GENERAL SYMBOLS

- (T) TEMPERATURE SENSOR
- (T)i TEMPERATURE SENSOR WITH INSULATED SUB-BASE
- (H) HUMIDITY SENSOR
- (O) TIMED OVERRIDE
- (R) REFRIGERANT SENSOR
- (P) PRESSURE SENSOR
- (S)## SENSOR: CO = CARBON MONOXIDE; CO2 = CARBON DIOXIDE; NG = NATURAL GAS; R = REFRIGERANT
- AMS — AIRFLOW MEASURING STATION
- S-1 / 100 — TYPE OF SERVICE: S = SUPPLY, R = RETURN, E = EXHAUST, T = TRANSFER; SCHEDULED DEVICE NO; AIR QUANTITY IN CFM
- # — KEYED NOTE
- INTERFACE, EXISTING TO NEW
- SIM / 1 / M101 — SECTION NUMBER; SHEET WHERE LOCATED
- AHU / 1 — EQUIPMENT DESIGNATION; UNIT NUMBER
- FSD / 1 — DAMPER TYPE DESIGNATION; UNIT NUMBER

DUCT SYSTEM SYMBOLS

- 15x15 / DUCT SIZE — EXISTING TO REMAIN
- 15x15 / DUCT SIZE — NEW WORK
- 15x15 — DUCT SIZE, FIRST FIGURE IS SIDE SHOWN (ACTUAL SIZE INDICATED)
- 15ø — ROUND DUCT SIZE, (ACTUAL SIZE INDICATED)
- 15 x 10ø — SPIRAL FLAT-OVAL DUCT SIZE, FIRST FIGURE IS SIDE SHOWN (ACTUAL SIZE INDICATED)
- AP — ACCESS PANEL, TOP OR SIDE
- FLEXIBLE DUCT CONNECTION
- R — CHANGE OF ELEVATION - RISE (R) OR DROP (D)
- TURNING VANES
- EXISTING EQUIPMENT OR DUCTWORK SHOWN HATCHED AND BOLD INDICATES EXISTING ITEMS DEMOLISHED TO BE REMOVED
- MOTORIZED DAMPER, MODULATING
- MOTORIZED DAMPER, TWO POSITION
- BDD — GRAVITY BACKDRAFT DAMPER
- VD — MANUAL VOLUME DAMPER
- FD — FIRE DAMPER
- SMOKE DAMPER
- F/S DPR — FIRE/SMOKE DAMPER
- FLEXIBLE DUCT
- SUPPLY AND OUTSIDE AIR SECTION UP
- SUPPLY AND OUTSIDE AIR SECTION DOWN
- RETURN AIR SECTION UP
- RETURN AIR SECTION DOWN
- EXHAUST AIR SECTION UP
- EXHAUST AIR SECTION DOWN
- FLOW ARROW DOWNSTREAM OF FAN
- FLOW ARROW UPSTREAM OF FAN
- SUPPLY DIFFUSER AS SCHEDULED. ARROWS INDICATE DIRECTION OF AIR DISCHARGE. IF NO ARROWS ARE SHOWN ON PLAN, DEFAULT IS A 4-WAY THROW.
- RETURN OR EXHAUST GRILLE OR REGISTER AS SCHEDULED

PIPE LINE SYMBOLS

- SHUT OFF VALVE (SEE SPECIFICATION FOR TYPE)
- GATE VALVE
- BALL VALVE
- BUTTERFLY VALVE
- VALVE IN RISE
- 3 — MULTI-PURPOSE PUMP DISCHARGE VALVE
- CHECK VALVE
- GLOBE VALVE
- PRESSURE REGULATING VALVE
- CALIBRATED - ORIFACE BALANCING VALVE
- PLUG VALVE
- Y - PATTERN STRAINER
- Y - PATTERN STRAINER W/ BLOWDOWN VALVE
- UNION
- M — AIR VENT (M - MANUAL, A - AUTOMATIC)
- RELIEF VALVE
- PRESSURE AND TEMPERATURE TEST PORT
- THERMOMETER
- PRESSURE GAGE WITH COCK
- FLEX PIPE COUPLING
- EXPANSION JOINT
- PITCH DOWN IN DIRECTION OF ARROW
- FLOW ARROW
- M — WATER METER
- TWO-WAY CONTROL VALVE
- THREE-WAY CONTROL VALVE
- M — MOTORIZED BUTTERFLY VALVE

MEDIUM DETAIL	FINE DETAIL	
		ELBOW DOWN
		ELBOW UP
		TEE DOWN
		TEE UP
		CAP
		CONCENTRIC REDUCER/INCREASER
		ECCENTRIC REDUCER/INCREASER
		FLANGED

PIPE SYSTEM ABBREVIATIONS

CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
CW	COLD WATER, DOMESTIC
D	DRAIN
G	NATURAL GAS
HW	DOMESTIC HOT WATER
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
MU	MAKE-UP WATER (NON-POTABLE)
RHG	REFRIGERANT HOT GAS
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
V	VENT

EQUIPMENT DESIGNATION

ACC	AIR COOLED CONDENSER
ACU	AIR CONDITIONING UNIT
AF	AIR FILTER
AHU	AIR HANDLING UNIT
AS	AIR SEPARATOR
CAV	CONSTANT AIR VOLUME
CC	COOLING COIL
CH	CHILLER
CU	CONDENSING UNIT
CUH	CABINET UNIT HEATER
CWP	CHILLED WATER PUMP
EF	EXHAUST FAN
ERU	ENERGY RECOVERY UNIT
ET	EXPANSION TANK
F	FAN
FD	FIRE DAMPER
FSD	COMBINATION FIRE/SMOKE DAMPER
GV	GRAVITY VENTILATOR
HC	HEATING COIL
MAU	MAKE-UP AIR UNIT
MD	MOTORIZED DAMPER
P	PUMP
PAC	PACKAGED AIR CONDITIONING UNIT
PG	PIPE GUIDE
PHWP	PRIMARY HEATING WATER PUMP
PHX	PLATE HEAT EXCHANGER
PRV	PRESSURE REGULATING VALVE
RF	RETURN FAN
RHC	TERMINAL REHEAT COIL
RP	RADIANT PANEL
RTU	ROOFTOP UNIT
SAV	SUPPLY AIR VALVE
SCWP	SECONDARY CHILLED WATER PUMP
SD	SMOKE DAMPER
SF	SUPPLY FAN
SHWP	SECONDARY HEATING WATER PUMP
ST	STEAM TRAP
T	TANK
UH	UNIT HEATER
VAV	VARIABLE AIR VOLUME BOX
WCC	WATER COOLED CONDENSER

GENERAL ABBREVIATIONS

A	AIR OR AMP (PER CONTEXT)
A/E	ARCHITECT / ENGINEER
AAV	AUTOMATIC AIR VENT
ACC	ACCESSORIES
ACCH	AIR COOLED CHILLER
ACCU	AIR COOLED CONDENSING UNIT
ACD	AUTOMATIC CONTROL DAMPER, MODULATING
ACD-TP	AUTOMATIC CONTROL DAMPER, TWO POSITION
ACU	AIR CONDITIONING UNIT
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AFMD	AIR FLOW MEASURING DEVICE
AFS	AIR FLOW SWITCH
AHRI	AIR CONDITIONING, HEATING, AND REFRIGERATION INSTITUTE
AHU	AIR-HANDLING UNIT
AI	ANALOG SIGNAL INPUT
AMB	AMBIENT
AMP	AMPERAGE
AO	ANALOG SIGNAL OUTPUT
AP	ACCESS PANEL
APD	AIR PRESSURE DROP
ARCH	ARCHITECTURE/ARCHITECT
ARI	AIR CONDITIONING AND REFRIGERATION INSTITUTE
AUX	AUXILIARY
AV	AUTOMATIC VENT
AVG	AVERAGE
BDD	BACK DRAFT DAMPER
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BI	BINARY SIGNAL INPUT
BO	BINARY SIGNAL OUTPUT
BOB	BOTTOM OF BEAM
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
CAP	CAPACITY
CAV	CONSTANT AIR VOLUME
CC	COOLING COIL
CCD	COOLING COIL CONDENSATE DRAIN
CD-1	CONSTRUCTION DOCUMENTS (SUBMISSION 1)
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CI	CAST IRON
CM	CARBON MONOXIDE
CO2	CARBON DIOXIDE
COND	CONDENSATE
CONN	CONNECTION
COP	COEFFICIENT OF PERFORMANCE
CORR	CORREDOR
CU	CONDENSING UNIT
CV	CONSTANT VOLUME
CW	COLD WATER (POTABLE)
D	DEPTH OR DAMPER - AUTOMATIC(PER CONTEXT)
DB	DECIBELS
Db	DRY-BULB TEMPERATURE
DBA	A-WEIGHTED DECIBELS
DD-1	DESIGN DEVELOPMENT (SUBMISSION 1)
DD-2	DESIGN DEVELOPMENT (SUBMISSION 2)
DDC	DIRECT DIGITAL CONTROLS
DEFL	DEFLECTION
DEG	DEGREES
DEG F	DEGREES FAHRENHEIT
DIA	DIAMETER
DIM	DIMENSION
DISCH	DISCHARGE
DIV	DIVISION
DN	DOWN
DP	DEW POINT TEMPERATURE
DPS	DIFFERENTIAL PRESSURE SWITCH OR SENSOR (PER CONTEXT)
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
DTL	DETAIL
DWG(S)	DRAWING(S)
DX	DIRECT EXPANSION
EA	EXHAUST AIR OR EACH (PER CONTEXT)
EAT	ENTERING AIR TEMPERATURE
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EFF	EFFICIENCY
ELEC	ELECTRIC
ELEV	ELEVATION
ENT	ENTERING
EQ	EQUAL
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK

GENERAL ABBREVIATIONS, CONTINUED

EWB	ENTERING AIR WET BULB TEMPERATURE
EWT	ENTERING WATER TEMPERATURE
EX	EXISTING
EXH	EXHAUST
F	FARENHEIT
F/SDPR	COMBINATION FIRE SMOKE DAMPER
FA	FREE AREA
FC	FLEXIBLE CONNECTION
FD	FIRE DAMPER
FF	FINAL FILTER
FIN	FINISHED
FLR	FLOOR
FPI	FINS PER INCH
FPM	FEET PER MINUTE
FS	FLOW SWITCH
FSTAT	FREEZESTAT
FT	FEET
FT-HD	HEAD IN FEET
GA	GAUGE
GAL	GALLONS
GC	GENERAL CONTRACTOR
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
H	HEIGHT
HAC	HOUSEKEEPING AID CLOSET
HC	HEATING COIL
HD	HEAD
HOA	HAND/OFF/AUTOMATIC
HP	HORSEPOWER
HR	HOUR
HVAC	HEATING, VENTILATING & AIR CONDITIONING
HW	HOT WATER
HWC	HOT WATER COIL
HWP	HEATING HOT WATER PUMP
HZ	HERTZ
I/O	INPUT/OUTPUT
IAQ	INDOOR AIR QUALITY
ICU	INTENSIVE CARE UNIT
IN	INCH/INCHES
IN HG	INCHES OF MERCURY
IN WC	INCH WATER COLUMN
IPLV	INTEGRATED PART LOAD VALUE
kW	KILOWATT
L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LB(S)	POUNDS
LF	LINEAR FOOT (FEET)
LH	LATENT HEAT
LRA	LOCKED ROTOR AMPS
LSD	LINEAR SLOT DIFFUSER
LTCP	LOCAL TEMPERATURE CONTROL PANEL
LVL	LEVEL
LWT	LEAVING WATER TEMPERATURE
MA	MIXED AIR
MAN	MANUAL
MANU	MANUFACTURER
MAT	MIXED AIR TEMPERATURE
MAV	MANUAL AIR VENT
MAX	MAXIMUM
MBH	ONE THOUSAND BRITISH THERMAL UNITS PER HOUR
MCA	MINIMUM BRANCH CIRCUIT AMPACITY
MECH	MECHANICAL
MERV	MINIMUM EFFICIENCY REPORTING VALUE (ASHRAE 52.2)
MFR	MANUFACTURER
MIN	MINIMUM OR MINUTE (PER CONTEXT)
MTD	MOUNTED
MV	MANUAL VENT
MVD	MANUAL VOLUME DAMPER
MZ	MULTI-ZONE
NA	NOT APPLICABLE
NC	NORMALLY CLOSED OR NOISE CRITERIA (PER CONTEXT)
NG	NATURAL GAS
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN OR NUMBER (PER CONTEXT)
NOM	NOMINAL
NPLV	NON-STANDARD PART LOAD VALUE
NPSH	NET POSITIVE SUCTION HEAD
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER
P	PUMP
PBD	PARALLEL BLADE DAMPER
PD	PRESSURE DROP

GENERAL ABBREVIATIONS, CONTINUED

PG	PRESSURE GAGE
PH	PHASE
PHC	PREHEAT COIL
PLBG	PLUMBING
PPH	POUNDS PER HOUR
PPM	PARTS PER MILLION
PRV	PRESSURE REGULATING VALVE
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAUGE
QTY	QUANTITY
RA	RETURN AIR
RAD	RADIATED
RAT	RETURN AIR TEMPERATURE
RDS	ROOM DATA SHEETS
REFR	REFRIGERANT
REQ	REQUIRED
RF	RETURN FAN
RG	RETURN GRILLE
RH	RELATIVE HUMIDITY
RHC	REHEAT COIL
RHG	REFRIGERANT HOT GAS
RL	REFRIGERANT LIQUID LINE
RLA	RUNNING LOAD AMPS
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION
RV	RELIEF VALVE
SA	SUPPLY AIR
SAD	SOUND ATTENUATING DEVICE
SAN	SANITARY
SAT	SUPPLY AIR TEMPERATURE
SD	SMOKE DETECTOR SUPPLY AIR DIFFUSER (PER CONTEXT)
SD-1	SCHEMATIC DESIGN (SUBMISSION 1)
SD-2	SCHEMATIC DESIGN (SUBMISSION 2)
SDPR	SMOKE DAMPER
SECN	SECTION
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SEN	SENSIBLE HEAT
SF	SUPPLY FAN
SG	SUPPLY AIR GRILLE
SH	SENSIBLE HEAT
SHT	SHEET
SND	SOUND
SOL	SOLENOID
SP	STATIC PRESSURE
SQ	SQUARE
SQ FT	SQUARE FOOT (FEET)
T & PCV	TEMPERATURE AND PRESSURE CONTROL VALVE
T&P	TEMPERATURE AND PRESSURE
TAB	TESTING, ADJUSTING, BALANCE
TC	TEMPERATURE CONTROL
TD	TEMPERATURE DIFFERENTIAL
TDH	TOTAL DYNAMIC HEAD
TEMP	TEMPERATURE
TG	TRANSFER GRILLE
TOT	TOTAL
TSP	TOTAL STATIC PRESSURE
TSTAT	THERMOSTAT
TYP	TYPICAL
UC	UNDER CUT
UG	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
V	VOLTS
VAC	VACUUM
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER (MANUAL OPPOSED BLADE)
VEL	VELOCITY
VERT	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE
VHA	VETERANS HEALTH ADMINISTRATION
VOL	VOLUME
VSD	VARIABLE SPEED DRIVE
W	WATT OR WIDTH (PER CONTEXT)
W/	WITH
W/O	WITHOUT
WB	WET BULB (TEMPERATURE)
WC	WATER COLUMN
WG	WATER GAUGE
WPD	WATER SIDE PRESSURE DROP
WT	WEIGHT
YR	YEAR

GENERAL NOTES:

1. ALL PIPING AND DUCTS IN FINISHED ROOMS OR SPACES SHALL BE CONCEALED IN A FURRED CHASE OR ABOVE THE HARD SUSPENDED CEILING.
2. THE FIRST FIGURE OF DUCT SIZE INDICATES DIMENSION OF FACE SHOWN OR INDICATED. DUCT SIZES ARE NET INSIDE DIMENSIONS.
3. ACCESS PANELS IN HARD SUSPENDED CEILINGS ARE REQUIRED FOR ALL VALVES, TRAPS, DAMPERS, CLEANOUTS, CONTROLS, ETC. ACCESS PANELS SHALL BE FURNISHED AND INSTALLED UNDER THE ARCHITECTURAL SPECIFICATIONS.
4. TOTAL STATIC PRESSURE NOTED IN THE SCHEDULES INCLUDES DUCT SYSTEM, TERMINAL UNITS, FILTERS, COILS, ETC.
5. FOR TYPICAL WATER PIPING CONNECTIONS TO EQUIPMENT, SEE STANDARD EQUIPMENT DETAILS.
6. DIFFUSER, REGISTER AND GRILLE SIZES SHOWN ON FLOOR PLANS ARE NECK SIZES.
7. WATER PIPE CONNECTIONS TO AIR HEATING AND COOLING COILS SHALL BE MADE TO PROVIDE COUNTER FLOW BETWEEN WATER AND AIR.
8. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATIONS OF CEILING DIFFUSERS, REGISTERS, AND GRILLES.
9. THESE PLANS ARE DIAGRAMMATIC IN NATURE. THE CONTRACTOR SHALL BE PREPARED TO MAKE SOME ALTERATIONS TO THE EXACT LOCATION OF DUCTWORK, PIPING AND EQUIPMENT FROM THE LOCATION INDICATED ON THESE DRAWINGS TO FIT ACTUAL JOB CONDITIONS. THESE AND OTHER FEILD CHANGES SHALL BE DOCUMENTED ON RED-LINE DRAWINGS ON SITE SO THAT AS-BUILT DRAWINGS CAN BE PROPERLY UPDATED.
10. ALL ELBOWS, FITTINGS, ETC., IN PIPING AND DUCTWORK REQUIRED TO CLEAR ALL JOB OBSTRUCTIONS ARE NOT NECESSARILY INDICATED. ALL NECESSARY TRANSITIONS, FITTINGS AND OFFSETS ARE REQUIRED WHETHER SHOWN OR NOT.
11. BECAUSE OF THE LIMITED SPACE AVAILABLE TO INSTALL ALL OF THE MECHANICAL WORK, COORDINATION BETWEEN THE VARIOUS TRADES IS OF THE UTMOST IMPORTANCE.
12. THE CONTRACTOR SHALL COORDINATE STAGING AND SCHEDULING WITH THE OWNER'S REPRESENTATIVE.
13. EXISTING CONDITIONS ARE BASED ON INFORMATION OBTAINED FROM PREVIOUS CONSTRUCTION DOCUMENTS AND INFORMAL FIELD OBSERVATION AND SHALL NOT BE CONSTITUTED AS "AS BUILT." THE CONTRACTOR SHALL FIELD-VERIFY EXISTING CONDITIONS BEFORE THE ONSET OF CONSTRUCTION.
14. WHERE CONTRACTOR IS REQUIRED TO CONCEAL NEW WORK, REMOVE OR MODIFY EXISTING CONSTRUCTION OR EQUIPMENT, OR ATTACH TO EXISTING CONSTRUCTION. THE CONTRACTOR SHALL REPAIR OR REPLACE EXISTING CONSTRUCTION AND MATERIALS TO MATCH CONDITIONS AT THE ONSET OF CONSTRUCTION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REMOVE AND REPLACE EXISTING CEILINGS AND WALLS REQUIRED FOR INSTALLATION OF MECHANICAL SYSTEMS.
15. THE OWNER SHALL MAINTAIN ALL SALVAGE RIGHTS OF EQUIPMENT AND MATERIALS REMOVED. ALL EQUIPMENT AND MATERIALS NOT CLAIMED BY THE OWNER SHALL BE REMOVED FROM THE PREMISES BY THIS CONTRACTOR.
16. ALL WORK SHALL BE INSTALLED PER THE REFERENCE DETAILS, REGARDLESS OF WHETHER OR NOT THE DETAILS ARE CALLED OUT ON THE PLANS. SEE SHEET(S) MH301 AND MP311 .
17. PROVIDE VENTS AT ALL HYDRONIC PIPING HIGH POINTS, AND DRAINS AT ALL PIPING LOW POINTS, REGARDLESS OF WHETHER SHOWN OR NOT.
18. THE CONTRACTOR SHALL VERIFY ALL REFRIGERANT PIPE SIZING AND ROUTINGS WITH THE EQUIPMENT MANUFACTURER. THE CONTRACTOR SHALL ALSO PROVIDE ALL REQUIRED REFRIGERANT ACCESSORIES AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER FOR COMPLETE AND FULLY FUNCTIONAL SYSTEMS.
19. DO NOT SCALE THE LOCATION OF HVAC CEILING ELEMENTS, SUCH AS AIR INLETS AND OUTLETS, FROM THE M-SERIES DRAWINGS. SEE ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT HVAC CEILING ELEMENT LOCATIONS. REFLECTED CEILING PLANS GOVERN THE LOCATION OF DIFFUSERS, REGISTERS, AND GRILLES. M-SERIES DRAWINGS GOVERN TYPE, STYLE, AND SIZE OF DIFFUSERS, REGISTERS, AND GRILLES.
20. ALL DUCTWORK SHALL COMPLY WITH "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE," 3RD EDITION, SMACNA 2005, EXCEPT WHERE MORE RESTRICTIVE REQUIREMENTS ARE SPECIFIED. ANY PLAN REFERENCES TO "SMACNA FIGURE ---" REFERS TO THIS STANDARD. SEE SPECIFICATIONS FOR SCHEDULE OF DUCT PRESSURE CLASS AND SEAL CLASS.
21. IN GENERAL, THE FINAL FLEX DUCT RUNOUT TO EACH DIFFUSER, REGISTER, OR GRILLE IS NOT SIZED ON PLANS. FLEX DUCT RUNOUT SIZE SHALL MATCH AIR OUTLET NECK SIZE, UNO.
22. IT IS THE INTENT OF THESE DRAWINGS THAT A MANUAL BALANCING DAMPER BE PROVIDED AT EVERY INDIVIDUAL DUCTED CONNECTION TO AN AIR DEVICE, UNLESS A BALANCING DAMPER IS SCHEDULED TO BE FURNISHED WITH AIR DEVICE. VAV BOXES WITH SINGLE DIFFUSERS ARE NOT REQUIRED TO HAVE A BALANCING DAMPER.
23. THE CONTRACTOR SHALL CONNECT THE NEW HVAC SYSTEM TO THE OWNER'S EXISTING BUILDING CONTROL SYSTEM. REFER TO THE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
24. CONTRACTOR SHALL HAVE THE DOCUMENTS REVIEWED COMPLETELY BY A CERTIFIED BALANCING CONTRACTOR FOR THE INCLUSION OF THE NECESSARY ADDITIONAL AIR AND HYDRONIC SYSTEM BALANCING DEVICES NOT SHOWN IN THESE DOCUMENTS FOR COMPLETE HVAC SYSTEM BALANCING. REFER TO SPECIFICATION SECTION 230593 FOR CONSTRUCTION DOCUMENT EXAMINATION REPORT.
25. IT SHOULD BE NOTED THAT SOME SYSTEMS (I.E. GENERAL AND ISOLATION EXHAUST) ARE REQUIRED TO BE BALANCED MORE THAN ONCE TO ASSURE DESIGN AIRFLOWS ARE PROVIDED.
26. REFER TO SPECIFICATIONS FOR TESTING REQUIRED FOR EACH SYSTEM.

