## HVAC LEGEND (ALL MAY NOT APPLY)

- RM — REFRIGERATION MONITORING SYSTEM ALARM DEVICE
- TS — SPACE TEMPERATURE SENSOR - MOUNTING HEIGHT 48"
- H — SPACE HUMIDISTAT
- M — SPACE MOTION SENSOR
- T — THERMOSTAT ELECTRIC - MOUNTING HEIGHT 48"
- T — THERMOSTAT PNEUMATIC - MOUNTING HEIGHT 48"
- CO — CARBON MONOXIDE SENSOR
- P — SPACE PRESSURE SENSOR
- (P-1)E — EXISTING EQUIPMENT TAG
- H-1 — NEW EQUIPMENT REFERENCE SYMBOL
- 2 — NOTE SYMBOL
- CONNECT TO EXISTING SYMBOL
- 105 — ROOM NUMBER
- 9'-6" — APPROXIMATE ELEVATION FROM FLOOR TO BOTTOM OF DUCT, PIPE OR EQUIPCHMENT ITEM
- A / M1-1 — SECTION "A" DESIGNATION, SHOWN ON SHEET H1
- 21 / H33 — DETAIL REFERENCE SYMBOL, DETAIL "A" SHOWN ON SHEET H1
- E1-22"x22" 1200 — CEILING MOUNTED AIR DEVICE, E1- AIR DEVICE DESIGNATION. REFER TO SCHEDULE. 22"x22" NECK SIZE, 1,200 REQUIRED CFM. DUCT SIZE SAME AS NECK SIZE UNLESS INDICATED OTHERWISE.
- R1-22"x22" 1200 — CEILING MOUNTED AIR DEVICE, R1- AIR DEVICE DESIGNATION. REFER TO SCHEDULE. 22"x22" NECK SIZE, 1,200 REQUIRED CFM. DUCT SIZE SAME AS NECK SIZE UNLESS INDICATED OTHERWISE.
- 2-WAY SUPPLY DIFFUSER
- S1-10"x6" 200-7'-6" — WALL OR DUCT MOUNTED AIR DEVICE, S1 AIR DEVICE DESIGNATION. REFER TO SCHEDULE. 10"x6" NECK SIZE, 200-REQUIRED CFM, 7'-6" MOUNTING HEIGHT FROM FLOOR TO BOTTOM OF AIR DEVICE. BRANCH DUCT SIZE SAME AS NECK SIZE UNLESS INDICATED OTHERWISE.
- MANUAL BALANCING VOLUME DAMPER WITH LOCKING DEVICE
- U/C — 1" DOOR UNDER CUT
- EXISTING TO REMAIN
- NEW WORK
- DEMOLITION OF DUCTWORK, PIPING, EQUIPMENT ETC.
- R — DUCT RISE IN DIRECTION OF AIR FLOW 45° OFFSET
- D — DUCT DROP IN DIRECTION OF AIR FLOW 45° OFFSET
- LINED DUCTWORK
- DOUBLE WALL DUCT WITH 1" INSULATION PERFORATED LINER
- FLEXIBLE DUCT CONNECTION
- AIR TURNING VANES
- AIR TRANSFER ASSEMBLY
- FIRE DAMPER AND CONFIGURATION TYPE
- F — EXISTING FIRE DAMPER
- S — SMOKE DAMPER
- S — EXISTING SMOKE DAMPER
- S F — COMBINATION SMOKE/FIRE DAMPER AND CONFIGURATION TYPE
- S F — EXST. COMBINATION SMOKE/FIRE DAMPER AND CONFIG. TYPE
- M — MOTOR OPERATED DAMPER (OPPOSED)
- M — MOTOR OPERATED DAMPER (PARALLEL)
- T — DUCT TEMPERATURE SENSOR
- H — DUCT HUMIDITY SENSOR
- H — DUCT HUMIDITY HIGH LIMIT SENSOR
- F — DUCT AIR FLOW SENSOR
- SP — DUCT STATIC PRESSURE SENSOR
- MEDIUM PRESSURE CONICAL LOW LOSS DUCT TEE
- LOW PRESSURE BELL MOUTH WITH LOCKING QUADRANT DAMPER
- SUPPLY AND OR OUTSIDE AIR DUCT DROP
- RETURN, EXHAUST AND OR RELIEF AIR DROP
- SUPPLY AND OR OUTSIDE AIR RISE
- RETURN, EXHAUST AND OR RELIEF AIR RISE
- SINGLE LINE DUCT TRANSITION

## HVAC LEGEND (ALL MAY NOT APPLY)

- D — DRAIN PIPE
- (C)E — EXISTING STEAM CONDENSATE (GRAVITY RETURN)
- C — STEAM CONDENSATE (GRAVITY RETURN)
- (CPD)E — EXISTING PUMPED CONDENSATE
- CPD — PUMPED CONDENSATE
- (CR)E — EXISTING CONDENSER WATER RETURN
- CS — CONDENSER WATER SUPPLY
- CR — CONDENSER WATER RETURN
- (CS)E — EXISTING CONDENSER WATER SUPPLY
- CWR — CHILLED WATER RETURN
- (CWR)E — EXISTING CHILLED WATER RETURN
- CWS — CHILLED WATER SUPPLY
- (CWS)E — EXISTING CHILLED WATER SUPPLY
- (LPR)E — EXISTING LOW PRESSURE RETURN
- LPR — LOW PRESSURE RETURN
- (MPR)E — EXISTING MEDIUM PRESSURE RETURN
- MPR — MEDIUM PRESSURE RETURN
- (HPR)E — EXISTING HIGH PRESSURE RETURN
- HPR — HIGH PRESSURE RETURN
- (15)E — EXISTING STEAM SUPPLY (VALUE INDICATES PRESSURE)
- 15 — STEAM SUPPLY (VALUE INDICATES PRESSURE)
- (HWR)E — EXISTING HOT WATER RETURN
- HWR — HOT WATER RETURN
- (HWS)E — EXISTING HOT WATER SUPPLY
- HWS — HOT WATER SUPPLY
- (MUW)E — EXISTING MAKE UP WATER
- MUW — MAKE UP WATER
- RL — REFRIGERANT LIQUID
- RHGB — REFRIGERANT HOT GAS BYPASS LINE
- RD — REFRIGERANT DISCHARGE
- RS — REFRIGERANT SUCTION

## HVAC LEGEND (ALL MAY NOT APPLY)

- PRESSURE GAUGE WITH SHUTOFF COCK SNUBBER REQUIRED FOR STEAM SERVICE
- THERMOMETER
- T — THERMOSTATIC AIR VENT
- M — MANUAL AIR VENT WITH SHUTOFF COCK
- A — AUTOMATIC AIR VENT WITH SHUTOFF COCK, VENT TO DRAIN
- S — WATER TEMPERATURE SENSOR
- DP — VARIABLE SPEED PUMPING DIFFENTIAL PRESSURE SENSOR
- M — METER
- FLEXIBLE CONNECTOR
- UNION
- CO — CLEAN OUT
- STRAINER WITH BLOW DOWN
- SHUTOFF/ISOLATION VALVE
- COMBINATION BALANCING/SHUTOFF VALVE
- CHECK VALVE
- THREE WAY CONTROL VALVE
- TWO WAY CONTROL VALVE
- TRIPLE DUTY VALVE
- 3/4" NPT PETES PLUG
- PRESSURE REDUCING VALVE
- OS&Y VALVE
- S — SOLENOID VALVE
- GLOBE VALVE
- 30 — PRESSURE RELIEF VALVE WITH INDICATED SETTING
- FILL VALVE
- BALL VALVE
- BUTTERFLY VALVE
- PLUG VALVE
- CIRCUIT SETTER
- NEEDLE VALVE
- AUTOMATIC FLOW CONTROL VALVE WITH SHUTOFF
- FLOW CONTROL VALVE
- FS — FLOW SWITCH
- VB — VACUUM BREAKER
- PIPE FLANGE
- CONCENTRIC PIPE REDUCER
- ECCENTRIC PIPE REDUCER
- VENTURI FLOW METER
- PIPE CAP
- PIPE DROP
- PIPE RISE
- PIPE TEE UP
- PIPE TEE DOWN
- VALVE IN RISER
- PIPE ANCHOR
- PIPE GUIDE
- PIPE EXPANSION JOINT
- PRESSURE DIFFERENTIAL SWITCH WITH SHUTOFF COCK
- F&T TRAP
- BUCKET TRAP
- PITCH DOWN
- DIRECTION OF FLOW
- PRE ENGINEERED EXPANSION LOOP. SEE SPECIFICATIONS

## HVAC GENERAL NOTES

A.- PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS AND AS SPECIFIED.

B.- ALL WORK SHALL BE INSTALLED ACCORDING TO THE LATEST LOCAL, STATE AND NATIONAL CODES. ALL DUCTWORK SHALL BE INSTALLED ACCORDING TO THE LATEST ASHRAE RECOMMENDATIONS AND SMACNA INSTALLATION MANUALS.

C.- CONTRACT DOCUMENT DRAWINGS FOR MECHANICAL WORK ARE DIAGRAMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY.

D.- PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.

E.- PROVIDE VIBRATION ISOLATORS FOR ALL PIPING SUPPORTS CONNECTED TO AND WITHIN 50 FEET OF ISOLATED EQUIPMENT THROUGHOUT MECHANICAL EQUIPMENT ROOMS.

F.- COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH EXISTING AND NEW ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC.

G.- MAINTAIN A MINIMUM OF 6'-8" CLEARANCE TO UNDERSIDE OF PIPES, DUCTS, CONDUITS, SUSPENDED EQUIPMENT, ETC., THROUGHOUT ACCESS ROUTES IN MECHANICAL ROOMS.

H.- CAULK SPACE BETWEEN SLEEVES, DUCTS AND PIPES WHERE DUCTS AND PIPES PASS THROUGH WALLS. CAULKING TO BE AIRTIGHT.

I.- ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.

J.- COORDINATE OPENINGS THROUGH OUTSIDE WALLS, WITH STRUCTURAL AND ARCHITECTURAL REQUIREMENTS.

K.- COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURERS' CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATION.

L.- MINIMUM CONCRETE PAD THICKNESS SHALL BE 4 INCHES. PAD SHALL EXTEND BEYOND THE EQUIPMENT A MINIMUM OF 4 INCHES ON EACH SIDE, WITH BEVELED EDGES.

M.- PROVIDE INSULATED SUBBASES ON ALL THERMOSTATS/TEMPERATURE SENSORS LOCATED ON EXTERIOR WALLS.

N.- INLET DUCTWORK TO DIFFUSERS SHALL BE SAME SIZE AS DIFFUSER NECK SIZE UNLESS NOTED OTHERWISE. INLET DUCTWORK TO AIR TERMINAL BOXES SHALL BE SAME SIZE AS BOX INLET UNLESS NOTED OTHERWISE.

O.- ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN DETAILS FOR PIPING, DUCTWORK AND EQUIPMENT (UNLESS NOTED OTHERWISE) SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.

P.- PROVIDE PROPERLY SIZED ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVICE DAMPERS, VALVES, SMOKE DETECTORS, AND OTHER CONCEALED MECHANICAL EQUIPMENT. ACCESS PANELS SHALL BE TURNED OVER TO GENERAL CONTRACTOR FOR INSTALLATION.

Q.- ALL DUCTWORK, PIPING AND EQUIPMENT SUPPORTED FROM STRUCTURE SHALL BE COORDINATED WITH STRUCTURAL REQUIREMENTS.

R.- LOCATION AND SIZESED OF ALL FLOOR, WALL AND ROOF OPENINGS SHALL BE COORDINATED IWTH ALL OTHER TRADES INVOLVED.

S.- ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED. SEE SPECIFICATIONS FOR REQUIREMENTS.

T.- ALL AIR CONDITIONING CONDENSATE DRAIN LINES FROM EACH AIR HANDLING UNIT SHALL BE PIPED FULL SIZE OF THE UNIT DRAIN OUTLET, WITH P-TRAP, AND PIPED TO NEAREST DRAIN. SEE DETAILS SHOWN ON THE DRAWINGS FOR DEPTH OF CONDENSATE TRAP.

U.- COVER ALL OUTDOOR PIPING WITH ALUMINUM JACKETING.

V.- PROVIDE AN AIR VENT AT THE HIGH POINT OF EACH DROP IN THE HEATING WATER, CHILLED WATER, AND OTHER CLOSED WATER PIPING SYSTEMS. ALL PIPING SHALL GRADE TO LOW POINTS. PROVIDE HOSE END DRAIN VALVES AT THE BOTTOM OF ALL RISERS AND LOW POINTS.

W.- UNLESS OTHERWISE NOTED, ALL PIPING IS OVERHEAD, TIGHT TO UNDERSIDE OF STRUCTURE OR SLAB, WITH SPACE FOR INSULATION WHERE REQUIRED IN THE SPECIFICATIONS.

X.- INSTALL PIPING SO THAT ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES AND OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.

Y.- ALL BALANCING VALVES AND BUTTERFLY VALVES SHALL BE PROVIDED WITH POSITION INDICATORS AND MAXIMUM ADJUSTABLE STOPS (MEMORY STOPS).

Z.-PROVIDE CHAINWHEEL OPERATORS FOR ALL VALVES IN EQUIPMENT ROOMS MOUNTED GREATER THAN 7'-0" ABOVE FLOOR LEVEL; CHAIN SHALL EXTEND TO 7'-0" ABOVE FLOOR LEVEL.

AA.-UNIONS AND/OR FLANGES SHALL BE INSTALLED AT EACH PIECE OF EQUIPMENT, IN BYPASSES, AND IN LONG PIPING RUNS (100 FEET OR MORE) TO PERMIT DISASSEMBLY FOR ALTERATIONS AND REPAIRS.

BB.-ALL PIPING WORK AND DUCTWORK SHALL BE COORDINATED WITH EXISTING PIPING , EQUIPMENT, STRUCTURES, CONDUIT, AND ANY OTHER OBSTRUCTIONS. ALL TRADES INVOLVED. OFFSETS IN PIPING AND DUCTS AROUND OBSTRUCTIONS SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.

CC.-CERTAIN ITEMS SUCH AS RISES AND DROPS IN DUCTWORK, ACCESS DOORS, VOLUME DAMPERS, ETC., ARE INDICATED ON THE CONTRACT DOCUMENT DRAWINGS FOR CLARITY FOR A SPECIFIC LOCATION REQUIREMENT AND SHALL NOT BE INTERPRETED AS THE EXTEND OF THE REQUIREMENTS FOR THESE ITEMS.

DD.-ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS AND DUCT SIZE SHALL BE INCREASED TO COMPENSATE FOR DUCT LINING THICKNESS.

EE.- PROVIDE 90 DEGREE SQUARE ELBOWS WITH DOUBLE RADIUS TURNING VANES UNLESS OTHERWISE INDICATED.

FF.- COORDINATE DIFFUSER, REGISTER AND GRILLE LOCATIONS WITH EXISTING CEILING, LIGHTING AND OTHER CEILING ITEMS AND MAKE MINOR DUCT MODIFICATIONS TO SUIT.

GG.- PROVIDE MINIMUM 4" FLEXIBLE CONNECTIONS IN ALL DUCTWORK SYSTEMS (SUPPLY, RETURN AND EXHAUST) CONNECTED TO AIR HANDLING UNITS, FANS AND OTHER EQUIPMENT WHICH REQUIRE VIBRATION ISOLATION. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT THE POINT OF CONNECTION TO THE EQUIPMENT UNLESS OTHERWISE INDICATED.

HH.- UNLESS OTHERWISE NOTED, ALL DUCTWORK IS OVERHEAD, TIGHT TO THE UNDERSIDE OF STRUCTURE, WITH SPACE FOR INSULATION WHERE REQUIRED IN THE SPECIFICATIONS.

II.- RUNS OF FLEXIBLE DUCT SHALL NOT EXCEED 7 FEET AND SHALL NOT BE USED FOR 90 DEGREE BENDS.

JJ.- PROVIDE ACCESS DOORS IN DUCTWORK FOR ACCESS TO ALL SMOKE DETECTORS, FIRE DAMPERS, SMOKE DAMPERS, VOLUME DAMPERS, COILS AND OTHER ITEMS LOCATED IN THE DUCTWORK WHICH REQUIRE SERVICE AND/OR INSPECTION.

KK.- SMOKE DETECTORS SHALL BE FURNISHED AND WIRED BY THIS CONTRACTOR. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR MOUNTING THE SMOKE DETECTOR IN THE DUCTWORK AS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTRUCTIONS.

LL.- CONTRACTOR TO PROVIDE FIRE STOPPING AT ALL RATED HORIZONTAL AND VERTICAL ASSEMBLIES. CONTRACTOR SHALL NOT LEAVE OPENINGS UNPROTECTED DURING THE CONSTRUCTION PERIOD EXCEPT FOR SHORT DURATIONS WHILE ITEMS ARE BEING INSTALLED THROUGH OPENINGS

MM.-SMOKE DETECTORS SHALL BE LISTED FOR USE IN AIR DISTRIBUTION SYSTEMS AND IN ACCORDANCE WITH UL 268A.

NN.-FIRE DAMPERS SHALL BE LISTED IN ACCORDANCE WITH UL 555 AND HAVE A MINIMUM OF 1-1/2 HR. FIRE RATING. FUSIBLE LINKS FOR FIRE DAMPERS SHALL NOT BE RATED FOR TEMPERATURES LESS THAN 160 DEG. F.

OO.-FUSIBLE LINKS FOR FIRE DAMPERS SHALL BE NOT RATED FOR TEMPERATURES LESS THAN 160 DEG. F.

PP-FIRE DAMPERS SHALL BE INSTALLED, INSPECTED, AND TESTED IN ACCORDANCE WITH CHAPTER 19 OF NFPA 80.

QQ.-FIRE DAMPERS WITH FUSIBLE LINKS, INTERNAL OPERATORS, OR BOTH SHALL BE PRPOVIDED WITH AN ACCESS DOOR THAT IS NOT LESS THAN 12" SQUARE.

RR.-FIRE DAMPERS SHALL BE LABELED WITH THE WORDS "FIRE DAMPER" IN LETTERS NOT LESS THAN 1" IN HEIGHT.

DESIGNER/ENGINEER SH
CAD OPERATOR SH
QA/QC/CHECKER SS

| Revisions | Date |
|---|---|
| 95% OWNER REVIEW DOCUMENTS | 01/18/2013 |
| ISSUED FOR BID DOCUMENTS | 01/31/2013 |
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Dynamix Engineering Ltd.
Facility Engineering Consultants
855 Grandview Avenue, 3rd Floor Columbus, Ohio 43215
Phone: (614)443-1178 · Fax: (614)443-1594 · Email: dynamix@dynamix-ltd.com
Comm. No.: 120050


STATE OF OHIO — MACE — Registered Professional Engineer

Professional Seal

Revised By:
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Drawing Title: HVAC SCHEDULES AND DETAILS

Approved: Project Engineer Philip Kirk

Project Title: MODERNIZE HVAC, B-115

Building Number: B-115 115
Checked: DYNAMIX
Drawn: SH
Location: 4100 WEST THIRD ST DAYTON, OH 45428

Date: 04-30-2013
Project No.: 552-13-301
Drawing No.: M00

VAMC, DAYTON

VA Department of Veterans Affairs

VA FORM 08-6231, OCT 1978

## VARIABLE FREQUENCY DRIVES

| TAG | SERVICE | ENCLOSURE | NOTES |
|---|---|---|---|
| AH-1S | AH-1 SUPPLY FAN | SEE SPECIFICATIONS | 1,2,3,4 |
| AH-2S | AH-2 SUPPLY FAN | SEE SPECIFICATIONS | 1,2,3,4 |
| HWP-1 | HWP-1 | SEE SPECIFICATIONS | 1,2,3,4 |
| HWP-2 | HWP-2 | SEE SPECIFICATIONS | 1,2,3,4 |
| CWP-1 | CWP-1 | SEE SPECIFICATIONS | 1,2,3,4 |
| CWP-2 | CWP-2 | SEE SPECIFICATIONS | 1,2,3,4 |
| CWP-3 | CWP-3 | SEE SPECIFICATIONS | 1,2,3,4 |
| - | - | - | - |
| - | - | - | - |

NOTES:
1.- ALL VFD'S TO BE FROM SAME MANUFACTURER.
2.- REFER TO EQUIPMENT SCHEDULES FOR MOTOR DATA.
3.- FURNISH DRIVE WITH BYPASS
4.- FURNISH DRIVE WITH COMMUNICATION INTERFACE.

## DUCT CONSTRUCTION/SEALING

| DUCT SYSTEM | SMACNA SP CONST | SMACNA SEAL CL | NOTES |
|---|---|---|---|
| MEDIUM VELOCITY SUPPLY | +3" | A | - |
| LOW VELOCITY SUPPLY | +1" | B | - |
| RETURN / RELIEF | -1" | C | - |
| GENERAL EXHAUST | -0.5" | C | - |
| OUTSIDE AIR | -0.5" | C | - |
| - | - | - | - |
| - | - | - | - |
| - | - | - | - |

NOTES
1.-

## LOUVERS

| TAG | SERVICE | SIZE DP | SIZE W | SIZE H | CFM | P.D. IN | F.A. SQ. FT | NOTES |
|---|---|---|---|---|---|---|---|---|
| L-1 | RELIEF | 4" | 44" | 44" | 7600 | 0.11 | 8.33 | 1,2,3,4,6 |
| L-2 | INTAKE | 4" | 44" | 44" | 7600 | 0.11 | 8.33 | 1,2,3,4,6 |
| L-3 | RELIEF | 4" | 44" | 44" | 7600 | 0.11 | 8.33 | 1,2,3,4,6 |
| L-4 | INTAKE | 4" | 44" | 44" | 7600 | 0.11 | 8.33 | 1,2,3,4,6 |
| L-5 | EXHAUST | 1.5" | 12" | 12" | 225 | 0.01 | 0.37 | 1,2,3,4,5 |
| - | - | - | - | - | - | - | - | - |

1.- CONTRACTOR SHALL PROVIDE INSULATED SHEETMETAL PLENUM BEHIND ALL LOUVERS.
2.- COLOR OF LOUVER SELECTED BY THE OWNER.
3.- CONTRACTOR TO FIELD-VERIFY EXISING OPENING SIZE. ADJUST LOUVER SIZE TO MATCH EXISTING OPENING SIZE.
4.-PROVIDE BIRDSCREEN.
5.-PROVIDE MOTORIZED DAMPER. WIRE TO OPEN WHEN THE ASSOCIATED FAN OPERATES
6.-PROVIDE MOTORIZED DAMPER. WIRE TO ASSOCIATED AIR HANDLER CONTROLS.

## HYDRONIC HEATING UNITS

HEATING CAPACITY BASED ON 60°F ENT AIR &
200°F ENT WATER, 170°F LWT

| TAG | DESCRIPTION | MOUNTING | ELECTRICAL DATA VOLTS | PHASE | HP | CFM | CAP'Y BTUH | GPM | RUNOUT SIZE (IN) | PD FT | MFG. | MODEL | REQ'D ACCESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CUH-1 | CABINET UNIT HEATER LOBBY | CEILING CONCEALED | 120 | 1 | 1/10 | 430 | 29,800 | 2.98 | 3/4 | 1.00 | - | - | 5,2 |
| CUH-2 | CABINET UNIT HEATER MECHANICAL ROOM | FLOOR MOUNTED | 120 | 1 | 1/15 | 230 | 16,400 | 1.64 | 3/4 | 0.20 | - | - | 1,4 |
| UH-1 | HORIZ. UNIT HEATER GROUND FLOOR | CEILING SUSPENDED | 120 | 1 | 16 WATT | 245 | 7227 | 0.80 | 3/4 | 0.47 | - | - | 6,7 |
| UH-2 | HORIZ. UNIT HEATER GROUND FLOOR | CEILING SUSPENDED | 120 | 1 | 16 WATT | 245 | 7227 | 0.80 | 3/4 | 0.47 | - | - | 6,7 |
| UH-3 | HORIZ. UNIT HEATER GROUND FLOOR | CEILING SUSPENDED | 120 | 1 | 16 WATT | 245 | 7227 | 0.80 | 3/4 | 0.47 | - | - | 6,7 |
| UH-4 | HORIZ. UNIT HEATER GROUND FLOOR | CEILING SUSPENDED | 120 | 1 | 16 WATT | 245 | 7227 | 0.80 | 3/4 | 0.47 | - | - | 6,7 |
| UH-5 | HORIZ. UNIT HEATER GROUND FLOOR | CEILING SUSPENDED | 120 | 1 | 16 WATT | 245 | 7227 | 0.80 | 3/4 | 0.47 | - | - | 6,7 |
| UH-6 | HORIZ. UNIT HEATER GROUND FLOOR | CEILING SUSPENDED | 120 | 1 | 16 WATT | 245 | 7227 | 0.80 | 3/4 | 0.47 | - | - | 6,7 |
| UH-7 | HORIZ. UNIT HEATER GROUND FLOOR | CEILING SUSPENDED | 120 | 1 | 16 WATT | 245 | 7227 | 0.80 | 3/4 | 0.47 | - | - | 6,7 |
| UH-8 | HORIZ. UNIT HEATER GROUND FLOOR | CEILING SUSPENDED | 120 | 1 | 16 WATT | 245 | 7227 | 0.80 | 3/4 | 0.47 | - | - | 6,7 |
| UH-9 | HORIZ. UNIT HEATER GROUND FLOOR | CEILING SUSPENDED | 120 | 1 | 16 WATT | 245 | 7227 | 0.80 | 3/4 | 0.47 | - | - | 6,7 |
| UH-10 | HORIZ. UNIT HEATER GROUND FLOOR | CEILING SUSPENDED | 120 | 1 | 16 WATT | 245 | 7227 | 0.80 | 3/4 | 0.47 | - | - | 6,7 |

REQ'D ACCY::
1. UNIT MOUNTED ADJUSTABLE LINE VOLTAGE THERMOSTAT WITH GRADUATED DIAL.
2.WALL MOUNTED THERMOSTAT.
3. STANDARD COIL
4. TOP OUTLET GRILLE AND BOTTOM INLET GRILLE.
5. FRONT OUTLET, BACK INLET.
6. HORIZONTAL VANE DISCHARGE.
7. UNIT MOUNTED LINE VOLTAGE THERMOSTAT FURNISHED WITH UNIT.

