN - HVAC - DEMOLITION

SHEET ID
MD401

RTA SUBMISSION 2/11/2021



B4 BASEMENT B3 FLOOR PLAN - DUCTWORK

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

SHEET NOTES:

(1) CAP AND SEAL EXISTING OPENINGS AIR TIGHT.

(2) EXHAUST DUCT MUST TERMINATE IN RE-BUILT MASONRY EXHAUST TUNNEL. SEAL DUCT PENETRATION AIR TIGHT.

PLAN NORTH

8 4 0 8 16

SCALE: 1/8"=1'-0"

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CONTRACT NO.: W912DS-19-C0031
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DESIGNED BY: WMF
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CHECKED BY: WCJ
SUBMITTED BY:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

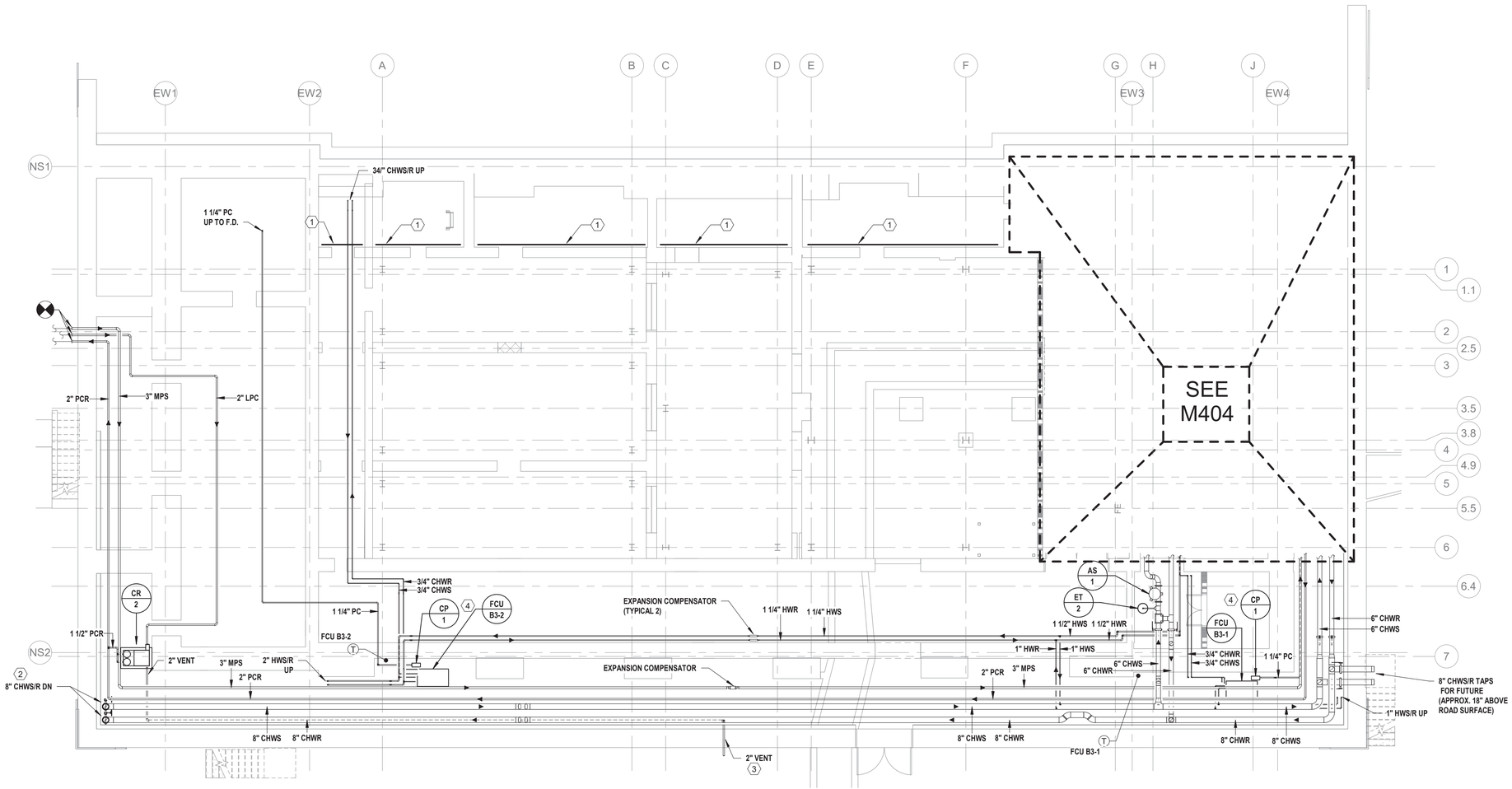
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

BASEMENT FLOOR PLAN B3 - DUCTWORK

SHEET ID

MH1B3

RTA SUBMISSION 2/11/2021



B4 BASEMENT B3 FLOOR PLAN - PIPING

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

SHEET NOTES:

(1) PROVIDE LEAK DETECTION CABLE

(2) VALVE AND CAP CHILLED WATER MAINS FOR FUTURE CONNECTION TO SITE CHILLED WATER DISTRIBUTION. VALVES SHALL BE LOCKABLE.

(3) REUSE EXISTING WALL PENETRATION FROM DEMOLISHED VENT PIPE.

(4) 3/4" CONDENSATE PIPE FROM FAN COIL UNIT DOWN TO CONDENSATE PUMP BELOW.

PLAN NORTH

8 4 0 8 16

SCALE: 1/8"=1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
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SUBMITTED BY: SK
ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
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SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

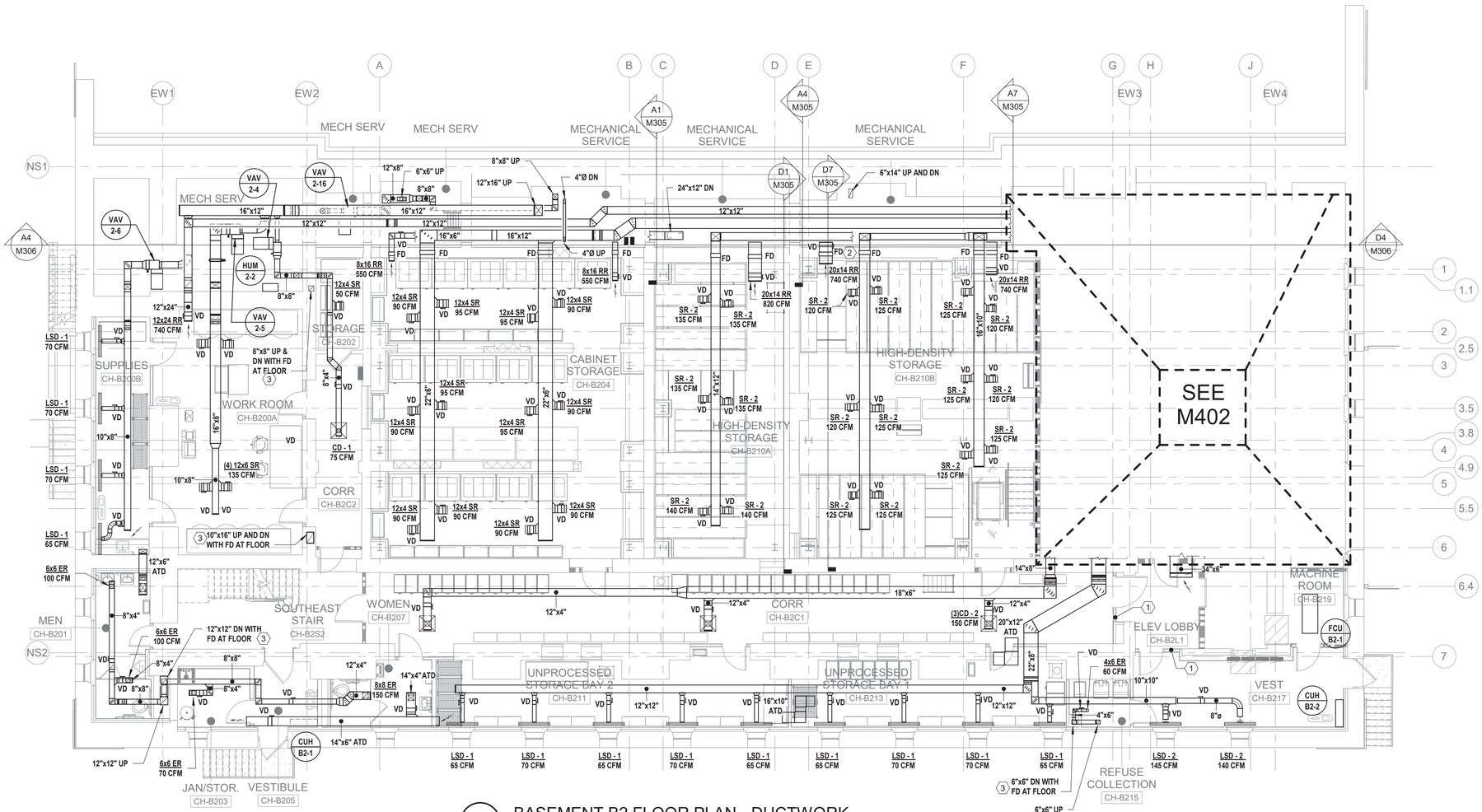
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

BASEMENT FLOOR PLAN B3 - PIPING

SHEET ID

MP1B3

RTA SUBMISSION 2/11/2021



C4 BASEMENT B2 FLOOR PLAN - DUCTWORK

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

SHEET NOTES:

(1) RETURN AIR PLENUM PATHWAY. WALL MUST BE OPEN (NO DRYWALL) ABOVE CEILING HEIGHT.

(2) ONE SIDED FIRE DAMPER TO ALLOW AIR DEVICE TO BE FLUSH WITH WALL.

(3) PROVIDE WALL/CEILING ACCESS PANEL ADJACENT TO FIRE DAMPER LOCATION FOR INSPECTION AND SERVICE. COORDINATE WITH ARCHITECTURAL DRAWINGS.

PLAN NORTH

US Army Corps of Engineers ®

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CHECKED BY: WCJ
SUBMITTED BY: SK
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

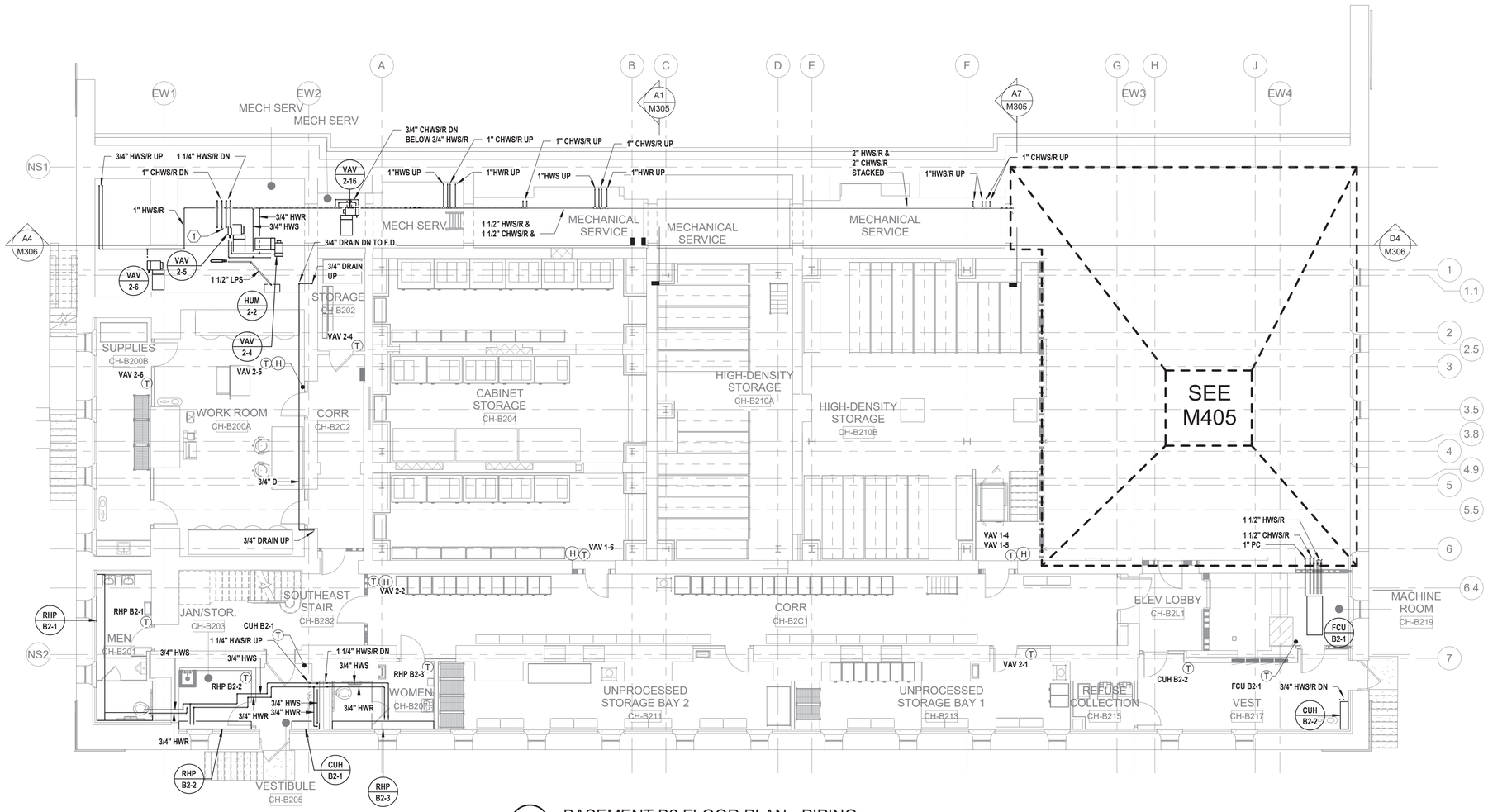
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

BASEMENT FLOOR PLAN B2 - DUCTWORK

SHEET ID

MH1B2

RTA SUBMISSION 2/11/2021



B4 BASEMENT B2 FLOOR PLAN - PIPING

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. CONDUIT ROUTING FOR SPACE SENSORS MUST BE MINIMIZED TO THE FULLEST EXTENT POSSIBLE IN DESIGNATED HISTORIC AREAS AS INDICATED ON THE ARCHITECTURAL DRAWING A-005. CONDUIT MUST BE ROUTED HORIZONTALLY THROUGH THE LEVEL BELOW HISTORIC AREAS TO SERVE DEVICES WITHIN THOSE SPACES. WHENEVER POSSIBLE, RUN CONDUIT HORIZONTALLY ALONG BASEBOARDS, AND VERTICALLY ALONG ARCHITECTURAL FEATURES LIKE PILASTERS OR DOOR FRAMES. CONDUIT MUST BE CONCEALED AND PAINTED TO MATCH SURROUNDING. CONTRACTOR MUST SUBMIT COORDINATED DRAWINGS AS SPECIFIED IN 013000 FOR APPROVAL PRIOR TO ROUGH-IN. REFER TO ARCHITECTURAL DRAWING A-005 FOR ADDITIONAL CONDUIT ROUTING REQUIREMENTS.
2. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL ES/S-504 AND RELATED SPECIFICATIONS.

SHEET NOTES:

(1) 1" CHWS/R UP & 1 1/4"HWS/R UP

PLAN NORTH

8 4 0 8 16

SCALE: 1/8"=1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494
SUBMITTED BY:
SIZE: ANSI D

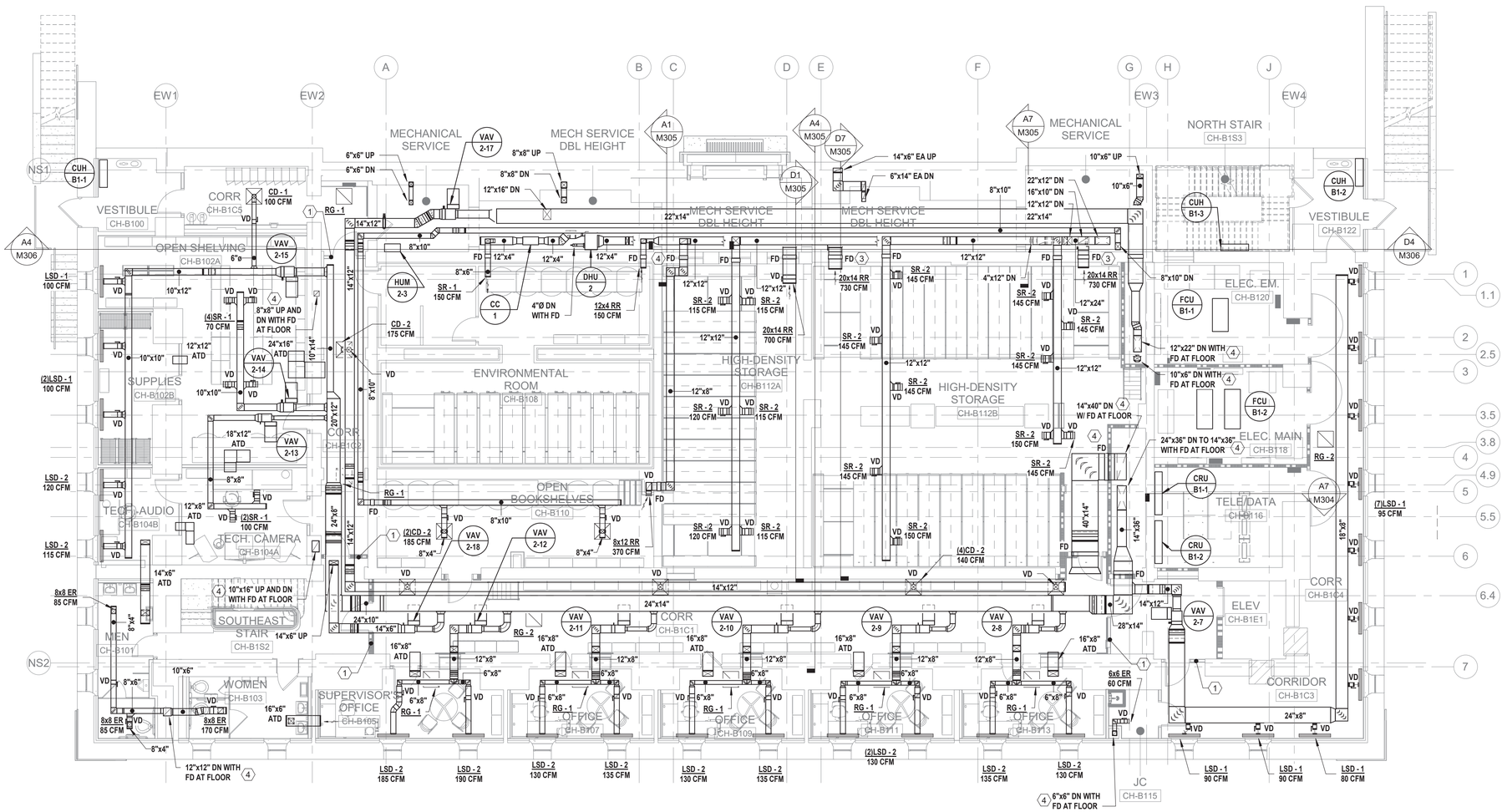
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

BASEMENT FLOOR PLAN B2 - PIPING

SHEET ID

MP1B2

RTA SUBMISSION 2/11/2021



C4 BASEMENT B1 FLOOR PLAN - DUCTWORK

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

SHEET NOTES:

1. RETURN AIR PLENUM PATHWAY. WALL MUST BE OPEN (NO DRYWALL) ABOVE CEILING HEIGHT.
2. FIRE DAMPER IN 22"x14" AND 10"x6" SUPPLY DUCTS
3. ONE SIDED FIRE DAMPER TO ALLOW AIR DEVICE TO BE FLUSH WITH WALL.
4. PROVIDE WALL/CEILING ACCESS PANEL ADJACENT TO FIRE DAMPER LOCATION FOR INSPECTION AND SERVICE. COORDINATE WITH ARCHITECTURAL DRAWINGS.

PLAN NORTH

8 4 0 8 16

SCALE: 1/8"=1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WMF
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

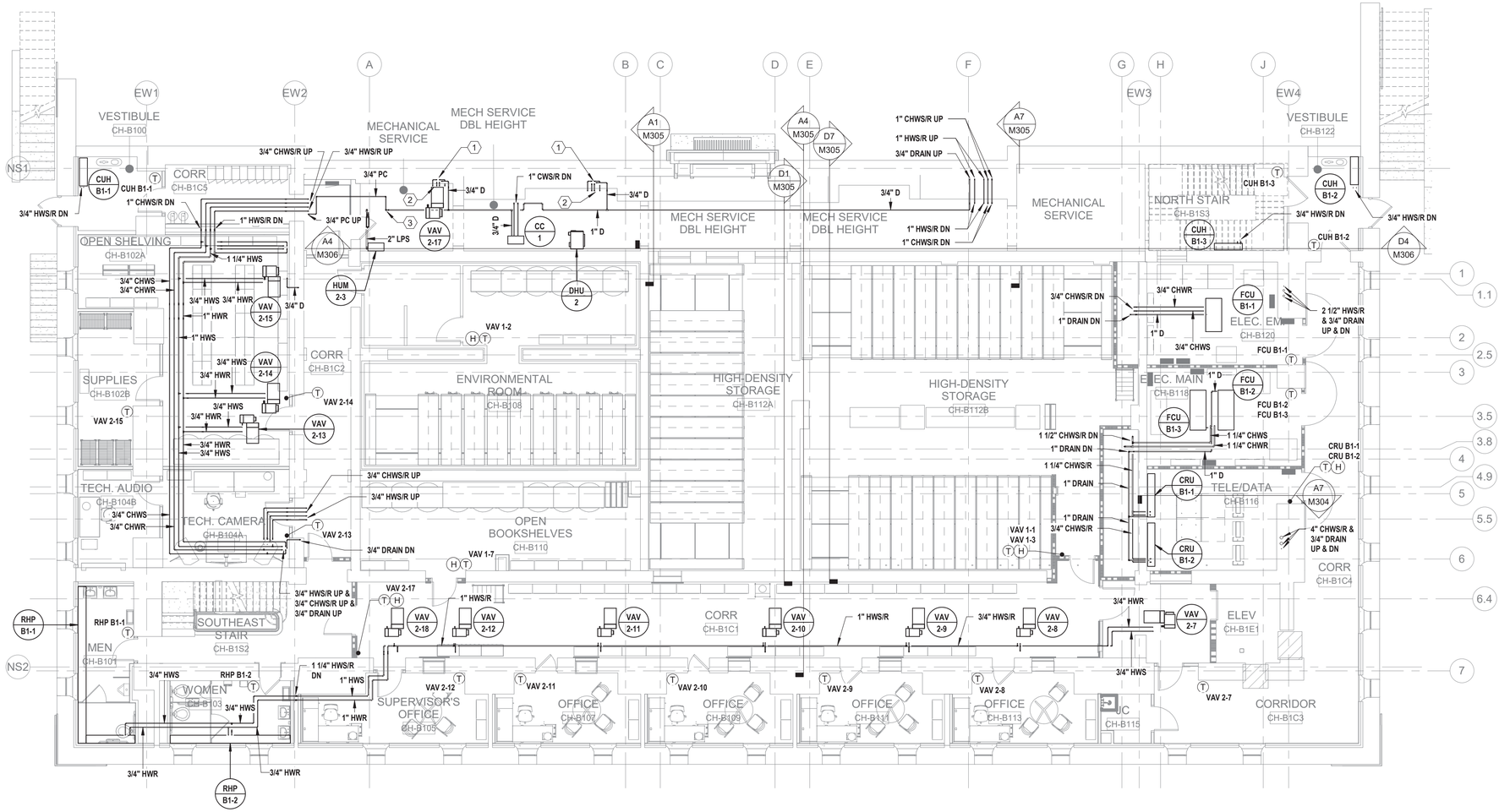
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

BASEMENT FLOOR PLAN B1 - DUCTWORK

SHEET ID

MH1B1

RTA SUBMISSION 2/11/2021



B4 BASEMENT B1 FLOOR PLAN - PIPING

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. CONDUIT ROUTING FOR SPACE SENSORS MUST BE MINIMIZED TO THE FULLEST EXTENT POSSIBLE IN DESIGNATED HISTORIC AREAS AS INDICATED ON THE ARCHITECTURAL DRAWING A-005. CONDUIT MUST BE ROUTED HORIZONTALLY THROUGH THE LEVEL BELOW HISTORIC AREAS TO SERVE DEVICES WITHIN THOSE SPACES. WHENEVER POSSIBLE, RUN CONDUIT HORIZONTALLY ALONG BASEBOARDS, AND VERTICALLY ALONG ARCHITECTURAL FEATURES LIKE PILASTERS OR DOOR FRAMES. CONDUIT MUST BE CONCEALED AND PAINTED TO MATCH SURROUNDING. CONTRACTOR MUST SUBMIT COORDINATED DRAWINGS AS SPECIFIED IN 013000 FOR APPROVAL PRIOR TO ROUGH-IN. REFER TO ARCHITECTURAL DRAWING A-005 FOR ADDITIONAL CONDUIT ROUTING REQUIREMENTS.
2. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

SHEET NOTES:

1. 1" HWS/R UP & 1" CHWS/R UP & 3/4" DRAIN UP
2. 1" HWS/R DN & 1" CHWS/R DN & 3/4" DRAIN DN
3. 1" CONDENSATE DRAIN DOWN TO FLOOR DRAIN

SCALE: 1/8"=1'-0"

PLAN NORTH

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

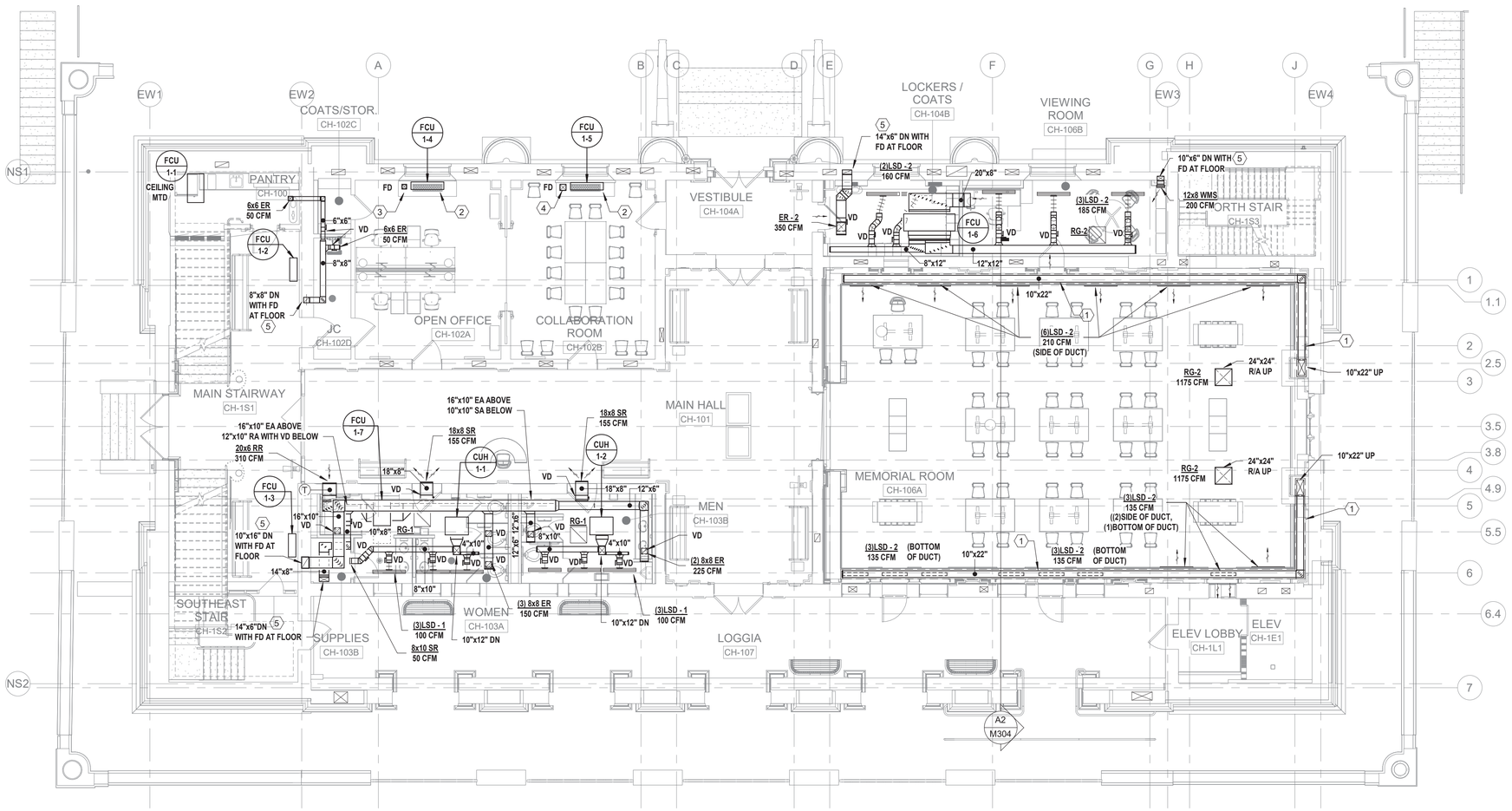
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

BASEMENT FLOOR PLAN B1 - PIPING

SHEET ID

MP1B1

RTA SUBMISSION 2/11/2021



B4 FIRST FLOOR PLAN - DUCTWORK

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION, UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

SHEET NOTES:

1. 10x22 SUPPLY DUCT CONCEALED BY CASEWORK OR ARCHITECTURAL FEATURE. COORDINATE LSD LOCATIONS WITH ARCHITECTURAL ROUTING LOCATIONS.
2. ARCHITECTURAL ENCLOSURE TO CONCEAL FCU, ASSOCIATED PIPING, AND FIRE DAMPER. ENCLOSURE HALL HAVE REMOVABLE FRONT PANEL FOR FCU AND FIRE DAMPER ACCESS AND SERVICE. SEE ARCHITECTURAL DRAWING A-593.
3. TERMINATE 6"x6" SUPPLY AIR DUCT WITH WMS 6" AFF WITHIN ENCLOSURE. BALANCE TO 100 CFM.
4. TERMINATE 8"x8" SUPPLY AIR DUCT WITH WMS 6" AFF WITNIN ENCLOSURE. BALANCE TO 200 CFM.
5. PROVIDE WALL/CEILING ACCESS PANEL ADJACENT TO FIRE DAMPER LOCATION FOR INSPECTION AND SERVICE. COORDINATE WITH ARCHITECTURAL DRAWINGS.

PLAN NORTH

8 4 0 8 16

SCALE: 1/8"=1'-0"

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MARK	DESCRIPTION	DATE

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SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494
SIZE: ANSI D

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY:

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

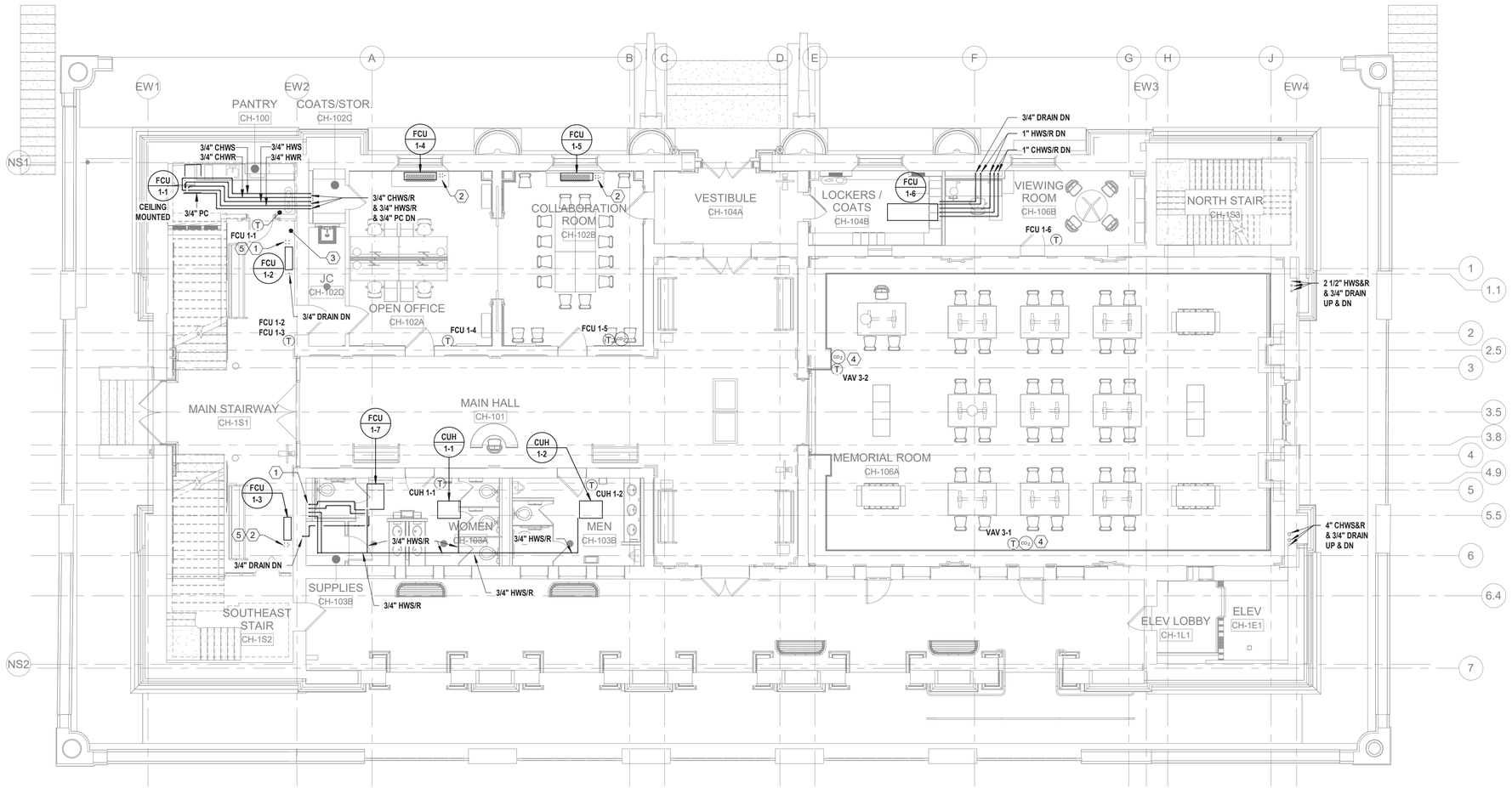
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

FIRST FLOOR PLAN - DUCTWORK

SHEET ID

MH110

RTA SUBMISSION 2/11/2021



B4 FIRST FLOOR PLAN - PIPING

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. CONDUIT ROUTING FOR SPACE SENSORS MUST BE MINIMIZED TO THE FULLEST EXTENT POSSIBLE IN DESIGNATED HISTORIC AREAS AS INDICATED ON THE ARCHITECTURAL DRAWING A-005. CONDUIT MUST BE ROUTED HORIZONTALLY THROUGH THE LEVEL BELOW HISTORIC AREAS TO SERVE DEVICES WITHIN THOSE SPACES. WHENEVER POSSIBLE, RUN CONDUIT HORIZONTALLY ALONG BASEBOARDS, AND VERTICALLY ALONG ARCHITECTURAL FEATURES LIKE PILASTERS OR DOOR FRAMES. CONDUIT MUST BE CONCEALED AND PAINTED TO MATCH SURROUNDING. CONTRACTOR MUST SUBMIT COORDINATED DRAWINGS AS SPECIFIED IN 013000 FOR APPROVAL PRIOR TO ROUGH-IN. REFER TO ARCHITECTURAL DRAWING A-005 FOR ADDITIONAL CONDUIT ROUTING REQUIREMENTS.
2. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

SHEET NOTES:

1. 3/4" CHWS/R & 3/4" HWS/R DN
2. 3/4" CHWS/R & 3/4" HWS/R & 3/4" DRAIN DN
3. ATFP EMERGENCY SHUTDOWN PUSH BUTTON LOCATED WITHIN MASS NOTIFICATION PANEL.
4. COMBINATION TEMPERATURE AND CARBON DIOXIDE SENSOR. LOCATION TO BE COORDINATED WITH EXISTING MEMORIAL ITEMS ON WALL. PROVIDE SHOP DRAWINGS PRIOR TO INSTALLATION FOR GOVERNMENT (COR) REVIEW.
5. ALL PIPING, POWER AND CONTROLS CONDUIT MUST BE CONCEALED IN FCU ENCLOSURE.

8 4 0 8 16
SCALE: 1/8"=1'-0"

PLAN NORTH

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

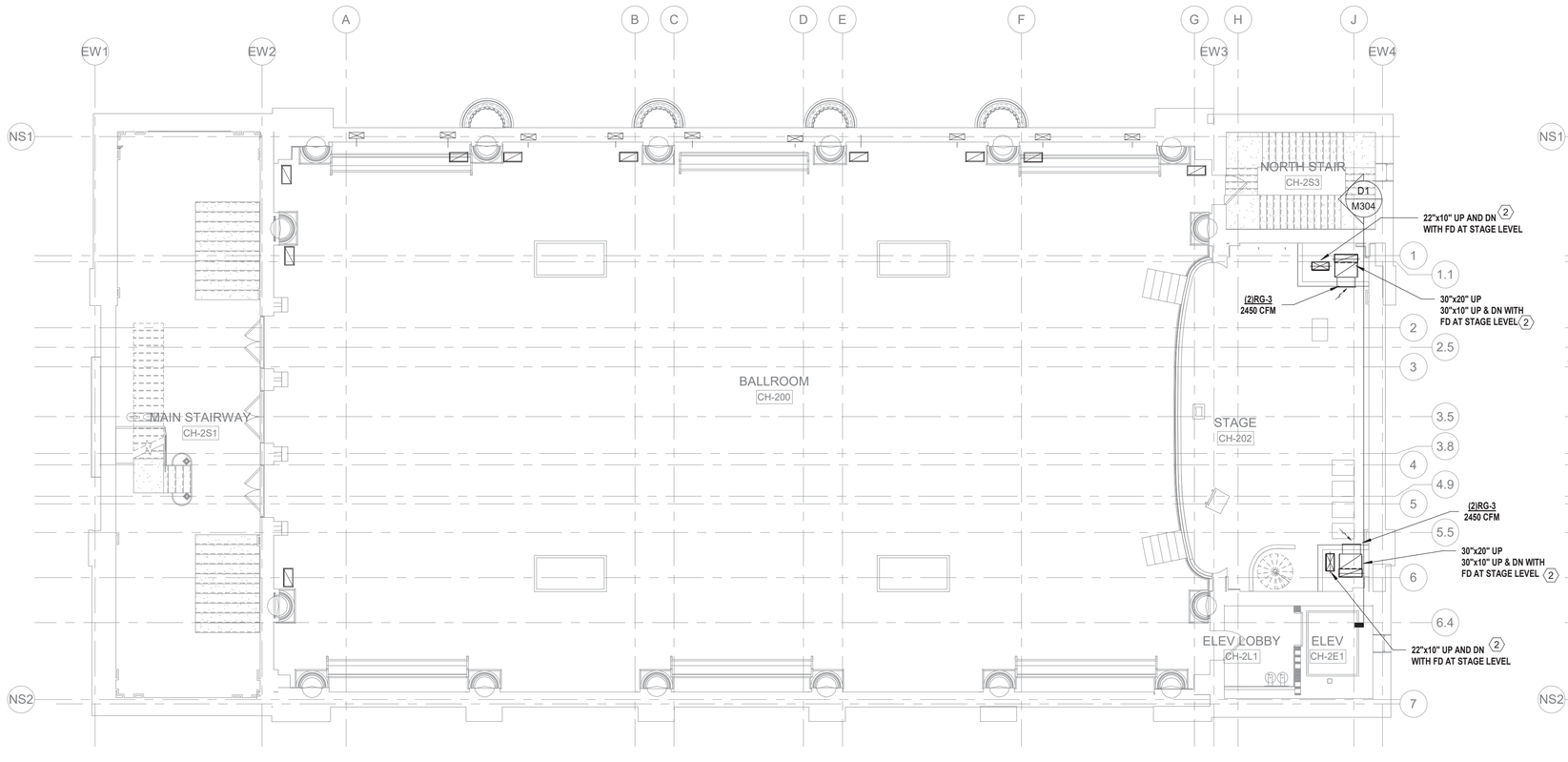
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

FIRST FLOOR PLAN - PIPING

SHEET ID

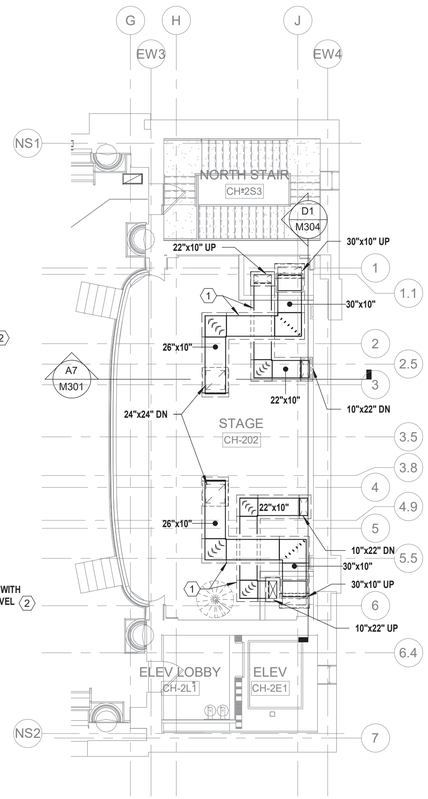
MP110

RTA SUBMISSION 2/11/2021



B3 SECOND FLOOR PLAN - DUCTWORK ABOVE STAGE

SCALE: 1/8" = 1'-0"



B8 SECOND FLOOR PLAN - DUCTWORK BELOW STAGE

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

SHEET NOTES:

(1) ALL DUCTWORK BELOW STAGE MUST BE FIREWRAPPED.

(2) PROVIDE WALL/CEILING ACCESS PANEL ADJACENT TO FIRE DAMPER LOCATION FOR INSPECTION AND SERVICE. COORDINATE WITH ARCHITECTURAL DRAWINGS.

PLAN NORTH

8 4 0 8 16

SCALE: 1/8"=1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY: SK
SIZE: ANSI D

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

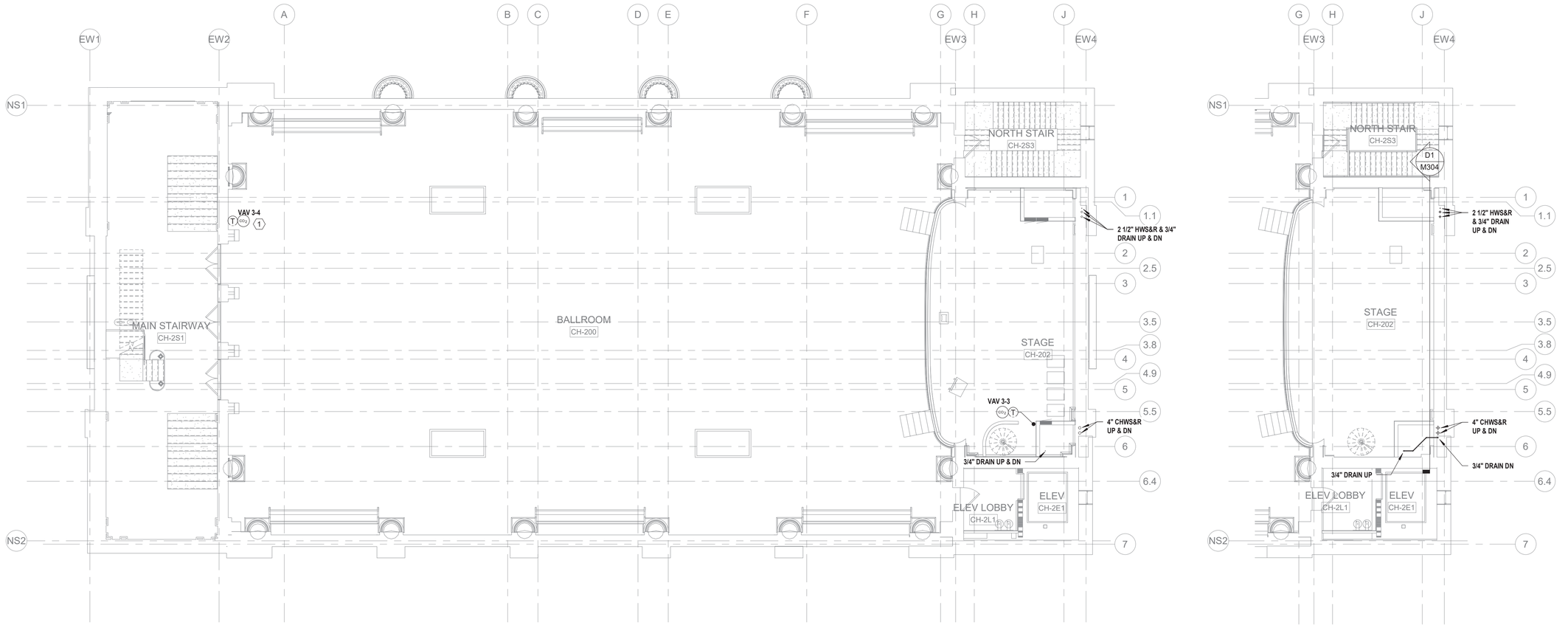
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

SECOND FLOOR PLAN - DUCTWORK

SHEET ID

MH120

RTA SUBMISSION 2/11/2021



B4 SECOND FLOOR PLAN - PIPING ABOVE STAGE

SCALE: 1/8" = 1'-0"

B8 SECOND FLOOR PLAN - PIPING BELOW STAGE

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. CONDUIT ROUTING FOR SPACE SENSORS MUST BE MINIMIZED TO THE FULLEST EXTENT POSSIBLE IN DESIGNATED HISTORIC AREAS AS INDICATED ON THE ARCHITECTURAL DRAWING A-005. CONDUIT MUST BE ROUTED HORIZONTALLY THROUGH THE LEVEL BELOW HISTORIC AREAS TO SERVE DEVICES WITHIN THOSE SPACES. WHENEVER POSSIBLE, RUN CONDUIT HORIZONTALLY ALONG BASEBOARDS, AND VERTICALLY ALONG ARCHITECTURAL FEATURES LIKE PILASTERS OR DOOR FRAMES. CONDUIT MUST BE CONCEALED AND PAINTED TO MATCH SURROUNDING. CONTRACTOR MUST SUBMIT COORDINATED DRAWINGS AS SPECIFIED IN 013000 FOR APPROVAL PRIOR TO ROUGH-IN. REFER TO ARCHITECTURAL DRAWING A-005 FOR ADDITIONAL CONDUIT ROUTING REQUIREMENTS.
2. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

SHEET NOTES:

(1) LOCATION TO BE COORDINATED WITH EXISTING MEMORIAL ITEMS ON WALL. PROVIDE SHOP DRAWINGS PRIOR TO INSTALLATION FOR GOVERNMENT (COR) REVIEW.

8 4 0 8 16

SCALE: 1/8"=1'-0"

PLAN NORTH

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE:	2/11/2021
SOLICITATION NO.:	W912DS-19-R-0014
CONTRACT NO.:	W912DS-19-C0031
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DESIGNED BY:	WMF
DRAWN BY:	SCB
CHECKED BY:	WCJ
SUBMITTED BY:	
SIZE:	ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

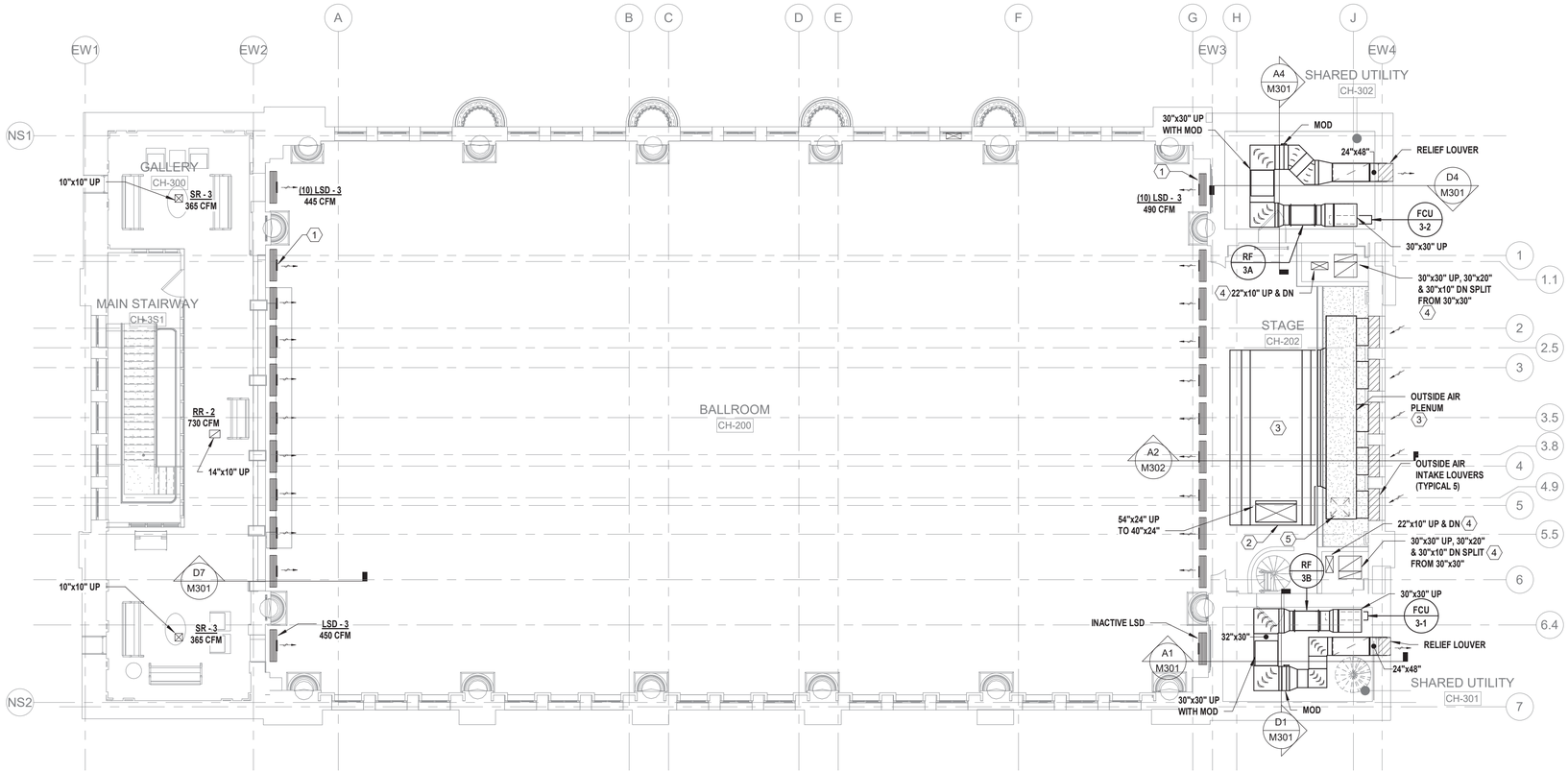
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

SECOND FLOOR PLAN - PIPING

SHEET ID

MP120

RTA SUBMISSION 2/11/2021



B4 THIRD FLOOR PLAN - DUCTWORK

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

SHEET NOTES:

1. LINEAR SLOT DIFFUSERS MOUNTED AT BOTTOM OF THE EXISTING CEILING COVE. MAINTAIN 6" SPACING BETWEEN LSDS.
2. CUSTOM FIELD FABRICATED PLENUM FORMED AROUND STRUCTURAL FRAMING.
3. PROVIDE ACOUSTICAL BARRIER WRAP AROUND ALL OUTSIDE AIR DUCTWORK AND PLENUMS, FROM THE OUTSIDE AIR LOUVERS TO THE AHU-3 INLET.
4. PROVIDE ACOUSTICAL BARRIER WRAP ON SUPPLY AND RETURN AIR RISERS.
5. SHEET METAL ACCESS DOOR BELOW STRUCTURAL FLOOR HATCH. MATCH DIMENSIONS AND LOCATION.

8 4 0 8 16

SCALE: 1/8"=1'-0"

PLAN NORTH

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
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DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY: SCB
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

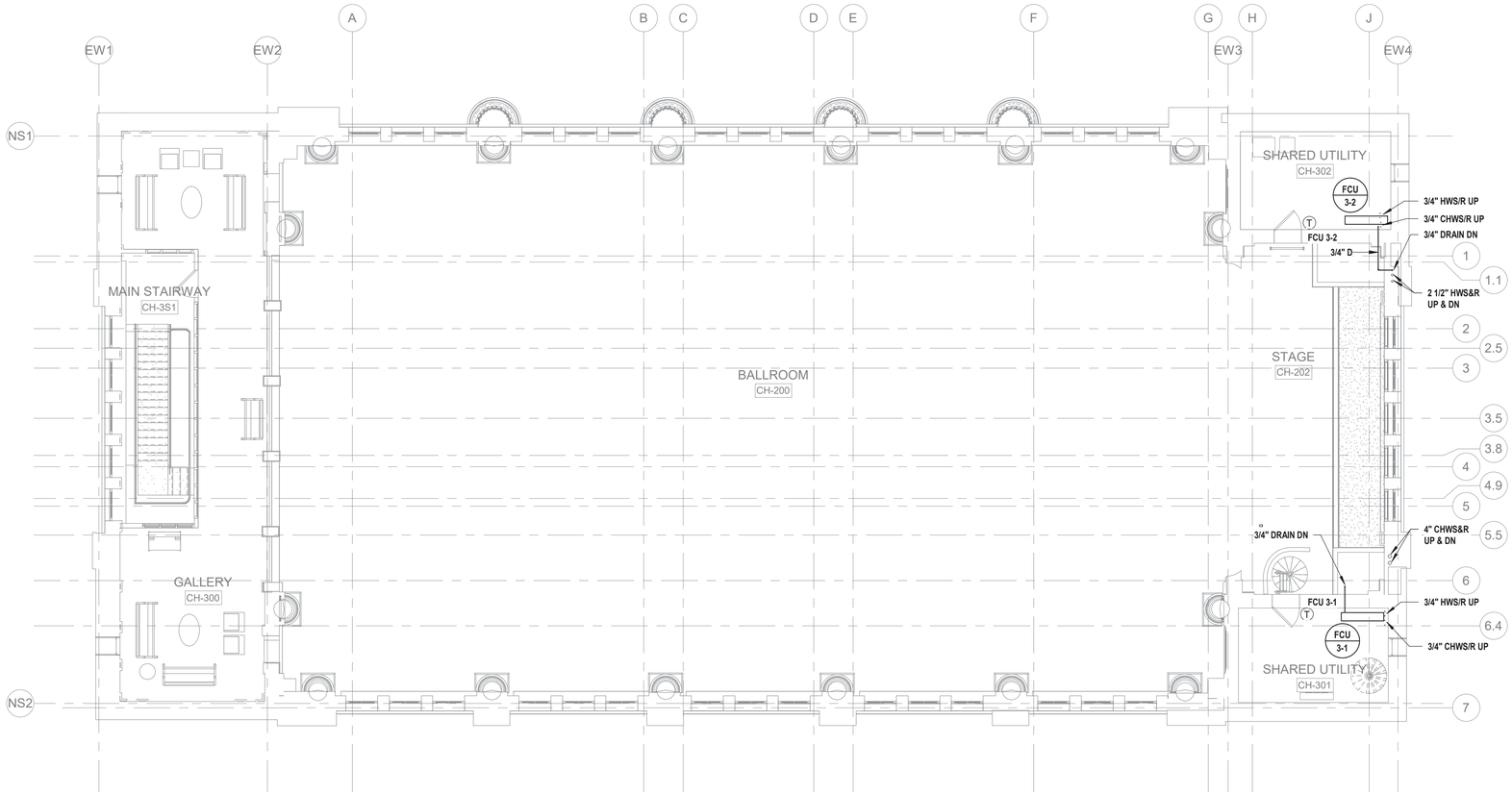
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

THIRD FLOOR PLAN - DUCTWORK

SHEET ID

MH130

RTA SUBMISSION 2/11/2021



B4 THIRD FLOOR PLAN - PIPING

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. CONDUIT ROUTING FOR SPACE SENSORS MUST BE MINIMIZED TO THE FULLEST EXTENT POSSIBLE IN DESIGNATED HISTORIC AREAS AS INDICATED ON THE ARCHITECTURAL DRAWING A-005. CONDUIT MUST BE ROUTED HORIZONTALLY THROUGH THE LEVEL BELOW HISTORIC AREAS TO SERVE DEVICES WITHIN THOSE SPACES. WHENEVER POSSIBLE, RUN CONDUIT HORIZONTALLY ALONG BASEBOARDS, AND VERTICALLY ALONG ARCHITECTURAL FEATURES LIKE PILASTERS OR DOOR FRAMES. CONDUIT MUST BE CONCEALED AND PAINTED TO MATCH SURROUNDING. CONTRACTOR MUST SUBMIT COORDINATED DRAWINGS AS SPECIFIED IN 013000 FOR APPROVAL PRIOR TO ROUGH-IN. REFER TO ARCHITECTURAL DRAWING A-005 FOR ADDITIONAL CONDUIT ROUTING REQUIREMENTS.
2. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

8 4 0 8 16

SCALE: 1/8"=1'-0"

PLAN NORTH

US Army Corps of Engineers ®

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SUBMITTED BY:	
SIZE:	ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

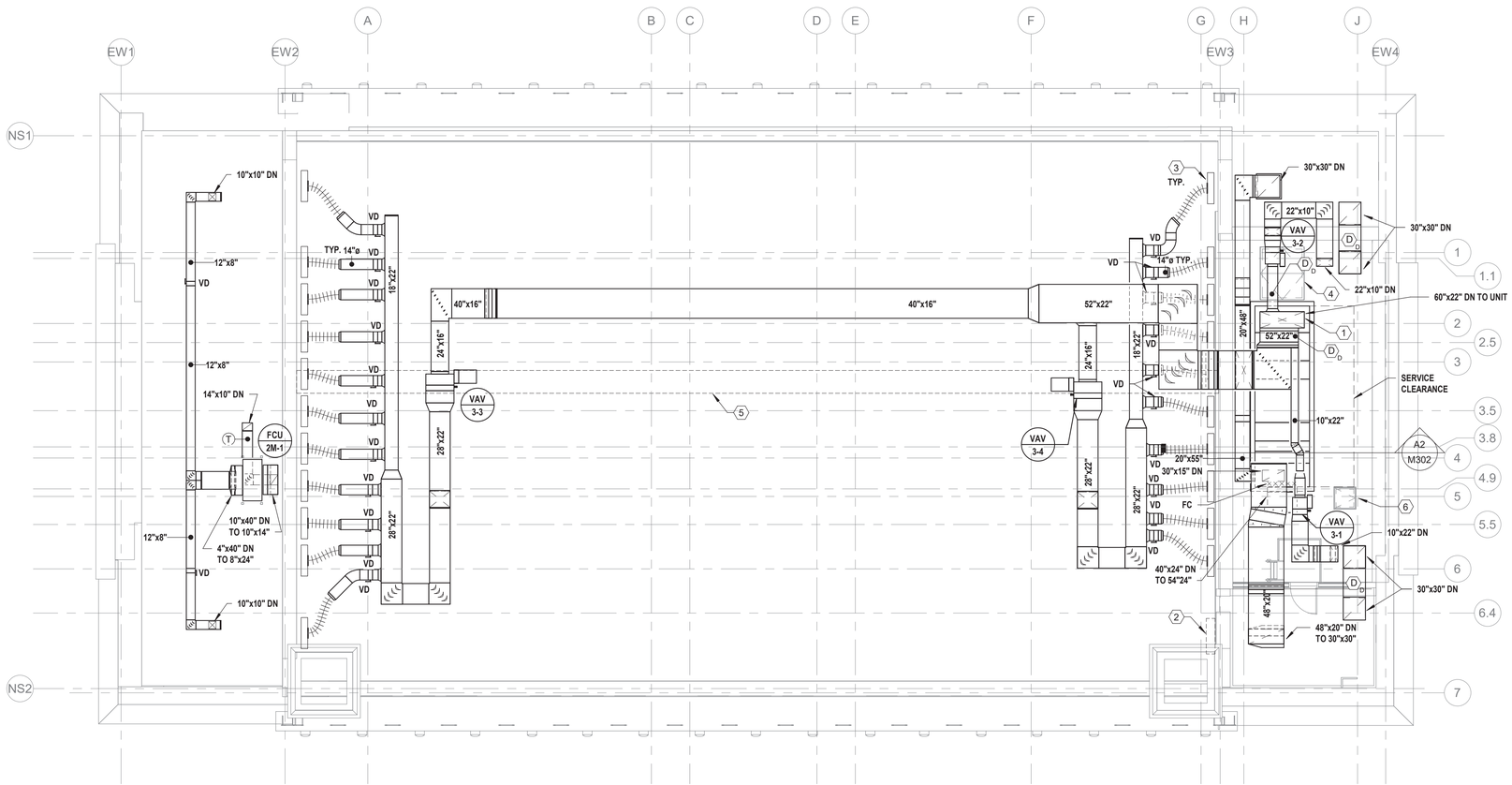
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

THIRD FLOOR PLAN - PIPING

SHEET ID

MP130

RTA SUBMISSION 2/11/2021



B4 ATTIC FLOOR PLAN - DUCTWORK

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

SHEET NOTES:

(1) ALL SUPPLY AIR DUCTWORK FROM THE AHU-3 SUPPLY AIR DISCHARGE OPENING TO A DISTANCE 10'-0" DOWNSTREAM OF ALL SYSTEM VAV BOXES MUST BE DOUBLE-WALL DUCTWORK WITH A PERFORATED INNER WALL

(2) INACTIVE LSD. NO PLENUM REQUIRED.

