

ABBREVIATIONS	
AC	AIR CONDITIONER
ACCU	AIR COOLED CONDENSING UNIT
AD	ACCESS DOOR
AF	AIR FILTER
AFF	ABOVE FINISHED FLOOR
AFMS	AIR FLOW MEASURING STATION
AHU	AIR HANDLING UNIT
ATC	AUTOMATIC TEMPERATURE CONTROLS
BG	BOTTOM GRILLE
BHP	BREAK HORSE POWER
BS	BRANCH SELECTOR BOX
BTU	BRITISH THERMAL UNIT
CC	COOLING COIL
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CG	CEILING GRILLE
CO	CLEAN OUT
CP	CONDENSATE PUMP
CR	CEILING REGISTER
DB	DRY BULB
DN	DOWN
DX	DIRECT EXPANSION
E	EXISTING
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EDH	ELECTRICAL DUCT HEATER
EF	EXHAUST FAN
ENT	ENTERING
ESP	EXTERNAL STATIC PRESSURE
F	DEGREE FAHRENHEIT
FC	FLEXIBLE CONNECTION
FD	FIRE DAMPER AND ACCESS DOOR
FF	FINISHED FLOOR
FPI	FINS PER INCH
FFM	FEET PER MINUTE
FSD	FIRE SMOKE DAMPER WITH ACCESS DOOR AND DETECTOR
FT	FEET
GC	GENERAL CONSTRUCTION CONTRACTOR
GPM	GALLONS PER MINUTE
GX	GENERAL EXHAUST
H	HEIGHT
HP	HORSE POWER
IN	INCH
IN WG	INCH OF WATER GAUGE
KW	KILOWATT
L	LENGTH
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LD	LINEAR DIFFUSER
LR	LINEAR RETURN
LVG	LEAVING
MAX	MAXIMUM
MBH	THOUSAND BTU'S PER HOUR
MERV	MINIMUM EFFICIENCY REPORTING VALUES
MCA	MINIMUM CIRCUIT AMPACITY
MIN	MINIMUM
MOP	MAXIMUM OVER CURRENT PROTECTION
MV	MANUAL AIR VENT
NIC	NOT IN THIS CONTRACT
NK	NECK (AS RELATED TO DUCT AND DIFFUSER)
NTS	NO TO SCALE
OA	OUTDOOR AIR
OAD	OUTSIDE AIR DAMPER
OAI	OUTSIDE AIR INTAKE
OED	OPEN ENDED DUCT WITH WIRE MESH SCREEN
PD	PUMPED DISCHARGE
PSI	POUNDS PER SQUARE INCH
QTY	QUANTITY
RG	REFRIGERANT GAS LINE
RL	REFRIGERANT LIQUID LINE
RM	ROOM
RPD	ROOM PRESSURE DISPLAY
RPI	ROOM PRESSURE INDICATOR
RPM	REVOLUTIONS PER MINUTE
RS	REFRIGERANT SUCTION LINE
RTU	ROOF TOP UNIT
SA	SUPPLY AIR
SEN	SENSIBLE
SP	STATIC PRESSURE
SQ FT	SQUARE FEET (AS RELATED TO SIZES/AREAS)
ST	SOUND TRAP/SOUND ATTENUATOR
TD	TRANSFER DUCT
TG	TOP GRILLE
TO	TRANSFER OPENING
TR	TOP REGISTER
TRG	TRANSFER GRILLE
TRR	TRANSFER REGISTER
TSP	TOTAL STATIC PRESSURE
Typ	TYPICAL
TX	TOILET EXHAUST
VD	VOLUME DAMPER
VEL	VELOCITY
W	WIDTH
WB	WET BULB
WMS	WIRE MESH SCREEN
NOTE: NOT ALL SYMBOLS AND ABBREVIATION ARE USED IN THE DRAWINGS	

SYMBOLS	
	DUCT SIZE (FIRST FIGURE INDICATES PLAN SIZE)
	RETURN OR EXHAUST DUCT UP (SUCTION SIDE OF FAN)
	RETURN OR EXHAUST DUCT UP (SUCTION SIDE OF FAN)
	ACOUSTIC LINING IN DUCT
	FLEXIBLE CONNECTION
	ELBOW WITH TURNING VANES
	RADIUS ELBOW WITH TURNING VANES
	WIRE MESH SCREEN
	SUPPLY AIR OUTLET - 3, 2 & 1 WAY THROW
	REMOVAL WORK (DUCTWORK/PIPPING/EQUIPMENT)
	EXISTING WORK (DUCTWORK/PIPPING/EQUIPMENT)
	NEW WORK (DUCTWORK/PIPPING/EQUIPMENT)
	ELBOW TURNED DOWN
	ELBOW TURNED UP
	ISOLATION VALVE
	CONTROL VALVE
	THERMOSTAT
	CUT EXISTING DUCT/PIPPING AND PATCH AND SEAL AIRTIGHT
	POINT OF DISCONNECTION
	POINT OF NEW CONNECTION
	MOTORIZED DAMPER W/ ACCESS DOOR
	FIRE DAMPER W/ ACCESS DOOR
	FIRE/SMOKE DAMPER W/ ACCESS DOOR
	VOLUME DAMPER
	DOOR LOUVER
	DOOR UNDERCUT
	SUPPLY AIR CFM
	RETURN/EXHAUST AIR CFM
	SUPPLY
	RETURN/EXHAUST
	AC UNIT
	CONDENSATE PUMP

GENERAL HVAC SYSTEM CLEANING REQUIREMENTS:

- COMPONENT CLEANING: CLEANING METHODS SHALL BE EMPLOYED SUCH THAT ALL HVAC SYSTEM COMPONENTS MUST BE VISIBLY CLEAN AS DEFINED IN APPLICABLE STANDARDS (SEE NATIONAL AIR DUCT CLEANING ASSOCIATION (NADCA) STANDARDS). UPON COMPLETION, ALL COMPONENTS MUST BE RETURNED TO THOSE SETTINGS RECORDED JUST PRIOR TO CLEANING OPERATIONS.
- CONTAMINANT: DEBRIS REMOVED DURING CLEANING SHALL BE COLLECTED AND PRECAUTIONS MUST BE TAKEN TO ENSURE THAT DEBRIS IS NOT OTHERWISE DISPERSED OUTSIDE THE HVAC SYSTEM DURING THE CLEANING PROCESS.
- AIR-VOLUME CONTROL DEVICES: DAMPERS ANY AIR-DIRECTIONAL MECHANICAL DEVICES INSIDE THE HVAC SYSTEM MUST HAVE THEIR POSITION MARKED PRIOR TO CLEANING AND, UPON COMPLETION, MUST BE RESTORED TO THEIR MARKED POSITION.
- SERVICE OPENINGS: UTILIZE SERVICE OPENINGS, AS REQUIRED FOR PROPER CLEANING, AT VARIOUS POINTS OF THE HVAC SYSTEM FOR PHYSICAL AND MECHANICAL ENTRY, AND INSPECTION.
 - UTILIZE THE EXISTING SERVICE OPENINGS ALREADY INSTALLED IN THE HVAC SYSTEM WHERE POSSIBLE.
 - OTHER OPENINGS SHALL BE CREATED WHERE NEEDED AND THEY MUST BE CREATED SO THEY CAN BE SEALED IN ACCORDANCE WITH INDUSTRY CODES AND STANDARDS.
 - CLOSURES MUST NOT SIGNIFICANTLY HINDER, RESTRICT, OR ALTER THE AIRFLOW WITHIN THE SYSTEM.
 - CLOSURES MUST BE PROPERLY INSULATED TO PREVENT HEAT LOSS/GAIN OR CONDENSATION ON SURFACES WITHIN THE SYSTEM W/ NEOPRENE GASKETS.
 - OPENINGS MUST NOT COMPROMISE THE STRUCTURAL INTEGRITY OF THE SYSTEM.
 - CONSTRUCTION TECHNIQUES USED IN THE CREATION OF OPENINGS SHOULD CONFORM TO REQUIREMENTS OF APPLICABLE BUILDING AND FIRE CODES, AND APPLICABLE NFPA, SMACNA AND NADCA STANDARDS.
 - CUTTING SERVICE OPENINGS INTO FLEXIBLE DUCT IS NOT PERMITTED. FLEXIBLE DUCT SHALL BE DISCONNECTED AT THE ENDS AS NEEDED FOR PROPER CLEANING AND INSPECTION.
 - ALL SERVICE OPENINGS CAPABLE OF BEING RE-OPENED FOR FUTURE INSPECTION OR REMEDIATION SHALL BE CLEARLY MARKED AND SHALL HAVE THEIR LOCATION REPORTED TO THE OWNER AND MOUNT SINAI REPORT DOCUMENTS.

GENERAL NOTES

- MECHANICAL WORK SHALL CONFORM TO ALL REQUIREMENTS OF THE LATEST CONSTRUCTION CODE AND LOCAL CODES RULES AND REGULATIONS. IT SHOULD ALSO CONFORM TO THE OWNER AND BUILDING MANAGEMENT COMPANY'S STANDARDS FOR DESIGN, ALTERATION, AND CONSTRUCTION.
- PROVIDE ALL LABOR, MATERIALS, TOOLS, EQUIPMENTS, AND SERVICES NECESSARY TO FURNISH AND SAFELY INSTALL THE COMPLETE AND PROPERLY OPERATING MECHANICAL SYSTEMS AS SPECIFIED IN THE CONTRACT DOCUMENTS OR WHICH MAY BE REASONABLY IMPLIED AS ESSENTIAL, WHETHER INDICATED ON THE CONTRACT DOCUMENT OR NOT.
- CONTRACTOR SHALL SURVEY THE AREA OF THIS WORK BEFORE SUBMITTING THE BID AND BE RESPONSIBLE FOR NOTIFYING THE ARCHITECT OF ANY CONDITIONS WHICH WOULD PREVENT THE INSTALLATION OF THE WORK AS SHOWN ON DRAWINGS.
- CONTRACTOR SHALL CHECK AND CORRECT ANY AND ALL DEFICIENCIES IN EXISTING DUCTS AND ASSOCIATED INSULATION. ALL NEW DUCTWORK SHALL COMPLY WITH THE LATEST SMACNA GUIDELINES AND CONFORM WITH REQUIREMENTS OF THE LATEST ASHRAE HANDBOOKS. ALL NEW DUCT INSULATION SHALL MEET OR EXCEED REQUIREMENTS OF THE LATEST ADOPTED ENERGY CODE.
- DESIGN DRAWINGS ARE TO BE CONSIDERED DIAGRAMMATIC. OFFSETS MAY BE REQUIRED TO AVOID EXISTING SERVICES, OTHER TRADES, ETC. COORDINATE WORK WITH ALL TRADES AND FIELD CONDITIONS.
- LOCATIONS OF NEW UTILITIES, INCLUDING PIPE RISERS, ARE GENERALLY SCHEMATIC. CONTRACTOR SHALL COORDINATE ALL NEW UTILITIES, SERVICES, ETC. WITH EXISTING STRUCTURAL AND ARCHITECTURAL DRAWINGS. CONTRACTOR SHALL PROVIDE ALL OFFSETS AS REQUIRED.
- PROVIDE FIRE STOPPING FOR ALL NEW AND EXISTING DUCT, PIPE, AND CONDUIT PENETRATIONS THROUGH FIRE RATED WALLS, PARTITIONS, AND SLABS.
- WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED, THIS CONTRACTOR SHALL BE RESPONSIBLE TO MAINTAIN THE RATED INTEGRITY.
- COORDINATE SCHEDULE FOR HOOK UPS TO EXISTING SYSTEMS AND EQUIPMENTS ALSO COORDINATE SCHEDULE FOR REMOVAL OR RELOCATIONS WITH THE OWNER AND PERFORM THIS WORK AT SUCH TIMES TO ENSURE THAT PERIODS OF SHUTDOWN WILL BE ACCEPTABLE TO THE OWNER. ALL SYSTEM SHUTDOWNS SHALL BE KEPT TO A MINIMUM.
- CONTRACTOR IS RESPONSIBLE FOR MAINTAINING AND RESTORING THE CONTINUITY OF ALL EXISTING SYSTEMS AFFECTED, INCLUDING BUT NOT LIMITED TO: INSULATION, VAPOR BARRIER, VALVES, CAPS, PUMPS, ETC.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE WORK INCLUDING ITS COMPLETION AND FINAL ACCEPTANCE. THE CONTRACTOR SHALL REPLACE ANY EQUIPMENT THAT MAY BE DAMAGED, LOST OR STOLEN WITHOUT ADDITIONAL COST TO OWNER.
- PRIOR TO COMMENCEMENT OF ANY WORK, EXISTING SYSTEMS ASSOCIATED WITH THIS WORK SHALL BE TESTED IN THE PRESENCE OF BUILDING PERSONNEL. PRE-CONSTRUCTION/DEMOLITION BALANCING REPORTS SHALL BE SUBMITTED TO ENGINEER AND BUILDING MANAGEMENT FOR REVIEW.
- DIFFUSERS, REGISTERS, AND GRILLES SHALL HAVE HARD DUCT CONNECTIONS.
- ALL NEW DUCTWORK AND PIPING SHALL BE PRESSURE TESTED PER BUILDING, SMACNA, ASME, ANSI, AND ASHRAE STANDARDS AND SPECIFICATIONS.
- ALL SYSTEMS AND SERVICES THAT SERVE ADJACENT SPACES SHALL BE MAINTAINED THROUGHOUT WORK.
- SUBMIT SHOP DRAWINGS OF ALL WORK WHICH MUST BE APPROVED BY THE ARCHITECT AND ENGINEER BEFORE WORK COMMENCES OR ITEMS ARE ORDERED.
- ALL DUCTWORK SHALL BE KEPT AS HIGH AS POSSIBLE TO MAINTAIN CEILING HEIGHTS SHOWN ON ARCHITECTURAL DRAWINGS. COORDINATE ALL DUCT AND PIPING SYSTEM ELEVATIONS WITH ALL OTHER TRADES AND PROVIDE NECESSARY OFFSETS TO AVOID CONFLICTS.
- FOR EXACT LOCATIONS OF DIFFUSERS, REGISTERS, GRILLES, AND LINEAR DIFFUSERS REFER TO ARCHITECTURAL DRAWINGS AND COORDINATE FINAL LOCATIONS.
- COORDINATE ALL EQUIPMENT REQUIREMENTS WITH APPROPRIATE TRADES (I.E. CONDENSATE PUMPS COORDINATED WITH ELECTRICAL, PLUMBING, ATC, ETC.)
- VERIFY AND COORDINATE ALL EQUIPMENT ACCESS AND CLEARANCES WITH THE ARCHITECT, GENERAL CONTRACTOR AND/OR CONSTRUCTION MANAGER.
- ALL DUCTWORK AND PIPING SHALL BE SUPPORTED DIRECTLY FROM THE STRUCTURE. DO NOT SUPPORT DUCT FROM PIPE SUPPORT AND VICE VERSA.
- PROVIDE 6" WIDE 45 DEGREE BRANCH TAKEOFF FOR ALL NEW DUCTS.
- ALL DUCT BRANCHES, TAKE-OFFS, AND DIFFUSERS SHALL BE EQUIPPED WITH VOLUME DAMPERS.
- LOCATE ALL DUCT VOLUME DAMPERS ABOVE ACCESSIBLE CEILINGS. PROVIDE REMOTE CABLE OPERATED VOLUME DAMPERS WITH THE OPERATOR ACCESSIBLE VIA THE AIR OUTLET WHEN BRANCH DUCTWORK IS LOCATED WITHIN AN INACCESSIBLE CEILING.
- ALL CONNECTIONS FROM RETURN, EXHAUST, AND SUPPLY DUCTS, CEILING DIFFUSERS, AND REGISTERS SHALL BE AIR TIGHT AND SEALED WITH WATER BASED APPROVED SEALANT.
- ALL DUCTWORK INSIDE BUILDING INCLUDING SUPPLY AND RETURN AIR DUCTS, PLENUMS SHALL BE PROVIDED WITH 2" THICK INSULATION UNLESS OTHERWISE NOTED. DUCTWORK INSULATION SHALL HAVE A MINIMUM AS INSTALLED RATING OF R-6. **INTERNAL LINING SHALL NOT BE PERMITTED ON THE PROJECT.**
- THE MECHANICAL CONTRACTOR SHALL PROVIDE CONTROL WIRING AND TRANSFORMERS FOR ALL THERMOSTATS, ACTUATORS AND CONTROLLERS. TRANSFORMERS SHALL BE ADEQUATELY SIZED TO SUPPORT THE EQUIPMENT SERVED. COORDINATE WITH ELECTRICAL CONTRACTOR FOR LOCATIONS OF DISCONNECT, JUNCTION BOX/SOURCE AND EXTEND WIRING TO DEVICES.
- ALL THERMOSTATS SHALL BE PER THE BUILDING AND OWNER STANDARD.
- PROVIDE TEMPORARY WORK, DUCT WITH DAMPERS, CAPS, EQUIPMENT, VALVES, CAPPED PIPE CONNECTIONS, SUPPORTS, AND ACCESSORIES TO KEEP EXISTING BUILDING SYSTEM IN OPERATION AND MAINTAIN SERVICES, HEATING, AIR CONDITIONING, VENTILATION IN OPERATION AT ALL TIMES.
- PROVIDE SUPPLEMENTAL STEEL TO SUPPORT EQUIPMENT, DUCTS, AND PIPING FROM BUILDING STRUCTURE.
- PROTECT ALL EXISTING AND NEW WORK FROM DUST, DIRT, DEBRIS, SEAL AND PROTECT ALL OPEN ENDS OF WORK, DUCT, PIPES FROM DUST, AND DIRT DURING DEMOLITION AND INSTALLATIONS.
- CONTRACTOR SHALL PERFORM ALL WORK IN SAFE MANNER. PROTECT WORK, PROPERTY, PERSONNEL AND SURROUNDINGS FROM DAMAGE, INJURY.
- GUARANTEE ALL WORK AGAINST FAULTY AND IMPROPER MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE BY THE OWNER, EXCEPT THAT WHERE GUARANTEES OR WARRANTIES FOR LONGER TERMS ARE SPECIFIED HEREIN, SUCH LONGER TERM SHALL APPLY, AT NO ADDITIONAL COST TO OWNER, WITHIN 24 HOURS AFTER NOTIFICATION, CORRECT ANY DEFICIENCIES WHICH OCCUR DURING THE GUARANTEE PERIOD, ALL TO THE SATISFACTION OF THE OWNER AND ARCHITECT.
 - PROVIDE 5 YEAR EQUIPMENT MANUFACTURERS WARRANTY FOR COMPRESSOR FROM DATE OF SHIPMENT.