## STEAM PRESSURE REDUCING VALVE AND RELIEF VALVE

| STEAM PRESSURE REDUCING VALVE | | | | | | | RELIEF VALVE | | |
|---|---|---|---|---|---|---|---|---|---|
| TAG | INLET PRESSURE (PSI) | OUTLET PRESS. (PSI) | CAP'Y lb/hr | VALVE SIZE (IN) | REQUIRED CV | REQ'D ACCESS | VALVE SIZE (IN) | RELIEF PRESSURE SETTING (PSI) | CAP'Y lb/hr |
| PRV-1 | 125 | 30 | 1100 | 1 | 4.61 | 1,2 | 2 | 36 | 1785 |
| - | - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - | - |

REQ'D ACCESS (INCLUDE ALL):
1. INCLUDE EXTERNAL STEAM PILOT CAPABLE OF +/- 1% ACCURACY.
2. NOISE LEVEL TO BE MAX. 85 DB.

## HYDRONIC FINNED TUBE

- 200°F ENT WATER TEMPERATURE
- 170°F LVG WATER TEMPERATURE

| TAG | DESCRIPTION | FIN SIZE(IN) | TIERS | FINS PER FOOT | TUBE SIZE(IN) | CAP'Y LIN FT | MOUNT. HEIGHT | ENCLOSURE(IN) DEPTH | ENCLOSURE(IN) HEIGHT | LENGTH OF ELEMENT | MODEL | REQ'D ACCESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FT-1 | FINNED TUBE | 4-1/4 | 1 | 50 | 3/4 | 1190 | 4 | 5-1/4 | 12 | 3'-0" | - | ALL |
| FT-2 | FINNED TUBE | 4-1/4 | 1 | 50 | 3/4 | 1190 | 4 | 5-1/4 | 12 | 3'-0" | - | ALL |
| FT-3 | FINNED TUBE | 4-1/4 | 1 | 50 | 3/4 | 1190 | 4 | 5-1/4 | 12 | 3'-0" | - | ALL |
| FT-4 | FINNED TUBE | 4-1/4 | 1 | 50 | 3/4 | 1190 | 4 | 5-1/4 | 12 | 3'-0" | - | ALL |
| FT-5 | FINNED TUBE | 4-1/4 | 1 | 50 | 3/4 | 1190 | 4 | 5-1/4 | 12 | 3'-0" | - | ALL |
| FT-6 | FINNED TUBE | 4-1/4 | 1 | 50 | 3/4 | 1190 | 4 | 5-1/4 | 12 | 3'-0" | - | ALL |
| FT-7 | FINNED TUBE | 4-1/4 | 1 | 50 | 3/4 | 1190 | 4 | 5-1/4 | 12 | 3'-0" | - | ALL |
| - | - | - | - | - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - | - | - | - | - |

REQ'D ACCESS
1. SLOPE TOP ENCLOSURE.
2. 2-WAY CONTROL VALVE
3. ROOM THERMOSAT

## AIR TERMINAL UNITS - MASTER SCHEDULE

-TYPES: VAV-# - VARIABLE AIR VOLUME
CAV-# - CONSTANT AIR VOLUME
TYPE: SINGLE DUCT, W/ INTEGRAL REHEAT COIL AND "FIBER-FREE" INSULATION LINER. DAMPER SHAFT AND CONTROL ENCLOSURE.
-REHEAT COIL BASED ON: HTG MAX AIRFLOW, 200°F EWT AND 55°F EAT

| TYPE | INLET SIZE (IN) | MODEL NO. | AIR FLOW (CFM) CLG MAX | MIN | HTG MAX | SP (IN WC) INLET | DOWN STREAM | MIN | SOUND MAX (NC) RAD | DISCH | MIN LAT (°F) | GPM | H.W. REHEAT COIL RUN OUT SIZE (IN) | MAX WTR PD FT HD | MAX AIR PD (IN) | ROWS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VAV-5 | 5 | - | 300 | 65 | 180 | 1 | 0.25 | 0.11 | 25 | 25 | 95.0 | 1.0 | 3/4 | 5.0 | 0.5 | 1 |
| VAV-6 | 6 | - | 400 | 80 | 240 | 1 | 0.25 | 0.35 | 25 | 25 | 95.0 | 1.0 | 3/4 | 5.0 | 0.5 | 2 |
| VAV-8 | 8 | - | 700 | 145 | 420 | 1 | 0.25 | 0.38 | 25 | 25 | 95.0 | 1.0 | 3/4 | 5.0 | 0.5 | 2 |
| VAV-10 | 10 | - | 1,100 | 230 | 660 | 1 | 0.25 | 0.42 | 25 | 25 | 95.0 | 2.0 | 3/4 | 5.0 | 0.5 | 2 |
| VAV-12 | 12 | - | 1,500 | 325 | 900 | 1 | 0.25 | 0.42 | 25 | 25 | 95.0 | 2.5 | 3/4 | 5.0 | 0.5 | 2 |
| VAV-14 | 14 | - | 2,200 | 450 | 1.320 | 1 | 0.25 | 0.45 | 25 | 25 | 95.0 | 3.5 | 1 | 5.0 | 0.5 | 2 |
| VAV-16 | 16 | - | 2,800 | 580 | 1,680 | 1 | 0.25 | 0.48 | 25 | 25 | 95.0 | 5.0 | 1 | 5.0 | 0.65 | 2 |
| VAV-24 | 24 x 16 | - | 5,000 | 1,400 | 3,000 | 1 | 0.25 | 0.70 | 40 | 30 | 95.0 | 8.0 | 1-1/4 | 5.0 | 0.65 | 2 |
| CAV-5 | 5 | - | 300 | 300 | 300 | 1 | 0.25 | 0.18 | 25 | 25 | 95.0 | 1.0 | 3/4 | 5.0 | 0.5 | 2 |
| CAV-6 | 6 | - | 400 | 400 | 400 | 1 | 0.25 | 0.35 | 25 | 25 | 95.0 | 1.0 | 3/4 | 5.0 | 0.5 | 2 |
| CAV-8 | 8 | - | 700 | 700 | 700 | 1 | 0.25 | 0.38 | 25 | 25 | 95.0 | 2.0 | 3/4 | 5.0 | 0.5 | 2 |
| CAV-10 | 10 | - | 1,100 | 1,100 | 1,100 | 1 | 0.25 | 0.42 | 25 | 25 | 95.0 | 3.0 | 3/4 | 5.0 | 0.5 | 2 |
| CAV-12 | 12 | - | 1,500 | 1,500 | 1,500 | 1 | 0.25 | 0.42 | 25 | 25 | 95.0 | 4.0 | 1 | 5.0 | 0.5 | 2 |
| CAV-14 | 14 | - | 2,200 | 2,200 | 2,200 | 1 | 0.25 | 0.45 | 25 | 25 | 95.0 | 6.0 | 1 | 5.0 | 0.5 | 2 |
| CAV-16 | 16 | - | 2,800 | 2,800 | 2,800 | 1 | 0.25 | 0.70 | 25 | 25 | 95.0 | 7.0 | 1-1/4 | 5.0 | 0.65 | 2 |
| CAV-24 | 24 x 16 | - | 5,000 | 5,000 | 5,000 | 1 | 0.25 | 0.70 | 40 | 30 | 94.0 | 10.0 | 1-1/4 | 5.0 | 0.65 | 2 |

NOTES:
1. ROOM NC LEVEL SHOWN INCLUDES ATTENUATION TRANSFER FUNCTIONS OBTAINED FROM TABLES IN ARI STANDARD 885-98.
2. SOUND DATA SHALL BE OBTAINED FROM TESTS CONDUCTED IN ACCORDANCE WITH ARI STANDARD 880-98.
3. SOUND LEVELS INDICATED ARE MAXIMUM VALUES. MANUFACTURERS TO PROVIDE "FIBER-FREE" SOUND ATTENUATORS AS REQUIRED TO MEET REQUIREMENTS.

## AIR DISTRIBUTION DEVICES

OWBE - OFF WHITE BAKED ENAMEL FINISH ECL - ETCHED CLEAR LACQUER FINISH

| TAG | DESCRIPTION | MODULE SIZE | MOUNTING TYPE LAY-IN | SURFACE | CONSTRUCTION TYPE ALUM. | STEEL | FINISH O.W.B.E. | E.C.L. | BY ARCH. | TYPE | REQ'D ACCY |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1 | SUPPLY | 24"x24" | ● | | | ● | ● | | | SQUARE - PLAQUE | - |
| S2 | SUPPLY | 12"x12" | ● | | | ● | ● | | | SQUARE - PLAQUE | 2 |
| S3 | SUPPLY | AS NOTED | | ● | | ● | ● | | | SUPPLY GRILLE | 1 |
| S4 | SUPPLY | AS NOTED | DUCT MOUNTED | | | ● | | | ● | ROUND CEILING DIFFUSER | - |
| | | | | | | | | | | | |
| R1 | RETURN | 24"x24" | ● | | ● | | ● | | | EGGCRATE RETURN GRILLE | - |
| R2 | RETURN | 24"x12" | ● | | ● | | ● | | | EGGCRATE RETURN GRILLE | - |
| R3 | RETURN | AS NOTED | | ● | ● | | ● | | | RETURN GRILLE | 1 |
| R4 | RETURN | AS NOTED | | ● | | ● | ● | | | RETURN GRILLE | 1 |
| | | | | | | | | | | | |
| E1 | EXHAUST | AS NOTED | ● | | ● | | ● | | | EGGCRATE RETURN GRILLE | - |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

REQ'D ACCY:
1. OPPOSED BLADE DAMPER
2. TRIM RING

## CHILLER(S)

AMBIENT TEMP 95°F DB

| TAG | DESCRIPTION | EWT °F | LWT °F | GPM | PD (FT) | TONS | NPLV / EER | ELECTRICAL DATA VOLTS | PHASE | MCA | MOCP | MFR | MODEL | REQ'D ACCESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CH-1 | AIR-COOLED CHILLER | 56 | 44 | 100 | 11.7 | 48 | 14.9/9.6 | 208 | 3 | 246 | 250 | - | - | 1,2,3,4,5 |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |

REQ'D ACCESS
1. FACTORY MOUNTED DISCONNECT
2. VIBRATION ISOLATORS
3. SINGLE POINT POWER CONNECTION
4. WATER FLOW SWITCH
5. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS

## CONVECTORS

- HEATING CAPACITY BASED ON 65 °F ENT AIR &
200 °F ENT WATER, 170 °F LWT

| TAG | DESCRIPTION | MOUNTING | MFR | MODEL | # OF TUBES/ ELEMENTS | CAP'Y MBH | GPM | PD FT | CABINET DIMENSIONS L (IN) | H (IN) | D (IN) | REQ'D ACCESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C-1 | CONVECTOR | SURFACE MOUNT | - | - | 3 | 15.5 | 1.0 | 0.27 | 52 | 32 | 6.25 | 1 |
| C-2 | CONVECTOR | SURFACE MOUNT | - | - | 3 | 15.5 | 1.0 | 0.27 | 52 | 32 | 6.25 | 1 |
| - | - | - | - | - | - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - | - | - | - | - | - |

REQ'D ACCESS.
1. UNIT MOUNTED THERMOSTAT.

## AIR TERMINAL UNITS - BALANCING

-REFER TO "AIR TERMINAL UNITS - MASTER SCHEDULE" FOR:
-PRESSURE REQUIREMENTS
-MAX ALLOWABLE SOUND LEVELS
-REHEAT COIL SIZE AND CAPACITY

TAG KEY: V-X-X
V = AIR HANDLING UNIT
X = SEQUENTIAL NUMBER

| TAG | TYPE | AIR FLOW (CFM) COOLING MAX | MIN | HEATING MAX | WATER FLOW (GPM) | RUNOUT SIZE | NOTES |
|---|---|---|---|---|---|---|---|
| V1-1 | NOT USED | - | - | - | - | - | |
| V1-2 | VAV-8 | 500 | 150 | 300 | 0.86 | 3/4 | - |
| V1-3 | VAV-8 | 610 | 366 | 366 | 1.05 | 3/4 | - |
| V1-4 | VAV-8 | 590 | 295 | 354 | 1.02 | 3/4 | - |
| V1-5 | VAV-8 | 660 | 200 | 400 | 0.79 | 3/4 | - |
| V1-6 | VAV-6 | 200 | 60 | 120 | 0.50 | 3/4 | - |
| V1-7 | VAV-6 | 110 | 33 | 66 | 0.50 | 3/4 | - |
| V1-8 | NOT USED | - | - | - | - | - | - |
| V1-9 | NOT USED | - | - | - | - | - | - |
| V1-10 | NOT USED | - | - | - | - | - | - |
| V1-11 | VAV-10 | 710 | 213 | 426 | 1.23 | 3/4 | - |
| V1-12 | VAV-6 | 300 | 90 | 180 | 0.50 | 3/4 | - |
| V1-13 | VAV-10 | 890 | 267 | 534 | 1.50 | 3/4 | - |
| V1-14 | VAV-8 | 550 | 165 | 330 | 0.95 | 3/4 | - |
| V1-15 | NOT USED | - | - | - | - | - | - |
| V1-16 | VAV-6 | 230 | 92 | 138 | 0.50 | 3/4 | - |
| V2-1 | NOT USED | - | - | - | - | - | - |
| V2-2 | NOT USED | - | - | - | - | - | - |
| V2-3 | VAV-8 | 560 | 168 | 336 | 0.97 | 3/4 | - |
| V2-4 | NOT USED | - | - | - | - | - | - |
| V2-5 | NOT USED | - | - | - | - | - | - |
| V2-6 | VAV-8 | 500 | 150 | 300 | 0.86 | 3/4 | - |
| V2-7 | VAV-8 | 480 | 144 | 288 | 0.83 | 3/4 | - |
| V2-8 | VAV-10 | 760 | 228 | 456 | 1.30 | 3/4 | - |
| V2-9 | VAV-10 | 1040 | 312 | 624 | 1.80 | 3/4 | - |
| V2-10 | NOT USED | - | - | - | - | - | - |
| V2-11 | NOT USED | - | - | - | - | - | - |
| V2-12 | NOT USED | - | - | - | - | - | - |
| V2-13 | NOT USED | - | - | - | - | - | - |
| V2-14 | VAV-6 | 290 | 87 | 174 | 0.50 | 3/4 | - |
| V2-15 | VAV-10 | 910 | 273 | 546 | 1.60 | 3/4 | - |
| V2-16 | VAV-10 | 940 | 282 | 564 | 1.60 | 3/4 | - |
| V2-17 | NOT USED | - | - | - | - | - | - |
| V2-18 | NOT USED | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - |

NOTES:
1. -

## AIR HANDLING UNITS

- WATER TYPE HEATING COIL CAPACITY BASED ON 200°F E.W.T./170°F L.W.T. -
WATER TYPE COOLING COIL CAPACITY BASED ON 44°F E.W.T./56°F L.W.T.
- PERFORMANCE SHALL BE EQUAL OR SUPERIOR TO SCHEDULED VALUES.

| UNIT NUMBER | | AH-1 | AH-2 | - | - |
|---|---|---|---|---|---|
| AREA SERVED | | NORTH | SOUTH | - | - |
| UNIT CONFIG. | | HORIZ. | HORIZ. | - | - |
| MFG. | | - | - | - | - |
| MODEL | | - | - | - | - |
| SUPPLY FAN | CFM | 7600 | 7600 | - | - |
| | TOTAL SP./EXT. SP. - IN. W.G. | 3.8 / 2.5 | 3.8 / 2.5 | - / - | - / - |
| | WHEEL DIA. | 18 IN. | 18 IN. | - | - |
| | WHEEL TYPE | AF | AF | - | - |
| | MOTOR H.P. | 10 | 10 | - | - |
| | - | - | - | - | - |
| HEATING COIL | FACE AREA | 15 | 15 | - | - |
| | CAP'Y - MBH | 288.5 | 239.8 | - | - |
| | ENT. AIR TEMP. | 30 | 40 | - | - |
| | LVG. AIR TEMP. | 65 | 69 | - | - |
| | CFM | 7600 | 7600 | - | - |
| | MAX. AIR P.D. - IN. W.C. | 2.2 | 1.55 | - | - |
| | GPM | 20 | 16 | - | - |
| | - | - | - | - | - |
| | - | - | - | - | - |
| COOLING COIL | SENSIBLE CL'G MBH | 197.4 | 189.8 | - | - |
| | **TOTAL CL'G MBH** | 254.9 | 238.0 | - | - |
| | ENT. AIR TEMP. DB/WB | 78.6/65.5 | 77.7/64.8 | - | - |
| | LVG. AIR TEMP. DB/WB | 55/54 | 55/54 | - | - |
| | CFM | 7600 | 7600 | - | - |
| | MAX. AIR P.D. - IN. W.C. | 0.5 | 0.53 | - | - |
| | GPM | 46 | 43 | - | - |
| | MAX. WATER P.D. FT. | 10.5 | 9.2 | - | - |
| | - | - | - | - | - |
| | - | - | - | - | - |
| FILTER | TYPE - FINAL | 2" PLEATED MERV 8 | 2" PLEATED MERV 8 | - | - |
| | FACE AREA S.F. | 28.9 | 28.9 | - | - |
| | P.D. IN. W.C. CLEAN/DIRTY | 0.56 /0.75 | 0.56 /0.75 | - | - |
| | - | - | - | - | - |
| OUTSIDE AIR - CFM (MIN.) | | 2130 | 1600 | - | - |
| REQ'D ACCESS. | | 1,2,3,4,5 | 1,2,3,4 | - | - |

REQ'D ACCESS.
1. KNOCKDOWN TYPE UNIT. UNIT SHALL BE CAPABLE OF BEING COMPLETELY ASSEMBLE ON SITE. CONTRACTOR SHALL ASSEMBLE UNIT ON SITE.
2. SPRING ISOLATORS FURNISHED BY UNIT MFR.
3. PROVIDE BASE RAILS IF REQUIRED FOR TRAP HEIGHT.
4. PROVIDE AC CONDENSATE DRAIN PUMP AND PIPE TO NEAREST FLOOR DRAIN. PUMP SHALL BE SIZED FOR MIN. 20 FT. HD.
5.-PROVIDE 3-WAY CONTROL VALVE FOR HOT WATER AND CHILLED WATER.

## PUMPS

| TAG | DESCRIPTION | SERVICE | TYPE | CAPACITY GPM | FT HD | MOTOR DATA BHP/HP | VOLT. | PHASE | RPM | NPSH FT | MIN EFF % | CONN. SIZE(IN) SUCT | DISCH | REQ'D ACCESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HWP-1 | IN-LINE | HOT WATER | CENTRIFUGAL | 74 | 75 | 2.8/3.0 | 208 | 3 | 3450 | 2 | 51 | 1.5 | 1.5 | 2,3,4 |
| HWP-2 | IN-LINE | HOT WATER | CENTRIFUGAL | 74 | 75 | 2.8/3.0 | 208 | 3 | 3450 | 2 | 51 | 1.5 | 1.5 | 2,3,4 |
| CWP-1 | BASE MOUNTED | CHILLED WATER | CENTRIFUGAL | 89 | 67 | 2.5/5.0 | 208 | 3 | 1760 | 5 | 60 | 2.5 | 1.5 | 1,2,3,4 |
| CWP-2 | BASE MOUNTED | CHILLED WATER | CENTRIFUGAL | 89 | 67 | 2.5/5.0 | 208 | 3 | 1760 | 5 | 60 | 2.5 | 1.5 | 1,2,3,4 |
| CWP-3 | IN-LINE | CHILLED WATER | CENTRIFUGAL | 100 | 50 | 2.2/3.0 | 208 | 3 | 1760 | 5 | 60 | 2 | 2 | 2,3,4 |
| | | | | | | | | | | | | | | |

REQ'D ACCESS
1. INCLUDE SUCTION DIFFUSER
2. PROVIDE VIBRATION ISOLATION PER SPEC SECTION 230541.
3. INCLUDE VFD.
4. PUMPS ARE SIZED FOR 100% REDUNDANCY.

## STEAM CONVERTERS

| TAG | TYPE | GPM | PD FT | CAP'Y MBH | NO PASSES | SHELL DIA (IN) | EWT °F | LWT °F | STEAM PRESS lbs | TUBE VEL FPS | MFG. | MODEL | REQ'D ACCESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CONV-1 | SHELL/TUBE | 74 | 0.44 | 1080 | 4 | 12 | 170 | 200 | 15 | 2.45 | - | - | 1,2 |
| CONV-2 | SHELL/TUBE | 74 | 0.44 | 1080 | 4 | 12 | 170 | 200 | 15 | 2.45 | - | - | 1,2 |
| | | | | | | | | | | | | | |

REQ'D ACCESS
1. CONVERTERS ARE SIZED FOR 100% REDUNDANCY
2. SIZE STEAM CONTROL VALVE FOR 15 PSI PRESSURE DROP.

## CONDENSATE RECEIVER PUMP

| TAG | DESCRIPTION | GPM | DISCH PRESS PSI | RPM | DISCH SIZE(IN) | INLET SIZE | RECIEVER CAP(GAL) | ELECTRICAL DATA HP | VOLTAGE | PHASE | REQ'D ACCESS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| CP-1 | CONDENSATE RETURN | 18 | 20 | 3500 | 1" | 2" | 25 | 1/3 | 120 | 1 | 1,2,3,4,5 |
| | | | | | | | | | | | |

REQ'D ACCESS
1. INLET BASKET STRAINER
2. DISCHARGE PRESSURE GAUGE
3. MECHANICAL ALTERNATOR (FLOW SWITCH INSIDE RECEIVER)
4. PUMP SUCTION ISOLATION VALVES
5. PROVIDE VIBRATION ISOLATION AS RECOMMENDED BY UNIT MNAUFACTURER.

DESIGNER/ENGINEER SH
CAD OPERATOR SH
QAQC/CHECKER SS

| Revisions | Date |
|---|---|
| 95% OWNER REVIEW DOCUMENTS | 01/18/2013 |
| ISSUED FOR BID DOCUMENTS | 01/31/2013 |
| ISSUED FOR BID DOCUMENTS | 04/30/2013 |


Dynamix Engineering Ltd.
Facility Engineering Consultants
855 Grandview Avenue, 3rd Floor Columbus, Ohio 43215
Phone: (614)443-1178 · Fax: (614)443-1594 · Email: dynamix@dynamix-ltd.com
Comm. No.: 120050

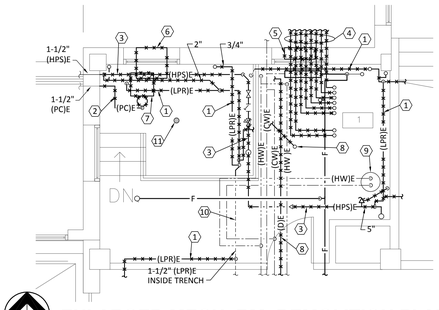

STATE OF OHIO MACE ROCKOW REGISTERED PROFESSIONAL ENGINEER
Professional Seal

Revised By:
---

Drawing Title: HVAC SCHEDULES AND DETAILS
Approved: Project Engineer Philip Kirk
Project Title: MODERNIZE HVAC, B-115
Building Number: B-115 115
Checked: DYNAMIX
Drawn: SHSH
Location: 4100 WEST THIRD ST DAYTON, OH 45428
Date: 04-30-2013
Project No. 552-13-301
Drawing No. M01

VAMC, DAYTON
Department of Veterans Affairs
VA

VA FORM 08-6231, OCT 1978




NORTH

## ENLARGED MECH. RM. DEMOLITION PLAN

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

## ENLARGED DEMOLITION PLAN NOTES

1.-REMOVE ALL EXISTING LOW PRESSURE CONDENSATE RETURN LINES. PROVIDE ASBESTOS ABATEMENT.

2.-REMOVE EXISTING PUMPED CONDENSATE RETURN LINE. PROVIDE ASBESTOS ABATEMENT

3.-REMOVE EXISTING STEAM LINES. PROVIDE ASBESTOS ABATEMENT

4.-REMOVE EXISTING REFRIGERANT LINES (4 SUCTION LINES, 4 LIQUID LINES). PROVIDE ASBESTOS ABATEMENT

5.-REMOVE EXISTING LOUVER.

6.-REMOVE EXISTING EXHAUST FAN.

7.-REMOVE EXISTING ELECTRIC CONDENSATE PUMP.

