SAFETY NOTES:

1. SPECIAL PRECAUTIONS SHALL BE TAKEN BY THE CONTRACTOR SO THAT EQUIPMENT ON THE APPLICATION AND ITS INSTALLATION WILL NOT AFFECT THE FOLLOWING:
   - EGRESS TO AND FROM THE BUILDING FIRE SAFETY OR CREATE A FIRE HAZARD
   - STRUCTURAL SAFETY OF THE BUILDING.
   - ACCUMULATION OF DUST AND DEBRIS. THE CONTRACTOR SHALL LEAVE THE SITE BROOM CLEAN EACH DAY.
2. ASBESTOS MUST FIRST BE INVESTIGATED AND VERIFIED IN FIELD BEFORE ANY DEMOLITION OR CONSTRUCTION WORK TO BE PERFORMED. ASBESTOS FREE MUST BE CERTIFIED FOR ALL HVAC EQUIPMENT, DUCTWORK, AND ALL PIPING INSULATION.
3. CONSTRUCTION WORK SHALL BE CONFINED TO WORK AREAS NOTED ON THE DRAWINGS AND SHALL INVOLVE TEMPORARY INTERRUPTION OF HEATING, WATER AND ELECTRIC SERVICES TO THE BUILDING SYSTEMS ONLY AS SCHEDULED WITH NEW YORK CITY.
4. FIRE SAFETY: ALL BUILDING MATERIALS STORED IN CONSTRUCTION AREA, AND/OR IN ANY AREA OF THE BUILDING ARE TO BE SECURED IN A LOCKED AREA. ACCESS TO SUCH AREAS TO BE CONTROLLED BY THE FACILITY AND/OR GENERAL CONTRACTOR.
5. CONTRACTOR SHALL PROVIDE BARRICADES AROUND WORK AREAS AS REQUIRED TO PREVENT UNAUTHORIZED PERSONS FROM ENTERING THEREIN.
6. THE CONTRACTOR SHALL SUBMIT SAFETY PLAN FOR CONSTRUCTION MANAGER'S APPROVAL.
7. CONFINED SPACES: ALL WORK WITHIN CONFINED SPACES SHALL BE CONDUCTED IN ACCORDANCE WITH OSHA REGULATIONS.

SUMMARY OF WORK:

THE WORK OF THIS PROJECT INCLUDES HVAC UPGRADES AT NORTH ROCKLAND HIGH SCHOOL. PROVIDE MATERIALS AND SERVICES AS FOLLOWS. THE FOLLOWING IS NOT INTENDED TO BE A COMPLETE DESCRIPTION OF THE WORK; PERFORM THE WORK AS HEREINAFTER DESCRIBED IN THESE CONTRACT DOCUMENTS.

A. REMOVE EXISTING WATER COOLED CHILLER, COOLING TOWER ON ROOF, CHILLED WATER PUMPS, CONDENSER WATER PUMPS, GLYCOL FEED SYSTEM INCLUDING EXPANSION TANKS FOR CHILLED WATER LOOP AND ALL ASSOCIATED CHILLED WATER AND CONDENSER WATER PIPING AND CONTROLS.
B. PROVIDE NEW AIR-COOLED SCREW CHILLERS ON ROOF OF MECHANICAL ROOM, PROVIDE NEW CHILLED WATER PUMPS, GLYCOL FEED SYSTEM INCLUDING EXPANSION TANKS FOR CHILLED WATER LOOP AND ASSOCIATED PIPING AND CONTROLS. EQUIPMENT IS TO BE TIED INTO EXISTING BMS SYSTEM.
C. REPLACE EXISTING BOILER, HOT WATER PUMPS AND ASSOCIATED PIPING AND CONTROLS SERVING PERIMETER RADIATORS. REPLACE GLYCOL FEED SYSTEM, EXPANSION TANKS FOR HOT WATER LOOP.
D. REMOVE EXISTING DOMESTIC HOT WATER SYSTEM AND REPLACE WITH NEW DOMESTIC HOT WATER SYSTEM .
E. DEMOLISH TWO(2) EXISTING ROOFTOP AIR HANDLING UNITS FOR THE MAIN GYM ROOF. DEMOLISH EXISTING ADAPTER CURB, PIPING, VALVE CONNECTIONS AND DUCTWORK TO UNIT, AS INDICATED. FURNISH AND INSTALL TWO(2) ROOFTOP AIR HANDLING UNITS WITH NEW ADAPTER CURBS, FURNISH AND INSTALL NEW PIPING AND COIL CONTROL VALVE CONNECTIONS, AS INDICATED. INTERCONNECT UNITS TO THE EXISTING BMS.
F. FURNISH AND INSTALL FOUR (4) NEW ROOFTOP AIR HANDLING UNITS FOR THE ANNEX GYM. FURNISH AND INSTALL NEW DUCTWORK AND AIR INLETS AND OUTLETS. FURNISH AND INSTALL NEW HOT WATER PIPING, CONTROL VALVES AND PUMPS FOR COIL CONNECTIONS TO UNIT. INTERCONNECT UNITS TO THE EXISTING BMS.
G. PERFORM ALL REQUIRED CLEANING, TESTING AND AIR AND WATER BALANCING OF THE NEW EQUIPMENT.
H. PERFORM START UP AND COMMISSIONING OF THE NEW EQUIPMENT.

MECHANICAL DEMOLITION NOTES:

1. DEMOLITION/RELOCATIONS: CONTRACTOR SHALL BE RESPONSIBLE FOR DEMOLITION AND RELOCATION'S OF SERVICES, EQUIPMENT AND MATERIAL RELATING TO HIS/HER RESPECTIVE TRADE. INCLUDE IN BID THE COST TO PROVIDE DEMOLITION OF ALL ELECTRICAL EQUIPMENT AND SYSTEMS ASSOCIATED WITH THE RENOVATION WORK. ALL DEMOLITION WORK SHALL COORDINATE WITH OWNER.
2. WHERE EXISTING WALLS, FLOORS OR CEILINGS ARE REMOVED OR PENETRATED, AND WHERE EXISTING END WALLS OF THE BUILDING ARE POINTS OF CONNECTION OF ADDITIONS, ALL SERVICES, PIPING, CONDUIT, CONTROL AND/OR SWITCH DEVICES, LIGHTS, OR OTHER HVAC, PLUMBING, FIRE PROTECTION OR ELECTRICAL EQUIPMENT SHALL BE REMOVED (AND/OR RELOCATED WHERE THEY MUST REMAIN IN SERVICE, OR SERVE, AREAS BEYOND THE IMMEDIATE WORK) CONTRACTOR SHALL FIELD VERIFY CONDITIONS AT THE SITE.
3. PRIOR TO DEMOLITION CONTRACTOR SHALL REVIEW WITH OWNER ALL MATERIALS TO BE REMOVED. SHOULD THE OWNER OPT TO KEEP ANY MATERIALS THE CONTRACTOR SHALL REMOVE AND DELIVER THE PARTS TO THE OWNER ON THE SITE WHERE SO DIRECTED. OTHERWISE ALL DEMOLISHED OR REMOVED MATERIALS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE AND BE DISPOSED OF IN A LEGAL MANNER.
4. DEMOLITION SHALL INCLUDE REMOVAL OF ALL PARTS AND PIECES IN THEIR ENTIRETY BACK TO POINTS INDICATED OR IF NOT INDICATED BACK TO THEIR POINT OF SOURCE. REMOVE CONDUCTORS FROM REMAINING CONDUITS WHERE IT IS INDICATED. WHERE CONDUCTORS REMAINED IN CONDUITS-DISCONNECT, ISOLATE AND CAPPED THEM TO ENSURE SAFETY AND PROTECTION. WHERE CONDITIONS PROHIBIT TOTAL REMOVAL OF THE WORK, THE REMAINING PORTION SHALL BE CUT FLUSH WITH THE SURROUNDING SURFACE AND BE CAPPED, PLUGGED OR SEALED AND THE SURROUNDING SURFACE SHALL BE REFINISHED IN AN APPROVED MANNER.
5. MAINTAIN EXISTING UTILITIES INDICATED OR REQUIRED TO REMAIN, KEEP IN SERVICE, AND PROTECT AGAINST DAMAGE DURING DEMOLITION OPERATIONS. DO NOT INTERRUPT EXISTING UTILITIES SERVING OCCUPIED OR USED FACILITIES, EXCEPT WHEN SCHEDULED WITH THE OWNER.
6. DO NOT REMOVE EXISTING STRUCTURAL WORK. DO NOT REMOVE OPERATIONAL ELEMENTS AND SAFETY-RELATED COMPONENTS IN A MANNER RESULTING IN A REDUCTION OF CAPACITIES TO PERFORM IN THE MANNER INTENDED OR RESULTING IN DECREASED OPERATIONAL LIFE, INCREASED MAINTENANCE, OR DECREASED SAFETY.
7. REMOVALS, DISCONNECTIONS, AND RELOCATIONS SHALL BE PERFORMED BY WORKMEN SKILLED IN THE TRADE INVOLVED AND SHALL BE EMPLOYED BY A CONTRACTOR LICENSED IN THE TRADE INVOLVED. ALL WORK SHALL BE DONE IN ACCORDANCE WITH ACCEPTED TRADE PRACTICES.
8. PROVIDE ADEQUATE TEMPORARY SUPPORT FOR WORK TO REMAIN, TO PREVENT FAILURE. DO NOT ENDANGER OTHER WORK.
9. PROTECTION: PROVIDE ADEQUATE PROTECTION WHERE REQUIRED FOR THE PRESENT BUILDING AND ITS CONTENTS. TEMPORARY DUSTPROOF BARRIERS AND BARRICADES SHALL BE ERECTED WHERE REQUIRED FOR PROTECTION OF PERSONNEL, PROTECTION FROM DUST AND DIRT, FOR SECURITY, FIRE AND WEATHER PROTECTIVE REASONS. CONTRACTOR SHALL TAKE EVERY PRECAUTION AGAINST FIRE BY EMPLOYING FIRE DEPARTMENT TYPE HOSES AND PORTABLE FIRE EXTINGUISHERS AS REQUIRED BY OSHA AND/OR THE OWNER'S INSURANCE UNDERWRITER.
10. USE TEMPORARY ENCLOSURES, OR OTHER SUITABLE METHODS TO LIMIT DUST AND DIRT RISING AND SCATTERING TO LOWEST PRACTICAL LEVEL. COMPLY WITH GOVERNING REGULATIONS PERTAINING TO ENVIRONMENTAL PROTECTION.
11. ALL EXISTING EQUIPMENT REQUIRED TO BE REUSED SHALL BE CLEANED, RECONDITIONED, CALIBRATED AND ADJUSTED. IN ALL INSTANCES WHERE CONTRACTOR FINDS THAT EXISTING EQUIPMENT IS DEFECTIVE TO THE POINT WHERE IT CANNOT BE PROPERLY RESTORED AND WILL NOT OPERATE PROPERLY, HE SHALL REPORT THE SPECIFIC INSTRUMENTS OR EQUIPMENT TO THE OWNER/ENGINEER FOR DIRECTIONS.
12. TEMPORARY SHUTDOWNS OF SERVICE OF EXISTING ELECTRICAL, HEATING, AIR CONDITIONING, AND VENTILATION SYSTEMS SHALL BE PERFORMED WITH A MINIMUM OF DISRUPTION OF SERVICE, HELD TO AN ABSOLUTE MINIMUM DURATION OF TIME, AND ONLY AFTER HAVING NOTIFIED THE BUILDING OPERATIONS MANAGEMENT AT LEAST TWO WEEKS IN ADVANCE AND HAVING RECEIVED THEIR PERMISSION IN WRITING, AT LEAST TWO WEEKS PRIOR TO THE SCHEDULED SHUTDOWN. COMMUNICATIONS SHALL BE RELAYED THROUGH THE PROJECT OFFICER.
13. ELECTRICAL CONTRACTOR SHALL RING OUT AND IDENTIFY ALL CIRCUITS REMAINING IN CONTRACT AREA, AFTER DEMOLITION. REMOVE ALL CIRCUITS BACK TO POINT OF SOURCE. MARK PANEL CIRCUITS NO LONGER IN USE "SPARE".
14. CONTRACTOR IS RESPONSIBLE TO REVIEW THE DRAWINGS AND THE EXISTING CONDITIONS PERTAINING TO THIS CONTRACT WORK. AND MAKE THE ARCHITECT/ ENGINEER AWARE OF ANY DEVIATIONS IN THE EXISTING CONDITIONS AND/OR DRAWINGS PERTAINING TO THIS CONTRACT WORK PRIOR TO ANY EXECUTION OF THIS SCOPE OF WORK.

ADDENDUM NOTES

SCHOOL DISTRICT WILL PURCHASE THE ROOFTOP HVAC UNITS ON STATE CONTRACT FROM THE MANUFACTURE. THE SCHOOL DISTRICT WILL ALSO PURCHASE THE CONTROL PACKAGES & PROGRAMING ON STATE CONTRACT FROM THE DISTRICTS BMS PROVIDER. THE MECHANICAL CONTRACTOR'D SCOPE IS TO DEMOLISH EXISTING UNITS AND INSTALL NEW UNITS D-1, D-2, RTU-3, 4, 5, 6

HVAC NOTES:

1. THE WORK SHALL COMPLY WITH THE 2020 BUILDING CODE OF NYS. IN ADDITIONS, THE WORK SHALL COMPLY WITH ALL OTHER RELEVANT CODES, RULES AND ORDINANCES OF THIS STATE OF NEW YORK, ALL LOCAL, STATE AND FEDERAL AUTHORITIES HAVING JURISDICTION.
2. CONTRACTOR SHALL PAY ALL FEES AND TAXES, OBTAIN ALL PERMITS AND APPROVALS, FILE THE REQUIRED DOCUMENTS AND CAUSE ALL INSPECTIONS.
3. CONTRACTOR SHALL PROVIDE ALL WORK, EQUIPMENT, LABOR AND MATERIAL REQUIRED FOR A COMPLETE AND TROUBLE FREE INSTALLATION.
4. ALL DUCTWORK ELBOWS SHALL BE EITHER LONG RADIUS OR SQUARE WITH TURNING VANES.
5. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL EQUIPMENT, PIPING, CONTROLS, DUCTWORK, REGISTERS, SUPPORTS, DAMPERS, AND ACCESSORIES PRIOR TO FABRICATION AND INSTALLATION. SUBMIT ALL REPORTS FOR REVIEW SUCH AS TESTING, ADJUSTING, AND BALANCING, AND COMMISSIONING.
6. CONTRACTOR SHALL VERIFY ALL EXISTING FIELD CONDITIONS AND NOTIFY OWNER OF ANY DISCREPANCIES BEFORE COMMENCING WORK.
7. PROVIDE AN AIR BALANCE REPORT FOR THE EQUIPMENT SHOWN ON THE DRAWINGS.
8. ALL EQUIPMENT AND MATERIALS SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER TO THE SATISFACTION OF THE OWNER.
9. EXCEPT AS NOTED, ALL MATERIAL AND EQUIPMENT SHALL BE NEW AND IN GOOD CONDITION. WHERE APPLICABLE BY CODE AND/OR THESE SPECIFICATIONS, EQUIPMENT AND MATERIALS SHALL BE LABELED BY THE REQUISITE GOVERNING AGENCY.
10. SURVEY THE INSTALLATION SITE PRIOR TO BID. DETERMINE THE CONSTRAINTS OF THE EXISTING AVAILABLE SPACE PERTAINING TO EQUIPMENT SIZE AND CONFIGURATION AND EXAMINE THE CONDITIONS UNDER WHICH THE EQUIPMENT WILL BE INSTALLED. VERIFY ALL MEASUREMENTS AT THE SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DIMENSIONAL COMPATIBILITY OF THE DUCTWORK AND EQUIPMENT WITH THE SPACE.
11. SHIP AND DELIVER EQUIPMENT KNOCKED DOWN AS NECESSARY TO FIT THROUGH EXISTING BUILDING OPENINGS. VERIFY IN FIELD THE CONSTRAINTS OF THE EXISTING BUILDING PRIOR TO FABRICATION OF EQUIPMENTS. INCLUDE IN THE BID ALL COSTS ASSOCIATED WITH RIGGING AND DELIVERY OF EQUIPMENT AS REQUIRED BY THE EXISTING BUILDING CONDITIONS.
12. SCHEDULE AND NOTIFY THE OWNER AND BUILDING MANAGEMENT IN ADVANCE PRIOR TO SHUTDOWN OF ANY SERVICES.
13. UPON COMPLETION OF THE PROJECT, PROVIDE AS-BUILT DRAWINGS TO THE OWNER. FOR QUANTITY OF COPIES, REFER TO GENERAL SPECIFICATIONS OR AS DIRECTED BY ARCHITECT.
14. IT IS THE INTENT OF THESE CONTRACT DOCUMENTS TO CALL FOR AN INSTALLATION THAT IS COMPLETE IN EVERY RESPECT. IF AN ITEM OF WORK IS SHOWN ON THE DRAWINGS, IT SHALL BE CONSIDERED SUFFICIENT FOR INCLUSION IN THE CONTRACT. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL MATERIAL AND EQUIPMENT USUALLY FURNISHED OR NEEDED TO MAKE A COMPLETE INSTALLATION, WHETHER SPECIFICALLY MENTIONED OR NOT.
15. RENDER FULL COOPERATION TO OTHER TRADES AND COORDINATE THE WORK WITH OTHER TRADES. THIS CONTRACTOR SHALL ASSIST IN WORKING OUT SPACE CONDITIONS.
16. PERFORM ALL CUTTING AND PATCHING NECESSARY FOR THE PROPER INSTALLATION OF THIS WORK. REPAIR ANY DAMAGE DONE BY THIS WORK AND REPAIR ANY DAMAGE CAUSED.
17. ON ACCEPTANCE OF CONTRACT, CONTRACTOR AGREES TO GUARANTEE THE WORK AND EQUIPMENT FOR A PERIOD OF NOT LESS THAN ONE (1) YEAR FROM DATE OF INITIAL OPERATION. MANUFACTURED EQUIPMENT SHALL CARRY FULL PERIOD OF MANUFACTURER'S GUARANTEE, AND SHALL NOT BE LESS THAN ONE (1) YEAR. COMPRESSORS SHALL CARRY AN EXTENDED WARRANTY OF FIVE YEARS.

HVAC DESIGN CRITERIA

A. SITE (BASED ON NEAREST AVAILABLE DATA: ASHRAE 2021 HANDBOOK CLIMATIC DESIGN INFORMATION, WESTCHESTER CO, NY):
   1. 41.07°N, 73.71°W
   2. ELEVATION: 397 FT
   3. CLIMATE ZONE 5A.

B. OUTSIDE DESIGN CONDITIONS (BASED ON NEAREST AVAILABLE DATA: ASHRAE 2013 CLIMATIC DESIGN INFORMATION, WESTCHESTER CO, NY):
   1. HEATING DB (99.6%): 8.7°F DB
   2. COOLING DB/MCWB (1%): 86.4°F DB, 71.9°F WB

C. INSIDE DESIGN CONDITIONS (PER NYSED MANUAL OF PLANNING STANDARDS S602-6 B. AND 2015 ASHRAE HANDBOOK CH 7 TABLE 6):
   1. HEATING INDOOR SETPOINT: 72°F
   2. COOLING INDOOR SETPOINT: 78°F, 60% RH

D. ACOUSTICS (PER NYSED MANUAL OF PLANNING STANDARDS, TABLE S304-1):
   1. DESIGN REQUIREMENTS FOR HVAC SYSTEM NOISE FOR CLASSROOMS, 7-12: RC 25-30.

E. FILTRATION: MERV 13 (PER NYSED MANUAL OF PLANNING STANDARDS).

F. DEMAND CONTROL VENTILATION IS REQUIRED FOR GYMNASIUM ROOFTOP UNITS.

SEQUENCE OF OPERATIONS

1. SEE SPECIFICATIONS.

GENERAL NOTES

1. ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THE 2020 NYS BUILDING CODE, 2020 NYS MECHANICAL CODE, AND 2020 NYS ENERGY CONSERVATION CODE, AND ALL GOVERNING LOCAL CODES, LAWS, AND REGULATIONS.
2. PROVIDE A COMPLETE OPERABLE SYSTEM IN A WORKMANLIKE MANNER. OUTLINE DESCRIPTION AND EQUIPMENT; DO NOT LIMIT CONTRACTOR'S LIABILITY FOR THE INSTALLATION OF A COMPLETE OPERABLE SYSTEM
3. THE CONTRACTOR SHALL FIELD VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE JOB AND NOTIFY THE OWNER OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN IN THESE DOCUMENTS. ALL DIMENSIONS AND EQUIPMENT ARE SHOWN DIAGRAMMATICALLY, COORDINATE WITH ACTUAL FIELD CONDITION.
4. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FILE ALL REQUIRED CERTIFICATES OF INSURANCE WITH THE BUILDING DEPARTMENT. OBTAIN ALL REQUIRED PERMITS AND PAY ALL FEES REQUIRED.
5. COORDINATION OF ALL WORK UNDER THIS CONTRACT SHALL BE MAINTAINED TO ENSURE THE QUALITY AND TIMELY COMPLETION OF THE WORK/PROJECT.
6. THE CONTRACTOR SHALL PERFORM ALL CUTTING AND PATCHING REQUIRED TO COMPLETE THE WORK OR TO MAKE ITS PARTS FIT TOGETHER PROPERLY WITHOUT COMPROMISING THE QUALITY OF THE WORK. RESTORE WALLS AND CEILINGS TO MATCH EXISTING.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATELY BRACING AND PROTECTING ALL WORK DURING CONSTRUCTION AGAINST DAMAGE, BREAKAGE, COLLAPSE, DISTORTIONS, AND OFF ALIGNMENTS ACCORDING TO CODES AND STANDARDS OF GOOD PRACTICE.
8. THE TERM "FINISH FLOOR" SHALL MEAN THE NORMAL FINISHED SURFACE OF THE FLOOR LEVEL. ALL ELEVATIONS GIVEN FOR EXISTING BUILDINGS ARE TO FINISHED FLOOR. THE CONTRACTOR SHALL FIELD VERIFY ALL ELEVATIONS FOR EXISTING STRUCTURES PRIOR TO THE COMMENCEMENT OF WORK.
9. THE CONTRACTOR SHALL PATCH AND REPAIR ALL FLOORS, WALLS CEILINGS, ETC. DAMAGED OR EXPOSED DUE TO WORK OR REMOVALS AND FINISH TO MATCH ADJOINING SURFACES.
10. ALL NEWLY INSTALLED, PATCHED WORK AND ALL AFFECTED AREAS SHALL BE PAINTED, ALL PAINTING WORK SHALL BE PERFORMED TO COVER THE ENTIRE HORIZONTAL OR VERTICAL SURFACE TO THE CLOSEST CORNER IN ALL FOUR DIRECTIONS. COLOR TO MATCH EXISTING CONDITIONS.
11. WORK NOT SHOWN OR SPECIFIED, BUT NECESSARY FOR PROPER AND ACCEPTABLE CONSTRUCTION, INSTALLATION OR OPERATION OF ANY PART OF THE WORK AS DETERMINED BY THE OWNER, SHALL BE INCLUDED IN THE WORK THE SAME AS IF HEREIN SPECIFIED OR INDICATED.
12. DURING CONSTRUCTION, TEMPORARY BAFFLES TO SEAL OPENINGS TO PREVENT DUST AND DIRT FROM FILTERING INTO OCCUPIED AREAS ARE TO BE PROVIDED BY CONTRACTOR.
13. ALL WORK SHALL BE INSTALLED SO THAT ALL PARTS REQUIRED ARE READILY ACCESSIBLE FOR INSPECTION, OPERATION, MAINTENANCE AND REPAIR.
14. CONTRACTOR SHALL MAINTAIN FREE AND UNOBSTRUCTED ACCESS FROM ALL FLOORS AND ADJACENT SPACES INTO THE EXISTING FIRE STAIRS TO OUTSIDE OF THE BUILDING AT ALL TIMES.
15. CONTRACTOR SHALL MAINTAIN FREE FROM DEBRIS AND ACCUMULATED REFUSE, AND SHALL HAVE SOLE RESPONSIBILITY FOR PROTECTING ALL DANGEROUS AREAS FROM ENTRY BY UNAUTHORIZED PARTIES. SITE WILL BE LEFT BROOM CLEAN AT THE END OF EACH WORKING DAY.
16. PROVIDE BARRICADES AROUND WORK AREAS AS REQUIRED TO PREVENT BUILDING OCCUPANTS AND OTHER UNAUTHORIZED PERSONS FROM ENTERING THEREIN.
17. CONTRACTOR IS TO NOTIFY IMMEDIATELY THE OWNER OF ANY HAZARDOUS MATERIALS ENCOUNTERED IN ENCLOSED SPACES. ANY SUCH MATERIALS SHALL BE PROMPTLY TESTED AND REMOVED BY A QUALIFIED CONSULTANT AS PER D.O.B. STANDARDS & THE LAW.
18. CONTRACTOR SHALL RELOCATE AND PATCH ANY EXISTING ITEMS INTERFERING WITH THE INSTALLATION OF NEW WORK WHETHER SHOWN OR NOT ON THE DRAWINGS AT NO COST TO OWNER.
19. THERE WILL BE NO CHANGE IN USE, EGRESS OR OCCUPANCY BECAUSE OF THE WORK OF THIS CONTRACT.
20. THE MECHANICAL CONTRACTOR SHALL PROVIDE POWER SUPPLIES, ELECTRICAL WIRING AND CONDUIT FOR POWER AND CONTROL TO PNEUMATIC DAMPER AND VALVE OPERATORS, THERMOSTATS, AUTOMATIC CONTROL INSTRUMENTATION. COORDINATE WITH THE ELECTRICAL CONTRACTOR TO PROVIDE A COMPLETE AND FUNCTIONAL SYSTEM.
21. FOR POWERED EQUIPMENT INTENDED FOR DEMOLITION, COORDINATE WITH THE ELECTRICAL TRADE TO ENSURE THAT POWER SUPPLIES AND DISCONNECT SWITCHES ASSOCIATED WITH THE EQUIPMENT ARE SHUT-OFF AND DISCONNECTED.
22. TEMPORARY SHUTDOWNS OF SERVICE OF EXISTING ELECTRICAL, STEAM, HEATING, AIR CONDITIONING AND VENTILATION SYSTEMS SHALL BE PERFORMED WITH A MINIMUM OF DISRUPTION OF SERVICE, HELD TO AN ABSOLUTE MINIMUM DURATION OF TIME, AND ONLY AFTER HAVING NOTIFIED THE BUILDING OPERATIONS MANAGEMENT AT LEAST TWO WEEKS IN ADVANCE AND HAVING RECEIVED THEIR PERMISSION IN WRITING, AT LEAST TWO WEEKS PRIOR TO THE SCHEDULED SHUTDOWN. COMMUNICATIONS SHALL BE RELAYED THROUGH THE PROJECT OFFICER.
23. PROVIDE EQUIPMENT MAINTENANCE MANUALS AND REQUIRED EQUIPMENT LABELS FOR ALL MECHANICAL, ELECTRICAL AND SERVICE HOT WATER HEATING EQUIPMENT. TO THE AUTHORITY WITHIN 90 DAYS AFTER SYSTEM ACCEPTANCE.
24. WHERE MANUFACTURERS NAMES AND PRODUCT NUMBERS ARE INDICATED ON THE DRAWINGS IT SHALL BE CONSTRUED TO MEAN THE ESTABLISHING OF QUALITY AND PERFORMANCE STANDARDS OF SUCH ITEMS. ALL OTHER PRODUCTS MUST BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE THEY SHALL BE DEEMED EQUAL.
25. ALL WORK ON THESE DRAWINGS SHALL BE CONSIDERED NEW WORK WHETHER STATED OR NOT EXCEPT WHERE SPECIFICALLY NOTED AS "EXISTING TO REMAIN".
26. DETAILS NOT SHOWN OR SPECIFIED, BUT NECESSARY FOR PROPER AND ACCEPTABLE CONSTRUCTION, INSTALLATION OR OPERATION OF ANY PART OF THE WORK AS DETERMINED BY THE ENGINEER, SHALL BE INCLUDED IN THE WORK THE SAME AS IF HEREIN SPECIFIED OR INDICATED.
27. THE WORD "PROVIDE" USED ON DRAWINGS AND SPECIFICATIONS ASSOCIATED WITH THIS PROJECT MEANS "FURNISH AND INSTALL". WHEN ONLY ONE PART OF ACTION IS REQUIRED, EITHER "FURNISH" OR "INSTALL" WILL BE USED ACCORDINGLY (TYP., U.O.W.N.).
28. ALL DISCONNECT SWITCHES, STARTERS, AND VARIABLE FREQUENCY DRIVES SHALL BE FURNISHED BY MECHANICAL CONTRACTOR AND INSTALLED BY ELECTRICAL CONTRACTOR.
29. DESIGN LOADS ASSOCIATED WITH HEATING, VENTILATING, AND AIR CONDITIONING HAVE BEEN DETERMINED IN ACCORDANCE WITH ANSI/ASHRAE/ACCA STANDARD 183.