100% OWNER REVIEW SET
FULLY SPRINKLERED

REVISIONS

Revision #	Description	Date

SUBMISSIONS

BID DOCUMENTS	4-27-2016
100% CONSTRUCTION DOCUMENTS	3-25-2016
95% CONSTRUCTION DOCUMENTS	12-17-2015
65% CONSTRUCTION DOCUMENTS	8-14-2015
35% CONSTRUCTION DOCUMENTS	5-15-2015

VA

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Drawing Title: SYMBOLS AND ABBREVIATIONS	Project Title: RENOVATE FOURTH FLOOR		Project Number: #610A4-08-104
			Building Number: 01
Approved: Project Director	Location: 2121 LAKE AVE., FORT WAYNE, IN 46805		Drawing Number: M-001
	Date: 2016.04.25	Checked: JDW / Drawn: TRT	Dwg. 65 of 138

Office of Construction and Facilities Management

VA Department of Veterans Affairs

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VA FORM 08-6231

GENERAL NOTES

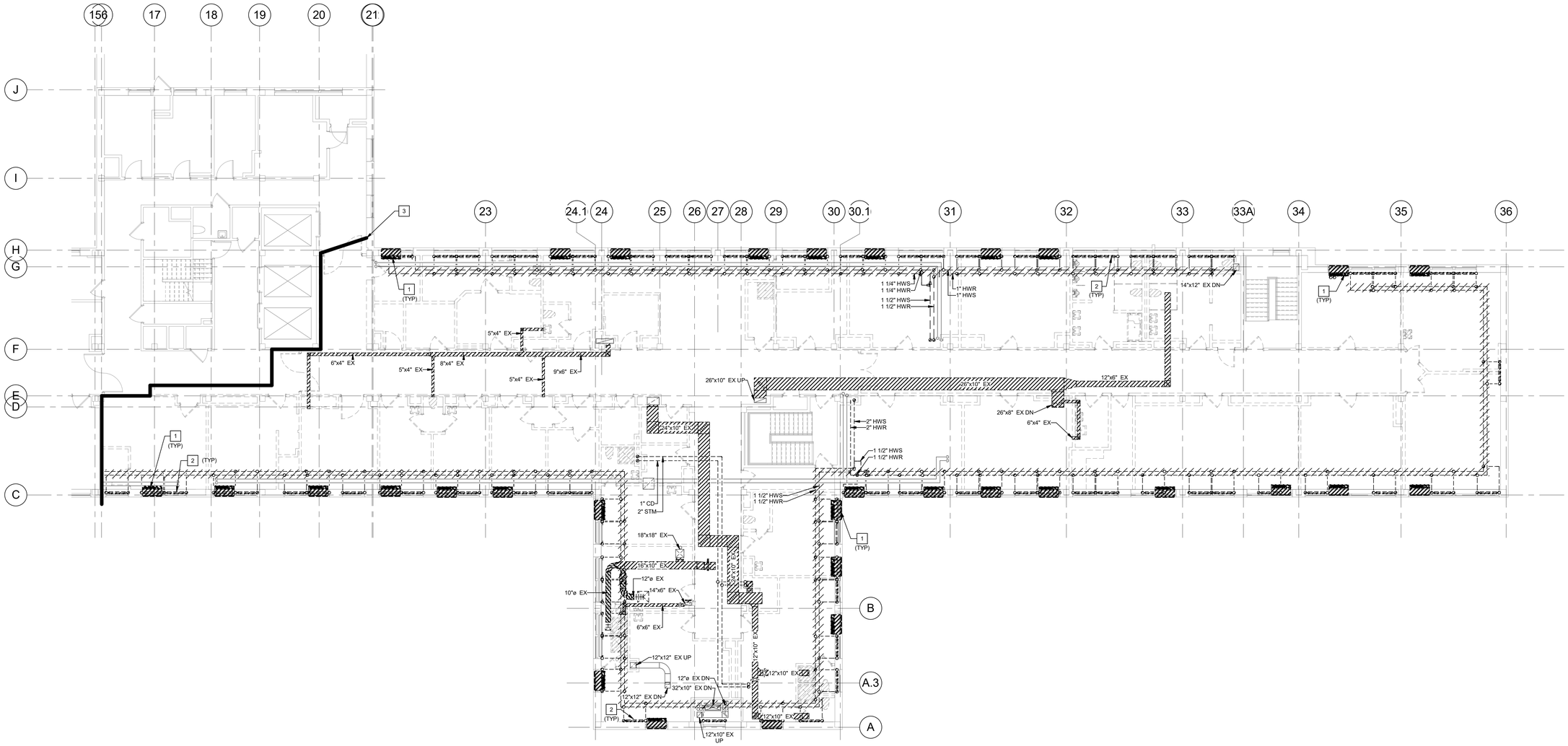
1. SEE SHEET M-001 FOR GENERAL NOTES.

KEYED NOTES

1 DISABLE EXISTING PTAC UNIT AND DEMOLISH UNIT. COORDINATE WITH HOSPITAL REPRESENTATIVES TO SALVAGE UNITS WHERE REQUESTED. PATCH EXTERIOR WALL TO MATCH EXISTING SURROUNDING CONSTRUCTION. SEE ARCHITECTURAL.

2 DISABLE EXISTING HOT WATER RADIATOR COIL AND DRAIN COIL. DEMOLISH COIL AND ALL ASSOCIATED PIPING, VALVES, SPECIALTIES AND CONTROLS.

3 LINE INDICATES SEPARATION BETWEEN PHASE 2 AND PHASE 3 WORK.



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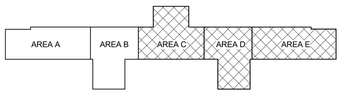
1 MD-101 **FOURTH FLOOR DEMOLITION - PHASE 2**

1/8" = 1'-0"



100% OWNER REVIEW SET
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REVISIONS

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Drawing Title: MECHANICAL DEMOLITION PLAN - PHASE 2

Approved: Project Director

Project Title: RENOVATE FOURTH FLOOR

Project Number: #610A4-08-104

Building Number: 01

Location: 2121 LAKE AVE., FORT WAYNE, IN 46805

Drawing Number: MD-101

Date: 2016.04.25 | Checked: JDW | Drawn: Author

Dwg. 66 of 138

Office of Construction and Facilities Management

VA Department of Veterans Affairs

VA FORM 08-6231

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KEYED NOTES

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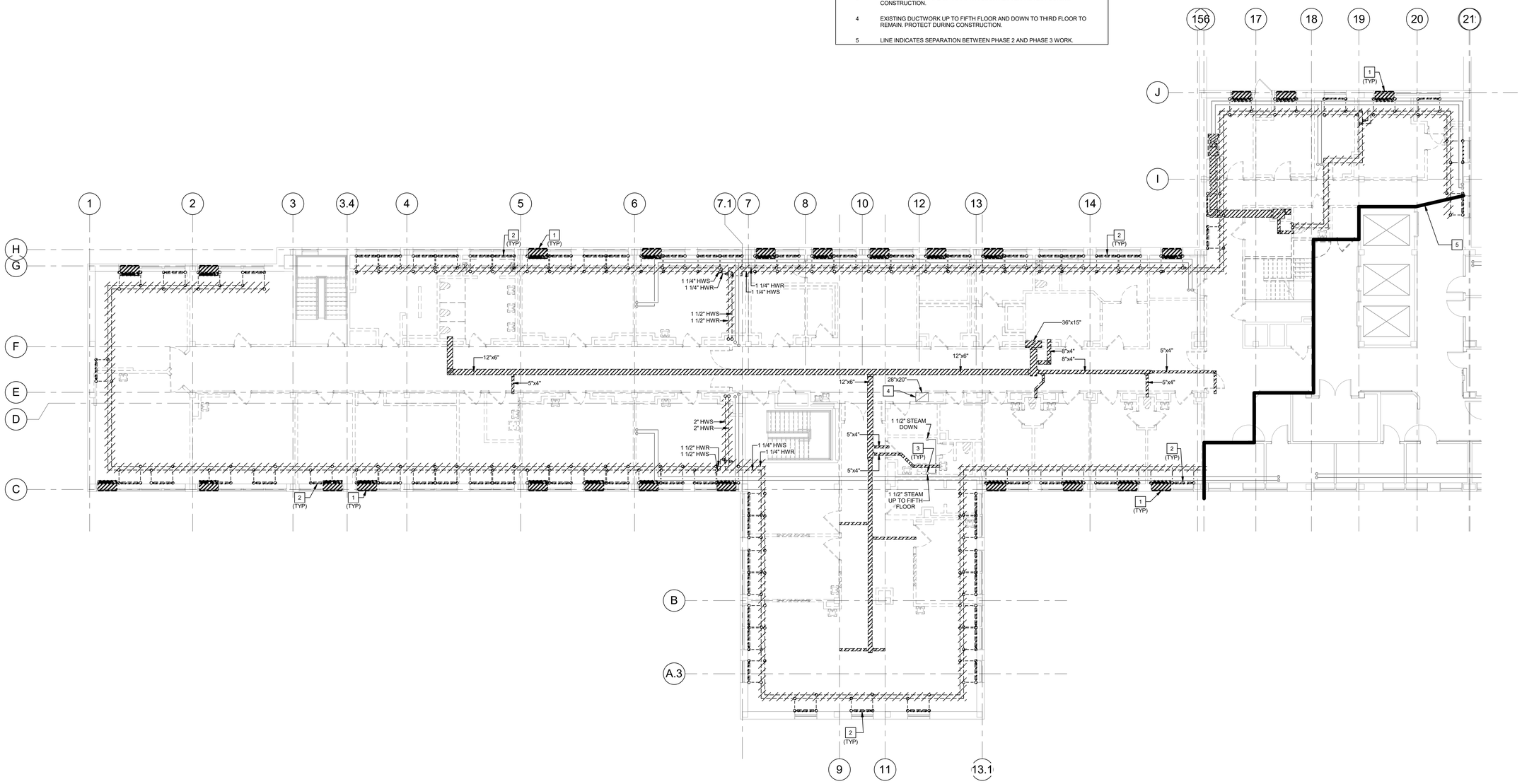
2. DISABLE EXISTING HOT WATER RADIATOR COIL AND DRAIN COIL. DEMOLISH COIL AND ALL ASSOCIATED PIPING, VALVES, SPECIALTIES AND CONTROLS.
3. EXISTING STEAM PIPE UP TO FIFTH FLOOR ABOVE. PROTECT DURING CONSTRUCTION.
4. EXISTING DUCTWORK UP TO FIFTH FLOOR AND DOWN TO THIRD FLOOR TO REMAIN. PROTECT DURING CONSTRUCTION.
5. LINE INDICATES SEPARATION BETWEEN PHASE 2 AND PHASE 3 WORK.

GENERAL NOTES

1. SEE SHEET M-001 FOR GENERAL NOTES.



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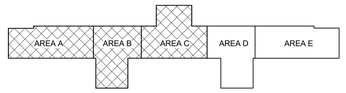
1 MD-102 **FOURTH FLOOR DEMOLITION - PHASE 3**

1/8" = 1'-0"



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REVISIONS

Revision #	Description	Date

SUBMISSIONS

BID DOCUMENTS	4-27-2016
100% CONSTRUCTION DOCUMENTS	3-25-2016
95% CONSTRUCTION DOCUMENTS	12-17-2015
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35% CONSTRUCTION DOCUMENTS	5-15-2015

VA NORTHERN INDIANA HEALTH CARE SYSTEM, FORT WAYNE
2121 LAKE AVE., FORT WAYNE, IN 46805

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RTM Consultants
6640 Parkdale Place, Suite J
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JEFFREY R. CRAWFORD REGISTERED PE STATE OF INDIANA PROFESSIONAL ENGINEER 4/25/16

Drawing Title: MECHANCIAL DEMOLITION PLAN - PHASE 3

Approved: Project Director

Project Title: RENOVATE FOURTH FLOOR

Location: 2121 LAKE AVE., FORT WAYNE, IN 46805

Date: 2016.04.25 | Checked: JDW | Drawn: Author

Project Number: #610A4-08-104

Building Number: 01

Drawing Number: MD-102

Dwg. 67 of 138

Office of Construction and Facilities Management

VA Department of Veterans Affairs

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GENERAL NOTES

1. SEE SHEET M-001 FOR GENERAL NOTES.

KEYED NOTES

1 CAP DUCTWORK AT PHASE BARRIER FOR CONNECTION DURING PHASE 3 WORK.

2 LINE INDICATES SEPARATION BETWEEN PHASE 2 AND PHASE 3 WORK.

3 EXHAUST AIR UP TO ENERGY RECOVERY UNIT ON ROOF. SEE SHEET MH200 FOR CONTINUATION.

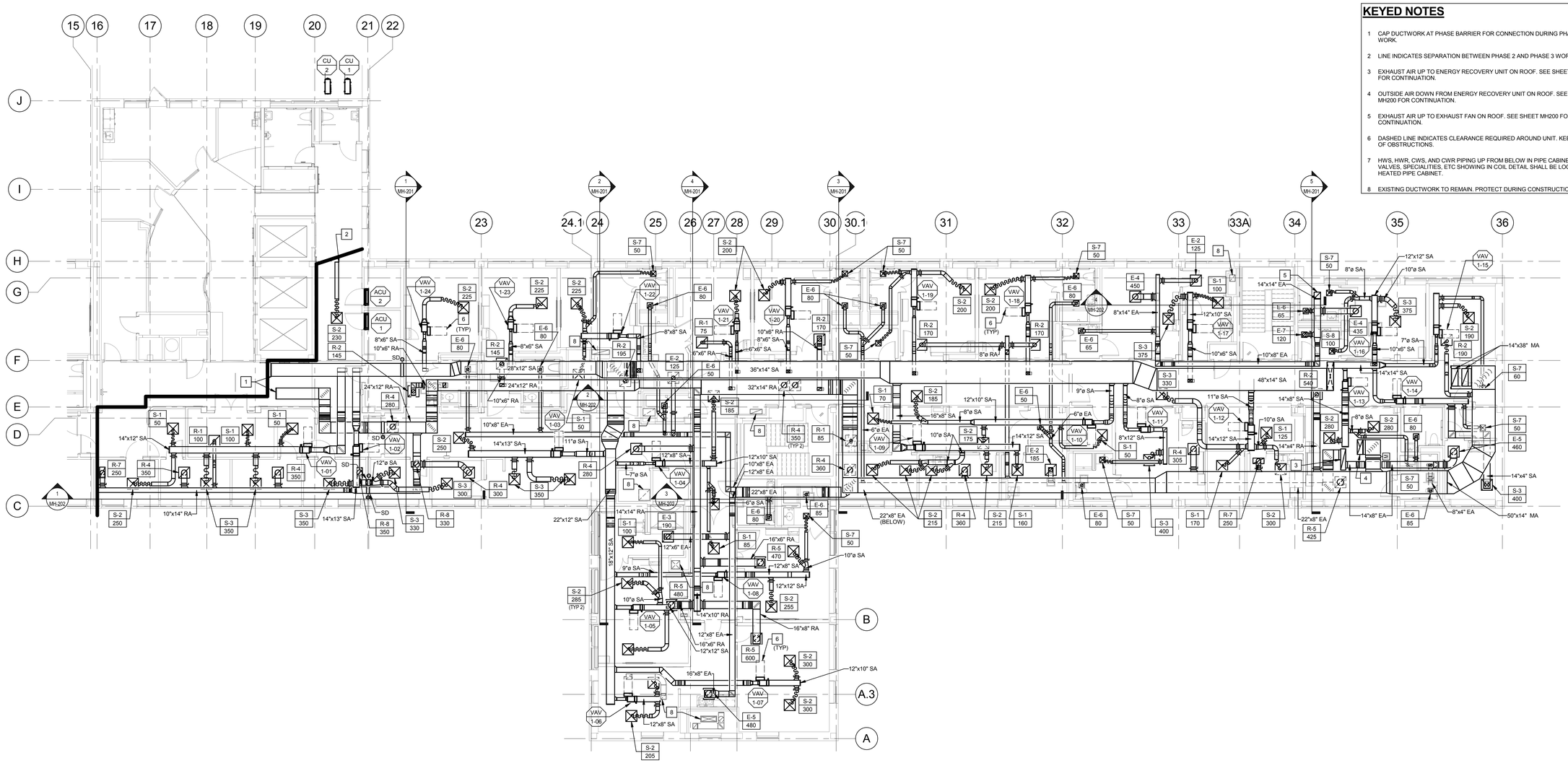
4 OUTSIDE AIR DOWN FROM ENERGY RECOVERY UNIT ON ROOF. SEE SHEET MH200 FOR CONTINUATION.

5 EXHAUST AIR UP TO EXHAUST FAN ON ROOF. SEE SHEET MH200 FOR CONTINUATION.

6 DASHED LINE INDICATES CLEARANCE REQUIRED AROUND UNIT. KEEP CLEAR OF OBSTRUCTIONS.

7 HWS, HWR, CWS, AND CWR PIPING UP FROM BELOW IN PIPE CABINET. ALL VALVES, SPECIALITIES, ETC SHOWING IN COIL DETAIL SHALL BE LOCATED IN HEATED PIPE CABINET.

8 EXISTING DUCTWORK TO REMAIN. PROTECT DURING CONSTRUCTION.



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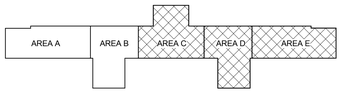
1 MH-101 **FOURTH FLOOR DUCTWORK NEW WORK PHASE 2**

1/8" = 1'-0"



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REVISIONS

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100% CONSTRUCTION DOCUMENTS	3-25-2016
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VA NORTHERN INDIANA HEALTH CARE SYSTEM, FORT WAYNE
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RTM Consultants
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JEFFREY R. CRAWFORD REGISTERED PE STATE OF INDIANA PROFESSIONAL ENGINEER 4/25/16

Drawing Title: FOURTH FLOOR DUCTWORK NEW WORK PHASE 2

Approved: Project Director

Project Title: RENOVATE FOURTH FLOOR

Location: 2121 LAKE AVE., FORT WAYNE, IN 46805

Date: 2016.04.25 | Checked: JDW | Drawn: TRT

Project Number: #610A4-08-104

Building Number: 01

Drawing Number: MH-101

Dwg. 68 of 138

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VA Department of Veterans Affairs

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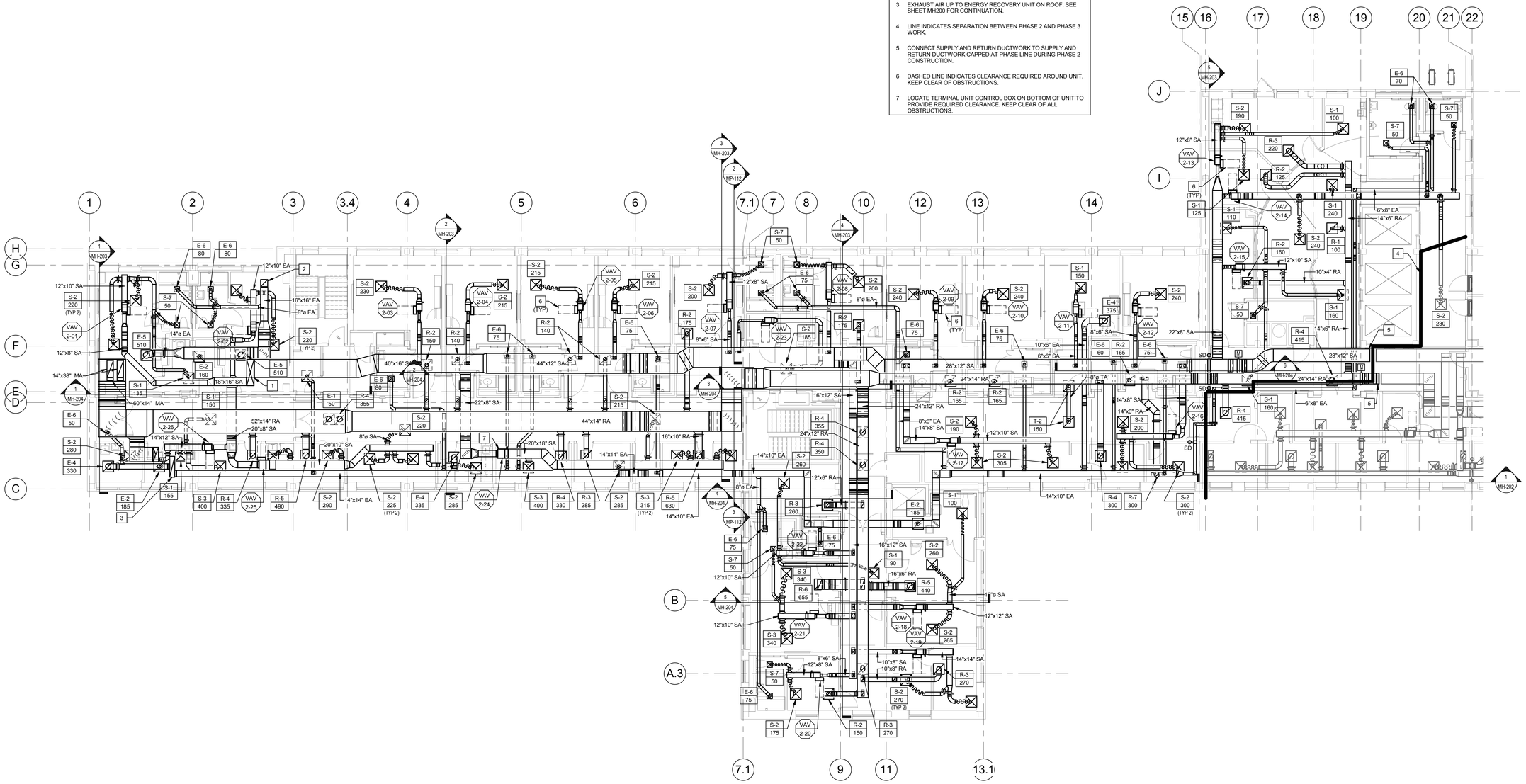
KEYED NOTES

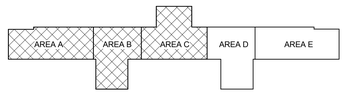
1. SUPPLY AIR DOWN FROM AIR HANDLING UNIT ON ROOF. SEE SHEET MH200 FOR CONTINUATION.
2. EXHAUST AIR UP TO EXHAUST FAN ON ROOF. SEE SHEET MH200 FOR CONTINUATION.
3. EXHAUST AIR UP TO ENERGY RECOVERY UNIT ON ROOF. SEE SHEET MH200 FOR CONTINUATION.
4. LINE INDICATES SEPARATION BETWEEN PHASE 2 AND PHASE 3 WORK.
5. CONNECT SUPPLY AND RETURN DUCTWORK TO SUPPLY AND RETURN DUCTWORK CAPPED AT PHASE LINE DURING PHASE 2 CONSTRUCTION.
6. DASHED LINE INDICATES CLEARANCE REQUIRED AROUND UNIT. KEEP CLEAR OF OBSTRUCTIONS.
7. LOCATE TERMINAL UNIT CONTROL BOX ON BOTTOM OF UNIT TO PROVIDE REQUIRED CLEARANCE. KEEP CLEAR OF ALL OBSTRUCTIONS.

