

MECHANICAL DRAWING LIST	
SHEET NO.	DRAWING TITLE
M001	MECHANICAL GENERAL NOTES, SYMBOL LIST, DRAWING LIST
M101	BASEMENT DUCTWORK PLAN
M102	FIRST FLOOR DUCTWORK PLAN
M103	SECOND FLOOR DUCTWORK PLAN
M501	MECHANICAL DETAILS
M801	MECHANICAL CONTROLS

MECHANICAL SYSTEMS GENERAL NOTES

- A. ALL PIPING IS TO BE RUN CONCEALED IN FINISHED AREAS. COORDINATE PIPING INSTALLATION WITH WORK OF OTHER TRADES TO ENSURE CONCEALMENT.
- B. COORDINATE ALL EQUIPMENT LOCATIONS AND INSTALLATION WITH THE WORK OF OTHER TRADES. COORDINATE EQUIPMENT WITH WALL, CEILING AND FLOOR FINISHES.
- C. COORDINATE DIFFUSER AND GRILLE LOCATIONS WITH LIGHTING, FIRE DETECTION, AND CEILING. COORDINATE DUCTWORK WITH LIGHTING AND PIPING INSTALLERS TO ALLOW CLEARANCE FOR LIGHT FIXTURES, PIPING AND WORK OF OTHER TRADES.
- D. COORDINATE LOUVER, DIFFUSER AND GRILLE FRAME TYPES TO MATE AND MATCH ADJACENT WALL AND CEILING CONSTRUCTION.
- E. COORDINATE DUCTWORK WITH WORK OF OTHER TRADES TO ENSURE ALL DUCTWORK IS CONCEALED. COORDINATE EXACT DIFFUSER AND GRILLE LOCATIONS TO MATCH ARCHITECTURAL REQUIREMENTS FOR SPACING AND CENTERING.
- F. PROVIDE MANUAL BALANCING DAMPERS FOR ALL DUCT BRANCHES SERVING SUPPLY DIFFUSERS, RETURN AIR GRILLES, LINEAR SLOTS AND EXHAUST AIR GRILLES.
- G. UNLESS OTHERWISE NOTED PROVIDE DRAINS AT LOW POINTS. DRAINS SHALL BE CONSTRUCTED WITH 3/4" BALL VALVE WITH HOSE CONNECTION AND END CAP.
- H. VERIFY THAT EQUIPMENT MATCHES FIELD VOLTAGE. COORDINATE WITH ELECTRICAL CONTRACTOR FOR REQUIREMENTS PRIOR TO ORDER.
- I. INSTALLATION SHALL PROVIDE FOR SERVICE ACCESS AREAS. CONFIRM LOCATIONS AND SERVICEABILITY PRIOR TO ORDER.
- J. COORDINATE ANY INTERRUPTION OF UTILITY SERVICES WITH OWNER.
- K. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF ALL WORK. REFER TO STRUCTURAL DRAWINGS FOR EXACT LOCATIONS OF BUILDING STRUCTURAL ELEMENTS. COORDINATE ALL EQUIPMENT LOCATIONS, CONCEALMENT AND SURFACE FINISH TREATMENTS WITH WORK OF ALL TRADES. IN ANY CASE OF DISCREPANCY BETWEEN THE PLANS OR IN ANY CASE WHERE SUCH ISSUES REQUIRE CLARIFICATION, NOTIFY ENGINEER IN WRITING.
- L. ALL PIPING AND DUCTWORK SIZES INDICATED ARE MINIMUM SIZES. LARGER SIZES MAY BE INSTALLED BY THE CONTRACTOR IN ALL CASES. EXISTING SURFACES, SUBSTRATES, OR STRUCTURE WHICH ARE PENETRATED, ALTERED OR DAMAGED IN ANY WAY BY THE WORK ASSOCIATED WITH THIS CONTRACT SHALL BE REPAIRED SO AS TO MATCH ORIGINAL SURFACE, SUBSTRATE, OR STRUCTURE.
- M. ALL SURFACE MOUNTED EQUIPMENT SHALL BE FASTENED WITH ANCHORS OR FASTENERS AS SPECIFIED FOR THE SUBSTRATE. PLASTIC OR FIBER SHIELDS ARE NOT ACCEPTABLE.
- N. DRAWINGS ARE DIAGRAMATIC, AND DO NOT SHOW ALL RISES, DROPS, OFFSETS, AND ROUTING TO AVOID OBSTRUCTIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD CONDITIONS REQUIRING ADDITIONAL MATERIAL QUANTITIES.
- O. PROVIDE LABOR, MATERIALS, EQUIPMENT AND SERVICES AS REQUIRED FOR THE COMPLETE INSTALLATION DESIGNED IN THE CONTRACT DRAWINGS TO PERFORM AS DESCRIBED IN THE SEQUENCE OF OPERATIONS. PROVIDE WIRING AND CONDUIT REQUIRED TO CONNECT DEVICES. CONTROL WIRING IS DEFINED AS WIRING UP AND INCLUDING 120 VOLTS. INSTALL WIRING IN ACCORDANCE WITH REQUIREMENTS OF "ELECTRICAL WIRING" IN SECTION 230504 AND THE NATIONAL ELECTRICAL CODE. PROVIDE ALL REQUIRED DEVICES FOR PROPER SYSTEM OPERATION, INCLUDING SPECIAL ELECTRICAL SWITCHES, TRANSFORMERS, RELAYS, PUSHBUTTON STATIONS ETC. ALL ACTUATION OF DAMPERS SHALL BE ELECTRIC.
- P. PITCH CONDENSATE DRAIN PIPING AT 1" PER 10'-0" TOWARDS FLOOR DRAIN, SLOP SINK OR HUB DRAIN
- Q. CONTRACTOR SHALL REFER TO SPECIFICATIONS FOR SPACING OF EQUIPMENT HANGERS. PRIOR TO COMMENCEMENT OF WORK, COORDINATE LOCATION OF CEILING EQUIPMENT HANGERS WITH GC.
- R. REFER TO DETAIL SHEET M501 FOR DETAILS APPLICABLE TO ALL DRAWINGS, REGARDLESS IF THEY ARE SPECIFICALLY REFERENCED OR NOT.
- S. PROVIDE INSULATED REFRIGERANT PIPING BETWEEN INDOOR HEAT PUMP UNITS AND OUTDOOR AIR COOLED CONDENSING UNITS. REFER TO DRAWINGS FOR ROUTING. PIPING SHALL BE SIZED AND INSTALLED AS PER HEAT PUMP MANUFACTURER'S INSTRUCTIONS AND ACTUAL FIELD PIPE LENGTHS. CAULK AND SEAL REFRIGERANT PIPE PENETRATIONS THROUGH EXTERIOR WALL (SEAL WEATHER TIGHT).