CALCULATIONS

COMBUSTION AIR REQUIREMENTS FOR EMERGENCY GENERATOR.

1. EXISTING EMERGENCY GENERATOR RATED: 55 KW
2. AS PER NYS FGC 304.6.2, ONE PERMANENT OPENING REQUIRES MINIMUM FREE AREA OF 734 SQ MM PER 1 KW.
3. FREE AREA REQUIRED IS 40,370 SQ MM = 61.71 SQ IN = 0.43 SQ FT.
4. A 36 x 18 FRESH AIR OPENING UP THROUGH ROOF COMPLIES WITH THE REQUIRED COMBUSTION AIR FOR THE EMERGENCY GENERATOR.

COMBUSTION AIR REQUIREMENTS FOR THE BOILERS.

1. DESIGN COMPLIES WITH THE MANUFACTURER'S INSTRUCTIONS AS PER NYS FGC 304.1
2. MIN. FREE AREA OF 1 SQ IN PER 3,000 BTU/H.

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

No.	Date	Revisions
1	01/08/25	ISSUED FOR BID

REG. EXP DATE: 10-31-26

Drawn by A.W
Checked by P.C
Project No. 43065
Scale AS NOTED
Date 12/06/23

Mechanical & Electrical Engineer: GREENMAN PEDERSEN, INC
2 EXECUTIVE BOULEVARD, SUITE 202, SUFFERN, NY 10901

Structural Engineer:

NORTH ROCKLAND HIGH SCHOOL CHILLER & HVAC UPGRADES

HIGH SCHOOL SED# 50-02-01-06-0-016-037

106 Hammond Road, Thiells NY 10984

COUNTY OF ROCKLAND

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Drawing Title
MECHANICAL GENERAL NOTES, SYMBOLS, AND ABBREVIATIONS

Drawing No.
M-001

SHEETMETAL LEGEND

SINGLE LINE	DOUBLE LINE					
	UP DN	SUPPLY DUCT (UP & DN)				SIDEWALL SUPPLY REGISTER (SR)
	UP DN	RETURN OR EXHAUST DUCT (UP & DN)				SIDEWALL RETURN REGISTER (RR)
12 x 10	12 x 10	RECTANGULAR DUCTWORK (WIDTH X DEPTH)		TCD	TCD	AUTOMATIC TEMPERATURE CONTROL DAMPER (OPPOSED BLADE)
12 x 10	12 x 10	FLAT OVAL DUCTWORK (WIDTH X DEPTH)				FLEXIBLE CONNECTOR. INSTALL AT ALL MOTOR DRIVEN EQUIPMENT
10"ø	10"ø	ROUND DUCTWORK (SIZE, DIAMETER)				FLEXIBLE DUCT (MAXIMUM LENGTH NOT TO EXCEED 36 INCHES)
		VANED ELBOW (PROVIDE ALL SQUARE OR RECTANGULAR ELBOWS WITH VANES)				TRANSITION WITH FLAT SIDE
	W R	RADIUS ELBOW (I.D. RADIUS IS DUCT WIDTH)				TRANSITION ON CENTER
		RADIUSED TEE WITH VOLUME DAMPERS (I.D. RADIUS IS DUCT WIDTH)				RECTANGULAR TO ROUND TRANSITION
		SQUARE THROATED TEE WITH TURNING VANES & VOLUME DAMPERS				BRANCH TAKE-OFF WITH VOLUME DAMPER
DN	DN	CHANGE IN ELEVATION (UP) (DN) IN DIRECTION OF AIR FLOW			W R R	RADIUS OFFSET (I.D. RADIUS IS DUCT WIDTH)
		VOLUME DAMPER (SINGLE OR OPPOSED BLADE) AS SPECIFIED				ROUND TAP TO RECTANGULAR DUCT (SPIN-IN-FITTING OR BELL MOUTH) & VOLUME DAMPER
AD	AD	ACCESS DOOR (BOTTOM SHOWN)		SD,FD,OR FD/SD	SD,FD,OR FD/SD	SMOKE DAMPER, FIRE DAMPER, OR SMOKE/FIRE DAMPER W/ACCESS DOOR
AD	AD	ACCESS DOOR (SIDE SHOWN)				SUPPLY DUCT WITH SPLITTER DAMPER AND SQUARE-THROAT ELBOW
		DUCTWORK TO BE REMOVED, INCLUDING ALL SUPPORTS AND HANGERS				SUPPLY DUCT WITH SPLITTER DAMPER AND RADIUS ELBOW (I.D. RADIUS IS DUCT WIDTH)
		CEILING DIFFUSER (CD) W/SQUARE NECK				
		CEILING DIFFUSER (CD) W/ROUND NECK				
		CEILING EXHAUST REGISTER/GRILLE (ER)/(EG) OR RETURN REGISTER/GRILLE (RR)/(RG) W/SQUARE NECK				
		CEILING EXHAUST REGISTER/GRILLE (ER)/(EG) OR RETURN REGISTER/GRILLE (RR)/(RG) W/ROUND NECK				

DEMOLISH

A — A SECTION A-A

DETAIL NUMBER

DRAWING NUMBER WHERE DETAIL IS DRAWN — H501

DETAIL INDICATION

SECTION NUMBER

DRAWING NUMBER WHERE SECTION IS DRAWN — A / H001

DIRECTION OF VIEW

SECTION INDICATION

PIPING LEGEND

CWS	CHILLED WATER SUPPLY
CWR	CHILLED WATER RETURN
CWS	CONDENSER WATER SUPPLY TO TOWER
CWR	CONDENSER WATER RETURN FROM TOWER
CD	CONDENSATE DRAIN
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
MUW	MAKE UP WATER
GS	GLYCOL SUPPLY
GR	GLYCOL RETURN
ATV	ATMOSPHERIC VENT
	EXISTING TO REMAIN
X	EXISTING TO BE REMOVED
	POINT OF CONNECTION
	POINT OF DISCONNECTION

SPECIALTY LEGEND

	AUTOMATIC AIR VENT
MV	MANUAL AIR VENT
	AIR SEPARATOR
	FLEXIBLE CONNECTOR
	VENTURI FLOWMETER
	FLOWLIMITING FITTING
	PRESSURE GAUGE W/NEEDLE VALVE
	THERMOMETER
	THERMOMETER WELL
FS	FLOW SWITCH
PS	PRESSURE SWITCH
	Y-LINE STRAINER
	Y-LINE STRAINER W/VALVE
T	THERMOSTAT (48" AFF) (ELECTRIC) (REFER TO SPECIFICATION)
S	DUCT SMOKE DETECTOR
H	HUMIDITY SENSOR
C	CO2 SENSOR

FITTING LEGEND

	ELBOW TURNED UP
	ELBOW TURNED DOWN
	TEE TURNED UP
	TEE TURNED DOWN
	TEE (SIDE)
	RISE OR DROP IN PIPE
	UNION
	FLANGE
	PIPE CAP
	CLEANOUT W/ PLUG
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
UP	PIPE PITCH UP
DN	PIPE PITCH DOWN

VALVE LEGEND

	BALL VALVE
	BUTTERFLY VALVE
	GATE VALVE
	GLOBE VALVE
	CALIBRATED BALANCING VALVE
	PUMP TRIPLE DUTY VALVE
	LUBRICATED PLUG VALVE
	ANGLE VALVE
	CHECK VALVE
	RELIEF VALVE
	HOSE END DRAIN VALVE
	MODULATING TWO WAY VALVE
	MODULATING THREE WAY VALVE
	ELECTRIC MOTOR ACTUATOR
	SOLENOID ACTUATOR
BS	BOILER EMERGENCY SHUTOFF-RED

ABBREVIATIONS

AD	ACCESS DOOR
AF	AIR FILTER
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
APD	AIR PRESSURE DROP
AV	AUTOMATIC AIR VENT
AMP	AMPERE
BHP	BRAKE HORSEPOWER
BOIL.	BOILER
BTUH	BRITISH THERMAL UNITS PER HOUR
CAI	COMBUSTION AIR INTAKE
CC	COOLING COIL
CD	CEILING DIFFUSER
CD	CONDENSATE DRAIN
CFM	CUBIC FEET PER MINUTE
CO	CLEAN OUT
CONT.	CONTINUED
CR	CEILING RETURN
CT	COOLING TOWER
CW	COLD WATER
DEG, °	DEGREES
dB	DECIBELS
DB	DRY BULB
DDC	DIRECT DIGITAL CONTROL
DIA	DIAMETER
DPT	DEW POINT TEMPERATURE
DWG	DRAWING
DX	DIRECT EXPANSION
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EG	EXHAUST GRILLE
EJ	EXPANSION JOINT
ER	EXHAUST REGISTER
ET	EXPANSION TANK
EWT	ENTERING WATER TEMPERATURE
EX. EXIST.	EXISTING
FD	FIRE DAMPER
FD/SD	COMBINATION FIRE/SMOKE DAMPER
FF	FINAL FILTER
FL	FLOOR
FLA	FULL LOAD AMPS
FLD	FLOOR DRAIN
FM	WATER FLOW MEASURING STATION
FPM	FEET PER MINUTE
FT	FEET
GAL	GALLONS
GPM	GALLONS PER MINUTE
GS	GLYCOL SUPPLY
GR	GLYCOL RETURN
HC	HEATING COIL
HE	HEAT EXCHANGER
HGT	HEIGHT
HP	HORSEPOWER OR HEAT PUMP
HWB	HOT WATER BOILER
HZ	HERTZ
IN	INCH
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LBS/HR	POUNDS PER HOUR
LF	LINEAR FOOT
LWT	LEAVING WATER TEMPERATURE
LxWxH	LENGTH BY WIDTH BY HEIGHT
MAX	MAXIMUM
MBH	ONE THOUSAND BRITISH THERMAL UNITS PER HOUR
MCA	MINIMUM CIRCUIT AMPACITY
MD	MOTORIZED DAMPER
MIN	MINIMUM
NIC	NOT IN CONTRACT
NOM	NOMINAL
OA	OUTSIDE AIR
P	PUMP
PD	PRESSURE DROP
PF	PREFILTER
PH	PREHEAT COIL
PRV	PRESSURE REDUCING VALVE/POWER ROOF VENTILATOR
PSIG	POUNDS PER SQUARE INCH GAUGE
RA	RETURN AIR
REQD	REQUIRED
RF	RETURN AIR FAN
RG	RETURN GRILLE
RH	REHEAT COIL
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
RR	RETURN REGISTER
RTU	ROOFTOP UNIT
SA	SUPPLY AIR
SF	SUPPLY AIR FAN
SD	SMOKE DAMPER
SG	SPECIFIC GRAVITY
SP	STATIC PRESSURE
SR	SUPPLY REGISTER
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SENS	SENSIBLE
SF	SQUARE FEET
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL
TEMP	TEMPERATURE
THK	THICK
TG	TOP GRILLE (WALL TYPE)
TO	TRANSFER OPENING
TR	TOP REGISTER (WALL TYPE)
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
UTR	UP TO ROOF
V	VENT, VOLTS, OR VOLUME
VA	VENTILATION AIR
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER (MANUAL)
VIV	VARIABLE INLET VANE
VFD	VARIABLE FREQUENCY DRIVE
VIF	VERIFY IN FIELD
W	WATTS, WIDTH
WBT	WET BULB TEMPERATURE (°F)
WC	WATER COLUMN
WG	WATER GAUGE
WMS	WIRE MESH SCREEN
WPD	WATER PRESSURE DROP

1/2" IF THIS BAR DOES NOT MEASURE 1", THEN DRAWING IS NOT TO FULL SCALE

No.	Revisions	Date
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NORTH ROCKLAND HIGH SCHOOL CHILLER & HVAC UPGRADES

HIGH SCHOOL SED# 50-02-01-06-0-016-037

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Drawing Title
MECHANICAL LEGEND, SYMBOLS AND ABBREVIATIONS

Drawing No.
M-002

AIR COOLED SCREW CHILLER SCHEDULE

CHILLER TAG			CH-1 AND CH-2
LOCATION			MECHANICAL ROOM - ROOF
MAX DIMENSIONS (OVERALL)	LENGTH X WIDTH (IN)		346 X 88
	HEIGHT (IN)		99
	OPERATING WEIGHT (LBS)		19,192
REFRIGERATION CAPACITY (TONS), EACH			275
COMPRESSORS	QUANTITY		2
	CAPACITY STEPS		-
	KW INPUT (TOTAL)		-
EVAPORATOR	TEMP. ENT °F		54
	TEMP. LVG °F		44
	GPM		649.7
	MAX PD - FT.		16.3
	FOULING FACTOR		0.0001
CONDENSER	AMBIENT AIR TEMP °F		95
	FANS PER MODULE	QUANTITY	12
		FAN MOTOR HP	-
		FAN MOTOR POWER PER FAN	-
ELECTRICAL DATA (PER POWER SUPPLY)	QUANTITY (# OF POWER SUPPLIES)		1
	VOLTS/PH/HZ		460/3/60
	MCA (AMPS)		483.6
	MOCP (AMPS)		600
REFRIGERANT DATA	REFRIGERANT TYPE		R-513A
	# OF CIRCUITS		2
	REFRIGERANT CHARGE EACH(LB)		293/310
	REFRIGERANT SAFETY CLASS		A1
DIMENSION OF CONDENSER STEEL DUNNAGE			SEE STRUCTURAL PLANS
A-WEIGHTED SOUND PRESSURE (DBA)			70
TOTAL SYSTEM, COOLING EFFICIENCY(KW/TON)			1.34
RATED EFFICIENCY, AHRI EER			9.989
IPLV (BTU/Wh)			18.80
IPLV (EER)			18.80
BASIS OF DESIGN	MANUFACTURER		CARRIER
	MODEL		30XV275M
	SERIAL		NA

REMARKS
1. PROVIDE OPERATIONS AND MAINTENANCE MANUALS, CONTRACTOR TO INSTALL UNIT PER MFGR'S IOM MANUAL.
2. SHIP CHILLER PACKAGED PER EACH MODULE.
3. PROVIDE DIGITAL SCROLL LEAD COMPRESSOR.
4. PROVIDE VARIABLE SPEED DRIVE.
5. PROVIDE ISOLATION VALVES ON EVAPORATOR AND CONDENSER.
6. PROVIDE ENERGY MANAGEMENT MODULE AND BACNET CARD.
7. PROVIDE FINE MESH STRAINER ON EACH EVAPORATOR AND CONDENSER BRANCH LINE.
8. PROVIDE MICROPROCESSOR CONTROL FOR EACH CHILLER WITH BACNET BMS INTERFACE FOR MONITORING.
9. PROVIDE MINIMUM 3' CLEARANCE IN ALL DIRECTIONS FOR SERVICE.
10. PROVIDE DISCONNECT SWITCH INSTALLED BY FACTORY.

1 N.I.C.

PIPE INSULATION SCHEDULE

FLUID	THICKNESS	OPERATING TEMP RANGE, °F
CHILLED WATER (LESS THAN 1-1/2")	0.5"	40-60
CHILLED WATER (1-1/2" AND GREATER)	1.0"	40-60
CONDENSER WATER (ALL SIZES)	NONE	60-105
MAKE-UP WATER (ALL SIZES)	0.5"	40-60
HWS&R (LESS THAN 1-1/2")	1.5"	141-200
HWS&R (1-1/2" AND GREATER)	2.0"	141-200
HTS&R(LESS THAN 1-1/2")	4.0"	251-350
HTS&R(1-1/2" AND GREATER)	4.5"	251-350
REFRIGERANT (LESS THAN 1-1/2")	1.0"	<40

PIPE SIZE SCHEDULE

PIPE SIZE	FLOW RANGE
3/4"	0-4 GPM
1"	5-7.5 GPM
1-1/4"	8-16 GPM
1-1/2"	17-24 GPM
2"	25-48 GPM
2-1/2"	49-77 GPM
3"	78-140 GPM
4"	141-280 GPM
5"	281-500 GPM
6"	501-800 GPM

MINIMUM PIPE SIZES SHALL BE PROVIDED AS SCHEDULED ABOVE. WHERE PIPE SIZES INDICATED ELSEWHERE WITHIN DRAWINGS CONFLICT WITH SCHEDULED FLOW, THE LARGER SIZE PIPE SHALL BE PROVIDED. MINIMUM PIPE SIZE 3/4".

WATER PUMP SCHEDULE (SEE DRAWING M-301)

UNIT NUMBER		HWP-4, HWP-5	HWP-6, HWP-7	HWP-8, HWP-9, HWP-10, HWP-11	P-1, P-2,P-3 EXISTING	P-4, P-5, P-6 EXISTING	P-7, P-8	P-9, P-10
LOCATION		MECHANICAL RM	MECHANICAL RM	MECHANICAL RM	CHILLER RM	CHILLER RM	ANNEX GYM MEZZANINE	MECHANICAL RM
SYSTEM SERVICE		BOILER B-3, B-4	BOILER B-3, B-4	BOILER B-3, B-4 CIRCULATORS	CHILLED WATER LOOP	PRIMARY CHILLED WATER LOOP CH-1, CH-2	ROOFTOP UNITS RTU-3, RTU-4, RTU-5. RTU-6	IWH-1, IWH-2
TYPE		BASE MOUNTED END SUCTION	CLOSE COUPLED IN-LINE CENTRIFUGAL	CLOSE COUPLED IN-LINE CENTRIFUGAL	HORIZONTAL SPLIT CASE - DOUBLE SUCTION	HORIZONTAL SPLIT CASE - DOUBLE SUCTION	CLOSE COUPLED IN-LINE CENTRIFUGAL ECM	CLOSE COUPLED IN-LINE CENTRIFUGAL
PUMP DATA	IMPELLER DIA. (IN)	9.5	6	N/A	13.75	10.5	3.75	4.375
	SUCTION CONN. (IN)	2.5	1.5	N/A	6	6	2	1
	DISCHARGE CONN. (IN)	2	1.5	N/A	6	6	2	1
	CAPACITY (GPM)	150	35	150	463	850	49.2	27
	TOTAL HD (FT.)	70	35	20	190	80	10	10
	WORKING FLUID	WATER - 30% PG	WATER - 30% PG	WATER - 30% PG	WATER - 30% PG	WATER - 30% PG	WATER	WATER
	FLUID TEMP °F	160	160	160	44	44	140	180
MOTOR	TYPE	NEMA PREMIUM, VFD READY	NEMA	NEMA	EXISTING NEMA PREMIUM, VFD READY	EXISTING NEMA PREMIUM, VFD READY	NEMA	NEMA
	H.P.	7.5	1	3	40	25	0.25	0.25
	RATED R.P.M.	1800	1800	N/A	1750	1750	1800	1800
	DUTY POINT R.P.M.	1538	1681	2525	1628	1601	1653	1437
	ENCL. TYPE	ODP	ODP	ODP	ODP	ODP	ODP	ODP
	V/PH/HZ	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/1/60	460/3/60
	DUTY POINT BHP	3.56	0.534	1.19	32	21	0.174	0.119
	DUTY POINT EFF. (%)	72.8	57.5	N/A	70.0	75	70.2	55.2
OPERATING WEIGHT (LB)		350	84	50	EXIZTING	EXISTING	60	46
PUMP BASE DIMENSIONS (L x W) (IN)		35 x 15	NA - SUPPORTED FROM CEILING	NA - SUPPORTED FROM FLOOR	EXISTING	EXISTING	NA- SUPPORTED FROM CEILING	NA- SUPPORTED FROM CEILING
BASIS OF DESIGN	MANUFACTURER	BELL & GOSSETT	BELL & GOSSETT	BELL & GOSSETT	EXISTING	EXISTING	BELL & GOSSETT ECM	BELL & GOSSETT
	MODEL	e-1510-2BD-SS-213T	e-90 1.5AB	ECOCIRC XL 45-375	EXISTING	EXISTING	e-90 2AAC ECM	e-90E

REMARKS
1. PROVIDE OPERATIONS AND MAINTENANCE MANUALS.
2. PROVIDE NEW 6" TALL EQUIPMENT PAD, EXTEND 6" BEYOND EQUIPMENT BASE IN ALL DIRECTIONS.
3. PROVIDE VIBRATION ISOLATORS.
4. PROVIDE VFD FOR ALL UNITS WITH 5 MOTOR HP AND GREATER. PROVIDE MOTOR STARTER/DISCONNECT FOR ALL OTHER PUMPS.
5. ELECTRICAL MOTORS SHALL MEET THE MINIMUM EFFICIENCY REQUIREMENTS OF TABLES C405.8(1) THOUGH C405.8(4) WHEN TESTED AND RATED IN ACCORDANCE WITH THE DOE 10 CFR 431.
6. CHILLED WATER PUMPS P-4, P-5, AND P-6 TO BE REFURNISHED, NEW VFD COMPATIBLE MOTORS AND VFD'S.

BOILER-BURNER UNIT SCHEDULE

UNIT NO		B-3, B-4
LOCATION		MECHANICAL ROOM
TYPE		CONDENSING
RATING	GROSS I.B.R. OUTPUT (BTU/HR)	1,419,000
	MIN OVERALL BOILER EFFICIENCY (%)	94.6
	NET I.B.R. OUTPUT (WATER) @ 100% (BTU/H)	NA
	TURNDOWN RATIO	20:1
DESIGN HOT WATER SUPPLY TEMPERATURE (°F)		180
DESIGN HOT WATER RETURN TEMPERATURE (°F)		160
SYSTEM DESIGN PRESSURE (PSI)		12
MAX ALLOWABLE OPERATING PRESSURE (PSIG)		160
FLUE OUTLET & AIR INTAKE SIZE (INCHES)		6
SUPPLY OUTLET SIZE (INCHES)		4
RETURN INLET SIZE (INCHES)		4
FUEL DATA	GAS CONNECTION, NPT (IN)	2
	GAS FIRING RATE (CFH)	1500
	INLET PRESSURE RANGE (IN. WC)	4.0 - 14
ELECTRICAL DATA	VOLTS/PH/HZ	120/1/60
	POWER, FLA	16
	OPERATING AMPS, MCA	-
OVERALL DIMENSIONS WITHOUT CONTROLS (L X W X H) (INCHES)		57.4 X 28 X 78
HOUSE KEEPING CONCRETE PAD DIMENSIONS (INCHES)		-
OPERATING WEIGHT (LBS)		1654
BASIS OF DESIGN	BOILER MANUFACTURER	AERCO
	BOILER MANUFACTURER & MODEL NO.	BENCHMARK 1500

REMARKS
1. PROVIDE OPERATIONS AND MAINTENANCE MANUALS, CONTRACTOR TO INSTALL UNIT PER MFGR'S IOM MANUAL.
2. SHIP BOILER PACKAGED AND SHOULD FIT THROUGH STANDARD 3 FOOT DOOR WIDTH.
3. VERIFY IN FIELD CONNECTION LOCATIONS AND CLEARANCES FOR BOILERS, REFER TO MANUFACTURER'S DOCUMENTS.
4. PROVIDE CONTROL PANEL.
5. NEW YORK STATE EDUCATION DEPARTMENT CONTROL COMPLIANCE, WIRING, AND OTHER EQUIPMENT AS NECESSARY TO SATISFY THE SEQUENCE OF OPERATION.
6. VENTLESS GAS TRAIN
7. BOILER SHALL UTILIZE NON-METALLIC VENT.
8. CONTROLLER SHALL DISPLAY AN ALERT WHEN O2 LEVEL IS ABOVE OR BELOW CRITICAL VALUES.
9. COMBUSTION O2 LEVELS SHALL NOTE EXCEED 7% THROUGHOUT ENTIRE FIRING RANGE.
10. BOILER MANUFACTURER TO PROVIDE AND CONTROL FIELD INSTALLED, MOTORIZED ISOLATION VALVES ON EACH BOILER.
11. PROVIDE BOILER SEQUENCING WITH HW RESET.
12. BOILER SHALL BE EQUIPPED WITH COMBUSTION AIR TEMPERATUER COMPENSATION TO AUTOMATICALLY COMPENSATE FOR AIR DENSITY CHANGES BY ADJUSTING OXYGEN AND OPTIMIZE THE COMBUSTION EFFICIENCY UNDER ALL SEASONAL TEMPERATURE CHANGES.
13. BOILER STAGING POINT NOT TO EXCEED 40%
14. BOILER MANUFACTURER TO PROVIDE 10 YEAR NON-PRORATED HEAT EXCHANGER WARRANTY.
15. BOILER MANUFACTURER TO PROVIDE 2 YEAR NON-PRORATED CONTROLLER WARRANTY.
16. BOILER MANUFACTURER TO PROVIDE LETTER OF GUARANTEE FOR AS BUILT FLUE AND COMBUSTION AIR INSTALLATION.
17. PROVIDE CONDENSATE NEUTRALIZER FOR EACH BOILER AND COMMON FLUE DRAINS.

WATER MAKE-UP UNIT

UNIT NO.		MU-1	MU-2
PUMP DATA	FLOW RATE (GPM)	5	5
	MAX. PRESSURE (PSIG)	60	60
	RPM	3600	3600
	HP	3/4	3/4
	V/PH/Hz	115/1/60	115/1/60
TANK SIZE (GAL)		55	55
UNIT DIMENSIONS (LxWxH)(IN)		30 x 30 x 60	30 x 30 x 60
UNIT WEIGHT (LBS)		600	600

REMARKS:
1. PROVIDE A PACKAGED MAKE-UP UNIT WHICH SHALL BE CAPABLE OF MAINTAINING THE SYSTEM FILL PRESSURE AT 30 PSIG. PROVIDE A POLYETHYLENE TANK WITH REMOVABLE LID, STRAINER, ISOLATION VALVES, PUMP WITH OPEN DRIP PROOF MOTOR, CHECK/BALANCING VALVE, EXPANSION TANK, DISCHARGE PRESSURE GAUGE, STEEL PIPING, LOW LEVEL CUT-OUT, AND CONTROL/ALARM PANEL WITH INDICATOR LIGHTS IN A NEMA 4 ENCLOSURE.
2. REFER TO DETAIL 7/M502 FOR PIPING AND INSTALLATION.
3. PROVIDE OPERATION AND MAINTENANCE MANUAL.
4. BASIS OF DESIGN: BELL & GOSSETT GMU-60.

COMBUSTION AIR DAMPER SCHEDULE

MARK	SERVICE	SIZE (WxH, IN)	BASIS OF DESIGN
D-1	COMBUSTION AIR (WH-1)	36X36	RUSKIN CD50

EXPANSION TANK SCHEDULE

UNIT #	SERVICE	LOCATION	SYSTEM TEMP RANGE		INITIAL PRESS. IN TANK PSIG	MIN. VOLUME GAL	ACCEPT VOLUME GAL	PIPE SIZE TO TANK	WEIGHT (LBS)	BASIS OF DESIGN	
			MIN °F	MAX °F						MANUFACTURER	MODEL #
ET-1	CHILLED WATER	BOILER RM	40	90	5	80	80	1	928	BELL & GOSSETT	B-300
ET-2	HOT WATER	BOILER RM	140	190	12	50	34.56	1-1/2	651	BELL & GOSSETT	B-200

EXPANSION TANK SCHEDULE NOTES:
1. PROVIDE HORIZONTAL, ASME BLADDER EXPANSION TANK FULLY CHARGED TO MEET THE REQUIREMENTS OF THIS SCHEDULE.

AIR SEPARATOR SCHEDULE

UNIT #	SERVICE	LOCATION	TYPE	AIR SEPARATOR			OPERATING WEIGHT (LBS)	BASIS OF DESIGN	
				SIZE (IN)	FLOW (GPM)	PRESS. DROP (FT H20)		MANUFACTURER	MODEL #
AS-1	CHILLED WATER	MECHANICAL RM	COALESCING AIR & DIRT	8	480	0.3	1083	BELL & GOSSETT	CRS-8F
AS-2	HOT WATER	MECHANICAL RM	COALESCING AIR & DIRT	8	480	0.3	1083	BELL & GOSSETT	CRS-8F

CHEMICAL SHOT FEEDER SCHEDULE

UNIT #	SERVICE	LOCATION	TYPE	SIZE (GAL)	MAX. PRESS. (PSIG)	WEIGHT (LBS)	BASIS OF DESIGN	
							MANUFACTURER	MODEL #
CF-1	CHILLED WATER	BOILER RM	VERTICAL BY-PASS	5	300	38	NEPTUNE	DBF-5HP
CF-2	HOT WATER	BOILER RM	VERTICAL BY-PASS	5	300	38	NEPTUNE	DBF-5HP

DOMESTIC INDIRECT WATER HEATER SCHEDULE

UNIT #	SERVICE	LOCATION	CAPACITY (GAL)	WATER TEMP RANGE		BASIS OF DESIGN	
				INLET °F	OUTLET °F	MANUFACTURER	MODEL #
IWH-1	HOT WATER	BOILER RM	200	40	140	AO SMTIH	HWGV200ASW660
IWH-2	HOT WATER	BOILER RM	200	40	140	AO SMTIH	HWGV200ASW660

INDIRECT WATER HEATER SCHEDULE NOTES:
1. PROVIDE 210 GALLON 2-PORT BUFFER TANK, ASME CODE SECTION VIIIM MAX PRESSURE 125 PSIG, MAX FLOW RATE 55 GPM.