GENERAL NOTES

1. SEE SHEET M-001 FOR GENERAL NOTES.



1 MH-102 **FOURTH FLOOR DUCTWORK NEW WORK PHASE 3**
1/8" = 1'-0"



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REVISIONS

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JEFFREY R. CRAWFORD REGISTERED PE STATE OF INDIANA PROFESSIONAL ENGINEER 4/25/16

Drawing Title: FOURTH FLOOR DUCTWORK NEW WORK PHASE 3

Approved: Project Director

Project Title: RENOVATE FOURTH FLOOR

Location: 2121 LAKE AVE., FORT WAYNE, IN 46805

Date: 2016.04.25 | Checked: JDW | Drawn: TRT

Project Number: #610A4-08-104
Building Number: 01
Drawing Number: MH-102
Dwg. 69 of 138

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VA Department of Veterans Affairs

VA FORM 08-6231

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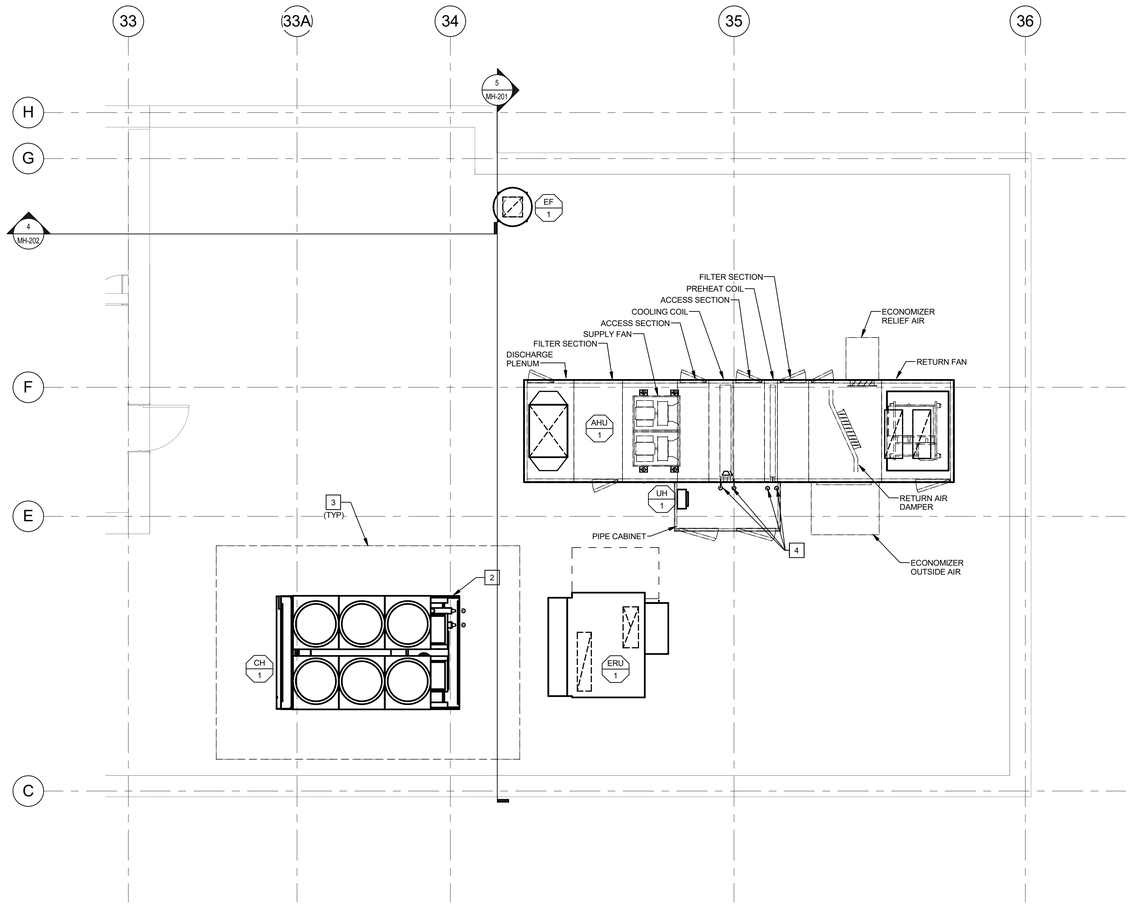
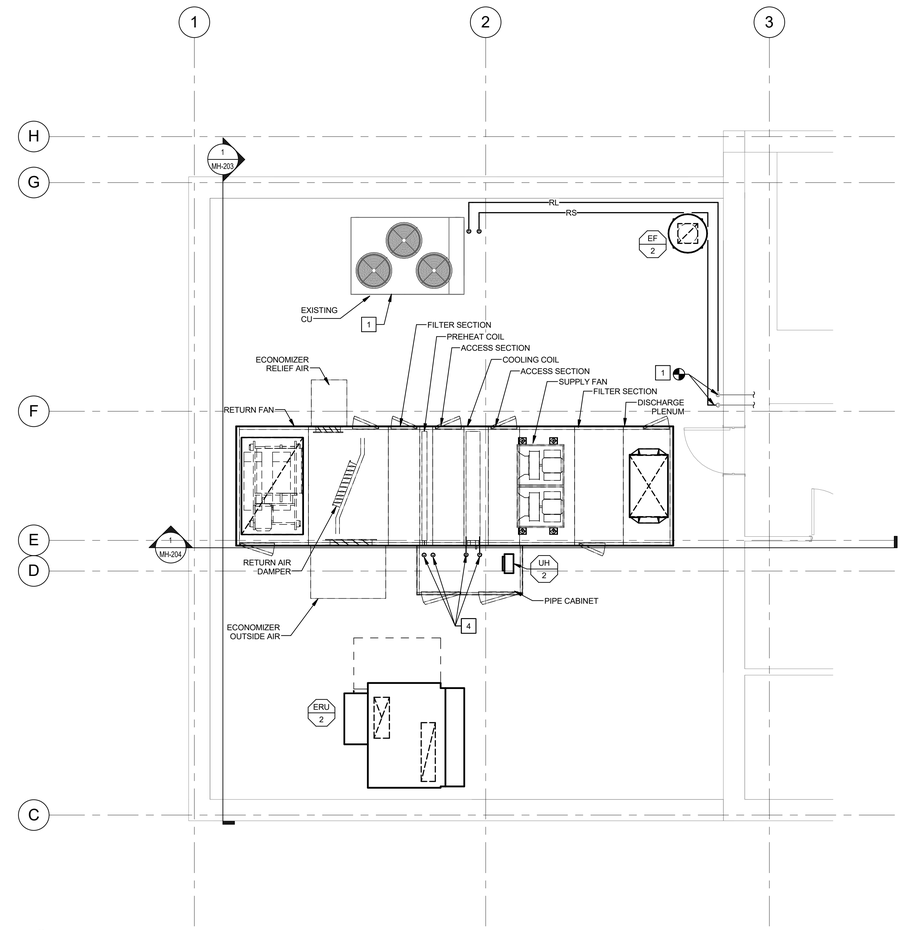


1 MH-103 **PARTIAL ROOF PLAN PHASE 2**

1/4" = 1'-0"



2 MH-103 **PARTIAL ROOF PLAN PHASE 3**

1/4" = 1'-0"

GENERAL NOTES

1. SEE SHEET M-001 FOR GENERAL NOTES.

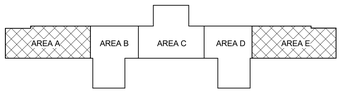
KEYED NOTES

1 RELOCATE EXISTING CONDENSING UNIT TO LOCATION SHOWN. PATCH ROOF WHERE EXISTING ROOF RAILS ARE REMOVED IN ACCORDANCE WITH ROOF MANUFACTURER'S RECOMMENDATIONS TO MAINTAIN ROOF WARRANT Y. INSTALL NEW ROOF RAILS IN NEW UNIT LOCATION AND POSITIVELY ATTACH UNIT TO RAILS. SEE ARCHITECTURAL FOR FLASHING REQUIREMENTS. EXTEND REFRIGERATION PIPING PER MANUFACUTRER'S RECOMMENDATIONS AS SHOWN ON PLAN. COORDINATE UNIT DOWNTIME WITH HOSPITAL PERSONNEL.

2 PROVIDE HEAT TRACING ON FIRST TEN FEET OF CHILLED WATER SUPPLY AND RETURN PIPING. SEE ELECTRICAL.

3 DASHED LINE INDICATES CLEARANCE REQUIRED AROUND UNIT. KEEP CLEAR OF OBSTRUCTIONS.

4 HWS, HWR, CWS, AND CWR PIPING UP FROM BELOW IN PIPE CABINET. ALL VALVES, SPECIALITIES, ETC SHOWING IN COIL DETAIL SHALL BE LOCATED IN HEATED PIPE CABINET.



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REVISIONS

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W5 DESIGN
1105 West Weir Street
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RTM Consultants
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Indianapolis, IN 46254

WP DESIGN

JEFFREY R. CRAWFORD
REGISTERED
PE 20001134
STATE OF INDIANA
PROFESSIONAL ENGINEER
4/25/16

Drawing Title: ENLARGED MECHANICAL ROOFTOP PLANS

Approved: Project Director

Project Title: RENOVATE FOURTH FLOOR

Location: 2121 LAKE AVE., FORT WAYNE, IN 46805

Date	Checked	Drawn
2016.04.25	JDW	TRT

Project Number: #610A4-08-104

Building Number: 01

Drawing Number: MH-103

Dwg. 70 of 138

Office of Construction and Facilities Management

VA Department of Veterans Affairs

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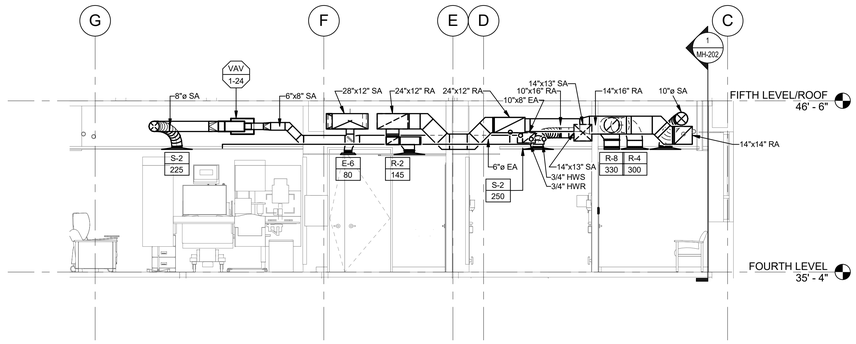
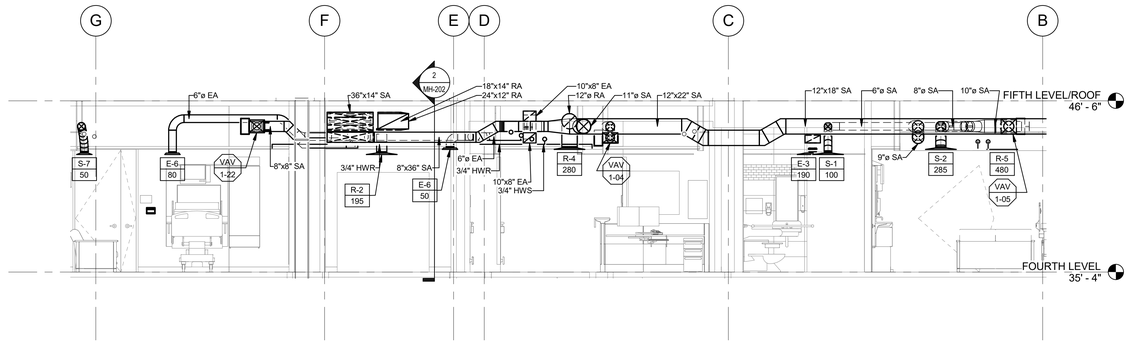
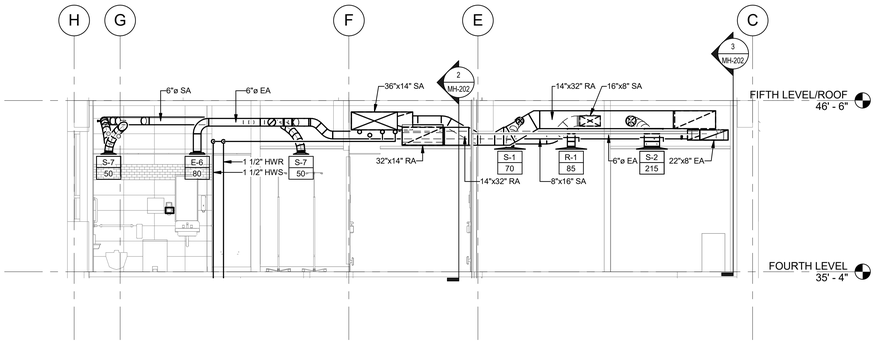


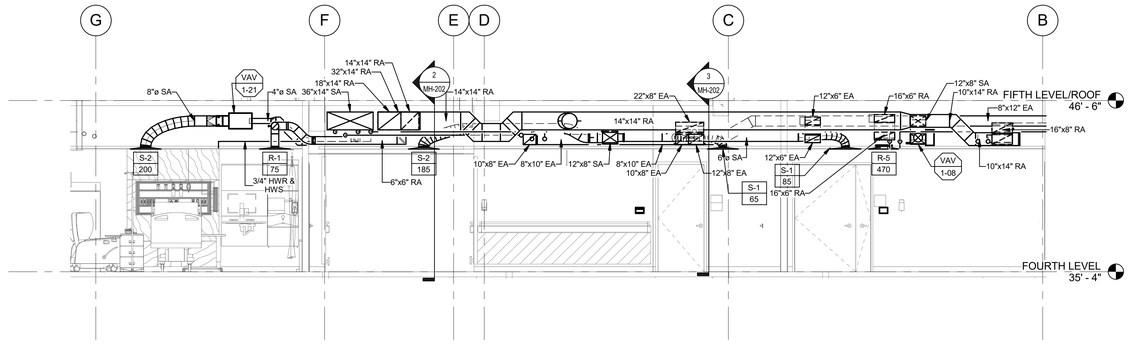
1 MH-201 **HVAC SECTION**
1/4" = 1'-0"



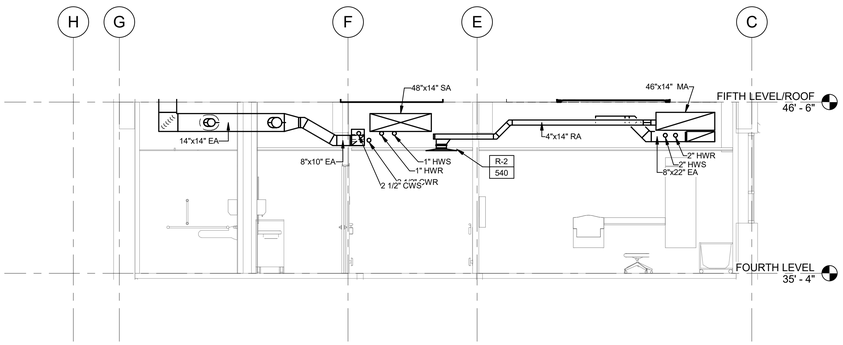
2 MH-201 **HVAC SECTION**
1/4" = 1'-0"



3 MH-201 **HVAC SECTION**
1/4" = 1'-0"



4 MH-201 **HVAC SECTION**
1/4" = 1'-0"



5 MH-201 **HVAC SECTION**
1/4" = 1'-0"

GENERAL NOTES

1. SEE SHEET M-001 FOR GENERAL NOTES.

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REVISIONS

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JEFFREY R. CRAWFORD REGISTERED PE STATE OF INDIANA PROFESSIONAL ENGINEER
4/25/16

Drawing Title: SECTIONS PHASE 2	Project Title: RENOVATE FOURTH FLOOR	Project Number: #610A4-08-104	Office of Construction and Facilities Management
Approved: Project Director	Location: 2121 LAKE AVE., FORT WAYNE, IN 46805	Building Number: 01	
	Date: 2016.04.25 / Checked: JDW / Drawn: TRT	Drawing Number: MH-201	VA Department of Veterans Affairs
		Dwg. 71 of 138	

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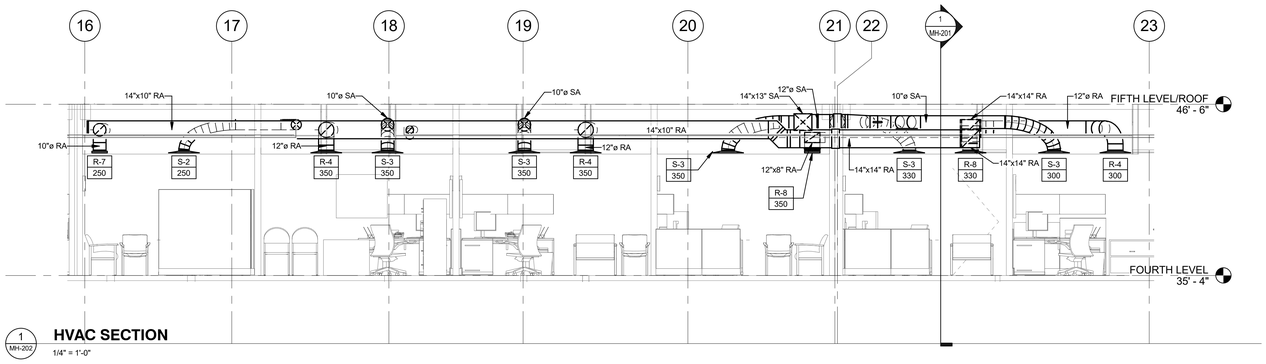
GENERAL NOTES

1. SEE SHEET M-001 FOR GENERAL NOTES.



1 MH-202 **HVAC SECTION**
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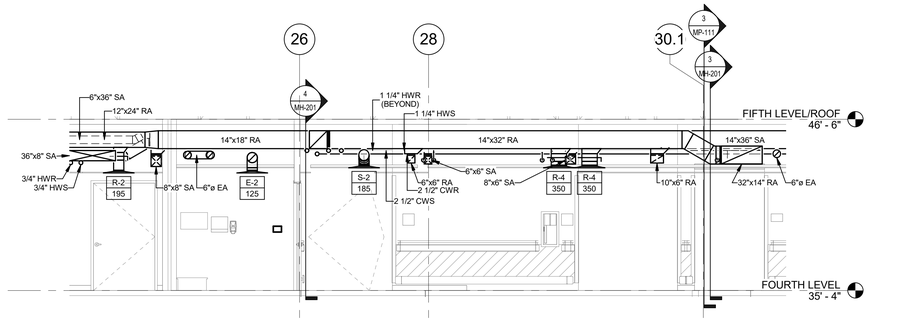
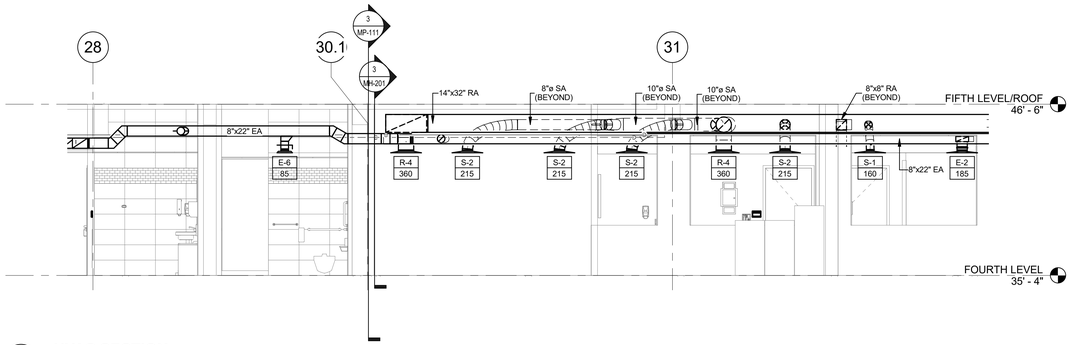
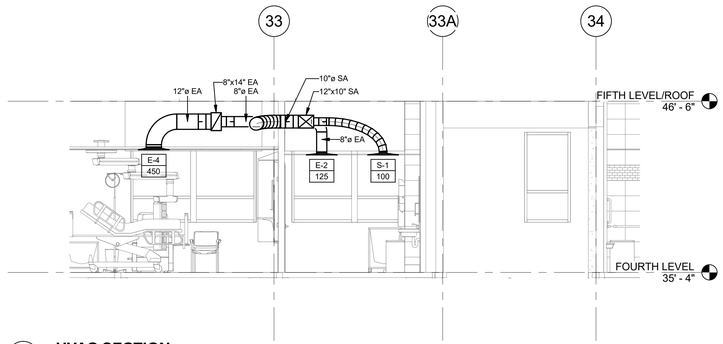


2 MH-202 **HVAC SECTION**
1/4" = 1'-0"



3 MH-202 **HVAC SECTION**
1/4" = 1'-0"



4 MH-202 **HVAC SECTION**
1/4" = 1'-0"

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REVISIONS

Revision #	Description	Date

SUBMISSIONS

BID DOCUMENTS	4-27-2016
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2121 LAKE AVE., FORT
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Indianapolis, IN 46254