8.-REMOVE EXISTING AC CONDENSATE DRAIN PIPING.

9.-EXISTING WATER HEATER TO REMAIN.

10.-CAP AND ABANDON LOW PRESSURE CONDENSATE RETURN PIPING INSIDE TRENCH.

11.-EXISTING FLOOR DRAIN TO REMAIN.

## GENERAL ASBESTOS ABATEMENT NOTES

A.-ALL ASBESTOS ABATEMENT SHALL BE CONDUCTED IN ACCORDANCE WITH 02 82 11 TRADITIONAL ASBESTOS ABATEMENT SPECIFICATIONS.

B.-ABATE EXISTING ACM CAULK/PUTTY LOCATED ON METAL DUCTS AND EXISTING ACM BRIDGING ENCAPSULANT LOCATED ON FIBERGLASS DUCT INSULATION.

C.- ABATE EXISTING ACM FLEXIBLE EQUIPMENT/DUCT CONNECTIONS.

D.-ABATE EXISTING ACM BRIDGING ENCAPSULANT LOCATED ON FIBERGLASS PIPE INSULATION.

E.- ALL DUCTWORK, PIPING AND FLEXIBLE CONNECTIONS SHOWN TO BE DEMOLISHED ARE TO BE ASSUMED TO BE ASBESTOS CONTAINING.

F.- ABATEMENT SHALL BE COMPLETED ONE FLOOR AT A TIME. COORDINATE WITH COR.

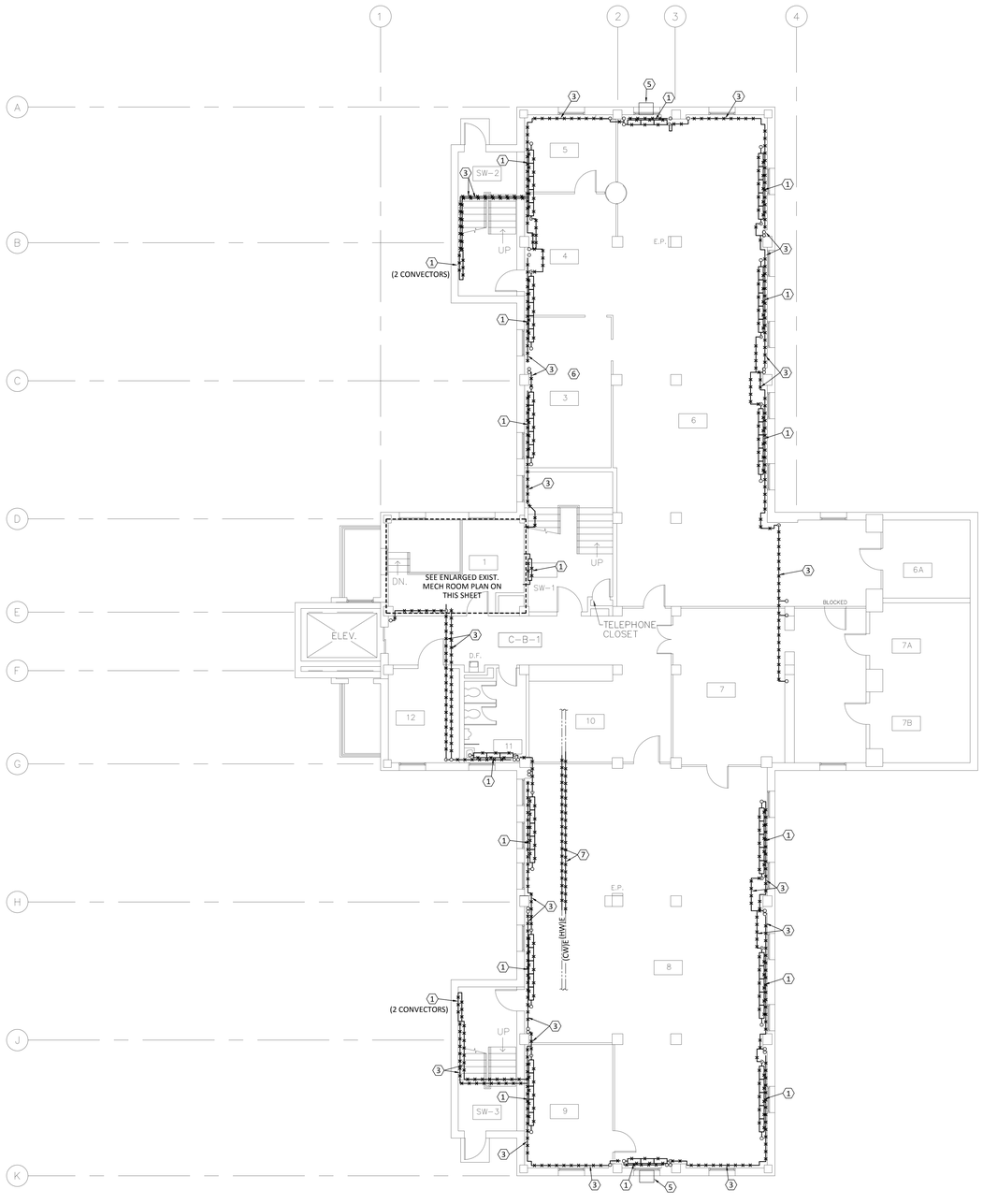
G.-PROVIDE ABATEMENT FOR ANY ASBESTOS CONTAINING CEILINGS OR STRUCTURES THAT NEED TO BE DISTURBED TO COMPLETE MECHANICAL WORK. (TO INSTALL PIPE HANGERS, EQUIPMENT SUPPORST…ECT.).

## INSTALLATION NOTES

1.- UNLESS NOTED OTHERWISE, ALL NEW DUCTWORK AND PIPING IS TO BE MOUNTED ABOVE EXISTING LAY-IN CEILINGS. CONTRACTOR SHALL PROVIDE ALL LABOR AND MATERIALS TO REMVOE AND RE-INSTALL EXISTING CEILING TLES AS REQUIRED TO INSTALL THE NEW DUCWORK AND PIPING AND DEMO EXISTING PIPING AND DUCTWORK ABOVE THE CEILING. ANY EXISTING CEILING TILES THAT ARE DAMAGED DURING CONSTRUCTION ARE TO BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.

2. - PROVIDE NEW CEILING TILES TO REPLACE LOCATIONS WHERE AIR DEVICE IS BEING REMOVED AND NOT REPLACED WITH A NEW ONE IN THE SAME LOCATION. SEE HVAC DEMOLITION DRAWINGS AND HVAC DUCT PLANS FOR DIFFUSER LOCATIONS.

3. -PROVIDE OPENINGS IN PLASTER CEILINGS AS REQUIRED FOR INSTALLATION OF DUCTWORK AND PIPING HANGERS (HANGERS MUST BE SUPPORTED FROM BUILDING STRUCTURE). PROVIDE PATCHING AND REPAIR AS NECESSARY TO LOCATE STRUCTURE. PROVIDE PATCHING AND REPAIR OF PLASTER CEILINGS WHERE HANGERS PENETRATE CEILINGS. PLASTER CEILINGS EXIST ABOVE LAY-IN CEILINGS.




NORTH

## BASEMENT FLOOR HVAC DEMOLITION PLAN

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

## GROUND FLOOR DEMOLITION PLAN NOTES

1.- REMOVE ALL EXISTING RADIATORS OR CONVECTORS AND ASSOCIATED CONTROLS, ALL RISERS, AND PIPING. PROVIDE ASBESTOS ABATEMENT

2.-NOT USED.

3.-REMOVE EXISTING STEAM AND CONDENSATE PIPING. PROVIDE ASBESTOS ABATEMENT

4.-NOT USED.

5.-EXISTING AC UNIT TO REMAIN.

6.-REMOVE EXISTING ACOUSTICAL CEILING SYSTEM AND ALL ASSOCIATED ITEMS.

7.-REMOVE EXISTING DOMESTIC COLD WATER AND HOT WATER PIPING AS SHOWN. PROVIDE ASBESTOS ABATEMENT OF SECTION OF PIPE TO BE REMOVED. ENCAPSULATE EXISTING INSULATION THAT IS TO REMAIN.

## GENERAL DEMOLITION NOTES

1.- PATCH ALL WALLS, FLOORS, AND CEILINGS (TO MATCH EXISTING) WHERE PIPING OR DUCTWORK HAS BEEN REMOVED.

## GENERAL ASBESTOS ABATEMENT NOTES

A.-ALL ASBESTOS ABATEMENT SHALL BE CONDUCTED IN ACCORDANCE WITH 02 82 11 TRADITIONAL ASBESTOS ABATEMENT SPECIFICATIONS.

B.-ABATE EXISTING ACM CAULK/PUTTY LOCATED ON METAL DUCTS AND EXISTING ACM BRIDGING ENCAPSULANT LOCATED ON FIBERGLASS DUCT INSULATION.

C.- ABATE EXISTING ACM FLEXIBLE EQUIPMENT/DUCT CONNECTIONS.

D.-ABATE EXISTING ACM BRIDGING ENCAPSULANT LOCATED ON FIBERGLASS PIPE INSULATION.

E.- ALL DUCTWORK, PIPING AND FLEXIBLE CONNECTIONS SHOWN TO BE DEMOLISHED ARE TO BE ASSUMED TO BE ASBESTOS CONTAINING.

F.- ABATEMENT SHALL BE COMPLETED ONE FLOOR AT A TIME. COORDINATE WITH COR.

G.-PROVIDE ABATEMENT FOR ANY ASBESTOS CONTAINING CEILINGS OR STRUCTURES THAT NEED TO BE DISTURBED TO COMPLETE MECHANICAL WORK. (TO INSTALL PIPE HANGERS, EQUIPMENT SUPPORST…ECT.).

## INSTALLATION NOTES

1.- UNLESS NOTED OTHERWISE, ALL NEW DUCTWORK AND PIPING IS TO BE MOUNTED ABOVE EXISTING LAY-IN CEILINGS. CONTRACTOR SHALL PROVIDE ALL LABOR AND MATERIALS TO REMVOE AND RE-INSTALL EXISTING CEILING TLES AS REQUIRED TO INSTALL THE NEW DUCWORK AND PIPING AND DEMO EXISTING PIPING AND DUCTWORK ABOVE THE CEILING. ANY EXISTING CEILING TILES THAT ARE DAMAGED DURING CONSTRUCTION ARE TO BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.

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3. -PROVIDE OPENINGS IN PLASTER CEILINGS AS REQUIRED FOR INSTALLATION OF DUCTWORK AND PIPING HANGERS (HANGERS MUST BE SUPPORTED FROM BUILDING STRUCTURE). PROVIDE PATCHING AND REPAIR AS NECESSARY TO LOCATE STRUCTURE. PROVIDE PATCHING AND REPAIR OF PLASTER CEILINGS WHERE HANGERS PENETRATE CEILINGS. PLASTER CEILINGS EXIST ABOVE LAY-IN CEILINGS.

## ROOM SCHEDULE

| NO. | NAME |
|---|---|
| 1 | MECH ROOM |
| 3 | FILES |
| 4 | FILES |
| 5 | FILES |
| 6 | FILES |
| 6A | UNFINISHED |
| 7 | STORAGE |
| 7A | UNFINISHED |
| 7B | UNFINISHED |
| 8 | FILES |
| 9 | STORAGE |
| 10 | FILES |
| 11 | STORAGE |
| 12 | TRANSFORMER ROOM |
| SW-1 | STAIR |
| SW-2 | STAIR |
| SW-3 | STAIR |

DESIGNER/ENGINEER SH
CAD OPERATOR SH
QAQC/CHECKER SS

| Revisions | Date |
|---|---|
| 95% OWNER REVIEW DOCUMENTS | 01/18/2013 |
| ISSUED FOR BID DOCUMENTS | 01/31/2013 |
| ISSUED FOR BID DOCUMENTS | 04/30/2013 |


Dynamix Engineering Ltd.
Facility Engineering Consultants
855 Grandview Avenue, 3rd Floor Columbus, Ohio 43215
Phone: (614)443-1178 · Fax: (614)443-1594 · Email: dynamix@dynamix-ltd.com
Comm. No.: 120050


STATE OF OHIO · MACE E. MOSES · REGISTERED PROFESSIONAL ENGINEER

Professional Seal

Revised By: ---

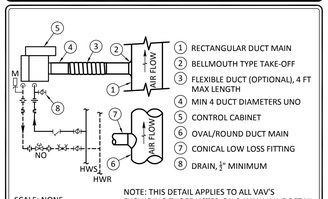
| | |
|---|---|
| Drawing Title | BASEMENT FLOOR HVAC DEMOLITION PLAN |
| Project Title | MODERNIZE HVAC, B-115 |
| Date | 04-30-2013 |
| Project No. | 552-13-301 |
| Approved: Project Engineer | Philip Kirk |
| Building Number | B-115 115 |
| Checked | DYNAMIX |
| Drawn | SHSH |
| Drawing No. | M1 |
| Location | 4100 WEST THIRD ST DAYTON, OH 45428 |

VAMC, DAYTON

VA Department of Veterans Affairs

VA FORM 08-6231, OCT 1978

## AIR TERMINAL UNIT (2 WAY) — 1

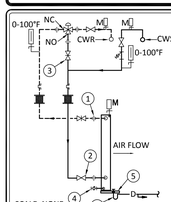



1. RECTANGULAR DUCT MAIN
2. BELLMOUTH TYPE TAKE-OFF
3. FLEXIBLE DUCT (OPTIONAL), 4 FT MAX LENGTH
4. MIN 4 DUCT DIAMETERS UNO
5. CONTROL CABINET
6. OVAL/ROUND DUCT MAIN
7. CONICAL LOW LOSS FITTING
8. DRAIN, ¾" MINIMUM

NOTE: THIS DETAIL APPLIES TO ALL VAV'S EXCLUDING THOSE LISTED ON 3-WAY VALVE DETAIL.

SCALE: NONE

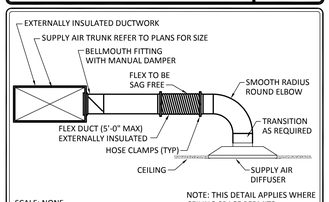
## AHU-1 COOLING COIL — 2




1. CONNECTION (TYPICAL): UNION OR FLANGE, SEE SPECIFICATIONS FOR CRITERIA
2. ISOLATION/SHUTTOFF VALVE (TYPICAL): BALL VALVE OR BUTTERFLY VALVE, SEE SPECIFICATIONS FOR CRITERIA
3. BALANCE VALVE (TYPICAL): CIRCUIT SETTER & BALL VALVE OR COMBINATION BALANCE/SHUTOFF VALVE, SEE SPECIFICATIONS FOR CRITERIA
4. DRAIN, ¾" MINIMUM
5. DRAIN PAN
6. DEEP SEAL TRAP ON DRAIN PIPING

SCALE: NONE

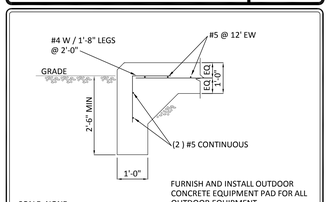
## CEILING DIFFUSER — 3




SCALE: NONE

NOTE: THIS DETAIL APPLIES WHERE CEILING SPACE PERMITS

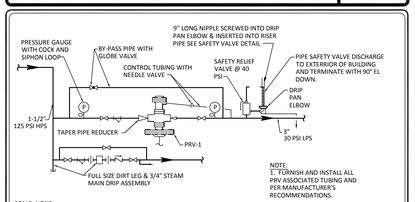
## OUTDOOR EQUIPMENT PAD — 4




FURNISH AND INSTALL OUTDOOR CONCRETE EQUIPMENT PAD FOR ALL OUTDOOR EQUIPMENT

SCALE: NONE

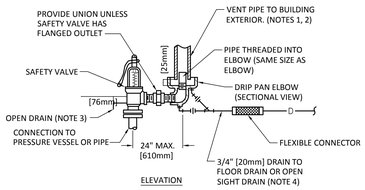
## PRV-1 STEAM PRESS. REDUCING STATION — 5




NOTE:
1. FURNISH AND INSTALL ALL PRV ASSOCIATED TUBING AND PER MANUFACTURER'S RECOMMENDATIONS.

SCALE: NONE

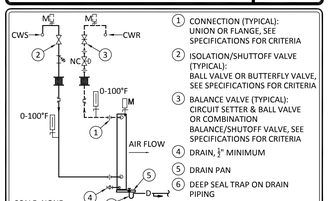
## SAFETY VALVE DETAIL — 6




NOTES

1. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, SIZE THE VENT PIPE SO THAT STEAM IS NOT BLOWN OUT AT THE VENT PIPE ENTRANCE. UTILIZE THE CALCULATION METHOD CONTAINED IN ANSI B31.1. POWER PIPING CODE, APPENDIX II.
2. VENT PIPE SHALL TERMINATE AT EXTERRIOR OF BUILDING WITH 90° ELBOW DOWN.
3. DISCHARGE OF DRAIN MUST BE DIRECTED AWAY FROM PLATFORMS OR OTHER AREAS WHICH PERSONNEL MAY OCCUPY.
4. DO NOT CONNECT ANY OTHER DRAIN TO THE DRIP PAN ELBOW DRAIN PIPE.

## AHU-2 COOLING COIL — 7




1. CONNECTION (TYPICAL): UNION OR FLANGE, SEE SPECIFICATIONS FOR CRITERIA
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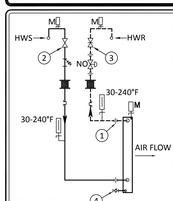
3. BALANCE VALVE (TYPICAL): CIRCUIT SETTER & BALL VALVE OR COMBINATION BALANCE/SHUTOFF VALVE, SEE SPECIFICATIONS FOR CRITERIA
4. DRAIN, ¾" MINIMUM
5. DRAIN PAN
6. DEEP SEAL TRAP ON DRAIN PIPING

SCALE: NONE

## AHU-2 HEATING COIL — 8

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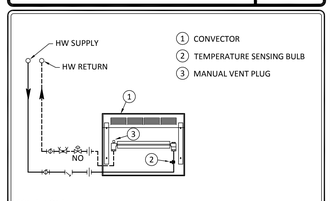
3. BALANCE VALVE (TYPICAL): CIRCUIT SETTER & BALL VALVE OR COMBINATION BALANCE/SHUTOFF VALVE, SEE SPECIFICATIONS FOR CRITERIA
4. DRAIN, ¾" MINIMUM

SCALE: NONE

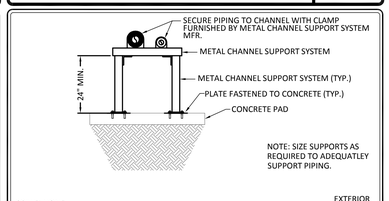
## CONVECTOR PIPING — 9




1. CONVECTOR
2. TEMPERATURE SENSING BULB
3. MANUAL VENT PLUG

SCALE: NONE

## OUTDOOR PIPING SUPPORT — 10

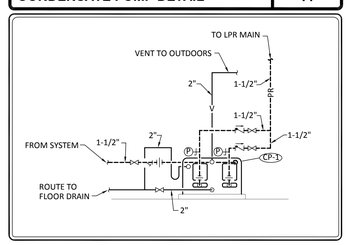



NOTE: SIZE SUPPORTS AS REQUIRED TO ADEQUATELY SUPPORT PIPING.

SCALE: NONE

EXTERIOR

## CONDENSATE PUMP DETAIL — 11




## FIRE DAMPER NOTES

GENERAL NOTES: INSTALL OF FIRE DAMPERS SHALL CONFORM TO NFPA 90A, SMACNA AND MFR'S INSTRUCTIONS. ALL FIRE DAMPERS TO BE DYNAMIC.

DETAIL NOTES:
1.- FIRE DAMPER SHALL BE FOLDED BLADE TYPE, EXCEPT AS NOTED. VERTICAL MOUNT: GRAVITY DROP. HORIZONTAL MOUNT: SPRING LOADED TO CLOSE.
TYPE "A" - BLADES STORED IN AIR STREAM.
TYPE "B" - BLADES STORED OUT OF THE AIR STREAM.
TYPE "C" - HIGH VELOCITY TYPE, BLADES STORED OUT OF THE AIR STREAM, RECTANGULAR, ROUND OR OVAL CONNECTION.

2.- DUCT/SLEEVE CONNECTION, BREAK AWAY TYPE.

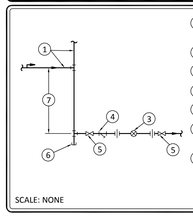
3.- SHEET METAL SLEEVE, 16 GAUGE MIN. SAME MATERIAL AS DUCT EXCEPT GALVANIZED FOR FIBER GLASS DUCTBOARD.

4.- DUCT ACCESS PANEL. REFER TO SPECIFICATIONS.

5.- RETAINING ANGLE ALL FOUR SIDES, GAUGE PER SMACNA. 1" MIN. OVERLAP OF WALL OPENING. BOLT OR TACK WELD TO WALL SLEEVE AS PER SMACNA.

6.- 10 GAUGE WALL SLEEVE WITH 1/2" WIDE LEG AT ALL SIDES ON OPPOSITE SIDE OF DUCT CONNECTION TO OVERLAP WALL OPENING.

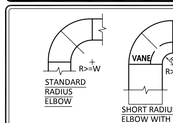
## LOW PRESSURE STEAM DRIP — 12



1. LOW PRESSURE STEAM MAIN (15-30 PSI)
2. "Y" STRAINER
3. F&T TRAP
4. STRAINER
5. SHUTOFF VALVE
6. COLLECTING POCKET AND DIRT LEG SAME SIZE AS MAIN
7. LENGTH FROM INVERT OF MAIN TO DRIP PIPE, 1 1/2 x MAIN PIPE DIA., 8" MINIMUM

SCALE: NONE

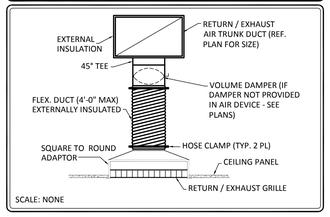
## DUCTWORK RADIUS ELBOWS — 13




NOTE:
1. THE INTERIOR SURFACE OF ALL RADIUS ELBOWS SHALL BE MADE ROUND.
2. ALL STANDARD RADIUS ELBOWS SHOWN ON FLOOR PLANS MAY BE MADE SHORT RADIUS ELBOWS. ALL SHORT RADIUS ELBOWS SHALL HAVE VANES. VANES SHALL BE CONSTRUCTED, SUPPORTED AND FASTENED AS RECOMMENDED BY SMACNA.