HVAC SYMBOL LIST			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
////	EXISTING WORK TO BE REMOVED	—A—	COMPRESSED AIR
	POINT OF CONNECTION	—V—	VENT
	POINT OF DISCONNECTION	—BBD—	BOILER BLOW DOWN
MBH	THOUSAND BTU/HOUR	—CS—	CONDENSER WATER SUPPLY
NTS	NOT TO SCALE	—CR—	CONDENSER WATER RETURN
(E)	EXISTING	—CWS—	CHILLED WATER SUPPLY
(L)	ACOUSTIC THERMAL LINING - 1/2" THICK	—CWR—	CHILLED WATER RETURN
(2L)	ACOUSTIC THERMAL LINING - 2" THICK	—D—	DRAIN
(DBL)	DOUBLE WALL LINED DUCT	—FOF—	FUEL OIL FILL
FPM	FEET PER MINUTE	—FOG—	FUEL OIL GAUGE
CFM	CUBIC FEET PER MINUTE	—FOS—	FUEL OIL SUPPLY
AFF	ABOVE FINISHED FLOOR	—FOR—	FUEL OIL RETURN
AD	ACCESS DOOR	—FOV—	FUEL OIL TANK VENT
W/W	WALL TO WALL	—G—	GAS
G.C.	GENERAL CONTRACTOR	—GS—	GLYCOL SUPPLY
M.C.	MECHANICAL CONTRACTOR	—GR—	GLYCOL RETURN
P.C.	PLUMBING CONTRACTOR	—HPWS—	HEAT PUMP WATER SUPPLY
E.C.	ELECTRICAL CONTRACTOR	—HPWR—	HEAT PUMP WATER RETURN
N.O.	NORMALLY OPEN	—HWS—	HOT WATER SUPPLY
N.C.	NORMALLY CLOSED	—HWR—	HOT WATER RETURN
~~~~~	FLEXIBLE DUCTWORK	—LPS—	LOW PRESSURE STEAM
	DUCT SECTION - FLAT OVAL (FO)	—LPC—	LOW PRESSURE CONDENSATE
12"	ROUND DUCT - IN INCHES	—MPS—	MEDIUM PRESSURE STEAM
	DUCT SECTION - SUPPLY	—MPC—	MEDIUM PRESSURE CONDENSATE
	DUCT SECTION - RETURN	—HPS—	HIGH PRESSURE STEAM
	WIDTH A x DEPTH B	—HPC—	HIGH PRESSURE CONDENSATE
SINGLE LINE		—PC—	PUMPED CONDENSATE
DOUBLE LINE		—RD—	REFRIGERANT DISCHARGE
DUCT TAKEOFFS		—RL—	REFRIGERANT LIQUID
TRANSITION SQUARE TO ROUND		—RS—	REFRIGERANT SUCTION
RISE IN DUCT - IN DIRECTION OF AIRFLOW		—HG—	HOT GAS
DROP IN DUCT - IN DIRECTION OF AIRFLOW		—VAC—	VACUUM
SUPPLY DUCT TURNING UP OR DOWN		—CW—	DOMESTIC COLD WATER
RETURN DUCT TURNING UP OR DOWN		—TD—	TRIPLE DUTY VALVE
6" BOOT TAP		—G—	GLOBE VALVE
RECTANGULAR MAIN RECTANGULAR BRANCH		—B—	BALL VALVE
SUPPLY/RETURN RECTANGULAR MAIN RECTANGULAR BRANCH		—G—	GATE VALVE
SUPPLY/RETURN RECTANGULAR MAIN ROUND BRANCH		—C—	CONTROL VALVE
SUPPLY/RETURN ROUND MAIN ROUND BRANCH		—T—	THREE WAY CONTROL VALVE
CONICAL TEE		—C—	CHECK VALVE
LATERAL		—B—	BALANCING VALVE
MITERED ELBOW WITH TURNING VANES		—B—	BUTTERFLY VALVE
SUPPLY DIFFUSER, REGISTER OR GRILLE		—R—	RELIEF VALVE
RETURN OR EXHAUST REGISTER OR GRILLE		—PRV—	PRESSURE REDUCING VALVE
FIN TUBE RADIATION		—T—	PRESSURE/TEMPERATURE TEST PLUG
VALANCE		—T—	SINGLE LINE PIPE OR DUCT CONTINUED
REGISTER, GRILLE OR DIFFUSER TAG		—T—	DOUBLE LINE PIPE OR ROUND DUCT CONTINUED
FIN TUBE RADIATION TAG		—T—	DOUBLE LINE RECTANGULAR DUCT CONTINUED
VALANCE TAG		—T—	AIR FLOW
AIR TERMINAL UNIT AND TAG (OPTION 1)		—T—	PIPE ANCHOR
AIR TERMINAL UNIT TAG (OPTION 2)		—T—	PIPE GUIDE
DUCT SMOKE DETECTOR		—T—	EXPANSION COMPENSATOR WITH GUIDES
HUMIDISTAT		—T—	PRE-FAB EXPANSION LOOP
TEMPERATURE SENSOR		—T—	STRAINER
PNEUMATIC/ELECTRIC THERMOSTAT		—T—	PRESSURE GAUGE
THERMOSTAT/SENSOR WITH GUARD		—T—	THERMOMETER
		—T—	UNION
		—T—	AIR VENT
		—T—	THERMOSTATIC TRAP
		—T—	FLOAT & THERMOSTATIC TRAP
		—T—	THERMODYNAMIC TRAP
		—T—	BUCKET TRAP
		—T—	DIRECTION OF FLOW
		—T—	REDUCER
		—T—	CAP OR PLUG
		—T—	ELBOW DOWN
		—T—	ELBOW UP
		—T—	BOTTOM TAP
		—T—	AUTOMATIC AIR DAMPER
		—T—	FIRE DAMPER
		—T—	SMOKE DAMPER
		—T—	BACK DRAFT DAMPER
		—T—	FLEX CONNECTOR - DUCTWORK
		—T—	MOTORIZED DAMPER
		—T—	BLAST GATE
		—T—	VOLUME DAMPER
		—T—	SUCTION DIFFUSER
		—T—	FLEXIBLE CONNECTOR - PIPING
		—T—	DRAIN VALVE WITH HOSE CONNECTION, CAP AND CHAIN
		—T—	WATER FLOW SENSOR
		—T—	WATER TEMPERATURE SENSOR
		—T—	STATIC PRESSURE SENSOR

ME ENGINEERING  
Mechanical/Electrical Engineering Consultants  
NY: 914-233-1100  
NJ: 908-233-1100  
PA: 484-233-1100  
OH: 614-233-1100  
TX: 972-233-1100  
VA: 703-233-1100  
WA: 206-233-1100  
WY: 307-233-1100

DATE: 8/17/2020  
REVISION:

PROJECT NO: 2020095  
DESIGNED BY: COA  
DRAWN BY: WFW  
CHECKED BY: RSA  
SCALE: AS NOTED  
NOTES:

MECHANICAL GENERAL  
NOTES, SYMBOL LIST,  
DRAWING LIST

HARRIS A. SANDERS  
ARCHITECTS, P.C.  