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

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Drawing Title
MECHANICAL SCHEDULES - 1

Drawing No.
M-003

MECHANICAL VENTILATION SCHEDULE

ROOM	OCCUPANCY CLASSIFICATION	FLOOR AREA (FT^2)	ROOM VOLUME (FT^3)	OCCUPANT LOAD (OCCUPANT/1,000 FT^2)	# OF OCCUPANTS	REQUIRED CFM/OCCUPANT	REQUIRED CFM/FT^2	BREATHING ZONE OUTDOOR AIRFLOW (CFM)	ZONE DISTRIBUTION EFFECTIVENESS	TOTAL ROOM OUTDOOR AIR REQUIRED (CFM)	ACTUAL ROOM OUTDOOR AIRFLOW RATE (CFM)	TOTAL SUPPLY AIRFLOW (CFM)	AIR CHANGE RATE (ACH)
									COOLING	COOLING	COOLING	COOLING	COOLING
MAIN GYM	GYM	12736	318400	7	89	20	0.18	4076	0.8	5094	5095	9000	1.7
ANNEX GYM	GYM	11810	295250	7	83	20	0.18	3779	0.8	4724	4725	9000	1.8

MECHANICAL VENTILATION SCHEDULE NOTES :
1. ACTUAL OUTDOOR AIR VENTILATION SUPPLY IS BASED OFF MAX OCCUPANCY POSTED IN GYMNASIUM

ROOFTOP HEAT PUMP UNIT SCHEDULE

UNIT #	AREA SERVED	SUPPLY FAN					RETURN/EXHAUST FAN				COOLING					HEATING – HEAT PUMP			HEATING COIL (30% GLYCOL)				FILTER	ELECTRICAL			WEIGHT (LBS)	MAKE & MODEL NO.	REMARKS
		AIRFLOW (CFM)	OUTSIDE AIR (CFM)	ESP (IN WC)	TSP (IN WC)	MOTOR (hP)	AIRFLOW (CFM)	ESP (IN WC)	TSP (IN WC)	MOTOR (hP)	NOMINAL CAPACITY (TONS)	REFRIG.	TOTAL CAPACITY (MBH)	SENS. CAPACITY (MBH)	EER	CONDENSER EAT (°F DB)	EDB/LDB (°F)	TOTAL CAPACITY (MBH)	COP	EDB/LDB (°F)	FLOW (GPM)	EWT/LWT (°F)	TOTAL CAPACITY (MBH)	MERV	MCA	MAX FUSE SIZE	VOLT/PH/HZ			
RTU-D1	MAIN GYM	9000	4500	1.25	3.35	10	6049	1.0	2.23	5	40	R410A	384.4	233.1	11.0	95	69.5/104.1	368.5	3.2	69.5/99.8	30.6	180/160	299.2	14	90.3	100	460/3/60	7912	TRANE HORIZON OANE480A4	
RTU-D2	MAIN GYM	9000	4500	1.25	3.35	10	6049	1.0	2.23	5	40	R410A	384.4	233.1	11.0	95	69.5/104.1	368.5	3.2	69.5/99.8	30.6	180/160	299.2	14	90.3	100	460/3/60	7912	TRANE HORIZON OANE480A4	
RTU-3	ANNEX GYM	4000	2250	1.50	3.25	5	2431	1.0	2.18	1.5	15	R410A	162.8	117.4	10.6	95	60.8/84.7	110.5	3.2	60.8/115.7	24.6	180/160	240.2	14	42.3	50	460/3/60	3914	TRANE HORIZON OADG015C3	
RTU-4	ANNEX GYM	4000	2250	1.50	3.25	5	2431	1.0	2.18	1.5	15	R410A	162.8	117.4	10.6	95	60.8/84.7	110.5	3.2	60.8/115.7	24.6	180/160	240.2	14	42.3	50	460/3/60	3914	TRANE HORIZON OADG015C3	
RTU-5	ANNEX GYM	4000	2250	1.50	3.25	5	2431	1.0	2.18	1.5	15	R410A	162.8	117.4	10.6	95	60.8/84.7	110.5	3.2	60.8/115.7	24.6	180/160	240.2	14	42.3	50	460/3/60	3914	TRANE HORIZON OADG015C3	
RTU-6	ANNEX GYM	4000	2250	1.50	3.25	5	2431	1.0	2.18	1.5	15	R410A	162.8	117.4	10.6	95	60.8/84.7	110.5	3.2	60.8/115.7	24.6	180/160	240.2	14	42.3	50	460/3/60	3914	TRANE HORIZON OADG015C3	

REMARKS:
1. BASIS OF DESIGN IS BY TRANE OR APPROVED EQUAL.
2. RTU - D1 & D2 TO HAVE ADAPTER CURBS.
3. RTU - 3, 4, 5, 6, MECHANICAL CONTRACTOR TO PROVIDE NEW 14" HIGH INSULATED ROOF CURB WITH VIBRATION ISOLATORS, GENERAL CONTRACTOR TO INSTALL.
4. PROVIDE SUPPLY AND RETURN SMOKE DETECTORS (FACTORY INSTALLED) TO SHUTDOWN UNIT.
5. PROVIDE 4" PLEATED AIR FILTERS, MERV 14 RATING, SEE SPEC 234100 FOR MORE INFO. MC TO REPLACE ALL FILTERS PRIOR TO TURN OVER.
6. PROVIDE START-UP BY MANUFACTURER'S AUTHORIZED TECHNICIAN.
7. PROVIDE FACTORY INSTALLED 0-100% ECONOMIZER WITH DIFFERENTIAL ENTHALPY CONTROL.
8. UNIT TO BE DELIVERED VIA CRANES, ALL NECESSARY PERMITS FOR RIGGING REQUIRED.
9. MC TO PROVIDE FACTORY INSTALLED VFD W/ INTEGRAL MOTOR STARTERS FOR EACH FAN, EC TO FURNISH AND INSTALL NON-FUSIBLE TYPE DISCONNECT SWITCHES(FIELD INSTALL)
10. MC TO FURNISH UNIT WITH CONVENIENCE OUTLET AND SUPPLY AN EXHAUST FAN SERVICE LIGHT. COORDINATE WITH EC.
11. PROVIDE WITH MODULATING DIGITAL SCROLL COMPRESSORS AND MODULATING HOT GAS REHEAT.
12. PROVIDE WITH 2" DOUBLE WALL CONSTRUCTION.
13. PROVIDE HOT GAS BYPASS WITH CONTINUOUS CAPACITY MODULATION (MAXIMUM 25% TOTAL CAPACITY).
14. PROVIDE FACTORY ZONE AND TEMPERATURE SENSORS FOR PROPER INSTALLATION AND COORDINATION WITH UNIT CONTROLS
15. PROVIDE BACNET COMPATIBLE CONTROLS FOR INTERCONNECTION TO EXISTING SIEMENS BMS SYSTEM. FULL DDC CONTROL OF ENERGY WHEELS (WHERE APPLICABLE) INCLUDING FROST PROTECTION VIA ENERGY WHEEL VFD SPEED CONTROL, 100% ECONOMIZER MODE VIA ENERGY WHEEL BYPASS DAMPERS
16. MECHANICAL TO PROVIDE HEATING CONTROL VALVE, SEE COIL PIPING DETAILS ON DRAWING M503.
17. UNIT WEIGHT DOES NOT INCLUDES WEIGHT OF CURB. EXACT CURB WEIGHT TO BE CONFIRMED WITH MANUFACTURER.
18. MC TO FIELD INSTALL VIBRATION ISOLATION SUPPORTS FOR ENERGY RECOVERY WHEEL AT EACH UNIT.
19. POWER/CIRCUIT INFORMATION OF NEW UNITS TO BE COORDINATED WITH ELECTRICAL CONTRACTOR. SHOWN HERE FOR REFERENCE ONLY.
20. UNITS TO TO BE PROVIDED WITH AND HAVE DEMAND CONTROL VENTILATION.
21. UNITS TO HAVE TWO CO2 SENSORS PER UNIT MOUNTED IN CONDITIONED SPACE.

ROOFTOP HEAT PUMP UNIT SCHEDULE - CONTINUED

UNIT #	ENERGY RECOVERY WHEEL													
	WINTER CONDITIONS								SUMMER CONDITIONS					
	SUPPLY AIR			EXHAUST AIR			THERMAL EFF %	HEAT RECOVERED MBH	SUPPLY AIR			EXHAUST AIR			THERMAL EFF %	HEAT RECOVERED MBH
	INLET DB/WB	OUTLET DB/WB	AIR PD	INLET DB/WB	OUTLET DB/WB	AIR PD			INLET DB/WB	OUTLET DB/WB	AIR PD	INLET DB/WB	OUTLET DB/WB	AIR PD		
RTU-D1	9/5.6	64.1/55.6	0.78	75/63	31.6/31.4	0.98	83%	424.32	88/76	77/67.3	0.78	75/65	83.5/72.3	0.98	84%	148.95
RTU-D2	9/5.6	64.1/55.6	0.78	75/63	31.6/31.4	0.98	83%	424.32	88/76	77/67.3	0.78	75/65	83.5/72.3	0.98	84%	148.95
RTU-3	9/5.6	53.6/46.8	0.98	70/58	25.2/24.3	0.98	73%	163.46	77/63	75.5/63	0.98	75/63	76.5/63.1	0.98	74%	6.96
RTU-4	9/5.6	53.6/46.8	0.98	70/58	25.2/24.3	0.98	73%	163.46	77/63	75.5/63	0.98	75/63	76.5/63.1	0.98	74%	6.96
RTU-5	9/5.6	53.6/46.8	0.98	70/58	25.2/24.3	0.98	73%	163.46	77/63	75.5/63	0.98	75/63	76.5/63.1	0.98	74%	6.96
RTU-6	9/5.6	53.6/46.8	0.98	70/58	25.2/24.3	0.98	73%	163.46	77/63	75.5/63	0.98	75/63	76.5/63.1	0.98	74%	6.96

AIR OUTLETS SCHEDULE

TAG	SERVICE	TYPE	FACE SIZE (IN)	NECK SIZE (IN)	MOUNTING	MAX. NOISE CRITERIA (NC)	BASIS OF DESIGN		REMARKS
							MFR.	MODEL #	
S-1	SUPPLY	STEEL ROUND PLAQUE DIFFUSER	27-3/8"Ø	SEE PLANS	DUCT MOUNTED	25	NAILOR	RUNI	1, 3, 4, 5
R-1	RETURN	STEEL RETURN REGISTER	24x24	-	LAY IN	25	NAILOR	6145H	1, 2, 3, 4, 5
S-3	SUPPLY	STEEL SUPPLY GRILLE	6X4	-	WALL MOUNTED	25	NAILOR	6145H	3,4,5
TG	RETURN	STEEL RETURN GRILLE	SEE PLANS	-	WALL MOUNTED	25	NAILOR	6145H	3,4,5

NOTES:
1. NECK SIZES ARE INDICATED ON THE PLANS.
2. PROVIDE 48X24 CEILING MODULE.
3. PROVIDE VOLUME DAMPERS OPPOSED BLADE DAMPER FROM MANUFACTURER.
4. COORDINATE FINISH, BORDER TYPE, AND INSTALLATION WITH ARCHITECTURAL PLANS.
5. OR APPROVED EQUAL

1/2" 0 1" IF THIS BAR DOES NOT MEASURE 1", THEN DRAWING IS NOT TO FULL SCALE

No.	Date	Revisions
1	01/08/25	ISSUED FOR BID

REG. EXP DATE: 10-31-26

Drawn by A.W
Checked by P.C
Project No. 43065
Scale AS NOTED
Date 12/06/23

GREENMAN PEDERSEN, INC
2 EXECUTIVE BOULEVARD, SUITE 202, SUFFERN, NY 10901

Mechanical & Electrical Engineer:

Structural Engineer:

NORTH ROCKLAND HIGH SCHOOL CHILLER & HVAC UPGRADES

HIGH SCHOOL SED# 50-02-01-06-0-016-037

106 Haverstraw Road, Suffern NY 10954

COUNTY OF ROCKLAND

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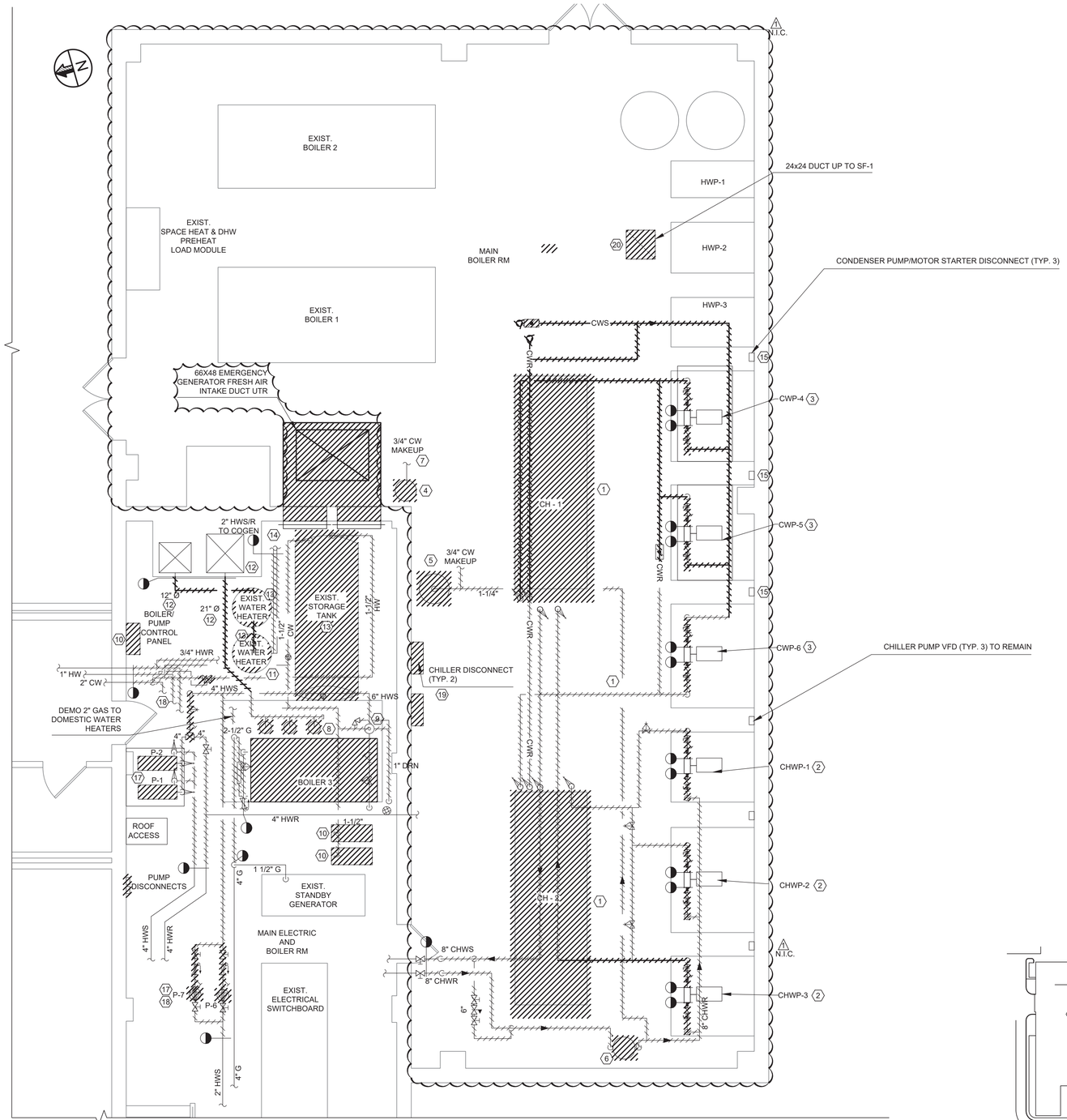
Drawing Title
MECHANICAL SCHEDULES - 2

Drawing No.
M-004

NOTES:

1. ALL EXISTING CONCRETE PADS TO REMAIN.

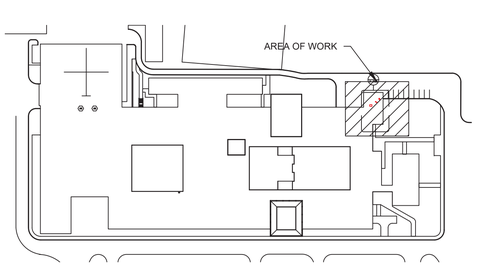


1 MECHANICAL ROOM - CHILLER REMOVAL

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

KEYED NOTES:

1. REMOVE AND DISPOSE OF EXISTING CENTRIFUGAL CHILLER, SYSTEM PIPING, EQUIPMENT AND CONTROLS. ASSOCIATED EXISTING CONCRETE PADS TO REMAIN.
2. EXISTING CHILLED WATER PUMPS, PIPING, AND CONCRETE PAD TO REMAIN.
3. EXISTING CONDENSER WATER PUMPS, PIPING, AND CONCRETE PAD TO REMAIN.
4. DISCONNECT, REMOVE AND DISPOSE OF GLYCOL TANK AND SYSTEM.
5. DISCONNECT, REMOVE AND DISPOSE OF EXPANSION TANK FOR CHILLERS.
6. DISCONNECT, REMOVE AND DISPOSE OF AIR SEPARATOR, VALVES AND ASSOCIATED PIPING FOR CHILLER.
7. DISCONNECT, REMOVE AND DISPOSE OF MAKE-UP WATER SYSTEM FOR CHILLERS.
8. DISCONNECT AND DISPOSE HOT WATER BOILER AND ASSOCIATED PIPING. EXISTING CONCRETE PAD TO REMAIN.
9. DISCONNECT, REMOVE AND DISPOSE OF AIR SEPARATOR FOR HEATING SYSTEM.
10. DISCONNECT, REMOVE AND DISPOSE OF EXPANSION TANK FOR HEATING SYSTEM.
11. DISCONNECT, REMOVE AND DISPOSE OF MAKE-UP WATER SYSTEM AND VALVES FOR HEATING SYSTEM.
12. DISCONNECT, REMOVE AND DISPOSE OF BREECHING AND INSULATION, CAP AND SEAL AT CHIMNEY.
13. DISCONNECT, REMOVE AND DISPOSE OF HOT WATER HEATERS AND STORAGE TANK INCLUDING ASSOCIATED PIPING AND VALVES BACK TO MAIN.
14. DISCONNECT, REMOVE AND DISPOSE OF MOTORIZED DAMPERS, 3'X5' SERVING EMERGENCY GENERATOR. (TYP. 2) REMOVE CONTROL WIRING TO GENERATOR.
15. PUMP MOTOR STARTER DISCONNECT TO REMAIN.
16. DISCONNECT, REMOVE AND DISPOSE OF BOILER/PUMP CONTROL PANEL..
17. DISCONNECT, REMOVE AND DISPOSE OF HOT WATER PUMPS P-1, 2, 7, 8. PAD TO REMAIN.
18. DISCONNECT , REMOVE AND DISPOSE OF ALL HOT WATER PIPING.
19. DISCONNECT, REMOVE AND DISPOSE OF CHILLED WATER DISCONNECT.
20. DISCONNECT, REMOVE AND DISPOSE OF SF-1 FAN. COORDINATE GENERAL CONTRACTOR FOR ROOFING.



KEY PLAN

PLAN NORTH

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Structural Engineer:

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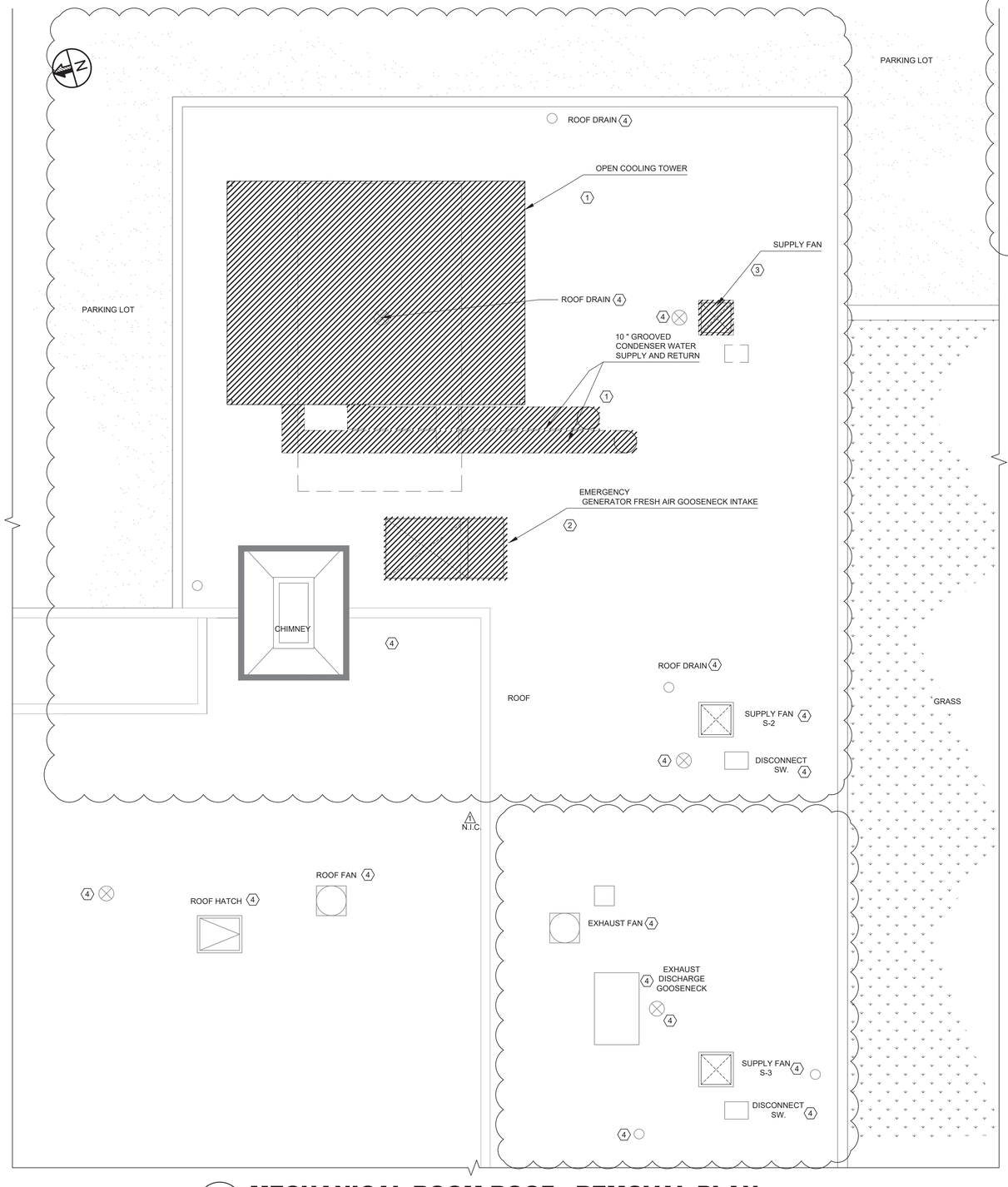
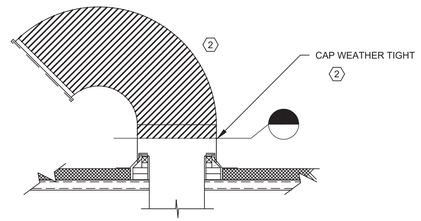
Drawing Title
MECHANICAL ROOM - BOILER_CHILLER REMOVAL

Drawing No.
MD-101



1 MECHANICAL ROOM ROOF - REMOVAL PLAN
SCALE: 1/4" = 1'- 0"



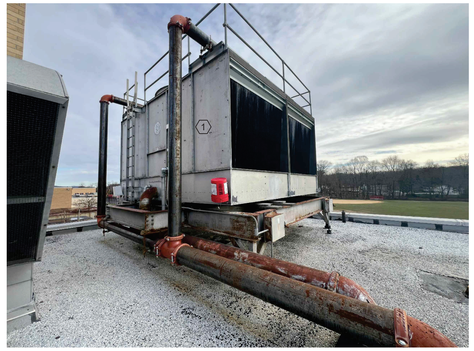
4 FRESH AIR GOOSENECK -REMOVE
SCALE: NONE

N.I.C.

KEYED NOTES:

1. DRAIN, DISCONNECT, REMOVE AND DISPOSE OF OPEN COOLING TOWER, PIPING AND MAKE-UP WATER SYSTEM.
2. DISCONNECT, REMOVE AND DISPOSE OF FRESH AIR DUCTWORK FOR EMERGENCY GENERATOR. CAP WEATHER TIGHT EXISTING ROOF OPENING.
3. DISCONNECT, REMOVE AND DISPOSE OF SUPPLY FAN COORDINATE WITH GENERAL CONTRACTOR.
4. EXISTING EQUIPMENT TO REMAIN.

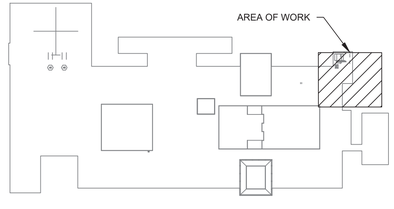
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1", THEN DRAWING IS NOT TO FULL SCALE



2 OPEN COOLING TOWER -REMOVE
SCALE: NONE

N.I.C.

3 SUPPLY FAN -REMOVE
SCALE: NONE



KEY PLAN

PLAN NORTH

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REG. EXP DATE: 10-31-26

Drawn by A.W
Checked by P.C
Project No. 43065
Scale AS NOTED
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GREENMAN PEDERSEN, INC
2 EXECUTIVE BOULEVARD, SUITE 202, SUFFERN, NY 10901

Mechanical & Electrical Engineer:

Structural Engineer:

NORTH ROCKLAND HIGH SCHOOL CHILLER & HVAC UPGRADES

HIGH SCHOOL SED# 50-02-01-06-0-016-037

COUNTY OF ROCKLAND

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Suffern, NY 10901

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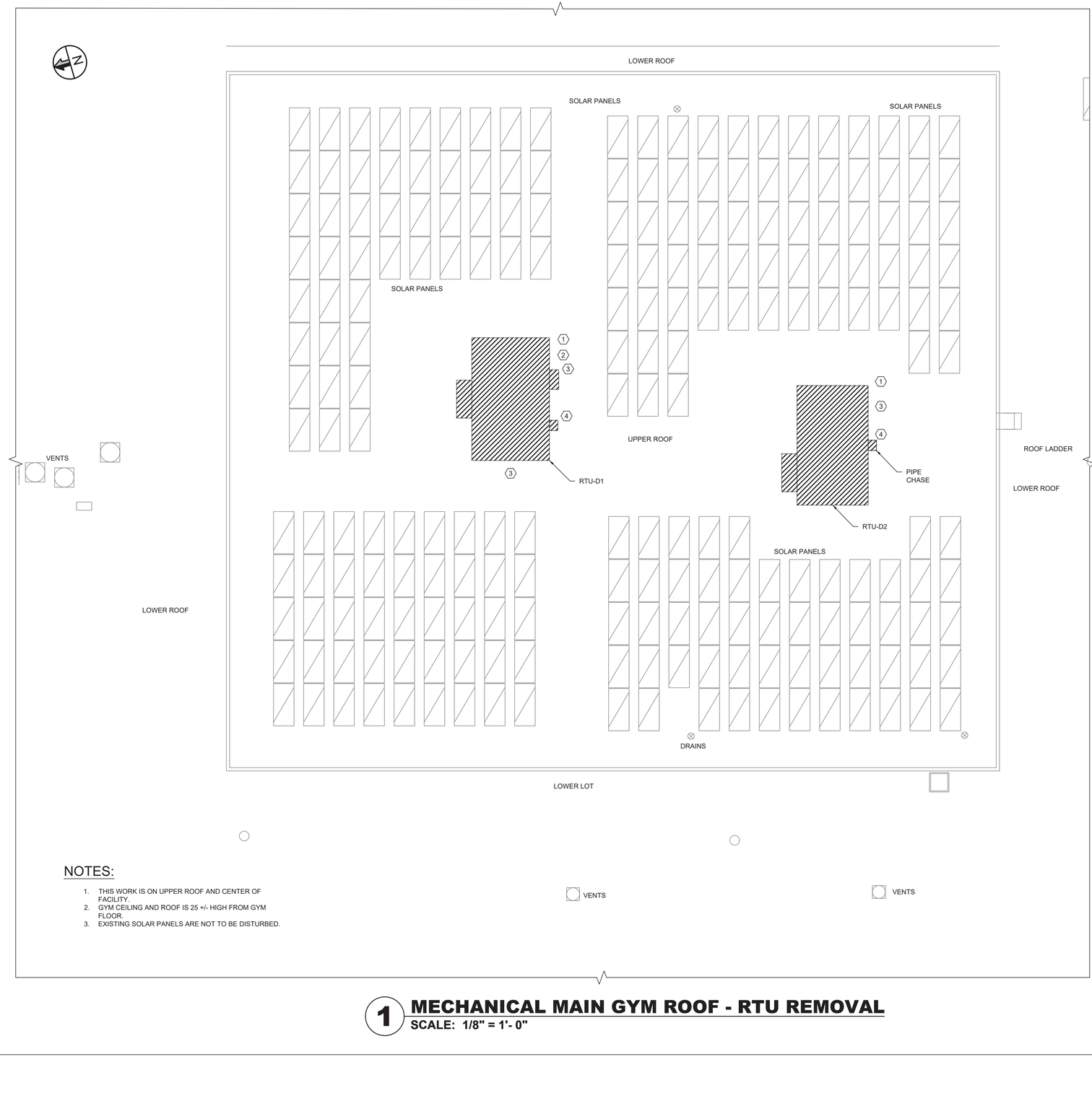
Drawing Title
MECHANICAL ROOM ROOF - COOLING TOWER REMOVAL

Drawing No.
MD-102



NOTES:

1. THIS WORK IS ON UPPER ROOF AND CENTER OF FACILITY.
2. GYM CEILING AND ROOF IS 25 +/- HIGH FROM GYM FLOOR.
3. EXISTING SOLAR PANELS ARE NOT TO BE DISTURBED.