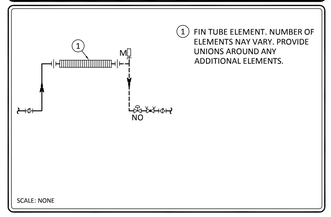
SCALE: NONE

## RETURN/EXHAUST CONNECTION — 14




SCALE: NONE

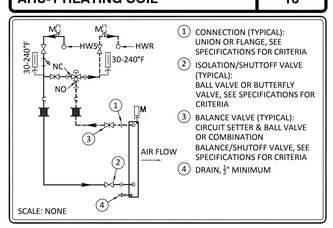
## FIN TUBE PIPING — 15




1. FIN TUBE ELEMENT. NUMBER OF ELEMENTS NAY VARY. PROVIDE UNIONS AROUND ANY ADDITIONAL ELEMENTS.

SCALE: NONE

## AHU-1 HEATING COIL — 16

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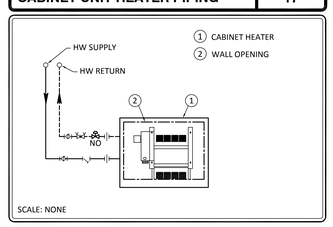
3. BALANCE VALVE (TYPICAL): CIRCUIT SETTER & BALL VALVE OR COMBINATION BALANCE/SHUTOFF VALVE, SEE SPECIFICATIONS FOR CRITERIA
4. DRAIN, ¾" MINIMUM

SCALE: NONE

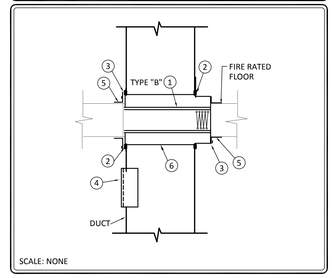
## CABINET UNIT HEATER PIPING — 17




1. CABINET HEATER
2. WALL OPENING

SCALE: NONE

## FIRE DAMPER - TYPE B (AT FLOOR) — 20

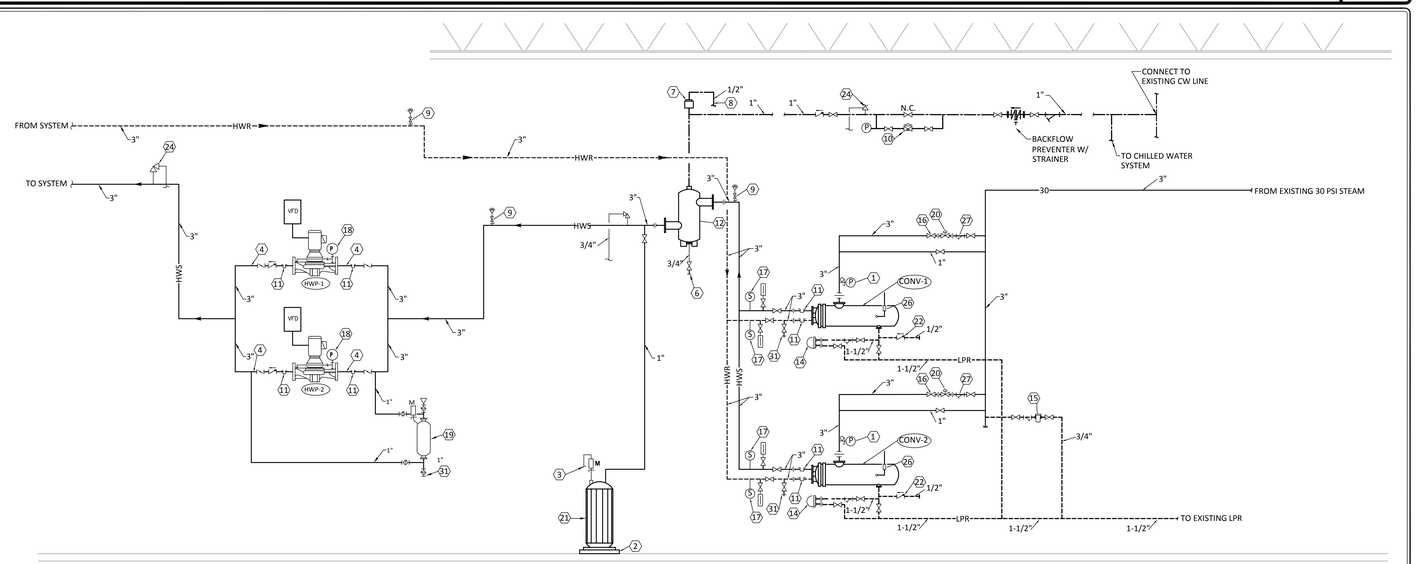



SCALE: NONE

## STEAM AND HOT WATER PIPING DIAGRAM — 18

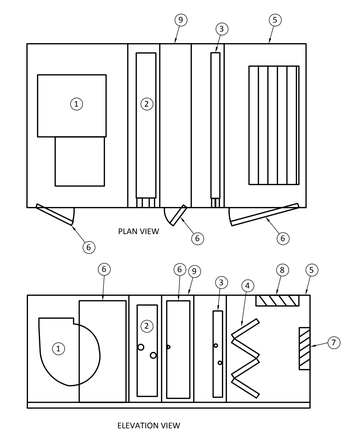
### NOMENCLATURE

1.- PRESSURE GAUGE WITH SIPHON LOOP
2.- NEW 4" HIGH CONCRETE EQUIPMENT PAD.
3.- ROUTE TO NEAREST FLOOR DRAIN.
4.- USE SPRING ISOLATION HANGERS ON PIPING WITHIN 5 ELBOWS OF PUMPS SUCTION AND DISCHARGE.
5.- NOT USED.
6.- BLOW DOWN WITH THREAD HOSE END
7.- HIGH CAPACITY AUTOMATIC AIR VENT
8.- ROUTE TO FLOOR DRAIN
9.- AIR VENT MANUAL TYPE, WITH SHUTOFF COCK
10.- PRESSURE REDUCING VALVE.
11.- PRESSURE/TEMPERATURE INSERTION PORT.
12.- LINE SIZE AIR AND DIRT SEPERATOR.
13.- NOT USED.
14.- F & T TRAP
15.- INVERTED BUCKET TRAP
16.- VALVES SHALL BE LINE SIZE PROVIDE ECCENTRIC PIPE REDUCERS AT CONTROL VALVE
17.- HOT WATER SENSORS TO BAS
18.- PUMP PRESSURE DIFFERENTIAL GAUGE
19.- TWO GALLON SHOT FEEDER, MOUNT TO MECHANICAL ROOM WALL
20.- MODULATING STEAM CONTROL VALVE (SIZE FOR 15 PSI PRESURE DROP ACROSS CONTROL VALVE.)
21.- EXPANSION TANK 41 GAL. ACCEPT. VOL., 79 GAL TANK VOL.
22.- VACUUM BREAKER
23.- NOT USED
24.- PRESSURE RELIEF VALVE SET AT 30 PSI
25.- NOT USED
26.- AUTOMATIC THERMOSTATIC AIR VENT
27.- INLINE STRAINER WITH 100 MESH GASKET
28.- NOT USED
29.- NOT USED
30.- NOT USED
31.- DRAIN VALVE AND THREADED HOSE END.




SCALE: NONE

## AH-1 AND AH-2 DETAIL — 19




1. SUPPLY FAN
2. COOLING COIL
3. HEATING COIL
4. FILTER
5. MIXING SECTION
6. ACCESS DOOR
7. RETURN AIR OPENING
8. OUTSIDE AIR OPENING
9. ACCESS SECTION

SCALE: NONE

DESIGNER/ENGINEER SH.
CAD OPERATOR SH.
QAQC/CHECKER SS.

| Revisions | Date |
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| 95% OWNER REVIEW DOCUMENTS | 01/18/2013 |
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Dynamix Engineering Ltd.
Facility Engineering Consultants
855 Grandview Avenue, 3rd Floor Columbus, Ohio 43215
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STATE OF OHIO — MACE E. KOSSMAN — REGISTERED PROFESSIONAL ENGINEER

Professional Seal

Revised By: ---

| | |
|---|---|
| Drawing Title | HVAC SCHEDULES AND DETAILS |
| Project Title | MODERNIZE HVAC, B-115 |
| Date | 04-30-2013 |
| Project No. | 552-13-301 |
| Approved: Project Engineer | Philip Kirk |
| Building Number | B-115 115 |
| Checked | DYNAMIX |
| Drawn | SH |
| Drawing No. | M02 |
| Location | 4100 WEST THIRD ST DAYTON, OH 45428 |

VAMC, DAYTON

VA Department of Veterans Affairs

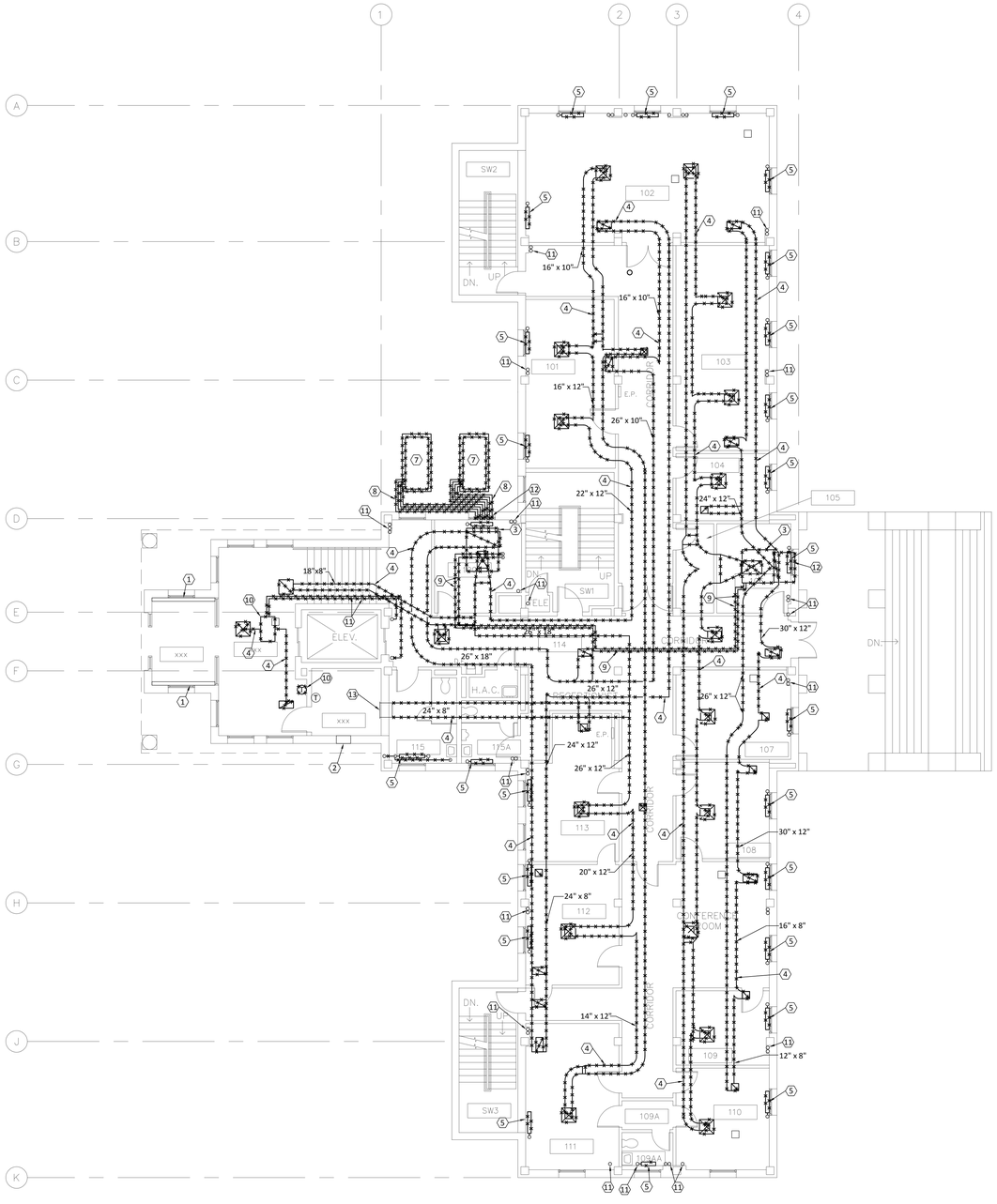
VA FORM 08-6231, OCT 1978

## INSTALLATION NOTES

1.- UNLESS NOTED OTHERWISE, ALL NEW DUCTWORK AND PIPING IS TO BE MOUNTED ABOVE EXISTING LAY-IN CEILINGS. CONTRACTOR SHALL PROVIDE ALL LABOR AND MATERIALS TO REMVOE AND RE-INSTALL EXISTING CEILING TLES AS REQUIRED TO INSTALL THE NEW DUCWORK AND PIPING AND DEMO EXISTING PIPING AND DUCTWORK ABOVE THE CEILING. ANY EXISTING CEILING TILES THAT ARE DAMAGED DURING CONSTRUCTION ARE TO BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.

2. - PROVIDE NEW CEILING TILES TO REPLACE LOCATIONS WHERE AIR DEVICE IS BEING REMOVED AND NOT REPLACED WITH A NEW ONE IN THE SAME LOCATION. SEE HVAC DEMOLITION DRAWINGS AND HVAC DUCT PLANS FOR DIFFUSER LOCATIONS.

3. -PROVIDE OPENINGS IN PLASTER CEILINGS AS REQUIRED FOR INSTALLATION OF DUCTWORK AND PIPING HANGERS (HANGERS MUST BE SUPPORTED FROM BUILDING STRUCTURE). PROVIDE PATCHING AND REPAIR AS NECESSARY TO LOCATE STRUCTURE. PROVIDE PATCHING AND REPAIR OF PLASTER CEILINGS WHERE HANGERS PENETRATE CEILINGS. PLASTER CEILINGS EXIST ABOVE LAY-IN CEILINGS.




NORTH

## FIRST FLOOR HVAC DEMOLITION PLAN

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

## DEMOLITION PLAN NOTES

1.- EXISTING ELECTRIC BASEBOARD HEATING TO REMAIN.

2.-EXISTING EXHAUST FAN TO REMAIN.

3.-REMOVE EXISTING AIR HANDLER AND ALL ASSOCIATED CONTROLS. AIR HANDLER WILL NEED TO BE DISASSEMBLED IN PLACE BEFORE REMOVAL. PROVIDE ALL LABOR AND MATERIALS TO DISASSEMBLE UNIT IN PLACE.

4.-REMOVE EXISTING DUCTWORK AND ALL ASSOCIATED DIFFUSERS, REGISTERS, AND GRILLES. PROVIDE ASBESTOS ABATEMENT

5.-REMOVE EXISTING RADIATORS OR CONVECTORS AND ASSOCIATED CONTROLS, ALL RISERS, AND PIPING. PROVIDE ASBESTOS ABATEMENT

6.-NOT USED.

7.-REMOVE EXISTING CONDENSING UNIT, CONCRETE PAD, AND ASSOCIATED CONTROLS.

8.-REMOVE ALL REFRIGERANT PIPING (4 LIQUID LINES, 4 SUCTION LINES).PROVIDE ASBESTOS ABATEMENT

9.-REMOVE ALL EXISTING REFRIGERANT PIPING (2 LIQUID LINES, 2 SUCTION LINES).

10.-REMOVE EXISTING CABINET UNIT HEATER, ASSOCIATED STEAM PIPING, AND CONTROLS.

11.-REMOVE EXISTING STEAM AND CONDENSATE PIPING. PROVIDE ASBESTOS ABATEMENT.

12.-REMOVE EXISTING WINDOW MOUNTED LOUVER.

13.-EXISTING SUPPLY GRILLE TO REMAIN. CAP DUCT BEHIND GRILLE.

## GENERAL DEMOLITION NOTES

1.- PATCH ALL WALLS, FLOORS, AND CEILINGS (TO MATCH EXISTING) WHERE PIPING OR DUCTWORK HAS BEEN REMOVED.

## GENERAL ASBESTOS ABATEMENT NOTES

A.-ALL ASBESTOS ABATEMENT SHALL BE CONDUCTED IN ACCORDANCE WITH 02 82 11 TRADITIONAL ASBESTOS ABATEMENT SPECIFICATIONS.

B.-ABATE EXISTING ACM CAULK/PUTTY LOCATED ON METAL DUCTS AND EXISTING ACM BRIDGING ENCAPSULANT LOCATED ON FIBERGLASS DUCT INSULATION.

C.- ABATE EXISTING ACM FLEXIBLE EQUIPMENT/DUCT CONNECTIONS.

D.-ABATE EXISTING ACM BRIDGING ENCAPSULANT LOCATED ON FIBERGLASS PIPE INSULATION.

E.- ALL DUCTWORK, PIPING AND FLEXIBLE CONNECTIONS SHOWN TO BE DEMOLISHED ARE TO BE ASSUMED TO BE ASBESTOS CONTAINING.

F.- ABATEMENT SHALL BE COMPLETED ONE FLOOR AT A TIME. COORDINATE WITH COR.

G.-PROVIDE ABATEMENT FOR ANY ASBESTOS CONTAINING CEILINGS OR STRUCTURES THAT NEED TO BE DISTURBED TO COMPLETE MECHANICAL WORK. (TO INSTALL PIPE HANGERS, EQUIPMENT SUPPORST...ECT.).

## ROOM SCHEDULE

| NO. | NAME |
|---|---|
| 100 | MECHICAL |
| 101 | CLASSROOM |
| 102 | TRAINING CLASSROOM |
| 103 | CLASSROOM |
| 104 | STORAGE |
| 105 | STORAGE |
| 106 | A/C |
| 107 | NURSING EDUCATION |
| 108 | OFFICE |
| 109 | OFFICE |
| 109A | |
| 109AA | |
| 110 | OFFICE |
| 111 | OFFICE |
| 112 | OFFICE |
| 113 | OFFICE |
| 114 | MEN |
| 115 | WOMEN |
| SW-1 | STAIR |
| SW-2 | STAIR |
| SW-3 | STAIR |
| XXX | VESTIBULE |
| XXX | LOBBY |
| XXX | ELEVATOR EQUIPMENT ROOM |

DESIGNER/ENGINEER SH
CAD OPERATOR SH
QAQC/CHECKER SS

| Revisions | Date |
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Phone: (614)443-1178 · Fax: (614)443-1594 · Email: dynamix@dynamix-ltd.com
Comm. No.: 120050


STATE OF OHIO · MACE · REGISTERED PROFESSIONAL ENGINEER

Professional Seal

Revised By: ---

| Drawing Title | Project Title | Date |
|---|---|---|
| FIRST FLOOR HVAC DEMOLITION PLAN | MODERNIZE HVAC, B-115 | 04-30-2013 |
| Approved: Project Engineer: Philip Kirk | Building Number: B-115 115 · Checked: DYNAMIX · Drawn: SHSH | Project No. 552-13-301 |
| | Location: 4100 WEST THIRD ST DAYTON, OH 45428 | Drawing No. M2 |

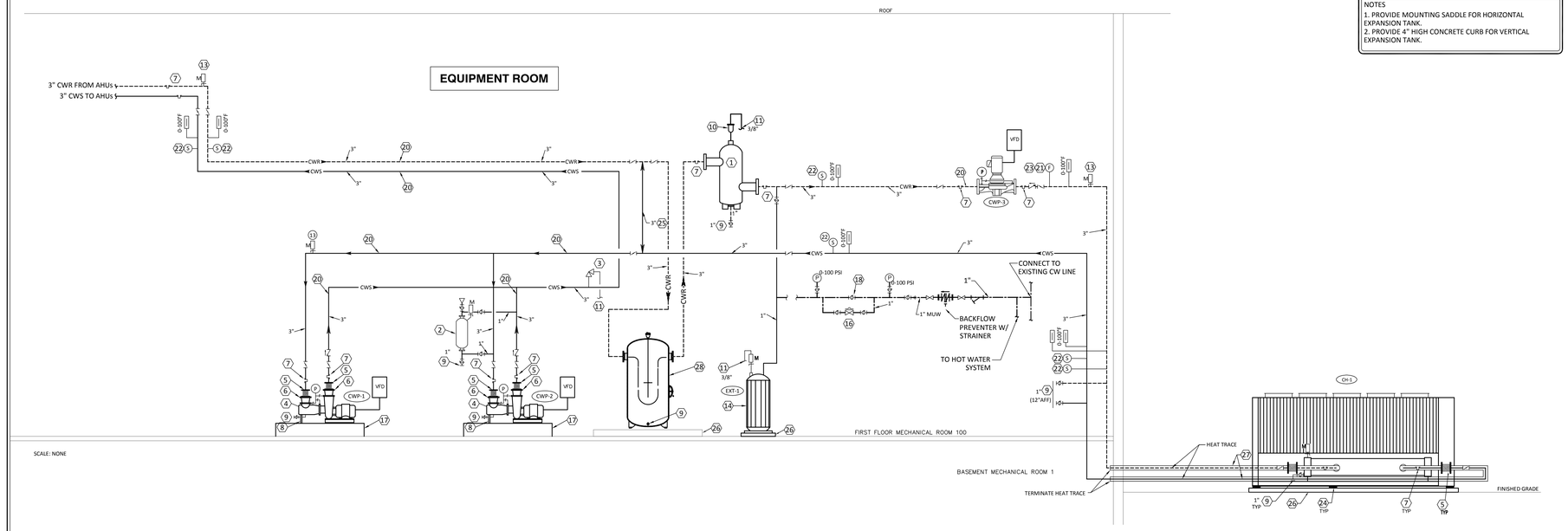
VAMC, DAYTON

VA Department of Veterans Affairs

VA FORM 08-6231, OCT 1978

## CHILLED WATER PIPING SCHEMATIC

XX




SCALE: NONE

### EXPANSION TANKS

| TAG | SERVICE | TYPE | VOLUME (GAL) | ACCEPTANCE (GAL) |
|---|---|---|---|---|
| EXT-1 | CHILLED WATER | VERTICAL | 35 | 15 |
| - | - | - | - | - |

NOTES
1. PROVIDE MOUNTING SADDLE FOR HORIZONTAL EXPANSION TANK.
2. PROVIDE 4" HIGH CONCRETE CURB FOR VERTICAL EXPANSION TANK.

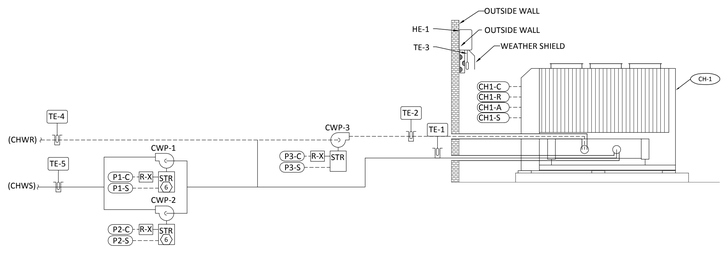
### NOMENCLATURE

1. COMBINATION AIR/DIRT SEPARATOR, LINE SIZE
2. FIVE GALLON CHEMICAL SHOT FEEDER.
3. RELIEF VALVE SET AT 45 PSI, RUN FULL SIZE TO FLOOR DRAIN.
4. END SUCTION DIFFUSER W/ STRAINER & START UP STRAINER. HC TO REMOVE START UP STRAINER AFTER FINAL FLUSH & TURN OVER TO OWNER.
5. FLEXIBLE CONNECTION.
6. REDUCER COUPLING.
7. PRESSURE / TEMPERATURE INSERTION PORT.
8. SUPPLEMENTAL SUPPORT PIPE WITH THREADED ADJUSTABLE LEG.
9. DRAIN VALVE AND THREADED HOSE END.
10. HIGH CAPACITY AUTOMATIC AIR VENT.
11. ROUTE PIPING TO THE NEAREST FLOOR DRAIN.
12. NOT USED
13. PROVIDE MANUAL AIR VENTS AT ALL HIGH POINTS OF PIPING SYSTEM.
14. EXPANSION TANK, SEE SCHEDULE ON THIS SHEET FOR CAPACITY
15. NOT USED
16. PRESSURE REDUCING VALVE SET AT 15 PSIG.
17. SPRING ISOLATED INERTIA BASE
18. VALVED BY-PASS.
19. NOT USED
20. USE SPRING ISOLATION HANGERS ON PIPING WITHIN 5 ELBOWS OF PUMPS, SUCTION AND DISCHARGE.
21. BAS CONTRACTOR SHALL RUN SHIELDED CONTROL WIRING IN CONDUIT TO THE OUTDOOR CHILLER CONTROL PANEL.
22. TEMPERATURE SENSORS TO BAS.
23. FLOW SWITCH.
24. RUBBER-IN-SHEAR ISOLATORS BY CHILLER MANF.
25. FULL SIZE EQUALIZER LINE.
26. CONCRETE EQUIPMENT PAD
27. ELECTRICALLY HEAT TRACED PIPING. SUPPORT PIPING AS REQUIRED.
28. CHILLED WATER BUFFER TANK. TANK TO BE 100 GALLONS, 24" DIAMETER, 60" HIGH. INCLUDE LEG STANDS. INSTALL 1" THICK INSULATION.

CHILLED WATER SYSTEM

DP-1, 0-100' DIFF. PRESSURE TRANSMITTER SEE PLANS FOR LOCATION

## CHILLED WATER CONTROLS




### CHILLER PLANT OPERATION SEQUENCE

SEQUENCE OF OPERATIONS (PRIMARY CHILLED WATER SYSTEM)

CHILLER ENABLE -THE CHILLER SYSTEM SHALL BE OPERATIONAL WHENEVER THE OUTSIDE AIR TEMPERATURE IS ABOVE 55 DEG F. AND ANY OF THE FOLLOWING CONDITIONS ARE MET (SPECIFIC TO ONLY THE AIR HANDLERS SERVED BY THIS CHILLER SYSTEM):

1. ANY AIR HANDLER IS IN THE OCCUPIED MODE.
2. ANY AIR HANDLER IS OPERATING DUE TO NIGHT SETUP HIGH TEMPERATURE, AND ECONOMIZER IS NOT AVAILABLE.

WHEN THE CHILLER SYSTEM BECOMES OPERATIONAL, THE CHILLER SHALL BE INDEXED TO OPERATE.

THE CHILLER SYSTEM SHALL STOP WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW 55 DEG F, OR WHEN ALL AIR HANDLERS AND ZONED AREAS HAVE ENTERED THE UNOCCUPIED MODE.

WHEN THE CHILLER IS INDEXED TO OPERATE, ITS ASSOCIATED CHILLED WATER PUMP SHALL BE STARTED AND RUN CONTINUOUSLY. UPON PROOF OF PUMP STATUS, THE CHILLER SHALL THEN BE ENABLED TO RUN UNDER ITS OWN CONTROLS.

A FLOW SWITCH IN THE CHILLED WATER SHALL PROVE FLOW BEFORE THE COMPRESSOR ACTUALLY OPERATES. FURNISH ALL NECESSARY AUXILIARY CONTACTS AND EXTERNAL RELAYS, AND ALL WIRING (INCLUDING FLOW SWITCHES), REQUIRED TO ACCOMPLISH THE DESCRIBED START-UP, OPERATING AND SAFETY SEQUENCE DESCRIBED. ALL CHILLER CONTROL DEVICE INSTALLATION AND SET-UP SHALL BE PROVIDED UNDER THIS CONTRACT.

WHEN THE CHILLER SYSTEM'S OPERATIONAL CONDITIONS ARE NO LONGER SATISFIED, THE CHILLER SHALL BE STOPPED FIRST. AFTER A 5 MINUTE TIME DELAY, ITS ASSOCIATED CHILLED WATER PUMP SHALL BE STOPPED.

THE CHILLER SHALL UTILIZE A MINIMUM ON TIMER AND A MINIMUM OFF TIMER TO PREVENT SHORT CYCLING.