252 WASHINGTON AVENUE, ALBANY, NEW YORK 12210

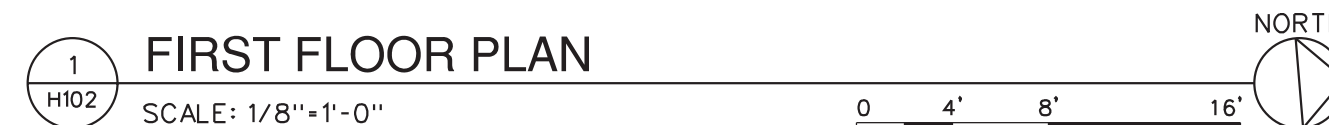
L'DOR ADULT CARE FACILITY  
156 WEST CLARKSTOWN ROAD  
NEW CITY, N.Y. 10956

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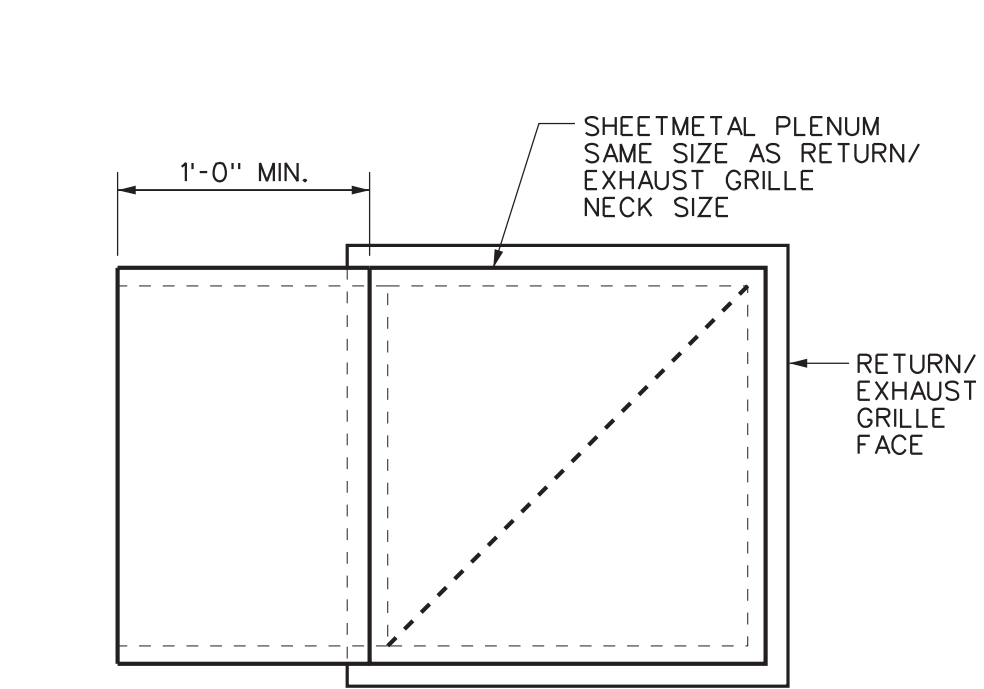
ME ENGINEERING

SHEET NO:  
  
M001





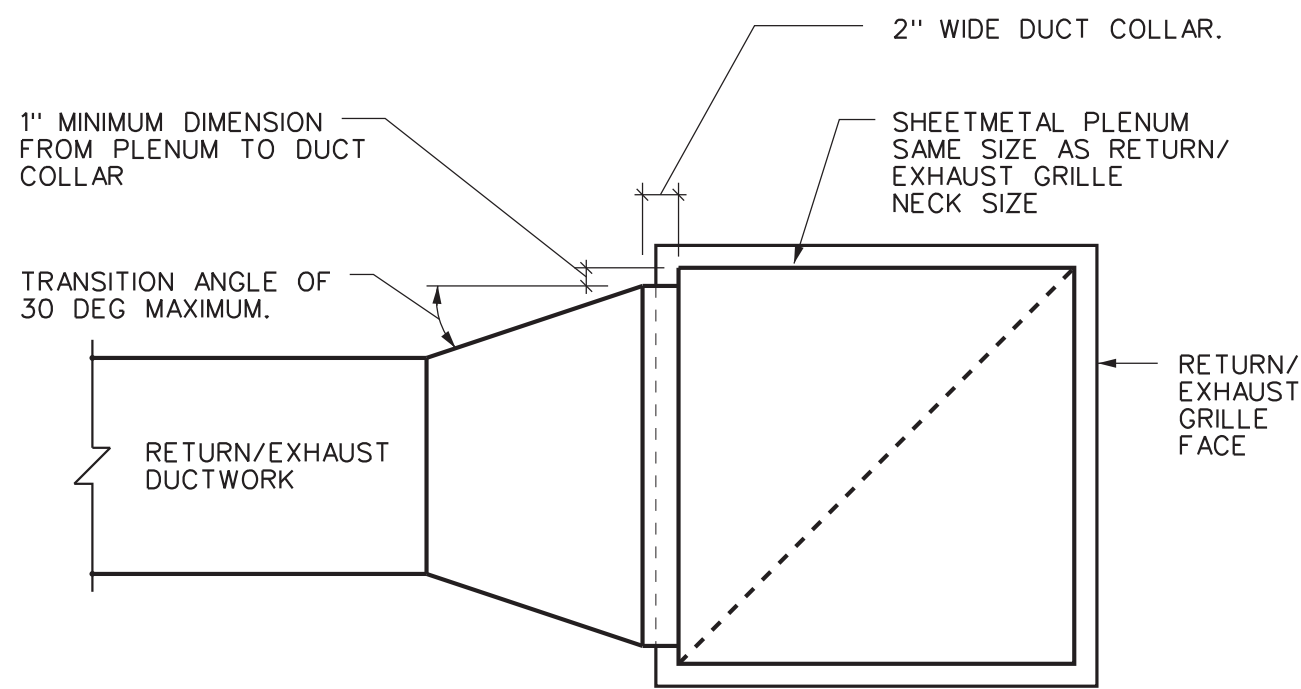