(3) REFER TO M300 SERIES FOR LSD MOUNTED IN ALCOVE DETAIL.

(4) FLOOR HATCH (4'-0" x 5'-0") FOR FUTURE EQUIPMENT REPLACEMENT. REFER TO STRUCTURAL DRAWING S-130.

(5) EXISTING WOODEN WALKWAY APPROXIMATE WIDTH AND LOCATION.

(6) STRUCTURAL FLOOR HATCH ABOVE SHEET METAL ACCESS DOOR.

PLAN NORTH

8 4 0 8 16

SCALE: 1/8"=1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY: SK
SIZE: ANSI D

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

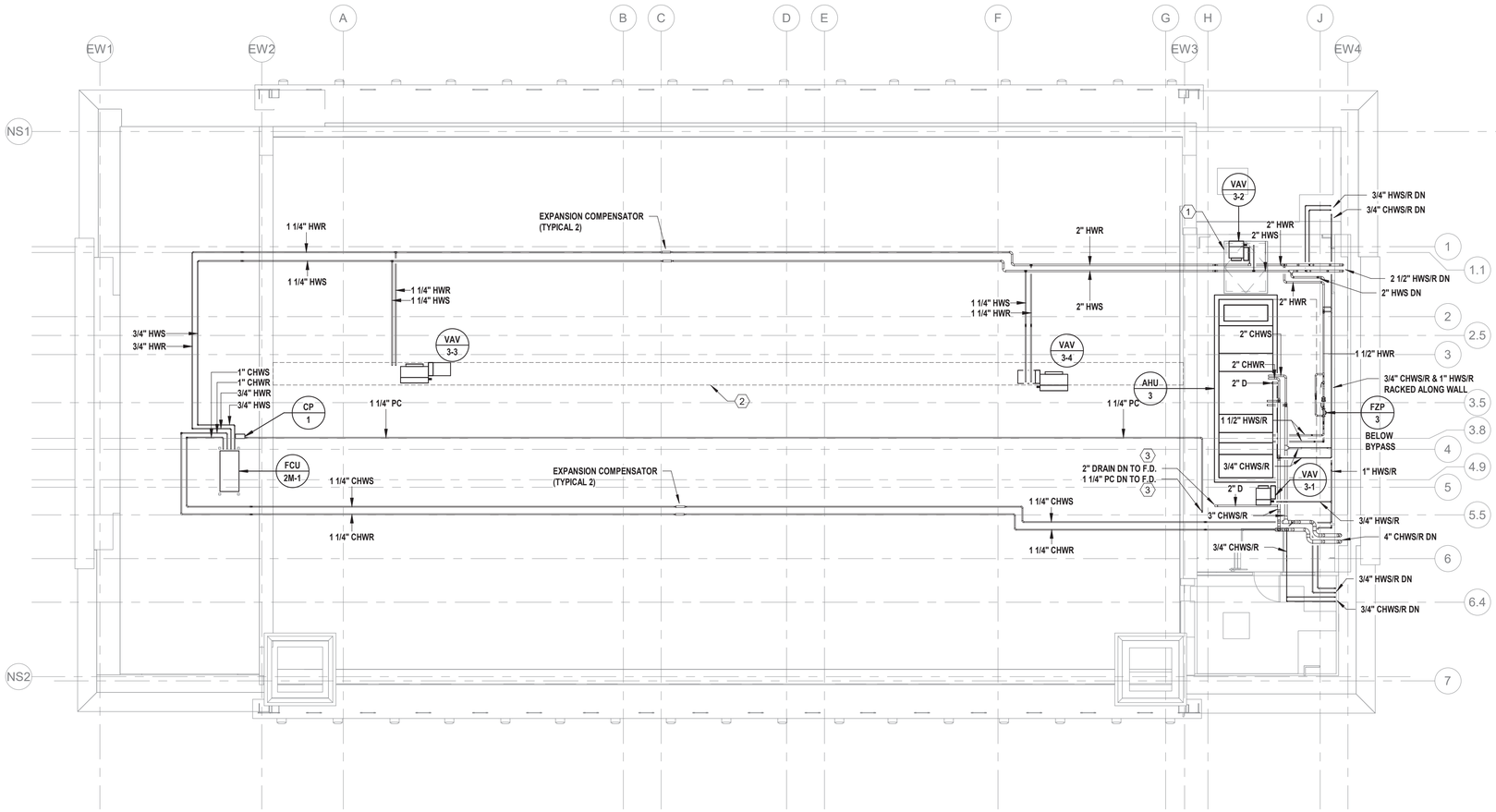
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

ATTIC PLAN - DUCTWORK

SHEET ID

MH140

RTA SUBMISSION 2/11/2021



B4 ATTIC FLOOR PLAN - PIPING

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

SHEET NOTES:

(1) FLOOR HATCH (4'-0" x 5'-0") FOR FUTURE EQUIPMENT REPLACEMENT. REFER TO STRUCTURAL DRAWING S-130.

(2) EXISTING WOODEN WALKWAY APPROXIMATE WIDTH AND LOCATION.

(3) SEE PLUMBING DRAWINGS FOR DRAIN LOCATION

PLAN NORTH

8 4 0 8 16

SCALE: 1/8"=1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY: SK
SIZE: ANSI D
ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

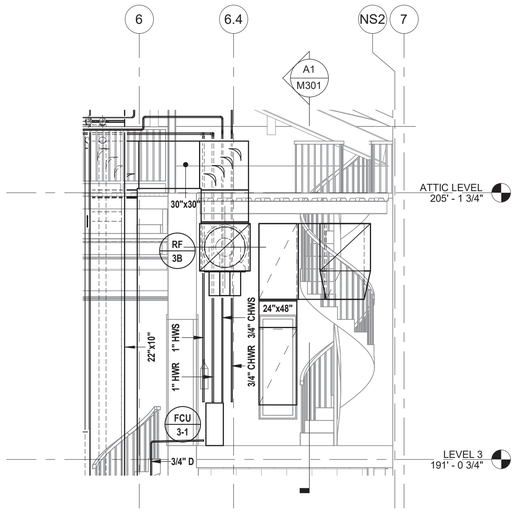
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

ATTIC PLAN - PIPING

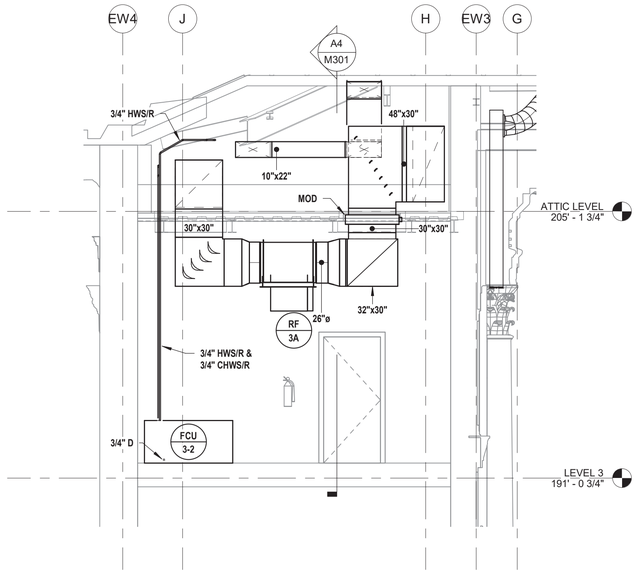
SHEET ID

MP140

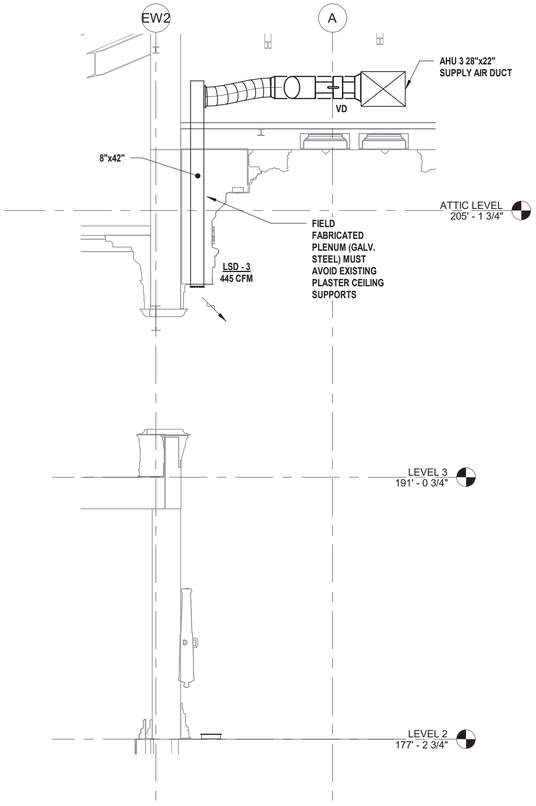
RTA SUBMISSION 2/11/2021



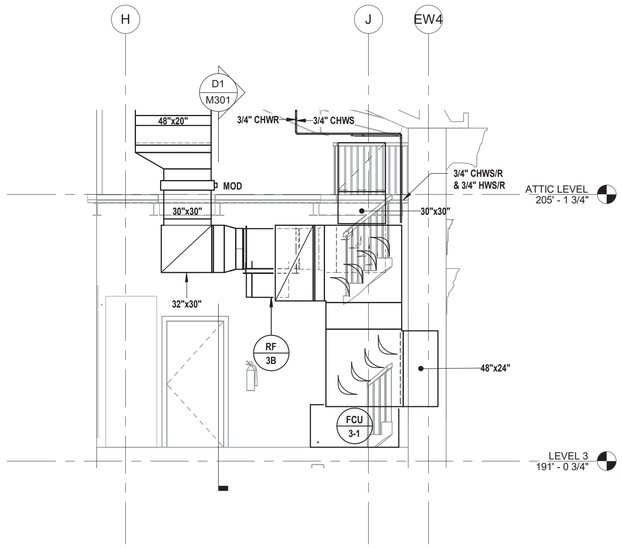
D1 CH-301 SHARED UTILITY NORTH VIEW
SCALE: 1/4" = 1'-0"



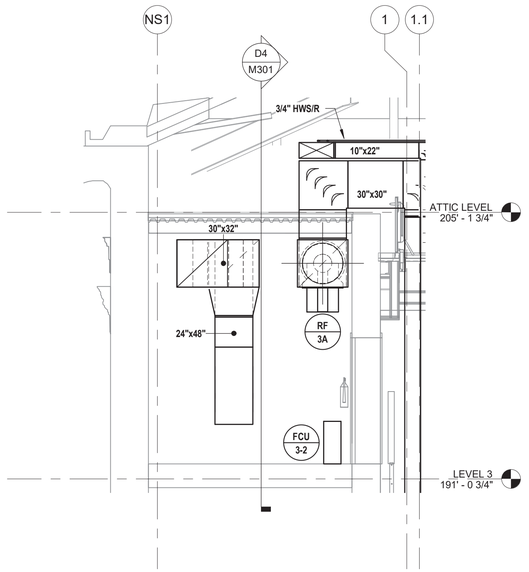
D4 CH-302 SHARED UTILITY EAST VIEW
SCALE: 1/4" = 1'-0"



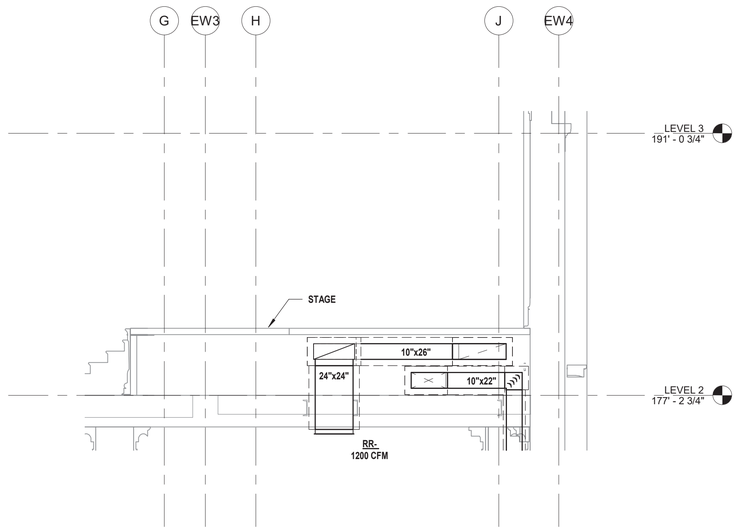
D7 LINEAR SLOT DIFFUSER COVE
SCALE: 1/4" = 1'-0"



A1 CH-301 SHARED UTILITY WEST VIEW
SCALE: 1/4" = 1'-0"



A4 CH-302 SHARED UTILITY NORTH VIEW
SCALE: 1/4" = 1'-0"



A7 UNDER STAGE WEST VIEW
SCALE: 1/4" = 1'-0"

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MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

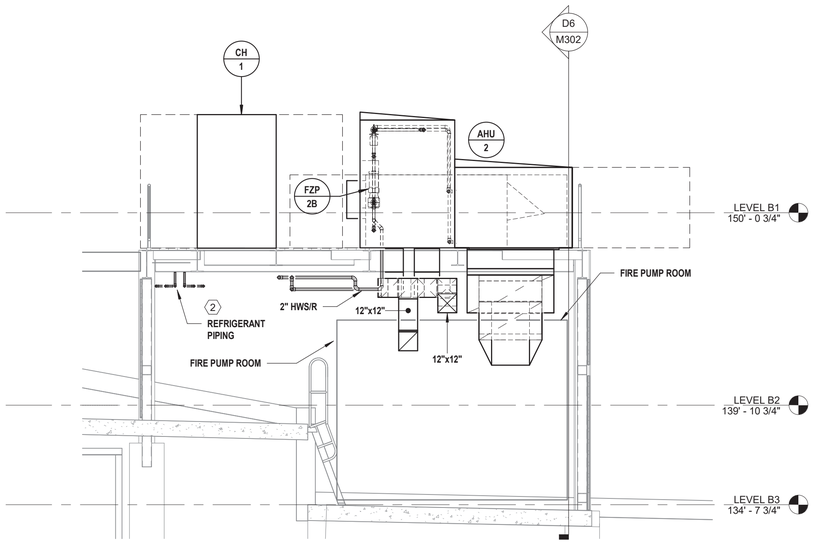
SECTIONS - HVAC

SHEET ID
M301

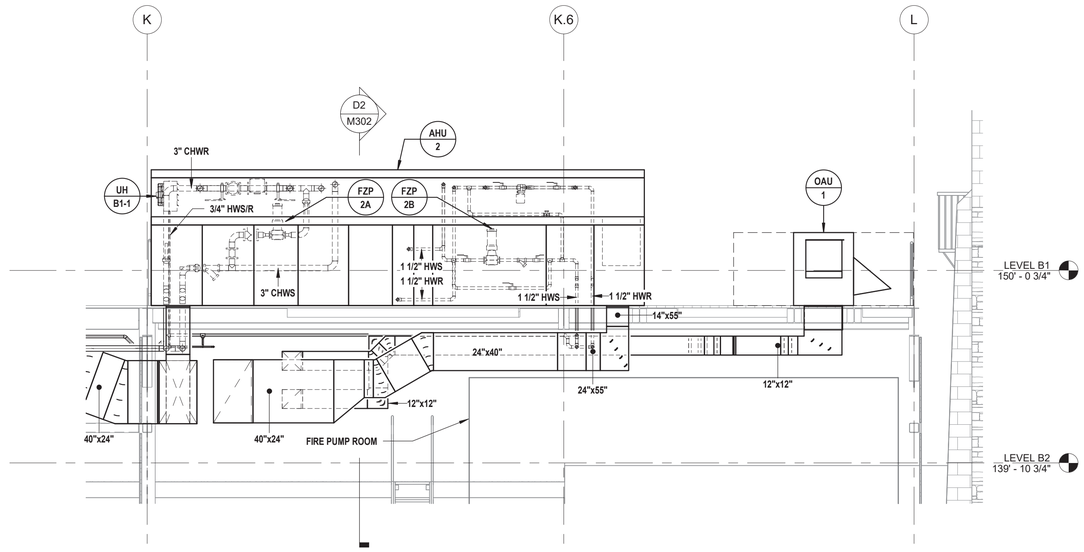
RTA SUBMISSION 2/11/2021

SHEET NOTES:

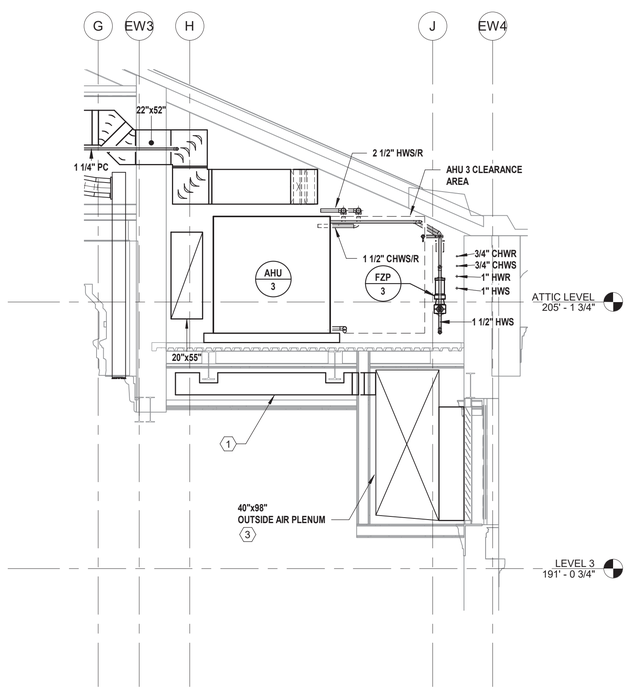
1. CUSTOM FIELD FABRICATED PLENUM FORMED AROUND STRUCTURAL FRAMING.
2. SUGGESTED PATHWAY FOR COLD BOX MANUFACTURER'S REFRIGERANT PIPING.
3. OUTSIDE AIR PLENUM MUST BE PITCHED TOWARDS THE LOUVERS FOR CARRYOVER WATER TO DRAIN.



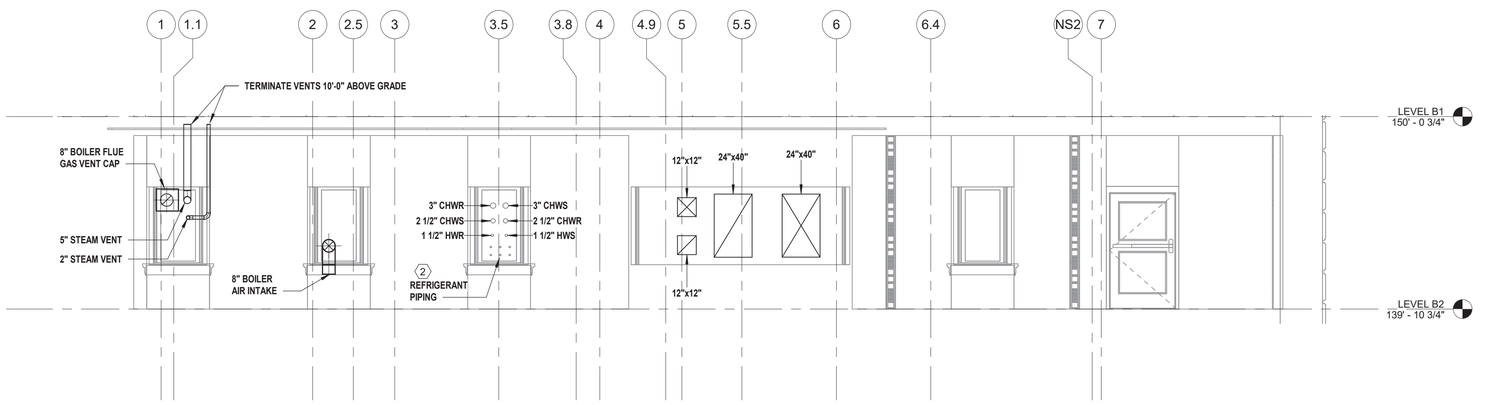
D2 SERVICE YARD NORTH VIEW
SCALE: 1/4" = 1'-0"



D6 SERVICE YARD WEST VIEW
SCALE: 1/4" = 1'-0"



A2 AHU 3 WEST VIEW
SCALE: 1/4" = 1'-0"



A6 LEVEL B2 MECHANICAL WALL PENETRATIONS
SCALE: 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

SECTIONS - HVAC

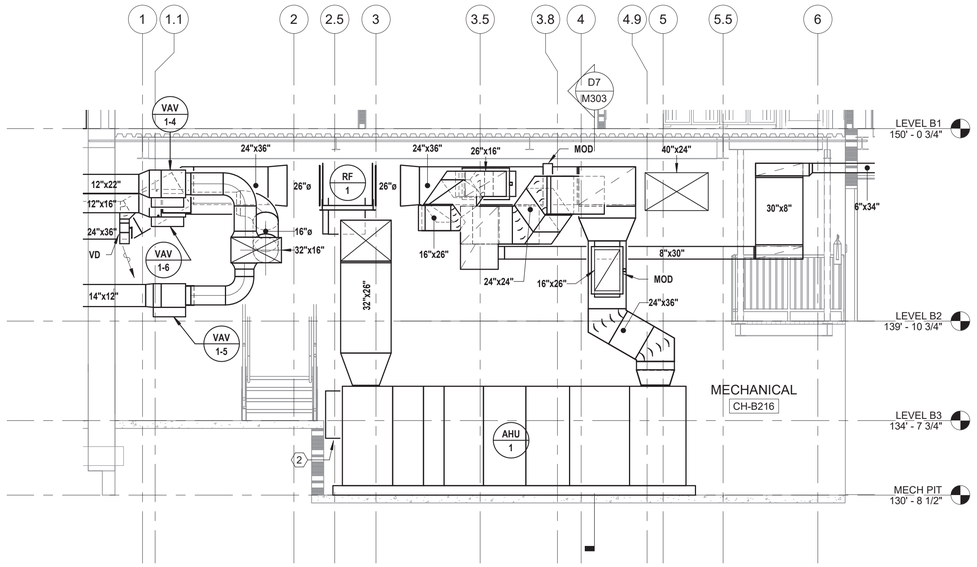
SHEET ID

M302

RTA SUBMISSION 2/11/2021

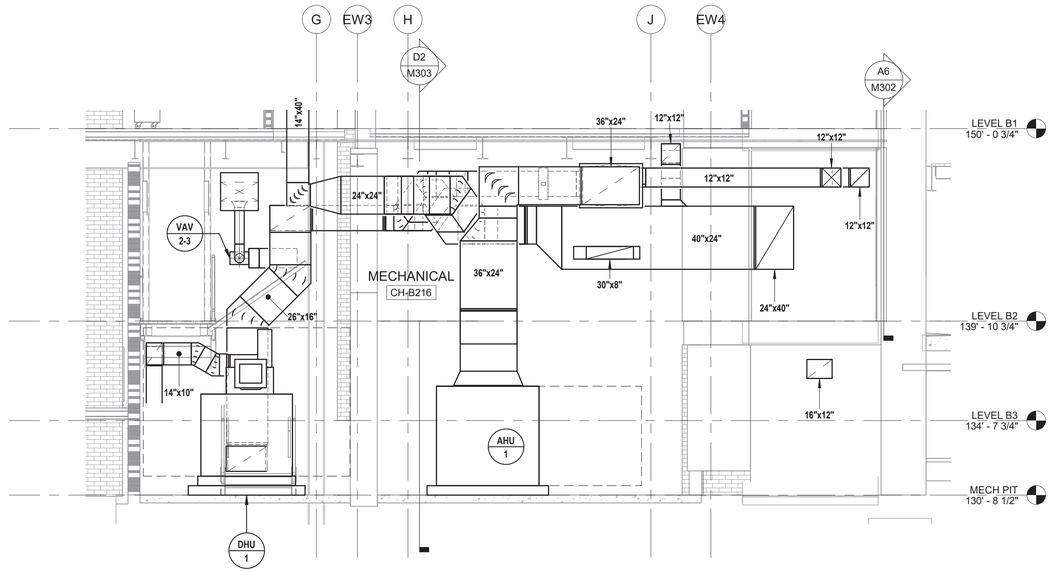
SHEET NOTES:

1. REFRIGERANT PIPING BY COLDBOX MANUFACTURER. SUGGESTED PIPING PATH INTO BUILDING.
2. UNISTRUT MOUNTED BAS PANEL (JACE) INTERFACE.



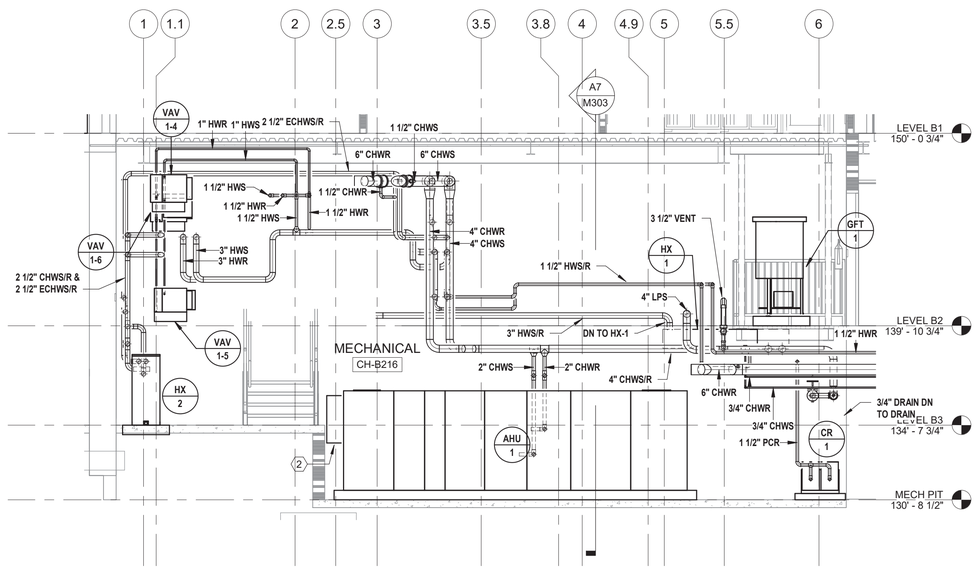
D2 MECHANICAL ROOM NORTH VIEW DUCTWORK

SCALE: 1/4" = 1'-0"



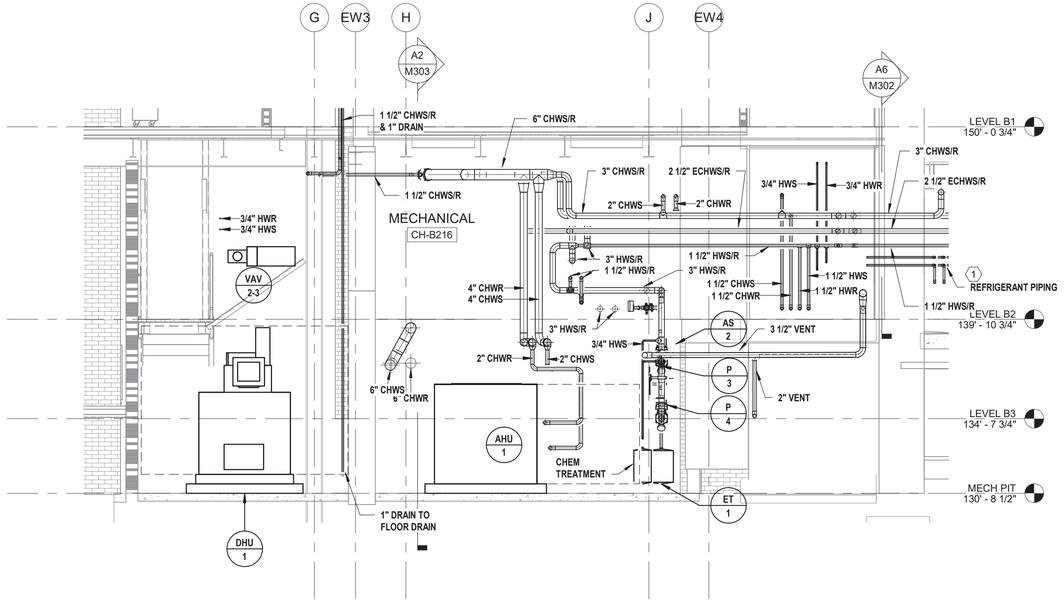
D7 MECHANICAL ROOM WEST VIEW DUCTWORK

SCALE: 1/4" = 1'-0"



A2 MECHANICAL ROOM NORTH VIEW PIPING

SCALE: 1/4" = 1'-0"



A7 MECHANICAL ROOM WEST VIEW PIPING

SCALE: 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

SECTIONS - HVAC

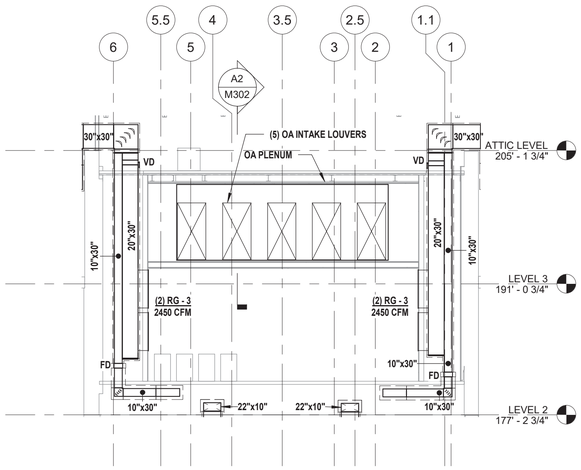
SHEET ID

M303

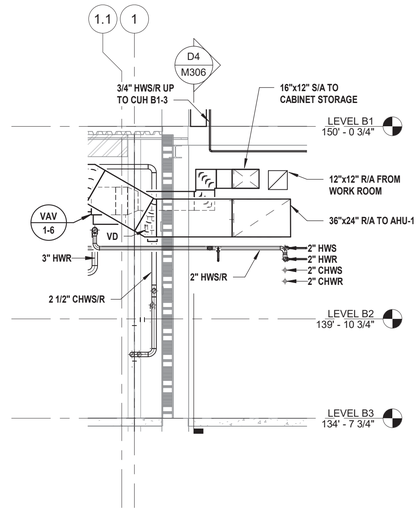
RTA SUBMISSION 2/11/2021

SHEET NOTES:

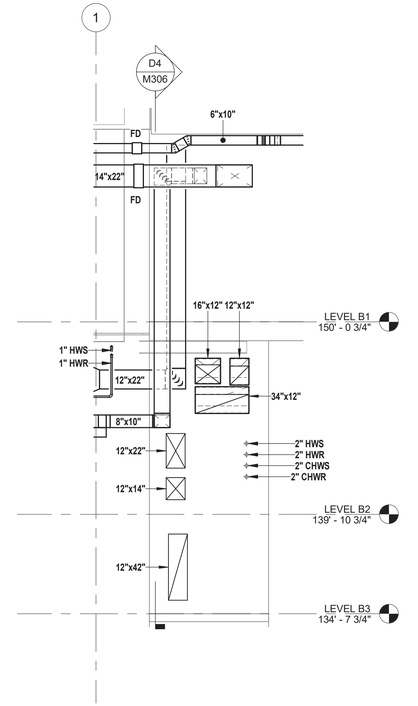
1. 10"x22" SUPPLY DUCT WITHIN ARCHITECTURAL CASEWORK. REFER TO ARCHITECTURAL DRAWINGS A-590 TO A-592.



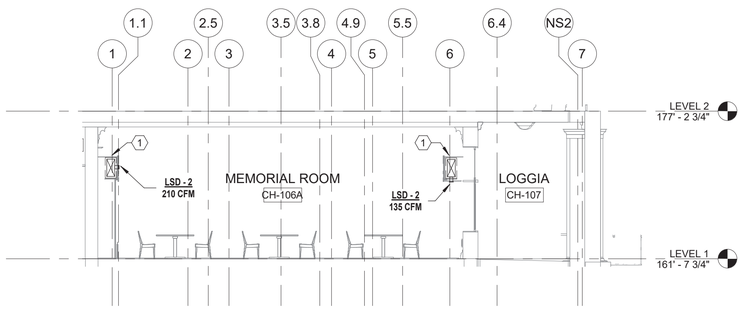
D1 RETURN GRILLES ON STAGE RISERS
SCALE: 1/8" = 1'-0"



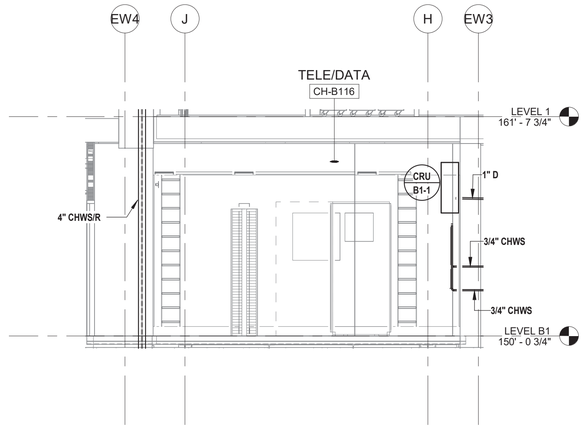
D4 MECHANICAL ROOM EXIT AT COLUMN J - FACING SOUTH
SCALE: 1/4" = 1'-0"



D7 MECHANICAL ROOM EXIT AT COLUMN G - FACING SOUTH
SCALE: 1/4" = 1'-0"



A2 106A MEMORIAL HALL NORTH VIEW
SCALE: 1/8" = 1'-0"



A7 TELE/DATA CH-B116 - EAST VIEW
SCALE: 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY: BE
SIZE: ANSI D
ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

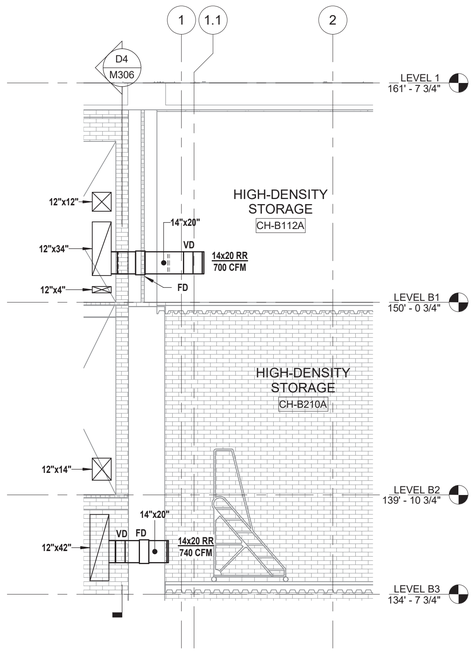
JACOBS / EWING COLE A Joint Venture

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

SECTIONS - HVAC

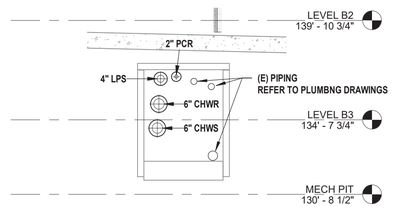
SHEET ID
M304

RTA SUBMISSION 2/11/2021



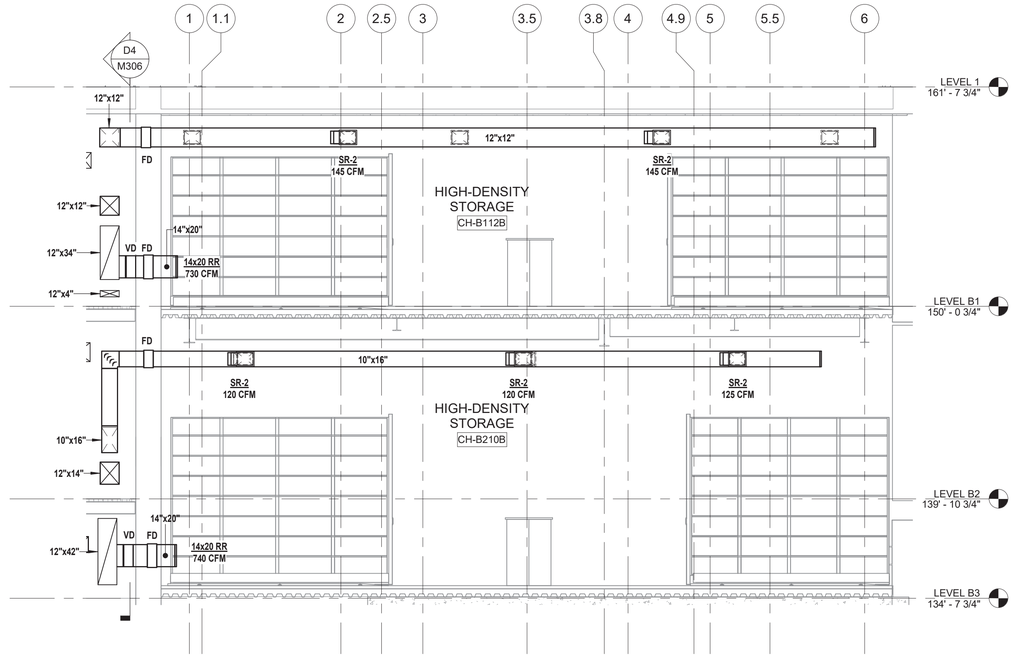
D1 LEVELS B1 & B2 HIGH DENSITY STORAGE ROOMS - LOOKING NORTH

SCALE: 1/4" = 1'-0"



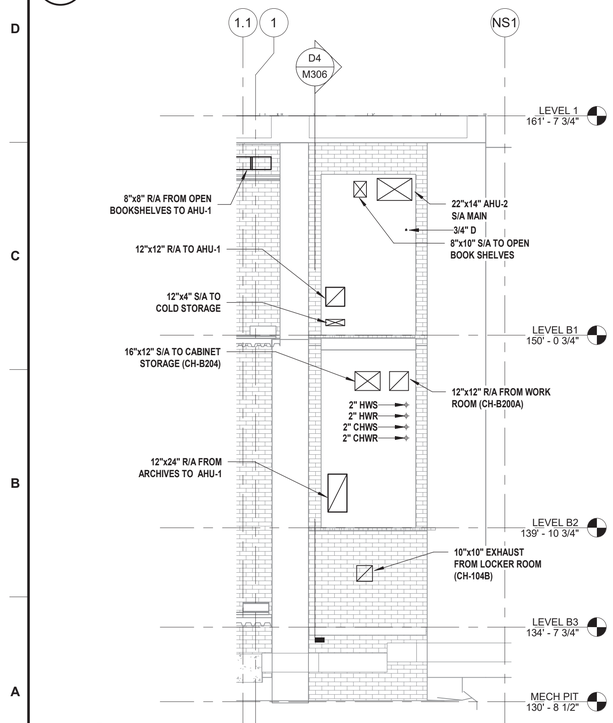
E4 TUNNEL TO LINCOLN NORTH VIEW

SCALE: 1/4" = 1'-0"



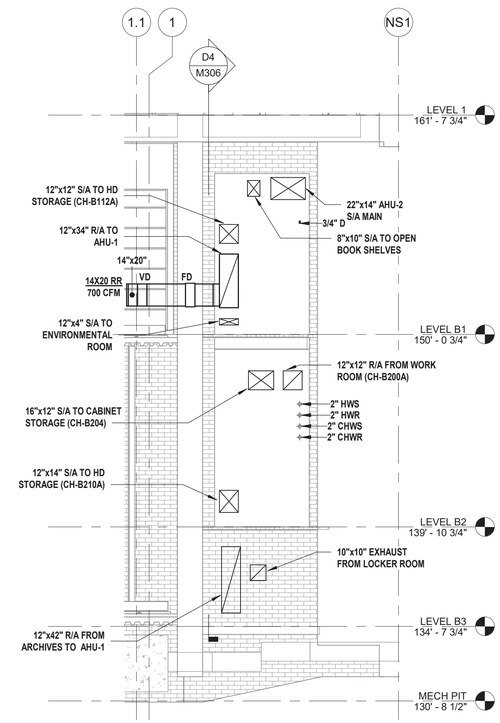
D7 HIGH DENSITY STORAGE B210B & B112B - LOOKING NORTH

SCALE: 1/4" = 1'-0"



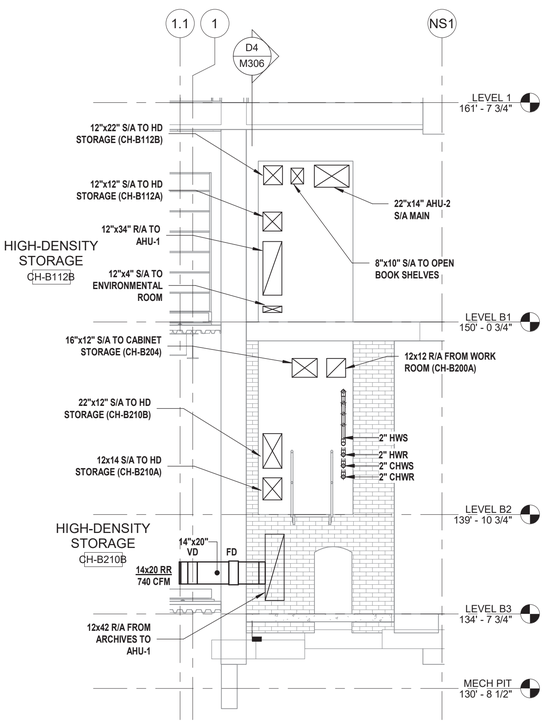
A1 SERVICE CORRIDOR AT COLUMN C - LOOKING SOUTH

SCALE: 1/4" = 1'-0"



A4 SERVICE CORRIDOR AT COLUMN D - LOOKING SOUTH

SCALE: 1/4" = 1'-0"



A7 SERVICE CORRIDOR AT COLUMN F - LOOKING SOUTH 2

SCALE: 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY: SK
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

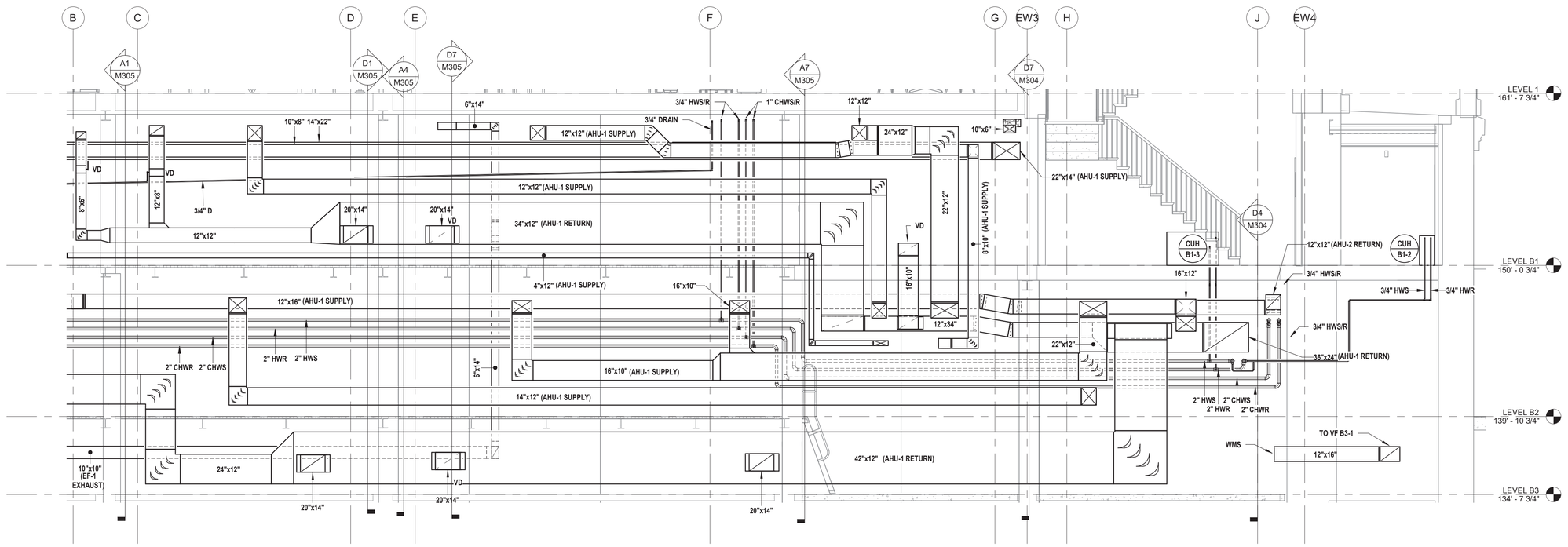
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

SECTIONS - HVAC

SHEET ID

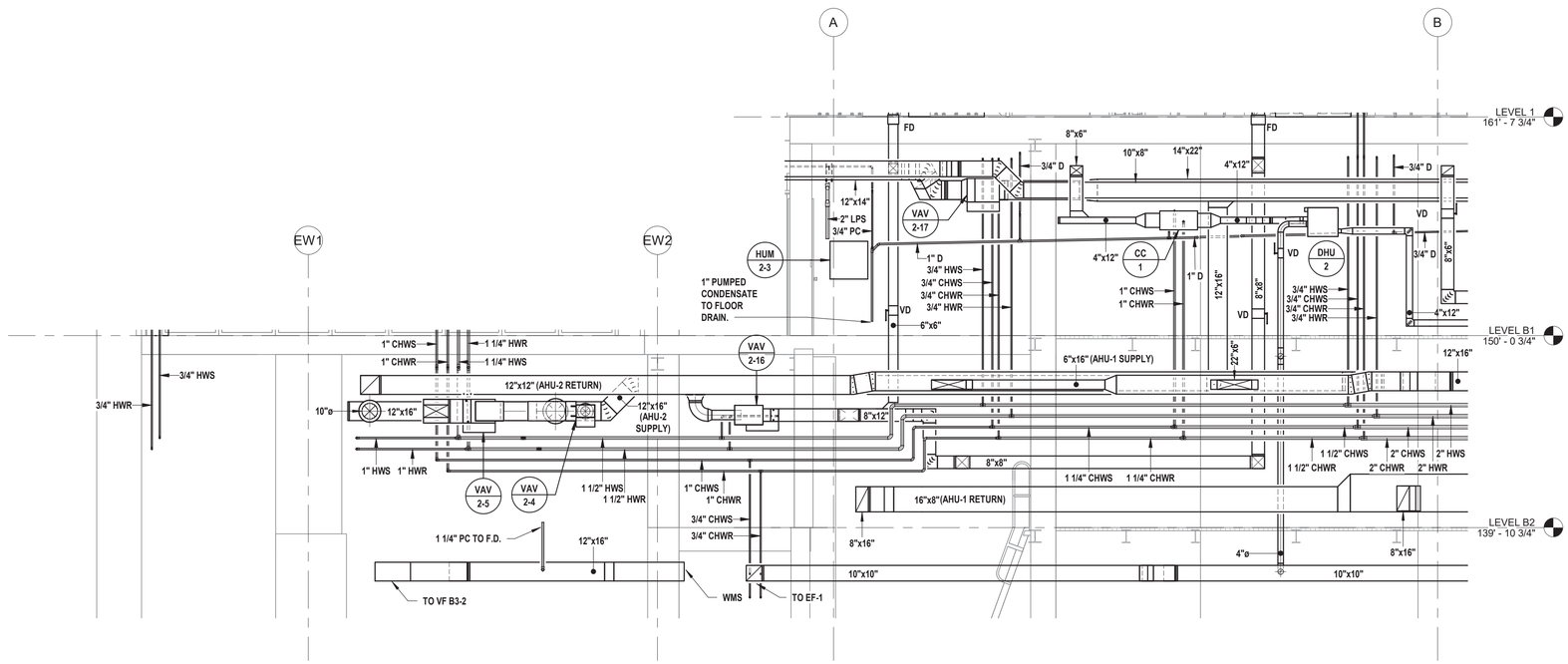
M305

RTA SUBMISSION 2/11/2021



D4 LEVELS B1, B2, & B3 MECHANICAL SERVICE CORRIDOR WEST VIEW NORTH

SCALE: 1/4" = 1'-0"



A4 LEVEL B1, B2, & B3 MECHANICAL SERVICE CORRIDOR WEST VIEW SOUTH

SCALE: 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY: BK
SIZE: ANSI D

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

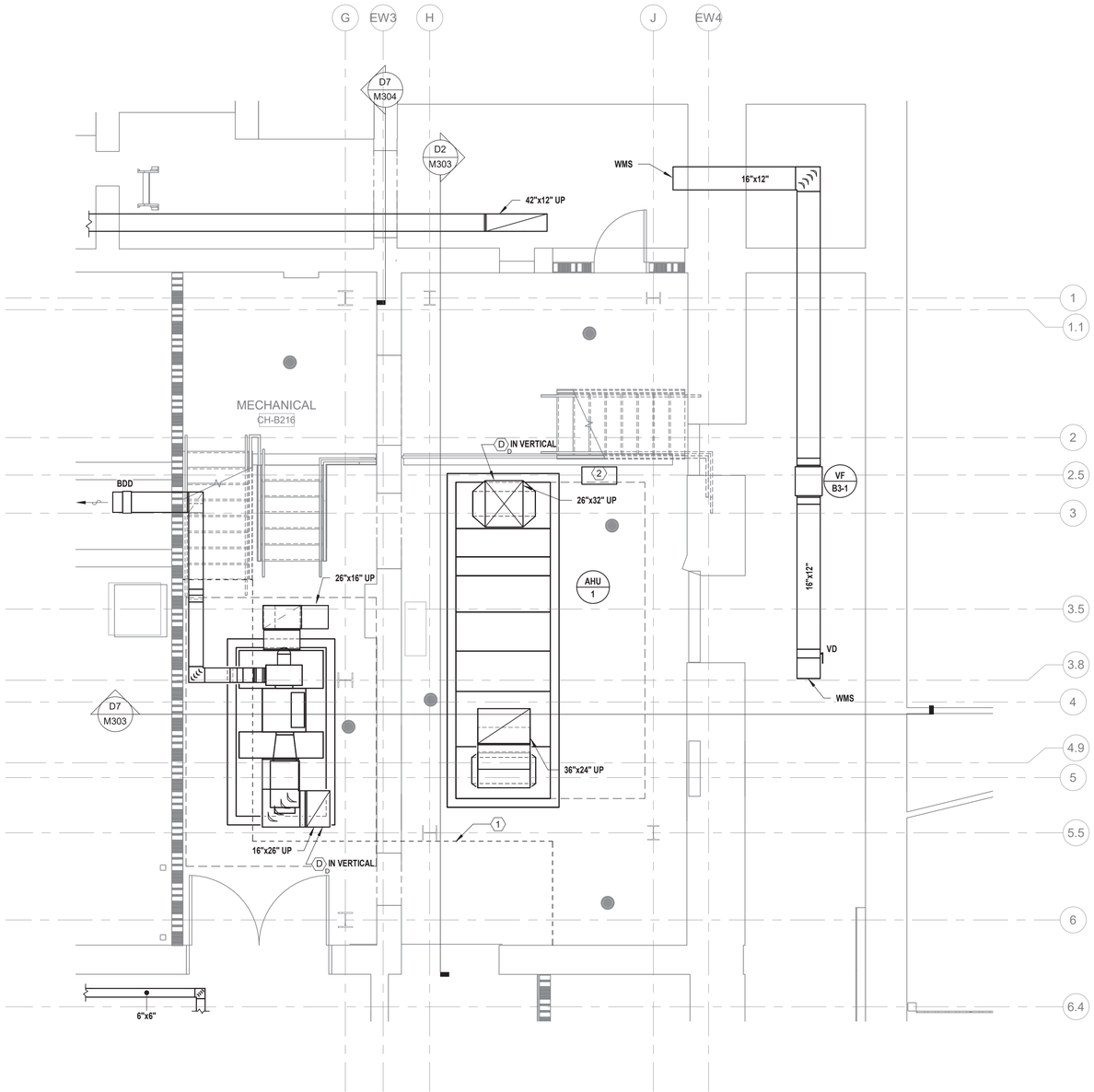
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

SECTIONS - HVAC

SHEET ID

M306

RTA SUBMISSION 2/11/2021



B4 ENLARGED LOWER MECH ROOM - DUCTWORK

SCALE: 1/4" = 1'-0"

SHEET NOTES:

1. EDGE OF CATWALK ABOVE.
2. UNISTRUT MOUNTED BAS PANEL (JACE) INTERFACE.

GENERAL NOTES:

1. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

4 2 0 4 8

SCALE: 1/4"=1'-0"

PLAN NORTH

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-1b-C0031
PROJECT NO: 20190494

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY: WCJ
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

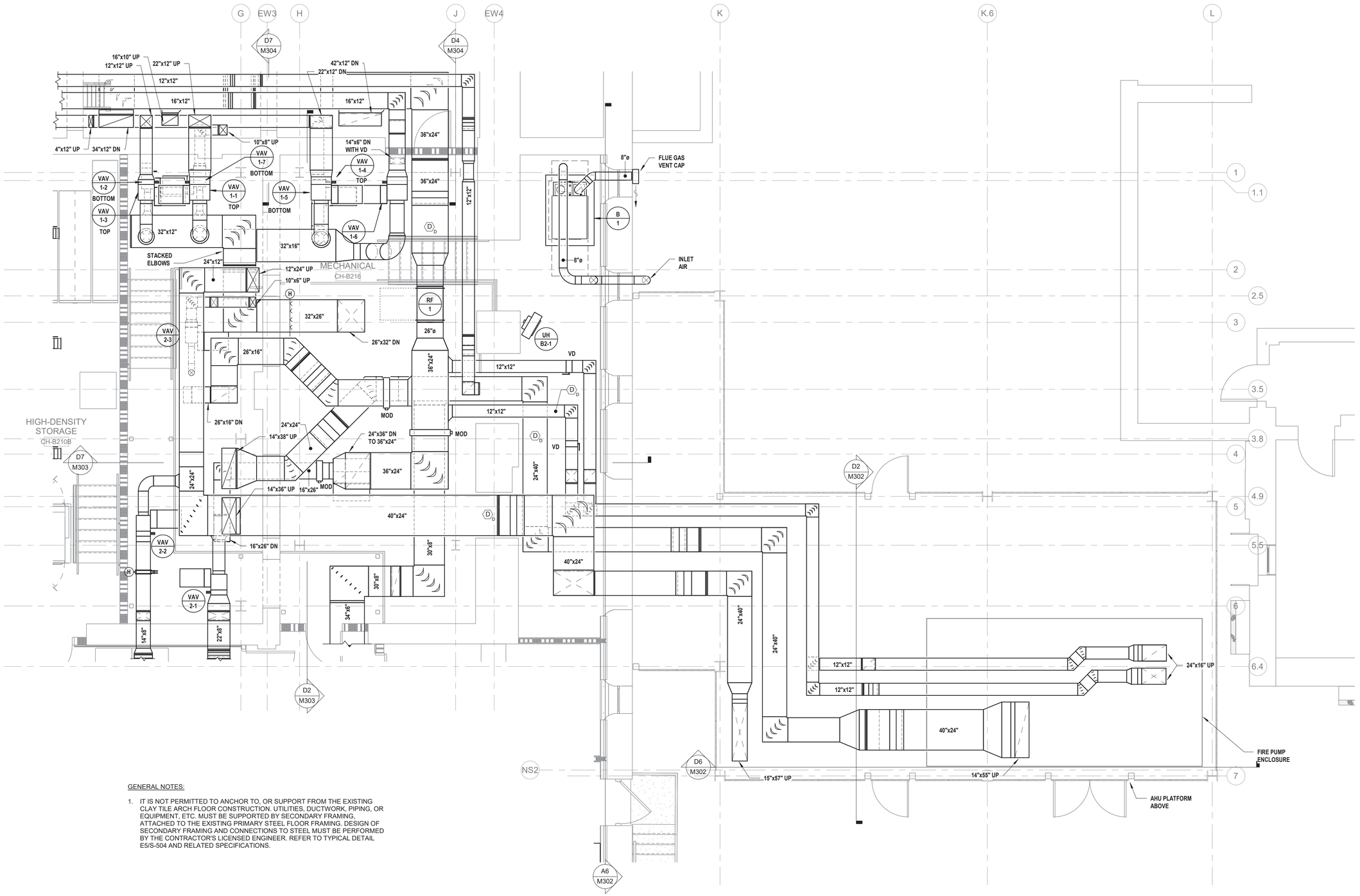
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

ENLARGED MECH ROOM PLANS - HVAC

SHEET ID

M401

RTA SUBMISSION 2/11/2021



GENERAL NOTES:

1. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

A4 ENLARGED UPPER MECH ROOM AND NORTH SERVICE YARD - DUCTWORK

SCALE: 1/4" = 1'-0"

PLAN NORTH

4 2 0 4 8

SCALE: 1/4"=1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY:	ISSUE DATE:
WMF	2/11/2021
DRAWN BY:	SOLICITATION NO.:
SCB	W912DS-19-R-0014
CHECKED BY:	CONTRACT NO.:
WCJ	W912DS-19-C0031
SUBMITTED BY:	PROJECT NO:
SCB	20190494
	SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

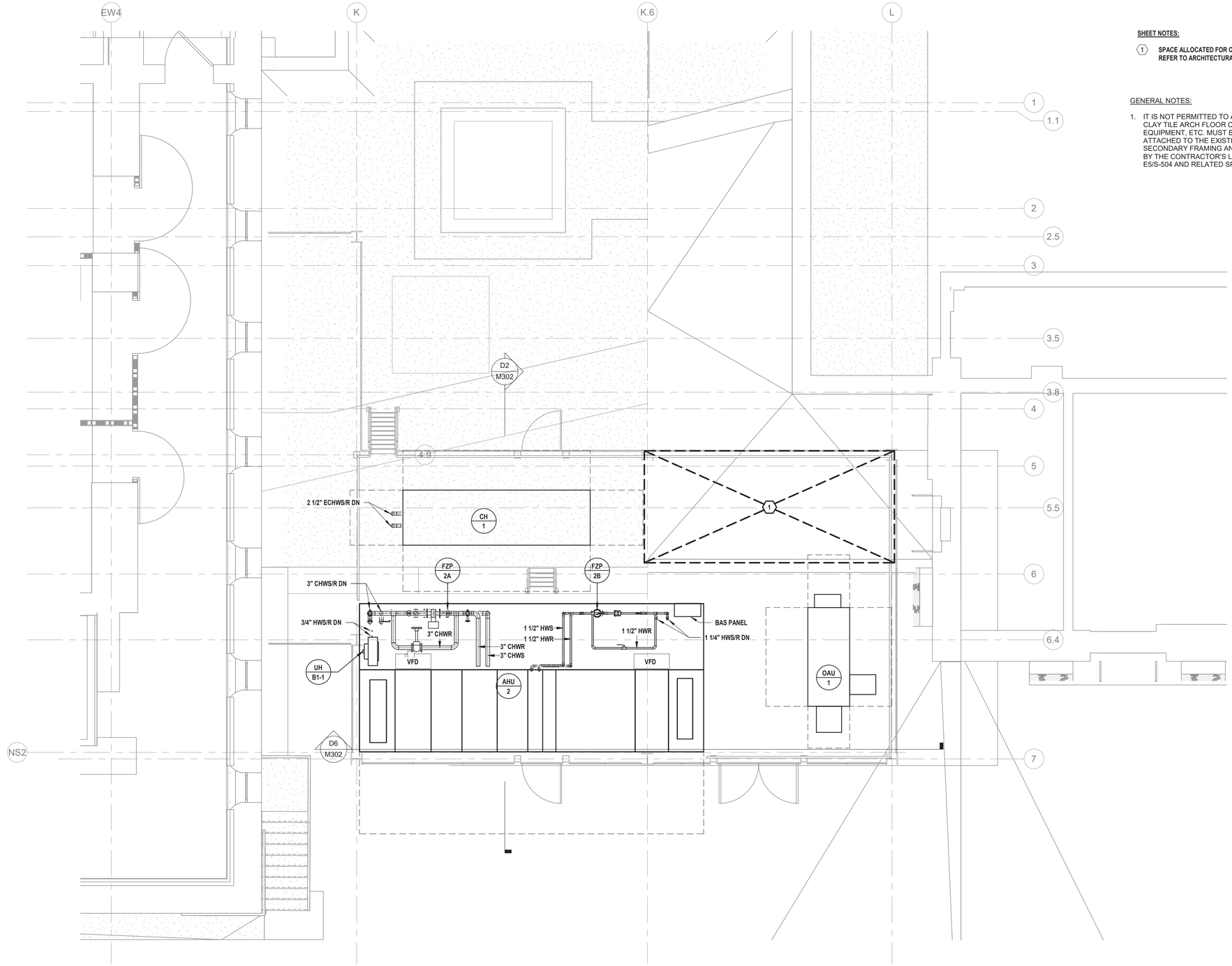
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

ENLARGED MECH ROOM & SERVICE YARD PLANS - HVAC

SHEET ID

M402

RTA SUBMISSION 2/11/2021



A4 ENLARGED SERVICE YARD HVAC ABOVE DUNNAGE

SCALE: 1/4" = 1'-0"

SHEET NOTES:

1. SPACE ALLOCATED FOR COLD BOX EQUIPMENT. REFER TO ARCHITECTURAL DRAWINGS.

GENERAL NOTES:

1. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

PLAN NORTH

4 3 2 1 0 4 8

SCALE: 1/4" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

CULLUM SERVICE YARD PLAN - HVAC ABOVE DUNNAGE

SHEET ID

M403

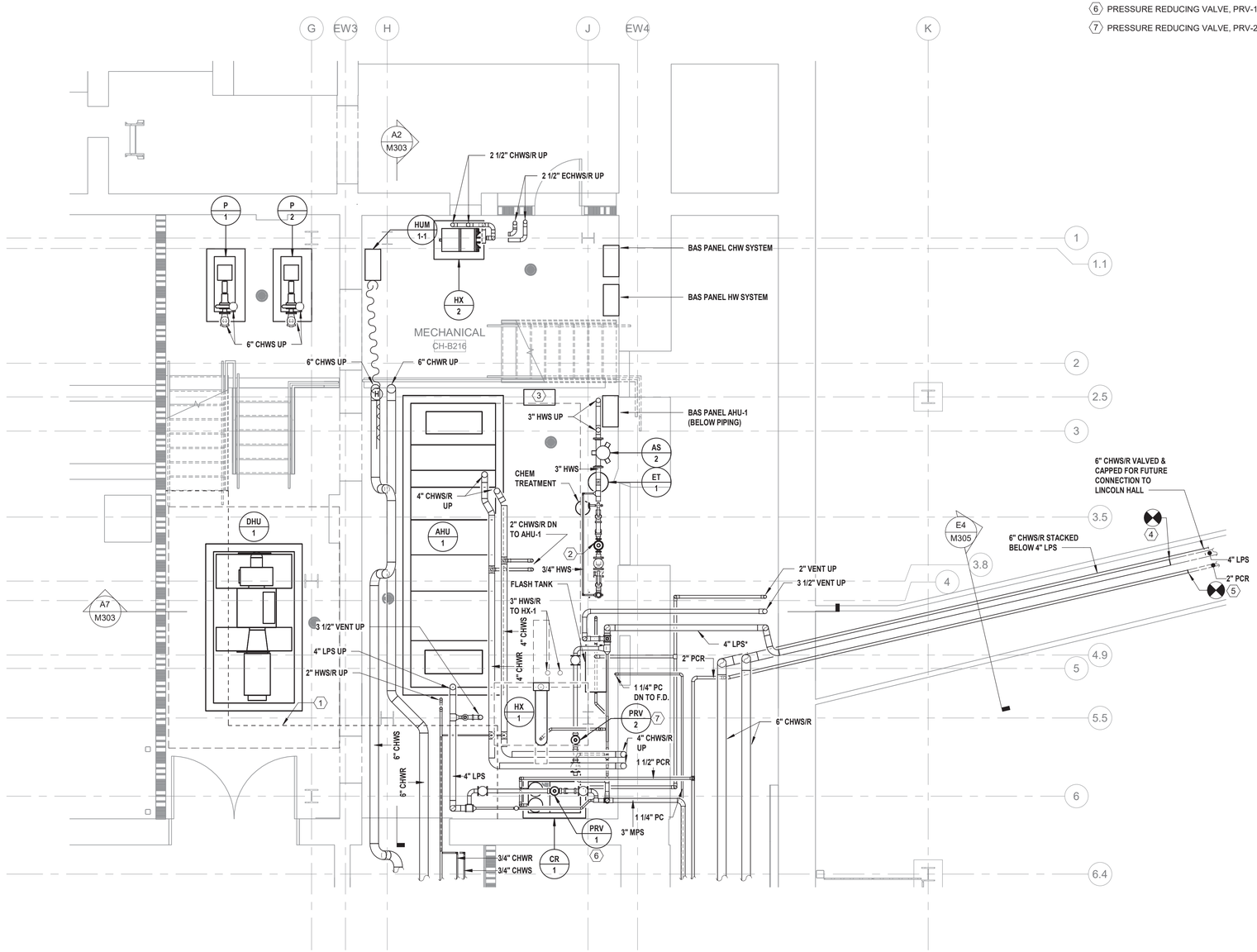
RTA SUBMISSION 2/11/2021

GENERAL NOTES:

1. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

SHEET NOTES:

1. EDGE OF CATWALK ABOVE.
2. HW PUMPS RACKED ALONG WALL. P/3 ON TOP AND P/4 ON BOTTOM. PROVIDE UNISTRUT SUPPORTS POST UP FROM THE FLOOR.
3. UNISTRUT MOUNTED BAS PANEL (JACE) INTERFACE.
4. CONNECT NEW 4" LPS TO EXISTING LPS SERVING LINCOLN HALL.
5. CONNECT NEW 2" PCR TO EXISTING PCR SERVING LINCOLN HALL.
6. PRESSURE REDUCING VALVE, PRV-1, SERVES CULLUM HALL.
7. PRESSURE REDUCING VALVE, PRV-2, SERVES LINCOLN HALL.