BUILDING DEPARTMENT NOTES:

- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE NEW YORK STATE CONSTRUCTION CODE (CC), BUILDING CODE (BC), FIRE CODE (FC) AND MECHANICAL CODE (MC). WORK SHALL BE EXECUTED IN FULL COMPLIANCE WITH THE APPLICABLE PROVISIONS OF ALL LOCAL LAWS, BY LAWS, STATUTES, ORDINANCES, CODES, RULES, REGULATIONS AND LAWFUL ORDERS OF PUBLIC AUTHORITIES BEARING ON THE PERFORMANCE AND EXECUTION OF THE WORK.
 - SPECIAL INSPECTIONS AND TESTS THAT ARE REQUIRED:
 - MECHANICAL SYSTEMS AS REQUIRED IN SECTION MC-104 AND BC-105.
 - AIR CONDITIONING AND VENTILATION SYSTEMS
 - PROGRESS INSPECTIONS:
 - ENERGY CODE COMPLIANCE INSPECTIONS BC 105.3
 - THEY SHALL HAVE BEEN ACCEPTABLE PRIOR TO THE EFFECTIVE DATE OF THE CODE BY THE BOARD OF STANDARDS AND APPEALS.
 - THEY SHALL HAVE BEEN ACCEPTED FOR USE UNDER THE PRESCRIBED TEST METHODS BY THE COMMISSIONER.
- DUCTS SHALL BE SUBSTANTIALLY SUPPORTED ACCORDING TO CHAPTER 16 OF NEW YORK STATE BUILDING CODE, SEISMIC REQUIREMENTS.
- DUCTS SHALL BE CONSTRUCTED OF APPROVED STANDARD AS SPECIFIED IN NEW YORK STATE MECHANICAL CODE MC-603.
- WHERE DUCTS PASS THROUGH WALLS OR PARTITIONS, THE SPACE AROUND SHALL BE SEALED AS REQUIRED IN CHAPTER 7 OF THE NEW YORK STATE BUILDING CODE.
- ALL WORK SHALL COMPLY WITH ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE.
- THE HEATING AND AIR CONDITIONING SYSTEMS HAVE BEEN DESIGNED TO MAINTAIN A MAXIMUM TEMPERATURE OF 78°F (SUMMER) AND A MINIMUM TEMPERATURE OF 70°F (WINTER).
- ALL MATERIALS AND EQUIPMENT DELIVERED TO THE SITE SHALL BE RECOGNIZED BY THE OFFICE OF TECHNICAL CERTIFICATION AND RESEARCH (OTCR).
- PRODUCTS THAT ARE NOT CODE-PRESCRIBED OR APPROVED ALTERNATIVE SHALL BE REJECTED UNTIL SUCH CERTIFICATES ARE OBTAINED.
- ALL EQUIPMENT USE PERMITS SHALL BE OBTAINED BY THE CONTRACTOR AS REQUIRED IN NEW YORK STATE CONSTRUCTION CODES, ARTICLE 28-118.
- ALL NEW AC UNITS AND EQUIPMENT SHALL COMPLY WITH ALL APPLICABLE NEW YORK STATE MECHANICAL CODE.

REMOVAL NOTES:

- THE CONTRACTOR SHALL BE HELD TO HAVE EXAMINED THE PREMISES AND COMPARED IT WITH THE DRAWINGS AND SPECIFICATIONS AND TO HAVE SATISFIED HIMSELF OF THE CONDITIONS EXISTING THERE AS TO THE PERFORMANCE OF THE WORK REQUIRED BEFORE SUBMISSION OF HIS BID.
- CONTRACTOR SHALL ASSURE THAT DEMOLITION AND INSTALLATION WORK WILL NOT CAUSE ANY DAMAGE TO EQUIPMENT, DUCTWORK, PIPING, ELECTRICAL, PLUMBING OR ANY OTHER EXISTING SERVICES.
- ALL EQUIPMENT SHOWN TO REMAIN SHALL BE PROTECTED FROM DAMAGE DURING THE CONSTRUCTION AND IF ANY DAMAGE OCCURS IT SHALL BE REPAIRED AT THE EXPENSE OF THIS CONTRACTOR.
- ALL EXISTING SERVICES INCLUDING PIPING, ELECTRIC CONDUITS ETC. WHICH MAY INTERFERE WITH NEW INSTALLATION WORK AND NOT BEING REMOVED SHALL BE TEMPORARILY DISCONNECTED AND PROTECTED FROM DAMAGE PRIOR TO DEMOLITION WORK. THEY SHALL BE RECONNECTED OR RE-ROUTED AS NECESSARY UPON COMPLETION OF THE WORK. NO TUBING OR CONDUIT SHALL BE COVERED BY THERMAL INSULATION. ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH UL NEC CODE (NFPA 70).

MECHANICAL SHEET LIST

M-001.00	MECHANICAL SYMBOL LIST, NOTES, AND ABBREVIATIONS
M-002.00	MECHANICAL SPECIFICATIONS SHEET - 1
M-003.00	MECHANICAL SPECIFICATIONS SHEET - 2
M-101.00	DEMOLITION PART PLAN, HVAC PIPING AND DUCTWORK
M-201.00	FIRST FLOOR HVAC PART PLAN, DUCTWORK
M-202.00	2ND FL AND ROOF HVAC PART PLAN PIPING AND VENT
M-301.00	HVAC DETAILS AND SCHEDULES SHEET 1 OF 2
M-302.00	HVAC DETAILS AND SCHEDULES SHEET 2 OF 2

CFM	DUCT SIZE
0-200	106
201-230	126
231-260	146
261-300	166
301-360	206

CRYOGEN VENT NOTES:

- THE VENT MATERIAL MUST BE OF THE FOLLOWING MATERIAL WITH THE WALL THICKNESS INDICATED.
 - SS 304: MINIMUM 0.035IN; MAXIMUM 0.125IN WELDED CONSTRUCTION.
- VENT SHALL BE WELDED JOINTS OR BOLTED FLANGED JOINTS WITH FIBERGLASS GASKETS PER MRI VENDOR REQUIREMENTS.
- MATERIALS ACCESSORIES, DETAILS OF QUENCH VENT INSTALLATION MUST BE IN ACCORDANCE WITH MRI VENDORS RECOMMENDATIONS AND REQUIREMENTS. PROVIDE ALL MATERIAL, LABOR, WORK, ACCESSORIES FOR INSTALLATION.
- EITHER TUBES OR PIPES MAY BE USED AND MUST BE SEAMLESS OR HAVE WELDED SEAMS.
- STAINLESS STEEL BELLOW PIPE LESS THAN 1FT LENGTH MAY BE USED AS A TERMINAL EXPANSION POINT.
- THE VENT PIPE MUST WITHSTAND A MAXIMUM PRESSURE OF 6.5 PSI.
- WAVEGUIDE VENT MATERIAL MUST MATCH THE MAGNET VENT.
- TERMINATION OF VENT SHALL BE PROTECTED WITH STAINLESS STEEL WIRE MESH SCREEN MINIMUM AREA 2.5 TIMES THE CROSS SECTIONAL AREA OF THE QUENCH VENT.
- PROVIDE GALVANIC SEPARATION BETWEEN MAGNET AND QUENCH VENT.
- PROVIDE 12" TO 19" LONG FLEX SECTION.
- PROVIDE MINIMUM 2" THICK HIGH DENSITY FIBERGLASS SECTIONAL PIPE INSULATION THROUGHOUT ALL AROUND QUENCH VENT WITH VAPOR BARRIER ALUMINUM STAINLESS STEEL JACKET, MINIMUM 18 GAUGE, HELD IN PLACE WITH STAINLESS STEEL 2-BANDS AT 12" CENTER.
- CRYOGEN VENT SHALL BE FABRICATED BY A SIEMENS APPROVED FABRICATOR.



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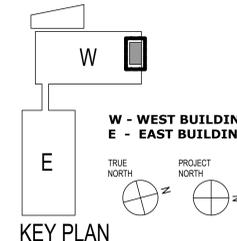
OWNER:

COLUMBIA DOCTOR'S TARRYTOWN

PROJECT:

NEW MRI

155 WHITE PLAINS ROAD
TARRYTOWN, NY 10591



NO.	DESCRIPTION	DATE
1	CD SUBMISSION	6-18-21

REVISIONS/ISSUES

SHEET TITLE: MECHANICAL SYMBOLS LIST, NOTES, AND ABBREVIATIONS

SEAL:	DATE: 7/23/2020
	CON/REF No.
	CONTRACT No.
	SCALE: As indicated
	PROJECT No. 12384
	CHECKED: Checker
	DRAWN: LGP

SHEET NO.

M-001.00

DWG OF

THIS PLAN IS APPROVED ONLY FOR WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON, OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

HVAC SPECIFICATIONS

1. CODES & STANDARDS

- A. DESIGN AND PERFORMANCE OF COMPONENTS AND METHODS SPECIFIED HEREIN SHALL COMPLY WITH THE APPLICABLE PROVISIONS OF THE CODES, STANDARDS, AND MANUFACTURERS' RECOMMENDATIONS OF THE ENTITIES LISTED BELOW.

2. SCOPE OF WORK

- A. ALL MECHANICAL AND ELECTRICAL WORK SHALL BE FREE FROM DEFECTS IN WORKMANSHIP AND MATERIALS FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE AND SHALL MEET ALL LOCAL CODES AS STATED BELOW.

- 1) PROVIDE NEW SUPPLEMENTAL COMPUTER GRADE SPILT SYSTEM AIR CONDITIONING UNIT WITH REHEAT AND HUMIDIFICATION AND BMS COMPATIBLE CONTROLS, EXHAUST FAN, RECEIVE AND INSTALL THE NEW MEDICAL GRADE AIR COOLED CHILLER, CHILLED GLYCOL-WATER PIPING, REFRIGERANT PIPING, RECEIVE AND INSTALL BY-PASS PANEL, VALVES, FITTINGS, AND ACCESSORIES.

3. CODE, PERMITS AND INSPECTIONS

- A. ALL WORK SHALL MEET OR EXCEED THE LATEST REQUIREMENT OF THE NYS BUILDING CODE, ENERGY CODES, MECHANICAL CODE, ELECTRICAL CODE AND THE FIRE PREVENTION CODE AND OTHER AUTHORITIES EXERCISING JURISDICTION OF THE WORK OF THIS PROJECT.

4. NOTICE TO BIDDERS

- A. THE SPECIFICATIONS AND DRAWINGS ARE INTENDED TO SERVE JOINTLY AS A BASIS UPON WHICH THE CONTRACTOR SHALL SUBMIT A CONTRACT PRICE FOR THE MATERIAL AND LABOR PROVISIONS.

5. SUBMITTALS

- A. SHOP DRAWINGS OF DUCTWORK, PIPING LAYOUTS AND ELEVATIONS SHALL BE SUBMITTED FOR APPROVAL TO THE ENGINEER PRIOR TO ERECTION OR PURCHASE. SUBMIT CATALOG CUTS FOR AIR CONDITIONING UNITS, PIPE HANGERS, INSULATION, DIFFUSERS, PUMPS, VALVES, MISCELLANEOUS ACCESSORIES, ETC., INCLUDING CERTIFIED EQUIPMENT MANUFACTURERS PERFORMANCE DATA.

- WORK WITH THE WORK OF OTHER TRADES. CONTRACTOR SHALL PREPARE AND FURNISH DUCTWORK LAYOUTS AT 3/8" = 1' 0" SCALE FOR USE BY AND COORDINATION WITH OTHER TRADES. COORDINATION MEETINGS SHALL BE HELD UNDER THE SUPERVISION OF THE CONSTRUCTION MANAGER (CM) OR GENERAL CONTRACTOR (GC).

6. AS-BUILT DRAWINGS

- A. CONTRACTOR SHALL KEEP RECORD OF ALL CHANGES, FIELD CONDITIONS, AND SHALL PREPARE AND PROVIDE AS-BUILT DRAWINGS INDICATING ANY DEVIATION FROM THE ORIGINAL MECHANICAL DESIGN. THE DRAWING SHALL BE STAMPED "AS-BUILT" WITH THE DATE AND CONTRACTORS SIGNATURE.

7. CUTTING AND PATCHING

- A. REFER TO THE ARCHITECTURAL SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS AND INFORMATION BEYOND THAT COVERED BELOW.

8. DIFFUSERS, GRILLES, REGISTERS & DAMPERS

- A. DIFFUSERS, GRILLES AND REGISTERS SHALL BE FURNISHED AND INSTALLED FOR CAPACITIES AND IN LOCATIONS INDICATED ON THE DRAWINGS. ALL REGISTERS AND DIFFUSERS SHALL BE PRIME COATED STEEL OR EXTRUDED ALUMINUM FINISHED, UNLESS OTHERWISE NOTED, IN BAKED WHITE ENAMEL.

9. DUCTWORK AND ACCESSORIES

- A. ALL DUCTWORK SHALL COMPLY WITH ASHRAE GUIDE AND SMACNA, LATEST EDITION, FUNDAMENTALS OF DUCT DESIGN.

10. INSULATION

- A. ALL NEW AND EXISTING LOW VELOCITY DUCTWORK SHALL BE SEALED THROUGHOUT INCLUDING ALL SEAMS, JOINTS, TAKE OFFS FOR ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK AND PLenums WITH APPROVED DUCT MASTIC SEALANT RATHER THAN LESS OF SMACNA PRESSURE CLASSIFICATIONS AND REQUIREMENTS. LOW PRESSURE DUCTWORK SHALL BE CONSTRUCTED TO SMACNA 2" W.G. STANDARDS. ALL DUCTWORK UPSTREAM OF VAV BOXES SHALL BE CONSTRUCTED TO SMACNA 4" W.G. STANDARDS.

- O. SEAL ALL COLLAR TAPES TO DIFFUSERS AT DUCT CONNECTION, AT NECK CONNECTION, AND ALL NEW AND EXISTING DUCTS AT TRAVEL AND LONGITUDINAL JOINTS WITH A WATER BASE SEALER. HARD DUCT CONNECTIONS TO SUPPLY AIR DIFFUSER COLLARS AND DUCTS SHALL BE SEALED WITH 3M CO. 800 SEALANT AND CLAMPED WITH STAINLESS STEEL "E" TYPE CLAMP.

11. EQUIPMENT SUPPORTING REQUIREMENTS

- A. L SUPPORTING STEEL SHALL BE DESIGNED AND APPROVED BY A LICENCED STRUCTURAL ENGINEER.

12. HVAC INSULATION

- A. GENERAL
- 1) DESIGN AND PERFORMANCE OF COMPONENTS AND METHODS SPECIFIED HEREIN SHALL COMPLY WITH THE APPLICABLE PROVISIONS OF THE CODES, STANDARDS, AND RECOMMENDATIONS OF THE ENTITIES LISTED BELOW.

B. DUCT INSULATION

- 1) ALL SUPPLY, RETURN, AND EXHAUST AIR DUCTS INCLUDING EXISTING DUCTS IN WORK AREA SHALL BE EXTERNALLY INSULATED.

MINIMUM DUCT INSULATION R-VALUE

Table with 3 columns: EXTERIOR, PLENUM, UNCONDITIONED SPACE. Values: R-8, R-6, R-4.

C. INSULATION OF PIPES

- 1) INSULATION FOR ALL PIPING, INCLUDING HOT WATER, STATEWATER, DRAIN, CONDENSATE DRAIN PIPING, CONDENSER WATER SUPPLY/RETURN, AND CHILLED WATER SUPPLY/RETURN PIPING:

13. PIPING & ACCESSORIES

- A. PIPE: 1) PIPE SHALL BE NEW, FREE FROM SCALE OR RUST, AND OF MATERIAL AND WEIGHT SPECIFIED.

Table with columns: SYSTEM, SCHEDULE, PIPING, FITTINGS. Includes rows for CONDENSATE DRAIN, CHW, HW, CONDENSER WATER, VALVES, TYPE, BALL, GATE, CONDENSER WATER, DRAIN PANS.

- B. PROVIDE A CLEANOUT IN CONDENSATE DRAIN LINE PIPING AT EVERY CHANGE IN DIRECTION.

- H. STRAINER: 1) STRAINERS SHALL BE SIMILAR AND EQUAL TO THOSE MANUFACTURED BY MUELLER STEAM.

- I. DAMPER PIPING TO EQUIPMENT TO PERMIT SERVICING OR REMOVAL WITHOUT DISMANTLING PIPE BRANCHES.

- M. PIPE SUPPORTS AND HANGERS: 1) ALL SUPPORTS AND PARTS SHALL CONFORM TO THE LATEST REQUIREMENTS OF ANSII B31 AS APPLICABLE FOR PRESSURE PIPING AND MSS STANDARD PRACTICE SP-58 SP-69.

- 2) THICKNESS OF THE INSULATION SHALL BE SUFFICIENT TO ACHIEVE 6% MINIMUM RATING FOR ALL SUPPLY DUCTS. ALL INSULATION SHALL BE UL-LABELED FOR FIRE AND SMOKE RATINGS (NOT TO EXCEED FIVE CLASSIFICATION OF SMOKE DEVELOPED OF 50), AND ALL ACCESSORIES SHALL ALSO BE LABELED.

Table with 3 columns: PIPE SIZE, MAX. HANGER SPACING, MIN. ROD SIZE. Rows for 1/2" to 4", 1 1/4" to 2 1/2", 2 1/2" to 4".

- 8) AT POINTS WHERE VALVES, SPECIALTIES OR BRANCH CONNECTIONS ARE LOCATED, ADDITIONAL HANGERS, OR SUPPORTS SHALL BE USED TO PROPERLY SUPPORT THE LOAD.

14. INSTALLATION OF PIPING

- A. INSTALL ALL PIPING AS SHOWN ON PLANS. PROVIDE DE-ELECTRIC FITTINGS WHERE DIS-SIMILAR METAL PIPING JOIN. STEEL PIPING TO COPPER PIPING JOIN.

16. OVERFLOW DRAIN PANS

- A. DRAIN PANS SHALL BE INSTALLED UNDER ALL CEILING MOUNTED AIR HANDLER UNITS. ALL PIPING AS SHOWN ON PLANS.

17. WATER ALARM SYSTEMS

- A. USE LIEBERT LT-410 OR EQUAL WATER LEAK DETECTING SENSOR.



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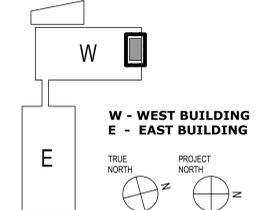
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- A. DRAIN PANS SHALL BE INSTALLED UNDER ALL CEILING MOUNTED AIR HANDLER UNITS. ALL PIPING AS SHOWN ON PLANS.

- A. PROVIDE KRUEGER, TITUS, OR PRICE VARIABLE/CONSTANT AIR VOLUME TERMINAL UNITS AS SHOWN ON THE PLANS AND SPECIFIED HEREIN WITH FACTORY INSTALLED CONTROLS. ALL BOXES, INSULATION SHALL BE HOSPITAL GRADE.

PROJECT:
NEW MRI

155 WHITE PLAINS ROAD
TARRYTOWN, NY 10591



KEY PLAN

Table with columns: NO., DESCRIPTION, DATE. Includes row for CD SUBMISSION on 6/18-21.

REVISIONS/ISSUES
1) THE TERMINALS SHALL BE EQUIPPED WITH PRESSURE INDEPENDENT PNEUMATIC CONTROLS WHICH CAN BE RESET TO MODULATE AIRFLOW BETWEEN ZERO AND THE MAXIMUM CATALOGUED CUBIC FEET PER MINUTE. MAXIMUM AIRFLOW UNITS ARE NOT ACCEPTABLE.

SHEET TITLE:
MECHANICAL
SPECIFICATIONS
SHEET - 1
SCALE: As indicated
PROJECT No. 12384
CHECKED: Checker
DRAWN: LGP

SHEET NO.
M-002.00

DWG OF THIS PLAN IS APPROVED ONLY FOR WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE TO BE CONSIDERED AS EITHER UNAPPROVED OR NOT BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

MINIMUM AND MAXIMUM CUBIC FEET PER MINUTE SETPOINTS, DAMPER FAIL POSITION, AND THERMOSTAT ACTION. PNEUMATIC ACTUATORS SHALL BE PROVIDED BY THE TERMINAL MANUFACTURER.

5) BOX CONTROLLERS IN CRITICAL SPACES WITH SELF CALIBRATION SHALL NOT INTERRUPT AIR FLOW.

K. HOT WATER REHEAT COILS SHALL BE ENCLOSED IN A MINIMUM TWENTY (20) GAUGE GALVANIZED STEEL CASING, WITH SLIP AND DRIVE CONSTRUCTION FOR ATTACHMENT TO METAL DUCTWORK. COILS SHALL BE FACTORY INSTALLED ON THE TERMINAL. DISCHARGE FINS SHALL BE RIPPED AND CORRUGATED HEAVY GAUGE ALUMINUM. MECHANICALLY EXPANDED TO TUBES. TUBES SHALL BE COPPER WITH MINIMUM WALL THICKNESS OF 0.16 INCH WITH MALE SOLDER HEADER CONNECTIONS. COILS SHALL BE LEAK TESTED TO 300 POUNDS PER SQUARE INCH, WITH MINIMUM BURST PRESSURE OF 2000 POUNDS PER SQUARE INCH AT AMBIENT TEMPERATURE. NUMBER OF COIL ROWS AND CIRCUITS SHALL BE SELECTED TO PROVIDE PERFORMANCE AS SCHEDULED ON THE DRAWINGS. COIL PERFORMANCE DATA SHALL BE BASED ON TESTS RUN IN ACCORDANCE WITH ARI STANDARD 410.

19. TESTING, ADJUSTING & BALANCING

A. THE CONTRACTOR SHALL PROVIDE THE SERVICES OF AN AIR BALANCING AND TESTING SPECIALIST WHO SPECIALIZES IN HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS.

B. ALL INSTRUMENTS USED SHALL BE ACCURATELY CALIBRATED AND MAINTAINED IN GOOD WORKING ORDER.

C. THE TESTING SHALL BE PERFORMED IN THE PRESENCE OF A BUILDING REPRESENTATIVE.

D. THE CONTRACTOR SHALL PROVIDE ALL ADDITIONAL BALANCING DAMPERS, PRESSURE TAPS, GAUGES AND OTHER SIMILAR APPURTENANCES AS REQUIRED FOR A PROPERLY BALANCED SYSTEM AND AT NO ADDITIONAL COST TO THE OWNER.

E. ALL BALANCING WORK SHALL BE PERFORMED IN STRICT ACCORDANCE TO THE PROCEDURES AND STANDARDS DESCRIBED IN THE "MANUAL FOR THE BALANCING AND ADJUSTMENT OF THE AIR DISTRIBUTION SYSTEMS" AS PUBLISHED BY THE SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION, INC.

F. QUALIFICATION:

- 1) CONTRACTOR SHALL RETAIN THE SERVICES OF A TESTING AND BALANCING (T&B) CONTRACTOR TO PERFORM ALL AIR AND WATER BALANCING SPECIFIED HEREIN.
- 2) IF THE T&B CONTRACTOR FINDS THAT HE CANNOT BALANCE ANY AIR OR WATER SYSTEM, OR IF HE FINDS ANY POTENTIALLY DETERMINAL OPERATING CONDITION, HE SHALL IMMEDIATELY ADVISE THE ARCHITECT IN WRITING AND SHALL STATE THE REASONS WHY BALANCING CANNOT BE ACHIEVED. HE SHALL ALSO MAKE CORRECTIVE RECOMMENDATIONS ON WHAT IS TO BE DONE BY THE CONTRACTOR. AFTER REVIEW OF THESE RECOMMENDATIONS, THE ARCHITECT WILL DIRECT THE CONTRACTOR TO PERFORM ALL NECESSARY WORK TO ALLOW THE BALANCING CONTRACTOR TO BALANCE THE VARIOUS SYSTEMS ACCORDING TO THE SPECIFICATIONS. CONTRACTOR IS EXPECTED TO DO WITHOUT EXTRA CHARGE, CHANGES TO THE SHEAVES AND FAN BELTS, AS SPECIFIED OR REQUIRED.
- 3) THE T&B CONTRACTOR SHALL COORDINATE THE WORK WITH THE CONTRACTOR THROUGH THE CONSTRUCTION MANAGER. THE T&B CONTRACTOR SHALL HAVE NO BUSINESS AFFILIATION WITH THE SHEETMETAL CONTRACTOR.
- 4) THE T&B CONTRACTOR SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB); MOREOVER, HE MUST HAVE ALL CREDENTIALS AND CAPABILITY REQUIRED FOR AABC OR NEBB MEMBERS AND MUST HAVE AT LEAST 4 YEARS EXPERIENCE IN AIR AND WATER BALANCING ON COMPARABLE PROJECTS IN SIZE AND SCOPE. THE TECHNICIANS MUST BE CERTIFIED THROUGH COMPLETION OF SMCANA OR OTHER SUCH APPROVED SPONSORED TRAINING PROGRAMS FOR AIR OR WATER BALANCING. TECHNICIAN QUALIFICATIONS MUST BE SUBMITTED FOR APPROVAL PRIOR TO COMMENCEMENT OF FIELD WORK.
- 5) THE BALANCING EFFORT SHALL BE DONE UNDER THE DIRECT SUPERVISION OF A REGISTERED PROFESSIONAL ENGINEER WHO WILL CERTIFY THE ACCURACY OF THE FINAL BALANCING DATA AND REPORTS.
- 6) COMPRESSED AIR, REFRIGERANTS, AND CHEMICALS REQUIRED FOR TESTING AND START-UP OF SYSTEMS SHALL BE FURNISHED BY THE CONTRACTOR.
- 7) ELECTRIC POWER AND WATER WILL BE MADE AVAILABLE TO THE CONTRACTOR AT SOURCES DIRECTED.

G. IN THE EVENT THAT THE EQUIPMENT CANNOT BE PROPERLY BALANCED DUE TO LACK OF FINAL CONNECTION, THE CONTRACTOR SHALL HAVE THE TESTING AND BALANCING SPECIALIST ADVISE THE ENGINEER, IN WRITING, OF THE OMISSION PRIOR TO THE SUBMISSION OF THE FINAL BALANCING REPORT.

H. ADJUSTMENT OR REPLACEMENT OF PARTS REQUIRED BY THE RESULTS OF THE TESTING AND BALANCING WORK SHALL BE MADE BY THE CONTRACTOR IN STRICT ACCORDANCE WITH THE RESPECTIVE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.

I. UPON COMPLETION OF WORK SPECIFIED ABOVE, ALL INFORMATION SHALL BE INSERTED ON A SHEET LISTING ALL ITEMS REQUIRED TO BE INCLUDED IN THE COMPLETE TESTING AND BALANCING REPORT. ALL SHEETS SHALL BE NEATLY TYPED, THREE (3) COPIES OF THE BALANCING REPORT MUST BE SUBMITTED TO THE ENGINEER FOR REVIEW.

J. ALL OPENING IN DUCTS, PLENUMS AND OTHER SIMILAR ITEMS, NECESSARY TO THE BALANCING WORK, SHALL BE REPAIRED BY THE CONTRACTOR IN A SUITABLE MANNER. ALL PATCHING MUST BE SUITABLE TO THE SERVICE OF THE SYSTEM SUCH AS MAINTAINING VAPOR SEALS IN COLD DUCTWORK AND OTHER SIMILAR SERVICES.

K. RECOMMENDATIONS AND RESULTS OF THE TESTING AND BALANCING WORK WHICH ARE NECESSARY FOR THE PROPER OPERATION OF THE SYSTEMS, SHALL BE SUBMITTED IN WRITING TO THE ENGINEER. THE SUBMITTAL SHALL INCLUDE A SCHEMATIC DIAGRAM LOCATING ALL AIR INLETS AND OUTLETS.

L. ALL AIR TERMINAL DEVICES SHALL BE BALANCED TO WITHIN FIVE PERCENT OF THEIR DESIGN REQUIREMENTS.

M. ALL FANS AND AIR HANDLING UNITS SHALL BE BALANCED TO WITHIN TEN PERCENT OF THEIR DESIGN CAPACITIES.

N. THE TEMPERATURE CONDITIONS, BOTH D.B. AND W.B. AND SOUND LEVELS SHALL BE READ AND RECORDED.

O. AFTER TESTING AND BALANCING WORK IS COMPLETE, THE CONTRACTOR SHALL INSTALL A NEW SET OF AIR FILTERS.

P. ALL VAV BOXES SHALL BE BALANCED WITHIN FIVE PERCENT THE DESIGN REQUIREMENTS.

Q. ALL WATER SYSTEMS SHALL BE BALANCED WITHIN FIVE PERCENT OF DESIGN REQUIREMENTS.

20. AIR-COOLED SPLIT SYSTEM, COMPUTER ROOM AIR HANDLING UNIT

A. THE EVAPORATOR CABINET IS BUILT OF DURABLE PLASTIC, IVORY WHITE COLOR.

B. THE FAN SECTION IS DESIGNED TO PROVIDE ULTRA-QUIET OPERATION, WITH OPERATING LEVELS OF 40 TO 45 DB.

C. THE EVAPORATOR COILS ARE OF HYDROPHILIC-COATED ALUMINUM SLIT-FINS WITH INNER GROOVED COPPER TUBING, MECHANICALLY EXPANDED TO THE ALUMINUM FINS TO PROVIDE GREATER EFFICIENCY. THE UNITS ARE TO HAVE THREE ROW COILS WITH A FACE AREA OF 2.46 SQUARE FEET WITH 17 FPI.

D. THE FAN SECTION SHALL CONTAIN A SINGLE-FAN MOTOR THAT IS THERMALLY PROTECTED.

E. THE UNITS ARE TO BE PROVIDED WITH INDIVIDUAL DDC BASED CONTROLS WITH BACNET CAPABILITY.

F. UNITS ARE TO BE EQUIPPED WITH A THERMAL EXPANSION VALVE. UNITS ARE PROVIDED WITH A FLARE CONNECTION FOR EASY PIPING CONNECTION AND INSTALLATION.

G. UNITS ARE TO BE EQUIPPED WITH PERMANENT, CLEANABLE FILTERS.

H. CONDENSING UNIT: THE FAN COIL IS MATCHED TO THE FLEXIBLE INDOOR CONDENSING UNIT WITH A SINGLE-CIRCUIT SPLIT SYSTEM. CONDENSING SECTION IS TO BE AIR-COOLED WITH A CENTRIFUGAL FAN CAPABLE OF UP TO 0.5 INCHES STATIC PRESSURE.

I. THE UNITS ARE TO BE BACKED BY A ONE-YEAR LIMITED WARRANTY, WITH AN OPTIONAL 5-YEAR COMPRESSOR WARRANTY.

J. THE CONDENSING SECTION IS TO BE PROVIDED WITH INTERNAL TYPE HOT GAS BYPASS. THE PURPOSE OF THE INTERNAL HOT GAS BYPASS IS TO PROVIDE MODULATED CAPACITY CONTROL AND FREEZE PROTECTION. THE HOT GAS BYPASS VALVE DIRECTS A PORTION OF THE HOT GAS REFRIGERANT FROM THE DISCHARGE OUTLET OF THE COMPRESSOR TO THE SUCTION SIDE OF THE COMPRESSOR. REFRIGERANT CIRCUIT: THIS CONTROL FEATURE IS PERFORMED TO MAINTAIN A HIGH SUCTION PRESSURE WHEN LOW TEMPERATURES ARE PRESENT OR LOW LOAD CONDITIONS. THE QUENCH VALVE DIVERTS "COOL" REFRIGERANT TAKEN AFTER THE CONDENSER AND MIXES WITH THE HOT GAS TO COOL THE MIXED TEMPERATURES OF THE REFRIGERANT BEFORE IT ENTERS THE COMPRESSOR. THIS OPTION DOES NOT REQUIRE ADDITIONAL EXTERNAL PIPING LINES SINCE ALL PIPING LINES ARE LOCATED IN THE CONDENSING CABINET.

K. THE UNIT SHALL HAVE A MODULATING VALVE CONTROLLED BY REFRIGERANT DISCHARGE PRESSURE. A FALL IN AMBIENT TEMPERATURE LOWERS THE DISCHARGE PRESSURE CAUSING AN IMBALANCE IN THE DISCHARGE PRESSURE. THE MODULATING VALVE LOCATED BETWEEN THE CONDENSER AND RECEIVER, REGULATES COMPRESSOR DISCHARGE HOT GAS TO THE RECEIVER. THE HIGHER PRESSURE REDUCES THE FLOW OUT OF THE CONDENSER RESULTING IN A LIQUID REFRIGERANT ACCUMULATION OR "FLOOD" IN THE CONDENSER.

L. THE SINGLE REFRIGERATION CIRCUIT SHALL INCLUDE A REFRIGERANT STRAINER, AN ELECTRONIC CONTROLLED EXPANSION VALVE HIGH AND LOW SIDE CHARGING PORTS, SERVICES VALVES AND INTERCONNECTING PIPING.

M. THE EVAPORATOR SECTION SHALL INCLUDE EVAPORATOR COIL, CONTROL CIRCUIT BOARD, AND FAN MOTOR.

N. THE OUTDOOR AIR COOLED CENTRIFUGAL FAN CONDENSING UNIT SHALL INCLUDE A CONDENSER COIL, A FAN, AN INVERTER DRIVEN COMPRESSORS, ELECTRONIC EXPANSION VALVE, 4-WAY REVERSING VALVE.

- 1) ALL COMPONENTS SHALL BE FACTORY ASSEMBLED, CHARGED WITH R410A REFRIGERANT AND

SEALD. NO INTERNAL PIPING, BRAZING, DEHYDRATION OR CHARGING SHALL BE REQUIRED.

- 2) THE CONDENSER COIL SHALL BE CONSTRUCTED OF COPPER TUBE AND ALUMINUM FINS.
- 3) THE CONDENSING UNIT SHALL BE DESIGNED TO OPERATE AT A SOUND LEVEL LESS THAN 57 dBA.
- 4) EASY ACCESS SHALL BE AFFORDED TO ALL SERVICEABLE PARTS BY MEANS OF REMOVABLE PANEL SECTIONS.
- 5) THE OUTDOOR UNIT SHALL HAVE AN ACCUMULATOR AND HIGH PRESSURE SAFETY SWITCH. THE COMPRESSOR SHALL BE MOUNTED TO AVOID THE TRANSMISSION OF VIBRATION.

O. THE CONTROL SYSTEM SHALL BE MICROPROCESSOR-BASED, FACTORY-WIRED INTO THE SYSTEM AND TESTED PRIOR TO SHIPMENT. THE CONTROL DISPLAY SHALL BE FIELD-WIRED TO THE CONTROL BOARD. THE INDOOR UNIT SHALL BE 120 VOLTS, 60. FIELD WIRING SHALL RUN DIRECTLY FROM THE INDOOR UNIT TO THE WALL MOUNTED CONTROLLER WITH NO SPICES.

- 1) THE CONTROL SYSTEM SHALL PREVENT COMPRESSOR SHIRT-CYCLING
- 2) THE CONTROL SHALL BE USER-CONFIGURABLE TO USE A MANUAL SETPOINT CONTROL
- 3) FOR STARTUP AFTER POWER FAILURE, THE SYSTEM SHALL PROVIDE AUTOMATIC RESTART.

P. THE CONTROL SYSTEM SHALL MONITOR UNIT OPERATION AND ACTIVATE A VISUAL ALARM IN THE EVENT OF THE FACTORY PRESET ALARM CONDITIONS.

Q. FILTRATION

1. THE FILTER CHAMBER SHALL BE AN INTEGRAL PART OF THE SYSTEM, DESIGNED WITHIN THE UNIT FOR EASY FRONT ACCESSIBILITY.
2. AN INITIAL SET OF FILTERS SHALL BE FACTORY INSTALLED IN THE UNIT.
3. FILTERS SHALL BE 2-INCH DEEP, DISPOSABLE, PLEATED DESIGN, EXTENDED-SURFACE, NONWOVEN, REINFORCED COTTON FABRIC, SUPPORTED AND BONDED TO WELDED-WIRE GRID, ENCLOSED IN CARBONAD FRAME DESIGN.
4. RATED NOT LESS THAN MERV 8 PER ASHRAE STD. 52.2.
5. A FILTER DIFFERENTIAL SWITCH FOR ALARM ACTIVATION SHALL BE INCLUDED. DESCRIPTION: THE ENVIRONMENTAL CONTROL, CHILLED WATER COMPUTER ROOM AIR HANDLING EQUIPMENT SHALL BE PROVIDED WITH A HIGH SENSIBLE COOLING SYSTEM. FACTORY ASSEMBLED, PIPED, WIRED, AND FACTORY TESTED PRIOR TO SHIPMENT. UNITS SHALL INCLUDE AN ENCLOSURE/CABINET ASSEMBLY, FAN SECTION, FILTER SECTION, COOLING COIL, CONTROLS, AND INTERCONNECTING PIPING INTERNAL TO UNIT.

R. ELECTRIC REHEAT

1. THE REHEAT SHALL BE OF THE FINNED ENCLOSED, SHEATH TYPE, FABRICATED OF STAINLESS STEEL CORE SHEATH WITH PLATED FINS TO WITHSTAND MOST CONDITIONS.
2. THE REHEAT SHALL BE INSTALLED ON THE AIR DISCHARGE SIDE OF THE COOLING COIL AND SHALL HAVE THREE (3) STAGES.
3. THE REHEAT SHALL BE CAPABLE OF MAINTAINING ROOM DRY BULB CONDITIONS WHEN THE SYSTEM IS CALLING FOR DEHUMIDIFICATION.
4. THE REHEAT SECTION SHALL INCLUDE A SAFETY SWITCHES TO PROTECT THE SYSTEM FROM OVERHEATING.
5. THE ELECTRIC REHEAT REQUIREMENTS SHALL BE AS DETAILED ON THE PROJECT PLANS AND SCHEDULE.

S. HUMIDIFIER

1. THE UNIT SHALL BE PROVIDED WITH A SELF-CONTAINED, MICROPROCESSOR-CONTROLLED STEAM GENERATOR TYPE HUMIDIFIER. THE STEAM GENERATING HUMIDIFIER SHALL USE DISPOSABLE CYLINDER TYPE WITH ELECTRONIC CONTROLS.
2. THE HUMIDIFIER SHALL DISCHARGE PURE STEAM WITH NO MATERIAL DUST CARRY-OVER AND HAVE A SELF-REGULATING AUTOMATIC FLUSH CYCLE. CYLINDERS SHALL BE DISPOSABLE NOT REQUIRING CLEANING OR MAINTENANCE. THE HUMIDIFIER FILL LEVEL, WATER CONDUCTIVITY AND FLUSH RATE SHALL AUTOMATICALLY ADAPT BOTH IN FREQUENCY AND DURATION TO VARIATIONS IN THE INCOMING WATER.
3. DRAIN DURATION AND DRAIN INTERVAL SHALL BE FIELD-ADJUSTABLE.
4. HUMIDIFIERS USING AN OPEN RESERVOIR IN THE AIR STREAM ARE NOT ACCEPTABLE.
5. THE CAPACITY AND POWER CONSUMPTION SHALL BE AS DETAILED ON THE PROJECT PLANS AND SCHEDULE.

T. ELECTRICAL

1. ALL ELECTRICAL COMPONENTS, INCLUDING CONTACTORS, RELAYS AND CONTROL TRANSFORMERS SHALL BE PRE-WIRED AND CONTAINED IN A UNIT MOUNTED ELECTRICAL ENCLOSURE WITH PIANO-HINGED DOOR THAT SHALL SWING OUT FOR EASY ACCESS AND SERVICING.
2. THE CONTROL CIRCUIT VOLTAGE SHALL BE 24 VOLTS AC.
3. THE INPUT ELECTRICAL POWER SHALL BE AS DETAILED ON THE PROJECT PLANS AND SCHEDULE.

21. OXYGEN VENT

A. THE VENT MATERIAL MUST BE OF THE FOLLOWING MATERIAL WITH THE WALL THICKNESS INDICATED.

1. SS 304- MINIMUM 0.035IN; MAXIMUM 0.125IN

B. VENT SHALL BE WELDED JOINTS OR BOLTED FLANGED JOINTS WITH FIBERGLASS GASKETS PER MRI VENDOR REQUIREMENTS.

C. MATERIALS ACCESSORIES, DETAILS OF QUENCH VENT INSTALLATION MUST BE IN ACCORDANCE WITH MRI VENDORS RECOMMENDATIONS AND REQUIREMENTS. PROVIDE ALL MATERIAL, LABOR, WORK, ACCESSORIES FOR INSTALLATION.

D. EITHER TUBES OR PIPES MAY BE USED AND MUST BE SEAMLESS OR HAVE WELDED SEAMS.

E. STAINLESS STEEL BELLOWS PIPE LESS THAN 1FT LENGTH MAY BE USED AS A TERMINAL EXPANSION POINT.

F. THE VENT PIPE MUST WITHSTAND A MAXIMUM PRESSURE OF 6.5 PSI.

G. WAVEGUIDE VENT MATERIAL MUST MATCH THE MAGNET VENT.

H. TERMINATION OF VENT SHALL BE PROTECTED WITH STAINLESS STEEL WIRE MESH SCREEN MINIMUM AREA 2.5 TIMES THE CROSS SECTIONAL AREA OF THE QUENCH VENT.

I. PROVIDE GALVANIC SEPARATION BETWEEN MAGNET AND QUENCH VENT.

J. PROVIDE 12" TO 19" LONG FLEX SECTION.

K. PROVIDE MINIMUM 2" THICK HIGH DENSITY FIBERGLASS SECTIONAL PIPE INSULATION THROUGHOUT ALL AROUND QUENCH VENT WITH VAPOR BARRIER. PROVIDE ALUMINUM JACKETING ALL AROUND THROUGHOUT, MINIMUM 18 GAUGE, HELD IN PLACE WITH STAINLESS STEEL Z-BANDS AT 12" CENTER.

22. OXYGEN SENSOR AND ALARM PANELS

A. PROVIDE TWO (2) OXYGEN DEPLETION MONITORING SYSTEM FOR MRI EXAM ROOM AND MRI EQUIPMENT ROOM SYSTEM SHALL INCLUDE SAMPLE DRAW RUBY PLASTIC TUBE THAT USES NO METAL COMPONENTS NEAR OR INSIDE MRI ROOM, REMOTE MONITORING AND ALARM PANEL.

B. FOR MRI EXAM ROOM AND MRI EQUIPMENT ROOM PROVIDE PLASTIC TUBE WITH PLASTIC PLATE AND FILTER HOUSING IN ROOM.

C. REMOTE MONITORING AND ALARM PANEL SHALL BE WITH FOUR DIGIT LED READOUT DISPLAY, SHALL CONTINUOUSLY DISPLAY GAS CONCENTRATION READINGS, SHALL PROVIDE 3 ALARM SET POINTS FOR CAUTION, WARNING, AND ALARM. PANEL SHALL PROVIDE VISUAL PILOT AND HORN ALARM WITH SILENCE SWITCH AND RESEAT.

D. SYSTEM SHALL BE UL APPROVED, MSA TQARGO II. PROVIDE ADEQUATE LENGTH OF TUBE, POWER AND WIRING.

23. AUTOMATIC CONTROLS

A. GENERAL: PROVIDE COMPLETELY READY FOR OPERATION CONTROL SYSTEMS AS DESCRIBED HEREIN. THE INSTALLATION SHALL BE TESTED AND CERTIFIED BY THE MANUFACTURER, BASIS OF DESIGN TRACER SC.

- 1) THE ENTIRE CONTROL SYSTEM SHALL BE COMPLETE WITH ALL NECESSARY CONTROL DEVICES, THERMOSTATS, PRESSURE SENSORS, RELAYS, SWITCHES, TRANSFORMERS, PANELS, CONTROLLERS, UNITARY CONTROLLERS, WIRING, AND TO PROVIDE THE FUNCTIONS AS SPECIFIED. ALL CONTROLS SHALL BE THE PRODUCT OF ONE MANUFACTURER.
- 2) THE CONTROL SYSTEM SHALL BE INSTALLED COMPLETE IN ALL RESPECTS BY COMPETENT WORKERS, REGULARLY EMPLOYED BY THE MANUFACTURER OF THE CONTROL SYSTEM. ALL ELECTRIC WIRING IN CONNECTION WITH THE CONTROL SYSTEM SHALL BE INSTALLED UNDER THE SECTION.

3) COMPLETE DRAWINGS SHALL BE SUBMITTED TO THE ENGINEERS FOR APPROVAL BEFORE ANY FIELD INSTALLATION IS STARTED. SUCH DRAWINGS SHALL GIVE COMPLETE DESCRIPTION AND DETAILS.

4) SERVICE - AFTER COMPLETION OF THE CONTROL SYSTEM INSTALLATION, THE CONTROL CONTRACTOR SHALL REGULATE AND ADJUST THERMOSTAT, CONTROL RELAYS, ETC., AND PLACE THEM IN COMPLETE OPERATING CONDITION SUBJECT TO THE APPROVAL OF THE ENGINEERS. COMPLETE INSTRUCTIONS SHALL BE GIVEN TO THE OWNER.

5) ALL FIELD WIRING WORK INCLUDING INTERLOCKING WIRING IN CONNECTION WITH THE ELECTRICAL CONTROL SYSTEM FOR AUTOMATIC CONTROLS SHALL BE PROVIDED BY THE HVAC CONTRACTOR. THE CONTRACTOR SHALL HAVE THE CONTROL MANUFACTURER FURNISH APPROVED DETAIL TERMINAL TO TERMINAL WIRING DIAGRAMS TO FACILITATE THE FIELD WIRING. ALL WORK SHALL BE IN ACCORDANCE WITH THE ELECTRICAL CODE.

B. DESCRIPTION

- 1) DIRECT-DIGITAL CONTROL (DDC) SYSTEMS SHALL BE ENGINEERED, MOUNTED, WIRED, AND TESTED BY THE HVAC EQUIPMENT. EACH CONTROL SYSTEM SHALL BE FULLY FUNCTIONAL IN A STAND-ALONE MODE OR MAY BE TIED TO A BUILDING AUTOMATION SYSTEM. ADDITIONALLY, ALL FACTORY-MOUNTED CONTROLS MUST INCLUDE FACTORY-INSTALLED AND ADDRESSED WIRELESS CONNECTIVITY MODULES TO SUPPORT BUILDING AUTOMATION CERTIFIED BACNET COMMUNICATIONS. ALL FACTORY-MOUNTED CONTROLS SHALL BE COVERED BY THE HVAC EQUIPMENT MANUFACTURER'S STANDARD WARRANTY.
- 2) THE PROJECT SHALL BE COMPRISED OF A HIGH SPEED ETHERNET NETWORK UTILIZING BACNET/IP COMMUNICATIONS BETWEEN SYSTEM CONTROLLERS AND WORKSTATIONS. COMMUNICATIONS BETWEEN SYSTEM CONTROLLERS AND SUB-NETWORKS OF CUSTOM APPLICATION CONTROLLERS AND/OR APPLICATION SPECIFIC CONTROLLERS SHALL UTILIZE BACNET SELF-HEALING WIRELESS MESH COMMUNICATIONS.
- 3) EACH SYSTEM CONTROLLER SHALL PERFORM COMMUNICATIONS TO A NETWORK OF CUSTOM APPLICATION AND APPLICATION SPECIFIC CONTROLLERS USING BACNET SELF-HEALING MESH NETWORK AS SPECIFIED.
- 4) EACH SYSTEM CONTROLLER SHALL FUNCTION AS A BACNET ROUTER TO EACH UNIT CONTROLLER PROVIDING A UNIQUE BACNET DEVICE ID FOR ALL CONTROLLERS WITHIN THE SYSTEM.
- 5) THE OWNER OR DATA CONTRACTOR WILL PROVIDE ALL COMMUNICATION MEDIA, CONNECTORS, REPEATERS, NETWORK SWITCHES, AND ROUTERS NECESSARY FOR THE HIGH SPEED ETHERNET NETWORK. AN ACTIVE ETHERNET PORT WILL BE PROVIDED ADJACENT TO EACH SYSTEM CONTROLLER AND OPERATOR INTERFACE (PCI) FOR CONNECTION TO THE HIGH SPEED ETHERNET NETWORK.
- 6) ALL VALUES WITHIN THE SYSTEM (I.E. SCHEDULES, DATALOGS, POINTS, SOFTWARE VARIABLES, CUSTOM PROGRAM VARIABLES) SHALL BE READABLE AND CONTROLLABLE (WHERE APPROPRIATE) BY ANY SYSTEM CONTROLLER OR BACNET WORKSTATION IN THE COMMUNICATIONS NETWORK VIA BACNET.

H. ARCHITECTURE/COMMUNICATION - FIELD CONTROL

- 1) ALL FACTORY AND FIELD-PROVIDED CONTROLLERS SHALL BE BACNET-CERTIFIED PER BACNET TESTING LABORATORIES (BTL) STANDARDS.

I. WALL MOUNTED THERMOSTAT TO BE AS FOLLOWS:

- 1) CONTAIN ALL ADJUSTMENTS FOR TEMPERATURE CONTROL.
- 2) MINIMUM, MAXIMUM, AND AUXILIARY FLOW LIMIT ADJUSTMENTS.
- 3) LIVE VELOCITY READOUT TERMINAL.
- 4) TAMPER PROOF COVER WITH HIDDEN SETPOINT SLIDERS.
- 5) MODERN APPEARANCE.
- 6) THERMOSTATS SHALL BE CAPABLE OF CONTROLLING WITHIN PLUS OR MINUS 1-1/2 DEG. F. CHANGE.
- 7) THERMOSTATS SHALL BE CAPABLE OF CONTROLLING BOTH HEATING AND COOLING.
- 8) LOCKABLE COVERS WHERE REQUIRED BY OWNER/BUILDING MANAGEMENT.

J. ALARM/EVENT NOTIFICATION

- 1) AN OPERATOR SHALL BE NOTIFIED OF NEW ALARMS/EVENTS AS THEY OCCUR WHILE NAVIGATING THROUGH ANY PART OF THE SYSTEM VIA AN ALARM CON.

K. ALARM/EVENT LOG. THE OPERATOR SHALL BE ABLE TO VIEW ALL LOGGED SYSTEM ALARMS/EVENTS FROM ANY OPERATOR INTERFACE.

- 1) THE OPERATOR SHALL BE ABLE TO SORT AND FILTER ALARMS FROM EVENTS. ALARMS SHALL BE SORTED IN A MINIMUM OF 4 CATEGORIES BASED ON SEVERITY.
- 2) ALARM/EVENT MESSAGES SHALL USE FULL LANGUAGE, EASILY RECOGNIZED DESCRIPTORS.
- 3) AN OPERATOR WITH THE PROPER SECURITY LEVEL MAY ACKNOWLEDGE AND CLEAR ALARMS/EVENTS.

L. SCHEDULING. PROVIDE THE CAPABILITY TO SCHEDULE EACH OBJECT OR GROUP OF OBJECTS IN THE SYSTEM.

M. ALARM/EVENT LOG

- 1) ANY OBJECT IN THE SYSTEM SHALL BE CONFIGURABLE TO GENERATE AN ALARM WHEN TRANSITIONING IN AND OUT OF A NORMAL OR FAULT STATE. ROUTE THE ALARM/EVENT TO ONE OR MORE ALARM LOG. THE ALARM MESSAGE SHALL INCLUDE THE NAME OF THE ALARM LOCATION, THE DEVICE THAT GENERATED THE ALARM, AND THE ALARM MESSAGE TSEF.

ROOM.

- 3) WHEN THE FAN IS ENERGIZED, THE DAMPER ON THE FAN INTAKE SHALL OPEN, THE DAMPER ON THE RETURN VAV BOX SHALL CLOSE, AND THE DAMPER ON THE RELIEF DUCT AT THE CONTROL ROOM SHALL OPEN.

C. OXYGEN DEPLETION SENSOR AND PRESSURE MONITOR IN THE MRI

- 1) WHEN EITHER THE OXYGEN DEPLETION SENSOR OR THE PRESSURE MONITOR IN THE MRI ROOM EXCEEDS SET POINT (DUE TO A HELIUM RELEASE) AN ALARM SHALL BE SOUNDED IN THE MRI CONTROL ROOM AND AT THE BMS. THE DAMPER ON THE RELIEF VENT AT THE CONTROL ROOM WALL SHALL OPEN, AND THE DAMPER ON THE RETURN VAV BOX SHALL CLOSE.
- 2) WHEN THE ALARM CONDITION IS RESTORED, THE DAMPERS SHALL RETURN TO THEIR NORMAL POSITIONS.

SECTION.

ROOM.

- 3) WHEN THE FAN IS ENERGIZED, THE DAMPER ON THE FAN INTAKE SHALL OPEN, THE DAMPER ON THE RETURN VAV BOX SHALL CLOSE, AND THE DAMPER ON THE RELIEF DUCT AT THE CONTROL ROOM SHALL OPEN.

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- 1) WHEN EITHER THE OXYGEN DEPLETION SENSOR OR THE PRESSURE MONITOR IN THE MRI ROOM EXCEEDS SET POINT (DUE TO A HELIUM RELEASE) AN ALARM SHALL BE SOUNDED IN THE MRI CONTROL ROOM AND AT THE BMS. THE DAMPER ON THE RELIEF VENT AT THE CONTROL ROOM WALL SHALL OPEN, AND THE DAMPER ON THE RETURN VAV BOX SHALL CLOSE.
- 2) WHEN THE ALARM CONDITION IS RESTORED, THE DAMPERS SHALL RETURN TO THEIR NORMAL POSITIONS.

24. SEQUENCE OF OPERATION

A. AIR CONDITIONING UNIT AC-5 UNIT CONTROLS

- a) AC-5 SHALL BE EQUIPPED WITH WALL MOUNTED, STAND-ALONE CONTROLS. CONTROLLERS SHALL HAVE BACNET COMMUNICATION.
- b) EACH SYSTEM SHALL BE FURNISHED WITH A MICROPROCESSOR BASE PROGRAMMABLE THERMOSTAT PROVIDED BY AC MANUFACTURER.
- c) EACH SYSTEM SHALL OPERATE BASED ON 100% RECIRCULATION.
- d) EACH SYSTEM SHALL BE CONTROLLED BY ITS OWN CONTROL THERMOSTAT SET POINTS.

2) SAFETIES:

- a) AUTOMATIC OPERATION AC-5: WHEN ALARMED, SMOKE DETECTORS WILL STOP THE SUPPLY AIR (THROUGH SOFTWARE INTERLOCK), WHEN SMOKE CONDITION IS CLEARED AND DETECTORS ARE RESET, THE SYSTEM RESUMES NORMAL OPERATION.
- b) STATIC PRESSURE OPERATION: THE SUPPLY FAN SHALL SHUT DOWN UPON A HIGH DISCHARGE PRESSURE OR LOW SUCTION PRESSURE CONDITION. ONCE THE SUPPLY FAN HAVE BEEN SHUT DOWN, MANUAL RESET THROUGH A PUSH BUTTON LOCATED AT THE DDC PANEL, IS REQUIRED TO RESTART THEM.
- c) THE UNIT SHALL BE FURNISHED WITH INTERNAL SAFETIES THAT SHALL SHUT THE UNIT DOWN DURING AN ALARM CONDITION. THE UNIT CONTROLLER SHALL COMMUNICATE THESE ALARM CONDITIONS TO THE BMS FOR REMOTE ALARM. THE UNIT SHALL AT A MINIMUM HAVE THE FOLLOWING AS SAFETIES:
 - FAN OVERLOAD
 - FIRE/STAT/ SMOKE CONDITION
 - HIGH REFRIGERANT PRESSURE
 - LOW REFRIGERANT PRESSURE

IN ADDITION TO DEVICE CONTROL, THE BMS OPERATOR SHALL HAVE THE CAPABILITY TO MODIFY THE FOLLOWING:

- MODES OF OPERATION
- SCHEDULES
- SETPOINT FOR ALL OPERATIONS
- AMBIENT LOCKOUT SETPOINT
- SETPOINT BANDS

AT NO TIME SHALL THE UNIT CONTROLLER PREVENT THE BMS OPERATOR FROM MANUALLY ADJUSTING POINTS FROM THE BMS TO THE UNIT. THE MANUFACTURER SHALL MAKE PROVISIONS SO THAT THE UNIT CONTROLLER CAN BE ADJUSTED VIA COMMUNICATION FROM THE BMS AT ALL TIMES.

- 4) UNIT OFF: UPON UNIT SHUT/DOWN ON SCHEDULE OR A COMMAND FROM BMS OR A COMMAND TO SHUT DOWN BY FIRE ALARM SYSTEM OR OTHER SHUT DOWN COMMAND, THE FAN MOTORS WILL BE DE-ENERGIZED, THE AIR HANDLING UNIT'S OUTSIDE AIR DAMPERS WILL CLOSE.
- 5) SYSTEM OFF: WHENEVER THE AIR HANDLING SYSTEM IS OFF, THE OUTDOOR AIR DAMPERS WILL CLOSE.
- 6) SYSTEM START UP: THE DDC SHALL COMMAND THE SUPPLY AIR FAN OF THE UNIT ON AND ENABLE THE OUTDOOR AIR INTAKE AND RETURN DAMPERS. THE SUPPLY AIR FAN WILL START THEIR FANS. THE OUTSIDE AIR DAMPER WILL OPEN. THE RETURN AIR DAMPER WILL OPEN.
- 7) UNIT ON: COOLING: TO MAINTAIN DISCHARGE AIR TEMPERATURE IN THE COOLING SEASON, THE DISCHARGE AIR TEMPERATURE SENSOR WILL, THROUGH A THREE MODE (P-H-D) DIRECT ACTING TEMPERATURE SOFTWARE CONTROLLER, AND START COMPRESSOR TO MAINTAIN THE ADJUSTABLE DISCHARGE TEMPERATURE SETPOINT.

B. EXHAUST FAN EF-1

- 1) FAN SHALL BE CONTROLLED BY A WALL MOUNTED SWITCH AND PILOT LIGHT.
- 2) WALL SWITCH SHALL HAVE A LAMINOID PLACK IDENTIFYING IT AS THE PURGE SWITCH FOR THE MRI

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OWNER:

**COLUMBIA DOCTOR'S
TARRYTOWN**

PROJECT:
NEW MRI

155 WHITE PLAINS ROAD
TARRYTOWN, NY 10591

KEY PLAN

W - WEST BUILDING
E - EAST BUILDING

TRUE NORTH
PROJECT NORTH

NO.	DESCRIPTION	DATE
1	CD SUBMISSION	6-18-21
REVISIONS / ISSUES		

SHEET TITLE:
**MECHANICAL
SPECIFICATIONS
SHEET - 2**

SEAL:	DATE: 7/23/2020 CON/REF No. PROJECT No. 12384 CHECKED: Checker DRAWN: LGP
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SHEET NO.
M-003.00

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F

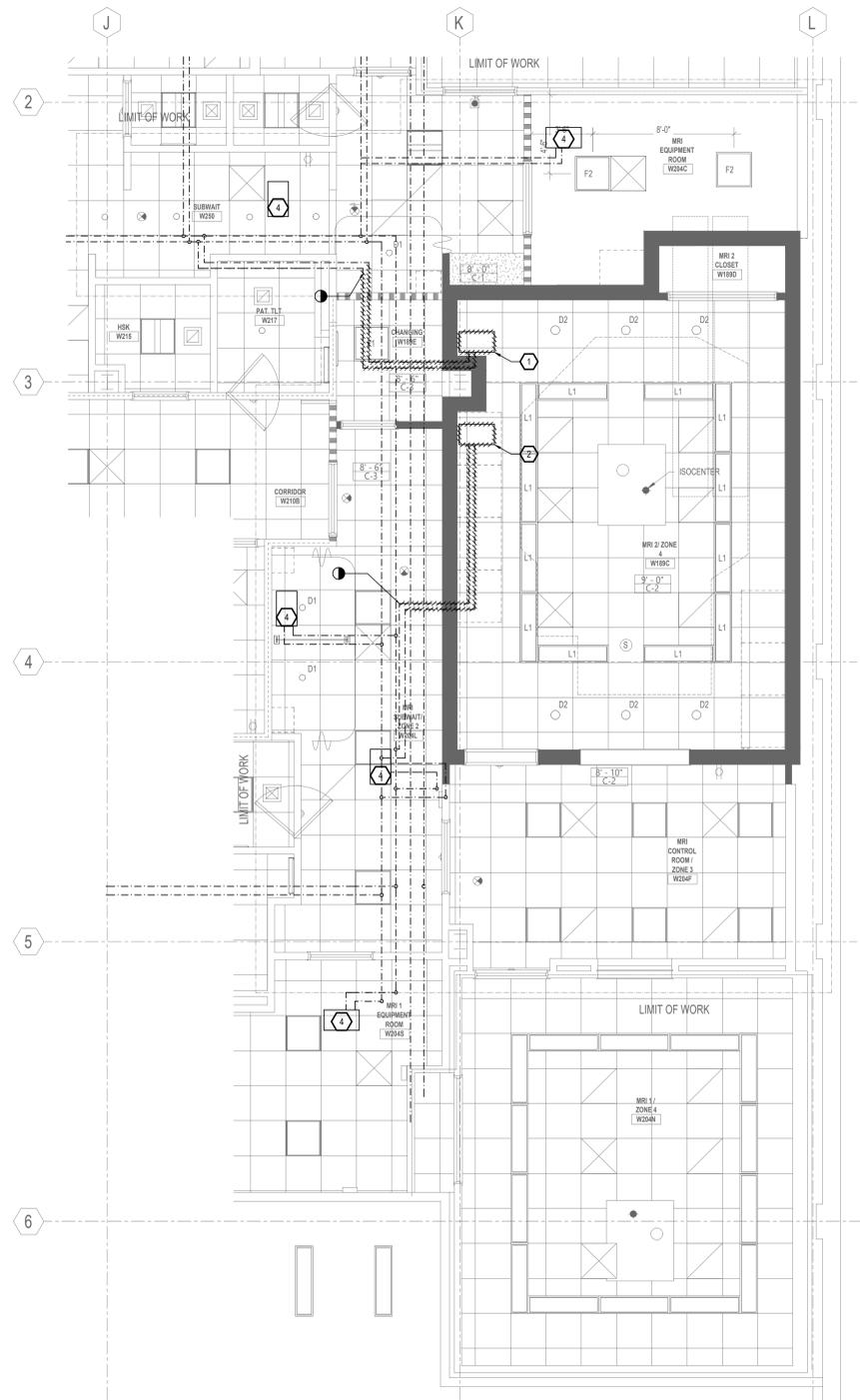
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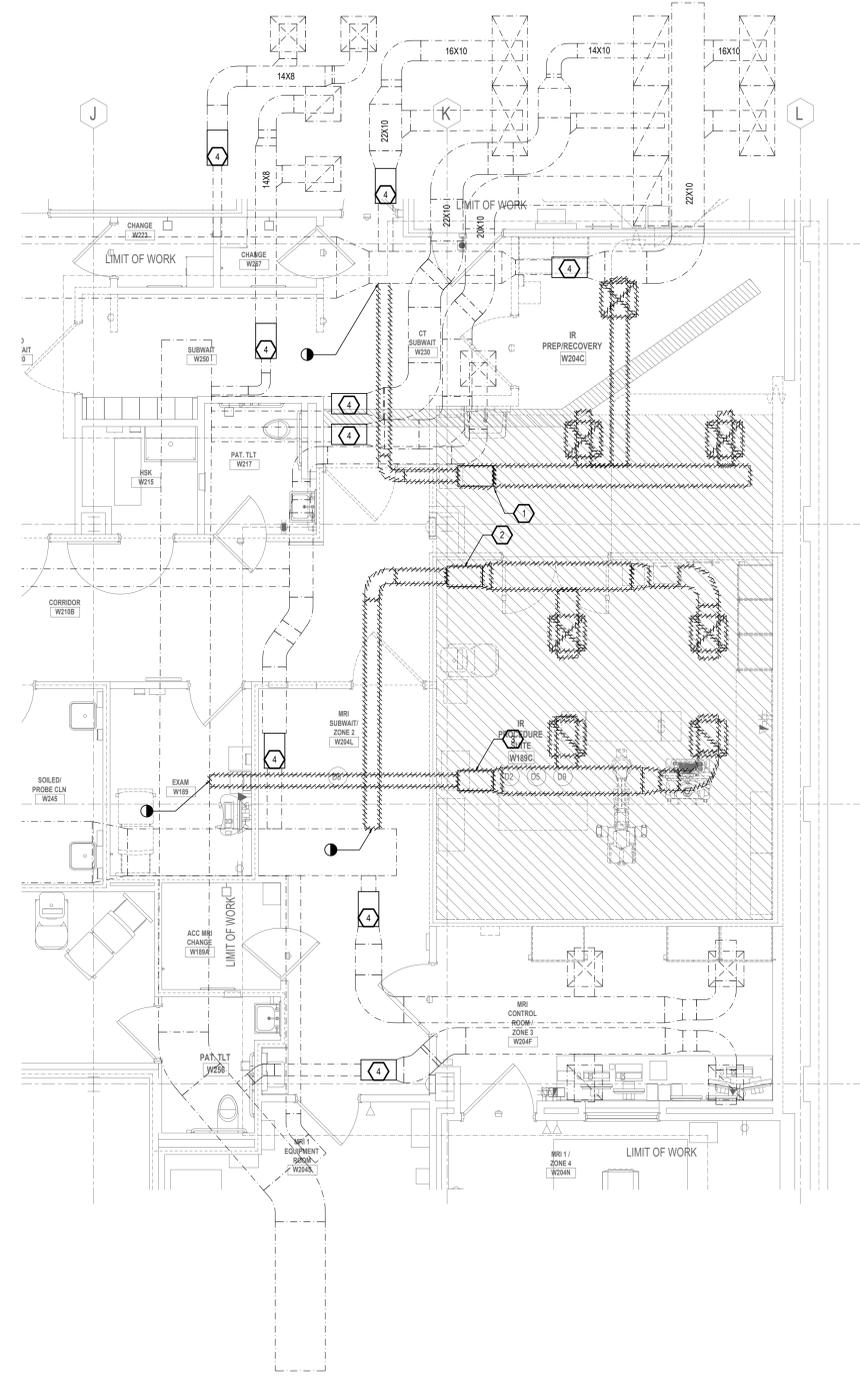
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B

A



DEMOLITION PART PLAN, PIPING



DEMOLITION PART PLAN, DUCTWORK

KEY NOTES

1	EXISTING 6-INCH SUPPLY AIR VAV BOX TO BE RELOCATED. REFURBISH BOX AS REQUIRED. REMOVE ALL DUCTWORK TO/FROM BOX. REMOVE BRANCH PIPING AS INDICATED.
2	EXISTING 10-INCH SUPPLY AIR VAV BOX TO BE RELOCATED. REFURBISH BOX AS REQUIRED. REMOVE ALL DUCTWORK TO/FROM BOX. REMOVE BRANCH PIPING AS INDICATED.
3	EXISTING 10-INCH RETURN AIR VAV BOX TO BE RELOCATED. REFURBISH BOX AS REQUIRED. REMOVE ALL DUCTWORK TO/FROM BOX.
4	EXISTING VAV BOX TO REMAIN



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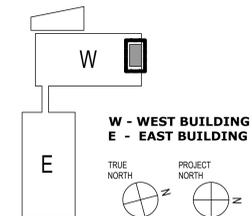
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PROJECT:
 NEW MRI

155 WHITE PLAINS ROAD
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KEY PLAN

NO.	DESCRIPTION	DATE
1	CD SUBMISSION	6-18-21
REVISIONS/ISSUES		

SHEET TITLE:
 DEMOLITION PART
 PLAN, HVAC PIPING
 AND DUCTWORK

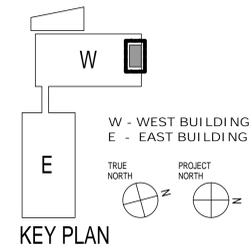
SEAL: _____ **DATE:** 7/23/2020
CON/REF No. _____
CONTRACT No. _____
SCALE: As indicated
PROJECT No. 12384
CHECKED: Checker
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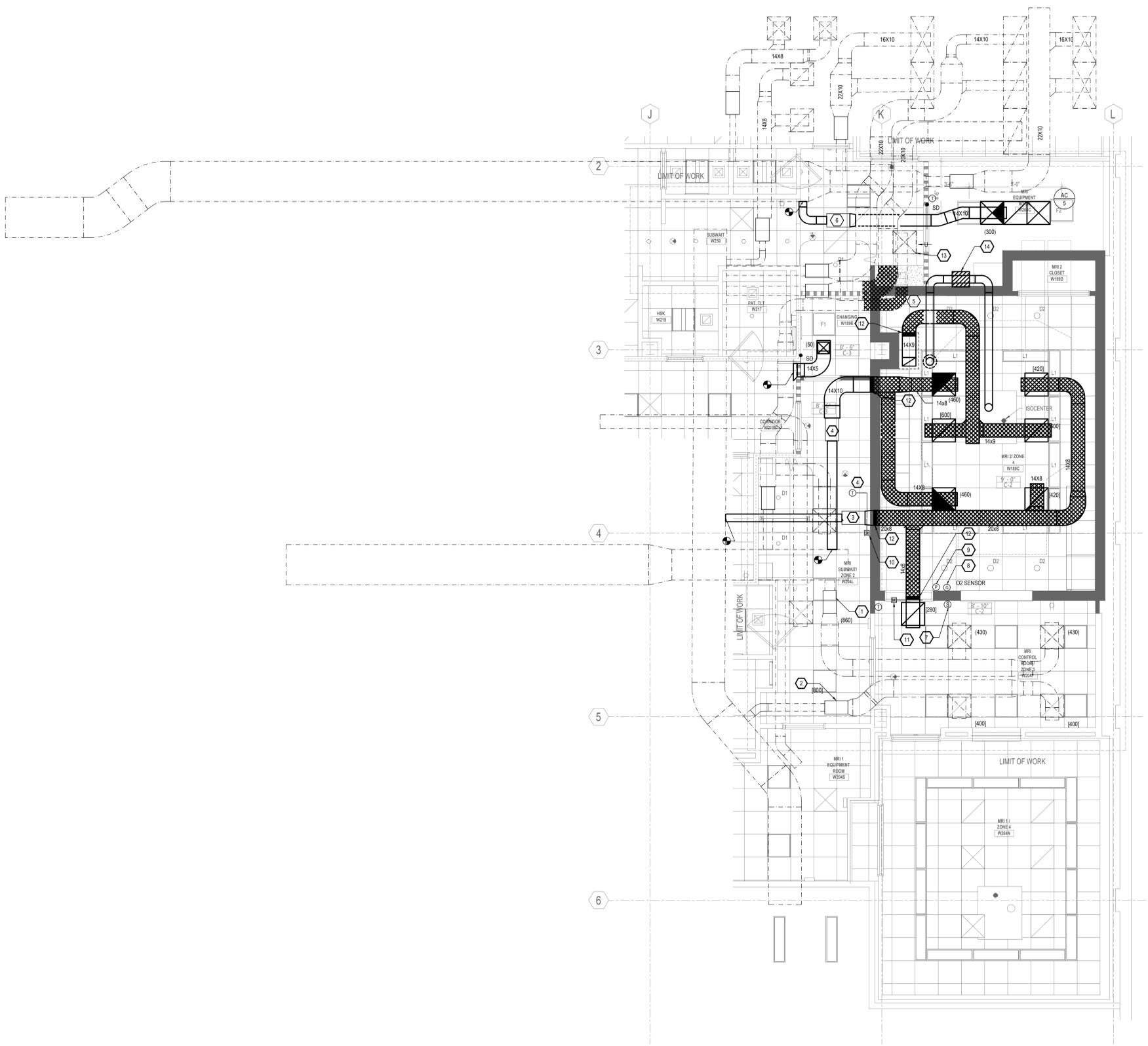
NO.	DESCRIPTION	DATE
1	CD SUBMISSION	6-18-21
REVISIONS/ISSUES		

SHEET TITLE:
**FIRST FLOOR
 HVAC PART PLAN
 DUCTWORK**

SEAL:	DATE: 7/23/2020
	CON/REF No.
	CONTRACT No.
	SCALE: As indicated
	PROJECT No. 12384
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- KEY NOTES**
- REBALANCE EXISTING 8-INCH SUPPLY AIR VAV BOX FROM 775 CFM TO 880 CFM. PROVIDE NEW THERMOSTAT.
 - REBALANCE EXISTING 8-INCH RETURN AIR VAV BOX FROM 775 CFM TO 880 CFM.
 - RELOCATE AND REBALANCE EXISTING 10-INCH RETURN AIR BOX TO 840 CFM. INTERLOCK WITH SUPPLY AIR BOX TO ROOM.
 - RELOCATE AND REBALANCE EXISTING 10-INCH VAV BOX FROM 880 CFM TO 920 CFM. PROVIDE NEW PIPING AND VALVES. PROVIDE NEW RETURN DUCT MOUNTED TSTAT FOR CONTROL OF REHEAT VALVE.
 - ADD-ALTERNATE - IF EXISTING 20X10 AND 22X10 ARE INSIDE SHIELD AREA. PROVIDE WAVE GUIDES WHERE DUCT ENTERS AND EXITS MRI SHIELD AND REPLACE EXISTING DUCT SECTIONS WITH ALUMINUM DUCTWORK OF SAME SIZE. REBALANCE THE ASSOCIATED VAV BOXES (2) AFTER COMPLETION OF THE WORK. DUCT REPLACEMENT TO BE DONE ON OVERTIME.
 - RELOCATE AND REBALANCE EXISTING 6-INCH VAV BOX FROM 450 CFM TO 350 CFM. PROVIDE NEW PIPING, VALVES AND TSTAT.
 - WALL SWITCH FOR ON/OFF CONTROL OF THE EMERGENCY PURGE FAN. PROVIDE SWITCH WITH INSTRUCTIONAL PLATE AS PER THE MRI MANUFACTURER'S RECOMMENDATIONS.
 - OXYGEN DEPLETION SENSOR. REFER TO THE SEQUENCE OF OPERATION. CONNECT TO THE BUILDING BMS.
 - ROOM HIGH PRESSURE SENSOR. REFER TO SEQUENCE OF OPERATION. CONNECT TO THE BUILDING BMS.
 - RETURN AIR MOTORIZED DAMPER (N.O.) REFER TO SEQUENCE OF OPERATION.
 - RELIEF AIR MOTORIZED DAMPER (N.C.) REFER TO SEQUENCE OF OPERATION.
 - WAVE GUIDE ON DUCTWORK AT SHIELD PENETRATION. ALL DUCTWORK, DIFFUSERS AND AIR DEVICES IN MRI ROOM ARE TO BE ALUMINUM.
 - REBALANCE EXISTING DIFFUSER FROM 220 TO 170 CFM.
 - 8-INCH DIAMETER CRYOGENIC VENT AND EXPANSION JOINT. REFER TO DETAILS AND CONSTRUCTION NOTES FOR FABRICATION AND INSTALLATION.

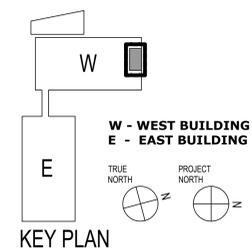
CONTRACTOR NOTES:

- PROVIDE AN ALTERNATE PRICE TO REPLACE THE VAV BOXES WITH NEW INCLUDING THE COILS, CONTROLS, VALVES AND DUCTWORK.
- PROVIDE FOR A MINIMUM OF FIVE (5) SITE VISITS FOR BALANCING INCLUDING BALANCING FOR CONFORMANCE TO FGI REQUIREMENTS AND FOR COMFORT.

VENTILATION TABLE PER 2018 GUIDELINES FOR DESIGN AND CONSTRUCTION OF HEALTH CARE COMPLIANCE CHECK

ROOM NAME	ROOM #	AREA	CLEAN	RM TYPE	DESIGN		ACTUAL		DESIGN TEMP (°F)	COMPLY?
					PERIODIC RELATIONSHIP TO ADJACENT SPACES	OUTSIDE AIR CHANGE PER HOUR (ACH)	TOTAL ACH	EXHAUST TO OUTSIDE		
MRI Room	W200	405	S	CLASS 1 (HAAS RM) (STAIR)	0	0	0	0	72	Yes
MRI Control Room	W201	210	S	OFFICE (SMALL)	10	10	10	10	72	Yes
MRI Equipment Room	W202	140	S	MISC. (SEE NOTES)	0	0	0	0	72	Yes

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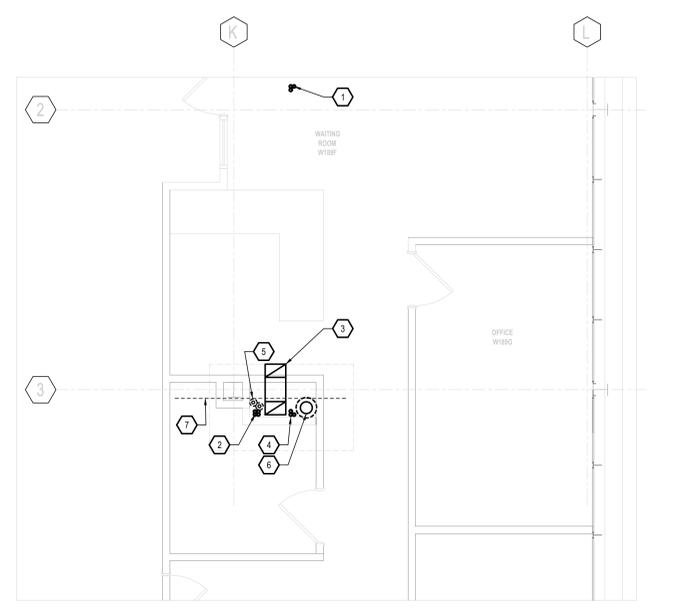
SHEET TITLE:
 2nd FL AND ROOF HVAC
 PART PLAN PIPING AND
 CYROGENIC VENT

SEAL: [Signature Area]
DATE: 7/23/2020
CON/REF No.
CONTRACT No.
SCALE: As indicated
PROJECT No. 12384
CHECKED: Checker
DRAWN: LGP

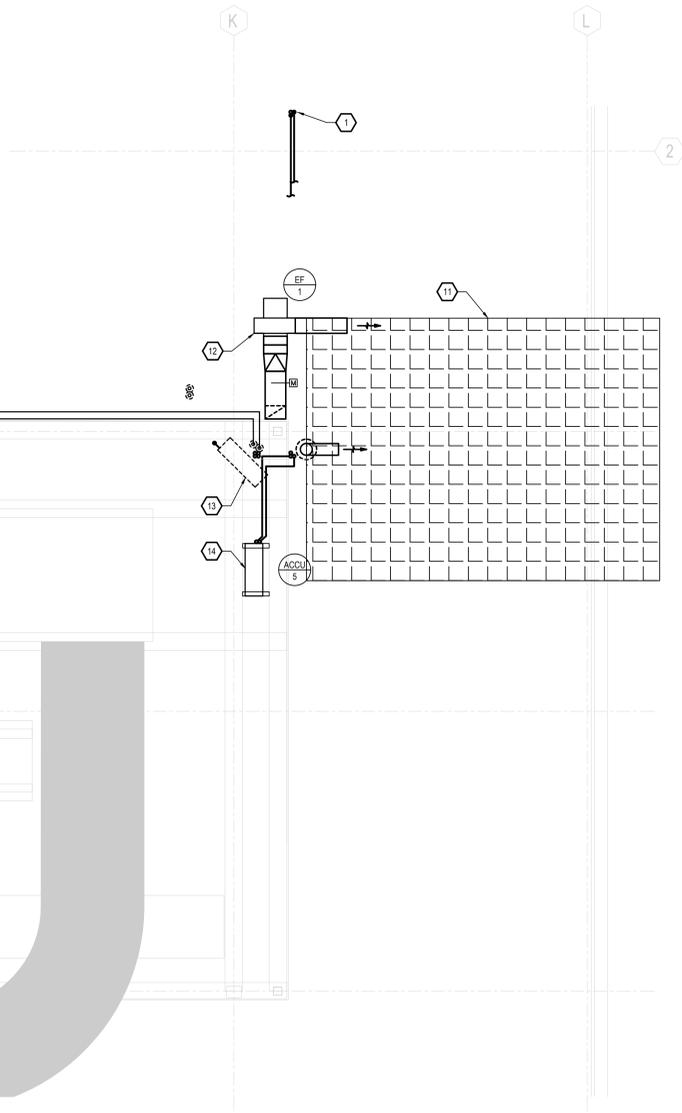
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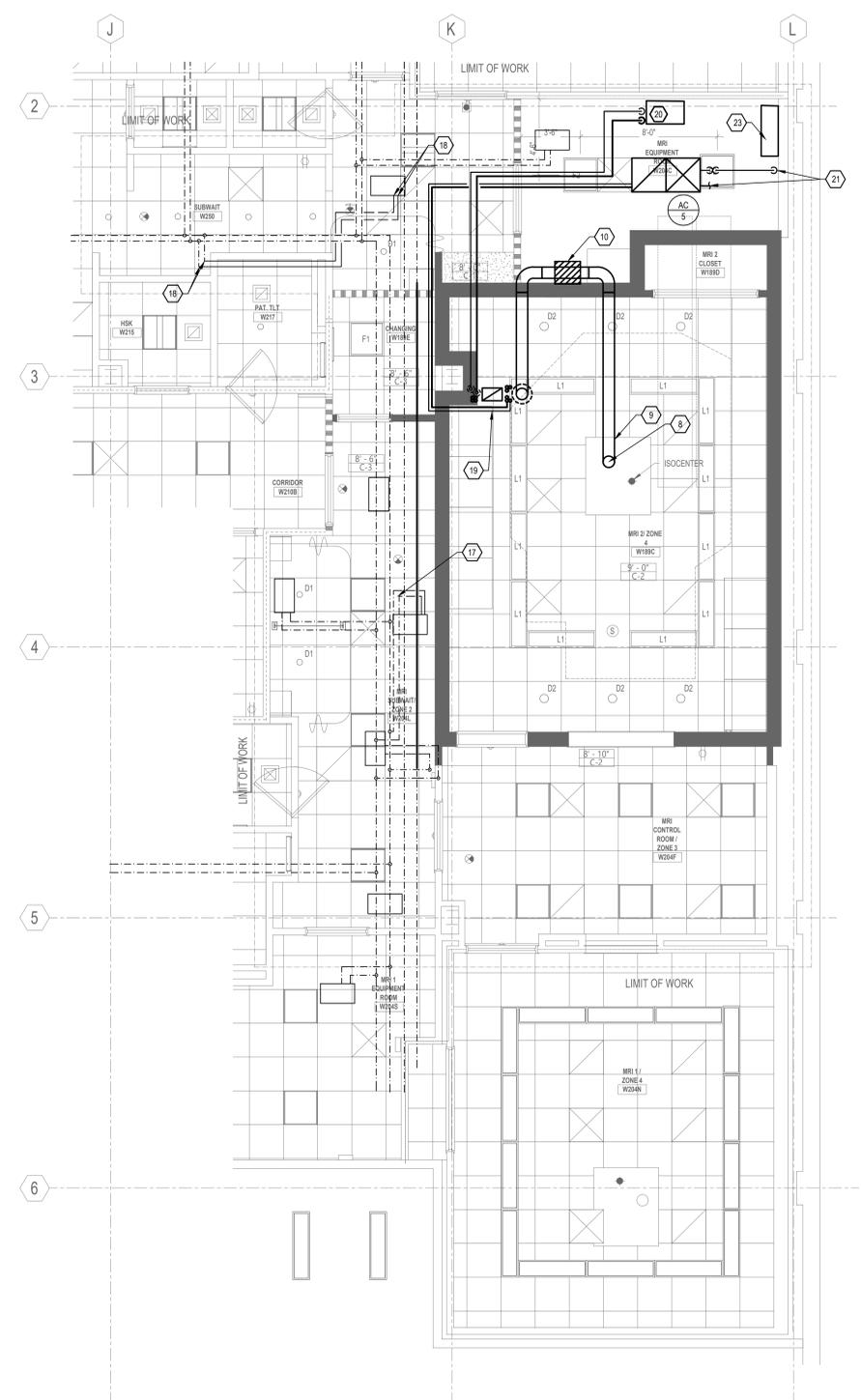
- KEY NOTES**
- REFRIGERANT PIPING AND CONDUIT FOR XRAY EQUIPMENT TO REMAIN.
 - CONDUIT FOR CONTROL AND POWER WIRING OF NEW CHILLER AND NEW MRI EXHAUST FAN
 - 14X9 EXHAUST DUCT UP TO MRI EXHAUST FAN ON ROOF. OFFSET ABOVE CEILING TO ROOF PENETRATION. WRAP ENTIRE LENGTH OF DUCT FROM RATED SHAFT TO THE ROOF IN 2-HOUR FIREWRAP INSULATION.
 - REFRIGERANT PIPING AND CONDUIT FOR MRI EQUIPMENT ROOM AC UNIT CRAC-5
 - 2-1/2-INCH CHILLED GLYCOL SUPPLY AND CHILLED GLYCOL RETURN UP TO ROOF MOUNTED MEDICAL CHILLER MCH-1
 - 8-INCH CYROGENIC VENT WITH INSULATION AND WITH EXPANSION JOINT AND ACCESS DOOR. RUN TO ROOF DISCHARGE
 - LINE OF STEEL FLANGE ON FLOOR BELOW AND ROOF ABOVE
 - CONNECT 8-INCH CYROGENIC VENT TO MRI UNIT AND INSTALL GE SUPPLIED FLEXIBLE CONNECTION
 - INSTALL WAVE GUIDE IN VENT PIPE WHERE IT PENETRATES THE MRI SHIELD
 - PROVIDE EXPANSION JOINT AND ACCESS IN CYROGENIC VENT
 - SAFE AREA FOR DISCHARGE OF CYROGENIC VENT. PROVIDE WARNING SIGNS AND RESTRICTIVE BARRIER AS PER MRI MANUFACTURER'S RECOMMENDATIONS
 - NEW MRI ROOM EMERGENCY EXHAUST FAN. PROVIDE DISCHARGE DUCT FROM FAN TO RESTRICTIVE AREA. PROVIDE MOTORIZED DAMPER ON FAN INLET.
 - EXISTING CONDENSING UNIT MOUNTED ON SCREEN WALL SUPPORTS
 - PROVIDE ANGLE IRON SUPPORTS WELDED TO TUBE STEEL FOR SCREEN WALL AND MOUNT THE NEW CONDENSING UNIT ON THE ANGLE IRON SUPPORTS. RUN REFRIGERANT PIPING FROM ROOF PENETRATION TO CONDENSING UNIT AS REQUIRED.
 - SUSPEND NEW, INSULATED 2-1/2-INCH CHILLED GLYCOL PIPING FROM SCREEN WALL SUPPORT STEEL. RUN PIPING FROM ROOF PENETRATION TO AIR COOLED CHILLER AS REQUIRED.
 - EXISTING ELECTRICAL PANEL TO REMAIN.
 - MEDICAL CHILLER TO BE PROVIDED WITH A MANUAL FILL FOR THE CONTRACTOR SUPPLIED AND INSTALLED 40% GLYCOL SOLUTION. APPROXIMATE VOLUME 200 GALLONS.
 - NEW REFRIGERANT PIPING AND CHILLED GLYCOL PIPING TO RUN ABOVE SHIELDING, TIGHT TO STRUCTURE.
 - CONNECT NEW 2-1/2-INCH CHILLED GLYCOL PIPING TO FLOOR MOUNTED HEX CABINET. REFER TO DETAILS AND MANUFACTURER'S RECOMMENDATIONS FOR CONNECTION TO THE CABINET. THE FLOW METER AND THE 100 MICRON FILTER.
 - EXTEND 3/4-INCH CONDENSATE DRAIN FROM UNIT TO NEW FLOOR DRAIN. RUN PIPING DRIP ALONG WALL. CONNECT NEW 1/2-INCH COLD WATER FROM PLUMBING CONTRACTOR TO THE UNIT HUMIDIFIER.
 - PROVIDE RECTANGULAR TO ROUND STAINLESS STEEL SHEETMETAL TRANSITION AT CHIMNEY TERMINATION. EXTEND NEW ROUND FLUE A MINIMUM OF 3 FEET ABOVE THE HEIGHT OF THE ADJACENT SCREEN WALL. PROVIDE FOUR (4) HOLD-DOWN CABLES ON THE FLUE AND ANCHOR TO THE ROOF STRUCTURE.
 - CITY WATER BYPASS COOLER CABINET TO BE FURNISHED BY GE. RECEIVED MOUNTED AND PIPED BY THE CONTRACTOR. REFER TO PIPING DETAIL.