1 RETURN/ EXHAUST GRILLE PLENUM DETAIL

SCALE: NONE

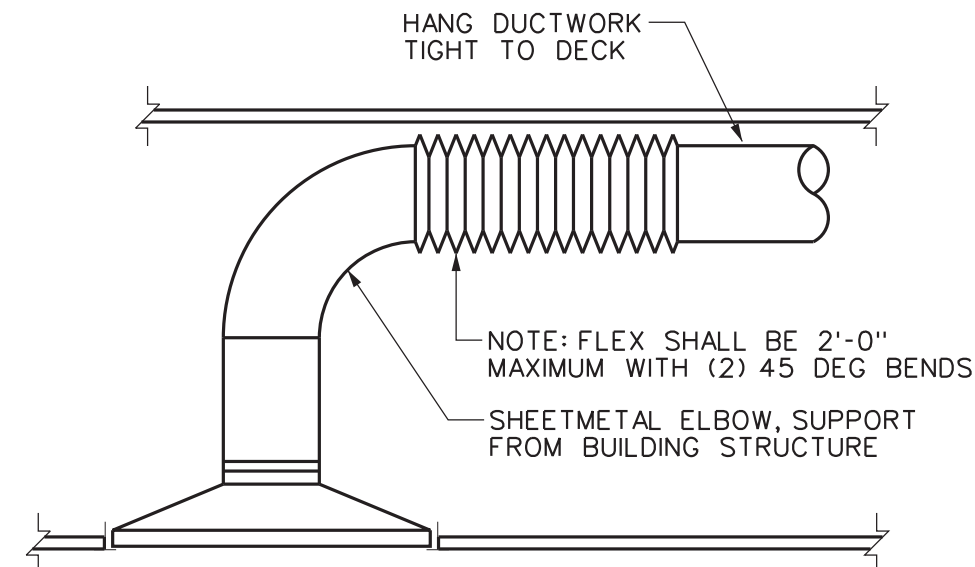
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2 RETURN/ EXHAUST GRILLE PLENUM DETAIL

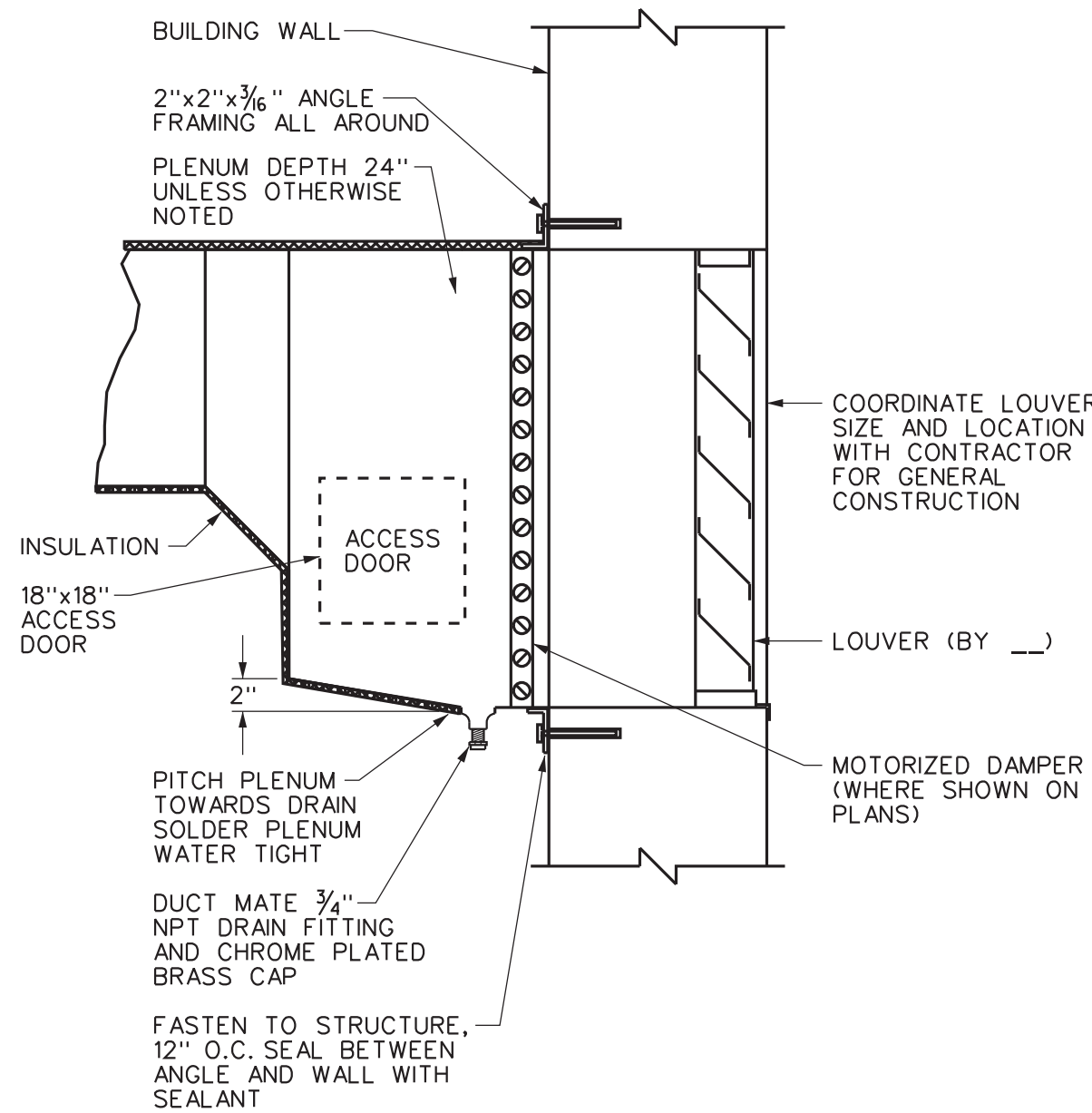
SCALE: NONE

DUCTED



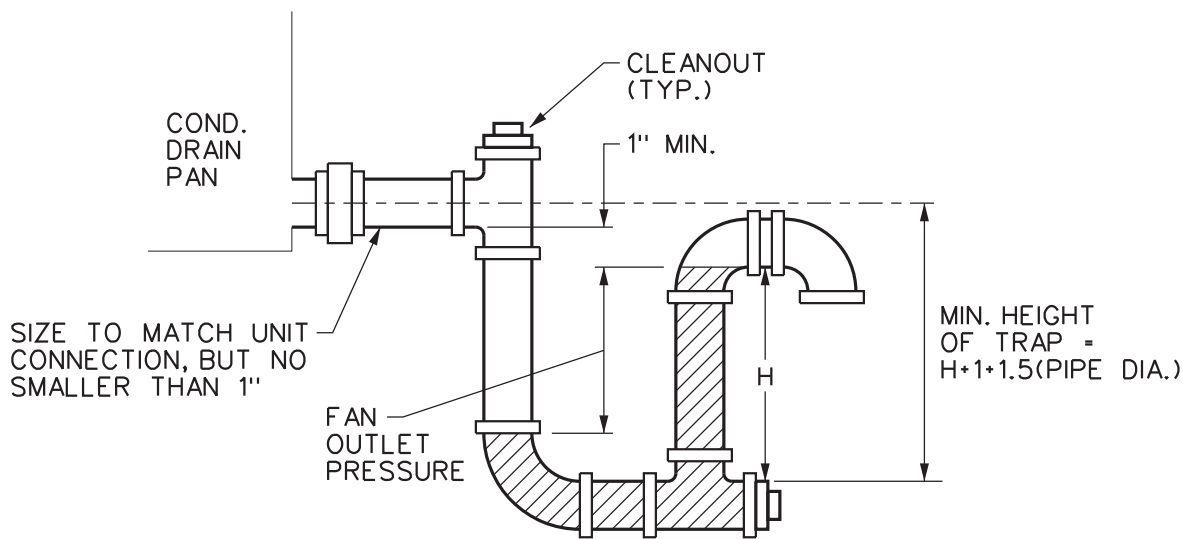
3 TYPICAL DIFFUSER INSTALLATION DETAIL

SCALE: NONE