A4 ENLARGED LOWER MECH ROOM - PIPING

SCALE: 1/4" = 1'-0"

PLAN NORTH

4 2 0 4 8

SCALE: 1/4"=1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY:

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

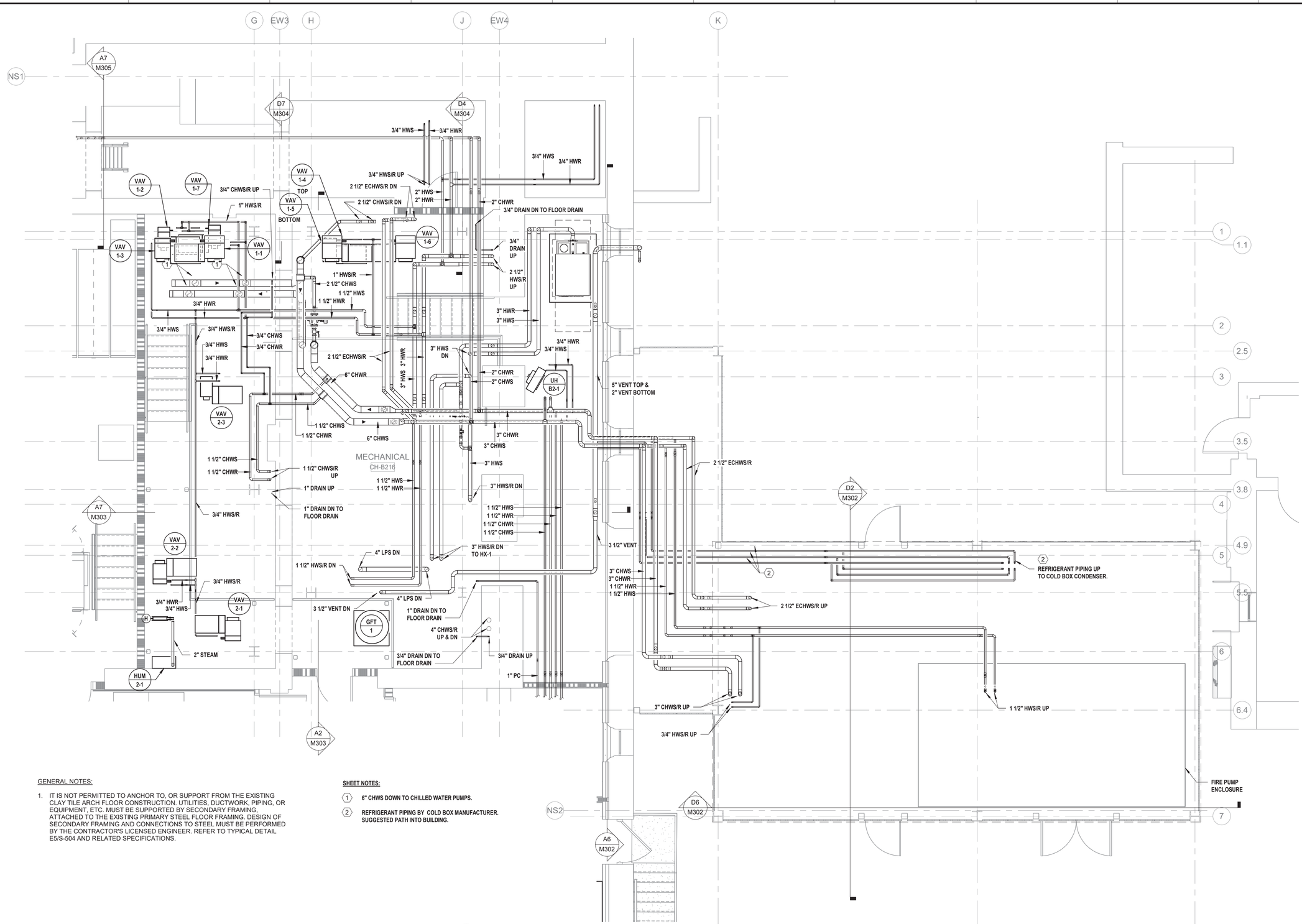
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

ENLARGED MECH ROOM PLANS - HVAC

SHEET ID

M404

RTA SUBMISSION 2/11/2021



GENERAL NOTES:

1. IT IS NOT PERMITTED TO ANCHOR TO, OR SUPPORT FROM THE EXISTING CLAY TILE ARCH FLOOR CONSTRUCTION. UTILITIES, DUCTWORK, PIPING, OR EQUIPMENT, ETC. MUST BE SUPPORTED BY SECONDARY FRAMING, ATTACHED TO THE EXISTING PRIMARY STEEL FLOOR FRAMING. DESIGN OF SECONDARY FRAMING AND CONNECTIONS TO STEEL MUST BE PERFORMED BY THE CONTRACTOR'S LICENSED ENGINEER. REFER TO TYPICAL DETAIL E5/S-504 AND RELATED SPECIFICATIONS.

SHEET NOTES:

1. 6" CHWS DOWN TO CHILLED WATER PUMPS.
2. REFRIGERANT PIPING BY COLD BOX MANUFACTURER. SUGGESTED PATH INTO BUILDING.

A4 ENLARGED UPPER MECH ROOM AND NORTH SERVICE YARD - PIPING
SCALE: 1/4" = 1'-0"

PLAN NORTH

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

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WCJ
SUBMITTED BY: BK
SIZE: ANSI D
ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

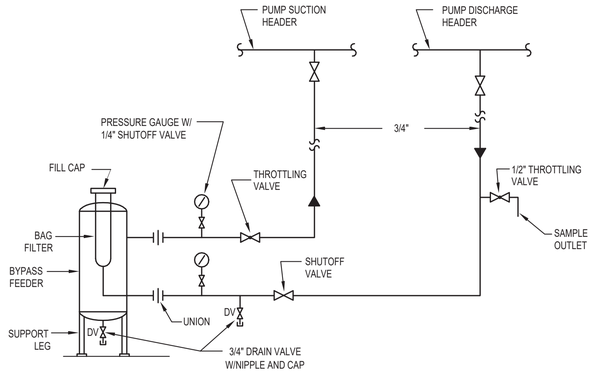
JACOBS / EWING COLE A Joint Venture

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

ENLARGED MECH ROOM & SERVICE YARD PLANS - HVAC

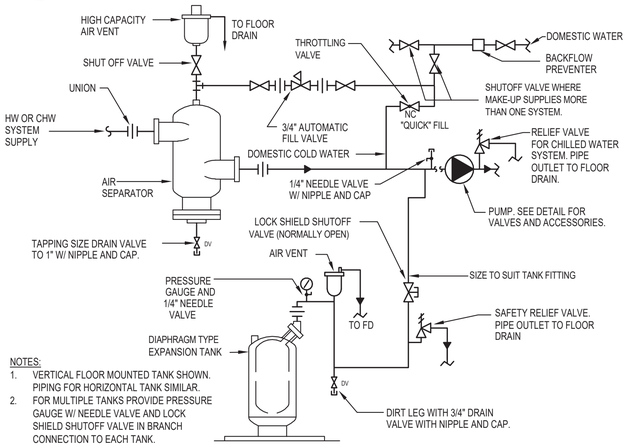
SHEET ID
M405

RTA SUBMISSION 2/11/2021



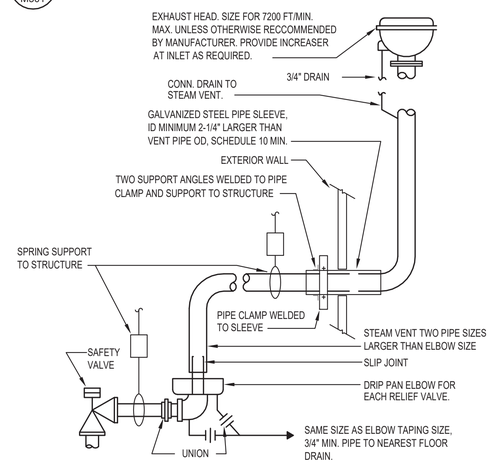
E1 / M501 **10 GALLON WATER TREATMENT BYPASS FEEDER PIPING**

WITH BAG FILTER

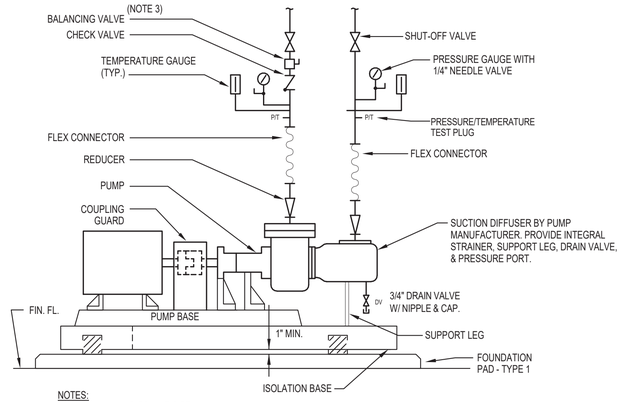


NOTES:
1. VERTICAL FLOOR MOUNTED TANK SHOWN. PIPING FOR HORIZONTAL TANK SIMILAR.
2. FOR MULTIPLE TANKS PROVIDE PRESSURE GAUGE W/ NEEDLE VALVE AND LOCK SHIELD SHUTOFF VALVE IN BRANCH CONNECTION TO EACH TANK.

C1 / M501 **EXPANSION, PURGE & VENT SYSTEM**



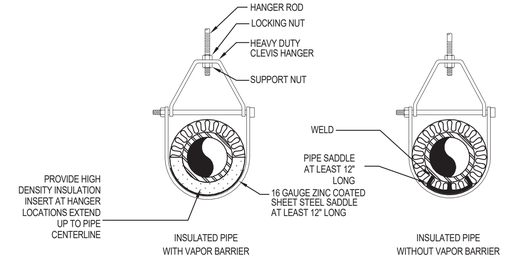
A1 / M501 **DRIP PAN ELBOW AND EXHAUST HEAD**



NOTES:
1. ALL AUXILIARIES LINE SIZE.
2. SUCTION DIFFUSER MUST BE BY PUMP MANUFACTURER. MAX PRESSURE DROP 3 PSI (7 FT HD)
3. BALANCING VALVE MUST BE MANUAL FLOW CONTROL WITH FLOW ORIFICE (VENTURI). USE BUTTERFLY VALVES FOR 3" AND LARGER.

E5 / M501 **END SUCTION PUMP PIPING**

WITH ISOLATION BASE

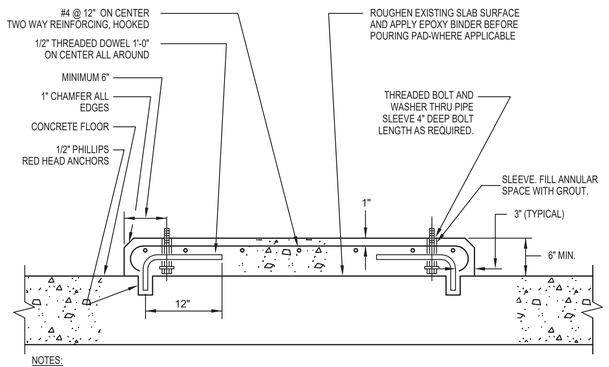


TYPICAL CLEVIS HANGER SUPPORTS

NOT TO SCALE

NOTES:
1. REFER TO SPECIFICATION 23 05 00 FOR SUPPORT SPACING AND ADDITIONAL REQUIREMENTS

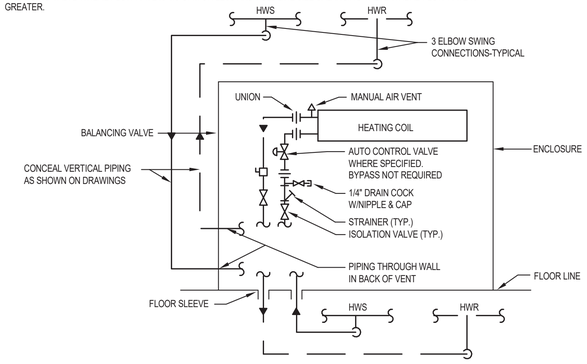
C5 / M501 **PIPE SUPPORT DETAILS**



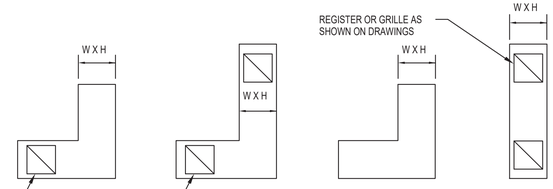
NOTES:
1. PAD DIMENSIONS AND ANCHOR BOLTS TO SUIT EQUIPMENT

A5 / M501 **FOUNDATION PAD - TYPE 1**

NOTES:
1. VERTICAL UNIT SHOWN. HORIZONTAL UNIT SIMILAR, EXCEPT VALVES OUTSIDE OF ENCLOSURE WHERE LOCATED IN CEILING SPACE OR WHERE PIPING IS EXPOSED.
2. ALL BRANCH PIPING 3/4" UNLESS OTHERWISE NOTED ON DRAWINGS. PROVIDE FULL LINE SIZE RADIATOR VALVE. PROVIDE 1/2" BALANCING VALVE WHERE FLOW RATE IS 1.3 GPM OR LESS AND FULL LINE SIZE BALANCING VALVE WHERE FLOW RATE IS GREATER.

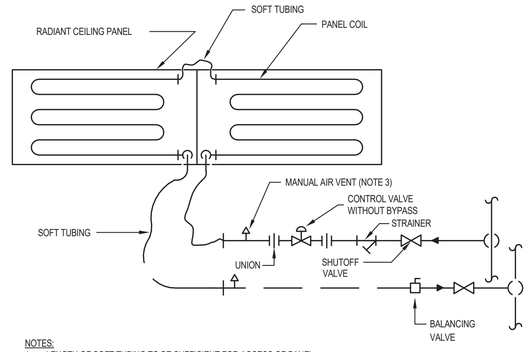


E8 / M501 **HOT WATER CABINET UNIT HEATER PIPING**



NOTES:
1. ALL TRANSFER DUCT TERMINATIONS MUST HAVE GRILLES ON BOTH ENDS EXCEPT WHERE TERMINATION IS CONCEALED ABOVE A CEILING.
2. TRANSFER GRILLE SIZE MUST BE EQUIVALENT TO TRANSFER DUCT SIZE.

C8 / M501 **NON-ACOUSTICALLY LINED TRANSFER DUCT DETAILS**



NOTES:
1. LENGTH OF SOFT TUBING TO BE SUFFICIENT FOR ACCESS OF PANEL.
2. PROVIDE FULL LINE SIZE SHUTOFF VALVE AND STRAINER. PROVIDE 1/2" BALANCING VALVE WHERE FLOW RATE IS 1.3 GPM OR LESS AND FULL LINE SIZE BALANCING VALVE WHERE FLOW RATE IS GREATER.
3. PROVIDE MANUAL AIR VENT AS REQUIRED WHERE HWS/R MAINS ARE INSTALLED AT A LOWER ELEVATION THAN THE RADIANT CEILING PANEL.

A8 / M501 **HOT WATER RADIANT CEILING PANELS**

US Army Corps of Engineers ®

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DESIGNED BY: WMF
DRAWN BY: RKG
CHECKED BY: WCJ
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CONTRACT NO.: W912DS-19-C0031
SUBMITTED BY:
PROJECT NO: 20190494
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

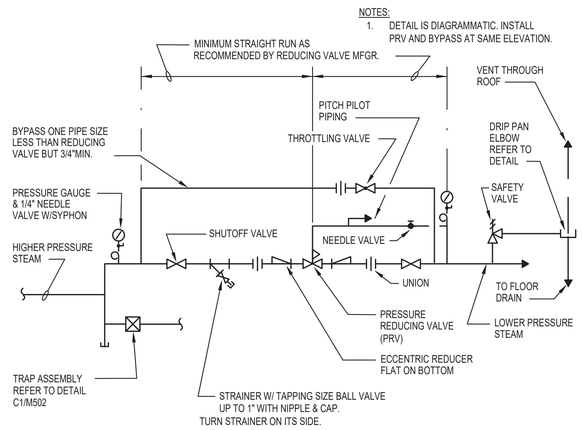
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

DETAILS - HVAC

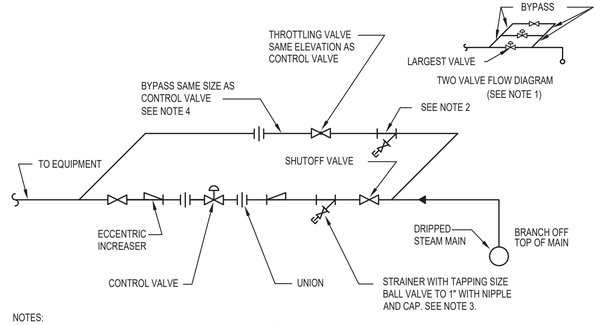
SHEET ID

M501

RTA SUBMISSION 2/11/2021

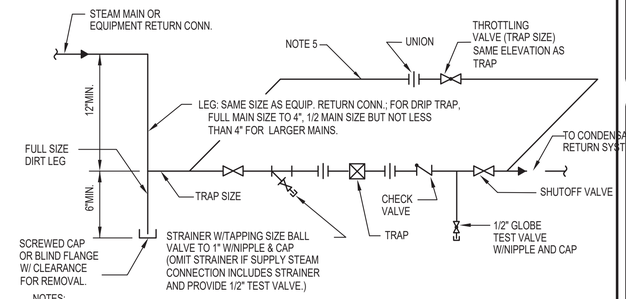


E1 / M502 SINGLE STEAM PRESSURE REDUCING STATION



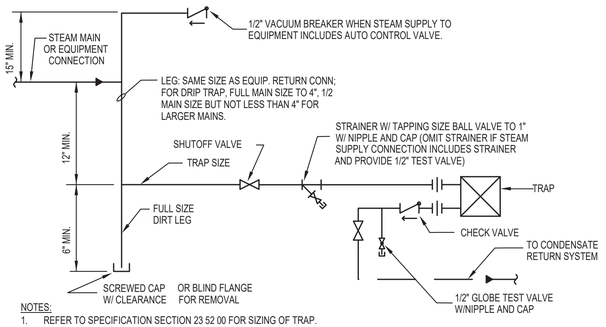
NOTES:
1. WHERE TWO CONTROL VALVES ARE SHOWN, SPECIFIED OR REQUIRED, INSTALL BOTH AT SAME ELEVATION PIPED AS SHOWN FOR SINGLE VALVE WITH COMMON BYPASS FOR BOTH VALVES (SEE DIAGRAM ABOVE). MAKE BYPASS ONE PIPE SIZE LARGER THAN LARGER CONTROL VALVE.
2. STRAINER IN BYPASS REQUIRED FOR INNER STEAM DISTRIBUTING TUBE COIL ONLY. TURN STRAINER ON ITS SIDE.
3. PROVIDE STRAINER WITH 3/4" NORMALLY OPEN VALVE AND STEAM TRAP PIPED TO CONDENSATE RETURN WHERE HORIZONTAL DISTANCE BETWEEN STRAINER AND STEAM MAIN IS GREATER THAN 10'-0". WHERE DISTANCE IS LESS THAN 10'-0" TURN STRAINER ON ITS SIDE TO AVOID COLLECTING CONDENSATE IN STRAINER.
4. THE SYMBOL ⟨⟩ ON DRAWINGS OR DETAILS INDICATES CONTROL VALVE TO BE INSTALLED AS SHOWN ON THIS DETAIL.

E5 / M502 STEAM CONTROL VALVE ASSEMBLY



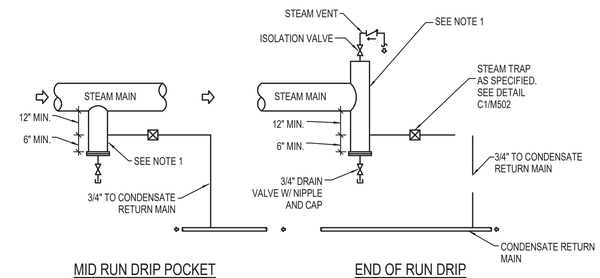
NOTES:
1. STEAM MAIN DRIP TRAP TO BE 3/4" UNLESS OTHERWISE NOTED.
2. PROVIDE TEST VALVE AT MAJOR EQUIPMENT ONLY.
3. PROVIDE ELEVATED SUPPORT/LEGS AS REQUIRED FOR FLOOR MOUNTED EQUIPMENT TO OBTAIN MINIMUM TRAP LEG HEIGHT AS SHOWN AND PITCH OF CONDENSATE RETURN TO TERMINATION.
4. INSTALL TRAP ASSEMBLIES IN PARALLEL WHEN MORE THAN ONE REQUIRED FOR LOAD.
5. BYPASS ONLY REQUIRED AT MAIN RISERS

E8 / M502 THERMODYNAMIC TRAP ASSEMBLY



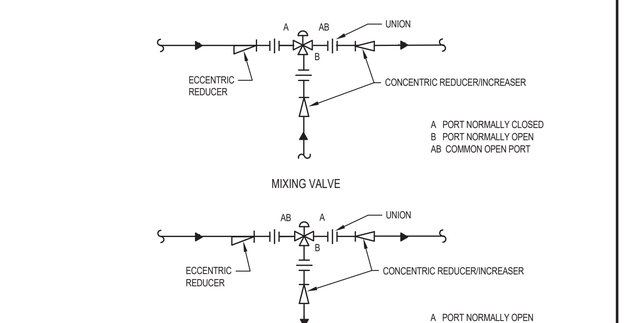
NOTES:
1. REFER TO SPECIFICATION SECTION 23 52 00 FOR SIZING OF TRAP.
2. STEAM MAIN DRIP TRAP TO BE 3/4" UNLESS OTHERWISE NOTED.
3. OMIT CHECK VALVE IF STEAM PRESSURE IS 15 PSIG OR LESS AND CONDENSATE IS NOT LIFTED.
4. PROVIDE TEST VALVE AT MAJOR EQUIPMENT ONLY.
5. OMIT INLET SHUTOFF VALVE AND BYPASS FOR UNIT HEATER AND HUMIDIFIER.
6. FOR PREHEAT COIL ONLY, PROVIDE THERMOSTATIC DRAIN VALVE AHEAD OF BYPASS, PIPE TO F.D.
7. PROVIDE ELEVATED SUPPORTS/LEGS AS REQUIRED FOR FLOOR MOUNTED EQUIPMENT TO OBTAIN MINIMUM TRAP LEG HEIGHT AS SHOWN AND PITCH OF CONDENSATE RETURN TO TERMINATION.
8. INSTALL TRAP ASSEMBLIES IN PARALLEL WHEN MORE THAN ONE TRAP REQUIRED FOR LOAD.

C1 / M502 FLOAT AND THERMOSTATIC TRAP ASSEMBLY



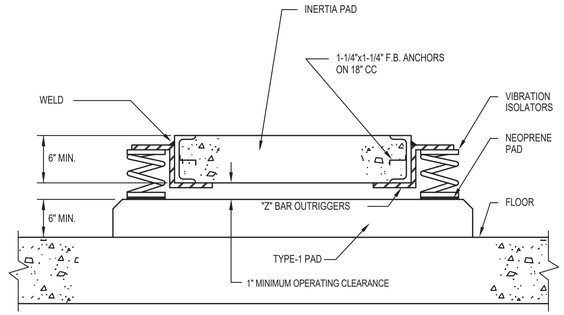
NOTES:
1. FULL LINE SIZE UP TO 4" MAIN. FOR LARGER MAIN SIZES, 2 TO 3 SIZES SMALLER THAN MAIN SIZE, BUT NOT LESS THAN 4".

C5 / M502 STEAM MAIN DIRT LEG DETAIL



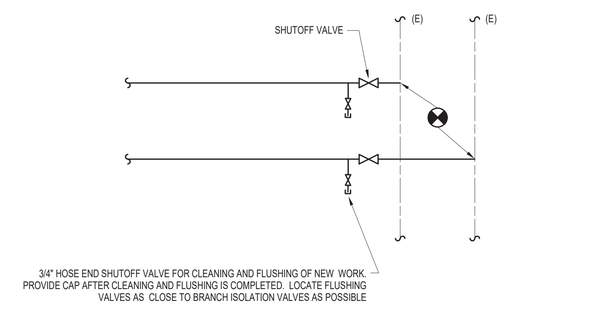
NOTES:
1. PORT DESIGNATIONS ARE DIAGRAMMATIC. REVISE PIPING TO SUIT VALVE CONSTRUCTION.

C8 / M502 THREE WAY WATER CONTROL VALVE PIPING

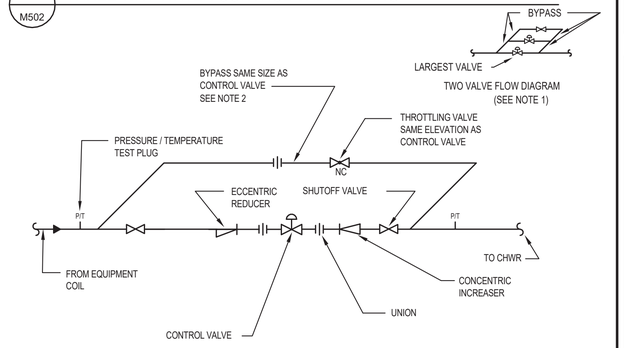


NOTES:
1. EQUIPMENT AND MOTOR ON COMMON BED PLATE.

A1 / M502 INERTIA PAD - TYPE 3



A5 / M502 PIPING CONNECTION TO EXISTING WORK



NOTES:
1. WHERE TWO CONTROL VALVES ARE SHOWN, SPECIFIED OR REQUIRED, INSTALL BOTH AT SAME ELEVATION PIPED AS SHOWN FOR SINGLE VALVE WITH COMMON BYPASS FOR BOTH VALVES (SEE DIAGRAM ABOVE). MAKE BYPASS ONE PIPE SIZE LARGER THAN LARGER CONTROL VALVE.
2. THE SYMBOL ⟨⟩ ON DRAWINGS OR DETAILS INDICATES CONTROL VALVE TO BE INSTALLED AS SHOWN ON THIS DETAIL.

A8 / M502 TWO WAY WATER CONTROL VALVE ASSEMBLY

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: RKG
CHECKED BY: WCJ
SUBMITTED BY: SK
SIZE: ANSI D
ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
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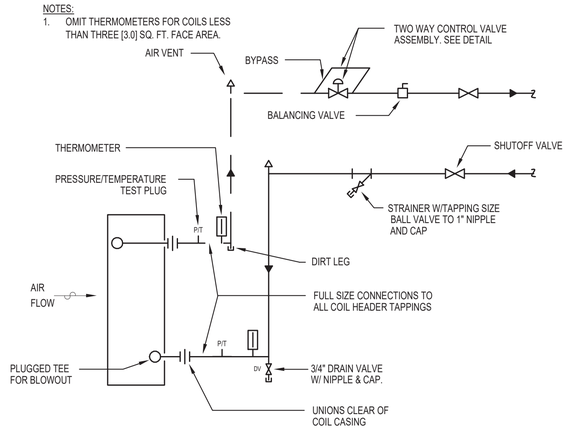
US ARMY CORPS OF ENGINEERS
JACOBS / EWING COLE A Joint Venture

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

DETAILS - HVAC

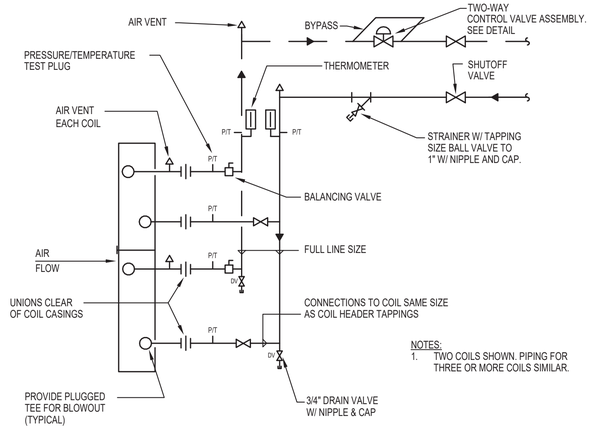
SHEET ID
M502

RTA SUBMISSION 2/11/2021



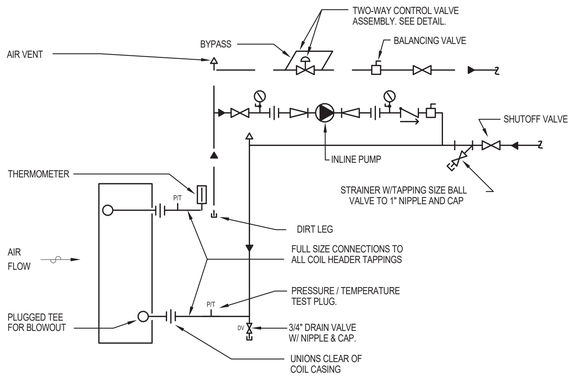
E1 / M503 **SINGLE CHILLED WATER COOLING OR HOT WATER HEATING COIL**

TWO–WAY CONTROL VALVE



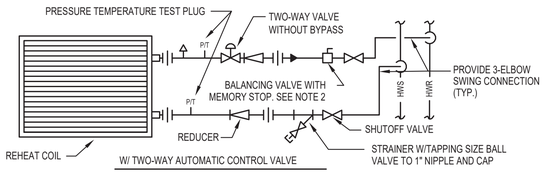
C1 / M503 **STACKED WATER COOLING OR HEATING COIL**

TWO–WAY CONTROL VALVE



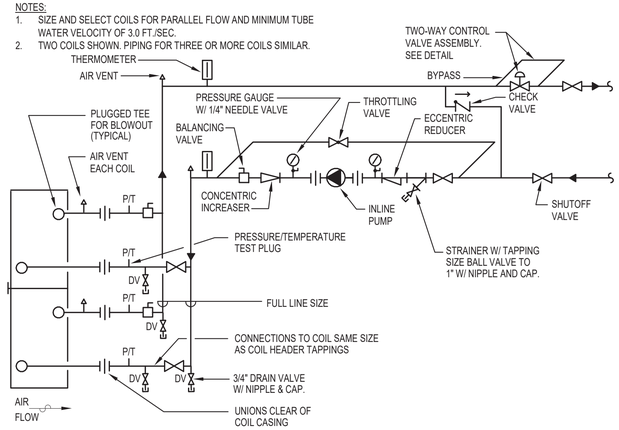
A1 / M503 **SINGLE CHILLED WATER COOLING COIL AND INLINE PUMP**

TWO–WAY CONTROL VALVE



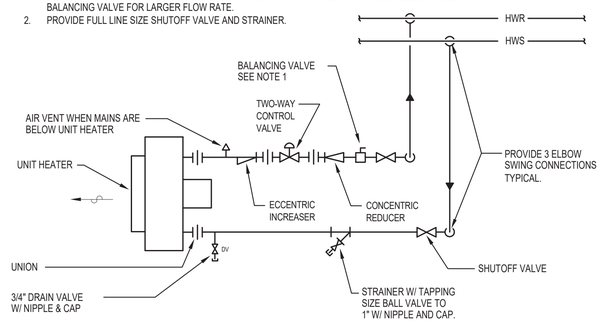
E5 / M503 **REHEAT COIL PIPING**

DUCT OR AIR VOLUME CONTROL BOX MOUNTED



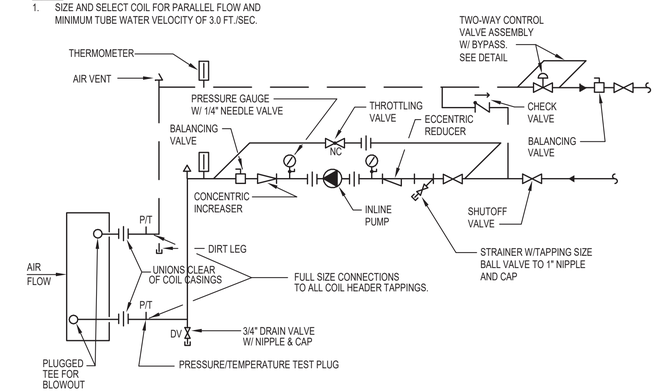
C5 / M503 **STACKED HOT WATER HEATING COIL AND INLINE PUMP**

TWO–WAY CONTROL VALVE (SINGLE COIL PIPING SIMILAR)



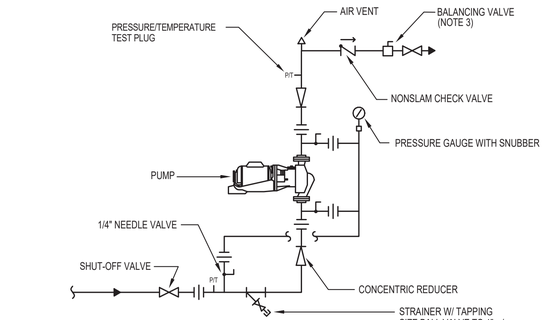
A5 / M503 **HOT WATER PROPELLER UNIT HEATER PIPING**

W/ CONTROL VALVE W/O BYPASS



C8 / M503 **SINGLE HOT WATER HEATING COIL AND INLINE PUMP**

TWO–WAY CONTROL VALVE



A8 / M503 **IN-LINE PUMP PIPING**

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: RKG
CHECKED BY: WCJ
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: 2/11/2021
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US ARMY CORPS OF ENGINEERS

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WEST POINT, NY
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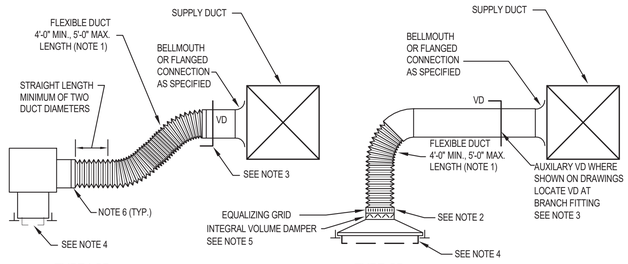
DETAILS - HVAC

SHEET ID

M503

RTA SUBMISSION 2/11/2021



TYPE LSD

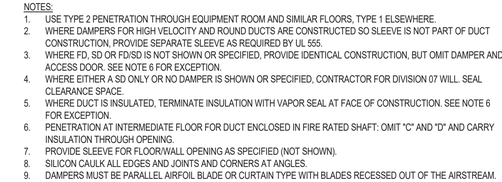
TYPE CD

NOTES:
1. FLEXIBLE DUCT MUST BE SUPPORTED FROM STRUCTURE ABOVE TO PREVENT KINKING AND SAGGING.
2. PROVIDE SHEET METAL TRANSITION AS REQUIRED IF DIFFUSER DOES NOT HAVE ROUND CONNECTION.
3. PROVIDE CONCEALED CEILING DAMPER REGULATOR OR CEILING ACCESS DOOR WHERE VD IS LOCATED ABOVE INACCESSIBLE CEILING.
4. PROVIDE BORDER STYLE AND DIFFUSER FACE COMPATABLE WITH CEILING SYSTEM.
5. OMIT INTEGRAL VOLUME DAMPER WHERE SPECIFIED.
6. ATTACH FLEXIBLE DUCT TO DIFFUSER AND BRANCH DUCT WITH SCREW WORM GEAR BAND CLAMP. PLASTIC TIE STRAPS NOT ACCEPTABLE.
7. FLEXIBLE DUCT OFFSETS MUST BE LIMITED TO A TOTAL BEND OF 45°.

E2 / M504 DIFFUSER INSTALLATION

A: ACCESS DOOR
* B: TRANSVERSE JOINT
* C: SLEEVE
D: ANGLE, ALL 4 SIDES
SEE NOTE 8
E: MFG'S REQUIRED CLEARANCE SPACE
F: FD, SD OR FD/SD
WHERE SPECIFIED OR SHOWN
G: CURB

* SEE SPECIFICATIONS FOR REQUIREMENTS

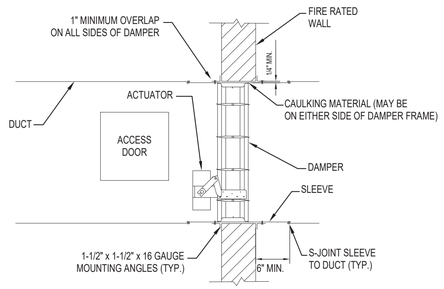


TYPE 1

TYPE 2

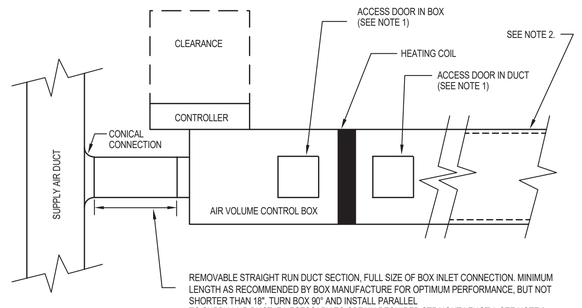
NOTES:
1. USE TYPE 2 PENETRATION THROUGH EQUIPMENT ROOM AND SIMILAR FLOORS, TYPE 1 ELSEWHERE.
2. WHERE DAMPERS FOR HIGH VELOCITY AND ROUND DUCTS ARE CONSTRUCTED SO SLEEVE IS NOT PART OF DUCT CONSTRUCTION, PROVIDE SEPARATE SLEEVE AS REQUIRED BY UL 555.
3. WHERE FD, SD OR FD/SD IS NOT SHOWN OR SPECIFIED, PROVIDE IDENTICAL CONSTRUCTION, BUT OMIT DAMPER AND ACCESS DOOR. SEE NOTE 6 FOR EXCEPTION.
4. WHERE EITHER A SD ONLY OR NO DAMPER IS SHOWN OR SPECIFIED, CONTRACTOR FOR DIVISION 07 WILL SEAL CLEARANCE SPACE.
5. WHERE DUCT IS INSULATED, TERMINATE INSULATION WITH VAPOR SEAL AT FACE OF CONSTRUCTION. SEE NOTE 6 FOR EXCEPTION.
6. PENETRATION AT INTERMEDIATE FLOOR FOR DUCT ENCLOSED IN FIRE RATED SHAFT: OMIT "C" AND "D" AND CARRY INSULATION THROUGH OPENING.
7. PROVIDE SLEEVE FOR FLOOR/WALL OPENING AS SPECIFIED (NOT SHOWN).
8. SILICON CAULK ALL EDGES AND JOINTS AND CORNERS AT ANGLES.
9. DAMPERS MUST BE PARALLEL AIRFOIL BLADE OR CURTAIN TYPE WITH BLADES RECESSED OUT OF THE AIRSTREAM.

C2 / M504 DUCT PENETRATION THROUGH FLOOR AND FIRE OR SMOKE RATED WALL OR PARTITION



NOTES:
1. PROVIDE FIRE DAMPER THAT MEETS THE REQUIREMENTS ESTABLISHED BY UL STANDARDS 555.

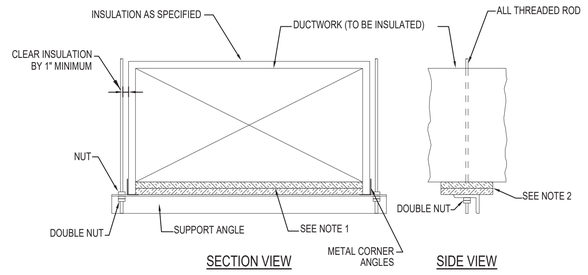
A2 / M504 FIRE DAMPER INSTALLATION



NOTES:
1. IF BOX DOES NOT HAVE EITHER REMOVABLE BOX CASING PANEL OR ACCESS DOOR UPSTREAM OF HEATING COIL, REMOVE COIL AND REINSTALL IN DOWNSTREAM DUCTWORK WITH REQUIRED ACCESS DOORS. REFER TO DUCT MOUNTED REHEAT COIL INSTALLATION DETAIL.
2. PROVIDE A 5' SECTION OF DOUBLE WALL DUCTWORK WITH PERFORATED INNER LINING AND AT LEAST ONE 90° ELBOW BETWEEN THE VAV BOX AND THE FIRST BRANCH TAKE-OFF.
3. IF ELBOW IS PROVIDED BETWEEN SUPPLY MAIN AND BOX, OR LENGTH OF DUCT EXCEEDS 10 FT., INCREASE INLET DUCT BY 2 INCH IN DIAMETER.

E5 / M504 SUPPLY AIR VOLUME CONTROL BOX

WITH HEATING COIL

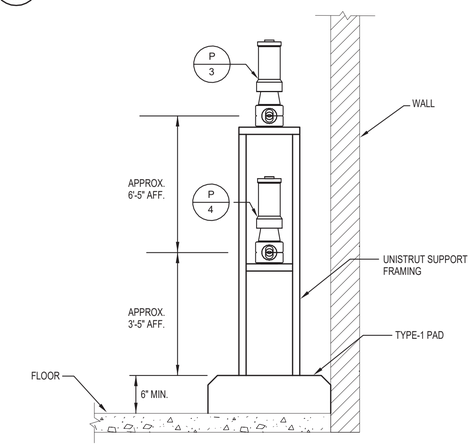


SECTION VIEW

SIDE VIEW

NOTES:
1. DOUBLE LAYER OF RIGID INSULATION TO BE PLACED BETWEEN CONDITIONED DUCTWORK AND SUPPORT ANGLE.
2. PROVIDE INSULATION 12" LONG MINIMUM, FULL WIDTH OF DUCT BETWEEN SUPPORTS FOR ALL DUCTWORK SPECIFIED AS BEING INSULATED (SUPPLY, EXHAUST, RETURN AND OUTSIDE AIR).
3. USE ALUMINUM JOINT TAPE TO SEAL ALL SEAMS AND REINFORCE BOTTOM CORNERS OF INSULATION
4. INSTALLATION MUST FORM A CONTINUOUS VAPOR BARRIER

C5 / M504 INSULATED DUCT HANGER DETAIL



A5 / M504 HOT WATER SYSTEM PUMPS SUPPORT DETAIL

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: RKG
CHECKED BY: WCJ
ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
SUBMITTED BY:
PROJECT NO: 20190494
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

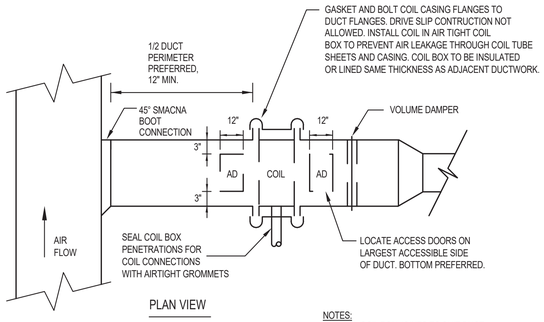
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

DETAILS - HVAC

SHEET ID

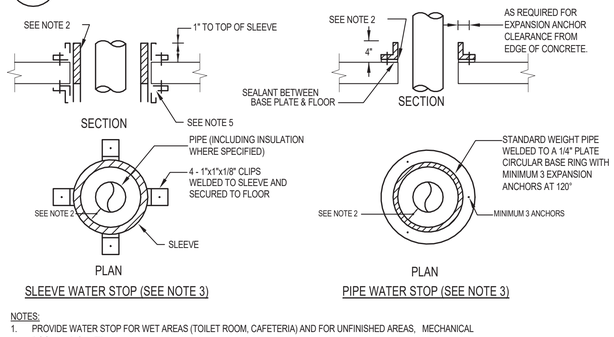
M504

RTA SUBMISSION 2/11/2021



NOTES:
1. ALL COIL BOX JOINTS TO SUIT DUCT PRESSURE CLASSIFICATION AND TO BE SEALED BY APPLYING SEALANT BEFORE ASSEMBLY.
2. REFER TO SMACNA HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE - 2ND EDITION FIG. 2-9.

E1 / M505 DUCT MOUNTED REHEAT COIL INSTALLATION

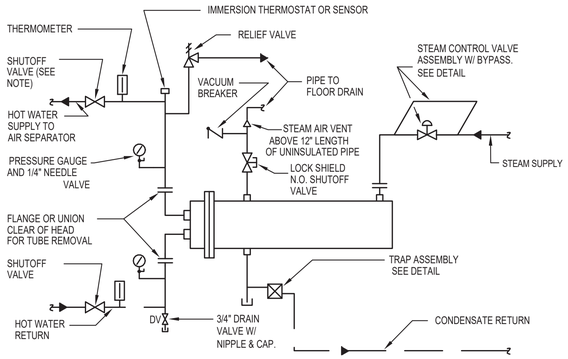


SLEEVE WATER STOP (SEE NOTE 3)

PIPE WATER STOP (SEE NOTE 3)

NOTES:
1. PROVIDE WATER STOP FOR WET AREAS (TOILET ROOM, CAFETERIA) AND FOR UNFINISHED AREAS, MECHANICAL ROOM AND SHAFT.
2. THROUGH - PENETRATION FIRESTOP SYSTEM (NOT SHOWN) TO BE PROVIDED BY DIVISION 07. COORDINATE WITH DIVISION 07 FOR REQUIREMENTS FOR CLEARANCES, ETC.
3. USE SLEEVE WATER STOP ONLY WHERE SLEEVE IS ALLOWED BY THROUGH - PENETRATION FIRESTOP SYSTEM. USE PIPE WATER STOP ELSEWHERE.
4. PROVIDE SILICONE SEALANT IN SPACE BETWEEN FLOOR OPENING AND SLEEVE AND BOTH UNDER ENTIRE SURFACE AND AROUND ENTIRE PERIMETER OF CLIPS, SLEEVE, BASE RING, ETC.
5. EXTEND SLEEVE AND LOCATE CLIPS BELOW FLOOR IN FINISHED AREAS.

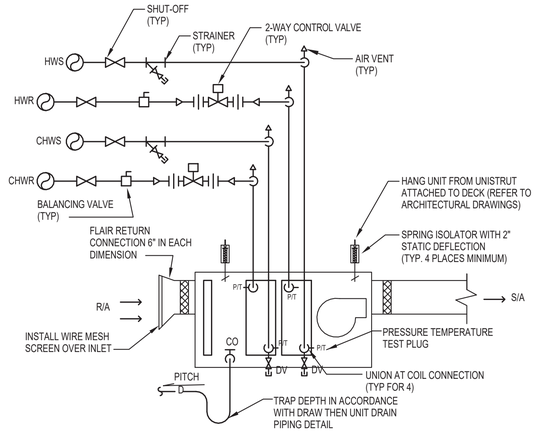
C1 / M505 WATER STOP AT CORED OPENING FOR PIPE PENETRATION THROUGH FLOOR



NOTES:
1. BALANCING VALVE FOR MULTIPLE CONVERTOR INSTALLATION

A1 / M505 STEAM TO WATER HEAT EXCHANGER PIPING

TWO-WAY CONTROL VALVE

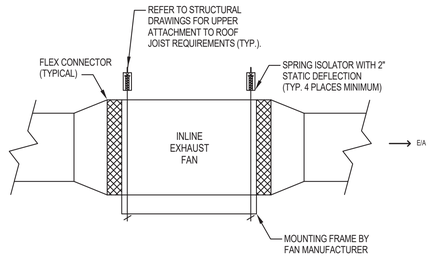


E4 / M505 HORIZONTAL FAN COIL UNIT (FCU) INSTALLATION AND PIPING DETAIL

NOTES:
1. VALVES OUTSIDE OF ENCLOSURE WHERE LOCATED IN CEILING SPACE OR WHERE PIPING IS EXPOSED.
2. ALL BRANCH PIPING 3/4" UNLESS OTHERWISE NOTED ON DRAWINGS. PROVIDE 1/2" BALANCING VALVE WHERE FLOW RATE IS 1.3 GPM OR LESS AND FULL LINE SIZE BALANCING VALVE WHERE FLOW RATE IS GREATER.

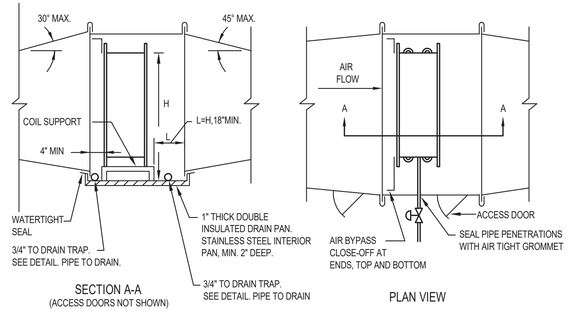
C4 / M505 A/C CONDENSATE PUMP LEAK CONTAINMENT PAN DETAIL

(TYPICAL FOR ALL CONDENSATE PUMPS)

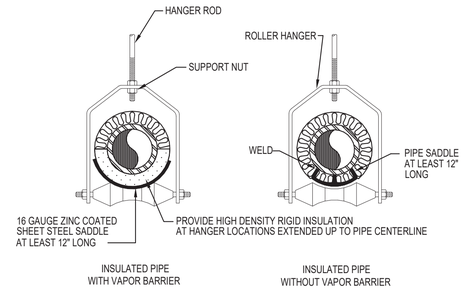


A4 / M505 INLINE EXHAUST FAN (EF) INSTALLATION DETAIL

NOTES:
1. REFER TO SMACNA HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE - 2ND EDITION FIG. 2-9.



E7 / M505 DUCT MOUNTED COOLING COIL INSTALLATION



TYPICAL ROLLER HANGER SUPPORTS

NOT TO SCALE

NOTES:
1. REFER TO SPECIFICATIONS FOR SUPPORT SPACING AND ADDITIONAL REQUIREMENTS

A7 / M505 PIPE SUPPORT DETAILS

PIPE SUBJECT TO THERMAL EXPANSION

US Army Corps of Engineers ®

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DESIGNED BY: WMF
DRAWN BY: RKG
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US ARMY CORPS OF ENGINEERS

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WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

DETAILS - HVAC

SHEET ID

M505

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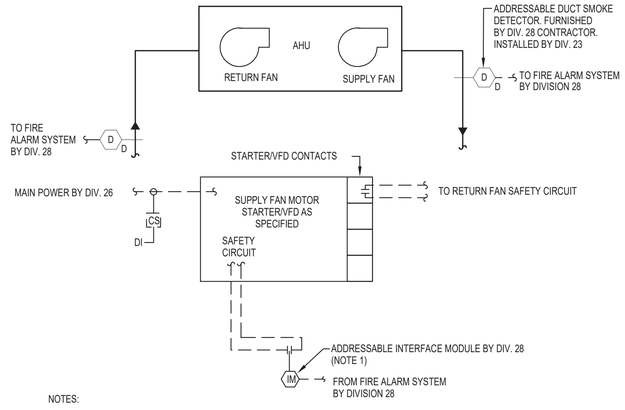
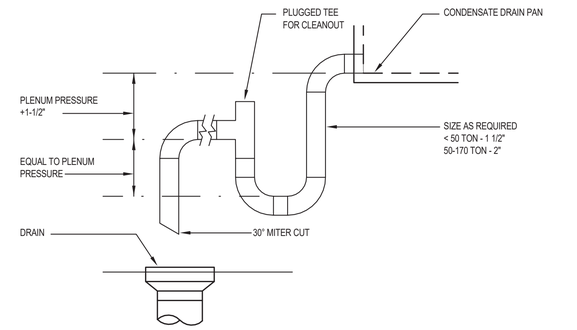


NOTES:

1. MUST MAINTAIN MAXIMUM OF 3 FT. DISTANCE FROM INTERFACE MODULE TO STARTER.

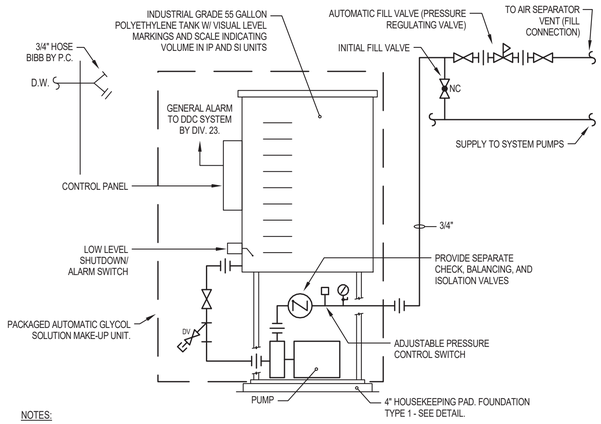
E1 / M506 AHU SMOKE DETECTOR WIRING DIAGRAM



NOTES:

1. PROVIDE SUPPORT FRAME OR LEGS FOR FLOOR MOUNTED UNIT TO ALLOW TRAP INSTALLATION, PIPE TO DRAIN
2. PLENUM PRESSURE AT COOLING COIL DRAIN. AHU MANUFACTURER MUST CONFIRM MINIMUM PLENUM PRESSURE BASED ON UNIT INTERNAL STATIC PRESSURE PROFILE

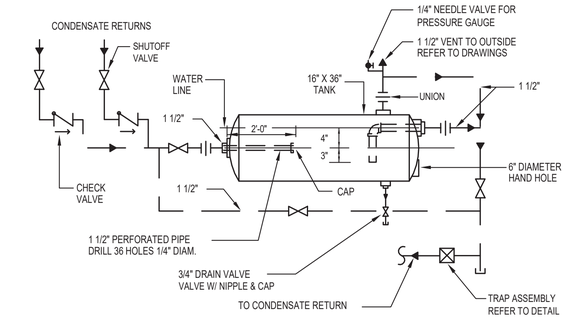
C1 / M506 DRAW-THRU UNIT DRAIN PAN PIPING



NOTES:

1. FILL SYSTEM WITH 40% (BY VOLUME) FOOD GRADE PROPYLENE GLYCOL.

A1 / M506 GLYCOL SYSTEM FILL DETAIL

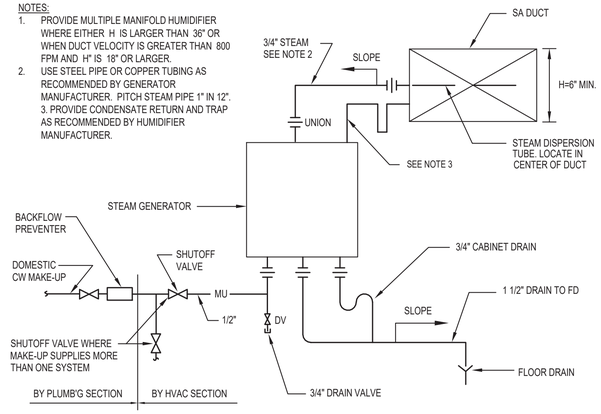


E4 / M506 FLASH TANK ASSEMBLY

VENTED TO OUTSIDE

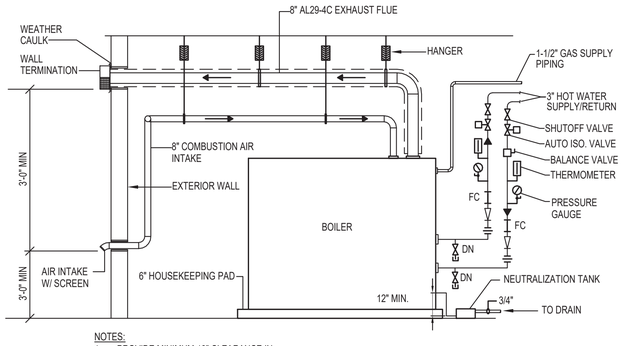
NOTES:

1. PROVIDE MULTIPLE MANIFOLD HUMIDIFIER WHERE EITHER H IS LARGER THAN 36" OR WHEN DUCT VELOCITY IS GREATER THAN 800 FPM AND H" IS 18" OR LARGER.
2. USE STEEL PIPE OR COPPER TUBING AS RECOMMENDED BY GENERATOR MANUFACTURER. PITCH STEAM PIPE 1" IN 12".
3. PROVIDE CONDENSATE RETURN AND TRAP AS RECOMMENDED BY HUMIDIFIER MANUFACTURER.