IF THE CHILLER OR ITS ASSOCIATED CHILLED WATER PUMP FAILS TO PROVE STATUS DURING THEIR OPERATION, AN ALARM SHALL BE INITIATED AT THE OPERATOR WORKSTATION

WHEN THE OUTSIDE AIR TEMPERATURE FALLS BELOW 32 DEG F, THE PRIMARY CHILLED WATER PUMP SHALL BE STARTED. IF THE LEAVING CHILLED WATER TEMPERATURE FROM THE CHILLER RISES ABOVE 90 DEG F., THE ASSOCIATED PUMP SHALL CYCLE OFF. IF THE OUTSIDE AIR TEMPERATURE REMAINS BELOW 32 DEG F., AND THE SUPPLY CHILLED WATER TEMPERATURE (TE-1) DROPS BELOW 40 DEG F., THE PUMPS SHALL BE ENABLE AGAIN FOR OPERATION UNTIL THE CHILLED WATER TEMPERATURE RISES ABOVE 90 DEG F. THIS PROCESS SHALL CONTINUE AS LONG AS THE OUTSIDE AIR TEMPERATURE REMAINS BELOW 32 DEG F.

### CHILLER PLANT OPERATION SEQUENCE

SEQUENCE OF OPERATIONS (SECONDARY CHILLED WATER SYSTEM)

THE SECONDARY CHILLED WATER PUMPS SHALL OPERATE ON A LEAD/LAG BASIS. THE LEAD PUMP SHALL BE OPERATOR SELECTABLE AND SHALL AUTOMATICALLY ALTERNATE ON A MONTHLY BASIS. WHEN THE ALTERNATION OCCURS, THE PUMP WITH THE LEAST AMOUNT OF OVERALL TOTALIZED RUNTIME SHALL BECOME THE LEAD.

THE LEAD PUMP SHALL START AND RUN CONTINUOUSLY WHENEVER THE PRIMARY CHILLED WATER SYSTEM IS OPERATIONAL.

THE SPEED OF THE LEAD PUMP SHALL BE MODULATED TO MAINTAIN A CONSTANT DIFFERENTIAL PRESSURE AS SENSED BETWEEN THE SUPPLY AND RETURN OF SECONDARY CHILLED WATER SYSTEM. THE DIFFERENTIAL SETPOINT TO BE DETERMINED BY THE BALANCING CONTRACTOR

1. THE LOCAL DIFFERENTIAL PRESSURE SENSOR SHALL BE HARD WIRED TO THE LOCAL CONTROLLER PERFORMING THE PRESSURE CONTROL SEQUENCE.
2. A REMOTE DIFFERENTIAL PRESSURE SENSOR SHALL BE USED TO RESET THE LOCAL DIFFERENTIAL PRESSURE SETPOINT WHEN THE BAS COMMUNICATIONS NETWORK IS ON-LINE AND OPERATIONAL. AS THE REMOTE DIFFERENTIAL PRESSURE VARIES FROM THE REMOTE PRESSURE SETPOINT, THE LOCAL SETPOINT SHALL BE RESET ACCORDINGLY.
3. THE LOCAL AND REMOTE DIFFERENTIAL SETPOINTS SHALL BE DETERMINED BY THE BALANCING CONTRACTOR.

PUMP SEQUENCING

1. IF THE SPEED OF THE LEAD PUMP EXCEEDS 90% PERCENT CAPACITY, THE LAG PUMP SHALL BE STARTED. ITS SPEED SHALL BE SLOWLY RAMPED UP, AND THE SPEED OF BOTH OPERATING PUMPS SHALL BE CONTROLLED IN UNISON TO MAINTAIN THE DIFFERENTIAL PRESSURE SETPOINT.
2. WHEN BOTH THE LEAD AND LAG PUMPS ARE OPERATING, AND THE SPEED OF BOTH PUMPS IS BELOW 40% CAPACITY, THE LAG PUMP SHALL BE STOPPED.

IF THE LEAD PUMP FAILS TO PROVE STATUS DURING ITS OPERATION, THE LEAD PUMP SHALL BE STOPPED, THE LAG PUMP SHALL BE STARTED AND AN ALARM SHALL BE INITIATED AT THE OPERATOR WORKSTATION. IF THE LAG PUMP FAILS TO PROVE STATUS DURING ITS OPERATION, AN ALARM SHALL BE INITIATED AT THE OPERATOR WORKSTATION.

### CHILLER CONTROLLER POINTS

TYPE:
AI - ANALOG INPUT
AO - ANALOG OUTPUT
DI - DIGITAL INPUT
DO - DIGITAL OUTPUT
PI - PULSED INPUT

FEATURES:
D - DISPLAYED ON WORKSTATION GRAPHICS
M - MODIFIED/OVERRIDDEN FROM WORKSTATION GRAPHICS
A - ALARMS AT WORKSTATION
L - LOGGED/TRENDED AT WORKSTATION
S - TIME SCHEDULED AT WORKSTATION
G - GLOBALLY SHARED TO ALL CONTROLLERS

NOTE:
*INCLUDE ALL POINTS LISTED BELOW AND PROVIDE ANY OTHER POINTS AS REQUIRED TO ACCOMPLISH THE SEQUNCE OF OPERATION.

### CHILLER PLANT CONTROLLER POINTS

| TAG | TYPE | DESCRIPTION | QTY | D | M | A | L | S | G | NOTES |
|---|---|---|---|---|---|---|---|---|---|---|
| CH1-C | DO | CHILLER 1 COMMAND | 1 | X | X | - | - | - | - | - |
| CH1-R | AO | CHILLER 1 WATER RESET SETPOINT | 1 | X | X | - | - | - | - | - |
| CH1-S | DI | CHILLER 1 STATUS | 1 | X | - | X | - | - | - | - |
| CH1-A | DI | CHILLER 1 ALARM | 1 | X | - | X | - | - | - | - |
| TE-1 | AI | MAIN CHILLED WATER SUPPLY TEMPERATURE | 1 | X | - | - | X | - | - | - |
| TE-2 | AI | MAIN CHILLED WATER RETURN TEMPERATURE | 1 | X | - | - | X | - | - | - |
| TE-3 | AI | OUTSIDE AIR TEMPERATURE | 1 | X | - | - | X | - | - | - |
| TE-4 | AI | SECONDARY RETURN TEMPERATURE | 1 | X | - | - | X | - | - | - |
| TE-5 | AI | SECONDARY SUPPLY TEMPERATURE | 1 | X | - | - | X | - | - | - |
| P1-C | DO | CHILLED WATER PUMP 1 COMMAND | 1 | X | X | - | - | - | - | - |
| P1-S | DI | CHILLED WATER PUMP 1 STATUS | 1 | X | - | X | - | - | - | - |
| P1-SC | AO | CHILLED WATER PUMP 1 SPEED COMMAND | 1 | X | X | - | - | - | - | - |
| P2-C | DO | CHILLED WATER PUMP 2 COMMAND | 1 | X | X | - | - | - | - | - |
| P2-S | DI | CHILLED WATER PUMP 2 STATUS | 1 | X | - | X | - | - | - | - |
| P2-SC | AO | CHILLED WATER PUMP 2 SPEED COMMAND | 1 | X | X | - | - | - | - | - |
| P3-C | DO | CHILLED WATER PUMP 3 COMMAND | 1 | X | X | - | - | - | - | - |
| P3-S | DI | CHILLED WATER PUMP 3 STATUS | 1 | X | - | X | - | - | - | - |

NOTES:
1.-

DESIGNER/ENGINEER SH
CAD OPERATOR SH
QAQC/CHECKER SS

| Revisions | Date |
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| 95% OWNER REVIEW DOCUMENTS | 01/18/2013 |
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| ISSUED FOR BID DOCUMENTS | 04/30/2013 |


Dynamix Engineering Ltd.
Facility Engineering Consultants
855 Grandview Avenue, 3rd Floor Columbus, Ohio 43215
Phone: (614)443-1178 · Fax: (614)443-1594 · Email: dynamix@dynamix-ltd.com
Comm. No.: 120050


Professional Seal

Revised By:
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Drawing Title: HVAC SCHEDULES AND DETAILS

Approved: Project Engineer Philip Kirk

Project Title: MODERNIZE HVAC, B-115

Building Number: B-115 115

Checked: DYNAMIX

Drawn: SHSH

Location: 4100 WEST THIRD ST DAYTON, OH 45428

Date: 04-30-2013

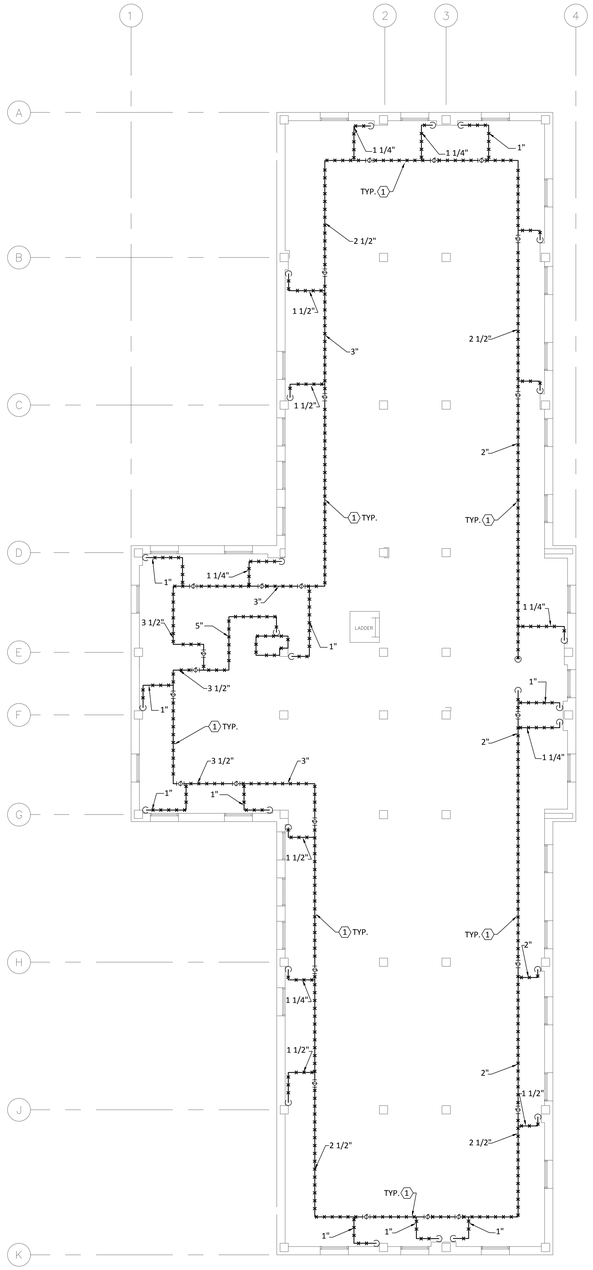
Project No. 552-13-301

Drawing No. M03

VAMC, DAYTON

VA Department of Veterans Affairs

VA FORM 08-6231, OCT 1978




NORTH

## ATTIC HVAC DEMOLITION PLAN

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

## ATTIC DEMOLITION PLAN NOTES

1. -REMOVE ALL STEAM AND CONDENSATE PIPING AND ALL ASSOCIATED COMPONENTS. PATCH ALL ATTIC SLAB OPENINGS LEFT BY REMOVED PIPING. PATCH OPENINGS WITH FIRESTOPPING. PROVIDE ASBESTOS ABATEMENT.

## GENERAL DEMOLITION NOTES

1.- PATCH ALL WALLS, FLOORS, AND CEILINGS (TO MATCH EXISTING) WHERE PIPING OR DUCTWORK HAS BEEN REMOVED.

## GENERAL ASBESTOS ABATEMENT NOTES

A.-ALL ASBESTOS ABATEMENT SHALL BE CONDUCTED IN ACCORDANCE WITH 02 82 11 TRADITIONAL ASBESTOS ABATEMENT SPECIFICATIONS.

B.-ABATE EXISTING ACM CAULK/PUTTY LOCATED ON METAL DUCTS AND EXISTING ACM BRIDGING ENCAPSULANT LOCATED ON FIBERGLASS DUCT INSULATION.

C.- ABATE EXISTING ACM FLEXIBLE EQUIPMENT/DUCT CONNECTIONS.

D.-ABATE EXISTING ACM BRIDGING ENCAPSULANT LOCATED ON FIBERGLASS PIPE INSULATION.

E.- ALL DUCTWORK, PIPING AND FLEXIBLE CONNECTIONS SHOWN TO BE DEMOLISHED ARE TO BE ASSUMED TO BE ASBESTOS CONTAINING.

F.- ABATEMENT SHALL BE COMPLETED ONE FLOOR AT A TIME. COORDINATE WITH COR.

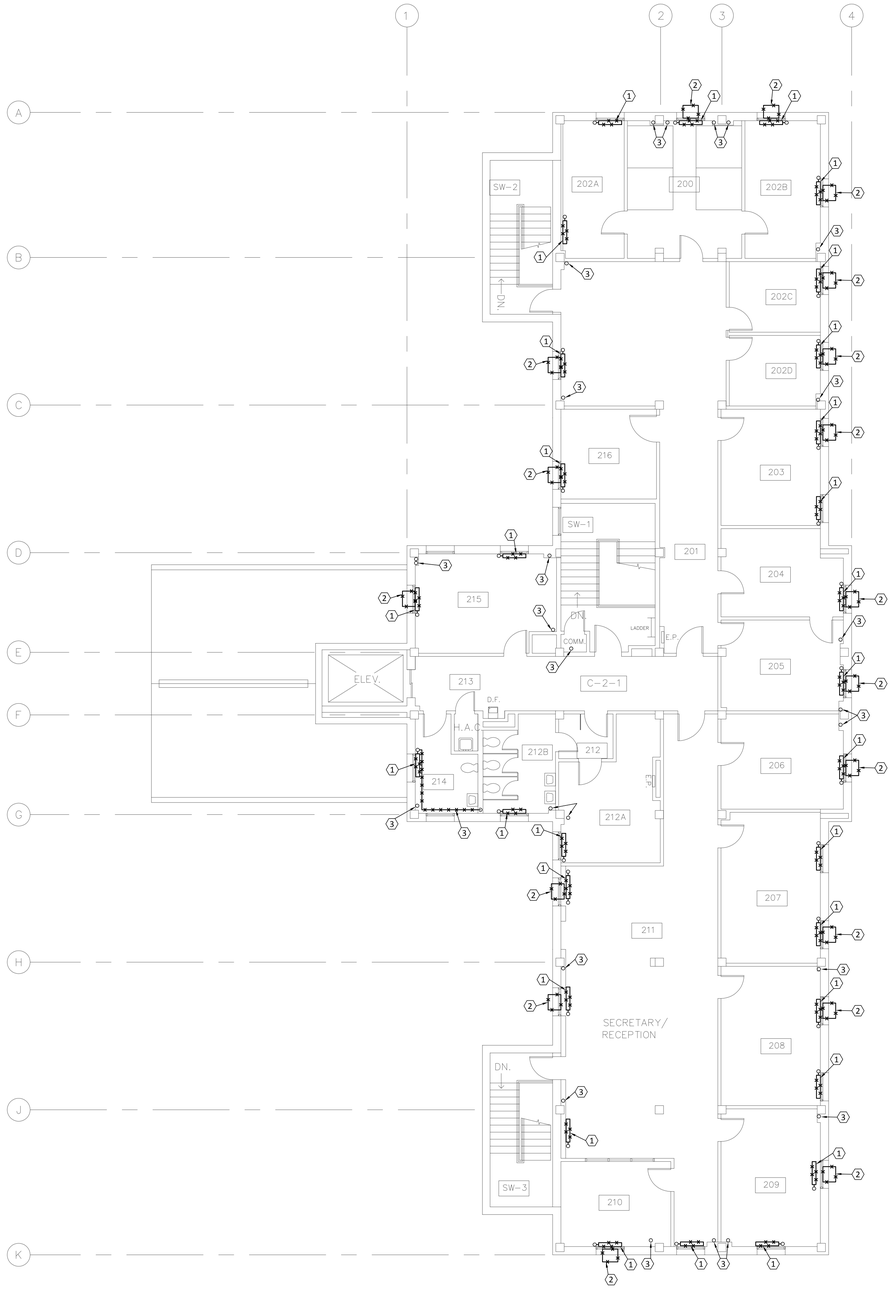
G.-PROVIDE ABATEMENT FOR ANY ASBESTOS CONTAINING CEILINGS OR STRUCTURES THAT NEED TO BE DISTURBED TO COMPLETE MECHANICAL WORK. (TO INSTALL PIPE HANGERS, EQUIPMENT SUPPORST…ECT.).

## INSTALLATION NOTES

1.- UNLESS NOTED OTHERWISE, ALL NEW DUCTWORK AND PIPING IS TO BE MOUNTED ABOVE EXISTING LAY-IN CEILINGS. CONTRACTOR SHALL PROVIDE ALL LABOR AND MATERIALS TO REMVOE AND RE-INSTALL EXISTING CEILING TLES AS REQUIRED TO INSTALL THE NEW DUCWORK AND PIPING AND DEMO EXISTING PIPING AND DUCTWORK ABOVE THE CEILING. ANY EXISTING CEILING TILES THAT ARE DAMAGED DURING CONSTRUCTION ARE TO BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.

2. - PROVIDE NEW CEILING TILES TO REPLACE LOCATIONS WHERE AIR DEVICE IS BEING REMOVED AND NOT REPLACED WITH A NEW ONE IN THE SAME LOCATION. SEE HVAC DEMOLITION DRAWINGS AND HVAC DUCT PLANS FOR DIFFUSER LOCATIONS.

3. -PROVIDE OPENINGS IN PLASTER CEILINGS AS REQUIRED FOR INSTALLATION OF DUCTWORK AND PIPING HANGERS (HANGERS MUST BE SUPPORTED FROM BUILDING STRUCTURE). PROVIDE PATCHING AND REPAIR AS NECESSARY TO LOCATE STRUCTURE. PROVIDE PATCHING AND REPAIR OF PLASTER CEILINGS WHERE HANGERS PENETRATE CEILINGS. PLASTER CEILINGS EXIST ABOVE LAY-IN CEILINGS.




NORTH

## SECOND FLOOR HVAC DEMOLITION PLAN

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

## DEMOLITION PLAN NOTES

1.-REMOVE EXISTING RADIATORS OR CONVECTORS, ASSOCIATED CONTROLS, ALL RISERS, AND PIPING. PROVIDE ASBESTOS ABATEMENT.

2.-REMOVE EXISTING WINDOW AC UNIT. WINDOW UNITS ARE TO BE DELIVERED TO OWNER OR DISPOSED BY CONTRACTOR AS DIRECTED BY OWNER.

3.-REMOVE EXISTING STEAM AND CONDENSATE PIPING. PROVIDE ASBESTOS ABATEMENT.

## GENERAL DEMOLITION NOTES

1.- PATCH ALL WALLS, FLOORS, AND CEILINGS (TO MATCH EXISTING) WHERE PIPING OR DUCTWORK HAS BEEN REMOVED.

## GENERAL ASBESTOS ABATEMENT NOTES

A.-ALL ASBESTOS ABATEMENT SHALL BE CONDUCTED IN ACCORDANCE WITH 02 82 11 TRADITIONAL ASBESTOS ABATEMENT SPECIFICATIONS.

B.-ABATE EXISTING ACM CAULK/PUTTY LOCATED ON METAL DUCTS AND EXISTING ACM BRIDGING ENCAPSULANT LOCATED ON FIBERGLASS DUCT INSULATION.

C.- ABATE EXISTING ACM FLEXIBLE EQUIPMENT/DUCT CONNECTIONS.

D.-ABATE EXISTING ACM BRIDGING ENCAPSULANT LOCATED ON FIBERGLASS PIPE INSULATION.

E.- ALL DUCTWORK, PIPING AND FLEXIBLE CONNECTIONS SHOWN TO BE DEMOLISHED ARE TO BE ASSUMED TO BE ASBESTOS CONTAINING.

F.- ABATEMENT SHALL BE COMPLETED ONE FLOOR AT A TIME. COORDINATE WITH COR.

G.-PROVIDE ABATEMENT FOR ANY ASBESTOS CONTAINING CEILINGS OR STRUCTURES THAT NEED TO BE DISTURBED TO COMPLETE MECHANICAL WORK. (TO INSTALL PIPE HANGERS, EQUIPMENT SUPPORST…ECT.).

## INSTALLATION NOTES

1.- UNLESS NOTED OTHERWISE, ALL NEW DUCTWORK AND PIPING IS TO BE MOUNTED ABOVE EXISTING LAY-IN CEILINGS. CONTRACTOR SHALL PROVIDE ALL LABOR AND MATERIALS TO REMVOE AND RE-INSTALL EXISTING CEILING TLES AS REQUIRED TO INSTALL THE NEW DUCWORK AND PIPING AND DEMO EXISTING PIPING AND DUCTWORK ABOVE THE CEILING. ANY EXISTING CEILING TILES THAT ARE DAMAGED DURING CONSTRUCTION ARE TO BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.

2. - PROVIDE NEW CEILING TILES TO REPLACE LOCATIONS WHERE AIR DEVICE IS BEING REMOVED AND NOT REPLACED WITH A NEW ONE IN THE SAME LOCATION. SEE HVAC DEMOLITION DRAWINGS AND HVAC DUCT PLANS FOR DIFFUSER LOCATIONS.

3. -PROVIDE OPENINGS IN PLASTER CEILINGS AS REQUIRED FOR INSTALLATION OF DUCTWORK AND PIPING HANGERS (HANGERS MUST BE SUPPORTED FROM BUILDING STRUCTURE). PROVIDE PATCHING AND REPAIR AS NECESSARY TO LOCATE STRUCTURE. PROVIDE PATCHING AND REPAIR OF PLASTER CEILINGS WHERE HANGERS PENETRATE CEILINGS. PLASTER CEILINGS EXIST ABOVE LAY-IN CEILINGS.