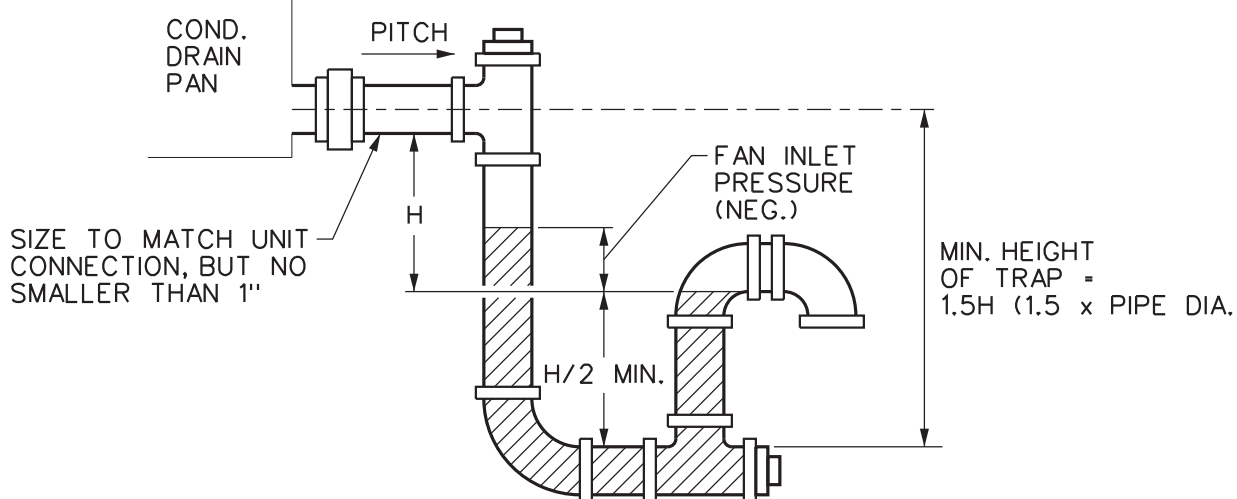


4 LOUVER PLENUM DETAIL

SCALE: NONE



BLOW THRU UNITS (POSITIVE STATIC PRESSURE)



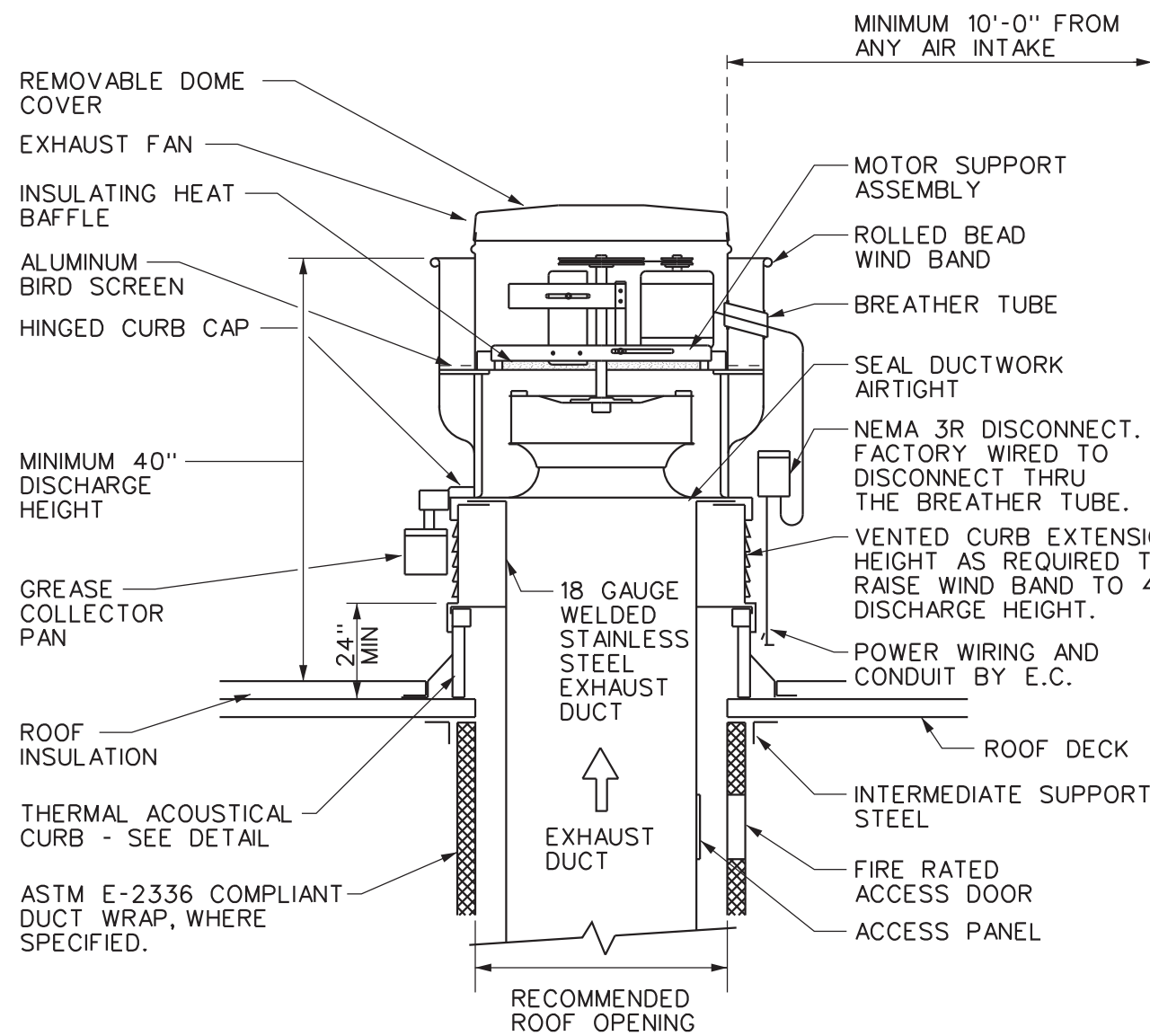
DRAW THRU UNITS

DETAIL NOTES:

- AS AN ALTERNATIVE, IT IS ACCEPTABLE TO PIPE THE TRAP EXACTLY AS SHOWN IN THE MANUFACTURER'S INSTALLATION MANUAL.
- SEE SPECIFICATIONS FOR PIPE TYPE.