C4 / M506 STEAM HUMIDIFIER WITH ELECTRIC GENERATOR

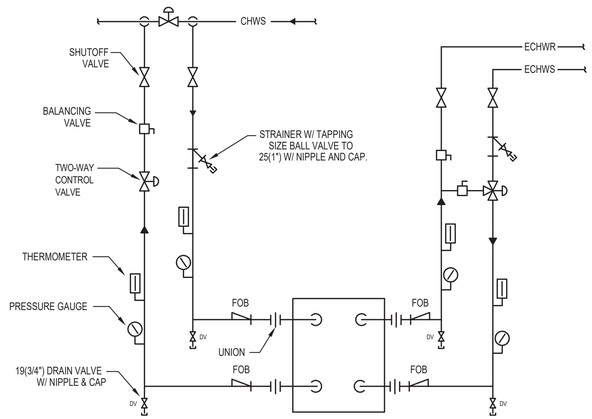
SINGLE DISPERSION TUBE



NOTES:

1. PROVIDE MINIMUM 18" CLEARANCE IN HORIZONTAL RUN BETWEEN COMBUSTION AIR INTAKE AND VENT.

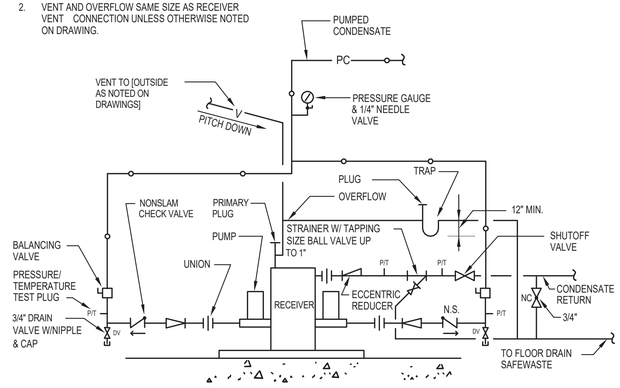
A4 / M506 CONDENSING BOILER INSTALLATION DETAIL



C8 / M506 PLATE AND FRAME HEAT EXCHANGER PIPING DETAIL

NOTES:

1. CONNECTIONS FOR SINGLE PUMP SET SIMILAR.
2. VENT AND OVERFLOW SAME SIZE AS RECEIVER VENT CONNECTION UNLESS OTHERWISE NOTED ON DRAWING.



A8 / M506 CONDENSATE RETURN PUMP PIPING

ELECTRIC

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY:	WMF
DRAWN BY:	RKG
CHECKED BY:	WCJ
SUBMITTED BY:	
SIZE	ANSI D
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WEST POINT, NY
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DETAILS - HVAC

SHEET ID

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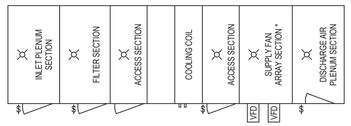
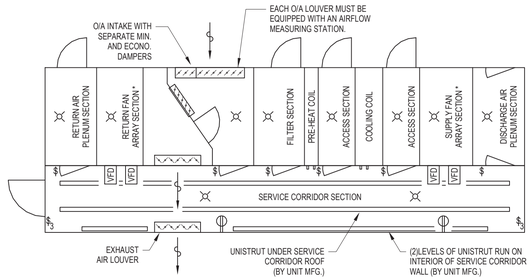
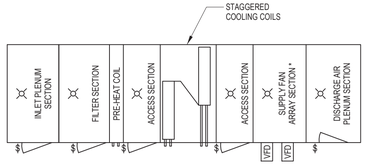


AHU-1 COMPONENT DIAGRAM



AHU-2 COMPONENT DIAGRAM



AHU-3 COMPONENT DIAGRAM

AHU COMPONENT DIAGRAM LEGEND:

- GFI DUPLEX RECEPTACLE (BY UNIT MFG.)
- LIGHT - JELLY JAR W/COMPACT FLUORESCENT LAMP (BY UNIT MFG.)
- LIGHT SWITCH (BY UNIT MFG.)
- LIGHT SWITCH - 3-WAY (BY UNIT MFG.)
- MOTOR OPERATED DAMPER (BY UNIT MFG.)
- VFD VARIABLE FREQUENCY DRIVE (BY UNIT MFG.)
- * PROVIDE HOIST BEAM FOR FAN AND MOTOR REMOVAL (BY UNIT MFG.)

AIR HANDLING UNIT SCHEDULE (SEE HPE SCHEDULE FOR ELECTRICAL SERVICE)

SYMBOL	TYPE (SEE NOTE 1)	SERVICE	LOCATION	TOTAL CFM	MIN O/A CFM (NOTE 2) TAB CFM	MIN O/A CFM (NOTE 2) COIL DESIGN	SUPPLY FAN DATA (SEE NOTES 3, 4, 14) SP/IN.WG. EXT.	SP/IN.WG. TOT.	TYPE	MIN. QTY.	MAX BHP EA.	MOTOR HP EA.	RETURN FAN DATA (SEE NOTES 3, 4, 14) SP/IN.WG. EXT.	SP/IN.WG. TOT.	TYPE	MIN. QTY.	MAX BHP EA.	MOTOR HP EA.	COOLING COIL (SEE NOTE 5) EAT °F DB	EAT °F WB	LAT °F DB	LAT °F WB	MBH TOT.	MBH SENS.	MAX. FACE VEL. / FPM	APD/ IN. WG	WATER GPM	WATER PD/FT. WG	MIN. ROWS	MAX FINS/IN.	ATC VALVE	PREHEAT/HEATING COIL (SEE NOTES 6, 7, 8, 9) LOC	EAT °F	LAT °F	MBH	FACE VEL. FPM	APD/ IN. WG	PRIMARY WATER GPM	CIRC. WATER GPM	CIRC. WATER PD / FT.	ATC VALVE	FILTERS (SEE NOTE 10) LOC	APD/IN WG INIT.	APD/IN WG FINAL	QTY. HIGH	QTY. WIDE	QTY. MERV	QTY. TYPE	REMARKS (NOTES 11, 13, 14, 15, 16)	BASIS OF DESIGN
AHU-1	VAV	ARCHIVE	BASEMENT MER	6,500	800	800	2.0	6.0	PLENUM ARRAY	4	2.71	5	-	-	-	-	-	-	74.8	54.9	51.5	47.6	132.5	125	500	0.44	20	14	5	10	2-WAY	-	-	-	-	-	-	-	-	-	-	PF AF	0.23 0.36	0.46 0.72	2 2	2 2	8 14	2" PL. 12" CART.	NOTES 17, 18	INGENIA CUSTOM
AHU-2	VAV	BUFFER	NORTH SERVICE YARD	8,000	1,600	1,600	2.3	5.0	PLENUM ARRAY	4	2.69	5	1.5	2.0	PLENUM ARRAY	4	1.22	3	78.2	66.9	51.7	51.2	377	233	500	0.66	57	14	7	10	2-WAY	PRE	55	71	142	450	0.05	7	10	8	2-WAY	PF AF	0.23 0.36	0.46 0.72	1.5 1.5	2.5 2.5	8 13	2" PL. 12" CART.	-	INGENIA CUSTOM
AHU-3	VAV	HALLS	ABOVE STAGE	13,000	1,100	4,400	2.3	5.0	PLENUM ARRAY	4	4.23	7.5	-	-	-	-	-	-	81.7	67.7	51.5	50.9	657	432	500	0.77	98	14	7	10	2-WAY	PRE	55	70.0	206	543	0.06	11	14	10	2-WAY	PF AF	0.23 0.36	0.46 0.72	2.5 2.5	2.5 2.5	8 13	2" PL. 12" CART.	NOTES 15, 17, 18	INGENIA CUSTOM

NOTES:

1. VAV = VARIABLE AIR VOLUME (W/ VFD) CV - CONSTANT VOLUME
2. UNITS HAVE CO2 RESET AND/OR PURGE MODE. TAB CFM INDICATES THE OUTSIDE AIRFLOW THAT THE UNITS ARE TO BE BALANCED TO AND THE COIL DESIGN CFM INDICATES THE DESIGN OUTSIDE AIR FOR COIL SIZING
3. TOTAL SP IS AN ESTIMATED VALUE BASED ON INFORMATION OF ONE MANUFACTURER OF AHU's. ADJUST TOTAL AS REQUIRED BASED ON ACTUAL UNIT AND COIL LOSSES AND SPECIFIED EXTERNAL AND FILTER FINAL SP.
4. TYPE - BI= BACKWARD INCLINED, AF = AIR FOIL, FC = FORWARD CURVED
5. CHILLED WATER EWT = 43°F & LWT = 56°F.
6. LOC - PRE = PREHEAT LOCATION; RE = REHEAT LOCATION
7. PRIMARY HEATING WATER EWT = 180°F & LWT = 140°F. PREHEAT COILS HAVE CIRCULATING PUMPS THAT MAINTAIN CONSTANT FLOW RATE THRU THE COIL. COIL CAPACITY IS CONTROLLED CHANGING THE COIL EWT. THIS IS ACCOMPLISHED THRU A CONTROL VALVE THAT MIXES PRIMARY HEATING WATER & COIL CIRC. WATER.
8. CONTROL VALVE FLOW IS SCHEDULED AS PRIMARY WATER GPM.
9. ALL PREHEAT COILS MUST BE PARALLEL FLOW TYPE SIZED FOR MINIMUM TUBE VELOCITY OF 3 FT/S.
10. FILTERS - "PF"=PREFILTER LOCATION, "AF"=AFTERFILTER LOCATION, "PL"=PLEATED, "CART"=CARTRIDGE, "GAS"=GAS PHASE
11. SEE DIAGRAM ABOVE FOR ADDITIONAL ACCESSORY AND ARRANGEMENT INFORMATION
12. FANS ARE TO BE INTERNALLY ISOLATED WITH SPRING ISOLATORS (2" DEFLECTION)
13. PROVIDE TWO VFDs FOR THE SUPPLY FANS, AND TWO VFDs FOR THE RETURN FANS FOR EACH AIR HANDLING UNIT.
14. SUPPLY AND RETURN FAN ARRAYS TO BE SIZED FOR TOTAL CFM. MINIMUM FAN HERTZ MUST BE 67 AT DESIGN CONDITIONS.
15. COOLING COIL MUST BE SPLIT HORIZONTALLY AND STAGGERED.
16. PROVIDE SPARE SET OF ALL FILTERS.
17. UNIT MUST BE 100% KNOCKDOWN CONSTRUCTION. EACH COMPONENT MUST FIT THROUGH A 3'-0" WIDE BY 7'-0" HIGH OPENING.
18. PROVIDE FACTORY SUPERVISION DURING FIELD ASSEMBLY AND FIELD LEAK TESTING UPON COMPLETION.

OUTSIDE AIR UNIT SCHEDULE (SEE HPE SCHEDULE FOR ELECTRICAL SERVICE)

SYMBOL	TYPE (SEE NOTE 1)	SERVICE	LOCATION	OA CFM	EXH CFM	SUPPLY FAN ESP IN.WG.	SUPPLY FAN KW	RETURN FAN ESP IN.WG.	RETURN FAN KW	SUMMER OA EAT °F DB	SUMMER OA EAT °F WB	SUMMER SA LAT °F DB	SUMMER SA LAT °F WB	SUMMER RA EAT °F DB	SUMMER RA EAT °F WB	SUMMER EA LAT °F DB	SUMMER EA LAT °F WB	WINTER OA EAT °F DB	WINTER OA EAT °F WB	WINTER SA LAT °F DB	WINTER SA LAT °F WB	WINTER RA EAT °F DB	WINTER RA EAT °F WB	WINTER EA LAT °F DB	WINTER EA LAT °F WB	FILTERS OUTDOOR AIR	FILTERS RETURN AIR	REMARKS	BASIS OF DESIGN
OAU-1	TER	ARCHIVES	NORTH SERVICE YARD	800	500	0.75	2.5	0.75	2.5	92	75	76	63.2	65	52	87.3	71.6	2	1	39.4	34.9	65	52	13.2	12.8	MERV 14	MERV 8	NOTES 2,3,4,5,6,7	SEMCO - XPH

NOTES:

1. TER = TOTAL ENERGY RECOVERY (SENSIBLE & LATENT TRANSFER)
2. PROVIDE RETURN AIR AND OUTSIDE AIR FILTERS.
3. FANS ARE TO BE INTERNALLY ISOLATED WITH SPRING ISOLATORS (2" DEFLECTION)
4. UNIT TO BE FLOOR MOUNTED AND OF DOUBLE WALL CONSTRUCTION
5. UNIT MUST BE PROVIDED WITH SINGLE POINT POWER ENTRY AND MUST COME FACTORY EQUIPPED WITH DDC CONTROLS. ALL CONTROL DEVICES, WIRING, ETC MUST BE INTEGRAL WITH THE UNIT. THE BAS MUST ENABLE AND DISABLE THE UNIT, ADJUST SETPOINTS, AND MUST RECEIVE COMMON ALARM FROM UNIT - PROVIDE ALL NECESSARY INTERFACE HARDWARE AND SOFTWARE.
6. PROVIDE LOCAL DISCONNECT.
7. PROVIDE SPARE SET OF ALL FILTERS.

HUMIDIFIER SCHEDULE (SEE HPE SCHEDULE FOR ELECTRICAL SERVICE)

SYMBOL	LOCATION	SERVICE	DISCHARGE LBS. STM/ HR.	ELECTRIC KW	AIRFLOW CFM	APPROX. DUCT WxH (IN.)	REMARKS (NOTES 1, 2, 3, 4)	BASIS OF DESIGN
HUM 1-1	BSMT MER	ARCHIVES	145	56.1	6,500	32x26	AHU-1	NORTEC EL150
HUM 2-1	BSMT MER	B2 CORR 2	9	3.7	450	14x8	VAV 2-2	NORTEC EL010
HUM 2-2	MECH SERVICE	WORK ROOM B2 CORR 1	12	7.5	615	16x8	VAV 2-5	NORTEC EL020
HUM 2-3	MECH SERVICE	B1 CORR 1	14	7.5	735	14x12	VAV 2-17	NORTEC EL020

NOTES:

1. PROVIDE PACKAGED CONTROLS WITH USER DISPLAY. PACKAGED CONTROLS MUST INTERFACE WITH THE BAS. COORDINATE INTERFACE REQUIREMENTS WITH THE DIV.25 CONTRACTOR.
2. ALL HUMIDIFIERS MUST HAVE MODULATING STEAM OUTPUT (25% TO 100% CAPACITY).
3. PROVIDE INSULATED STEAM TUBING AND DUCT-MOUNTED STEAM DISTRIBUTOR.
4. PROVIDE INTERNAL PRIMARY FINISHING OPTION FOR SCCR OF 100 KA. HUM 1-1 ONLY.

BOILER SCHEDULE (SEE HPE SCHEDULE FOR ELECTRICAL SERVICE)

SYMBOL	LOCATION	SERVICE	TYPE NOTE 2	BOILER HP	DESIGN PRESS. PSIG	INPUT MBH	GROSS OUTPUT MBH	WATER GPM	WATER LWT °F	RELIEF VALVE SETTING PSIG	GAS BURNER CFH	GAS BTU/ CU. FT.	INLET PRESS. IN. WG.	BLOWER KW	FLUE GAS VENT DIA./ IN.	FOUND. TYPE	REMARKS	BASIS OF DESIGN
B-1	BASEMENT MER	ARCHIVES	COND	45	30	1,500	1,320	105	180	90	1,500	1,000	7" - 14"	1.7	8	1	NOTE 1	CLEAVER BROOKS CFC-E 1500

NOTES:

1. PROVIDE BOILER WITH GAS TRAIN, RELIEF VALVE, FM & IRI SAFETY CONTROLS, COMPLETE CONTROL SYSTEM, BAROMETRIC DAMPER, MODULATING
2. COND=CONDENSING

DEHUMIDIFIER SCHEDULE (SEE HPE SCHEDULE FOR ELECTRICAL SERVICE)

SYMBOL	SERVICE	LOCATION	ENERGY SOURCE ELEC. KW	ENERGY SOURCE GAS CFH	ENERGY SOURCE GAS MBH	REACTIVATION FAN ESP IN. WG.	REACTIVATION FAN MOTOR HP	REACTIVATION FAN AIRFLOW CFM	REACTIVATION AIR ENT AIR DB	REACTIVATION AIR ENT AIR GR/LB	REACTIVATION AIR LVG AIR DB	PROCESS AIR AIRFLOW CFM	PROCESS AIR ENT AIR DB	PROCESS AIR ENT AIR GR/LB	PROCESS AIR LVG AIR DB	PROCESS AIR LVG AIR GR/LB	BYPASS AIR CFM	REMARKS (NOTE 1)	BASIS OF DESIGN
DHU-1	ARCHIVES	BSMT MER	-	72	66.8	0.5	2	282	285	82.4	127	1,010	66	44.7	110	3.8	1,990	NOTES 2, 3	MUNTERS HCD-1125
DHU-2	COLD STORAGE	BSMT MER	2.35	-	-	-	-	30	250	126.6	120	150	60	26.4	86	5.1	-	-	MUNTERS HC-150

NOTES:

1. PROVIDE SPARE SET OF ALL FILTERS.
2. UNIT MUST BE 100% KNOCKDOWN CONSTRUCTION. EACH COMPONENT MUST FIT THROUGH A 3'-0" WIDE BY 7'-0" HIGH OPENING.
3. PROVIDE FACTORY SUPERVISION DURING FIELD ASSEMBLY AND FIELD LEAK TESTING UPON COMPLETION.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: RKG
CHECKED BY: WCJ
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

SCHEDULES - HVAC

SHEET ID

M601

RTA SUBMISSION 2/11/2021

VARIABLE AIR VOLUME CONTROL BOX SCHEDULE

SYMBOL	SERVICE	INLET / DAMPER SIZE (IN.)	AFS DUCT SIZE (IN.)	PRIMARY AIR COOLING (CFM)		WO SP (NOTE 1)	NC @ 1.5" WG (NOTE 2)		HEATING COIL										REMARKS (SEE NOTE 4, 5)	BASIS OF DESIGN
													WATER (NOTE 3)		CONTROL VALVE					
				MAX.	MIN.		RAD.	DISCH.	HTG CFM	MBH	EAT °F	LAT °F	GPM	PD/FT.WG	TYPE	MAX. PD (FT.)	FAIL POS.	BRANCH PIPE SIZE	MIN. ROWS	
VAV-1-1	HIGH-DENSITY STORAGE B112B	14	-	1,460	1,460	0.11	18	22	1,460	31.7	55	75	1.9	0.2	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-1-2	COLD STORAGE B108	6	-	150	150	0.04	10	20	-	-	-	-	-	-	-	-	-	-	-	-	TITUS DESV
VAV-1-3	HIGH-DENSITY STORAGE B112A	12	-	700	700	0.06	17	25	700	15.2	55	75	0.7	0.1	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-1-4	HIGH-DENSITY STORAGE B210B	14	-	1,480	1,480	0.11	18	23	1,480	32.1	55	75	2.0	0.21	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-1-5	HIGH-DENSITY STORAGE B210A	12	-	820	820	0.07	18	24	820	17.8	55	75	0.9	0.15	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-1-6	CABINET STORAGE B204 & MECHANICAL B216	14	-	1,400	1,400	0.1	18	22	1,400	30.4	55	75	1.7	0.17	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-1-7	OPEN BOOK SHELVES B110	6	-	370	370	0.2	19	27	370	8.0	55	75	0.5	TG	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-2-1	VEST B217, UNPROC STOR B213 & B211, & REFUSE B215	12	-	890	270	0.08	19	25	500	18.7	55	90	2.4	0.71	2-WAY MOD.	7 FT.	NC	3/4"	2	-	TITUS DESV
VAV-2-2	CORRIDOR B2C1	10	-	450	135	0.05	16	23	135	6.7	55	75	0.6	0.07	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-2-3	1ST FLOOR	6	-	200	200	0	13	24	200	5.2	55	75	0.3	0.08	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-2-4	STORAGE B202 & CORRIDOR B2C2	6	-	125	50	0.03	-	18	115	4.3	55	90	0.3	0.08	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-2-5	WORKROOM B200A	12	-	540	185	0.04	14	24	280	10.5	55	90	0.6	0.08	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-2-6	SUPPLIES B200B	10	-	275	85	0.03	14	22	230	8.7	55	90	0.7	0.08	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-2-7	CORRIDOR B1C3 & B1C4	12	-	925	280	0.16	18	24	650	22.5	55	90	0.9	0.11	2-WAY MOD.	7 FT.	NC	3/4"	2	-	TITUS DESV
VAV-2-8	OFFICE B113	6	-	265	100	0.11	17	27	150	5.6	55	90	0.5	0.14	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-2-9	OFFICE B111	6	-	260	100	0.1	15	27	180	6.9	55	90	1.1	0.50	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-2-10	OFFICE B109	6	-	265	100	0.11	17	27	150	5.6	55	90	0.5	0.14	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-2-11	OFFICE B107	6	-	265	100	0.11	17	27	150	5.6	55	90	0.5	0.14	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-2-12	OFFICE B105	8	-	375	120	0.07	17	27	200	7.7	55	90	0.7	0.26	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-2-13	TECH CAMERA B104A	6	-	200	60	0.06	13	24	60	3.2	55	75	0.3	0.08	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-2-14	OPEN SHELVING B102A	10	-	280	85	0.03	14	22	85	5.3	55	75	0.6	0.07	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-2-15	SUPP B102B, TECH AUDIO B104B, OPEN SHELVING B102A & CORR B1C5	12	-	635	165	0.04	15	25	350	13.1	55	90	0.9	0.14	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-2-16	OPEN OFFICE 102A & COLLABORATION 102B	6	-	300	300	0.13	18	24	300	6.5	55	75	0.4	0.11	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-2-17	CORRIDOR B1C1 & B1C2	12	-	735	225	0.19	19	25	525	19.1	55	90	0.9	0.1	2-WAY MOD.	7 FT.	NC	3/4"	2	-	TITUS DESV
VAV-2-18	MAIN HALL 101	6	-	300	300	0.13	18	24	300	6.5	55	75	0.4	0.11	2-WAY MOD.	7 FT.	NC	3/4"	1	-	TITUS DESV
VAV-3-1	MEMORIAL ROOM 106A, ELEVATOR LOBBY 1L1	14	-	1,215	485	0.14	15	20	1,215	45.4	55	90	1.7	0.17	2-WAY MOD.	7 FT.	NC	3/4"	2	-	TITUS DESV
VAV-3-2	MEMORIAL ROOM 106A	14	-	1,260	505	0.15	15	20	1,260	41.3	55	90	1.4	0.12	2-WAY MOD.	7 FT.	NC	3/4"	2	-	TITUS DESV
VAV-3-3	MEMORIAL HALL 200	24x16	-	4,900	1960	0.75	37	18	4,900	187.1	55	90	6.2	0.6	2-WAY MOD.	7 FT.	NC	1-1/4"	3	NOTE 6	TITUS DESV
VAV-3-4	MEMORIAL HALL 200	24x16		4,900	1960	0.75	37	18	4,900	187.1	55	90	6.2	0.6	2-WAY MOD.	7 FT.	NC	1-1/4"	3	NOTE 6	TITUS DESV

NOTES:
1. BOX WIDE OPEN STATIC PRESSURE LOSS, IN. WG. INCLUDING HEATING COIL.
2. ACOUSTICAL PERFORMANCE DETERMINED USING AHRI 885-2008 APPENDIX E WITH A 1.5" W.G. INLET PRESSURE. OTHER SCHEDULED PERFORMANCE IS BASED UPON TESTS PERFORMED IN ACCORDANCE WITH ASHRAE 130-2008 & AHRI 880-2008.
3. CAPACITY BASED ON 180 deg F ENTERING WATER TEMPERATURE. 3/4" BRANCH PIPE SIZE TO WATER COIL UNLESS OTHERWISE NOTED ON DRAWINGS. TWO OR THREE WAY ATC VALVE AS NOTED.
4. UNITS TO HAVE PRESSURE INDEPENDENT PRIMARY AIR CONTROL, MULTI-POINT INLET VELOCITY SENSOR, BOTTOM ACCESS, INTEGRAL 24V CONTROL TRANSFORMER, SINGLE POINT ENTRY.
5. PROVIDE UNIT WITH COIL FACE LINER.
6. PROVIDE UNIT MOUNTED SOUND ATTENUATOR.

AIR DEVICE SCHEDULE

SYMBOL	DESCRIPTION	NECK SIZE (IN.)	FLOW RANGE (CFM)	NO. SLOTS	SLOT WIDTH (IN.)	MAX. P.D. (IN. WG)	BLOW PATTERN	MAX. N.C.	REMARKS (SEE NOTES 1, 2, 3, 4)	BASIS OF DESIGN
CD-1	18x18 ALUMINUM CEILING DIFFUSER	6"Ø	0-100	-	-	.15 MAX	4-WAY U.N.O.	25	-	TITUS TDCA-AA
CD-2	18x18 ALUMINUM CEILING DIFFUSER	8"Ø	101-200	-	-	.15 MAX	4-WAY U.N.O.	25	-	TITUS TDCA-AA
CD-3	18x18 ALUMINUM CEILING DIFFUSER	12"Ø	201-500	-	-	.15 MAX	4-WAY U.N.O.	25	-	TITUS TDCA-AA
ER-1	12x12 ALUMINUM EXHAUST REGISTER	10x10	0-100	-	-	.10 MAX	-	30	W/ OPPOSED BLADE DAMPER	TITUS 355FL
ER-2	12x12 ALUMINUM EXHAUST REGISTER	12x12	101-350	-	-	.10 MAX	-	30	W/ OPPOSED BLADE DAMPER	TITUS 355FL
LSD-1	48" LONG ALUMINUM SLOT DIFFUSER	6"Ø	0-100	2	1	.10 MAX	2-WAY ADJUSTABLE	25	-	TITUS ML-39
LSD-2	48" LONG ALUMINUM SLOT DIFFUSER	10"Ø	101-210	2	1	.10 MAX	2-WAY ADJUSTABLE	30	NOTE 12	TITUS ML-39
LSD-3	42" LONG ALUMINUM SLOT DIFFUSER	14"Ø	400-500	5	3/4	.10 MAX	2-WAY ADJUSTABLE	25	NOTE 11	TITUS ML-38
RG-1	16x16 ALUMINUM RETURN GRILLE	14x14	0-500	-	-	.10 MAX	-	20	-	TITUS 355FL
RG-2	24x24 ALUMINUM RETURN GRILLE	22x22	1000-1500	-	-	.10 MAX	-	20	-	TITUS 355FL
RG-3	30x24 ALUMINUM RETURN GRILLE	24x48	2450	-	-	.10 MAX	-	20	-	TITUS 355FL
RR-1	12x12 ALUMINUM RETURN REGISTER	12x12	0-500	-	-	.10 MAX	-	25	W/ OPPOSED BLADE DAMPER	TITUS 355FL
RR-2	24x24 ALUMINUM RETURN REGISTER	22x22	501-1000	-	-	.10 MAX	-	25	W/ OPPOSED BLADE DAMPER	TITUS 355FL
TG	ALUMINUM TRANSFER GRILLE	NOTE 10	-	-	-	.10 MAX	-	20	-	TITUS 355FL
SR-1	ALUMINUM SUPPLY REGISTER	8x6	0-100	-	-	.10 MAX	DOUBLE DEFLECTION	30	W/ OPPOSED BLADE DAMPER	TITUS 300FS
SR-2	ALUMINUM SUPPLY REGISTER	10x8	101-200	-	-	.10 MAX	DOUBLE DEFLECTION	30	W/ OPPOSED BLADE DAMPER	TITUS 300FS
SR-3	ALUMINUM SUPPLY REGISTER	14x10	201-300	-	-	.10 MAX	DOUBLE DEFLECTION	30	W/ OPPOSED BLADE DAMPER	TITUS 300FS

NOTES:
1. FLEXIBLE DUCT SIZE TO MATCH NECK SIZE.
2. ADJUST AIR DEVICE SIZE OR DESIGNATION WHERE AIR FLOW INDICATED ON THE DRAWINGS EXCEEDS SCHEDULED FLOW RANGE, MAX. P.D. OR MAX. N.C.
3. PROVIDE SQUARE TO ROUND ADAPTERS AS REQUIRED. PROVIDE FIELD FABRICATED PLENUMS WHERE FACTORY PLENUMS WILL NOT FIT DUE TO FIELD CONDITIONS.
4. PROVIDE GYPSUM FRAMES FOR ALL AIR DEVICES MOUNTED IN PLASTER CEILINGS. SEE ARCHITECTURAL REFLECTED CEILING PLANS.
5. PROVIDE 24x24 DROP PANEL FOR LAY-IN CEILING.
6. ALL SIZES INDICATED FOR T-BAR CEILINGS ARE NOMINAL - EXACT SIZE TO BE LESS TO ALLOW DEVICES TO LAY IN CEILING.
7. EACH SLOT TO BE INDEPENDENTLY ADJUSTABLE FOR BLOW DIRECTION & AIR VOLUME.
8. WITH GYPSUM MOUNTING FRAME, FLANGED BORDER & FIELD FABRICATED INSULATED PLENUM. PART OF A LONGER SLOT ASSEMBLY THAT IS TO HAVE CONTINUOUS APPEARANCE. PROVIDE ALIGNMENT PINS AND END CAPS. SEE FLOOR PLANS FOR TOTAL LENGTH.
9. WITH GYPSUM MOUNTING FRAME, FLANGED BORDER & FIELD FABRICATED AIRTIGHT BLANK OFF PLENUM. PART OF A LONGER SLOT ASSEMBLY THAT IS TO HAVE A CONTINUOUS APPEARANCE. PROVIDE ALIGNMENT PINS AND END CAPS. SEE FLOOR PLANS FOR TOTAL LENGTH.
10. REFER TO DUCTWORK PLANS AND ATD DETAIL FOR TG SIZES.
11. LSD WIDTH (INCLUDING DIFFUSER FACE) CANNOT EXCEED 8". BASIS OF DESIGN: TITUS BORDER TYPE 15.
12. FLUSH SIDE WALL LSD BASIS OF DESIGN: TITUS BORDER TYPE A2. FLUSH BOTTOM OF CASEWORK BASIS OF DESIGN: TITUS BORDER TYPE D2.

FAN SCHEDULE (SEE HPE SCHEDULE FOR ELECTRICAL SERVICE)

SYMBOL	TYPE	LOCATION	SERVICE	CFM	SP/ IN. WG	RPM	MOTOR		MOUNTING		MAX. dBA	VFD	REMARKS	BASIS OF DESIGN
							MAX. BHP	HP	TYPE	VIBRATION ISOLATION				
EF-1	INL	TUNNEL B3 LEVEL	GENERAL EXHAUST	2,200	1.5	2,204	0.99	1.5	CEIL	2" SPR.	67	N	-	COOK 120QMX
RF-1	INL, MIX	BASEMENT MER	RETURN FAN AHU-1	6,500	1.9	1,955	4.75	7.5	CEIL	2" SPR.	76	Y	-	COOK 180QMX
RF-3A	INL, MIX	CH-302	RETURN FAN AHU-3	6,500	2	1,955	4.75	7.5	CEIL	2" SPR.	76	Y	-	COOK 180QMX
RF-3B	INL, MIX	CH-301	RETURN FAN AHU-3	6,500	2	1,955	4.75	7.5	CEIL	2" SPR.	76	Y	-	COOK 180QMX
VF B3-1	INL	TUNNEL B3 LEVEL	VENTILATION	1,000	0.5	1,063	172W	0.5	CEIL	2" SPR.	58	N	PROVIDE SPEED CONTROLLER	COOK SQND-EC
VF B3-2	INL	TUNNEL B3 LEVEL	VENTILATION	1,000	0.5	1,063	172W	0.5	CEIL	2" SPR.	58	N	PROVIDE SPEED CONTROLLER	COOK SQND-EC

NOTES:
1. FANS WITH SPEED CONTROLS MUST BE SELECTED FOR SCHEDULED FAN PERFORMANCE AT MEDIAN AVAILABLE RPM.
2. ALL FANS TO BE BELT DRIVEN UNLESS NOTED OTHERWISE.
3. ALL FANS ARE TO BE PROVIDED WITH BACK DRAFT DAMPERS.
4. PROVIDE FANS WITH ALL OPTIONAL GUARDS, COVERS AND SAFETY DEVICES.
5. CENT = CENTRIFUGAL, PROP = PROPELLER, UTIL = UTILITY SET, UP = UPBLAST, CAB = CABINET, MIX = MIXED FLOW, INL = INLINE

A/C CONDENSATE PUMP UNIT SCHEDULE (SEE HPE SCHEDULE FOR ELECTRICAL SERVICE)

SYMBOL	LOCATIONS	SERVICE	NO. OF PUMPS	GPM EA.	FT. WG	HP EA.	RECEIVER GAL.	REMARKS	BASIS OF DESIGN
CP-1	SEE PLANS	FCUs 2M-1, B3-1, B3-2	1	6	15	1/5	1	SEE NOTES 1 & 2	LITTLE GIANT VCL-45

NOTES:
1. PROVIDE UNIT WITH INTEGRAL FLOAT SWITCH, HIGH LEVEL SAFETY SWITCH & THERMAL OVERLOADS.
2. PUMPS SHALL BE HARDWIRED TO 120V CIRCUIT.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-15-C0031
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DESIGNED BY: WMF
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SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

SCHEDULES - HVAC

SHEET ID

M602

RTA SUBMISSION 2/11/2021

SHELL AND TUBE HEAT EXCHANGER SCHEDULE

SYMBOL	LOCATION	SERVICE	MBH	FOUL FACTOR	TUBE SIDE								SHELL SIDE						REMARKS (SEE NOTE 1)	BASIS OF DESIGN
					GPM	SERVICE	EWT °F	LWT °F	PD (FT.WG.)	NO. OF PASSES	CONN. SIZE SUP.	CONN. SIZE RET.	LBS/HR	PSI	PD (FT.WG.)	NO. OF PASSES	CONN. SIZE STM	CONN. SIZE COND		
HX-1	BASEMENT MER	HEATING HOT WATER	1,400	0.00025	105	HW	152.7	180	0.6	2	4	4	1,439	2	0.2	1	4	1.25	-	BELL & GOSSETT SU-104-2

NOTE:
1. ELEVATE HEAT EXCHANGERS AS REQUIRED TO ACCOMMODATE FOR BOTTOM PIPING INLET OR OUTLET CONNECTIONS AND LAYOUT.

PLATE AND FRAME HEAT EXCHANGER SCHEDULE

SYMBOL	LOCATION	SERVICE	MBH	FOUL FACTOR	TOTAL SURFACE AREA (FT.²)	CHILLED WATER SIDE							EMERGENCY CHILLED WATER SIDE						REMARKS (SEE NOTE 1)	BASIS OF DESIGN
						GPM	PERCENT GLYCOL	EWT °F	LWT °F	PD (FT.WG.)	CONN. SIZE (IN.) SUP.	CONN. SIZE (IN.) RET.	GPM	PERCENT GLYCOL	EWT °F	LWT °F	PD (FT.WG.)	CONN. SIZE (IN.) SUP.	CONN. SIZE (IN.) RET.	
HX-2	BASEMENT MER	CHILLED WATER	320	0.00025	244	50	0%	56	43	2	2.5	2.5	67	40%	40	50	6	2.5	2.5	-	BELL & GOSSETT GPX

NOTE:
1. PLATES MUST BE 304 STAINLESS STEEL.

AIR COOLED CHILLER SCHEDULE (SEE HPE SCHEDULE FOR ELECTRICAL SERVICE)

SYMBOL	LOCATION	SERVICE	CAPACITY		EVAPORATOR							AMBIENT AIR °F		COMPRESSOR			FAN		PUMPS			FULL LOAD KW/TON (MAX.)	REMARKS	BASIS OF DESIGN
			NOM. TONS	MBH	GPM	PD / FT. WG	EWT °F	LWT °F	REF.	FOUL FACT.	CONN. SIZE	SUMMER	WINTER	QTY.	TYPE	KW EA.	QTY.	HP EA.	QTY.	GPM	HP EA.			
CH-1	NORTH SERVICE YARD	ARCHIVES	30	360	67	22.4	50	40	R-410A	0.0001	2.5	92	2	2	SCROLL	14	3	1.5	2	67	5	1.06	NOTES: 1,2,3	TRANE CGAM030

NOTES:
1. PROVIDE INTEGRAL EXPANSION TANK AND 140 GALLON BUFFER TANK.
2. PROVIDE INTEGRAL DUAL PUMPS (N+1) WITH VFDS.
3. CHILLED WATER INCLUDES 40% PROPYLENE GLYCOL.
4. ALL CHILLER AND PUMP COMPONENTS, TRIM, AND ACCESSORIES MUST BE WINTERIZED AND FULLY FACTORY INSULATED.

PUMP SCHEDULE (SEE HPE SCHEDULE FOR ELECTRICAL SERVICE)

SYMBOL	TYPE	LOCATION	SERVICE	GPM	TOTAL HEAD FT. WG	MAX. NPSH FT. WG	OPER. TEMP. °F	SIZE IN. SUCT.	SIZE IN. DISCH.	EFF. %	RPM	BHP	HP	REMARKS NOTE 1	BASIS OF DESIGN
P-1	END SUCTION	BASEMENT MER	TERTIARY CHILLED WATER	220	75	7.15	43	3	2	71.7	1800	5.79	7.5	-	BELL & GOSSETT e1510 2EB
P-2	END SUCTION	BASEMENT MER	TERTIARY CHILLED WATER	220	75	7.15	43	3	2	71.7	1800	5.79	7.5	SPARE	BELL & GOSSETT e1510 2EB
P-3	INLINE	BASEMENT MER	HEATING HOT WATER	105	65	7.97	180	2	2	61.3	1800	2.81	5	-	BELL & GOSSETT e80 2x2x9.5C
P-4	INLINE	BASEMENT MER	HEATING HOT WATER	105	65	7.97	180	2	2	61.3	1800	2.81	5	SPARE	BELL & GOSSETT e80 2x2x9.5C
FZP-2A	INLINE	AHU-2 VESTIBULE	CW FREEZE PROTECTION	57	35	8.53	43	1 1/2	1 1/2	62.3	1800	0.807	1.5	-	BELL & GOSSETT e90 1.5AB
FZP-2B	INLINE	AHU-2 VESTIBULE	HW FREEZE PROTECTION	10	35	6.54	180	1	1	63.0	3250	0.4	0.5	-	BELL & GOSSETT PL-55
FZP-3	INLINE	ABOVE STAGE	HW FREEZE PROTECTION	14	35	7.07	180	1 1/4	1 1/4	63.0	3250	0.4	0.5	-	BELL & GOSSETT PL-55

NOTES:
1. PUMPS TO BE NON-OVERLOADING AT EVERY POINT ON PUMP CURVE.

EQUIPMENT PHYSICAL PROPERTIES SCHEDULE

SYMBOL	LENGTH/DEPTH IN.	HEIGHT IN.	WIDTH IN.	WEIGHT LBS.	REMARKS
AHU-1	218	69	65	3,500	NOTES 1,4
AHU-2	313	98	135	10,000	NOTES 1,2,4
AHU-3	245	74	74	5,200	NOTES 1,4
B-1	56	80	36	2,778	NOTE 1
CH-1	171	85	51	4,687	NOTE 1
DHU-1	116	100	62	1,532	NOTES 1,5
OAU-1	90	47	38	900	NOTES 1,3,4

NOTES:
1. DIMENSIONS DO NOT INCLUDE SERVICE CLEARANCE.
2. DIMENSIONS INCLUDE SERVICE VESTIBULE. HEIGHT IS TO THE HIGH POINT OF THE SLOPED VESTIBULE ROOF.
3. DIMENSIONS DO NOT INCLUDE WEATHER HOODS.
4. HEIGHT INCLUDES BASERAIL.
5. DIMENSIONS INCLUDE ALL ACCESSORIES.

GLYCOL FILL TANK SCHEDULE (SEE HPE SCHEDULE FOR ELECTRICAL SERVICE)

SYMBOL	TYPE	LOCATION	SERVICE	PUMP GPM	PUMP HEAD PSI	PUMP MOTOR HP	GLYCOL	TANK VOLUME (GALLONS)	REMARKS	BASIS OF DESIGN
GFT-1	PROPYLENE	BASEMENT MER	ARCHIVES CHILLER CH-1	5	60	3/4	40	55	NOTE 1	BELL & GOSSETT GMU60

NOTES:
1. FILL TANK TO BE A PACKAGED SYSTEM COMPLETE WITH TRANSFER PUMP, Y-STRAINER, SHUTOFF VALVE, CHECK VALVE, BALANCING VALVE, HIGH AND LOW PRESSURE CUTOUTS, LOW LEVEL CUTOUT, AND ALARM INDICATOR LIGHT.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

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SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

DESIGNED BY: WMF
DRAWN BY: RKG
CHECKED BY: WCJ
SUBMITTED BY: BK
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

SCHEDULES - HVAC

SHEET ID

M603

RTA SUBMISSION 2/11/2021

STEAM CONDENSATE RECEIVER SCHEDULE (SEE HPE SCHEDULE FOR ELECTRICAL SERVICE)

SYMBOL	TYPE	LOCATION	SERVICE	NO. OF PUMPS	FLOW	HEAD	TEMP.	SIZE		PUMP MOTOR	RECEIVER	FOUND.	REMARKS	BASIS OF DESIGN
								SUCT.	DISCH.					
					GPM ea.	PSI	F°	IN	IN	HP ea.	GAL	TYPE	NOTES 1,2	
CR-1	DUPLEX	BASEMENT MER	CULLUM	2	9	25	212	2	1.5	0.5	23	1	-	BELL & GOSSETT CB
CR-2	DUPLEX	TUNNEL	LINCOLN	2	9	25	212	2	1.5	0.5	23	1	-	BELL & GOSSETT CB

NOTES:
1. PUMPS TO BE NON-OVERLOADING AT EVERY POINT ON PUMP CURVE.
2. PROVIDE TEFC MOTORS, WATER LEVEL GAUGE W/ SHUTOFF VALVE, THERMOMETER, INLET STRAINER, DISCHARGE PRESSURE GAUGES, UNIT MOUNTED CONTROL, PANEL W/ PUMP ALTERNATOR, HIGH LEVEL ALARM CONTACTS, CONTROL TRANSFORMER, TWO FLOAT SWITCHES, HOA MAGNETIC STARTERS AND DISCONNECT SWITCH.

FAN COIL UNIT SCHEDULE (SEE HPE SCHEDULE FOR ELECTRICAL SERVICE)

SYMBOL	SERVICE	TYPE	FAN				COOLING (NOTE 2)									HEATING									REMARKS (NOTE 3)	BASIS OF DESIGN
													CONTROL VALVE			BRANCH PIPE SIZE						CONTROL VALVE			BRANCH PIPE SIZE		
		(SEE NOTE 1)	CFM	ESP IN. WG	HP	RPM	EAT DB °F	EAT WB °F	EWT °F	GPM	SENS. MBH	TOTAL MBH	PD/ FT. WG	TYPE	MAX. PD (FT.)	FAIL POS.		EAT °F	MBH	EWT °F	GPM	PD/FT. WG	TYPE	MAX. PD (FT.)	FAIL POS.			
FCU B3-1	TUNNEL	4P HCON	180	0.25	0.03	1194	80	65	43	0.7	3.5	4.7	3.2	2W MOD.	7 FT.	NO	3/4"	60	14.2	180	0.94	4.03	2W MOD.	7 FT.	NO	3/4"	-	TRANE FCDB020
FCU B3-2	TUNNEL	4P HCON	180	0.25	0.03	1194	80	65	43	0.7	3.5	4.7	3.2	2W MOD.	7 FT.	NO	3/4"	60	14.2	180	0.94	4.03	2W MOD.	7 FT.	NO	3/4"	-	TRANE FCDB020
FCU B2-1	B219 - EMR	4P HCAB	1200	-	0.23	-	75	65	43	4	28.43	34.51	6.4	2W MOD.	7 FT.	NC	1"	65	64.1	180	4	6.1	2W MOD.	7 FT.	NO	1"	NOTE 4	EMI CCP48
FCU B1-1	B120 - ELEC EM	2P HCAB	350	-	0.16	-	75	65	43	2	8.8	10.9	5.3	2W MOD.	7 FT.	NC	3/4"	-	-	-	-	-	-	-	-	-	NOTE 4	EMI CCP12
FCU B1-2	B118 - ELEC MAIN	2P HCAB	1200	-	0.23	-	75	65	43	4	28.43	34.51	6.4	2W MOD.	7 FT.	NC	1"	-	-	-	-	-	-	-	-	-	NOTE 4	EMI CCP48
FCU B1-3	B118 - ELEC MAIN	2P HCAB	1200	-	0.23	-	75	65	43	4	28.43	34.51	6.4	2W MOD.	7 FT.	NO	1"	-	-	-	-	-	-	-	-	-	NOTE 4	EMI CCP48
FCU 1-1	CH-100 - PANTRY	4P HCAB	350	-	0.16	-	75	62	43	1	7.3	7.8	3	2W MOD.	7 FT.	NO	3/4"	65	22.9	180	2	3.4	2W MOD.	7 FT.	NO	3/4"	NOTE 4	EMI CCP12
FCU 1-2	CH-1S1 MAIN STAIR	4P VCON	250	-	0.04	1208	75	62	43	0.6	4	4.11	0.6	2W MOD.	7 FT.	NO	3/4"	65	10.4	180	0.69	1.15	2W MOD.	7 FT.	NO	3/4"	NOTE 5	TRANE FCBB020
FCU 1-3	CH-1S1 MAIN STAIR	4P VCON	250	-	0.04	1208	75	62	43	0.6	4	4.11	0.6	2W MOD.	7 FT.	NO	3/4"	65	10.4	180	0.69	1.15	2W MOD.	7 FT.	NO	3/4"	NOTE 5	TRANE FCBB020
FCU 1-4	CH-102A OFFICE	4P VCON	650	0.25	0.22	1745	75	62	43	1.9	12.2	12.5	1.6	2W MOD.	7 FT.	NO	3/4"	65	24.8	180	1.65	8.12	2W MOD.	7 FT.	NO	3/4"	-	TRANE FCAB060
FCU 1-5	CH-102B COLLAB	4P VCON	650	0.25	0.22	1745	75	62	43	1.9	12.2	12.5	1.6	2W MOD.	7 FT.	NO	3/4"	65	24.8	180	1.65	8.12	2W MOD.	7 FT.	NO	3/4"	-	TRANE FCAB060
FCU 1-6	CH-104B/CH-106B	4P HCON	875	0.4	0.24	1596	75	62	43	3	19.2	19.6	2.7	2W MOD.	7 FT.	NO	1"	65	30.2	180	0.86	4.44	2W MOD.	7 FT.	NO	3/4"	-	TRANE FCCB100
FCU 1-7	CH-101 LOBBY	4P HCON	310	0.4	0.09	1565	75	62	43	1.1	6.6	6.9	2.1	2W MOD.	7 FT.	NO	3/4"	65	13.8	180	0.92	2.21	2W MOD.	7 FT.	NO	3/4"	-	TRANE FCCB040
FCU 2M-1	CH-300 GALLERY	4P HCON	730	0.4	0.24	1745	75	62	43	2.6	16.1	16.8	3.1	2W MOD.	7 FT.	NO	3/4"	65	30.2	180	2.01	13.81	2W MOD.	7 FT.	NO	3/4"	-	TRANE FCDB080
FCU 3-1	SHARED	4P VCAB	360	-	0.08	1485	75	62	43	1.4	8.3	9.1	3.4	2W MOD.	7 FT.	NO	3/4"	65	14.8	180	0.99	2.53	2W MOD.	7 FT.	NO	3/4"	-	TRANE FCBB040
FCU 3-2	SHARED	4P VCAB	600	-	0.16	1540	75	62	43	1.8	11.2	11.5	1.4	2W MOD.	7 FT.	NO	3/4"	65	23.9	180	1.59	7.58	2W MOD.	7 FT.	NO	3/4"	-	TRANE FCBB060

NOTES:
1. TYPE - 4P = 4 PIPE, 2P = 2 PIPE, VHR = VERTICAL HIGH RISE, HCAB = HORIZONTAL CABINET, HCON = HORIZONTAL CONCEALED, VCAB = VERTICAL CABINET, VCON = VERTICAL CONCEALED.
2. CHILLED WATER LWT = 56°F
3. PROVIDE SPARE SET OF ALL FILTERS.
4. PROVIDE INTEGRAL CONDENSATE PUMP.
5. PROVIDE CABINET EXTENSIONS TO CONCEAL ALL PIPING AND TRIM.

RADIANT HEATING PANEL SCHEDULE

SYMBOL	SERVICE	PANEL WIDTH (FT.)	PANEL LENGTH (FT.)	HEATING							REMARKS	BASIS OF DESIGN
				MBH	AWT °F	GPM	NO. PASSES	CONTROL VALVE TYPE	CONTROL VALVE MAX. PD (FT.)	CONTROL VALVE FAIL POS.	BRANCH PIPE SIZE		
RHP B2-1	MEN B201	1	26	4.9	160	0.25	2	2W 2POS	1 FT.	NO	3/4"	NOTES 1,2	STERLING
RHP B2-2	JC/STORAGE B203	1	9	2.0	170	0.2	2	2W 2POS	1 FT.	NO	3/4"	NOTE 1	STERLING
RHP B2-3	WOMEN B207	1	13	2.8	170	0.28	2	2W 2POS	1 FT.	NO	3/4"	NOTE 1	STERLING
RHP B1-1	MEN B101	1	27	5.1	160	0.26	2	2W 2POS	1 FT.	NO	3/4"	NOTES 1,2	STERLING
RHP B1-2	WOMEN B103	1	15	3.4	175	0.7	2	2W 2POS	1 FT.	NO	3/4"	NOTE 1	STERLING

NOTES:
1. PANELS MUST BE 12" WIDE AND COVER THE ENTIRE LENGTH OF THE RESPECTIVE SPACE EXTERIOR WALLS. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LENGTHS.
2. PROVIDE CORNER PIECES AND ACCESSORIES AS REQUIRED FOR CONTINUOUS PANELS AROUND ROOM PERIMETER.

DUCT-MOUNTED CHILLED WATER COIL SCHEDULE

SYMBOL	SERVICE OR LOCATION	CFM	MBH	EAT		LAT		APD	WATER								DUCT WxH	REMARKS	BASIS OF DESIGN
									EWT	LWT	GPM	PD/	CONTROL VALVE			BRANCH PIPE SIZE (IN.)	ROWS			
				°F DB	°F WB	°F DB	°F WB						TYPE	MAX. PD (FT.)	FAIL POS.				
								IN. WG	°F	°F		FT. WG						(IN.)		
CC-1	COLD STORAGE	150	6.9	88	55	46	46	0.3	43	45.7	5	6.56	2W MOD.	7 FT.	NO	1"	12	12X4	-	TRANE - COONEY

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US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

SCHEDULES - HVAC

SHEET ID
M604

RTA SUBMISSION 2/11/2021

COMPUTER ROOM AIR CONDITIONING UNIT SCHEDULE (SEE HPE SCHEDULE FOR ELECTRICAL SERVICE)

SYMBOL	TYPE	SERVICE	LOCATION	TOTAL CFM	FAN DATA			EAT °F		LAT °F		MBH		GPM	COOLING COIL NOM. TONS	CONTROL VALVE			BRANCH PIPE SIZE	REHEAT			HUMIDIFIER		REMARKS (NOTES 1, 2, 3)	BASIS OF DESIGN
					ESP IN. WG	MAX KW	HP	DB	WB	DB	WB	TOT.	SENS.			TYPE	MAX. PD (FT.)	FAIL POS.		MBH	ELECTRIC KW	ELECTRIC STEPS	CAPACITY LBS/HR	TYPE		
CRU B1-1	WALL-MOUNTED	TELECOM	TELECOM	1,200	0.0	0.398	0.75	72	58.7	55.0	52.2	22.4	21.9	5.3	3	2W MOD.	7 FT.	NO	1"	20.4	5.5	2	3	STM	-	LIEBERT DME044C
CRU B1-2	WALL-MOUNTED	TELECOM	TELECOM	1,200	0.0	0.398	0.75	72	58.7	55.0	52.5\2	22.4	21.9	5.3	3	2W MOD.	7 FT.	NO	1"	20.4	5.5	2	3	STM	-	LIEBERT DME044C

NOTES:
1. PROVIDE UNIT WITH REMOTE WALL MOUNTED MICROPROCESSOR CONTROL KEYPAD.
2. PROVIDE INTEGRAL CONDENSATE PUMP.
3. PROVIDE SPARE SET OF ALL FILTERS.

CABINET UNIT HEATER SCHEDULE (SEE HPE SCHEDULE FOR ELECTRICAL SERVICE)

SYMBOL	TYPE (NOTE 2)	LOCATION	FAN (NOTE 1)			HEATING CAPACITY									REMARKS (SEE NOTES) 3, 6, 9, 10	BASIS OF DESIGN
											CONTROL VALVE					
			CFM	HP / WATTS	RPM	MBH	EAT °F	GPM	PD/ FT. WG	EWT °F	TYPE	MAX. PD (FT.)	FAIL POS.	BRANCH PIPE SIZE	ROWS	
CUH 1-1	HCAB	CH-103 - WOMEN	350	0.25	MEDIUM	7.2	65	0.9	3.2	180	2W MOD.	7 FT.	NO	3/4"	2	5	TRANE B04
CUH 1-2	HCAB	CH-105 - MEN	300	0.25	MEDIUM	8.2	65	1.1	3.3	180	2W MOD.	7 FT.	NO	3/4"	2	5	TRANE B04
CUH B2-1	VCAB	B205 - VEST	350	58 WATTS	MEDIUM	16	65	2	5.5	180	-	-	-	3/4"	3	4, 7, 8	TRANE FF-B04
CUH B2-2	VCAB	B217 - VEST	350	58 WATTS	MEDIUM	16	65	2	5.5	180	-	-	-	3/4"	3	4, 7, 8	TRANE FF-B04
CUH B1-1	VCAB	B100 - VEST	350	58 WATTS	MEDIUM	16	65	2	5.5	180	-	-	-	3/4"	3	4, 7, 8	TRANE FF-B04
CUH B1-2	VCAB	B122 - VEST	350	58 WATTS	MEDIUM	16	65	2	5.5	180	-	-	-	3/4"	3	4, 7, 8	TRANE FF-B04
CUH B1-3	VCAB	NW STAIR	350	58 WATTS	MEDIUM	21	65	2.7	5.5	180	-	-	-	3/4"	3	4, 7, 8	TRANE FF-B04

NOTES:
1. AIR FLOW INCLUDES ALLOWANCES FOR ALL INTEGRAL PRESSURE DROPS (INCLUDING INTAKE AND DISCHARGE GRILLES, COILS AND FILTERS.
2. TYPES - VCAB = VERTICAL CABINET, HCAB = HORIZONTAL CABINET.
3. PROVIDE UNIT WITH HINGED VANDAL-PROOF ACCESS DOORS
4. PROVIDE UNIT HEATER WITH INTEGRAL FAN ON-OFF AUTO SWITCH & THERMOSTAT. ON A CALL FOR HEAT THE UNIT CONTROLS MUST OPEN A SOLENOID VALVE LOCATED UNDER UNIT COVER IN AN ACCESSIBLE LOCATION. ALL CONTROL DEVICES, TRANSFORMERS, ETC. MUST COME PRE-WIRED WITH UNIT.
5. UNIT HEATER MUST BE CONTROLLED THRU DDC SYSTEM.
6. PROVIDE 1" THROWAWAY FILTER FOR RETURN AIR.
7. COORDINATE WITH DOR FOR FINISHES COLOR.
8. PROVIDE ACCESSIBLE EXTENDED CABINET TO ENCLOSE ALL CUH TRIM AND ACCESSORIES.
9. PROVIDE SPARE SET OF ALL FILTERS.
10. PROVIDE UNIT MOUNTED DISCONNECT SWITCH.

UNIT HEATER SCHEDULE (SEE HPE SCHEDULE FOR ELECTRICAL SERVICE)

SYMBOL	TYPE	LOCATION	FAN			HEATING CAPACITY								REMARKS (SEE NOTES 1,2,3,4,5)	BASIS OF DESIGN
											CONTROL VALVE				
			CFM	HP / WATTS	RPM	MBH	EAT °F	GPM	PD/ FT. WG	EWT °F	TYPE	MAX. PD (FT.)	FAIL POS.	BRANCH PIPE SIZE	
UH B2-1	EX	MECHANICAL B216	420	16W	1350	15.7	65	1.9	2.2	180	2W MOD.	7 FT.	NO	3/4"	-	TRANE S-A18
UH B1-1	EX	AHU-2 VESTIBULE	420	16W	1350	15.7	65	1.9	2.2	180	2W MOD.	7 FT.	NO	3/4"	-	TRANE S-A18

NOTES:
1. AIR FLOW INCLUDES ALLOWANCES FOR ALL INTEGRAL PRESSURE DROPS (INCLUDING INTAKE AND DISCHARGE GRILLES, COILS AND FILTERS).
2. TYPES - EX = EXPOSED, VCAB = VERTICAL RECESSED CABINET, HCAB = HORIZONTAL CABINET.
3. ALL UNITS MUST BE HORIZONTAL DISCHARGE WITH INTEGRAL FAN GUARDS.
4. UNIT HEATER MUST BE CONTROLLED THROUGH THE BAS.
5. PROVIDE UNIT MOUNTED DISCONNECT SWITCH.