## ROOM SCHEDULE

| NO. | NAME |
|---|---|
| 200 | OFFICE |
| 201 | CORRIDOR |
| 202A | OFFICE |
| 202B | OFFICE |
| 202C | FUTURE OFFICE |
| 202D | FUTURE OFFICE |
| 203 | OFFICE |
| 204 | OFFICE |
| 205 | OFFICE |
| 206 | OFFICE |
| 207 | CHAPLIN'S OFFICE |
| 208 | CHAPLIN'S OFFICE |
| 209 | CHAPLIN'S OFFICE |
| 210 | CHAPLIN'S OFFICE |
| 211 | CORRIDOR |
| 212 | |
| 212A | STORAGE |
| 212B | MEN |
| 213 | |
| 214 | WOMEN |
| 215 | CONFERENCE ROOM |
| 216 | OFFICE |
| SW-1 | STAIR |
| SW-2 | STAIR |
| SW-3 | STAIR |

DESIGNER/ENGINEER SH
CAD OPERATOR SH
QA/QC/CHECKER SS

| Revisions | Date |
|---|---|
| 95% OWNER REVIEW DOCUMENTS | 01/18/2013 |
| ISSUED FOR BID DOCUMENTS | 01/31/2013 |
| ISSUED FOR BID DOCUMENTS | 04/30/2013 |


Dynamix Engineering Ltd.
Facility Engineering Consultants
855 Grandview Avenue, 3rd Floor Columbus, Ohio 43215
Phone: (614)443-1178 · Fax: (614)443-1594 · Email: dynamix@dynamix-ltd.com
Comm. No.: 120050


STATE OF OHIO · MACE · HUDSON · GRIFFITH · KIRK · REGISTERED PROFESSIONAL ENGINEER

Professional Seal

Revised By:
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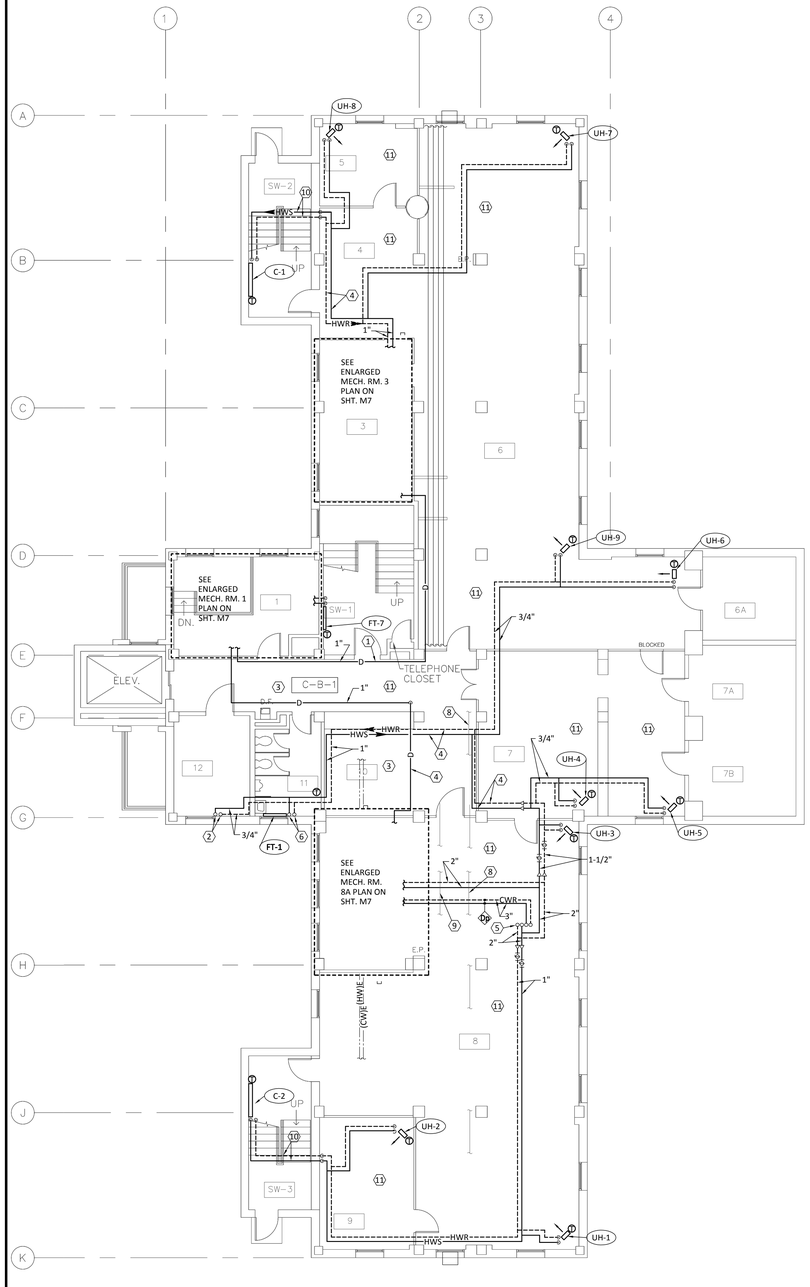
| Drawing Title | Project Title | Date |
|---|---|---|
| SECOND FLOOR HVAC DEMOLITION PLAN | MODERNIZE HVAC, B-115 | 04-30-2013 |
| Approved: Project Engineer: Philip Kirk | Building Number: B-115 115; Checked: DYNAMIX; Drawn: SH | Project No. 552-13-301 |
| | Location: 4100 WEST THIRD ST DAYTON, OH 45428 | Drawing No. M3 |

VAMC, DAYTON

VA Department of Veterans Affairs

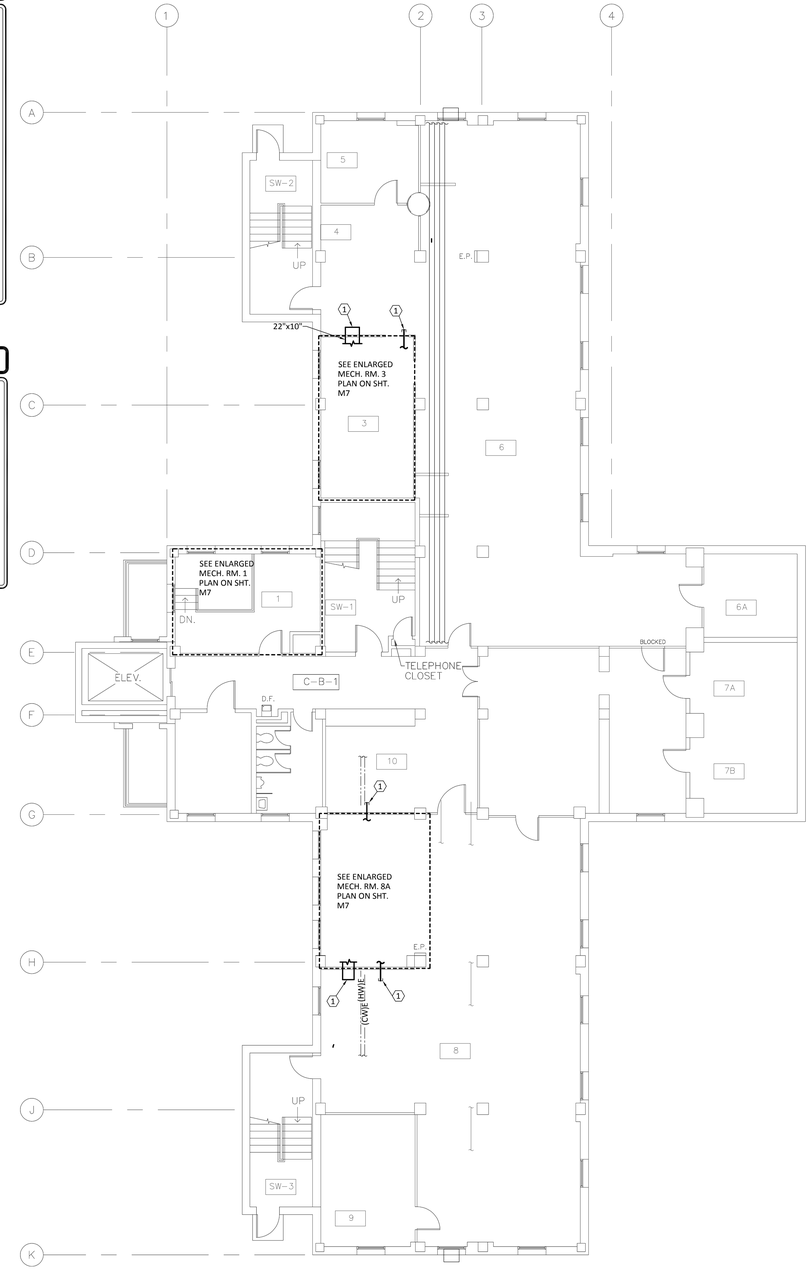
VA FORM 08-6231, OCT 1978




## BASEMENT FLOOR HVAC PIPING PLAN

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

NORTH




## BASEMENT FLOOR HVAC DUCT PLAN

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

NORTH

## PIPING PLAN NOTES

1.-COORDINATE EXACT LOCATION OF AC CONDENSATE DRAIN PIPING WITH EXISTING PIPING.

2.-3/4" HWS AND HWR UP. COORDINATE EXACT LOCATION WITH NEW FINNED TUBE ON FIRST FLOOR AND BUILDING STRUCTURE (RIBBED SLAB).

3.-CLOSELY COORDINATE ALL PIPING IN THIS AREA.

4.-MOUNT ALL NEW PIPING AS HIGH AS POSSIBLE.

5.-HWS,HWR, CWS, AND CWR UP. COORDINATE LOCATION WITH CHASE ABOVE AND WITH BUILDING STRUCTURE (RIBBED SLAB).

6.-3/4" HWS AND HWR UP. COORDINATE EXACT LOCATION WITH NEW FINNED TUBE ON FIRST FLOOR AND BUILDING STRUCTURE (RIBBED SLAB). EXTEND 3/4" HWS AND HWR PIPING DOWN TO FINNED TUBE ON THIS FLOOR.

7.-COORDINATE ALL NEW INSTALLATIONS WITH EXISTING PIPING AND CONDUIT.

8.-COORDINATE WITH CABLE TRAY. MOUNTING PIPING AS HIGH AS POSSIBLE.

9.-RELOCATE CONDUIT TIGHT TO CEILING TO ALLOW INSTALLATION OF NEW PIPING.

10.-MOUNT PIPING TIGHT TO LANDING WALL WITH BOTTOM AT 12" A.F.F.

11.-GROUND FLOOR IS NOW CONSIDERED MECHANICAL SPACE. INSTALL PIPING AND EQUIPMENT AS HIGH AS POSSIBLE.

## INSTALLATION NOTES

1.- UNLESS NOTED OTHERWISE, ALL NEW DUCTWORK AND PIPING IS TO BE MOUNTED ABOVE EXISTING LAY-IN CEILINGS. CONTRACTOR SHALL PROVIDE ALL LABOR AND MATERIALS TO REMVOE AND RE-INSTALL EXISTING CEILING TLES AS REQUIRED TO INSTALL THE NEW DUCWORK AND PIPING AND DEMO EXISTING PIPING AND DUCTWORK ABOVE THE CEILING. ANY EXISTING CEILING TILES THAT ARE DAMAGED DURING CONSTRUCTION ARE TO BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.

2. - PROVIDE NEW CEILING TILES TO REPLACE LOCATIONS WHERE AIR DEVICE IS BEING REMOVED AND NOT REPLACED WITH A NEW ONE IN THE SAME LOCATION. SEE HVAC DEMOLITION DRAWINGS AND HVAC DUCT PLANS FOR DIFFUSER LOCATIONS.

3. -PROVIDE OPENINGS IN PLASTER CEILINGS AS REQUIRED FOR INSTALLATION OF DUCTWORK AND PIPING HANGERS (HANGERS MUST BE SUPPORTED FROM BUILDING STRUCTURE). PROVIDE PATCHING AND REPAIR AS NECESSARY TO LOCATE STRUCTURE. PROVIDE PATCHING AND REPAIR OF PLASTER CEILINGS WHERE HANGERS PENETRATE CEILINGS. PLASTER CEILINGS EXIST ABOVE LAY-IN CEILINGS.

## HVAC DUCT PLAN NOTES

1.-CAP DUCT FOR FUTURE.

## INSTALLATION NOTES

1.- UNLESS NOTED OTHERWISE, ALL NEW DUCTWORK AND PIPING IS TO BE MOUNTED ABOVE EXISTING LAY-IN CEILINGS. CONTRACTOR SHALL PROVIDE ALL LABOR AND MATERIALS TO REMVOE AND RE-INSTALL EXISTING CEILING TLES AS REQUIRED TO INSTALL THE NEW DUCWORK AND PIPING AND DEMO EXISTING PIPING AND DUCTWORK ABOVE THE CEILING. ANY EXISTING CEILING TILES THAT ARE DAMAGED DURING CONSTRUCTION ARE TO BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.

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## ROOM SCHEDULE

| NO. | NAME |
|---|---|
| 1 | MECH ROOM |
| 3 | FILES |
| 4 | FILES |
| 5 | FILES |
| 6 | FILES |
| 6A | UNFINISHED |
| 7 | STORAGE |
| 7A | UNFINISHED |
| 7B | UNFINISHED |
| 8 | FILES |
| 9 | STORAGE |
| 10 | FILES |
| 11 | STORAGE |
| 12 | TRANSFORMER ROOM |
| SW-1 | STAIR |
| SW-2 | STAIR |
| SW-3 | STAIR |

DESIGNER/ENGINEER SH
CAD OPERATOR SH
QAQC/CHECKER SS

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Dynamix Engineering Ltd.
Facility Engineering Consultants
855 Grandview Avenue, 3rd Floor Columbus, Ohio 43215
Phone: (614)443-1178 · Fax: (614)443-1594 · Email: dynamix@dynamix-ltd.com
Comm. No.: 120050


Professional Seal

Revised By:
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Drawing Title: BASEMENT FLOOR HVAC DUCT AND PIPING PLANS

Approved: Project Engineer: Philip Kirk

Project Title: MODERNIZE HVAC, B-115

Building Number: B-115 115 | Checked: DYNAMIX | Drawn: SHSH

Location: 4100 WEST THIRD ST DAYTON, OH 45428

Date: 04-30-2013

Project No. 552-13-301

Drawing No. M4

VAMC, DAYTON

Department of Veterans Affairs

VA FORM 08-6231, OCT 1978

## HVAC PIPING PLAN NOTES

1.-MOUNT CHILLER ON 6" HIGH CONCRETE PAD. PAD TO EXTEND 4" FROM EDGE OF UNIT ON ALL SIDES.

2.-COVER WEATHER-EXPOSED PIPING WITH ALUMINUM JACKET . MOUNT PIPING ALL EQUIPMENT SUPPORTS LOCATED AT 3'-0" ON CENTER AND AT ALL CHANGES IN DIRECTION. PROVIDE A COMPLETE ELECTRIC HEAT TRACE SYSTEM FOR WEATHER-EXPOSED CHILLED WATER PIPING (TO PREVENT FREEZING).

3.-EXTEND CONCRETE PAD UNDER PIPING FOR EQUIPMENT SUPPORT MOUNTING.

4.-MAINTAIN ALL MANUFACTURER REQUIRED CLEARANCES.

5.-REGRADE AS NECESSARY. FURNISH AND INSTALL 6" GRAVEL BED CONFORMING TO AASHTO IN THIS AREA.

6.-HWS,HWR, CWS, AND CWR DOWN. COORDINATE LOCATION WITH BUILDING STRUCTURE (RIBBED SLAB).

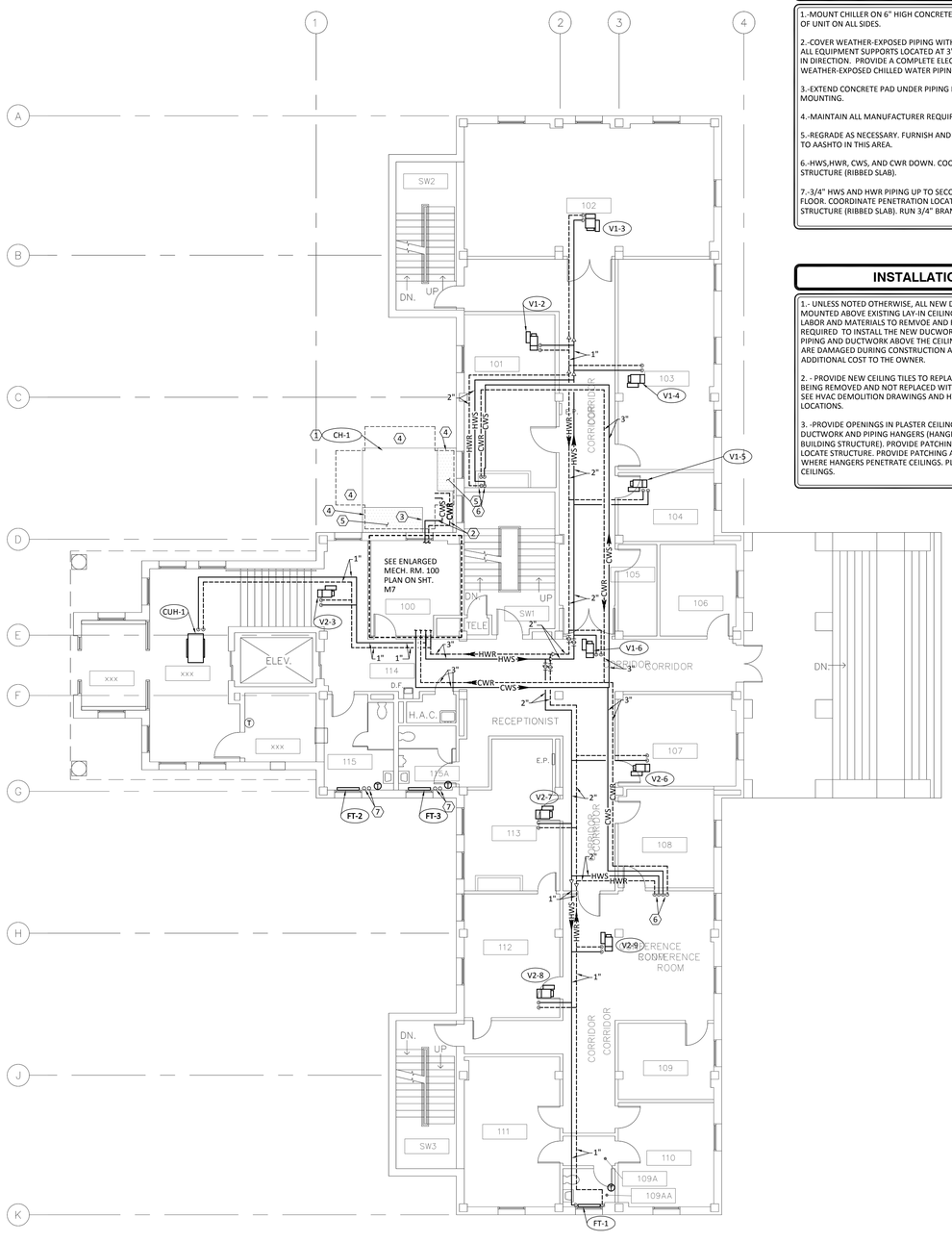
7.-3/4" HWS AND HWR PIPING UP TO SECOND FLOOR AND DOWN TO GROUND FLOOR. COORDINATE PENETRATION LOCATION WITH EXISTING BUILDING STRUCTURE (RIBBED SLAB). RUN 3/4" BRANCH TO FINNED TUBE ON THIS FLOOR.

## INSTALLATION NOTES

1.- UNLESS NOTED OTHERWISE, ALL NEW DUCTWORK AND PIPING IS TO BE MOUNTED ABOVE EXISTING LAY-IN CEILINGS. CONTRACTOR SHALL PROVIDE ALL LABOR AND MATERIALS TO REMVOE AND RE-INSTALL EXISTING CEILING TLES AS REQUIRED TO INSTALL THE NEW DUCWORK AND PIPING AND DEMO EXISTING PIPING AND DUCTWORK ABOVE THE CEILING. ANY EXISTING CEILING TILES THAT ARE DAMAGED DURING CONSTRUCTION ARE TO BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.

2. - PROVIDE NEW CEILING TILES TO REPLACE LOCATIONS WHERE AIR DEVICE IS BEING REMOVED AND NOT REPLACED WITH A NEW ONE IN THE SAME LOCATION. SEE HVAC DEMOLITION DRAWINGS AND HVAC DUCT PLANS FOR DIFFUSER LOCATIONS.

3. -PROVIDE OPENINGS IN PLASTER CEILINGS AS REQUIRED FOR INSTALLATION OF DUCTWORK AND PIPING HANGERS (HANGERS MUST BE SUPPORTED FROM BUILDING STRUCTURE). PROVIDE PATCHING AND REPAIR AS NECESSARY TO LOCATE STRUCTURE. PROVIDE PATCHING AND REPAIR OF PLASTER CEILINGS WHERE HANGERS PENETRATE CEILINGS. PLASTER CEILINGS EXIST ABOVE LAY-IN CEILINGS.




NORTH

## FIRST FLOOR HVAC PIPING PLAN

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

## HVAC DUCT PLAN NOTES

1.-COORDINATE DUCT LOCATION WITH NEW CHASE. SEE ARCHITECTURAL DWGS.

2.-NOT USED.

3.-NOT USED.

4.-NOT USED.

5.-30"x16" R.A. DOWN AND 24"x16" S.A. DOWN INSIDE NEW CHASE.

6.-26"x12" R.A. AND 16"x12" S.A. UP . COORDINATE EXACT LOCATION WITH NEW CHASE ON SECOND FLOOR AND BUILDING STRUCTURE (RIBBED SLAB). PROVIDE ACCESSIBLE FIRE DAMPERS AT SECOND FLOOR PENETRATION.

7.-34"x14" R.A. DOWN. 24" x14" S.A. DOWN.

8.-20"x12" R.A. UP. 16"x12" S.A. UP. COORDINATE EXACT LOCATION WITH CHASE ON SECOND FLOOR AND BUILDING STRUCTURE (RIBBED SLAB). PROVIDE ACCESSIBLE FIRE DAMPERS AT FLOOR PENETRATION.

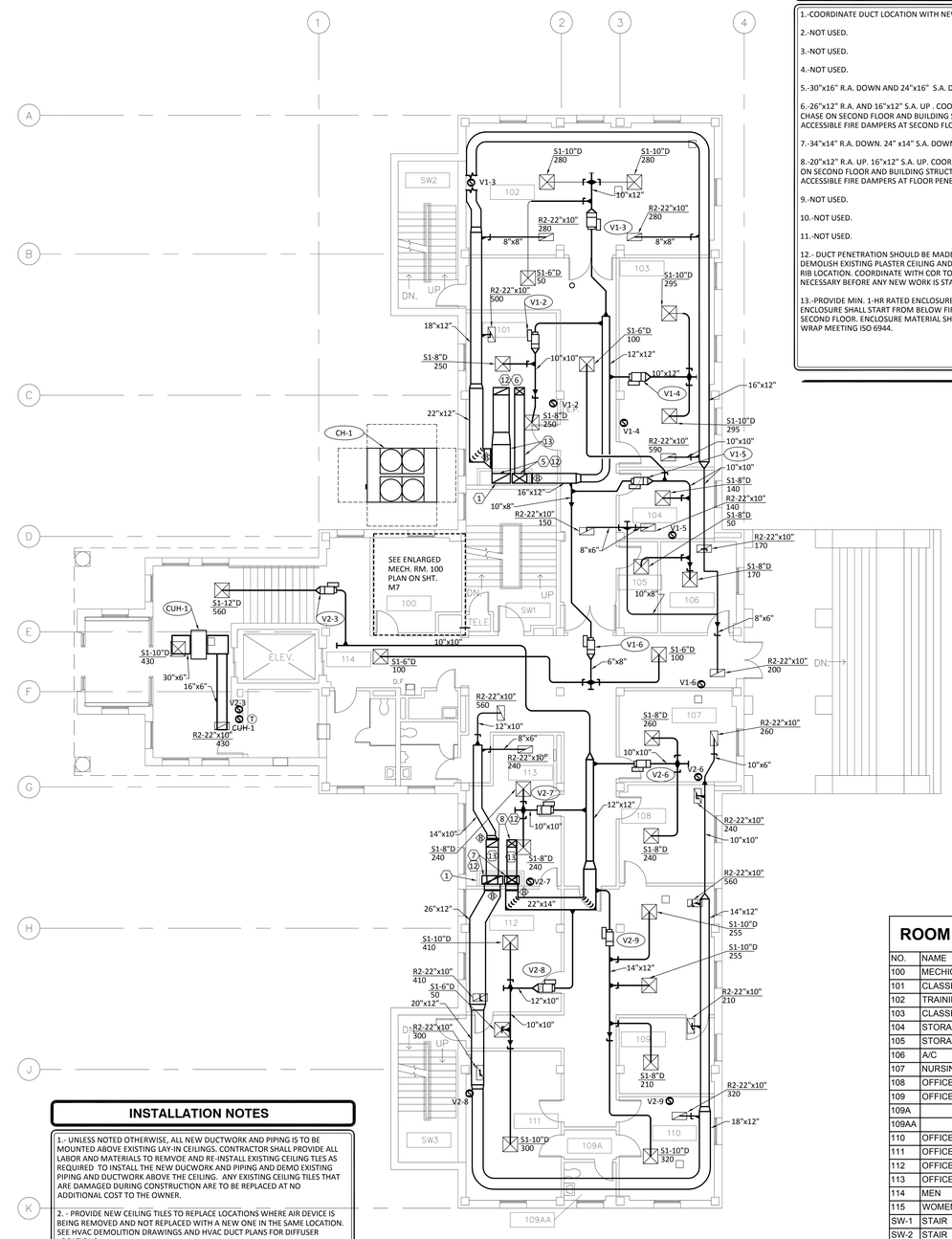
9.-NOT USED.

10.-NOT USED.

11.-NOT USED.

12.- DUCT PENETRATION SHOULD BE MADE BETWEEN STRUCTURAL RIBS. DEMOLISH EXISTING PLASTER CEILING AND FIELD-VERIFY EXISTING STRUCTURAL RIB LOCATION. COORDINATE WITH COR TO ADJUST CHASE LOCATIONS AS NECESSARY BEFORE ANY NEW WORK IS STARTED.

13.-PROVIDE MIN. 1-HR RATED ENCLOSURE AROUND DUCTWORK PER NFPA 90A. ENCLOSURE SHALL START FROM BELOW FIRST FLOOR AND TERMINATE ABOVE SECOND FLOOR. ENCLOSURE MATERIAL SHALL BE UL LISTED FIRE-RATED DUCT WRAP MEETING ISO 6944.




## INSTALLATION NOTES

1.- UNLESS NOTED OTHERWISE, ALL NEW DUCTWORK AND PIPING IS TO BE MOUNTED ABOVE EXISTING LAY-IN CEILINGS. CONTRACTOR SHALL PROVIDE ALL LABOR AND MATERIALS TO REMVOE AND RE-INSTALL EXISTING CEILING TLES AS REQUIRED TO INSTALL THE NEW DUCWORK AND PIPING AND DEMO EXISTING PIPING AND DUCTWORK ABOVE THE CEILING. ANY EXISTING CEILING TILES THAT ARE DAMAGED DURING CONSTRUCTION ARE TO BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.

2. - PROVIDE NEW CEILING TILES TO REPLACE LOCATIONS WHERE AIR DEVICE IS BEING REMOVED AND NOT REPLACED WITH A NEW ONE IN THE SAME LOCATION. SEE HVAC DEMOLITION DRAWINGS AND HVAC DUCT PLANS FOR DIFFUSER LOCATIONS.

3. -PROVIDE OPENINGS IN PLASTER CEILINGS AS REQUIRED FOR INSTALLATION OF DUCTWORK AND PIPING HANGERS (HANGERS MUST BE SUPPORTED FROM BUILDING STRUCTURE). PROVIDE PATCHING AND REPAIR AS NECESSARY TO LOCATE STRUCTURE. PROVIDE PATCHING AND REPAIR OF PLASTER CEILINGS WHERE HANGERS PENETRATE CEILINGS. PLASTER CEILINGS EXIST ABOVE LAY-IN CEILINGS.