1 MECHANICAL MAIN GYM ROOF - RTU REMOVAL
SCALE: 1/8" = 1'- 0"

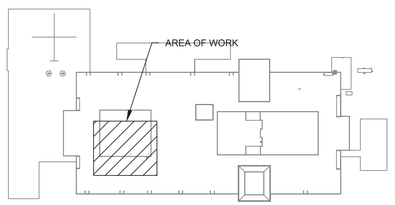
KEYED NOTES:

1. DISCONNECT, REMOVE AND DISPOSE OF EXISTING ROOFTOP UNITS, SUPPLY AND RETURN DUCTWORK, HOT WATER SUPPLY AND RETURN PIPING AND ASSOCIATED CONTROLS. ORIGINAL ROOF CURB TO REMAIN. REFER TO DETAIL 1/M.501 FOR HWS/HWR PIPING REMOVALS. HOT WATER PIPING TO BE CUT BELOW ROOF IN CEILING OF GYM.
2. DISCONNECT, REMOVE AND DISPOSE OF EXISTING CURB ADAPTER.
3. EXISTING ROOF CURBS TO REMAIN.
4. PATCH ROOFING AS REQUIRED / EXISTING HWS & HWR PIPING HOLES.

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1", THEN DRAWING IS NOT TO FULL SCALE

2 RTU-1 REMOVAL
SCALE: NONE

3 RTU-2 REMOVAL
SCALE: NONE



KEY PLAN

PLAN NORTH

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Project No.	43065
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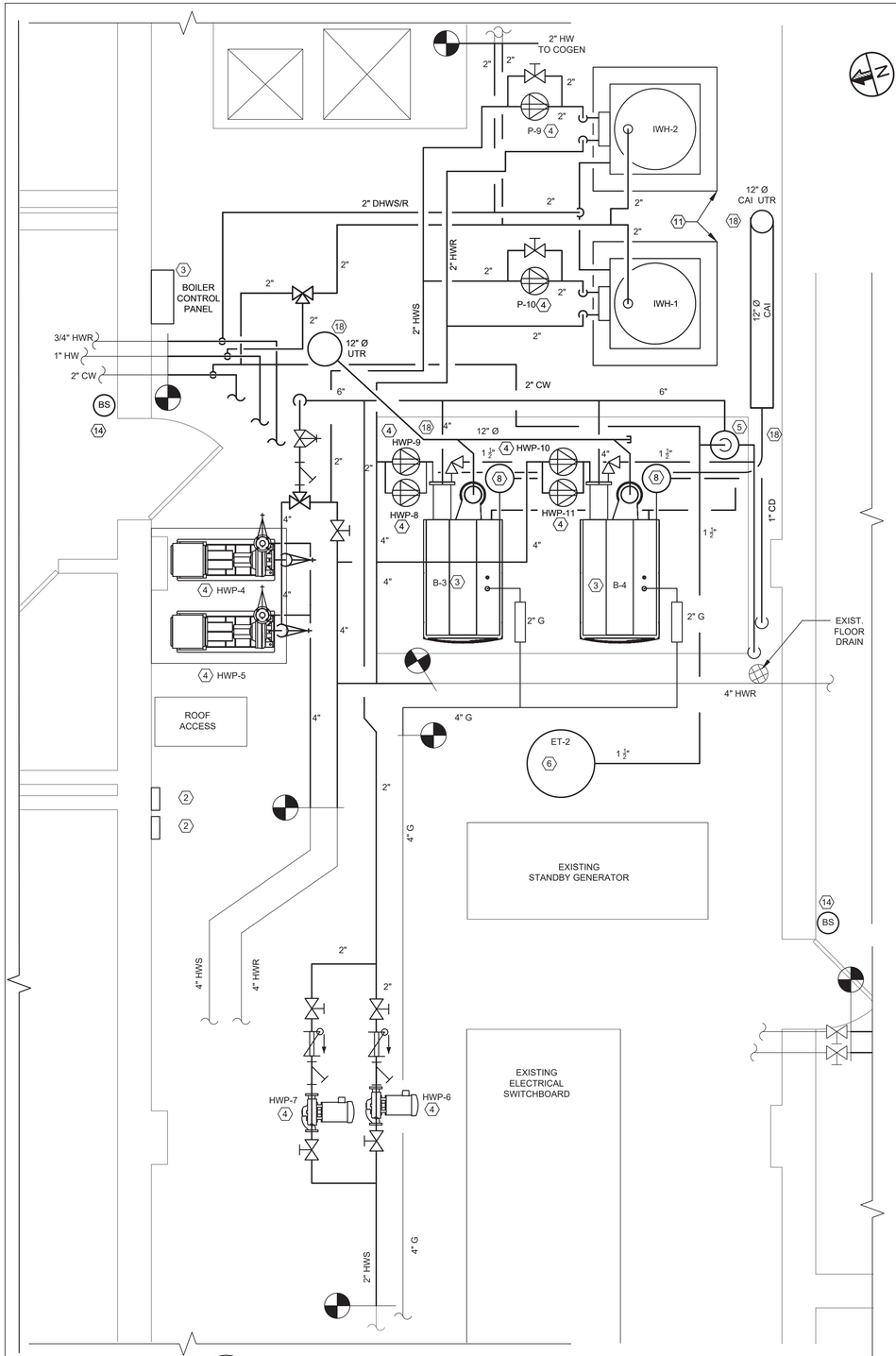
140 Park Avenue New City, NY 10956 Tel 845-708-9200
www.shilale.com

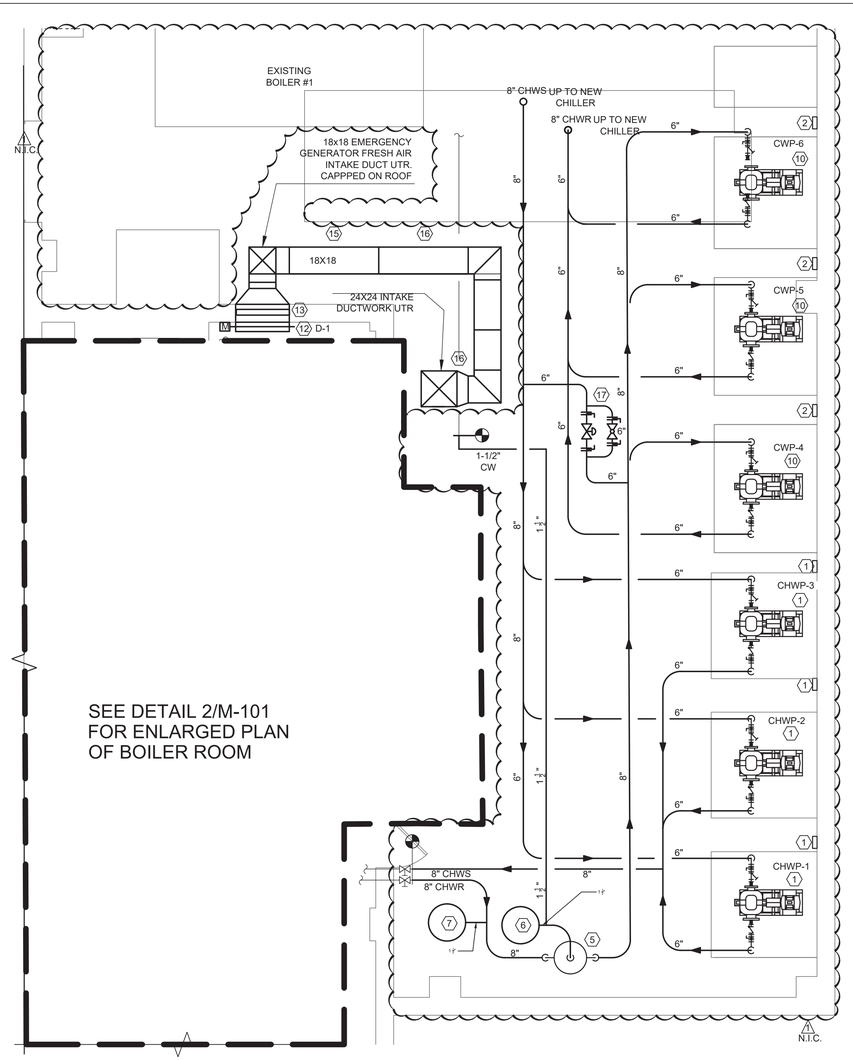
Drawing Title
MECHANICAL MAIN GYM - RCP

Drawing No.
MD-103



2 BOILER RM - INSTALLATION

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



SEE DETAIL 2/M-101
FOR ENLARGED PLAN
OF BOILER ROOM

1 MECHANICAL ROOM - INSTALLATION

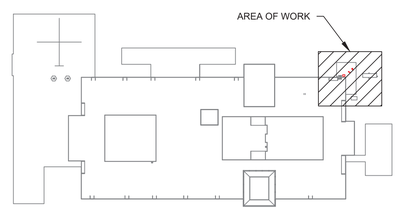
SCALE: 1/4" = 1'- 0"

KEYED NOTES:

1. EXSITING CHILLED WATER PUMPS, PIPING, AND VFD. SEE PUMP SCHEDULE ON M003.
2. FURNISH AND INSTALL NEW VFD CONTROLS FOR ASSOCIATED PUMPS.
3. FURNISH AND INSTALL NEW HOT WATER CONDENSING BOILER, CONTROLS, BREECHING AND PIPING AND CONTROL PANEL.
4. FURNISH AND INSTALL NEW HOT WATER PUMPS CONTROL PANEL AND PIPING, SEE PUMP SCHEDULE ON M003.
5. FURNISH AND INSTALL NEW AIR SEPARATOR AND ASSOCIATED PIPING.
6. FURNISH AND INSTALL FLOOR MOUNTED NEW EXPANSION TANK AND ASSOCIATED PIPING, SUPPORT TANK FROM CEILING..
7. FURNISH AND INSTALL NEW GLYCOL MAKEUP UNIT AND ASSOCIATED PIPING ON 36X36X4" CONCRETE PAD AS PER MANUFACTURER.
8. FURNISH AND INSTALL CONDENSATE NEUTRALIZER FOR THE CONDENSING BOILERS. SEE DETAIL ON M-505.
9. FURNISH AND INSTALL DOMESTIC HOT WATER HEAT EXCHANGER, SEE SCHEDULE ON M003.
10. EXISTING CONDENSER WATER PUMPS WITH NEW MOTOR AND NEW VFD.
11. NEW CONCRETE PAD, SEE STRUCTURAL DRAWING, S-102.
12. NEW MOTORIZED DAMPER FOR EMERGENCY GENERATOR COMBUSTION AIR, INTERLOCK WITH GENERATOR, FOR SIZES SEE COMBUSTION AIR DAMPER SCHEDULE ON M-003.
13. FIRE DAMPER WITH ACCESS DOOR FOR RESETTING DAMPER. TYP. 2 SIZE TO MATCH DUCT
14. INSTALL BOILER EMERGENCY SHUT OFF SWITCH-SHUTDOWN
15. INSTALL 2 HR FIRE RATED DUCT WRAP ON ALL INTERIOR EMERGENCY GENERATOR DUCTWORK.
16. INSTALL AND CONNECT FRESH AIR DUCT UP TO ROOF , 18X18 & 24X24 WITH 2 HR FIRE WRAP
17. INSTALL CONTROL VALVE CV-1 AND BY-PASS WITH ISOLATION VALVES .
18. ROUTE AND INSTALL BOILER FRESH AIR AND FLUE IN BOILER ROOM AND UP THROUGH ROOF. COORDINATE ACTUAL ROUTING IN FIELD.

NOTES:

1. SEE PIPING DIAGRAMS AND DETAILS FOR ALL VALVES AND FITTINGS.
2. ALL DUCTWORK AND PIPING TO BE INSULATED.
3. TEST AND BALANCE ALL PIPING AND DUCTWORK
4. SEE PIPING RISER DIAGRAMS AND DETAILS FOR PIPE SIZES AND FITTINGS.



KEY PLAN

PLAN NORTH

IF THIS BAR DOES NOT MEASURE 1", THEN DRAWING IS NOT TO FULL SCALE

No.	Date	Revisions
1	01/08/25	ISSUED FOR BID

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Checked by	P.C
Project No.	4306S
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GREENMAN PEDERSEN, INC
2 EXECUTIVE BOULEVARD, SUITE 202, SUFFERN, NY 10901

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Structural Engineer:

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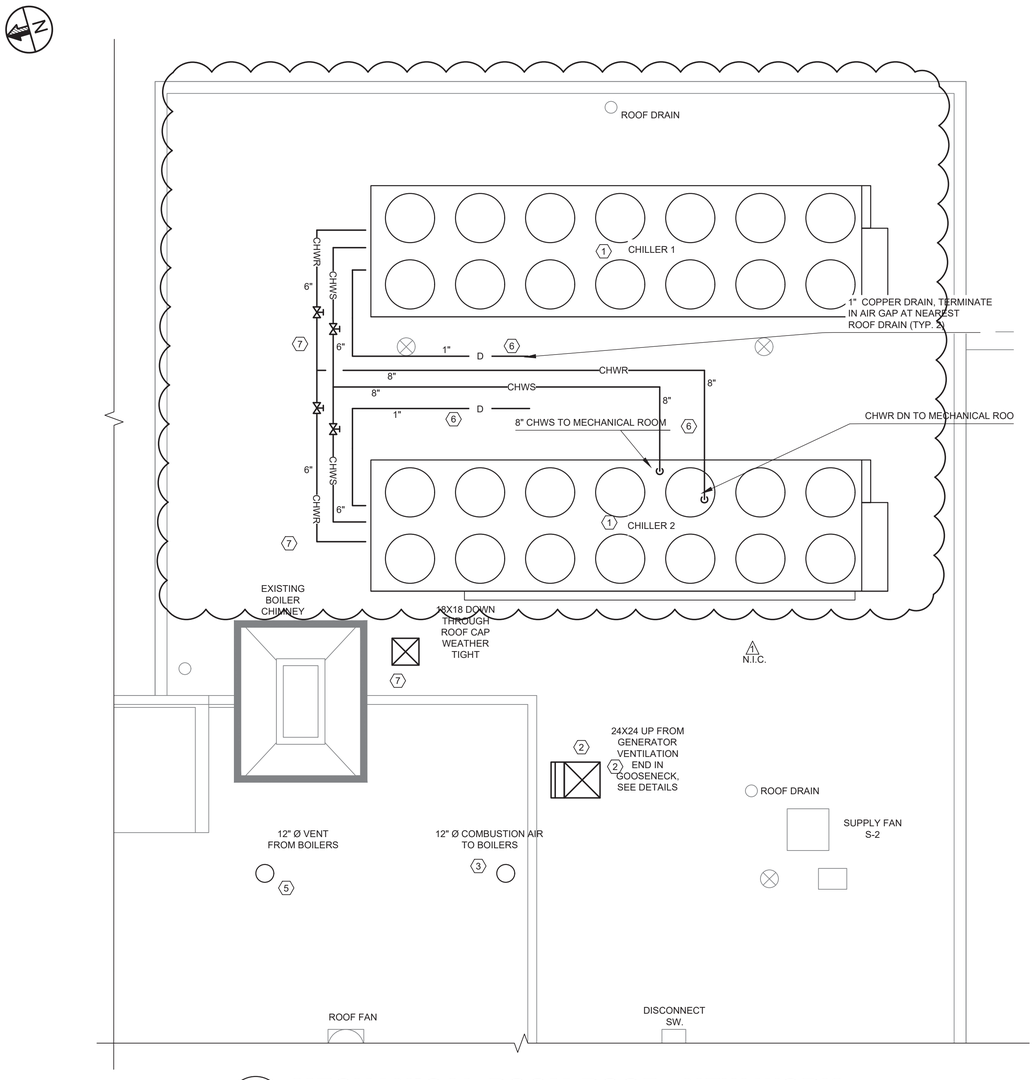
Drawing Title
MECHANICAL ROOM
BOILER CHILLER
INSTALL PLAN

Drawing No.
M-101



1 MECHANICAL ROOM ROOF - NEW WORK

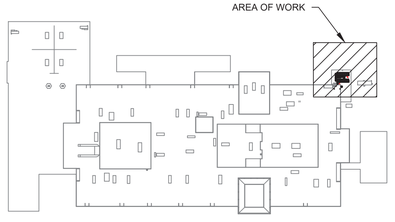
SCALE: 1/4" = 1'- 0"

KEYED NOTES:

1. FURNISH, INSTALL AND CONNECT NEW AIR-COOLED CHILLERS AND ASSOCIATED PIPING AND VALVES, CONTROLS, INSULATION, START UP, AND BALANCING. SUPPORTS AND WEATHER PROOF INSULATION, SUPPORTS SEE 2/M-301. SEE STRUCTURAL FOR SUPPORT STEEL.
2. FURNISH AND INSTALL VENTILATION GOOSENECK AIR DUCTWORK FOR EMERGENCY GENERATOR. SEE DETAIL 4/M-504
3. FURNISH AND INSTALL 12" COMBUSTION AIR INTAKE VENT FOR CONDENSING BOILERS. TERMINATE IN GOOSENECK, MIN. 3' ABOVE ROOF, WITH MESH SCREEN, MIN. 1"X1" AT INLET. ROUTING AND LOCATION TO BE VERIFIED IN THE FIELD, SEE DETAIL 4/M-504
4. INSTALL DRAINS AS REQUIRED, ROUTE TO ROOF DRAIN .
5. INSTALL AND CONNECT BOILER 12" FLUE STACK UP THROUGH ROOF WEATHER TIGHT, MIN 3' ABOVE ROOF, ROUTING AND LOCATION TO BE VERIFIED IN THE FIELD. SEE DETAIL 3/M-504.
6. INSTALL CHILLED WATER SUPPLY AND RETURN PIPING SUPPORT AND WEATHER PROOF INSULATION.
7. CAP TERMINATED TERMINATED VENTILATION DUCTWORK WEATHER TIGHT, MATCH EXISTING.

GENERAL NOTES:

1. SEE PIPING DIAGRAM AND DETAILS FOR ALL VALVING, FITTINGS AND SIZES.



KEY PLAN

PLAN NORTH

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1", THEN DRAWING IS NOT TO FULL SCALE

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GREENMAN PEDERSEN, INC
2 EXECUTIVE BOULEVARD, SUITE 202, SUFFERN, NY 10901

Mechanical & Electrical Engineer:

Structural Engineer:

NORTH ROCKLAND HIGH SCHOOL CHILLER & HVAC UPGRADES

HIGH SCHOOL SED# 50-02-01-06-0-016-037

COUNTY OF ROCKLAND

106 Haverstraw Road, Suffern NY 10901

MICHAEL SHILALE ARCHITECTS, L.L.P.
149 Park Avenue New City, NY 10956 Tel 845-708-9200
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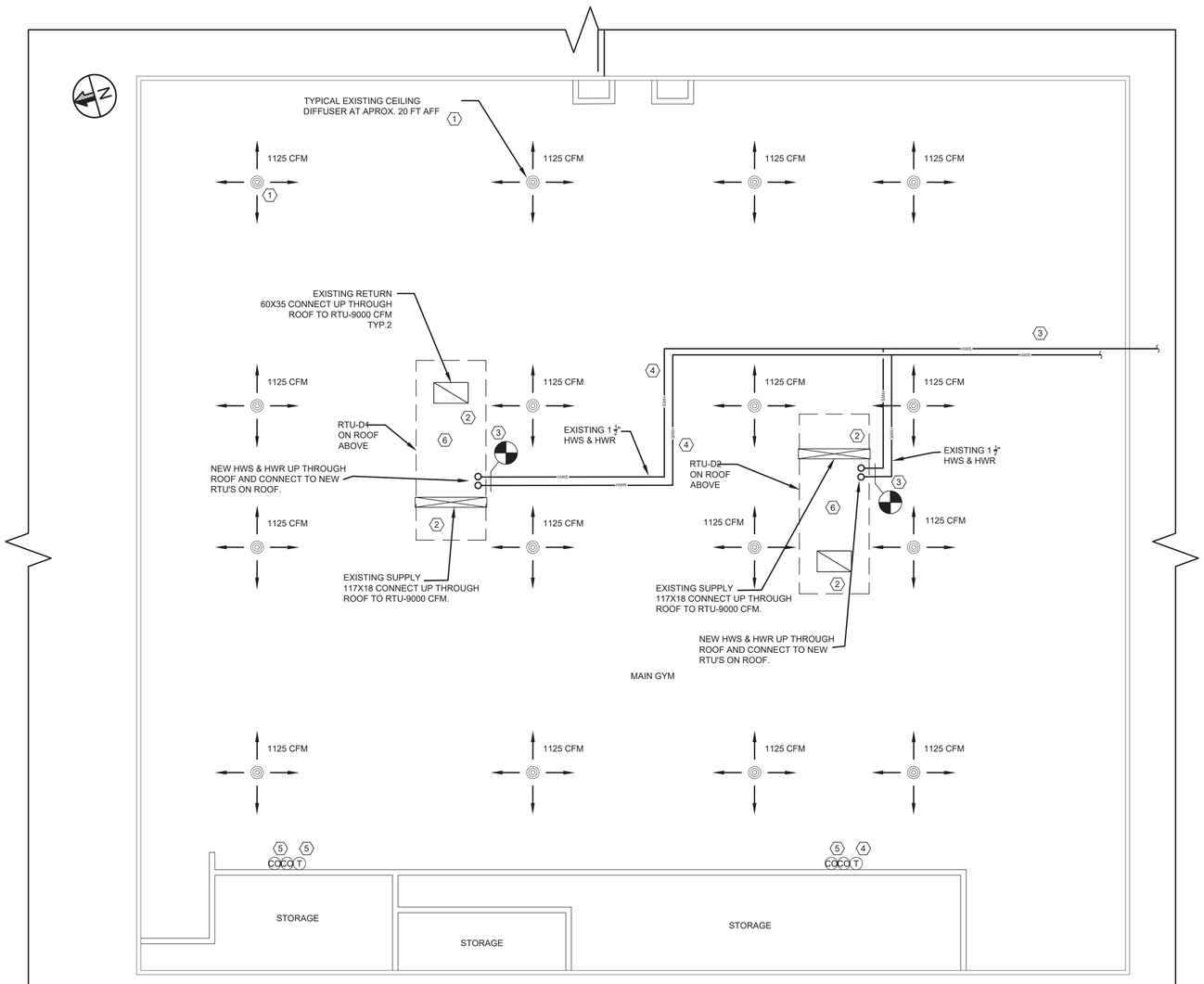
Drawing Title
MECHANICAL ROOM ROOF - INSTALL

Drawing No.
M-102



1 MECHANICAL MAIN GYM ROOF - RCP INSTALL

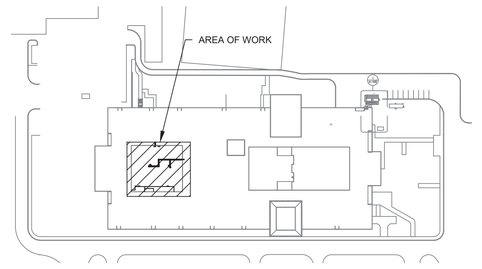
SCALE: 1/8" = 1'- 0"

KEYED NOTES:

1. BALANCE EXISTING CEILING DIFFUSERS. NOTE CEILING IS AT 20 FEET +/-. TYPICAL OF 16.
2. CONNECT NEW RTU-D1 AND RTU-D2 SUPPLY AND RETURN DUCTWORK TO MAIN GUM EXISTING SUPPLY AND RETURN DUCTWORK . OFFSET AND TRANSITION SUPPLY AND RETURN DUCTWORK AS REQUIRED IN GYM CEILING, COORDINATE WITH ALL TRADES.
3. CONTRACTOR TO VERIFY LOCATION OF EXISTING HWS & HWR PIPING CONCEALED WITHIN THE HUNG CEILING. CONNECT TO EXISTING HWS & HWR IN CEILING. TEST, INSULATE AND BALANCE ALL PIPING. REFER TO MAIN GYM HOT WATER PIPING DIAGRAM ON M-303.
4. INSTALL AND CONNECT THERMOSTAT FOR RTU D1 &D 2.
5. INSTALL AND CONNECT C02 SENSOR AT SAME LEVEL AS THERMOSTATS FOR RTU-D1&D2 FOR DEMAND CONTROL VENTILATION.
6. TEST NEW DUCTWORK AS REQUIRED.

NOTES:

1. GYM CEILING AND ROOF IS 20 +/- HIGH FROM GYM FLOOR.
2. ALL DUCTWORK AND PIPING TO BE INSULATED.
3. TEST AND BALANCE ALL PIPING AND DUCTWORK



KEY PLAN

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1", THEN DRAWING IS NOT TO FULL SCALE

No.	Date	Revisions
1	01/08/25	ISSUED FOR BID

REG. EXP DATE: 10-31-26

Drawn by	A.W
Checked by	P.C
Project No.	43065
Scale	AS NOTED
Date	12/06/23

GREENMAN PEDERSEN, INC
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Mechanical & Electrical Engineer:

Structural Engineer:

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HIGH SCHOOL SED# 50-02-01-08-0-016-037

COUNTY OF ROCKLAND

108 Hammond Road, Suffern, NY 10901

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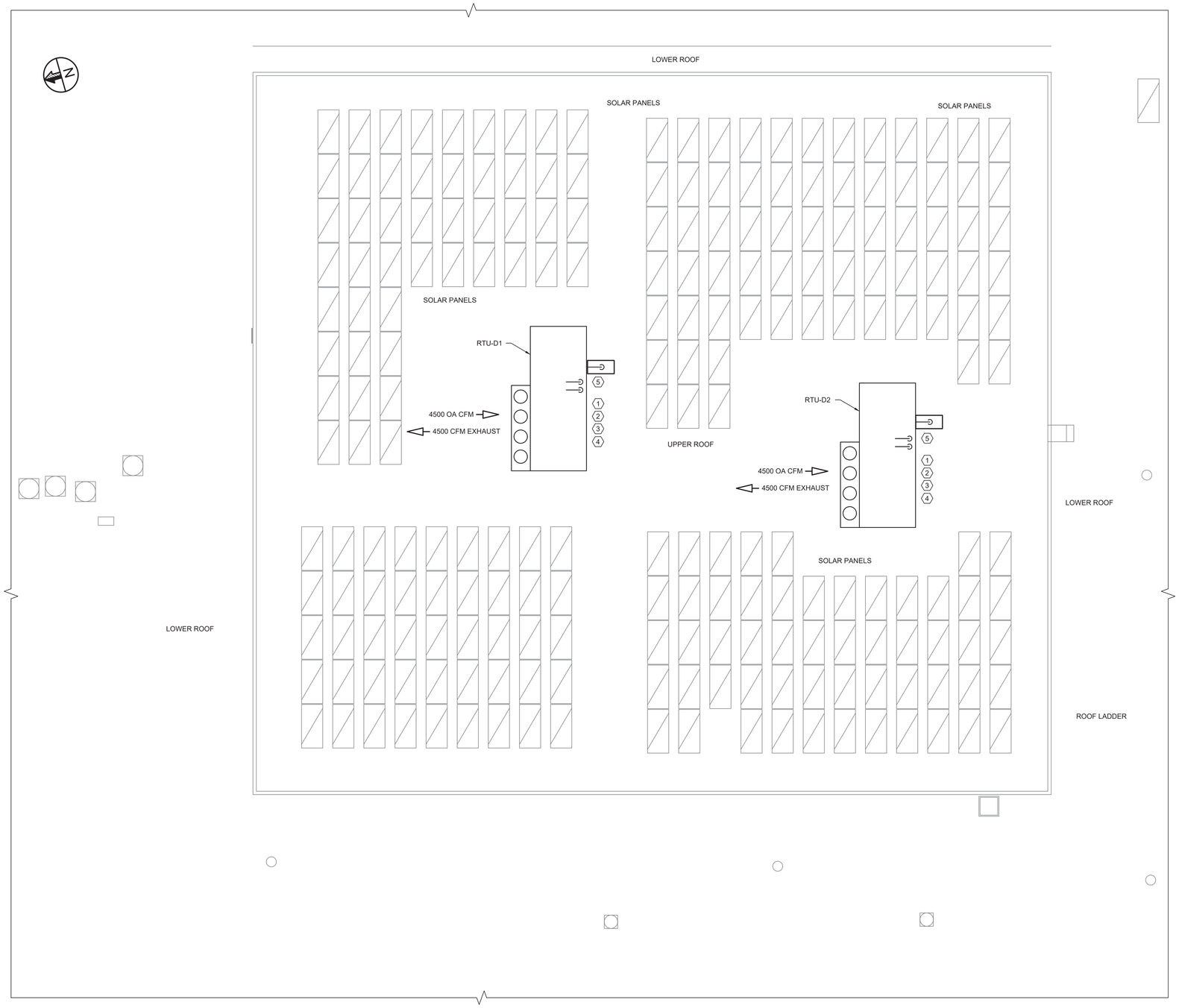
Drawing Title
MECHANICAL MAIN GYM - RCP INSTALL

Drawing No.
M-103



KEYED NOTES:

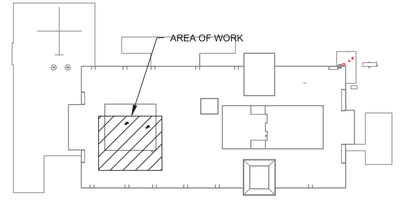
1. INSTALL, CONNECT, TEST, AND BALANCE NEW RTU-D1, D2. SEE M-003 ON EXISTING CURB AND CURB ADAPTORS.
2. INSTALL AND CONNECT ROOFTOP UNITS HHWS & HWR PIPING, INSTALL HOT WATER ISOLATION VALVES ON BOTH SUPPLY AND RETURN AND ONE SET OF VALVES IN UNIT AND ANOTHER SET OF VALVES JUST BELOW ROOF IN GYM CEILING. REFER TO DETAIL 3/M-303. PRESSURE BALANCE AND TEST AS REQUIRED.
3. INSTALL AND CONNECT ROOFTOP STANDALONE CONTROLS IN UNIT.
4. INSTALL ADAPTER CURBS . VERIFY EXACT DIMENSIONS OF ADAPTER CURB IN THE FIELD.
5. 1-1/4" CONDENSATE DRAIN TO SPILL ONTO SPLASH BLOCK ON ROOF.