W5 DESIGN

JEFFREY R. CRAWFORD
REGISTERED
PE
STATE OF INDIANA
PROFESSIONAL ENGINEER
4/25/16

Drawing Title
SECTIONS PHASE 2

Approved: Project Director

Project Title
RENOVATE FOURTH FLOOR

Location
2121 LAKE AVE., FORT WAYNE, IN 46805

Date 2016.04.25 | Checked JDW | Drawn Author

Project Number #610A4-08-104

Building Number 01

Drawing Number MH-202

Dwg. 72 of 138

Office of Construction and Facilities Management

VA Department of Veterans Affairs

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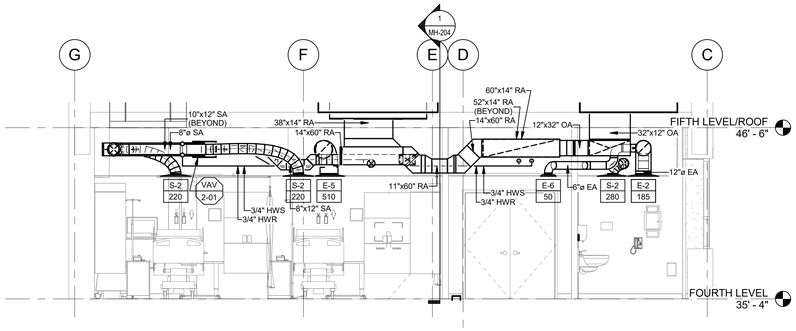
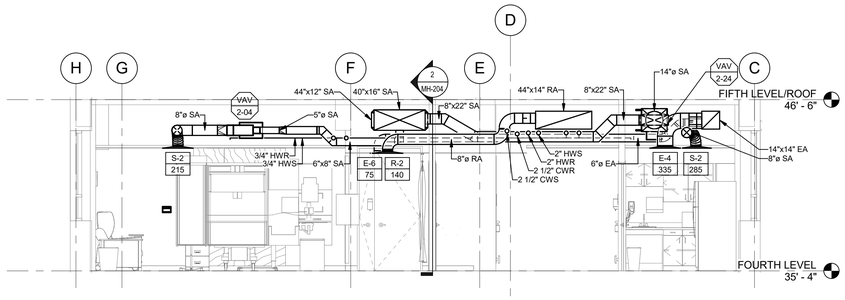


1 MH-203 **HVAC SECTION**

1/4" = 1'-0"

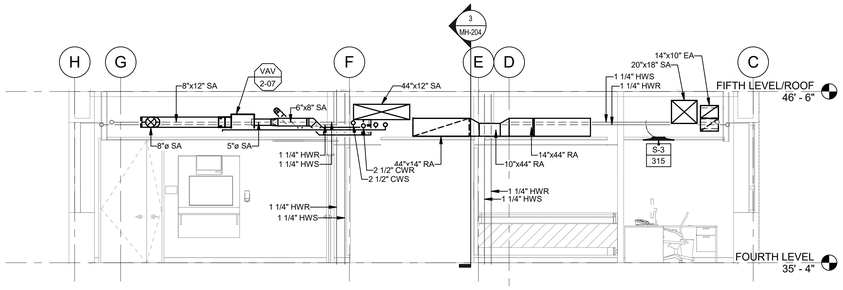


2 MH-203 **HVAC SECTION**

1/4" = 1'-0"

GENERAL NOTES

1. SEE SHEET M-001 FOR GENERAL NOTES.



3 MH-203 **HVAC SECTION**

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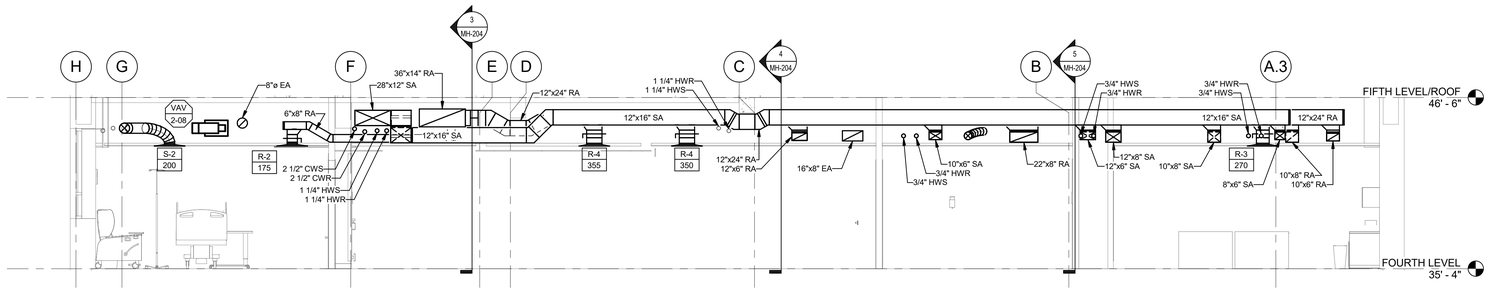
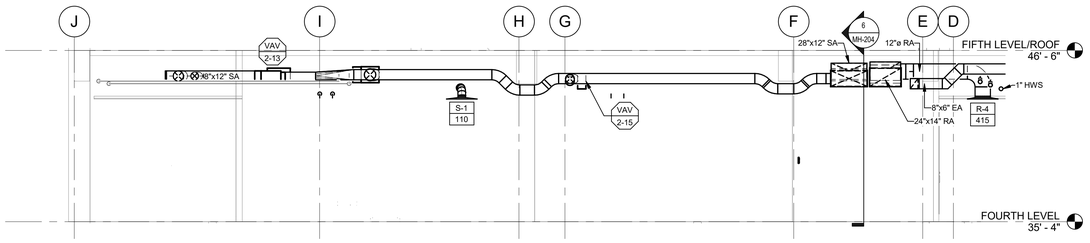


4 MH-203 **HVAC SECTION**

1/4" = 1'-0"



5 MH-203 **HVAC SECTION**

1/4" = 1'-0"

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JEFFREY R. CRAWFORD
REGISTERED
PE
STATE OF INDIANA
PROFESSIONAL ENGINEER
4/25/16

Drawing Title: SECTIONS PHASE 3	Project Title: RENOVATE FOURTH FLOOR		Project Number: #610A4-08-104
			Building Number: 01
Approved: Project Director	Location: 2121 LAKE AVE., FORT WAYNE, IN 46805		Drawing Number: MH-203
	Date: 2016.04.25	Checked: JDW	Drawn: Author
			Dwg. 73 of 138

Office of Construction and Facilities Management

VA Department of Veterans Affairs

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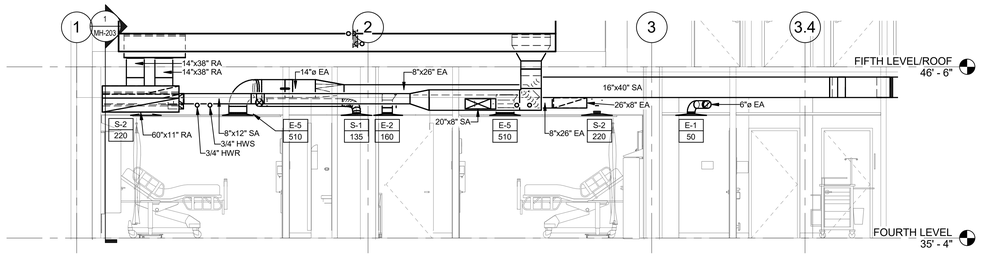
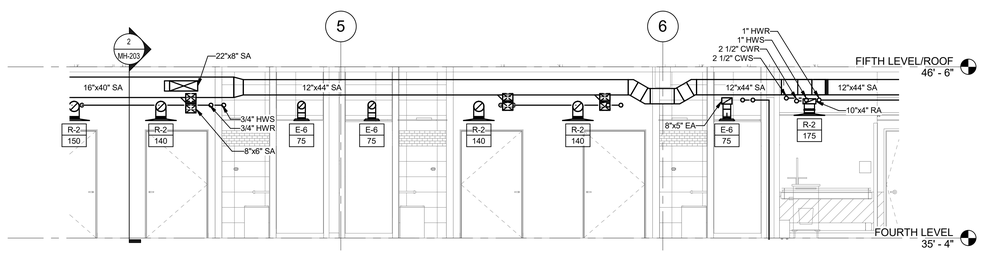
VA FORM 08-6231

GENERAL NOTES

1. SEE SHEET M-001 FOR GENERAL NOTES.



1 MH-204 **HVAC SECTION**
1/4" = 1'-0"



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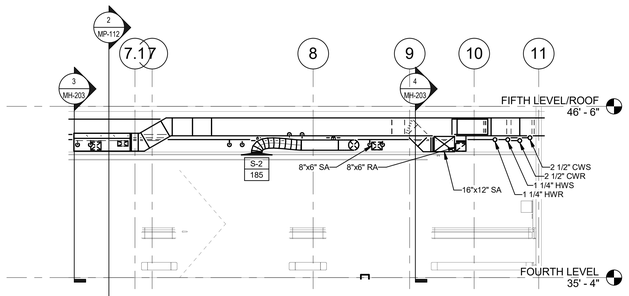

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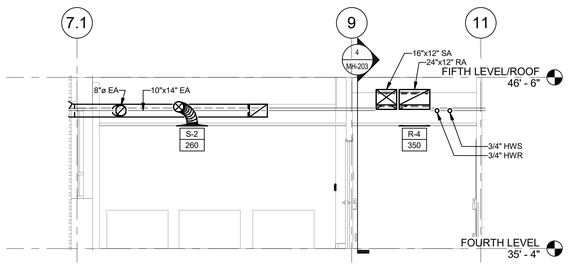

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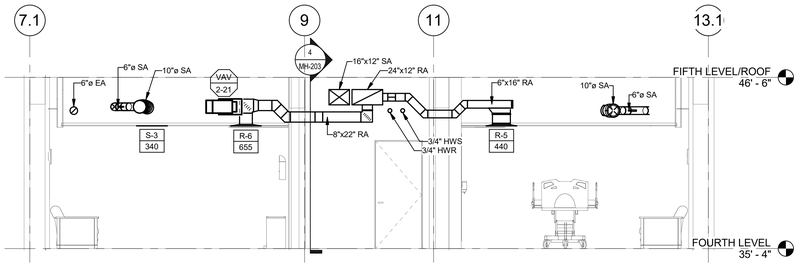

5 MH-204 **HVAC SECTION**
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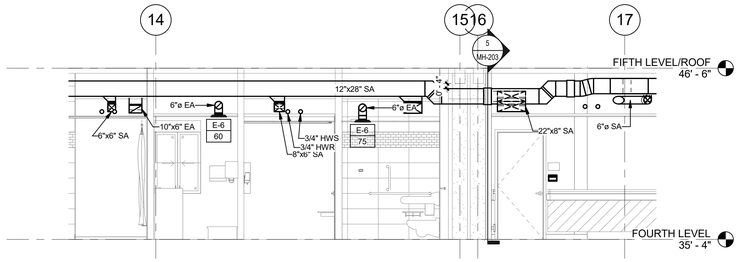

6 MH-204 **HVAC SECTION**
1/4" = 1'-0"

100% OWNER REVIEW SET
FULLY SPRINKLERED

REVISIONS

Revision #	Description	Date

SUBMISSIONS

BID DOCUMENTS	4-27-2016
100% CONSTRUCTION DOCUMENTS	3-25-2016
95% CONSTRUCTION DOCUMENTS	12-17-2015
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35% CONSTRUCTION DOCUMENTS	5-15-2015

VA

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4/25/16

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			Building Number: 01
Approved: Project Director	Location: 2121 LAKE AVE., FORT WAYNE, IN 46805		Drawing Number: MH-204
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			Dwg. 74 of 138

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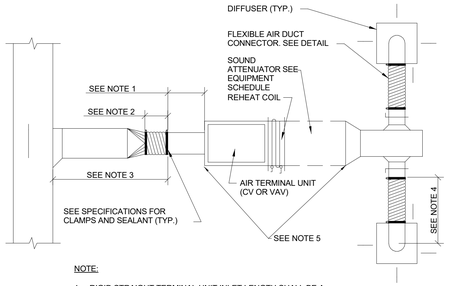
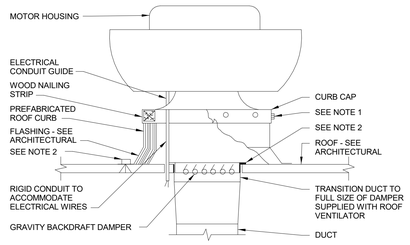


NOTE:

1. RIGID STRAIGHT TERMINAL UNIT INLET LENGTH SHALL BE A MINIMUM OF 3 TIMES THE DIAMETER OF INLET
2. A FLEXIBLE AIR DUCT CONNECTOR IS NOT MANDATORY FOR INLET TO THIS BOX, BUT ALLOWED TO ACCOMMODATE MINOR OFFSETS. MAXIMUM LENGTH 3'-0" [900mm].
3. A BRANCH DUCT SERVING AN INDIVIDUAL BOX MAY BE THE SAME SIZE AS THE BOX INLET, PROVIDED THE EQUIVALENT LENGTH OF THE BRANCH DUCT, AS SHOWN, DOES NOT EXCEED 10 FEET (3 METERS). FOR LONGER LENGTHS, INCREASE THE DUCT SIZE AND PROVIDE A DUCT TRANSITION TO MAINTAIN THE DUCT STATIC PRESSURE DROP AT OR BELOW 0.2"/100' [1.64Pa/m].
4. FLEXIBLE AIR DUCT CONNECTORS, WHEN USED FROM TERMINAL UNIT SUPPLY AIR DUCT TO DIFFUSER, SHALL NOT EXCEED 5'-0" [1500mm]. USE RIGID ELBOWS FOR CHANGE OF DIRECTION GREATER THAN 45°.
5. COMPONENT ARRANGEMENT MAY VARY BY MANUFACTURER. PROVIDE INSULATION W/VAPOR BARRIER FOR CONNECTING DUCT SECTIONS.
6. USE OF THE FLEXIBLE AIR DUCT CONNECTORS ARE NOT PERMITTED FOR THE DEDICATED AHU SERVING THE SURGICAL SUITE.

1 MH-301 AIR TERMINAL UNIT CONNECTION DETAIL

NTS

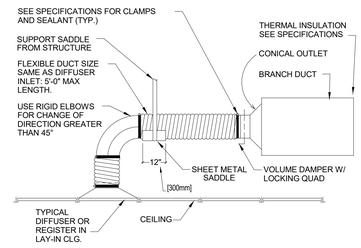


NOTE:

1. SECURE CURB CAP TO WOOD NAILING STRIP WITH 3/8" [10mm] CADMIUM PLATED LAG BOLTS NOT OVER 12" [300mm] ON CENTER.
2. SECURE ROOF CURB, DUCTWORK AND DAMPER TO ROOF WITH EXPANSION BOLTS (CONCRETE ROOF) OR RUST RESISTANT BOLTS (METAL DECK AND BAR JOIST ROOF).
3. RUN ELECTRICAL LINES THROUGH CLEARANCE HOLE PROVIDED IN GRAVITY DAMPER, THEN THROUGH VENTILATOR ELECTRICAL CONDUIT GUIDE.

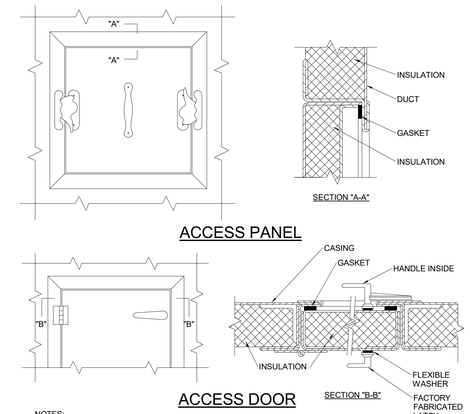
2 MH-301 ROOF MOUNTED FAN DETAIL

NTS



3 MH-301 DIFFUSER CONNECTION DETAIL

NTS

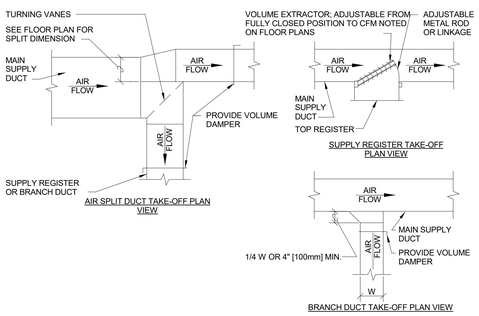


NOTES:

1. LATCHES SHALL BE OF THE WEDGE TYPE TO CLOSE DOORS TIGHTLY.
2. HINGES ON THE ACCESS DOORS SHALL HAVE NON-CORROSIVE PINS.
3. SEE SMACNA 2005, FIGURE 9-15

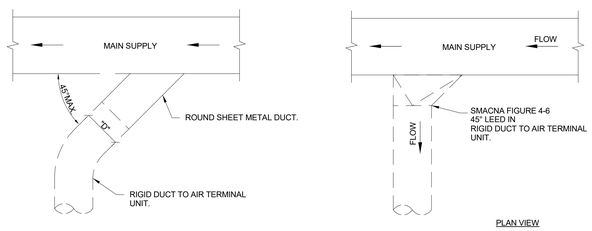
4 MH-301 VOLUME DAMPER DETAIL

NTS



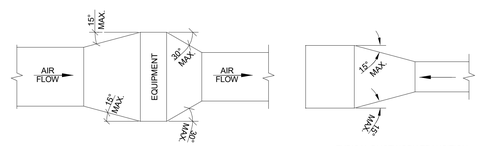
5 MH-301 SUPPLY DUCTWORK TAKE-OFFS

NTS



6 MH-301 SUPPLY DUCTWORK TAKE-OFFS FOR TERMINAL UNITS

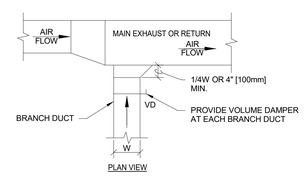
NTS



NOTE:
UNLESS OTHERWISE INDICATED ON PLANS, MAXIMUM ANGLES SHOWN SHALL APPLY.

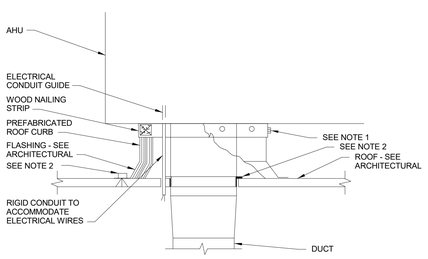
7 MH-301 DUCTWORK TRANSITIONS TO DUCT MOUNTED EQUIPMENT DETAIL

NTS



8 MH-301 EXHAUST OR RETURN BRANCH DUCTWORK DETAILS

NTS



NOTE:

1. SECURE UNIT TO WOOD NAILING STRIP WITH 3/8" [10mm] CADMIUM PLATED LAG BOLTS NOT OVER 12" [300mm] ON CENTER.
2. SECURE ROOF CURB TO ROOF WITH EXPANSION BOLTS (CONCRETE ROOF) OR RUST RESISTANT BOLTS (METAL DECK AND BAR JOIST ROOF).
3. ELECTRICAL FEEDERS AND HOT AND CHILLED WATER PIPES SHALL BE FED UP THROUGH CURB FROM BELOW.

9 MH-301 ROOFTOP UNIT DETAIL

NTS

100% OWNER REVIEW SET
FULLY SPRINKLERED

REVISIONS

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Approved: Project Director	Location: 2121 LAKE AVE., FORT WAYNE, IN 46805	Building Number: 01	
	Date: 2016.04.25 / Checked: JDW / Drawn: TRT	Drawing Number: MH-301	VA Department of Veterans Affairs

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ENERGY RECOVERY UNIT SCHEDULE

PLAN MARK		TYPE	LOCATION	SERVICE	OUTSIDE AIR (CFM)	EXHAUST AIR (CFM)	OUTSIDE AIR FAN: ESP (IN WC)	OUTSIDE AIR FAN: TYPE	OUTSIDE AIR FAN: DRIVE	EXHAUST FAN: ESP (IN WC)	EXHAUST FAN: TYPE	EXHAUST FAN: DRIVE	ENTHALPY ENERGY-RECOVERY SECTION: TEMPERATURE DB/WB (°F) (WINTER): OA IN	OA OUT	EA IN	EFFECTIVENESS (%) (WINTER): SENS.	TOTAL	TEMPERATURE DB/WB (°F) (SUMMER): OA IN	OA OUT	EA IN	EFFECTIVENESS (%) (SUMMER): SENS.	TOTAL	FILTERS: SUPPLY: TYPE	SUPPLY: DESIGN APD (IN WC)	EXHAUST: TYPE	EXHAUST: DESIGN APD (IN WC)	ELECTRICAL DATA: HP (SUPPLY / RETURN)	V/PH/HZ	NOTES
ERU	1	STATIC PLATE	EAST ROOF	AHU-1	3600	2430	0.5	FORWARD CURVED	BELT	1.5	FORWARD CURVED	BELT	-4 / -6	36 / 32.2	70 / 49	83	75	90 / 74	82 / 70	75 / 52	83	62	MERV 8 - 2"	0.5	MERV 8 - 2"	0.5	3 / 3	(1)	(2),(3)
ERU	2	STATIC PLATE	WEST ROOF	AHU-2	4390	2615	0.5	FORWARD CURVED	BELT	1.5	FORWARD CURVED	BELT	-4 / -6	33.4 / 30	70 / 49	85	76	90 / 74	82.4 / 70	75 / 52	85	63	MERV 8 - 2"	0.5	MERV 8 - 2"	0.5	5 / 3	(1)	(2),(3)

NOTES:

1. SEE EQUIPMENT DATA SCHEDULE ON SHEET MEP001 FOR ELECTRICAL INFORMATION.
2. SOUND POWER LEVEL RATINGS SHOWN IN DECIBELS, REFERRED TO 10(-12) WATTS CALCULATED PER AMCA STANDARD 301, VALUES ARE DISCHARGE/INLET/RADIATED.
3. PROVIDE WITH INVERTER-READY OR INVERTER-DUTY MOTOR FOR VARIABLE SPEED OPERATION.
4. PROVIDE WITH MANUFACTURER'S STANDARD ROOF CURB FOR FLAT ROOF INSTALLATION.

AIR HANDLING UNIT SCHEDULE

PLAN MARK		LOCATION	SERVICE	MIN. OA (CFM)	TOTAL AIRFLOW (CFM)	SUPPLY FAN: STATIC PRESSURE: TSP (IN WC)	ESP (IN WC)	TYPE	DRIVE	SIZE (IN)	MAX FAN SPEED (RPM)	NOMINAL MOTOR SPEED (RPM)	MIN. FAN EFF. (%)	RETURN FAN: AIRFLOW (CFM)	STATIC PRESSURE: TSP (IN WC)	ESP (IN WC)	TYPE	DRIVE	MAX WHEEL SIZE (IN)	MAX FAN SPEED (RPM)	MOTOR SPEED (RPM)	MIN. FAN EFF. (%)	HOT WATER COIL: CAPACITY (MBH)	MAX FACE VEL. (FPM)	EAT (°F)	WATER FLOW (GPM)	EWT (°F)	ROWS	MAX PD: AIR (IN WC)	WATER (FT)
AHU	1	EAST ROOF	EAST WING	3885	11000	5.0	2.5	ARRAY (2W x 2H)	DIRECT	15	2957	1800	64	11000	2.6	1.5	AIRFOIL	DIRECT	22	1368	1800	62	374	500	44	18.70	180	1	0.1	1
AHU	2	WEST ROOF	WEST WING	4150	13000	5.0	2.5	ARRAY (2W x 2H)	DIRECT	16.5	2847	1800	64	13000	2.7	1.5	AIRFOIL	DIRECT	25	1183	1800	66	406	500	46.4	20.30	180	1	0.1	1

AIR HANDLING UNIT SCHEDULE CONTD.

