ABBREVIATIONS

(E)	EXISTING ITEM
(ED)	EXISTING ITEM TO BE DEMOLISHED
(ER)	EXISTING ITEM TO BE RELOCATED
(F)	FUTURE
(N)	NEW
(RL)	RELOCATED ITEM
AAV	AUTOMATIC AIR VENT
AC	AIR CONDITIONING UNIT
ACC	AIR COOLED CONDENSER
ACCU	AIR COOLED CONDENSING UNIT
ACD	AUTOMATIC CONTROL DAMPER
ACLC	AIR COOLED LIQUID CHILLER
AD	ACCESS DOOR
AF	AIR FILTER
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
ARCH	ARCHITECT
AS	AIR SEPARATOR
ASC	APPLICABLE SECTION CONTRACTOR
ATC	AUTOMATIC TEMPERATURE CONTROL
B	BOILER
BDD	BACKDRAFT DAMPER
BE	BATHROOM EXHAUST
BMS	BUILDING MANAGEMENT SYSTEM
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BOS	BOTTOM OF STEEL
BTU	BRITISH THERMAL UNIT
BTUH	BTU PER HOUR
BVC	BOILER VENT AND COMBUSTION AIR
CA	COMBUSTION AIR
CAP	CAPACITY
CC	COOLING COIL
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CH	CHILLER
CM	CONSTRUCTION MANAGER
CO	CLEAN OUT
CONN	CONNECT
CP	CONDENSATE PUMP
CT	COOLING TOWER
CU	CONDENSING UNIT
CUH	CABINET UNIT HEATER
CV	CONVECTOR
CVB	CONSTANT VOLUME BOX
D	CONDENSATE DRAIN
DB	DRY BULB
DDC	DIRECT DIGITAL CONTROL
DE	DRYER EXHAUST
DF	DESTRATIFICATION FAN
DHW	DOMESTIC HOT WATER
DIA or Ø	DIAMETER
DN	DOWN
DP	DIFFERENTIAL PRESSURE
DWG	DRAWING
DX	DIRECT EXPANSION
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ECU	EVAPORATIVE CONDENSING UNIT
EDH	ELECTRIC DUCT HEATER
EF	EXHAUST FAN
EG	EXHAUST GRILLE
EMS	EMERGENCY MANAGEMENT SYSTEM
ER	EXHAUST REGISTER
ERV	EXHAUST ROOF VENT
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
F	FAN
F&TT	FLOAT & THERMOSTATIC TRAP
FA	FREE AREA
FCU	FAN COIL UNIT
FD	FIRE DAMPER
FLA	FULL LOAD AMPS
FLR	FLOOR
FM	FLOW METER
FMS	FLOW MEASUREING STATION
FO	FUEL OIL
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FP	FAN POWERED
FPB	FAN POWERED BOX
FPI	FINS PER INCH
FPM	FEET PER MINUTE
FSD	FIRE SMOKE DAMPER
FT	FEET
FTR	FIN-TUBE RADIATION
FTU	FAN TERMINAL UNIT

ABBREVIATIONS

GAL	GALLONS
GC	GENERAL CONTRACTOR
GE	GENERAL EXHAUST
GPM	GALLONS PER MINUTE
H	HUMIDIFIER
HC	HEATING COIL
HE	HOOD EXHAUST
HF	HEPA FILTER
HP	HORSE POWER
HP	HEAT PUMP
HRB	HEAT RECOVERY BOX
HRC	HEAT RECOVERY COIL
HV	HEATING AND VENTILATING UNIT
HVAC	HEATING VENTILATION AND AIR CONDITIONING
HX	HEAT EXCHANGER
HZ	HERTZ
ID	INSIDE DIAMETER
IN	INCHES
IRV	INTAKE ROOF VENT
KE	KITCHEN EXHAUST
KW	KILOWATTS
LAT	LEAVING AIR TEMPERATURE
LBG	LINEAR BAR GRILLE
LD	LINEAR DIFFUSER, LOUVERED DOOR
LS	LOOSE STARTER
LWT	LEAVING WATER TEMPERATURE
MAT	MIXED AIR TEMPERATURE
MBH	THOUSAND BTU'S PER HOUR
MC	MECHANICAL CONTRACTOR
MD	MOTORIZED DAMPER
MECH	MECHANICAL
MER	MECHANICAL EQUIPMENT ROOM
MOD	MOTOR OPERATED DAMPER
MUA	MAKE-UP AIR
MUAU	MAKE-UP AIR UNIT
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OAT	OUTSIDE AIR TEMPERATURE
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER
OD	OUTSIDE DIAMETER
P	PUMP
PC	PLUMBING CONTRACTOR
PD	PRESSURE DROP
PRV	PRESSURE REDUCING VALVE
PS	PACKAGE STARTER
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAUGE
RA	RETURN AIR
RD	RETURN DIFFUSER
RF	RETURN FAN
RG	RETURN GRILLE
RIC	RETURN IN COVER
RPM	REVOLUTIONS PER MINUTE
RTU	ROOF TOP UNIT
SA	SUPPLY AIR
SAT	SUPPLY AIR TEMPERATURE
SCT	SATURATED CONDENSING TEMPERATURE
SD	SMOKE DAMPER
SDA	SOUND ATTENUATOR
SDC	STAND ALONE DIGITAL CONTROLLER
SF	SQUARE FEET
SF	SUPPLY AIR FAN
SG	SUPPLY GRILLE
SP	STATIC PRESSURE
SPD	SPEED
SR	SUPPLY REGISTER
SST	STATIC SUCTION TEMPERATURE
TA	TRANSFER AIR
TD	TRANSFER DUCT
TE	TOILET EXHAUST
TF	TRANSFER FAN
TG	TRANSFER GRILLE
TOS	TOP OF STEEL
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UC	UNDERCUT DOOR
UF	UNDERFLOOR
UH	UNIT HEATER
UON	UNLESS OTHERWISE NOTED
UV	UNIT VENTILATOR
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
VI	VIBRATION ISOLATOR
VIF	VERIFY IN FIELD
VRF	VARIABLE REFRIGERANT FLOW
VSD	VARIABLE SPEED DRIVE
WB	WET BULB TEMPERATURE
WMS	WIRE MESH SCREEN
WSHP	WATER SOURCE HEAT PUMP

DRAWING LIST - HVAC_BOS

DRAWING NUMBER	DRAWING TITLE	SHEET NUMBER	
		INDEX	TOTAL
M0-0-1	MECHANICAL LEGENDS, ABBREVIATIONS, AND GENERAL NOTES	1	14
M0-0-2	HVAC ZONING PLAN	2	14
M0-0-3	HVAC ZONING PLAN	3	14
M1-1-0	HVAC LOWER LEVEL FLOOR PLAN	4	14
M1-1-1E	HVAC FIRST FLOOR PLAN - PLAN EAST	5	14
M1-1-1W	HVAC FIRST FLOOR PLAN - PLAN WEST	6	14
M1-1-2E	HVAC SECOND FLOOR PLAN - PLAN EAST	7	14
M1-1-2W	HVAC SECOND FLOOR PLAN - PLAN WEST	8	14
M1-1-3E	HVAC THIRD FLOOR PLAN - PLAN EAST	9	14
M1-1-3W	HVAC THIRD FLOOR PLAN - PLAN WEST	10	14
M1-1-4E	HVAC FOURTH FLOOR PLAN - PLAN EAST	11	14
M1-1-4W	HVAC FOURTH FLOOR PLAN - PLAN WEST	12	14
M1-2-1E	HVAC ROOF PLAN - PLAN EAST	13	14
M1-2-1W	HVAC ROOF PLAN - PLAN WEST	14	14

MECHANICAL VALVES AND ACCESSORIES

- ISOLATION VALVE SEE SPECIFICATIONS FOR TYPE
- 2-WAY CONTROL VALVE (DDC OR PNEUMATIC)
- M — 2-WAY CONTROL VALVE (MOTORIZED)
- 3-WAY CONTROL VALVE (DDC OR PNEUMATIC)
- M — 3-WAY CONTROL VALVE (MOTORIZED)
- TCV — THERMOSTIC CONTROL VALVE
- S — SOLENOID VALVE
- DIFFERENTIAL PRESSURE VALVE
- GATE VALVE
- GLOBE VALVE
- OSY VALVE
- PRESSURE REDUCING VALVE
- SAFETY RELIEF VALVE
- ANGLE VALVE
- BALL VALVE
- BALL VALVE WITH MEMORY STOP
- BUTTERFLY VALVE
- BALANCING VALVE WITH TEST PORTS
- CHECK VALVE (Left & Right)
- PRESSURE GAUGE
- PRESSURE GAUGE WITH COCK
- PRESSURE GAUGE WITH SYPHON AND COCK
- PRESSURE GAUGE WITH SNUBBER & COCK AND WELL
- P/T — PRESSURE TEMPERATURE GAUGE PORT
- FLOAT & THERMOSTATIC TRAP
- THERMOSTATIC TRAP
- T — STEAM TRAP SEE SPECIFICATION FOR TYPE
- SITE GLASS
- THERMOMETER
- THERMOMETER WITH WELL
- CONCENTRIC PIPE REDUCER
- ECCENTRIC PIPE REDUCER
- A — AUTOMATIC AIR VENT
- M — MANUAL AIR VENT
- T — THERMOSTATIC AIR VENT
- VB — VACUUM BREAKER
- PIPE CAP
- CONCENTRIC PIPE REDUCER PIPE RISING / OR RISING AND DROPPING
- PIPE CONNECTION TOP OF MAIN
- PIPE TURNING DOWN
- TEE CONNECTION
- UNION
- PIPE CONNECTION BOTTOM OF MAIN
- PIPE ANCHOR
- FLANGED CONNECTION
- PIPE GUIDE
- PIPE UP TO RADIATION
- STRAINER
- STRAINER AND DRAIN VALVE W HOSE END CONN AND CAP.
- FLEXIBLE CONNECTOR
- DIRECTION OF FLOW
- FLOW MEASURING DEVICE
- EXPANSION COMPENSATOR
- PIPE HEAT TRACE ELEMENT

MECHANICAL PIPING LEGEND

BD	(BD) BLOW DOWN
BF	(BF) BOILER FEED
CA	(CA) COMPRESSED AIR
CD	(CD) CONDENSATE DRAIN
CF	(CF) CHEMICAL FEED
CHWR	(CHWR) CHILLED WATER RETURN
CHWS	(CHWS) CHILLED WATER SUPPLY
CLD	(CLD) CONDUIT TANK LEAK
COND	(COND) CONDENSATE
CTR	(CTR) COOLING TOWER RETURN
CTS	(CTS) COOLING TOWER SUPPLY
CW	(CW) COLD WATER CITY WATER MAKE UP
CWR	(CWR) CONDENSER WATER RETURN
CWS	(CWS) CONDENSER WATER SUPPLY
D	(D) DRAIN
DTR	(DTR) DUAL TEMP RETURN
DTS	(DTS) DUAL TEMP SUPPLY
(ED)	PIPING TO BE REMOVED
(E)	EXISTING PIPING
FOG	(FOG) FUEL OIL GAUGE
FOR	(FOR) FUEL OIL RETURN
FOS	(FOS) FUEL OIL SUPPLY
FOV	(FOV) FUEL OIL VENT
GR	(GR) GLYCOL WATER RETURN
GS	(GS) GLYCOL WATER SUPPLY
HG	(HG) REFRIG HOT GAS
HPR	(HPR) HIGH PRESS STEAM COND RETURN
HPS	(HPS) HIGH PRESS STEAM SUPPLY
HPWR	(HPWR) HEAT PUMP WATER RETURN
HPWS	(HPWS) HEAT PUMP WATER SUPPLY
HWR	(HWR) HOT WATER RETURN
HWS	(HWS) HOT WATER SUPPLY
LPR	(LPR) LOW PRESS COND RETURN
LPS	(LPS) LOW PRESS STEAM SUPPLY
MPR	(MPR) MED PRESS COND RETURN
MPS	(MPS) MED PRESS STEAM SUPPLY
NPW	(NPW) NON POTABLE WATER
PC	(PC) PUMPED CONDENSATE
PSC	(PSC) PUMPED STEAM CONDENSATE
PHWR	(PHWR) PRIMARY HOT WATER RETURN
PHWS	(PHWS) PRIMARY HOT WATER SUPPLY
RL	(RL) REFRIG LIQUID
RS	(RS) REFRIG SUCTION
SCHWR	(SCHWR) SECONDARY CHILLED WATER RETURN
SCHWS	(SCHWS) SECONDARY CHILLED WATER SUPPLY
SHWR	(SHWR) SECONDARY HOT WATER RETURN
SHWS	(SHWS) SECONDARY HOT WATER SUPPLY
TSTAT	(TSTAT) THERMOSTAT
V	(V) VENT

DUCTWORK SYMBOLS DOUBLE LINE

- 24 X 8 — RECTANGULAR DUCTWORK - FIRST DIMENSION IS SIZE SHOWN (IN)
- 24 Ø — ROUND DUCTWORK DIAMETER (IN)
- 24 X 8 ϴ — FLAT OVAL DUCT
- 24 X 8 — CAPPED DUCT
- 24 X 8 — EXISTING DUCTWORK
- EXISTING DUCTWORK TO BE REMOVED
- 24X 8 — CAPPED ACOUSTICALLY LINED DUCTWORK
- 24X 8 — DOUBLE-WALL DUCTWORK
- SUPPLY/OUTSIDE AIR DUCTWORK UP
- SUPPLY/OUTSIDE AIR DUCTWORK DOWN
- RETURN AIR DUCTWORK UP
- RETURN AIR DUCTWORK DOWN
- EXHAUST AIR DUCTWORK UP
- EXHAUST AIR DUCTWORK DOWN
- FLEXIBLE EQUIPMENT CONNECTION
- FLEXIBLE DUCT
- R / D — CHANGE OF ELEVATION IN DIRECTION OF AIR FLOW R=RISE & D=DROP
- 24X 8 / 18X 8 — RECTANGULAR TO RECTANGULAR TRANSITION
- 24X 8 / 12 Ø — RECTANGULAR TO ROUND TRANSITION
- MITERED ELBOW W/TURNING VANES
- MITERED ELBOW
- RADIUSED ELBOW
- SPIN COLLAR
- 90° SPLIT TEE WITH TURNING VANES
- BELL MOUTH BRANCH DUCT TAKE OFF
- BELL MOUTH BRANCH DUCT TAKE OFF WITH DAMPER
- BRANCH DUCT TAKE OFF
- BDD — BACK DRAFT DAMPER
- FSD / DS — COMBINATION FIRE SMOKE DAMPER WITH SMOKE DETECTOR
- FD — FIRE DAMPER
- M — MOTORIZED DAMPER
- SD / DS — SMOKE DAMPER WITH SMOKE DETECTOR
- VOLUME DAMPER
- DS — DUCT MOUNTED SMOKE DETECTOR
- SIDE WALL MOUNTED SUPPLY REGISTER
- SIDE WALL MOUNTED RETURN / EXHAUST REGISTER / GRILLE
- ELEVATION VIEW SIDE WALL MOUNTED EXHAUST REGISTER / GRILLE
- ELEVATION VIEW SIDE WALL MOUNTED RETURN REGISTER / GRILLE
- ELEVATION VIEW SIDE WALL MOUNTED SUPPLY REGISTER
- TRANSFER DUCT WITH ACOUSTICAL LINING
- SUPPLY / INTAKE OR DOOR UNDERCUT PRESSURIZATION
- EXHAUST / RETURN / TRANSFER
- LD — LOUVERED DOOR PRESSURIZATION
- SUPPLY DIFFUSER 4 - WAY THROW
- SUPPLY DIFFUSER 3 - WAY THROW
- SUPPLY DIFFUSER 2 - WAY THROW
- SUPPLY DIFFUSER 2 - WAY THROW 90 °
- SUPPLY DIFFUSER 1 - WAY THROW
- RETURN REGISTER \ GRILLE
- EXHAUST REGISTER \ GRILLE
- SUPPLY AIR DIFFUSER BELOW DUCT
- RETURN AIR DIFFUSER BELOW DUCT
- EXHAUST AIR DIFFUSER BELOW DUCT
- LINEAR DIFFUSER
- ACCESS DOOR IN CEILING
- AD / AP — DUCT MOUNTED ACCESS DOOR - ACCESS PANEL

INSTRUMENTATION SYMBOLS

CO2	CARBON DIOXIDE SENSOR
CO2	CARBON DIOXIDE SENSOR DUCT MOUNTED
CO	CARBON MONOXIDE SENSOR
CO	CARBON MONOXIDE SENSOR DUCT MOUNTED
TC2	COMBINATION TEMPERATURE AND CARBON DIOXIDE SENSOR
CS	CURRENT SENSOR
FS	FLOW SENSOR
FZ	FREEZE STAT
LD	LEAK DETECTOR
H	HUMIDITY SENSOR
H	HUMIDITY SENSOR DUCT MOUNTED
H2	HYDROGEN SENSOR
R	REFRIGERANT LEAK SENSOR
R	REFRIGERANT LEAK SENSOR DUCT MOUNTED
DS	SMOKE DETECTOR
DS	SMOKE DETECTOR DUCT MOUNTED
SP	STATIC PRESSURE SENSOR
T	TEMPERATURE SENSOR
T	TEMPERATURE SENSOR DUCT MOUNTED
T/H	COMBINATION TEMPERATURE RELATIVE HUMIDITY SENSOR
T/H	COMBINATION TEMPERATURE RELATIVE HUMIDITY SENSOR DUCT MOUNTED
E	EMERGENCY POWER REQUIRED
S	SWITCH
PS	PACKAGED STARTER BY MECHANICAL
LS	LOOSE STARTER BY ELECTRICAL
VFD	VARIABLE FREQUENCY DRIVE
FM	FLOW MEASURING STATION

MISC. LEGEND / TAGS

- 2-A — DIFFUSER, REGISTER, GRILLE DESIGNATION
- 12X12 — NECK SIZE OR LENGTH IF LINEAR DIFFUSER
- 500 — AIR QUANTITY - CFM
- VAV — SCHEDULED EQUIPMENT TYPE (WITHOUT MOTOR)
- NO — SCHEDULED REFERENCE NUMBER
- AC — SCHEDULED EQUIPMENT TYPE (WITH MOTOR)
- 1 — SCHEDULED REFERENCE NUMBER

EQUIPMENT TYPE
- FTR-1 — EQUIPMENT TYPE
- 7'-0" — EQUIPMENT LENGTH
- 63.0 — EQUIPMENT CAPACITY - MBH/kW

SECTION SYMBOL
- A — SECTION DESIGNATION
- M-1 — DRAWING NUMBER LOCATION

DETAIL SYMBOL
- 1 — DETAIL NUMBER
- M-1 — DRAWING NUMBER LOCATION

POWERED DAMPER
- FSD — DAMPER TYPE (FSD OR SD)
- HV-1-S — ASSOCIATED FAN SYSTEM
- NO — NORMAL DAMPER (NON-ENERGIZED) POSITION

- CONNECT NEW TO EXISTING
- LIMIT OF REMOVAL
- AA — DISTANCE TO FINISH FLOOR (FEET & INCHES) FROM BOTTOM OF DUCT OR PIPE
- TE — RISER DESIGNATION TYPE
- # — NUMBER
- X — DEMOLITION SHEET NOTE NUMBER X
- X — NEW WORK SHEET NOTE NUMBER X
- X — REVISION NUMBER X

DESIGN CONDITIONS

TEMPERATURES AND HUMIDITIES	TEMPERATURES AND HUMIDITIES	
WINTER: OUTDOOR AIR TEMPERATURE: 8°F (99.6%) INDOOR AIR TEMPERATURES: 70°F GENERAL SPACES 65°F EXTERIOR STORAGE/MECHANICAL SPACES	CITY, STATE	BOSTON, MA
	SUB-LOCATION	-------------------
	ELEVATION, AMSL	-------------------
SUMMER: OUTDOOR AIR TEMPERATURE: 91°F db; 73°F wb*(0.4%) INDOOR AIR TEMPERATURES: 75°F; 50%RH** GENERAL SPACES		
* MEAN COINCIDENT WET BULB. ** INCIDENTAL RELATIVE HUMIDITY, UNLESS SPECIFIC HIGH-LIMIT HUMIDITY CONTROL IS REQUIRED.	WEATHER DATA BASED ON 2017 ASHRAE FUNDAMENTALS HANDBOOK, CHAPTER 14, APPENDIX AND IECC 2018, CLIMATE ZONE 5A.	