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1", THEN DRAWING IS NOT TO FULL SCALE

GENERAL NOTES

1. FOR ADDITIONAL INFORMATION AND SPECIFICS REGARDING AIR HANDLING UNIT INSTALLATION, SEE THE AIR HANDLING UNIT SPECIFICATION. PROVIDE EXTRA PARTS AS DEPICTED IN THE SPECIFICATION.
2. INSTALL DUCT SMOKE DETECTORS FOR THE NEW AIR HANDLING UNITS TO COMPLY TO CODE. EXISTING DUCT SMOKE DETECTORS ON SUPPLY SIDE TO BE REPLACED WITH NEW. NEW DUCT SMOKE DETECTORS SHALL BE INSTALLED ON A STRAIGHT DUCT ON THE RETURN SIDE. NEW SMOKE DETECTORS SHALL BE CONNECTED TO THE EXISTING FIRE ALARM CONTROL PANEL. COORDINATE INSTALLATION WITH ELECTRICAL CONTRACTOR.
3. PERFORM A COMPLETE BALANCING TEST OF THE DUCTS AND BRANCHES SERVING THE NEW UNITS. PROVIDE BALANCING REPORT TO ENGINEER FOR REVIEW AND APPROVAL. SEE REFERENCE DRAWINGS FOR LOCATION OF EXISTING DUCT, DIFFUSERS, ETC. IN EACH SPACE BEING SERVED.
4. THE CONTRACTOR IS RESPONSIBLE FOR RIGGING THE UNITS. CONTRACTOR SHALL INSTALL UNITS WITH PROPER LIFTS AND EQUIPMENT IN A SAFE WORKMAN-LIKE MANNER. CONTRACTOR IS RESPONSIBLE TO PULL PERMITS RELATED TO RIGGING AND INSTALLING THE UNITS.
5. CONTRACTOR SHALL COORDINATE WITH OWNER REGARDING THE SHUTDOWN AND REMOVAL OF EQUIPMENT.
6. CONTRACTOR SHALL FOLLOW MANUFACTURER'S INSTRUCTIONS TO ENSURE ALL INSTALLATION CLEARANCES ARE MET AND THAT THE UNIT IS INSTALLED AS PER LATEST NYS MECHANICAL CODE.
7. PROVIDE AN ALLOWANCE FOR DUCT CLEANING THE EXISTING DUCTWORK.
8. PROVIDE ADEQUATE MEANS FOR CONDENSATE DISPOSAL FOR EACH UNIT, SEE DETAIL 2/M-504.



KEY PLAN

PLAN NORTH

NOTES:

1. THIS WORK IS ON UPPER ROOF AND CENTER OF FACILITY.
2. GYM CEILING AND ROOF IS 25 +/- HIGH FROM GYM FLOOR.
3. EXISTING SOLAR PANELS ARE NOT TO BE DISTURBED.

1 MECHANICAL MAIN GYM ROOF - RTU INSTALL

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

No.	Date	Revisions
1	01/08/25	ISSUED FOR BID

REG. EXP DATE: 10-31-26

Drawn by A.W
Checked by P.C
Project No. 43065
Scale AS NOTED
Date 12/06/23

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Mechanical & Electrical Engineer:

Structural Engineer:

NORTH ROCKLAND HIGH SCHOOL CHILLER & HVAC UPGRADES

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COUNTY OF ROCKLAND

108 Hammond Road, Thiells NY 10984

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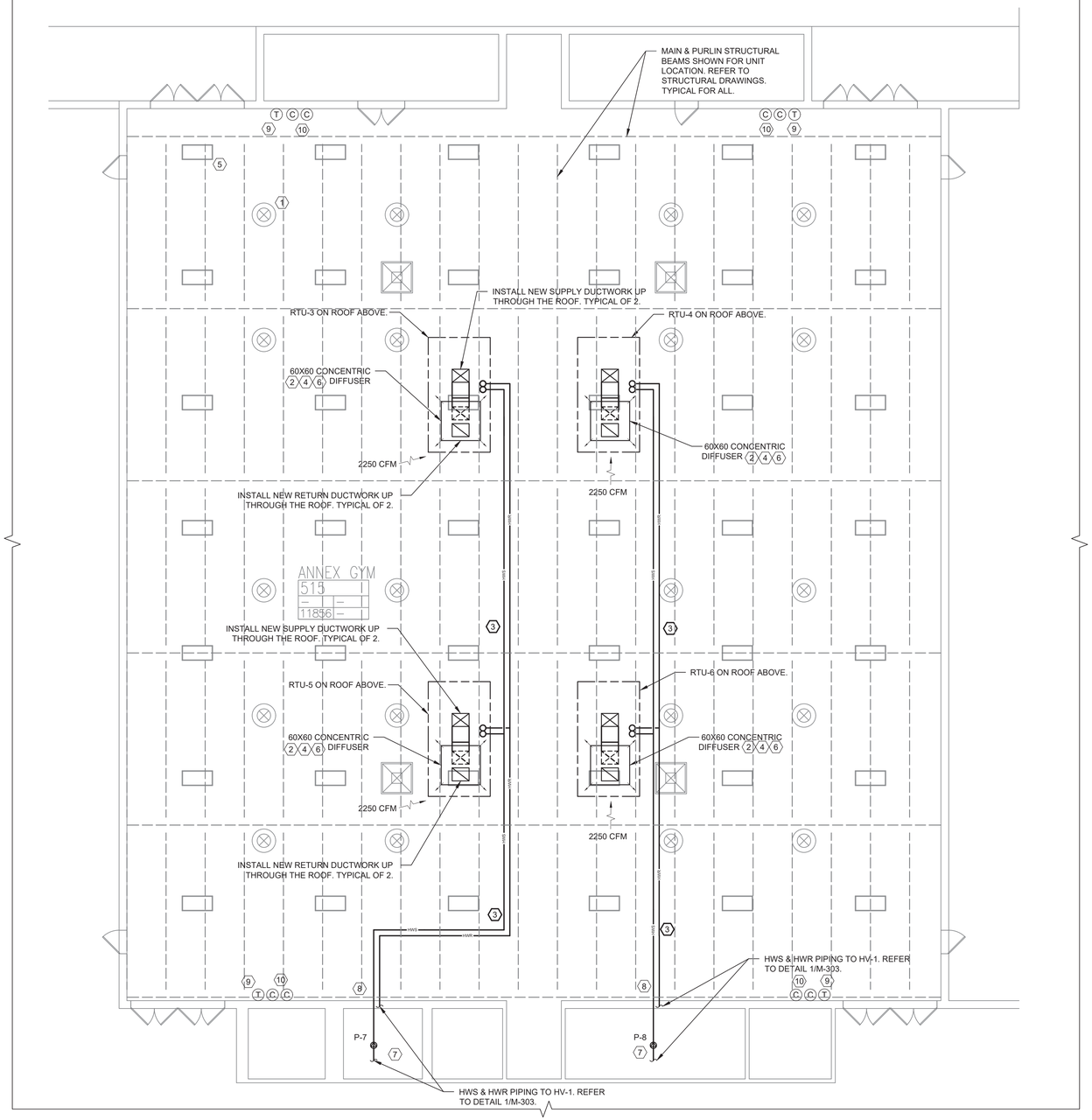
Drawing Title
MECHANICAL MAIN GYM ROOF - INSTALL

Drawing No.
M-104



1 MECHANICAL ANNEX GYM RCP - RTU INSTALL

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

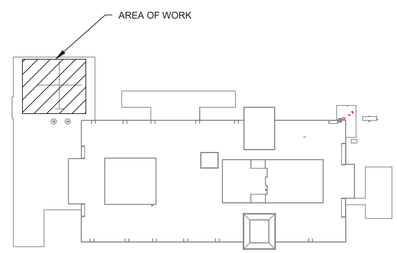
KEYED NOTES:

1. EXISTING CEILING DIFFUSER TO REMAIN. TYPICAL OF 20.
2. FURNISH & INSTALL CEILING CONCENTRIC DIFFUSER. REFER TO DETAIL 6/M-501 FOR INSTALLATION ELEVATION AND CONFICURATION.
3. HWS & HWR PIPING TO BE INSTALLED & CONCEALED WITHIN THE HUNG CEILING. INSTALL ISOLATION VALVES AT EACH RTU. SEE DETAIL 1/M-303, M-503.
4. COORDINATE WITH ELECTRICAL CONTRACTOR, REMOVE, AND RELOCATE ONE EXISTING CEILING LIGHTING AS REQUIRED.
5. EXISTING LIGHTING FIXTURE TO REMAIN. TYPICAL OF 38.
6. COORDINATE WITH ARCHITECT DRAWINGS FOR ACTUAL LOCATION OF CONCENTRIC SUPPLY AND RETURN DIFFUSERS AND DUCTWORK.
7. INSTALL AND CONNECT IN-LINE PUMP P-7, P-8 IN MER ROOM ABOVE GYM OFFICE. SEE DETAIL 1/M-303, M-503.
8. PIPE WALL PENETRATION SEE SEE DETAIL 2/M-502, M-503..
9. INSTALL AND CONNECT THERMOSTAT FOR RTU-3, RTU-4, RTU-5, RTU-6.
10. INSTALL AND CONNECT C02 SENSOR AT SAME LEVEL AS THERMOSTATS FOR RTU-3, RTU-4, RTU-5, RTU-6 FOR DEMAND CONTROL VENTILATION.

IF THIS BAR DOES NOT MEASURE 1", THEN DRAWING IS NOT TO FULL SCALE
0 1/2 1

NOTES:

1. GYM CEILING AND ROOF IS 20 +/- HIGH FROM GYM FLOOR.
2. ALL DUCTWORK AND PIPING TO BE INSULATED.
3. TEST AND BALANCE ALL PIPING AND DUCTWORK
4. EXISTING CEILING DIFFUSERS ARE NOT CONNECTED TO NEW RTU'S.



KEY PLAN

PLAN NORTH

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Structural Engineer:

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HIGH SCHOOL SED# 50-02-01-06-0-016-037

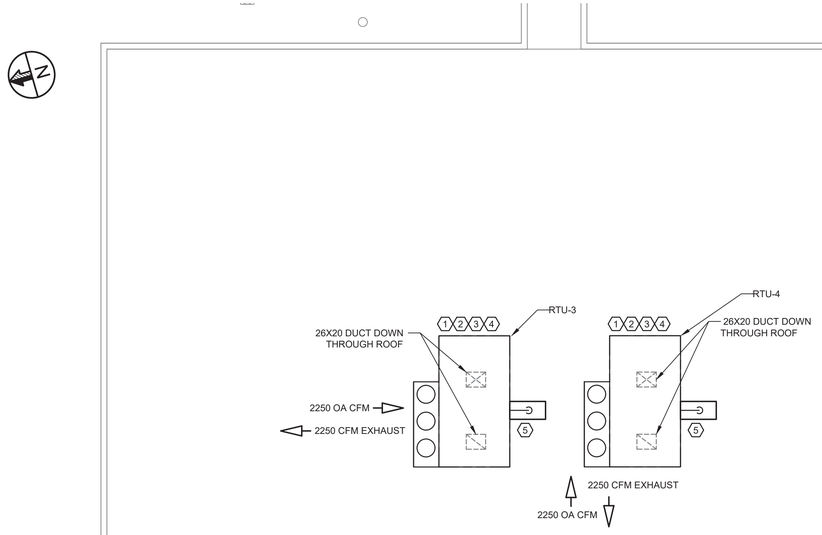
COUNTY OF ROCKLAND

150 Hamwood Road, Thiells NY 10984

HSA
MICHAEL SHILALE ARCHITECTS, L.L.P.
140 Park Avenue New City, NY 10956 Tel 845-708-8200
www.shilale.com

Drawing Title
MECHANICAL ANNEX GYM 1ST FLOOR - INSTALL

Drawing No.
M-105



1 MECHANICAL ANNEX GYM ROOF - RTU INSTALL

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

KEYED NOTES:

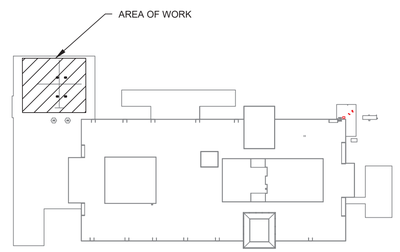
1. INSTALL, CONNECT , TEST AND BALANCE NEW ROOFTOP UNITS 3, 4, 5, 6. SEE UNITS SCHEDULE ON DRAWING M-003.
2. INSTALL AND CONNECT ROOFTOP UNITS HWS & HWR PIPING, INSTALL HOT WATER ISOLATION VALVES ON BOTH SUPPLY AND RETURN AND ONE SET OF VALVES IN UNIT AND ANOTHER SET OF VALVES JUST BELOW ROOF IN GYM CEILING. REFER TO DETAIL 3/M-303.
3. INSTALL AND CONNECT ROOFTOP STANDALONE CONTROLS IN UNIT .
4. INSTALL ROOF CURBS, COORDINATE WITH GENERAL CONTRACTOR FOR ROOF AND WORK.
5. 1-1/4" CONDENSATE DRAIN TO SPILL ONTO SPLASH BLOCK ON ROOF.

GENERAL NOTES:

1. FOR ADDITIONAL INFORMATION AND SPECIFICS REGARDING AIR HANDLING UNIT INSTALLATION, SEE THE AIR HANDLING UNIT SPECIFICATION. PROVIDE EXTRA PARTS AS DEPICTED IN THE SPECIFICATION.
2. INSTALL DUCT SMOKE DETECTORS FOR THE NEW AIR HANDLING UNITS TO COMPLY TO CODE. EXISTING DUCT SMOKE DETECTORS ON SUPPLY SIDE TO BE REPLACED WITH NEW. NEW DUCT SMOKE DETECTORS SHALL BE INSTALLED ON A STRAIGHT DUCT ON THE RETURN SIDE. NEW SMOKE DETECTORS SHALL BE CONNECTED TO THE EXISTING FIRE ALARM CONTROL PANEL. COORDINATE INSTALLATION WITH ELECTRICAL CONTRACTOR.
3. PERFORM A COMPLETE BALANCING TEST OF THE DUCTS AND BRANCHES SERVING THE NEW UNITS. PROVIDE BALANCING REPORT TO ENGINEER FOR REVIEW AND APPROVAL. SEE REFERENCE DRAWINGS FOR LOCATION OF EXISTING DUCT, DIFFUSERS, ETC. IN EACH SPACE BEING SERVED.
4. THE CONTRACTOR IS RESPONSIBLE FOR RIGGING THE UNITS. CONTRACTOR SHALL INSTALL UNITS WITH PROPER LIFTS AND EQUIPMENT IN A SAFE WORKMAN-LIKE MANNER. CONTRACTOR IS RESPONSIBLE TO PULL PERMITS RELATED TO RIGGING AND INSTALLING THE UNITS.
5. CONTRACTOR SHALL COORDINATE WITH OWNER REGARDING THE SHUTDOWN AND REMOVAL OF EQUIPMENT.
6. CONTRACTOR SHALL FOLLOW MANUFACTURER'S INSTRUCTIONS TO ENSURE ALL INSTALLATION CLEARANCES ARE MET AND THAT THE UNIT IS INSTALLED AS PER LATEST NYS MECHANICAL CODE.
7. PROVIDE AN ALLOWANCE FOR DUCT CLEANING THE EXISTING DUCTWORK.
8. PROVIDE ADEQUATE MEANS FOR CONDENSATE DISPOSAL FOR EACH UNIT, SEE DETAIL 2/M-504.

NOTES:

1. THIS WORK IS ON ROOF AND CENTER OF FACILITY.
2. GYM CEILING AND ROOF IS 25 +/- HIGH FROM GYM FLOOR.



KEY PLAN

PLAN NORTH

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1	01/08/25	ISSUED FOR BID

REG. EXP DATE: 10-31-26

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Checked by P.C
Project No. 43065
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Structural Engineer:

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COUNTY OF ROCKLAND

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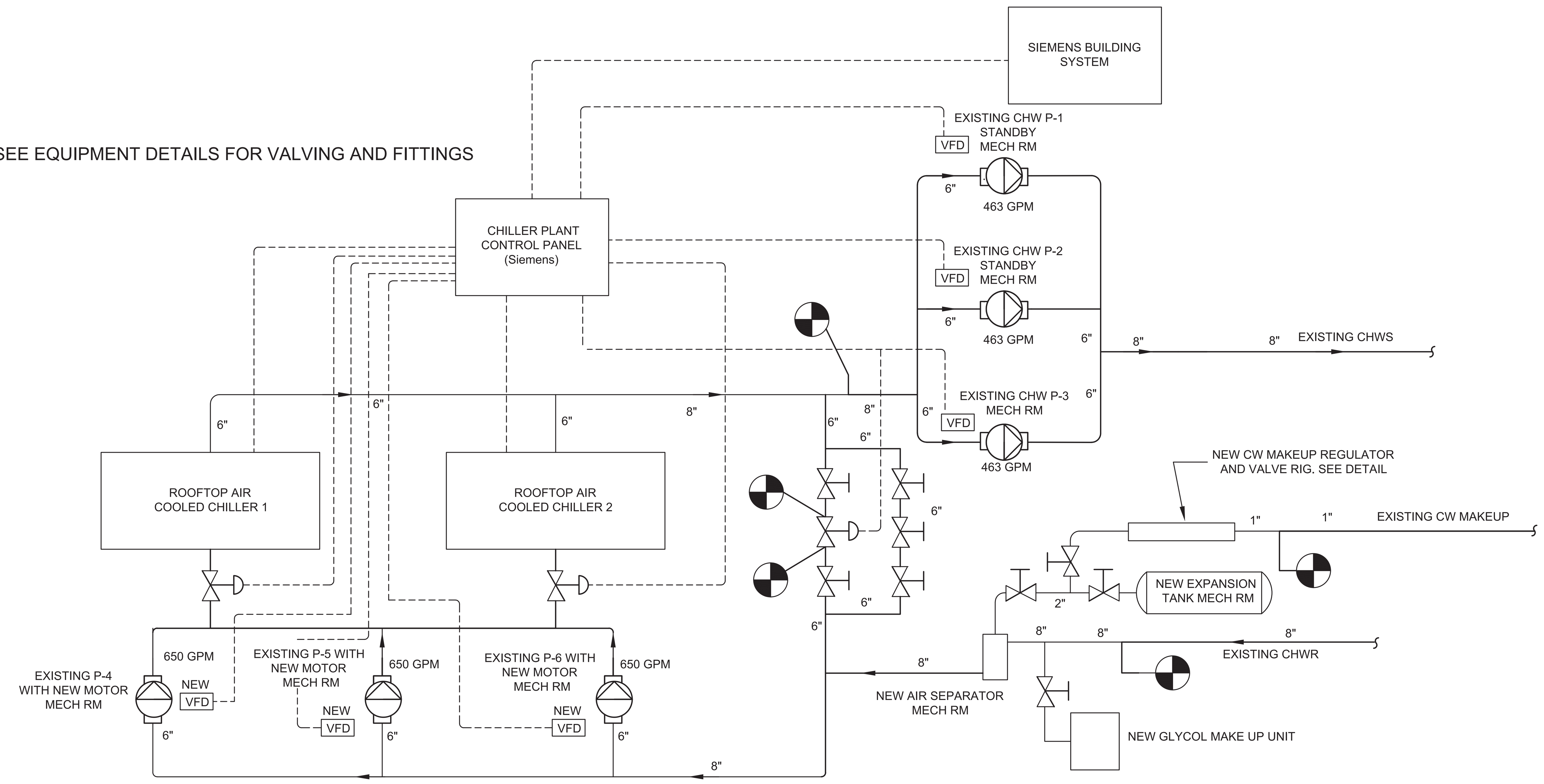
Drawing Title
MECHANICAL ANNEX GYM ROOF - INSTALL

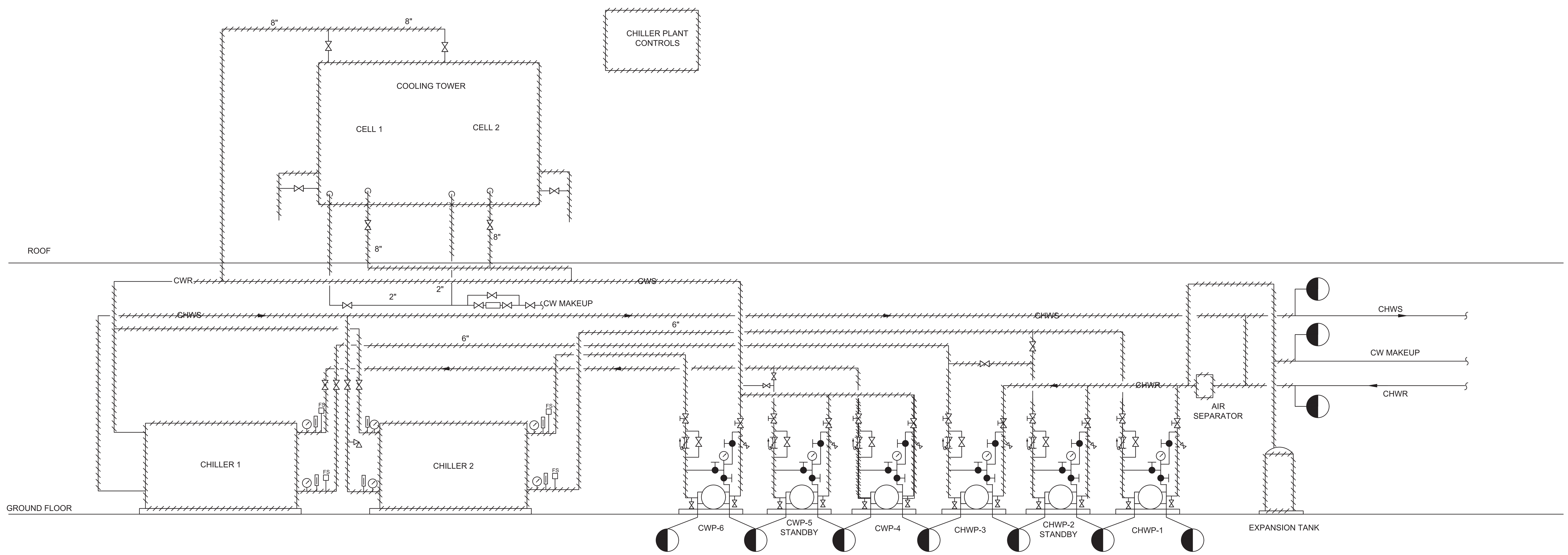
Drawing No.
M-106

SEE EQUIPMENT DETAILS FOR VALVING AND FITTINGS



2 CHILLED WATER RISER - INSTALLATION

SCALE: NONE



DISCONNECT, REMOVE AND DISPOSE

1 CONDENSER & CHILLED WATER RISER - DEMOLITION

SCALE: NONE

N.I.C.

0 1/2 1 IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

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Structural Engineer:

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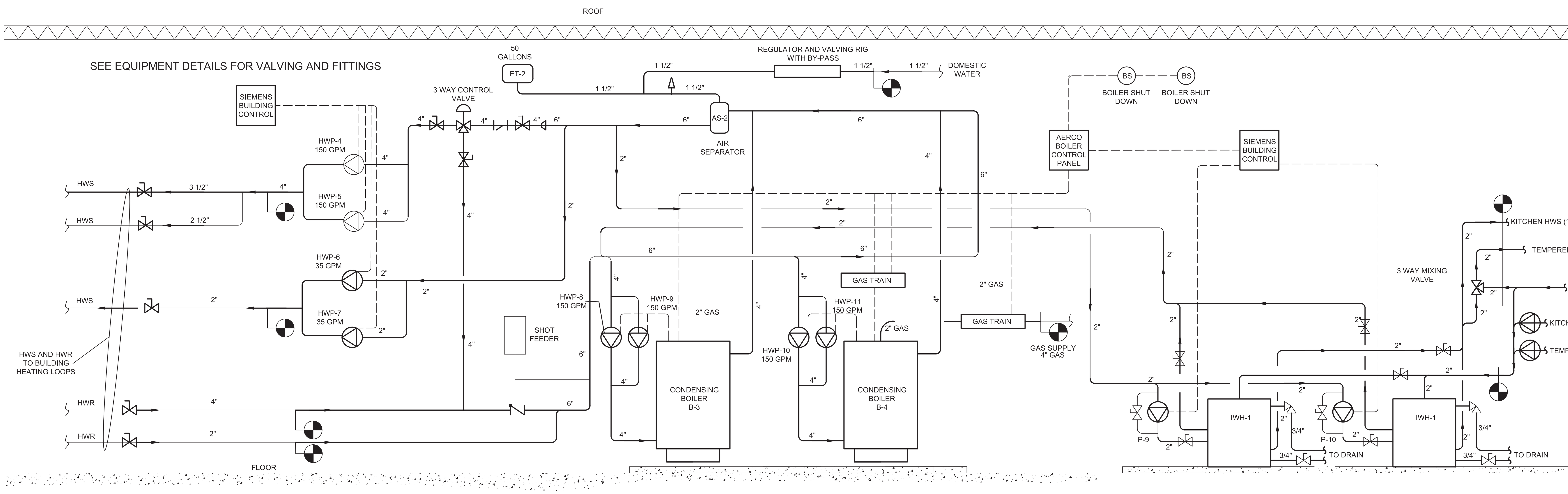
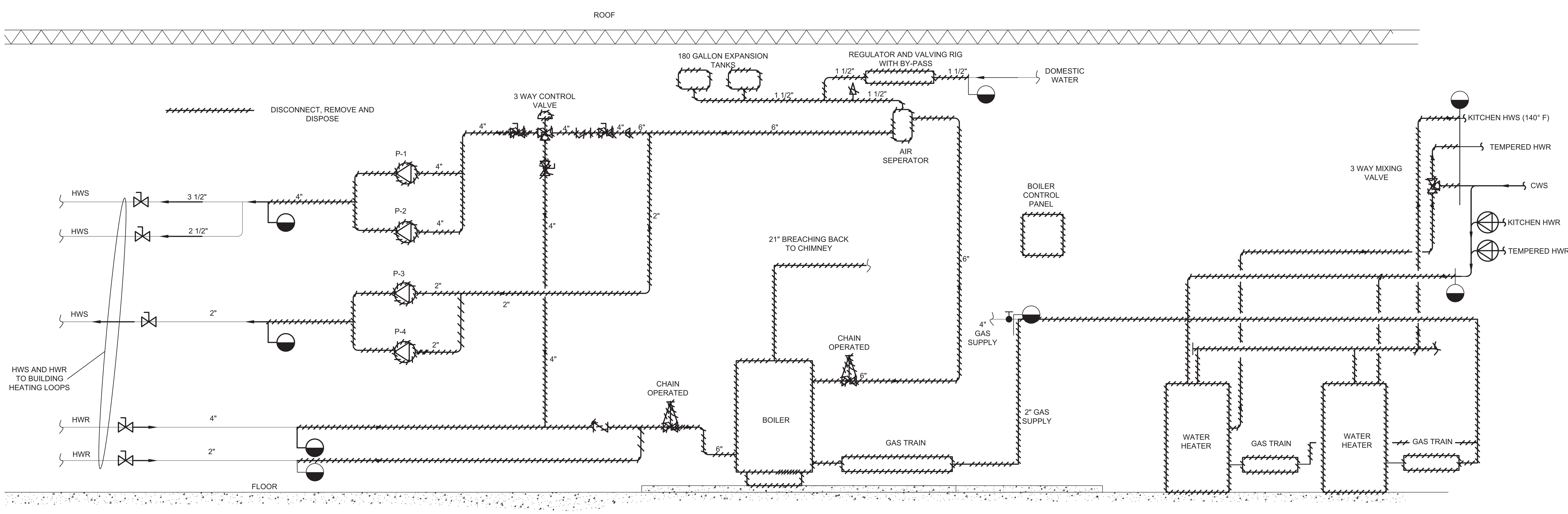
Drawing Title: MECHANICAL RISER DIAGRAM - CHILLER

Drawing No. **M-301**



2 BOILER RISER DIAGRAM - INSTALLATION

SCALE: NONE



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COUNTY OF ROCKLAND

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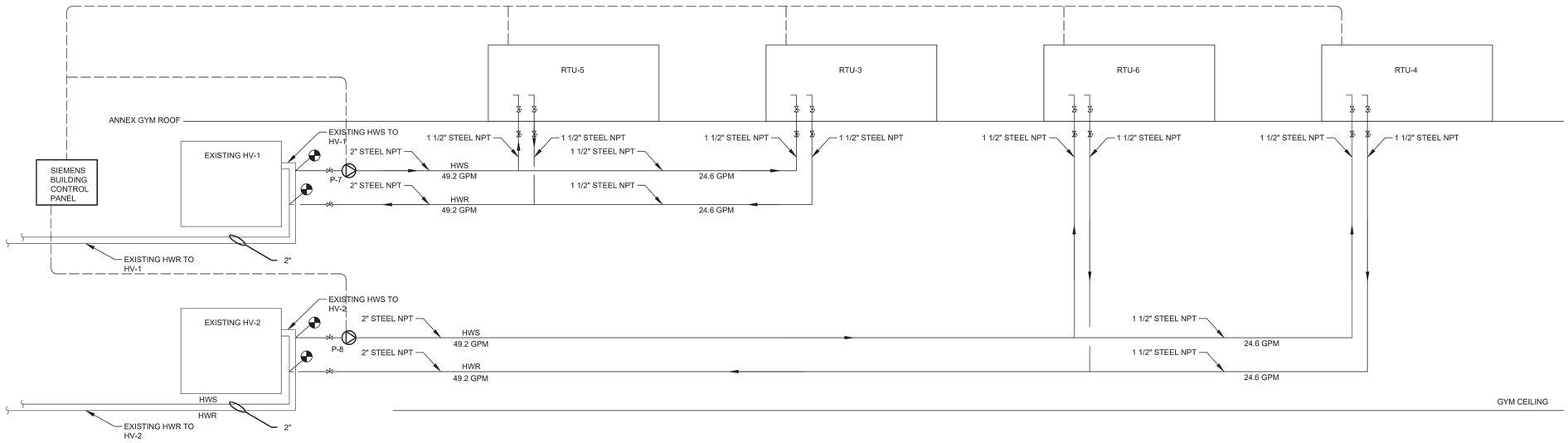
Drawing Title: MECHANICAL RISER DIAGRAM - BOILER

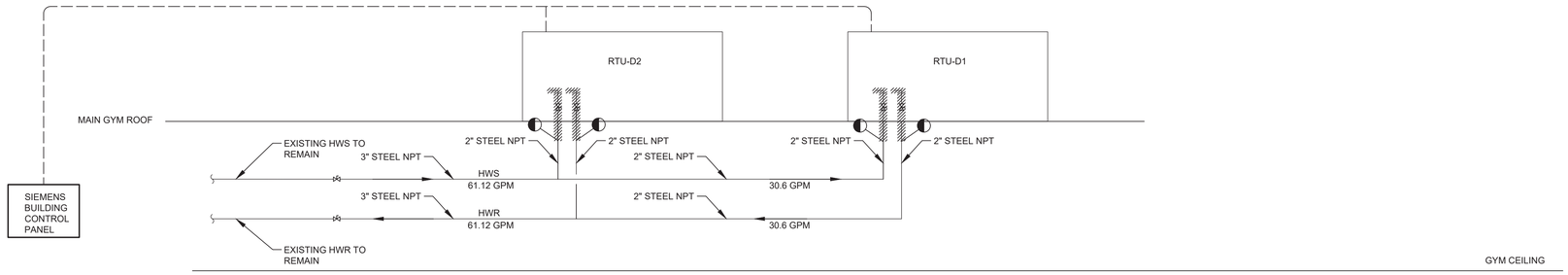
Drawing No. M-302



ANNEX GYM MEZZANINE

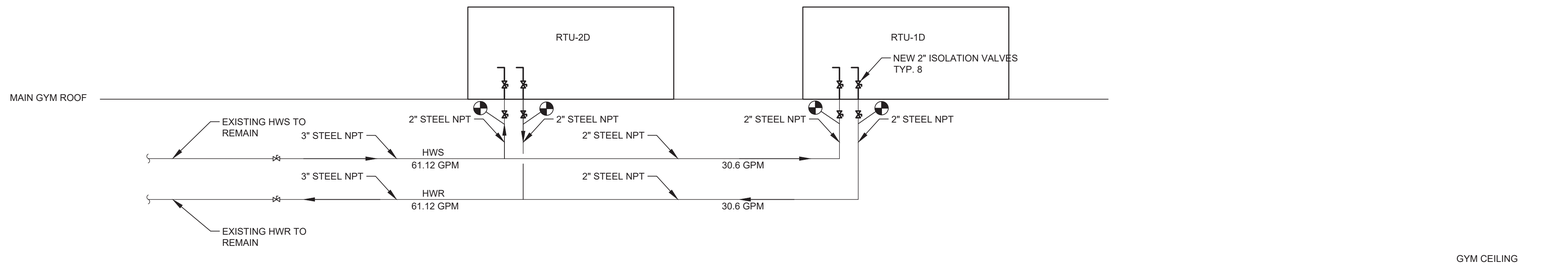
1 ANNEX GYM HOT WATER PIPING DIAGRAM

SCALE: NONE



2 MAIN GYM HOT WATER PIPING DIAGRAM - REMOVAL

SCALE: NONE



3 MAIN GYM HOT WATER PIPING DIAGRAM - INSTALLATION

SCALE: NONE

IF THIS BAR DOES NOT MEASURE 1", THEN DRAWING IS NOT TO FULL SCALE

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Drawing Title
MECHANICAL RISER DIAGRAM - ANNEX GYM

Drawing No.
M-303

<u>SEQUENCE OF OPERATIONS:</u>

REFER TO SPECIFICATION SECTION 230993 FOR SEQUENCE OF OPERATION AND CONTROL OF MECHANICAL EQUIPMENT LISTED AND SHOWN ON DRAWING M003. REFER TO MECHANICAL EQUIPMENT SPECIFICATIONS FOR ADDITIONAL INFORMATION.

A. GENERAL:

1. THE OCCUPANCY MODE (UNOCCUPIED OR OCCUPIED) SHALL BE DETERMINED THROUGH A USER-DEFINABLE TIME SCHEDULE. SUMMERTIME MODE SHALL INCLUDE TIMES DURING WHICH HEATING IS NOT REQUIRED. WINTERTIME MODE SHALL INCLUDE TIMES DURING WHICH HEATING IS REQUIRED.
2. BOILER B-3 SHALL BE THE PRIMARY LEAD BOILER. BOILER B-4 SHALL BE THE LAG BOILER, SEE LEAD-LAG PROGRAMMING CONTROLS BELOW.
3. BOILER B-4 SHALL RUN WHEN MAINTENANCE IS REQUIRED ON BOILER B-3.
4. NEW BREAK GLASS STATION AT EACH BOILER ROOM DOORWAY SHALL SHUT DOWN BOTH BOILER PRIMARY CONTROL CIRCUITS AND CLOSE MAIN FUEL VALVES.

B. WINTERTIME OCCUPIED MODE:

HEATING MODE SHALL BE INITIATED WHEN OUTSIDE TEMPERATURE FALLS BELOW 55°F, (ADJUSTABLE). THE HOT WATER BOILER SHALL BE ENGAGED AND MAINTAIN AT LEAST MINIMUM HOT WATER TEMPERATURE REQUIRED BY THE BOILER.

1. BOILER B-3: B-3 SHALL MODULATE TO MAINTAIN HOT WATER SUPPLY TEMPERATURE SETPOINT OF 180°F (ADJ.).
   a. PUMP P-4/5: P-4/5 SHALL BE ENERGIZED AND SHALL OPERATE AT A CONSTANT SPEED WHENEVER B-3 IS ENERGIZED (HARDWIRED TO BOILER CONTROLLER). B-3 SHALL NOT OPERATE UNLESS P-4/5 IS RUNNING. P-4/5 FLOW RATE SHALL BE IN ACCORDANCE WITH BOILER MANUFACTURER'S PUMPING REQUIREMENTS.
   b. B-3 BURNERS SHALL FULLY MODULATE AS FACTORY BURNER SET PROGRAMMING.
   c. LOW RETURN TEMPERATURE: WHENEVER THE HOT WATER RETURN TEMPERATURE FALLS BELOW 140°F (ADJ.) AND B-1 IS ENERGIZED, AN ALARM SHALL GENERATE.

2. BOILER B-4: B-4 SHALL MODULATE TO MAINTAIN HOT WATER SUPPLY TEMPERATURE SETPOINT OF 180°F (ADJ.).
   a. PUMP P-6/7: P-6/7 SHALL BE ENERGIZED AND OPERATE AT VARIABLE SPEED WHENEVER B-4 IS ENERGIZED (HARD WIRED TO BOILER CONTROLLER). B-4 SHALL NOT OPERATE UNLESS P-6/7 IS RUNNING. P-6/7 FLOW RATE SHALL BE IN ACCORDANCE WITH BOILER MANUFACTURER'S PUMPING REQUIREMENTS.
   b. B-4 BURNERS SHALL FULLY MODULATE AS FACTORY BURNER SET PROGRAMMING.
   c. LOW RETURN TEMPERATURE: WHENEVER THE HOT WATER RETURN TEMPERATURE FALLS BELOW 140°F (ADJ.) AND B-4 IS ENERGIZED, AN ALARM SHALL GENERATE.

3. SECONDARY PUMPS:
   a. PUMPS P-8/9 AND P-10/11: P-8/9 AND P-10/11 SHALL OPERATE AT VARIABLE SPEED TO MAINTAIN ZONE HOT WATER SUPPLY TEMPERATURE AT A SETPOINT (BASED ON OUTSIDE AIR TEMPERATURE RESET) WHENEVER ANY OF THE PRIMARY PUMPS (P-4/5 OR P-6/7) IS ENERGIZED.
   b. PUMPS P-8/9 AND P-10/11: P-8/9 AND P-10/11 SHALL ALTERNATE TO EQUALIZE RUN TIME. SELECTION OF LEAD PUMP IS EVALUATED ON A WEEKLY BASIS. THE PUMP WITH THE LEAST RUNTIME IS THE LEAD PUMP. THE PUMP WITH THE MOST RUNTIME IS THE LAG PUMP.
   c. THE DDC SYSTEM USES CURRENT SWITCHES TO CONFIRM THE LEAD PUMP IS IN THE DESIRED STATE (I.E. ON OR OFF) AND GENERATES AN ALARM IF STATUS DEVIATES FROM DDC START/STOP CONTROL. IF THE LEAD PUMP GOES INTO ALARM, THE LAG PUMP STARTS.

4. OUTSIDE AIR TEMPERATURE RESET:
   a. NATURAL GAS MODE (BOILER B-4): B-4 SHALL MODULATE TO MAINTAIN HOT WATER SETPOINT ACCORDING TO THE MANUFACTURER'S SUGGESTED PROTOCOL. HOT WATER SUPPLY TEMPERATURE MAY BE RESET TO 140 DEG F (ADJ.)
   b. OUTSIDE AIR RESET MODE SHALL BE CANCELED IF THE PRIMARY HOT WATER RETURN TEMPERATURE DROPS TO 140 DEG F. (ADJ.) WHENEVER B-3 IS ENERGIZED. THERE IS NO HOT WATER RETURN LOW LIMIT FOR B-4.

5. LEAD LAG PROGRAMMING CONTROL:

   A LEAD-LAG PROGRAMMING CONTROL SHALL SEQUENCE AUTOMATICALLY THE FIRING OF MULTIPLE BOILERS WITH CHANGING LOAD CONDITIONS. THE FIRST (LEAD) BOILER STARTS-UP AND REACHES ITS BURNER DELIVERY (HIGH FIRE) RATE. IF THE FIRST BOILER IS UNABLE TO MEET THE REQUIRED WATER TEMPERATURE, THE SECOND (LAG) BOILER SHALL AUTOMATICALLY FIRE. BOILERS SHALL OPERATE IN UNISON, MODULATING TO MEET THE DEMAND. IF THE DEMAND IS LESS THAN THE CAPACITY PROVIDED BY BOTH BOILERS FIRING AT LOW FIRE, THE LAG BOILER SHALL AUTOMATICALLY SHUT DOWN. THE LEAD BOILER SHALL SHUT DOWN WHEN THE DEMAND HAS BEEN EXCEEDED. SELECTION OF THE LEAD BOILER SHALL BE MADE EITHER MANUALLY BY MEANS OF A SELECTOR DIAL ON THE CONTROL CABINET OR AUTOMATICALLY AS A FUNCTION OF RUN TIME.

6. BURNER OPERATING CONTROLS:

   TO MAINTAIN SAFE OPERATING CONDITIONS, THE FOLLOWING BURNER SAFETY CONTROLS LIMIT BURNER OPERATION.
   a. HIGH TEMPERATURE LIMIT: AUTOMATIC AND MANUAL RESET STOPS BURNER IF OPERATING CONDITIONS RISE ABOVE MAXIMUM BOILER DESIGN TEMPERATURE. LIMIT SWITCH TO BE MANUALLY RESET ON THE CONTROL INTERFACE.
   b. LOW-WATER CUTOFF SWITCH: ELECTRONIC PROBE SHALL PREVENT BURNER OPERATION ON LOW WATER. CUTOFF SWITCH SHALL BE MANUALLY RESET ON THE CONTROL INTERFACE.
   c. BLOCKED INLET SAFETY SWITCH: MANUAL-RESET PRESSURE SWITCH FIELD MOUNTED ON BOILER COMBUSTION-AIR INLET.
   d. HIGH AND LOW GAS PRESSURE SWITCHES: PRESSURE SWITCHES SHALL PREVENT BURNER OPERATION ON LOW OR HIGH GAS PRESSURE. PRESSURE SWITCHES TO BE MANUALLY RESET ON THE CONTROL INTERFACE.
   e. BLOCKED DRAIN SWITCH: BLOCKED DRAIN SWITCH SHALL PREVENT BURNER OPERATION WHEN TRIPPED. SWITCH TO BE MANUALLY RESET ON THE CONTROL INTERFACE.
   f. LOW AIR PRESSURE SWITCH: PRESSURE SWITCHES SHALL PREVENT BURNER OPERATION ON LOW AIR PRESSURE. SWITCH TO BE MANUALLY RESET ON THE CONTROL INTERFACE.
   g. AUDIBLE ALARM: FACTORY MOUNTED ON CONTROL PANEL WITH SILENCE SWITCH; SHALL SOUND ALARM FOR ANY LOCKOUT CONDITIONS.
   h. EACH BURNER SHALL BE PROVIDED WITH A FLAME FAILURE (COMBUSTION SAFETY) PROGRAMMING CONTROL WHICH SHALL DE-ENERGIZE ALL ELECTRICALLY OPERATED FUEL VALVES AND BURNER EQUIPMENT WITHIN FOUR SECONDS, AND ACTUATE A VISUAL ALARM MOUNTED ON THE CONTROL PANEL AFTER AN OPERATING FLAME FAILURE HAS OCCURRED. AUTOMATIC START UP AND SHUTDOWN PROGRAMMING SHALL BE A PART OF THIS SAFETY EQUIPMENT.
   i. CARBON MONOXIDE SHUT DOWN: BURNER EQUIPMENT SHALL BE SHUT DOWN BY THE STAND ALONE CO SYSTEM ON DETECTION OF HIGH CARBON MONOXIDE LEVELS.
   j. LOW FIRE HOLD AQUASTAT: A LOW FIRE HOLD MINIMUM TEMPERATURE AQUASTAT SHALL LIMIT BURNER MODULATION TO PREVENT BOILER FROM MODULATING TO HIGH FIRE UNTIL WATER TEMPERATURE REACHES 180°F.

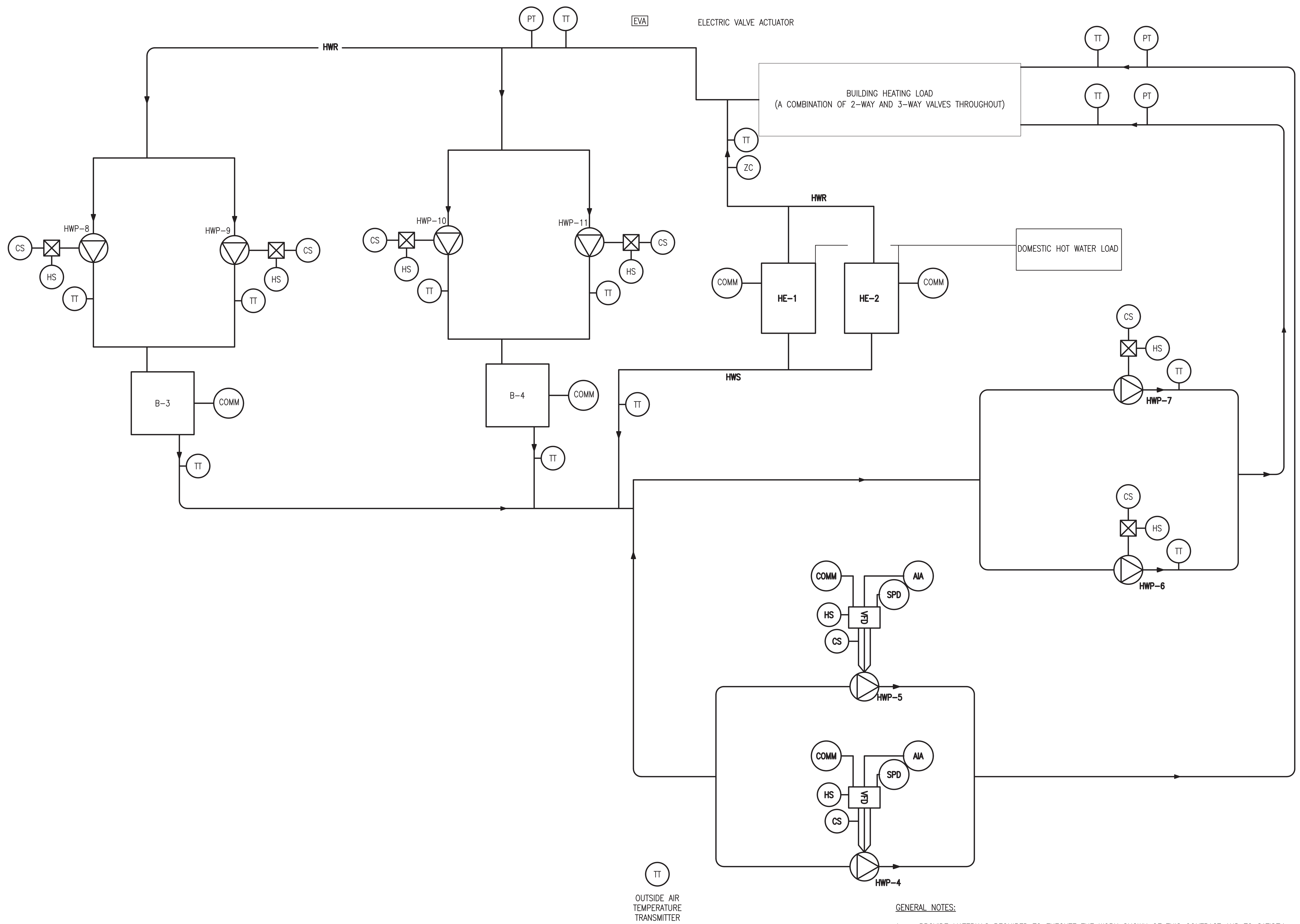
C. WINTERTIME UNOCCUPIED MODE: THE BOILER SHALL MODULATE ACCORDING TO THE SAME SEQUENCE ABOVE. THE TEMPERATURE CONTROL SYSTEM SHALL BE CAPABLE OF NIGHT SETBACK.

D. SUMMERTIME MODE: BOILERS B-3 AND B-4 SHALL BE TO MAINTAIN DOMESTIC HOW WATER HEATING REQUIREMENTS. THE SUMMER SWING VALVE SWITCH SHALL BE SET TO OFF. PRIMARY LOOP PUMPS SHALL BE OFF. SECONDARY LOOP PUMPS SHALL BE OFF.

<u>CONTROLS SYMBOLS</u>

TT	TEMPERATURE TRANSMITTER
PT	PRESSURE TRANSMITTER
CS	CURRENT TRANSMITTER
HS	HAND SWITCH (HAND–OFF–AUTO SWITCH)
ZC	VALVE OR DAMPER POSITION CONTROLLER
ES	DAMPER END SWITCH
VFD	VARIABLE FREQUENCY DRIVE
⊠	MOTOR STARTER
DPS	DIFFERENTIAL PRESSURE SENSOR
SPD	SPEED COMMAND
AIA	ANALOG INPUT
COMM	COMMUNICATION
ADJ	ADJUSTABLE
EVA	ELECTRIC VALVE ACTUATOR

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE



1 CONTROL SYSTEM SCHEMTIC DIAGRAM
SCALE: N.T.S.

<u>GENERAL NOTES:</u>

1. PROVIDE MATERIALS REQUIRED TO EXECUTE THE WORK SHOWN OF THIS CONTRACT AND TO SATISFY THE SEQUENCE OF OPERATIONS WHICH SHALL INCLUDE, BUT NOT BE LIMITED TO: LOW VOLTAGE WIRING, CONDUIT, MATERIALS, PROGRAMMING, SOFTWARE, HARDWARE, AND APPURTENANCES.
2. PROVIDE LOW VOLTAGE WIRING IN EMT CONDUIT THROUGHOUT. PAINT TO MATCH EXISTING FINISHES.
3. SCHEDULE THE WORK WITH THE OWNER AND NOTIFY THE OWNER AT LEAST 48 HOURS IN ADVANCE OF PERFORMING ANY SHUTDOWNS.
4. PERFORM CUTTING AND PATCHING AS REQUIRED TO ACCESS THE EXISTING VENT DAMPERS OR TO OTHERWISE EXECUTE THE WORK. RESTORE FINISHES TO MATCH EXISTING TO THE SATISFACTION OF THE OWNER.

No.	Date	Revisions
1	01/08/25	ISSUED FOR BID

REG. EXP DATE: 10-31-26

Drawn by A.W
Checked by P.C
Project No. 43065
Scale AS NOTED
Date 12/06/23

Mechanical & Electrical Engineer: GREENMAN PEDERSEN, INC
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Structural Engineer:

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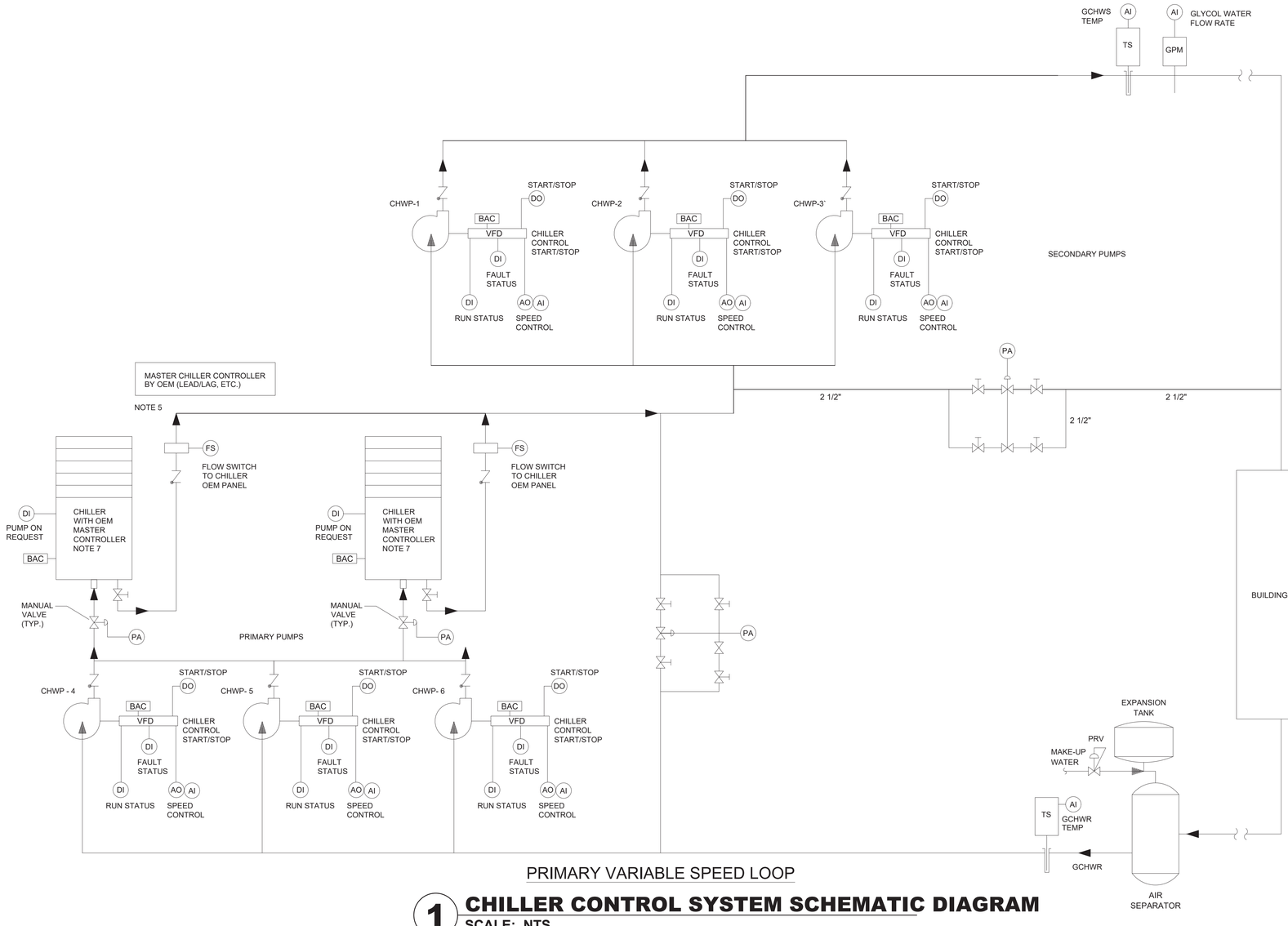
Drawing Title
MECHANICAL CONTROL DIAGRAMS - BOILER

Drawing No.
M-401

N.T.C.



PRIMARY VARIABLE SPEED LOOP

1 CHILLER CONTROL SYSTEM SCHEMATIC DIAGRAM

SCALE: NTS

NOTES:

1. FOR COMPLETE VALVE AND INSTRUMENTATION REQUIREMENTS SEE CONTRACT SPECIFICATION.
2. USE MODULATING 2-WAY VALVES FOR THROTTLING OF AHU AND TERMINAL UNITS.
3. PROVIDE A SYSTEM DIFFERENTIAL PRESSURE TRANSMITTER TO PROVIDE VARIABLE FLOW CONTROL SIGNAL TO AUTOMATICALLY CONTROL THE SPEED OF THE GLYCOL CHILLED WATER PUMP. PROVIDE SEPARATE CHILLER DIFFERENTIAL PRESSURE TRANSMITTER(S) TO MODULATE SYSTEM BYPASS VALVE(S). PROVIDE MODULATING 2-WAY BYPASS VALVES SIZED IN THE AGGREGATE FOR THE FLOW REQUIRED TO SATISFY THE CRITICAL MINIMUM FLOW OF GLYCOL PUMP (40-45% VFD) AND FOR FLOW REQUIREMENT OF CHILLER AT TRANSIENT FULL LOAD WITH MINIMUM FLOW. COORDINATE WITH CHILLER MANUFACTURER AND WATER BALANCER TO SET REQUIRED FLOW AND MINIMUM AMOUNT OF MODULAR CHILLER MODULES REQUIRED TO BE OPEN WHEN CHILLER IS IDLE TO ENSURE PRIMARY LOOP GLYCOL PUMP IS NEVER "DEAD HEADED".
4. NOT USED
5. LOCAL MODULAR MASTER CHILLER CONTROL PANEL SHALL STAGE ON AS REQUIRED THE INTERNAL MODULAR CHILLER MODULES TO SATISFY THE WATER TEMPERATURE SETPOINT. CHILLER MANUFACTURER SHALL ROTATE LEAD MODULE TO ENSURE EQUAL RUN TIME ON ALL MODULES. CHILLER MANUFACTURER SHALL CONFIGURE MASTER CHILLER CONTROL PANEL TO ALLOW CURRENT LEAD MODULE AND ANY OTHER MODULE NEEDED TO BE OPEN TO ALLOW SYSTEM FLOW, EVEN IF THE CHILLER IS IDLE. TCC SHALL WIRE AN OEM PROVIDED FLOW SWITCH TO CHILLER MASTER PANEL AS SAFETY INTERLOCK. TCC SHALL INTEGRATE CHILLER OEM MASTER PANEL VIA BACnet INTERFACE TO THE BMS/DDC SYSTEM. TCC SHALL PROVIDE ALL PRIMARY LOOP CONTROL AND MONITORING REQUIREMENTS AS PER THE POINTS LIST.
6. SECONDARY LOOP CONTROLS INCLUDING LAG/LEAD OF SECONDARY PUMPS AND MODULATION OF PRIMARY LOOP HX CONTROL VALVE TO MAINTAIN SECONDARY LOOP SUPPLY TEMPERATURE BY TCC. ALL OTHER SECONDARY LOOP MONITORING AND CONTROLS INCLUDING SECONDARY LOOP DIFFERENTIAL PRESSURE TRANSMITTER AND BYPASS VALVE CONTROL BY TCC.
7. EACH MODULE SHALL BE PROVIDED WITH A MOTORIZED ISOLATION VALVE (NOT SHOWN) CONTROLLED BY OEM.
8. PROVIDE DIFFERENTIAL PRESSURE TRANSMITTER TO PROVIDE VARIABLE FLOW CONTROL SIGNAL TO OPERATING SECONDARY CHILLED WATER PUMPS AND DIFFERENTIAL PRESSURE VALVE. PROVIDE 2-WAY VALVE BYPASS SIZED IN THE AGGREGATE FOR THE FLOW REQUIRED TO SATISFY THE CRITICAL MINIMUM FLOW (40%-45% VFD SPEED). TCC TO COORDINATE WITH WATER BALANCER.
9. PROVIDE OEM SUPERVISORY MASTER CONTROLLER TO LEAD/LAG CONTROL MULTIPLE CHILLER BANKS.
10. DIFFERENTIAL PRESSURE SHALL BE MEASURED AT OR NEAR THE MOST REMOTE TERMINAL UNIT OR THE TERMINAL UNIT REQUIRING THE GREATEST DIFFERENTIAL PRESSURE.
11. ALL CONTROL VALVES TO HAVE MANUEL BY-PASS WITH ISOLATION VALVES AND BALANCING VALVE.

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

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Structural Engineer:

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Drawing Title
MECHANICAL CONTROL DIAGRAM - CHILLER

Drawing No.
M-402

GENERAL NOTES

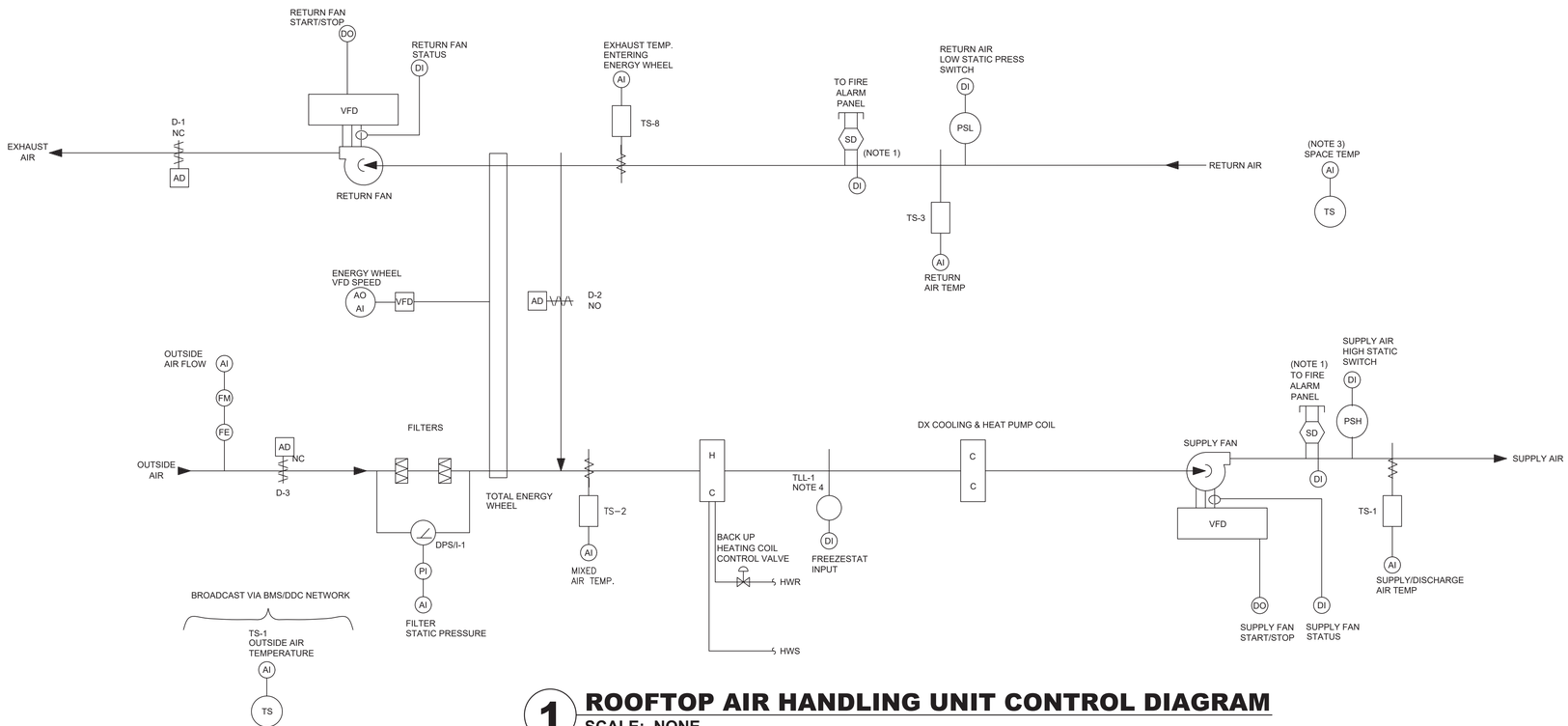
1. DUCT SMOKE DETECTORS SHALL BE PROVIDED IN MAIN SUPPLY AND RETURN DUCT FOR SYSTEMS OVER 1,000 CFM AND ALSO UPSTREAM OF EACH STORY RETURN DUCT/ RISER CONNECTION WHERE RETURN AIR RISERS SERVE TWO OR MORE STORIES FOR SYSTEMS OVER 15,000 CFM.
2. INTEGRATE AIR FLOW MEASURING APPARATUS INTO THE BMS/DDC NETWORK. PROVIDE ONE OUTSIDE AIR FLOW MEASURING STATION FOR EACH OUTSIDE AIR INTAKE PORT. PROVIDE FACTORY INSTALLED AIRFLOW STATION.
3. PROVIDE NEW THERMOSTATS WITH LOCK BOXES IN ROOMS BEING SERVED BY AHU. CONTRACTOR SHALL PROVIDE ALL ASSOCIATED CONTROL WIRING.
4. SAFETY SHUTDOWN DEVICES SHALL BE HARDWIRED TO THE FAN STARTER CIRCUIT IN ADDITION TO THE DDC SYSTEM. COORDINATE WITH MANUFACTURER FOR SHUTDOWN UNDER ALL MODES OF OPERATION.
5. MECHANICAL CONTRACTOR SHALL HIRE A FIRE ALARM SUBCONTRACTOR. FIRE ALARM CONTRACTOR TO FURNISH FIRE ALARM SYSTEM COMPLIANT SMOKE DETECTORS TO THE MECHANICAL CONTRACTOR WHO SHALL IN TURN FURNISH THEM TO THE CENTRAL AIR HANDLING UNIT MANUFACTURER FOR FACTORY INSTALLATION OR TO THE SHEET METAL CONTRACTOR FOR FIELD DUCTWORK INSTALLATION FOR THE FLOOR RETURN/RISER RETURN CONNECTIONS AS APPLICABLE. CONTRACTOR SHALL PROVIDE ALL SIGNAL AND CONTROL POWER WIRING TO UNIT.
6. CONTRACTOR TO PROVIDE OCCUPANCY SENSORS IN EACH SPACE. SENSORS ARE TO BE INTERCONNECTED TO THE BMS.

LEGEND

VFD	VARIABLE FREQUENCY DRIVE
TLL-1	TEMPERATURE LOW LIMIT
TCC	TEMPERATURE CONTROLS CONTRACTOR
TS-1	OUTSIDE AIR TEMP
TS-2	MIXED AIR TEMP
TS-3	HEATING COIL DISCHARGE
TS-4	DISCHARGE AIR TEMP
TS-5	RETURN AIR TEMP
FE	FLOW ELEMENT
FM	FLOW METER
DCV	DEMAND CONTROL VENTILATION
CO2	CARBON DIOXIDE
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
AI	ANALOG INPUT
AO	ANALOG OUTPUT
LON	LONWORKS NETWORK CONNECTION
BMS	BUILDING MANAGEMENT SYSTEM
PSL	PRESSURE SWITCH LOW
PSH	PRESSURE SWITCH HIGH
DPS/I	DIFF. PRESSURE SWITCH/INDICATOR
AD	DPR ACTUATORS

DIAGRAM NOTES

1. THE POINT LISTED HEREIN ARE THE MINIMUM POINTS REQUIRED FOR THE CONTROL AND MONITORING OF THIS EQUIPMENT. THIS POINT LIST IS TYPICAL FOR EACH MECHANICAL/ELECTRICAL SYSTEM OF THIS TYPE. IF THE SEQUENCE OF OPERATION REQUIRES ADDITIONAL OR DIFFERING INFORMATION, IT MUST BE PROVIDED BY THE RESPECTIVE PROVIDER OF THE CONTROLS FOR THIS TYPE OF EQUIPMENT AS COORDINATED BY THE GENERAL AND MECHANICAL CONTRACTORS.
2. THE TCC SHALL PROVIDE ALL DIGITAL ALARM LOGIC. ALL DIGITAL ALARMS SHALL BE COMPATIBLE WITH THE EXISTING SIEMENS BMS SYSTEM.
3. THE TCC SHALL PROVIDE ALL TRENDING AND ANALOG ALARMING VIA THE SOFTWARE USED AT THE EXISTING SIEMENS BMS SYSTEM.
4. PROVIDE ACCUMULATED AIR FLOW FOR VALIDATION OF PURGE-MODE AND FOR PERMANENT VALIDATION OF OCCUPANT VENTILATION.
5. PROVIDE MANUAL RESET DEVICE. NOTE THAT THIS DEVICE BOTH ALARMS IN THE BMS AND IS HARDWIRED TO THE VFDS FOR SHUTDOWN OF THE FANS IN ALL OPERATING CONDITIONS OF THE VFD.
6. PROVIDE THE ALARM WHEN AT THE CALCULATED DIFFERENTIAL BETWEEN OUTSIDE AIR AND SPACE AIR CO2 VALUE IS 1000 ppm.
7. PROVIDE LON COMMUNICATION CONNECTION TO THIS DEVICE MAPPING ALL REQUIRED POINTS INTO THE LNS DATABASE.



1 ROOFTOP AIR HANDLING UNIT CONTROL DIAGRAM
SCALE: NONE

HEAT PUMPS ARE TO BE PRIMARY HEATING.
HOT WATER COILS TO BE SECONDARY BACK UP HEATING.
DURING DX COIL DEFROST MODE HOT WATER COILS TO BE USED.
HOT WATER VALVES TO BE 5% OPEN ALL TIME FOR FREEZE PROTECTION.
CIRCULATION PUMPS TO BE ON ALL TIMES.
SEE SEQUENCE OF OPERATION FOR DETAILS

0 1/2 1
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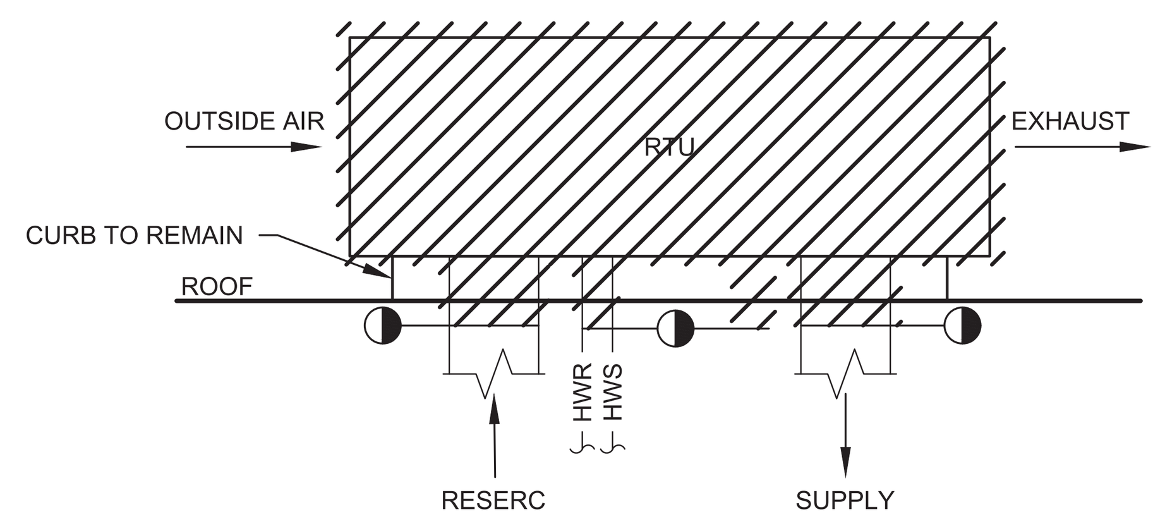
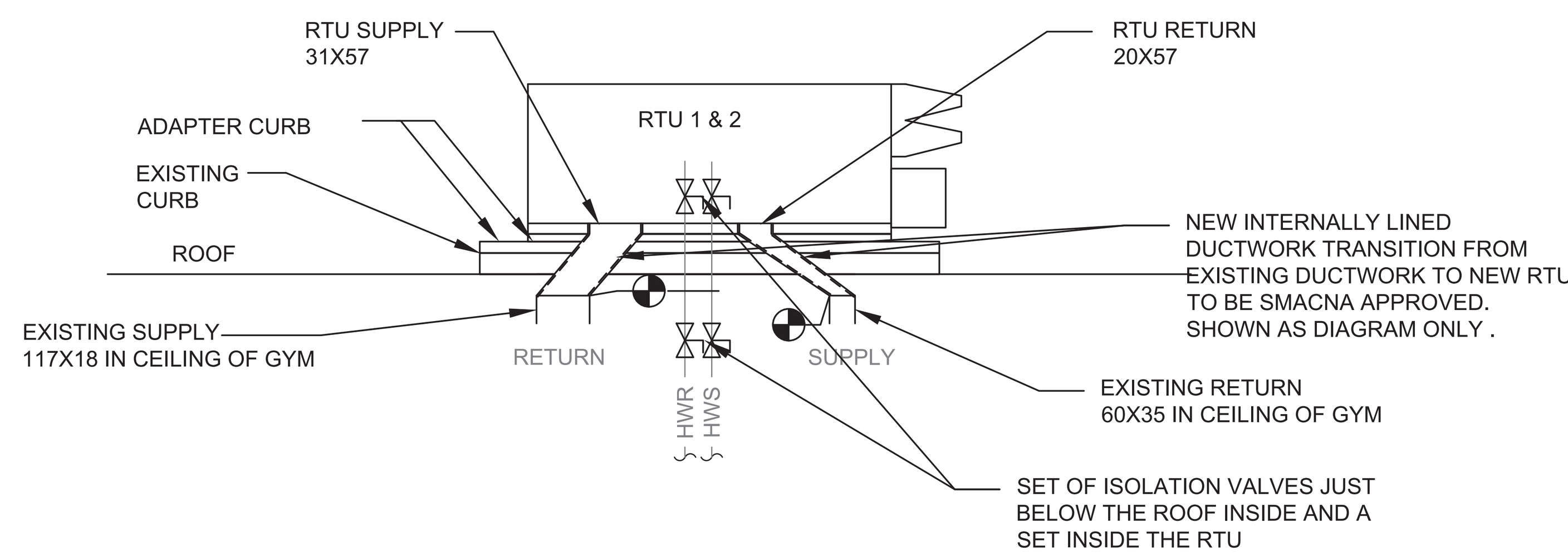
Drawing Title
MECHANICAL CONTROL DIAGRAMS - RTU'S

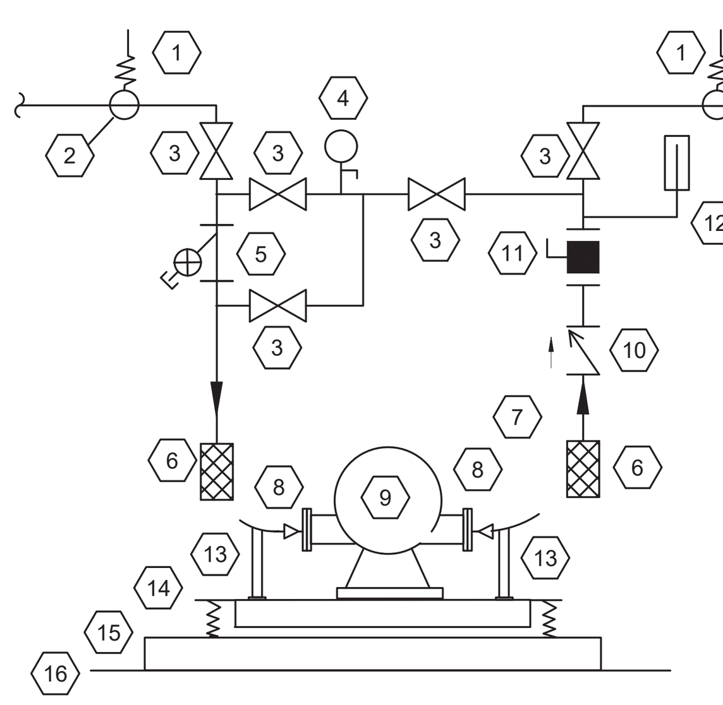
Drawing No.
M-403



1 RTU REMOVAL DETAIL
SCALE: NONE



2 RTU INSTALL DETAIL
SCALE: NONE

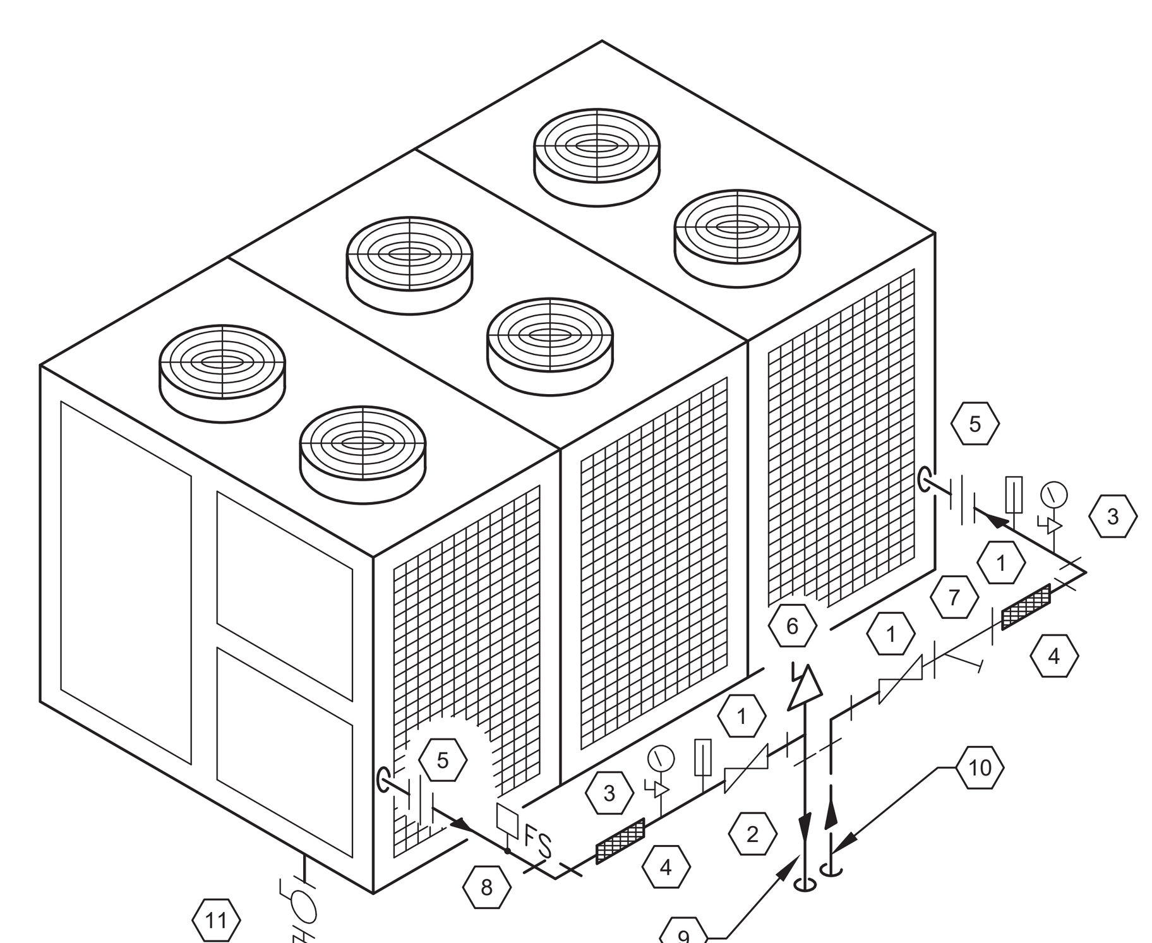


NOTES:

ALL TEMPERATURE AND PRESSURE MEASURING STATIONS SHOWN ABOVE SHALL BE LOCAL INDICATORS (I.E. THERMOMETER AND PRESSURE GAGES) SEE FLOW DIAGRAMS FOR ALL THE T, P, F REQUIRING INTERFACE WITH ENERGY MANAGEMENT SYSTEM.

1. SPRING TYPE VIBRATION ISOLATION PIPE HANGERS, TYPICAL
2. INSTALL HANGER AS CLOSE TO PIPE ELBOW AS POSSIBLE. PROVIDE SWAY CONSTRAINTS
3. SHUT OFF VALVE
4. PRESSURE GAGE (COMPOUND GAGE REQUIRED)
5. STRAINER W/ DRAIN
6. FLEX. CONNECTOR
7. LONG RADIUS ELBOW (TYPICAL)
8. PIPE INCREASER/DECREASER
9. PUMP
10. CHECK VALVE
11. BALANCING VALVE
12. THERMOMETER
13. 1" MIN. DIA. PIPE STAND (TYPICAL)
14. INERTIA BASE
15. 4" HIGH CONCRETE HOUSE KEEPING PAD
16. FLOOR

3 HOT AND CHILLED WATER PUMP DETAIL
SCALE: NONE



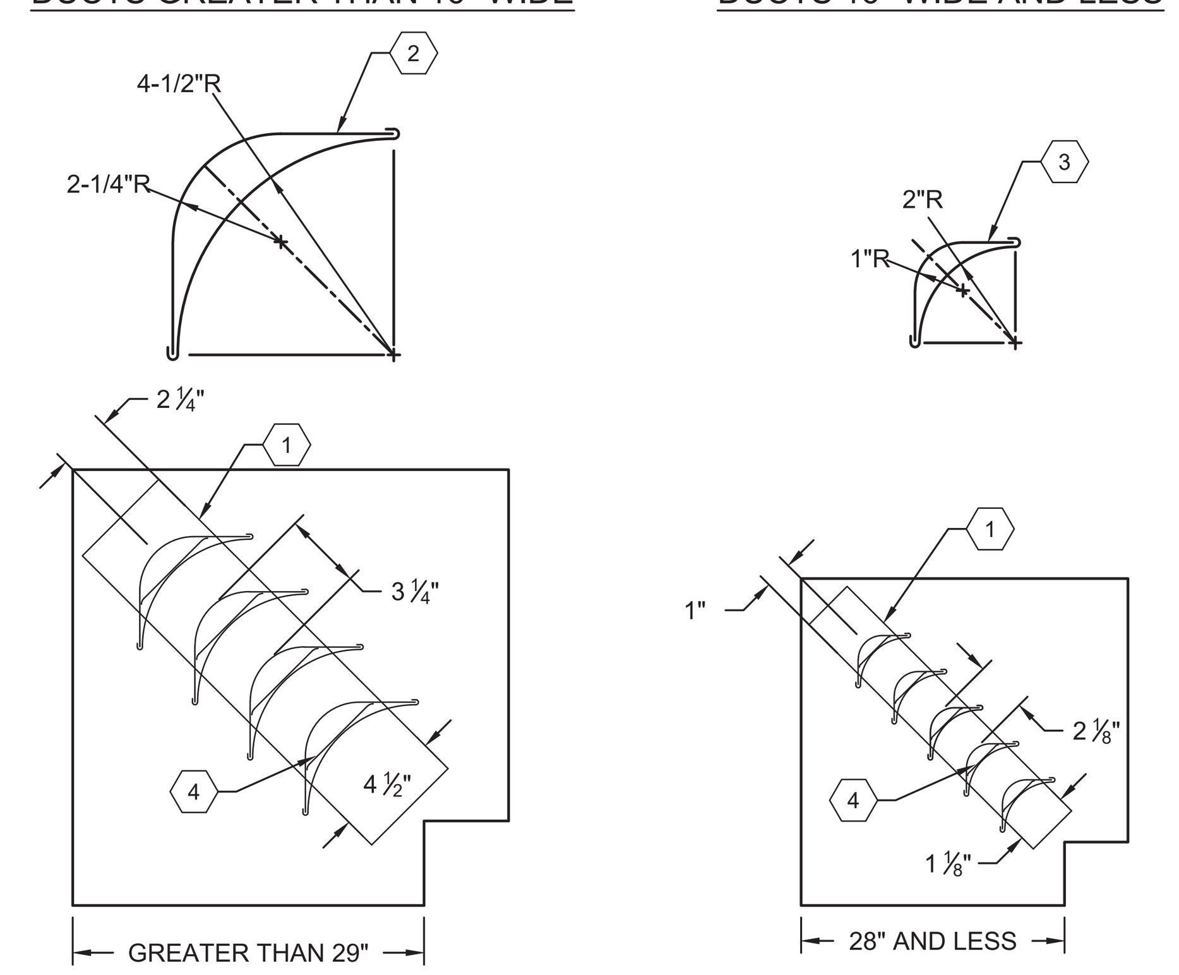
1. GATE VALVE
2. THERMOMETER
3. PRESSURE GAUGE
4. FLEXIBLE CONNECTOR
5. UNION
6. MANUAL AIR VENT
7. STRAINER
8. FLOW SWITCH
9. CHILLED WATER SUPPLY
10. CHILLED WATER RETURN
11. DRAIN VALVE

1 N.I.C.

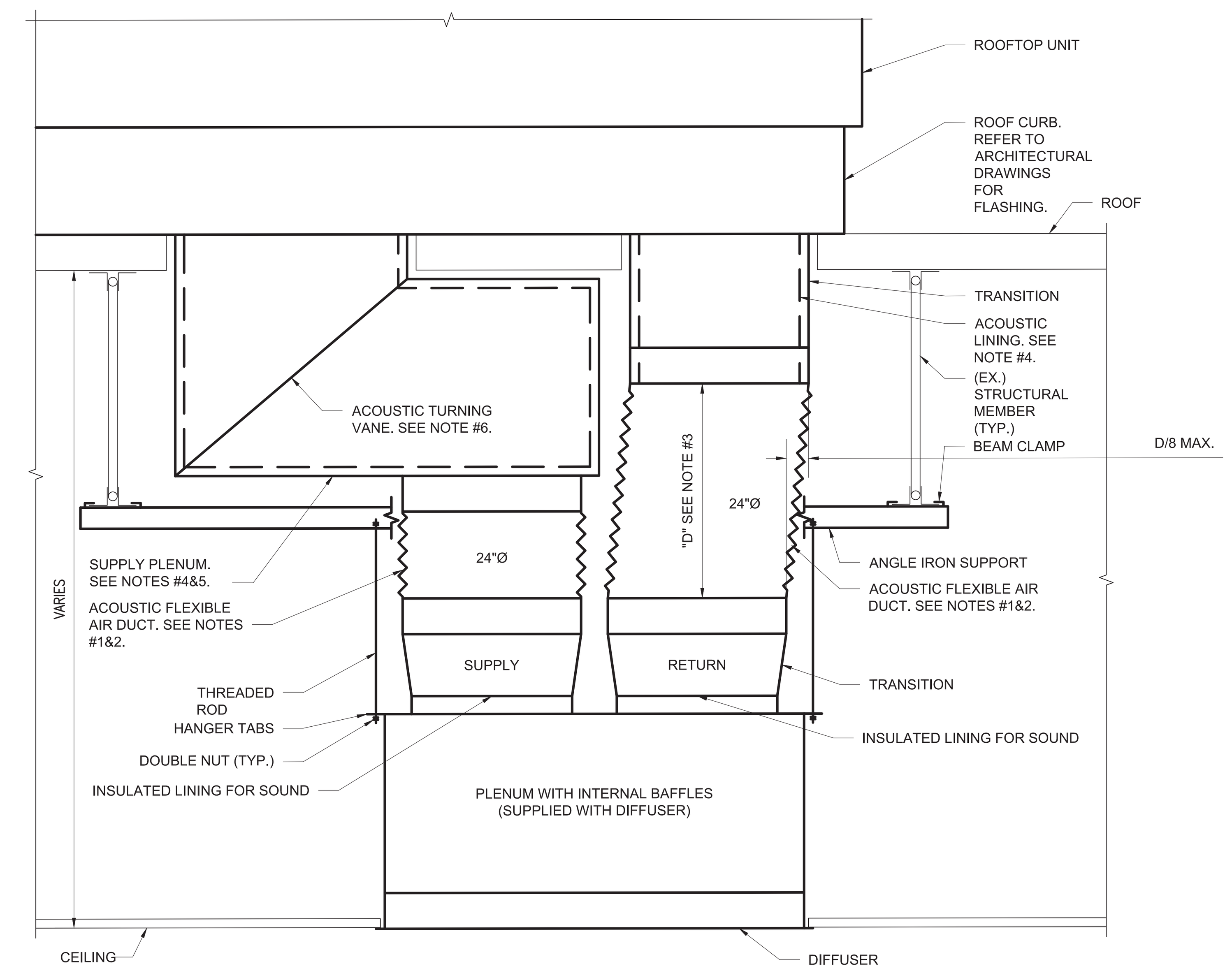
4 AIR COOLED CHILLER PIPING DETAIL
SCALE: NONE

1. 22 GA VANE RUNNER BOLTED, SCREWED OR WELDED TO DUCT
2. LARGE DOUBLE VANE, MIN 24 GA, 72" MAX UNSUPPORTED VANE LENGTH
3. SMALL DOUBLE VANE, MIN 26 GA, 48" MAX UNSUPPORTED VANE LENGTH
4. TURNING VANE MOUNTED ON EACH TAB OF RUNNER. EVERY RUNNER TAB MUST RECEIVE A TURNING VANE.

DUCTS GREATER THAN 16" WIDE | DUCTS 16" WIDE AND LESS



5 DUCTWORK DETAILS
SCALE: NONE



NOTES:
1. PROVIDE A UL LISTED ACOUSTIC FLEXIBLE AIR DUCT FACTORY COMPOSED OF A RESILIENT CALENDARED FILM LINER DUCT PERMANENTLY BONDED TO A COATED SPRING STEEL WIRE HELIX AND SUPPORTING A FIBERGLASS INSULATING BLANKET WITH LOW PERMEABILITY OUTER VAPOR BARRIER OF FIBERGLASS REINFORCED FILM LAMINATE. DUCT SHALL BE 24"Ø UNLESS OTHERWISE NOTED ON THE PLANS. BASIS OF DESIGN, THERMAFLEX M-KE.
2. MAXIMUM OFFSET FOR FLEXIBLE DUCT SHALL BE 1/8 OF ITS INSTALLED LENGTH. USE ROUND, LONG RADIUS GALVANIZED STEEL ELBOWS IF A GREATER OFFSET IS REQUIRED. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
3. FLEXIBLE DUCT SHALL BE LIMITED TO 5 FEET IN LENGTH.
4. DUCT SHALL BE INTERNALLY LINED WITH 1" THICK ACOUSTIC FIBERGLASS DUCT LINER (JOHNS MANVILLE LINACOUSTIC RC-HP OR EQUAL).
5. CLEAR INSIDE DIMENSIONS OF SUPPLY PLENUM SHALL BE 24"X24" MINIMUM.
6. PROVIDE 4" DOUBLE WALL ACOUSTIC TURNING VANES WHERE SHOWN (DUCTMATE 4AVGA24 OR EQUAL).

6 CONCENTRIC DIFFUSER RTU 3-6 DETAIL
SCALE: NONE

0 1/2 1
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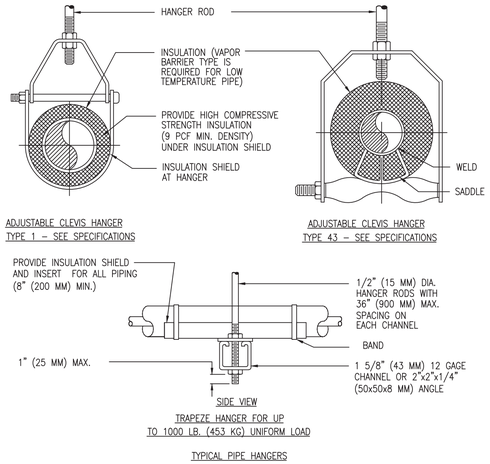
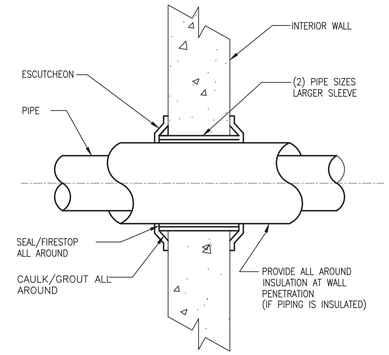
Drawing Title
MECHANICAL DETAILS - 1

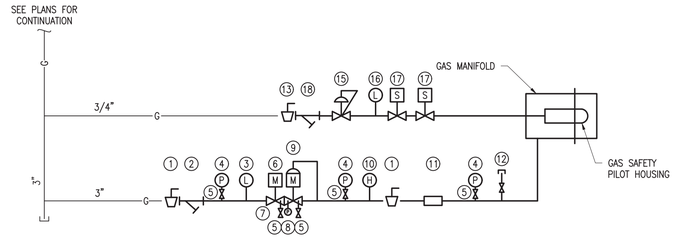
Drawing No.
M-501



1 PIPE HANGER DETAIL
SCALE: NTS



2 WALL PENETRATION
SCALE: NTS



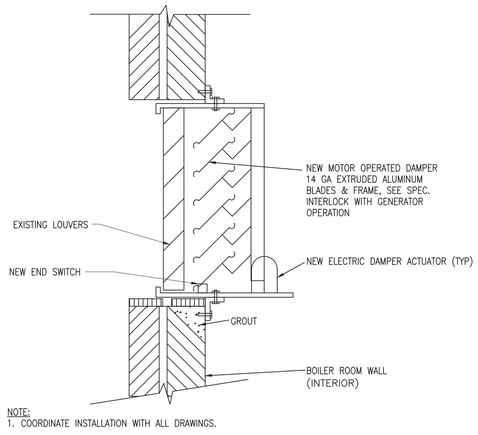
KEYED NOTES:

1 MANUAL BALL VALVE
2 MAIN GAS STRAINER
3 MAIN GAS LOW PRESSURE SWITCH
4 GAS PRESSURE GAUGE
5 MANUAL TEST VALVE
6 MAIN MOTORIZED GAS VALVE WITH PROOF OF CLOSURE
7 MAIN GAS VALVE BODY
8 GAS LOW PRESSURE SWITCH (AUTO RESET)
9 MAIN REGULATOR/MOTORIZED SHUTOFF GAS VALVE WITH PROOF OF CLOSURE
10 MAIN GAS HIGH PRESSURE SWITCH
11 FUEL FLOW CONTROL VALVE (BUTTERFLY VALVE)
12 TEST COCK WITH PLUG
13 PILOT MANUAL BALL VALVE
14 PILOT STRAINER
15 PILOT GAS PRESSURE REGULATOR
16 PILOT GAS LOW PRESSURE SWITCH (MANUAL RESET)
17 PILOT SOLENOID VALVE
18 PILOT STRAINER

NOTES:

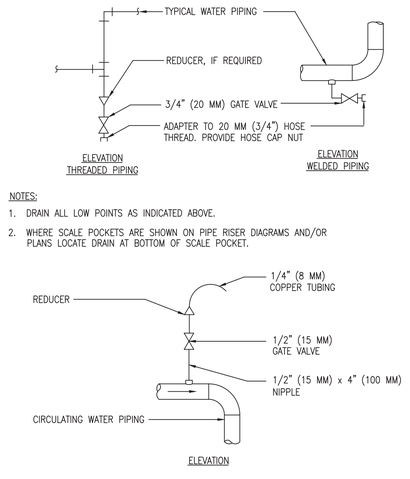
1. PROVIDE A LISTED, APPROVED, VENTLESS GAS TRAIN ASSEMBLY IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS AND SPECIFICATIONS.
2. SUBMIT BURNER GAS PIPING SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION.

3 BOILER GAS TRAIN
SCALE: NTS



NOTE:
1. COORDINATE INSTALLATION WITH ALL DRAWINGS.

4 MOTORIZED DAMPER DETAIL
SCALE: NTS

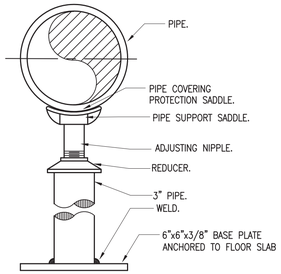


NOTES:
1. DRAIN ALL LOW POINTS AS INDICATED ABOVE.
2. WHERE SCALE POCKETS ARE SHOWN ON PIPE RISER DIAGRAMS AND/OR PLANS LOCATE DRAIN AT BOTTOM OF SCALE POCKET.

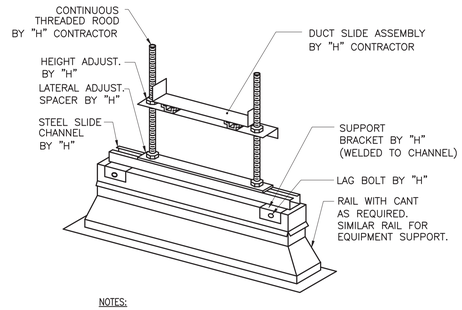
TYPICAL AIR VENT

NOTES:
1. VENT ALL HIGH POINTS INDICATED ABOVE.
2. IF AUTOMATIC AIR VENTS ARE USED, PIPE DISCHARGE TO DRAIN

5 AIR VENT AND DRAIN DETAIL
SCALE: NTS

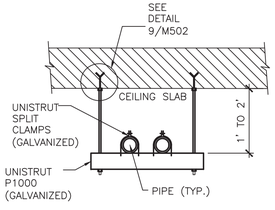


6 ADJUSTABLE PIPE/EQUIPMENT SUPPORT
SCALE: NTS

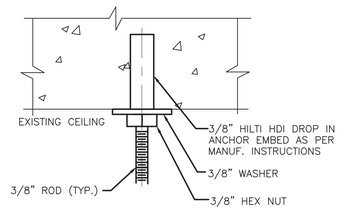


NOTES:
1. PIPING SUPPORTS TO BE INSTALLED 8'–0" ON CENTER.

7 ROOF DUCT SUPPORT
SCALE: NTS



8 PIPE SUPPORT DETAIL
SCALE: NTS



9 HANGER DETAIL
SCALE: NTS

No.	Date	Revisions
1	01/08/25	ISSUED FOR BID

REG. EXP DATE: 10-31-26

Drawn by A.W
Checked by P.C
Project No. 43065
Scale AS NOTED
Date 12/06/23

GREENMAN PEDERSEN, INC
2 EXECUTIVE BOULEVARD, SUITE 202, SUFFERN, NY 10901

Mechanical & Electrical Engineer:
Structural Engineer:

NORTH ROCKLAND HIGH SCHOOL CHILLER & HVAC UPGRADES
HIGH SCHOOL SED# 50-02-01-06-0-016-037
COUNTY OF ROCKLAND
108 Hammond Road, Pearl River, NY 10965

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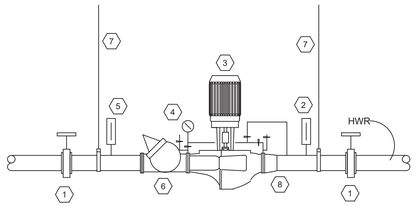
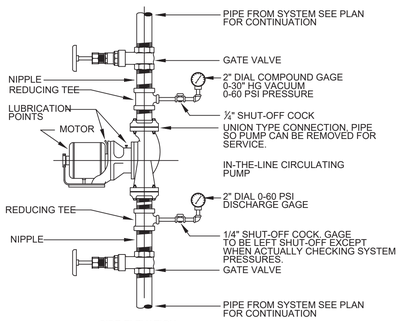
Drawing Title
MECHANICAL DETAILS - 2

Drawing No.
M-502



1. ISOLATION VALVE
2. THERMOMETER
3. INLINE PUMP
4. PRESSURE GAUGE
5. THERMOMETER
6. PUMP TRIPLE DUTY VALVE
7. PIPE HANGER
8. PIPE REDUCER (AS NEEDED)

1 INLINE PUMP DETAIL
SCALE: NTS



SIDE ELEVATION

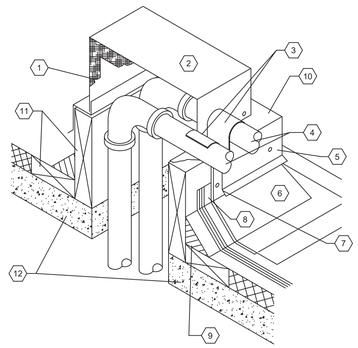
INSTALLATION NOTES

1. THE PUMP SHALL BE INSTALLED DEAD LEVEL, AND SHALL NOT TOUCH OR REST ON ANY PART OF THE BUILDING STRUCTURE.
2. THE ELECTRICAL CONNECTION TO THE PUMP SHALL BE MADE THROUGH THE USE OF FLEXIBLE CONDUIT (GREENFIELD) AT LEAST 18" LONG.
3. THE PUMP SHALL BE INSTALLED SO THAT THE PUMP CAN BE COMPLETELY REMOVED WITHOUT THE DISMANTLING OR REMOVAL OF ANY PIPING OR VALVES.
4. THE MOTOR AND COUPLING SHALL BE CHECKED AND PROPERLY ALIGNED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
5. THE ADJACENT PIPING SHALL BE CAREFULLY FITTED AND ERECTED SO THAT THE PUMP CAN BE INSTALLED OR REMOVED FROM THE PIPE WITHOUT FORCING OR SPRINGING.
6. AFTER THE SYSTEM HAS BEEN COMPLETED AND THE PUMP STARTED THE PUMP AND SYSTEM SHALL BE CHECKED FOR VIBRATION AND EXCESSIVE NOISE AND IMMEDIATELY CORRECTED.

LUBRICATION NOTES

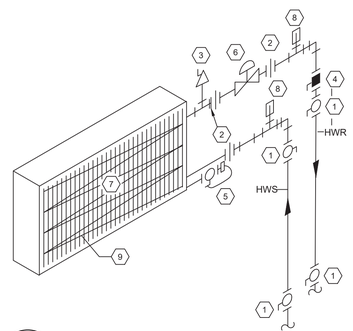
1. AFTER COMPLETION OF THE SYSTEM AND BEFORE START-UP . THE PUMP SHALL BE LUBRICATED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
2. A METAL INSTRUCTION PLATE SHALL BE ATTACHED TO THE PUMP IN A LOCATION WHERE IT IS CLEARLY VISIBLE. THESE INSTRUCTIONS SHALL INDICATE THE RECOMMENDED LUBRICANT, THE POINTS OF LUBRICATION, AND THE RECOMMENDED FREQUENCY OF LUBRICATION.

3 INLINE CIRCULATION PUMP AT BOILER DETAIL
SCALE: NTS



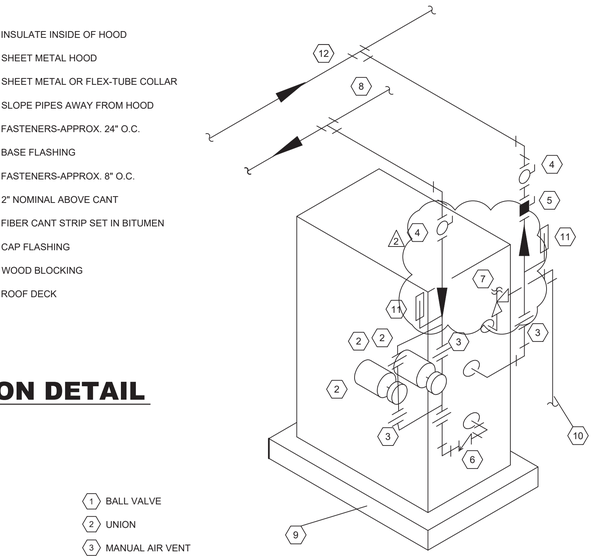
1. INSULATE INSIDE OF HOOD
2. SHEET METAL HOOD
3. SHEET METAL OR FLEX-TUBE COLLAR
4. SLOPE PIPES AWAY FROM HOOD
5. FASTENERS-APPROX. 24" O.C.
6. BASE FLASHING
7. FASTENERS-APPROX. 8" O.C.
8. 2" NOMINAL ABOVE CANT
9. FIBER CANT STRIP SET IN BITUMEN
10. CAP FLASHING
11. WOOD BLOCKING
12. ROOF DECK

2 ROOF PIPE PENETRATION DETAIL
SCALE: NTS



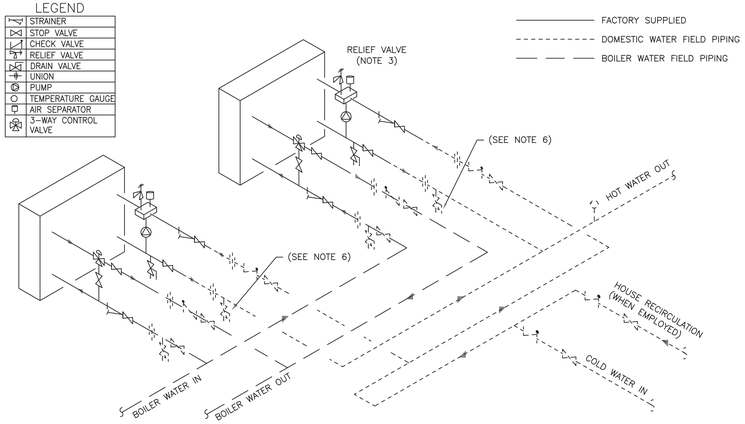
1. BALL VALVE
2. UNION
3. MANUAL AIR VENT
4. CALIBRATED BALANCING VALVE
5. DRAIN VALVE
6. TWO-WAY CONTROL VALVE (ELECTRIC)
7. HEATING COIL
8. THERMOMETER
9. FREEZE STAT (SERPENTINE)

4 AHU HOT WATER COIL
SCALE: NONE



1. BOILER
2. CIRCULATING PUMP
3. UNION
4. BALL VALVE
5. CALIBRATED BALANCING VALVE
6. CHECK VALVE
7. PRESSURE RELIEF VALVE
8. HOT WATER RETURN PIPING
9. 6" CONCRETE HOUSEKEEPING PAD
10. PIPE TO FLOOR DRAIN
11. THERMOMETER
12. HOT WATER SUPPLY PIPING

6 BOILER PIPING DETAIL
SCALE: NONE



5 DOMESTIC HW HEAT EXCHANGER PIPING DETAIL
SCALE: NTS

NOTES:
1. FOR ACTUAL SIZES AND LOCATIONS OF PIPING AND OTHER CONNECTIONS TO THE HEATER, SEE DIMENSIONAL DRAWING.
2. REDUCERS, ON THE WATER INLET SIDE, SHOULD BE LOCATED ADJACENT TO THE HEATER. EXPANSION FITTINGS, ON THE WATER INLET SIDE, SHOULD BE LOCATED AS FAR AS POSSIBLE FROM THE HEATER.
3. DRAIN VALVE SHOULD BE PIPED DIRECTLY TO A FLOOR DRAIN. RELIEF VALVE SHOULD BE PIPED VERTICALLY TO A HEIGHT 19" ABOVE THE FLOOR.
4. HEATERS SHOULD BE PIPED REVERSE RETURN OR BALANCING DEVICES ON THE OUTLETS SHOULD BE EMPLOYED
5. REFER TO SMARTPLATE APPLICATIONS GUIDE, SP-1010, TO DETERMINE IF SYSTEM REQUIRES A BUFFER TANK.
6. INSTALL A HOSE CONNECTION AT THE HOT WATER OUTLET.

IF THIS BAR DOES NOT MEASURE 1", THEN DRAWING IS NOT TO FULL SCALE

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1	01/08/25	ISSUED FOR BID

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Checked by P.C
Project No. 43065
Scale AS NOTED
Date 12/06/23

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2 EXECUTIVE BOULEVARD, SUITE 202, SUFFERN, NY 10901

Mechanical & Electrical Engineer:

Structural Engineer:

NORTH ROCKLAND HIGH SCHOOL CHILLER & HVAC UPGRADES

HIGH SCHOOL SED# 50-02-01-06-0-016-037

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COUNTY OF ROCKLAND

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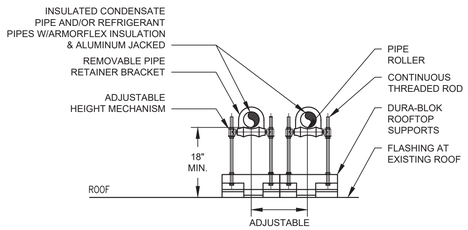
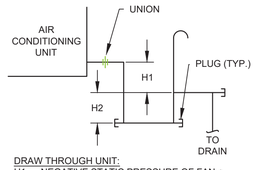
Drawing Title
MECHANICAL DETAILS - 3

Drawing No.
M-503



NOTE:
1. FURNISH AND INSTALL PIPE MOUNTED PEDESTALS FOR MULTIPLE PIPE SUPPORTS MANUFACTURED BY COOPER B-LINE, (DURA-BLOK ROOFTOP SUPPORTS) DB SERIES OR APPROVED EQUAL.
2. PIPING SUPPORTS TO BE INSTALLED 8'-0" ON CENTER.

1 ROOF PIPE SUPPORT
SCALE: NONE



DRAW THROUGH UNIT:
H1= NEGATIVE STATIC PRESSURE OF FAN + 1" MIN.
H2= H1

2 CONDENSATE DRAIN TRAP SIZING
SCALE: NONE

NOTE:
1. MC RESPONSIBLE TO VERIFY AND COMPLY WITH MANUFACTURERS INSTALLATION INSTRUCTIONS FOR PROPER TRAP SIZING.

1. DOUBLE WALL FLUE PIPE
2. STACK CAP
3. PARAPET WALL
4. STORM COLLAR
5. TALL CONE FLASHING
6. MAINTAIN CLEARANCE FROM COMBUSTIBLES
7. ROOF SUPPORT BRACKET
8. SILICONE SEALANT

3 DOUBLE WALL FLUE PIPE DETAIL
SCALE: NONE

1. SHEET METAL INTAKE DUCT
2. ½" GALVANIZED SCREEN
3. DUCT SIZE + 25%
4. ANGLE TACK WELDED
5. ROOF CURB
6. METAL ROOF DECK

4 INTAKE GOOSENECK DETAIL
SCALE: NONE

1 IF THIS BAR DOES NOT MEASURE 1", THEN DRAWING IS NOT TO FULL SCALE

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Mechanical & Electrical Engineer:
Structural Engineer:

NORTH ROCKLAND HIGH SCHOOL CHILLER & HVAC UPGRADES
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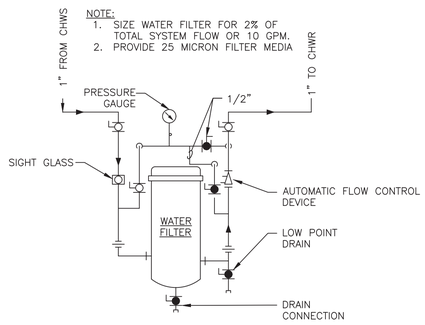
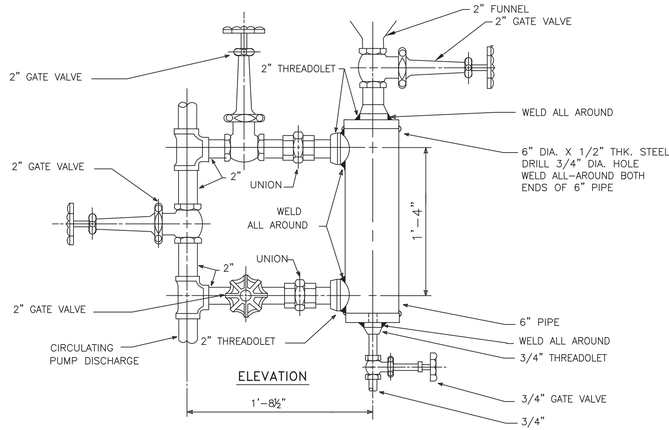
Drawing Title
MECHANICAL DETAILS - 4

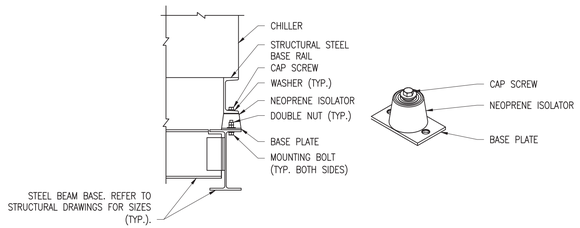
Drawing No.
M-504



2 WATER FILTER
SCALE: NONE

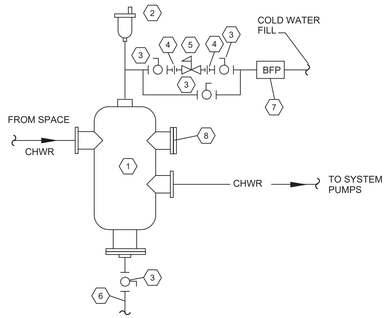


3 WATER TREATMENT SHOT FEEDER
SCALE: NONE



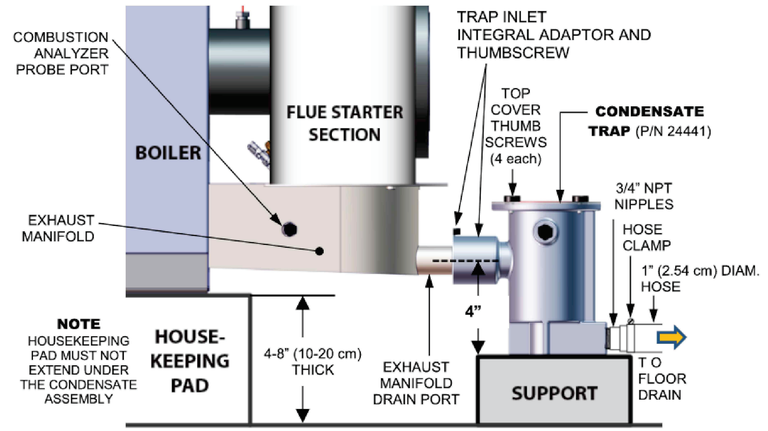
NOTES:
1. COORDINATE MOUNTING HOLE LOCATIONS AND QUANTITIES WITH OTHER TRADES PRIOR TO FABRICATION AND INSTALLATION OF STEEL AND EQUIPMENT.
2. COORDINATE EQUIPMENT DELIVERY WITH THE INSTALLATION OF THE VIBRATION ISOLATORS.
3. PROVIDE STAINLESS MOUNTING BOLTS OF THE GRADE, SIZE, AND QUANTITY REQUIRED BY THE ISOLATOR MANUFACTURER. ALIGN ISOLATOR WITH STEEL DUNNAGE SUCH THAT ALL ISOLATOR MOUNTING HOLES ARE UTILIZED. IF ISOLATORS WITH FOUR HOLES ARE FURNISHED, THEN FOUR MOUNTING BOLTS PER ISOLATOR SHALL BE REQUIRED.

4 CHILLER VIBRATION ISOLATION DETAIL
SCALE: NONE



1. AIR SEPARATOR
2. HIGH CAPACITY FLOAT TYPE AIR VENT
3. BALL VALVE
4. UNION
5. REDUCING VALVE WITH CHECK VALVE
6. 1" BLOWDOWN, PIPE TO FLOOR DRAIN
7. BACKFLOW PREVENTER
8. STRAINER REMOVAL FLANGE

5 AIR SEPARATOR PIPING DETAIL
SCALE: NONE



6 CONDENSATE NEUTRALIZER DETAIL
SCALE: NONE

IF THIS BAR DOES NOT MEASURE 1", THEN DRAWING IS NOT TO FULL SCALE
0 1/2 1

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Drawing Title
MECHANICAL DETAILS - 5

Drawing No.
M-505