STEAM PRESSURE REDUCING STATION SCHEDULE

SYMBOL	LOCATION	PRESSURE REDUCING VALVE				RELIEF VALVE				REMARKS	BASIS OF DESIGN
		SIZE (IN.)	FLOW LBS/HR.	INIT. PSIG	FIN. PSIG	FLOW LBS/HR.	SET PSIG	MIN. SIZE (IN.)	ORIFICE (SQ. IN.)		
PRV-1	TUNNEL	1.5	1,500	50	5	1,500	20	2	-	CULLUM; SEE NOTE 1 & 2	SPIRAX SARCO 25P (YELLOW)
PRV-2	TUNNEL	1.5	1,500	50	10	1,500	20	2	-	LINCOLN; SEE NOTE 1 & 2	SPIRAX SARCO 25P (YELLOW)

NOTES
1. SOUND VALUES INCLUDE THE EFFECTS OF ACOUSTIC PLATES AS WELL AS ACOUSTIC BLANKETS
2. RELIEF VALVE - BASIS OF DESIGN - SPRIAX SARCO SV570BJ, PROVIDE WITH DRIP PAN ELBOW AND 3-1/2" VENT ROUTED TO ATMOSPHERE.

US Army Corps of Engineers ®

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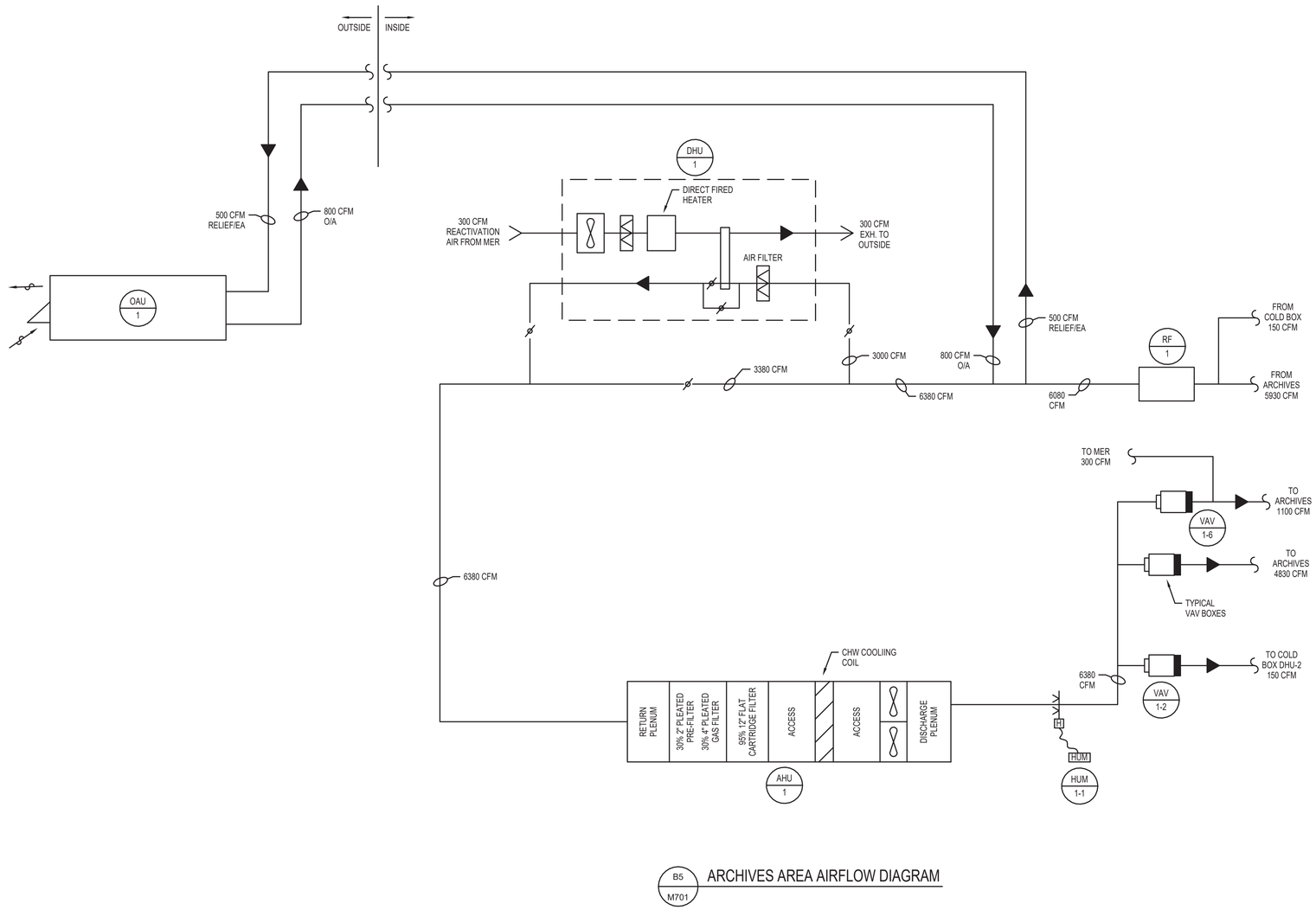
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

SCHEDULES - HVAC

SHEET ID

M605

RTA SUBMISSION 2/11/2021



B5
M701 ARCHIVES AREA AIRFLOW DIAGRAM

US Army Corps of Engineers ®

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FLOW DIAGRAMS - HVAC

SHEET ID

M701

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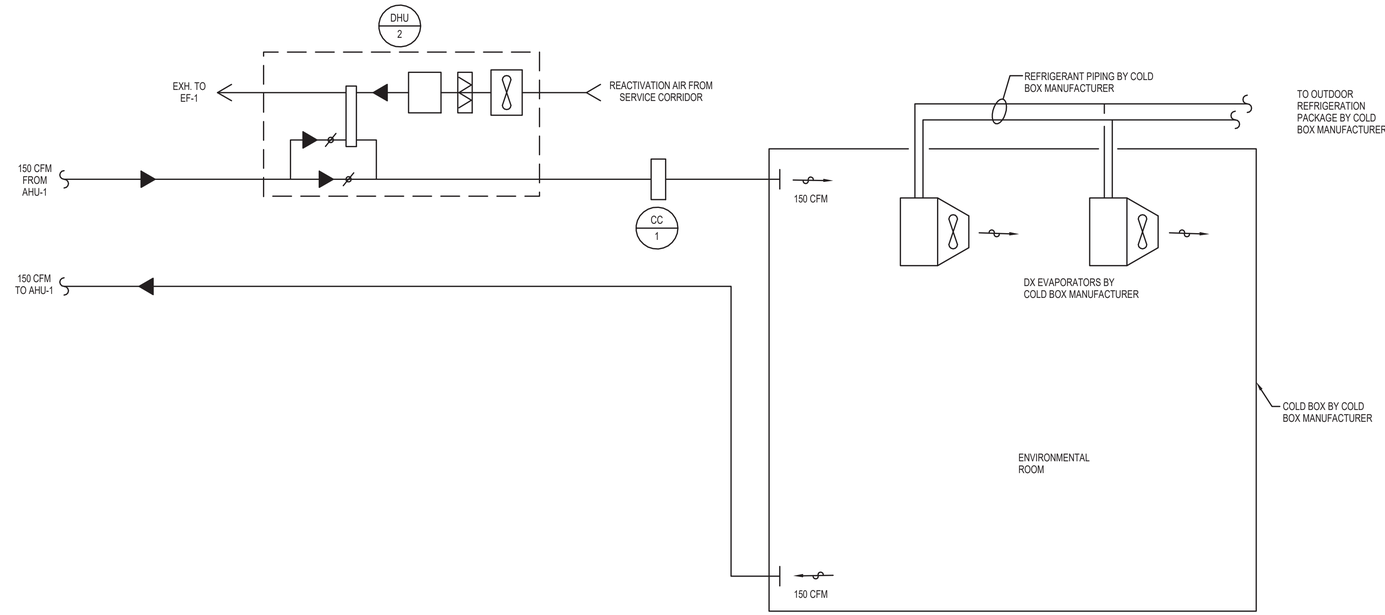

B5
M702 ENVIRONMENTAL ROOM AREA AIRFLOW DIAGRAM

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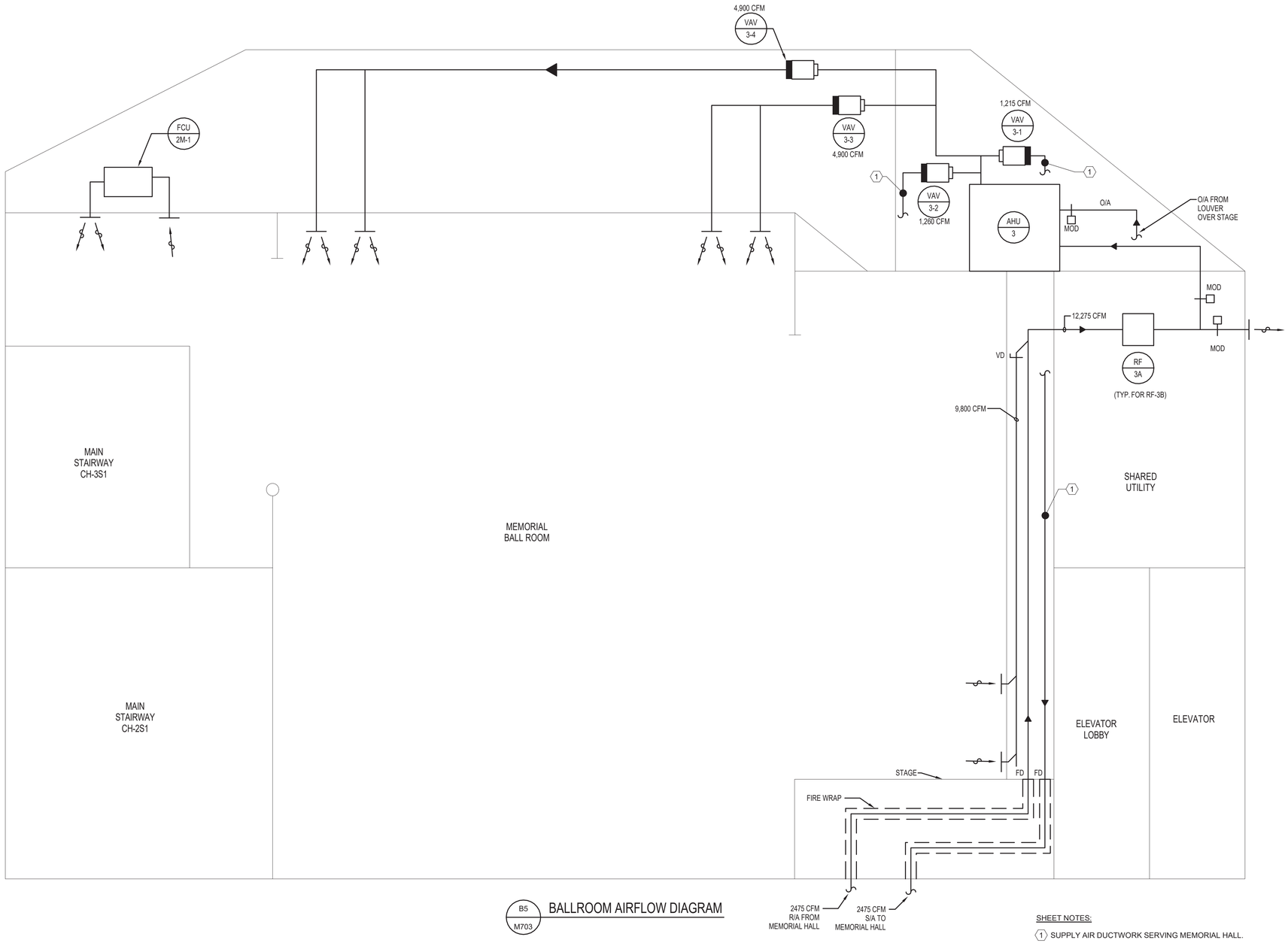
USMA BUILDING 605 CULLUM HALL RENOVATION

FLOW DIAGRAMS - HVAC

SHEET ID

M702



B5
M703 BALLROOM AIRFLOW DIAGRAM

SHEET NOTES:

1. SUPPLY AIR DUCTWORK SERVING MEMORIAL HALL.

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FLOW DIAGRAMS - HVAC

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M703

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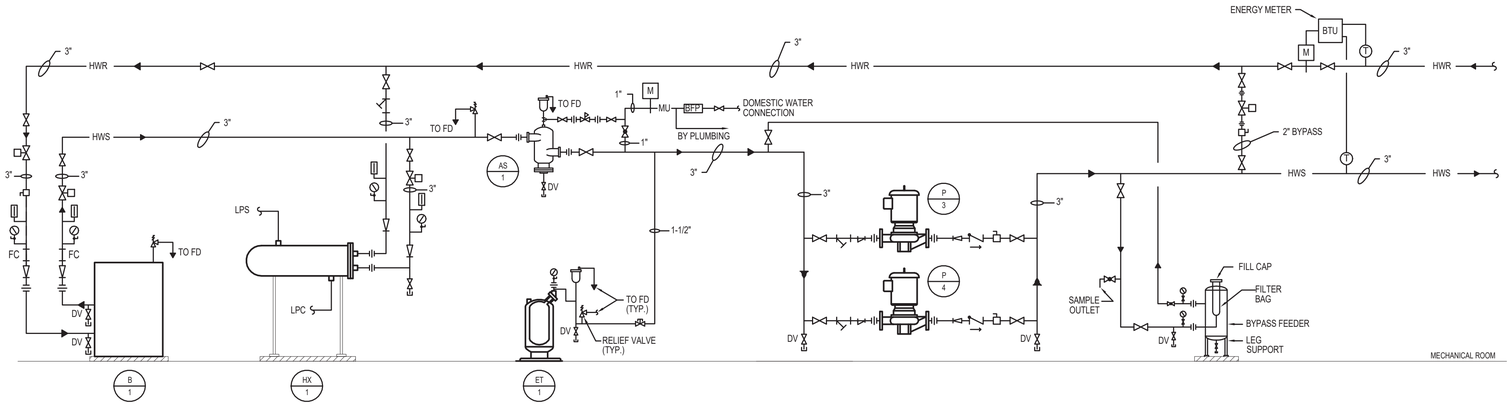

C4 / M704 HEATING WATER FLOW DIAGRAM

NTS

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SHEET ID

M704

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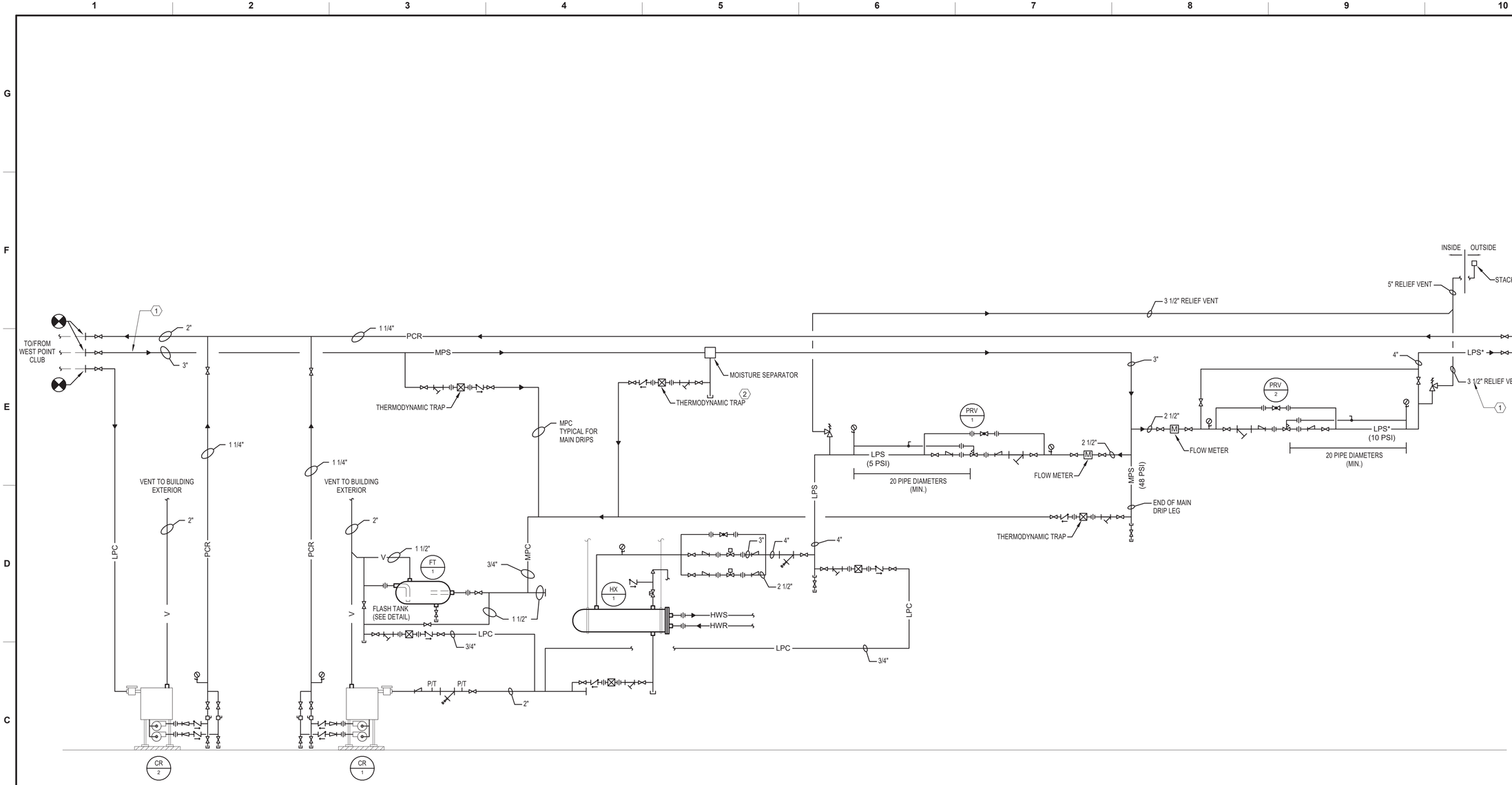

B5 / M705 STEAM FLOW DIAGRAM

NTS

GENERAL NOTES:

1. RATE ALL STEAM PIPING, EQUIPMENT AND ACCESSORIES UP TO AND INCLUDING THE HEAT EXCHANGER FOR 125 PSIG STEAM.
2. ALL STEAM TRAPS MUST BE FLOAT AND THERMOSTATIC UNLESS NOTED OTHERWISE.

SHEET NOTES:

(1) PROVIDE LINE SIDE ISOLATION VALVEWITH BYPASS AND 1 1/2" WARM UP VALVE.

(2) PROVIDE INLINE, LINE-SIZE, CYCLONE-TYPE, STEAM MOISTURE SEPARATOR DESIGNED TO SEPARATE AND DRAIN ENTRAINED WATER DROPLETS WITH A MINIMUM EFFICIENCY OF 99% FOR REMOVING PARTICULATE AND LIQUID 10 MICRONS OR LARGER IN SIZE. IT MUST BE DUCTILE IRON CONSTRUCTION, RATED FOR 125 PSI MINIMUM WORKING PRESSURE.

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FLOW DIAGRAMS - HVAC

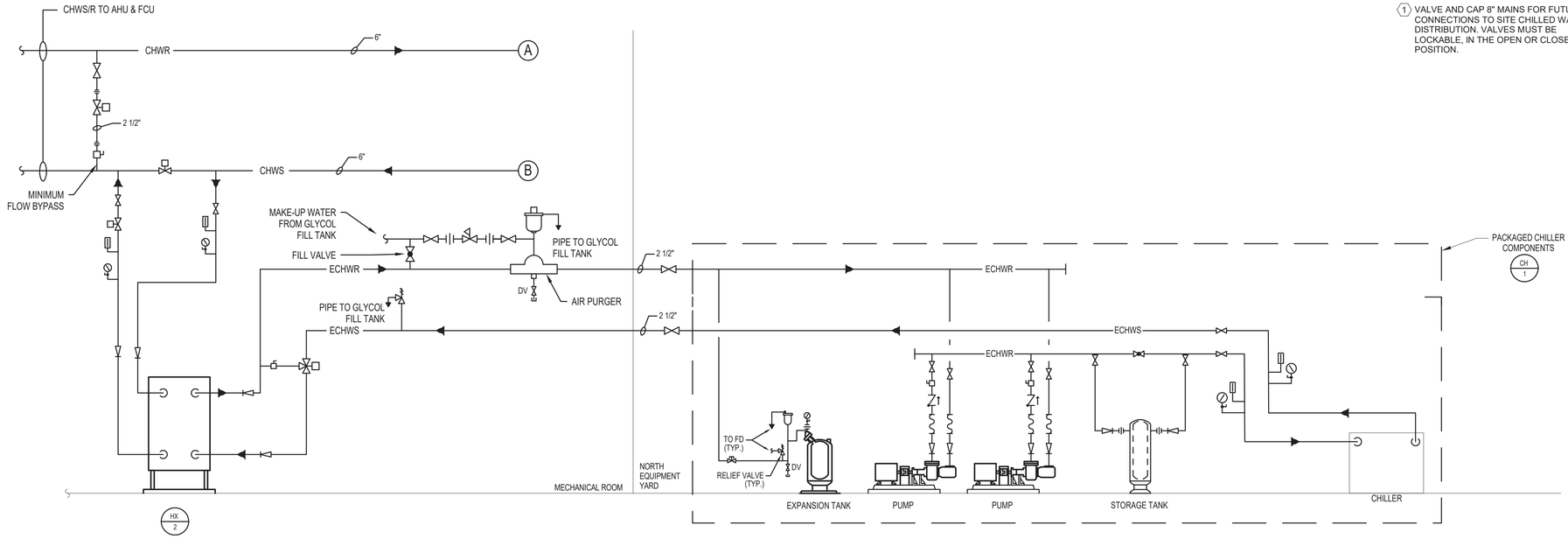
SHEET ID

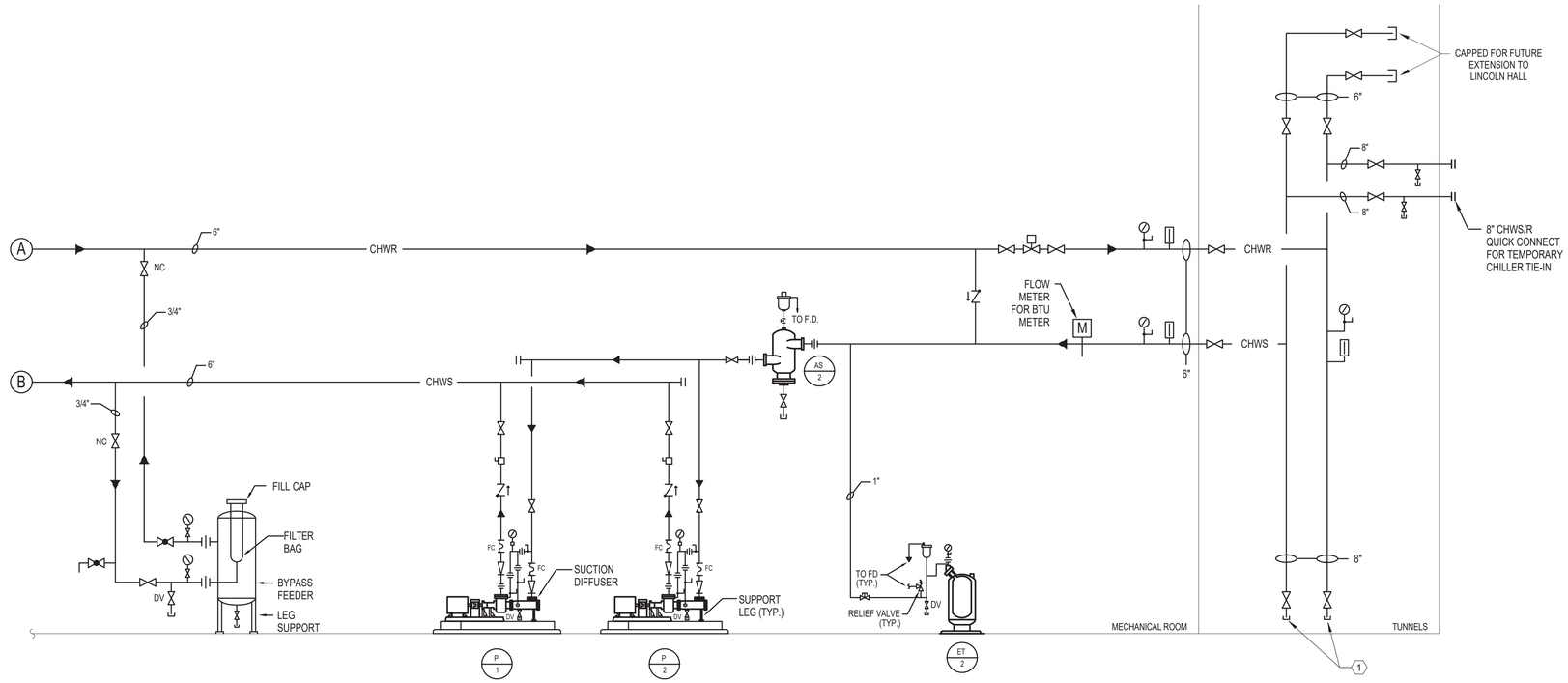
M705

RTA SUBMISSION 2/11/2021

SHEET NOTES:

1. VALVE AND CAP 8" MAINS FOR FUTURE CONNECTIONS TO SITE CHILLED WATER DISTRIBUTION. VALVES MUST BE LOCKABLE, IN THE OPEN OR CLOSED POSITION.





A5 / M706 CHILLED WATER FLOW DIAGRAM

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US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE:	2/11/2021
SOLICITATION NO.:	W912DS-19-R-0014
CONTRACT NO.:	W912DS-19-C0031
PROJECT NO:	20190494
DESIGNED BY:	WMF
DRAWN BY:	RKG
CHECKED BY:	WCJ
SUBMITTED BY:	SK
SIZE	ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

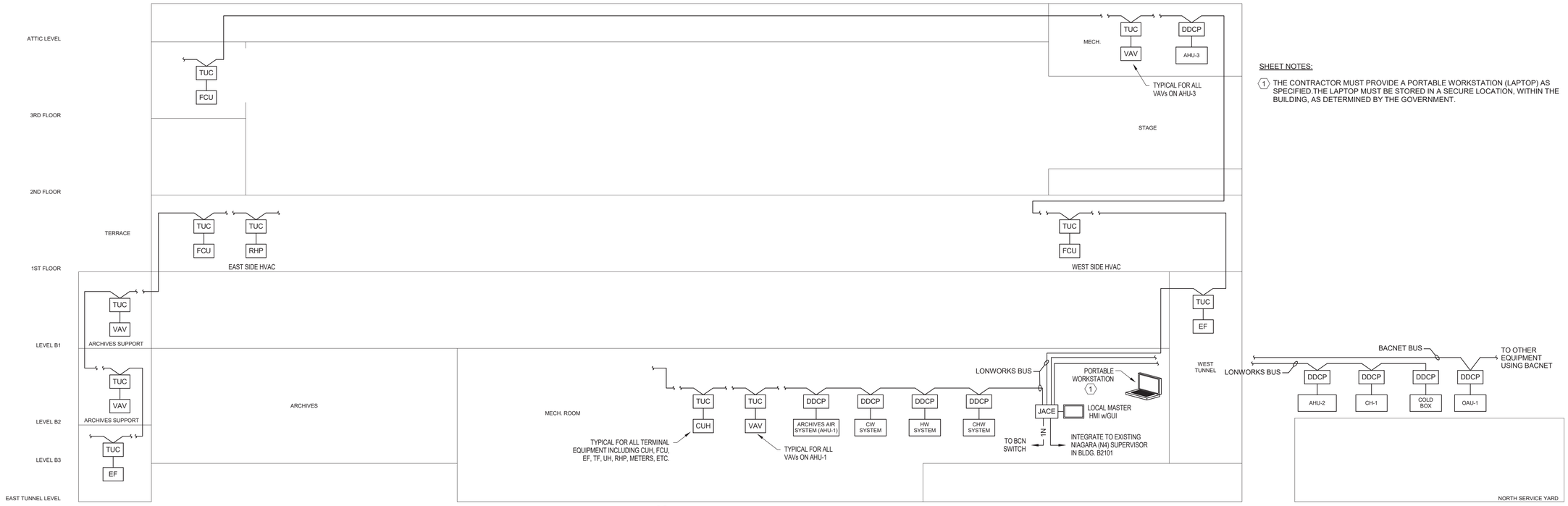
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

FLOW DIAGRAMS - HVAC

SHEET ID

M706

RTA SUBMISSION 2/11/2021



D5 / M801 SYSTEM ARCHITECTURE DIAGRAM

SHEET NOTES:

1. THE CONTRACTOR MUST PROVIDE A PORTABLE WORKSTATION (LAPTOP) AS SPECIFIED.THE LAPTOP MUST BE STORED IN A SECURE LOCATION, WITHIN THE BUILDING, AS DETERMINED BY THE GOVERNMENT.

SYMBOLS:

- M — DAMPER WITH MOTOR ACTUATOR
- ES — DPDT WHISKER TYPE END SWITCH
- T — DUCT TEMPERATURE SENSOR
- H — DUCT HUMIDITY SENSOR
- HL — DUCT HUMIDITY HIGH LIMIT
- P — DUCT STATIC PRESSURE SENSOR
- T — IMMERSION TEMPERATURE SENSOR WITH WELL
- T — SPACE TEMPERATURE SENSOR
- T — SPACE SENSOR ON EXTERIOR WALL TO BE MOUNTED WITH INSULATED PANEL
- H — SPACE HUMIDITY SENSOR
- SD — DUCT SMOKE DETECTOR
- CO2 — CARBON DIOXIDE SENSOR
- SD — SMOKE DAMPER
- SD/FD — SMOKE/FIRE DAMPER
- SCD — SMOKE CONTROL DAMPER
- COMPRESSED AIR PIPING
- V — VOLTAGE SENSOR
- LTLT — LOW TEMPERATURE LIMIT THERMOSTAT
- STARTER — STARTER
- VFD — VARIABLE FREQUENCY DRIVE
- CS — CURRENT SENSOR
- R — RELAY
- TWO-WAY VALVE WITH MOTOR ACTUATOR
- TWO-WAY VALVE WITH PNEUMATIC ACTUATOR
- THREE-WAY VALVE WITH MOTOR ACTUATOR
- THREE-WAY VALVE WITH PNEUMATIC ACTUATOR
- AFS — AIR FLOW STATION W/ LOCAL DISPLAY
- DPT — DIFFERENTIAL PRESSURE TRANSMITTER
- DS — DOOR SWITCH
- FS — FLOW SWITCH
- D/X — DX COOLING COIL

SYMBOLS (CONTINUED):

- FM — FLOW METER
- I/P — ELECTRO-PNEUMATIC RELAY
- PB — PUSHBUTTON
- X — PUSH TO TEST INDICATING LIGHT X = COLOR
- GD — GAS DETECTION SENSOR
- POS — POSITION SWITCH
- PS — PRESSURE SWITCH
- R/H — REHEAT COIL
- — 1N — 1ST TIER CONTROL NETWORK WIRING (ETHERNET)
- — 2N — 2ND TIER CONTROL NETWORK WIRING (SERIAL BUS)

ABBREVIATIONS:

AHU = AIR HANDLING UNIT
BCN = BUILDING CONTROL NETWORK
BI = BINARY INPUT (SAME AS DIGITAL INPUT)
BO = BINARY OUTPUT (SAME AS DIGITAL OUTPUT)
COR = CONTRACTING OFFICER'S REPRESENTATIVE
OAT = OUTDOOR AIR TEMPERATURE
CH = CHILLER
CT = COOLING TOWER
CT = COOLING TOWER
HMI = HUMAN MACHINE INTERFACE
F/A = FIRE ALARM
FPOC = FIELD POINT OF CONNECTION
GUI = GRAPHICAL USER INTERFACE
DDC = DIRECT DIGITAL CONTROL
DDCP = DIRECT DIGITAL CONTROL PANEL W/LOCAL LCD KEYPAD (GPPC)
TUC = TERMINAL UNIT CONTROLLER (AGC)
VAV = VARIABLE AIR VOLUME BOX
NC = NORMALLY CLOSED
NO = NORMALLY OPEN
AI = ANALOG INPUT
AO = ANALOG OUTPUT
DI = DIGITAL INPUT (SAME AS BINARY INPUT)
DO = DIGITAL OUTPUT (SAME AS BINARY OUTPUT)
SD = SMOKE DAMPER
BAS = BUILDING AUTOMATION SYSTEM
FCU = FAN COIL UNIT
AIP = ANALOG INPUT (PNEUMATIC)
AOP = ANALOG OUTPUT (PNEUMATIC)
DIP = DIGITAL INPUT (PNEUMATIC)
DOP = DIGITAL OUTPUT (PNEUMATIC)
NS = LONWORKS NETWORK SERVER (JACE)
WSHP = WATER SOURCE HEAT PUMP

GENERAL NOTES

1. THE BMS MUST BE A HONEYWELL LON DIRECT DIGITAL CONTROLS (DDC) SYSTEM, OR APPROVED EQUAL. THE NEW INSTALLED SYSTEM MUST BE NIAGARA N4 COMPLIANT. IT MUST BE COMPATIBLE WITH ENERGY MANAGEMENT AND CONTROLS SYSTEM (EMCS) SERVER VIA A JACE INTERFACE.
2. ANY INSTALLED HARDWARE FROM OTHER MANUFACTURER OTHER THAN HONEYWELL MUST BE COMPATIBLE WITH HONEYWELL PRODUCTS WHICH MUST NOT AFFECT THE SYSTEM FUNCTIONALITY.
3. BMS MUST BE BASED ON THE LONWORKS OPEN PROTOCOL WHICH INCLUDES THE SOFTWARE WITH CAPABILITY FOR SCHEDULING, LOCAL AND REMOTE CONTROL ADJUSTMENT, LOAD SHEDDING, EVENT MANAGEMENT, MONITORING, TRENDING, LOGGING, MAINTENANCE NOTIFICATION AND ALARMS.
4. THE CONTRACTOR MUST HIRE THE SYSTEM INTEGRATOR WITHIN THE BUDGET OF THE PROJECT.
5. ALL NEW EQUIPMENT TO BE DDC CONTROLLED THROUGH THE NEW BUILDING AUTOMATION SYSTEM (BAS), UNLESS NOTED OTHERWISE. EQUIPMENT PROVIDED WITH INTEGRAL CONTROLS MUST BE ENABLED, DISABLED, AND ALARMED THRU THE BAS.
6. SMOKE DAMPERS MUST BE SUPPLIED, AND INSTALLED BY DIVISION 23 CONTRACTOR, WIRED BY DIVISION 26 CONTRACTOR, AND CONTROLLED BY F/A SYSTEM. ALL WIRING TO F/A SYSTEM BY CONTROLS CONTRACTOR.
7. ALL NEW EQUIPMENT MUST BE PROVIDED WITH CONTROL GRAPHICS ON THE EXISTING BAS SYSTEM. THESE GRAPHICS MUST BE ACCESSIBLE FROM ANY EXISTING LOCAL OR REMOTE OPERATORS STATION.
8. ALL ABBREVIATIONS AND SYMBOLS MAY NOT APPEAR ON DRAWINGS.
9. REFER TO SPECIFICATIONS FOR CONTROL SEQUENCES. PROVIDE ADDITIONAL HARDWARE/SOFTWARE AS REQUIRED TO PERFORM SPECIFIED SEQUENCE. WHERE SPECIFICATIONS AND DRAWINGS CONFLICT, THE MORE STRINGENT MUST APPLY.
10. CONTROL DIAGRAMS HAVE NOT BEEN PROVIDED FOR EVERY DEVICE TO BE CONTROLLED BY THE DDC SYSTEM, REFER TO FLOOR PLANS, FLOW DIAGRAMS, DETAILS & SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
11. ARCHITECTURE SHOWN INDICATES MINIMUM REQUIREMENTS. PROVIDE ADDITIONAL PANELS AS REQUIRED TO ACCOMMODATE CONTROL DIAGRAMS & CONTROL SEQUENCES INDICATED IN SPECIFICATIONS & DRAWINGS.
12. CONTROLS CONTRACTOR MUST PROVIDE RELAYS/CONTACTORS NEEDED FOR ALL SINGLE PHASE EQUIPMENT NOT PROVIDED WITH STARTERS.
13. CONTROLS CONTRACTOR IS REQUIRED TO PROVIDE APPROPRIATE DEAD BANDS AND ADJUST PROPORTIONAL, INTEGRAL, AND DIFFERENTIAL SETTINGS TO ASSURE NON-CYCLIC OPERATION WITHOUT SACRIFICING SYSTEM ACCURACY.
14. FLOATING CONTROL IS NOT PERMITTED. ALL SIGNALS INDICATED AS AO MUST BE 4-20mA OR 0-10V CONTROL SIGNALS.
15. CONTROLS CONTRACTOR MUST COORDINATE WITH USACE CONTRACTING OFFICER'S REPRESENTATIVE (COR) TO OBTAIN SECURITY, NETWORK, AND SYSTEM INTEGRATION RULES, PROCEDURES AND CLEARANCES. CONTROLS CONTRACTOR MUST COORDINATE DDC CONTROLLER INTEGRATION TO EXISTING NETWORK WITH USACE COR.
16. CONTROLS CONTRACTOR MUST NOTIFY BASE TECHNICIANS PRIOR TO UPLOADING DATA TO EXISTING BAS SERVER.
17. CONTROLS CONTRACTOR MUST CHECK THE SYSTEM PROFILE BEFORE AND AFTER CABINET INSTALLATION.
18. CONTROLS CONTRACTOR TO MATCH EXISTING CONTROL SYSTEM'S UNITS OF MEASUREMENT IN ALL CONTROL SYSTEM PROGRAMMING, DISPLAYS AND GRAPHICS.
19. CONTROLS CONTRACTOR MUST PROVIDE AND INSTALL ALL CONTROL NETWORK OUTLETS, WIRING AND CONDUIT.
20. CONTROLS CONTRACTOR MUST INSTALL LATEST TECHNOLOGY CONTROLLERS.
21. CONTROLS CONTRACTOR MUST USE EXISTING WEST POINT NAMING AND ADDRESS CONVENTIONS FOR NAMING AND ADDRESSING ALL NEW CONTROL HARDWARE.
22. CONTROLS CONTRACTOR MUST PROVIDE DDC GRAPHICS FOR ALL NEW SYSTEMS THAT MATCH THE EXISTING GRAPHICS IN CONTENT AND STYLE. OBTAIN USACE COR'S WRITTEN APPROVAL OF GRAPHICS PRIOR TO LOADING ON SYSTEM.
23. CONTROLS CONTRACTOR MUST INSTALL AND WIRE ALL CONTROL COMPONENTS SHIPPED LOOSE WITH HVAC EQUIPMENT.
24. CONTROLS CONTRACTOR MUST SUBMIT FOR COORDINATION AND A/E APPROVAL, DRAWINGS SHOWING THE PROPOSED LOCATION AND MOUNTING HEIGHT FOR BAS PANELS, SPACE SENSORS, DUCT STATIC PRESSURE SENSORS AND HYDRONIC DIFFERENTIAL PRESSURE SENSORS.
25. PROVIDE AN ALARM FOR EVERY MOTOR FAILURE (AS INDICATED BY A CURRENT SENSOR), EQUIPMENT ALARM, AND LISTED SAFETY. ADDITIONALLY, PROVIDE AN ALARM FOR EVERY CONTROLLED VARIABLE WHICH DROPS BELOW OR RISES ABOVE SETPOINT BY MORE THAN 10% (ADJUSTABLE).
26. EACH ALARM MUST BE ASSIGNED A PRIORITY LEVEL WHICH WILL BE DISPLAYED WITH THE ALARM DESCRIPTION ON THE OPERATORS CONSOLE AND WHICH MUST TRIGGER AN INDEPENDENTLY PROGRAMMABLE ACTION. AT A MINIMUM THERE MUST BE AT LEAST FOUR LEVELS OF ALARMS - WARNING, MINOR, MAJOR AND CRITICAL.
27. COORDINATE ALARM PRIORITY AND APPROPRIATE ACTION WITH USACE COR'S PRIOR TO FINAL ALARM PROGRAMMING. AT A MINIMUM, EVERY ALARM MUST BE GRAPHICALLY CONVEYED AND RECORDED IN A PERMANENT ALARM FILE. AT THE END OF EACH MONTH A NEW ALARM FILE WILL BE CREATED AND THE FILE NAMED BY MONTH AND YEAR.
28. REFER TO ARCHITECTURAL DRAWINGS FOR SENSOR MOUNTING HEIGHT REQUIREMENTS. WHERE NOT SHOWN, MOUNT IN ACCORDANCE WITH PROJECT SPECIFICATIONS.
29. EACH FAN INLET AIRFLOW MONITOR TO BE PROVIDED WITH A LOCAL DISPLAY INDICATING CURRENT AIRFLOW. LOCATE ADJACENT TO UNIT CONTROL PANEL AND LABEL ACCORDINGLY.
30. ALL COIL DISCHARGE AND MIXED AIR TEMPERATURE SENSORS WITHIN AIR HANDLING UNITS MUST BE AVERAGING TYPE.
31. REPEATERS MUST NOT BE USED EXCEPT WHERE APPROVED BY USACE COR.
32. CONTROLS CONTRACTOR TO PROVIDE ALL POWER AND CONTROL WIRING AND CONDUIT FOR ALL CONTROL COMPONENTS INCLUDING OPERATORS, DAMPERS, CONTROL PANELS, ETC.
33. ALL BAS SERIAL NETWORK (FLOOR LEVEL NETWORK-2N BUS) WIRING TO BE CONTINUOUS BETWEEN DEVICES. NO T-TAPS OR SPLICES WILL BE PERMITTED.
34. CONTROLS CONTRACTOR MUST SET UP AND PROGRAM PACKAGED EQUIPMENT.
35. REVIEW ALL SENSOR LOCATIONS WITH USACE COR PRIOR TO ROUGH-IN.
36. PROVIDE STATIC GRAPHICS CONTAINING CONTROL SEQUENCES FOR EVERY CONTROLLED DEVICE. EACH DEVICE IN ACTIVE GRAPHICS MUST CONTAIN A LINK TO THE ASSOCIATED CONTROL SEQUENCE GRAPHIC. PRELIMINARY BUILDING OCCUPANCY SCHEDULE: MON - FRI: 6AM TO 10PM, SAT & SUN: 8AM TO 9PM.
37. ALL BAS CONTROL PANELS SERVING EQUIPMENT ON EMERGENCY POWER MUST BE PROVIDED WITH EMERGENCY POWER AND INTEGRAL BATTERY BACKUP TO MAINTAIN POWER UNTIL GENERATOR STARTS.
38. PROVIDE A DEDICATED WALL MOUNTED DDC TEMPERATURE SENSOR FOR EACH AVB, FCU, WSHP, AND TF EXCEPT WHERE THE FLOOR PLANS INDICATE THAT A SINGLE SENSOR IS TO SERVE MULTIPLE TERMINAL UNITS.
39. UNIT GRAPHICS MUST INDICATE CURRENT OPERATING MODES (E.G: "NORMAL", "CO2 RESET", "UNOCCUPIED", ETC.).
40. RETURN AND OUTSIDE AIR DAMPERS IN AHU MIXING BOXES ARE TO BE PARALLEL BLADE TYPE. ALL OTHER CONTROL DAMPERS ARE TO BE OPPOSED BLADE TYPE.
41. ALL EQUIPMENT OCCUPANCY SCHEDULES MUST BE SUBMITTED TO AND APPROVED BY THE USACE COR. PROVIDE REPROGRAMMABLE OCCUPANCY SCHEDULES AND PROVIDE UNOCCUPIED MODE SEQUENCES FOR ALL EQUIPMENT. WHERE USACE COR DIRECTS THAT UNITS ARE TO REMAIN IN OCCUPIED MODE (AND NEVER ENTER UNOCCUPIED MODE), SET SCHEDULES FOR 24 HOUR/365 DAY OPERATION.
42. ALL CONTROLLERS MUST BE LONWORKS DEVICES CERTIFIED BY THE LONWORKS ASSOCIATION.
43. THE ABBREVIATIONS "DI" AND "DO" ARE USED INTERCHANGEABLY WITH BI AND BO THROUGHOUT THE CONTRACT DOCUMENTS.
44. PROVIDE AN ALARM FOR HEAT TRACE FAILURE AS INDICATED BY EACH HEAT TRACE CONTROLLER.
45. FIELD POINT OF CONNECTION (FPOC) MUST BE N4 COMPATIBLE.
46. ALL HARD-WIRED AND VIRTUAL POINTS (CONTROL VARIABLES) MUST BE CAPABLE OF BEING TRENDED BY THE BAS.
47. THE SUPERVISORY GATEWAY/FPOC MUST BE A JACE-8XXX (OR OTHER APPROVED MODEL) THAT IS COMPATIBLE WITH THE CURRENT VERSION (v4.7 OR LATER) OF NIAGARA N4.
48. CONTROLS CONTRACTOR MUST FULLY INSTALL AND COMPLETE ALL BMS BUILDING CONTROLS INTEGRATION WORK ON WEST POINT EMCS NETWORK. CONTRACTOR MUST COORDINATE ALL BMS CONTROLS INTEGRATION WORK WITH CURRENT WEST POINT EMCS OPERATOR.

US Army Corps of Engineers ®

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DRAWN BY: RKG
CHECKED BY: WCJ
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SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

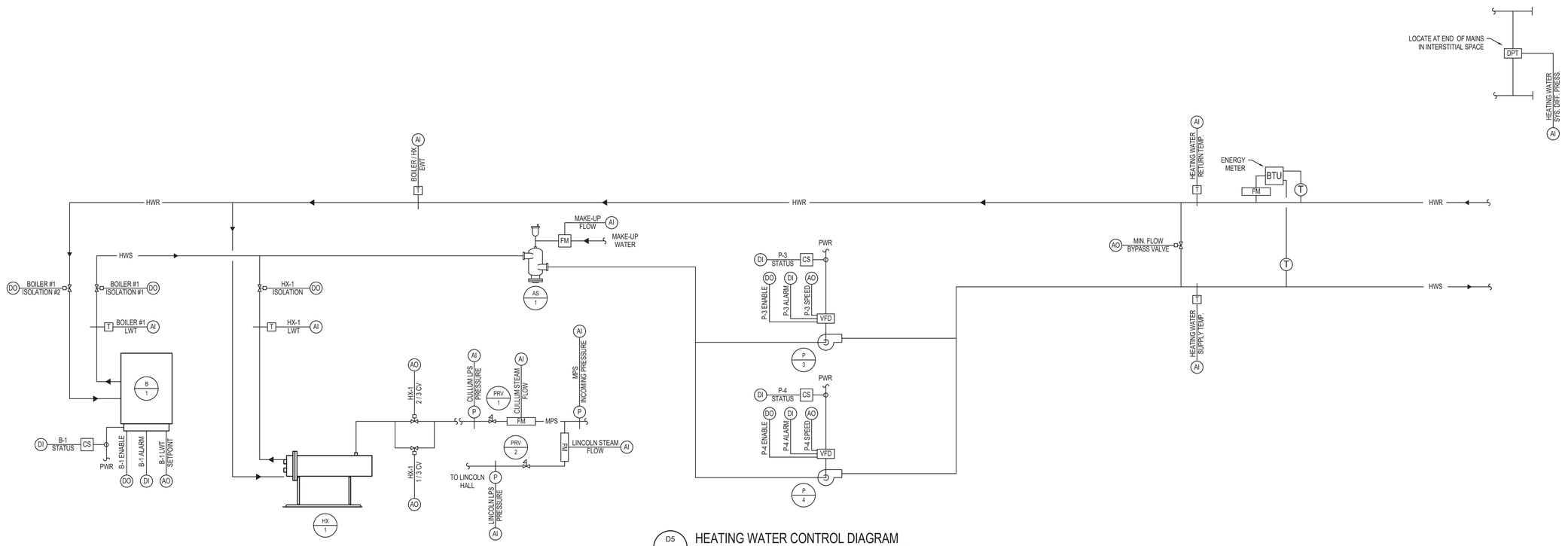
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

HVAC CONTROLS

SHEET ID

M801

RTA SUBMISSION 2/11/2021



D5 / M802 HEATING WATER CONTROL DIAGRAM

HEATING WATER SYSTEM CONTROL SEQUENCE

GENERAL
- THE SYSTEM CONSISTS OF A STEAM HEAT EXCHANGER, A GAS FIRED BOILER FOR BACKUP AND TWO PUMPS IN A LEAD-SPARE ARRANGEMENT.
- THE BOILER MUST BE PROVIDED WITH INTEGRAL CONTROLS. THE BAS SYSTEM MUST ENABLE/DISABLE THE BOILER, PROVIDE BOILER LEAVING WATER TEMPERATURE SETPOINT, AND MONITOR BOILER STATUS. THE REMAINDER OF THE BOILER FUNCTIONS MUST BE CONTROLLED BY THE INTEGRAL CONTROLS.
- THE HEATING WATER SYSTEM MUST BE ENABLED/DISABLED THROUGH THE BAS SYSTEM.
- THE HEATING WATER SYSTEM MUST BE ENABLED WHENEVER OUTDOOR AIR TEMPERATURE IS BELOW 50° F (REPROGRAMMABLE) OR WHEN ANY AIR HANDLING SYSTEM IS IN OCCUPIED MODE.

STARTUP AND SHUTDOWN
- WHEN THE HEATING WATER SYSTEM IS ENABLED, HX-1 ISOLATION VALVE AND THE MINIMUM FLOW BYPASS VALVE MUST BE OPENED.
- AFTER A TIME DELAY (5 MIN. REPROGRAMMABLE) TO ALLOW THE VALVES TO OPEN, THE LEAD HEATING WATER PUMP MUST BE ENERGIZED AND HX-1 ENABLED.
- LEAD PUMP REMAINS ENERGIZED AND HX-1 ENABLED WHENEVER HEATING SYSTEM IS ENABLED.

HEATING WATER LOOP TEMPERATURE CONTROL
- THE BAS SYSTEM MUST LINEARLY RESET THE HWS WATER TEMPERATURE BETWEEN 180°F AT 35°F OUTDOOR TEMPERATURE TO 160°F AT 50°F OUTDOOR TEMPERATURE (ADJUSTABLE).
- WHEN HX-1 IS ENABLED, UPON A DROP IN HWS TEMPEARTURE BELOW SETPIONT, THE BAS MUST FIRST MODULATE OPEN THE HX-1 $\frac{1}{3}$ CV AND AFTER THE HX-1 $\frac{1}{3}$ CV IS FULLY OPENED, MODULATE OPEN THE HX-1 2/3 CV.
- IF THE HEATING WATER SUPPLY TEMPERATURE SETPOINT CANNOT BE SATISFIED BY HX-1 OR LPS PRESSURE DROPS BELOW 3 PSI (ADJUSTABLE), THE BAS SYSTEM MUST ALARM, DISABLE HX-1 AND INITIATE A TIMED SEQUENCE OF OPERATION TO STAGE ON THE BOILER.
- THE BOILER MUST OPERATE UNDER ITS THEIR OWN SELF-CONTAINED CONTROLS TO MAINTAIN THEIR LEAVING WATER TEMPERATURE AT THE HEATING WATER SUPPLY TEMPERATURE SETPOINT DETERMINED BY THE BAS SYSTEM.

HEATING WATER PUMP CONTROL
- WHEN THE HEATING WATER SYSTEM IS ENABLED, THE DDC SYSTEM MUST STAGE THE PUMPS AND MODULATE THE VFD'S TO MAINTAIN THE HEATING WATER SUPPLY DIFFERENTIAL PRESSURE (AS MEASURED BY A DIFFERENTIAL PRESSURE SENSOR LOCATED AT THE END OF THE HWS/R MAINS) AT A REPROGRAMMABLE SETPOINT
- AS THE DIFFERENTIAL PRESSURE DEVIATES FROM SETPOINT, THE BAS SYSTEMS MUST SEND THE APPROPRIATE ANALOG SIGNAL TO THE VFDS TO SPEED UP OR SLOW DOWN THE PUMP MOTORS.
- IF THE DIFFERENTIAL SETPOINT CANNOT BE SATISFIED BY DESIGNATED LEAD PUMP, OR IF LEAD PUMP SHOULD BE REQUIRED TO OPERATE BEYOND ITS END OF CURVE POINT, THE BAS MUST INITIATE A TIMED SEQUENCE OF OPERATION TO STAGE ON THE SPARE PUMP.
- SPARE PUMP MUST ACCELERATE RESULTING IN LEAD PUMP DECELERATING UNTIL BOTH PUMPS EQUALIZE IN SPEED. FURTHER CHANGE IN SYSTEM VARIABLE MUST CAUSE PUMPS TO CHANGE SPEED TOGETHER.
- WHEN THE SETPOINT CAN BE SAFELY SATISFIED WITH FEWER PUMPS, THE BAS SYSTEM MUST, AFTER AN APPROPRIATE TIME DELAY, INITIATE A TIMED DE-STAGE SEQUENCE AND CONTINUE VARIABLE SPEED OPERATION. THE DE-STAGE POINT MUST BE DETERMINED BY THE TAB CONTRACTOR AS THE POINT WHERE THE MULTIPLE SPEED PUMP CURVE FALLS COMPLETELY BELOW THE SINGLE PUMP MAXIMUM SPEED CURVE.
- UPON FAILURE THE LEAD PUMP, IT MUST BE DISABLED, THE SPARE PUMP STARTED, LEAD-SPARE ASSIGNMENTS ADJUSTED AND BAS SYSTEM ALARMED.
- WHEN LEAD PUMP IS OPERATING AT MINIMUM SPEED, THE BAS MUST OPEN THE MINIMUM FLOW BYPASS VALVE.
- IN EVENT OF FAILURE TO RECEIVE THE ZONE SYSTEM VARIABLE SIGNAL, VFD MUST MAINTAIN AT THE LAST SPEED, UNLESS OTHERWISE REQUIRED FOR END OF CURVE PROTECTION, RESET MUST BE AUTOMATIC UPON CORRECTION OF THE FAILURE.
- THE LEAD AND SPARE PUMP ASSIGNMENTS MUST BE ROTATED IN ORDER TO EQUALIZE PUMP RUN TIMES. ROTATE ASSIGNMENTS EVERY 240 HOURS (REPROGRAMMABLE) OF LEAD PUMP RUN TIME.

SAFETIES
- PUMP AND BOILER STATUS MUST BE MONITORED AND ALARMED TO THE BAS SYSTEM.
- AN EMERGENCY SHUTDOWN SWITCH, LOCATED AT EACH DOOR INTO THE FIRST FLOOR MECHANICAL ROOM, MUST DISABLE THE BOILER.
- THE BAS MUST MONITOR BOILER RUNTIME AND ALARM IF THE BOILER HAS NOT BEEN ENABLED FOR A 6 MONTH PERIOD (ADJUSTABLE). THE BAS OPERATOR CAN THEN CHOOSE TO MANUALLY ENABLE BOILER OPERATION FOR AN ADJUSTABLE PERIOD OF TIME TO EXERCISE THE EQUIPMENT.

GENERAL
- AN EMERGENCY GAS BURNER SHUTDOWN SWITCH MUST BE PROVIDED AT EACH ENTRY INTO THE BOILER ROOM.
- THE DDC SYSTEM PERMISSIVE MUST BE WIRED INTO EACH BURNERS SAFETY CIRCUIT.
- WHEN A SWITCH IS TOGGLED OFF, THE DDC SYSTEM MUST DISABLE ALL BURNERS BY OPENING THE PERMISSIVE CONTACT IN THEIR SAFETY CIRCUITS.

HEATING WATER SYSTEM CONTROL VALVE SCHEDULE (NOTE 2)

TAG	TYPE	MAX. PD (FT.)	FLOW	FAIL POSITION	LINE SIZE
BOILER B-1 ISOLATION #1	2-WAY 2-POSITION	1 FT.	-	NORMALLY OPEN	3"
BOILER B-1 ISOLATION #2	2-WAY 2-POSITION	1 FT.	-	NORMALLY OPEN	3"
MIN FLOW BYPASS VALVE	2-WAY MODULATING	7 FT.	NOTE 1	NORMALLY OPEN	2"
HX-1 ISOLATION	2-WAY 2-POSITION	1 FT.	-	NORMALLY OPEN	3"
HX-1 STEAM 1/3 CV	2-WAY MODULATING	3 PSI	500 LBS/HR	NORMALLY CLOSED	2.5"
HX-1 STEAM 2/3 CV	2-WAY MODULATING	3 PSI	1000 LBS/HR	NORMALLY CLOSED	3"

NOTES:
1. SIZE VALVE FOR MINIMUM PUMP FLOW AS DETERMINED BY THE PUMP MANUFACTURER IN THE PUMP SUBMITTAL.
2. THE CONTRACTOR MUST INCLUDE ALL COLUMNS IN THIS SCHEDULE IN THE VALVE SCHEDULE GENERATED FOR THE CONTROLS SUBMITTAL. ADDITIONAL COLUMNS AND DATA MUST BE ADDED TO THE CONTRACTOR'S VALVE SCHEDULE AS REQUIRED BY SPECIFICATION SECTION 23 09 00, PARAGRAPH 3.3.4.

US Army Corps of Engineers ®

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US ARMY CORPS OF ENGINEERS

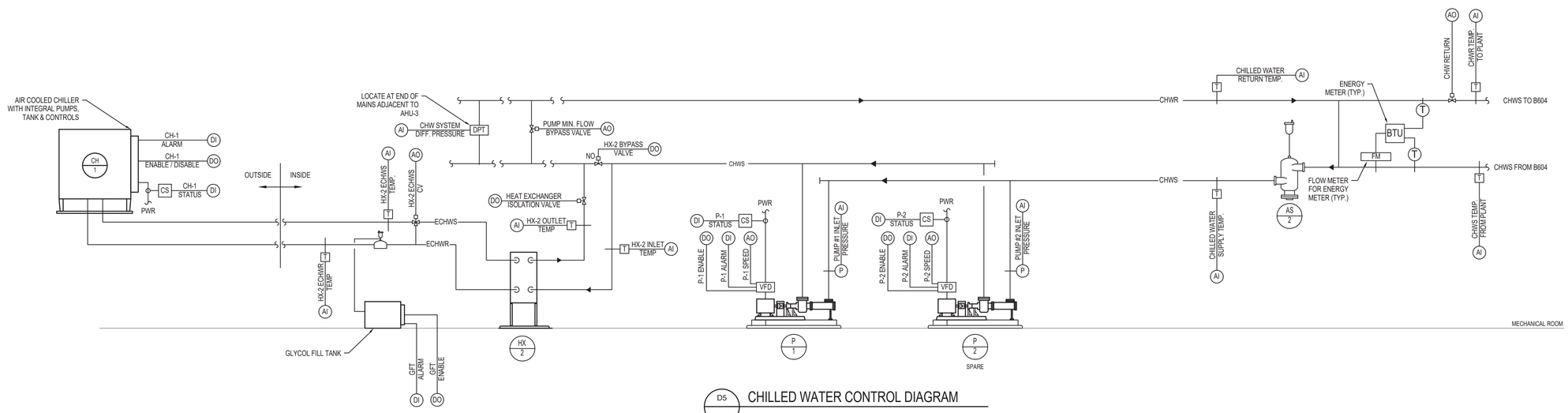
JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

HVAC CONTROLS

SHEET ID
M802

RTA SUBMISSION 2/11/2021



D5
M803
CHILLED WATER CONTROL DIAGRAM

CHILLED WATER SYSTEM CONTROL SEQUENCE

GENERAL

- CULLUM HALL UTILZES CHILLED WATER DELIVERED TO THE BUILDING FROM THE CENTRAL CHILLER PLANT IN BUILDING B604. THE CHILLED WATER SYSTEM WITHIN CULLUM HALL CONSISTS OF TWO TERTIARY PUMPS IN A LEAD-SPARE ARRANGEMENT, AND A BACK-UP AIR-COOLED CHILLER WITH PLATE & FRAME HEAT EXCHANGER FOR EMERGENCY OPERATION.
- THE CHILLER MUST BE PROVIDED WITH INTEGRAL CONTROLS. THE BAS SYSTEM MUST ENABLE/DISABLE THE CHILLER, PROVIDE CHILLER LEAVING WATER TEMPERATURE SETPOINT (40F ADJUSTABLE), AND MONITOR CHILLER STATUS. THE REMAINDER OF THE CHILLER FUNCTIONS MUST BE CONTROLLED BY THE INTEGRAL CONTROLS.
- THE GLYCOL FILL SYSTEM MUST BE PROVIDED WITH INTEGRAL CONTROLS. THE BAS SYSTEM MUST ENABLE/DISABLE THE GLYCOL FILL SYSTEM AND MONITOR ITS STATUS. THE REMAINDER OF ITS FUNCTIONS MUST BE CONTROLLED BY THE INTEGRAL CONTROLS.
- THE CHILLED WATER SYSTEM MUST BE ENABLED/DISABLED THROUGH THE BAS SYSTEM.
- THE CHILLED WATER SYSTEM MUST BE ENABLED WHENEVER OUTDOOR AIR TEMPERATURE IS ABOVE 55° F (REPROGRAMMABLE) OR WHEN ANY AIR HANDLING SYSTEM IS CALLING FOR COOLING.