PLAN MARK		CHILLED WATER COIL: CAPACITY (MBH): TOTAL	SENS.	MAX FACE VELC. (FPM)	EAT: DB (°F)	WB (°F)	WATER FLOW (GPM)	EWT (°F)	MIN ROWS	MAX PD: AIR (IN WC)	WATER (FT)	FILTERS: INTERMEDIATE: TYPE	DESIGN APD (IN WC)	PRE-1: TYPE	DESIGN APD (IN WC)	PRE-2: TYPE	DESIGN APD (IN WC)	MAX SOUND POWER RATING: OCTAVE BAND (HZ): 63	125	250	500	1000	2000	4000	8000	ELECTRICAL DATA: HP (SUPPLY / RETURN)	V/PH/HZ	NOTES
AHU	1	459	314	500	78.6	66.2	65.30	42	8	1.0	10	MERV 14 - 12"	1.0	MERV 7 - 2"	0.5	MERV 11 - 6"	1.0	80/87/84	88/89/83	93/86/82	84/82/72	79/78/74	73/75/60	68/73/48	62/70/47	20 / 7.5	(1)	(2) (3)
AHU	2	533	372.3	500	78.4	66	75.90	42	8	1.0	10	MERV 14 - 12"	1.0	MERV 7 - 2"	0.5	MERV 11 - 6"	1.0	77/86/82	89/85/78	89/84/80	82/78/67	76/74/68	67/72/57	65/70/47	58/65/41	20 / 10	(1)	(2) (3)

NOTES:

1. SEE EQUIPMENT DATA SCHEDULE ON SHEET MEP001 FOR ELECTRICAL INFORMATION.
2. SOUND POWER LEVEL RATINGS SHOWN IN DECIBELS, REFERRED TO 10(-12) WATTS CALCULATED PER AMCA STANDARD 301, VALUES ARE DISCHARGE/INLET/RADIATED.
3. PROVIDE WITH INVERTER-READY OR INVERTER-DUTY MOTOR FOR VARIABLE SPEED OPERATION.
4. PROVIDE WITH MANUFACTURER'S STANDARD ROOF CURB FOR FLAT ROOF INSTALLATION.

AIR COOLED CHILLER SCHEDULE

PLAN MARK		TYPE	SERVICE	LOCATION	REFRIG. TYPE	AMBIENT TEMP.	NOM. TONS	EVAPORATOR: EWT (°F)	LWT (°F)	FLOW (GPM)	CLG. MAX WPD (FT)	NUM. OF PASSES	FOULING FACTOR	MIN NPLV (EER)	MIN FULL LOAD EFF. (EER)	MAX SOUND PRESS.	MAX SIZE (LxWxH) IN	OPERATING WIEGHT (LBS)	ELECTRICAL DATA: KW	V/PH/HZ	NOTES
CH	1	SCROLL	AHU-1,2	EAST ROOF	R410A	105	90	56	42	141.2	10	2	0.0001	15.7	9.2	67	143.1 x 89 x 92.4	8830.1	107.3	(1)	(2) (3) (4) (5)

NOTES:

1. SEE EQUIPMENT DATA SCHEDULE ON SHEET MEP001 FOR ELECTRICAL INFORMATION.
2. AS DEFINED BY AHRI 550/590 - PERFORMANCE RATINGS OF WATER-CHILLING PACKAGES USING THE THE VAPOR COMPRESSION CYCLE.
3. SOUND PRESSURE MEASURED IN ACCORDANCE WITH ANSI/AHRI STANDARD 575-1994 (A-WEIGHTED).
4. PROVIDE WITH FACTORY HEATED AND INSULATED EVAPORATOR SHELL AND ROOF RAILS TO BE FLASHED INTO ROOF. SEE ARCHITECTURAL FOR FLASHING DETAIL.
5. CHILLER SHALL BE ABLE TO WITHSTAND AVAILABLE FAULT CURRENT OF 65K AIC AS SHOWN ON THE ELECTRICAL DRAWINGS.

SPLIT SYSTEM WITH CU SCHEDULE

PLAN MARK		TYPE	SERVICE	INDOOR UNIT DATA: TYPE	CFM	COOLING CAPACITY (MBH): TOTAL	SENSIBLE	EAT DB/WB (°F)	MAXIMUM LAT (°F)	ELEC DATA	OUTDOOR UNIT DATA (CU): PLAN MARK	LOCATION	DESIGN SUMMMER AMBIENT (°F)	DESIGN WINTER AMBIENT (°F)	MAX SND (DBA)	REFRIGERANT	MIN EFF (SEER)	ELECTRICAL DATA: AMPS	V/PH/HZ	NOTES
ACU	1	DUCTLESS	ELECTRICAL/SECURITY	WALL MOUNTED	635	30	21	75/62	58	(1)	CU-1	ROOF	105	14	52	R410A	15.5	25	(1)	
ACU	2	DUCTLESS	ELECTRICAL/SECURITY	WALL MOUNTED	247	12	9	75/62	58	(1)	CU-2	ROOF	105	14	52	R410A	15.2	13	(1)	

NOTES:

1. SEE EQUIPMENT DATA SCHEDULE ON SHEET MEP001 FOR ELECTRICAL INFORMATION.
2. PROVIDE CONDENSING UNIT WITH MANUFACTURER'S WALL BRACKET FOR WALL INSALLATION.

FAN SCHEDULE

PLAN MARK		TYPE	LOCATION	SERVICE	DRIVE	AIRFLOW (CFM)	ESP (IN WC)	MAX FAN SPEED (RPM)	MOTOR SPEED (RPM)	MAX SOUND POWER RATING (INLET / OUTLET): OCTAVE: 63	125	250	500	1000	2000	4000	8000	MAX SND (dBA)	MAX WEIGHT (LBS)	ELECTRICAL DATA: HP	V/PH/HZ	NOTES
EF	1	UPBLAST	EAST ROOF	ICU ISOLATION	DIRECT	1300	0.75	1272	1725	77	82	78	67	62	61	56	52	61	125	0.5	(1)	(2) (3) (4)
EF	2	UPBLAST	WEST ROOF	MED/SURG ISOLATION	DIRECT	1340	0.75	1272	1725	77	82	78	67	62	61	56	52	61	125	0.5	(1)	(2) (3) (4)

NOTES:

1. SEE EQUIPMENT DATA SCHEDULE ON SHEET MEP001 FOR ELECTRICAL INFORMATION.
2. SOUND PWER LEVEL RATINGS SHOWN IN DECIBELS, REFERRED TO 10(-12) WATTS CALCULATED PER AMCA STANDARD 301.
3. PROVIDE WITH INVERTER READY OR INVERTER DUTY MOTOR FOR VARIABLE SPEED OPERATION AS DESCRIBED IN SEQUENCE OF OPERATION.
4. PROVIDE WITH MANUFACTURER'S STANDARD ROOF CURB FOR FLAT ROOF INSTALLATION.

UNIT HEATER SCHEDULE

PLAN MARK		TYPE	LOCATION	SERVICE	ELECTRIC HEATING COIL: CAPACITY (kW)	EAT (°F)	CONTROL	ELECTRICAL DATA: KW	V/PH/HZ	NOTES
UH	1	ELECTRIC	AHU-1 PIPE CABINET	AHU-1	2	55	TSTAT	2	(1)	
UH	2	ELECTRIC	AHU-2 PIPE CABINET	AHU-2	2	55	TSTAT	2	(1)	

NOTES:

1. SEE EQUIPMENT DATA SCHEDULE ON SHEET MEP001 FOR ELECTRICAL INFORMATION.

AIR TERMINAL UNIT SCHEDULE

PLAN MARK		TYPE	INLET DUCT SIZE (IN)	AIRFLOW (CFM): MAX	MIN	DESIGN INLET STATIC PRESSURE (IN WC)	OUTLET DUCT SIZE LxW (IN)	MAX PRESSURE DROP (IN WC)	AUXILIARY HOT WATER HEATNG COIL: AIRFLOW (CFM)	CAPACITY (MBH)	EAT (°F)	LAT (°F)	EWT (°F)	FLOW (GPM)	ROWS	MAX WPD (FT HD)	MAX APD (IN WC)	MAX NC LEVEL @ MAX CFM: DISCHARGE	RADIATED	NOTES
VAV	1-01	SINGLE DUCT PRESSURE INDEPENDENT	10	1150	400	1.0	14x13	0.75	400	12.9	55	84.7	180	0.90	(2)	5	0.5	35	35	(3)
VAV	1-02	SINGLE DUCT PRESSURE INDEPENDENT	10	980	350	1.0	14x13	0.75	400	12.9	55	84.7	180	0.90	(2)	5	0.5	35	35	(3)
VAV	1-03	SINGLE DUCT PRESSURE INDEPENDENT	9	950	645	1.0	14x13	0.75	645	18.8	55	81.9	180	1.90	(2)	5	0.5	35	35	(3)
VAV	1-04	SINGLE DUCT PRESSURE INDEPENDENT	5	335	315	1.0	12x8	0.75	315	9.2	55	81.9	180	0.80	(2)	5	0.5	35	35	(3)
VAV	1-05	SINGLE DUCT PRESSURE INDEPENDENT	8	670	440	1.0	12x10	0.75	440	12.8	55	81.8	180	1.10	(2)	5	0.5	35	35	(3)
VAV	1-06	SINGLE DUCT PRESSURE INDEPENDENT	6	410	160	1.0	12x8	0.75	200	6.1	55	83.1	180	0.40	(2)	5	0.5	35	35	(3)
VAV	1-07	SINGLE DUCT PRESSURE INDEPENDENT	8	600	200	1.0	12x10	0.75	350	10.4	55	82.4	180	0.60	(2)	5	0.5	35	35	(3)
VAV	1-08	SINGLE DUCT PRESSURE INDEPENDENT	7	555	445	1.0	12x10	0.75	445	13.6	55	83.2	180	1.50	(2)	5	0.5	35	35	(3)
VAV	1-09	SINGLE DUCT PRESSURE INDEPENDENT	10	1020	350	1.0	14x13	0.75	350	10.4	55	82.3	180	0.60	(2)	5	0.5	35	35	(3)
VAV	1-10	SINGLE DUCT PRESSURE INDEPENDENT	7	480	300	1.0	12x10	0.75	300	8.7	55	81.7	180	0.50	(2)	5	0.5	35	35	(3)
VAV	1-11	SINGLE DUCT PRESSURE INDEPENDENT	6	450	285	1.0	12x8	0.75	285	8.3	55	81.8	180	0.60	(2)	5	0.5	35	35	(3)
VAV	1-12	SINGLE DUCT PRESSURE INDEPENDENT	9	925	530	1.0	14x13	0.75	530	15.5	55	81.9	180	1.10	(2)	5	0.5	35	35	(3)
VAV	1-13	SINGLE DUCT PRESSURE INDEPENDENT	8	610	370	1.0	12x10	0.75	370	10.8	55	81.9	180	0.70	(2)	5	0.5	35	35	(3)
VAV	1-14	SINGLE DUCT PRESSURE INDEPENDENT	6	450	200	1.0	12x8	0.75	200	6	55	82.7	180	0.40	(2)	5	0.5	35	35	(3)
VAV	1-15	SINGLE DUCT PRESSURE INDEPENDENT	5	250	100	1.0	12x8	0.75	250	7.8	55	83.8	180	0.60	(2)	5	0.5	35	35	(3)
VAV	1-16	SINGLE DUCT PRESSURE INDEPENDENT	7	525	460	1.0	12x10	0.75	460	13.4	55	81.8	180	1.30	(2)	5	0.5	35	35	(3)
VAV	1-17	SINGLE DUCT PRESSURE INDEPENDENT	7	475	475	1.0	12x10	0.75	475	13.9	55	82	180	1.40	(2)	5	0.5	35	35	(3)
VAV	1-18	SINGLE DUCT PRESSURE INDEPENDENT	5	250	250	1.0	12x8	0.75	250	7.3	55	81.9	180	0.50	(2)	5	0.5	35	35	(3)
VAV	1-19	SINGLE DUCT PRESSURE INDEPENDENT	5	300	265	1.0	12x8	0.75	265	7.7	55	81.8	180	0.50	(2)	5	0.5	35	35	(3)
VAV	1-20	SINGLE DUCT PRESSURE INDEPENDENT	5	250	250	1.0	12x8	0.75	250	7.3	55	81.9	180	0.50	(2)	5	0.5	35	35	(3)
VAV	1-21	SINGLE DUCT PRESSURE INDEPENDENT	4	200	200	1.0	12x8	0.75	200	6.1	55	83.1	180	0.40	(2)	5	0.5	35	35	(3)
VAV	1-22	SINGLE DUCT PRESSURE INDEPENDENT	6	325	325	1.0	12x8	0.75	325	9.5	55	81.9	180	0.90	(2)	5	0.5	35	35	(3)
VAV	1-23	SINGLE DUCT PRESSURE INDEPENDENT	5	225	225	1.0	12x8	0.75	225	6.9	55	83.3	180	0.50	(2)	5	0.5	35	35	(3)
VAV	1-24	SINGLE DUCT PRESSURE INDEPENDENT	5	225	225	1.0	12x8	0.75	225	6.9	55	83.3	180	0.50	(2)	5	0.5	35	35	(3)
VAV	2-01	SINGLE DUCT PRESSURE INDEPENDENT	8	625	625	1.0	12x10	0.75	630	18.4	55	81.9	180	0.70	(2)	5	0.5	35	35	(3)
VAV	2-02	SINGLE DUCT PRESSURE INDEPENDENT	7	490	490	1.0	12x10	0.75	490	14.3	55	81.9	180	1.60	(2)	5	0.5	35	35	(3)
VAV	2-03	SINGLE DUCT PRESSURE INDEPENDENT	5	230	230	1.0	12x8	0.75	230	6.9	55	82.7	180	0.50	(2)	5	0.5	35	35	(3)
VAV	2-04	SINGLE DUCT PRESSURE INDEPENDENT	5	215	215	1.0	12x8	0.75	215	6.8	55	84.2	180	0.50	(2)	5	0.5	35	35	(3)
VAV	2-05	SINGLE DUCT PRESSURE INDEPENDENT	5	215	215	1.0	12x8	0.75	215	6.8	55	84.2	180	0.50	(2)	5	0.5	35	35	(3)
VAV	2-06	SINGLE DUCT PRESSURE INDEPENDENT	5	215	215	1.0	12x8	0.75	215	6.8	55	84.2	180	0.50	(2)	5	0.5	35	35	(3)
VAV	2-07	SINGLE DUCT PRESSURE INDEPENDENT	5	250	100	1.0	12x8	0.75	175	5.3	55	82.9	180	0.30	(2)	5	0.5	35	35	(3)
VAV	2-08	SINGLE DUCT PRESSURE INDEPENDENT	5	250	250	1.0	12x8	0.75	250	7.3	55	81.9	180	0.50	(2)	5	0.5	35	35	(3)
VAV	2-09	SINGLE DUCT PRESSURE INDEPENDENT	5	240	240	1.0	12x8	0.75	240	7	55	81.9	180	0.50	(2)	5	0.5	35	35	(3)
VAV	2-10	SINGLE DUCT PRESSURE INDEPENDENT	5	240	240	1.0	12x8	0.75	240	7	55	81.9	180	0.50	(2)	5	0.5	35	35	(3)
VAV	2-11	SINGLE DUCT PRESSURE INDEPENDENT	4	150	150	1.0	12x8	0.75	150	5	55	85.8	180	0.30	(2)	5	0.5	35	35	(3)
VAV	2-12	SINGLE DUCT PRESSURE INDEPENDENT	5	240	240	1.0	12x8	0.75	240	7	55	81.9	180	0.50	(2)	5	0.5	35	35	(3)
VAV	2-13	SINGLE DUCT PRESSURE INDEPENDENT	6	415	415	1.0	12x8	0.75	415	11.4	55	80.3	180	1.50	(2)	5	0.5	35	35	(3)
VAV	2-14	SINGLE DUCT PRESSURE INDEPENDENT	9	810	785	1.0	14x13	0.75	785	23	55	82	180	0.90	(2)	5	0.5	35	35	(3)
VAV	2-15	SINGLE DUCT PRESSURE INDEPENDENT	7	480	480	1.0	12x10	0.75	480	14	55	81.9	180	1.50	(2)	5	0.5	35	35	(3)
VAV	2-16	SINGLE DUCT PRESSURE INDEPENDENT	8	800	300	1.0	12x10	0.75	300	8.9	55	82.4	180	0.50	(2)	5	0.5	35	35	(3)
VAV	2-17	SINGLE DUCT PRESSURE INDEPENDENT	8	800	505	1.0	12x10	0.75	505	14.7	55	81.8	180	1.80	(2)	5	0.5	35	35	(3)
VAV	2-18	SINGLE DUCT PRESSURE INDEPENDENT	8	625	440	1.0	12x10	0.75	440	12.8	55	81.8	180	1.10	(2)	5	0.5	35	35	(3)
VAV	2-19	SINGLE DUCT PRESSURE INDEPENDENT	7	540	190	1.0	12x10	0.75	300	8.8	55	82	180	0.50	(2)	5	0.5	35	35	(3)
VAV	2-20	SINGLE DUCT PRESSURE INDEPENDENT	5	225	150	1.0	12x8	0.75	175	5.3	55	82.9	180	0.30	(2)	5	0.5	35	35	(3)
VAV	2-21	SINGLE DUCT PRESSURE INDEPENDENT	8	730	295	1.0	12x10	0.75	295	8.7	55	82.2	180	0.50	(2)	5	0.5	35	35	(3)
VAV	2-22	SINGLE DUCT PRESSURE INDEPENDENT	6	350	350	1.0	12x8	0.75	350	11	55	83.9	180	1.90	(2)	5	0.5	35	35	(3)
VAV	2-23	SINGLE DUCT PRESSURE INDEPENDENT	4	185	185	1.0	12x8	0.75	185	5.8	55	83.9	180	0.40	(2)	5	0.5	35	35	(3)
VAV	2-24	SINGLE DUCT PRESSURE INDEPENDENT	14	1530	600	1.0	20x18	0.75	800	21.7	55	80.1	180	0.90	(2)	5	0.5	35	35	(3)
VAV	2-25	SINGLE DUCT PRESSURE INDEPENDENT	14	1535	755	1.0	20x18	0.75	755	23.6	55	83.8	180	1.20	(2)	5	0.5	35	35	(3)
VAV	2-26	SINGLE DUCT PRESSURE INDEPENDENT	10	985	325	1.0	14x13	0.75	450	14	55	83.7	180	1.00	(2)	5	0.5	35	35	(3)

NOTES:

1. SEE EQUIPMENT DATA SCHEDULE ON SHEET MEP001 FOR ELECTRICAL INFORMATION.
2. MAX TOTAL PRESSURE DROP SHALL INCLUDE BOX AND REHEAT COIL (WHERE APPLICABLE).
3. PROVIDE THE NUMBERS OF COIL ROWS AS REQUIRED TO MEET SCHEDULED PERFORMANCE AND STILL FALL WITHIN REHEAT COIL PRESSURE DROP LIMITATION.
4. PROVIDE WITH OPTIONAL BOTTOM ACCESS DOOR PER SPECIFICATIONS.

ROOM PRESSURIZATION SCHEDULE

(ROOMS NOT SHOWN DO NOT REQUIRE PRESSURIZATION)

ROOM NUMBER	ROOM NAME	ROOM PRESSURIZATION: AIRFLOW (CFM)	PERCENTAGE (%)
4E-1	CORRIDOR	90	15
4E-2	CORRIDOR	165	59
4E-3	CORRIDOR	35	16
4E-4	CORRIDOR	145	15
4E-5	CORRIDOR	155	15
4E-6	CORRIDOR	30	21
4E-7-1	CORRIDOR-1	15	18
4E-7-2	CORRIDOR-2	130	15
4E-8	CORRIDOR	90	12
4W-2	CORRIDOR	170	19
4W-3	CORRIDOR	15	17
4W-4	CORRIDOR	30	16
4W-5	CORRIDOR	190	20
4W-6	CORRIDOR	30	20
4W-7	CORRIDOR	175	18
4101	SOILED UITILITY ROOM	-50	-14
4102	LINEN ROOM SOILD HOLD	-10	-25
4103	SOILED EQUIPMENT	-30	-19
4104	MED/SURG/ ISOLATION	-100	-23
4106	ANTEROOM (AIRBORNE INFECTION ISOLATION)	-25	-19
4107	CLEAN UTILITY	65	16
4108	MED/SURG/ ISOLATION	-100	-23
4109	MEDICATION ROOM	90	16
4110	SOILED HOLD	-10	-25
4115	NOURISHMENT	-50	-18
4117	CLEAN SUPPLY	70	18
4148	HAC	-15	-33
4156	WASHROOM	-75	-21
4168	WAITING	-35	-15
4172	FAMILY ROOM	-30	-16
4177	VENDING	-140	
4318	CLEAN LINEN	10	20
4322	HOUSEKEEPING AIDES CLOSET (HAC)	-15	-43
4334	KITCHENETTE	-70	-17
4341	NOURISHMENT	-15	-21
4343	CLEAN SUPPLY	70	16
4347	MEDICATION ROOM	70	16
4349	SOILED UTILITY/EQUIP	-25	-18
4350	SOILED LINEN	-10	-25
4351	CLEAN SUPPLY	10	20
4352	PATIENT ROOM INTENSIVE CARE ISOLATION	-75	-17
4353	PATIENT ROOM INTENSIVE CARE	65	16
4358	ANTEROOM	-25	-18
4361	MEDICATION ROOM	50	17
4362	ANTEROOM	-20	-20
4364	PATIENT ROOM INTENSIVE CARE ISOLATION	-75	-23
4365	PATIENT ROOM INTENSITIVE CARE	100	18
4369	STAFF LOUNGE	-60	-15

AIR DEVICE SCHEDULE

PLAN MARK	TYPE	NECK SIZE (IN)	FACE SIZE (IN x IN)	MATERIAL	FINISH	MAX TPD (IN WC)	MAX NOISE (NC)	MAX CFM @ LISTED CONDITIONS	MIN THROW (FT) 50 FPM	NOTES
S-1	SQUARE PLAQUE	6	24x24	STEEL	WHITE	0.1	30	170	8	1, 2
S-2	SQUARE PLAQUE	8	24x24	STEEL	WHITE	0.1	30	305	12	1, 2
S-3	SQUARE PLAQUE	10	24x24	STEEL	WHITE	0.1	30	400	13	1, 2
S-7	SQUARE PLAQUE	6	12x12	STEEL	WHITE	0.1	30	60	8	1, 2
S-8	SQUARE PLAQUE	7	12x12	STEEL	WHITE	0.1	30	140	9	1, 2
R-1	LOUVERED FACE	6	24x24	STEEL	WHITE	0.1	30	100	-	1, 2, 3
R-2	LOUVERED FACE	8	24x24	STEEL	WHITE	0.1	30	190	-	1, 2, 3
R-3	LOUVERED FACE	10	24x24	STEEL	WHITE	0.1	30	280	-	1, 2, 3
R-4	LOUVERED FACE	12	24x24	STEEL	WHITE	0.1	30	430	-	1, 2, 3
R-5	LOUVERED FACE	14	24x24	STEEL	WHITE	0.1	30	630	-	1, 2, 3
R-6	LOUVERED FACE	22x22	24x24	STEEL	WHITE	0.1	30	1880	-	1, 2, 3
R-7	LOUVERED FACE	10	12x24	STEEL	WHITE	0.1	30	300	-	1, 2, 3
R-8	LOUVERED FACE	12	24x24	STEEL	WHITE	0.1	30	430	-	1, 2, 3
E-1	LOUVERED FACE	6	24x24	STEEL	WHITE	0.1	30	100	-	1, 2, 3
E-2	LOUVERED FACE	8	24x24	STEEL	WHITE	0.1	30	190	-	1, 2, 3
E-3	LOUVERED FACE	10	24x24	STEEL	WHITE	0.1	30	280	-	1, 2, 3
E-4	LOUVERED FACE	12	24x24	STEEL	WHITE	0.1	30	430	-	1, 2, 3
E-5	LOUVERED FACE	14	24x24	STEEL	WHITE	0.1	30	630	-	1, 2, 3
E-6	LOUVERED FACE	6	12x12	STEEL	WHITE	0.1	30	100	-	1, 2, 3
E-7	LOUVERED FACE	8	12x12	STEEL	WHITE	0.1	30	190	-	1, 2, 3
T-2	LOUVERED FACE	8	24x24	STEEL	WHITE	0.1	30	190	-	1, 2, 3

NOTES:

1. COORDINATE BORDER FRAME WITH ARCHITECTURAL PLANS.
2. PROVIDE WITH ACCESSORIES AS LISTED IN THE SPECIFICATIONS.
3. PROVIDE WITH BACKPAN WITH SQUARE TO ROUND ADAPTER TO ACCOMMODATE SCHEDULED NECK SIZE.
4. PROVIDE WITH INTEGRAL BALANCING DAMPER.