5 ROOFTOP UNIT CONDENSATE DRAIN TRAP DETAIL

SCALE: NONE



DETAIL NOTES:

- PROVIDE WIND RESTRAINT PER SPECIFICATION SECTION 230550-WIND RESTRAINT FOR HVAC SYSTEMS (230529-SEISMIC AND WIND RESTRAINT FOR MECHANICAL SYSTEMS).

6 KITCHEN EXHAUST FAN DETAIL

SCALE: NONE

DATE: 8/17/2020  
REVISION:

PROJECT NO. 20095  
DESIGNED BY: CCM  
DRAWN BY: WRW  
CHECKED BY: RSA  
SCALE: AS NOTED  
NOTES:

MECHANICAL GENERAL  
NOTES, SYMBOL LIST,  
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HARRIS A. SANDERS  
ARCHITECTS, P.C.  
252 WASHINGTON AVENUE, ALBANY, NEW YORK 12210

L'DOR ADULT CARE FACILITY  
156 WEST CLARKSTOWN ROAD  
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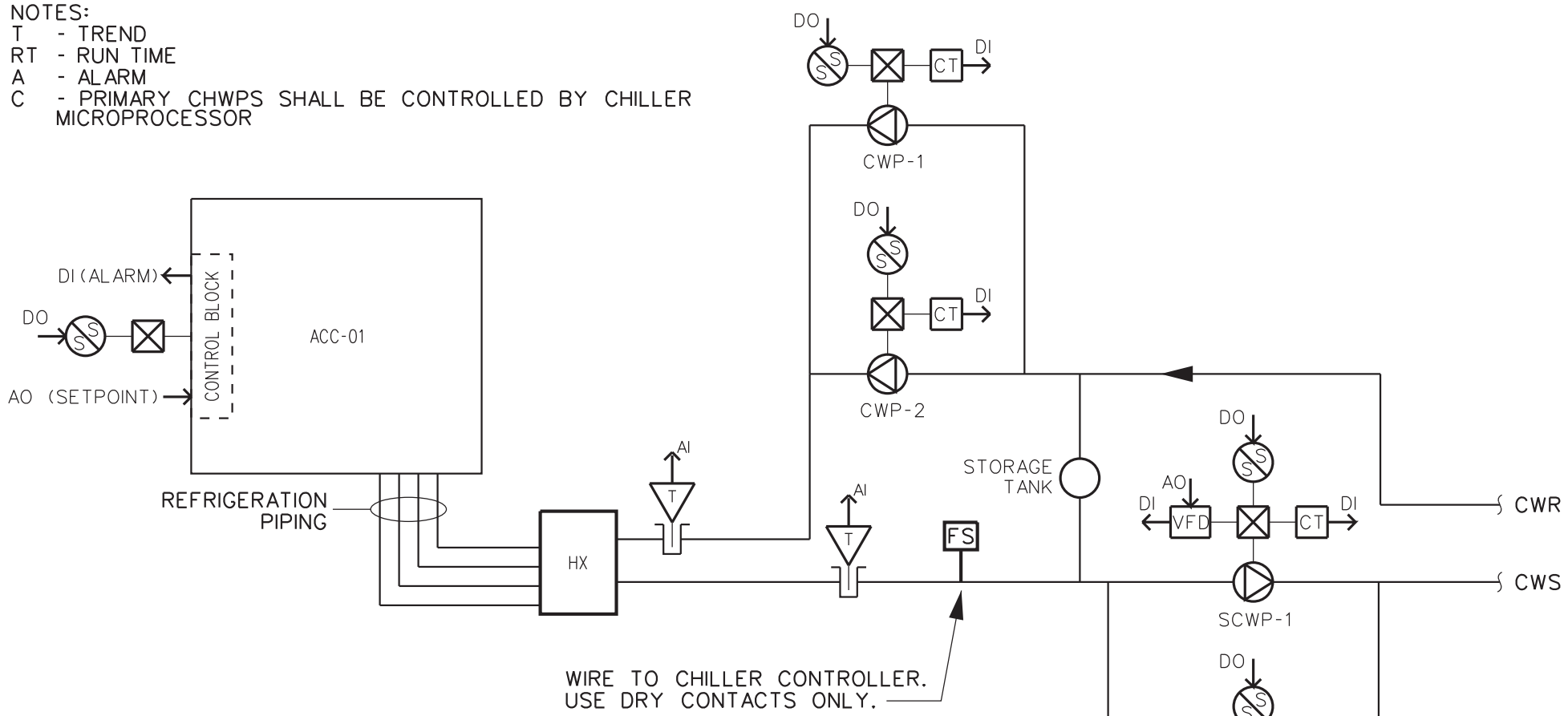
**ME** ENGINEERING

SHEET NO.

M501

CHILLED WATER LOOP POINT LIST					
DESCRIPTION	POINTS				NOTES
	INPUT		OUTPUT		
	DIGITAL	ANALOG	DIGITAL	ANALOG	
PRIMARY CWP-1 START/STOP			●		C
PRIMARY CWP-1 STATUS	●				A, RT, C
PRIMARY CWP-2 START/STOP			●		C
PRIMARY CWP-2 STATUS	●				A, RT, C
SECONDARY CWP-1 START/STOP			●		
SECONDARY CWP-1 STATUS	●				A, RT
SECONDARY CWP-1 ASD FAULT	●				A
SECONDARY CWP-1 ASD SPEED				●	
SECONDARY CWP-2 START/STOP			●		
SECONDARY CWP-2 STATUS	●				A, RT
SECONDARY CWP-2 ASD FAULT	●				A
SECONDARY CWP-2 ASD SPEED				●	
CHILLED WATER SUPPLY TEMP.		●			A
CHILLED WATER RETURN TEMP.		●			A
ACC-01 START/STOP			●		
ACC-01 SETPOINT				●	
ACC-01 ALARM	●				A, RT

NOTES:  
T - TREND  
RT - RUN TIME  
A - ALARM  
C - PRIMARY_CHWPS SHALL BE CONTROLLED BY CHILLER MICROPROCESSOR



NOTES

- REFER TO "AIR COOLED ROTARY SCREW CHILLER" SPECIFICATION FOR ACC-01 CONTROLS.

CHILLED WATER LOOP CONTROL SEQUENCE

- SYSTEM GENERAL DESCRIPTION:

THE BUILDING AUTOMATION SYSTEM (BAS) CONTROLLER PROVIDES STAND-ALONE CONTROL OR CONTROL FROM A HIGHER LEVEL BAS AND PROVIDES START/STOP AND LEAD/LAG/STANDBY CONTROL FOR THE PRIMARY CHILLED WATER PUMPS AND ALSO PROVIDES LEAD/LAG/STANDBY CONTROL OF THE SECONDARY CHILLED WATER PUMPS IN ORDER TO MAINTAIN THE CHILLED WATER SYSTEM DIFFERENTIAL PRESSURE SETPOINT (ADJ.).