STARTUP AND SHUTDOWN

- WHEN THE CHILLED WATER SYSTEM IS ENABLED, THE CHILLED WATER SYSTEM ISOLATION VALVE MUST OPEN.
- AFTER A TIME DELAY (5 MIN. REPROGRAMMABLE) TO ALLOW THE VALVES TO OPEN, THE LEAD CHILLED WATER PUMP MUST BE ENERGIZED.
- THE LEAD PUMP REMAINS ENERGIZED WHENEVER THE CHILLED WATER SYSTEM IS ENABLED.

CHILLED WATER PUMP CONTROL

- WHEN THE CHILLED WATER SYSTEM IS ENABLED, THE BAS MUST STAGE THE PUMPS AND MODULATE THE VFD'S TO MAINTAIN THE CHILLED WATER SUPPLY DIFFERENTIAL PRESSURE (AS MEASURED BY A DIFFERENTIAL PRESSURE SENSOR LOCATED AT THE END OF THE CHWS/R MAINS) AT A REPROGRAMMABLE SETPOINT
- AS THE DIFFERENTIAL PRESSURE DEVIATES FROM SETPOINT, THE BAS SYSTEMS MUST SEND THE APPROPRIATE ANALOG SIGNAL TO THE VFDS TO SPEED UP OR SLOW DOWN THE PUMP MOTORS.
- IF THE DIFFERENTIAL SETPOINT CANNOT BE SATISFIED BY DESIGNATED LEAD PUMP, OR IF LEAD PUMP SHOULD BE REQUIRED TO OPERATE BEYOND ITS END OF CURVE POINT, THE BAS MUST INITIATE A TIMED SEQUENCE OF OPERATION TO STAGE ON THE SPARE PUMP.
- SPARE PUMP MUST ACCELERATE RESULTING IN LEAD PUMP DECELERATING UNTIL BOTH PUMPS EQUALIZE IN SPEED. FURTHER CHANGE IN SYSTEM VARIABLE MUST CAUSE PUMPS TO CHANGE SPEED TOGETHER.
- WHEN THE SETPOINT CAN BE SAFELY SATISFIED WITH FEWER PUMPS, THE BAS SYSTEM MUST, AFTER AN APPROPRIATE TIME DELAY, INITIATE A TIMED DE-STAGE SEQUENCE AND CONTINUE VARIABLE SPEED OPERATION. THE DE-STAGE POINT MUST BE DETERMINED BY THE TAB CONTRACTOR AS THE POINT WHERE THE MULTIPLE SPEED CURVE FAILS COMPLETELY BELOW THE SINGLE PUMP MAXIMUM SPEED CURVE.
- UPON FAILURE THE LEAD PUMP, IT MUST BE DISABLED, THE SPARE PUMP STARTED, LEAD-SPARE ASSIGNMENTS ADJUSTED AND BAS SYSTEM ALARMED.
- WHEN LEAD PUMP IS OPERATING AT MINIMUM SPEED, THE BAS MUST OPEN THE MINIMUM FLOW BYPASS VALVE.
- IN EVENT OF FAILURE TO RECEIVE THE ZONE SYSTEM VARIABLE SIGNAL, VFD MUST MAINTAIN AT THE LAST SPEED, UNLESS OTHERWISE REQUIRED FOR END OF CURVE PROTECTION, RESET MUST BE AUTOMATIC UPON CORRECTION OF THE FAILURE.
- THE LEAD AND SPARE PUMP ASSIGNMENTS MUST BE ROTATED IN ORDER TO EQUALIZE PUMP RUN TIMES. ROTATE ASSIGNMENTS EVERY 240 HOURS (REPROGRAMMABLE) OF LEAD PUMP RUN TIME.

TERTIARY LOOP CHILLED WATER TEMPERATURE CONTROL

- THE BAS MUST MODULATE THE CHILLED WATER RETURN VALVE TO MAINTAIN CHILLED WATER SUPPLY TEMPERATURE AT SETPOINT (43F ADJUSTABLE).

EMERGENCY CHILLER (CH-1) OPERATION

- THE BAS MUST ENABLE THE EMERGENCY CHILLER UPON ANY OF THE FOLLOWING CONDITIONS:
  HIGH SPACE TEMPERATURE (5F ABOVE SETPOINT, ADJUSTABLE) IN ANY OF THE ARCHIVAL STORAGE SPACES.
  HIGH SPACE HUMIDITY (5% RH ABOVE SETPOINT, ADJUSTABLE) IN ANY OF THE ARCHIVAL STORAGE SPACES.
  HIGH CHILLED WATER SUPPLY TEMPERATURE FROM THE SITE LOOP (B604 PLANT)
- WHENEVER THE EMERGENCY CHILLER IS ENABLED, THE BAS MUST PERFORM THE FOLLOWING:
  CLOSE THE CHILLED WATER CONTROL VALVES FOR AIR HANDLING UNITS AHU-2 AND AHU-3 AND DISABLE COOLING.
  OPEN THE HEAT EXCHANGER ISOLATION VALVE, AND CLOSE THE HX-2 BYPASS VALVE.
  CLOSE THE CHILLED WATER RETURN VALVE (TO B604 PLANT)
  MODULATE THE HX-2 ECHWS CHILLED WATER CONTROL VALVE TO MAINTAIN HX-2 OUTLET TEMPERATURE AT SETPOINT (43F ADJUSTABLE).

SAFETIES

- PUMP, CHILLER, AND GLYCOL FILL STATION STATUS MUST BE MONITORED AND ALARMED TO THE BAS SYSTEM.
- THE BAS MUST MONITOR CHILLER RUNTIME AND ALARM IF THE CHILLER HAS NOT BEEN ENABLED FOR A 6 MONTH PERIOD (ADJUSTABLE). THE BAS OPERATOR CAN THEN CHOOSE TO MANUALLY ENABLE CHILLER OPERATION FOR AN ADJUSTABLE PERIOD OF TIME TO EXERCISE THE EQUIPMENT.

CHILLED WATER SYSTEM CONTROL VALVE SCHEDULE (NOTE 2)

TAG	TYPE	MAX. PD (FT.)	FLOW	FAIL POSITION	LINE SIZE
HX-2 ECHWS	3-WAY MODULATING	7 FT.	67 GPM	NORMALLY OPEN	2.5"
HX-2 ISOLATION	2-WAY 2-POSITION	1 FT.	-	NORMALLY OPEN	2.5"
HX-2 BYPASS	2-WAY 2-POSITION	1 FT.	-	NORMALLY OPEN	6"
PUMP MIN FLOW BYPASS	2-WAY MODULATING	7 FT.	NOTE 1	NORMALLY OPEN	2.5"
CHW RET	2-WAY MODULATING	7 FT.	220 GPM	NORMALLY OPEN	6"

NOTES:

1. SIZE VALVE FOR MINIMUM PUMP FLOW AS DETERMINED BY THE PUMP MANUFACTURER IN THE PUMP SUBMITTAL.
2. THE CONTRACTOR MUST INCLUDE ALL COLUMNS IN THIS SCHEDULE IN THE VALVE SCHEDULE GENERATED FOR THE CONTROLS SUBMITTAL. ADDITIONAL COLUMNS AND DATA MUST BE ADDED TO THE CONTRACTOR'S VALVE SCHEDULE AS REQUIRED BY SPECIFICATION SECTION 23 09 00, PARAGRAPH 3.3.4.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: VMF
DRAWN BY: RKG
CHECKED BY: WCJ
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
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PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

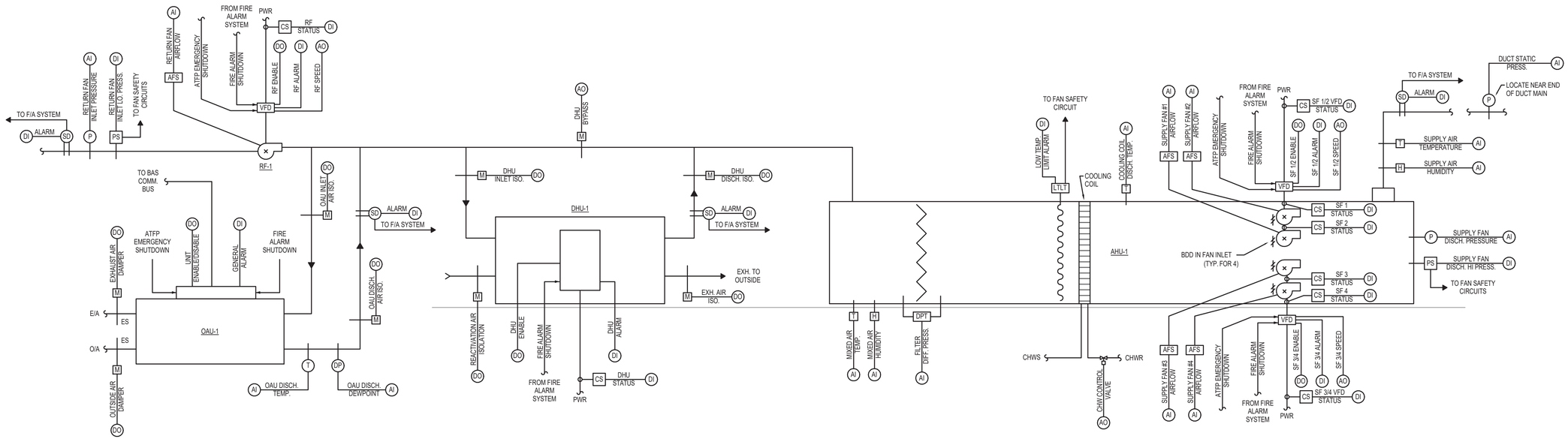
JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

HVAC CONTROLS

SHEET ID
M803

RTA SUBMISSION 2/11/2021



ARCHIVES AIR HANDLING SYSTEM CONTROL DIAGRAM

(AHU-1)

AHU - 1 CONTROL SEQUENCES

GENERAL
- SYSTEM HAS A RETURN FAN, AN OUTDOOR AIR UNIT, A GAS-FIRED DEHUMIDIFIER, A CHILLED WATER COOLING COIL WITH FACE & BYPASS DAMPER, A SUPPLY FAN ARRAY, A DISCHARGE PLENUM. THE SUPPLY FAN FAN ARRAY IS COMPRISED OF FOUR FANS WITH TWO VARIABLE FREQUENCY DRIVES CONTROLLING TWO FANS EACH. UNIT IS STARTED AND STOPPED BY THE BAS SYSTEM.
- THE OUTDOOR AIR UNIT MUST BE PROVIDED WITH INTEGRAL CONTROLS. THE BAS SYSTEM MUST ENABLE/DISABLE THE OUTSIDE AIR UNIT AND MONITOR ITS STATUS. THE REMAINDER OF ITS FUNCTIONS MUST BE CONTROLLED BY THE INTEGRAL CONTROLS.
- THE DEHUMIDIFIER MUST BE PROVIDED WITH INTEGRAL CONTROLS. THE BAS SYSTEM MUST ENABLE/DISABLE THE DEHUMIDIFIER AND MONITOR ITS STATUS. THE REMAINDER OF ITS FUNCTIONS MUST BE CONTROLLED BY THE INTEGRAL CONTROLS.
- THE SYSTEM MUST BE PROGRAMMED WITH AN INDEPENDENT 24 HR/365 DAY REPROGRAMMABLE OCCUPANCY SCHEDULE.

STARTUP AND SHUTDOWN
- WHEN THE UNIT IS INDEXED TO START, THE BAS SYSTEM MUST ENERGIZE THE SUPPLY AND RETURN FANS, OPEN THE OUTSIDE AIR UNIT ISOLATION DAMPERS AND ENABLE THE OUTSIDE AIR UNIT.
- WHENEVER AIR SYSTEM IS DE-ENERGIZED, THE SUPPLY AND RETURN FANS ARE DE-ENERGIZED. THE OUTSIDE AIR UNIT IS DE-ENERGIZED AND THE OUTSIDE AIR UNIT ISOLATION DAMPERS ARE CLOSED. THE CHILLED WATER CONTROL VALVE MUST CLOSE.

OCCUPIED MODE
- THE BAS SYSTEM MUST ALWAYS ENABLE THE AHU IN OCCUPIED MODE.
- SUPPLY AND RETURN FANS MUST RUN CONTINUOUSLY.
- THE RETURN FAN CFM DIFFERENTIAL SETPOINT MUST BE SET TO THE DIFFERENCE BETWEEN OAU-1 INLET AND DISCHARGE CFM VALUES (300 CFM).

HUMIDIFICATION (HUM 1-1)
- REFER TO CONTROLS DETAIL A4/M807.

DEHUMIDIFICATION (DHU-1)
- UPON A RISE OF ANY SPACE RH 4% ABOVE SETPOINT (ADJUSTABLE), THE BAS SYSTEM MUST OPEN THE DEHUMIDIFIER ISOLATION DAMPERS AND ENABLE THE DEHUMIDIFIER.

MECHANICAL COOLING
- THE BAS MUST MODULATE OPEN THE COOLING COIL CONTROL VALVE TO MAINTAIN SUPPLY AIR TEMPERATURE AT SETPOINT.

SUPPLY FANS
- THE FAN SYSTEM CONSISTS OF TWO VARIABLE FREQUENCY DRIVES (VFD'S) CONFIGURED IN A LEAD-LAG ARRANGEMENT. EACH VFD CONTROLS TWO FANS.
- A SUPPLY DUCT STATIC PRESSURE SENSOR MUST BE PROVIDED AT THE END OF THE MAINS ON LEVEL B1. THE BAS SYSTEM MUST STAGE AND MODULATE THE SUPPLY FAN VFD'S TO MAINTAIN DUCT STATIC PRESSURE AT THE LOWEST FAN SPEED THAT MAINTAINS DUCT STATIC PRESSURE AT OR ABOVE SETPOINT (PRELIMINARY SETPOINT TO BE .65" WITH THE FINAL SETPOINT INDIVIDUALLY DETERMINED BY THE TAB CONTRACTOR BASED UPON THE FINAL SENSOR LOCATIONS AND THE MINIMUM STATIC REQUIREMENTS OF THE DUCT SYSTEM.
- AS THE STATIC PRESSURE DEVIATES FROM SETPOINT, THE BAS MUST SEND THE APPROPRIATE ANALOG SIGNAL TO THE VFDS TO SPEED UP OR SLOW DOWN THE FANS.
- IF SETPOINT CANNOT BE SATISFIED BY THE DESIGNATED LEAD SET OF FANS, THE BAS SYSTEM MUST RESET THE LEAD FAN SPEED TO MINIMUM AND STAGE ON THE LAG SET OF FANS. LEAD AND LAG FANS MUST THEN ACCELERATE TOGETHER TO MEET THE DUCT STATIC PRESSURE SETPOINT. FURTHER CHANGE IN SUPPLY DUCT STATIC MUST CAUSE THE FANS TO CHANGE SPEED TOGETHER.
- WHEN THE VFD OUTPUT DROPS TO MINIMUM SPEED (20 HZ, ADJUSTABLE), THE LAG FANS MUST BE DISABLED AND THE LEAD FANS CONTINUE VARIABLE SPEED OPERATION.
- UPON FAILURE OF THE LEAD FANS, AN ALARM MUST NOTIFY THE DDC SYSTEM, THE LEAD FANS MUST BE DISABLED AND THE LAG FANS MUST BE ENERGIZED.
- UPON A FAILURE OF THE LAG FANS, THE BAS SYSTEM MUST BE ALARMED AND THE LAG FANS MUST BE DISABLED.
- THE SUPPLY FAN DISCHARGE PRESSURE SENSOR MUST OVERRIDE SUPPLY DUCT STATIC CONTROL TO PREVENT OVER PRESSURING OF THE SYSTEM (3.0" W.G. MAXIMUM).
- - THE LEAD AND LAG FAN ASSIGNMENTS MUST BE ROTATED IN ORDER TO EQUALIZE ALL FANS' RUN TIMES. ROTATE ASSIGNMENTS EVERY 240 HOURS (REPROGRAMMABLE) OF LEAD FANS RUN TIME.

RETURN FAN
- THE FAN SYSTEM CONSISTS OF AN INLINE RETURN FAN WITH VFD.
- THE BAS SYSTEM MUST MODDULATE THE RETURN FAN VFD TO MAINTAIN THE CFM OFFSET BETWEEN THE SUPPLY AND RETURN AIRFLOWS AT THE CURRENT RETURN FAN CFM DIFFERENTIAL SETPOINT.
- AS THE RETURN FAN CFM DIFFERENTIAL DEVIATES FROM SETPOINT, THE BAS MUST SEND THE APPROPRIATE ANALOG SIGNAL TO THE VFDS TO SPEED UP OR SLOW DOWN THE FANS.

ALARMS
- VFD STATUS MUST BE MONITORED AND ALARMED TO THE BAS SYSTEM.
- FAN STATUS MUST BE MONITORED THROUGH CURRENT SENSORS AND BE ALARMED TO BAS SYSTEM.
- A DIFFERENTIAL PRESSURE SWITCH ACROSS THE FILTER BANK MUST ALARM THE BAS SYSTEM UPON A RISE IN PRESSURE ABOVE SETPOINT (1.5" ESP.).

SAFETY CONTROLS
- ALL SAFETY CONTROLS TO BE WIRED INTO FAN (STARTER OR VFD) SAFETY CIRCUITS AND REMAIN ACTIVE EVEN WHEN FANS ARE MANUALLY OVERRIDDEN.
- SMOKE DETECTORS IN SUPPLY, RETURN, AND OUTSIDE AIR DUCTS MUST DE-ENERGIZE FANS AND ALARM BAS SYSTEM.
- SUPPLY FAN STATIC PRESSURE SWITCH MUST, DE-ENERGIZE FANS AND ALARM DDC SYSTEM IN CASE OF EXCESSIVE PRESSURE (GREATER THAN 4.0" W.G.).
- THE RETURN FAN INLET PRESSURE SWITCH MUST, THROUGH THE BAS SYSTEM, DE-ENERGIZE FANS AND ALARM BAS SYSTEM IN CASE OF EXCESSIVE NEGATIVE PRESSURE (MORE THAN 3.0" W.G. NEGATIVE).
- A LOW TEMPERATURE LIMIT SWITCH MUST ALARM THE BAS AND SHUTDOWN THE UNIT UPON A DROP IN COOLING COIL DISCHARGE TEMPERATURE BELOW 35°F.
- THE ATFP EMERGENCY SHUTDOWN SWITCHES MUST SHUTDOWN ALL UNIT FANS AND CLOSE ALL UNIT OUTSIDE AIR AND EXHAUST DAMPERS.

AHU-1 SYSTEM CONTROL VALVE SCHEDULE (NOTE 1)

TAG	TYPE	MAX. PD (FT.)	FLOW	FAIL POSITION	LINE SIZE
CHW CONTROL	2-WAY MODULATING	7 FT.	20 GPM	NORMALLY OPEN	2"

NOTES:
1. THE CONTRACTOR MUST INCLUDE ALL COLUMNS IN THIS SCHEDULE IN THE VALVE SCHEDULE GENERATED FOR THE CONTROLS SUBMITTAL. ADDITIONAL COLUMNS AND DATA MUST BE ADDED TO THE CONTRACTOR'S VALVE SCHEDULE AS REQUIRED BY SPECIFICATION SECTION 23 09 00, PARAGRAPH 3.3.4.

A5 / M804 AHU-1 CONTROL DIAGRAM

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: RKG
CHECKED BY: WCJ
SUBMITTED BY:
SIZE: ANSI D

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SOLICITATION NO.: W912DS-19-R-0014
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US ARMY CORPS OF ENGINEERS

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WEST POINT, NY
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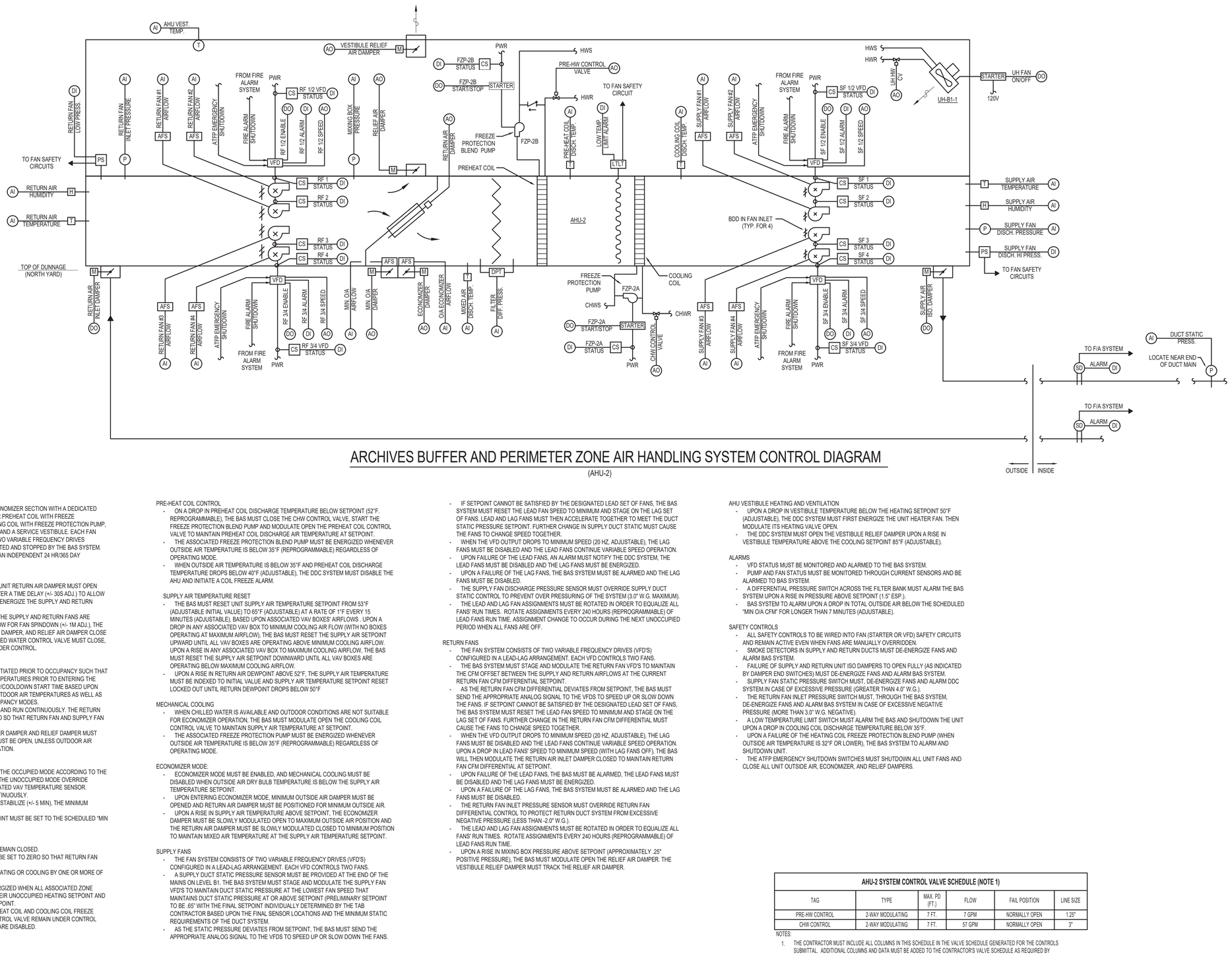
HVAC CONTROLS

SHEET ID

M804

RTA SUBMISSION 2/11/2021



ARCHIVES BUFFER AND PERIMETER ZONE AIR HANDLING SYSTEM CONTROL DIAGRAM

(AHU-2)

AHU - 2 CONTROL SEQUENCES

GENERAL
- SYSTEM HAS A RETURN FAN ARRAY, AN ECONOMIZER SECTION WITH A DEDICATED MINIMUM OUTSIDE AIR DAMPER, A HOT WATER PREHEAT COIL WITH FREEZE PROTECTION PUMP, A CHILLED WATER COOLING COIL WITH FREEZE PROTECTION PUMP, A SUPPLY FAN ARRAY, A DISCHARGE PLENUM AND A SERVICE VESTIBULE. EACH FAN ARRAY IS COMPRISED OF FOUR FANS WITH TWO VARIABLE FREQUENCY DRIVES CONTROLLING TWO FANS EACH. UNIT IS STARTED AND STOPPED BY THE BAS SYSTEM.
- THE SYSTEM MUST BE PROGRAMMED WITH AN INDEPENDENT 24 HR/365 DAY REPROGRAMMABLE OCCUPANCY SCHEDULE.

STARTUP AND SHUTDOWN
- WHEN THE UNIT IS INDEXED TO START, THE UNIT RETURN AIR DAMPER MUST OPEN AND OUTSIDE AIR DAMPERS MUST CLOSE. AFTER A TIME DELAY (+/- 30S ADJ.) TO ALLOW DAMPER OPERATION, THE BAS SYSTEM MUST ENERGIZE THE SUPPLY AND RETURN FANS.
- WHENEVER AIR SYSTEM IS DE-ENERGIZED, THE SUPPLY AND RETURN FANS ARE DE-ENERGIZED. AFTER A TIME DELAY TO ALLOW FOR FAN SPINDOWN (+/- 1M ADJ.), THE MINIMUM OUTSIDE AIR DAMPER, ECONOMIZER DAMPER, AND RELIEF AIR DAMPER CLOSE AND THE RETURN DAMPER OPENS. THE CHILLED WATER CONTROL VALVE MUST CLOSE, AND FREEZE PROTECTION PUMPS REMAIN UNDER CONTROL.

MORNING WARMUP / COOLDOWN
- A WARM UP/COOL DOWN CYCLE MUST BE INITIATED PRIOR TO OCCUPANCY SUCH THAT ALL SPACES ATTAIN OCCUPIED SETPOINT TEMPERATURES PRIOR TO ENTERING THE OCCUPIED MODE. BAS MUST ADJUST WARMUP/COOLDOWN START TIME BASED UPON THE DIFFERENTIAL BETWEEN INDOOR AND OUTDOOR AIR TEMPERATURES AS WELL AS THE SETPOINT DIFFERENTIAL BETWEEN OCCUPANCY MODES.
- SUPPLY AND RETURN FANS MUST START UP AND RUN CONTINUOUSLY. THE RETURN FAN CFM DIFFERENTIAL MUST BE SET TO ZERO SO THAT RETURN FAN AND SUPPLY FAN AIRFLOWS ARE EQUAL.
- MINIMUM OUTSIDE AIR DAMPER, ECONOMIZER DAMPER AND RELIEF DAMPER MUST REMAIN CLOSED AND RETURN AIR DAMPER MUST BE OPEN, UNLESS OUTDOOR AIR CONDITIONS ALLOW FOR ECONOMIZER OPERATION.

OCCUPIED MODE
- THE BAS SYSTEM MUST ENABLE THE AHU IN THE OCCUPIED MODE ACCORDING TO THE BUILDING OCCUPANCY SCHEDULE, OR WHEN THE UNOCCUPIED MODE OVERRIDE PUSHBUTTON IS DEPRESSED ON ANY ASSOCIATED VAV TEMPERATURE SENSOR.
- SUPPLY AND RETURN FANS MUST RUN CONTINUOUSLY.
- AFTER A TIME DELAY TO ALLOW SYSTEM TO STABILIZE (+/- 5 MIN), THE MINIMUM OUTSIDE AIR DAMPER MUST OPEN.
- THE RETURN FAN CFM DIFFERENTIAL SETPOINT MUST BE SET TO THE SCHEDULED "MIN O/A CFM".

UNOCCUPIED MODE
- THE MINIMUM OUTSIDE AIR DAMPER MUST REMAIN CLOSED.
- THE RETURN FAN CFM DIFFERENTIAL MUST BE SET TO ZERO SO THAT RETURN FAN AND SUPPLY FAN AIRFLOWS ARE EQUAL.
- FANS MUST RUN ONLY UPON A CALL FOR HEATING OR COOLING BY ONE OR MORE OF THE ASSOCIATED VAV BOXES.
- UNIT MUST BE DISABLED AND FANS DE-ENERGIZED WHEN ALL ASSOCIATED ZONE TEMPERATURES ARE BETWEEN 5°F ABOVE THEIR UNOCCUPIED HEATING SETPOINT AND 5°F BELOW THEIR UNOCCUPIED COOLING SETPOINT.
- WHEN UNIT FANS ARE DE-ENERGIZED, PREHEAT COIL AND COOLING COIL FREEZE PROTECTION PUMPS AND PREHEAT COIL CONTROL VALVE REMAIN UNDER CONTROL AND ALL COOLING AND ECONOMIZER MODES ARE DISABLED.

PRE-HEAT COIL CONTROL
- ON A DROP IN PREHEAT COIL DISCHARGE TEMPERATURE BELOW SETPOINT (52°F. REPROGRAMMABLE), THE BAS MUST CLOSE THE CHW CONTROL VALVE, START THE FREEZE PROTECTION BLEND PUMP AND MODULATE OPEN THE PREHEAT COIL CONTROL VALVE TO MAINTAIN PREHEAT COIL DISCHARGE AIR TEMPERATURE AT SETPOINT.
- THE ASSOCIATED FREEZE PROTECTION BLEND PUMP MUST BE ENERGIZED WHENEVER OUTSIDE AIR TEMPERATURE IS BELOW 35°F (REPROGRAMMABLE) REGARDLESS OF OPERATING MODE.
- WHEN OUTSIDE AIR TEMPERATURE IS BELOW 35°F AND PREHEAT COIL DISCHARGE TEMPERATURE DROPS BELOW 40°F (ADJUSTABLE), THE DDC SYSTEM MUST DISABLE THE AHU AND INITIATE A COIL FREEZE ALARM.

SUPPLY AIR TEMPERATURE RESET
- THE BAS MUST RESET UNIT SUPPLY AIR TEMPERATURE SETPOINT FROM 53°F (ADJUSTABLE INITIAL VALUE) TO 65°F (ADJUSTABLE) AT A RATE OF 1°F EVERY 15 MINUTES (ADJUSTABLE), BASED UPON ASSOCIATED VAV BOXES' AIRFLOWS . UPON A DROP IN ANY ASSOCIATED VAV BOX TO MINIMUM COOLING AIR FLOW (WITH NO BOXES OPERATING AT MAXIMUM AIRFLOW), THE BAS MUST RESET THE SUPPLY AIR SETPOINT UPWARD UNTIL ALL VAV BOXES ARE OPERATING ABOVE MINIMUM COOLING AIRFLOW. UPON A RISE IN ANY ASSOCIATED VAV BOX TO MAXIMUM COOLING AIRFLOW, THE BAS MUST RESET THE SUPPLY AIR SETPOINT DOWNWARD UNTIL ALL VAV BOXES ARE OPERATING BELOW MAXIMUM COOLING AIRFLOW.
- UPON A RISE IN RETURN AIR DEWPOINT ABOVE 52°F, THE SUPPLY AIR TEMPERATURE MUST BE INDEXED TO INITIAL VALUE AND SUPPLY AIR TEMPERATURE SETPOINT RESET LOCKED OUT UNTIL RETURN DEWPOINT DROPS BELOW 50°F

MECHANICAL COOLING
- WHEN CHILLED WATER IS AVAILABLE AND OUTDOOR CONDITIONS ARE NOT SUITABLE FOR ECONOMIZER OPERATION, THE BAS MUST MODULATE OPEN THE COOLING COIL CONTROL VALVE TO MAINTAIN SUPPLY AIR TEMPERATURE AT SETPOINT.
- THE ASSOCIATED FREEZE PROTECTION PUMP MUST BE ENERGIZED WHENEVER OUTSIDE AIR TEMPERATURE IS BELOW 35°F (REPROGRAMMABLE) REGARDLESS OF OPERATING MODE.

ECONOMIZER MODE:
- ECONOMIZER MODE MUST BE ENABLED, AND MECHANICAL COOLING MUST BE DISABLED WHEN OUTSIDE AIR DRY BULB TEMPERATURE IS BELOW THE SUPPLY AIR TEMPERATURE SETPOINT.
- UPON ENTERING ECONOMIZER MODE, MINIMUM OUTSIDE AIR DAMPER MUST BE OPENED AND RETURN AIR DAMPER MUST BE POSITIONED FOR MINIMUM OUTSIDE AIR.
- UPON A RISE IN SUPPLY AIR TEMPERATURE ABOVE SETPOINT, THE ECONOMIZER DAMPER MUST BE SLOWLY MODULATED OPEN TO MAXIMUM OUTSIDE AIR POSITION AND THE RETURN AIR DAMPER MUST BE SLOWLY MODULATED CLOSED TO MINIMUM POSITION TO MAINTAIN MIXED AIR TEMPERATURE AT THE SUPPLY AIR TEMPERATURE SETPOINT.

SUPPLY FANS
- THE FAN SYSTEM CONSISTS OF TWO VARIABLE FREQUENCY DRIVES (VFD'S) CONFIGURED IN A LEAD-LAG ARRANGEMENT. EACH VFD CONTROLS TWO FANS.
- A SUPPLY DUCT STATIC PRESSURE SENSOR MUST BE PROVIDED AT THE END OF THE MAINS ON LEVEL B1. THE BAS SYSTEM MUST STAGE AND MODULATE THE SUPPLY FAN VFD'S TO MAINTAIN DUCT STATIC PRESSURE AT THE LOWEST FAN SPEED THAT MAINTAINS DUCT STATIC PRESSURE AT OR ABOVE SETPOINT (PRELIMINARY SETPOINT TO BE .65" WITH THE FINAL SETPOINT INDIVIDUALLY DETERMINED BY THE TAB CONTRACTOR BASED UPON THE FINAL SENSOR LOCATIONS AND THE MINIMUM STATIC REQUIREMENTS OF THE DUCT SYSTEM.
- AS THE STATIC PRESSURE DEVIATES FROM SETPOINT, THE BAS MUST SEND THE APPROPRIATE ANALOG SIGNAL TO THE VFDS TO SPEED UP OR SLOW DOWN THE FANS.
- IF SETPOINT CANNOT BE SATISFIED BY THE DESIGNATED LEAD SET OF FANS, THE BAS SYSTEM MUST RESET THE LEAD FAN SPEED TO MINIMUM AND STAGE ON THE LAG SET OF FANS. LEAD AND LAG FANS MUST THEN ACCELERATE TOGETHER TO MEET THE DUCT STATIC PRESSURE SETPOINT. FURTHER CHANGE IN SUPPLY DUCT STATIC MUST CAUSE THE FANS TO CHANGE SPEED TOGETHER.
- WHEN THE VFD OUTPUT DROPS TO MINIMUM SPEED (20 HZ, ADJUSTABLE), THE LAG FANS MUST BE DISABLED AND THE LEAD FANS CONTINUE VARIABLE SPEED OPERATION.
- UPON FAILURE OF THE LEAD FANS, AN ALARM MUST NOTIFY THE DDC SYSTEM, THE LEAD FANS MUST BE DISABLED AND THE LAG FANS MUST BE ENERGIZED.
- UPON A FAILURE OF THE LAG FANS, THE BAS SYSTEM MUST BE ALARMED AND THE LAG FANS MUST BE DISABLED.
- THE SUPPLY FAN DISCHARGE PRESSURE SENSOR MUST OVERRIDE SUPPLY DUCT STATIC CONTROL TO PREVENT OVER PRESSURING OF THE SYSTEM (3.0" W.G. MAXIMUM).
- THE LEAD AND LAG FAN ASSIGNMENTS MUST BE ROTATED IN ORDER TO EQUALIZE ALL FANS' RUN TIMES. ROTATE ASSIGNMENTS EVERY 240 HOURS (REPROGRAMMABLE) OF LEAD FANS RUN TIME. ASSIGNMENT CHANGE TO OCCUR DURING THE NEXT UNOCCUPIED PERIOD WHEN ALL FANS ARE OFF.

RETURN FANS
- THE FAN SYSTEM CONSISTS OF TWO VARIABLE FREQUENCY DRIVES (VFD'S) CONFIGURED IN A LEAD-LAG ARRANGEMENT. EACH VFD CONTROLS TWO FANS.
- THE BAS SYSTEM MUST STAGE AND MODULATE THE RETURN FAN VFD'S TO MAINTAIN THE CFM OFFSET BETWEEN THE SUPPLY AND RETURN AIRFLOWS AT THE CURRENT RETURN FAN CFM DIFFERENTIAL SETPOINT.
- AS THE RETURN FAN CFM DIFFERENTIAL DEVIATES FROM SETPOINT, THE BAS MUST SEND THE APPROPRIATE ANALOG SIGNAL TO THE VFDS TO SPEED UP OR SLOW DOWN THE FANS. IF SETPOINT CANNOT BE SATISFIED BY THE DESIGNATED LEAD SET OF FANS, THE BAS SYSTEM MUST RESET THE LEAD FAN SPEED TO MINIMUM AND STAGE ON THE LAG SET OF FANS. FURTHER CHANGE IN THE RETURN FAN CFM DIFFERENTIAL MUST CAUSE THE FANS TO CHANGE SPEED TOGETHER.
- WHEN THE VFD OUTPUT DROPS TO MINIMUM SPEED (20 HZ, ADJUSTABLE), THE LAG FANS MUST BE DISABLED AND THE LEAD FANS CONTINUE VARIABLE SPEED OPERATION. UPON A DROP IN LEAD FANS' SPEED TO MINIMUM SPEED (WITH LAG FANS OFF), THE BAS WILL THEN MODULATE THE RETURN AIR INLET DAMPER CLOSED TO MAINTAIN RETURN FAN CFM DIFFERENTIAL AT SETPOINT.
- UPON FAILURE OF THE LEAD FANS, THE BAS MUST BE ALARMED, THE LEAD FANS MUST BE DISABLED AND THE LAG FANS MUST BE ENERGIZED.
- UPON A FAILURE OF THE LAG FANS, THE BAS SYSTEM MUST BE ALARMED AND THE LAG FANS MUST BE DISABLED.
- THE RETURN FAN INLET PRESSURE SENSOR MUST OVERRIDE RETURN FAN DIFFERENTIAL CONTROL TO PROTECT RETURN DUCT SYSTEM FROM EXCESSIVE NEGATIVE PRESSURE (LESS THAN -2.0" W.G.).
- THE LEAD AND LAG FAN ASSIGNMENTS MUST BE ROTATED IN ORDER TO EQUALIZE ALL FANS' RUN TIMES. ROTATE ASSIGNMENTS EVERY 240 HOURS (REPROGRAMMABLE) OF LEAD FANS RUN TIME.
- UPON A RISE IN MIXING BOX PRESSURE ABOVE SETPOINT (APPROXIMATELY .25" POSITIVE PRESSURE), THE BAS MUST MODULATE OPEN THE RELIEF AIR DAMPER. THE VESTIBULE RELIEF DAMPER MUST TRACK THE RELIEF AIR DAMPER.

AHU VESTIBULE HEATING AND VENTILATION
- UPON A DROP IN VESTIBULE TEMPERATURE BELOW THE HEATING SETPOINT 50°F (ADJUSTABLE), THE DDC SYSTEM MUST FIRST ENERGIZE THE UNIT HEATER FAN. THEN MODULATE ITS HEATING VALVE OPEN.
- THE DDC SYSTEM MUST OPEN THE VESTIBULE RELIEF DAMPER UPON A RISE IN VESTIBULE TEMPERATURE ABOVE THE COOLING SETPOINT 85°F (ADJUSTABLE).

ALARMS
- VFD STATUS MUST BE MONITORED AND ALARMED TO THE BAS SYSTEM.
- PUMP AND FAN STATUS MUST BE MONITORED THROUGH CURRENT SENSORS AND BE ALARMED TO BAS SYSTEM.
- A DIFFERENTIAL PRESSURE SWITCH ACROSS THE FILTER BANK MUST ALARM THE BAS SYSTEM UPON A RISE IN PRESSURE ABOVE SETPOINT (1.5" ESP).
- BAS SYSTEM TO ALARM UPON A DROP IN TOTAL OUTSIDE AIR BELOW THE SCHEDULED "MIN O/A CFM" FOR LONGER THAN 7 MINUTES (ADJUSTABLE).

SAFETY CONTROLS
- ALL SAFETY CONTROLS TO BE WIRED INTO FAN (STARTER OR VFD) SAFETY CIRCUITS AND REMAIN ACTIVE EVEN WHEN FANS ARE MANUALLY OVERRIDDEN.
- SMOKE DETECTORS IN SUPPLY AND RETURN DUCTS MUST DE-ENERGIZE FANS AND ALARM BAS SYSTEM.
- FAILURE OF SUPPLY AND RETURN UNIT ISO DAMPERS TO OPEN FULLY (AS INDICATED BY DAMPER END SWITCHES) MUST DE-ENERGIZE FANS AND ALARM BAS SYSTEM.
- SUPPLY FAN STATIC PRESSURE SWITCH MUST, DE-ENERGIZE FANS AND ALARM DDC SYSTEM IN CASE OF EXCESSIVE PRESSURE (GREATER THAN 4.0" W.G.).
- THE RETURN FAN INLET PRESSURE SWITCH MUST, THROUGH THE BAS SYSTEM, DE-ENERGIZE FANS AND ALARM BAS SYSTEM IN CASE OF EXCESSIVE NEGATIVE PRESSURE (MORE THAN 3.0" W.G. NEGATIVE).
- A LOW TEMPERATURE LIMIT SWITCH MUST ALARM THE BAS AND SHUTDOWN THE UNIT UPON A DROP IN COOLING COIL DISCHARGE TEMPERATURE BELOW 35°F.
- UPON A FAILURE OF THE HEATING COIL FREEZE PROTECTION BLEND PUMP (WHEN OUTSIDE AIR TEMPERATURE IS 32°F OR LOWER), THE BAS SYSTEM TO ALARM AND SHUTDOWN UNIT.
- THE ATFP EMERGENCY SHUTDOWN SWITCHES MUST SHUTDOWN ALL UNIT FANS AND CLOSE ALL UNIT OUTSIDE AIR, ECONOMIZER, AND RELIEF DAMPERS.

AHU-2 SYSTEM CONTROL VALVE SCHEDULE (NOTE 1)

TAG	TYPE	MAX. PD (FT.)	FLOW	FAIL POSITION	LINE SIZE
PRE-HW CONTROL	2-WAY MODULATING	7 FT.	7 GPM	NORMALLY OPEN	1.25"
CHW CONTROL	2-WAY MODULATING	7 FT.	57 GPM	NORMALLY OPEN	3"

NOTES:
1. THE CONTRACTOR MUST INCLUDE ALL COLUMNS IN THIS SCHEDULE IN THE VALVE SCHEDULE GENERATED FOR THE CONTROLS SUBMITTAL. ADDITIONAL COLUMNS AND DATA MUST BE ADDED TO THE CONTRACTOR'S VALVE SCHEDULE AS REQUIRED BY SPECIFICATION SECTION 23 09 00, PARAGRAPH 3.3.4.

A5 / M805 AHU-2 CONTROL DIAGRAM

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

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DRAWN BY: RKG
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SOLICITATION NO.: W912DS-19-R-0014
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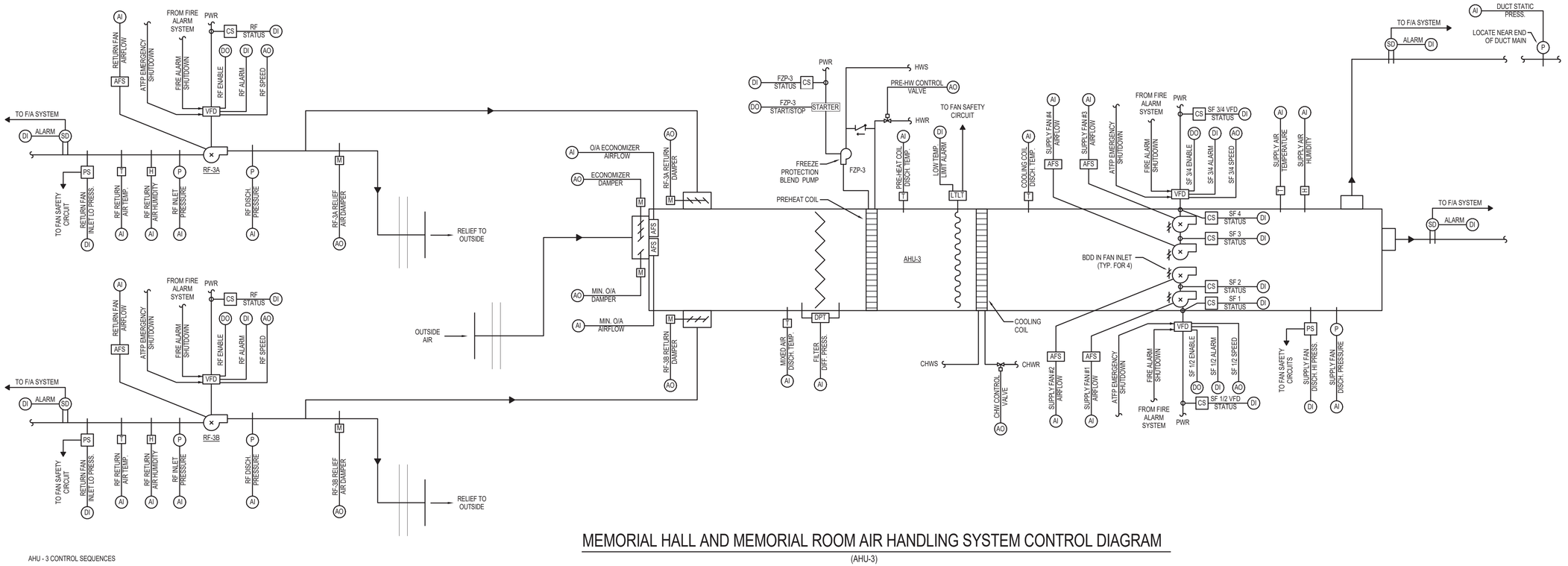
M805

RTA SUBMISSION 2/11/2021



MEMORIAL HALL AND MEMORIAL ROOM AIR HANDLING SYSTEM CONTROL DIAGRAM

(AHU-3)

AHU - 3 CONTROL SEQUENCES

GENERAL
- SYSTEM HAS TWO DUCT-MOUNTED RETURN FANS (WITH VFDS), AN ECONOMIZER (DUCTED CONFIGURATION), A HOT WATER PREHEAT COIL WITH FREEZE PROTECTION PUMP, A CHILLED WATER COOLING COIL, A SUPPLY FAN ARRAY, AND A DISCHARGE PLENUM. THE FAN ARRAY IS COMPRISED OF FOUR FANS WITH TWO VARIABLE FREQUENCY DRIVES CONTROLLING TWO FANS EACH. UNIT IS STARTED AND STOPPED BY THE BAS SYSTEM.
- THE SYSTEM MUST BE PROGRAMMED WITH AN INDEPENDENT 24 HR/365 DAY REPROGRAMMABLE OCCUPANCY SCHEDULE.

STARTUP AND SHUTDOWN
- WHEN THE UNIT IS INDEXED TO START, THE UNIT RETURN AIR DAMPERS MUST OPEN AND OUTSIDE AIR DAMPERS MUST CLOSE. AFTER A TIME DELAY (+/- 30S ADJ.) TO ALLOW DAMPER OPERATION, THE BAS SYSTEM MUST ENERGIZE THE SUPPLY AND RETURN FANS.
- WHENEVER AIR SYSTEM IS DE-ENERGIZED, THE SUPPLY AND RETURN FANS ARE DE-ENERGIZED. AFTER A TIME DELAY TO ALLOW FOR FAN SPINDOWN (+/- 1M ADJ.), THE MINIMUM OUTSIDE AIR DAMPER, ECONOMIZER DAMPER, AND RELIEF AIR DAMPERS CLOSE AND THE RETURN DAMPERS OPEN. THE CHILLED WATER CONTROL VALVE MUST CLOSE, AND FREEZE PROTECTION PUMPS REMAIN UNDER CONTROL.

MORNING WARMUP / COOLDOWN
- A WARM UP/COOL DOWN CYCLE MUST BE INITIATED PRIOR TO OCCUPANCY SUCH THAT ALL SPACES ATTAIN OCCUPIED SETPOINT TEMPERATURES PRIOR TO ENTERING THE OCCUPIED MODE. BAS MUST ADJUST WARMUP/COOLDOWN START TIME BASED UPON THE DIFFERENTIAL BETWEEN INDOOR AND OUTDOOR AIR TEMPERATURES AS WELL AS THE SETPOINT DIFFERENTIAL BETWEEN OCCUPANCY MODES.
- SUPPLY AND RETURN FANS MUST START UP AND RUN CONTINUOUSLY. THE RETURN FAN CFM DIFFERENTIAL MUST BE SET TO ZERO SO THAT RETURN FAN AND SUPPLY FAN AIRFLOWS ARE EQUAL.
- MINIMUM OUTSIDE AIR DAMPER, ECONOMIZER DAMPER AND RELIEF DAMPER MUST REMAIN CLOSED AND RETURN AIR DAMPER MUST BE OPEN, UNLESS OUTDOOR AIR CONDITIONS ALLOW FOR ECONOMIZER OPERATION.

OCCUPIED MODE
- THE BAS SYSTEM MUST ENABLE THE AHU IN THE OCCUPIED MODE ACCORDING TO THE BUILDING OCCUPANCY SCHEDULE, OR WHEN THE UNOCCUPIED MODE OVERRIDE PUSHBUTTON IS DEPRESSED ON ANY ASSOCIATED VAV TEMPERATURE SENSOR.
- SUPPLY AND RETURN FANS MUST RUN CONTINUOUSLY.
- AFTER A TIME DELAY TO ALLOW SYSTEM TO STABILIZE (+/- 5 MIN), THE MINIMUM OUTSIDE AIR DAMPER MUST OPEN.
- THE RETURN FAN CFM DIFFERENTIAL SETPOINT MUST BE SET TO THE SCHEDULED "MIN O/A CFM".

UNOCCUPIED MODE
- THE MINIMUM OUTSIDE AIR DAMPER MUST REMAIN CLOSED.
- THE RETURN FAN CFM DIFFERENTIAL MUST BE SET TO ZERO SO THAT RETURN FAN AND SUPPLY FAN AIRFLOWS ARE EQUAL.
- FANS MUST RUN ONLY UPON A CALL FOR HEATING OR COOLING BY ONE OR MORE OF THE ASSOCIATED VAV BOXES.
- UNIT MUST BE DISABLED AND FANS DE-ENERGIZED WHEN ALL ASSOCIATED ZONE TEMPERATURES ARE BETWEEN 5°F ABOVE THEIR UNOCCUPIED HEATING SETPOINT AND 5°F BELOW THEIR UNOCCUPIED COOLING SETPOINT.
- WHEN UNIT FANS ARE DE-ENERGIZED, PREHEAT COIL FREEZE PROTECTION PUMP AND PREHEAT COIL CONTROL VALVE REMAIN UNDER CONTROL AND ALL COOLING AND ECONOMIZER MODES ARE DISABLED.

PRE-HEAT COIL CONTROL
- ON A DROP IN PREHEAT COIL DISCHARGE TEMPERATURE BELOW SETPOINT (52°F. REPROGRAMMABLE), THE BAS MUST CLOSE THE CHW CONTROL VALVE, START THE FREEZE PROTECTION BLEND PUMP AND MODULATE OPEN THE PREHEAT COIL CONTROL VALVE TO MAINTAIN PREHEAT COIL DISCHARGE AIR TEMPERATURE AT SETPOINT.
- THE ASSOCIATED FREEZE PROTECTION BLEND PUMP MUST BE ENERGIZED WHENEVER OUTSIDE AIR TEMPERATURE IS BELOW 35°F (REPROGRAMMABLE) REGARDLESS OF OPERATING MODE.
- WHEN OUTSIDE AIR TEMPERATURE IS BELOW 35°F AND PREHEAT COIL DISCHARGE TEMPERATURE DROPS BELOW 40°F (ADJUSTABLE), THE DDC SYSTEM MUST DISABLE THE AHU AND INITIATE A COIL FREEZE ALARM.

SUPPLY AIR TEMPERATURE RESET
- THE BAS MUST RESET UNIT SUPPLY AIR TEMPERATURE SETPOINT FROM 53°F (ADJUSTABLE INITIAL VALUE) TO 65°F (ADJUSTABLE) AT A RATE OF 1°F EVERY 15 MINUTES (ADJUSTABLE), BASED UPON ASSOCIATED VAV BOXES' AIRFLOWS . UPON A DROP IN ANY ASSOCIATED VAV BOX TO MINIMUM COOLING AIR FLOW (WITH NO BOXES OPERATING AT MAXIMUM AIRFLOW), THE BAS MUST RESET THE SUPPLY AIR SETPOINT UPWARD UNTIL ALL VAV BOXES ARE OPERATING ABOVE MINIMUM COOLING AIRFLOW. UPON A RISE IN ANY ASSOCIATED VAV BOX TO MAXIMUM COOLING AIRFLOW, THE BAS MUST RESET THE SUPPLY AIR SETPOINT DOWNWARD UNTIL ALL VAV BOXES ARE OPERATING BELOW MAXIMUM COOLING AIRFLOW.
- UPON A RISE IN RETURN AIR DEWPOINT ABOVE 52°F, THE SUPPLY AIR TEMPERATURE MUST BE INDEXED TO STARTUP VALUE AND SUPPLY AIR TEMPERATURE SETPOINT RESET LOCKED OUT UNTIL RETURN DEWPOINT DROPS BELOW 50°F

MECHANICAL COOLING
- WHEN CHILLED WATER IS AVAILABLE AND OUTDOOR CONDITIONS ARE NOT SUITABLE FOR ECONOMIZER OPERATION, THE BAS MUST MODULATE OPEN THE COOLING COIL CONTROL VALVE TO MAINTAIN SUPPLY AIR TEMPERATURE AT SETPOINT.

ECONOMIZER MODE:
- ECONOMIZER MODE MUST BE ENABLED, AND MECHANICAL COOLING MUST BE DISABLED WHEN OUTSIDE AIR DRY BULB TEMPERATURE IS BELOW THE SUPPLY AIR TEMPERATURE SETPOINT.
- UPON ENTERING ECONOMIZER MODE, MINIMUM OUTSIDE AIR DAMPER MUST BE OPENED AND RETURN AIR DAMPERS MUST BE POSITIONED FOR MINIMUM OUTSIDE AIR.
- UPON A RISE IN SUPPLY AIR TEMPERATURE ABOVE SETPOINT, THE ECONOMIZER DAMPER MUST BE SLOWLY MODULATED OPEN TO MAXIMUM OUTSIDE AIR POSITION AND THE RETURN AIR DAMPERS MUST BE SLOWLY MODULATED CLOSED TO MINIMUM POSITION TO MAINTAIN MIXED AIR TEMPERATURE AT THE SUPPLY AIR TEMPERATURE SETPOINT.

SUPPLY FANS
- THE FAN SYSTEM CONSISTS OF TWO VARIABLE FREQUENCY DRIVES (VFD'S) CONFIGURED IN A LEAD-LAG ARRANGEMENT. EACH VFD CONTROLS TWO FANS.
- A SUPPLY DUCT STATIC PRESSURE SENSOR MUST BE PROVIDED AT THE END OF THE MAINS ON LEVEL 1. THE BAS SYSTEM MUST STAGE AND MODULATE THE SUPPLY FAN VFD'S TO MAINTAIN DUCT STATIC PRESSURE AT THE LOWEST FAN SPEED THAT MAINTAINS DUCT STATIC PRESSURE AT OR ABOVE SETPOINT (PRELIMINARY SETPOINT TO BE .65" WITH THE FINAL SETPOINT INDIVIDUALLY DETERMINED BY THE TAB CONTRACTOR BASED UPON THE FINAL SENSOR LOCATIONS AND THE MINIMUM STATIC REQUIREMENTS OF THE DUCT SYSTEM.
- AS THE STATIC PRESSURE DEVIATES FROM SETPOINT, THE BAS MUST SEND THE APPROPRIATE ANALOG SIGNAL TO THE VFDS TO SPEED UP OR SLOW DOWN THE FANS.
- IF SETPOINT CANNOT BE SATISFIED BY THE DESIGNATED LEAD SET OF FANS, THE BAS SYSTEM MUST RESET THE LEAD FAN SPEED TO MINIMUM AND STAGE ON THE LAG SET OF FANS. LEAD AND LAG FANS MUST THEN ACCELERATE TOGETHER TO MEET THE DUCT STATIC PRESSURE SETPOINT. FURTHER CHANGE IN SUPPLY DUCT STATIC MUST CAUSE THE FANS TO CHANGE SPEED TOGETHER.
- WHEN THE VFD OUTPUT DROPS TO MINIMUM SPEED (20 HZ, ADJUSTABLE), THE LAG FANS MUST BE DISABLED AND THE LEAD FANS CONTINUE VARIABLE SPEED OPERATION.
- UPON FAILURE OF THE LEAD FANS, AN ALARM MUST NOTIFY THE DDC SYSTEM, THE LEAD FANS MUST BE DISABLED AND THE LAG FANS MUST BE ENERGIZED.
- UPON A FAILURE OF THE LAG FANS, THE BAS SYSTEM MUST BE ALARMED AND THE LAG FANS MUST BE DISABLED.
- THE SUPPLY FAN DISCHARGE PRESSURE SENSOR MUST OVERRIDE SUPPLY DUCT STATIC CONTROL TO PREVENT OVER PRESSURING OF THE SYSTEM (3.0" W.G. MAXIMUM).
- THE LEAD AND LAG FAN ASSIGNMENTS MUST BE ROTATED IN ORDER TO EQUALIZE ALL FANS' RUN TIMES. ROTATE ASSIGNMENTS EVERY 240 HOURS (REPROGRAMMABLE) OF LEAD FANS RUN TIME. ASSIGNMENT CHANGE TO OCCUR DURING THE NEXT UNOCCUPIED PERIOD WHEN ALL FANS ARE OFF.