100% OWNER REVIEW SET
FULLY SPRINKLERED

REVISIONS

Revision #	Description	Date

SUBMISSIONS

BID DOCUMENTS	4-27-2016
100% CONSTRUCTION DOCUMENTS	3-25-2016
95% CONSTRUCTION DOCUMENTS	12-17-2015
65% CONSTRUCTION DOCUMENTS	8-14-2015
35% CONSTRUCTION DOCUMENTS	5-15-2015

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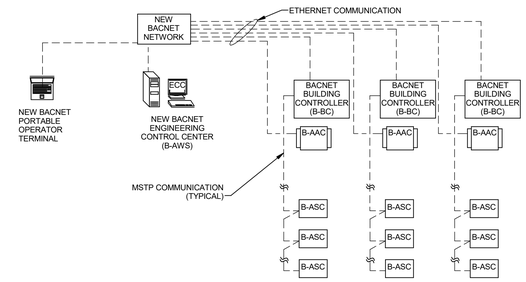
JEFFREY R. CRAWFORD
REGISTERED
PROFESSIONAL EN

CONTROLS SYMBOLS

T	ROOM THERMOSTAT/TRANSMITTER - WALL MOUNT
M	ROOM HUMIDISTAT (MOISTURE)/TRANSMITTER - WALL MOUNT
TT	TEMPERATURE TRANSMITTER
TT	TEMPERATURE TRANSMITTER, AVERAGING ELEMENT
MT	MOISTURE (HUMIDITY) TRANSMITTER
PT	PRESSURE TRANSMITTER
SPS	STATIC PRESSURE SENSOR
FT	FLOW TRANSMITTER
IT	CURRENT TRANSMITTER
CT	CONDUCTIVITY TRANSMITTER
SD	SMOKE DETECTOR
PDT	PRESSURE DIFFERENTIAL TRANSMITTER
PDS	PRESSURE DIFFERENTIAL SWITCH
HS	HAND SWITCH (HAND-OFF-AUTO SWITCH)
ZC	VALVE OR DAMPER POSITION CONTROLLER
KR	LOCAL RECORDING TIME CLOCK (RUNTIME)
TSL	TEMPERATURE SWITCH, LOW (FREEZESTAT)
TSH	TEMPERATURE SWITCH, HIGH (FREEZESTAT)
LC	LEVEL CONTROLLER
LT	LEVEL TRANSMITTER
PSH	PRESSURE SWITCH HIGH
PSL	PRESSURE SWITCH LOW

EPT	ELECTRONIC TO PNEUMATIC TRANSDUCER
AT CO2	CARBON DIOXIDE TRANSMITTER
AT CO	CARBON MONOXIDE TRANSMITTER
AT OC	OCCUPANCY SENSOR
LTCP	LOCAL TEMPERATURE CONTROL PANEL
HVAC	HVAC CONTROL PANEL
VSMC	VARIABLE SPEED MOTOR CONTROLLER
ECC	INTEGRATE CONTROL POINT ON REMOTE GRAPHICS WORKSTATION AT ENERGY CONTROL CENTER
TC	TEMPERATURE CONTROLLER. SEE SEQUENCE OF OPERATION
PC	PRESSURE CONTROLLER. SEE SEQUENCE OF OPERATION
SC	SPEED CONTROLLER. SEE SEQUENCE OF OPERATION
FC	FLOW CONTROLLER. SEE SEQUENCE OF OPERATION
FSH	FLOW SWITCH HIGH
FSL	FLOW SWITCH LOW
KC	TIME CLOCK CONTROLLING EQUIPMENT ON A SCHEDULE
	TEMPERATURE SENSING ELEMENT FOR TRANSMITTING TEMPERATURE TO EMCS (PROVIDE 12 INCHES [200mm] MINIMUM LENGTH IN DUCT WHEN SPACE PERMITS.)
A	SENSOR WITH AVERAGING ELEMENT TO TRANSMIT TEMPERATURE TO EMCS
	MOTOR STARTER
M	ELECTRIC OPERATED CONTROL DAMPER/OR VALVE



NOTES:

1. THE CONTRACTOR SHALL TIE INTO THE EXISTING DIRECT DIGITAL CONTROL (DDC) BUILDING MANAGEMENT SYSTEM (BMS) AS REQUIRED FOR A COMPLETE CONTROL SYSTEM AS DEFINED IN THE SPECIFICATIONS AND PER THE SEQUENCES AND THE INPUT/OUTPUT TABLE ON THESE SHEETS.

2. THE CONTRACTOR WILL BE EXPECTED TO WORK OUT THE DETAILS OF CONTROLLER ACTION, CONTROL LOOP TUNING, NORMALLY OPEN/NORMALLY CLOSED CONNECTIONS, EXACT EQUIPMENT REQUIREMENTS, ETC., TO PROVIDE A WORKING CONTROL SYSTEM.

3. THE WRITTEN SEQUENCE OF OPERATION SHALL BE THE CRITERION USED TO JUDGE THE FINAL PERFORMANCE OF THE CONTROL SYSTEM.

4. ALL FUNCTIONS IN THE SEQUENCE WILL BE REQUIRED EVEN IF THE REQUIRED EQUIPMENT AND CONNECTIONS ARE NOT DEPICTED ON THESE DRAWINGS.

5. THE CONTRACTOR SHALL INSTALL THE BUILDING CONTROL PANELS AS SHOWN ON THE DRAWINGS AND AS DETAILED IN THE SPECIFICATIONS.

6. THE NEW SYSTEM SHALL BE COMPATIBLE WITH THE EXISTING CONTROLS AT THE HOSPITAL.

1 MI-501 **CONTROLS SYSTEM ARCHITECTURE**
NTS

CHILLED WATER POINTS LIST

SYSTEM POINT DESCRIPTION	POINT ID	ABBREVIATION	POINT LEGEND: PRIORITY / ADD-ALTERNATE NO.	POINT LEGEND: #	SYSTEM OUTPUTS BINARY: ELECTRIC DEVICE	SYSTEM OUTPUTS BINARY: START / STOP	SYSTEM OUTPUTS BINARY: OPEN / CLOSE	SYSTEM OUTPUTS ANALOG: #	SYSTEM OUTPUTS ANALOG: SPEED COMMAND	SYSTEM OUTPUTS ANALOG: VALVE POSITION	SYSTEM OUTPUTS ANALOG: DAMPER POSITION	SYSTEM INPUTS BINARY: STATUS	SYSTEM INPUTS BINARY: ALARM	SYSTEM INPUTS BINARY: PRESSURE	SYSTEM INPUTS BINARY: HIGH HUMIDITY	SYSTEM INPUTS BINARY: HIGH STATIC PRESSURE	SYSTEM INPUTS BINARY: LOW TEMPERATURE	SYSTEM INPUTS ANALOG: #	SYSTEM INPUTS ANALOG: TEMPERATURE (TI)	SYSTEM INPUTS ANALOG: PRESSURE	SYSTEM INPUTS ANALOG: POSITION	SYSTEM INPUTS ANALOG: FLOW	SYSTEM INPUTS ANALOG: PERCENT	SYSTEM INPUTS ANALOG: STATIC PRESSURE	SYSTEM INPUTS ANALOG: CARBON MONOXIDE	SYSTEM INPUTS ANALOG: HUMIDITY	SYSTEM INPUTS ANALOG: VACUUM	SYSTEM SOFTWARE / CONTROL ALARM PROCESSING: LOCAL ALARM PANEL	SYSTEM SOFTWARE / CONTROL ALARM PROCESSING: AREA ALARM PANEL	SYSTEM SOFTWARE / CONTROL ALARM PROCESSING: MASTER ALARM PANEL	SYSTEM SOFTWARE / CONTROL ALARM PROCESSING: HIGH LIMIT	SYSTEM SOFTWARE / CONTROL ALARM PROCESSING: LOW LIMIT	SYSTEM SOFTWARE / CONTROL ALARM PROCESSING: #	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: SCHEDULE START / STOP	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: FUNCTION	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: DUTY CYCLE	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: TEMPERATURE ECONOMIZER	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: ENTHALPY ECONOMIZER	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: TEMPERATURE RESET	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: DEMAND LIMITING	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: TEMPERATURE OVERRIDE	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: STATIC PRESSURE RESET	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: #	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: PRESSURE / VOLUME CONTROL	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: FAILURE MODE	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: SPACE TEMP CONTROL	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: FULL COMMUNICATION	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: TRENDING	NOTES
CHILLER CURRENT TRANSFORMER	AI-1	CH-CT																																																		•	
CHILLED WATER RETURN TEMPERATURE	AI-2	CWR-T																																																		•	
CHILLED WATER SUPPLY TEMPERATURE	AI-3	CWS-T											•																		•	•																				•	
CHILLED WATER VALVE POSITION	AI-4/5	CW-P																		•																																•	
CHILLED WATER VALVE MODULATION	AO-1/2	CW-VL								•																																											
CHILLER ALARM	BI-1	CH-AL											•																																								
CHILLER STATUS	BI-2	CH-S										•																																								•	
CHILLER START/STOP	BO-1	CH-SS			•																																																

CHILLED WATER SYSTEM SEQUEMCE OF OPERATION

1. CHILLED WATER SYSTEM

1.1 THE CHILLED WATER SYSTEM INCLUDES AN AIR-COOLED CHILLER (CH-1) AND TWO (2) VARIABLE SPEED PUMPS. PUMPS ARE DUTY/STANDBY AND ARE PART OF CHILLER PACKAGE.

2. OPERATION

2.1 THE SYSTEM IS ENERGIZED WHEN THERE IS A CALL FOR MECHANICAL COOLING AND THE OUTSIDE AIR TEMPERATURE IS GREATER THAN 55°F.

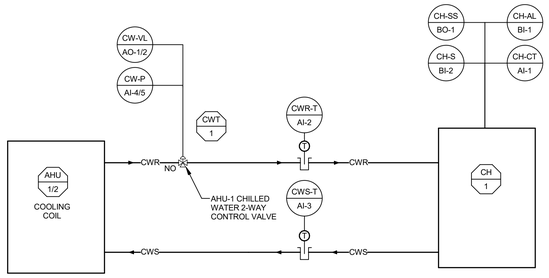
2.2 ON A CALL FOR COOLING, THE BMS SHALL OPEN THE CHILLED WATER CONTROL VALVE AND SEND AN ENABLE SIGNAL TO THE CHILLER. IF SUPPLY AIR TEMPERATURE CANNOT BE MAINTAINTED, THE CHILLER SHALL START THE LEAD PUMP AFTER RUNNING THROUGH ITS SYSTEM CHECKS. THE CHILLER SHALL CONTROL THE LEAVING WATER TEMPERATURE TO 44°F (ADJ). IF THE SUPPLY WATER TEMPERATURE AS SENSED BY THE SUPPLY WATER TEMPERATURE SENSOR AT THE COOLING COIL REACHES OR EXCEEDS 60°F (ADJ) THE SYSTEM SHALL ALARM AND THE CHILLER SHALL STOP.

2.3 WHEN THERE IS NO LONGER A CALL FOR COOLING, THE CHILLER SHALL STOP THE LEAD PUMP AND DE-ENERGIZE. PROVIDE A TEMPERATURE SENSOR IN THE RETURN WATER PIPING TO MONITOR CHILLED WATER RETURN TEMPERATURE.

2.4 THE CHILLER SHALL TRACK AND LOG PUMP RUN TIME. THE PUMP WITH THE LOWEST NUMBER OF RUN HOURS SHALL BE DEFINED AS THE LEAD PUMP. THE PUMP WITH GREATEST NUMBER OF RUN HOURS SHALL BE DEFINED AS THE LAG PUMP. UPON RUN TIME DIFFERENTIAL OF 200 HOURS THE CHILLER SHALL ALTERNATE LEAD/LAG PUMP DESIGNATION TO EQUALIZE RUNTIME.

2.5 UPON FAILURE OF THE LEAD PUMP TO START, AN ALARM SHALL BE SENT TO THE OPERATOR'S WORKSTATION AND THE CHILLER SHALL START LAG PUMP AND CONTINUE OPERATION.

2.6 UPON A CHILLER ALARM FROM THE CHILLER CONTROL PANEL, THE BMS SHALL BE ALARMED. THE SPECIFIC ALARM NEED NOT BE IDENTIFIED.



2 MI-501 **CHILLED WATER SYSTEM CONTROLS DIAGRAM**
NTS

ISOLATION SUITE POINTS LIST

SYSTEM POINT DESCRIPTION	POINT ID	ABBREVIATION	POINT LEGEND: PRIORITY / ADD-ALTERNATE NO.	POINT LEGEND: #	SYSTEM OUTPUTS BINARY: ELECTRIC DEVICE	SYSTEM OUTPUTS BINARY: START / STOP	SYSTEM OUTPUTS BINARY: OPEN / CLOSE	SYSTEM OUTPUTS ANALOG: #	SYSTEM OUTPUTS ANALOG: SPEED COMMAND	SYSTEM OUTPUTS ANALOG: VALVE POSITION	SYSTEM OUTPUTS ANALOG: DAMPER POSITION	SYSTEM INPUTS BINARY: STATUS	SYSTEM INPUTS BINARY: ALARM	SYSTEM INPUTS BINARY: PRESSURE	SYSTEM INPUTS BINARY: HIGH HUMIDITY	SYSTEM INPUTS BINARY: HIGH STATIC PRESSURE	SYSTEM INPUTS BINARY: LOW TEMPERATURE	SYSTEM INPUTS ANALOG: #	SYSTEM INPUTS ANALOG: TEMPERATURE (TI)	SYSTEM INPUTS ANALOG: PRESSURE	SYSTEM INPUTS ANALOG: POSITION	SYSTEM INPUTS ANALOG: FLOW	SYSTEM INPUTS ANALOG: PERCENT	SYSTEM INPUTS ANALOG: STATIC PRESSURE	SYSTEM INPUTS ANALOG: CARBON MONOXIDE	SYSTEM INPUTS ANALOG: HUMIDITY	SYSTEM INPUTS ANALOG: VACUUM	SYSTEM SOFTWARE / CONTROL ALARM PROCESSING: LOCAL ALARM PANEL	SYSTEM SOFTWARE / CONTROL ALARM PROCESSING: AREA ALARM PANEL	SYSTEM SOFTWARE / CONTROL ALARM PROCESSING: MASTER ALARM PANEL	SYSTEM SOFTWARE / CONTROL ALARM PROCESSING: HIGH LIMIT	SYSTEM SOFTWARE / CONTROL ALARM PROCESSING: LOW LIMIT	SYSTEM SOFTWARE / CONTROL ALARM PROCESSING: #	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: SCHEDULE START / STOP	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: FUNCTION	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: DUTY CYCLE	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: TEMPERATURE ECONOMIZER	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: ENTHALPY ECONOMIZER	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: TEMPERATURE RESET	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: DEMAND LIMITING	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: TEMPERATURE OVERRIDE	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: STATIC PRESSURE RESET	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: #	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: PRESSURE / VOLUME CONTROL	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: FAILURE MODE	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: SPACE TEMP CONTROL	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: FULL COMMUNICATION	SYSTEM SOFTWARE / CONTROL APPLICATION / FUNCTION: TRENDING	NOTES
EXHAUST FAN STATUS	BI-1/2	EF-S										•																																								•	
EXHAUST FAN START/STOP	BO-1/2	EF-SS				•																																															•	
EXHAUST AIR DAMPER OPEN/CLOSE	AO-1/2	EF-D									•																																									•	
ISO. ROOM DIFF. PRESS. MONITOR	AI-1-4	ISO-DP																					•																						•							•	
ISO ROOM STATUS	BI-3/4	ISO-RM											•																																								•	

ISOLATION SUITES SEQUENCE OF OPERATION

1. SYSTEM DESCRIPTION

1.1 THE SYSTEM CONSISTS OF A CONSTANT VOLUME EXHAUST FAN WITH AN ISOLATION DAMPER, TERMINAL UNITS WITH REHEAT COILS AND DIFFERENTIAL PRESSURE MONITORS BETWEEN THE CORRIDOR AND EACH ISOLATION ROOM.

2. EXHAUST FAN

2.1 START/STOP: UPON RECEIVING A SIGNAL TO START, AFTER A TIME DELAY TO ALLOW ALL THE ISOLATION, FIRE/SMOKE AND SMOKE DAMPERS TO OPEN, THE DDC SYSTEM SHALL START THE SUPPLY FAN.

2.2 THE FAN SHALL RUN CONTINUOUSLY DURING OCCUPIED HOURS.

2.3 INSTALL A CURRENT STATUS SWITCH TO PROVE SUPPLY FAN OPERATION. SEND AN ALARM TO THE OPERATOR'S WORKSTATION UPON FAN FAILURE.

3. ISOLATION DAMPER

3.1 PRIOR TO ENABLING EXHAUST FAN, ISOLATION DAMPER SHALL OPEN, ONCE PROVEN OPEN, FAN SHALL BE ENABLED.

3.2 WHEN FAN IS DISABLED, AFTER A TIME DELAY TO ALLOW FOR FAN TO RAMP DOWN, ISOLATION DAMPER SHALL CLOSE.

4. DIFFERENTIAL PRESSURE MONITOR

4.1 NEGATIVE PRESSURE (0.1" WC MINIMUM) SHALL BE MAINTAINED BETWEEN EACH ISOLATION ROOM AND THE CORRIDOR.

4.2 A PERMANENTLY INSTALLED DEVICE AND/OR MECHANISM SHALL BE USED TO CONSTANTLY MONITOR THE PRESSURE DIFFERENTIALS INDICATED ABOVE AND SHALL DISPLAY LOCALLY THAT A NEGATIVE PRESSURE DIFFERENTIAL IS MAINTAINED. SEE PLANS FOR LOCATIONS OF THESE DEVICES.

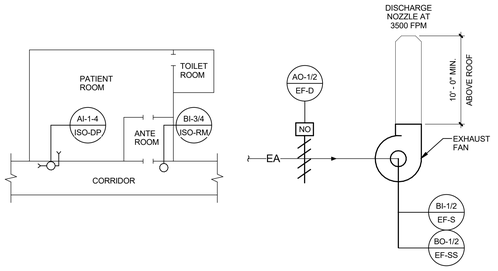
5. TERMINAL UNITS

5.1 TERMINAL UNITS SHALL BE CONTROLLED AS DESCRIBED IN TERMINAL UNIT SEQUENCE WITH THE EXCEPTION THAT AIRFLOW SEETING SHALL BE OVERRIDDEN TO MAINTAIN PRESSURE DIFFERENTIAL AS REQUIRED EVEN IF TEMPERATURE SETPOINT IS SATISFIED. UNIT AIRFLOW IS SELECTED SO THAT AT MAXIMUM AIRFLOW, A 0.1" WC PRESSURE DIFFERENTIAL IS MAINTAINED AS REQUIRED BY THIS SEQUENCE.

6. ROOM STATUS

6.1 A STATUS SWITCH ON THE WALL NEAR THE ANTE ROOMS SHALL PROVIDE ROOM STATUS TO THE DDC SYSTEM. WHEN ROOM STATUS IS IDENTIFIED AS "ISOLATION", THE SYSTEM SHALL OPERATE AS DESCRIBED ABOVE AND THE AIRFLOWS SHOWN ON THE PLANS. WHEN ROOM STATUS IS IDENTIFIED AS "NORMAL", THE EXHAUST AIRFLOW SHALL BE RESET TO EQUAL THE SUPPLY AIRFLOW TO THE ISOLATION ROOM. ANTE ROOM, AND RESTROOM. UNDER NORMAL OPERATION, EF-1 AIRFLOW SHALL BE RESET TO 1000 CFM AND EF-2 SHALL BE RESET TO 1120 CFM USING VFD SUPPLIED WITH FAN.