- CHILLED WATER SYSTEM ENABLE/DISABLE:

THE CHILLED WATER SYSTEM WILL BE ENABLED WHEN THE OUTDOOR AIR TEMPERATURE IS ABOVE 60 DEG. F. OR ON AN ALL FOR DEHUMIDIFICATION THE BAS CONTROLLER WILL THEN START THE LEAD SYSTEM PUMP. WHEN RUN STATUS FOR THAT PUMP IS PROVEN, THE BAS WILL THEN ENABLE CHILLER TO RUN. THE CHILLER WILL OPERATE BASED UPON ITS FACTORY INSTALLED CONTROLS.

WHEN THE CHILLED WATER SYSTEM IS DISABLED, THE SECONDARY CHILLED WATER PUMPS WILL BE OFF AND THE PRIMARY PUMPS WILL BE OFF.

- PRIMARY CHILLED WATER PUMP START/STOP:

THE BAS CONTROLLER WILL START A CHILLED WATER PUMP THROUGH A CONTACT CLOSURE OF THE PUMPS MOTOR STARTER ENABLE CONTACTS.

- PRIMARY CHILLED WATER PUMP STATUS:

THE BAS CONTROLLER WILL DETECT CHILLED WATER PUMP RUN STATUS BY CURRENT SWITCH.

- PRIMARY CHILLED WATER PUMP LEAD/LAG:

THE CHILLED WATER PUMP LEAD/LAG SEQUENCE WILL BE ROTATED ON A WEEKLY SCHEDULE. THE SEQUENCE WILL BE BASED ON CALCULATED RUN TIME WITH THE PUMP HAVING THE LEAST RUN TIME AS LEAD, THE PUMP WITH THE NEXT LOWEST RUN TIME WILL BE THE SECOND IN THE SEQUENCE AND SO ON. FROM THE BAS OR WITH TRACER TU AN OPERATOR WILL BE ABLE TO MANUALLY CHANGE THE LEAD/LAG SEQUENCE.

- PRIMARY CHILLED WATER PUMP FAILURE:

IF THE LEAD START/STOP RELAY IS ENABLED AND THE CURRENT SWITCH STATUS IS OFF FOR MORE THAN 30 SECONDS (ADJ.), THE BAS CONTROLLER WILL ANNUNCIATE A CHILLED WATER PUMP FAILURE ALARM TO THE BAS AND START THE NEXT PUMP IN THE SEQUENCE.

ONCE THE PROBLEM HAS BEEN CORRECTED, THE OPERATOR WILL BE ABLE TO CLEAR THE ALARM FAILURE FROM THE BAS CONTROLLER USING TRACER TU, FROM A BAS OR BY MANUALLY OVERRIDING THE PUMP ON MOMENTARILY.

THIS WILL RE-ENABLE THE LEAD/LAG SEQUENCE.

- SECONDARY CHILLED WATER PUMP START/STOP:

THE BAS CONTROLLER WILL START A SECONDARY CHILLED WATER PUMP THROUGH A CONTACT CLOSURE OF THE PUMPS VFD RUN-ENABLE CONTACTS.

- SECONDARY CHILLED WATER PUMP STATUS:

THE BAS CONTROLLER WILL DETECT SECONDARY CHILLED WATER PUMP RUN STATUS BY A ASD CURRENT SWITCH.

- SECONDARY CHILLED WATER PUMP LEAD/LAG:

THE SECONDARY CHILLED WATER PUMP LEAD/LAG/STANDBY SEQUENCE WILL BE BASED ON A WEEKLY SCHEDULE. FROM THE BAS CONTROLLER HUMAN-INTERFACE PANEL OR A BAS WORKSTATION, AN OPERATOR WILL BE ABLE TO MANUALLY CHANGE THE LEAD/LAG/STANDBY SEQUENCE.

IF THE CHILLED WATER SYSTEM DIFFERENTIAL PRESSURE FALLS 0.5 PSIG (ADJ.), BELOW SETPOINT AND THE LEAD PUMP IS AT 100% (ADJ.) FOR MORE THAN 5 MINUTES (ADJ.), THE NEXT PUMP IN THE SEQUENCE WILL START. IF THE PUMP SPEED CONTROL OUTPUT IS BELOW 40% (ADJ.) FOR MORE THAN 5 MINUTES (ADJ.), THE LAST OPERATING PUMP IN THE SEQUENCE WILL BE DISABLED.

- SECONDARY CHILLED WATER PUMP FAILURE:

IF THE LEAD START/STOP RELAY IS ENABLED AND THE CURRENT SWITCH STATUS IS OFF FOR MORE THAN 30 SECONDS (ADJ.), THE BAS CONTROLLER WILL ANNUNCIATE A SECONDARY CHILLED WATER PUMP ALARM TO THE BAS AND START THE LAG PUMP. WHEN A SECONDARY CHILLED WATER PUMP FAILURE EXISTS, LEAD/LAG/STANDBY AUTOMATION WILL BE DISABLED AND THE CURRENTLY RUNNING PUMP BECOMES THE LEAD PUMP. ONCE THE PROBLEM HAS BEEN CORRECTED, THE OPERATOR WILL BE ABLE TO CLEAR THE ALARM FAILURE FROM THE BAS CONTROLLER OR BAS WORKSTATION.

THIS WILL RE-ENABLE THE LEAD/LAG/STANDBY SEQUENCE.

- SECONDARY CHILLED WATER PUMP SPEED:

THE BAS CONTROLLER WILL MONITOR THE CHILLED WATER SYSTEM DIFFERENTIAL PRESSURE SENSOR. WHEN THE PUMP VARIABLE FREQUENCY DRIVE IS ENABLED, THE BAS CONTROLLER WILL CONTROL THE ANALOG SPEED SIGNAL THAT IS SENT TO THE VARIABLE FREQUENCY DRIVES OF OPERATING PUMPS TO MAINTAIN A CHILLED WATER SYSTEM DIFFERENTIAL PRESSURE SETPOINT OF 15.0 PSIG (ADJ.).

- SECONDARY CHILLED WATER AHU PUMP PRESSURE SETPOINT OPTIMIZATION:

THE BAS WILL CONTINUALLY MONITOR THE CHILLED WATER CONTROL VALVE POSITION OF ALL AHUS IN THE CHILLED WATER SYSTEM.

AT CHILLED WATER SYSTEM STARTUP, THE CHILLED WATER SYSTEM PRESSURE SETPOINT WILL BE 100% OF THE MAXIMUM PRESSURE SETPOINT. WHEN ALL CHILLED WATER VALVES ARE LESS THAN 85% OPEN, THE CHILLED WATER SYSTEM DIFFERENTIAL PRESSURE SETPOINT WILL BE LOWERED BY 0.1 PSIG (ADJ.) OF THE CURRENT CHILLED WATER SYSTEM DIFFERENTIAL PRESSURE SETPOINT. THIS OCCURS EVERY 5 MINUTES UNTIL AT LEAST ONE VALVE IS MORE THAN 85% OPEN, OR IF THE SETPOINT IS EQUAL TO THE MINIMUM CHILLED WATER SYSTEM DIFFERENTIAL PRESSURE SETPOINT, OR IF THE PUMP VARIABLE FREQUENCY DRIVES ARE AT A MINIMUM SPEED SETTING (22 HZ).