RETURN FANS
- THE FAN SYSTEM CONSISTS OF TWO VARIABLE FREQUENCY DRIVES (VFD'S) CONFIGURED IN A LEAD-LAG ARRANGEMENT. EACH VFD CONTROLS ONE FANS.
- THE BAS SYSTEM MUST STAGE AND MODULATE THE RETURN FAN VFD'S TO MAINTAIN THE CFM OFFSET BETWEEN THE SUPPLY AND RETURN AIRFLOWS AT THE CURRENT RETURN FAN CFM DIFFERENTIAL SETPOINT.
- AS THE RETURN FAN CFM DIFFERENTIAL DEVIATES FROM SETPOINT, THE BAS MUST SEND THE APPROPRIATE ANALOG SIGNAL TO THE VFDS TO SPEED UP OR SLOW DOWN THE FANS. IF SETPOINT CANNOT BE SATISFIED BY THE DESIGNATED LEAD FAN, THE BAS SYSTEM MUST RESET THE LEAD FAN SPEED TO MINIMUM AND STAGE ON THE LAG FAN. FURTHER CHANGE IN THE RETURN FAN CFM DIFFERENTIAL MUST CAUSE THE FANS TO CHANGE SPEED TOGETHER.
- WHEN THE VFD OUTPUT DROPS TO MINIMUM SPEED (20 HZ, ADJUSTABLE), THE LAG FAN MUST BE DISABLED AND THE LEAD FAN CONTINUE VARIABLE SPEED OPERATION. UPON A DROP IN LEAD FAN SPEED TO MINIMUM SPEED (WITH LAG FAN OFF), THE BAS WILL THEN MODULATE THE RETURN AIR INLET DAMPERS CLOSED TO MAINTAIN RETURN FAN CFM DIFFERENTIAL AT SETPOINT.
- UPON FAILURE OF THE LEAD FAN, THE BAS MUST BE ALARMED, THE LEAD FAN MUST BE DISABLED AND THE LAG FAN MUST BE ENERGIZED.
- UPON A FAILURE OF THE LAG FAN, THE BAS SYSTEM MUST BE ALARMED AND THE LAG FAN MUST BE DISABLED.
- THE RETURN FAN INLET PRESSURE SENSOR MUST OVERRIDE RETURN FAN DIFFERENTIAL CONTROL TO PROTECT RETURN DUCT SYSTEM FROM EXCESSIVE NEGATIVE PRESSURE (LESS THAN -2.0" W.G.);
- THE LEAD AND LAG FAN ASSIGNMENTS MUST BE ROTATED IN ORDER TO EQUALIZE ALL FANS' RUN TIMES. ROTATE ASSIGNMENTS EVERY 240 HOURS (REPROGRAMMABLE) OF LEAD FANS RUN TIME.
- UPON A RISE IN RETURN FAN DISCHARGE PRESSURE ABOVE SETPOINT (APPROXIMATELY .25" POSITIVE PRESSURE), THE BAS MUST MODULATE OPEN THE RELIEF AIR DAMPERS.

ALARMS
- VFD STATUS MUST BE MONITORED AND ALARMED TO THE BAS SYSTEM.
- PUMP AND FAN STATUS MUST BE MONITORED THROUGH CURRENT SENSORS AND BE ALARMED TO BAS SYSTEM.
- A DIFFERENTIAL PRESSURE SWITCH ACROSS THE FILTER BANK MUST ALARM THE BAS SYSTEM UPON A RISE IN PRESSURE ABOVE SETPOINT (1.5" ESP).
- BAS SYSTEM TO ALARM UPON A DROP IN TOTAL OUTSIDE AIR BELOW THE SCHEDULED "MIN O/A CFM" FOR LONGER THAN 7 MINUTES (ADJUSTABLE).

SAFETY CONTROLS
- ALL SAFETY CONTROLS TO BE WIRED INTO FAN (STARTER OR VFD).SAFETY CIRCUITS AND REMAIN ACTIVE EVEN WHEN FANS ARE MANUALLY OVERRIDDEN.
- SMOKE DETECTORS IN SUPPLY AND RETURN DUCTS MUST DE-ENERGIZE FANS AND ALARM BAS SYSTEM.
- FAILURE OF SUPPLY AND RETURN UNIT ISO DAMPERS TO OPEN FULLY (AS INDICATED BY DAMPER END SWITCHES) MUST DE-ENERGIZE FANS AND ALARM BAS SYSTEM.
- SUPPLY FAN STATIC PRESSURE SWITCH MUST, DE-ENERGIZE FANS AND ALARM DDC SYSTEM IN CASE OF EXCESSIVE PRESSURE (GREATER THAN 4.0" W.G.).
- THE RETURN FAN INLET PRESSURE SWITCH MUST, THROUGH THE BAS SYSTEM, DE-ENERGIZE FANS AND ALARM BAS SYSTEM IN CASE OF EXCESSIVE NEGATIVE PRESSURE (MORE THAN 3.0" W.G. NEGATIVE).
- A LOW TEMPERATURE LIMIT SWITCH MUST ALARM THE BAS AND SHUTDOWN THE UNIT UPON A DROP IN COOLING COIL DISCHARGE TEMPERATURE BELOW 35°F.
- UPON A FAILURE OF THE HEATING COIL FREEZE PROTECTION BLEND PUMP (WHEN OUTSIDE AIR TEMPERATURE IS 32°F OR LOWER), THE BAS SYSTEM TO ALARM AND SHUTDOWN UNIT.
- THE ATFP EMERGENCY SHUTDOWN SWITCHES MUST SHUTDOWN ALL UNIT FANS AND CLOSE ALL UNIT OUTSIDE AIR, ECONOMIZER, AND RELIEF DAMPERS.

AHU-3 SYSTEM CONTROL VALVE SCHEDULE (NOTE 1)

TAG	TYPE	MAX. PD (FT.)	FLOW	FAIL POSITION	LINE SIZE
PRE-HW CONTROL	2-WAY MODULATING	7 FT.	11 GPM	NORMALLY OPEN	1.5"
CHW CONTROL	2-WAY MODULATING	7 FT.	98 GPM	NORMALLY OPEN	3"

NOTES:
1. THE CONTRACTOR MUST INCLUDE ALL COLUMNS IN THIS SCHEDULE IN THE VALVE SCHEDULE GENERATED FOR THE CONTROLS SUBMITTAL. ADDITIONAL COLUMNS AND DATA MUST BE ADDED TO THE CONTRACTOR'S VALVE SCHEDULE AS REQUIRED BY SPECIFICATION SECTION 23 09 00, PARAGRAPH 3.3.4.

A5
M806
AHU-3 CONTROL DIAGRAM

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: RKG
CHECKED BY: WCJ
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

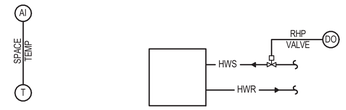
JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

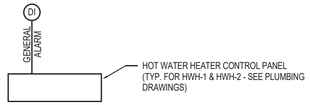
HVAC CONTROLS

SHEET ID
M806

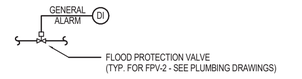
RTA SUBMISSION 2/11/2021



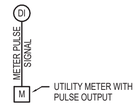
F1 / M807 RADIANT HEATING PANEL CONTROL DIAGRAM
(TYPICAL)



F5 / M807 HOT WATER HEATER CONTROL DIAGRAM
(TYPICAL)



F8 / M807 FLOOD PROTECTION VALVE CONTROL DIAGRAM
(TYPICAL)

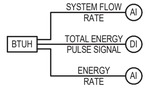


UTILITY METER CONTROL SEQUENCE

GENERAL
- EACH UTILITY METER IS TO BE PROVIDED WITH A PULSE OUTPUT. A BAS CONTROLLER MUST BE PROVIDED FOR EACH METER THAT WILL COUNT PULSES OVER TIME TO CALCULATE TOTAL UTILITY CONSUMPTION AND CURRENT RATE OF CONSUMPTION.
- THE GRAPHIC DISPLAY FOR EACH METER MUST DISPLAY TOTAL CONSUMPTION BY MONTH FOR THE PREVIOUS YEAR, TOTAL CONSUMPTION FOR THE YEAR TO DATE, THE RATE OF CURRENT CONSUMPTION AND THE PEAK RATE RECORDED FOR THE CURRENT YEAR.
- THE BAS MUST STORE ALL METER DATA ON A MONTHLY BASIS.

ALARMS
- THE BAS MUST ALARM WHEN THE CURRENT RATE OF CONSUMPTION EXCEEDS THE MAXIMUM RECORDED FOR THE PREVIOUS 12 MONTHS.

D1 / M807 UTILITY METER CONTROL DIAGRAM
TYPICAL FOR MAIN ELECTRIC SERVICE METER,MAIN NATURAL GAS SERVICE METER, MAIN DOMESTIC HOT WATER METER, TOILET ROOMS COLD WATER METER, AND TOILET ROOMS HOT WATER METER AND STEAM SERVICE METERS (LINCOLN HALL AND CULLUM HALL).

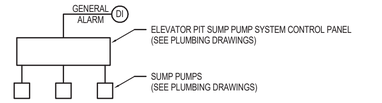


ENERGY METER CONTROL SEQUENCE

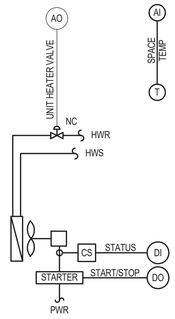
GENERAL
- EACH ENERGY METER IS BEING PROVIDED WITH A PULSE OUTPUT. A BAS CONTROLLER MUST BE PROVIDED FOR EACH METER THAT WILL COUNT PULSES OVER TIME TO CALCULATE TOTAL UTILITY CONSUMPTION.
- THE GRAPHIC DISPLAY FOR EACH METER MUST DISPLAY THE CURRENT FLOW RATE, TOTAL ENERGY CONSUMPTION BY MONTH FOR THE PREVIOUS YEAR, TOTAL ENERGY CONSUMPTION FOR THE YEAR TO DATE, THE RATE OF CURRENT ENERGY CONSUMPTION AND THE PEAK RATE OF CONSUMPTION RECORDED FOR THE CURRENT YEAR.
- THE BAS MUST STORE ALL METER DATA ON A MONTHLY BASIS.

ALARMS
- THE BAS MUST ALARM WHEN THE CURRENT RATE OF CONSUMPTION EXCEEDS THE MAXIMUM RECORDED FOR THE PREVIOUS 12 MONTHS.

D5 / M807 ENERGY METER CONTROL DIAGRAM
TYPICAL FOR CHILLED WATER SYSTEM AND HEATING WATER SYSTEM



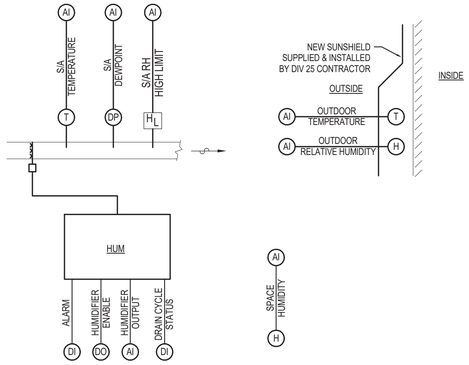
D8 / M807 SUMP PUMP CONTROL DIAGRAM
(TYPICAL)



UNIT HEATER (UH) CONTROL SEQUENCE

GENERAL
- THE DDC SYSTEM WILL ENABLE THE UNIT HEATER WHENEVER OUTDOOR AIR TEMPERATURE FALLS BELOW SETPOINT (50°F. ADJUSTABLE).
- THE UNIT FAN MUST RUN ONLY ON A CALL FOR HEAT.
- DDC SPACE SENSOR MUST MODULATE THE HEATING CONTROL VALVE TO MAINTAIN SPACE ABOVE THE HEATING TEMPERATURE SETPOINT (60°F. ADJUSTABLE).

A1 / M807 UNIT HEATER CONTROL DIAGRAM (UH B2-1)

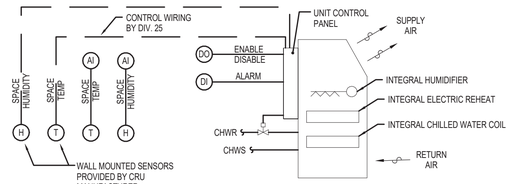


HUMIDIFIER (HUM) CONTROL SEQUENCE
HUM 1-1
- ON A DROP IN SPACE HUMIDITY BELOW SETPOINT (35% ADJUSTABLE) ,THE HUMIDIFIER WILL BE ENABLED AND ITS OUTPUT MODULATED TO MAINTAIN THE SUPPLY AIR DEWPOINT AT SETPOINT (40°F ADJUSTABLE).
- ON A RISE IN SPACE HUMIDITY ABOVE SETPOINT (45% ADJUSTABLE), THE HUMIDIFIER WILL BE DISABLED.

HUM (2-1, 2-2, 2-3)
- THE HUMIDIFIER WILL BE ENABLED AND ITS OUTPUT MODULATED TO MAINTAIN MINIMUM SPACE HUMIDITY ABOVE SETPOINT (20%RH ADJUSTABLE).

SAFETY CONTROLS
- THE HUMIDIFIER WILL BE DISABLED WHENEVER OUTSIDE AIR DEWPOINT RISES ABOVE SETPOINT (55°F. ADJUSTABLE)
- THE SUPPLY AIR HIGH LIMIT WILL LIMIT THE HUMIDIFIER OUTPUT TO PREVENT DUCT HUMIDITY FROM RISING ABOVE 90% ADJUSTABLE.
- HUMIDIFIER HUM 1-1 MUST BE INTERLOCKED WITH AHU-1 AND MUST BE DISABLED WHEN AHU-1 SUPPLY FANS ARE NOT RUNNING.
- HUMIDIFIERS HUM 2-1, 2-2, AND 2-3 MUST BE INTERLOCKED WITH AHU-2 AND MUST BE DISABLED WHEN AHU-2 SUPPLY FANS ARE NOT RUNNING.

A4 / M807 HUMIDIFIER (DUCT-MOUNTED) CONTROL DIAGRAM
(TYPICAL)



WALL-MOUNTED COMPUTER ROOM UNIT (CRU) CONTROL SEQUENCE
GENERAL
- EACH UNIT HAS SELF-CONTAINED MICROPROCESSOR CONTROLS, SUPPLY FAN, CHILLED WATER COOLING COIL, ELECTRIC REHEAT COIL, AND HUMIDIFIER.
- THE COMPUTER ROOM UNITS MUST BE MUST BE ENABLED/DISABLED THROUGH THE BAS.
- THE BAS MUST MONITOR ROOM TEMPERATURE AND ROOM HUMIDITY, AND UNIT ALARM STATUS.
- UNIT PACKAGED CONTROLS MUST MAINTAIN SPACE TEMPERATURE (72°F) AND SPACE HUMIDITY (15% RH MINIMUM) AT SETPOINTS.

A8 / M807 WALL MOUNTED CRU CONTROL DIAGRAM
(TYPICAL)

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: RKG
CHECKED BY: WCJ
SUBMITTED BY:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

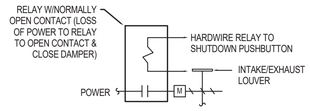
ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-15-C0031
PROJECT NO: 20190494

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

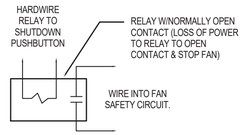
HVAC CONTROLS

SHEET ID
M807

RTA SUBMISSION 2/11/2021

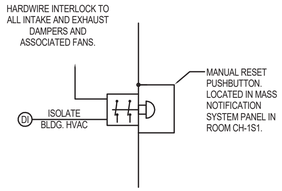


INTAKE/EXHAUST LOUVER
(TYPICAL EACH INTAKE AND EXHAUST LOUVER)

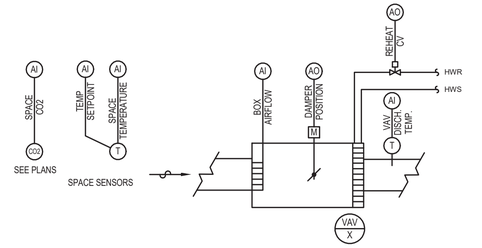


INTAKE/EXHAUST FAN
(TYPICAL EACH INTAKE AND EXHAUST FAN)

HVAC SYSTEM ISOLATION CONTROL SEQUENCE
- PROVIDE MANUALLY OPERATED EMERGENCY SHUT-OFF SWITCHES IN LOCATIONS SHOWN ON DRAWINGS. EACH SWITCH MUST BE A TWO POSITION-TWO POLE MUSHROOM RED BUTTON SWITCH.
- THIS SWITCH MUST BE HARDWIRE INTERLOCKED AT EACH OUTSIDE AIR SUPPLY & EXHAUST FAN AND TO EACH EXHAUST, RELIEF & OUTSIDE AIR DAMPER. UPON ACTIVATION OF THE SWITCH, THE RELAY WILL DE-ENERGIZE EACH FAN SYSTEM IN BOTH THE "HAND" AND "AUTOMATIC" MODES OF OPERATION, AND CLOSE ALL OUTSIDE AIR DAMPERS, RELIEF AIR DAMPERS AND EXHAUST AIR DAMPERS.

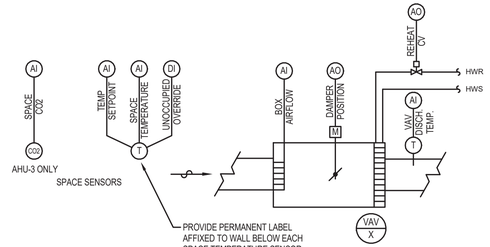


E2 / M808 HVAC ATFP EMERGENCY SHUTDOWN CONTROL DIAGRAM (TYPICAL)



SINGLE DUCT AIR VOLUME CONTROL BOXES (CONSTANT)
GENERAL
- EACH VAV MUST HAVE AN INDIVIDUALLY REPROGRAMMABLE OCCUPANCY SCHEDULE.
- ALL VAVS MUST HAVE CROSS FLOW AIR FLOW SENSORS, CONTROL TRANSFORMER, DAMPER AND TERMINAL STRIP PROVIDED BY VAV MANUFACTURER.
- CONTROLS CONTRACTOR MUST DELIVER DDC CONTROLLER, DAMPER ACTUATOR, HEATING COIL VALVE OPERATOR (AND VALVE) AND ALL REQUIRED ACCESSORIES TO VAV MANUFACTURER FOR FACTORY INSTALLATION. CONTROLS CONTRACTOR MUST COORDINATE WITH VAV MANUFACTURER AND PROVIDE ALL NECESSARY MATERIALS.
- PROVIDE WALL MOUNTED DDC TEMPERATURE SENSOR.

OCCUPIED MODE
- THE VAV DAMPER MUST MODULATE TO MAINTAIN AIRFLOW SETPOINT. THE REHEAT COIL CONTROL VALVE MUST BE MODULATED TO MAINTAIN SPACE TEMPERATURE SETPOINT.



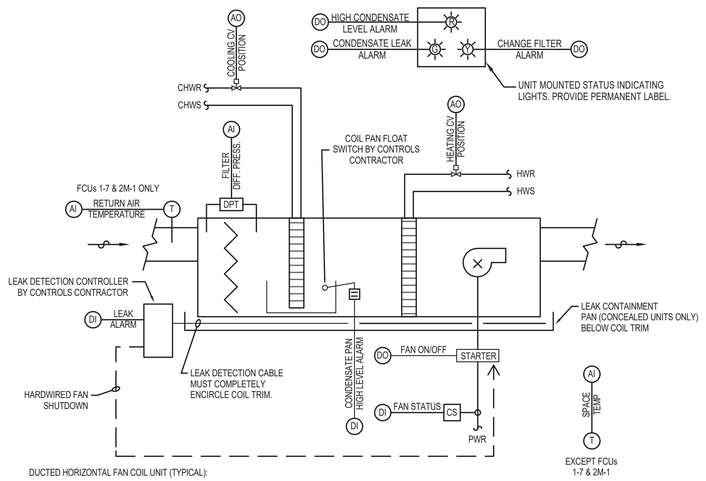
SINGLE DUCT AIR VOLUME CONTROL BOXES (VARIABLE)
GENERAL
- SEPARATE OCCUPIED AND UNOCCUPIED TEMPERATURE SET POINTS MUST BE MAINTAINED. EACH VAV MUST HAVE AN INDIVIDUALLY REPROGRAMMABLE OCCUPANCY SCHEDULE.
- ALL VAVS MUST HAVE CROSS FLOW AIR FLOW SENSORS, CONTROL TRANSFORMER, DAMPER AND TERMINAL STRIP PROVIDED BY VAV MANUFACTURER.
- CONTROLS CONTRACTOR MUST DELIVER DDC CONTROLLER, DAMPER ACTUATOR, HEATING COIL VALVE OPERATOR (AND VALVE) AND ALL REQUIRED ACCESSORIES TO VAV MANUFACTURER FOR FACTORY INSTALLATION. CONTROLS CONTRACTOR MUST COORDINATE WITH VAV MANUFACTURER AND PROVIDE ALL NECESSARY MATERIALS.
- PROVIDE WALL MOUNTED DDC TEMPERATURE SENSOR.
- EACH SPACE SENSOR IS TO HAVE AN UNOCCUPIED MODE PUSHBUTTON TO INDEX THE ASSOCIATED AIR HANDLING UNIT INTO OCCUPIED MODE FOR 2 HOURS (REPROGRAMMABLE).

OCCUPIED MODE
- ON A FALL IN ROOM AIR TEMPERATURE BELOW OCCUPIED COOLING TEMPERATURE SETPOINT (75°F. ADJUSTABLE), MODULATE VAV TO MINIMUM COOLING AIR FLOW. ON A CONTINUED FALL BELOW OCCUPIED HEATING TEMPERATURE SETPOINT (68°F. ADJUSTABLE), VAV MUST BE SET TO MINIMUM HEATING AIR FLOW & REHEAT COIL CONTROL VALVE MODULATED TO MAINTAIN SPACE TEMPERATURE SETPOINT.

UNOCCUPIED MODE
- PRIMARY AIR VALVE IS SET TO MINIMUM COOLING AIR FLOW.
- UPON A RISE IN SPACE TEMPERATURE ABOVE UNOCCUPIED COOLING SETPOINT (80°F. ADJUSTABLE), THE DDC SYSTEM MUST ENERGIZE THE ASSOCIATED AHU IN COOLDOWN MODE AND MODULATE OPEN VAV VALVE TO MAINTAIN SPACE TEMPERATURE 5°F BELOW UNOCCUPIED COOLING SETPOINT.
- UPON A DROP IN SPACE TEMPERATURE BELOW UNOCCUPIED HEATING SETPOINT (60°F. ADJUSTABLE), THE DDC SYSTEM MUST ENERGIZE THE ASSOCIATED AHU. REHEAT COIL WILL BE ENABLED AND THE REHEAT CONTROL VALVE MODULATED TO MAINTAIN SPACE TEMPERATURE 5°F ABOVE UNOCCUPIED HEATING SETPOINT.

CO2 CONTROL (AHU-3 ONLY)
- CO2 RESET TO OCCUR ONLY DURING OCCUPIED HOURS.
- UPON A RISE IN SPACE CO2 LEVEL 400 PPM (ADJUSTABLE) ABOVE OUTDOOR LEVEL, THE DDC SYSTEM MUST FIRST MODULATE VAV AIR VALVE OPEN TO MAX COOLING CFM. UPON A CONTINUED RISE IN SPACE CO2 LEVEL, MODULATE THE ECONOMIZER DAMPER OPEN (UP TO MAXIMUM SCHEDULED OA) AND MODULATE THE RETURN AIR DAMPERS CLOSED.

E5 / M-808 CONSTANT VOLUME BOX CONTROL DIAGRAM



DUCTED HORIZONTAL FAN COIL UNIT (TYPICAL):

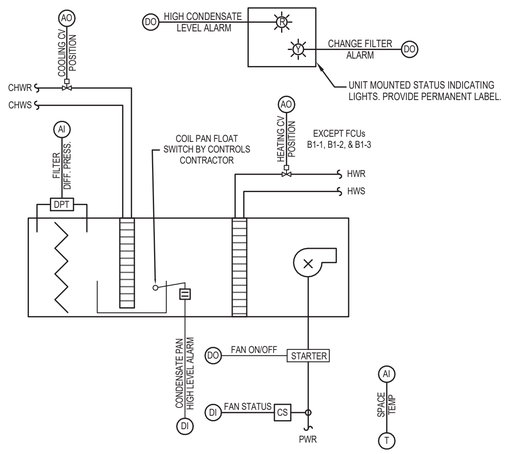
GENERAL
- SEPARATE OCCUPIED AND UNOCCUPIED TEMPERATURE SET POINTS MUST BE MAINTAINED. EACH FCU MUST HAVE AN INDIVIDUALLY REPROGRAMMABLE OCCUPANCY SCHEDULE.
- THE UNIT FAN MUST RUN CONTINUOUSLY DURING OCCUPIED HOURS AND INTERMITTENTLY DURING UNOCCUPIED MODE (ONLY ON A CALL FOR HEATING OR COOLING).

OCCUPIED MODE:
- FAN MUST RUN CONTINUOUSLY DURING OCCUPIED HOURS.
- DDC SPACE SENSOR MUST, ON A FALL IN ROOM AIR TEMPERATURE BELOW OCCUPIED COOLING TEMPERATURE SETPOINT (72°F. ADJUSTABLE), MODULATE CHILLED WATER VALVE CLOSED. ON A CONTINUED FALL BELOW OCCUPIED HEATING TEMPERATURE SETPOINT (68°F. ADJUSTABLE), REHEAT COIL CONTROL VALVE MUST BE MODULATED OPEN.

UNOCCUPIED MODE:
- FAN IS DE-ENERGIZED AND CONTROL VALVES ARE CLOSED.
- UPON A RISE IN SPACE TEMPERATURE ABOVE UNOCCUPIED COOLING SETPOINT (80°F ADJUSTABLE), THE DDC SYSTEM MUST ENERGIZE THE UNIT FAN. UPON A FURTHER RISE IN SPACE TEMPERATURE, THE CHILLED WATER CONTROL VALVE MUST BE MODULATED OPEN.
- UPON A DROP IN SPACE TEMPERATURE BELOW UNOCCUPIED HEATING SETPOINT (60°F. ADJUSTABLE), THE DDC SYSTEM MUST MODULATE THE REHEAT COIL CONTROL VALVE OUTPUT TO MAINTAIN SPACE TEMPERATURE ABOVE THE UNOCCUPIED HEATING SET POINT.

SAFETY CONTROLS
- THE LEAK DETECTION CONTROLLER MUST BE HARDWIRED INTO THE FAN SAFETY CIRCUIT.
- THE LEAK DETECTION CONTROLLER MUST ALARM THE BAS. PROVIDE LOCAL ALARM LIGHT.
- THE COIL PAN FLOAT SWITCH MUST ALARM THE BAS. PROVIDE LOCAL ALARM LIGHT.
- THE FILTER DPT MUST ALARM THE BAS. PROVIDE LOCAL ALARM LIGHT.

A2 / M808 DUCTED HORIZONTAL FAN COIL UNIT CONTROL DIAGRAM (TYPICAL)



NON-DUCTED HORIZONTAL FAN COIL UNIT (TYPICAL):

GENERAL
- SEPARATE OCCUPIED AND UNOCCUPIED TEMPERATURE SET POINTS MUST BE MAINTAINED. EACH FCU MUST HAVE AN INDIVIDUALLY REPROGRAMMABLE OCCUPANCY SCHEDULE.
- THE UNIT FAN MUST RUN CONTINUOUSLY DURING OCCUPIED HOURS AND INTERMITTENTLY DURING UNOCCUPIED MODE (ONLY ON A CALL FOR HEATING OR COOLING).

OCCUPIED MODE:
- FAN MUST RUN CONTINUOUSLY DURING OCCUPIED HOURS.
- DDC SPACE SENSOR MUST, ON A FALL IN ROOM AIR TEMPERATURE BELOW OCCUPIED COOLING TEMPERATURE SETPOINT (72°F. ADJUSTABLE), MODULATE CHILLED WATER VALVE CLOSED. ON A CONTINUED FALL BELOW OCCUPIED HEATING TEMPERATURE SETPOINT (68°F. ADJUSTABLE), REHEAT COIL CONTROL VALVE MUST BE MODULATED OPEN.

UNOCCUPIED MODE:
- FAN IS DE-ENERGIZED AND CONTROL VALVES ARE CLOSED.
- UPON A RISE IN SPACE TEMPERATURE ABOVE UNOCCUPIED COOLING SETPOINT (80°F ADJUSTABLE), THE DDC SYSTEM MUST ENERGIZE THE UNIT FAN. UPON A FURTHER RISE IN SPACE TEMPERATURE, THE CHILLED WATER CONTROL VALVE MUST BE MODULATED OPEN.
- UPON A DROP IN SPACE TEMPERATURE BELOW UNOCCUPIED HEATING SETPOINT (60°F. ADJUSTABLE), THE DDC SYSTEM MUST MODULATE THE REHEAT COIL CONTROL VALVE OUTPUT TO MAINTAIN SPACE TEMPERATURE ABOVE THE UNOCCUPIED HEATING SET POINT.

SAFETY CONTROLS
- THE LEAK DETECTION CONTROLLER MUST BE HARDWIRED INTO THE FAN SAFETY CIRCUIT.
- THE LEAK DETECTION CONTROLLER MUST ALARM THE BAS. PROVIDE LOCAL ALARM LIGHT.
- THE COIL PAN FLOAT SWITCH MUST ALARM THE BAS. PROVIDE LOCAL ALARM LIGHT.
- THE FILTER DPT MUST ALARM THE BAS. PROVIDE LOCAL ALARM LIGHT.

A5 / M808 NON-DUCTED HORIZONTAL FAN COIL UNIT CONTROL DIAGRAM (VERTICAL UNITS SIMILAR)

D8 / M-808 VARIABLE VOLUME BOX CONTROL DIAGRAM

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: RKG
CHECKED BY: WCJ
SUBMITTED BY:
BY:
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US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

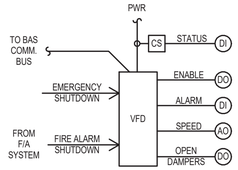
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

HVAC CONTROLS

SHEET ID

M808

RTA SUBMISSION 2/11/2021



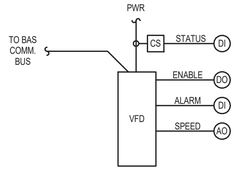
VARIABLE FREQUENCY DRIVE (VFD) CONTROL SEQUENCE

GENERAL
- THE BAS MUST BE PROGRAMMED TO ALLOW THE FAN SPEED TO BE MANUALLY SET WHEN OPERATED IN HAND, WHILE THE OTHER UNIT FUNCTIONS REMAIN UNDER AUTOMATIC CONTROL.
- THE BAS MUST CLOSE ASSOCIATED DAMPERS UPON FAN FAILURE.
- ALL HAND AND AUTOMATIC OPERATIONS MUST CONTINUE TO FUNCTION IN THE EVENT OF A CONTROL NETWORK FAILURE.
- BAS MUST OPEN ALL ASSOCIATED DAMPERS WHEN OPERATING IN HAND.
- REFER TO FAN SYSTEM CONTROL DIAGRAM FOR ADDITIONAL REQUIREMENTS.

HAND OPERATION
- IF THE ASSOCIATED FAN(S) IS OFF WHEN INDEXED TO HAND, THE BAS MUST INDEX THE ASSOCIATED SYSTEM INTO OCCUPIED MODE AND OPERATE ACCORDING TO ITS OCCUPIED MODE SEQUENCES.
- IF THE ASSOCIATED FANS ARE RUNNING WHEN INDEXED TO HAND, THE BAS WILL CONTINUE TO OPERATE THE SYSTEM IN THE CURRENT OCCUPANCY MODE.
- FOR FAN WALL UNITS WITH MULTIPLE VFDs, PROVIDE A LABEL ON EACH VFD AS FOLLOWS: "IN HAND, OPERATE ALL VFDs AT THE SAME SPEED."

SAFETY CONTROLS
- IF THE FAN(S) FAILS TO START (AS INDICATED BY CURRENT SWITCHES AND DIFFERENTIAL PRESSURE SENSORS) AFTER 5 MINUTES (ADJUSTABLE), BAS IS TO PERFORM A SYSTEM SHUTDOWN IN ACCORDANCE WITH ITS NORMAL SHUTDOWN SEQUENCES.
- THE HVAC EMERGENCY SHUTDOWN AND FAN PRESSURE SAFETIES MUST BE WIRED INTO THE VFD SAFETY CIRCUIT TO SHUT DOWN THE UNIT IN HAND AND AUTO. BAS IS TO ALARM IF UNIT REMAINS IN HAND FOR MORE THAN 24 HRS. (ADJUSTABLE).

E1 / M809 VARIABLE FREQUENCY DRIVE (VFD) CONTROL DIAGRAM (TYPICAL FOR FANS)



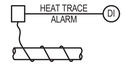
VARIABLE FREQUENCY DRIVE (VFD) CONTROL SEQUENCE

GENERAL
- THE BAS MUST BE PROGRAMMED TO ALLOW THE PUMP SPEED TO BE MANUALLY SET WHEN OPERATED IN HAND, WHILE THE OTHER UNIT FUNCTIONS REMAIN UNDER AUTOMATIC CONTROL.
- ALL HAND AND AUTOMATIC OPERATIONS MUST CONTINUE TO FUNCTION IN THE EVENT OF A CONTROL NETWORK FAILURE.
- REFER TO PUMP SYSTEM CONTROL DIAGRAM FOR ADDITIONAL REQUIREMENTS.

HAND OPERATION
- IF THE ASSOCIATED PUMP(S) IS OFF WHEN INDEXED TO HAND, THE BAS MUST INDEX THE ASSOCIATED SYSTEM INTO OCCUPIED MODE AND OPERATE ACCORDING TO ITS OCCUPIED MODE SEQUENCES.
- IF THE ASSOCIATED PUMPS ARE RUNNING WHEN INDEXED TO HAND, THE BAS WILL CONTINUE TO OPERATE THE SYSTEM IN THE CURRENT OCCUPANCY MODE.

SAFETY CONTROLS
- IF THE PUMP(S) FAILS TO START (AS INDICATED BY CURRENT SWITCHES AND DIFFERENTIAL PRESSURE SENSORS) AFTER 5 MINUTES (ADJUSTABLE), BAS IS TO PERFORM A SYSTEM SHUTDOWN IN ACCORDANCE WITH ITS NORMAL SHUTDOWN SEQUENCES.
- THE PUMP PRESSURE SAFETIES MUST BE WIRED INTO THE VFD SAFETY CIRCUIT TO SHUT DOWN THE UNIT IN HAND AND AUTO. BAS IS TO ALARM IF UNIT REMAINS IN HAND FOR MORE THAN 24 HRS. (ADJUSTABLE).

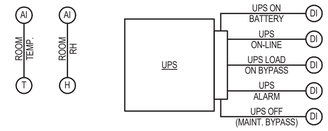
E4 / M809 VARIABLE FREQUENCY DRIVE (VFD) CONTROL DIAGRAM (TYPICAL FOR PUMPS)



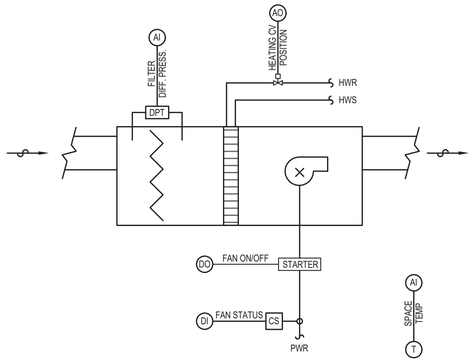
PIPING HEAT TRACE CONTROL SEQUENCE

GENERAL
- THE HEAT TRACE MUST BE SELF-REGULATING, CAPABLE OF CONTINUOUS EXPOSURE TO 150°F WHEN OFF.
- LOCAL SELF-CONTAINED CONTROLLERS MUST BE PROVIDED TO ENERGIZE HEAT TRACING BASED UPON PIPE TEMPERATURE.
- THE HEAT BAS MUST MONITOR HEAT TRACE OPERATION.

F8 / M809 PIPING HEAT TRACE CONTROL DIAGRAM



E8 / M809 UPS MONITORING CONTROL DIAGRAM (TYP. FOR ALL UPS UNITS)



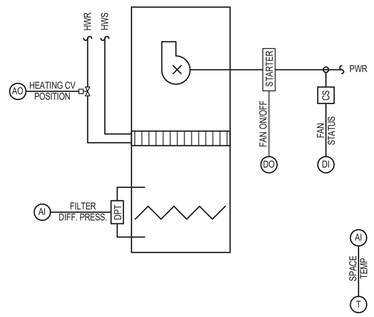
DUCTED HORIZONTAL CABINET UNIT HEATER (TYPICAL):

GENERAL
- SEPARATE OCCUPIED AND UNOCCUPIED TEMPERATURE SET POINTS MUST BE MAINTAINED. EACH MUST HAVE AN INDIVIDUALLY REPROGRAMMABLE OCCUPANCY SCHEDULE.
- THE UNIT FAN MUST RUN CONTINUOUSLY DURING OCCUPIED HOURS AND INTERMITTENTLY DURING UNOCCUPIED MODE (ONLY ON A CALL FOR HEATING).

OCCUPIED MODE:
- FAN MUST RUN CONTINUOUSLY DURING OCCUPIED HOURS.
- DDC SPACE SENSOR MUST, ON A FALL IN ROOM AIR TEMPERATURE BELOW OCCUPIED HEATING TEMPERATURE SETPOINT (68°F. ADJUSTABLE), HEATING COIL CONTROL VALVE MUST BE MODULATED OPEN.

UNOCCUPIED MODE:
- FAN IS DE-ENERGIZED AND CONTROL VALVE IS CLOSED.
- UPON A DROP IN SPACE TEMPERATURE BELOW UNOCCUPIED HEATING SETPOINT (50°F. ADJUSTABLE), THE DDC SYSTEM MUST MODULATE THE HEATING COIL CONTROL VALVE OUTPUT TO MAINTAIN SPACE TEMPERATURE ABOVE THE UNOCCUPIED HEATING SET POINT.

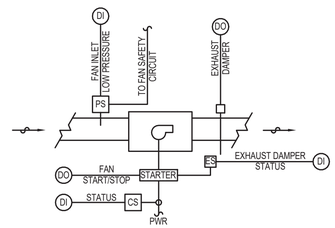
A1 / M809 DUCTED HORIZONTAL CABINET UNIT HEATER CONTROL DIAGRAM (TYPICAL)



NON-DUCTEDVERTICAL CABINET UNIT HEATER (TYPICAL):

GENERAL
- THE BAS MUST ENABLE THE CABINET UNIT HEATER WHENEVER OUTDOOR AIR TEMPERATURE FALLS BELOW SETPOINT (55F ADJUSTABLE).
- THE UNIT FAN MUST RUN CONTINUOUSLY DURING OCCUPIED HOURS (WHEN CABINET UNIT HEATER IS ENABLED) AND INTERMITTENTLY DURING UNOCCUPIED MODE (ONLY ON A CALL FOR HEATING).
- THE BAS SPACE TEMPERATURE SENSOR MUST MODULATE THE HEATING CONTROL VALVE TO MAINTAIN SPACE ABOVE THE HEATING TEMPERATURE SETPOINT (65F ADJUSTABLE).

A4 / M809 NON-DUCTED VERTICAL CABINET UNIT HEATER CONTROL DIAGRAM (TYPICAL)



EXHAUST FAN CONTROL SEQUENCE

STARTUP AND SHUTDOWN
- WHEN THE FAN IS INDEXED TO START, THE DDC SYSTEM MUST OPEN THE ASSOCIATED EXHAUST DAMPER. WHEN DAMPER IS FULLY OPEN, THE DDC SYSTEM MUST ENERGIZE THE EXHAUST FAN.
- THE FAN SHALL RUN WHENEVER THE BUILDING IS IN OCCUPIED MODE.

SAFETIES
- FAN INLET LOW PRESSURE SWITCH MUST, DE-ENERGIZE FAN AND ALARM DDC SYSTEM IN CASE OF EXCESS NEGATIVE PRESSURE.
- FAN WILL BE DISABLED UPON A FAILURE OF THE DAMPER TO FULLY OPEN.
- FAN STATUS MUST BE MONITORED THROUGH CURRENT SENSORS AND BE ALARMED TO DDC SYSTEM.

A8 / M809 IN-LINE EXHAUST FAN (EF) CONTROL DIAGRAM (SIMILAR FOR VENTILATION FANS)

US Army Corps of Engineers ®

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DESIGNED BY:	VMF
DRAWN BY:	RKG
CHECKED BY:	WCJ
SUBMITTED BY:	
SIZE	ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

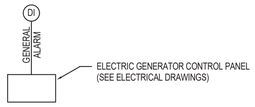
WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

HVAC CONTROLS

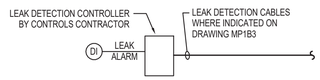
SHEET ID

M809

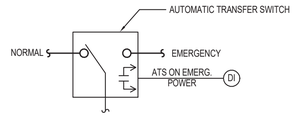
RTA SUBMISSION 2/11/2021



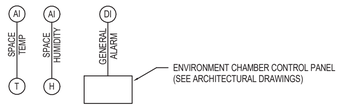
F1 M810 ELECTRIC GENERATOR CONTROL DIAGRAM
(TYPICAL)



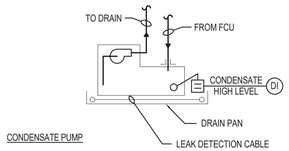
FS M810 LEAK DETECTION CABLE CONTROL DIAGRAM
(TYPICAL)



F7 M810 AUTOMATIC TRANSFER SWITCH CONTROL DIAGRAM
(TYPICAL)



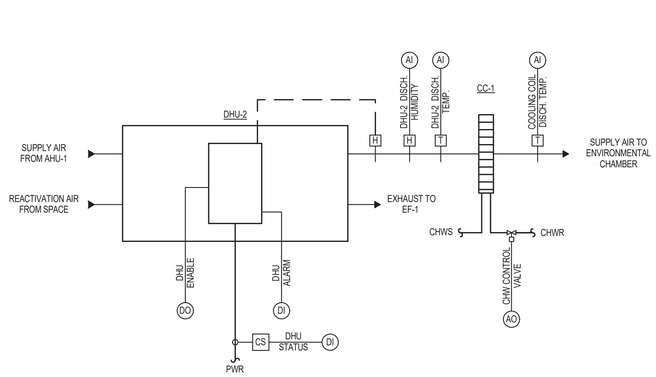
E1 M810 ENVIRONMENTAL CHAMBER CONTROL DIAGRAM
(TYPICAL)



CONDENSATE PUMP

GENERAL
- UPON RECEIVING A CONDENSATE HIGH LEVEL SIGNAL, THE BAS MUST DISABLE ALL FAN COIL UNITS DISCHARGING TO ASSOCIATED CONDENSATE PUMP.
- LEAK DETECTION CABLE CONTROLLER MUST ALARM BAS UPON DETECTION OF WATER.

ES M810 FCU CONDENSATE PUMP CONTROL DIAGRAM (CP-1)
(TYPICAL)



ENVIRONMENTAL CHAMBER VENTILATION AIR (DHU-2 AND CC-1):

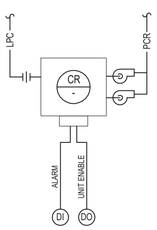
GENERAL
- THE SYSTEM CONSISTS OF A DUCT-MOUNTED ELECTRIC DEHUMIDIFIER AND DUCT-MOUNTED CHILLED WATER COOLING COIL.
- THE SYSTEM MUST BE ENABLED WHENEVER AIR HANDLING UNIT AHU-1 IS ENABLED.

DEHUMIDIFICATION:
- DEHUMIDIFIER DHU-2 MUST MAINTAIN MAXIMUM DOWNSTREAM DUCT HUMIDITY BELOW SETPOINT (ADJUSTABLE) THROUGH PACKAGED MANUFACTURER'S CONTROLS.

COOLING:
- THE BAS MUST MODULATE THE CHILLED WATER CONTROL VALVE TO MAINTAIN COOLING COIL DISCHARGE TEMPERATURE AT SETPOINT (46F ADJUSTABLE).

SAFETIES:
- THE BAS MUST MONITOR AND ALARM THE DEHUMIDIFIER.

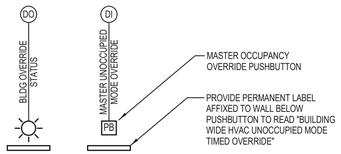
A1 M810 ENVIRONMENTAL CHAMBER VENTILATION CONTROL DIAGRAM



STEAM CONDENSATE RECEIVER

GENERAL
- THE BAS MUST ENABLE/DISABLE THE CONDENSATE RECEIVERS AND MONITOR ALARM.

CS M810 STEAM CONDENSATE RECEIVER CONTROL DIAGRAM
(TYPICAL)



MASTER OCCUPANCY OVERRIDE CONTROL SEQUENCE
GENERAL
- THE MASTER OCCUPANCY OVERRIDE PUSHBUTTON IS TO BE LOCATED IN ROOM CH-101. WHEN DEPRESSED, THE BUILDING HVAC SYSTEM MUST ENTER OCCUPIED MODE FOR 3 HOURS (REPROGRAMMABLE)

A5 M810 MASTER OCCUPANCY OVERRIDE CONTROL DIAGRAM
(TYPICAL)

US Army Corps of Engineers ®

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SOLICITATION NO.: W912DS-19-R-0014
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PROJECT NO: 20190494

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DRAWN BY: SCB
CHECKED BY: WMF
SUBMITTED BY:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

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WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

HVAC CONTROLS

SHEET ID

M810

RTA SUBMISSION 2/11/2021

AHU-1 SYSTEM POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS) NOTE 4	RANGE (WITH UNITS) NOTE 4	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVERRIDE	TREND REQ'D	ALARMING		PRIMARY POINT INFORMATION			OVERRIDES		CONFIGURATION INFORMATION
											ALARM CONDITION	ALARM PRIORITY	SNVT NAME	SNVT TYPE	NIAGARA ID	SNVT NAME	SNVT TYPE	
PROOFS & SAFETIES	< >	SUPPLY FAN 1&2 VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 1 & 2 VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 1 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 1 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 2 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 2 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3&4 VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 3 & 4 VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 3 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 4 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 4 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	RETURN FAN PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	LOW LIMIT TEMPERATURE ALARM (FREEZESTAT)	< >	35 DEG F	ALARM/NORMAL	DI	N/A	H	V	Y	FREEZESTAT ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN DISCHARGE HIGH PRESSURE SWITCH	< >	4.00 IN-W.C.	ALARM/NORMAL	DI	N/A	H	V	Y	SUPPLY AIR HIGH STATIC PRESSURE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN INLET LOW PRESSURE SWITCH	< >	-3.00 IN-W.C.	ALARM/NORMAL	DI	N/A	H	V	Y	RETURN FAN LOW STATIC PRESSURE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR SMOKE DETECTOR	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	SUPPLY AIR SMOKE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN AIR SMOKE DETECTOR	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	RETURN AIR SMOKE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	DEHUMIDIFIER STATUS	< >	~	ON/OFF	DI	N/A	~	V	Y	DEHUMIDIFIER PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	DEHUMIDIFIER DISCHARGE AIR SMOKE DETECTOR	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	DUHUMIDIFIER DISCHARGE AIR SMOKE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 1&2 VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	SUPPLY FAN 1 & 2 VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3&4 VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	SUPPLY FAN 3 & 4 VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	RETURN FAN VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	OUTSIDE AIR UNIT ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	OUTSIDE AIR UNIT GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	OUTSIDE AIR UNIT DISCHARGE AIR SMOKE DETECTOR	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	OUTSIDE AIR UNIT DISCHARGE AIR SMOKE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	DEHUMIDIFIER ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	DEHUMIDIFIER GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	FILTER DIFFERENTIAL PRESSURE	< >	1.5 IN-W.C.	0 - 2 IN-W.C.	AI	N/A	~	VO	Y	DIRTY FILTER ALARM	INFO	< >	< >	< >	< >	< >	< >
SCHEDULING	< >	SYSTEM OCCUPANCY SCHEDULE	~	~	OCCUPIED/UNOCCUPIED	NET-IN	N/A	OC	V	~	~	~	< >	< >	< >	< >	< >	< >
START/STOP	< >	OCCUPANCY COMMAND	~	~	OCCUPIED/UNOCCUPIED	NET-IN	N/A	~	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SYSTEM OCCUPANCY (ACTUAL)	~	~	OCCUPIED/UNOCCUPIED	NET-OUT	N/A	~	V	~	~	~	< >	< >	< >	< >	< >	< >
	< >	ATFP EMERGENCY SHUTDOWN SWITCH STATUS	< >	~	EMERGENCY/NORMAL	NET-OUT	N/A	~	V	Y	ATFP EMERGENCY ALARM ACTIVATED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 1&2 VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3&4 VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	DEHUMIDIFIER ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	OUTSIDE AIR UNIT ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
SUPPLY FAN CONTROL	< >	SUPPLY AIR DUCT STATIC PRESSURE SETPOINT	~	< 0.65" IN-W.C. >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR DUCT STATIC PRESSURE	< >	~	< 0 - __ IN-W.C. >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 1&2 VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3&4 VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN DISCHARGE PRESSURE	< >	~	< 0 - 4 IN-W.C. >	AI	N/A	~	V	Y	STATIC PRESSURE RISES ABOVE 3.00 IN-W.C. (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	SUPPLY FAN PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
RETURN FAN CONTROL	< >	SUPPLY FAN 1 AIRFLOW	< >	~	< 0 - __ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 2 AIRFLOW	< >	~	< 0 - __ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3 AIRFLOW	< >	~	< 0 - __ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 4 AIRFLOW	< >	~	< 0 - __ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN AIRFLOW	< >	~	< 0 - __ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	AIRFLOW OFFSET VALUE	~	< 300 CFM >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN AIRFLOW SETPOINT	~	< >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN INLET PRESSURE	< >	~	< -3 - 0 IN-W.C. >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	RETURN FAN PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
SUPPLY AIR TEMPERATURE CONTROL	< >	MIXED AIR TEMPERATURE	< >	~	< 0 - __ DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	MIXED AIR HUMIDITY	< >	~	< 0 - 100% RH >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	COOLING COIL CONTROL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	COOLING COIL DISCHARGE AIR TEMPERATURE	< >	~	< 0 - __ DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	COOLING COIL PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR HUMIDITY	< >	~	< 0 - 100% RH >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR TEMPERATURE SETPOINT	~	< 55 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR TEMPERATURE	< >	~	< 0 - __ DEG F >	AI	N/A	~	V	Y	TEMPERATURE DEVIATES FROM SETPOINT BY +/- 5 DEG F (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
OUTSIDE AIR UNIT CONTROL	< >	OUTSIDE AIR UNIT EXHAUST AIR DAMPER COMMAND	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	OUTSIDE AIR UNIT OUTSIDE AIR DAMPER COMMAND	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	OUTSIDE AIR UNIT INLET DAMPER COMMAND	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	OUTSIDE AIR UNIT DISCHARGE AIR TEMPERATURE	< >	~	< -10 DEG F - 110 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	OUTSIDE AIR UNIT DISCHARGE AIR DEW POINT	< >	~	< -10 DEG F - 110 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	OUTSIDE AIR UNIT DISCHARGE DAMPER COMMAND	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
DEHUMIDIFIER CONTROL	< >	SPACE RELATIVE HUMIDITY SETPOINT	~	< 40 %RH >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE HUMIDITY	~	~	< __ %RH >	NET-OUT	N/A	~	V	~	SPACE HUMIDITY RISES ABOVE SETPOINT BY 5 %RH (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	< >	DEHUMIDIFIER BYPASS DAMPER COMMAND	< >	~	< 0 - 100% >	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	DEHUMIDIFIER INLET DAMPER COMMAND	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	DEHUMIDIFIER REACTIVATION AIR DAMPER COMMAND	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	DEHUMIDIFIER EXHAUST DAMPER COMMAND	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	DEHUMIDIFIER DISCHARGE DAMPER COMMAND	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >

NOTES:

1. THE CONTRACTOR MUST INCLUDE ALL DATA IN THIS SCHEDULE IN THE POINTS SCHEDULE GENERATED FOR THE CONTROLS SUBMITTAL. ADDITIONAL ROWS, COLUMNS, AND DATA MUST BE ADDED TO THE CONTRACTOR'S POINT SCHEDULE AS REQUIRED BY SPECIFICATION SECTION 23 09 00, PARAGRAPH 3.3.10.
2. THE ABBREVIATIONS "DI" AND "DO" ARE USED INTERCHANGEABLY WITH "BI" AND "BO" THROUGHOUT THE CONSTRUCTION DOCUMENTS.
3. THE SYMBOL "< >" DENOTES FIELDS REQUIRING CONTRACTOR ENTERED DATA. THE SYMBOL "~" DENOTES NO ENTRY REQUIRED. THE SYMBOL "N/A" DENOTES NO VALID ENTRY AVAILABLE.
4. ALL SETTINGS AND RANGES MUST BE FULLY ADJUSTABLE. INITIAL VALUES PROVIDED IN THIS SCHEDULE MUST BE ADJUSTED BY THE CONTRACTOR AS REQUIRED FOR SYSTEM BALANCING AND TO PERMIT THE SYSTEMS TO PERFORM THEIR RESPECTIVE SEQUENCES OF OPERATION.

AHU-2 SYSTEM POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS) NOTE 4	RANGE (WITH UNITS) NOTE 4	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVERRIDE	TREND REQ'D	ALARMING		PRIMARY POINT INFORMATION			OVERRIDES		CONFIGURATION INFORMATION
											ALARM CONDITION	ALARM PRIORITY	SNVT NAME	SNVT TYPE	NIAGARA ID	SNVT NAME	SNVT TYPE	
PROOFS & SAFETIES	< >	SUPPLY FAN 1&2 VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 1 & 2 VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 1 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 1 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 2 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 2 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3&4 VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 3 & 4 VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 3 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 4 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 4 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 1&2 VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	RETURN FAN 1 & 2 VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 1 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	RETURN FAN 1 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 2 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	RETURN FAN 2 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3&4 VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	RETURN FAN 3 & 4 VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	RETURN FAN 3 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 4 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	RETURN FAN 4 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	FREEZE PROTECTION PUMP 2A STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	FREEZE PROTECTION PUMP 2A PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	FREEZE PROTECTION PUMP 2B STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	FREEZE PROTECTION PUMP 2B PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	LOW LIMIT TEMPERATURE ALARM (FREEZESTAT)	< >	35 DEG F	ALARM/NORMAL	DI	N/A	H	V	Y	FREEZESTAT ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN DISCHARGE HIGH PRESSURE SWITCH	< >	3.00 IN-W.C.	ALARM/NORMAL	DI	N/A	H	V	Y	SUPPLY AIR HIGH STATIC PRESSURE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN INLET LOW PRESSURE SWITCH	< >	-3.00 IN-W.C.	ALARM/NORMAL	DI	N/A	H	V	Y	RETURN FAN LOW STATIC PRESSURE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR SMOKE DETECTOR	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	SUPPLY AIR SMOKE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN AIR SMOKE DETECTOR	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	RETURN AIR SMOKE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 1&2 VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	SUPPLY FAN 1 & 2 VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3&4 VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	SUPPLY FAN 3 & 4 VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 1&2 VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	RETURN FAN 1 & 2 VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3&4 VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	RETURN FAN 3 & 4 VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	FILTER DIFFERENTIAL PRESSURE	< >	1.5 IN-W.C.	0 - 2 IN-W.C.	AI	N/A	~	VO	Y	DIRTY FILTER ALARM	INFO	< >	< >	< >	< >	< >	< >

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE A Joint Venture

DESIGNED BY:	DRAWN BY:	CHECKED BY:
WMF	RKG	WCJ

SUBMITTED BY:

SIZE: ANSI D

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

HVAC CONTROLS

SHEET ID

M811

AHU-2 SYSTEM POINTS SCHEDULE (CONTINUED)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS) NOTE 4	RANGE (WITH UNITS) NOTE 4	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVERRIDE	TREND REQ'D	ALARMING		PRIMARY POINT INFORMATION			OVERRIDES		CONFIGURATION INFORMATION
											ALARM CONDITION	ALARM PRIORITY	SNVT NAME	SNVT TYPE	NIAGARA ID	SNVT NAME	SNVT TYPE	
SCHEDULING	< >	SYSTEM OCCUPANCY SCHEDULE	~	~	MORNING/OCC/UNOCC	NET-IN	N/A	OC	V	~	~	~	< >	< >	< >	< >	< >	< >
START/STOP	< >	OCCUPANCY COMMAND	~	~	MORNING/OCC/UNOCC	NET-IN	N/A	~	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SYSTEM OCCUPANCY (ACTUAL)	~	~	MORNING/OCC/UNOCC	NET-OUT	N/A	~	V	~	~	~	< >	< >	< >	< >	< >	< >
	< >	ATFP EMERGENCY SHUTDOWN SWITCH STATUS	< >	~	EMERGENCY/NORMAL	NET-OUT	N/A	~	V	Y	ATFP EMERGENCY ALARM ACTIVATED	CRIT	< >	< >	< >	< >	< >	< >
	< >	OCCUPANCY OVERRIDE PUSH-BUTTON SWITCH STATUS	< >	~	OCCUPIED/NORMAL	NET-OUT	N/A	~	V	Y	UNNOCCUPIED MODE OVERRIDE INITIATED	INFO	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 1&2 VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3&4 VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 1&2 VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3&4 VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	DAMPER OPERATION TIME DELAY	~	< 30 SEC >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	FAN SPINDOWN TIME DELAY	~	< 60 SEC >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR ISOLATION DAMPER	< >	~	OPEN/CLOSE	DO	N/A		V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN AIR ISOLATION DAMPER	< >	~	OPEN/CLOSE	DO	N/A		V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	UNIT HEATER FAN ON/OFF	< >	~	ON/OFF	DO	Y		VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	FREEZE PROTECTION PUMP 2A START/STOP	< >	~	ON/OFF	DO	Y		VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	FREEZE PROTECTION PUMP 2B START/STOP	< >	~	ON/OFF	DO	Y		VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	MODE SWITCH SYSTEM STABILIZE TIME DELAY	~	< 300 SEC >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
SUPPLY FAN CONTROL	< >	SUPPLY AIR DUCT STATIC PRESSURE SETPOINT	~	< 0.65" IN-W.C. >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR DUCT STATIC PRESSURE	< >	~	< 0 - __ IN-W.C. >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 1&2 VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3&4 VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN DISCHARGE PRESSURE	< >	~	< 0 - 4 IN-W.C. >	AI	N/A	~	V	Y	STATIC PRESSURE RISES ABOVE 3.00 IN-W.C. (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	SUPPLY FAN PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
RETURN FAN CONTROL	< >	SUPPLY FAN 1 AIRFLOW	< >	~	< 0 - ___ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 2 AIRFLOW	< >	~	< 0 - ___ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3 AIRFLOW	< >	~	< 0 - ___ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 4 AIRFLOW	< >	~	< 0 - ___ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 1 AIRFLOW	< >	~	< 0 - ___ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 2 AIRFLOW	< >	~	< 0 - ___ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3 AIRFLOW	< >	~	< 0 - ___ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 4 AIRFLOW	< >	~	< 0 - ___ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	OCCUPIED AIRFLOW OFFSET VALUE	~	< 1600 CFM >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	OCCUPIED RETURN FAN AIRFLOW SETPOINT	~	< >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	MORNING & UNOCCUPIED AIRFLOW OFFSET VALUE	~	< 0 CFM >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	MORNING & UNOCCUPIED RETURN FAN AIRFLOW SETPOINT	~	< >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 1&2 VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3&4 VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN INLET PRESSURE	< >	~	< -3 - 0 IN-W.C. >	AI	N/A	~	V	Y	STATIC PRESSURE FALLS BELOW -2.00 IN-W.C. (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	RETURN FAN PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
SUPPLY AIR TEMPERATURE CONTROL	< >	RETURN AIR HUMIDITY	< >	~	< 0 - 100% RH >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN AIR TEMPERATURE	< >	~	< 0 - __ DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	MIXED AIR TEMPERATURE	< >	~	< 0 - __ DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	PREHEAT COIL CONTROL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	PREHEAT COIL DISCHARGE TEMPERATURE SETPOINT	~	< 52 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	PREHEAT COIL DISCHARGE TEMPERATURE	< >	~	< 0 - __ DEG F >	AI	N/A	~	V	Y	PREHEAT COIL DISCHARGE TEMP FALLS BELOW SETPOINT BY 5 DEG F (ADJ.)	INFO	< >	< >	< >	< >	< >	< >
	PREHEAT COIL PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	COOLING COIL CONTROL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	COOLING COIL DISCHARGE AIR TEMPERATURE	< >	~	< 0 - __ DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	COOLING COIL PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR HUMIDITY	< >	~	< 0 - 100% RH >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR TEMPERATURE SETPOINT	~	RESET	< 53 - 65 DEG F >	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR TEMPERATURE	< >	~	< 0 - __ DEG F >	AI	N/A	~	V	Y	TEMPERATURE DEVIATES FROM SETPOINT BY +/- 5 DEG F (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
OUTSIDE AIR, RETURN AIR, AND RELIEF AIR DAMPER CONTROL	< >	MIXING BOX STATIC PRESSURE SETPOINT	~	< 0.25" IN-W.C. >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	MIXING BOX STATIC PRESSURE	< >	~	< 0 - 0.5 IN-W.C. >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	MINIMUM OUTSIDE AIR DAMPER AIRFLOW	< >	~	< 0 - ___ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	ECONOMIZER DAMPER AIRFLOW	< >	~	< 0 - ___ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	MINIMUM OUTSIDE AIR DAMPER COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	ECONOMIZER DAMPER COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	OUTSIDE AIR DAMPER PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN AIR DAMPER COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	RETURN AIR DAMPER PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	RELIEF AIR DAMPER COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	VESTIBULE RELIEF AIR DAMPER COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	RELIEF AIR DAMPER PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
VESTIBULE TEMPERATURE CONTROL	< >	VESTIBULE SPACE TEMPERATURE HEATING SETPOINT	~	< 50 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	VESTIBULE SPACE TEMPERATURE COOLING SETPOINT	~	< 85 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	VESTIBULE SPACE TEMPERATURE	< >	~	< 0 - __ DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	UNIT HEATER HEATING COIL CONTROL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	UNIT HEATER HEATING COIL PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >

NOTES:

1. THE CONTRACTOR MUST INCLUDE ALL DATA IN THIS SCHEDULE IN THE POINTS SCHEDULE GENERATED FOR THE CONTROLS SUBMITTAL. ADDITIONAL ROWS, COLUMNS, AND DATA MUST BE ADDED TO THE CONTRACTOR'S POINT SCHEDULE AS REQUIRED BY SPECIFICATION SECTION 23 09 00, PARAGRAPH 3.3.10.
2. THE ABBREVIATIONS "DI" AND "DO" ARE USED INTERCHANGEABLY WITH "BI" AND "BO" THROUGHOUT THE CONSTRUCTION DOCUMENTS.
3. THE SYMBOL "< >" DENOTES FIELDS REQUIRING CONTRACTOR ENTERED DATA. THE SYMBOL "~" DENOTES NO ENTRY REQUIRED. THE SYMBOL "N/A" DENOTES NO VALID ENTRY AVAILABLE.
4. ALL SETTINGS AND RANGES MUST BE FULLY ADJUSTABLE. INITIAL VALUES PROVIDED IN THIS SCHEDULE MUST BE ADJUSTED BY THE CONTRACTOR AS REQUIRED FOR SYSTEM BALANCING AND TO PERMIT THE SYSTEMS TO PERFORM THEIR RESPECTIVE SEQUENCES OF OPERATION.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY:	WMF
DRAWN BY:	RKG
CHECKED BY:	WMF
SUBMITTED BY:	
SIZE	ANSI D
ISSUE DATE:	2/11/2021
SOLICITATION NO.:	W912DS-19-R-0014
CONTRACT NO.:	W912DS-19-C0031
PROJECT NO:	20190494

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

HVAC CONTROLS

SHEET ID

M812

RTA SUBMISSION 2/11/2021

AHU-3 SYSTEM POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS) NOTE 4	RANGE (WITH UNITS) NOTE 4	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVERRIDE	TREND REQ'D	ALARMING		PRIMARY POINT INFORMATION		OVERRIDES		CONFIGURATION INFORMATION
											ALARM CONDITION	ALARM PRIORITY	SNVT NAME	SNVT TYPE	NIAGARA ID	SNVT NAME	SNVT TYPE	
PROOFS & SAFETIES	< >	SUPPLY FAN 1&2 VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 1 & 2 VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 1 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 1 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 2 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 2 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3&4 VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 3 & 4 VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 3 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 4 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	SUPPLY FAN 4 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3A VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	RETURN FAN 3A VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3B VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	RETURN FAN 3B VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	FREEZE PROTECTION PUMP 3 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	FREEZE PROTECTION PUMP 3 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	LOW LIMIT TEMPERATURE ALARM (FREEZESTAT)	< >	35 DEG F	ALARM/NORMAL	DI	N/A	H	V	Y	FREEZESTAT ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN DISCHARGE HIGH PRESSURE SWITCH	< >	3 IN-W.C.	ALARM/NORMAL	DI	N/A	H	V	Y	SUPPLY AIR HIGH STATIC PRESSURE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3A INLET LOW PRESSURE SWITCH	< >	-3.00 IN-W.C.	ALARM/NORMAL	DI	N/A	H	V	Y	RETURN FAN 3A LOW STATIC PRESSURE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3B INLET LOW PRESSURE SWITCH	< >	-3.00 IN-W.C.	ALARM/NORMAL	DI	N/A	H	V	Y	RETURN FAN 3B LOW STATIC PRESSURE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR SMOKE DETECTOR 1	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	SUPPLY AIR 1 SMOKE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR SMOKE DETECTOR 2	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	SUPPLY AIR 2 SMOKE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN AIR SMOKE DETECTOR RF-3A	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	RETURN AIR RF-3A SMOKE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN AIR SMOKE DETECTOR RF-3B	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	RETURN AIR RF-3B SMOKE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 1&2 VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	SUPPLY FAN 1 & 2 VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3&4 VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	SUPPLY FAN 3 & 4 VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3A VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	RETURN FAN 3A VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3B VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	RETURN FAN 3B VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	FILTER DIFFERENTIAL PRESSURE	< >	1.5 IN-W.C.	0 - 2 IN-W.C.	AI	N/A	~	VO	Y	DIRTY FILTER ALARM	INFO	< >	< >	< >	< >	< >	< >
SCHEDULING	< >	SYSTEM OCCUPANCY SCHEDULE	~	~	MORNING/OCC/UNOCC	NET-IN	N/A	OC	V	~	~	~	< >	< >	< >	< >	< >	< >
START/STOP	< >	OCCUPANCY COMMAND	~	~	MORNING/OCC/UNOCC	NET-IN	N/A	~	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SYSTEM OCCUPANCY (ACTUAL)	~	~	MORNING/OCC/UNOCC	NET-OUT	N/A	~	V	~	~	~	< >	< >	< >	< >	< >	< >
	< >	ATFP EMERGENCY SHUTDOWN SWITCH STATUS	< >	~	EMERGENCY/NORMAL	NET-OUT	N/A	~	V	Y	ATFP EMERGENCY ALARM ACTIVATED	CRIT	< >	< >	< >	< >	< >	< >
	< >	OCCUPANCY OVERRIDE PUSH-BUTTON SWITCH STATUS	< >	~	OCCUPIED/NORMAL	NET-OUT	N/A	~	V	Y	UNNOCCUPIED MODE OVERRIDE INITIATED	INFO	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 1&2 VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3&4 VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3A VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3B VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	DAMPER OPERATION TIME DELAY	~	< 30 SEC >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	FAN SPINDOWN TIME DELAY	~	< 60 SEC >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	FREEZE PROTECTION PUMP 3 START/STOP	< >	~	ON/OFF	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
SUPPLY FAN CONTROL	< >	SUPPLY AIR DUCT STATIC PRESSURE SETPOINT	~	< 0.65" IN-W.C. >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR DUCT STATIC PRESSURE	< >	~	< 0 - __ IN-W.C. >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 1&2 VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3&4 VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN DISCHARGE PRESSURE	< >	~	< 0 - 4 IN-W.C. >	AI	N/A	~	V	Y	STATIC PRESSURE RISES ABOVE 3.00 IN-W.C. (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	SUPPLY FAN PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
RETURN FAN CONTROL	< >	SUPPLY FAN 1 AIRFLOW	< >	~	< 0 - __ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 2 AIRFLOW	< >	~	< 0 - __ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 3 AIRFLOW	< >	~	< 0 - __ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY FAN 4 AIRFLOW	< >	~	< 0 - __ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3A AIRFLOW	< >	~	< 0 - __ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3B AIRFLOW	< >	~	< 0 - __ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	AIRFLOW OFFSET VALUE	~	< 1100 CFM >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN AIRFLOW SETPOINT	~	< >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	MORNING & UNOCCUPIED AIRFLOW OFFSET VALUE	~	< 0 CFM >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	MORNING & UNOCCUPIED RETURN FAN AIRFLOW SETPOINT	~	< >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3A VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3B VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3A INLET PRESSURE	< >	~	< -3 - 0 IN-W.C. >	AI	N/A	~	V	Y	STATIC PRESSURE FALLS BELOW -2.00 IN-W.C. (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3B INLET PRESSURE	< >	~	< -3 - 0 IN-W.C. >	AI	N/A	~	V	Y	STATIC PRESSURE FALLS BELOW -2.00 IN-W.C. (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	RETURN FAN PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
SUPPLY AIR TEMPERATURE CONTROL	< >	RETURN AIR HUMIDITY RF-3A	< >	~	< 0 - 100% RH >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN AIR HUMIDITY RF-3B	< >	~	< 0 - 100% RH >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN AIR TEMPERATURE RF-3A	< >	~	< 0 - __ DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN AIR TEMPERATURE RF-3B	< >	~	< 0 - __ DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	MIXED AIR TEMPERATURE	< >	~	< 0 - __ DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	PREHEAT COIL CONTROL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	PREHEAT COIL DISCHARGE TEMPERATURE SETPOINT	~	< 52 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	PREHEAT COIL DISCHARGE TEMPERATURE	< >	~	< 0 - __ DEG F >	AI	N/A	~	V	Y	PREHEAT COIL DISCHARGE TEMP FALLS BELOW SETPOINT BY 5 DEG F (ADJ.)	INFO	< >	< >	< >	< >	< >	< >
	PREHEAT COIL PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	COOLING COIL CONTROL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	COOLING COIL DISCHARGE AIR TEMPERATURE	< >	~	< 0 - __ DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	COOLING COIL PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR HUMIDITY	< >	~	< 0 - 100% RH >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR TEMPERATURE SETPOINT	~	RESET	< 53 - 65 DEG F >	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR TEMPERATURE	< >	~	< 0 - __ DEG F >	AI	N/A	~	V	Y	TEMPERATURE DEVIATES FROM SETPOINT BY +/- 5 DEG F (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
OUTSIDE AIR, RETURN AIR, AND RELIEF AIR DAMPER CONTROL	< >	RETURN FAN DISCHARGE PRESSURE SETPOINT	~	< 0.25" IN-W.C. >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3A DISCHARGE PRESSURE	< >	~	< 0 - 0.5 IN-W.C. >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN FAN 3B DISCHARGE PRESSURE	< >	~	< 0 - 0.5 IN-W.C. >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	MINIMUM OUTSIDE AIR DAMPER AIRFLOW	< >	~	< 0 - __ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	ECONOMIZER DAMPER AIRFLOW	< >	~	< 0 - __ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	MINIMUM OUTSIDE AIR DAMPER COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	ECONOMIZER DAMPER COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	OUTSIDE AIR DAMPER PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	RF-3A RETURN AIR DAMPER COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RF-3B RETURN AIR DAMPER COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	RETURN AIR DAMPER PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	RF-3A RELIEF AIR DAMPER COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	RF-3B RELIEF AIR DAMPER COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	RELIEF AIR DAMPER PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >

NOTES:

1. THE CONTRACTOR MUST INCLUDE ALL DATA IN THIS SCHEDULE IN THE POINTS SCHEDULE GENERATED FOR THE CONTROLS SUBMITTAL. ADDITIONAL ROWS, COLUMNS, AND DATA MUST BE ADDED TO THE CONTRACTOR'S POINT SCHEDULE AS REQUIRED BY SPECIFICATION SECTION 23 09 00, PARAGRAPH 3.3.10.
2. THE ABBREVIATIONS "DI" AND "DO" ARE USED INTERCHANGEABLY WITH "BI" AND "BO" THROUGHOUT THE CONSTRUCTION DOCUMENTS.
3. THE SYMBOL "< >" DENOTES FIELDS REQUIRING CONTRACTOR ENTERED DATA. THE SYMBOL "~" DENOTES NO ENTRY REQUIRED. THE SYMBOL "N/A" DENOTES NO VALID ENTRY AVAILABLE.
4. ALL SETTINGS AND RANGES MUST BE FULLY ADJUSTABLE. INITIAL VALUES PROVIDED IN THIS SCHEDULE MUST BE ADJUSTED BY THE CONTRACTOR AS REQUIRED FOR SYSTEM BALANCING AND TO PERMIT THE SYSTEMS TO PERFORM THEIR RESPECTIVE SEQUENCES OF OPERATION.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

DESIGNED BY: WMF
DRAWN BY: RKG
CHECKED BY: WMF
SUBMITTED BY: BK
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

HVAC CONTROLS

SHEET ID

M813

RTA SUBMISSION 2/11/2021

HEATING WATER SYSTEM POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS) NOTE 4	RANGE (WITH UNITS) NOTE 4	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVERRIDE	TREND REQ'D	ALARMING		PRIMARY POINT INFORMATION			OVERRIDES		CONFIGURATION INFORMATION
											ALARM CONDITION	ALARM PRIORITY	SNVT NAME	SNVT TYPE	NIAGARA ID	SNVT NAME	SNVT TYPE	
PROOFS & SAFETIES	< >	BOILER B-1 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	BOILER B-1 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	PUMP P-3 VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	PUMP P-3 VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	PUMP P-4 VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	PUMP P-4 VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	BOILER B-1 ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	BOILER B-1 GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	PUMP P-3 VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	PUMP P-3 VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	PUMP P-4 VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	PUMP P-4 VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	BOILER B-1 EMERGENCY SHUTDOWN SWITCH 1	< >	~	EMERGENCY/NORMAL	DI	N/A	~	V	Y	BOILER EMERGENCY ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	BOILER B-1 EMERGENCY SHUTDOWN SWITCH 2	< >	~	EMERGENCY/NORMAL	DI	N/A	~	V	Y	BOILER EMERGENCY ALARM	CRIT	< >	< >	< >	< >	< >	< >
SCHEDULING	< >	SYSTEM OCCUPANCY SCHEDULE	~	~	OCCUPIED/UNOCCUPIED	NET-IN	N/A	OC	V	~	~	~	< >	< >	< >	< >	< >	< >
START/STOP	< >	OCCUPANCY COMMAND	~	~	OCCUPIED/UNOCCUPIED	NET-IN	N/A	~	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SYSTEM OCCUPANCY (ACTUAL)	~	~	OCCUPIED/UNOCCUPIED	NET-OUT	N/A	~	V	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SYSTEM MODE	~	~	EMERGENCY/NORMAL	NET-OUT	N/A	~	V	~	~	~	< >	< >	< >	< >	< >	< >
	< >	OUTDOOR AIR TEMPERATURE	~	< __ DEG F >	~	NET-OUT	N/A	~	V	~	~	~	< >	< >	< >	< >	< >	< >
	< >	BOILER COMBUSTION PERMISSIVE	< >	~	EMERGENCY/NORMAL	DO	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	BOILER B-1 ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	PUMP P-3 VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	PUMP P-4 VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	BOILER ISOLATION VALVE 1	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	BOILER ISOLATION VALVE 2	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HEAT EXCHANGER ISOLATION VALVE	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
PUMP CONTROL	< >	HEATING WATER SYSTEM DIFFERENTIAL PRESSURE SETPOINT	~	< 10 PSI >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	HEATING WATER SYSTEM DIFFERENTIAL PRESSURE	< >		< 0 - __ PSI >	AI	N/A	~	V	Y	DIFFERENTIAL PRESSURE DEVIATES FROM SETPOINT BY +/- 20% (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	< >	PUMP P-3 VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	PUMP P-4 VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	MINIMUM FLOW BYPASS VLAVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	PUMP PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
BOILER & HEAT EXCHANGER CONTROL	< >	BOILER LEAVING WATER TEMPERATURE SETPOINT	~	< 180 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	BOILER LEAVING WATER TEMPERATURE SETPOINT	< >	< >	~	AO	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	BOILER LEAVING WATER TEMPERATURE	< >	~	< 0 - 200 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HEAT EXCHANGER LEAVING WATER TEMPERATURE SETPOINT	~	< 180 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	HEAT EXCHANGER LEAVING WATER TEMPERATURE	< >	~	< 0 - 200 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	BOILER/HEAT EXCHANGER ENTERING WATER TEMPERATURE	< >	~	< 0 - 200 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HEATING WATER TEMPERATURE SETPOINT	~	RESET	< 180 - 160 DEG F >	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	HEATING WATER SUPPLY TEMPERATURE	< >	~	< 0 - 200 DEG F >	AI	N/A	~	V	Y	HEATING WATER TEMPERATURE FALLS BELOW SETPOINT BY 5 DEG F (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	< >	HEATING WATER RETURN TEMPERATURE	< >	~	< 0 - 200 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HEAT EXCHANGER 1/3 CONTROL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HEAT EXCHANGER 2/3 CONTROL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	INCOMING MEDIUM PRESSURE STEAM PRESSURE	< >	~	< 0 - __ PSI >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	CULLUM HALL LOW PRESSURE STEAM PRESSURE	< >	~	< 0 - __ PSI >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	CULLUM HALL LOW PRESSURE STEAM FLOW	< >	~	< 0 - __ LBS/HR >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	LINCOLN HALL LOW PRESSURE STEAM PRESSURE	< >	~	< 0 - __ PSI >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	LINCOLN HALL LOW PRESSURE STEAM FLOW	< >	~	< 0 - __ LBS/HR >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	MAKE UP WATER FLOW	< >	~	< 0 - __ GPM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >

NOTES:

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CHILLED WATER SYSTEM POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS) NOTE 4	RANGE (WITH UNITS) NOTE 4	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVERRIDE	TREND REQ'D	ALARMING		PRIMARY POINT INFORMATION			OVERRIDES		CONFIGURATION INFORMATION
											ALARM CONDITION	ALARM PRIORITY	SNVT NAME	SNVT TYPE	NIAGARA ID	SNVT NAME	SNVT TYPE	
PROOFS & SAFETIES	< >	CHILLER CH-1 STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	CHILLER CH-1 PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	PUMP P-1 VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	PUMP P-1 VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	PUMP P-2 VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	PUMP P-2 VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	CHILLER CH-1 ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	CHILLER CH-1 GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	PUMP P-1 VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	PUMP P-1 VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	PUMP P-2 VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	PUMP P-2 VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	GLYCOL FILL SYSTEM ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	GLYCOL FILL SYSTEM GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	HIGH SPACE TEMPERATURE	~	~	ALARM/NORMAL	NET-OUT	N/A	~	V	~	~	~	< >	< >	< >	< >	< >	< >
	< >	HIGH SPACE HUMIDITY	~	~	ALARM/NORMAL	NET-OUT	N/A	~	V	~	~	~	< >	< >	< >	< >	< >	< >
SCHEDULING	< >	SYSTEM OCCUPANCY SCHEDULE	~	~	OCCUPIED/UNOCCUPIED	NET-IN	N/A	OC	V	~	~	~	< >	< >	< >	< >	< >	< >
START/STOP	< >	OCCUPANCY COMMAND	~	~	OCCUPIED/UNOCCUPIED	NET-IN	N/A	~	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SYSTEM OCCUPANCY (ACTUAL)	~	~	OCCUPIED/UNOCCUPIED	NET-OUT	N/A	~	V	~	~	~	< >	< >	< >	< >	< >	< >
	< >	CHILLER CH-1 ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	PUMP P-1 VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	PUMP P-2 VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	GLYCOL FILL SYSTEM ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HEAT EXCHANGER BYPASS VALVE	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HEAT EXCHANGER ISOLATION VALVE	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
PUMP CONTROL	< >	CHILLED WATER SYSTEM DIFFERENTIAL PRESSURE SETPOINT	~	< 10 PSI >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	CHILLED WATER SYSTEM DIFFERENTIAL PRESSURE	< >		< 0 - __ PSI >	AI	N/A	~	V	Y	DIFFERENTIAL PRESSURE DEVIATES FROM SETPOINT BY +/- 20% (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	< >	PUMP P-1 VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	PUMP P-2 VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	MINIMUM FLOW BYPASS VLAVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	PUMP P-1 INLET PRESSURE	< >	~	< 0 - __ PSI >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	PUMP P-2 INLET PRESSURE	< >	~	< 0 - __ PSI >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	PUMP PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
CHILLER & HEAT EXCHANGER CONTROL	< >	EMERGENCY CHILLED WATER SUPPLY TEMPERATURE SETPOINT	~	< 40 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	EMERGENCY CHILLED WATER SUPPLY TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	EMERG. CHILLED WATER SUPPLY TEMP. RISES ABOVE SETPOINT BY 5 DEG F (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	< >	EMERGENCY CHILLED WATER RETURN TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HEAT EXCHANGER EMERGENCY CHILLED WATER SUPPLY VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HEAT EXCHANGER INLET WATER TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HEAT EXCHANGER OUTLET TEMPERATURE SETPOINT	~	< 43 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	HEAT EXCHANGER OUTLET WATER TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	HEAT EXCHANGER OUTLET TEMP. RISES ABOVE SETPOINT BY 5 DEG F (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	< >	CHILLED WATER SUPPLY TEMPERATURE SETPOINT	~	< 43 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	CHILLED WATER SUPPLY TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	CHILLED WATER SUPPLY TEMPERATURE RISES ABOVE SETPOINT BY 5 DEG F (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	< >	CHILLED WATER RETURN TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	CHILLED WATER SUPPLY TEMPERATURE (FROM B604)	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	CHILLED WATER SUPPLY TEMPERATURE (FROM B604) RISES ABOVE 48 DEG F (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	< >	CHILLED WATER RETURN TEMPERATURE (TO B604)	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >

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US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WMF
SUBMITTED BY: SK
SIZE: ANSI D

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

HVAC CONTROLS

SHEET ID

M814

RTA SUBMISSION 2/11/2021

MISCELLANEOUS SYSTEMS POINTS SCHEDULE

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS) NOTE 4	RANGE (WITH UNITS) NOTE 4	IO TYPE	HOA REQ'D	CONFIG. TYPE	M&C VIEW AND OVERRIDE	TREND REQ'D	ALARMING		PRIMARY POINT INFORMATION			OVERRIDES		CONFIGURATION INFORMATION
											ALARM CONDITION	ALARM PRIORITY	SNVT NAME	SNVT TYPE	NIAGARA ID	SNVT NAME	SNVT TYPE	
UNIT HEATERS (TYPICAL)																		
DETAIL A1/M807	< >	UNIT HEATER STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	UNIT HEATER PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	UNIT HEATER START/STOP	< >	~	ON/OFF	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HOT WATER VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	HEATING COIL VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE SETPOINT	~	< 60 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	SPACE TEMPERATURE FALLS BELOW SETPOINT BY 5 DEG F (ADJ.)	INFO	< >	< >	< >	< >	< >	< >
HUMIDIFIERS DUCT-MOUNTED (TYPICAL)																		
DETAIL A4/M807	< >	HUMIDIFIER ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	HUMIDIFIER GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	HUMIDIFER DRAIN CYCLE STATUS	< >	~	ON/OFF	DI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HUMIDIFIER ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HUMIDIFIER OUTPUT	< >	~	< 0 - __ LBS./HR. >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE HUMIDITY SETPOINT	~	< __ %RH >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE HUMIDITY	< >	~	< 0 - 100 %RH >	AI	N/A	~	V	Y	SPACE HUMIDITY FALLS BELOW SETPOINT BY 5 %RH (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	< >	OUTDOOR AIR TEMPERATURE	< >	~	< -10 - 110 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	OUTDOOR AIR RELATIVE HUMIDITY	< >	~	< 0 - 100 %RH >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR DUCT TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR DUCT DEW POINT	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SUPPLY AIR DUCT RELATIVE HUMIDITY HIGH LIMIT	< >	< 90% RH >	< 0 - 100 %RH >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
COMPUTER ROOM UNITS WALL MOUNTED (TYPICAL)																		
DETAIL A8/M807	< >	COMPUTER ROOM UNIT ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	COMPUTER ROOM UNIT GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	COMPUTER ROOM UNIT ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE SETPOINT	~	< 72 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	SPACE TEMPERATURE DEVIATES FROM SETPOINT BY +/-5 DEG F (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	< >	SPACE HUMIDITY SETPOINT	~	< 15 %RH >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE HUMIDITY	< >	~	< 0 - 100 %RH >	AI	N/A	~	V	Y	SPACE HUMIDITYE DEVIATES FROM SETPOINT BY +/-5 %RH (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
UTILITY METERS (TYPICAL)																		
DETAIL D1/M807	< >	METER PULSE SIGNAL	< >	~	~	DI PULSE	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
ENERGY METERS (TYPICAL)																		
DETAIL D5/M807	< >	SYSTEM FLOW RATE	< >	~	< GPM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	TOTAL ENERGY PULSE SIGNAL	< >	~	~	DI PULSE	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	ENERGY RATE	< >	~	< BTUH >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
SUMP PUMPS (TYPICAL)																		
DETAIL D8/M807	< >	SUMP PUMP ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	SUMP PUMP GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
RADIANT HEATING PANELS (TYPICAL)																		
DETAIL F1/M807	< >	HOT WATER VALVE COMMAND	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE SETPOINT	~	< 72 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE	< >	< __ DEG F >	< 0 - 100 DEG F >	AI	N/A	~	V	Y	SPACE TEMPERATURE DEVIATES FROM SETPOINT BY +/-5 DEG F (ADJ.)	INFO	< >	< >	< >	< >	< >	< >
HOT WATER HEATERS (TYPICAL)																		
DETAIL F5/M807	< >	HOT WATER HEATER ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	HOT WATER HEATER GENERAL ALARM	INFO	< >	< >	< >	< >	< >	< >
FLOOD PROTECTION VALVES (TYPICAL)																		
DETAIL F8/M807	< >	FLOOD PROTECTION VALVE ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	FLOOD PROTECTION VALVE GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
FAN COIL UNITS DUCTED (TYPICAL)																		
DETAIL A2/M808	< >	FAN STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	FAN PROOF FAILED	INFO	< >	< >	< >	< >	< >	< >
	< >	CONDENSATE PAN HIGH LEVEL ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	CONDENSATE PAN HIGH LEVEL ALARM	INFO	< >	< >	< >	< >	< >	< >
	< >	CONDENSATE PAN HIGH LEVEL INDICATING LIGHT	< >	~	ON/OFF	DO	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	LEAK DETECTION ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	LEAK DETECTION ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	LEAK DETECTION INDICATING LIGHT	< >	~	ON/OFF	DO	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	FILTER DIFFERENTIAL PRESSURE	< >	< __ IN-W.C. >	0 - 2 IN-W.C.	AI	N/A	~	VO	Y	DIRTY FILTER ALARM	INFO	< >	< >	< >	< >	< >	< >
	< >	CHANGE FILTER INDICATING LIGHT	< >	~	ON/OFF	DO	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	FAN ON/OFF	< >	~	ON/OFF	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HEATING COIL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	HEATING COIL VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	COOLING COIL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	COOLING COIL VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	RETURN AIR DUCT TEMPERATURE	< >	< __ DEG F >	< 0 - 100 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE SETPOINT	~	< 72 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	SPACE TEMPERATURE DEVIATES FROM SETPOINT BY +/-5 DEG F (ADJ.)	INFO	< >	< >	< >	< >	< >	< >
FAN COIL UNITS NON-DUCTED (TYPICAL)																		
DETAIL A5/M808	< >	FAN STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	FAN PROOF FAILED	INFO	< >	< >	< >	< >	< >	< >
	< >	CONDENSATE PAN HIGH LEVEL ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	CONDENSATE PAN HIGH LEVEL ALARM	INFO	< >	< >	< >	< >	< >	< >
	< >	CONDENSATE PAN HIGH LEVEL INDICATING LIGHT	< >	~	ON/OFF	DO	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	FILTER DIFFERENTIAL PRESSURE	< >	< __ IN-W.C. >	0 - 2 IN-W.C.	AI	N/A	~	VO	Y	DIRTY FILTER ALARM	INFO	< >	< >	< >	< >	< >	< >
	< >	CHANGE FILTER INDICATING LIGHT	< >	~	ON/OFF	DO	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	FAN ON/OFF	< >	~	ON/OFF	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HEATING COIL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	HEATING COIL VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	COOLING COIL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	COOLING COIL VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE SETPOINT	~	< 72 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	SPACE TEMPERATURE DEVIATES FROM SETPOINT BY +/-5 DEG F (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
VARIABLE VOLUME BOXES (TYPICAL)																		
DETAIL D8/M808	< >	VAV BOX AIRFLOW	< >	< __ CFM >	< 0 - __ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	VAV DAMPER POSITION	< >	~	0 - 100%	AO	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	VAV DISCHARGE AIR TEMPERATURE	< >	< __ DEG F >	< 0 - 100 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	REHEAT COIL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE SETPOINT	~	< 72 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	SPACE TEMPERATURE DEVIATES FROM SETPOINT BY +/-5 DEG F (ADJ.)	INFO	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE SETPOINT	~	< 72 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	UNNOCCUPIED MODE OVERRIDE	< >	~	OCCUPIED/NORMAL	DI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE CO2 LEVEL	< >	~	< 0 - __ PPM >	AI	N/A	~	V	Y	SPACE CO2 LEVEL EXCEEDS OUTDOOR CO2 LEVEL BY 400 PPM (ADJ.)	INFO	< >	< >	< >	< >	< >	< >
	REHEAT COIL VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	~	N/A	C	~	~	~	~	< >	< >	< >	< >	< >	< >
ATFP EMERGENCY SHUTDOWN																		
DETAIL E2/M808	< >	HVAC ISOLATION PUSH-BUTTON	< >	~	EMERGENCY/NORMAL	DI	N/A	~	V	Y	ATFP EMERGENCY ALARM ACTIVATED	CRIT	< >	< >	< >	< >	< >	< >

NOTES:

1. THE CONTRACTOR MUST INCLUDE ALL DATA IN THIS SCHEDULE IN THE POINTS SCHEDULE GENERATED FOR THE CONTROLS SUBMITTAL. ADDITIONAL ROWS, COLUMNS, AND DATA MUST BE ADDED TO THE CONTRACTOR'S POINT SCHEDULE AS REQUIRED BY SPECIFICATION SECTION 23 09 00, PARAGRAPH 3.3.10.
2. THE ABBREVIATIONS "DI" AND "DO" ARE USED INTERCHANGEABLY WITH "BI" AND "BO" THROUGHOUT THE CONSTRUCTION DOCUMENTS.
3. THE SYMBOL "< >" DENOTES FIELDS REQUIRING CONTRACTOR ENTERED DATA. THE SYMBOL "~" DENOTES NO ENTRY REQUIRED. THE SYMBOL "N/A" DENOTES NO VALID ENTRY AVAILABLE.
4. ALL SETTINGS AND RANGES MUST BE FULLY ADJUSTABLE. INITIAL VALUES PROVIDED IN THIS SCHEDULE MUST BE ADJUSTED BY THE CONTRACTOR AS REQUIRED FOR SYSTEM BALANCING AND TO PERMIT THE SYSTEMS TO PERFORM THEIR RESPECTIVE SEQUENCES OF OPERATION.
5. FOR EQUIPMENT IDENTIFIED AS "(TYPICAL)" PROVIDE ALL IDENTIFIED CONTROL POINTS FOR EACH OCCURRENCE OF THE EQUIPMENT, UNLESS SPECIFICALLY NOTED OTHERWISE. REFER TO THE SCHEDULE DRAWINGS (M5 SERIES) FOR QUANTITIES.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE:	2/11/2021
SOLICITATION NO.:	W912DS-19-R-0014
CONTRACT NO.:	W912DS-19-C0031
PROJECT NO:	20190494
DESIGNED BY:	WMF
DRAWN BY:	SCB
CHECKED BY:	WMF
SUBMITTED BY:	
SIZE	ANSI D

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

HVAC CONTROLS

SHEET ID

M815

RTA SUBMISSION 2/11/2021

MISCELLANEOUS SYSTEMS POINTS SCHEDULE (CONTINUED)

FUNCTION	POINT NAME	DESCRIPTION	DDC HARDWARE ID	SETTINGS (WITH UNITS) NOTE 4	RANGE (WITH UNITS) NOTE 4	IO TYPE	HOA REQ'D	CONFIG TYPE	M&C VIEW AND OVERRIDE	TREND REQ'D	ALARMING		PRIMARY POINT INFORMATION			OVERRIDES		CONFIGURATION INFORMATION
											ALARM CONDITION	ALARM PRIORITY	SNVT NAME	SNVT TYPE	NIAGARA ID	SNVT NAME	SNVT TYPE	
CONSTANT VOLUME BOXES (TYPICAL)																		
DETAIL E5/M808	< >	VAV BOX AIRFLOW	< >	< __ CFM >	< 0 - __ CFM >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	VAV DAMPER POSITION	< >	~	0 - 100%	AO	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	VAV DISCHARGE AIR TEMPERATURE	< >	< __ DEG F >	< 0 - 100 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	REHEAT COIL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE SETPOINT	~	< 72 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	SPACE TEMPERATURE DEVIATES FROM SETPOINT BY +/-5 DEG F (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE SETPOINT	< >	~	< 0 - 100 DEG F >	AI	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE CO2 LEVEL	< >	~	< 0 - __ PPM >	AI	N/A	~	V	Y	SPACE CO2 LEVEL EXCEEDS OUTDOOR CO2 LEVEL BY 400 PPM (ADJ.)	INFO	< >	< >	< >	< >	< >	< >
	REHEAT COIL VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	N/A	C	~	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	N/A	C	~	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	N/A	C	~	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	N/A	C	~	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	N/A	C	~	~	~	~	~	< >	< >	< >	< >	< >	< >
CABINET UNIT HEATERS DUCTED (TYPICAL)																		
DETAIL A1/M809	< >	FAN STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	FAN PROOF FAILED	INFO	< >	< >	< >	< >	< >	< >
	< >	FILTER DIFFERENTIAL PRESSURE	< >	< __ IN-W.C. >	0 - 2 IN-W.C.	AI	N/A	~	VO	Y	DIRTY FILTER ALARM	INFO	< >	< >	< >	< >	< >	< >
	< >	FAN ON/OFF	< >	~	ON/OFF	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HEATING COIL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	HEATING COIL VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	N/A	C	~	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	N/A	C	~	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	N/A	C	~	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	N/A	C	~	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	N/A	C	~	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE SETPOINT	~	< 60 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	SPACE TEMPERATURE FALLS BELOW SETPOINT BY 5 DEG F (ADJ.)	INFO	< >	< >	< >	< >	< >	< >
CABINET UNIT HEATERS NON-DUCTED (TYPICAL)																		
DETAIL A4/M809	< >	FAN STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	FAN PROOF FAILED	INFO	< >	< >	< >	< >	< >	< >
	< >	FILTER DIFFERENTIAL PRESSURE	< >	< __ IN-W.C. >	0 - 2 IN-W.C.	AI	N/A	~	VO	Y	DIRTY FILTER ALARM	INFO	< >	< >	< >	< >	< >	< >
	< >	FAN ON/OFF	< >	~	ON/OFF	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	HEATING COIL VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	HEATING COIL VALVE PID LOOP SETTINGS	PROPORTIONAL CONSTANT	~	< >	~	N/A	C	~	~	~	~	~	< >	< >	< >	< >	< >	< >
		INTEGRAL CONSTANT	~	< >	~	N/A	C	~	~	~	~	~	< >	< >	< >	< >	< >	< >
		BIAS	~	< >	~	N/A	C	~	~	~	~	~	< >	< >	< >	< >	< >	< >
		MAXIMUM OUTPUT	~	< >	~	N/A	C	~	~	~	~	~	< >	< >	< >	< >	< >	< >
		MINIMUM OUTPUT	~	< >	~	N/A	C	~	~	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE SETPOINT	~	< 60 DEG F >	~	NET-IN	N/A	OC	VO	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	SPACE TEMPERATURE FALLS BELOW SETPOINT BY 5 DEG F (ADJ.)	INFO	< >	< >	< >	< >	< >	< >
EXHAUST FANS IN-LINE (TYPICAL)																		
DETAIL A8/M809	< >	FAN STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	FAN PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	FAN INLET LOW PRESSURE SWITCH	< >	< __ IN-W.C. >	ALARM/NORMAL	DI	N/A	H	V	Y	FAN LOW STATIC PRESSURE ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	EXHAUST DAMPER STATUS (END SWITCH)	< >	~	OPEN/CLOSE	DI	N/A	~	V	Y	DAMPER FAILED TO OPEN	CRIT	< >	< >	< >	< >	< >	< >
	< >	EXHAUST DAMPER COMMAND	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	FAN START/STOP	< >	~	ON/OFF	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
VARIABLE FREQUENCY DRIVES FANS (TYPICAL)																		
DETAIL E1/M809	< >	VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	OPEN DAMPERS COMMAND	< >	~	OPEN/CLOSE	DO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	VFD MODE	~	~	HAND/AUTO	NET-OUT	N/A	~	V	~			< >	< >	< >	< >	< >	< >
	< >	VFD OUTPUT SPEED	~	~	< __ RPM >	NET-OUT	N/A	~	V	~			< >	< >	< >	< >	< >	< >
	< >	VFD OUTPUT FREQUENCY	~	~	< __ HZ >	NET-OUT	N/A	~	V	~			< >	< >	< >	< >	< >	< >
	< >	VFD OUTPUT CURRENT	~	~	< __ AMPS >	NET-OUT	N/A	~	V	~			< >	< >	< >	< >	< >	< >
	< >	VFD OUTPUT POWER	~	~	< __ KW >	NET-OUT	N/A	~	V	~			< >	< >	< >	< >	< >	< >
	< >	VFD ENERGY USAGE	~	~	< __ KWH >	NET-OUT	N/A	~	V	Y			< >	< >	< >	< >	< >	< >
	< >	VFD COMMUNICATION LOSS	~	~	ALARM/NORMAL	NET-OUT	N/A	~	V	~	VFD COMMUNICATION LOSS	CRIT	< >	< >	< >	< >	< >	< >
VARIABLE FREQUENCY DRIVES PUMPS (TYPICAL)																		
DETAIL E4/M809	< >	VFD STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	VFD PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	VFD ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	VFD ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	VFD GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	VFD SPEED	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	VFD MODE	~	~	HAND/AUTO	NET-OUT	N/A	~	V	~			< >	< >	< >	< >	< >	< >
	< >	VFD OUTPUT SPEED	~	~	< __ RPM >	NET-OUT	N/A	~	V	~			< >	< >	< >	< >	< >	< >
	< >	VFD OUTPUT FREQUENCY	~	~	< __ HZ >	NET-OUT	N/A	~	V	~			< >	< >	< >	< >	< >	< >
	< >	VFD OUTPUT CURRENT	~	~	< __ AMPS >	NET-OUT	N/A	~	V	~			< >	< >	< >	< >	< >	< >
	< >	VFD OUTPUT POWER	~	~	< __ KW >	NET-OUT	N/A	~	V	~			< >	< >	< >	< >	< >	< >
	< >	VFD ENERGY USAGE	~	~	< __ KWH >	NET-OUT	N/A	~	V	Y			< >	< >	< >	< >	< >	< >
	< >	VFD COMMUNICATION LOSS	~	~	ALARM/NORMAL	NET-OUT	N/A	~	V	~	VFD COMMUNICATION LOSS	CRIT	< >	< >	< >	< >	< >	< >
UPS MONITORING (TYPICAL)																		
DETAIL E8/M809	< >	UPS ON	< >	~	ON/OFF	DI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	UPS ONLINE	< >	~	ONLINE/OFFLINE	DI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	UPS LOAD ON BYPASS	< >	~	BYPASS/NORMAL	DI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	UPS ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	UPS GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	UPS OFF (MAINTENANCE BYPASS)	< >	~	SERVICE/NORMAL	DI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE SETPOINT	~	< __ DEG F >	~	NET-OUT	N/A	~	V	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	SPACE TEMPERATURE DEVIATES FROM SETPOINT BY +/- 5 DEG F (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	< >	SPACE RELATIVE HUMIDITY SETPOINT	~	< __ %RH >	~	NET-OUT	N/A	~	V	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE RELATIVE HUMIDITY	< >	~	< 0 - 100 %RH >	AI	N/A	~	V	Y	SPACE HUMIDITY DEVIATES FROM SETPOINT BY +/- 5 %RH (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
PIPING HEAT TRACE (TYPICAL)																		
DETAIL F8/M809	< >	HEAT TRACE ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	HEAT TRACE GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
ENVIRONMENTAL CHAMBER VENTILATION																		
DETAIL A1/M810	< >	DEHUMIDIFIER STATUS (CURRENT SENSOR)	< >	~	ON/OFF	DI	N/A	~	V	Y	DEHUMIDIFIER PROOF FAILED	CRIT	< >	< >	< >	< >	< >	< >
	< >	DEHUMIDIFIER ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	DEHUMIDIFIER GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	DEHUMIDIFIER ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	CHILLED WATER VALVE COMMAND	< >	~	0 - 100%	AO	N/A	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	DEHUMIDIFIER DISCHARGE TEMPERATURE	< >	< __ DEG F >	< 0 - 100 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	DEHUMIDIFIER DISCHARGE HUMIDITY	< >	< __ %RH >	< 0 - 100 %RH >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	COOLING COIL DISCHARGE TEMPERATURE	< >	< __ DEG F >	< 0 - 100 DEG F >	AI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
MASTER OCCUPANCY OVERRIDE																		
DETAIL A5/M810	< >	MASTER UNNOCCUPIED MODE OVERRIDE	< >	~	OCCUPIED/NORMAL	DI	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
	< >	BUILDING OVERRIDE STATUS	< >	~	OCCUPIED/NORMAL	DO	N/A	~	V	Y	~	~	< >	< >	< >	< >	< >	< >
STEAM CONDENSATE RECEIVERS (TYPICAL)																		
DETAIL C5/M810	< >	CONDENSATE RECEIVER ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	CONDENSATE RECEIVER GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	CONDENSATE RECEIVER ENABLE/DISABLE	< >	~	ENABLE/DISABLE	DO	Y	~	VO	Y	~	~	< >	< >	< >	< >	< >	< >
ENVIRONMENTAL CHAMBER																		
DETAIL E1/M810	< >	ENVIRONMENTAL CHAMBER ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	ENVIRONMENTAL CHAMBER GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE SETPOINT	~	< __ DEG F >	~	NET-OUT	N/A	~	V	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE TEMPERATURE	< >	~	< 0 - 100 DEG F >	AI	N/A	~	V	Y	SPACE TEMPERATURE DEVIATES FROM SETPOINT BY +/- 5 DEG F (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
	< >	SPACE RELATIVE HUMIDITY SETPOINT	~	< __ %RH >	~	NET-OUT	N/A	~	V	~	~	~	< >	< >	< >	< >	< >	< >
	< >	SPACE RELATIVE HUMIDITY	< >	~	< 0 - 100 %RH >	AI	N/A	~	V	Y	SPACE HUMIDITY DEVIATES FROM SETPOINT BY +/- 5 %RH (ADJ.)	CRIT	< >	< >	< >	< >	< >	< >
FCU CONDENSATE PUMP (TYPICAL)																		
DETAIL E5/M810	< >	CONDENSATE HIGH LEVEL ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	CONDENSATE HIGH LEVEL ALARM	INFO	< >	< >	< >	< >	< >	< >
ELECTRIC GENERATOR																		
DETAIL F1/M810	< >	GENERATOR ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	GENERATOR GENERAL ALARM	CRIT	< >	< >	< >	< >	< >	< >
LEAK DETECTION CABLE (TYPICAL)																		
DETAIL F5/M810	< >	LEAK DETECTION ALARM	< >	~	ALARM/NORMAL	DI	N/A	~	V	Y	LEAK DETECTION ALARM	CRIT	< >	< >	< >	< >	< >	< >
AUTOMATIC TRANSFER SWITCHES (TYPICAL)																		
DETAIL F7/M810	< >	ATS STATUS	< >	~	EMERGENCY/NORMAL	DI	N/A	~	V	Y	OPERATING ON EMERGENCY POWER	CRIT	< >	< >	< >	< >	< >	< >

NOTES:

1. THE CONTRACTOR MUST INCLUDE ALL DATA IN THIS SCHEDULE IN THE POINTS SCHEDULE GENERATED FOR THE CONTROLS SUBMITTAL. ADDITIONAL ROWS, COLUMNS, AND DATA MUST BE ADDED TO THE CONTRACTOR'S POINT SCHEDULE AS REQUIRED BY SPECIFICATION SECTION 23 09 00, PARAGRAPH 3.3.10.
2. THE ABBREVIATIONS "DI" AND "DO" ARE USED INTERCHANGEABLY WITH "BI" AND "BO" THROUGHOUT THE CONSTRUCTION DOCUMENTS.
3. THE SYMBOL "< >" DENOTES FIELDS REQUIRING CONTRACTOR ENTERED DATA. THE SYMBOL "~" DENOTES NO ENTRY REQUIRED. THE SYMBOL "N/A" DENOTES NO VALID ENTRY AVAILABLE.
4. ALL SETTINGS AND RANGES MUST BE FULLY ADJUSTABLE. INITIAL VALUES PROVIDED IN THIS SCHEDULE MUST BE ADJUSTED BY THE CONTRACTOR AS REQUIRED FOR SYSTEM BALANCING AND TO PERMIT THE SYSTEMS TO PERFORM THEIR RESPECTIVE SEQUENCES OF OPERATION.
5. FOR EQUIPMENT IDENTIFIED AS "(TYPICAL)" PROVIDE ALL IDENTIFIED CONTROL POINTS FOR EACH OCCURRENCE OF THE EQUIPMENT, UNLESS SPECIFICALLY NOTED OTHERWISE. REFER TO THE SCHEDULE DRAWINGS (M6 SERIES) FOR QUANTITIES.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

US ARMY CORPS OF ENGINEERS

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WMF
SUBMITTED BY:

JACOBS / EWING COLE *A Joint Venture*

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-19-C0031
PROJECT NO: 20190494
SIZE: ANSI D

WEST POINT, NY
USMA BUILDING 605 CULLUM HALL RENOVATION

HVAC CONTROLS

SHEET ID

M816

RTA SUBMISSION 2/11/2021

UMCS EQUIPMENT SCHEDULE (NOTES 1,2)

REFERENCE	HARDWARE	HARDWARE PROVIDED BY	HARDWARE LOCATION (BLDG & RM)	NETWORK NAME	IP ADDRESS	MEDIA SIZE OR MONITOR SIZE	LNS NETWORK CONFIGURATION TOOL	NIAGARA FRAMEWORK ENGINEERING TOOL	REFERENCE SHEET NO.
B605 JACE	FPOC (GATEWAY)	CONTRACTOR	BLDG B605, RM CH-B216	< >	< >	~	~	~	< >
B605 LAPTOP	COMPUTER	CONTRACTOR	BLDG B605, NOTE 3	< >	< >	13" MINIMUM	REQUIRED	REQUIRED	< >

NOTES:
1. THE CONTRACTOR MUST COORDINATE WITH THE USACE COR TO COMPLETE THE UMCS EQUIPMENT SCHEDULE TEMPLATE, AS REQUIRED BY UFC 3-470-01 (JANUARY 12, 2018) PARAGRAPH 5-3. THE COMPLETED SCHEDULE MUST BE INCLUDED WITH THE CONTROLS SUBMITTALS FOR GOVERNMENT AND DOR REVIEW.
2. THE SYMBOL "< >" DENOTES FIELDS REQUIRING CONTRACTOR ENTERED DATA. THE SYMBOL "~" DENOTES NO ENTRY REQUIRED. THE SYMBOL "N/A" DENOTES NO VALID ENTRY AVAILABLE.
3. COORDINATE ROOM LOCATION FOR LAPTOP AS DETERMINED BY THE USACE COR.

DAMPER SCHEDULE (NOTE 1)

TAG	SYSTEM	TYPE	BLADE TYPE	MOUNTING (NOTE 2)	MAX. PD (IN.)	AIR FLOW (CFM)	SIZE (NOTE 2)
OUTSIDE AIR	OAU-1	2 POSITION	OPPOSED	UNIT	0.1	0 - 800	-
EXHAUST AIR	OAU-1	2 POSITION	OPPOSED	UNIT	0.1	0 - 500	-
OAU DISCHARGE AIR ISOLATION	OAU-1	2 POSITION	OPPOSED	DUCT	0.1	0 - 800	12x12
OAU INLET AIR ISOLATION	OAU-1	2 POSITION	OPPOSED	DUCT	0.1	0 - 500	12x12
DHU BYPASS	DHU-1	MODULATING	OPPOSED	DUCT	0.1	3500 - 6500	
DHU INLET ISOLATION	DHU-1	2 POSITION	OPPOSED	DUCT	0.1	0 - 3000	26x16
DHU DISCHARGE ISOLATION	DHU-1	2 POSITION	OPPOSED	DUCT	0.1	0 - 3000	26x16
REACTIVATION AIR ISOLATION	DHU-1	2 POSITION	OPPOSED	UNIT	0.1	0 - 300	-
EXHAUST AIR ISOLATION	DHU-1	2 POSITION	OPPOSED	UNIT	0.1	0 - 300	-
RETURN AIR INLET	AHU-2	2 POSITION	OPPOSED	DUCT	0.1	0 - 8000	55x14
SUPPLY AIR ISOLATION	AHU-2	2 POSITION	OPPOSED	DUCT	0.1	0 - 8000	57x15
MINIMUM OUTSIDE AIR	AHU-2	MODULATING	PARALLEL	UNIT	0.1	0 - 1600	-
ECONOMIZER	AHU-2	MODULATING	PARALLEL	UNIT	0.1	0 - 6400	-
RETURN AIR	AHU-2	MODULATING	PARALLEL	UNIT	0.1	0 - 8000	-
RELIEF AIR	AHU-2	MODULATING	OPPOSED	UNIT	0.1	0 - 8000	-
VESTIBULE RELIEF AIR	AHU-2	2 POSITION	OPPOSED	UNIT	0.1	0 - 8000	-
RF-3B RELIEF AIR	AHU-3	MODULATING	OPPOSED	DUCT	0.1	0 - 6500	30x30
RF-3A RELIEF AIR	AHU-3	MODULATING	OPPOSED	DUCT	0.1	0 - 6500	30x30
RF-3B RETURN	AHU-3	MODULATING	OPPOSED	DUCT	0.1	0 - 6500	30x30
RF-3A RETURN	AHU-3	MODULATING	OPPOSED	DUCT	0.1	0 - 6500	30x30
MINIMUM OUTSIDE AIR	AHU-3	MODULATING	PARALLEL	UNIT	0.1	0 - 4400	-
ECONOMIZER	AHU-3	MODULATING	PARALLEL	UNIT	0.1	0 - 8600	-
EXHAUST	EF-1	2 POSITION	OPPOSED	DUCT	0.1	0 - 2200	24x14

NOTES:
1. THE CONTRACTOR MUST INCLUDE ALL COLUMNS IN THIS SCHEDULE IN THE DAMPER SCHEDULE GENERATED FOR THE CONTROLS SUBMITTAL. ADDITIONAL COLUMNS AND DATA MUST BE ADDED TO THE CONTRACTOR'S DAMPER SCHEDULE AS REQUIRED BY SPECIFICATION SECTION 23 09 00, PARAGRAPH 3.3.5.
2. UNIT MOUNTED DAMPERS MUST BE PROVIDED BY THE EQUIPMENT MANUFACTURER, OR COORDINATED TO MATCH THE MANUFACTURER'S EQUIPMENT OPENINGS. DUCT SIZES INDICATED ARE APPROXIMATE. COORDINATE ALL DUCT MOUNTED DAMPER SIZES WITH REVIEWED SHEET METAL SHOP DRAWINGS PRIOR TO RELEASE FOR FABRICATION.

ALARM CONTACT SCHEDULE (NOTES 1,2,3)

PERSONS NAME	EMAIL ADDRESS	TEXT MESSAGE ADDRESS	DESCRIPTION
< >	< >	< >	< >
< >	< >	< >	< >
< >	< >	< >	< >
< >	< >	< >	< >
< >	< >	< >	< >
< >	< >	< >	< >
< >	< >	< >	< >
< >	< >	< >	< >

NOTES:
1. THE CONTRACTOR MUST COORDINATE WITH THE USACE COR TO COMPLETE THE ALARM CONTACT SCHEDULE TEMPLATE, AS REQUIRED BY UFC 3-470-01 (JANUARY 12, 2018) PARAGRAPH 5-2.2. THE COMPLETED SCHEDULE MUST BE INCLUDED WITH THE CONTROLS SUBMITTALS FOR GOVERNMENT AND DOR REVIEW.
2. THE SYMBOL "< >" DENOTES FIELDS REQUIRING CONTRACTOR ENTERED DATA. THE SYMBOL "~" DENOTES NO ENTRY REQUIRED. THE SYMBOL "N/A" DENOTES NO VALID ENTRY AVAILABLE.
3. ADD OR SUBTRACT ROWS AS DIRECTED BY THE USACE COR.

ALARM ROUTING GROUP SCHEDULE (NOTES 1,2,3)

ROUTING NAME	EMAIL TO	TEXT MESSAGE TO	POP-UP	PRINT TO PRINTERS
< >	< >	< >	< >	< >
< >	< >	< >	< >	< >
< >	< >	< >	< >	< >
< >	< >	< >	< >	< >
< >	< >	< >	< >	< >
< >	< >	< >	< >	< >
< >	< >	< >	< >	< >
< >	< >	< >	< >	< >

NOTES:
1. THE CONTRACTOR MUST COORDINATE WITH THE USACE COR TO COMPLETE THE ALARM ROUTING GROUP SCHEDULE TEMPLATE, AS REQUIRED BY UFC 3-470-01 (JANUARY 12, 2018) PARAGRAPH 5-2.3. THE COMPLETED SCHEDULE MUST BE INCLUDED WITH THE CONTROLS SUBMITTALS FOR GOVERNMENT AND DOR REVIEW.
2. THE SYMBOL "< >" DENOTES FIELDS REQUIRING CONTRACTOR ENTERED DATA. THE SYMBOL "~" DENOTES NO ENTRY REQUIRED. THE SYMBOL "N/A" DENOTES NO VALID ENTRY AVAILABLE.
3. ADD OR SUBTRACT ROWS AS DIRECTED BY THE USACE COR.

THERMOSTAT AND OCCUPANCY SENSOR SCHEDULE

SYSTEM SERVICE	TERMINAL UNIT IDENTIFIER	SPACES SERVED	STAT LOCATION	ZN-T	ZN-T-SP ADJUST	UNOCC OVERRIDE PUSHBUTTON	UNOCC OVERRIDE TIME	OCC SENSOR
AHU-1	VAV 1-1 VAV 1-3	B112A, B112B	B112B	X	X	~	~	~
	VAV 1-2	B108	B108	X	X	~	~	~
	VAV 1-4 VAV 1-5	B210A, B210B	B210B	X	X	~	~	~
	VAV 1-6	B204	B204	X	X	~	~	~
	VAV 1-7	B110	B110	X	X	~	~	~
AHU-2	VAV 2-1	B211, B213, B215	B213	X	X	X	2 HOURS	~
	VAV 2-10	B109	B109	X	X	X	2 HOURS	~
	VAV 2-11	B107	B107	X	X	X	2 HOURS	~
	VAV 2-12	B105	B105	X	X	X	2 HOURS	~
	VAV 2-13	B104A	B104A	X	X	X	2 HOURS	~
	VAV 2-14	B102A	B102A	X	X	X	2 HOURS	~
	VAV 2-15	B102B, B1C5, B104B	B102B	X	X	X	2 HOURS	~
	VAV 2-17	B1C1, B1C2	B1C2	X	X	X	2 HOURS	~
	VAV 2-2	B2C1	B2C1	X	X	X	2 HOURS	~
	VAV 2-4	B202, B2C2	B202	X	X	X	2 HOURS	~
	VAV 2-6	B200B	B200B	X	X	X	2 HOURS	~
	VAV 2-7	B1C3, B1C4	B1C3	X	X	X	2 HOURS	~
	VAV 2-8	B113	B113	X	X	X	2 HOURS	~
	VAV 2-9	B111	B111	X	X	X	2 HOURS	~
	VHV 2-5	B200A	B200A	X	X	X	2 HOURS	~
AHU-3	VAV 3-1	106A	106A	X	X	X	2 HOURS	~
	VAV 3-2	106A	106A	X	X	X	2 HOURS	~
	VAV 3-3	202, 200	202	X	X	X	2 HOURS	~
	VAV 3-4	202, 200	200	X	X	X	2 HOURS	~
~	CRU B1-1 CRU B1-2	B116	B116	X	~	~	~	~
~	CUH 1-1	103A, 103B	103A	X	~	~	~	~
~	CUH 1-2	103B	103B	X	~	~	~	~
~	CUH B1-1	B100	B100	X	~	~	~	~
~	CUH B1-2	B122	B122	X	~	~	~	~
~	CUH B1-3	B1S3	B1S3	X	~	~	~	~
~	CUH B2-1	B205	B205	X	~	~	~	~
~	CUH B2-2	B217	B217	X	~	~	~	~
~	FCU 1-1	100	100	X	~	~	~	~
~	FCU 1-2 FCU 1-3	1S1	1S1	X	~	~	~	~
~	FCU 1-4	102A	102A	X	~	~	~	~
~	FCU 1-5	102B	102B	X	~	~	~	~
~	FCU 1-6	104B, 106B	106B	X	~	~	~	~
~	FCU 1-7	101	103A, (NOTE 3)	X	~	~	~	~
~	FCU 2M-1	300	SOUTH ATTIC (NOTE 3)	X	~	~	~	~
~	FCU 3-1	301	301	X	~	~	~	~
~	FCU 3-2	302	302	X	~	~	~	~
~	FCU B1-1	B120	B120	X	~	~	~	~
~	FCU B1-2 FCU B1-3	B118	B118	X	~	~	~	~
~	FCU B2-1	B219	B219	X	~	~	~	~
~	FCU B3-1	NORTH TUNNELS	NORTH TUNNELS	X	~	~	~	~
~	FCU B3-2	SOUTH TUNNELS	SOUTH TUNNELS	X	~	~	~	~
~	RHP B1-1	B101	B101	X	~	~	~	~
~	RHP B1-2	B103	B103	X	~	~	~	~
~	RHP B2-1	B201	B201	X	~	~	~	~
~	RHP B2-2	B203	B203	X	~	~	~	~
~	RHP B2-3	B207	B207	X	~	~	~	~
~	UH B1-1	AHU-2 VESTIBULE	AHU-2 VESTIBULE	X	~	~	~	~
~	UH B2-1	B216	B216	X	~	~	~	~

NOTES:
1. THE CONTRACTOR MUST INCLUDE ALL COLUMNS IN THIS SCHEDULE IN THE THERMOSTAT AND OCCUPANCY SCHEDULE GENERATED FOR THE CONTROLS SUBMITTAL. ADDITIONAL COLUMNS AND DATA MUST BE ADDED TO THE CONTRACTOR'S THERMOSTAT AND OCCUPANCY SCHEDULE AS REQUIRED BY SPECIFICATION SECTION 23 09 00, PARAGRAPH 3.3.3.
2. THE SYMBOL "< >" DENOTES FIELDS REQUIRING CONTRACTOR ENTERED DATA. THE SYMBOL "~" DENOTES NO ENTRY REQUIRED. THE SYMBOL "N/A" DENOTES NO VALID ENTRY AVAILABLE.
3. DUCT MOUNTED THERMOSTAT.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: 2/11/2021
SOLICITATION NO.: W912DS-19-R-0014
CONTRACT NO.: W912DS-15-C0031
PROJECT NO: 20190494
SIZE: ANSI D

DESIGNED BY: WMF
DRAWN BY: SCB
CHECKED BY: WMF
SUBMITTED BY: BK

US ARMY CORPS OF ENGINEERS

JACOBS / EWING COLE *A Joint Venture*

WEST POINT, NY
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HVAC CONTROLS

SHEET ID

M817

RTA SUBMISSION 2/11/2021