2nd FL PIPING AND DUCTWORK PLAN



ROOF PIPING AND DUCTWORK PLAN

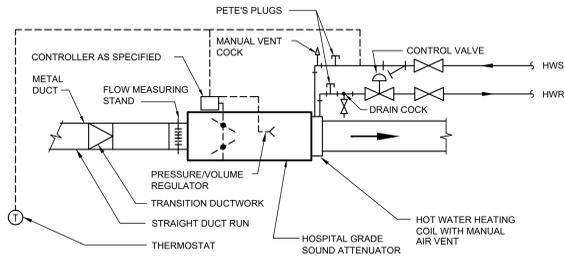


1st FLOOR PIPING PLAN



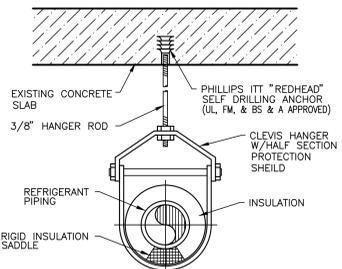
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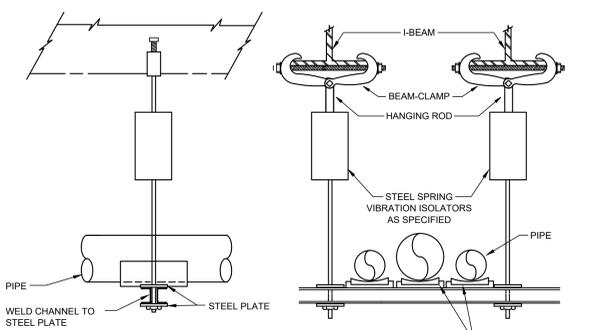
TYPICAL TERMINAL VAV BOX WITH HOT WATER HEATING COIL
NOT TO SCALE

E



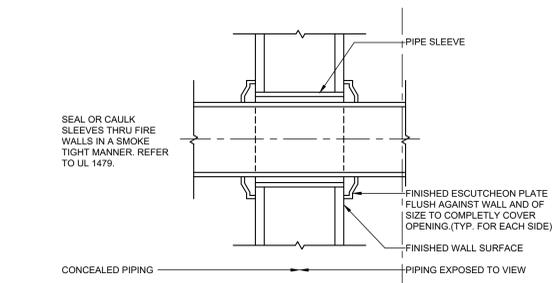
PIPE HANGING DETAIL
NOT TO SCALE

D



PIPE HANGING DETAIL
NO SCALE

C



TYPICAL DETAIL OF PIPE THRU RATED WALL
NO SCALE

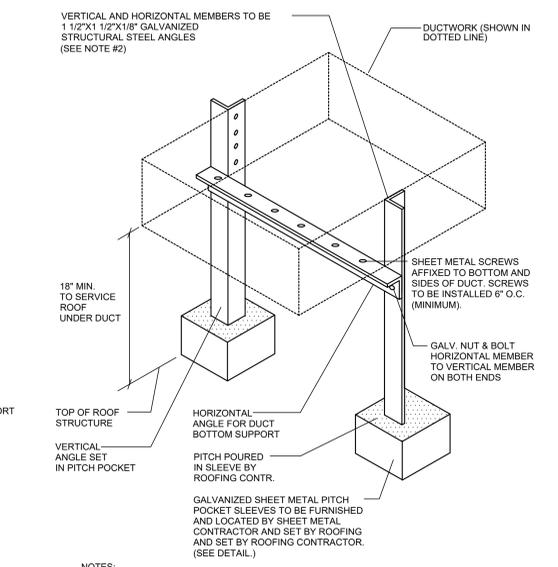
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A

DIFFUSER & REGISTER SCHEDULE						BASIS OF DESIGN:	
MARK	MODEL	NECK SIZE INCHES	MAX CFM	MODULE SIZE LAY-IN (INCHES)	REMARK		
CD	SPD	60	100	24 X 24	⊙	⊙	⊙
CD	SPD	60	200	24 X 24	⊙	⊙	⊙
CD	SPD	100	300	24 X 24	⊙	⊙	⊙
CD	SPD	120	450	24 X 24	⊙	⊙	⊙
CD	SPD	140	650	24 X 24	⊙	⊙	⊙
CD	SPD	160	850	24 X 24	⊙	⊙	⊙
CD	SPD	18 X 18	1250	24 X 24	⊙	⊙	⊙
CR	620	8 X 6	75	24 X 24	⊙	⊙	⊙
CR	620	8 X 6	130	24 X 24	⊙	⊙	⊙
CR	620	10 X 6	170	24 X 24	⊙	⊙	⊙
CR	620	12 X 10	230	24 X 24	⊙	⊙	⊙
CR	620	12 X 10	345	24 X 24	⊙	⊙	⊙
CR	620	12 X 12	450	24 X 24	⊙	⊙	⊙
CR	620	14 X 14	590	24 X 24	⊙	⊙	⊙
CR	620	15 X 16	800	24 X 24	⊙	⊙	⊙
CR	620	20 X 20	1050	24 X 24	⊙	⊙	⊙
CR	620	22 X 22	1650	N/A	⊙	⊙	⊙
CG	530	22 X 22	1050	N/A	⊙	⊙	⊙
EG	530	22 X 22	1000	N/A	⊙	⊙	⊙
SG	520	SEE PLAN			⊙	⊙	⊙
SR	520	SEE PLAN			⊙	⊙	⊙
RR	530	SEE PLAN			⊙	⊙	⊙
TG	520	SEE PLAN			⊙	⊙	⊙
LD	SDS100	SEE PLAN			⊙	⊙	⊙
LBG-1	LBP-158	SEE PLAN			⊙	⊙	⊙
LR	SDS100	SEE PLAN			⊙	⊙	⊙

NOTES:
 ① DIFFUSER WITH SQUARE OR ROUND NECK AND ADJUSTABLE DISCHARGE.
 ② SEE FLOOR PLANS FOR 1, 2, 3, OR 4 WAY HORIZONTAL BLOW.
 ③ PROVIDE OPPOSED BLADE VOLUME DAMPER.
 ④ PROVIDE EQUALIZING GRID.
 ⑤ PROVIDE STANDARD WHITE FINISH.
 ⑥ PROVIDE EARTHQUAKE TABS.
 ⑦ SIDEWALL SUPPLY REGISTER GRILLE WITH BLADES AT 3/4" SPACING AND DOUBLE DEFLECTION.
 ⑧ RETURN/EXHAUST SIDEWALL REGISTER GRILLE WITH BLADES AT 3/4" SPACING AND 30° FIXED DEFLECTION.
 ⑨ REFER TO SPECIFICATIONS FOR ACoustical RATING IN SPACES.
 ⑩ SIDEWALL TRANSFER GRILLE WITH BLADES AT 3/4" SPACING AND DOUBLE DEFLECTION.
 ⑪ 3/4" FLANGE, COLOR BY ARCHITECT.
 ⑫ VARIERE DEFLECTION, W/ 5" SPACING.
 ⑬ PROVIDE SPRING CLIPS FOR FASTENING.
 ⑭ DIFFUSERS AND REGISTERS SERVING ALL ARTICLES IN SPACES BE RATED NC-30 (MAX).
 ⑮ PROVIDE BORDER MODEL, OVERALL WIDTH 6".

CEILING SUPPLY DIFFUSER: 4-WAY, 3-WAY, 2-WAY, 1-WAY. CEILING EXHAUST/RETURN REGISTER OR GRILLE.



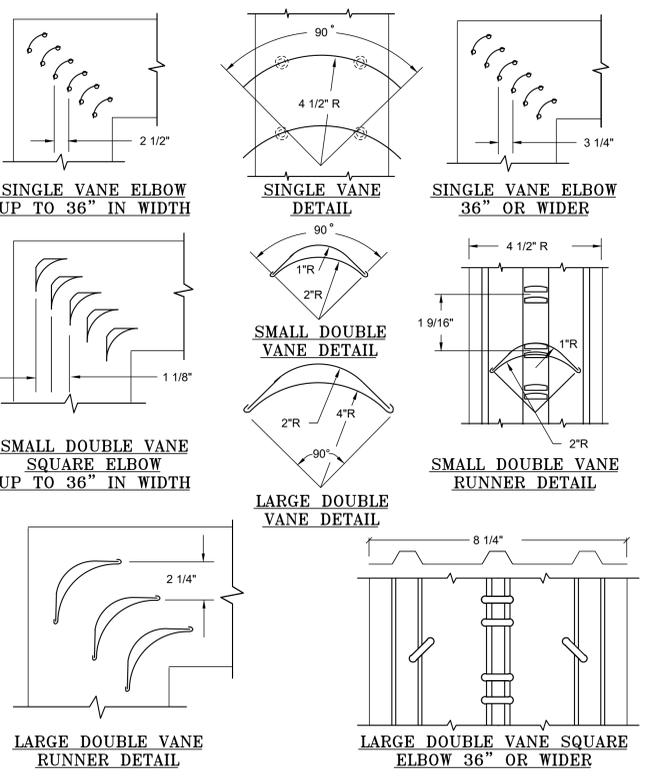
STRUCTURAL SUPPORTS FOR DUCTWORK ABOVE ROOF
NOT TO SCALE

MRI CHILLER SCHEDULE												SEE NOTES	
UNIT NO.	SERVICE	CHILLER DATA			MOTOR DATA				KW/TON	MODEL NO.	REMARKS		
		GPM	TEMP. °F		MAX. P.D. (PSI)	KW INPUT	VOLT/PH	FLA/LRA				MCOP	MCA
			ENT.	LVG.									
MCH-1	MRI	35	FROM GE	FROM GE	FROM GE	-	460/3	67	80	70	0.729	WQ2-2-5000	SEE NOTES

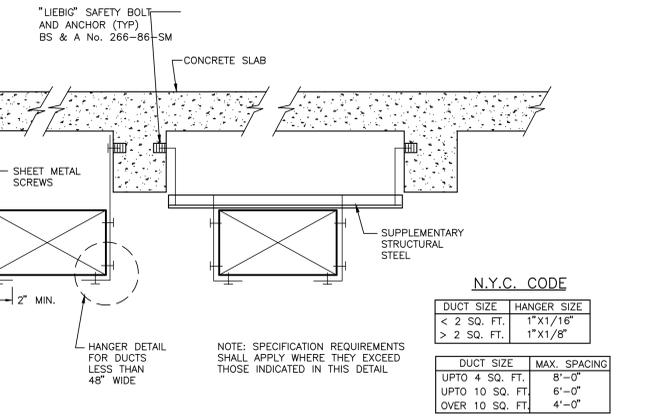
NOTES:
 1. CHILLER FURNISHED BY GE, RECEIVED, RIGGED, AND INSTALLED BY THE CONTRACTOR. PROVIDE NEOPRENE PADS ISOLATORS.

FAN SCHEDULE												MFG: GREENHECK			
UNIT NO.	LOCATION	AREA OR SYSTEM SERVED	FAN TYPE	STATIC PRESS (IN. WG)	CFM	FAN RPM	DRIVE	DISCHARGE	MOTOR DATA			WEIGHT (LBS)	MODEL NO.	REMARKS	
									BHP	HP	NO. OF SPEEDS				
EF-1	MRI EQUIPMENT RM	MRI ROOM	ROOF UTILITY	0.625	1200	1770	BELT	HOR.	0.19	0.5	1	120.1	75	USF-15	1, 2, 3, 4

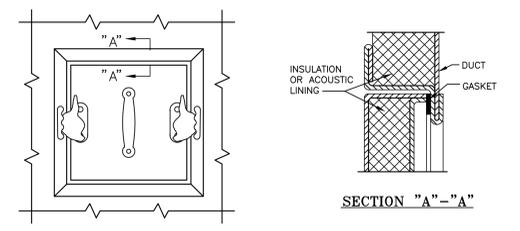
NOTES:
 1. PROVIDE SOLID STATE SPEED CONTROL FOR BALANCING.
 2. PROVIDE WITH WEATHER GUARD AND SUPPORTS WITH VIBRATION ISOLATORS.
 3. PROVIDE MANUAL MOTOR STARTER WITH THERMAL OVERLOADS.
 4. PROVIDE MANUAL SWITCH IN CONTROL ROOM WITH PILOT LIGHT.