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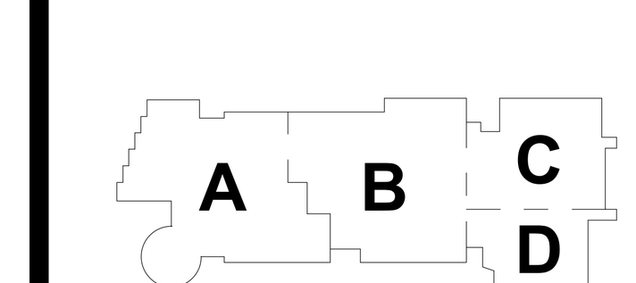
JUNE 17, 2021



KEY PLAN

PROJECT NORTH

MAGNETIC NORTH

MECHANICAL LEGENDS, ABBREVIATIONS, AND GENERAL NOTES

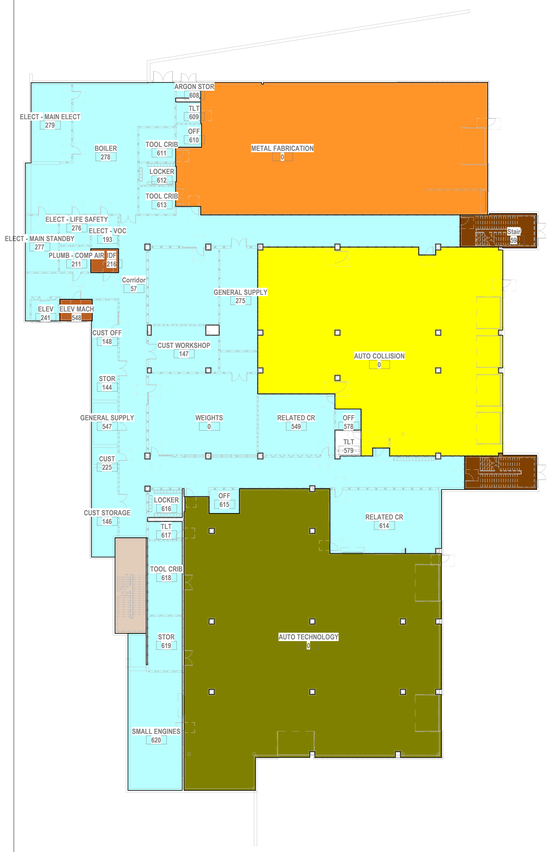
Scale: NTS

Job No.: 6020409

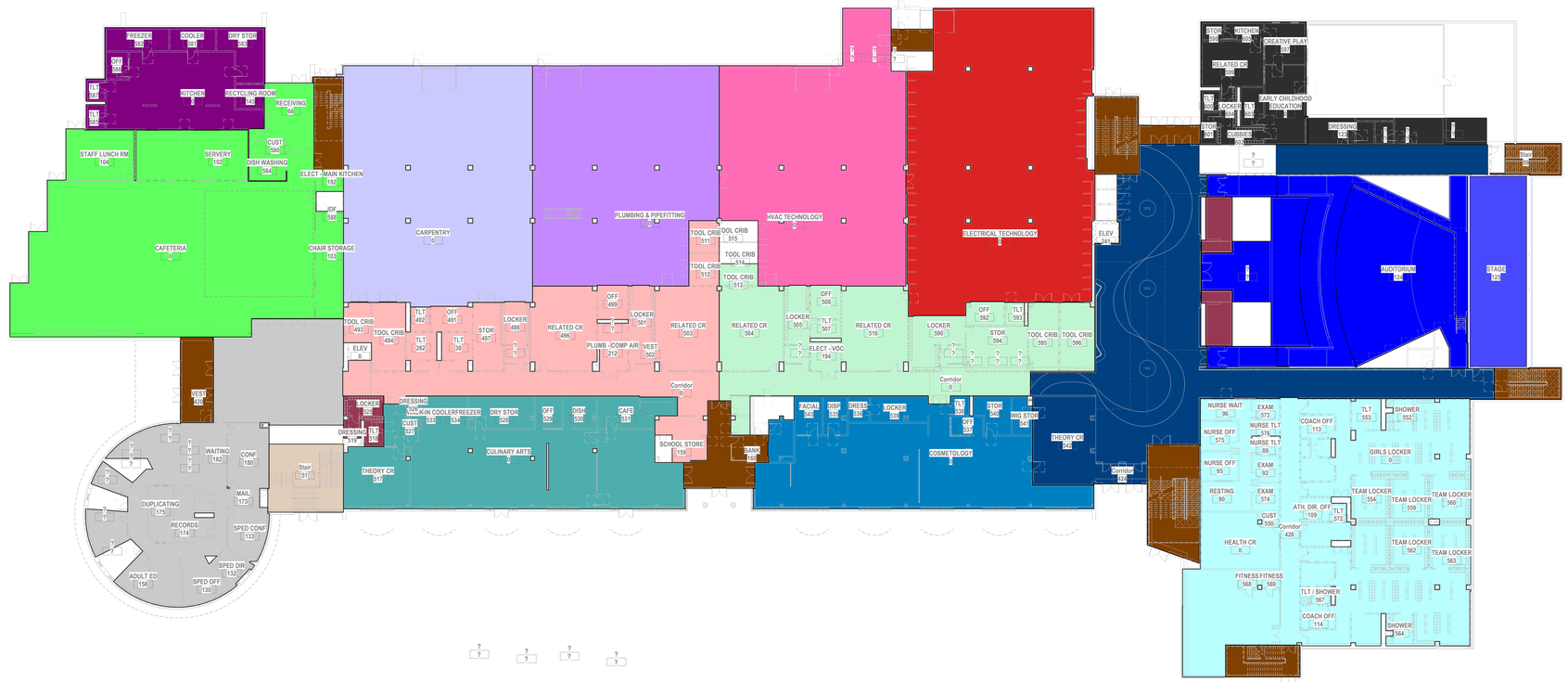
Drawn By: DRA

Date: JUNE 17, 2021

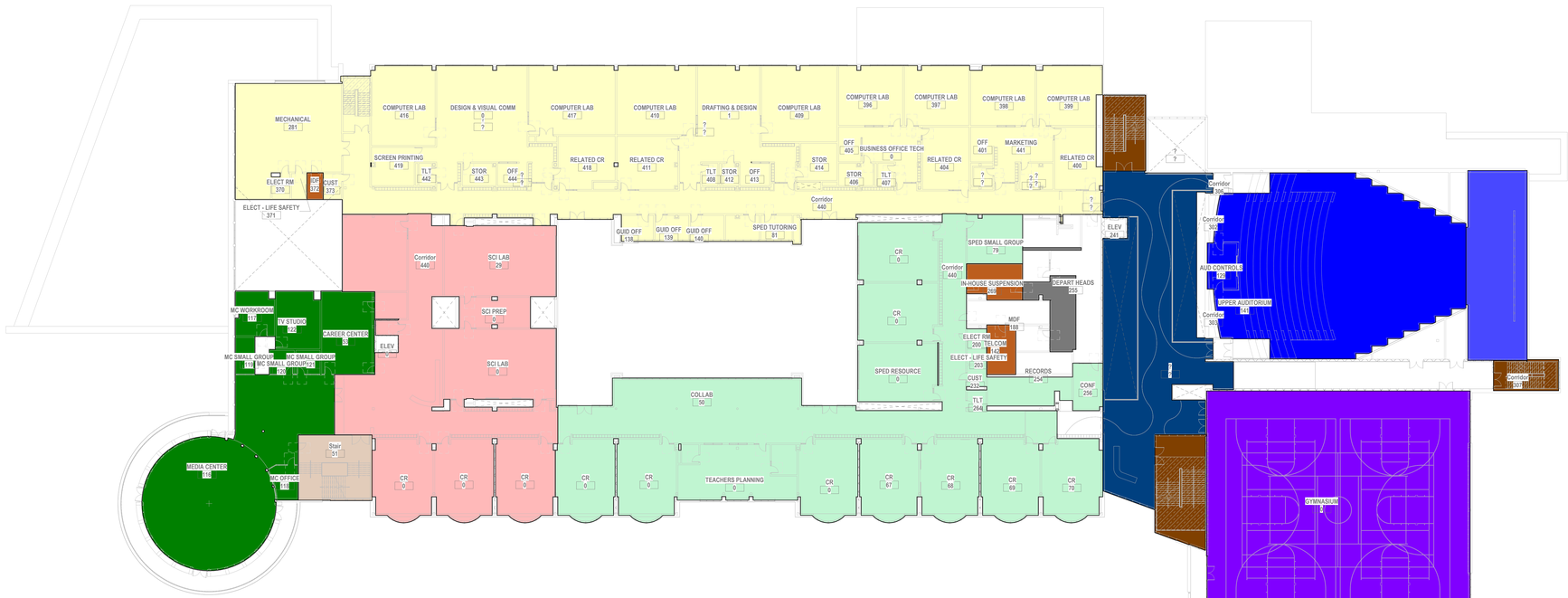
M0-0-1



1 HVAC Level 0 Zoning Plan
3/64" = 1'-0"



2 HVAC Level 1 Zoning Plan
3/64" = 1'-0"



3 HVAC Level 2 Zoning Plan
3/64" = 1'-0"

Zoning Plan Key

- VRF HEAT PUMP
- SPLIT AC
- HEATING AND VENTILATING ONLY
- EXHAUST ONLY
- ERV-1
- ERV-2
- ERV-3
- HRU-1
- HRU-2
- HRU-3
- HRU-4
- HV-1
- HV-2
- HV-3
- HV-4
- HV-5
- HV-7
- HV-8
- HVAC-1
- HVAC-2
- HVAC-3
- HVAC-4
- HVAC-5
- HVAC-6
- HVAC-7
- HVAC-8
- MAU-1

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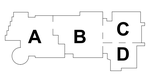


KEY PLAN

PROJECT NORTH

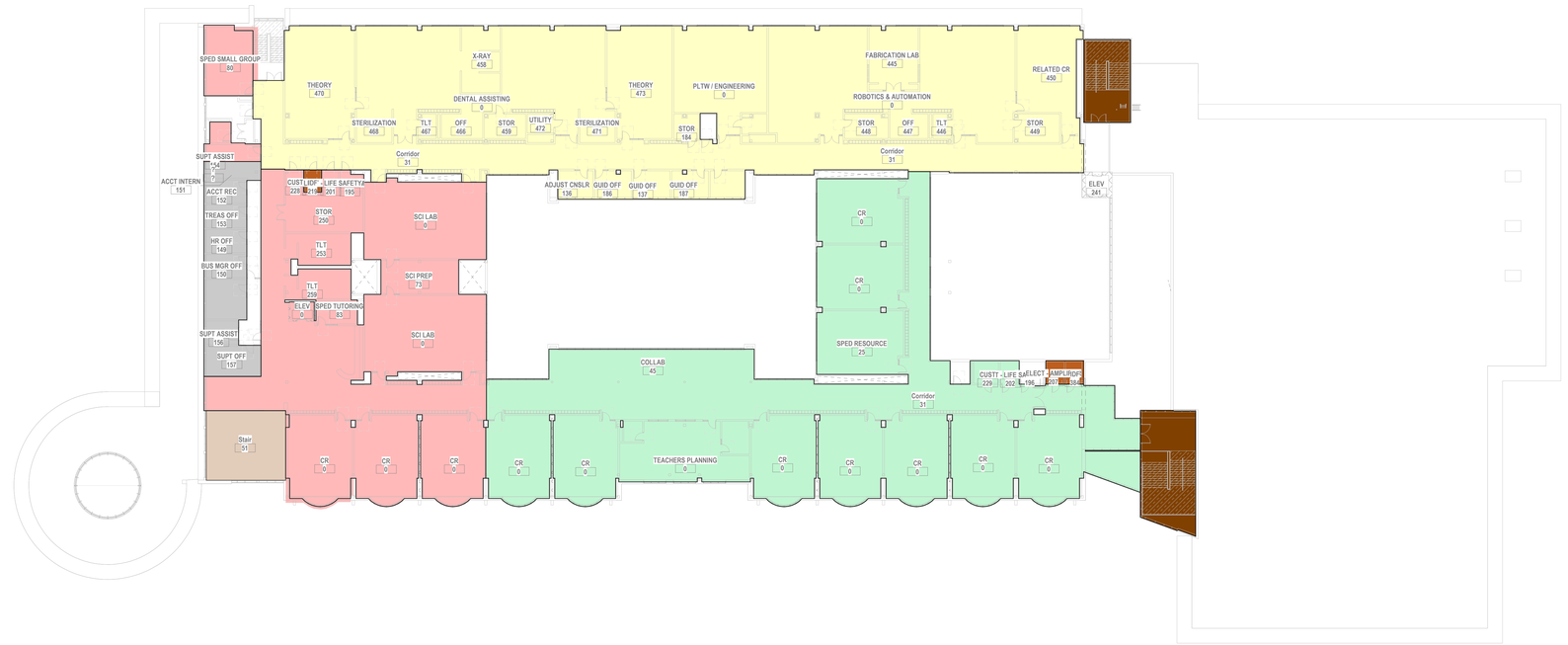
MAGNETIC NORTH

HVAC ZONING PLAN

Scale: 3/64" = 1'-0"
Job No.: 6020409
Drawn By: DRA
Date: JUNE 17, 2021

M0-0-2

1 HVAC Level 3 Zoning Plan
3/64" = 1'-0"



2 HVAC Level 4 Zoning Plan
3/64" = 1'-0"

Zoning Plan Key

- VRF HEAT PUMP
- SPLIT AC
- HEATING AND VENTILATING ONLY
- EXHAUST ONLY
- ERV-1
- ERV-2
- ERV-3
- HRU-1
- HRU-2
- HRU-3
- HRU-4
- HV-1
- HV-2
- HV-3
- HV-4
- HV-5
- HV-7
- HV-8
- HVAC-1
- HVAC-2
- HVAC-3
- HVAC-4
- HVAC-5
- HVAC-6
- HVAC-7
- HVAC-8
- MAU-1

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JUNE 17, 2021

A B C D

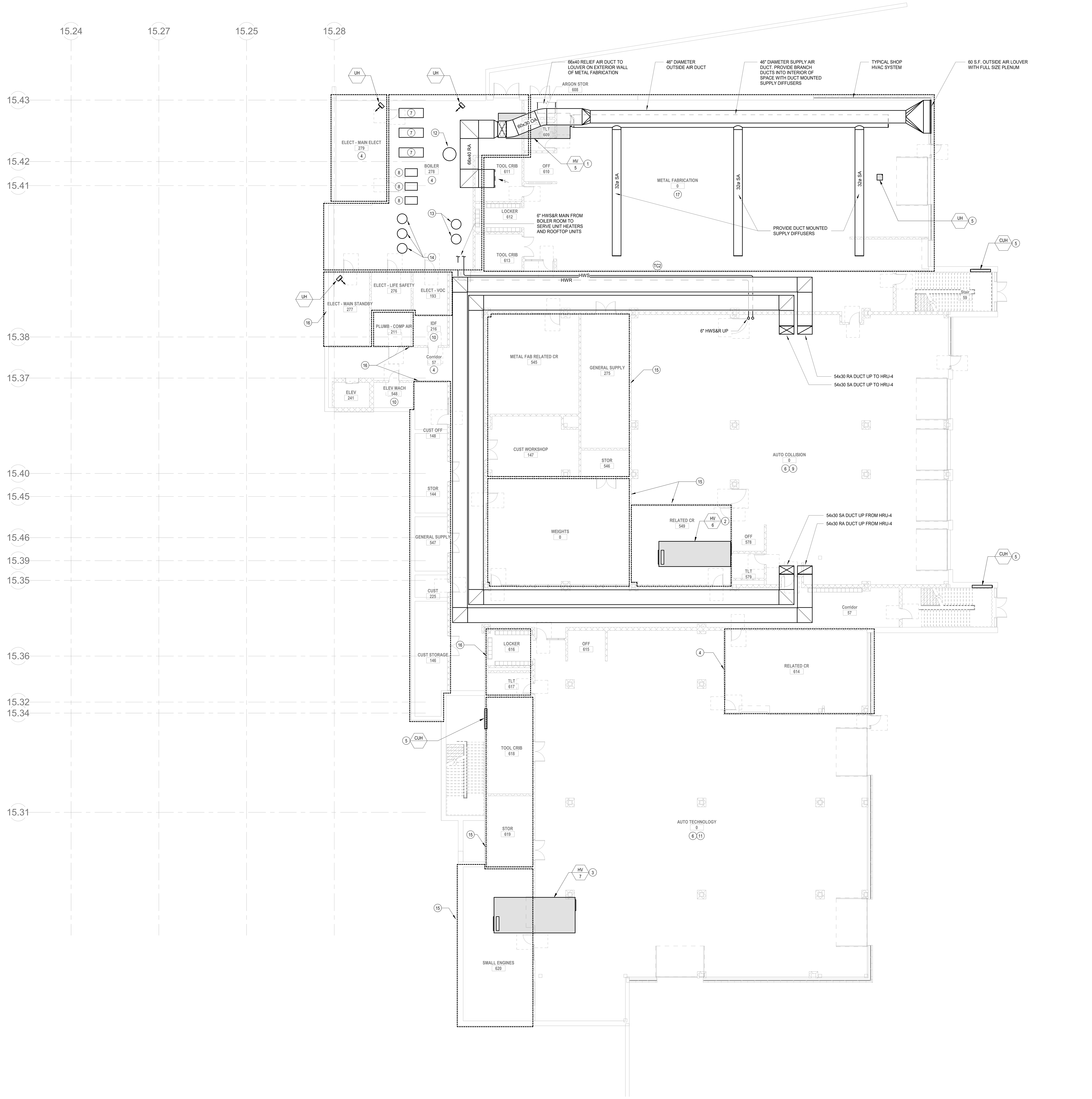
KEY PLAN

PROJECT NORTH | MAGNETIC NORTH

HVAC ZONING PLAN

Scale: 3/64" = 1'-0"
Job No.: 6020409
Drawn By: DRA
Date: JUNE 17, 2021

M0-0-3



2 M1-1-0 **HVAC Level 0 East**
3/32" = 1'-0"

HVAC DRAWING NOTES

1. HV-5: 11,700 CFM HEATING AND VENTILATING UNIT. PROVIDE MERV-8 PRE FILTER, MERV-13 FINAL FILTER, TOTAL ENERGY RECOVERY WHEEL WITH ECONOMIZER BYPASS, 100% ECONOMIZER, SUPPLY FAN, EXHAUST FAN, AND HOT WATER HEATING COIL. PROVIDE HWS&R BRANCH PIPING TO NEAREST HWS&R MAIN.
2. HV-6: 12,100 CFM HEATING AND VENTILATING UNIT. PROVIDE MERV-8 PRE FILTER, MERV-13 FINAL FILTER, TOTAL ENERGY RECOVERY WHEEL WITH ECONOMIZER BYPASS, 100% ECONOMIZER, SUPPLY FAN, EXHAUST FAN, AND HOT WATER HEATING COIL. PROVIDE HWS&R BRANCH PIPING TO NEAREST HWS&R MAIN.
3. HV-7: 19,000 CFM HEATING AND VENTILATING UNIT. PROVIDE MERV-8 PRE FILTER, MERV-13 FINAL FILTER, TOTAL ENERGY RECOVERY WHEEL WITH ECONOMIZER BYPASS, 100% ECONOMIZER, SUPPLY FAN, EXHAUST FAN, AND HOT WATER HEATING COIL. PROVIDE HWS&R BRANCH PIPING TO NEAREST HWS&R MAIN.
4. HRU-4 ZONE. PROVIDE ONE SUPPLY VAV TERMINAL UNIT DUCTED FROM HRU-4 MAIN SUPPLY DUCT TO SUPPLY DIFFUSERS IN EACH SPACE AND ONE EXHAUST VAV TERMINAL DUCTED FROM HRU-4 EXHAUST MAIN DUCT TO EXHAUST GRILLES IN EACH SPACE.
5. PROVIDE HWS&R BRANCH PIPING FROM CUH, UH, OR CONVECTOR TO NEAREST HWS&R MAIN (TYPICAL FOR ALL HYDRONIC HEATING EQUIPMENT).
6. REFER TO METAL FABRICATION SHOP FOR TYPICAL HEATING AND VENTILATION UNIT LAYOUT IN THIS AREA. REFER TO EQUIPMENT PLANS FOR EXHAUST REQUIREMENTS.
7. 3,000 MBH GAS FIRED CONDENSING BOILER. PROVIDE EXHAUST VENT UP TO ROOM AND COMBUSTION AIR INTAKE DUCT TO AREA WAY ADJACENT TO METAL FABRICATION. PROVIDE CONDENSATE NEUTRALIZATION KIT AND PIPE CONDENSATE TO NEAREAST FLOOR DRAIN. PROVIDE A 210 GPM VERTICAL INLINE BOILER PUMP. PROVIDE CONCRETE HOUSEKEEPING PAD FOR BOILERS.
8. 270 GPM, 10 H.P. SECONDARY HOT WATER PUMP.
9. PROVIDE ONE 36" DIAMETER EXHAUST DUCT FROM SPRAY BOOTH EXHAUST CONNECTION UP TO A 10,000 CFM EXHAUST FAN ON THE ROOF. PROVIDE A 36" DIAMETER MAKE-UP AIR DUCT FROM SPRAY BOOTH MAKE-UP AIR CONNECTION TO A ROOF VENT ON THE ROOF. PROVIDE A 10" DIAMETER EXHAUST DUCT FROM THE PAINT MIXING ROOM TO A 950 CFM EXHAUST FAN ON THE ROOF. PROVIDE A 36" DIAMETER EXHAUST DUCT FROM PREP BOOTH TO A 10,000 CFM EXHAUST FAN ON THE ROOF AND A 36" DIAMETER MAKE-UP AIR DUCT TO A ROOF VENT ON THE ROOF. PROVIDE A 28" DIAMETER EXHAUST DUCT FROM THE POWDER COATING BOOTH TO A 10,000 CFM EXHAUST FAN ON THE ROOF AND A 28" DIAMETER EXHAUST DUCT TO A ROOF VENT ON THE ROOF.
10. PROVIDE A 2 TON SPLIT AC TO CONDITION THIS ROOM. PROVIDE A WALL MOUNTED EVAPORATOR WITH CONDENSATE PUMP ABOVE THE DOOR AND A CONDENSING UNIT ON THE ROOF. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FROM EVAPORATOR TO CONDENSING UNIT ON ROOF. PROVIDE CONDENSATE PIPING TO NEAREST CONDENSATE RECEPTOR. (TYPICAL FOR SPLIT AC SPACES IDENTIFIED ON THE ZONING PLANS)
11. PROVIDE A 14" DIAMETER EXHAUST DUCT FROM WELDING BOOTHS TO A 600 CFM EXHAUST FAN ON THE ROOF. PROVIDE AN AUTOMOTIVE EXHAUST SYSTEM IN THE SMALL ENGINE ROOM AND THEORY ROOM. AUTOMOTIVE EXHAUST SYSTEM TO BE A CAR-MON SYSTEM OR EQUAL WITH 12 EXHAUST CONNECTIONS
12. HOT WATER SYSTEM PRIMARY/SECONDARY LOOP HYDRAULIC DECOUPLER AND AIR SEPARATOR.
13. GLYCOL MIXIING STATION AND 55 GALLON DRUM.
14. HOT WATER SYSTEM EXPANSION TANKS.
15. HRU-4 ZONE. PROVIDE ONE SUPPLY VAV TERMINAL UNIT DUCTED FROM HRU-4 MAIN SUPPLY DUCT TO VRF FCU RETURN DUCT AND ONE EXHAUST VAV TERMINAL DUCTED FROM HRU-4 EXHAUST MAIN DUCT TO EXHAUST GRILLES IN EACH SPACE. PROVIDE A NOMINAL 2 TON VRF FAN COIL UNIT WITH SUPPLY DUCT DISTRIBUTION TO CEILING MOUNTED SUPPLY DIFFUSERS IN EACH SPACE AND RETURN DUCT DISTRIBUTION TO FILTER RETURN GRILLES IN EACH SPACE. PROVIDE LIQUID AND SUCTION LINES FROM FAN COIL UNIT TO CONDENSING UNIT ON ROOF AND A CONDENDATE DRAIN TO NEAREST CONDENSATE RECEPTOR.
16. PROVIDE ONE EXHAUST VAV TERMINAL UNIT DUCTED FROM HRU-4 EXHAUST MAIN DUCT TO EXHAUST GRILLES IN EACH SPACE. PROVIDE A TRANSFER DUCT FROM THE CORRIDOR TO EACH SPACE.
17. PROVIDE A 6000 CFM METAL DUST COLLECTOR WITH EXHAUST DUCT DISTRIBUTION TO EQUIPMENT IN ROOM. PROVIDE A 5,000 CFM EXHAUST FAN ON THE ROOF WITH EXHAUST DUCT DISTRIBUTION TO BENCHES AND OVERHEAD EXHAUST ARMS IN ROOM.

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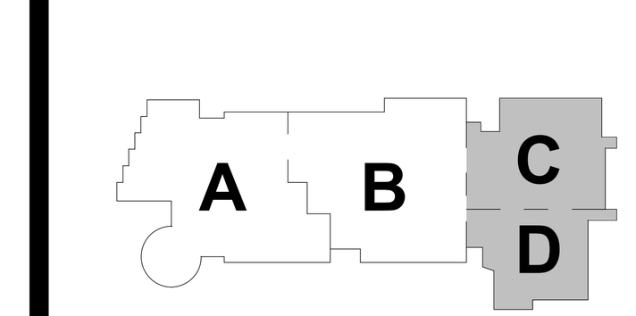
MSBA SCHEMATIC DESIGN SUBMITTAL

JUNE 17, 2021



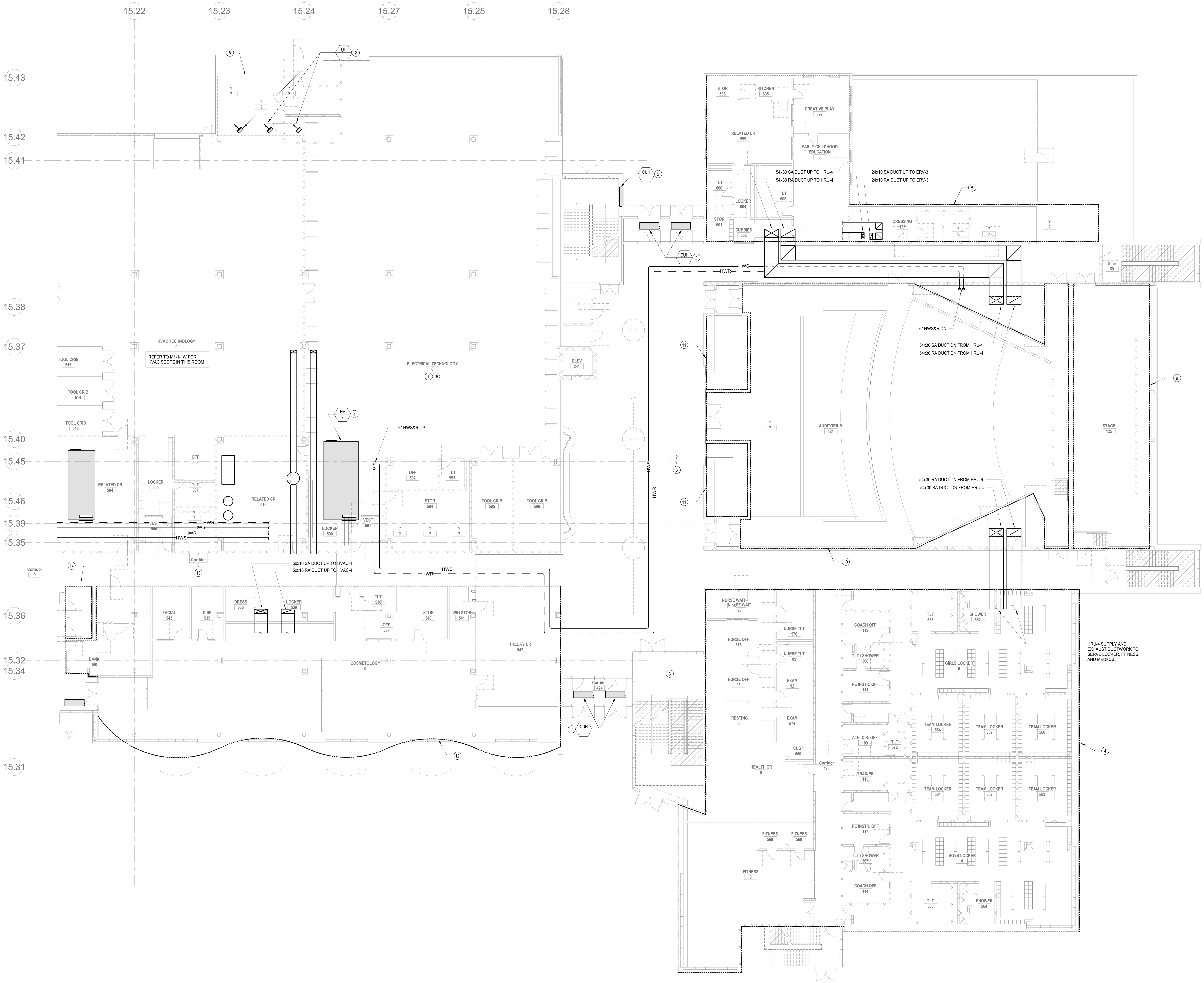
KEY PLAN

PROJECT NORTH | MAGNETIC NORTH

HVAC LOWER LEVEL FLOOR PLAN

Scale: As indicated
Job No.: 6020409
Drawn By: DRA
Date: JUNE 17, 2021

M1-1-0



HVAC Level 1 East
3/32" = 1'-0"

HVAC DRAWING NOTES

1. 20,800 CFM HEATING AND VENTILATING UNIT. PROVIDE MERV-8 PRE FILTER, MERV-13 FINAL FILTER, TOTAL ENERGY RECOVERY WHEEL WITH ECONOMIZER BYPASS, 100% ECONOMIZER, SUPPLY FAN, EXHAUST FAN, AND HOT WATER HEATING COIL. PROVIDE HWS&R BRANCH PIPING TO NEAREST HWS&R MAIN.
2. PROVIDE HWS&R BRANCH PIPING FROM CUH,UH, OR CONVECTOR TO NEAREST HWS&R MAIN (TYPICAL FOR ALL HYDRONIC HEATING EQUIPMENT).
3. PROVIDE A 2 TON SPLIT HEAT PUMP SYSTEM TO CONDITION THIS ROOM. PROVIDE A WALL MOUNTED EVAPORATOR WITH CONDENSATE PUMP AND A CONDENSING UNIT ON THE ROOF. PROVIDE CONDENSATE PIPING TO NEAREST CONDENSATE RECEPTOR.
4. AREA SERVED BY HRU-4. PROVIDE SUPPLY AND EXHAUST MAIN DUCTWORK FROM HRU-4 TO THIS AREA. PROVIDE A TOTAL OF 12 ZONES IN THIS AREA. EACH ZONE WILL BE PROVIDED WITH A VRF FCU DUCTED TO CEILING MOUNTED SUPPLY DIFFUSERS AND A FILTER RETURN GRILLE, A SUPPLY VAV TERMINAL UNIT DUCTED FROM HRU-4 SUPPLY MAIN TO THE FCU RETURN DUCT AND AN EXHAUST VAV TERMINAL UNIT DUCTED FROM HRU-4 EXHAUST MAIN TO A CEILING RETURN GRILLE. PROVIDE THREE 2.5 NOMINAL VRF FCU'S AND NINE 1.5 NOMINAL TON VRF FCU'S. PROVIDE CONDENSATE DRAIN PIPING TO NEAREST CONDENSATE RECEPTOR, LINED SUPPLY AND RETURN DUCTWORK, HEAT RECOVERY BRANCH SELECTOR BOX, AND REFRIGERANT LINES SET FROM ROOF MOUNTED CONDENSING UNIT TO FCU.
5. AREA SERVED BY ERV-3. PROVIDE SUPPLY AND EXHAUST MAIN DUCTWORK FROM ERV-3 TO THIS AREA. PROVIDE A TOTAL OF 6 ZONES IN THIS AREA. EACH ZONE WILL BE PROVIDED WITH A VRF FCU DUCTED TO CEILING MOUNTED SUPPLY DIFFUSERS AND A FILTER RETURN GRILLE, SUPPLY BRANCH DUCTWORK FROM ERV-3 MAIN DUCT TO THE FCU RETURN DUCT, AND AN EXHAUST BRANCH DUCT FROM ERV-3 EXHAUST MAIN TO A CEILING GRILLE. PROVIDE SIX 1.5 NOMINAL TON VRF FCUs. EACH FCU SHALL BE PROVIDED WITH CONDENSATE DRAIN PIPING TO THE NEAREST CONDENSATE RECEPTOR, LINE SUPPLY AND RETURN DUCTWORK, HEAT RECOVERY BRANCH SELECTOR BOX, AND A REFRIGERANT LINE SET FROM ROOF MOUNTED CONDENSING UNIT TO FCU.
6. AREA SERVED BY HVAC-5. PROVIDE 6 ZONES ON THIS LEVEL. EACH ZONE WILL HAVE A SUPPLY VAV TERMINAL DUCTED FROM HVAC-5 MAIN SUPPLY DUCTWORK TO CEILING MOUINTED SUPPLY DIFFUSERS. PROVIDE HWS&R PIPING FROM THE NEAREST HWS&R MAIN TO EACH VAV TERMINAL UNIT. PROVIDE RETURN DUCTWORK TO CEILING MOUNTED GRILLES.
7. REFER TO METAL FABRICATION SHOP FOR TYPICAL HVAC LAYOUT IN THIS AREA. REFER TO EQUIPMENT PLANS FOR EXHAUST REQUIREMENTS. PROVIDE DEDICATED EXHAUST DUCTWORK FROM SHOP EQUIPMENT UP TO ROOF MOUNTED EXHAUST FANS.
8. PROVIDE A 450 CFM INLINE EXHAUST FAN DUCTED TO A 3 S.F. LOUVER FROM EXHAUST GRILLES IN EACH SPACE. PROVIDE A 3 S.F. OUTSIDE AIR LOUVER WITH PLENUM DUCTED TO SUPPLY DIFFUSERS IN EACH SPACE.
9. PROVIDE SUPPLY DUCTWORK DISTRIBUTION FROM HVAC-7 TO SUPPLY DIFFUSERS ON EACH SIDE OF STAGE AND RETURN DUCTWORK DISTRIBUTION TO GRILLES LOCATED HIGH IN SPACE.
10. PROVIDE SUPPLY DUCTWORK DISTRIBUTION FROM HVAC-6 TO SUPPLY DIFFUSERS IN CEILING OF EACH SPACE AND RETURN DUCTWORK DISTRIBUTION TO CEILING GRILLES IN THE CEILING OF EACH SPACE.
11. PROVIDE EXHAUST DUCTWORK FROM CEILING GRILLES IN SPACE TO EXHAUST FAN LOCATED ON ROOF.
12. AREA SERVED BY HVAC-4. PROVIDE 5 ZONES. EACH ZONE WILL HAVE A SUPPLY VAV TERMINAL DUCTED FROM HVAC-4 MAIN SUPPLY DUCTWORK TO CEILING MOUNTED SUPPLY DIFFUSER AND RETURN DUCTWORK TO CEILING DIFFUSERS IN EACH SPACE. PROVIDE HWS&R PIPING FROM THE NEAREST HWS&R MAIN TO EACH VAV TERMINAL UNIT. PROVIDE A TEMPERATURE, HUMIDITY, AND CO2 SENSOR FOR EACH ZONE. REFER TO EQUIPMENT PLANS FOR EQUIPMENT REQUIRING EXHAUST AND PROVIDE EXHAUST DUCTWORK FROM EQUIPMENT AND CEILING MOUNTED EXHAUST GRILLES UP TO A 4,000 CFM EXHAUST FAN ON THE ROOF.
13. PROVIDE A SUPPLY VAV TERMINAL UNIT CONNECTED TO HRU-3 SUPPLY MAIN TO SERVE CORRIDOR. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING DIFFUSERS IN CORRIDOR.
14. PROVIDE ONE EXHAUST VAV TERMINAL UNIT DUCTED FROM HRU-3 EXHAUST MAIN DUCT TO EXHAUST GRILLES IN EACH SPACE. PROVIDE A TRANSFER DUCT FROM THE CORRIDOR TO EACH SPACE.
15. PROVIDE A 5,000 CFM EXHAUST FAN ON THE ROOF WITH EXHAUST DUCT DISTRIBUTION FROM ROOF FAN TO DUCT MOUNTED EXHAUST GRILLES IN THE SPACE AND LOCAL EXHAUST GRILLES AT EACH BOOTH.

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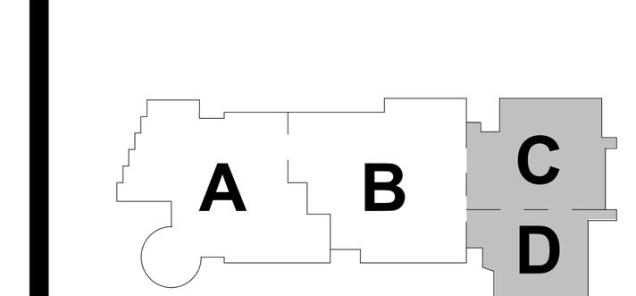
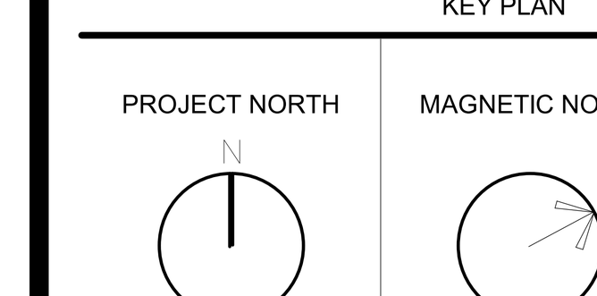
SCHEMATIC
DESIGN
SUBMITTAL

JUNE 17, 2021



KEY PLAN



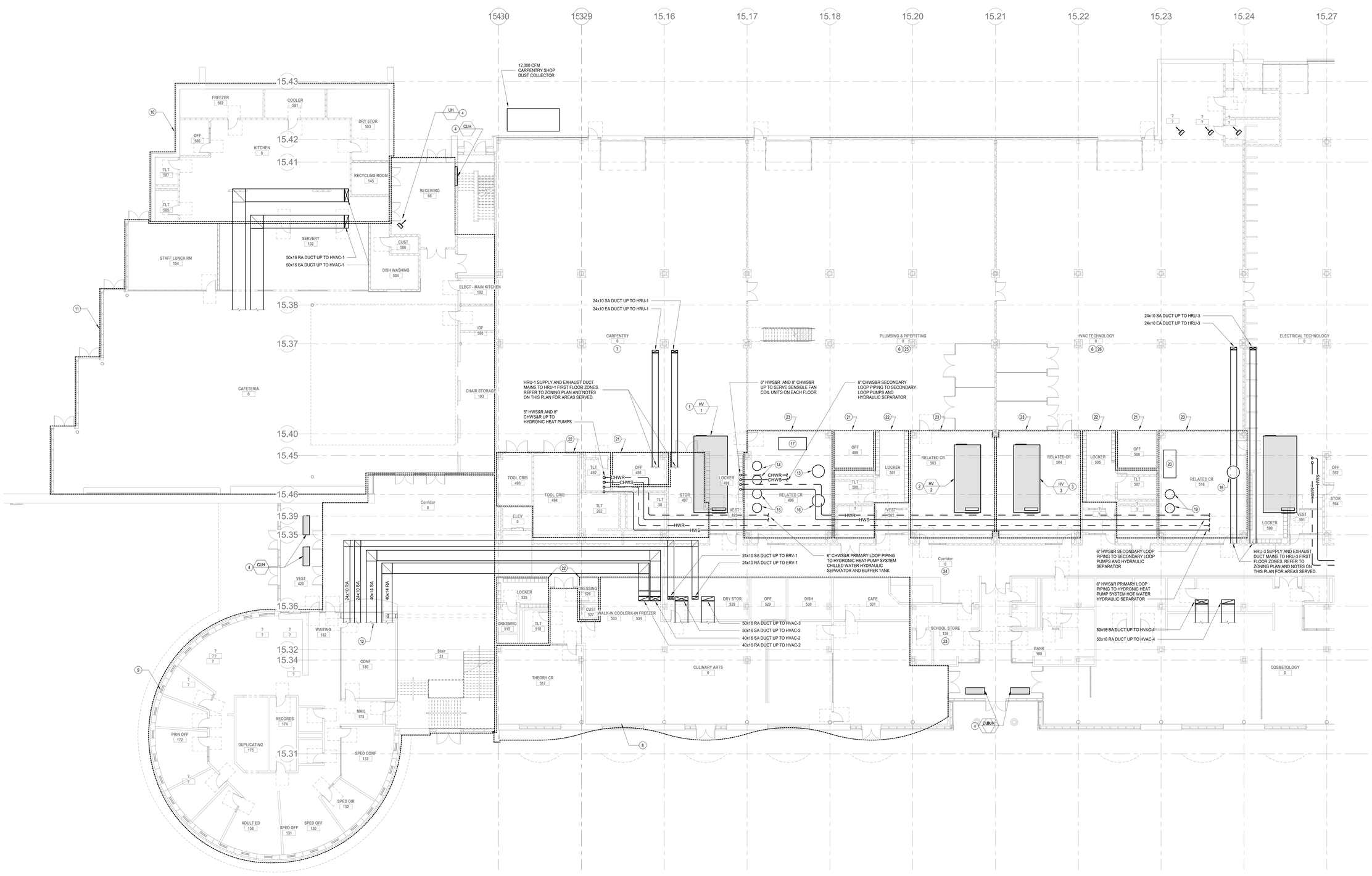
HVAC FIRST FLOOR PLAN - PLAN EAST

Scale: As indicated
Job No.: 6020409
Drawn By: DRA
Date: JUNE 17, 2021

M1-1-1E

HVAC DRAWING NOTES

1. 17,400 CFM HEATING AND VENTILATING UNIT. PROVIDE MERV-8 PRE FILTER, MERV-13 FINAL FILTER, TOTAL ENERGY RECOVERY WHEEL WITH ECONOMIZER BYPASS, 100% ECONOMIZER, SUPPLY FAN, EXHAUST FAN, AND HOT WATER HEATING COIL. PROVIDE HWS&R BRANCH PIPING TO NEAREST HWS&R MAIN.
2. 14,600 CFM HEATING AND VENTILATING UNIT. PROVIDE MERV-8 PRE FILTER, MERV-13 FINAL FILTER, TOTAL ENERGY RECOVERY WHEEL WITH ECONOMIZER BYPASS, 100% ECONOMIZER, SUPPLY FAN, EXHAUST FAN, AND HOT WATER HEATING COIL. PROVIDE HWS&R BRANCH PIPING TO NEAREST HWS&R MAIN.
3. 14,600 CFM HEATING AND VENTILATING UNIT. PROVIDE MERV-8 PRE FILTER, MERV-13 FINAL FILTER, TOTAL ENERGY RECOVERY WHEEL WITH ECONOMIZER BYPASS, 100% ECONOMIZER, SUPPLY FAN, EXHAUST FAN, AND HOT WATER HEATING COIL. PROVIDE HWS&R BRANCH PIPING TO NEAREST HWS&R MAIN.
4. PROVIDE HWS&R BRANCH PIPING FROM CUH,UH, OR CONVECTOR TO NEAREST HWS&R MAIN (TYPICAL FOR ALL HYDRONIC HEATING EQUIPMENT).
5. PROVIDE A 2 TON SPLIT HEAT PUMP SYSTEM TO CONDITION THIS ROOM. PROVIDE A WALL MOUNTED EVAPORATOR WITH CONDENSATE PUMP AND A CONDENSING UNIT ON THE ROOF. PROVIDE CONDENSATE PIPING TO NEAREST CONDENSATE RECEPTOR.
6. REFER TO METAL FABRICATION SHOP FOR TYPICAL HVAC LAYOUT IN THIS AREA. REFER TO EQUIPMENT PLANS FOR EXHAUST REQUIREMENTS. PROVIDE DEDICATED EXHAUST DUCTWORK FROM SHOP EQUIPMENT UP TO ROOF MOUNTED EXHAUST FANS.
7. REFER TO METAL FABRICATION SHOP FOR TYPICAL HVAC LAYOUT IN THIS AREA. REFER TO EQUIPMENT PLANS FOR EXHAUST REQUIREMENTS IN THIS SPACE. PROVIDE DEDICATED EXHAUST DUCTROM FROM SHOP EQUIPMENT TO DUST COLLECTOR LOCATED ON GRADE OUTSIDE.
8. AREA SERVED BY HVAC-3. PROVIDE 6 ZONES. EACH ZONE WILL HAVE A SUPPLY VAV TERMINAL DUCTED FROM HVAC-3 MAIN SUPPLY DUCTWORK TO CEILING MOUNTED SUPPLY DIFFUSER AND RETURN DUCTWORK TO CEILING DIFFUSERS IN EACH SPACE. PROVIDE HWS&R PIPING FROM THE NEAREST HWS&R MAIN TO EACH VAV TERMINAL UNIT. PROVIDE A COMBINATION TEPERATURE, HUMIDITY, AND CO2 SENSOR FOR EACH ZONE. REFER TO EQUIPMENT PLANS FOR EQUIPMENT REQUIRING EXHAUST. PROVIDE BLACK IRON EXHAUST DUCTWORK FROM KITCHEN HOODS/UP TO A 9,600 CFM EXHAUST FAN ON THE ROOF AND ALUMINUM DUCTWORK FROM DISHWASHER EXHAUST UP TO A 450 CFM EXHAUST FAN ON THE ROOF. PROVIDE AN EXHAUST DUCT FROM THE OVEN TO A 590 CFM EXHAUST FAN ON THE ROOF.
9. AREA SERVED BY ERV-1. PROVIDE 10 ZONES. PROVIDE EACH ZONE WITH AN OUTSIDE AIR VAV TERMINAL DUCTED FROM ERV-1 MAIN TO THE FCU RETURN DUCT, AN EXHAUST VAV TERMINAL DUCTED TO A CEILING GRILLE, AND A 1.5 TON VRF FCU WITH SUPPLY DUCTWORK TO CEILING DIFFUSERS AND RETURN DUCTWORK TO FILTER RETURN GRILLES. PROVIDE A COMBINATION TEMPERATURE, HUMIDITY, AND CO2 SENSOR FOR EACH ZONE.
10. AREA SERVED BY MAU-1. PROVIDE SUPPLY DUCTWORK DISTRIBUTION TO CEILING DIFFUSERS IN SPACE. REFER TO EQUIPMENT PLANS FOR EQUIPMENT REQUIRING EXHAUST. PROVIDE BLACK IRON EXHAUST DUCTWORK FROM KITCHEN HOOD UP TO A 6,650 CFM EXHAUST FAN ON THE ROOF. PROVIDE A KITCHEN EXHAUST BALANCING DAMPER IN EACH BRANCH DUCT TO HOOD. PROVIDE DISHWASHER EXHAUST DUCTWORK FROM DISHWASHER EXHAUST CONNECTIONS UP TO A 600 CFM EXHAUST FAN ON THE ROOF.
11. AREA SERVED BY HVAC-1. PROVIDE 8 ZONES. EACH ZONE WILL HAVE A SUPPLY VAV TERMINAL DUCTED FROM HVAC-1 MAIN SUPPLY DUCTWORK TO CEILING MOUNTED SUPPLY DIFFUSER AND RETURN DUCTWORK TO CEILING DIFFUSERS IN EACH SPACE. PROVIDE HWS&R PIPING FROM THE NEAREST HWS&R MAIN TO EACH VAV TERMINAL UNIT. PROVIDE A COMBINATION TEMPERATURE, HUMIDITY, AND CO2 SENSOR FOR EACH ZONE. PROVIDE A RADIANT HEATING FLOOR ALONG PERIMETER WALL OF CAFETERIA (1,800 S.F. OF RADIANT FLOOR HEATING)
12. 40x14 SUPPLY DUCT FROM HVAC-2 TO SERVE FLOOR MOUNTED DIFFUSERS IN THE MEDIA CENTER. PROVIDE FOUR SUPPLY SERIES FAN POWERED TERMINAL UNITS TO SERVE THE FLOOR MOUNTED DIFFUSERS. PROVIDE RETURN DUCTWORK FROM FAN POWERED TERMINAL UNIT RETURN DUCT CONNECTION TO FLOOR MOUNTED RETURN GRILLES. PROVIDE MERV-13 FILTER BOX IN RETURN DUCT. PROVIDE HWS&R BRANCH PIPING FROM NEAREST HWS&R MAIN TO EACH VAV TERMINAL UNIT.
13. HYDRONIC HEAT PUMP CHILLED WATER SYSTEM PRIMARY/SECONDARY LOOP HYDRAULIC DECOUPLER AND AIR SEPARATOR LOCATED IN VOCATIONAL SHOP MEZZANINE.
14. HYDRONIC HEAT PUMP CHILLED WATER SYSTEM GLYCOL MIXIING STATION AND 55 GALLON DRUM LOCATED IN VOCATIONAL SHOP MEZZANINE.
15. HYDRONIC HEAT PUMP CHILLED WATER SYSTEM EXPANSION TANKS LOCATED IN VOCATIONAL SHOP MEZZANINE.
16. HYDRONIC HEAT PUMP CHILLED WATER BUFFER TANK LOCATED IN VOCATIONAL SHOP MEZZANINE.
17. SECONDARY CHILLED WATER LOOP CHILLED WATER PUMPS LOCATED IN VOCATIONAL SHOP MEZZANINE. PROVIDE A PUMP PACKAGE WITH THREE 400 GPM, 15 HP EA. PUMPS. PROVIDE CHILLED WATER PIPE DISTRIBUTION TO CLASSROOM SENSIBLE FAN COIL UNITS.
18. HYDRONIC HEAT PUMP HOT WATER SYSTEM PRIMARY/SECONDARY LOOP HYDRAULIC DECOUPLER AND AIR SEPARATOR LOCATED IN VOCATIONAL SHOP MEZZANINE.
19. HYDRONIC HEAT PUMP HOT WATER SYSTEM EXPANSION TANKS LOCATED IN VOCATIONAL SHOP MEZZANINE.
20. HYDRONIC HEAT PUMP SECONDARY HOT WATER LOOP HOT WATER PUMPS LOCATED IN VOCATIONAL SHOP MEZZANINE. PROVIDE A PUMP PACKAGE WITH THREE 300 GPM, 10 HP EA. PUMPS. PROVIDE HOT WATER PIPE DISTRIBUTION TO CLASSROOM SENSIBLE FAN COIL UNITS.
21. HRU-1 ZONE. PROVIDE ONE SUPPLY VAV TERMINAL UNIT DUCTED FROM HRU-1 MAIN SUPPLY DUCT TO VRF FCU RETURN DUCT AND ONE EXHAUST VAV TERMINAL DUCTED FROM HRU-1 EXHAUST MAIN DUCT TO EXHAUST GRILLES IN EACH SPACE. PROVIDE A NOMINAL 1 TON VRF FAN COIL UNIT WITH SUPPLY DUCT DISTRIBUTION TO CEILING MOUNTED SUPPLY DIFFUSERS IN EACH SPACE AND RETURN DUCT DISTRIBUTION TO FILTER RETURN GRILLES IN EACH SPACE. PROVIDE LIQUID AND SUCTION LINES FROM FAN COIL UNIT TO VRF CONDENSING UNIT ON ROOF AND A CONDENDATE DRAIN TO NEAREST CONDENSATE RECEPTOR.
22. PROVIDE ONE EXHAUST VAV TERMINAL UNIT DUCTED FROM HRU-1 EXHAUST MAIN DUCT TO EXHAUST GRILLES IN EACH SPACE. PROVIDE A TRANSFER DUCT FROM THE CORRIDOR TO EACH SPACE.
23. HRU-1 ZONE. PROVIDE ONE SUPPLY VAV TERMINAL UNIT DUCTED FROM HRU-1 MAIN SUPPLY DUCT TO VRF FCU RETURN DUCT AND ONE EXHAUST VAV TERMINAL DUCTED FROM HRU-1 EXHAUST MAIN DUCT TO EXHAUST GRILLES IN EACH SPACE. PROVIDE A NOMINAL 2.5 TON VRF FAN COIL UNIT WITH SUPPLY DUCT DISTRIBUTION TO CEILING MOUNTED SUPPLY DIFFUSERS IN EACH SPACE AND RETURN DUCT DISTRIBUTION TO FILTER RETURN GRILLES IN EACH SPACE. PROVIDE LIQUID AND SUCTION LINES FROM FAN COIL UNIT TO VRF CONDENSING UNIT ON ROOF AND A CONDENDATE DRAIN TO NEAREST CONDENSATE RECEPTOR.
24. PROVIDE A SUPPLY VAV TERMINAL UNIT CONNECTED TO HRU-1 SUPPLY MAIN TO SERVE CORRIDOR. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING DIFFUSERS IN CORRIDOR.
25. PROVIDE BOILER EXHAUST VENTS UP TO ROOF AND COMBUSTION AIR INTAKE FROM LOUVER ON EXTERIOR WALL. REFER TO EQUIPMENT PLANS FOR QUANTITY AND TYPE OF BOILERS.
26. PROVIDE BOILER EXHAUST VENTS UP TO ROOF AND COMBUSTION AIR INTAKE FROM LOUVER ON EXTERIOR WALL. REFER TO EQUIPMENT PLANS FOR QUANTITY AND TYPE OF BOILERS



2 M1-1-1W **HVAC Level 1 West**
3/32" = 1'-0"

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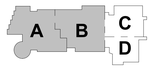
JUNE 17, 2021



KEY PLAN

PROJECT NORTH

MAGNETIC NORTH

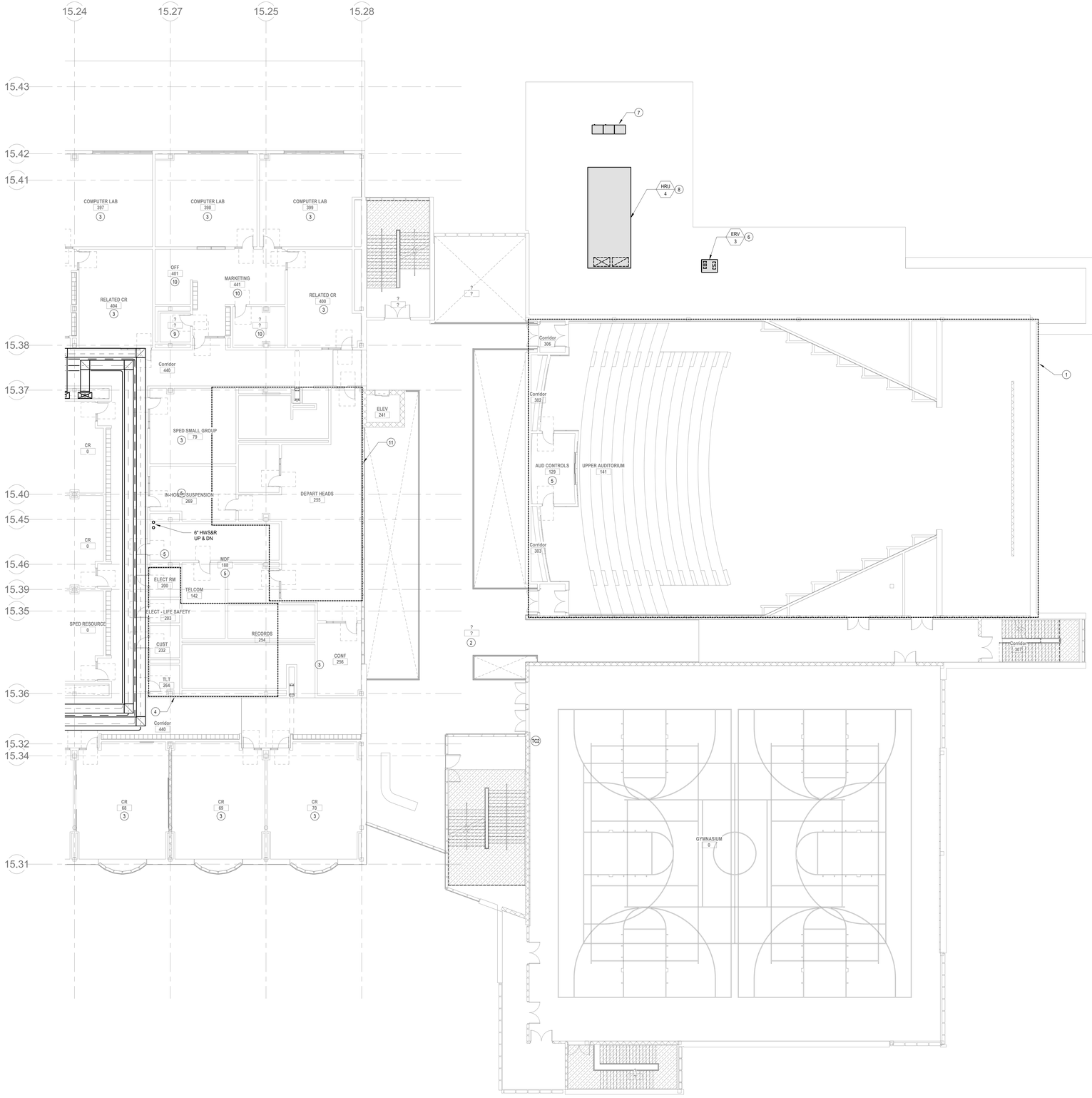
HVAC FIRST FLOOR PLAN - PLAN WEST

Scale: As indicated
Job No.: 6020409
Drawn By: DRA
Date: JUNE 17, 2021

M1-1-1W

HVAC DRAWING NOTES (#)

1. REFER TO LEVEL 1 FOR HVAC SCOPE IN THESE SPACES.
2. AREA SERVED BY HVAC-5. PROVIDE 4 ZONES ON THIS LEVEL. EACH ZONE WILL HAVE A SUPPLY VAV TERMINAL DUCTED FROM HVAC-5 MAIN SUPPLY DUCTWORK TO CEILING MOUNTED SUPPLY DIFFUSERS. PROVIDE HWS&R PIPING FROM THE NEAREST HWS&R MAIN TO EACH VAV TERMINAL UNIT. PROVIDE RETURN DUCTWORK TO CEILING MOUNTED GRILLES.
3. REFER TO 3RD FLOOR PLAN FOR TYPICAL CLASSROOM HVAC LAYOUT.
4. PROVIDE ONE EXHAUST VAV TERMINAL UNIT CONNECTED TO HRU-3 EXHAUST MAIN. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING GRILLES IN EACH SPACE.
5. PROVIDE A 3 NOMINAL TON SPLIT AC SYSTEM TO CONDITION THIS ROOM. PROVIDE A WALL MOUNTED EVAPORATOR WITH CONDENSATE PUMP ABOVE THE DOOR IN THE ROOM AND A CONDENSING UNIT ON THE ROOF. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FROM EVAPORATOR TO CONDENSING UNIT ON ROOF. PROVIDE CONDENSATE PIPING TO NEAREST CONDENSATE RECEPTOR.
6. ERV-3: 2000 CFM VARIABLE VOLUME ENERGY RECOVERY VENTILATOR SERVING THE 1ST FLOOR EARLY CHILDHOOD EDUCATION AREA. PROVIDE UNIT WITH A SUPPLY AND EXHAUST FAN, ENERGY RECOVERY WHEEL, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, AND HOT WATER HEATING COIL.
7. PROVIDE A 25 TON VRF HEAT PUMP CONDENSING UNIT SYSTEM WITH LOW AMBIENT CONTROL KIT AND AHU EXPANSION VALVE CONTROL KIT. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FOR EACH CIRCUIT FROM THE CONDENSING UNIT TO HRU-4.
8. HRU-4: 7,500 CFM VARIABLE AIR VOLUME DEDICATED OUDOOR AIR UNIT SERVING ATHLETICS. PROVIDE UNIT WITH SUPPLY AND EXHAUST FANS, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, ENERGY RECOVERY WHEEL, DX COIL, HOT WATER PRE-HEAT COIL, AND 100% ECONOMIZER. PROVIDE CONDENSATE DRAIN FROM HRU CONDENSATE DRAIN CONNECTION TO NEAREST ROOF DRAIN.
9. PROVIDE ONE EXHAUST VAV TERMINAL UNIT CONNECTED TO HRU-2 EXHAUST MAIN. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING GRILLES IN EACH SPACE.
10. SPACE SERVED BY HRU-2. PROVIDE A SENSIBLE FAN POWERED TERMINAL UNIT WITH HWS&R AND CHWS&R BRANCH PIPING FROM NEAREST HYDRONIC HEAT PUMP HWS&R AND CHWS&R MAIN. PROVIDE SUPPLY DUCTWORK FROM NEAREST HRU-2 SUPPLY MAIN AND RETURN DUCTWORK FROM A CEILING MOUNTED FITLER RETURN GRILLE TO THE SENSIBLE FAN POWERED TERMINAL UNIT AND SUPPLY DUCTWORK FROM THE SENSIBLE FAN POWERED TERMINAL UNIT TO A CEILING DIFFUSER
11. AREA SERVED BY ERV-2. PROVIDE 8 ZONES. PROVIDE EACH ZONE WITH AN OUTSIDE AIR VAV TERMINAL DUCTED FROM ERV-2 MAIN TO THE FCU RETURN DUCT, AN EXHAUST VAV TERMINAL DUCTED TO A CEILING GRILLE, AND A 1.5 TON VRF FCU WITH SUPPLY DUCTWORK TO CEILING DIFFUSERS AND RETURN DUCTWORK TO FILTER RETURN GRILLES. PROVIDE A COMBINATION TEMPERATURE, HUMIDITY, AND CO2 SENSOR FOR EACH ZONE.



2 M1-1-2E **HVAC Level 2 East**
3/32" = 1'-0"

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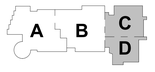


1 M1-1-2E SHADE
NTS

KEY PLAN

PROJECT NORTH

MAGNETIC NORTH

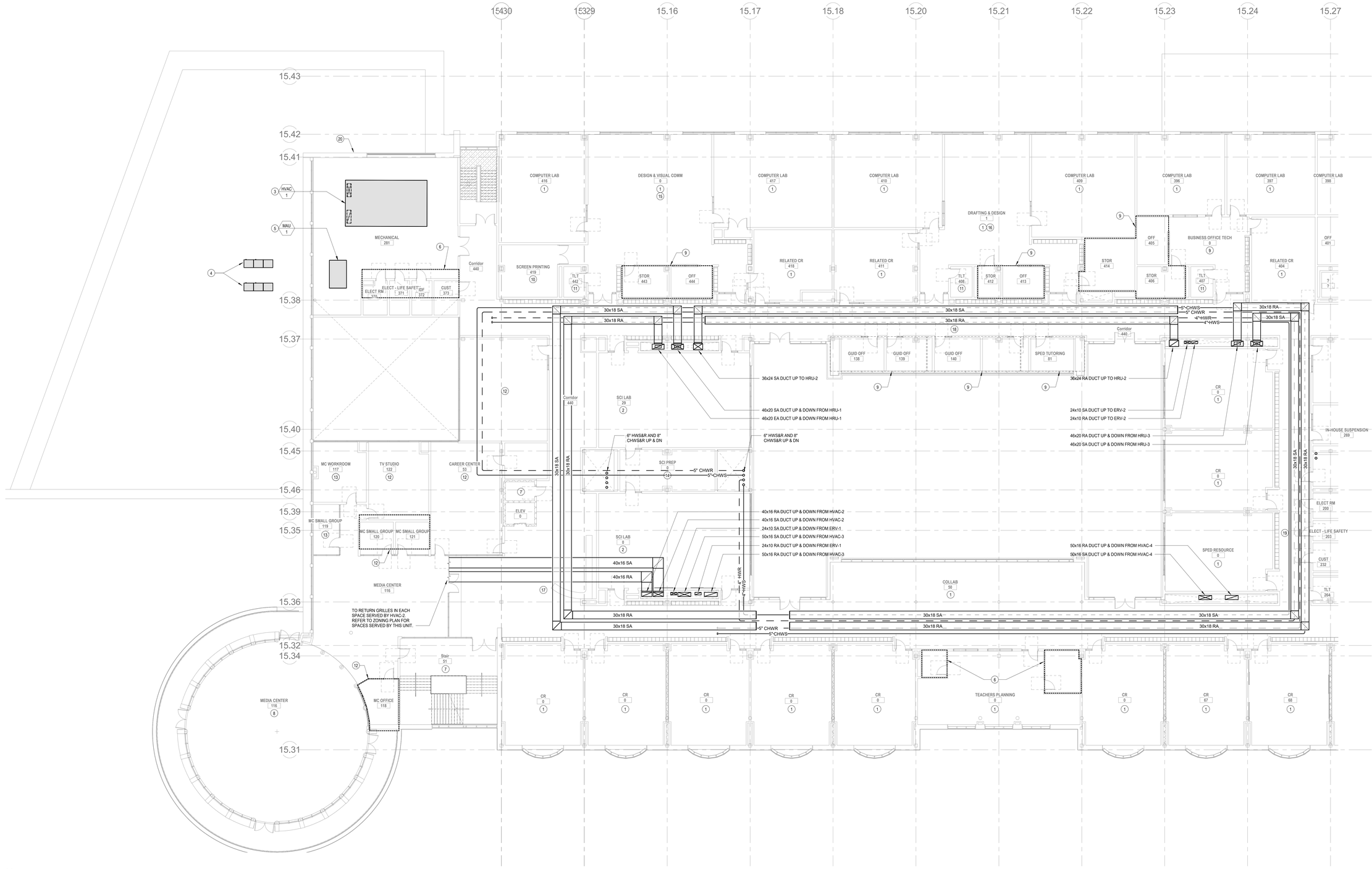
HVAC SECOND FLOOR PLAN - PLAN EAST

Scale: As indicated
Job No.: 6020409
Drawn By: DRA
Date: JUNE 17, 2021

M1-1-2E

HVAC DRAWING NOTES

1. REFER TO 3RD FLOOR PLAN FOR TYPICAL CLASSROOM HVAC LAYOUT.
2. REFER TO 3RD FLOOR PLAN FOR TYPICAL CLASSROOM HVAC LAYOUT. PROVIDE TWO SENSIBLE FAN COIL UNITS FOR EACH SCIENCE ROOM. PROVIDE A STAINLESS STEEL EXHAUST DUCT FROM FUME HOOD UP TO A DEDICATED FUME HOOD EXHAUST FAN.
3. HVAC-1: 9,500 CFM MULTI-ZONE MIXED AIR VARIABLE VOLUME ROOFTOP UNIT TO SERVE CAFETERIA. PROVIDE UNIT WITH SUPPLY AND RETURN FANS, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, ENERGY RECOVERY WHEEL, DX COIL, HOT WATER HEATING COIL AND 100% ECONOMIZER. PROVIDE CONDENSATE DRAIN FROM RTU CONDENSATE DRAIN CONNECTION TO NEAREST ROOF DRAIN.
4. PROVIDE A 30 TON VRF HEAT PUMP CONDENSING UNIT WITH LOW AMBIENT CONTROL KIT AND AHU CONTROL KIT. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FROM CONDENSING UNIT TO HVAC-1 DX COIL.
5. MAU-1: 4,500 CFM, 18 TON, SINGLE ZONE 100% OUTSIDE AIR, VARIABLE VOLUME MAKEUP AIR UNIT TO SERVE KITCHEN. PROVIDE UNIT WITH SUPPLY FAN, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, PACKAGED DX COOLING, HOT WATER HEATING COIL AND 100% ECONOMIZER. PROVIDE CONDENSATE DRAIN FROM RTU CONDENSATE DRAIN CONNECTION TO NEAREST ROOF DRAIN.
6. PROVIDE ONE EXHAUST VAV TERMINAL UNIT CONNECTED TO HRU-3 EXHAUST MAIN. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING GRILLES IN EACH SPACE.
7. PROVIDE A 2 TON SPLIT AC TO CONDITION THIS ROOM. PROVIDE A WALL MOUNTED EVAPORATOR WITH CONDENSATE PUMP AND A CONDENSING UNIT ON THE ROOF. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FROM EVAPORATOR TO CONDENSING UNIT ON ROOF. PROVIDE CONDENSATE PIPING TO NEAREST CONDENSATE RECEPTOR. (TYPICAL FOR SPLIT AC SPACES IDENTIFIED ON THE ZONING PLANS)
8. PROVIDE FLOOR MOUNTED SUPPLY DIFFUSERS IN THE MEDIA CENTER. PROVIDE SUPPLY DUCT DISTRIBUTION FROM 1ST FLOOR CEILING. PROVIDE SIDE WALL RETURN. PROVIDE RADIANT CEILING PANELS IN CEILING WITH HWS&R BRANCH PIPING FROM NEAREST HWS&R MAIN.
9. ZONE SERVED BY HRU-2. PROVIDE A SENSIBLE FAN POWERED TERMINAL UNIT WITH HWS&R AND CHWS&R BRANCH PIPING FROM NEAREST HYDRONIC HEAT PUMP HWS&R AND CHWS&R MAIN. PROVIDE SUPPLY DUCTWORK FROM NEAREST HRU-2 SUPPLY MAIN AND RETURN DUCTWORK FROM A CEILING MOUNTED FITLER RETURN GRILLE IN EACH SPACE TO THE SENSIBLE FAN POWERED TERMINAL UNIT. PROVIDE SUPPLY DUCTWORK FROM THE SENSIBLE FAN POWERED TERMINAL UNIT TO A CEILING DIFFUSER IN EACH SPACE
10. PROVIDE A VARIABLE VOLUME SUPPLY TERMINAL UNIT WITH DUCTWORK FROM THE NEAREST HRU-2 SUPPLY MAIN TO LAMINAR FLOW DIFFUSERS IN THE DARKROOM. PROVIDE EXHAUST DUCT DISTRIBUTION FROM DARKROOM SINK TO AN EXHAUST FAN ON THE ROOF.
11. PROVIDE ONE EXHAUST VAV TERMINAL UNIT CONNECTED TO HRU-2 EXHAUST MAIN. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING GRILLES IN EACH SPACE.
12. SPACE SERVED BY HVAC-2. PROVIDE A SUPPLY VAV TERMINAL UNIT DUCTED FROM HVAC-2 MAIN TO CEILING DIFFUSERS IN THE SPACE. PROVIDE A CEILING RETURN GRILLE AND DUCT TO HVAC-2 MAIN RETURN DUCT.
13. SPACE SERVED BY HVAC-2. PROVIDE A SERIES FAN POWERED TERMINAL UNIT DUCTED FROM HVAC-2 MAIN TO CEILING DIFFUSERS IN THE SPACE. PROVIDE A FILTER RETURN GRILLE DUCTED TO THE FAN POWERED TERMINAL UNITS RETURN CONNECTION. PROVIDE A CEILING RETURN GRILLE AND DUCT TO HVAC-2 MAIN RETURN DUCT.
14. ZONE SERVED BY HRU-1. PROVIDE A SENSIBLE FAN POWERED TERMINAL UNIT WITH HWS&R AND CHWS&R BRANCH PIPING FROM NEAREST HYDRONIC HEAT PUMP HWS&R AND CHWS&R MAIN. PROVIDE SUPPLY DUCTWORK FROM NEAREST HRU-1 SUPPLY MAIN AND RETURN DUCTWORK FROM A CEILING MOUNTED FITLER RETURN GRILLE IN EACH SPACE TO THE SENSIBLE FAN POWERED TERMINAL UNIT. PROVIDE SUPPLY DUCTWORK FROM THE SENSIBLE FAN POWERED TERMINAL UNIT TO A CEILING DIFFUSER IN EACH SPACE.
15. PROVIDE 12 LB/HR HUMIDIFIER WITH DUCT MOUNTED DISPERSION TUBES IN SENSIBLE FAN COIL UNIT SUPPLY DUCTWORK TO SERVE THIS SPACE.
16. PROVIDE DEDICATED EXHAUST DUCTWORK TO ROOF MOUNTED EXHAUST FAN FOR THE LASER CUTTER AND 3D PRINTER.
17. PROVIDE A SUPPLY VAV TERMINAL UNIT CONNECTED TO HRU-1 SUPPLY MAIN TO SERVE CORRIDOR. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING DIFFUSERS IN CORRIDOR.
18. PROVIDE A SUPPLY VAV TERMINAL UNIT CONNECTED TO HRU-2 SUPPLY MAIN TO SERVE CORRIDOR. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING DIFFUSERS IN CORRIDOR.
19. PROVIDE A SUPPLY VAV TERMINAL UNIT CONNECTED TO HRU-3 SUPPLY MAIN TO SERVE CORRIDOR. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING DIFFUSERS IN CORRIDOR.
20. PROVIDE A 56 S.F. OUTDOOR AIR INTAKE LOUVER WITH PLENUM AND DUCT DISTRIBUTION TO HVAC-1 AND MAU-1 OUTDOOR AIR CONNECTIONS. PROVIDE A 32 S.F. RELIEF AIR LOUVER WITH PLENUM AND DUCT DISTRIBUTION TO HVAC-3. OUTDOOR AIR INTAKE AND RELIEF LOUVERS SHALL BE SEPARATED BY A MINIMUM OF 25'-0".



2 M1-1-2W **HVAC Level 2 West**
3/32" = 1'-0"

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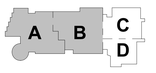


KEY PLAN

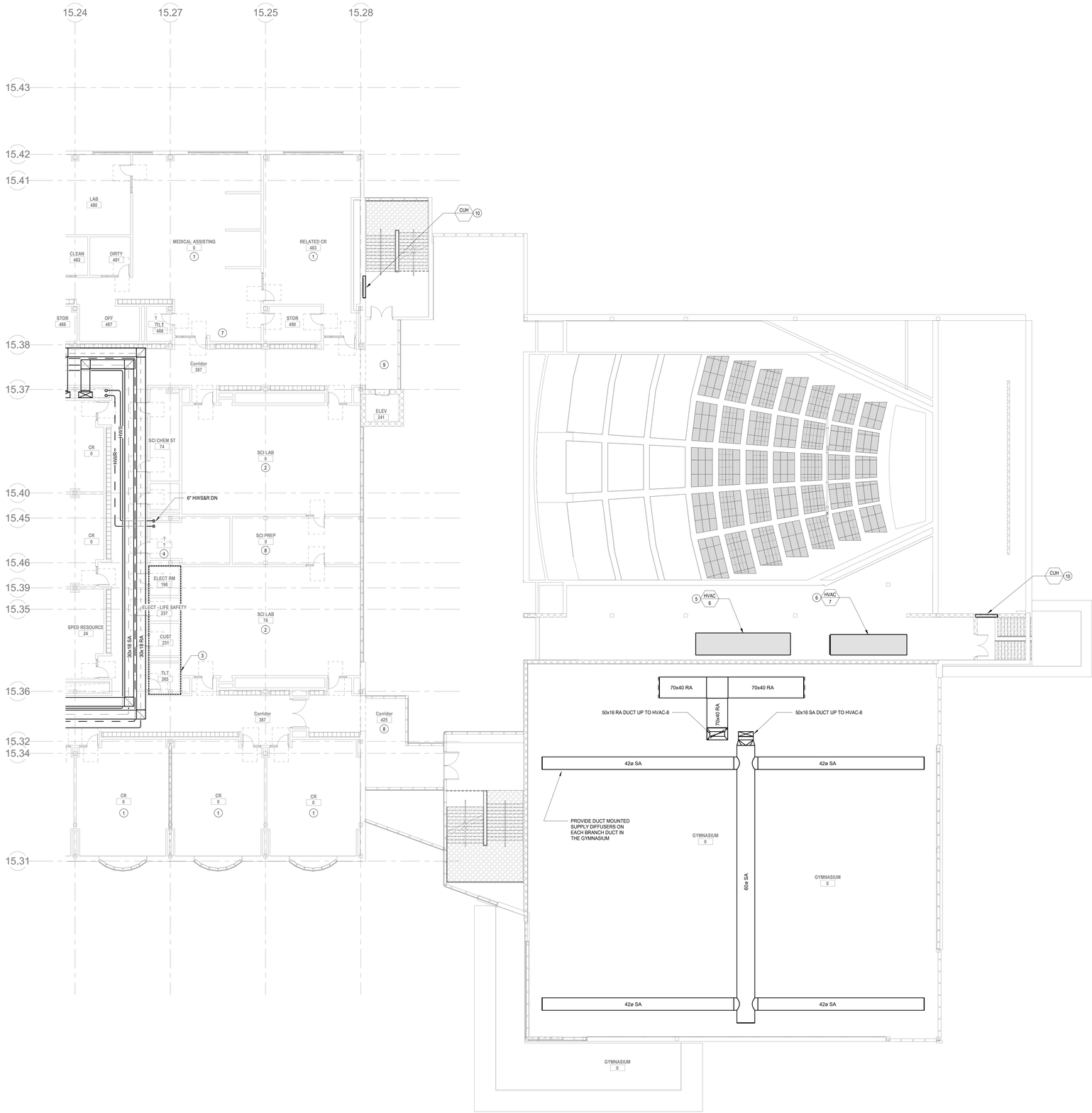
PROJECT NORTH

MAGNETIC NORTH

HVAC SECOND FLOOR PLAN - PLAN WEST

Scale: As indicated
Job No.: 6020409
Drawn By: DRA
Date: JUNE 17, 2021

M1-1-2W



2 M1-1-3E **HVAC Level 3 East**
3/32" = 1'-0"

HVAC DRAWING NOTES

1. REFER TO 3RD FLOOR PLAN FOR TYPICAL CLASSROOM HVAC LAYOUT.
2. REFER TO 3RD FLOOR PLAN FOR TYPICAL CLASSROOM HVAC LAYOUT. PROVIDE TWO SENSIBLE FAN COIL UNITS FOR EACH SCIENCE ROOM. PROVIDE A STAINLESS STEEL EXHAUST DUCT FROM FUME HOOD UP TO A DEDICATED FUME HOOD EXHAUST FAN.
3. PROVIDE ONE EXHAUST VAV TERMINAL UNIT CONNECTED TO HRU-3 EXHAUST MAIN. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING GRILLES IN EACH SPACE.
4. PROVIDE A 2 NOMINAL TON SPLIT AC SYSTEM TO CONDITION THIS ROOM. PROVIDE A WALL MOUNTED EVAPORATOR WITH CONDENSATE PUMP ABOVE THE DOOR IN THE ROOM AND A CONDENSING UNIT ON THE ROOF. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FROM EVAPORATOR TO CONDENSING UNIT ON ROOF. PROVIDE CONDENSATE PIPING TO NEAREST CONDENSATE RECEPTOR.
5. HVAC-6: 14,000 CFM SINGLE ZONE MIXED AIR VARIABLE VOLUME AIR HANDLING UNIT TO SERVE AUDITORIUM. PROVIDE UNIT WITH SUPPLY AND RETURN FANS, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, ENERGY RECOVERY WHEEL, DX COIL, HOT WATER HEATING COIL AND 100% ECONOMIZER. PROVIDE CONDENSATE DRAIN FROM RTU CONDENSATE DRAIN CONNECTION TO NEAREST ROOF DRAIN. PROVIDE SUPPLY AND RETURN DUCTWORK DISTRIBUTION TO SUPPLY DIFFUSERS AND RETURN GRILLES IN AUDITORIUM.
6. HVAC-7: 4,800 CFM SINGLE ZONE MIXED AIR VARIABLE VOLUME AIR HANDLING UNIT TO SERVE STAGE. PROVIDE UNIT WITH SUPPLY AND RETURN FANS, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, DX COIL, HOT WATER HEATING COIL AND 100% ECONOMIZER. PROVIDE CONDENSATE DRAIN FROM RTU CONDENSATE DRAIN CONNECTION TO NEAREST ROOF DRAIN. PROVIDE SUPPLY AND RETURN DUCTWORK DISTRIBUTION TO SUPPLY DIFFUSERS AND RETURN GRILLES IN AUDITORIUM.
7. PROVIDE ONE EXHAUST VAV TERMINAL UNIT CONNECTED TO HRU-2 EXHAUST MAIN. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING GRILLES IN EACH SPACE.
8. ZONE SERVED BY HRU-3. PROVIDE A SENSIBLE FAN POWERED TERMINAL UNIT WITH HWS&R AND CHWS&R BRANCH PIPING FROM NEAREST HYDRONIC HEAT PUMP HWS&R AND CHWS&R MAIN. PROVIDE SUPPLY DUCTWORK FROM NEAREST HRU-3 SUPPLY MAIN AND RETURN DUCTWORK FROM A CEILING MOUNTED FILTER RETURN GRILLE IN EACH SPACE TO THE SENSIBLE FAN POWERED TERMINAL UNIT. PROVIDE SUPPLY DUCTWORK FROM THE SENSIBLE FAN POWERED TERMINAL UNIT TO A CEILING DIFFUSER IN EACH SPACE.
9. ZONE SERVED BY HRU-2. PROVIDE A SENSIBLE FAN POWERED TERMINAL UNIT WITH HWS&R AND CHWS&R BRANCH PIPING FROM NEAREST HYDRONIC HEAT PUMP HWS&R AND CHWS&R MAIN. PROVIDE SUPPLY DUCTWORK FROM NEAREST HRU-2 SUPPLY MAIN AND RETURN DUCTWORK FROM A CEILING MOUNTED FILTER RETURN GRILLE IN EACH SPACE TO THE SENSIBLE FAN POWERED TERMINAL UNIT. PROVIDE SUPPLY DUCTWORK FROM THE SENSIBLE FAN POWERED TERMINAL UNIT TO A CEILING DIFFUSER IN EACH SPACE.
10. PROVIDE HWS&R BRANCH PIPING FROM NEAREST HWS&R MAIN.

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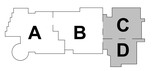


1 M1-1-3E SHADE
NTS

KEY PLAN

PROJECT NORTH

MAGNETIC NORTH

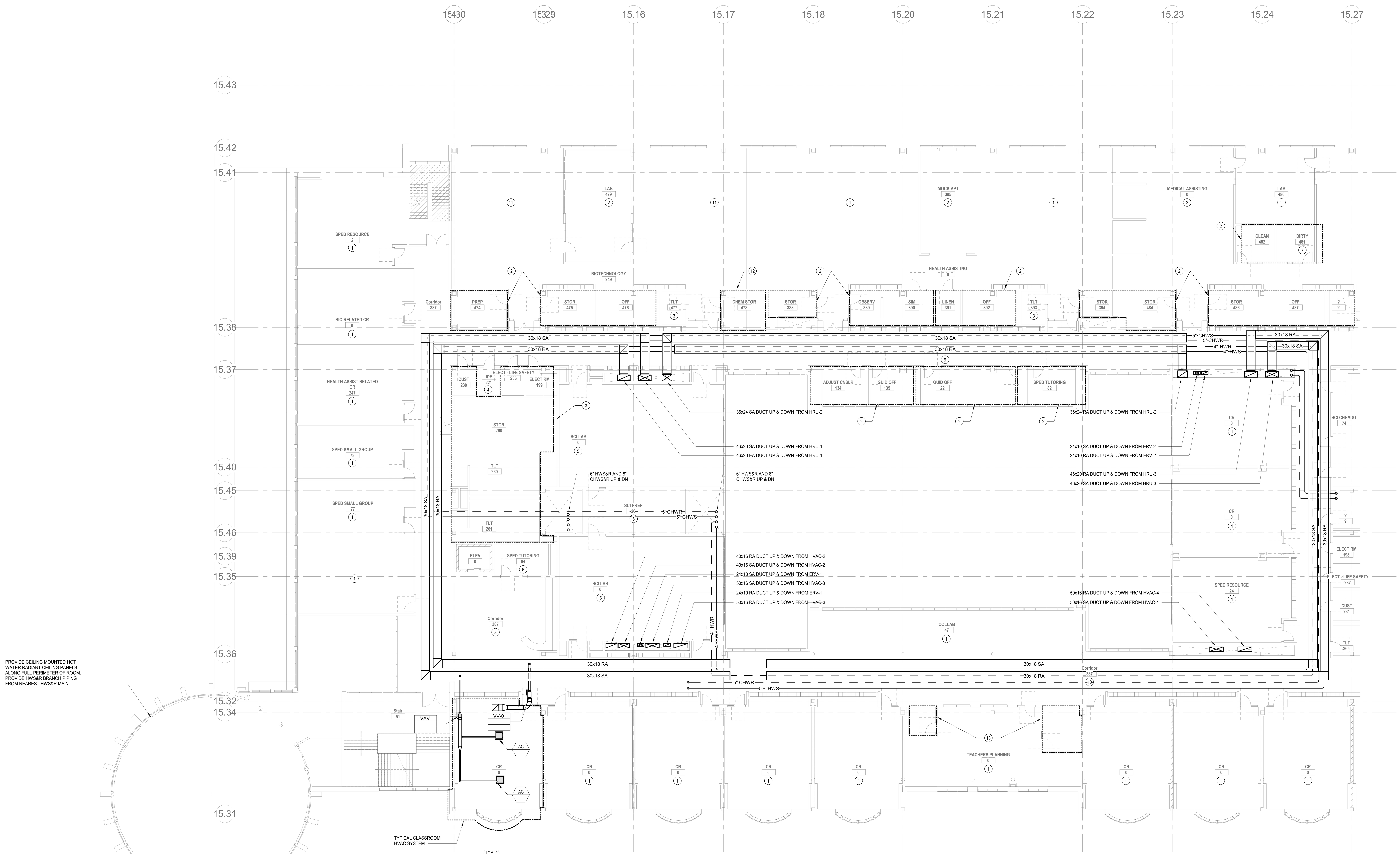
HVAC THIRD FLOOR PLAN - PLAN EAST

Scale: As indicated
Job No.: 6020409
Drawn By: DRA
Date: JUNE 17, 2021

M1-1-3E

HVAC DRAWING NOTES

1. REFER TO 3RD FLOOR PLAN FOR TYPICAL CLASSROOM HVAC LAYOUT.
2. ZONE SERVED BY HRU-2. PROVIDE A SENSIBLE FAN POWERED TERMINAL UNIT WITH HWS&R AND CHWS&R BRANCH PIPING FROM NEAREST HYDRONIC HEAT PUMP HWS&R AND CHWS&R MAIN. PROVIDE SUPPLY DUCTWORK FROM NEAREST HRU-2 SUPPLY MAIN AND RETURN DUCTWORK FROM A CEILING MOUNTED FITLER RETURN GRILLE IN EACH SPACE TO THE SENSIBLE FAN POWERED TERMINAL UNIT. PROVIDE SUPPLY DUCTWORK FROM THE SENSIBLE FAN POWERED TERMINAL UNIT TO A CEILING DIFFUSER IN EACH SPACE.
3. PROVIDE ONE EXHAUST VAV TERMINAL UNIT CONNECTED TO HRU-2 EXHAUST MAIN. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING GRILLES IN EACH SPACE.
4. PROVIDE A 2 NOMINAL TON SPLIT AC SYSTEM TO CONDITION THIS ROOM. PROVIDE A WALL MOUNTED EVAPORATOR WITH CONDENSATE PUMP ABOVE THE DOOR IN THE ROOM AND A CONDENSING UNIT ON THE ROOF. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FROM EVAPORATOR TO CONDENSING UNIT ON ROOF. PROVIDE CONDENSATE PIPING TO NEAREST CONDENSATE RECEPTOR.
5. REFER TO 3RD FLOOR PLAN FOR TYPICAL CLASSROOM HVAC LAYOUT. PROVIDE TWO SENSIBLE FAN COIL UNITS FOR EACH SCIENCE ROOM. PROVIDE A STAINLESS STEEL EXHAUST DUCT FROM FUME HOOD UP TO A DEDICATED FUME HOOD EXHAUST FAN.
6. ZONE SERVED BY HRU-1. PROVIDE A SENSIBLE FAN POWERED TERMINAL UNIT WITH HWS&R AND CHWS&R BRANCH PIPING FROM NEAREST HYDRONIC HEAT PUMP HWS&R AND CHWS&R MAIN. PROVIDE SUPPLY DUCTWORK FROM NEAREST HRU-1 SUPPLY MAIN AND RETURN DUCTWORK FROM A CEILING MOUNTED FITLER RETURN GRILLE IN EACH SPACE TO THE SENSIBLE FAN POWERED TERMINAL UNIT. PROVIDE SUPPLY DUCTWORK FROM THE SENSIBLE FAN POWERED TERMINAL UNIT TO A CEILING DIFFUSER IN EACH SPACE.
7. PROVIDE A DRYER EXHAUST BOOSTER FAN AND DUCTWORK FROM DRYER CONNECTION UP TO ROOF.
8. PROVIDE A SUPPLY VAV TERMINAL UNIT CONNECTED TO HRU-1 SUPPLY MAIN TO SERVE CORRIDOR. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING DIFFUSERS IN CORRIDOR.
9. PROVIDE A SUPPLY VAV TERMINAL UNIT CONNECTED TO HRU-2 SUPPLY MAIN TO SERVE CORRIDOR. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING DIFFUSERS IN CORRIDOR.
10. PROVIDE A SUPPLY VAV TERMINAL UNIT CONNECTED TO HRU-3 SUPPLY MAIN TO SERVE CORRIDOR. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING DIFFUSERS IN CORRIDOR.
11. REFER TO 3RD FLOOR PLAN FOR TYPICAL CLASSROOM HVAC LAYOUT. PROVIDE TWO SENSIBLE FAN COIL UNITS. PROVIDE A STAINLESS STEEL EXHAUST DUCT FROM EACH FUME HOOD UP TO A DEDICATED FUME HOOD EXHAUST FAN.
12. PROVIDE A CEILING EXHAUST GRILLE DUCTED TO A 200 CFM ROOF MOUNTED EXHAUST FAN.
13. PROVIDE ONE EXHAUST VAV TERMINAL UNIT CONNECTED TO HRU-3 EXHAUST MAIN. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING GRILLES IN EACH SPACE.



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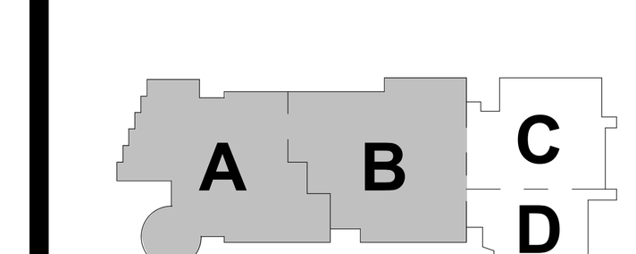
JUNE 17, 2021



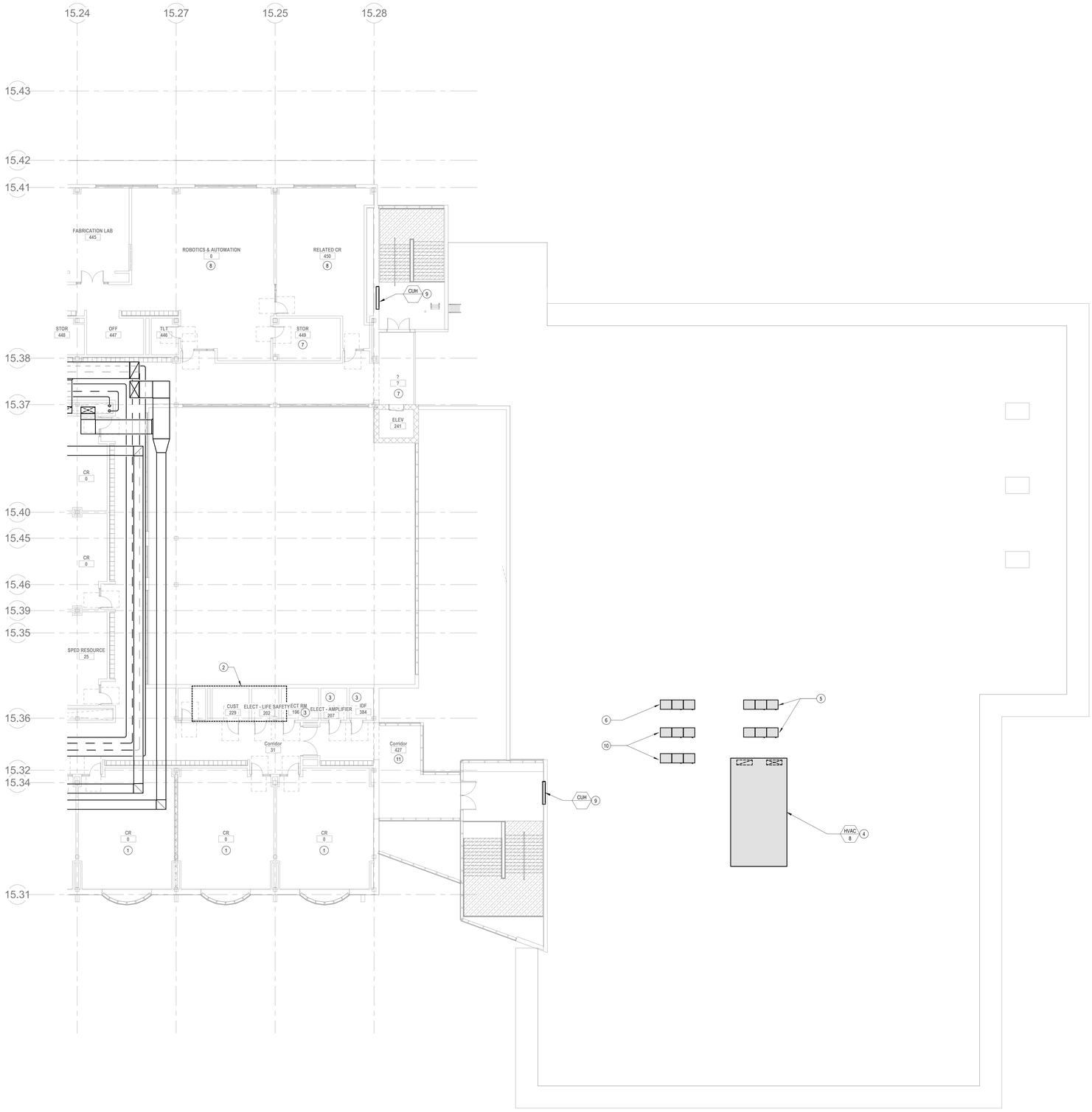
KEY PLAN

PROJECT NORTH | MAGNETIC NORTH

HVAC THIRD FLOOR PLAN - PLAN WEST

Scale: As indicated
Job No.: 6020409
Drawn By: DRA
Date: JUNE 17, 2021

M1-1-3W



HVAC DRAWING NOTES

1. REFER TO 3RD FLOOR PLAN FOR TYPICAL CLASSROOM HVAC LAYOUT.
2. PROVIDE ONE EXHAUST VAV TERMINAL UNIT CONNECTED TO HRU-3 EXHAUST MAIN. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING GRILLES IN EACH SPACE.
3. PROVIDE A 2 NOMINAL TON SPLIT AC SYSTEM TO CONDITION THIS ROOM. PROVIDE A WALL MOUNTED EVAPORATOR WITH CONDENSATE PUMP ABOVE THE DOOR IN THE ROOM AND A CONDENSING UNIT ON THE ROOF. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FROM EVAPORATOR TO CONDENSING UNIT ON ROOF. PROVIDE CONDENSATE PIPING TO NEAREST CONDENSATE RECEPTOR.
4. HVAC-8: 21,000 CFM SINGLE ZONE MIXED AIR VARIABLE VOLUME ROOFTOP UNIT TO SERVE GYMNASIUM. PROVIDE UNIT WITH SUPPLY AND RETURN FANS, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, ENERGY RECOVERY WHEEL, DX COIL, HOT WATER HEATING COIL AND 100% ECONOMIZER. PROVIDE CONDENSATE DRAIN FROM RTU CONDENSATE DRAIN CONNECTION TO NEAREST ROOF DRAIN.
5. PROVIDE A 55 TON VRF HEAT PUMP CONDENSING UNIT WITH LOW AMBIENT CONTROL KIT AND AHU CONTROL KIT. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FROM CONDENSING UNIT TO HVAC-8 DX COIL.
6. PROVIDE A 15 TON VRF HEAT PUMP CONDENSING UNIT WITH LOW AMBIENT CONTROL KIT AND AHU CONTROL KIT. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FROM CONDENSING UNIT TO HVAC-7 DX COIL.
7. ZONE SERVED BY HRU-2. PROVIDE A SENSIBLE FAN POWERED TERMINAL UNIT WITH HWS&R AND CHWS&R BRANCH PIPING FROM NEAREST HYDRONIC HEAT PUMP HWS&R AND CHWS&R MAIN. PROVIDE SUPPLY DUCTWORK FROM NEAREST HRU-2 SUPPLY MAIN AND RETURN DUCTWORK FROM A CEILING MOUNTED FITLER RETURN GRILLE IN EACH SPACE TO THE SENSIBLE FAN POWERED TERMINAL UNIT. PROVIDE SUPPLY DUCTWORK FROM THE SENSIBLE FAN POWERED TERMINAL UNIT TO A CEILING DIFFUSER IN EACH SPACE.
8. REFER TO 3RD FLOOR PLAN FOR TYPICAL CLASSROOM HVAC LAYOUT.
9. PROVIDE HWS&R BRANCH PIPING FROM CUH, UH, OR CONVECTOR TO NEAREST HWS&R MAIN (TYPICAL FOR ALL HYDRONIC HEATING EQUIPMENT).
10. PROVIDE A 40 TON VRF HEAT PUMP CONDENSING UNIT WITH LOW AMBIENT CONTROL KIT AND AHU CONTROL KIT. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FROM CONDENSING UNIT TO HVAC-6 DX COIL.
11. ZONE SERVED BY HRU-3. PROVIDE A SENSIBLE FAN POWERED TERMINAL UNIT WITH HWS&R AND CHWS&R BRANCH PIPING FROM NEAREST HYDRONIC HEAT PUMP HWS&R AND CHWS&R MAIN. PROVIDE SUPPLY DUCTWORK FROM NEAREST HRU-3 SUPPLY MAIN AND RETURN DUCTWORK FROM A CEILING MOUNTED FITLER RETURN GRILLE IN EACH SPACE TO THE SENSIBLE FAN POWERED TERMINAL UNIT. PROVIDE SUPPLY DUCTWORK FROM THE SENSIBLE FAN POWERED TERMINAL UNIT TO A CEILING DIFFUSER IN EACH SPACE.

2 M1-1-4E **HVAC Level 4 East**
3/32" = 1'-0"

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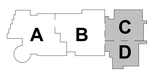


KEY PLAN

PROJECT NORTH

MAGNETIC NORTH

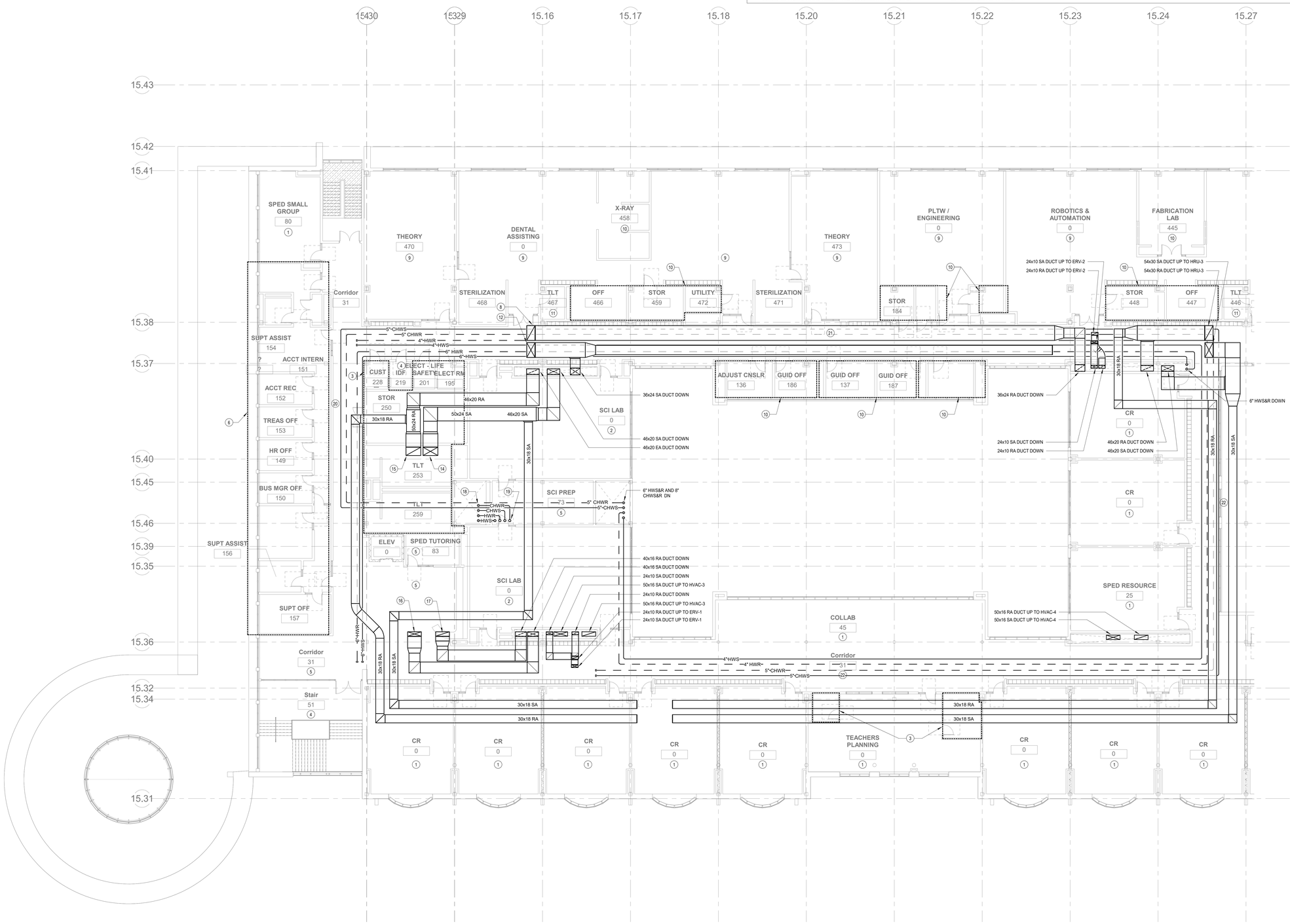
HVAC FOURTH FLOOR PLAN - PLAN EAST

Scale: As indicated
Job No.: 6020409
Drawn By: DRA
Date: JUNE 17, 2021

M1-1-4E

HVAC DRAWING NOTES

1. REFER TO 3RD FLOOR PLAN FOR TYPICAL CLASSROOM HVAC LAYOUT.
2. REFER TO 3RD FLOOR PLAN FOR TYPICAL CLASSROOM HVAC LAYOUT. PROVIDE TWO SENSIBLE FAN COIL UNITS FOR EACH SCIENCE ROOM. PROVIDE A STAINLESS STEEL EXHAUST DUCT FROM FUME HOOD UP TO A DEDICATED FUME HOOD EXHAUST FAN.
3. PROVIDE ONE EXHAUST VAV TERMINAL UNIT CONNECTED TO HRU-3 EXHAUST MAIN. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING GRILLES IN EACH SPACE.
4. PROVIDE A 2 NOMINAL TON SPLIT AC SYSTEM TO CONDITION THIS ROOM. PROVIDE A WALL MOUNTED EVAPORATOR WITH CONDENSATE PUMP ABOVE THE DOOR IN THE ROOM AND A CONDENSING UNIT ON THE ROOF. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FROM EVAPORATOR TO CONDENSING UNIT ON ROOF. PROVIDE CONDENSATE PIPING TO NEAREST CONDENSATE RECEPTOR
5. ZONE SERVED BY HRU-1. PROVIDE A SENSIBLE FAN POWERED TERMINAL UNIT WITH HWS&R AND CHWS&R BRANCH PIPING FROM NEAREST HYDRONIC HEAT PUMP HWS&R AND CHWS&R MAIN. PROVIDE SUPPLY DUCTWORK FROM NEAREST HRU-2 SUPPLY MAIN AND RETURN DUCTWORK FROM A CEILING MOUNTED FILTER RETURN GRILLE IN EACH SPACE TO THE SENSIBLE FAN POWERED TERMINAL UNIT. PROVIDE SUPPLY DUCTWORK FROM THE SENSIBLE FAN POWERED TERMINAL UNIT TO A CEILING DIFFUSER IN EACH SPACE.
6. VAV TERMINAL DUCTED FROM ERV-1 MAIN TO THE FCU RETURN DUCT, AN EXHAUST VAV TERMINAL DUCTED TO A CEILING GRILLE, AND A 1.5 TON VRF FCU WITH SUPPLY DUCTWORK TO CEILING DIFFUSERS AND RETURN DUCTWORK TO FILTER RETURN GRILLES. PROVIDE A COMBINATION TEMPERATURE, HUMIDITY, AND CO2 SENSOR FOR EACH ZONE.
7. ZONE SERVED BY HRU-3. PROVIDE A SENSIBLE FAN POWERED TERMINAL UNIT WITH HWS&R AND CHWS&R BRANCH PIPING FROM NEAREST HYDRONIC HEAT PUMP HWS&R AND CHWS&R MAIN. PROVIDE SUPPLY DUCTWORK FROM NEAREST HRU-3 SUPPLY MAIN AND RETURN DUCTWORK FROM A CEILING MOUNTED FITLER RETURN GRILLE IN EACH SPACE TO THE SENSIBLE FAN POWERED TERMINAL UNIT. PROVIDE SUPPLY DUCTWORK FROM THE SENSIBLE FAN POWERED TERMINAL UNIT TO A CEILING DIFFUSER IN EACH SPACE.
8. 54x30 EA DUCT UP TO HRU-2.
9. REFER TO 3RD FLOOR PLAN FOR TYPICAL CLASSROOM HVAC LAYOUT.
10. ZONE SERVED BY HRU-2. PROVIDE A SENSIBLE FAN POWERED TERMINAL UNIT WITH HWS&R AND CHWS&R BRANCH PIPING FROM NEAREST HYDRONIC HEAT PUMP HWS&R AND CHWS&R MAIN. PROVIDE SUPPLY DUCTWORK FROM NEAREST HRU-2 SUPPLY MAIN AND RETURN DUCTWORK FROM A CEILING MOUNTED FITLER RETURN GRILLE IN EACH SPACE TO THE SENSIBLE FAN POWERED TERMINAL UNIT. PROVIDE SUPPLY DUCTWORK FROM THE SENSIBLE FAN POWERED TERMINAL UNIT TO A CEILING DIFFUSER IN EACH SPACE.
11. PROVIDE ONE EXHAUST VAV TERMINAL UNIT CONNECTED TO HRU-2 EXHAUST MAIN. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING GRILLES IN EACH SPACE.
12. PROVIDE ONE EXHAUST VAV TERMINAL UNIT CONNECTED TO HRU-2 EXHAUST MAIN. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING GRILLES IN EACH SPACE.
13. 54x30 SA DUCT UP TO HRU-2.
14. 54x30 SA DUCT UP TO HRU-1.
15. 54x30 RA DUCT UP TO HRU-1.
16. 50x16 SA DUCT UP TO HVAC-2.
17. 50x16 RA DUCT UP TO HVAC-2.
18. 6" HWS&R AND 8" CHWS&R DN.
19. 6" HWS&R AND 8" CHWS&R UP TO HYDRONIC HEAT PUMPS.
20. PROVIDE A SUPPLY VAV TERMINAL UNIT CONNECTED TO HRU-1 SUPPLY MAIN TO SERVE CORRIDOR. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING DIFFUSERS IN CORRIDOR.
21. PROVIDE A SUPPLY VAV TERMINAL UNIT CONNECTED TO HRU-2 SUPPLY MAIN TO SERVE CORRIDOR. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING DIFFUSERS IN CORRIDOR.
22. PROVIDE A SUPPLY VAV TERMINAL UNIT CONNECTED TO HRU-3 SUPPLY MAIN TO SERVE CORRIDOR. PROVIDE DUCT DISTRIBUTION FROM VAV TERMINAL TO CEILING DIFFUSERS IN CORRIDOR.



2 M1-1-4W **HVAC Level 4 West**
3/32" = 1'-0"

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JUNE 17, 2021

A B C D

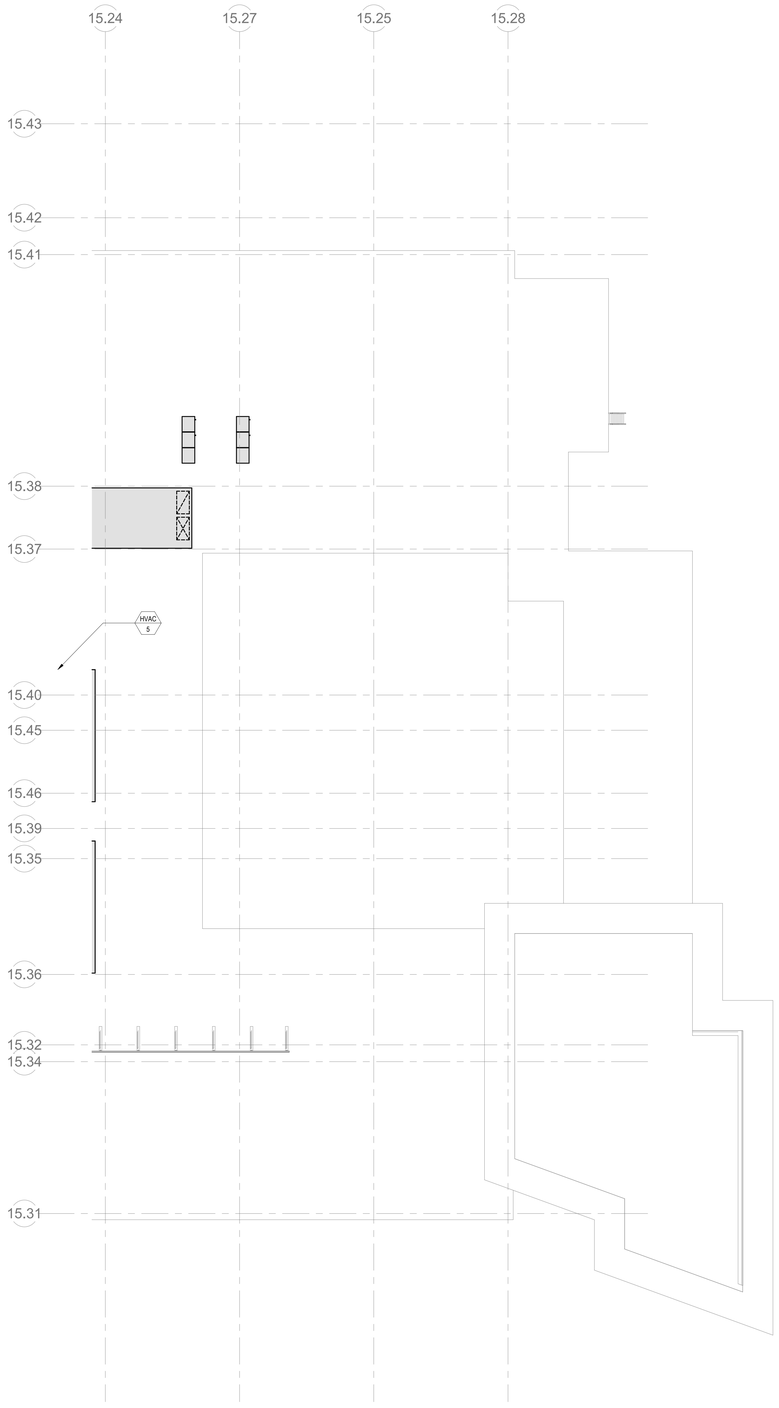
KEY PLAN

PROJECT NORTH | MAGNETIC NORTH

HVAC FOURTH FLOOR PLAN - PLAN WEST

Scale: As indicated
Job No.: 6020409
Drawn By: DRA
Date: JUNE 17, 2021

M1-1-4W



1 HVAC Main Roof East
3/32" = 1'-0"

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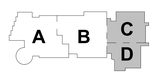


KEY PLAN

PROJECT NORTH

MAGNETIC NORTH

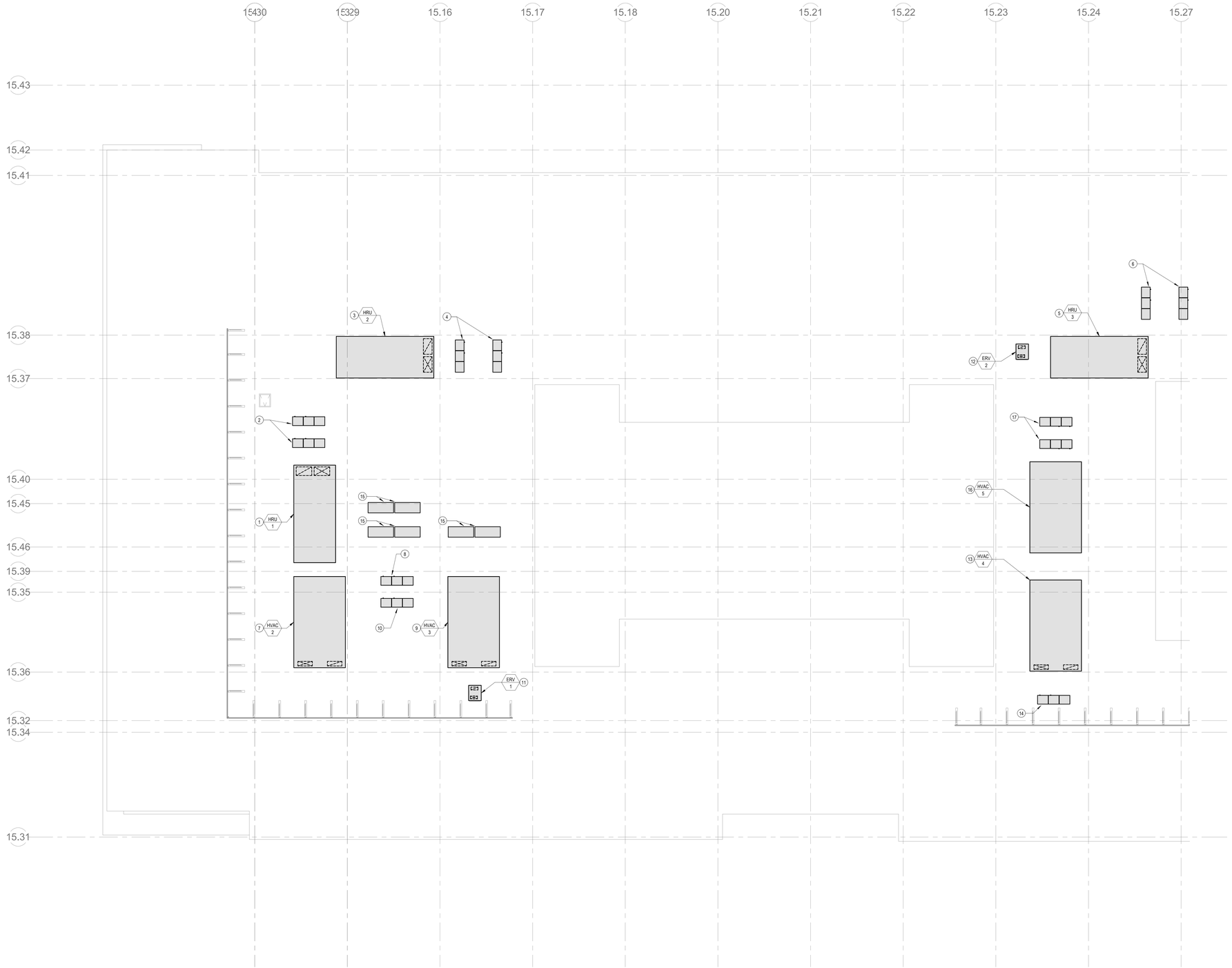
HVAC ROOF PLAN - PLAN EAST

Scale: As indicated
Job No.: 6020409
Drawn By: DRA
Date: JUNE 17, 2021

M1-2-1E

HVAC DRAWING NOTES

1. HRU-1: 16,500 CFM VARIABLE AIR VOLUME DEDICATED OUTDOOR AIR UNIT SERVING SPACES ON SOUTH SIDE OF ACADEMIC WING. PROVIDE UNIT WITH SUPPLY AND EXHAUST FANS, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, ENERGY RECOVERY WHEEL, DX COIL, HOT WATER PRE-HEAT COIL, AND 100% ECONOMIZER. PROVIDE CONDENSATE DRAIN FROM HRU CONDENSATE DRAIN CONNECTION TO NEAREST ROOF DRAIN.
2. PROVIDE A 55 TON, 2 CIRCUIT, VRF HEAT PUMP CONDENSING UNIT SYSTEM WITH LOW AMBIENT CONTROL KIT AND AHU EXPANSION VALVE CONTROL KIT. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FOR EACH CIRCUIT FROM THE CONDENSING UNIT TO HRU-1.
3. HRU-2: 16,500 CFM VARIABLE AIR VOLUME DEDICATED OUTDOOR AIR UNIT SERVING SPACES ON NORTH SIDE OF ACADEMIC WING. PROVIDE UNIT WITH SUPPLY AND EXHAUST FANS, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, ENERGY RECOVERY WHEEL, DX COIL, HOT WATER PRE-HEAT COIL, AND 100% ECONOMIZER. PROVIDE CONDENSATE DRAIN FROM HRU CONDENSATE DRAIN CONNECTION TO NEAREST ROOF DRAIN.
4. PROVIDE A 55 TON, 2 CIRCUIT, VRF HEAT PUMP CONDENSING UNIT SYSTEM WITH LOW AMBIENT CONTROL KIT AND AHU EXPANSION VALVE CONTROL KIT. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FOR EACH CIRCUIT FROM THE CONDENSING UNIT TO HRU-1.
5. HRU-3: 16,500 CFM VARIABLE AIR VOLUME DEDICATED OUTDOOR AIR UNIT SERVING SPACES ON SOUTH SIDE OF ACADEMIC WING. PROVIDE UNIT WITH SUPPLY AND EXHAUST FANS, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, ENERGY RECOVERY WHEEL, DX COIL, HOT WATER PRE-HEAT COIL, AND 100% ECONOMIZER. PROVIDE CONDENSATE DRAIN FROM HRU CONDENSATE DRAIN CONNECTION TO NEAREST ROOF DRAIN.
6. PROVIDE A 55 TON, 2 CIRCUIT, VRF HEAT PUMP CONDENSING UNIT SYSTEM WITH LOW AMBIENT CONTROL KIT AND AHU EXPANSION VALVE CONTROL KIT. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FOR EACH CIRCUIT FROM THE CONDENSING UNIT TO HRU-1.
7. HVAC-2: 7,000 CFM MULTI-ZONE MIXED AIR VARIABLE VOLUME ROOFTOP UNIT TO SERVE THE MEDIA CENTER. PROVIDE UNIT WITH SUPPLY AND RETURN FANS, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, ENERGY RECOVERY WHEEL, DX COIL, HOT WATER HEATING COIL AND 100% ECONOMIZER. PROVIDE CONDENSATE DRAIN FROM RTU CONDENSATE DRAIN CONNECTION TO NEAREST ROOF DRAIN.
8. PROVIDE A 20 TON VRF HEAT PUMP CONDENSING UNIT WITH LOW AMBIENT CONTROL KIT AND AHU CONTROL KIT. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FROM CONDENSING UNIT TO HVAC-2 DX COIL.
9. HVAC-3: 7,200 CFM MULTI-ZONE MIXED AIR VARIABLE VOLUME ROOFTOP UNIT TO SERVE CULINARY ARTS. PROVIDE UNIT WITH SUPPLY AND RETURN FANS, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, ENERGY RECOVERY WHEEL, DX COIL, HOT WATER HEATING COIL AND 100% ECONOMIZER. PROVIDE CONDENSATE DRAIN FROM RTU CONDENSATE DRAIN CONNECTION TO NEAREST ROOF DRAIN.
10. PROVIDE A 20 TON VRF HEAT PUMP CONDENSING UNIT WITH LOW AMBIENT CONTROL KIT AND AHU CONTROL KIT. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FROM CONDENSING UNIT TO HVAC-3 DX COIL.
11. ERV-1: 2000 CFM VARIABLE VOLUME ENERGY RECOVERY VENTILATOR SERVING THE 1ST FLOOR ADMIN AREA. PROVIDE WITH SUPPLY AND EXHAUST FAN, ENERGY RECOVERY WHEEL, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, AND HOT WATER HEATING COIL.
12. ERV-2: 1000 CFM VARIABLE VOLUME ENERGY RECOVERY VENTILATOR SERVING THE 2ND FLOOR DISTRICT OFFICES. PROVIDE WITH SUPPLY AND EXHAUST FAN, ENERGY RECOVERY WHEEL, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, AND HOT WATER HEATING COIL.
13. HVAC-4: 8,400 CFM MULTI-ZONE MIXED AIR VARIABLE VOLUME ROOFTOP UNIT TO SERVE COSMETOLOGY. PROVIDE UNIT WITH SUPPLY AND RETURN FANS, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, ENERGY RECOVERY WHEEL, DX COIL, HOT WATER HEATING COIL AND 100% ECONOMIZER. PROVIDE CONDENSATE DRAIN FROM RTU CONDENSATE DRAIN CONNECTION TO NEAREST ROOF DRAIN.
14. PROVIDE A 22 TON VRF HEAT PUMP CONDENSING UNIT WITH LOW AMBIENT CONTROL KIT AND AHU CONTROL KIT. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FROM CONDENSING UNIT TO HVAC-3 DX COIL.
15. TWELVE 30 NOMINAL TON VRF HEAT RECOVERY CONDENSING UNITS TO SERVE CLASSROOMS.
16. HVAC-5: 13,000 CFM MULTI-ZONE MIXED AIR VARIABLE VOLUME ROOFTOP UNIT TO SERVE AUDITORIUM AND GYMNASIUM LOBBIES. PROVIDE UNIT WITH SUPPLY AND RETURN FANS, MERV-8 PRE-FILTER, MERV-13 FINAL FILTER, ENERGY RECOVERY WHEEL, DX COIL, HOT WATER HEATING COIL AND 100% ECONOMIZER. PROVIDE CONDENSATE DRAIN FROM RTU CONDENSATE DRAIN CONNECTION TO NEAREST ROOF DRAIN.
17. PROVIDE A 40 TON, 2 CIRCUIT, VRF HEAT PUMP CONDENSING UNIT SYSTEM WITH LOW AMBIENT CONTROL KIT AND AHU EXPANSION VALVE CONTROL KIT. PROVIDE REFRIGERANT LIQUID AND SUCTION LINES FOR EACH CIRCUIT FROM THE CONDENSING UNIT TO HVAC-5.



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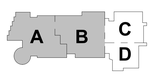

KEY PLAN

PROJECT NORTH

MAGNETIC NORTH

HVAC ROOF PLAN - PLAN WEST

Scale: As indicated
Job No.: 6020409
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M1-2-1W