NORTH

## FIRST FLOOR HVAC DUCT PLAN

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

## ROOM SCHEDULE

| NO. | NAME |
|---|---|
| 100 | MECHICAL |
| 101 | CLASSROOM |
| 102 | TRAINING CLASSROOM |
| 103 | CLASSROOM |
| 104 | STORAGE |
| 105 | STORAGE |
| 106 | A/C |
| 107 | NURSING EDUCATION |
| 108 | OFFICE |
| 109 | OFFICE |
| 109A | |
| 109AA | |
| 110 | OFFICE |
| 111 | OFFICE |
| 112 | OFFICE |
| 113 | OFFICE |
| 114 | MEN |
| 115 | WOMEN |
| SW-1 | STAIR |
| SW-2 | STAIR |
| SW-3 | STAIR |
| XXX | VESTIBULE |
| XXX | LOBBY |
| XXX | ELEVATOR EQUIPMENT ROOM |

DESIGNER/ENGINEER SH
CAD OPERATOR SH
QAQC/CHECKER SS

| Revisions | Date |
|---|---|
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Dynamix Engineering Ltd.
Facility Engineering Consultants
855 Grandview Avenue, 3rd Floor Columbus, Ohio 43215
Phone: (614)443-1178 · Fax: (614)443-1594 · Email: dynamix@dynamix-ltd.com
Comm. No.: 120050


Professional Seal

Revised By:
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Drawing Title: FIRST FLOOR HVAC DUCT AND PIPING PLANS

Approved: Project Engineer Philip Kirk

Project Title: MODERNIZE HVAC, B-115

Building Number: B-115 115

Checked: DYNAMIX

Drawn: SHSH

Location: 4100 WEST THIRD ST DAYTON, OH 45428

Date: 04-30-2013

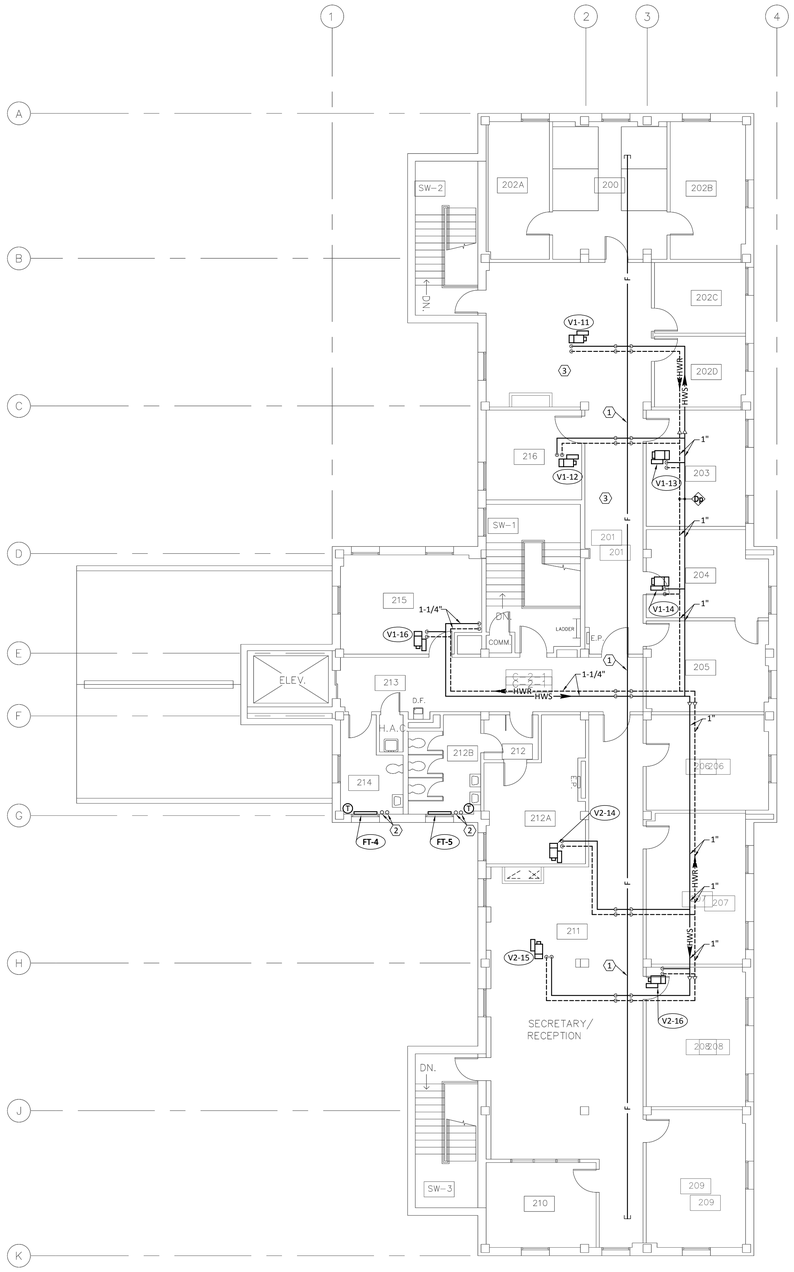
Project No. 552-13-301

Drawing No. M5

VAMC, DAYTON

VA Department of Veterans Affairs

VA FORM 08-6231, OCT 1978




NORTH

## SECOND FLOOR HVAC PIPING PLAN

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

## HVAC PIPING PLAN NOTES

1.- CLOSELY COORDINATE PIPE ROUTING WITH EXISTING FIRE PROTECTION AND OTHER EXISTING CONDITIONS.

2.-3/4" HWS AND HWR PIPING DOWN THRU FLOOR. COORDINATE EXACT LOCATION WITH BUILDING STRUCTURE (RIBBED SLAB). RUN 3/4" BRANCHES TO FINNED TUBE ON THIS FLOOR.

3.-PIPING IN THIS ROOM TO BE MOUNTED EXPOSED.

## INSTALLATION NOTES

1.- UNLESS NOTED OTHERWISE, ALL NEW DUCTWORK AND PIPING IS TO BE MOUNTED ABOVE EXISTING LAY-IN CEILINGS. CONTRACTOR SHALL PROVIDE ALL LABOR AND MATERIALS TO REMVOE AND RE-INSTALL EXISTING CEILING TLES AS REQUIRED TO INSTALL THE NEW DUCWORK AND PIPING AND DEMO EXISTING PIPING AND DUCTWORK ABOVE THE CEILING. ANY EXISTING CEILING TILES THAT ARE DAMAGED DURING CONSTRUCTION ARE TO BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.

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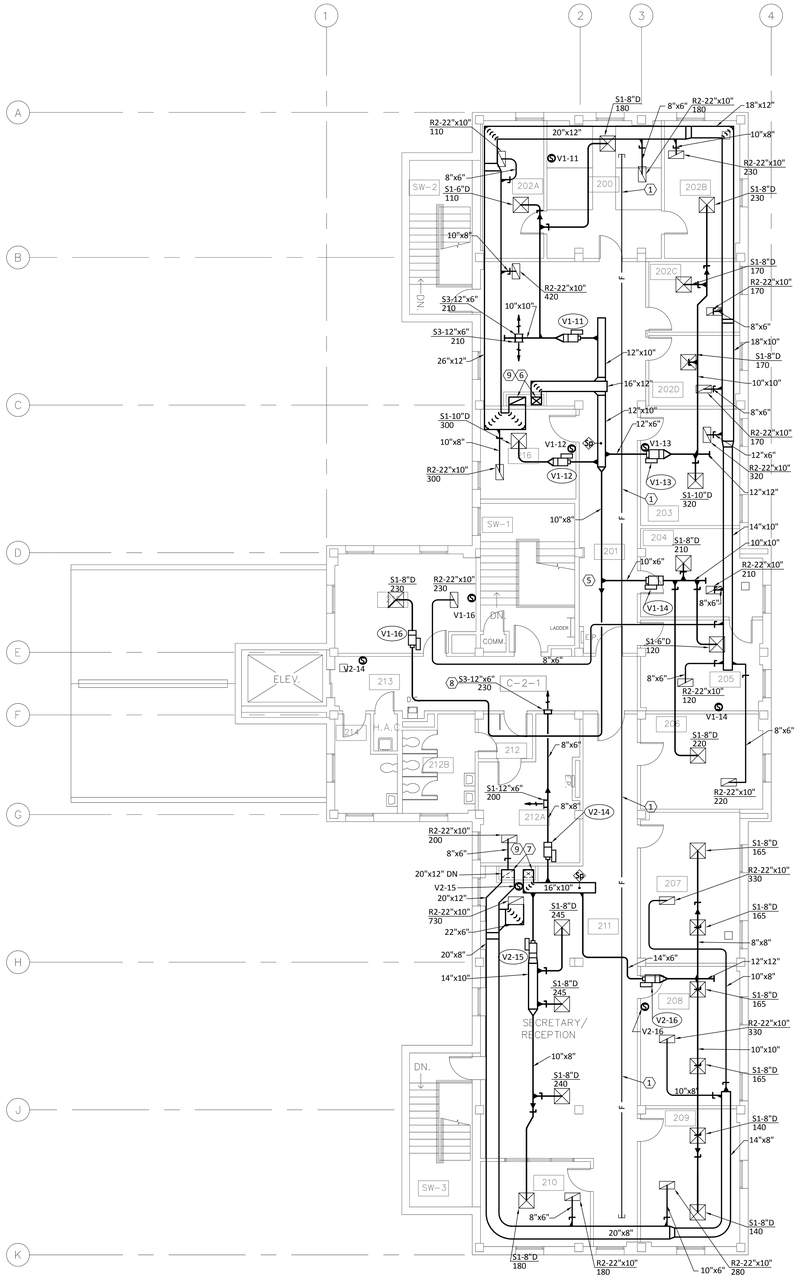


NORTH

## SECOND FLOOR HVAC DUCT PLAN

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

## HVAC DUCT PLAN NOTES

1.-CLOSELY COORDINATE ALL DUCT ROUTING WITH EXISTING FIRE PROTECTION AND OTHER EXISTING CONDITIONS.

2.-NOT USED.

3.-NOT USED.

4.-NOT USED.

5.-MOUNT ALL DUCTWORK AND EQUIPMENT EXPOSED IN THIS ROOM. PAINT ALL EXPOSED DUCTWORK AND VAV BOXES IN THIS ROOM TO MATCH EXISTING CEILING.

6.-26"x12" RETURN AIR DUCT DOWN INSIDE CHASE. 16"x12" SUPPLY AIR DUCT DOWN INSIDE CHASE. COORDINATE EXACT LOCATION WITH BUILDING CHASE ON FIRST FLOOR AND WITH STRUCTURE (RIBBED SLAB).

7.-20"x12" RETURN AIR DUCT DOWN INSIDE CHASE. 16"x12" SUPPLY AIR DUCT DOWN INSIDE CHASE. COORDINATE EXACT LOCATION WITH CHASE ON FIRST FLOOR AND WITH BUILDING STRUCTURE (RIBBED SLAB).

8.-MOUNT SUPPLY GRILLE WITH BOTTOM AT 8'-0" A.F.F.

9.-DUCT PENETRATION SHOULD BE MADE BETWEEN STRUCTURAL RIBS. DEMOLISH EXISTING PLASTER CEILING AND FIELD-VERIFY EXISTING STRUCTURAL RIB LOCATION. COORDINATE WITH COR TO ADJUST CHASE LOCATIONS AS NECESSARY BEFORE ANY NEW WORK IS STARTED..

## INSTALLATION NOTES

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## ROOM SCHEDULE

| NO. | NAME |
|---|---|
| 200 | OFFICE |
| 201 | CORRIDOR |
| 202A | OFFICE |
| 202B | OFFICE |
| 202C | FUTURE OFFICE |
| 202D | FUTURE OFFICE |
| 203 | OFFICE |
| 204 | OFFICE |
| 205 | OFFICE |
| 206 | OFFICE |
| 207 | CHAPLIN'S OFFICE |
| 208 | CHAPLIN'S OFFICE |
| 209 | CHAPLIN'S OFFICE |
| 210 | CHAPLIN'S OFFICE |
| 211 | CORRIDOR |
| 212 | |
| 212A | STORAGE |
| 212B | MEN |
| 213 | |
| 214 | WOMEN |
| 215 | CONFERENCE ROOM |
| 216 | OFFICE |
| SW-1 | STAIR |
| SW-2 | STAIR |
| SW-3 | STAIR |

DESIGNER/ENGINEER SH
CAD OPERATOR SH
QAQC/CHECKER SS

| Revisions | Date |
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Dynamix Engineering Ltd.
Facility Engineering Consultants
855 Grandview Avenue, 3rd Floor Columbus, Ohio 43215
Phone: (614)443-1178 · Fax: (614)443-1594 · Email: dynamix@dynamix-ltd.com
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Professional Seal

Revised By:
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Drawing Title: SECOND FLOOR HVAC DUCT AND PIPING PLANS

Approved: Project Engineer: Philip Kirk

Project Title: MODERNIZE HVAC, B-115

Building Number: B-115 115

Checked: DYNAMIX

Drawn: SHSH

Location: 4100 WEST THIRD ST DAYTON, OH 45428

Date: 04-30-2013

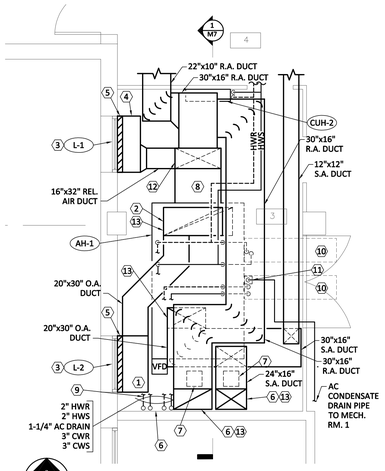
Project No.: 552-13-301

Drawing No.: M6

VAMC, DAYTON

VA Department of Veterans Affairs

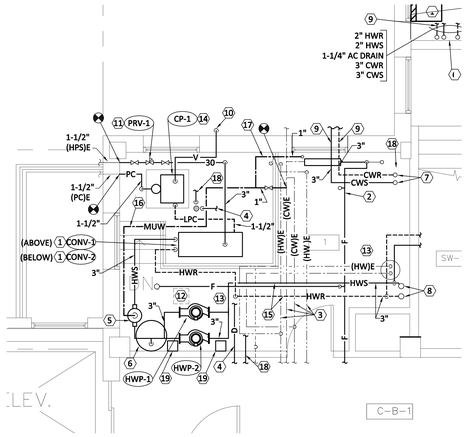
VA FORM 08-6231, OCT 1978




NORTH

## ENLARGED MECH. RM. 3 PLAN

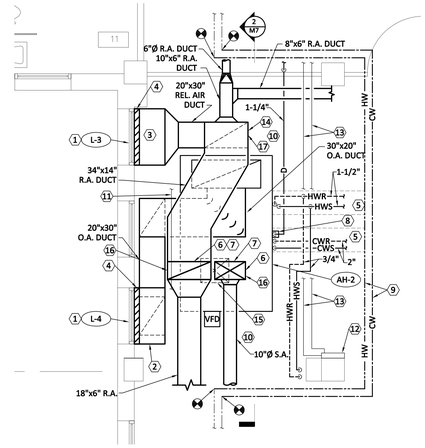
SCALE: 1/4"=1'-0"




NORTH

## ENLARGED MECH. RM. 1 PLAN

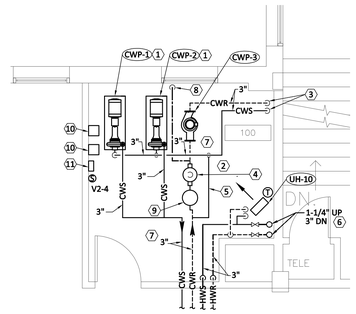
SCALE: 1/4"=1'-0"




NORTH

## ENLARGED MECH. RM. 8A PLAN

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




NORTH

## ENLARGED MECH. RM. 100 PLAN

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

## ENLARGED MECH. RM 3 PLAN NOTES

1.- EXTEND 44"x44" (FIELD-VERIFY SIZE) O.A. PLENUM FROM NEW LOUVER AS SHOWN.

2.-EXTEND UNIT O.A. INTAKE OPENING SIZE PLENUM FROM AIR HANDLER.

3.-REMOVE EXISTING WINDOW AND FRAME. INSTALL NEW LOUVER. SEE SHEET A1. FIELD-VERIFY EXISTING WINDOW OPENING SIZE.

4.-EXTEND 44"x44" (FIELD-VERIFY SIZE) RELIEF AIR PLENUM FROM NEW LOUVER AS SHOWN.

5.-INTERLOCK MOTORIZED DAMPER WITH AH CONTROLS.

6.-SUPPLY AND RETURN DUCT UP THRU FLOOR. COORDINATE EXACT LOCATION WITH BUILDING STRUCTURE (RIBBED SLAB) AND NEW CHASE ON FIRST FLOOR. PROVIDE FIRE DAMPER AT FLOOR PENETRATIONS.

7.-PROVIDE ACCESS DOORS FOR ALL FIRE DAMPERS.

8.-EXTEND UNIT RETURN AIR SIZED PLENUM FROM BACK OF UNIT.

9.-MOUNT PIPING TIGHT TO CEILING STRUCTURE.

10.-MAINTAIN COIL PULL CLEARANCE

11.- PROVIDE AC CONDENSATE DRAIN PUMP.

12.-PROVIDE SMOKE DETECTOR IN RETURN DUCT.

13.- DUCT PENETRATION SHOULD BE MADE BETWEEN STRUCTURAL RIBS. DEMOLISH EXISTING PLASTER CEILING AND FIELD-VERIFY EXISTING STRUCTURAL RIB LOCATION. COORDINATE WITH COR TO ADJUST CHASE LOCATIONS AS NECESSARY BEFORE ANY NEW WORK IS STARTED.

## ENLARGED MECH. RM. 1 PLAN NOTES

1.-STACK CONVERTERS ON WELDED STEEL FRAME.

2.-RELOCATE ALL EXISTING CONDUIT AND WIRING AS REQUIRED FOR INSTALLATION OF NEW PIPING.

3.-RELOCATE EXISTING PIPING - DROP BELOW NEW AS REQUIRED FOR INSTALLATION OF NEW PIPING. PROVIDE ASBESTOS ABATEMENT AS REQUIRED.

4.-FIELD-ROUTE 1" AC CONDENSATE DRAIN LINE FORM AH-2 CONDENSATE DRAIN PUMP TO FLOOR DRAIN.

5.-AIR SEPERATOR.

6.-FLOOR MOUNTED EXPANSION TANK.

7.-CWS AND CWR UP TO MECH. RM. 100. COORDINATE EXACT LOCATION WITH BUILDING STRUCTURE (RIBBED SLAB).

8.-HWS AND HWR UP TO MECH. ROOM 100. COORDINATE EXACT LOCATION WITH BUILDING STRUCTURE (RIBBED SLAB).

9.-NEW EXTERIOR WALL PENETRATION. SEAL EXTERIOR WALL PENETRATION WEATHER TIGHT.

10.-2" VENT FROM CONDENSATE PUMP. TERMINATE AT 12" ABOVE GRADE WITH 90 DEG. ELBOW DOWN.

11.-NEW PRV STATION. SEE DETAILS ON SHEET M02.

12.-RELOCATE JUNCTION BOX TIGHT TO CEILING STRUCTURE.

13.-RELOCATE ALL EXISTING EQUIPMENT, CONDUIT, AND PIPING IN THIS ROOM AS NECESSARY TO ALLOW FOR INSTALLATION OF NEW EQUIPMENT, DUCTWORK, AND PIPING. MOUNT PIPING AS HIGH AS POSSIBLE.

14.-INSTALL CONDENSATE PUMP ON 4" HIGH CONCRETE PAD.

15.-INSTALL NEW HWS AND HWR PIPING ABOVE EXISTING PIPING. RELOCATE EXISTING PIPING AS NECESSARY.

16.-1" MAKE-UP WATER CONNECTION FOR HEATING HOT WATER SYSTEM. SEE HOT WATER SYSTEM SCHEMATIC FOR DETAILS.

17.-1" MAKE-UP WATER CONNECTION FOR CHILLED WATER SYSTEM. SEE CHILLED WATER SYSTEM SCHEMATIC FOR DETAILS.

18.-FIELD-ROUTE 1" AC CONDENSATE DRAIN LINE FROM AH-1 CONDENSATE PUMP TO FLOOR DRAIN.

19.-HOT WATER PUMP VARIABLE FREQUENCY DRIVE.

## ENLARGED MECH. RM. 8 PLAN NOTES

1.-REMOVE EXISTING WINDOW AND FRAME. INSTALL NEW LOUVER. SEE SHEET A1. FIELD-VERIFY WINDOW OPENING SIZE.

2.-EXTEND 44"x44" (FIELD-VERIFY SIZE) O.A. PLENUM FROM NEW LOUVER AS SHOWN.

3.-EXTEND 44"x44" (FIELD-VERIFY SIZE) RELIEF AIR PLENUM FROM NEW LOUVER AS SHOWN.

4.-INTERLOCK MOTORIZED DAMPER WITH AIR HANDLER CONTROLS.

5.-MAINTAIN CLEARANCE FOR COIL PULL.

6.-24"x14" SUPPLY AND 34"x14" RETURN DUCT UP THRU FLOOR. COORDINATE EXACT LOCATION WITH BUILDING STRUCTURE (RIBBED SLAB) AND NEW CHASE ON FIRST FLOOR. PROVIDE FIRE DAMPERS AT FLOOR PENETRATION.

7.-PROVIDE ACCESS DOORS FOR ALL FIRE DAMPERS.

8.-PROVIDE AC CONDENSATE DRAIN PUMP.

9.-PROVIDE NEW CW AND HW PIPING TO REPLACE EXISTING THAT RUNS THRU LOCATION OF NEW MECHANICAL ROOM.

10.-RELOCATE ALL EXISTING EQUIPMENT, CONDUIT, AND PIPING IN THIS ROOM AS NECESSARY TO ALLOW FOR INSTALLATION OF NEW EQUIPMENT, DUCTWORK, AND PIPING. MOUNT PIPING AS HIGH AS POSSIBLE.

11.-RELOCATE 2 ELECTRICAL CONDUITS AS NECESSARY FOR INSTALLATION OF NEW DUCTWORK.

12.-EXISTING ELECTRICAL PANEL TO REMAIN.

13.-RELOCATE EXISTING CONDUITS TO JUST EAST OF COLUMN TO ACCOMMODATE NEW PIPING AND EQUIPMENT.

14.-PROVIDE SMOKE DETECTOR IN RETURN DUCT.

15.-OFFSET SUPPLY DUCT IN VERTICAL AS NECESSARY TO INSTALL FLOOR PENETRATION AS SHOWN.

16.-DUCT PENETRATION SHOULD BE MADE BETWEEN STRUCTURAL RIBS. DEMOLISH EXISTING PLASTER CEILING AND FIELD-VERIFY EXISTING STRUCTURAL RIB LOCATION. COORDINATE WITH COR TO ADJUST CHASE LOCATIONS AS NECESSARY BEFORE ANY NEW WORK IS STARTED.

## ENLARGED MECH. RM 100 PLAN NOTES

1.- INSTALL PUMP ON INERTIA BASE.

2.-SUSPEND ALL PIPING IN THIS ROOM FROM CEILING STRUCTURE.

3.-CWS AND CWR PIPING DOWN THRU FLOOR SEE ENLARGED MECHANICAL ROOM PLAN FOR CONTINUATION. COORDINATE EXACT LOCATION WITH BUILDING STRUCTURE (RIBBED SLAB).

4.-AIR SEPARATOR.

5.-3" BYPASS LINE.

6.-1-1/4" HWS AND HWR UP. 2" HWS AND HWR DOWN. COORDINATE EXACT LOCATION WITH BUILDING STRUCTURE (RIBBED SLAB).

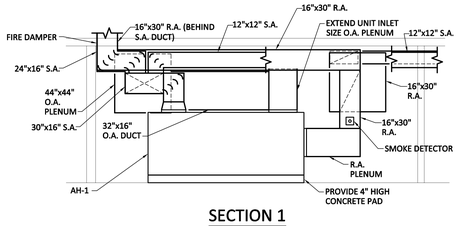
7.-RELOCATE ALL EXISTING EQUIPMENT, CONDUIT, AND PIPING IN THIS ROOM AS NECESSARY TO ALLOW FOR INSTALLATION OF NEW EQUIPMENT, DUCTWORK, AND PIPING. MOUNT PIPING AS HIGH AS POSSIBLE.

8.-1" MAKE-UP WATER CONNECTION FOR CHILLED WATER SYSTEM. SEE CHILLED WATER SYSTEM SCHEMATIC FOR DETAILS.

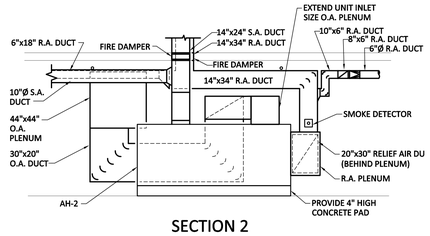
9.-CHILLED WATER BUFFER TANK. TANK TO BE 100 GALLONS, 24" DIAMETER, 60" HIGH. INCLUDE LEG STANDS. INSTALL 1" THICK INSULATION.

10.-CHILLED WATER PUMP VARIABLE FREQUENCY DRIVE.

11.-LOCATION OF BAS CONTROL PANELS.




SECTION 1




SECTION 2

## INSTALLATION NOTES

THESE NOTES APPLY TO ALL PLANS SHOWN ON THIS SHEET:

1.- UNLESS NOTED OTHERWISE, ALL NEW DUCTWORK AND PIPING IS TO BE MOUNTED ABOVE EXISTING LAY-IN CEILINGS. CONTRACTOR SHALL PROVIDE ALL LABOR AND MATERIALS TO REMVOE AND RE-INSTALL EXISTING CEILING TLES AS REQUIRED TO INSTALL THE NEW DUCWORK AND PIPING AND DEMO EXISTING PIPING AND DUCTWORK ABOVE THE CEILING. ANY EXISTING CEILING TILES THAT ARE DAMAGED DURING CONSTRUCTION ARE TO BE REPLACED AT NO ADDITIONAL COST TO THE OWNER.