6.2 TERMINAL UNITS SHALL BE CONTROLLED AS DESCRIBED IN TERMINAL UNIT SEQUENCE WITH THE EXCEPTION THAT AIR FLOW SETTING SHALL BE OVERRIDDEN TO MAINTAIN A ZERO PRESSURE DIFFERENTIAL BETWEEN ISOLATION ROOMS AND CORRIDOR AS MONITORED BY THE PRESSURE MONITOR.



3 MI-501 **ISOLATION SUITE CONTROLS DIAGRAM**
NTS

100% OWNER REVIEW SET
FULLY SPRINKLERED

REVISIONS

Revision #	Description	Date

SUBMISSIONS

BID DOCUMENTS	4-27-2016
100% CONSTRUCTION DOCUMENTS	3-25-2016
95% CONSTRUCTION DOCUMENTS	12-17-2015
65% CONSTRUCTION DOCUMENTS	8-14-2015
35% CONSTRUCTION DOCUMENTS	5-15-2015

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Drawing Title: CONTROLS

Approved: Project Director

Project Title: RENOVATE FOURTH FLOOR

Location: 2121 LAKE AVE., FORT WAYNE, IN 46805

Date: 2016.04.25 | Checked: JDW | Drawn: TRT

Project Number: #610A4-08-104

Building Number: 01

Drawing Number: MI-501

Dwg. 81 of 138

Office of Construction and Facilities Management

VA Department of Veterans Affairs

VA FORM 08-6231

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AIR TERMINAL UNIT (VAV-XX) POINTS LIST

SYSTEM POINT DESCRIPTION	POINT ID	ABBREVIATION	PRIORITY / ADD-ALTERNATE NO.	:	ELECTRIC DEVICE	START / STOP	OPEN / CLOSE	:	SPEED COMMAND	VALVE POSITION	DAMPER POSITION	STATUS	ALARM	PRESSURE	HIGH HUMIDITY	HIGH STATIC PRESSURE	LOW TEMPERATURE	:	TEMPERATURE (TI)	PRESSURE	POSITION	FLOW	PERCENT	STATIC PRESSURE	CARBON MONOXIDE	HUMIDITY	VACUUM	LOCAL ALARM PANEL	AREA ALARM PANEL	MASTER ALARM PANEL	HIGH LIMIT	LOW LIMIT	:	SCHEDULE START / STOP	FUNCTION	DUTY CYCLE	TEMPERATURE ECONOMIZER	ENTHALPY ECONOMIZER	TEMPERATURE RESET	DEMAND LIMITING	TEMPERATURE OVERRIDE	STATIC PRESSURE RESET	:	PRESSURE / VOLUME CONTROL	FAILURE MODE	SPACE TEMP CONTROL	FULL COMMUNICATION	TRENDING	NOTES
			POINT LEGEND		SYSTEM OUTPUTS							SYSTEM INPUTS																									SYSTEM SOFTWARE / CONTROL													
					BINARY				ANALOG			BINARY							ANALOG									ALARM PROCESSING						APPLICATION / FUNCTION															
ATU AIRFLOW	AI-1	ATU-F											•									•										•																•		
SUPPLY AIR TEMPERATURE	AI-2	SA-T											•						•												•	•																•		
SPACE TEMPERATURE	AI-3	SPC-T											•						•												•	•																•		
ATU DAMPER OPEN/CLOSE	AO-1	ATU-D									•																																							

AIR TERMINAL UNIT (VAV) SEQUENCE OF OPERATION

1. GENERAL

1.1 SET POINTS SHALL BE SET AS FOLLOWS:
COOLING 75°F (ADJ)
HEATING 70°F(ADJ)
DEADBAND OF 5° F BETWEEN HEATING AND COOLING SET POINTS WILL BE MAINTAINED.

1.2 UPON FALL IN SPACE TEMPERATURE THE VAV DAMPER WILL MODULATE TO MINIMUM POSITION.

1.3 UPON FURTHER DROP IN SPACE TEMPERATURE VALVE V-1 WILL MODULATE TO MAINTAIN SET POINT + .5° F. THE ADJUSTABLE TOLERANCE OF + .5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING.

1.4 THE REVERSE SHALL OCCUR ON A RISE IN SPACE TEMPERATURE.

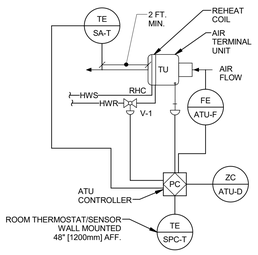
1.5 THE BAS SHALL UTILIZE FEEDBACK FROM ALL TERMINAL AIR BOX POSITIONS TO RESET THE SUPPLY DUCT DIFFERENTIAL STATIC PRESSURE TO MAINTAIN ONE VAV BOX DAMPER AT A 90% OPEN POSITION. PROVIDE PROVISIONS TO ALLOW OPERATE EXCLUDE UP TO 5 (ADJ.) BOXES FROM THIS SEQUENCE TO ALLOW FOR EXCLUSION OF MALFUNCTIONING BOXES.

2. ALARMS, INTERLOCKS AND SAFETIES

2.1 SEND AN ALARM TO THE BAS OPERATOR INTERFACE IF THE SPACE TEMPERATURE FALLS 10°F (ADJ.) BELOW SETPOINT FOR MORE THAN 15 MIN (ADJ.).

2.2 IF THE PRIMARY AIR DAMPER IS AT ITS MAXIMUM POSITION FOR A PERIOD OF 30 MINUTES, (ADJ) AND THE SPACE TEMPERATURE IS STILL ABOVE SET POINT, THEN A SPACE TEMPERATURE ALARM SHALL BE INITIATED TO THE BAS.

2.3 IF THE PRIMARY AIR DAMPER IS AT ITS MAXIMUM HEATING POSITION AND THE HEATING WATER VALVE IS FULLY OPEN FOR A PERIOD OF 30 MINUTES (ADJ) AND THE SPACE TEMPERATURE IS STILL BELOW SET POINT , THEN A SPACE TEMPERATURE ALARM SHALL BE INITIATED TO THE BAS.



1 MI-502 **AIR TERMINAL UNIT (VAV-XX) CONTROLS DIAGRAM**
NTS

ENERGY RECOVERY UNIT (ERU-1&2) POINTS LIST

SYSTEM POINT DESCRIPTION	POINT ID	ABBREVIATION	PRIORITY / ADD-ALTERNATE NO.	:	ELECTRIC DEVICE	START / STOP	OPEN / CLOSE	:	SPEED COMMAND	VALVE POSITION	DAMPER POSITION	STATUS	ALARM	PRESSURE	HIGH HUMIDITY	HIGH STATIC PRESSURE	LOW TEMPERATURE	:	TEMPERATURE (TI)	PRESSURE	POSITION	FLOW	PERCENT	STATIC PRESSURE	CARBON MONOXIDE	HUMIDITY	VACUUM	LOCAL ALARM PANEL	AREA ALARM PANEL	MASTER ALARM PANEL	HIGH LIMIT	LOW LIMIT	:	SCHEDULE START / STOP	FUNCTION	DUTY CYCLE	TEMPERATURE ECONOMIZER	ENTHALPY ECONOMIZER	TEMPERATURE RESET	DEMAND LIMITING	TEMPERATURE OVERRIDE	STATIC PRESSURE RESET	:	PRESSURE / VOLUME CONTROL	FAILURE MODE	SPACE TEMP CONTROL	FULL COMMUNICATION	TRENDING	NOTES
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SUPPLY AIR TEMPERATURE	AI-1	SA-T											•						•																														•		
OUTSIDE AIR FLOW	AI-2	OA-F											•									•									•																		•		
RETURN AIR TEMPERATURE	AI-4	RA-T											•						•																																
EXHAUST AIR FLOW	AI-5	EA-F											•									•									•																		•		
PRE-HEAT COIL DISCHARGE TEMPERATURE	AI-10	OA-T											•						•																														•		
PRE-HEAT COIL DISCHARGE TEMPERATURE	AI-10	EA-T											•						•																														•		
OUTSIDE AIR FAN VSMC SPEED	AO-1	OA-SPD						•																																									•	•	FULL COMMUNICATION
EXHAUST FAN VSMC SPEED	AO-2	EF-SPD						•																																									•	•	FULL COMMUNICATION
OUTSIDE AIR DAMPER	AO-4	OA-D								•																•																							•		
OUTSIDE AIR FAN STATUS	BI-1	OA-S									•																																						•		
OUTSIDE AIR FAN VSMC ALARM	BI-2	OA-AL										•																																					•		
EXHAUST FAN STATUS	BI-3	EF-S									•																																						•		
EXHAUST FAN VSMC ALARM	BI-4	EF-AL										•																																					•		
OUTSIDE AIR FAN START/STOP	BO-1	OA-SS			•																												•																•		
EXHAUST FAN START/STOP	BO-2	EF-SS			•																												•																•		

ENERGY RECOVERY UNIT (ERU-1&2) SEQUENCE OF OPERATION

1. SYSTEM DESCRIPTION

1.1 THE BMS SHALL PROVIDE ALL CONTROL FUNCTIONS FOR THIS ERU. THE UNIT IS A PACKAGED UNIT EQUIPPED WITH THE FOLLOWING:

CONSTANT VOLUME SUPPLY FAN AND EXHAUST FAN
A FIXED-PLATE CROSS-FLOW ENERGY RECOVERY COMPONENT
OUTSIDE AIR AND RETURN AIR FILTER BANKS

2. SUPPLY FAN

2.1 START/STOP: UPON RECEIVING A SIGNAL TO START, THE BMS SHALL OPEN THE OUTSIDE AIR DAMPER AND, AFTER A PRE-DETERMINED TIME DELAY, SHALL START THE OUTSIDE AIR FAN.

2.2 THE OUTSIDE AIR FAN SHALL BE CONTROLLED BY THE DIGITAL CONTROL PANEL MODULATING THE OUTSIDE AIR FAN VARIABLE SPEED MOTOR CONTROLLER TO MAINTAIN THE SCHEDULED OUTSIDE AIRFLOW FOR EACH UNIT.

3 EXHAUST FAN

3.1 START/STOP: UPON RECEIVING A SIGNAL TO START, THE BMS SHALL START THE EXHAUST FAN.

3.2 THE EXHAUST AIR FAN SHALL BE CONTROLLED BY THE DIGITAL CONTROL PANEL MODULATING THE EXHAUST AIR FAN VARIABLE SPEED MOTOR CONTROLLER TO MAINTAIN THE SCHEDULED EXHAUST AIRFLOW FOR EACH UNIT.

ENERGY RECOVERY UNIT (ERU-1&2) SEQUENCE OF OPERATION

4. ECONOMIZER OPERATION

4.1 ECONOMIZER-MODE SHALL BE INITIATED WHEN OUTSIDE AIR TEMPERATURE IS LESS THAN OR EQUAL TO 65°F. THE BMS SHALL MODULATE THE OUTSIDE AIR DAMPER CLOSED AND SHUT DOWN OUTSIDE AIR FAN. EXHAUST DAMPER SHALL REMAIN OPEN AND EXHAUST FAN SHALL CONTINUE TO RUN. OUTSIDE AIR SHALL BE PROVIDED BY THE AIR HANDLING UNIT'S ECONOMIZER SECTION DURING ECONOMIZER OPERATION.

5. FIRE ALARM INTERFACE

5.1 WHENEVER THE FIRE ALARM SYSTEM IS ACTIVATED, THE UNIT SHALL SHUT DOWN. AN ALARM SHALL BE SENT TO THE OPERATOR'S WORKSTATION AT THE HOSPITAL.

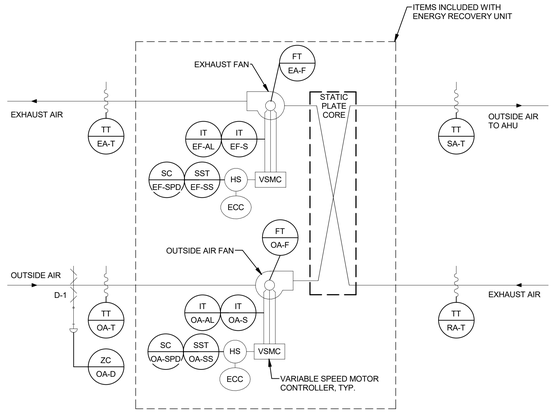
6. FILTERS

6.1 PROVIDE DIFFERENTIAL PRESSURE SENSORS ACROSS EACH FILTER BANK.

6.2 PROVIDE AN ALARM TO THE OPERATOR'S WORKSTATION AT THE HOSPITAL IF DIFFERENTIAL PRESSURE EXCEEDS SET POINT OF 0.5" WC (ADJ).

7. DAMPERS

7.1 PROVIDE A SEPARATE AND INDEPENDENT CONTROL SIGNAL TO EACH DAMPER SO THAT ANY ONE DAMPER CAN BE CONTROLLED INDEPENDENTLY FROM THE OTHER DAMPERS.



2 MI-502 **ENERGY RECOVERY UNIT (ERU-XX) CONTROLS DIAGRAM**
NTS

AIR HANDLING UNIT (AHU-1/2) POINTS LIST

SYSTEM POINT DESCRIPTION	POINT ID	ABBREVIATION	PRIORITY / ADD-ALTERNATE NO.	:	ELECTRIC DEVICE	START / STOP	OPEN / CLOSE	:	SPEED COMMAND	VALVE POSITION	DAMPER POSITION	STATUS	ALARM	PRESSURE	HIGH HUMIDITY	HIGH STATIC PRESSURE	LOW TEMPERATURE	:	TEMPERATURE (TI)	PRESSURE	POSITION	FLOW	PERCENT	STATIC PRESSURE	CARBON MONOXIDE	HUMIDITY	VACUUM	LOCAL ALARM PANEL	AREA ALARM PANEL	MASTER ALARM PANEL	HIGH LIMIT	LOW LIMIT	:	SCHEDULE START / STOP	FUNCTION	DUTY CYCLE	TEMPERATURE ECONOMIZER	ENTHALPY ECONOMIZER	TEMPERATURE RESET	DEMAND LIMITING	TEMPERATURE OVERRIDE	STATIC PRESSURE RESET	:	PRESSURE / VOLUME CONTROL	FAILURE MODE	SPACE TEMP CONTROL	FULL COMMUNICATION	TRENDING	NOTES
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SUPPLY AIR DUCT STATIC PRESSURE	AI-3	SA-SP											•											•							•												•						•		
RETURN AIR TEMPERATURE	AI-4	RA-T											•						•																														•		
RETURN AIR FLOW	AI-5	RA-F											•									•									•																		•		
MIXED AIR TEMPERATURE	AI-6	MA-LL											•				•		•													•																		•		
OUTSIDE AIR TEMPERATURE	AI-8	OA-T																	•																														•		
COOLING COIL DISCHARGE TEMPERATURE	AI-9	CC-T											•						•													•																		•		
PRE-HEAT COIL DISCHARGE TEMPERATURE	AI-10	PHC-T											•						•																														•		
PRE-FILTER PRESSURE DROP	AI-11	PD-PF											•											•							•																		•		
AFTER-FILTER PRESSURE DROP	AI-12	PD-AF											•											•							•																		•		
FINAL-FILTER PRESSURE DROP	AI-13	PD-FF											•											•							•																		•		
SUPPLY FAN VSMC SPEED	AO-1	SF-SPD							•																																							•	•	FULL COMMUNICATION
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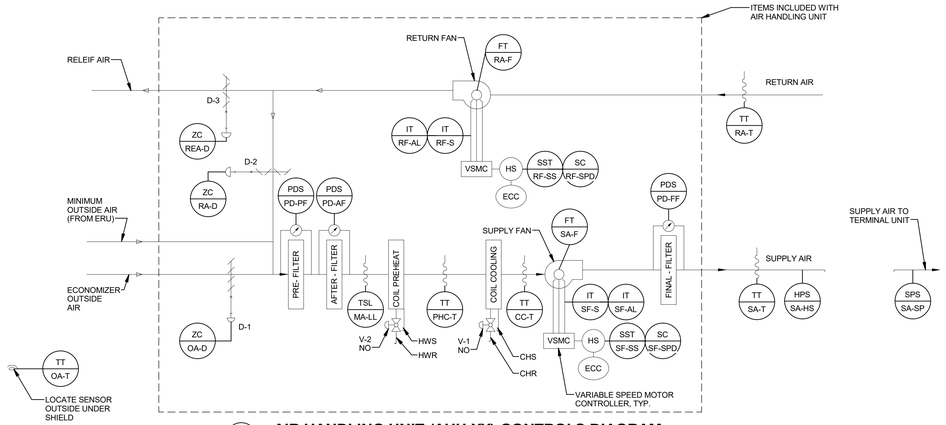
SUPPLY AIR HIGH STATIC ALARM	BI-6	SA-HS															•															•																		•		
SUPPLY FAN START/STOP	BO-1	SF-SS				•																												•																•		
RETURN FAN START/STOP	BO-2	RF-SS				•																												•																•		



3 MI-502 **AIR HANDLING UNIT (AHU-XX) CONTROLS DIAGRAM**
NTS

SEQUENCE OF OPERATION FOR AIR HANDLING UNITS-1&2

1. GENERAL

1.1 UNIT IS NORMALLY STARTED AND STOPPED REMOTELY AT THE ECC. H-O-A SWITCH SHALL BE KEPT IN THE "AUTO" POSITION. "HAND" AND "OFF" POSITIONS SHALL BE USED ONLY FOR MAINTENANCE. WHEN THE UNIT IS "OFF" D-1, D-3, SHALL BE FULLY CLOSED. WHEN THE UNIT IS "ON" D-1, SD-1 AND SD-2 SHALL BE FULLY OPEN. D-2 AND D-3 SHALL MODULATE IN ACCORDANCE WITH THE FOLLOWING SEQUENCE:

2. TEMPERATURE CONTROL

2.1 SUPPLY AIR TEMPERATURE, SENSED BY TT-1, SHALL BE MAINTAINED AT SETPOINT VIA DIGITAL CONTROL PANEL BY MODULATING V-1 OR D-2 AND D-3 OR V-2 IN SEQUENCE

2.2 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY TT-2, IS ABOVE 75°F (ADJ.) [23.8°C], THE DIGITAL CONTROL PANEL SHALL PREVENT THE MODULATION OF D-2 AND D-3 AND SHALL ASSUME THE MINIMUM OUTSIDE AIR POSITION (D-2 FULLY OPENED AND D-3 FULLY CLOSED). THE DIGITAL CONTROL PANEL SHALL MODULATE V-1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY TT-1.

2.3 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY TT-2, IS BETWEEN 65°F [18.3°C] AND THE SUPPLY AIR TEMPERATURE SENSED BY TT-1, DAMPER D-2 SHALL FULLY CLOSE AND D1 AND D3 SHALL BE FULLY OPEN (MAXIMUM OUTSIDE AIR POSITION). THE DIGITAL CONTROL PANEL SHALL MODULATE V-1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY TT-1.

2.4 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY TT-2, IS BELOW THE SUPPLY AIR TEMPERATURE, SENSED BY TT-1, DAMPERS D1, D-2 AND D-3 SHALL MODULATE TO MAINTAIN THE SCHEDULED SUPPLY AIR TEMPERATURE. IF D-2 IS OPEN AND D-3 IS CLOSED TO MINIMUM OUTSIDE AIR, V-2 SHALL MODULATE OPEN TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY TT-1.

3. AIR FLOW CONTROL

3.1 THE SUPPLY AIR FLOW SHALL BE CONTROLLED BY THE DIGITAL CONTROL PANEL MODULATING THE SUPPLY FAN VARIABLE SPEED MOTOR CONTROLLER TO MAINTAIN 1.0" [25mm] OF DUCT STATIC PRESSURE (FIELD ADJUSTABLE), SENSED BY SPS-1. RESET STATIC PRESSURE BASED ON ACTUAL BUILDING LOAD BY POLLING ALL ATU

3.2 THE DIGITAL CONTROL PANEL, USING TOTAL SUPPLY AIR AND RETURN AIR FLOW SIGNALS, SHALL RESET THE RETURN AIR FAN VSMC TO MAINTAIN A CONSTANT AIR FLOW DIFFERENCE BETWEEN THE SUPPLY AIR AND THE RETURN AIR EQUAL TO MINIMUM OUTSIDE AIR.

3.3 USING HIGH PRESSURE SENSOR SPS-2 LOCATED AT THE SUPPLY FAN DISCHARGE, SHALL PREVENT THE SUPPLY FAN FROM DEVELOPING OVER 3" [75mm] OF STATIC PRESSURE (FIELD ADJUSTABLE). IF STATIC PRESSURE AT SPS-2 DOES EXCEED 3" [75mm] THE SUPPLY AIR FAN SHALL STOP. SPS-2 SHALL BE HARDWIRED TO THE SUPPLY FAN VSMC AND UNIT SHALL BE SHUTDOWN IN HAND,AUTO OR BYPASS MODE. SPS-2 WILL REQUIRE MANUAL RESET AT THE DEVICE.

SEQUENCE OF OPERATION FOR AIR HANDLING UNITS-1&2

4. FREEZE PROTECTION

4.1 IF THE AIR TEMPERATURE AS SENSED BY TT-3 FALLS BELOW 45°F [7°C], AN ALARM SIGNAL SHALL INDICATE AT THE DCP AND ECC. IF THIS TEMPERATURE FALLS BELOW 40°F [4.4°C], AS SENSED BY THE TSL THE SUPPLY AND RETURN FANS SHALL SHUT DOWN AND A CRITICAL ALARM SHALL INDICATE AT THE DIGITAL CONTROL PANEL AND ECC. TSL SHALL BE HARDWIRED TO THE SUPPLY FAN UFD AND UNIT SHALL BE SHUTDOWN IN HAND,AUTO OR BYPASS MODE. TSL WILL REQUIRE MANUAL RESET AT THE DEVICE.

5. SHUTDOWN / RESTART

5.1 WHEN SMOKE IS DETECTED BY DUCT SMOKE DETECTOR, SD, THE SUPPLY AND RETURN FANS SHALL SHUT "OFF" AND AN ALARM SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SYSTEM. ALL SMOKE DAMPERS IN THE SUPPLY AND RETURN DUCTS SHALL CLOSE.

5.2 EXHAUST FANS SERVING AREA OF THE SUPPLY FAN SHALL CONTINUE TO RUN. SUPPLY AND RETURN FANS SHALL RESTART AND SMOKE DAMPERS SHALL OPEN WHEN FIRE ALARM CIRCUIT IS RESET.

6. EMERGENCY CONSTANT SPEED OPERATION

6.1 UPON FAILURE OF THE VSMC, THE SUPPLY AND RETURN FANS SHALL BE STARTED/STOPPED MANUALLY AT THE DIGITAL CONTROL PANEL OR THE ECC THROUGH THE BY-PASS STARTER. FANS SHALL THEN BE OPERATED AT CONSTANT SPEED.

