GENERAL CONSTRUCTION NOTES

1. READ ALL SPECIFICATIONS FOR REQUIREMENTS PERTAINING TO THESE DOCUMENTS.
2. THIS CONTRACTOR IS REQUIRED TO VISIT THE SITE AND FAMILIARIZE THEMSELVES WITH THE LOCATION OF EQUIPMENT, DUCTWORK, PIPING AND STRUCTURES PRIOR TO SUBMITTING THEIR BID.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THIS WORK WITH ALL OTHER TRADES ASSOCIATED WITH THIS PROJECT.
4. DRAWINGS ARE DIAGRAMMATIC; THEREFORE, DETERMINE EXACT LOCATIONS OF SYSTEMS AND COMPONENTS IN THE FIELD.
5. ALL NEW BUILDING PENETRATIONS SHALL BE FLASHED AND SEALED PER THE SPECIFICATION REQUIREMENTS.
6. LOCATE ALL EQUIPMENT TO ENSURE ACCESS TO FILTERS, CONTROL PANEL CABINETS AND MAINTENANCE CLEARANCES AS INDICATED BY MANUFACTURER.
7. THIS CONTRACTOR IS RESPONSIBLE FOR LOCATION AND COORDINATION OF ALL APPLICABLE BELOW AND ABOVE GROUND UTILITIES, PIPING AND EQUIPMENT.
8. THIS CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION AND CLEANLINESS OF EXISTING AND ADJACENT STRUCTURES, FACILITIES AND EQUIPMENT DURING CONSTRUCTION.
9. MAINTAINING DESIRED SYSTEM OPERATION IS TOP PRIORITY THROUGH ALL PHASES. SYSTEM SHUT-DOWNS FOR NEW PIPING, ELECTRICAL AND EQUIPMENT CONNECTIONS MUST BE COORDINATED AND APPROVED BY THE BUILDING OWNER. STRICT ADHERENCE IS REQUIRED FOR ALL TIMELINES AND DEADLINES SET BY OWNER AND CONSTRUCTION ADMINISTRATOR.
10. ALL WORK SHALL BE PERFORMED IN A NEAT, PROFESSIONAL AND SAFE MANNER, AND SHALL COMPLY WITH LOCAL, STATE AND NATIONAL CODES.
11. DURING CONSTRUCTION, ALL PIPING SHALL BE SEALED ON THE ENDS TO PREVENT DUST AND DEBRIS FROM ENTERING THE PIPING BETWEEN PHASES. SEALING SHALL INVOLVE A PLASTIC FILM COVERING WITH AN ELASTIC BAND TO RESTRAIN COVER.
12. CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE INSTALLATION OF ALL NEW EQUIPMENT, DUCTWORK AND PIPING REQUIRED PRIOR TO THE DEMOLITION AND REMOVAL OF EXISTING.
13. AT ALL TIMES, THIS CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONDITIONS OF THE JOBSITE, INCLUDING MEANS AND METHODS OF CONSTRUCTION AND SAFETY OF PERSONS AND PROPERTY. GENERAL HOUSEKEEPING OF ALL JOB SITE AREAS SHALL BE PERFORMED DAILY.
14. REFER TO CONTRACT SCOPE DOCUMENTS FOR ADDITIONAL INFORMATION AND SCOPE DEFINITION. PRIME CONTRACTOR'S BID SHALL PROVIDE COMPLETE AND WORKABLE SYSTEM.
15. NEW DUCTWORK THAT IS TO BE TIED INTO EXISTING DUCTWORK SHALL BE OF THE SAME SIZE AS THE EXISTING DUCT IN WHICH IT IS BEING CONNECTED. UNLESS NOTED OTHERWISE.

GENERAL DEMOLITION NOTES

1. ALL PIPING, FITTINGS, HANGERS, EQUIPMENT, APPURTENANCES, AND SUPPORTS MADE OBSOLETE BY THIS PROJECT SHALL BE REMOVED AND LEGALLY DISCARDED OFF SITE. THIS CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE MEANS OF DISPOSAL – ALL METAL SHALL BE SEPARATED AND RECYCLED.
2. THIS CONTRACTOR SHALL BE RESONSIBLE FOR ALL REMOVALS REQUIRED FOR THE INSTALLATION OF NEW WORK, WHETHER OR NOT IT IS SPECIFICALLY INDICATED OR NOTED IN THESE DOCUMENTS.
3. ON DEMOLITION DRAWINGS, ALL EQUIPMENT AND PIPING SHOWN BOLD, DASHED, HATCHED OR MARKED WITH AN "X" SHALL BE REMOVED. REFER TO SPECIFIC DEMOLITION NOTES FOR ADDITIONAL DETAILS.
4. ALL DUCTWORK, FITTINGS, HANGERS, EQUIPMENT, APPURTENANCES, SUPPORTS AND CONCRETE PADS MADE OBSOLETE BY THIS PROJECT SHALL BE REMOVED AND LEGALLY DISCARDED OFF SITE.
5. GENERAL TRADES CONTRACTOR IS RESPONSIBLE FOR PATCHING AND SEALING ALL FLOOR AND EXTERIOR WALL PENETRATIONS ABANDONED DUE TO DEMOLITION OF DUCT, PIPE OR EQUIPMENT.
6. REFER TO ARCHITECTURAL, ELECTRICAL AND STRUCTURAL DRAWINGS FOR ADDITIONAL INFORMATION RELATED TO MECHANICAL AND PLUMBING EQUIPMENT DEMOLITION.
7. EVACUATE AND DISPOSE OF ALL REFRIGERANTS PER LOCAL, STATE AND FEDERAL CODES AND PROCEDURES PRIOR TO DEMOLITION OF ANY EQUIPMENT CONTAINING REFRIGERANTS.

GENERAL MECHANICAL NOTES

1. ALL DUCTWORK, PIPING AND EQUIPMENT SHALL BE IDENTIFIED PER THE SPECIFICATIONS.
2. CONTRACTOR SHALL COORDINATE WORK WITH ALL OTHER TRADES. LOCATE ALL DUCTWORK, PIPING, AND EQUIPMENT AS TO MAINTAIN ACCESS TO FILTERS, CONTROL CABINETS AND MECHANICAL EQUIPMENT.
3. SEE ARCHITECTURAL DRAWINGS FOR GRAPHIC SYMBOL EXPLANATION OF FIRE RATINGS. PROVIDE THROUGH PENETRATION FIRE STOP SYSTEMS FOR RATED WALL PENETRATIONS. SEE SPECIFICATIONS SECTION 078413 FOR REQUIREMENTS.
4. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR FINAL DIFFUSER LOCATIONS. COORDINATE ANY CONFLICTS WITH THE ARCHITECT.
5. FURNISH CEILING AND WALL ACCESS PANELS FOR ACCESS TO ALL CONCEALED DEVICES FOR INSTALLATION BY THE GENERAL TRADES CONTRACTOR.
6. WORK SCOPE INCLUDES BALANCING OF ALL AIR SYSTEM TO CFM'S INDICATED ON THE PLANS.
7. WORK SCOPE INCLUDES BALANCING OF ALL WATER SYSTEMS TO GPM'S INDICATED ON THE PLANS.
8. COORDINATE LOCATIONS OF TEMPERATURE SENSORS AND/OR THERMOSTATS WITH ALL ELECTRICAL SWITCHES AND OCCUPANCY SENSORS. MOUNT ALL SENSORS AND/OR THERMOSTATS AT 48" AFF. MOUNTING HEIGHT IS TO CENTERLINE.

GENERAL HVAC NOTES

1. AMBIENT OA TEMP, RH, PRESSURE AND CO2 SENSOR LOCATIONS SHALL BE APPROVED BY ENGINEER.
2. COORDINATE LOCATIONS OF THERMOSTATS OR TEMPERATURE SENSORS WITH OCCUPANCY SENSORS.
3. WORK SCOPE INCLUDES PROVIDING EXTERNAL INSULATION FOR ALL SUPPLY, RETURN, OUTDOOR, TRANSFER AND RELIEF AIR DUCTS. REFER TO SPECIFICATIONS FOR INSULATION REQUIREMENTS.
4. PROVIDE FIRE DAMPERS AT ALL PENETRATIONS OF 2-HOUR RATED ASSEMBLIES AND FIRE DAMPERS FOR TRANSFER OPENINGS ONLY THRU 1 HOUR RATED ASSEMBLIES.
5. HIGH-EFFICIENCY BRANCH CONNECTIONS TO VAV AND FPB TERMINAL UNITS ARE REQUIRED. SPIN-IN FITTINGS NOT ACCEPTABLE. SEE DETAILS.
6. PROVIDE INTERNALLY LINED DUCTWORK AS NOTED ON PLANS. SEAL AND SECURE ALL EDGES OF LINER EXPOSED TO AIR STREAM. DIMENSIONS SHOWN ARE INSIDE CLEAR DIMENSIONS, ADJUST CONSTRUCTED SHEETMETAL DIMENSIONS ACCORDINGLY.
7. NO NEW EQUIPMENT, DUCTWORK, PIPING, ACCESSORIES, OR WIRING SHALL BE INSTALLED AND SUPPORTED BY OR HUNG FROM ANY COMPONENTS OF THE FIRE PROTECTION SYSTEM.
8. ALL DUCTWORK TERMINATING WITHIN A SPACE, NOT INDICATED TO HAVE A GRILLE OR TO BE CAPPED, SHALL BE TERMINATED WITH A METAL FRAME AND 1/2" x 1/2" WIRE MESH APPROVED BY ENGINEER.
9. PROVIDE DUCT MOUNTED MANUAL VOLUME DAMPER FOR EACH DIFFUSER (U.N.O.). LOCATE DAMPER AS FAR FROM DIFFUSER AS POSSIBLE WHILE ENSURING DAMPER ACCESSIBILITY. DAMPERS NOT REQUIRED FOR DIFFUSERS SERVED BY DEDICATED VAV BOXES.
10. WHEN ORDERING DIFFUSERS, REGISTERS AND GRILLES, REFER TO THE ARCHITECTURAL DRAWINGS TO OBTAIN THE APPROPRIATE FRAMES.
11. INSTALL DUCT SMOKE DETECTORS FURNISHED BY DIVISION 26.
12. ALL PUBLIC SPACE THERMOSTATS AND CO2 SENSORS SHALL BE PROVIDED WITH A CLEAR, LOCKABLE ENCLOSURE.
13. PROVIDE ACCOUSTICAL SEALANT ON ALL DUCTS, PIPES, ETC. THAT PENETRATE ACCOUSTICALLY RATED WALLS.

GENERAL PIPING NOTES

1. WORK SCOPE INCLUDES BALANCING ALL WATER SYSTEMS TO THE GPM VALUES INDICATED ON THE PLANS.
2. WORK SCOPE INCLUDES PROVIDING INSULATION FOR ALL CHILLED WATER AND HEATING WATER ABOVEGROUND AND UNDERGROUND PIPING. REFER TO SPECIFICATIONS FOR INSULATION REQUIREMENTS.
3. ALL EXTERIOR CONDENSER WATER SUPPLY, RETURN AND EQUALIZER PIPING SHALL BE PROVIDED WITH HEAT TRACE AND INSULATION. REFER TO SPECIFICATIONS FOR DETAILS.

REFRIGERANT PIPING

1. REFRIGERANT PIPING SHALL BE TYPE "ACR" COPPER WITH BRAZED JOINTS OR PRE-MANUFACTURED, PRE-INSULATED COPPER TUBE REFRIGERANT LINESETS WITH BRAZED JOINTS OR BRASS FITTINGS.
2. SIZE, ROUTE AND INSTALL ALL REFRIGERANT PIPING PER THE MANUFACTURER'S WRITTEN RECOMMENDATIONS AND REQUIREMENTS.
3. ALL REFRIGERANT PIPING SHALL BE INSULATED WITH ELASTOMERIC FOAM INSULATION - SEE SPECIFICATIONS. OUTDOOR, EXPOSED, ELASTOMERIC REFRIGERANT PIPING INSULATION SHALL HAVE TWO COATS OF UV-PROTECTANT COATING APPLIED.

CONDENSATE DRAIN PIPING

1. ALL CONDENSATE DRAIN PIPING SHALL BE TYPE DWV COPPER PITCHED AT MIN. 1%.
2. TRAP ALL AIR HANDLING UNIT CONDENSATE PIPING AS SHOWN IN THE MECHANICAL DETAILS.

EXISTING CEILING NOTES

1. SOME CEILINGS ARE EXISTING; WORK SHALL BE PERFORMED THROUGH EXISTING CEILING.
2. REMOVE EXISTING LAY-IN CEILING TILES AS REQUIRED TO PERFORM WORK, STORE TILES IN MANAGED LOCATION AND REPLACE TILES IN SAME LOCATION. MARK BACK SIDE OF TILES AS NECESSARY FOR REPLACEMENT.
3. DISCONNECT AND REMOVE EXISTING LIGHTS AS REQUIRED TO PERFORM WORK, STORE LIGHTS IN MANAGED LOCATION AND REPLACE LIGHTS IN SAME LOCATION. MARK BACK OF LIGHTS AS NECESSARY FOR REPLACEMENT.
4. CONTRACTOR IS RESPONSIBLE FOR REPLACING ANY DAMAGED CEILING TILES WITH PRODUCT TO MATCH EXISTING.
5. CONTRACTOR IS RESPONSIBLE FOR REMOVING AND REPLACING EXISTING CEILING GRID IF REMOVAL OF CEILING GRID IS NECESSARY TO PERFORM WORK. REPLACE ANY REMOVED CEILING GRID WITH PRODUCT TO MATCH EXISTING.

DUCT SYMBOLS LEGEND

- 24X12 — DUCT SIZE, FIRST FIGURE IS SIDE SHOWN
- 24X12 — EXISTING DUCTWORK TO REMAIN
- 24X12 — EXISTING DUCTWORK TO BE REMOVED
- UP / DN — CHANGE OF ELEVATION, INCLINED
- FLEXIBLE DUCT
- CONCENTRIC TRANSITION
- ECCENTRIC TRANSITION
- 32x16 — INTERNALLY LINED DUCTWORK
- SUPPLY DIFFUSER
- RETURN GRILLE
- EXHAUST GRILLE
- SQUARE THROAT ELBOW WITH TURNING VANES
- RADIUS ELBOW
- RECTANGULAR/ROUND BRANCH TAKE-OFF OR ROUND/ROUND BRANCH TAKE-OFF
- STANDARD TEE
- MOTOR OPERATED DAMPER
- BALANCING DAMPER (BD)
- CEILING RETURN
- CEILING EXHAUST
- AD / AD — AD - ACCESS DOORS, VERTICAL OR HORIZONTAL
- FLEXIBLE CONNECTION
- INLINE CENTRIFUGAL FAN
- UP / DN — CHANGE IN ELEVATION, VERTICAL

DIFFUSER TYPE — S1 | 10"x10" — BRANCH DUCT SIZE
100 CFM — DIFFUSER/GRILLE AIRFLOW
(TYP. OF X.) — QUANTITY
AIR TERMINAL / DIFFUSER TAG

NOTE: SOME SYMBOLS SHOWN ON THIS LEGEND MAY NOT PERTAIN TO THIS PROJECT

HVAC SYMBOLS LEGEND

- TEMPERATURE GAUGE
- BALL VALVE
- BYPASS MODULATING CONTROL VALVE
- 2-POSITION ISOLATION VALVE
- PRESSURE GAUGE
- UNION
- FLEX CONNECTION
- PRESSURE REDUCING VALVE
- AUTOMATIC AIR VENT
- STRAINER
- PRESSURE & TEMPERATURE PORT
- CHECK VALVE
- BFV - BUTTERFLY VALVE
- T OR TS — TEMPERATURE SENSOR
- FD — FIRE DAMPER
- T — THERMOSTAT +48" AFF (UNLESS NOTED OTHERWISE)
- T — THERMOSTAT FOR RADIANT CEILING PANEL (RCP)
- S — SENSOR
- H — HUMIDISTAT
- CO2 — CARBON DIOXIDE DETECTOR
- CO — CARBON MONOXIDE DETECTOR
- 1 HOUR FIRE RATED WALL ASSEMBLY
- 2 HOUR FIRE RATED WALL ASSEMBLY
- PARTITION TO RESIST THE PASSAGE OF SMOKE
- EQUIPMENT ON ROOF

AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AFMS	AIR FLOW MONITORING STATION
BD	BALANCING DAMPER
BPD	BYPASS DAMPER
CO-2	CARBON DIOXIDE
CO	CARBON MONOXIDE
DN	DOWN
DOAS	DEDICATED OUTDOOR AIR SYSTEM
DG	DOOR GRILLE
EF	EXHAUST FAN
EX	EXHAUST
EX	EXISTING WHEN USED AS PREFIX
FCU	FAN COIL UNIT
IH	INTAKE HOOD
ID1-9	INDOOR UNIT, OUTDOOR UNIT #1-INDOOR UNIT #9
KEF	KITCHEN EXHAUST FAN
KSF	KITCHEN SUPPLY FAN
LV	LOUVER
MOD	MOTOR OPERATED DAMPER
OA	OUTSIDE AIR
OD-3	OUTDOOR UNIT - UNIT NUMBER
RH	RELIEF HOOD
RA	RETURN AIR
RF	RELIEF AIR
RH	REHEAT COIL
RTU	PACKAGED ROOFTOP UNIT
SA	SUPPLY AIR
TOD	TOP OF DUCT
TA	TRANSFER AIR
VFD	VARIABLE FREQUENCY DRIVER
WMS	WIRE MESH SCREEN
ZD	ZONE DAMPER

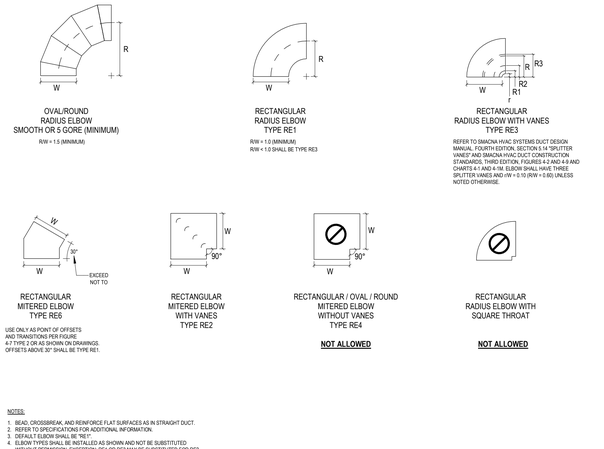
NOTE: SOME SYMBOLS SHOWN ON THIS LEGEND MAY NOT PERTAIN TO THIS PROJECT

PIPING SYMBOLS LEGEND

ACC	AIR COOLED CHILLER
AS	AIR SEPARATOR
B	BOILER
BV	BALL VALVE
CHL	CHILLER
CL	CENTER LINE (PIPE)
CHS	CHILLED WATER SUPPLY
CHR	CHILLED WATER RETURN
CHL	CHILLER
dP	DIFFERENTIAL PRESSURE SENSOR
ET	EXPANSION TANK
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
MCV	MOTORIZED CONTROL VALVE
P	WATER PUMP
UH	UNIT HEATER (HOT WATER)

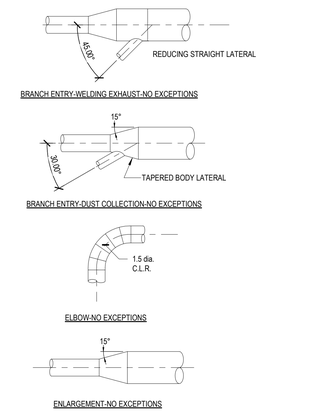
- ELBOW UP
- ELBOW DOWN
- TEE UP
- TEE DOWN
- PIPE REDUCER
- R — GAS REGULATOR
- M — GAS METER
- BALL VALVE
- CO - CLEAN OUT
- TIE INTO EXISTING
- POINT OF DISCONNECT

NOTE: SOME SYMBOLS SHOWN ON THIS LEGEND MAY NOT PERTAIN TO THIS PROJECT



NOTES:
1. BEAD, CROSSBREAK, AND REINFORCE FLAT SURFACES AS IN STRAIGHT DUCT.
2. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
3. DEFAULT ELBOW SHALL BE "RE1".
4. ELBOW TYPES SHALL BE INSTALLED AS SHOWN AND NOT BE SUBSTITUTED WITHOUT PERMISSION, EXCEPTION: RE1 OR RE3 MAY BE SUBSTITUTED FOR RE2.

2 ELBOW CONSTRUCTION
NO SCALE



1 DUCTWORK CONSTRUCTION DETAILS
NO SCALE

ZMM ARCHITECTS ENGINEERS
222 Lee Street, West
Charleston, West Virginia 25302
Phone: 304.342.0159
Fax: 304.345.8144
www.zmm.com

JOHN A. PRUETT
Lic. No. 62180
9.27.23
COMMONWEALTH OF VIRGINIA
PROFESSIONAL ENGINEER

NO.	DESCRIPTION	DATE

RENOVATIONS
MACY MCLAUGHERTY ELEMENTARY/MIDDLE SCHOOL
GILES COUNTY PUBLIC SCHOOLS
PEARISBURG, VIRGINIA

BIDDING/CONSTRUCTION DOCUMENTS

HVAC SYMBOLS, LEGEND AND GENERAL NOTES

DRAWN	CHECKED
SAO	JAP
DATE	07/07/2023
COMM. NO.	2022088

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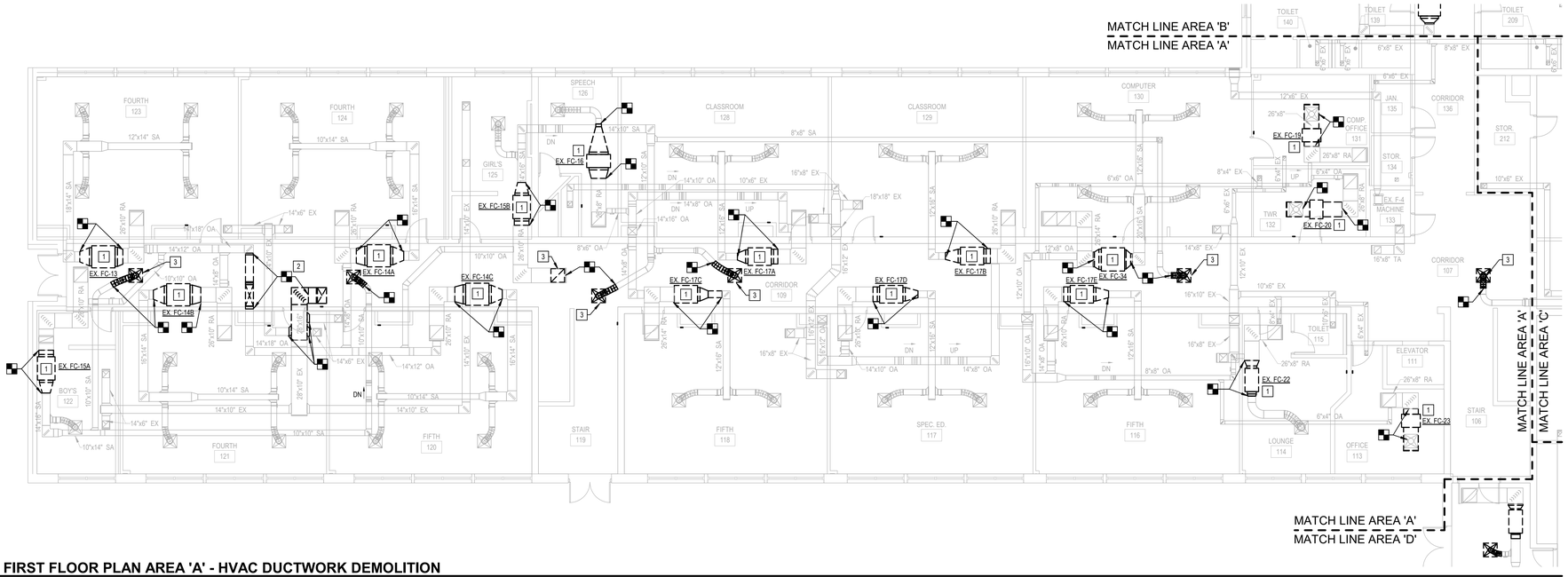
KEYED NOTES

1 DISCONNECT AND REMOVE EXISTING FAN COIL UNIT AND PORTIONS OF DUCTWORK AS INDICATED. COORDINATE WITH E.C.

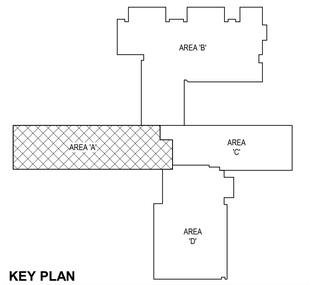
2 REMOVE PORTIONS OF DUCTWORK AS INDICATED BACK TO ROOF MOUNTED EQUIPMENT.

3 SUPPORT EXISTING AIR DEVICE TO BE REINSTALLED IN NEW CEILING GRID.



FIRST FLOOR PLAN AREA 'A' - HVAC DUCTWORK DEMOLITION

1/8" = 1'-0"



KEY PLAN

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FIRST FLOOR PLAN AREA 'A' - HVAC DUCT DEMOLITION

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	COMM. NO.: 2022088

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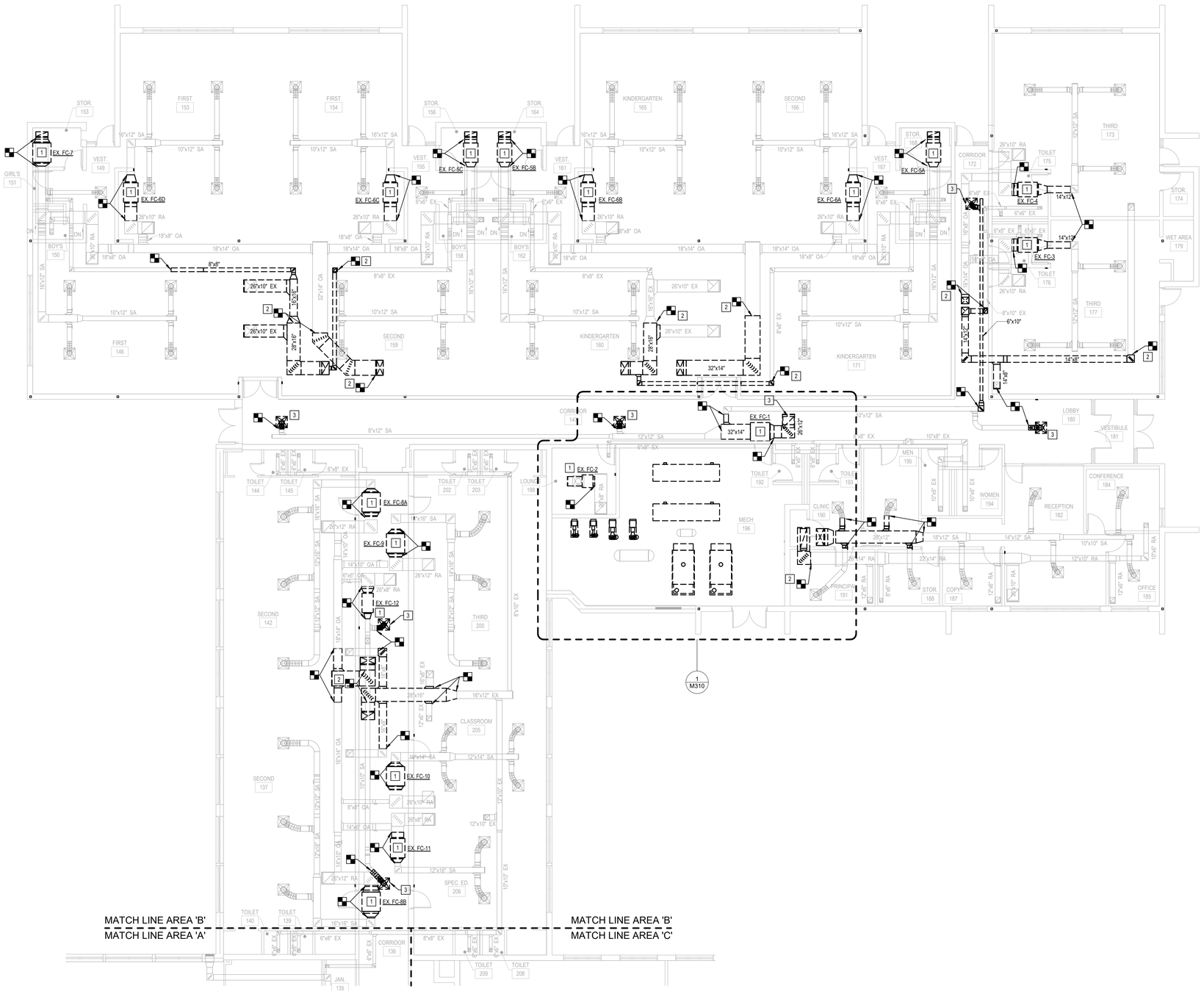
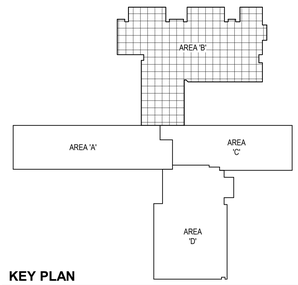
KEYED NOTES

1. DISCONNECT AND REMOVE EXISTING FAN COIL UNIT AND PORTIONS OF DUCTWORK AS INDICATED. COORDINATE WITH E.C.
2. REMOVE PORTIONS OF DUCTWORK AS INDICATED BACK TO ROOF MOUNTED EQUIPMENT.
3. SUPPORT EXISTING AIR DEVICE TO BE REINSTALLED IN NEW CEILING GRID.



FIRST FLOOR PLAN AREA 'B' - HVAC DUCTWORK DEMOLITION

1/8" = 1'-0"



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FIRST FLOOR PLAN AREA 'B' - HVAC DUCT DEMOLITION

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	COMM. NO.: 2022088

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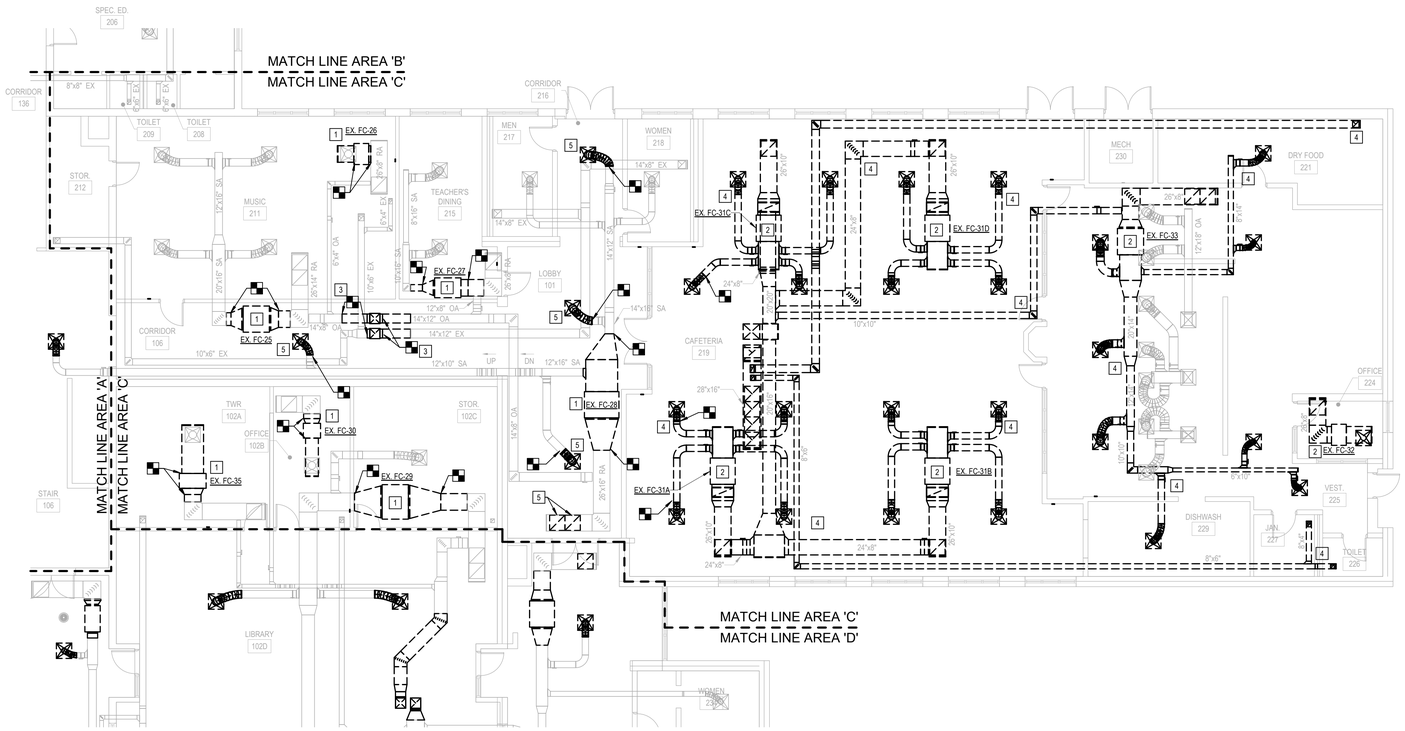
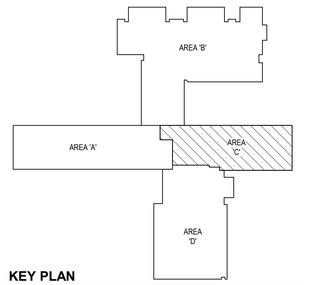
KEYED NOTES

1. DISCONNECT AND REMOVE EXISTING FAN COIL UNIT AND PORTIONS OF DUCTWORK AS INDICATED. COORDINATE WITH E.C.
2. DISCONNECT AND REMOVE EXISTING FAN COIL UNIT AND ALL ASSOCIATED DUCTWORK, AIR DEVICES, AND ACCESSORIES AS INDICATED. COORDINATE WITH E.C.
3. REMOVE PORTIONS OF DUCTWORK AS INDICATED BACK TO ROOF MOUNTED EQUIPMENT.
4. REMOVE EXISTING DUCTWORK, AIR DEVICES, AND ACCESSORIES.
5. SUPPORT EXISTING AIR DEVICE TO BE REINSTALLED IN NEW CEILING GRID.



FIRST FLOOR PLAN AREA 'C' - HVAC DUCTWORK DEMOLITION

1/8" = 1'-0"



KEY PLAN

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FIRST FLOOR PLAN AREA 'C' - HVAC DUCT DEMOLITION

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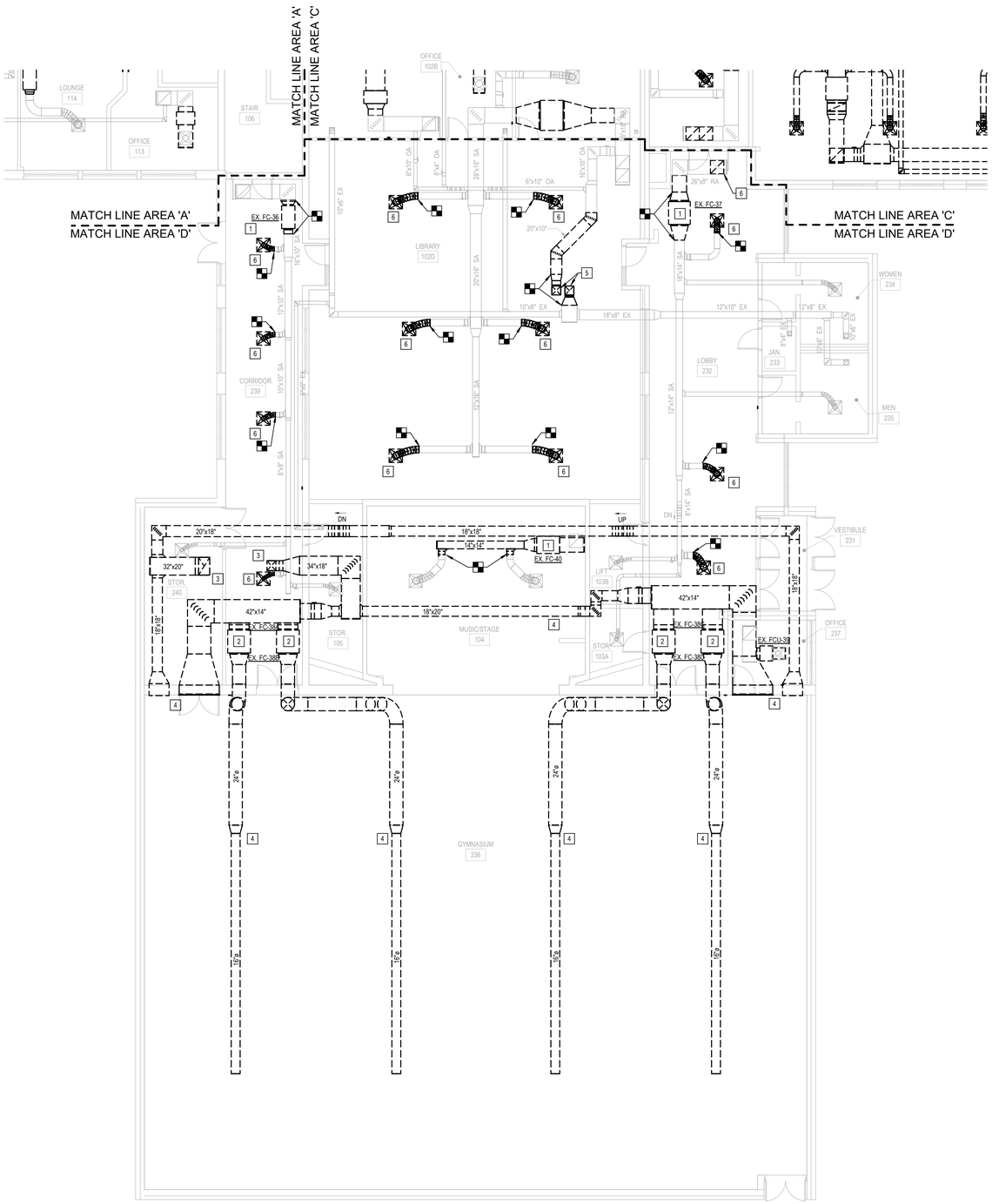
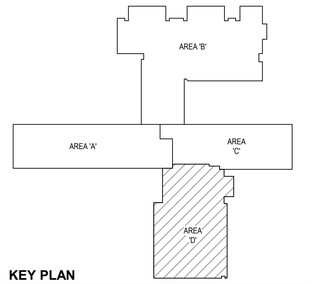


KEYED NOTES

1. DISCONNECT AND REMOVE EXISTING FAN COIL UNIT AND ALL ASSOCIATED DUCTWORK AS INDICATED. COORDINATE WITH E.C.
2. DISCONNECT AND REMOVE EXISTING FAN COIL UNIT AND ALL ASSOCIATED DUCTWORK, AIR DEVICES, AND ACCESSORIES AS INDICATED. COORDINATE WITH E.C.
3. REMOVE DUCTWORK AS INDICATED BACK TO ROOF MOUNTED EQUIPMENT.
4. REMOVE EXISTING DUCTWORK, AIR DEVICES, AND ACCESSORIES.
5. REMOVE PORTIONS OF DUCTWORK AS INDICATED BACK TO ROOF MOUNTED EQUIPMENT.
6. SUPPORT EXISTING AIR DEVICE TO BE REINSTALLED IN NEW CEILING GRID.

FIRST FLOOR PLAN AREA 'D' - HVAC DUCTWORK DEMOLITION

1/8" = 1'-0"



KEY PLAN

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FIRST FLOOR PLAN AREA 'D' - HVAC DUCT DEMOLITION

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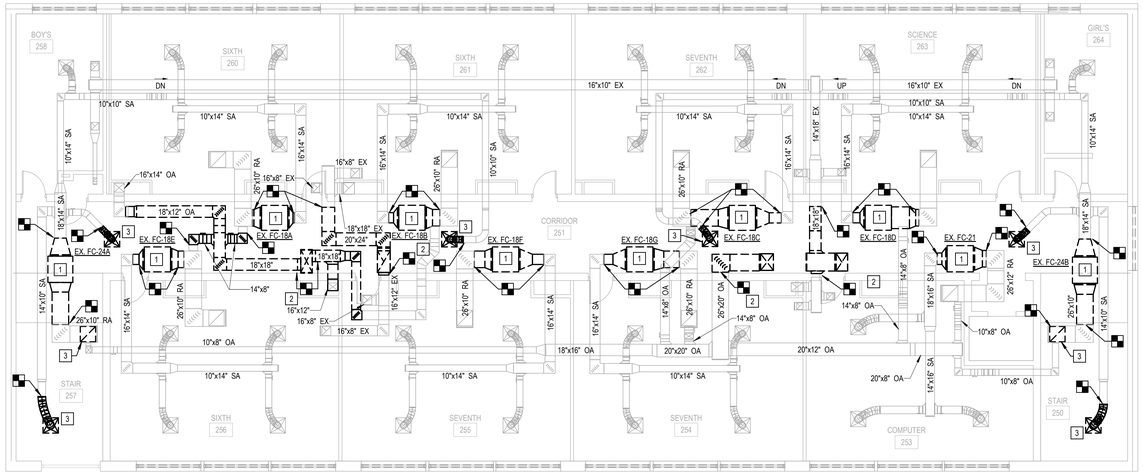
KEYED NOTES

1 DISCONNECT AND REMOVE EXISTING FAN COIL UNIT AND PORTIONS OF DUCTWORK AS INDICATED. COORDINATE WITH E.C.

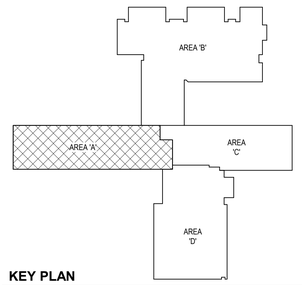
2 REMOVE PORTIONS OF DUCTWORK AS INDICATED BACK TO ROOF MOUNTED EQUIPMENT.

3 SUPPORT EXISTING AIR DEVICE TO BE REINSTALLED IN NEW CEILING GRID.



SECOND FLOOR PLAN - HVAC DUCTWORK DEMOLITION

1/8" = 1'-0"



KEY PLAN

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222 Lee Street, West
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Fax: 304.345.8144
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COMMONWEALTH OF VIRGINIA
JOHN A. PRUETT
Lic. No. 62180
9.27.23
PROFESSIONAL ENGINEER

NO.	DESCRIPTION	DATE

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RENOVATIONS
MACY MCLAUGHERTY ELEMENTARY/MIDDLE SCHOOL
GILES COUNTY PUBLIC SCHOOLS
PEARISBURG, VIRGINIA

BIDDING/CONSTRUCTION DOCUMENTS

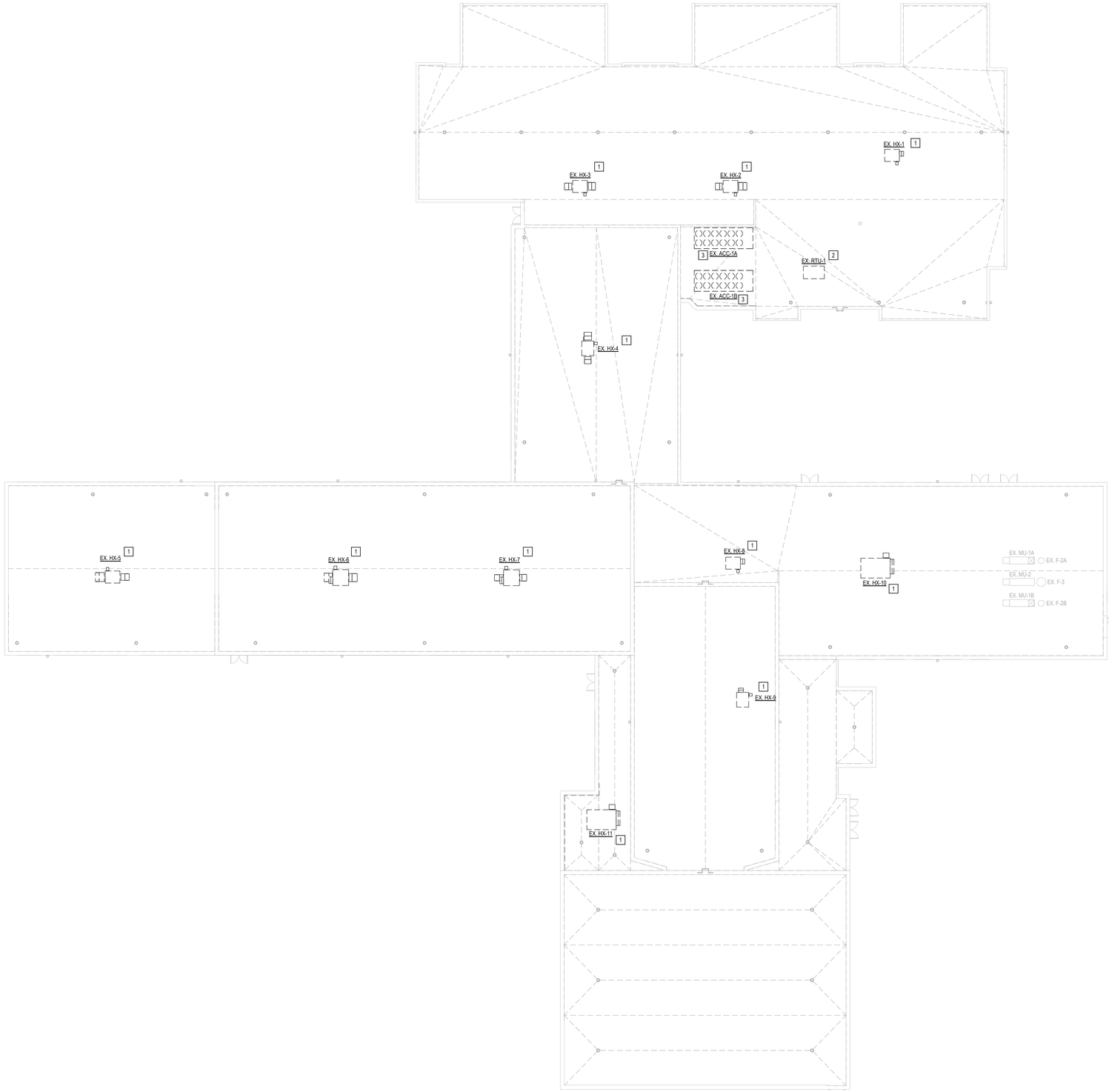
SECOND FLOOR PLAN - HVAC DUCT DEMOLITION

DRAWN	CHECKED
SAO	JAP
	DATE: 07/07/2023
	COMM. NO.: 2022088

M112

KEYED NOTES

1. REMOVE EXISTING ROOF MOUNTED HEAT EXCHANGER. COORDINATE WITH E.C.
2. REMOVE EXISTING PACKAGED ROOFTOP UNIT, AND PORTIONS OF GAS PIPING FOR INSTALLATION OF NEW UNIT. COORDINATE WITH E.C. AND P.C.
3. REMOVE EXISTING ROOF MOUNTED AIR COOLED CONDENSER. COORDINATE WITH E.C. AND P.C.



ROOF PLAN - HVAC DEMOLITION

1/16" = 1'-0"

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ROOF PLAN - HVAC DEMOLITION

DRAWN	CHECKED
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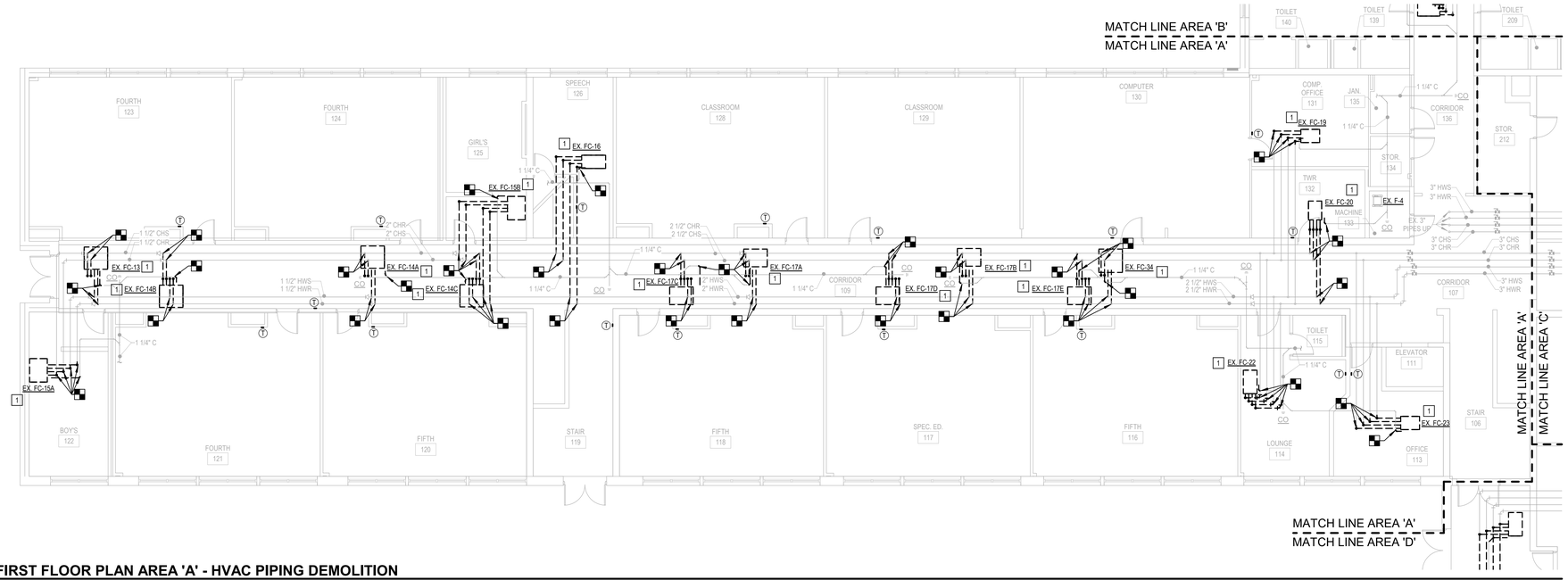
	DATE: 07/07/2023
	COMM. NO.: 2022088

M113

10/3/2023 9:15:14 AM C:\Revit Local\Macy McClaugherty EMS M 22_sogazU4RVW.rvt

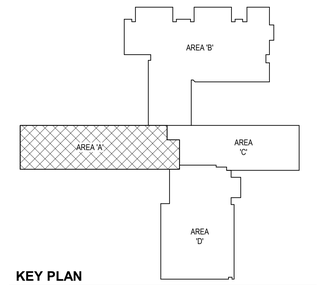
KEYED NOTES

1 DISCONNECT AND REMOVE FAN COIL UNIT, PORTIONS OF HYDRONIC PIPING AND PORTIONS OF CONDENSATE PIPING AS INDICATED, AND ASSOCIATED CONTROLS. COORDINATE WITH E.C.



FIRST FLOOR PLAN AREA 'A' - HVAC PIPING DEMOLITION

1/8" = 1'-0"



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FIRST FLOOR PLAN AREA 'A' - HVAC PIPING DEMOLITION

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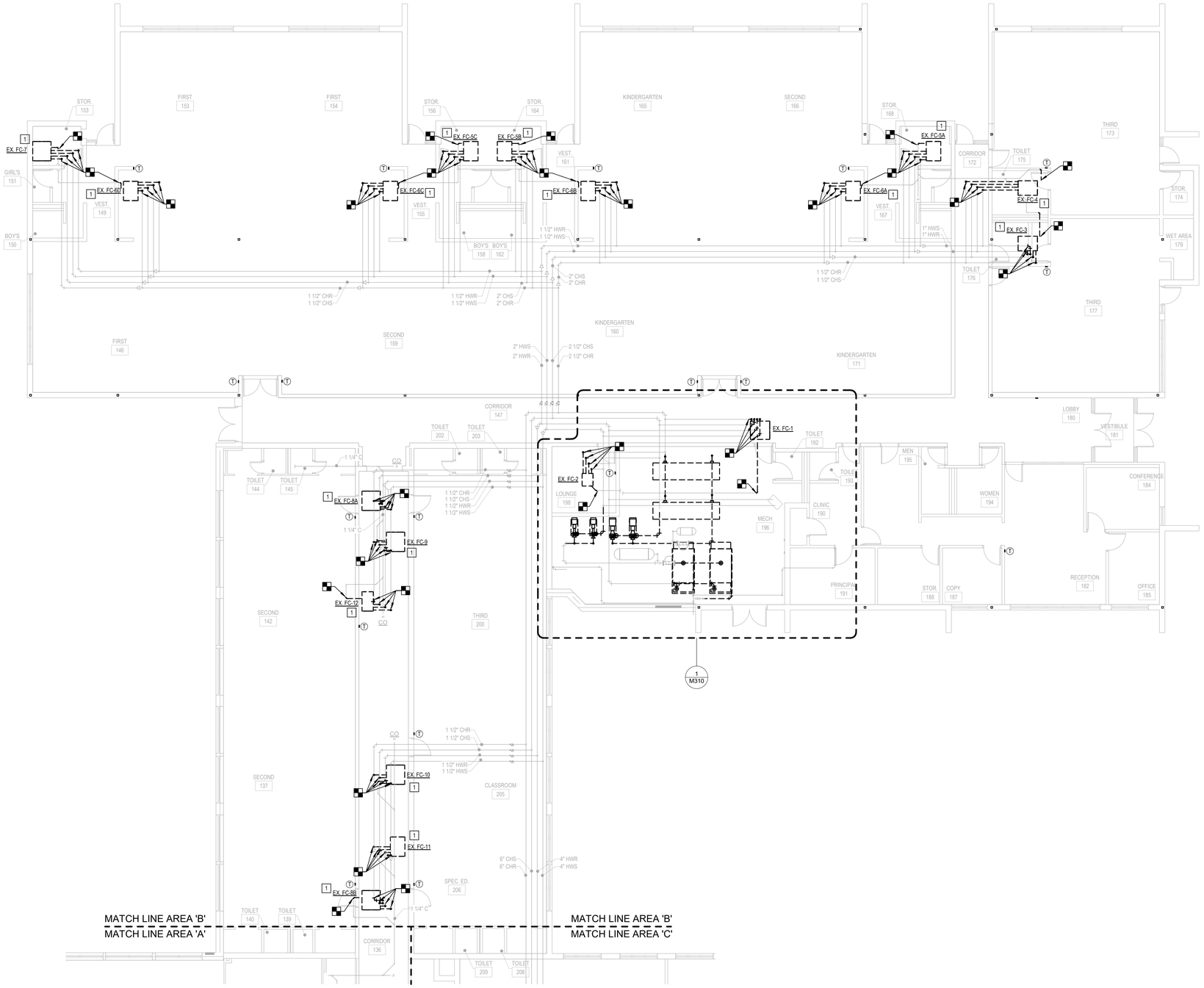
	DATE: 07/07/2023
	COMM. NO.: 2022088

M121a

10/3/2023 9:15:18 AM C:\Revit Local\Macy McClaugherty EMS M 22_sogazU4RVW.rvt

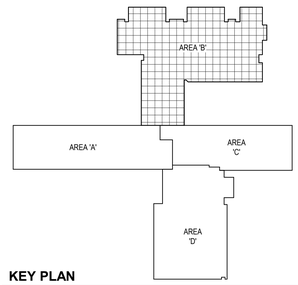
KEYED NOTES

1 DISCONNECT AND REMOVE FAN COIL UNIT, PORTIONS OF HYDRONIC PIPING AND PORTIONS OF CONDENSATE PIPING AS INDICATED, AND ASSOCIATED CONTROLS. COORDINATE WITH E.C.



FIRST FLOOR PLAN AREA 'B' - HVAC PIPING DEMOLITION

1/8" = 1'-0"



KEY PLAN

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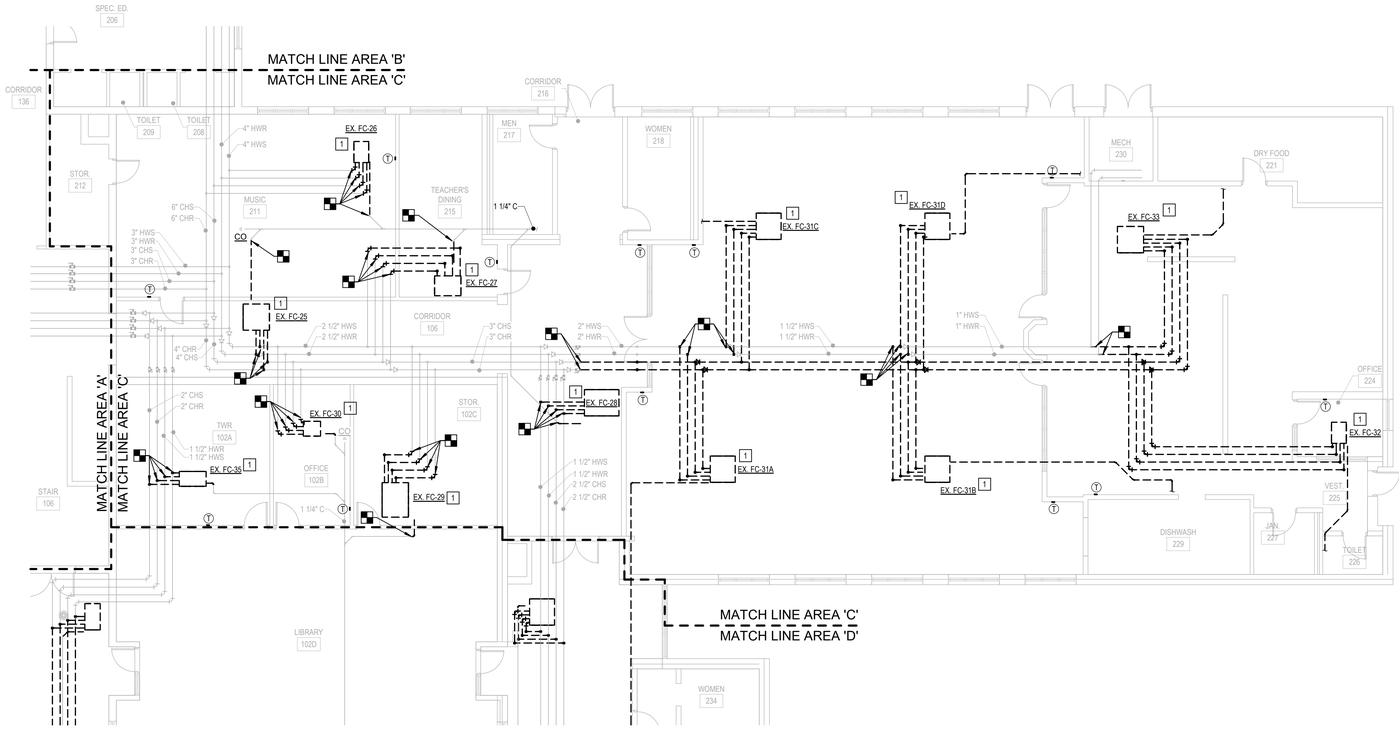
FIRST FLOOR PLAN AREA 'B' - HVAC PIPING DEMOLITION

DRAWN	CHECKED
SAO	JAP
DATE	07/07/2023
COMM. NO.	2022088

M121b

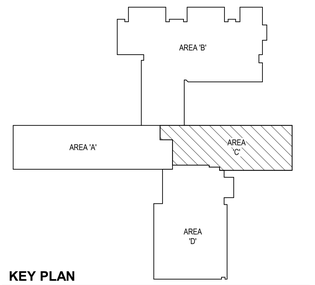
KEYED NOTES

1 DISCONNECT AND REMOVE FAN COIL UNIT, PORTIONS OF HYDRONIC PIPING AND PORTIONS OF CONDENSATE PIPING AS INDICATED, AND ASSOCIATED CONTROLS. COORDINATE WITH E.C.



FIRST FLOOR PLAN AREA 'C' - HVAC PIPING DEMOLITION

1/8" = 1'-0"



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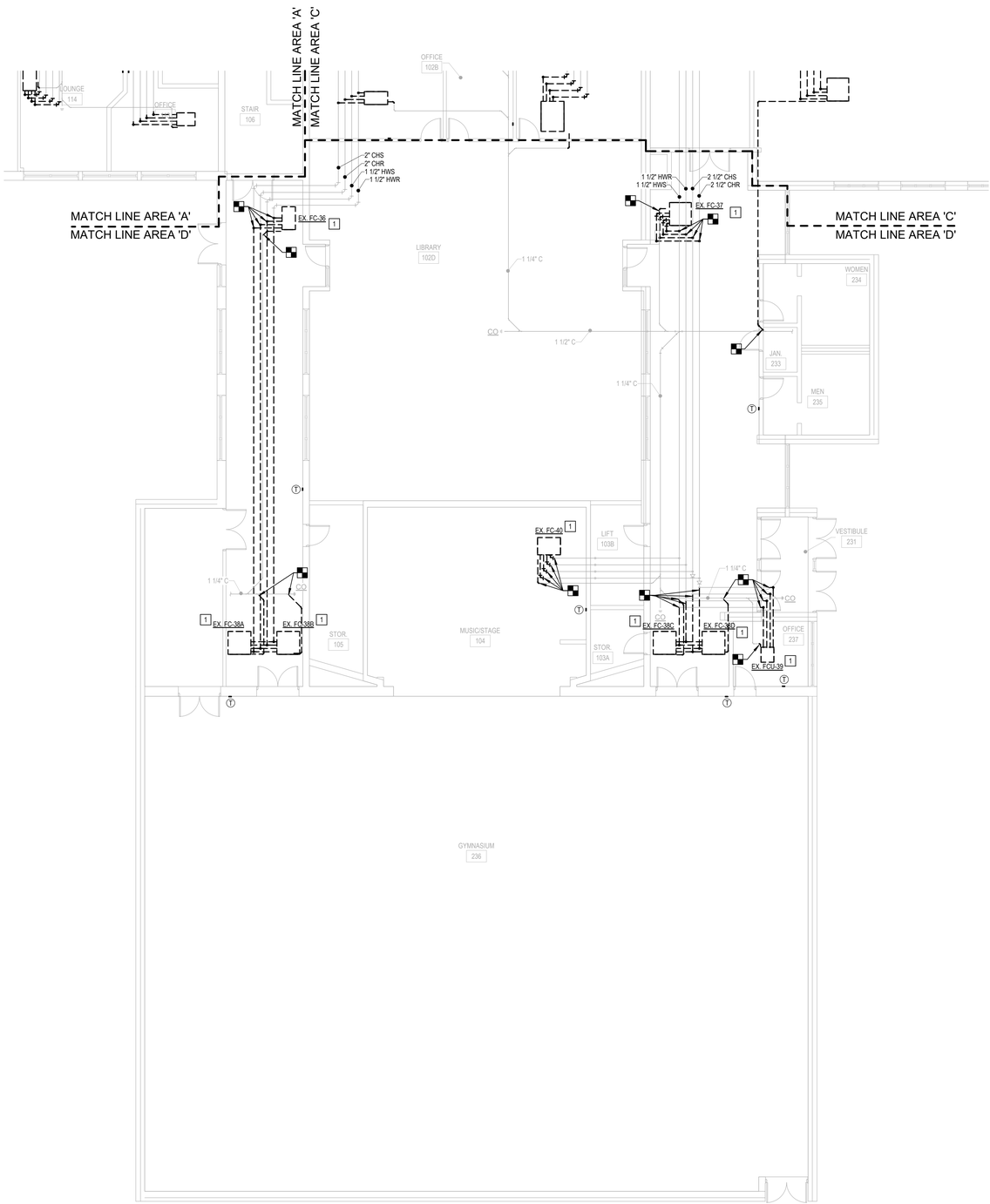
FIRST FLOOR PLAN AREA 'C' - HVAC PIPING DEMOLITION

DRAWN	CHECKED
SAO	JAP
	DATE: 07/07/2023
	COMM. NO.: 2022088

M121c

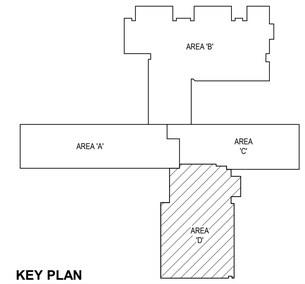


KEYED NOTES

1 DISCONNECT AND REMOVE FAN COIL UNIT, PORTIONS OF HYDRONIC PIPING AND PORTIONS OF CONDENSATE PIPING AS INDICATED, AND ASSOCIATED CONTROLS. COORDINATE WITH E.C.

FIRST FLOOR PLAN AREA 'D' - HVAC PIPING DEMOLITION

1/8" = 1'-0"



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FIRST FLOOR PLAN AREA 'D' - HVAC PIPING DEMOLITION

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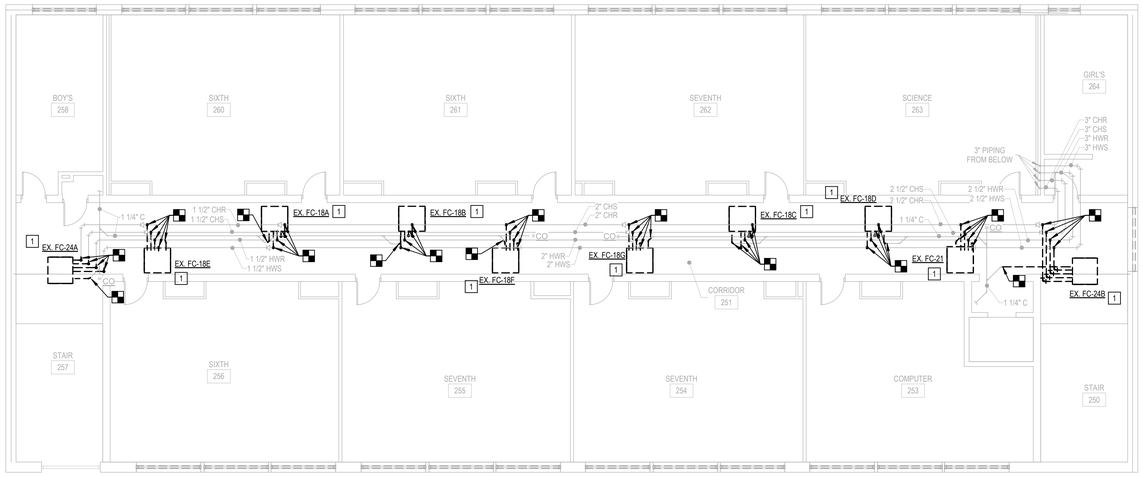
	DATE: 07/07/2023
	COMM. NO.: 2022088

M121d

10/3/2023 9:15:28 AM C:\Revit Local\Macy McClaugherty EMS M 22_sogazU4RVW.rvt

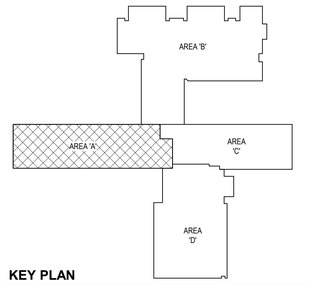
KEYED NOTES

1 DISCONNECT AND REMOVE FAN COIL UNIT, PORTIONS OF HYDRONIC PIPING AND PORTIONS OF CONDENSATE PIPING AS INDICATED, AND ASSOCIATED CONTROLS. COORDINATE WITH E.C.



SECOND FLOOR PLAN - HVAC PIPING DEMOLITION

1/8" = 1'-0"



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SECOND FLOOR PLAN - HVAC PIPING DEMOLITION

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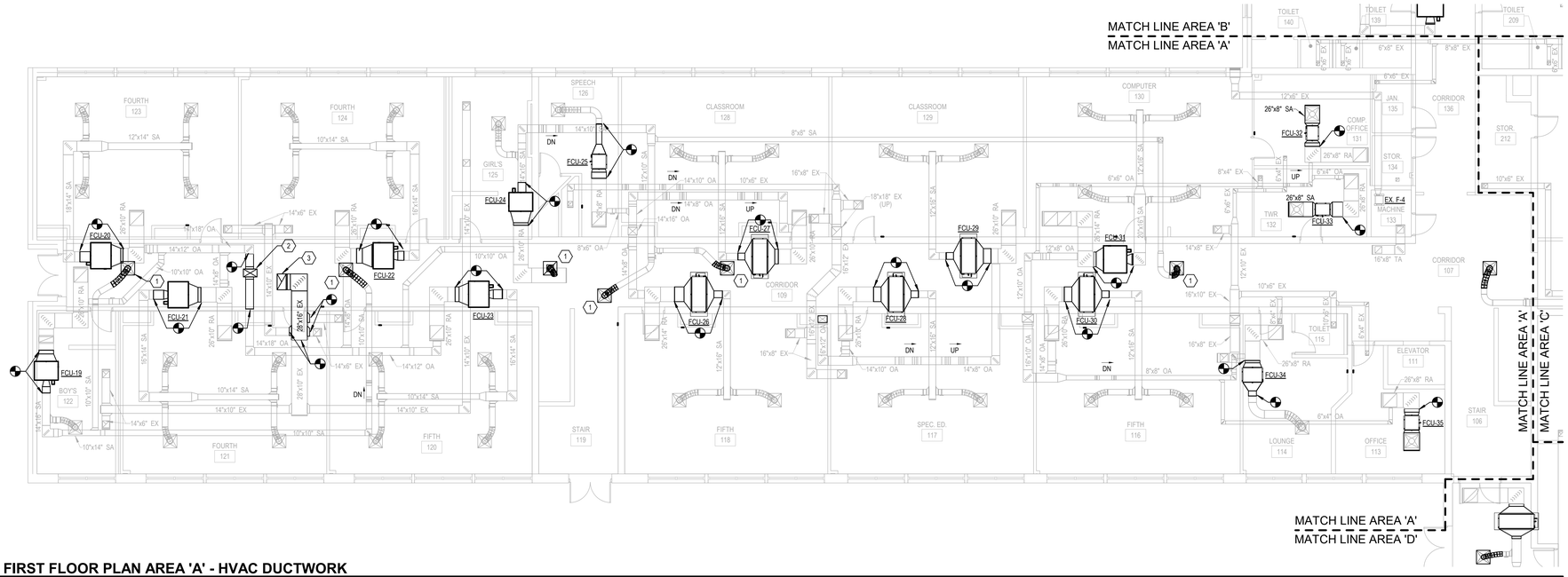
SAO	JAP
	DATE: 07/07/2023
	COMM. NO.: 2022088

M122

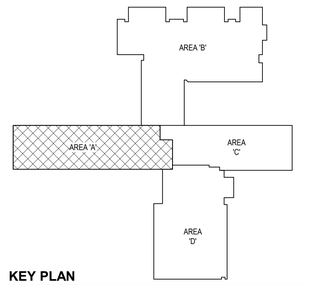
10/3/2023 9:15:30 AM C:\Revit Local\Macy McClaugherty EMS M 22_sogazU4RVW.rvt

KEYED NOTES

1 REALIGN AIR DEVICE INTO NEW CEILING GRID.
2 24" X 14" OA DUCT UP TO DOAS-5 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
3 28" X 16" EA DUCT UP TO DOAS-5 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.



FIRST FLOOR PLAN AREA 'A' - HVAC DUCTWORK
1/8" = 1'-0"



KEY PLAN
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PEARISBURG, VIRGINIA

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FIRST FLOOR PLAN - AREA 'A' - HVAC DUCTWORK

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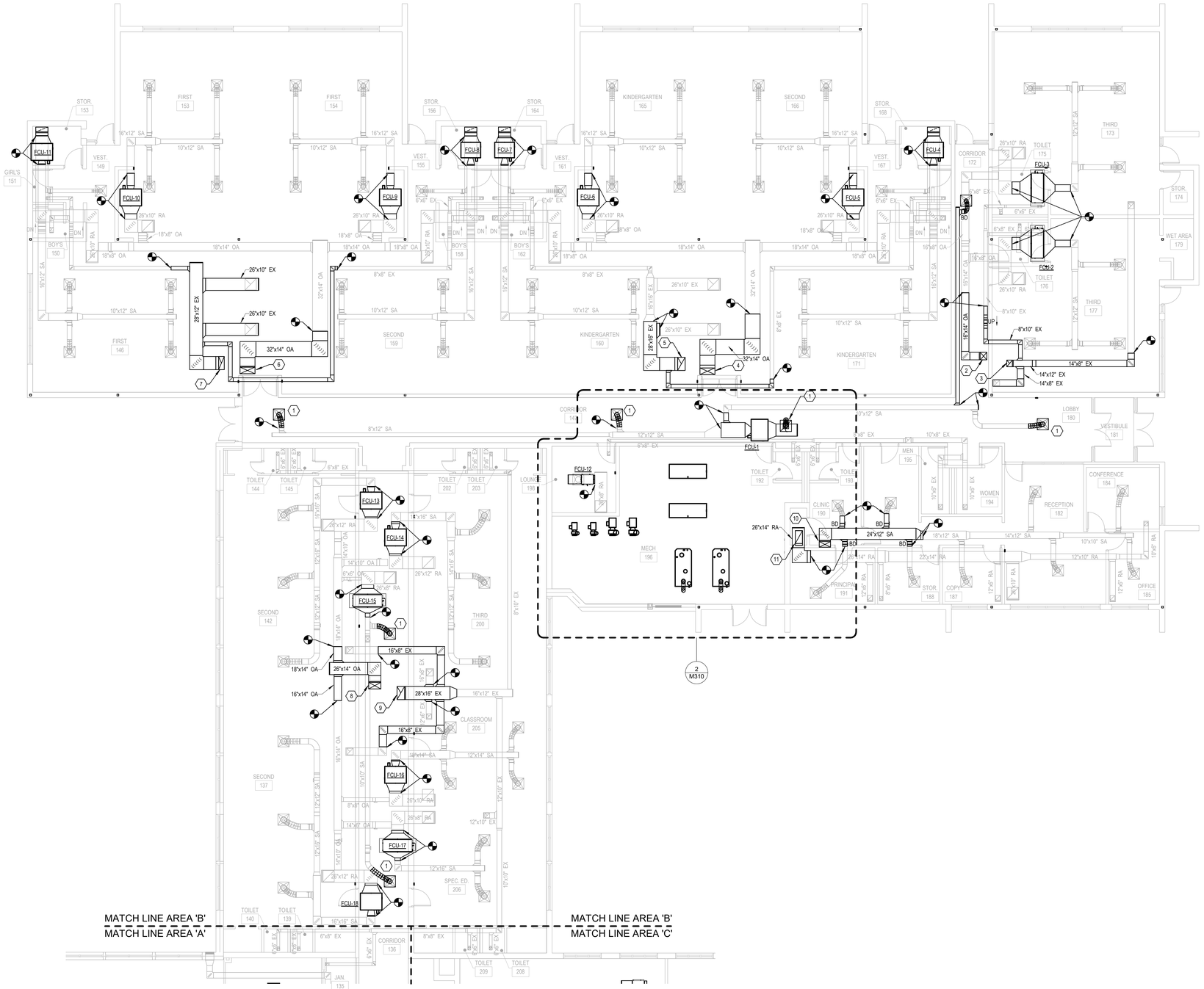
SAO	JAP
	DATE: 07/07/2023
	COMM. NO.: 2022088

M131a

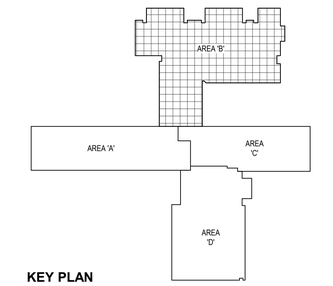


KEYED NOTES

1. REALIGN AIR DEVICE INTO NEW CEILING GRID.
2. 16" X 14" OA DUCT UP TO DOAS-1 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
3. 14" X 12" EA DUCT UP TO DOAS-1 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
4. 32" X 14" OA DUCT UP TO DOAS-2 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
5. 28" X 16" EA DUCT UP TO DOAS-2 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
6. 32" X 14" OA DUCT UP TO DOAS-3 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
7. 28" X 12" EA DUCT UP TO DOAS-3 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
8. 26" X 14" OA DUCT UP TO DOAS-4 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
9. 28" X 16" EA DUCT UP TO DOAS-4 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
10. 24" X 12" SA DUCT UP TO RTU-1 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
11. 26" X 14" EA DUCT UP TO RTU-1 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.

FIRST FLOOR PLAN AREA 'B' - HVAC DUCTWORK

1/8" = 1'-0"



KEY PLAN

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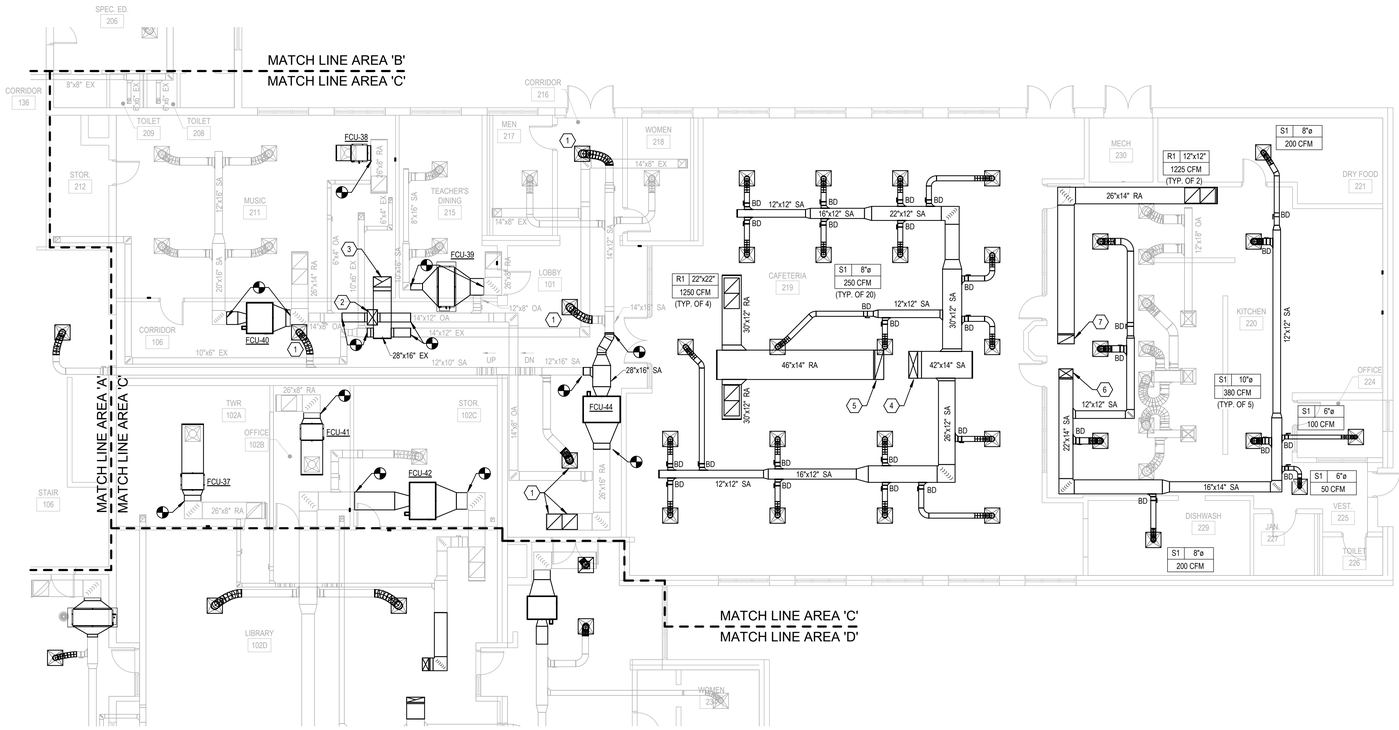
FIRST FLOOR PLAN - AREA 'B' - HVAC DUCTWORK

DRAWN	CHECKED
SAO	JAP
	DATE: 07/07/2023
	COMM. NO.: 2022088

M131b

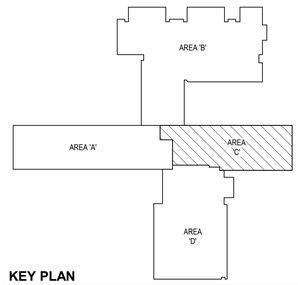
KEYED NOTES

1. REALIGN AIR DEVICE INTO NEW CEILING GRID.
2. 24" X 16" OA DUCT UP TO DOAS-8 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
3. 28" X 16" EA DUCT UP TO DOAS-8 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
4. 42" X 14" SA DUCT UP TO RTU-2 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
5. 46" X 14" RA DUCT UP TO RTU-2 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
6. 22" X 14" SA DUCT UP TO RTU-4 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
7. 26" X 14" RA DUCT UP TO RTU-4 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.



FIRST FLOOR PLAN AREA 'C' - HVAC DUCTWORK

1/8" = 1'-0"



KEY PLAN

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FIRST FLOOR PLAN - AREA 'C' - HVAC DUCTWORK

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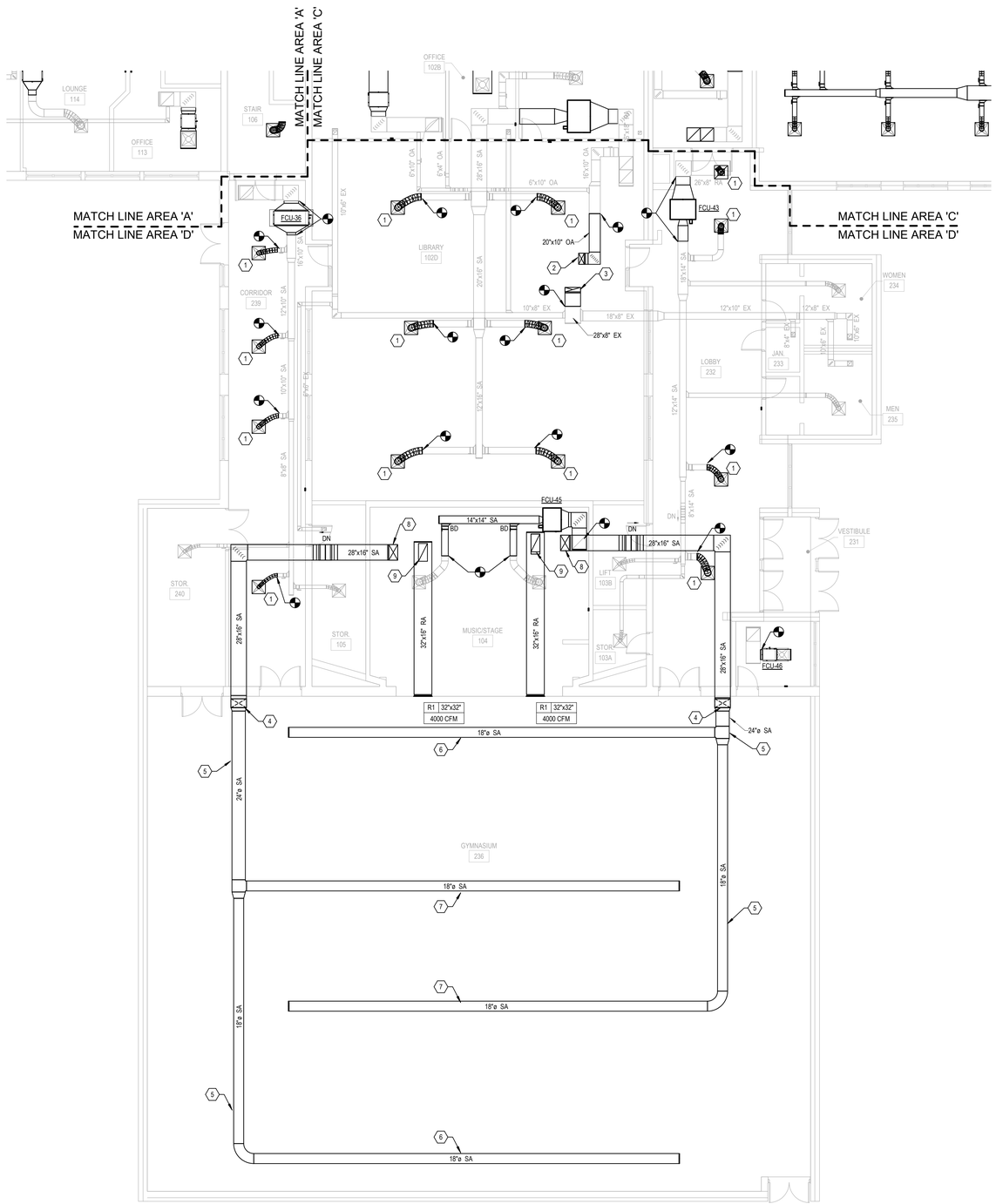
M131c

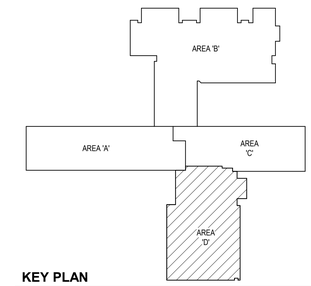


FIRST FLOOR PLAN AREA 'D' - HVAC DUCTWORK

1/8" = 1'-0"

KEYED NOTES

1. REALIGN AIR DEVICE INTO NEW CEILING GRID.
2. 20" X 10" SA DUCT UP TO DOAS-9 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
3. 28" X 8" EA DUCT UP TO DOAS-9 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
4. CONNECTION POINT OF FABRIC DUCT TO METAL DUCT. REFER TO DETAIL ON SHEET M511.
5. FABRIC DUCT WITHOUT AIR OPENINGS.
6. FABRIC DUCT (BASIS OF DESIGN: COMBI 70 FABRIC WITH ORILFOW OPENINGS FROM FABRICAIR). PROVIDE AIR OPENINGS AT THE 6 OCLOCK & 7 OCLOCK POSITION FOR 2,000 CFM WITH 25 FT THROW, ISOTHERMAL AIR, TO 50 FPM. OPENINGS SHALL BE EQUALLY DISTRIBUTED ALONG THE LENGTH OF FABRIC DUCT. CENTERLINE OF DUCT SHALL BE 20'-0" AFF. REFER TO DETAILS ON SHEET M510.
7. FABRIC DUCT (BASIS OF DESIGN: COMBI 70 FABRIC WITH ORILFOW OPENINGS FROM FABRICAIR). PROVIDE AIR OPENINGS AT THE 5 OCLOCK & 6 OCLOCK POSITION FOR 2,000 CFM WITH 25 FT THROW, ISOTHERMAL AIR, TO 50 FPM. OPENINGS SHALL BE EQUALLY DISTRIBUTED ALONG THE LENGTH OF FABRIC DUCT. CENTERLINE OF DUCT SHALL BE 20'-0" AFF. REFER TO DETAILS ON SHEET M510.
8. 28" X 16" LINED SUPPLY DUCT UP TO RTU-3A/3B ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
9. 32" X 16" LINED RETURN DUCT UP TO RTU-3A/3B ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.



KEY PLAN

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PEARISBURG, VIRGINIA

BIDDING/CONSTRUCTION DOCUMENTS

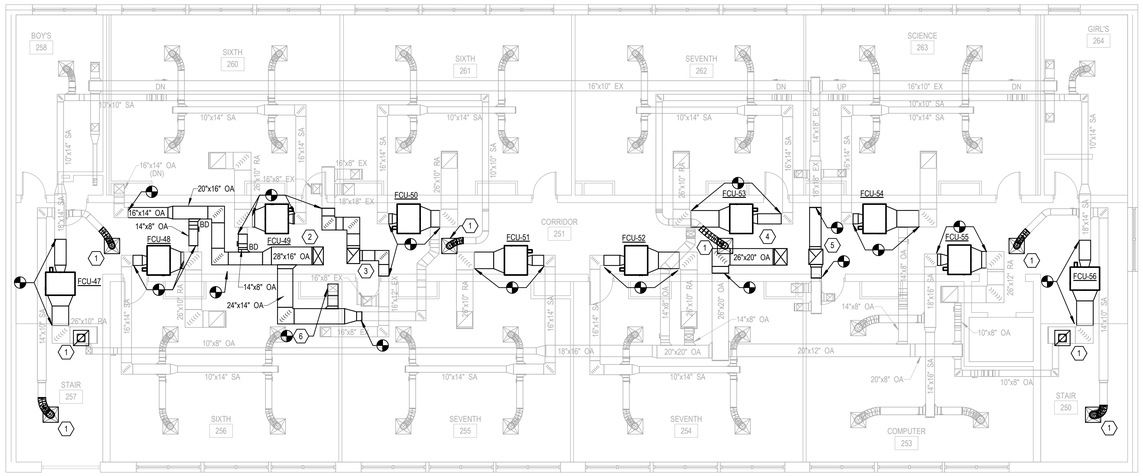
FIRST FLOOR PLAN - AREA 'D' - HVAC DUCTWORK

DRAWN	CHECKED
SAO	JAP
	DATE: 07/07/2023
	COMM. NO.: 2022088

M131d

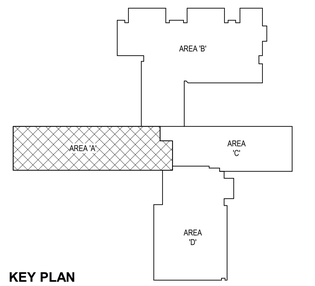
KEYED NOTES

1. REALIGN AIR DEVICE INTO NEW CEILING GRID.
2. 28" X 16" OA DUCT UP TO DOAS-6 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
3. 20" X 24" EA DUCT UP TO DOAS-6 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
4. 26" X 20" OA DUCT UP TO DOAS-7 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
5. 24" X 22" EA DUCT UP TO DOAS-7 ON ROOF. TRANSITION DUCT AS REQUIRED AT CONNECTION TO UNIT.
6. TIE NEW 16" X 12" OA DUCT INTO EXISTING 16" X 12" OA DUCT GOING DOWN TO FLOOR BELOW.



SECOND FLOOR PLAN - HVAC DUCTWORK

1/8" = 1'-0"



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NO.	DESCRIPTION	DATE
REVISIONS		

RENOVATIONS
MACY MCLAUGHERTY ELEMENTARY/MIDDLE SCHOOL
GILES COUNTY PUBLIC SCHOOLS
PEARISBURG, VIRGINIA

BIDDING/CONSTRUCTION DOCUMENTS

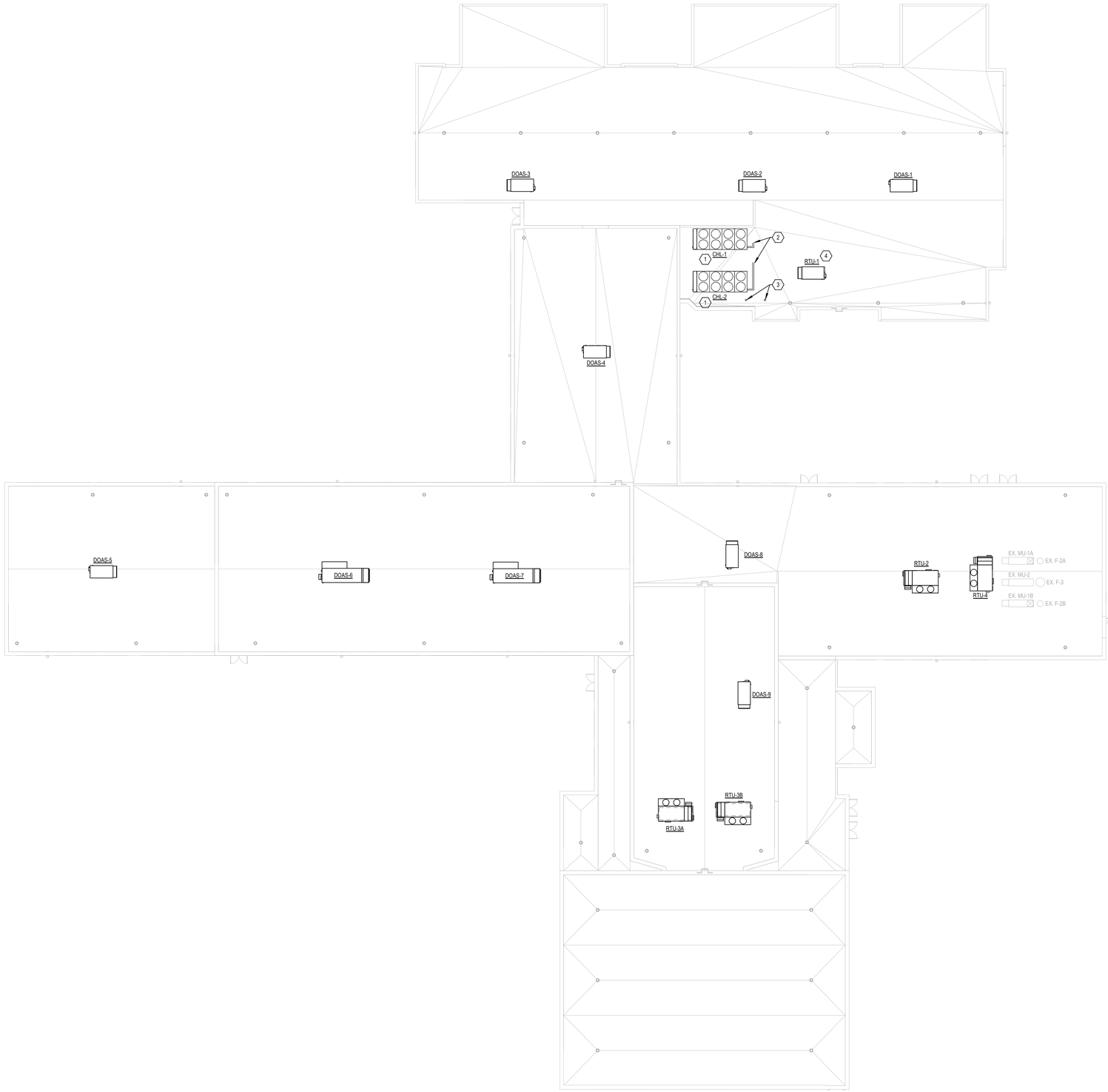
SECOND FLOOR PLAN - HVAC DUCTWORK

DRAWN	CHECKED
SAO	JAP
	DATE: 07/07/2023
	COMM. NO.: 2022088

M132

KEYED NOTES

1. CHILLER AIR COOLED CONDENSING UNIT. SEE DWG M141b FOR REMOTE EVAPORATOR LOCATION.
2. REFRIGERANT PIPING THRU ROOF. ROUTE REFRIGERANT PIPING IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS. SUPPORT REFRIGERANT PIPING EVER 10'-0" ON CENTER, AND AT EVERY CHANGING IN DIRECTION.
3. 8" BOILER FLUE PIPING THRU ROOF. LOCATE FLUE PIPING TO MAINTAIN MINIMUM 15'-0" CLEARANCE FROM FRESH AIR INTAKES. TERMINATE A MINIMUM OF 2'-0" ABOVE ROOF PARAPET.
4. NEW RTU-1 LOCATION. COORDINATE FINAL LOCATION WITH STRUCTURAL. EXTEND GAS PIPING TO NEW RTU AND CONNECT, SEE DETAIL.



ROOF PLAN - HVAC

1/16" = 1'-0"

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JOHN A. PRUETT
Lic. No. 62180
9.27.23
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MACY MCLAUGHERTY ELEMENTARY/MIDDLE SCHOOL
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PEARISBURG, VIRGINIA

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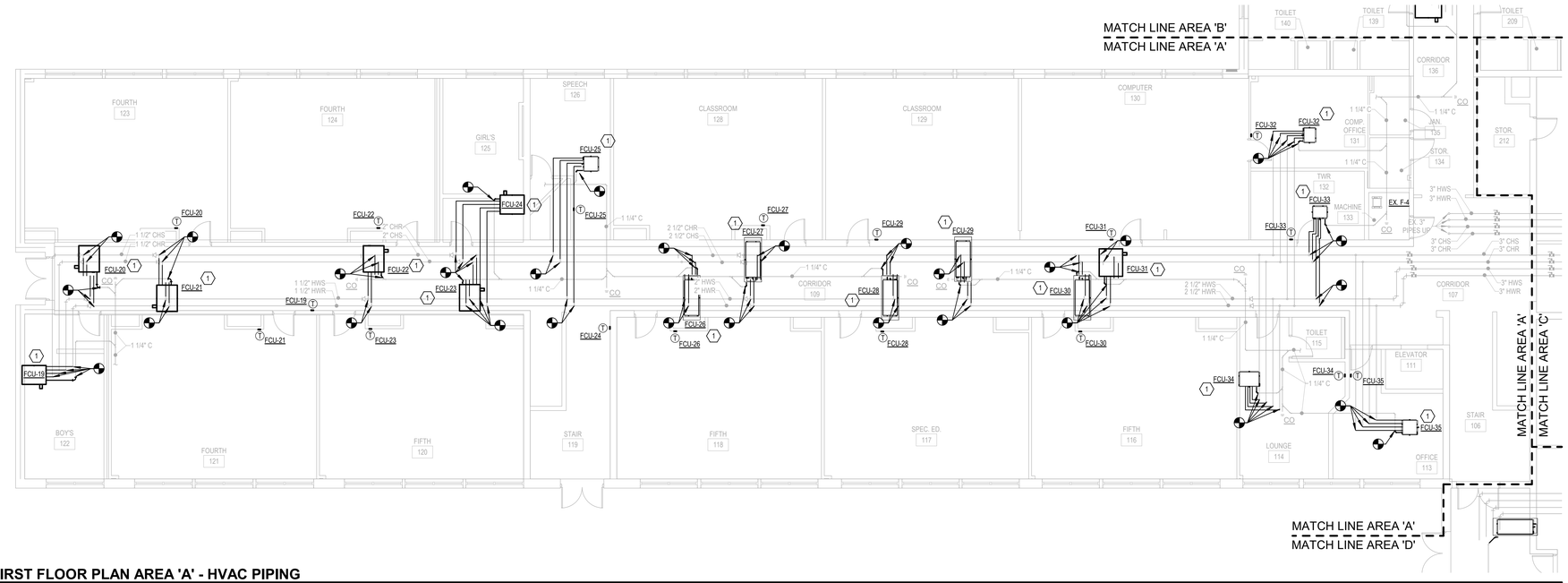
ROOF PLAN - HVAC

DRAWN	CHECKED
SAO	JAP
	DATE: 07/07/2023
	COMM. NO.: 2022088

M133

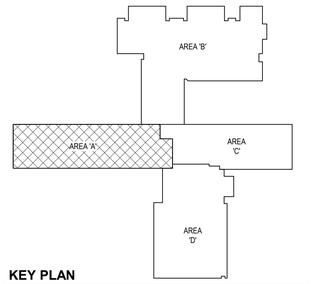
KEYED NOTES

1 EXTEND NEW CHILLED AND HEATING WATER PIPING FROM MAIN TO FAN COIL UNIT. TIE NEW CONDENSATE DRAIN PIPING INTO EXISTING CONDENSATE DRAIN SYSTEM. DRAIN PIPING SIZE SHALL NOT BE SMALLER THAN MANUFACTURER'S FACTORY DRAIN CONNECTION.



FIRST FLOOR PLAN AREA 'A' - HVAC PIPING

1/8" = 1'-0"



KEY PLAN

NOT TO SCALE

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FIRST FLOOR PLAN AREA 'A' - HVAC PIPING

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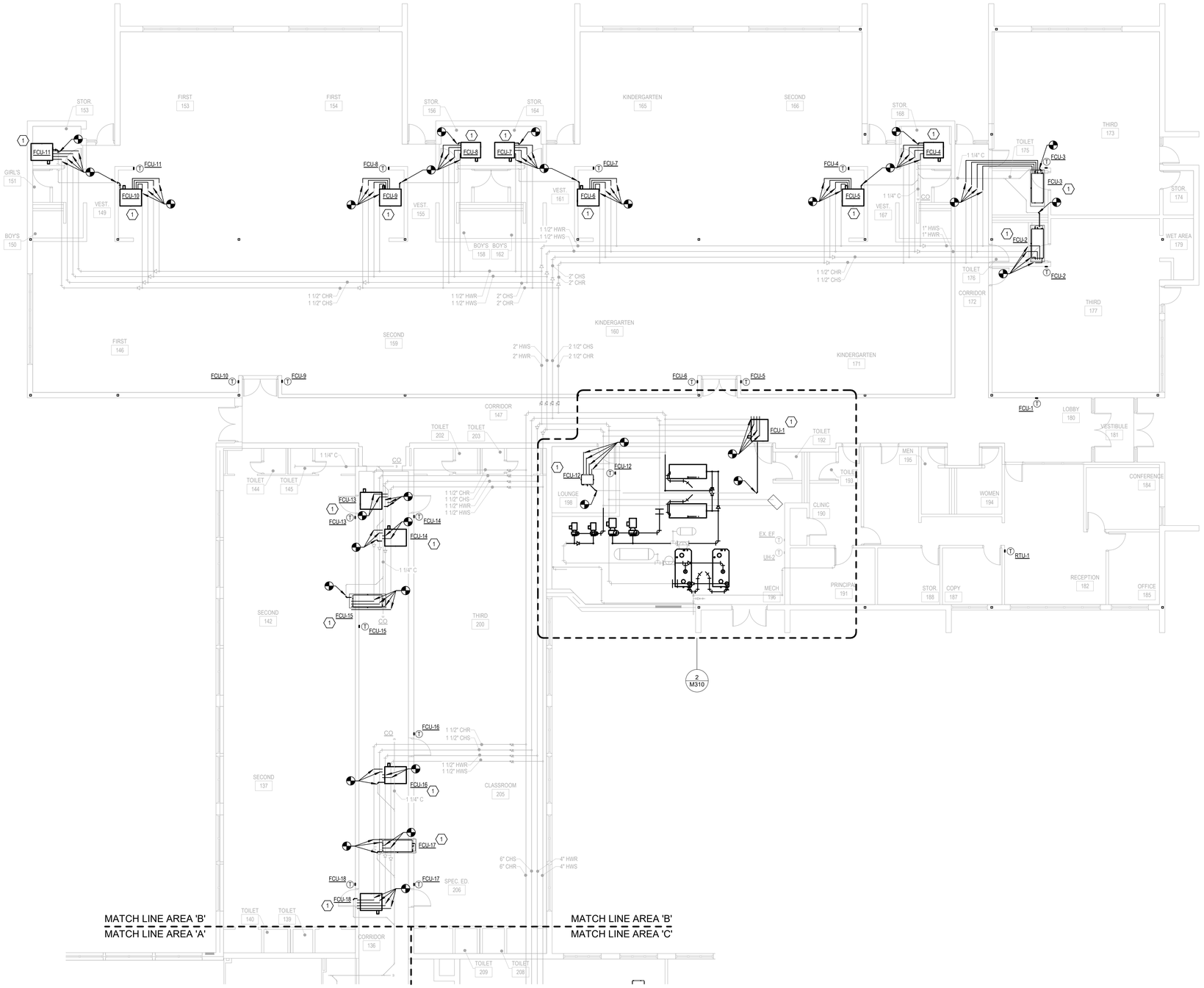
	DATE: 07/07/2023
	COMM. NO.: 2022088

M141a

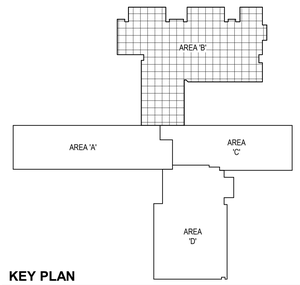
KEYED NOTES

1 EXTEND NEW CHILLED AND HEATING WATER PIPING FROM MAIN TO FAN COIL UNIT. TIE NEW CONDENSATE DRAIN PIPING INTO EXISTING CONDENSATE DRAIN SYSTEM. DRAIN PIPING SIZE SHALL NOT BE SMALLER THAN MANUFACTURER'S FACTORY DRAIN CONNECTION.



FIRST FLOOR PLAN AREA 'B' - HVAC PIPING

1/8" = 1'-0"



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FIRST FLOOR PLAN AREA 'B' - HVAC PIPING

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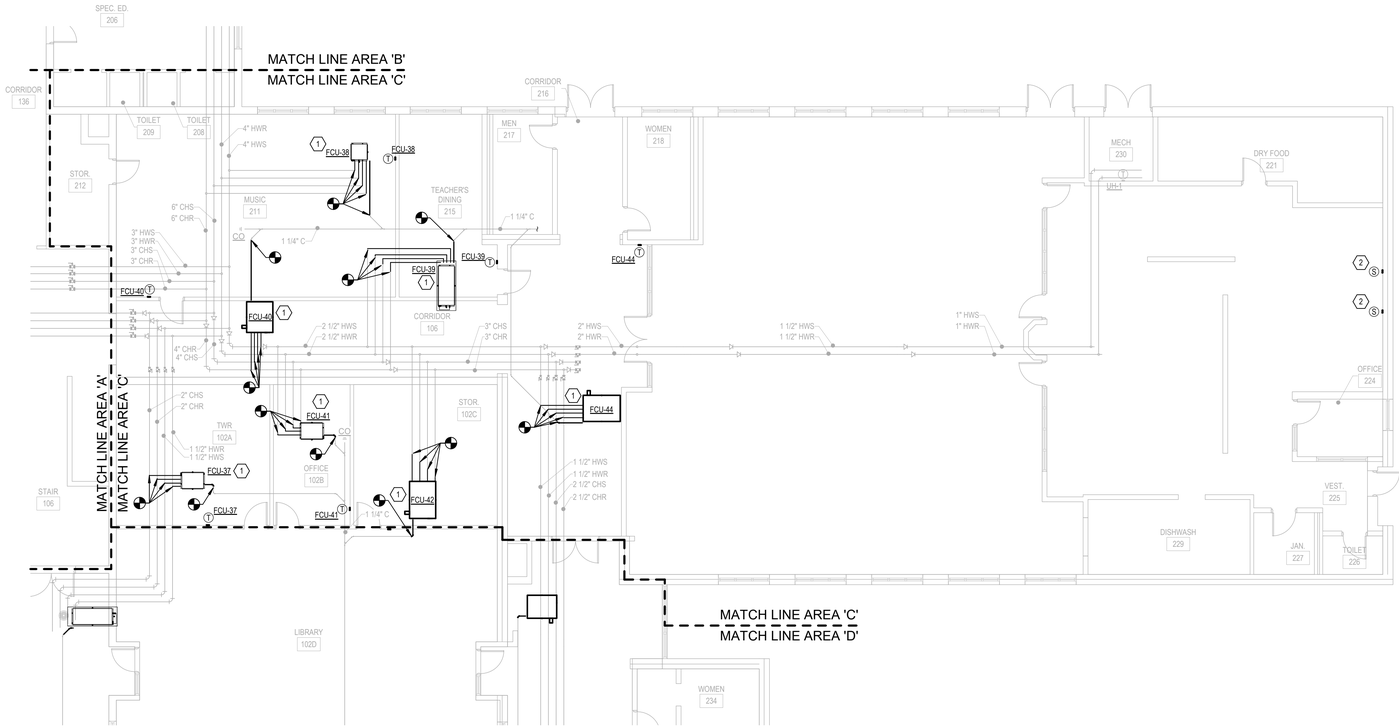
M141b

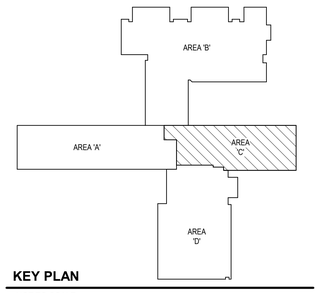
KEYED NOTES

1. EXTEND NEW CHILLED AND HEATING WATER PIPING FROM MAIN TO FAN COIL UNIT. TIE NEW CONDENSATE DRAIN PIPING INTO EXISTING CONDENSATE DRAIN SYSTEM. DRAIN PIPING SIZE SHALL NOT BE SMALLER THAN MANUFACTURER'S FACTORY DRAIN CONNECTION.
2. FREEZER/COOLER SENSOR SHALL BE LOCATED IN NEW WALK-IN UNITS.



FIRST FLOOR PLAN AREA 'C' - HVAC PIPING

1/8" = 1'-0"



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FIRST FLOOR PLAN AREA 'C' - HVAC PIPING

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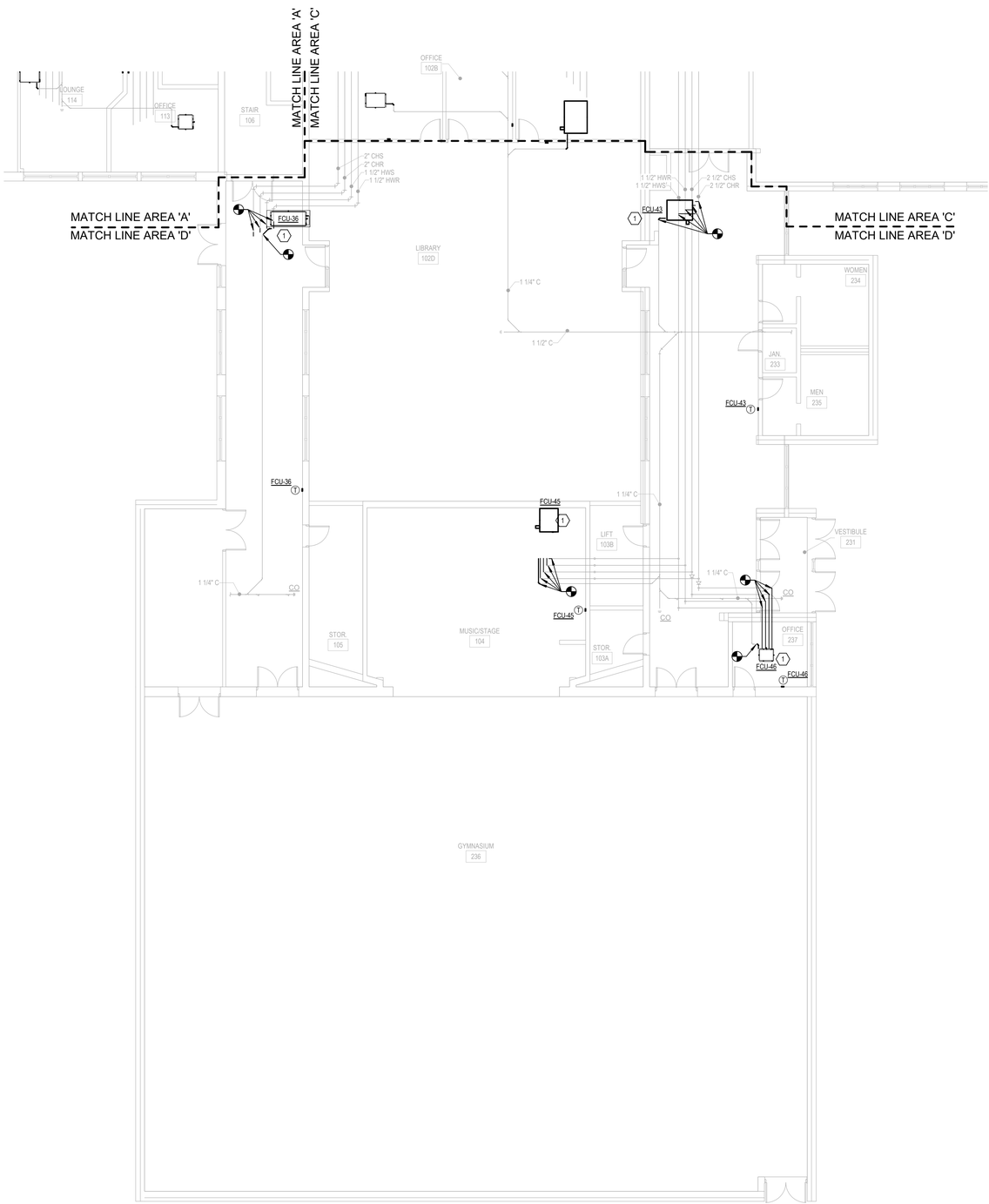
	DATE: 07/07/2023
	COMM. NO.: 2022088

M141c

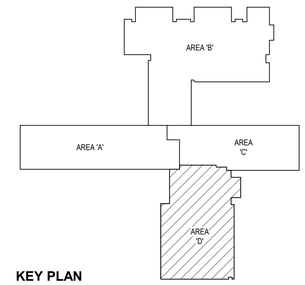


FIRST FLOOR PLAN AREA 'D' - HVAC PIPING

1/8" = 1'-0"

KEYED NOTES

1 EXTEND NEW CHILLED AND HEATING WATER PIPING FROM MAIN TO FAN COIL UNIT. TIE NEW CONDENSATE DRAIN PIPING INTO EXISTING CONDENSATE DRAIN SYSTEM. DRAIN PIPING SIZE SHALL NOT BE SMALLER THAN MANUFACTURER'S FACTORY DRAIN CONNECTION.



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FIRST FLOOR PLAN AREA 'D' - HVAC PIPING

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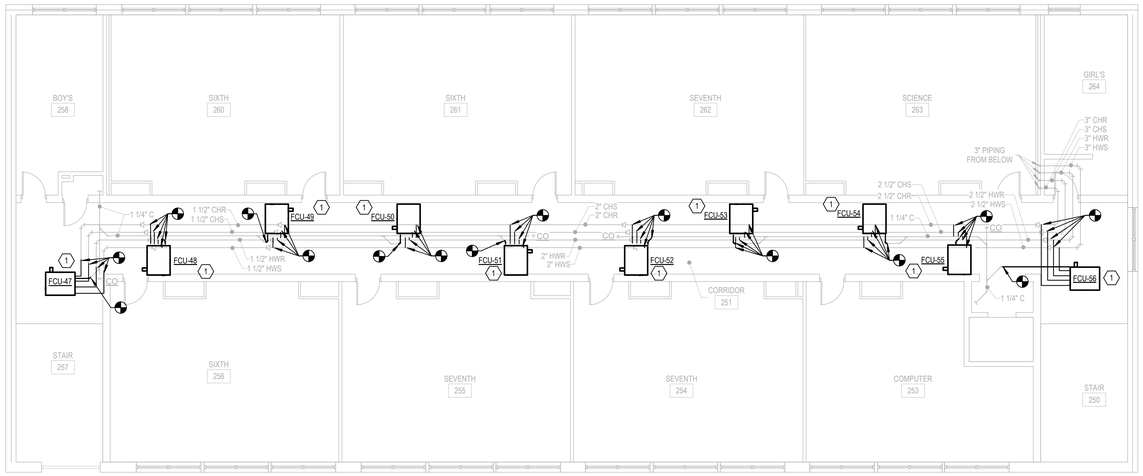
M141d

10/3/2023 9:16:14 AM C:\Revit Local\Macy McClaugherty EMS M 22_sogazU4RVW.rvt

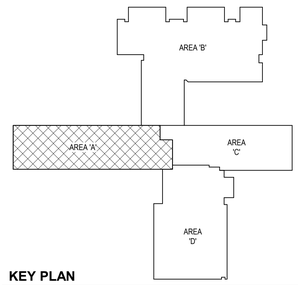
KEYED NOTES

1 EXTEND NEW CHILLED AND HEATING WATER PIPING FROM MAIN TO FAN COIL UNIT. TIE NEW CONDENSATE DRAIN PIPING INTO EXISTING CONDENSATE DRAIN SYSTEM. DRAIN PIPING SIZE SHALL NOT BE SMALLER THAN MANUFACTURER'S FACTORY DRAIN CONNECTION.



SECOND FLOOR PLAN - HVAC PIPING

1/8" = 1'-0"



KEY PLAN

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SECOND FLOOR PLAN - HVAC PIPING

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	DATE: 07/07/2023
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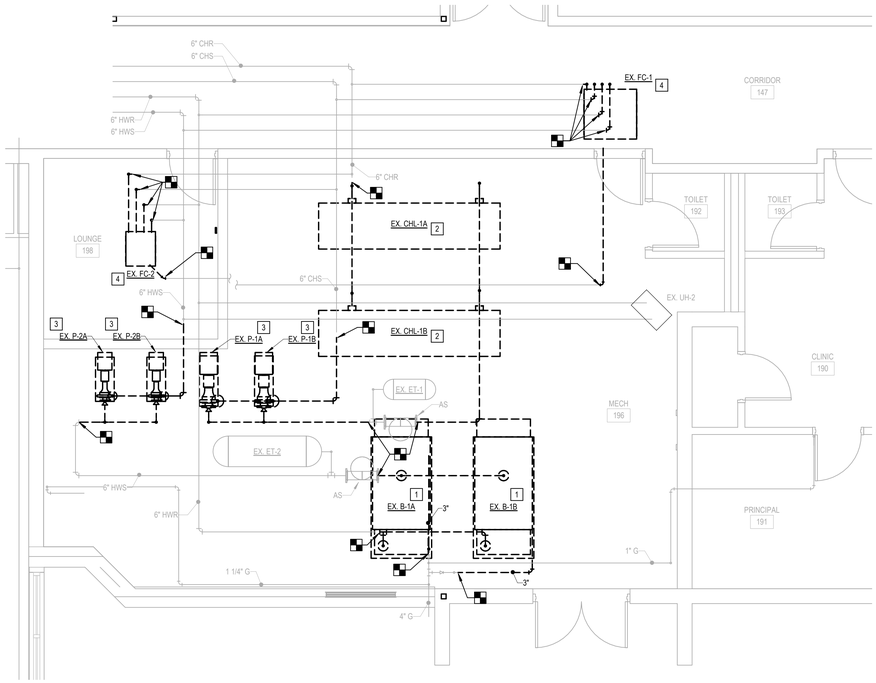
M142

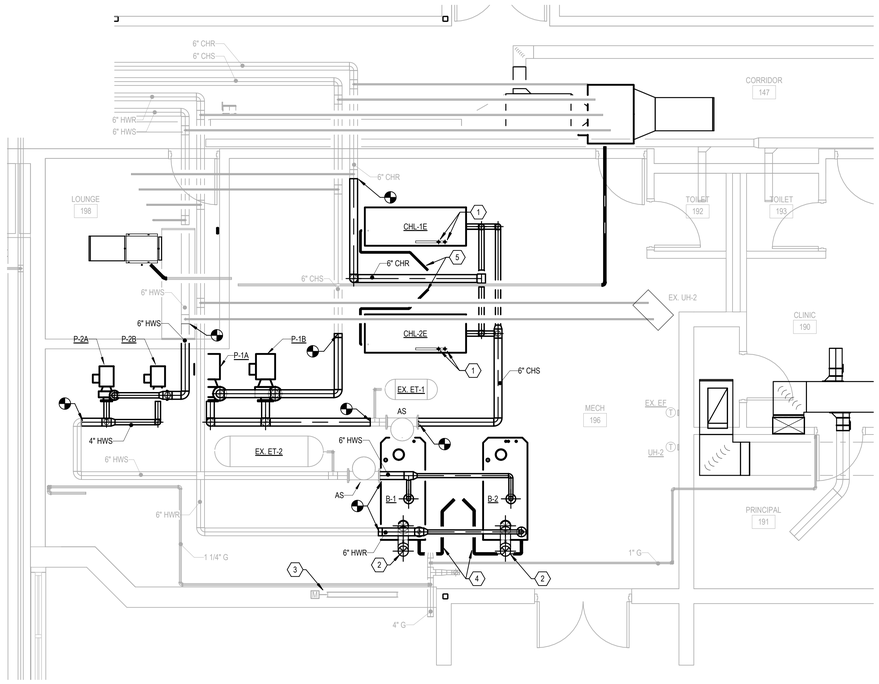


FIRST FLOOR PLAN AREA 'B' - ENLARGED PIPING DEMOLITION

1/4" = 1'-0"

KEYED NOTES

1. DISCONNECT AND REMOVE EXISTING NATURAL GAS BOILER, FLUE PIPING, PORTIONS OF HYDRONIC PIPING AND PORTIONS OF NATURAL GAS PIPING AS INDICATED. COORDINATE WITH E.C.
2. DISCONNECT AND REMOVE EXISTING REMOTE EVAPORATOR, REFRIGERANT PIPING, AND PORTIONS OF HYDRONIC PIPING AS INDICATED. COORDINATE WITH E.C.
3. DISCONNECT AND REMOVE EXISTING PUMP AND PORTIONS OF HYDRONIC PIPING AS INDICATED. COORDINATE WITH E.C.
4. DISCONNECT AND REMOVE FAN COIL UNIT, PORTIONS OF HYDRONIC PIPING AND PORTIONS OF CONDENSATE PIPING AS INDICATED, AND ASSOCIATED CONTROLS. COORDINATE WITH E.C.



FIRST FLOOR PLAN AREA 'B' - ENLARGED PIPING

1/4" = 1'-0"

KEYED NOTES

1. REFRIGERANT PIPING THRU ROOF. ROUTE REFRIGERANT PIPING IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
2. 8" BOILER FLUE PIPING THRU ROOF.
3. INTERLOCK EXISTING COMBUSTION AIR LOUVERS WITH NEW BOILER CONTROLS. PROVIDE BOILERS WITH ROOM AIR COMBUSTION KITS.
4. PROVIDE CONDENSATE NEUTRALIZATION KIT. ROUTE BOILER CONDENSATE DRAIN PIPING TO NEAREST FLOOR DRAIN. CONDESATE PIPING SIZE SHALL MATCH THE MANUFACTURER'S DISCHARGE CONNECTION SIZE.
5. ROUTE CHILLER CONDENSATE DRAIN PIPING TO NEAREST FLOOR DRAIN. CONDESATE PIPING SIZE SHALL MATCH THE MANUFACTURER'S DISCHARGE CONNECTION SIZE.

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ENLARGED MECHANICAL VIEWS

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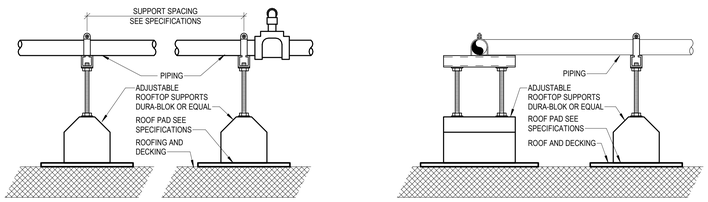
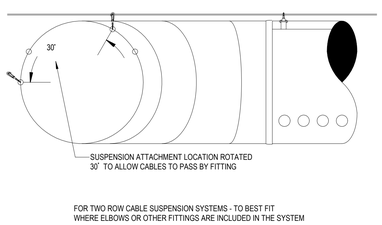
	DATE: 07/07/2023
	COMM. NO.: 2022088

M310

10/3/2023 9:16:20 AM C:\Revit Local\Macy McClaugherty EMS M 22_sogazU4RVW.rvt

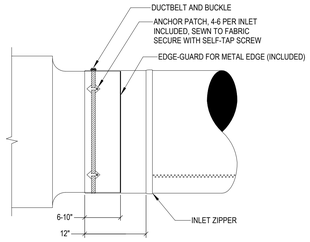


16 ROOFTOP PIPE SUPPORT DETAIL
NO SCALE

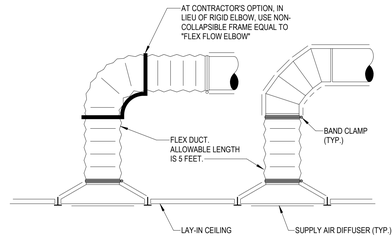


FOR TWO ROW CABLE SUSPENSION SYSTEMS - TO BEST FIT
WHERE ELBOWS OR OTHER FITTINGS ARE INCLUDED IN THE SYSTEM

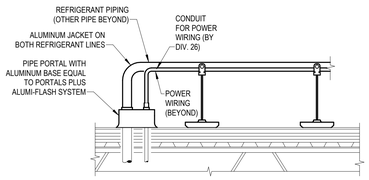
12 FABRIC DUCT ELBOW SUSPENSION
NO SCALE



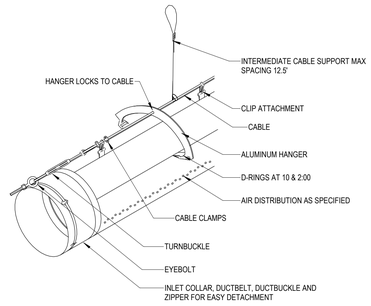
8 FABRIC DUCT INLET ATTACHMENT
NO SCALE



4 SUPPLY AIR DIFFUSER
NO SCALE

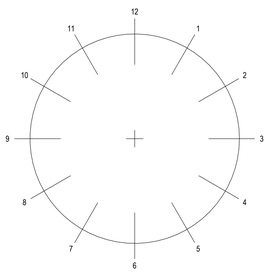


15 REFRIGERANT PIPING ROOF PENETRATION
NO SCALE



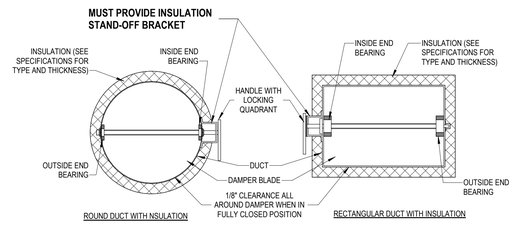
3x1 SUSPENSION, CABLE AT 12 O'CLOCK
HANGER SUPPORTS DUCTSOX AT 10 & 2
O'CLOCK

11 FABRIC DUCT SUSPENSION
NO SCALE

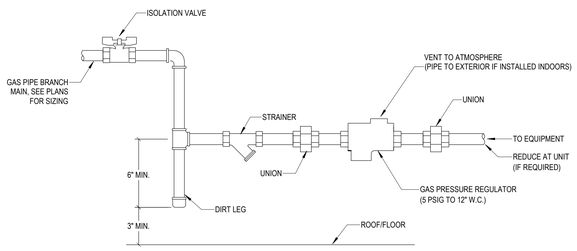


NOTE: ORIENTATION IS FROM INLET OF DUCT. (DIRECTION OF AIR FLOW IS INTO PAGE) FOR EXAMPLE, "8 O'CLOCK" ORIENTATION IS IN LINE WITH THE 8, AND "7:30" ORIENTATION IS MIDWAY BETWEEN THE 7 AND THE 8.

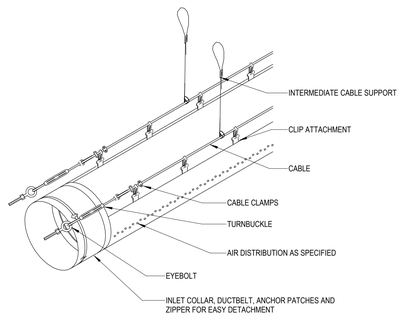
7 FABRIC DUCT VENT ORIENTATION
NO SCALE



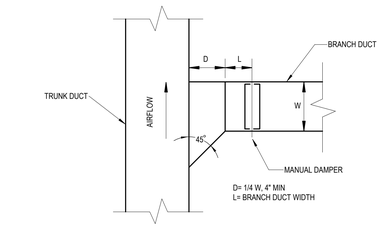
3 INSULATED DUCT MANUAL VOLUME DAMPER DETAIL
NO SCALE



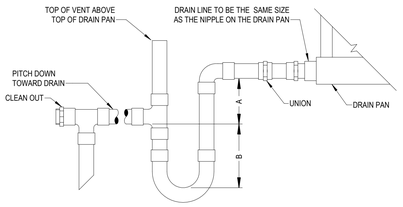
14 TYPICAL GAS PIPING AND REGULATOR DETAIL
NO SCALE



10 FABRIC DUCT SUSPENSION
NO SCALE



6 BRANCH DUCT TAKEOFF CONNECTION
NO SCALE

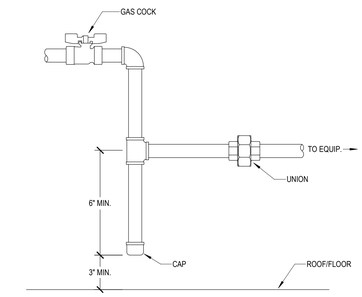


CONDENSATE DRAIN PIPING DIMENSIONS:		
UNIT TYPE	A	B
DRAW THRU	2" PLUS X	X
BLOW THRU	1" MIN.	2X

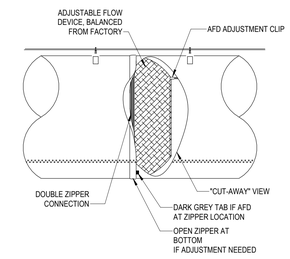
X =TOTAL STATIC PRESSURE IN PAN

COORDINATE MOUNTING/CURB HEIGHT AS REQUIRED
TO PROVIDE PROPER CONDENSATE DRAINAGE.

2 CONDENSATE DRAIN TRAP
NO SCALE

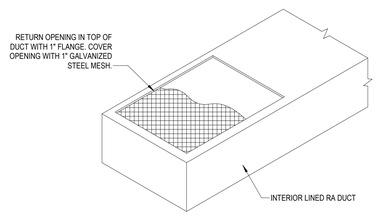


13 TYPICAL GAS DETAIL
NO SCALE

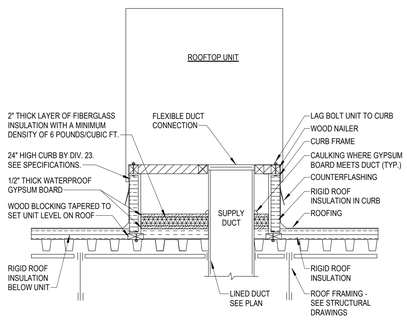


INSTALLED AT ZIPPER LOCATION AT INLET OR AS SPECIFIED IN
OTHER LOCAITONS, ZIPPER TO ZIPPER CONNECTION AS SHOWN.
EXTERNAL LABEL IDENTIFIES LOCATION

9 FABRIC DUCT ADJUSTABLE FLOW DEVICE
NO SCALE



5 RETURN AIR DUCT ASSEMBLY
NO SCALE



NOTES:
1. ROOF OPENING LARGE ENOUGH TO ACCOMODATE SUPPLY AND RETURN DUCTWORK
2. CAULK THE SPACE BETWEEN DUCTWORK AND OPENINGS AIR TIGHT

1 ROOFTOP UNIT CURB
NO SCALE

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MACY MCLAUGHERTY ELEMENTARY/MIDDLE SCHOOL
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PEARISBURG, VIRGINIA

BIDDING/CONSTRUCTION DOCUMENTS

DETAILS

DRAWN	CHECKED
SAO	JAP
DATE	07/07/2023
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M510

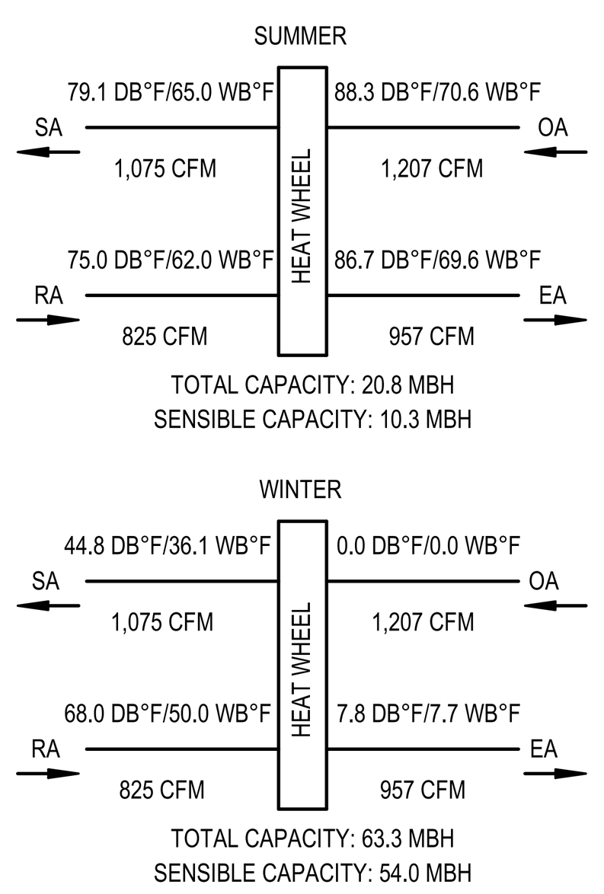
DESIGN CRITERIA

MODE	INSIDE TEMP	OUTSIDE TEMP
COOLING	74 db/61.5 wb	85/70
HEATING	72	0

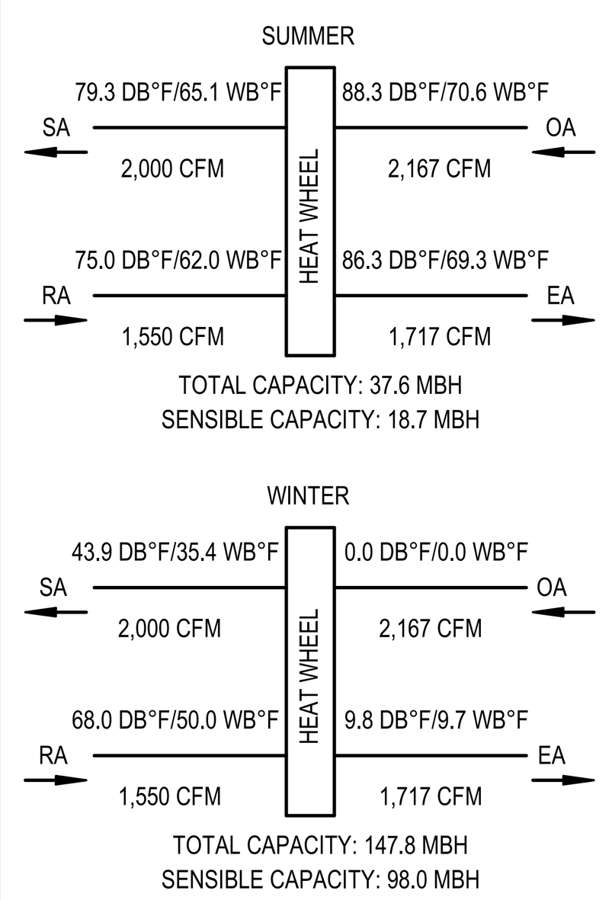
DIFFUSER SCHEDULE

MARK	DIFFUSER TYPE	MODEL	DESCRIPTION
R1	RETURN	TITUS 33RL	HEAVY DUTY SURFACE MOUNTED GRILLE
S1	SUPPLY	TITUS OMNI	24x24 PLAQUE DIFFUSER

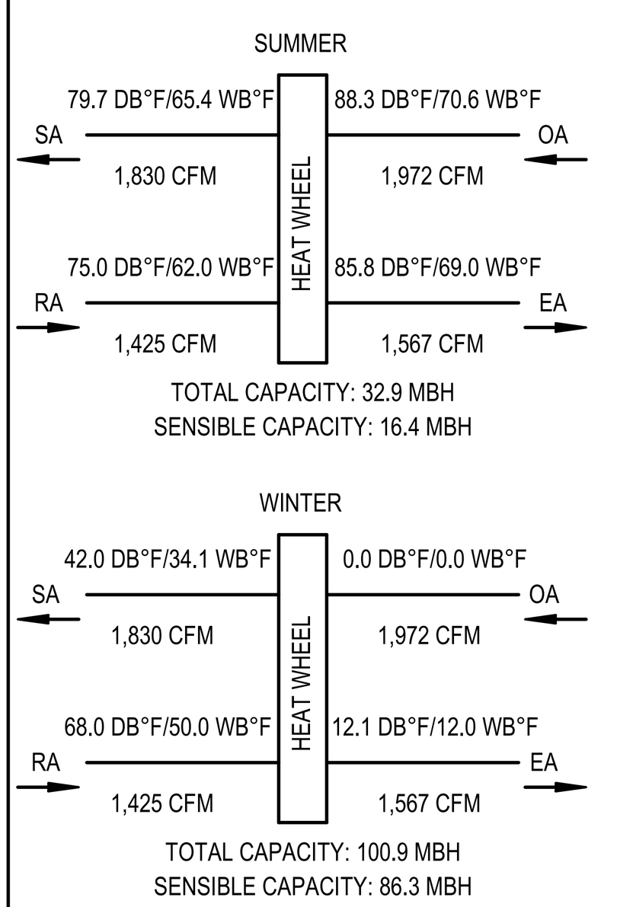
DOAS-1 HEAT WHEEL PERFORMANCE



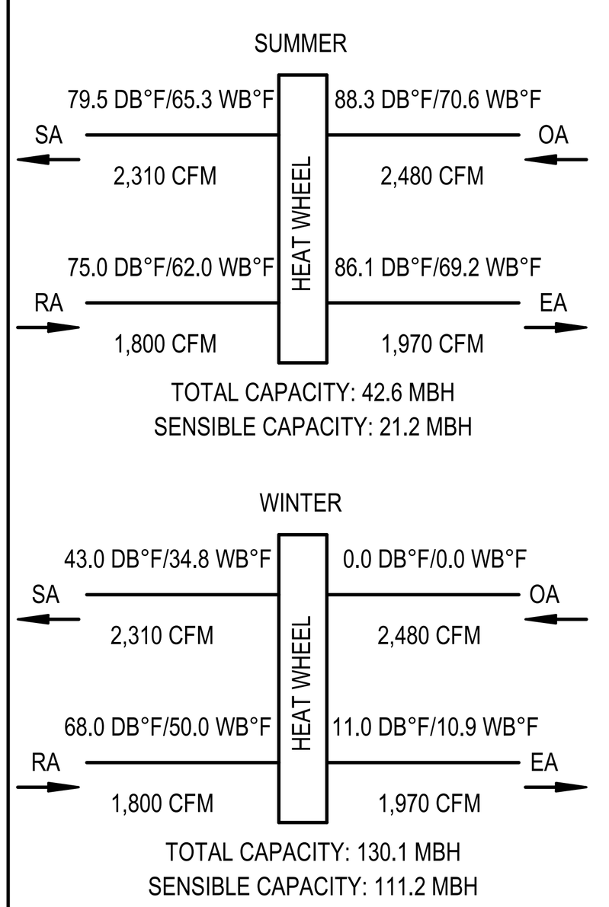
DOAS-2 HEAT WHEEL PERFORMANCE



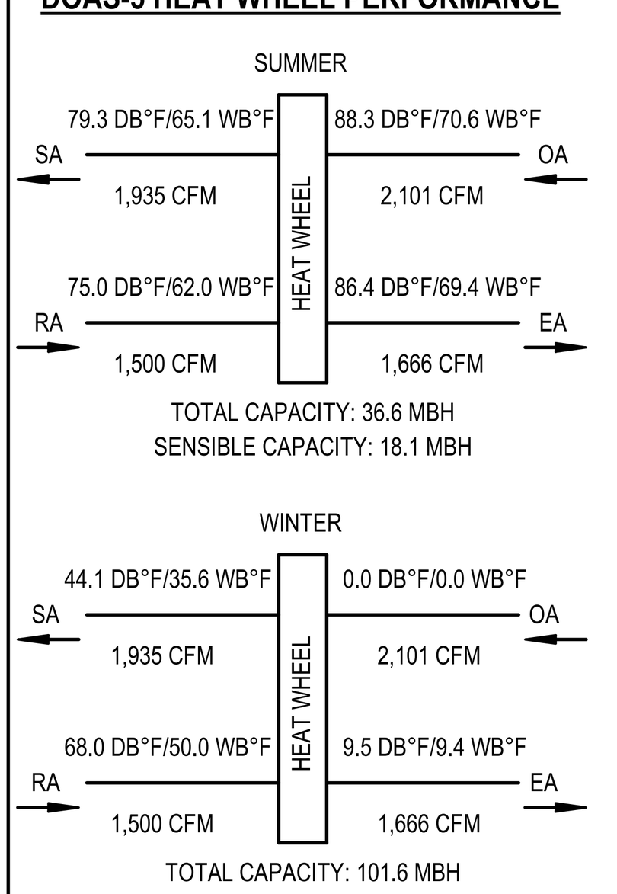
DOAS-3 HEAT WHEEL PERFORMANCE



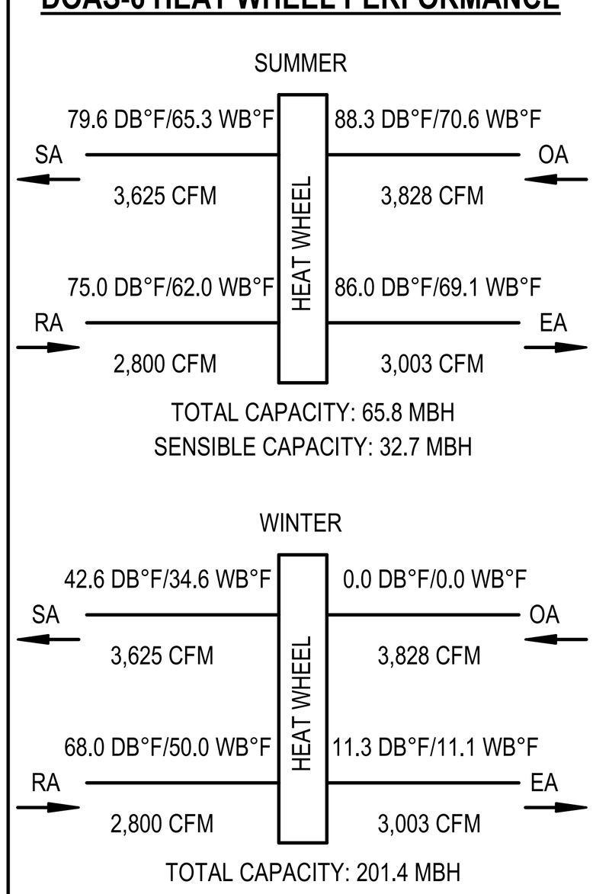
DOAS-4 HEAT WHEEL PERFORMANCE



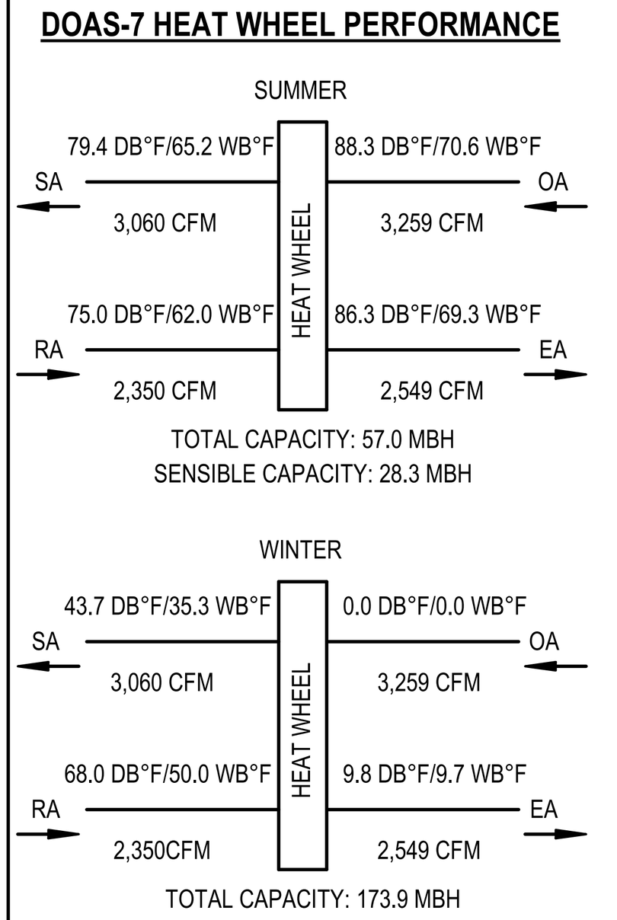
DOAS-5 HEAT WHEEL PERFORMANCE



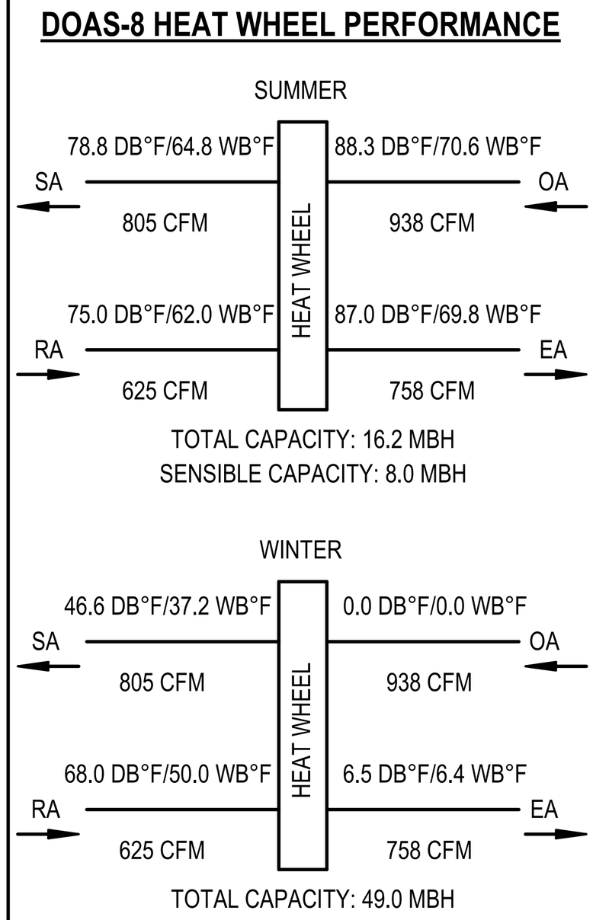
DOAS-6 HEAT WHEEL PERFORMANCE



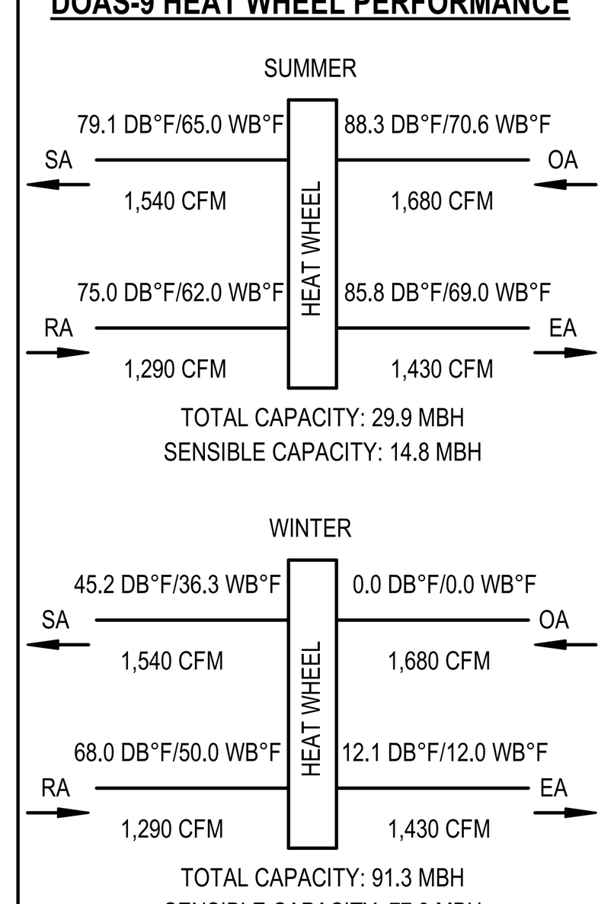
DOAS-7 HEAT WHEEL PERFORMANCE



DOAS-8 HEAT WHEEL PERFORMANCE



DOAS-9 HEAT WHEEL PERFORMANCE



FOUR PIPE FAN COIL UNIT SCHEDULE

					CW COOLING COIL DATA								HW HEATING COIL DATA					FAN DATA			ELECTRICAL DATA				
MARK	MFR	MODEL	APPROX. WEIGHT (LBS)	TOTAL SA (CFM)	TOTAL (MBH)	SENSIBLE (MBH)	EAT DB (°F)	EAT WB (°F)	LAT DB (°F)	LAT WB (°F)	FLOW (GPM)	RUNOUT SIZE	TOTAL (MBH)	EAT DB (°F)	LAT DB (°F)	FLOW (GPM)	RUNOUT SIZE	ESP (IN H2O)	DESIGN RPM	SIZE (HP)	VOLTS	PHASE	MCA	MOCP	REMARKS
FCU-1	TRANE	BCHE054	220	1400	49.6	34.4	78	66	55.7	54.4	8.5	1"	54.6	66	102.1	5.5	1"	0.5	1302	1	115	1	16.63	25	
FCU-2	TRANE	FCCB100	200	1000	41.7	28.4	78	66	53.9	53.2	8.5	1"	35.1	66	98.4	4	3/4"	0.5	1755	1@0.13 1@0.22	115	1	6.08	15	
FCU-3	TRANE	FCCB100	200	1000	42.2	28.7	78	66	53.7	53.0	9	1"	36.8	66	99.9	6	1"	0.5	1755	1@0.13 1@0.22	115	1	6.08	15	
FCU-4	TRANE	BCHE036	190	1200	49.3	32.1	78	66	53.7	52.3	9	1"	46.5	66	101.9	4.5	3/4"	0.5	1708	1	115	1	16.63	25	
FCU-5	TRANE	BCHE054	220	1200	49.3	32.1	78	66	53.7	52.3	9	1"	46.5	66	101.9	4.5	3/4"	0.5	1708	1	115	1	16.63	25	
FCU-6	TRANE	BCHE054	220	1200	49.3	32.1	78	66	53.7	52.3	9	1"	46.5	66	101.9	4.5	3/4"	0.5	1708	1	115	1	16.63	25	
FCU-7	TRANE	BCHE036	190	1200	49.3	32.1	78	66	53.7	52.3	9	1"	46.5	66	101.9	4.5	3/4"	0.5	1708	1	115	1	16.63	25	
FCU-8	TRANE	BCHE036	190	1200	49.3	32.1	78	66	53.7	52.3	9	1"	46.5	66	101.9	4.5	3/4"	0.5	1708	1	115	1	16.63	25	
FCU-9	TRANE	BCHE054	220	1200	49.3	32.1	78	66	53.7	52.3	9	1"	46.5	66	101.9	4.5	3/4"	0.5	1708	1	115	1	16.63	25	
FCU-10	TRANE	BCHE054	220	1200	49.3	32.1	78	66	53.7	52.3	9	1"	46.5	66	101.9	4.5	3/4"	0.5	1708	1	115	1	16.63	25	
FCU-11	TRANE	BCHE054	220	1400	49.6	34.4	78	66	55.7	54.4	8.5	1"	54.6	66	102.1	5.5	1"	0.5	1302	1	115	1	16.63	25	
FCU-12	TRANE	FCCB020	85	160	4.8	3.5	78	66	60.2	57.6	1	3/4"	5.7	66	99.0	0.5	3/4"	0.5	1291	0.13	115	1	2.75	15	
FCU-13	TRANE	BCHE054	220	1600	53.7	37.8	78	66	56.6	55.1	9.5	1"	60.0	66	100.7	6	1"	0.5	1408	1	115	1	16.63	25	
FCU-14	TRANE	BCHE054	220	1800	62.4	44.2	78	66	57.7	55.9	12.5	1-1/4"	69.8	66	101.9	5	1"	0.5	1494	1	115	1	16.63	25	
FCU-15	TRANE	FCCB100	200	725	19.9	15.6	78	66	60.3	58.3	3.5	3/4"	23.1	66	95.3	1	3/4"	0.5	1438	0.13	115	1	6.08	15	
FCU-16	TRANE	BCHE054	220	1600	53.7	37.8	78	66	56.6	55.1	9.5	1"	60.0	66	100.7	6	1"	0.5	1408	1	115	1	16.63	25	
FCU-17	TRANE	FCCB100	200	1100	35.2	26.3	78	66	58.1	56.7	7	1"	37.5	66	97.4	5	1"	0.5	1807	0.13	115	1	6.08	15	
FCU-18	TRANE	BCHE054	220	1600	53.7	37.8	78	66	56.6	55.1	9.5	1"	60.0	66	100.7	6	1"	0.5	1408	1	115	1	16.63	25	
FCU-19	TRANE	BCHE036	190	1200	49.3	32.1	78	66	53.7	52.3	9	1"	46.5	66	101.9	4.5	3/4"	0.5	1708	1	115	1	16.63	25	
FCU-20	TRANE	BCHE054	220	1500	51.7	36.1	78	66	56.1	54.4	9	1"	57.3	66	101.3	5.5	1"	0.5	1355	1	115	1	16.63	25	
FCU-21	TRANE	BCHE054	220	1400	49.6	34.4	78	66	55.7	54.4	8.5	1"	54.6	66	102.1	5.5	1"	0.5	1302	1	115	1	16.63	25	
FCU-22	TRANE	BCHE054	220	1400	49.6	34.4	78	66	55.7	54.4	8.5	1"	54.6	66	102.0	5.5	1"	0.5	1302	1	115	1	16.63	25	
FCU-23	TRANE	BCHE054	220	1400	49.6	34.4	78	66	55.7	54.4	8.5	1"	54.6	66	102.0	5.5	1"	0.5	1302	1	115	1	16.63	25	
FCU-24	TRANE	BCHE036	190	1200	49.3	32.1	78	66	53.7	52.3	9	1"	46.5	66	101.9	4.5	3/4"	0.5	1708	1	115	1	16.63	25	
FCU-25	TRANE	FCCB040	110	325	11.7	8.4	78	66	56.3	55.3	2.5	3/4"	11.2	66	97.7	1.5	3/4"	0.5	1617	0.13	115	1	2.75	15	
FCU-26	TRANE	FCCB100	200	1050	41.5	28.9	78	66	54.8	54.0	7.5	1"	36.4	66	97.9	4.5	3/4"	0.5	1798	1@0.13 1@0.22	115	1	6.08	15	
FCU-27	TRANE	FCCB100	200	1050	41.5	28.9	78	66	54.8	54.0	7.5	1"	36.4	66	97.9	4.5	3/4"	0.5	1798	1@0.13 1@0.22	115	1	6.08	15	
FCU-28	TRANE	FCCB100	200	1050	41.5	28.9	78	66	54.8	54.0	7.5	1"	36.4	66	97.9	4.5	3/4"	0.5	1798	1@0.13 1@0.22	115	1	6.08	15	
FCU-29	TRANE	FCCB100	200	1050	41.5	28.9	78	66	54.8	54.0	7.5	1"	36.4	66	97.9	4.5	3/4"	0.5	1798	1@0.13 1@0.22	115	1	6.08	15	
FCU-30	TRANE	FCCB100	200	1050	41.5	28.9	78	66	54.8	54.0	7.5	1"	36.4	66	97.9	4.5	3/4"	0.5	1798	1@0.13 1@0.22	115	1	6.08	15	
FCU-31	TRANE	BCHE090	275	2200	80.5	55.5	78	66	55.1	54.0	14	1-1/4"	87.5	66	102.8	8.5	1"	0.5	885	1	115	1	16.63	25	
FCU-32	TRANE	FCCB030	85	250	5.8	4.6	78	66	63.1	59.8	1	3/4"	6.5	66	90.1	0.5	3/4"	0.5	1526	0.13	115	1	2.75	15	
FCU-33	TRANE	FCCB020	85	250	6.7	5.0	78	66	61.8	58.6	1.5	3/4"	6.5	66	90.1	0.5	3/4"	0.5	1536	0.13	115	1	2.75	15	
FCU-34	TRANE	FCCB080	150	650	23.0	16.6	78	66	56.5	55.5	4	3/4"	21.6	66	96.6	2	3/4"	0.5	1672	0.22	115	1	3.88	15	
FCU-35	TRANE	FCCB040	110	240	8.4	6.1	78	66	56.5	55.7	1.5	3/4"	9.3	66	101.6	1	3/4"	0.5	1399	0.13	115	1	2.75	15	
FCU-36	TRANE	FCCB100	200	800	23.9	17.9	78	66	59.5	57.5	5	1"	32.1	66	103.0	4	3/4"	0.5	1503	1@0.13 1@0.22	115	1	6.08	15	
FCU-37	TRANE	FCCB060	140	460	12.8	9.8	78	66	60.5	58.2	2.5	3/4"	14.3	66	94.6	1	3/4"	0.5	1465	0.22	115	1	3.88	15	
FCU-38	TRANE	FCCB040	110	310	10.6	7.8	78	66	57.0	56.0	2	3/4"	10.1	66	96.1	1	3/4"	0.5	1575	0.13	115	1	2.75	15	
FCU-39	TRANE	FCCB100	200	950	31.2	23.2	78	66	57.7	56.5	6	1"	31.9	66	97.0	2.5	3/4"	0.5	1670	1@0.13 1@0.22	115	1	6.08	15	
FCU-40	TRANE	BCHE090	275	2100	78.1	53.7	78	66	54.8	53.8	13.5	1-1/4"	84.7	66	103.3	8.5	1"	0.5	864	1	115	1	16.63	25	
FCU-41	TRANE	FCCB020	85	150	4.6	3.3	78	66	59.9	57.2	1	3/4"	5.6	66	100.5	0.5	3/4"	0.5	1267	0.13	115	1	2.75	15	
FCU-42	TRANE	BCHE120	340	3200	129.0	86.7	78	66	53.4	52.6	22	1-1/2"	123.5	66	101.7	12	1-1/4"	0.5	1004	1.5	208	3	9.5	15	
FCU-43	TRANE	BCHE054	220	1500	51.7	36.1	78	66	56.1	54.7	9	1"	57.3	66	101.3	5.5	1"	0.5	1355	1	115	1	16.63	25	
FCU-44	TRANE	BCHE120	340	2500	106.2	70.7	78	66	52.3	51.7	18	1-1/2"	103.8	66	104.3	10	1-1/4"	0.5	867	1.5	208	3	9.5	15	
FCU-45	TRANE	BCHE036	190	1200	49.3	32.1	78	66	53.7	52.3	9	1"	46.5	66	101.9	4.5	3/4"	0.5	1708	1	115	1	16.63	25	
FCU-46	TRANE	FCCB020	85	150	4.6	3.3	78	66	59.9	57.2	1	3/4"	5.6	66	100.5	0.5	3/4"	0.5	1267	0.13	115	1	2.75	15	
FCU-47	TRANE	BCHE054	230	1600	53.7	37.8	78	66	56.6	55.1	9.5	1"	60.0	66	100.7	5.75	1"	0.5	1408	1	115	1	16.63	25	
FCU-48	TRANE	BCHE054	220	1400	49.6	34.4	78	66	55.7	54.4	8.5	1"	54.6	66	102.0	5.5	1"	0.5	1302	1	115	1	16.63	25	
FCU-49	TRANE	BCHE054	220	1400	49.6	34.4	78	66	55.7	54.4	8.5	1"	54.6	66	102.1	5.5	1"	0.5	1302	1	115	1	16.63	25	
FCU-50	TRANE	BCHE054	220	1400	49.6	34.4	78	66	55.7	54.4	8.5	1"	54.6	66	102.0	5.5	1"	0.5	1302	1	115	1	16.63	25	
FCU-51	TRANE	BCHE054	220	1400	49.6	34.4	78	66	55.7	54.4	8.5	1"	54.6	66	102.1	5.5	1"	0.5	1302	1	115	1	16.63	25	
FCU-52	TRANE	BCHE054	220	1400	49.6	34.4	78	66	55.7	54.4	8.5	1"	54.6	66	102.0	5.5	1"	0.5	1302	1	115	1	16.63	25	
FCU-53	TRANE	BCHE054	220	1400	49.6	34.4	78	66	55.7	54.4	8.5	1"	54.6	66	102.1	5.5	1"	0.5	1302	1	115	1	16.63	25	
FCU-54	TRANE	BCHE054	220	1400	49.6	34.4	78	66	55.7	54.4	8.5	1"	54.6	66	102.0	5.5	1"	0.5	1302	1	115	1	16.63	25	
FCU-55	TRANE	BCHE054	220	1800	62.4	44.2	78	66	55.7	55.9	12.5	1-1/4"	69.8	66	101.9	5	1"	0.5	1494	1	115	1	16.63	25	
FCU-56	TRANE	BCHE054	230	1600	53.7	37.8	78	66	56.6	55.1	9.5	1"	60.0	66	100.7	5.75	1"	0.5	1408	1	115	1	16.63	25	

DEDICATED OUTDOOR AIR SYSTEM UNIT SCHEDULE

					CW COOLING COIL DATA						NATURAL GAS HEATING DATA				SUPPLY FAN DATA			EXHAUST FAN DATA			ELECTRICAL DATA				
MARK	MFR	MODEL	APPROX. WEIGHT (LBS)	TOTAL SA (CFM)	TOTAL (MBH)	SENSIBLE (MBH)	EAT DB (°F)	EAT WB (°F)	LAT DB (°F)	LAT WB (°F)	INPUT (MBH)	OUTPUT (MBH)	EAT DB (°F)	LAT DB (°F)	ESP (IN H2O)	DESIGN RPM	SIZE (HP)	ESP (IN H2O)	DESIGN RPM	SIZE (HP)	VOLTS	PHASE	MCA	MOCP	REMARKS
DOAS-1	TRANE	OABD036	2200	1075	41.4	30.8	79.1	65.0	51.4	51.4	100	80	44.8	113.4	1.5	2279	1	1.0	1641	1	208	3	28.3	40	
DOAS-2	TRANE	OABD036	2300	2000	43.6	43.3	79.3	65.2	57.6	57.6	200	160	43.9	117.7	1.5	2495	3	1.0	2044	1	208	3	32.3	40	
DOAS-3	TRANE	OABD036	2200	1830	44.5	43.6	79.7	65.4	57.1	57.1	200	160	42.0	122.6	1.5	2442	3	1.0	2020	1	208	3	32.3	40	
DOAS-4	TRANE	OABD072	2300	2310	72.4	59.0	79.5	65.3	54.2	54.2	200	160	43.0	106.9	1.5	2701	3	1.0	2219	1.5	208	3	44.8	60	
DOAS-5	TRANE	OABD036	2300	1935	43.5	42.7	79.3	65.1	57.2	57.2	200	160	44.1	120.3	1.5	2442	3	1.0	2009	1	208	3	32.3	40	
DOAS-6	TRANE	OAKD180	5300	3625	180.5	121.9	79.6	65.3	47.1	47.1	350	280	42.6	113.8	1.5	1801	3	1.0	1460	2	208	3	84.9	100	
DOAS-7	TRANE	OAKD144	5200	3060	140.7	98.1	79.4	65.2	48.6	48.6	300	240	43.7	116.0	1.5	1681	3	1.0	1380	2	208	3	74.2	90	
DOAS-8	TRANE	OABD036	2200	805	39.2	26.6	78.8	64.8	47.0	47.0	75	60	46.6	115.3	1.5	2951	2	1.0	2640	2	208	3	33.1	40	
DOAS-9	TRANE	OABD048	2200	1540	50.3	40.2	79.1	65.0	53.5	53.5	125	100	45.2	105.1	1.5	2252	1.5	1.0	1926	1	208	3	35.4	50	

NOTES:
1. BASIS OF DESIGN: TRANE. SEE SPECIFICATIONS FOR ALTERNATE MANUFACTURERS.
2. CAPACITIES SHOWN ARE MINIMUM.
3. EXTERNAL STATIC PRESSURE DOES NOT INCLUDE DIRTY FILTER ALLOWANCE OR SUPPLY EXIT LOSS.
4. UNIT SHALL BE PROVIDED WITH FACTORY INSTALLED AND WIRED TERMINAL STRIP FOR DDC INTEGRATION.
5. SEE SPECIFICATION FOR ADDITIONAL INFORMATION ON EQUIPMENT REQUIREMENTS.
6. SEE CONTROLS SCHEMATICS FOR ADDITIONAL ACCESSORIES AND APPURTENANCES.
7. ANY UNIT EXCEEDING THE DIMENSIONS OR WEIGHTS SHALL BE SUBMITTED FOR REVIEW AND APPROVED BY THE ENGINEER.

ROOFTOP UNIT SCHEDULE

					CW COOLING COIL DATA						NATURAL GAS HEATING DATA				SUPPLY FAN DATA			EXHAUST FAN DATA			ELECTRICAL DATA				
MARK	MFR	MODEL	APPROX. WEIGHT (LBS)	TOTAL SA (CFM)	TOTAL (MBH)	SENSIBLE (MBH)	EAT DB (°F)	EAT WB (°F)	LAT DB (°F)	LAT WB (°F)	INPUT (MBH)	OUTPUT (MBH)	EAT DB (°F)	LAT DB (°F)	ESP (IN H2O)	DESIGN RPM	SIZE (HP)	ESP (IN H2O)	DESIGN RPM	SIZE (HP)	VOLTS	PHASE	MCA	MOCP	REMARKS
RTU-1	TRANE	OABD096A3	2,200	2,000	89.1	60.5	82.0	68.0	53.4	53.2	100	80	60.0	96.9	1.25	2,262	1.5	0.5	1,704	1.0	208	3	44.6	60	
RTU-2	TRANE	OADG020C1	3,800	5,000	244.4	151.0	82.0	69.0	53.4	52.9	300	243	50.0	94.8	1.5	1,562	5.0	0.5	1,708	1.5	208	3	91.7	110	
RTU-3A	TRANE	OADG020C1	3,500	4,000	188.2	115.3	80.0	68.0	52.6	52.2	250	202.5	50.0	96.7	1.5	1,718	3.0	0.5	1,414	1.0	208	3	77.3	100	
RTU-3B	TRANE	OADG020C1	3,500	4,000	188.2	115.3	80.0	68.0	52.6	52.2	250	202.5	50.0	96.7	1.5	1,718	3.0	0.5	1,414	1.0	208	3	77.3	100	
RTU-4	TRANE	OADG020C1	3,500	2,450	122.6	78.2	80.0	67.0	50.0	49.7	150	120	50.0	95.2	1.0	1,693	1.5	0.5	1,107	1.0	208	3	59.4	70	

NOTES:
1. BASIS OF DESIGN: TRANE. SEE SPECIFICATIONS FOR ALTERNATE MANUFACTURERS.
2. CAPACITIES SHOWN ARE MINIMUM.
3. EXTERNAL STATIC PRESSURE DOES NOT INCLUDE DIRTY FILTER ALLOWANCE OR SUPPLY EXIT LOSS.
4. UNIT SHALL BE PROVIDED WITH FACTORY INSTALLED AND WIRED TERMINAL STRIP FOR DDC INTEGRATION.
5. SEE SPECIFICATION FOR ADDITIONAL INFORMATION ON EQUIPMENT REQUIREMENTS.
6. SEE CONTROLS SCHEMATICS FOR ADDITIONAL ACCESSORIES AND APPURTENANCES.
7. ANY UNIT EXCEEDING THE DIMENSIONS OR WEIGHTS SHALL BE SUBMITTED FOR REVIEW AND APPROVED BY THE ENGINEER.

AIR COOLED CHILLER SCHEDULE

					CONDENSER		REMOTE EVAPORATOR DATA					REFRIGERANT DATA		ELECTRICAL DATA				
MARK	MFR	MODEL	LOCATION	APPROX. WEIGHT (LBS)	NOMINAL TONNAGE	IPLV (EER)	EWT (°F)	LWT (°F)	DESIGN FLOW (GPM)	MIN. FLOW (GPM)	DIFF. PRESS. (FT H2O)	TYPE	# CIRCUITS	VOLTAGE	PHASE	MCA	MOCP	REMARKS
CHL-1	TRANE	ACS-160	ROOF	8,000	160	16.243	54	44	289	240	7.32	R-410A	2	208	3	696	800	
CHL-2	TRANE	ACS-160	ROOF	8,000	160	16.243	54	44	289	240	7.32	R-410A	2	208	3	696	800	

NOTES:
1. BASIS OF DESIGN: TRANE - SEE SPECIFICATIONS FOR ALTERNATE MANUFACTURERS.
2. PROVIDE HAIL GUARDS AND SOUND BLANKETS.

CONDENSING BOILER SCHEDULE

								CONNECTIONS					ELECTRICAL DATA		
MARK	MFR	MODEL	APPROX WEIGHT (LBS)	INPUT (MBH)	OUTPUT (MBH)	EWT (°F)	LWT (°F)	HWR (IN.)	HWS (IN.)	FLUE (IN.)	AIR (IN.)	GAS (IN.)	VOLTS	PHASE	REMARKS
B-1	BRYAN	FF2000	4,800	2,000	1,900	110	130	3"	3"	8"	8"	2"	208	3	
B-2	BRYAN	FF2000	4,800	2,000	1,900	110	130	3"	3"	8"	8"	2"	208	3	

NOTES:
1. BASIS OF DESIGN: BRYAN - SEE SPECIFICATIONS FOR ALTERNATE MANUFACTURERS.
2. PROVIDE NEUTRALIZATION KIT.
3. PROVIDE BOILER FLUE AND VENTS PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.

HYDRONIC PUMP SCHEDULE

										ELECTRICAL DATA				
MARK	MFR.	MODEL	SERVICE	TYPE	FLOW (GPM)	HEAD (FT)	EFFICIENCY (%)	SUCTION SIZE (IN)	DISCHARGE SIZE (IN)	HP	RPM	VOLTS	PHASE	REMARKS
P-1A	BELL & GOSSETT	1531-5BD	CHILLED WATER	END SUCTION	720	80	76.9	6	5	25	1,800	208	3	
P-1B	BELL & GOSSETT	1531-5BD	CHILLED WATER	END SUCTION	720	80	76.9	6	5	25	1,800	208	3	
P-2A	BELL & GOSSETT	1531-3BD	HEATING WATER	END SUCTION	330	65	78.0	4	3	10	1,800	208	3	
P-2B	BELL & GOSSETT	1531-3BD	HEATING WATER	END SUCTION	330	65	78.0	4	3	10	1,800	208	3	

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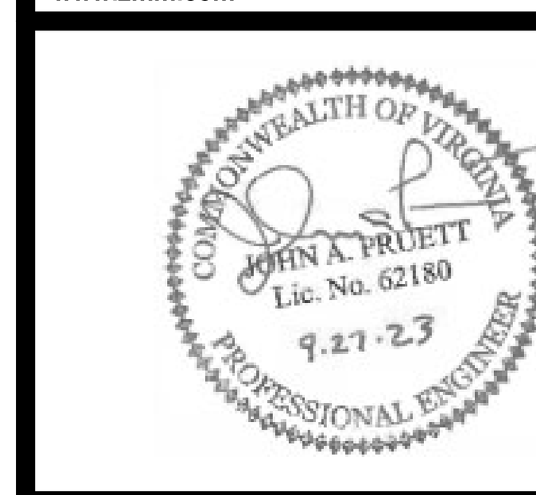

REVISIONS

NO.	DESCRIPTION	DATE

RENOVATIONS
MACY MCLAUGHERTY ELEMENTARY/MIDDLE SCHOOL
GILES COUNTY PUBLIC SCHOOLS
PEARISBURG, VIRGINIA

BIDDING/CONSTRUCTION DOCUMENTS

SCHEDULES

DRAWN SAO
CHECKED JAP
DATE 07/07/2023
COMM. NO. 2022088

M520

C:\Revit Local\Macy McClaugherty EMS M 22_sogazU4RVW.rvt
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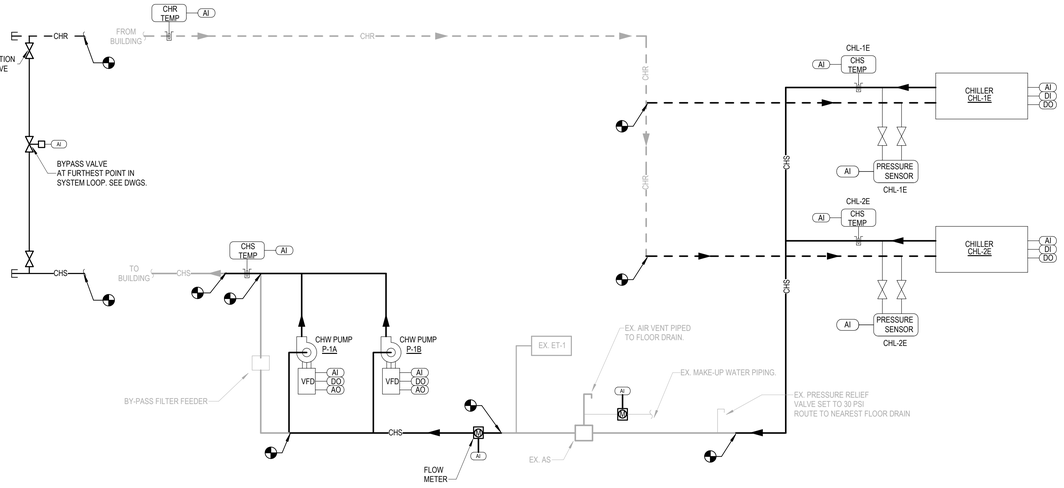
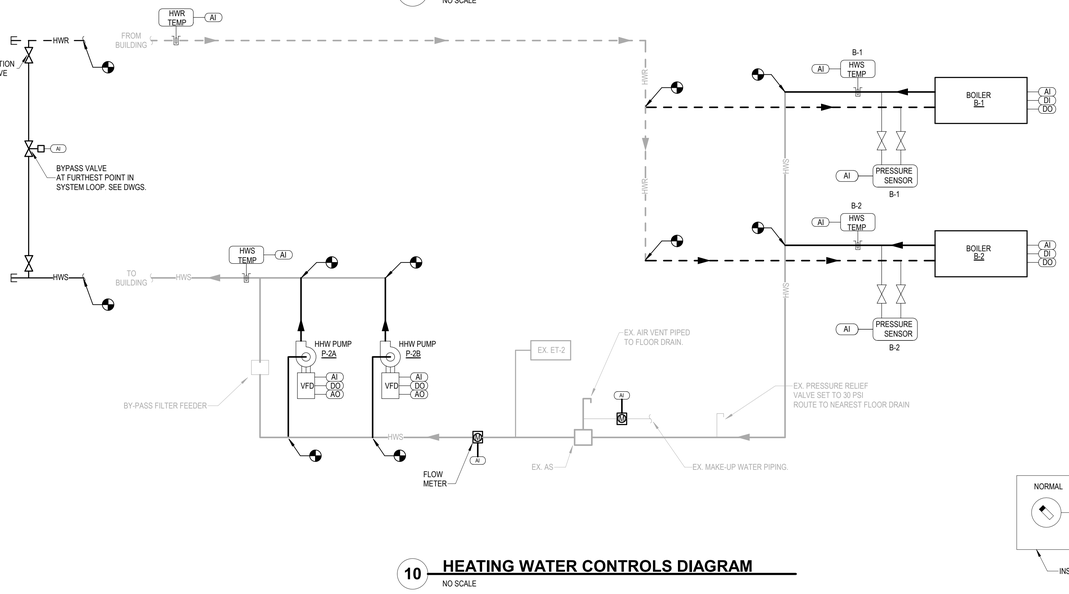


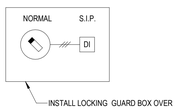
11 CHILLED WATER CONTROLS DIAGRAM

NO SCALE



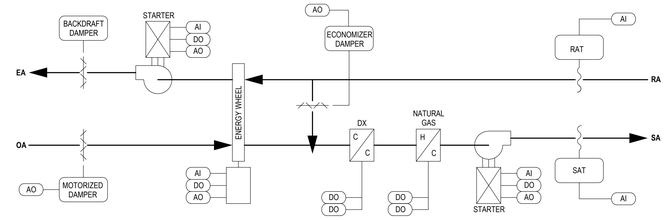
10 HEATING WATER CONTROLS DIAGRAM

NO SCALE



6 SHELTER IN PLACE

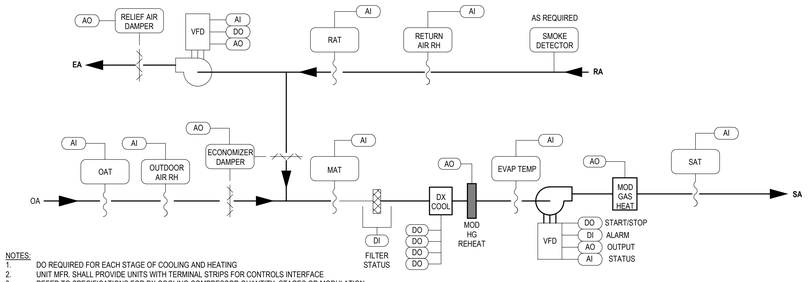
NO SCALE



NOTES:
1. DO REQUIRED FOR EACH STAGE OF COOLING AND HEATING.
2. UNIT MFR. SHALL PROVIDE UNITS WITH TERMINAL STRIPS FOR CONTROLS INTERFACE
3. REFER TO SPECIFICATIONS FOR DX COOLING COMPRESSOR QUANTITY, STAGES OR MODULATION REQUIREMENTS.
4. DIVISION 25 CONTRACTOR SHALL COORDINATE WITH REVIEW SUBMITTALS AND INSTALL ALL FIELD INSTALLED CONTROLS DEVICES PROVIDED BY UNIT MANUFACTURER.
5. ALL CONTROLS POINTS LISTED ABOVE SHALL BE VIEWABLE/ADJUSTABLE THROUGH THE BAS.

4 DEDICATED OUTDOOR AIR SYSTEM (DOAS) SCHEMATIC

NO SCALE



NOTES:
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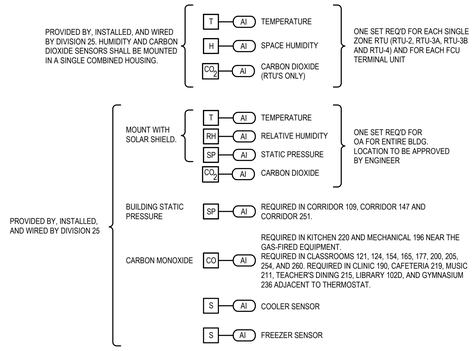
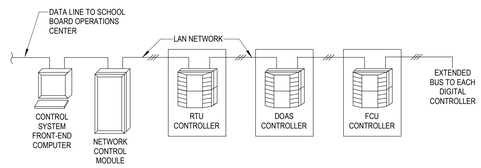
3 SINGLE ZONE VARIABLE AIR VOLUME ROOFTOP UNIT

NO SCALE



2 MISC SENSORS

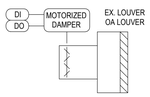
NO SCALE



NOTE:
1. ALL BAS SYSTEM 120vAC PROVIDED BY DIVISION 25 UNLESS OTHERWISE NOTED.

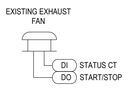
1 SYSTEM RISER DIAGRAM

NO SCALE



8 EXISTING MOTORIZED DAMPERS

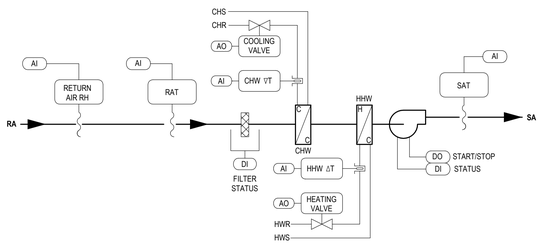
NO SCALE



NOTE:
1. RELAY PROVIDED BY DIV 25 CONTRACTOR

7 EXISTING EXHAUST FANS

NO SCALE



NOTES:
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2. REFER TO SPECIFICATIONS FOR DX COOLING COMPRESSOR QUANTITY, STAGES OR MODULATION REQUIREMENTS.
3. DIVISION 25 CONTRACTOR SHALL COORDINATE WITH REVIEW SUBMITTALS AND INSTALL ALL FIELD INSTALLED CONTROLS DEVICES PROVIDED BY UNIT MANUFACTURER.
4. ALL CONTROLS POINTS LISTED ABOVE SHALL BE VIEWABLE/ADJUSTABLE THROUGH THE BAS.

5 FAN COIL UNIT

NO SCALE

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COMMONWEALTH OF VIRGINIA
JOHN A. PRUETT
Lic. No. 62180
9.27.23
PROFESSIONAL ENGINEER

NO.	DESCRIPTION	DATE
	REVISIONS	

RENOVATIONS
MACY MCLAUGHERTY ELEMENTARY/MIDDLE SCHOOL
GILES COUNTY PUBLIC SCHOOLS
PEARISBURG, VIRGINIA

BIDDING/CONSTRUCTION DOCUMENTS

HVAC CONTROLS DIAGRAMS

DRAWN	CHECKED
SAO	JAP
DATE	07/07/2023
COMM. NO.	2022088

M620