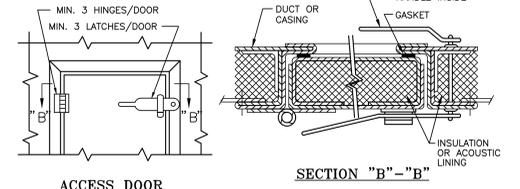
LOW VELOCITY DUCTWORK ELBOWS
NO SCALE



DUCT SUPPORT DETAIL
NOT TO SCALE

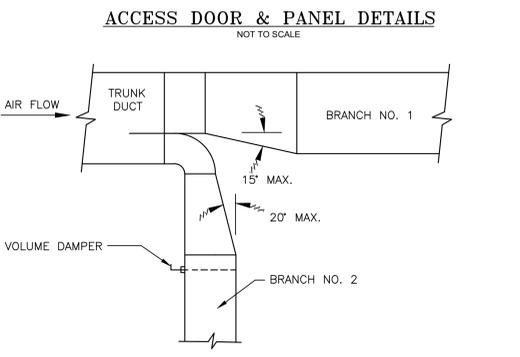


ACCESS PANEL
NOT TO SCALE

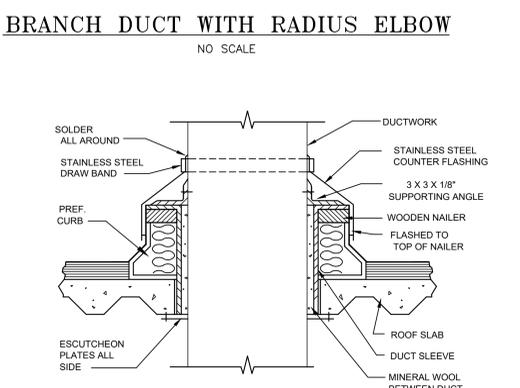


ACCESS DOOR
NOT TO SCALE

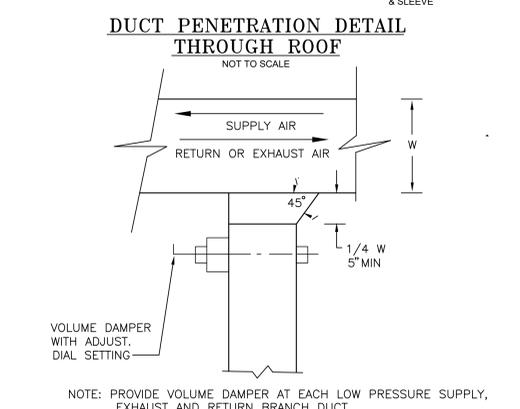
- NOTES:
 1. LATCHES SHALL BE OF THE WEDGE TYPE TO CLOSE DOORS TIGHTLY.
 2. HINGES ON THE ACCESS DOORS SHALL HAVE NON-CORROSIIVE PINS.
 3. PROVIDE ACCESS DOORS ON AIR HANDLING UNITS AND DUCT WORK INSTALLED IN EQUIPMENT ROOMS. PROVIDE ACCESS PANELS ON ALL EQUIPMENT AND DUCTWORK INSTALLED ABOVE FINISHED CEILINGS WHERE SPACE LIMITATIONS DO NOT ALLOW HINGED DOORS TO OPEN.
 4. ACCESS DOOR INSTALLED IN THE DUCT EXPOSED TO WEATHER TO BE WEATHERPROOF. ALL HARDWARE SHALL BE STAINLESS STEEL.



ACCESS DOOR & PANEL DETAILS
NOT TO SCALE



BRANCH DUCT WITH RADIUS ELBOW
NO SCALE



DUCT PENETRATION DETAIL THROUGH ROOF
NOT TO SCALE



DUCT BRANCH TAKEOFF FOR LOW PRESSURE DUCTWORK
NO SCALE

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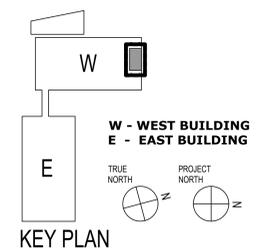
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OWNER:
 COLUMBIA DOCTOR'S TARRYTOWN

PROJECT:
 NEW MRI

155 WHITE PLAINS ROAD
 TARRYTOWN, NY 10591



NO.	DESCRIPTION	DATE
1	CD SUBMISSION	6-18-21

REVISIONS/ISSUES

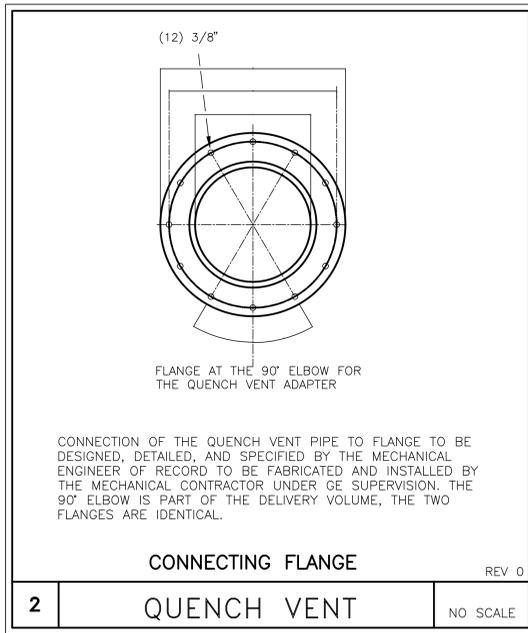
SHEET TITLE:
 HVAC DETAILS AND SCHEDULES
 SHEET 1 OF 2

SEAL: DATE: 7/23/2020
 CON/REF No.
 CONTRACT No.
 SCALE: As indicated
 PROJECT No. 12384
 CHECKED: Checker
 DRAWN: LGP

SHEET NO.
M-301.00

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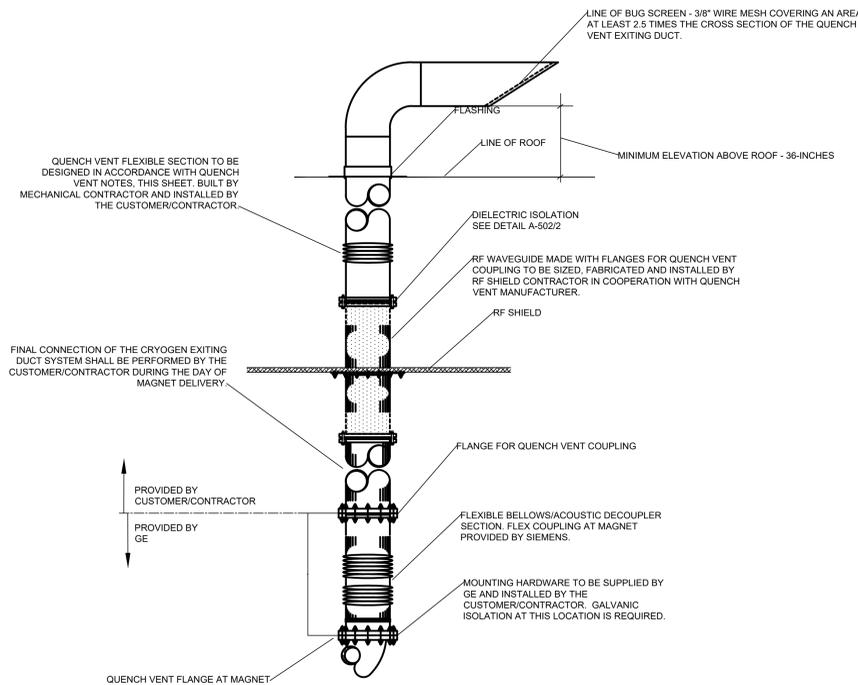


E

CONNECTION OF THE QUENCH VENT PIPE TO FLANGE TO BE DESIGNED, DETAILED, AND SPECIFIED BY THE MECHANICAL ENGINEER OF RECORD TO BE FABRICATED AND INSTALLED BY THE MECHANICAL CONTRACTOR UNDER GE SUPERVISION. THE 90° ELBOW IS PART OF THE DELIVERY VOLUME, THE TWO FLANGES ARE IDENTICAL.

CONNECTING FLANGE		REV. 0
2	QUENCH VENT	NO SCALE

D



C

CRYOGEN EXITING DUCT SYSTEM DETAIL

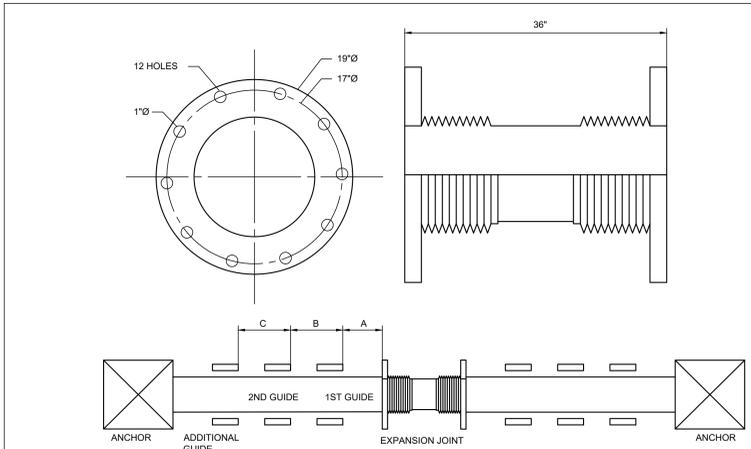
NO SCALE

B

AIR COOLED CONDENSING UNIT SCHEDULE										BASIS OF DESIGN: VERTIV	
UNIT NO.	LOCATION	TOTAL COOLING CAPACITY (MBH)	FAN		ELECTRICAL 208/1/60		REF.	DIMENSIONS W X D X H (IN)	WEIGHT (LBS)	MODEL NO.	REMARKS
			AIR FLOW (CFM)	FAN MOTOR FLA	FLA	OPD					
ACCU-5	ROOF	39.6	3082	NA	18.5	35	407C	53X36X18	351	PPH037A-H	1, 2, 3, 4

- NOTES:
- ACCU-5 IS TO BE ROOF MOUNTED ON DUNNAGE WITH NEOPRENE ISOLATORS.
 - ALL UNITS SHALL HAVE FIVE YEAR EXTENDED WARRANTY FOR COMPRESSORS.
 - PROVIDE LOW AMBIENT CONTROL KIT FOR OPERATION DOWN TO 0 DEG F AND WIND BAFFLE.
 - PROVIDE WEATHERPROOF DISCONNECT SWITCH FOR OUTDOOR CONDENSING UNITS.

A

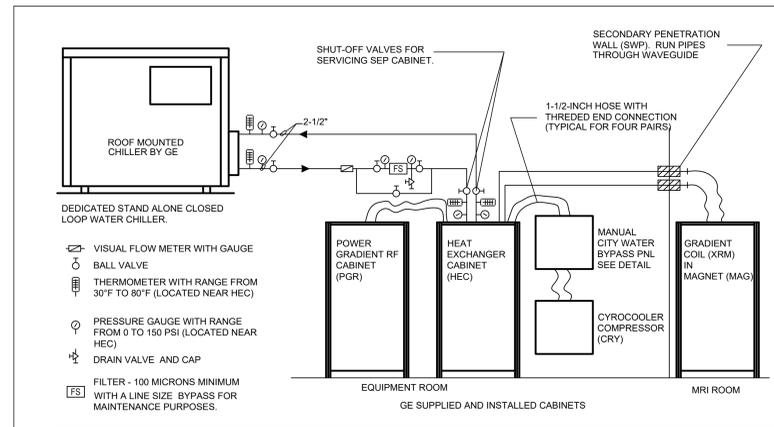


PIPE DIAMETER (IN)	A MAX DISTANCE FROM JOINT TO 1ST GUIDE OR ANCHOR (IN)	B APPROXIMATE DISTANCE BETWEEN 1ST AND 2ND GUIDE (IN)	C APPROXIMATE DISTANCE BETWEEN PIPE GUIDES (FT)			
			@ 50 PSIG	@ 100 PSIG	@ 150 PSIG	@ 300 PSIG
8	32	112	87	62	45	38
10	40	140	107	75	60	48

- NOTES:
- ALL WELDING AND WELDER QUALIFICATIONS SHALL BE IN ACCORDANCE WITH ASME.
 - DE-BURR AND REMOVE ALL SHARP EDGES.
 - BOLT HOLES TO STRADDLE THE CENTERLINE AND BE IN-LINE.
 - JOINT SHALL BE MANUFACTURED BY TRIAD BELLOWS OR EQUAL.
 - PROVIDE UNIT PRICE FOR EXPANSION JOINT.

EXPANSION JOINT DETAIL

NO SCALE



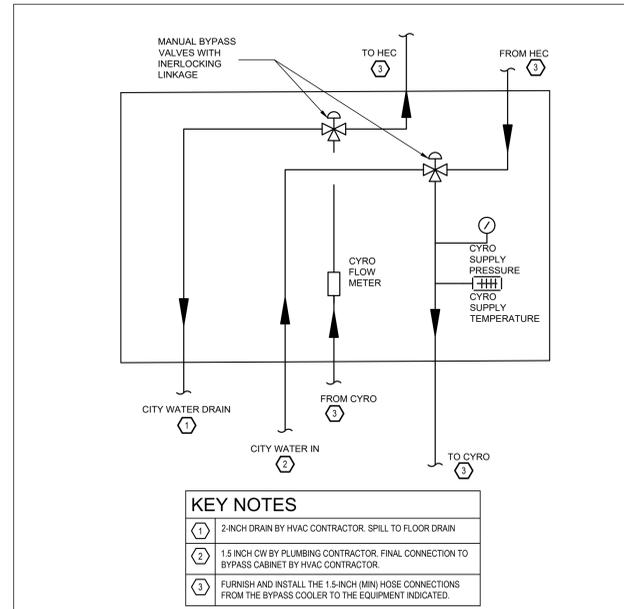
- NOTES:
- ALL PIPING AND PLUMBING FIXTURES SHALL BE FURNISHED, INSTALLED, PRESSURE TESTED AND CHARGED BY THE MECHANICAL CONTRACTOR PRIOR TO THE DELIVERY AND INSTALLATION OF THE GE SUPPLIED AND INSTALLED EQUIPMENT UNLESS SPECIFIED OTHERWISE.
 - AT THE HIGHEST POINT OF THE WATER SUPPLY PIPE FROM THE CHILLER AN AUTOMATIC DEAERATION DEVICE (AIR VENT) WITH BALL VALVE MUST BE INSTALLED BY THE MECHANICAL CONTRACTOR.
 - SYSTEM MUST BE PROVEN TO BE FREE FROM LEAKAGE.
 - THE MECHANICAL AND PIPING SYSTEMS SHALL BE IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND NATIONAL CODES. ALL WORK SHALL BE PERFORMED BY THE MECHANICAL CONTRACTOR AND SHALL BE SUBJECT TO COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE AND NATIONAL CODES.
 - THE SUPPLY AND RETURN PIPES FROM THE CHILLED WATER SUPPLY TO THE HEC MUST BE LABELED TO SHOW FLOW DIRECTION AND CONTENT (WATER).

PIPING SCHEMATIC FOR MRI CHILLED WATER

NO SCALE

AIR CONDITIONING UNIT SCHEDULE													BASIS OF DESIGN: VERTIV			
UNIT NO.	AREA SERVED	TYPE	TOTAL CFM	COOLING CAP. TOTAL (MBH)	COOLING CAP. SENSIBLE (MBH)	HUMIDIFIER		ELECTRICAL DATA			WEIGHT (LBS)	PIPING CONNECTIONS (IN.) (LIQUID, SUCTION, DRAIN, HUMIDIFIER)	REFRIGERANT	SCOP	MODEL NO.	REMARKS
						LBS. PER HR	KW	ELECT. DATA (VOLT/PH)	MAX CIRCUIT AMPS	OPD						
AC-5	MRI EQ. ROOM	SPLIT AIR COOLED	1000-1250	30	23	4.3	1.5	208-1	34.2	45	225	0.5-1.125-0.75-0.5	407C	1.88	MMD36E	1, 2, 3, 4, 5

- NOTES:
- PROVIDE REFRIGERANT PIPING BETWEEN AC UNIT AND CONDENSING UNIT PER MANUFACTURER'S RECOMMENDATIONS.
 - PROVIDE INTERCONNECTING CONTROL WIRING BETWEEN AC AND CU.
 - PROVIDE SCR ELECTRIC REHEAT (1.5 kW), FACE GRILLE WITH MERV 8 FILTERS, LIQUID DETECTOR, REMOTE CONTROL PANEL, BMS INTERFACE PANEL.
 - PROVIDE DRIP PANS AND LEAK DETECTORS.
 - MOUNT UNIT IN CEILING WITH MANUFACTURER'S RECOMMENDED CLEARANCES.



CITY WATER EMERGENCY BYPASS PIPING DETAIL

NO SCALE

MRI ROOM NOTES:

- ALL DEVICES, DAMPERS, DUCTWORK, AND COMPONENTS WITHIN THE MRI ROOM ARE TO BE OF NON-FERRUS MATERIALS.
- PROVIDE A MANUFACTURER'S APPROVED WAVE GUIDE AT ALL DUCT PENETRATIONS AND OPENINGS IN THE MRI WALLS.
- TERMINATE CRYOGENIC VENT IN A MANUFACTURER'S APPROVED ELBOW. DO NOT DISCHARGE VENT DOWN.
- PROVIDE EXPANSION JOINTS IN THE CRYOGENIC VENT AT DISTANCES RECOMMENDED BY THE MANUFACTURER.
- EXPANSION JOINTS SHALL BE FABRICATED AS PER THE MANUFACTURER'S REQUIREMENTS.
- PROVIDE AN OXYGEN MONITOR IN THE MRI ROOM. SENSOR SHALL HAVE A LOCAL ALARM.



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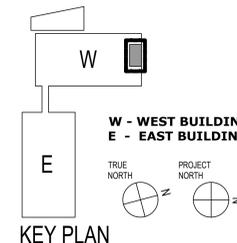
OWNER:

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NO.	DESCRIPTION	DATE
1	CD SUBMISSION	6-18-21

SHEET TITLE:
HVAC DETAILS AND SCHEDULES
SHEET 2 OF 2

SEAL:

DATE: 7/23/2020

CON/REF No.

SCALE: As indicated

PROJECT No. 12384

CHECKED: Checker

DRAWN: LGP

SHEET NO.

M-302.00

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