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REVISIONS

Revision #	Description	Date

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VA NORTHERN INDIANA HEALTH CARE SYSTEM, FORT WAYNE
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JEFFREY R. CRAWFORD REGISTERED PE STATE OF INDIANA PROFESSIONAL ENGINEER 4/25/16

Drawing Title	Project Title	Project Number	Office of Construction and Facilities Management
CONTROLS	RENOVATE FOURTH FLOOR	#610A4-08-104	
Approved: Project Director	Location: 2121 LAKE AVE., FORT WAYNE, IN 46805	Building Number: 01	
	Date: 2016.04.25 / Checked: JDW / Drawn: TRT	Drawing Number: MI-502	VA Department of Veterans Affairs
		Dwg. 82 of 138	

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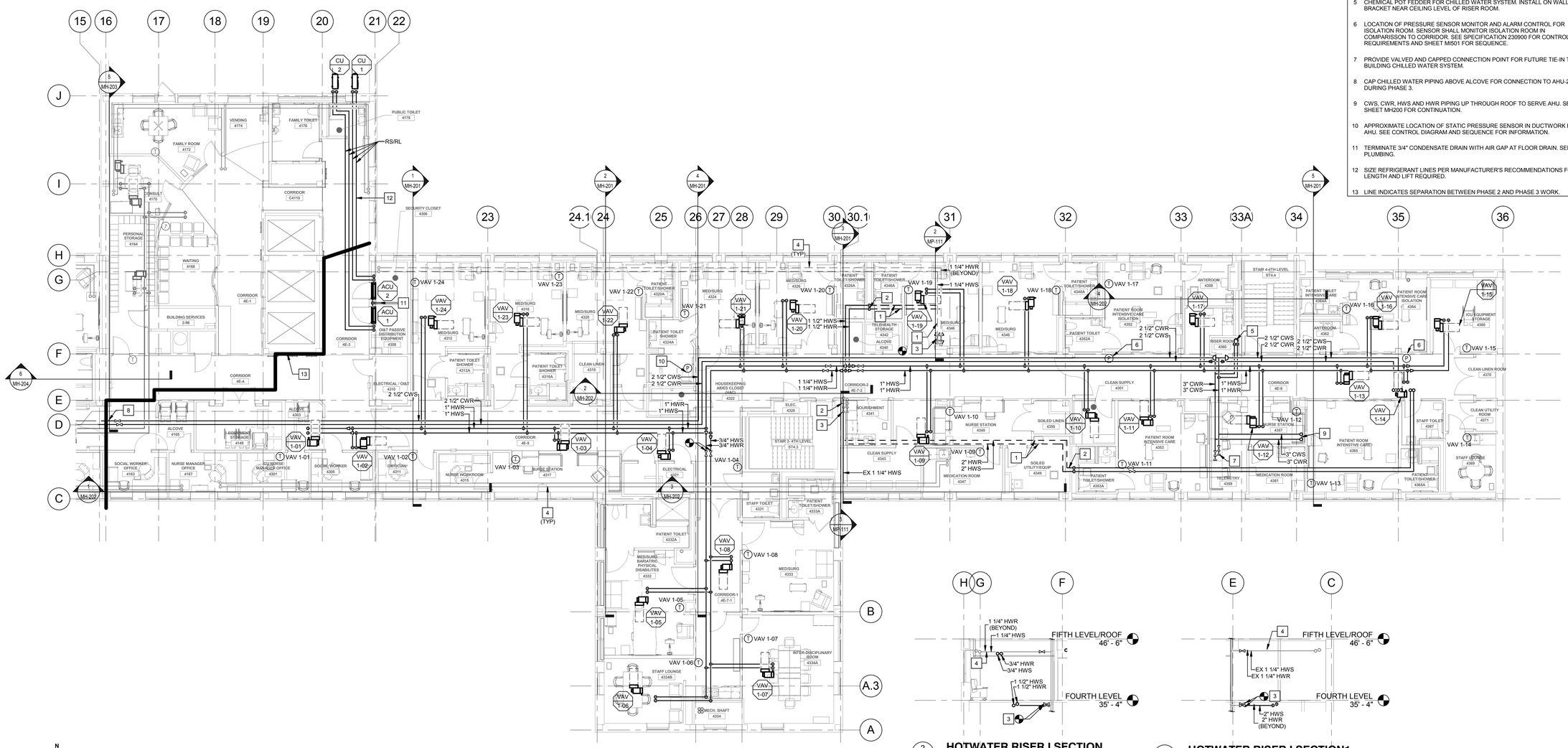
GENERAL NOTES

1. SEE SHEET M-001 FOR GENERAL NOTES.

KEYED NOTES

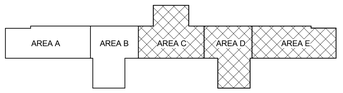
1. PIPING SHOWN DASHED TO BE LOCATED IN CEILING OF THIRD FLOOR.
2. ROUTE PIPING UP THROUGH PLUMBING CHASE TO FOURTH FLOOR CEILING.
3. LOCATE VALVED AND CAPPED HWS AND HWR IN THIRD FLOOR CEILING TO SERVE FOURTH FLOOR HEATING SYSTEM. CONNECT NEW HWS AND HWR LINES AND EXTEND TO LOCATION SHOWN.
4. EXISTING HOT WATER SUPPLY AND RETURN PIPING SERVING FIFTH FLOOR ABOVE TO REMAIN. REMOVE EXISTING INSULATION AND REINSULATE WITH NEW INSULATION. AVOID PIPING DURING CONSTRUCTION.
5. CHEMICAL POT FEDDER FOR CHILLED WATER SYSTEM. INSTALL ON WALL BRACKET NEAR CEILING LEVEL OF RISER ROOM.
6. LOCATION OF PRESSURE SENSOR MONITOR AND ALARM CONTROL FOR ISOLATION ROOM. SENSOR SHALL MONITOR ISOLATION ROOM IN COMPARISSON TO CORRIDOR. SEE SPECIFICATION 230900 FOR CONTROLLER REQUIREMENTS AND SHEET MI501 FOR SEQUENCE.
7. PROVIDE VALVED AND CAPPED CONNECTION POINT FOR FUTURE TIE-IN TO BUILDING CHILLED WATER SYSTEM.
8. CAP CHILLED WATER PIPING ABOVE ALCOVE FOR CONNECTION TO AHU-2 DURING PHASE 3.
9. CWS, CWR, HWS AND HWR PIPING UP THROUGH ROOF TO SERVE AHU. SEE SHEET MH200 FOR CONTINUATION.
10. APPROXIMATE LOCATION OF STATIC PRESSURE SENSOR IN DUCTWORK FOR AHU. SEE CONTROL DIAGRAM AND SEQUENCE FOR INFORMATION.
11. TERMINATE 3/4" CONDENSATE DRAIN WITH AIR GAP AT FLOOR DRAIN. SEE PLUMBING.
12. SIZE REFRIGERANT LINES PER MANUFACTURER'S RECOMMENDATIONS FOR LENGTH AND LIFT REQUIRED.
13. LINE INDICATES SEPARATION BETWEEN PHASE 2 AND PHASE 3 WORK.



1 MP-111 **FOURTH FLOOR PIPING NEW WORK PHASE I**
1/8" = 1'-0"

2 MP-111 **HOTWATER RISER I SECTION**
1/8" = 1'-0"

3 MP-111 **HOTWATER RISER I SECTION1**
1/8" = 1'-0"



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REVISIONS

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VA NORTHERN INDIANA HEALTH CARE SYSTEM, FORT WAYNE
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JEFFREY R. CRAWFORD REGISTERED PE STATE OF INDIANA PROFESSIONAL ENGINEER 4/25/16

Drawing Title: FOURTH FLOOR PIPING NEW WORK PHASE I

Approved: Project Director

Project Title: RENOVATE FOURTH FLOOR

Location: 2121 LAKE AVE., FORT WAYNE, IN 46805

Date: 2016.04.25 | Checked: JDW | Drawn: TRT

Project Number: #610A4-08-104

Building Number: 01

Drawing Number: MP-111

Dwg. 77 of 138

Office of Construction and Facilities Management

VA Department of Veterans Affairs

VA FORM 08-6231

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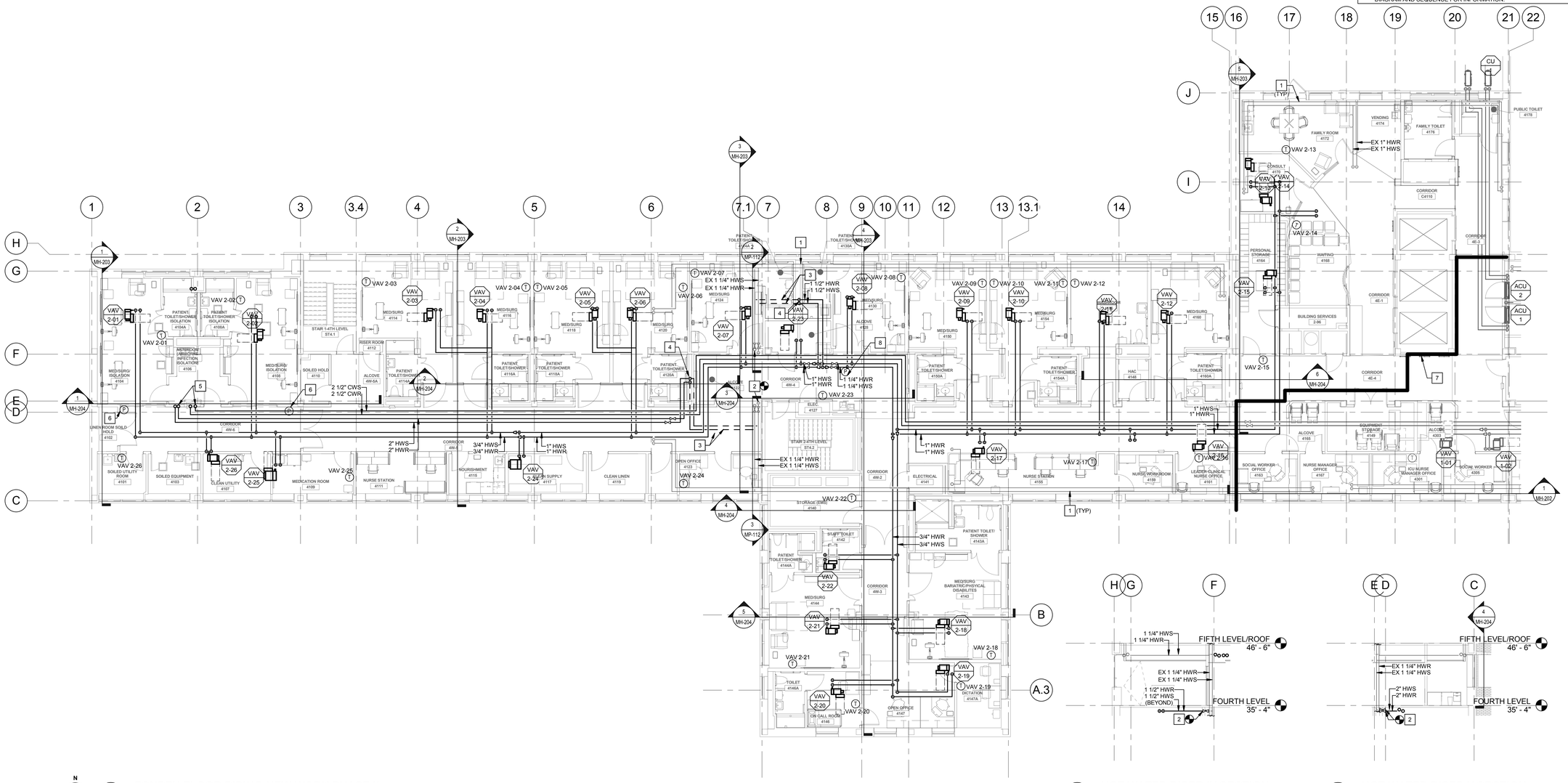
GENERAL NOTES

1. SEE SHEET M-001 FOR GENERAL NOTES.

KEYED NOTES

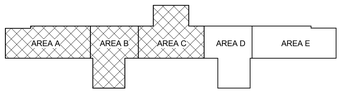
1. EXISTING HOT WATER SUPPLY AND RETURN PIPING SERVING FIFTH FLOOR ABOVE TO REMAIN. REMOVE EXISTING INSULATION AND REINSULATE WITH NEW INSULATION. AVOID PIPING DURING CONSTRUCTION.
2. LOCATE VALVED AND CAPPED HWS AND HWR IN THIRD FLOOR CEILING TO SERVE FOURTH FLOOR HEATING SYSTEM. CONNECT NEW HWS AND HWR LINES AND EXTEND TO LOCATION SHOWN.
3. PIPING SHOWN DASHED TO BE LOCATED IN CEILING OF THIRD FLOOR.
4. ROUTE PIPING UP THROUGH PLUMBING CHASE TO FOURTH FLOOR CEILING.
5. CWS, CWR, HWS AND HWR PIPING UP THROUGH ROOF TO SERVE AHU. SEE SHEET MH200 FOR CONTINUATION.
6. LOCATION OF PRESSURE SENSOR MONITOR AND ALARM CONTROL FOR ISOLATION ROOM. SENSOR SHALL MONITOR ISOLATION ROOM IN COMPARISSON TO CORRIDOR. SEE SPECIFICATION 230900 FOR CONTROLLER REQUIREMENTS AND SHEET MI501 FOR SEQUENCE.
7. LINE INDICATES SEPARATION BETWEEN PHASE 2 AND PHASE 3 WORK.
8. APPROXIMATE LOCATION OF STATIC PRESSURE SENSOR IN DUCTWORK FOR AHU. SEE CONTROL DIAGRAM AND SEQUENCE FOR INFORMATION.



1 MP-112 **FOURTH FLOOR PIPING NEW WORK PHASE II**
1/8" = 1'-0"

2 MP-112 **HOT WATER RISER IV SECTION**
1/8" = 1'-0"

3 MP-112 **HOT WATER RISER V SECTION**
1/8" = 1'-0"



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REVISIONS

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4/25/16

Drawing Title: FOURTH FLOOR PIPING NEW WORK PHASE II

Approved: Project Director

Project Title: RENOVATE FOURTH FLOOR

Location: 2121 LAKE AVE., FORT WAYNE, IN 46805

Date: 2016.04.25 | Checked: JDW | Drawn: TRT

Project Number: #610A4-08-104
Building Number: 01
Drawing Number: MP-112
Dwg. 78 of 138

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Department of Veterans Affairs

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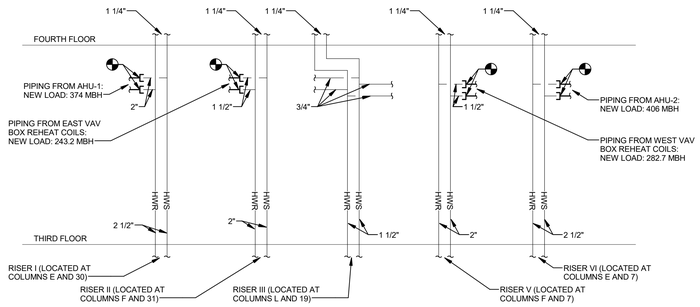
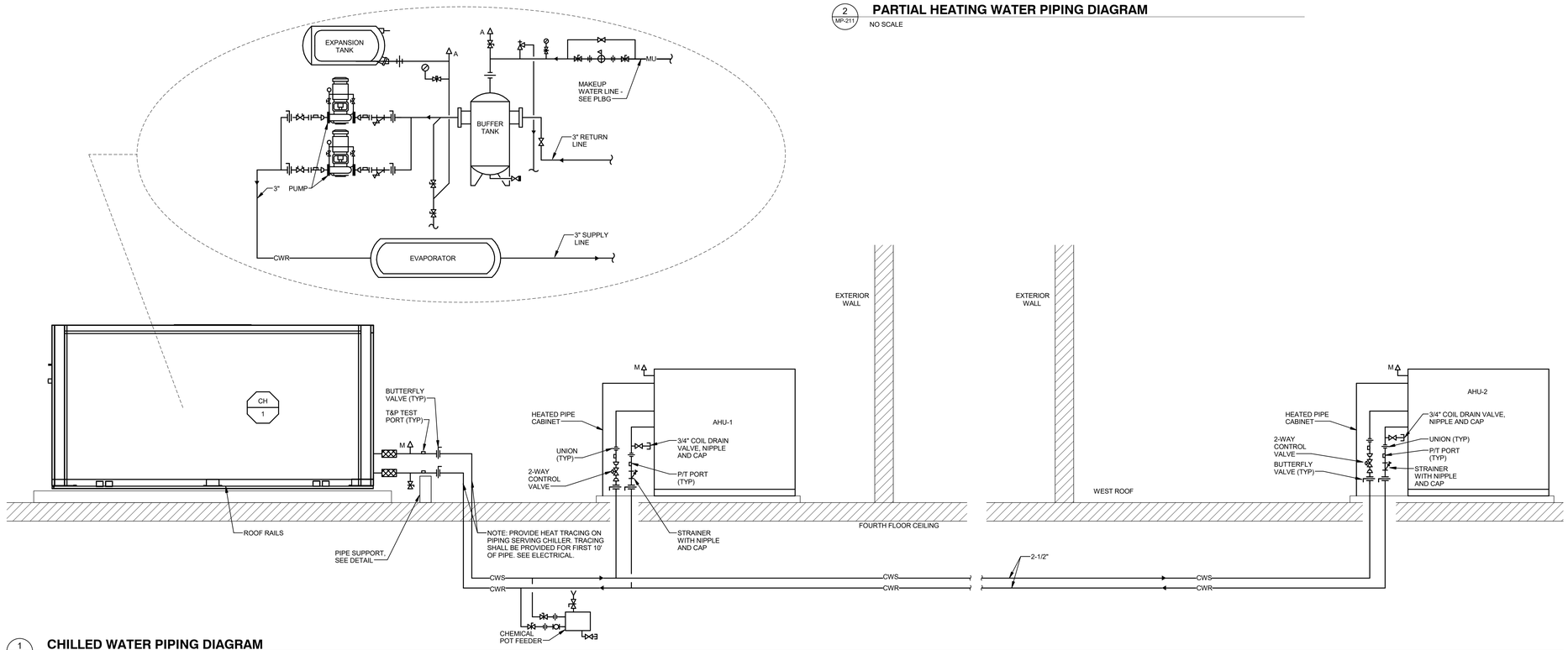
GENERAL NOTES

1. SEE SHEET M-001 FOR GENERAL NOTES.



2 MP-211 **PARTIAL HEATING WATER PIPING DIAGRAM**

NO SCALE



1 MP-211 **CHILLED WATER PIPING DIAGRAM**

NO SCALE

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Drawing Title: FLOW DIAGRAMS	Project Title: RENOVATE FOURTH FLOOR		Project Number: #610A4-08-104
			Building Number: 01
Approved: Project Director	Location: 2121 LAKE AVE., FORT WAYNE, IN 46805		Drawing Number: MP-211
	Date: 2016.04.25	Checked: JDW	Drawn: TRT
			Dwg. 79 of 138

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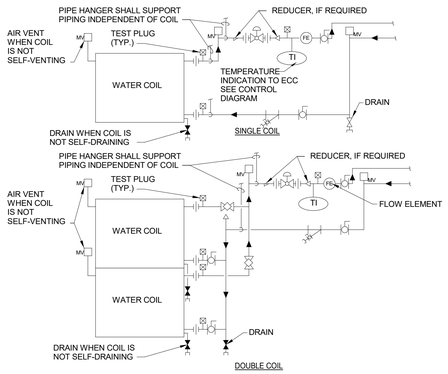
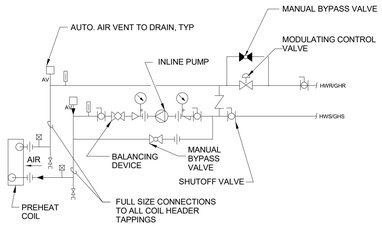


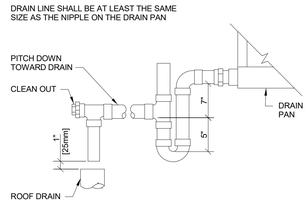
NOTE:

1. WHEN COIL IS INCLUDED IN CASING MOUNTED ON VIBRATION ISOLATORS THE FIRST 2 HANGERS FOR EACH PIPE SHALL BE SPRING & NEOPRENE TYPE. TYPE "H" FOR 4" [100mm] PIPE & SMALLER. TYPE "H-P" FOR 5" [125mm] PIPE & LARGER.
2. PIPING SHALL BE INSTALLED IN SUCH MANNER THAT IT WILL NOT BLOCK THE SWING OR USE OF ACCESS DOORS OR PANELS; NEITHER SHALL IT BLOCK THE SERVICING OF FILTERS, VALES, OR EQUIPMENT.
3. THE FLOW ELEMENT MAY BE INSTALLED IN THE SUPPLY PIPING IF THE REQUIRED MINIMUM UPSTREAM AND DOWNSTREAM DIMENSIONS CANNOT BE OBTAINED IN THE RETURN PIPING.

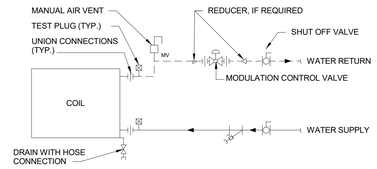
1 MP-311 **AHU COOLING COIL WITH 3-WAY VALVE DETAIL**
NTS



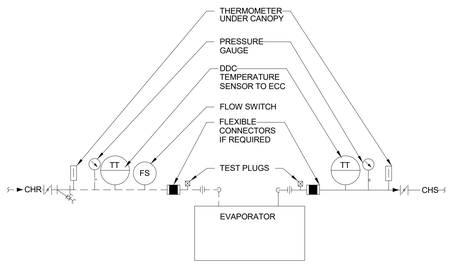
2 MP-311 **AHU PREHEAT COIL WITH FREEZE PUMP AND TWO-WAY VALVE DETAIL**
NTS



3 MP-311 **CONDENSATE DRAIN DETAIL**
NTS



4 MP-311 **TERMINAL UNIT COIL DETAIL**
NTS



5 MP-311 **AIR COOLED CHILLER PIPING CONNECTION DETAIL**
NTS

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JEFFREY R. CRAWFORD REGISTERED PROFESSIONAL ENGINEER STATE OF INDIANA
4/25/16

Drawing Title: PIPING DETAILS

Approved: Project Director

Project Title: RENOVATE FOURTH FLOOR

Location: 2121 LAKE AVE., FORT WAYNE, IN 46805

Date: 2016.04.25 | Checked: JDW | Drawn: TRT

Project Number: #610A4-08-104

Building Number: 01

Drawing Number: MP-311

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