2. - PROVIDE NEW CEILING TILES TO REPLACE LOCATIONS WHERE AIR DEVICE IS BEING REMOVED AND NOT REPLACED WITH A NEW ONE IN THE SAME LOCATION. SEE HVAC DEMOLITION DRAWINGS AND HVAC DUCT PLANS FOR DIFFUSER LOCATIONS.

3. -PROVIDE OPENINGS IN PLASTER CEILINGS AS REQUIRED FOR INSTALLATION OF DUCTWORK AND PIPING HANGERS (HANGERS MUST BE SUPPORTED FROM BUILDING STRUCTURE). PROVIDE PATCHING AND REPAIR AS NECESSARY TO LOCATE STRUCTURE. PROVIDE PATCHING AND REPAIR OF PLASTER CEILINGS WHERE HANGERS PENETRATE CEILINGS. PLASTER CEILINGS EXIST ABOVE LAY-IN CEILINGS.

| | |
|---|---|
| DESIGNER/ENGINEER | SH |
| CAD OPERATOR | SH |
| QAQC/CHECKER | SS |

| Revisions | Date |
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Dynamix Engineering Ltd.
Facility Engineering Consultants
855 Grandview Avenue, 3rd Floor Columbus, Ohio 43215
Phone: (614)443-1178 · Fax: (614)443-1594 · Email: dynamix@dynamix-ltd.com
Comm. No.: 120050


STATE OF OHIO · MACE · REGISTERED PROFESSIONAL ENGINEER

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Revised By:
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Drawing Title: ENLARGED HVAC DUCT AND PIPING PLANS

Approved: Project Engineer: Philip Kirk

Project Title: MODERNIZE HVAC, B-115

Building Number: B-115 115

Checked: DYNAMIX

Drawn: SH

Location: 4100 WEST THIRD ST DAYTON, OH 45428

Date: 04-30-2013

Project No. 552-13-301

Drawing No. M7

VAMC, DAYTON

VA Department of Veterans Affairs

VA FORM 08-6231, OCT 1978

# CONTROLS DIAGRAM - AH-1 AND AH-2 - VARIABLE AIR VOLUME

## SEQUENCE OF OPERATIONS

A. GENERAL
1. ALL SETPOINTS SHALL BE ADJUSTABLE.
2. UNIT IS NORMALLY STARTED AND STOPPED BY THE DCP OR 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, D-2 AND D-3 SHALL MODULATE IN ACCORDANCE WITH THE FOLLOWING SEQUENCE:

B. SAFETIES
1. ALL CONTROLS SHALL INCORPORATE THE FOLLOWING HARDWIRED SAFETIES WHERE APPLICABLE:
   a. A LOW TEMPERATURE LIMIT SAFETY "FREEZE STAT" SHALL BE PROVIDED AND INSTALLED ON THE DISCHARGE OF THE FIRST COIL IN THE AIR STREAM (UNLESS OTHERWISE NOTED) AND SHALL STOP THE AIR HANDLING UNIT FAN(S) IF A TEMPERATURE BELOW 40° F IS DETECTED.
   b. SMOKE DETECTORS FOR THE UNIT SHALL BE PROVIDED, INSTALLED AND INTERLOCKED TO STOP THE AIR HANDLING UNIT FAN(S) WHEN SMOKE IS DETECTED.
   c. A SUPPLY AND RETURN DUCT HIGH STATIC PRESSURE SAFETY SHALL BE PROVIDED AND INSTALLED ON THE UNIT. PROVIDE A MANUALLY RESET TYPE DUCT STATIC PRESSURE SWITCH, SET AT THE MAXIMUM WORKING PRESSURE OF THE DUCTWORK, TO STOP THE AIR HANDLING UNIT FAN(S) WHEN THE SYSTEM PRESSURE EXCEEDS SETPOINT.

C. FAN CONTROL
1. WHENEVER THE UNIT IS INDEXED TO START, THE FOLLOWING SEQUENCE SHALL BE EXECUTED:
   a. THE SUPPLY FAN SHALL START.
   b. ONCE FAN STATUS HAS BEEN PROVEN, THE MIXED AIR CONTROL, MINIMUM OUTDOOR AIRFLOW CONTROL, RETURN AIRFLOW CONTROL, DISCHARGE AIR CONTROL, AND STATIC PRESSURE CONTROL SHALL BE ENABLED.
2. WHENEVER THE UNIT IS DE-ENERGIZED, DUE TO EITHER A SCHEDULED SHUTDOWN OR A SAFETY TRIP, THE FOLLOWING SEQUENCE SHALL BE EXECUTED:
   a. THE SUPPLY FAN SHALL BE STOPPED.
   b. THE OUTSIDE AND EXHAUST AIR DAMPERS SHALL FULLY CLOSE AND THE RETURN AIR DAMPER SHALL FULLY OPEN.
   c. THE COOLING COIL VALVE SHALL FULLY CLOSE TO THE COIL.
   d. THE PREHEAT COIL VALVE SHALL FULLY OPEN TO THE COIL
      1) IF THE LOW TEMPERATURE LIMIT SAFETY "FREEZE STAT" HAS TRIPPED, THE HEATING COIL VALVE SHALL FULLY OPEN TO THE COIL.

D. MODE CONTROL
1. THE AIR HANDLING UNIT SHALL BE CAPABLE OF PRE-OCCUPIED CONTROL AND PROGRAMMED FOR THE OCCUPIED, AND UNOCCUPIED MODES.
2. THE OPERATING MODES SHALL BE AUTOMATICALLY INITIATED THROUGH TIME-OF-DAY SCHEDULES, APPLICATION PROGRAMS, OR THROUGH OPERATOR COMMANDS.
3. WITHIN EACH MODE THE UNIT SHALL OPERATE AS DESCRIBED BELOW.

E. PRE-OCCUPIED MODE
1. THE AIR HANDLING UNIT SHALL BE CONTROLLED ON ITS OWN OCCUPIED/UNOCCUPIED TIME SCHEDULE AS DEFINED AT THE OPERATOR WORKSTATION. THE BAS SHALL INDEX THE UNIT TO START IN ADVANCE OF THE SCHEDULED OCCUPIED TIME, VIA AN ADAPTIVE OPTIMAL START SEQUENCE. THE UNIT SHALL ENTER A MORNING WARM-UP OR COOL-DOWN MODE.
2. MORNING WARM-UP
   a. DURING THE WARM-UP MODE, THE UNIT SHALL OPERATE SIMILAR TO THE OCCUPIED MODE WITH THE FOLLOWING EXCEPTIONS:
      1) THE DISCHARGE AIR SETPOINT SHALL BE INCREASED TO 95° F.
      2) THE OUTSIDE AIR DAMPERS AND EXHAUST AIR DAMPERS SHALL REMAIN FULLY CLOSED. THE RETURN AIR DAMPER SHALL REMAIN FULLY OPEN.
      3) COOLING SHALL BE DISABLED.
   b. THIS MODE SHALL CONTINUE UNTIL THE SPACE REACHES ITS TARGETED OCCUPIED SETPOINT OR THE SCHEDULED OCCUPIED START TIME IS REACHED.
3. MORNING COOL-DOWN
   a. DURING THE COOL-DOWN MODE, THE UNIT SHALL OPERATE SIMILAR TO THE OCCUPIED MODE WITH THE FOLLOWING EXCEPTIONS:
      1) THE MINIMUM OUTSIDE AIR CONTROL LOOP SHALL BE DISABLED.
   b. THIS MODE SHALL CONTINUE UNTIL THE SCHEDULED OCCUPIED START TIME IS REACHED.
4. SHOULD THE SPACE TEMPERATURE NOT REACH THE OCCUPIED SETPOINT BEFORE TO THE SCHEDULED OCCUPIED TIME, OR REACH THE SETPOINT TOO EARLY, THE ADAPTIVE OPTIMAL START SEQUENCE SHALL AUTOMATICALLY ADJUST ITSELF FOR SUBSEQUENT STARTS.

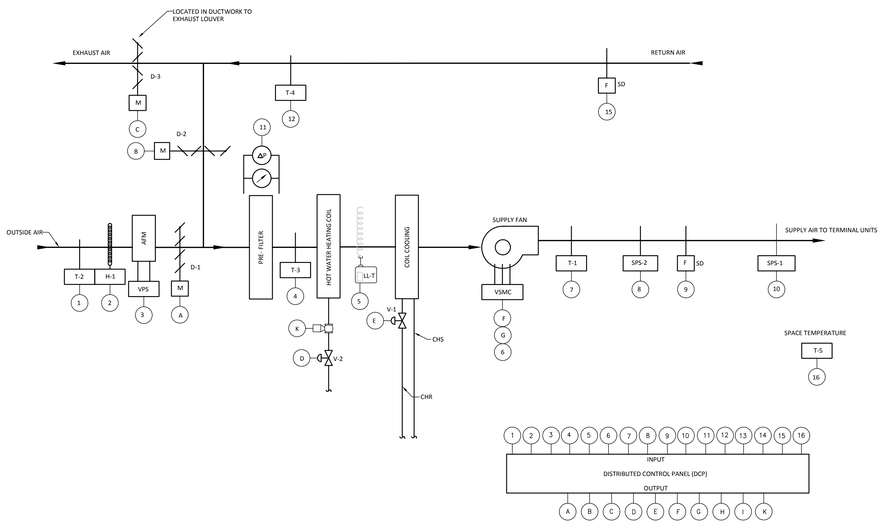
F. OCCUPIED MODE
1. MINIMUM OUTDOOR AIRFLOW CONTROL
   a. OUTSIDE AIRFLOW MEASURING STATION WILL MONITOR AND ADJUST OUTSIDE AIR FLOW TO THE UNIT. THE UNIT WILL MAINTAIN THE SCHEDULED VALUE OF OUTSIDE AIR FLOW. THIS OUTSIDE AIR FLOW VALUE SHALL BE ADJUSTABLE AT THE ECC.
2. MIXED AIR CONTROL
   a. WHEN THE OUTSIDE AIR ENTHALPY FALLS BELOW 28 BTU/LB, THE UNIT SHALL BE IN "ECONOMIZER MODE".
   b. DURING ECONOMIZER MODE, THE MIXED AIR DAMPERS SHALL BE ALLOWED TO MODULATE BEYOND MINIMUM AIRFLOW CONTROL, IN SEQUENCE WITH THE COIL VALVES TO MAINTAIN THE DISCHARGE AIR SETPOINT.
   c. DURING THE ECONOMIZER MODE, THE RETURN FAN SHALL BE CONTROLLED TO MAINTAIN A DIFFERENTIAL SETPOINT.
   d. WHEN THE OUTSIDE AIR ENTHALPY RISES ABOVE 29 BTU/LB , THE OUTSIDE AIR DAMPER AND RETURN AIR DAMPER SHALL REVERT BACK TO MINIMUM OUTSIDE AIRFLOW CONTROL ONLY.
   e. A MIXED AIR SENSOR AND MIXED AIR LOW LIMIT CONTROL LOOP SHALL PREVENT THE MIXED AIR TEMPERATURE FROM FALLING BELOW 45° F. AS THE MIXED-AIR TEMPERATURE APPROACHES THE LOW LIMIT, THE OUTSIDE AIR DAMPER SHALL BE MODULATED TOWARD THE FULLY CLOSED POSITION AND THE RETURN AIR DAMPER TOWARD THE FULLY OPEN POSITION.
3. DISCHARGE AIR CONTROL
   a. DURING THE OCCUPIED MODE, THE UNIT SHALL MAINTAIN THE DISCHARGE AIR SETPOINT.
   b. THE MIXING DAMPERS (ECONOMIZER MODE), HEATING AND COOLING COIL VALVES SHALL BE MODULATED IN SEQUENCE TO MAINTAIN THE DISCHARGE AIR SETPOINT.
4. STATIC PRESSURE CONTROL
   a. THE SUPPLY FAN VFD SHALL BE MODULATED TO MAINTAIN A SUPPLY STATIC PRESSURE SETPOINT OF 1.5" W.C. AS SENSED BY A STATIC PRESSURE SENSOR LOCATED 2/3 DISTANCE FROM THE SUPPLY FAN TO THE FARTHEST OUTLET . APPROXIMATELY LOCATE SENSORS AS INDICATED ON THE DRAWINGS. IF MULTIPLE SENSORS ARE SHOWN, THE SENSOR WITH THE LOWEST STATIC PRESSURE READING SHALL BE USED.

G. UNOCCUPIED CONTROL
1. DURING THE SCHEDULED UNOCCUPIED TIMES, THE SUPPLY FAN SHALL BE OFF.
2. NIGHT SETBACK HEATING
   a. WHEN THE UNOCCUPIED SPACE TEMPERATURE SERVED BY THE UNIT DROPS BELOW THE UNOCCUPIED HEATING SETPOINT OF 55° F, THE UNIT SHALL BE INDEXED TO START AND SHALL CONTINUE TO RUN FOR A MINIMUM OF 5 MINUTES AFTER SATISFACTION OF THE ZONE SETPOINT.
   b. THE UNIT SHALL OPERATE AS IN THE MORNING WARM-UP MODE.
3. NIGHT SETUP COOLING
   a. WHEN THE UNOCCUPIED SPACE TEMPERATURE SERVED BY THE UNIT RISES ABOVE THE UNOCCUPIED COOLING SETPOINT OF 85° F, THE UNIT SHALL BE INDEXED TO START AND SHALL CONTINUE TO RUN FOR A MINIMUM OF 5 MINUTES AFTER SATISFACTION OF THE SPACE SETPOINT.
   b. THE UNIT SHALL OPERATE AS IN THE MORNING COOL-DOWN MODE.

## LEGENDS

| | | |
|---|---|---|
| SPS-1 | STATIC PRESSURE SENSOR | SENSES AND TRANSMITS DUCT STATIC PRESSURE TO DCP. |
| SPS-2 | HIGH LIMIT STATIC PRESSURE SWITCH | SENSES DUCT STATIC PRESSURE AT THE AHU. SHUTS DOWN FANS WHEN STATIC EXCEEDS LIMIT. SENDS ALARM TO DCP. |
| T-1 | SUPPLY AIR TEMPERATURE SENSOR | SENSES AND TRANSMITS SUPPLY AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION. |
| T-2,H-1 | OUTSIDE AIR TEMPERATURE SENSOR AND HUMIDITY SENSOR | SENSES AND TRANSMITS OUTSIDE AIR DRY BULB TEMPERATURE AND HUMIDITY TO DCP FOR CONTROL AND INDICATION. |
| T-3 | MIXED AIR TEMPERATURE SENSOR | SENSES AND TRANSMITS MIXED AIR DRY BULB TEMPERATURE IN RESPONSE TO DCP |
| T-4 | RETURN AIR TEMPERATURE | SENSES AND TRANSMITS RETURN AIR DRY BULB TEMPERATURE TO DCP FOR CONTROL AND INDICATION. |
| T-5 | UNOCCUPIED SPACE TEMPERATURE SENSOR | SENSES AND TRANSMITS SPACE TEMPERATURE TO DCP FOR UNOCCUPIED CONTROL. |
| LL-T | LOW LIMIT TEMPERATURE SWITCH | SNAP ACTION THERMOSTAT DISABLES FANS TO PREVENT FREEZING. ONE SET OF CONTACTS ALARMS ECC. |
| V-1 | CHILLED WATER CONTROL VALVE, 3-WAY MODULATING TYPE | VARIES CHILLED WATER FLOW TO COOLING COIL IN RESPONSE TO DCP. |
| V-2 | HOT WATER CONTROL VALVE, 3-WAY MODULATING | VARIES HOT WATER FLOW TO PREHEAT COIL IN RESPONSE TO DCP. |
| D | ELECTRONIC DAMPER MOTOR | MODULATES DAMPER IN RESPONSE TO DCP. |
| VSMC | VARIABLE SPEED MOTOR CONTROLLER WITH MOTOR STARTER | CONTROLS SUPPLY AND RETURN FANS MOTOR SPEED IN RESPONSE TO DCP. FAN COMMAND AND STATUS |
| AFM | AIR FLOW MEASURING DEVICE | TRANSMITS VELOCITY PRESSURE TO DCP. |
| ΔP | DIFFERENTIAL PRESSURE SENSOR | TRANSMITS DIFFERENTIAL PRESSURE TO DCP TO INDICATE FILTER CONDITIONS. |
| DCP | DISTRIBUTED CONTROL PANEL | CONTROLS OPERATION OF AIR HANDLING UNITS IN ACCORDANCE WITH THE SEQUENCE OF OPERATION. |
| D-1 | OUTSIDE AIR DAMPER, MODULATING | VARIES OUTSIDE AIR FLOW IN RESPONSE TO SUPPLY AIR TEMP AND MINIMUM OA AIRFLOW CONDITIONS. |
| D-2 | RETURN AIR DAMPER, MODULATING | VARIES RETURN AIR FLOW IN RESPONSE TO SUPPLY AIR |
| D-3 | RELIEF AIR DAMPER, MODULATING | VARIES RELIEF AIR FLOW IN RESPONSE TO DCP. |
| ECC | ENGINEERING CONTROL CENTER | WORK STATION FOR MONITORING OF SYSTEMS OPERATIONS, CONNECTED TO ECC. |
| F SD | DUCT SMOKE DETECTORS (FURNISHED AND WIRED TO FIRE ALARM PANEL BY ELECTRICAL) | PROVIDE SMOKE SIGNAL TO DCP. |

## FLOW DIAGRAM




# CONTROLS DIAGRAM - VARIABLE AIR VOLUME TERMINAL UNIT

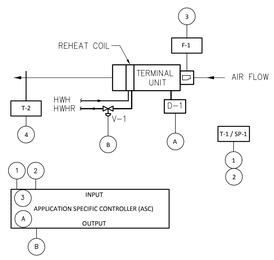
## SEQUENCE OF OPERATIONS

A. A VOLUME CONTROLLER SHALL CONTROL FOR AN AIRFLOW VOLUME SETPOINT. THE AIRFLOW SETPOINT SHALL BE RESET BY THE SPACE TEMPERATURE BASED ON THE MODE OF THE TERMINAL UNIT. ALL AIRFLOW VALUES SHALL BE SET AS INDICATED ON THE DRAWINGS.
B. THE OPERATING MODE OF THE TERMINAL UNIT SHALL BE CONTROLLED IN CONJUNCTION WITH THE OPERATING MODE OF THE ASSOCIATED AIR HANDLING UNIT.
C. OCCUPIED MODE
1. THE SPACE SHALL BE CONTROLLED FOR THE OCCUPIED TEMPERATURE SETPOINTS.
2. AS THE SPACE TEMPERATURE RISES ABOVE THE OCCUPIED COOLING SETPOINT (75°F-78°F), THE VOLUME SETPOINT SHALL BE RESET FROM THE MINIMUM AIRFLOW, TOWARD THE MAXIMUM COOLING AIRFLOW. THE REHEAT COIL VALVE SHALL BE FULLY CLOSED.
3. AS THE TEMPERATURE FALLS BELOW THE OCCUPIED HEATING SETPOINT (70°F-72°F), THE AIRFLOW SETPOINT SHALL BE SET AT THE MINIMUM AIRFLOW, AND THE REHEAT VALVE SHALL BE MODULATED TOWARD THE OPEN POSITION.
4. IF HOT WATER IS AVAILABLE, THE REHEAT VALVE IS AT ITS FULL OPEN POSITION, AND THE SPACE TEMPERATURE SETPOINT IS STILL NOT SATISFIED, THE AIRFLOW SETPOINT SHALL BE INCREASED TOWARD THE MAXIMUM HEATING AIRFLOW.
D. UNOCCUPIED MODE
1. NIGHT SETBACK - THE UNIT SHALL BE CONTROLLED IN A SIMILAR MANNER AS DESCRIBED IN THE WARM-UP MODE, USING THE UNOCCUPIED TEMPERATURE SETPOINT (55°F).
2. NIGHT SETUP - THE UNIT SHALL BE CONTROLLED IN A SIMILAR MANNER AS DESCRIBED IN THE OCCUPIED MODE, USING THE UNOCCUPIED TEMPERATURE SETPOINT OF (85°F).
3. AN OVERRIDE BUTTON SHALL BE PROVIDED AT EACH SENSOR TO OVERRIDE THE UNOCCUPIED MODE AND RETURN THE UNIT TO THE OCCUPIED MODE FOR A FIXED PROGRAMMABLE TIME.
E. WARM-UP MODE
1. THE SPACE SHALL BE CONTROLLED FOR THE OCCUPIED TEMPERATURE SETPOINTS. THE AIR HANDLER SHALL BE DELIVERING WARM AIR.
2. AS THE SPACE TEMPERATURE RISES ABOVE THE OCCUPIED COOLING SETPOINT, THE VOLUME SETPOINT SHALL BE RESET TOWARDS ZERO AIRFLOW. THE REHEAT COIL VALVE SHALL BE FULLY CLOSED.
3. AS THE TEMPERATURE FALLS BELOW THE OCCUPIED HEATING SETPOINT, THE AIRFLOW SETPOINT SHALL BE RESET FROM THE MINIMUM WARM-UP AIRFLOW, TOWARD THE MAXIMUM AIRFLOW. THE REHEAT VALVE SHALL BE IN THE FULL OPEN POSITION.

## LEGENDS

| | | |
|---|---|---|
| T-1/SP-1 | SPACE TEMPERATURE SENSOR AND REMOTE SETPOINT ADJ. | SENSES AND TRANSMITS SPACE TEMPERATURE AND REMOTE SETPOINT TO CTLR. FOR CONTROL AND INDICATION. |
| T-2 | TERMINAL UNIT DISCHARGE AIR TEMPERATURE SENSOR | SENSES AND TRANSMITS DISCHARGE DRY BULB TEMPERATURE TO CTLR. |
| F-1 | TERMINAL UNIT SUPPLY AIR FLOW TRANSMITTER | SENSES AND TRANSMITS AIR FLOW VELOCITY PRESSURE TO CTRL. FOR AIRFLOW CALCULATION. |
| D-1 | SUPPLY AIR DAMPER MODULATING TYPE | VARIES SUPPLY AIR FLOW IN RESPONSE TO SUPPLY AIR SETPOINT. |
| V-1 | REHEAT CONROL VALVE MODULATING TYPE | VARIES HEATING HOT WATER FLOW TO REHEAT COIL. |

## FLOW DIAGRAM




# CONTROLS DIAGRAM - HOT WATER STEAM CONVERTERS

## SEQUENCE OF OPERATIONS

A. THE HEAT EXCHANGERS AND THEIR ASSOCIATED PUMPS SHALL OPERATE ON A LEAD/STANDBY BASIS. THE LEAD HEAT EXCHANGER SHALL BE OPERATOR SELECTABLE AND SHALL AUTOMATICALLY ALTERNATE ON A MONTHLY BASIS.
B. WHEN THE HEAT EXCHANGER SYSTEM IS INDEXED TO START, THE LEAD HEAT EXCHANGER'S PUMP SHALL BE STARTED AND SHALL RUN CONTINUOUSLY. PUMPS SHALL RUN AT CONSTANT VOLUME. VARIABLE FREQUENCY DRIVE SHALL BE USED FOR BALANCING.
C. ONCE THE LEAD HEAT EXCHANGER'S PUMP STATUS HAS BEEN PROVEN, THE MODULATING STEAM CONTROL VALVE SHALL BE CONTROLLED TO MAINTAIN THE FOLLOWING OUTSIDE AIR RESET SCHEDULE:

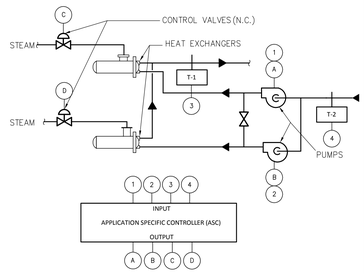
| O.A TEMP. | H.W. SUPPLY TEMP. |
|---|---|
| 0° F | 180° F |
| 60° F | 140° F |

D. IF THE LEAD HEAT EXCHANGER'S PUMP FAILS TO PROVE STATUS DURING ITS OPERATION, THE HEAT EXCHANGER'S STEAM VALVES SHALL FULLY CLOSE, ITS PUMP SHALL BE STOPPED, AND THE STANDBY HEAT EXCHANGER SHALL OPERATE IN ITS PLACE. AN ALARM SHALL BE INITIATED AT THE OPERATOR WORKSTATION.

## LEGENDS

| | | |
|---|---|---|
| T-1 | HEATING HOT WATER SUPPLY TEMPERATURE | SENSES AND TRANSMITS HEATING HOT WATER SUPPLY TEMPERATURE TO CTLR. |
| T-2 | HEATING HOT WATER RETURN TEMPERATURE | SENSES AND TRANSMITS HEATING HOT WATER RETURN TEMPERATURE TO CTLR. |

## FLOW DIAGRAM

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Dynamix Engineering Ltd.
Facility Engineering Consultants
855 Grandview Avenue, 3rd Floor Columbus, Ohio 43215
Phone: (614)443-1178 · Fax: (614)443-1594 · Email: dynamix@dynamix-ltd.com
Comm. No.: 120050


STATE OF OHIO · MACE E. MOSER · REGISTERED PROFESSIONAL ENGINEER

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