WHEN ANY CHILLED WATER VALVE IS MORE THAN 95% OPEN, THE CHILLED WATER SYSTEM PRESSURE SETPOINT WILL INCREASE BY 0.1 PSIG (ADJ.) OF THE CURRENT CHILLED WATER SYSTEM DIFFERENTIAL SETPOINT. THIS OCCURS EVERY 5 MINUTES UNTIL NO VALVE IS MORE THAN 95% OPEN, OR IF THE CHILLED WATER SYSTEM DIFFERENTIAL PRESSURE SETPOINT HAS RISEN TO THE SYSTEMS MAXIMUM SETTING, OR IF THE PUMP VARIABLE FREQUENCY DRIVES ARE AT THE MAXIMUM SETTING (60 HZ).

DUAL TEMPERATURE LOOP CONTROL SYSTEM - RUN CONDITIONS:  
THE LOOP MONITOR SHALL RUN WHENEVER:

- ANY FAN COIL UNIT CALLS FOR HEATING OR COOLING.

THE FOLLOWING LOOP WATER CONDITIONS SHALL BE MONITORED:

- FLOW STATUS.
- SUPPLY TEMPERATURE.
- RETURN TEMPERATURE.

ALARMS AND A FAN COIL SHUTDOWN SIGNAL SHALL BE GENERATED UPON ANY OF THE FOLLOWING LOOP WATER CONDITIONS:

- NO LOOP FLOW.
- HIGH LOOP WATER SUPPLY TEMP SHUTDOWN: IF THE LOOP WATER SUPPLY TEMPERATURE IS GREATER THAN 105°F (ADJ.).
- LOW LOOP WATER SUPPLY TEMP SHUTDOWN: IF THE LOOP WATER SUPPLY TEMPERATURE IS LESS THAN 40°F (ADJ.).

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH LOOP WATER SUPPLY TEMP: IF THE LOOP WATER SUPPLY TEMPERATURE IS GREATER THAN 95°F (ADJ.).
- LOW LOOP WATER SUPPLY TEMP: IF THE LOOP WATER SUPPLY TEMPERATURE IS LESS THAN 50°F (ADJ.).

LOOP WATER PUMP LEAD/STANDBY OPERATION:

THE TWO LOOP WATER PUMPS SHALL OPERATE IN A LEAD/STANDBY FASHION.

- THE LEAD PUMP SHALL RUN FIRST.
- ON FAILURE OF THE LEAD PUMP, THE LAG PUMP SHALL RUN AND THE LEAD PUMP SHALL TURN OFF.
- THE LEAD PUMP SHALL MODULATE TO MAINTAIN LOOP WATER DIFFERENTIAL PRESSURE SETPOINT.

THE DESIGNATED LEAD PUMP SHALL ROTATE UPON ONE OF THE FOLLOWING CONDITIONS (USER SELECTABLE):

- MANUALLY THROUGH A SOFTWARE SWITCH
- IF PUMP RUNTIME (ADJ.) IS EXCEEDED
- DAILY
- WEEKLY
- MONTHLY

ALARMS SHALL BE PROVIDED AS FOLLOWS:

LOOP WATER PUMP 1

- FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT.
- VFD FAULT.

LOOP WATER PUMP 2

- FAILURE: COMMANDED ON, BUT THE STATUS IS OFF.
- RUNNING IN HAND: COMMANDED OFF, BUT THE STATUS IS ON.
- RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS A USER DEFINABLE LIMIT.
- VFD FAULT.

LOOP WATER DIFFERENTIAL PRESSURE CONTROL:

THE CONTROLLER SHALL MEASURE LOOP WATER DIFFERENTIAL PRESSURE AND MODULATE THE LOOP WATER PUMP VFDS IN SEQUENCE TO MAINTAIN ITS LOOP WATER DIFFERENTIAL PRESSURE SETPOINT. THE FOLLOWING SETPOINTS ARE RECOMMENDED VALUES. ALL SETPOINTS SHALL BE FIELD ADJUSTED DURING THE COMMISSIONING PERIOD TO MEET THE REQUIREMENTS OF ACTUAL FIELD CONDITIONS.

THE CONTROLLER SHALL MODULATE LOOP WATER PUMP SPEEDS TO MAINTAIN A LOOP WATER DIFFERENTIAL PRESSURE OF 12 PSIG (ADJ.). THE VFD MINIMUM SPEED SHALL NOT DROP BELOW 20% (ADJ.).

ALARMS SHALL BE PROVIDED AS FOLLOWS:

- HIGH LOOP WATER DIFFERENTIAL PRESSURE: IF THE LOOP WATER DIFFERENTIAL PRESSURE IS 25% (ADJ.) GREATER THAN SETPOINT.

- LOW LOOP WATER DIFFERENTIAL PRESSURE: IF THE LOOP WATER DIFFERENTIAL PRESSURE IS 25% (ADJ.) LESS THAN SETPOINT.

BYPASS CONTROL VALVE:

VALVE SHALL MODULATE OPEN ONCE VFD SPEED REACHES 20% (ADJ.). VALVE SHALL MODULATE TO MAINTAIN LOOP WATER DIFFERENTIAL PRESSURE SETPOINT.

1

M801

AIR COOLED CHILLER SEQUENCE OF OPERATION

SCALE: NOT TO SCALE

2

M801

DUAL TEMPERATURE LOOP SEQUENCE OF OPERATION

SCALE: NOT TO SCALE



ME  
ENGINEERING  
Mechanical/Electrical Engineering Consultants  
NY: Project # 20005  
Schenectady, NY 12305  
Tel: 518.351.1777  
Fax: 518.351.1778  
www.meengr.com

DATE: 8/17/2000  
REVISION:

PROJECT NO: 200005  
DESIGNED BY: CDM  
DRAWN BY: WRW  
CHECKED BY: RSA  
SCALE: AS NOTED  
NOTES:

MECHANICAL CONTROLS

HARRIS A. SANDERS  
ARCHITECTS, P.C.  
252 WASHINGTON AVENUE, ALBANY, NEW YORK 12210

L'DOR ADULT CARE FACILITY  
156 WEST CLARKSTOWN ROAD  
NEW CITY, N.Y. 10956

PROGRESS PRINT

DO NOT USE FOR CONSTRUCTION  
08/11/20



SHEET NO:

M801

OF: