DUCT & FITTING SYMBOLS

DOUBLE LINE	SINGLE LINE	DESCRIPTION
SA		SUPPLY AIR
RA		RETURN AIR
OSA		OUTSIDE AIR
EA		EXHAUST AIR
ERA		ECONOMIZER RELIEF AIR
12x12	12x12	RECTANGULAR DUCT SIZE FIRST NUMBER INDICATES VISIBLE DIMENSION AND SECOND NUMBER INDICATES HIDDEN DIMENSION. ALL DIMENSIONS ARE INCHES.
12"Ø	12"Ø	ROUND DUCT DIAMETER
48x18Ø	48x18Ø	FLAT OVAL DUCT
		SUPPLY DUCT UP OR SECTION
		SUPPLY DUCT DOWN OR SECTION AWAY
		RETURN OR OSA DUCT UP OR SECTION
		RETURN OR OSA DUCT DOWN OR SECTION
		EXHAUST DUCT UP OR SECTION
		EXHAUST DUCT DOWN OR SECTION
		TRANSITION
SQR RND		SQUARE TO ROUND TRANSITION
		FLANGED TAKEOFF (RECTANGULAR DUCT)
VD ON BRANCH DUCT		LATERAL HIGH EFFICIENCY TAKE-OFF FITTING W / VD (SQR TO RND TAKEOFF FROM RECTANGULAR MAIN)
		CONICAL 90° TAKE-OFF (ROUND / OVAL DUCT)
		45° LATERAL TAKE-OFF (ROUND / OVAL DUCT)
R		DUCT SLOPE UP (RISE)
D		DUCT SLOPE DOWN (DROP)
		END CAP
		RECTANGULAR MITERED ELBOW W/ TURNING VANES
		RECTANGULAR TEE - 90° MITERED ELBOWS W/ TURNING VANES
R D or W	R	90° OR 45° LONG RADIUS ELBOW, R=1.5 DIA OR WIDTH (ROUND OR RECTANGULAR DUCT)

HVAC SYMBOLS & ABBREVIATIONS

- DUCT WITH INTERNAL ACOUSTICAL INSULATION
- ACCESS DOOR (AD)
- VOLUME DAMPER
- COMBINATION FIRE / SMOKE DAMPER (FSD)
- FIRE DAMPER (FD)
- VERTICAL FIRE DAMPER (FD)
- MOTORIZED DAMPER (M)
- BACKDRAFT DAMPER (BD)
- OPPOSED BLADE DAMPER
- PARALLEL BLADE DAMPER
- FLEXIBLE DUCT CONNECTION
- DIRECTION OF AIRFLOW
- SUPPLY DIFFUSER
- RETURN GRILLE
- EXHAUST GRILLE
- PRESSURE RELIEF GRILLE
- WALL OR DUCT REGISTER OR GRILLE
- LINEAR DIFFUSER (or)
- FILTER
- CEILING ACCESS DOOR (AD)
- TEMPERATURE GAUGE (T)
- PRESSURE GAUGE (P)
- OUTLET / INLET TAG (XX / XXX)
- AIRFLOW, CFM (F)
- PREFIX (F) INDICATES A FIRE RATED GRILLE, REGISTER, OR DIFFUSER
- HUMIDISTAT OR HUMIDITY SENSOR (H)
- THERMOSTAT OR TEMP SENSOR (T)
- DUCT SMOKE DETECTOR (D)
- SMOKE DETECTOR (SD)
- STATIC PRESSURE SENSOR (SP)
- CARBON DIOXIDE SENSOR (CO_2)
- EMERGENCY SWITCH (ES)
- DEMOLISH
- REPLACE

GENERAL SYMBOLS

- (C) CAP FOR FUTURE
- POINT OF NEW CONNECTION
- X REVISION NUMBER
- XX / XX SECTION (LETTER) OR DETAIL (NUMERICAL) DESIGNATION SHEET NUMBER
- X / XX SECTION DESIGNATION SHEET NUMBER
- GPM X" PIPE SIZE AND FLOW TAG
- GENERAL BREAK
- LINE BREAK
- ON DEMOLITION PLANS, INDICATES ITEMS TO BE REMOVED
- 1 KEYED NOTES
- (E) EXISTING
- (F) FUTURE

PIPE SYMBOLS

- R REFRIGERANT PIPING
- NG NATURAL GAS PIPING
- CWS CHILLED WATER SUPPLY
- CWR CHILLED WATER RETURN
- CD CONDENSATE DRAIN PIPING
- HWHS HOT WATER HEATING SUPPLY
- HWHR HOT WATER HEATING RETURN
- DIRECTION OF FLOW
- CHANGE IN SIZE
- PIPE DOWN
- PIPE UP
- TEE DOWN
- TEE UP
- CAP
- PIPE UNION
- GATE VALVE
- BALL VALVE
- PRESSURE GAUGE
- TEMPERATURE GAUGE GAUGE
- PRESSURE REDUCING VALVE
- PRESSURE & TEMPERATURE GAUGE PORT
- BALANCING VALVE
- PUMP
- GLOBE VALVE
- CHECK VALVE
- SAFETY RELIEF VALVE
- TWO WAY CONTROL VALVE
- THREE WAY CONTROL VALVE
- STRAINER
- STEAM CONDENSATE TRAP

NOTE : ABBREVIATIONS AND SYMBOLS ARE ARCSINE ENGINEERING STANDARDIZED SYMBOL LEGENDS. AS SUCH, ALL SYMBOLS SHOWN MAY NOT APPEAR ON OR WITHIN THIS SET OF CONTRACT DOCUMENTS.

HVAC ABBREVIATIONS

ACFM	ACTUAL AIR - CUBIC FEET PER MINUTE
ACH	AIR CHANGES PER HOUR
AD	ACCESS DOOR
AFF	ABOVE FINISH FLOOR
AHU	AIR HANDLING UNIT
AL	ALUMINUM
AP	ACCESS PANEL
ARCH	ARCHITECT OR ARCHITECTURAL
ATD	AIR TRANSFER DUCT
BD	BACKDRAFT DAMPER
BLDG	BUILDING
BM	BEAM
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BOS	BOTTOM OF STEEL
BTU	BRITISH THERMAL UNIT
CDV	CLOTHES DRYER VENT
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CLG	CEILING
CONSTR	CONSTRUCTION
CR	CONDENSATE RETURN (STEAM)
CWS	CHILLED WATER SUPPLY
CWR	CHILLED WATER RETURN
CV	CONSTRAINT VOLUME
DB	DRY BULB
DIA	DIAMETER
DN	DOWN
DWG	DRAWING
DX	DIRECT EXPANSION (REFRIGERATION)
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
ELEV	ELEVATION
ERA	ECONOMIZER RELIEF AIR
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
EXH	EXHAUST
°F	FAHRENHEIT
FC	FLEXIBLE CONNECTION
FD	FIRE DAMPER
FLA	FULL LOAD AMPS
FLR	FLOOR
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FPM	FEET PER MINUTE
FSD	COMBINATION FIRE / SMOKE DAMPER
GALV	GALVANIZED STEEL
GC	GENERAL CONTRACTOR
GM	GAS METER
GPM	GALLONS PER MINUTE
GRD	GRILLES, REGISTERS, DIFFUSERS
H	HUMIDISTAT
HDPE	HIGH-DENSITY POLYETHYLENE
HEPA	HIGH EFFICIENCY PARTICULATE AIR
HP	MOTOR HORSEPOWER
HVAC	HEATING, VENTING, AND CONDITIONING
HWHS	HOT WATER HEATING SUPPLY
HWHR	HOT WATER HEATING RETURN
LB(S)	POUND, POUNDS
LAT	LEAVING AIR TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MA	MIXED AIR
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT CAPACITY
MECH	MECHANICAL
MFR	MANUFACTURER
MFS	MAXIMUM FUSE SIZE
MIN	MINIMUM
MOCP	MAXIMUM OVERCURRENT PROTECTION
NC	NORMALLY CLOSED
NG	NATURAL GAS
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER
OA or OSA	OUTSIDE AIR
OMSC	2014 OREGON MECHANICAL SPECIALTY CODE
OSSC	2014 OREGON STRUCTURAL SPECIALTY CODE
PBD	PARALLEL BLADE DAMPER
PD	PRESSURE DRIP
PSI	POUNDS PER SQUARE INCH
PT	PRESSURE / TEMPERATURE PLUG
PVC	POLYVINYL CHLORIDE
RA	RETURN AIR
RECT	RECTANGULAR
RPM	REVOLUTIONS PER MINUTE
REQ'D	REQUIRED
SA	SUPPLY AIR
SCFM	STANDARD AIR - CUBIC FEET PER MINUTE
SEC	SECTION
SF or SQ FT	SQUARE FEET
SIM	SIMILAR
SM	SHEET METAL
SMACNA	SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION
SP	STATIC PRESSURE
SPEC	SPECIFICATION OR SPECIFIED
SS	STAINLESS STEEL
STD	STANDARD
STM	STEAM
T	THERMOSTAT
TA	TRANSFER AIR
TC	TEMPERATURE CONTROLS
TEMP	TEMPERATURE
TOS	TOP OF STEEL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
WB	WET BULB
W/	WITH
WG	WATER GAUGE

GENERAL NOTES

1. PROVIDE ALL LABOR, MATERIALS, AND EQUIPMENT NECESSARY TO CONSTRUCT A COMPLETE, OPERATIONAL HVAC SYSTEM FOR THE ENTIRE PROJECT AS SHOWN ON THESE DRAWINGS, INCLUDING ALL NECESSARY FEES AND PERMITS.
2. THE ENTIRE INSTALLATION SHALL CONFORM TO THE REQUIREMENTS OF THE MOST RECENTLY ADOPTED BUILDING CODE, MECHANICAL CODE, PLUMBING CODE, ELECTRICAL CODE, AND ALL OTHER APPLICABLE CITY, COUNTY, STATE, AND FEDERAL CODES AND REGULATIONS IN EFFECT AT THE DATE OF THE BID. WHEREVER THE REQUIREMENTS OF THE SPECIFICATIONS OR DRAWINGS EXCEED THOSE OF THE ITEMS ABOVE, THE REQUIREMENTS OF THE SPECIFICATIONS OR DRAWINGS SHALL GOVERN.
3. WHERE THE MECHANICAL WORK WILL BE INSTALLED IN CLOSE PROXIMITY TO, OR WILL INTERFERE WITH, WORK OF OTHER TRADES, THE CONTRACTOR SHALL ASSIST IN WORKING OUT SPACE CONDITIONS TO MAKE A SATISFACTORY ADJUSTMENT PRIOR TO COMMENCING WORK. IF THE CONTRACTOR INSTALLS HIS/HER WORK BEFORE COORDINATING WITH OTHER TRADES, SO AS TO CAUSE ANY INTERFERENCE WITH WORK OF OTHER TRADES, THE CONTRACTOR SHALL MAKE THE NECESSARY CHANGES IN HIS/HER WORK TO CORRECT THE CONDITION WITHOUT EXTRA CHARGE.
4. THE DRAWINGS SHOW THE GENERAL DESIGN, ARRANGEMENTS AND THE EXTENT OF THE SYSTEM. IT SHALL BE THE WORK OF THE CONTRACTOR TO MAKE SUCH ALTERATIONS AS MAY BE NECESSARY TO MAKE THE SYSTEM COMPLETE AND OPERATIONAL IN ACCORDANCE WITH THE DESIGN INTENT. MAJOR DEVIATIONS SUCH AS CHANGES IN COMPONENT SIZES, WEIGHTS, QUANTITIES, OR MATERIAL REQUIRE PRIOR APPROVAL BY THE CONSULTING ENGINEER.
5. CONTRACTORS AND SUB-CONTRACTORS SHALL CAREFULLY REVIEW THE CONSTRUCTION DOCUMENTS. INFORMATION REGARDING THE COMPLETE WORK IS DISPERSED THROUGHOUT THE DOCUMENT SET AND CANNOT BE ACCURATELY DETERMINED WITHOUT REFERENCE TO THE COMPLETE DOCUMENT SET.
6. THE WORKING DRAWINGS ARE DIAGRAMMATIC. BECAUSE OF THE SMALL SCALE OF THE DRAWINGS, THEY DO NOT SHOW EVERY OFFSET, BEND OR ELBOW NECESSARY FOR THE COMPLETE INSTALLATION IN THE SPACE PROVIDED. ALL LOCATIONS FOR HVAC EQUIPMENT AND PIPING SHALL BE CHECKED AND COORDINATED WITH THE ARCHITECTURAL, MECHANICAL, STRUCTURAL AND ELECTRICAL DRAWINGS.
7. SPACE ABOVE ALL CEILINGS IS EXTREMELY LIMITED. CONTRACTORS SHOULD EXPECT AN EXTRA-ORDINARY NUMBER OF OFFSETS, TRANSTIONS, ETC. (WHICH MAY OR MAY NOT BE SHOWN ON THE DRAWINGS) WILL BE REQUIRED. CAREFUL COORDINATION IS REQUIRED WITH ALL TRADES BEFORE ANY PIPE, DUCT, OR EQUIPMENT IS ORDERED, FABRICATED, AND/OR INSTALLED. ANY CONFLICTS AND/OR CHANGES FOUND DURING INSTALLATION THAT RESULT FROM LACK OF COORDINATION BY THE CONTRACTORS DURING THE SHOP DRAWING PROCESS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
8. THE DRAWINGS AND SPECIFICATIONS HAVE BEEN PREPARED TO SUPPLEMENT EACH OTHER AND THEY SHALL BE INTERPRETED AS AN INTEGRAL UNIT WITH THE ITEMS SHOWN ON ONE AND NOT THE OTHER BEING FURNISHED AND INSTALLED AS THOUGH SHOWN AND CALLED OUT IN BOTH.
9. DETAILS: THE CONTRACTOR IS RESPONSIBLE TO REVIEW AND USE WHERE APPROPRIATE ALL OF THE MECHANICAL DETAILS SHOWN ON THE DRAWINGS. DETAILS MAY OR MAY NOT BE CALLED OUT ON THE DRAWINGS WITH SYMBOLS OR KEYED NOTES. ANY CHANGES RESULTING FROM FAILURE TO INSTALL THE MECHANICAL SYSTEM WITHOUT USING THE INCLUDED DETAILS IS THE RESPONSIBILITY OF THE CONTRACTOR.
10. PIPING SCHEMATICS: THE CONTRACTOR IS RESPONSIBLE TO REVIEW THE PIPING SCHEMATICS INCLUDED WITH THE DRAWINGS FOR PIPING CONNECTIONS TO ALL MECHANICAL EQUIPMENT. THE PIPING SCHEMATICS MAY NOT SHOW DETAILED CONNECTIONS INCLUDING NECESSARY VALVES, FITTINGS, PRESSURE AND TEMPERATURE GAUGES, ETC., THAT ARE NOT SHOWN ON THE PIPING PLANS. ANY CHANGES RESULTING FROM FAILURE TO INSTALL THE MECHANICAL SYSTEM WITHOUT USING THE INCLUDED PIPING SCHEMATICS IS THE RESPONSIBILITY OF THE CONTRACTOR.
11. ALL DUCTWORK SHALL BE GALVANIZED STEEL, ROUND OR RECTANGULAR. GAUGE, REINFORCEMENT, AND SUPPORT SHALL BE PER SMACNA DUCT CONSTRUCTION STANDARDS. UNLESS NOTED OTHERWISE, SUPPLY AIR DUCTS SHALL BE CONSTRUCTED TO +2" PRESSURE STANDARD, RETURN DUCTS SHALL BE CONSTRUCTED TO -1" PRESSURE STANDARD. SEAL ALL DUCTS TO SMACNA CLASS "B" STANDARDS. INSTALL IN CONFORMANCE TO MECHANICAL CODES. FLEXIBLE DUCTS SHALL BE INSULATED NONMETALLIC, FORM "NIM-II,", MAXIMUM LENGTH OF 5'-0" AT DIFFUSER OR GRILLE CONNECTION. PROVIDE BUTTERFLY BALANCING DAMPERS WHERE SHOWN OR REQUIRED, ROUND OR RECTANGULAR, GALVANIZED SHEET METAL, WITH EXTERNAL INDICATING QUADRANT AND SETSCREW. PROVIDE TURNING VANES FOR ALL RECTANGULAR ELBOWS.
12. SHEET METAL DUCT SIZES SHOWN ARE NET CLEAR INSIDE DIMENSIONS. WHEN INTERNAL INSULATION IS REQUIRED, DUCT SIZE SHALL BE INCREASED TO PROVIDE NET CLEAR DIMENSIONS INDICATED.
13. CONTRACTOR SHALL INSTALL EXPOSED DUCTWORK IN A NEAT AND CLEAN MANNER AND UTILIZE SPIRAL DUCTWORK WHERE POSSIBLE. SCRATCHED OR DENTED DUCTWORK SHALL BE REPLACED. THE ARCHITECT AND/OR ENGINEER SHALL BE THE FINAL JUDGE OF ACCEPTANCE.
14. ALL PIPING SERVING AS PART OF A HEATING OR COOLING SYSTEM SHALL BE INSULATED PER SECTION 503.2.8 OF THE OEESC.
15. DUCTWORK INSULATION:
    - A. ALL SUPPLY AIR DUCTS IN UNCONDITIONED SPACES AND PLENUMS (ABOVE CEILINGS, WITHIN CHASES, SHAFTS, OR MECHANICAL ROOMS) AND WITHIN THE BUILDING ENVELOPE SHALL BE INSULATED WITH 2" THICK FIBERGLASS DUCT WRAP FACED WITH OUTER FOIL BLANKET, OR LINED WITH 1-1/2" THICK, COATED FIBERGLASS INSULATION, MINIMUM INSTALLED R-VALUE OF 5.
    - B. ALL OUTSIDE AIR DUCTS IN UNCONDITIONED SPACES AND PLENUMS (ABOVE CEILINGS, WITHIN CHASES, SHAFTS, OR MECHANICAL ROOMS) AND WITHIN THE BUILDING ENVELOPE SHALL BE INSULATED WITH 1-1/2" THICK, 3/4 LB. DENSITY, FIBERGLASS DUCT WRAP FACED WITH OUTER FOIL BLANKET, OR LINED WITH 1/2" THICK, COATED FIBERGLASS INSULATION, MINIMUM INSTALLED R-VALUE OF 1.9.
    - C. ALL OUTSIDE AIR DUCTS WITHIN FULLY CONDITIONED SPACES SHALL BE INSULATED WITH 1-1/2" THICK, 3/4 LB. DENSITY, FIBERGLASS DUCT WRAP FACED WITH OUTER FOIL BLANKET, OR LINED WITH 1" THICK, COATED FIBERGLASS INSULATION, MINIMUM INSTALLED R-VALUE OF 3.5.
    - D. ALL EXHAUST AIR DUCTWORK SHALL BE INSULATED BETWEEN THE FAN OUTLET AND WALL/ROOF OUTLET WITH 1-1/2" THICK, 3/4 LB. DENSITY, FIBERGLASS DUCT WRAP FACED WITH OUTER FOIL BLANKET, MIN. INSTALLED R-VALUE OF 3.5.
    - E. EXPOSED SUPPLY AND RETURN AIR DUCTWORK WITHIN CONDITIONED SPACES NEED NOT BE INSULATED UNLESS NOTED OTHERWISE.
16. PROVIDE FLEXIBLE DUCT CONNECTORS WHERE DUCTS CONNECT TO AIR HANDLING EQUIPMENT.
17. DUCT SMOKE DETECTORS:
    - A. UPON ACTIVATION, THE SMOKE DETECTORS SHALL SHUT DOWN ALL OPERATIONAL CAPABILITIES OF THE AIR DISTRIBUTION SYSTEM IN ACCORDANCE WITH THE LISTING AND LABELING OF APPLIANCES USED IN THE SYSTEM.
    - B. WHEN A FIRE ALARM SYSTEM IS PROVIDED THE DUCT SMOKE DETECTORS SHALL BE CONNECTED TO THE BUILDING'S FIRE ALARM CONTROL PANEL.
    - C. PROVIDE REMOTE TEST AND RESET CAPABILITIES FOR ALL DUCT DETECTORS.
18. THE STRUCTURE SHOWN ON ALL DETAILS MAY OR MAY NOT PERTAIN TO A PORTION OR ANY PORTION OF THE BUILDING. COORDINATE MOUNTING REQUIREMENTS WITH ARCHITECTURAL AND STRUCTURAL DRAWINGS.
19. ALL EQUIPMENT SHALL PROVIDE THE SCHEDULED PERFORMANCE AT THE SITE ALTITUDE OF 1950 FT. ALL MANUFACTURERS' SUBMITTAL DATA SHEETS SHALL SHOW PERFORMANCE AT SITE ALTITUDE.
20. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS. PROVIDE ALL FITTINGS, TRANSITIONS, VALVES, DAMPERS, AND OTHER DEVICES AND ACCESSORIES REQUIRED FOR A COMPLETE, WORKABLE INSTALLATION.
21. ALL MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING MUST BE SEISMICALLY BRACED FOR THE SITE SPECIFIC SEISMIC DESIGN CATEGORY AND SEISMIC USE GROUP, IN ACCORDANCE WITH THE LATEST ADOPTED EDITIONS OF THE OSSC, OMSC, ASHRAE, AND SMACNA. COORDINATE SITE SPECIFIC SEISMIC REQUIREMENTS WITH STRUCTURAL ENGINEER AND/OR ARCHITECT.
22. THE MECHANICAL CONTRACTOR SHALL FURNISH ALL REQUIRED MOTORS AND STARTERS. DISCONNECTS, WHEN NOT A PART OF THE EQUIPMENT, WILL BE FURNISHED BY THE ELECTRICAL CONTRACTOR.
23. EXISTING INTERIOR PIPING, EQUIPMENT, AND DUCTWORK HAS BEEN LOCATED IN AN APPROXIMATE WAY ONLY. THE CONTRACTOR SHALL VERIFY LOCATIONS AND POINTS OF CONNECTION AND PIPE ROUTING THROUGH EXISTING CONDITIONS PRIOR TO COMMENCING WORK.
24. IF CONTRACTOR ENCOUNTERS MATERIAL WHICH MAY CONTAIN ASBESTOS, IMMEDIATELY STOP WORK IN THIS AREA AND NOTIFY THE OWNER.
25. THE CONTRACTOR IS RESPONSIBLE FOR HVAC EQUIPMENT CHECK-IN, SAFEKEEPING, AND DAMAGE.
26. DO NOT ROUTE DUCTS AND PIPES ABOVE ELECTRICAL PANELS. ALL ELECTRICAL PANELS MUST HAVE CLEAR ACCESS SPACE IN FRONT OF PANEL 4'-0" DEEP AND 6'-6" HIGH. DO NOT ROUTE DUCT AND PIPES IN ELECTRICAL ROOMS, EXCEPT DUCTS AND PIPES SERVING THE ROOM.
27. COORDINATE EXACT LOCATIONS OF CEILING DIFFUSERS AND GRILLES WITH ARCHITECTURAL REFLECTED CEILING PLAN.
28. ALL FIRE DAMPERS SHOWN ARE 1-1/2 HOUR UNLESS OTHERWISE NOTED. INSTALL IN COMPLIANCE WITH MANUFACTURER'S U.L. LISTING.
29. PROVIDE CEILING ACCESS PANELS AS REQUIRED WHERE MECHANICAL EQUIPMENT, VALVES, VAV BOXES, FIRE DAMPERS, ETC. ARE LOCATED ABOVE INACCESSIBLE CEILINGS. MINIMUM ACCESS PANEL SIZE IS 24"x24" UNLESS OTHERWISE NOTED.
30. TWO OPERATING AND MAINTENANCE MANUALS SHALL BE PROVIDED IN HARD BACK LOOSE LEAF BINDERS. MANUALS SHALL CONTAIN PRODUCT CUT SHEETS AND OPERATING AND MAINTENANCE INSTRUCTIONS ON ALL EQUIPMENT, ACCESSORIES, FIXTURES, VALVES, ETC., PROVIDED FOR THE PROJECT. PROVIDE LIST OF EQUIPMENT WITH ALL NAMEPLATE DATA INCLUDING TAG #, MODEL NUMBER, SERIAL NUMBER, AND NAME OF LOCAL REPLACEMENT PARTS SUPPLIER.
31. UPON COMPLETION OF THE WORK, REMOVE ALL SURPLUS MATERIALS AND RUBBISH. MAKE ALL REQUIRED PATCHING AND REPAIRS OF OTHER TRADES' WORK DAMAGED BY THE MECHANICAL CONTRACTOR, AND LEAVE THE PREMISES IN A CLEAN, ORDERLY CONDITION.
32. THE MECHANICAL CONTRACTOR SHALL OPERATE THE SYSTEM AND DEMONSTRATE ALL ASPECTS TO THE ENGINEER AND/OR OWNER, TO PROVE ITS OPERATION. ALL FILTERS USED DURING CONSTRUCTION SHALL BE REPLACED PRIOR TO THE TEST RUN PERIOD.
33. THE CONTRACTOR SHALL, DURING CONSTRUCTION, MAINTAIN A SET OF AS-BUILT REDLINED RECORD DRAWINGS AT THE PROJECT SITE. ALL CHANGES IN LAYOUT, ROUTING, EQUIPMENT, COMPONENTS, AND ACCESSORIES SHALL BE RECORDED.

EXHIBIT B TO BRITT HALL COMMISSIONING RFP 2021-XX

SHEET LIST

kistler+ small +white architects
66 WATER STREET
SUITE 101
ASHLAND, OR
97520
TEL.: 541.488.8200

THESE DRAWINGS SHALL BE USED FOR:
CONSTRUCTION
BIDDING
RECORDATION
CONVEYANCE
ISSUANCE OF A PERMIT

PHASE 2
BID SET

REGISTERED PROFESSIONAL ENGINEER
75561
OREGON
JULY 31, 1985
JOHN M. KELLER
EXPIRES: 06/30/21

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SOUTHERN OREGON UNIVERSITY
SISKIYOU BOULEVARD, ASHLAND OREGON, 97520

REVISIONS
2 IB-1 07.24.2020

MECHANICAL LEGEND AND NOTES

PROJECT NO.: 1905
ISSUE DATE: 02.13.2020
SHEET:

M1.0

AIR HANDLING UNIT SCHEDULE

TAG	TOTAL CFM	OUTSIDE AIR CFM	MIN OUTSIDE AIR CFM	COOLING COIL						HEATING COIL					FILTERS		SUPPLY FAN				RETURN/RELIEF FAN					ELECTRICAL				MANUFACTURER	MODEL	DIM. L x W x H (IN.)	OPERATING WEIGHT	NOTES
				GPM	TOTAL MBH	SENS MBH	EWT/ LWT	EDB	EWB	LDB	LWB	HEATING CFM	GPM	TOTAL MBH	EWT/ LWT	EDB	LDB	TYPE	EFF.	BHP	MOTOR HP	EXT.SP	CONTROL TYPE	CFM	BHP	MOTOR HP	EXT SP	CONTROL TYPE	VOLTS	PHASE	MCA	MOCP					
AH-1	11,000	2,500	960	32.4	292.6	276.1	45/63	79.5	63.6	55	54	5,500	13.8	207	180/150	46.6	80	2" PLEAT	MERV13	11.2	2 @ 7.2	2.5	VFD	SEPARATE RETURN FAN, SEE FAN SCHEDULE					208	3	38.6	50	TRANE	CSAA021	151 x 80 x 53	2,500	1,2
AH-2	4,000	970	305	11.5	104.1	102.2	45/63	80.4	63.4	55	54	2,000	4.5	66.5	180/150	48	80	2" PLEAT	MERV13	3.7	7.6	2.2	VFD	4,000	2.4	4.2	0.75	VFD	208	3	22.8 & 12.13	40 & 20	TRANE	CSAA008	163 x 51 x 38	1,700	1,2,3
AH-3	3,000	625	225	9.5	85.4	83.9	45/63	82.8	64.2	55	55	1,500	6.1	91.0	180/150	50	80	2" PLEAT	MERV13	3.0	4.2	2.6	VFD	3,000	1.9	4.2	1.00	VFD	208	3	2 @ 12.13	2 @ 20	TRANE	CSAA006	148 x 44 x 36	1,700	1,2,3
AH-4	9,000	1,070	470	27.4	224.0	216.9	45/63	80.0	63.8	55	54	9,000	23.2	332.8	180/150	55.4	95	2" PLEAT	MERV13	8.1	Y2 @ Y1.2	1.8	VFD	9,000	2.2	Y2 @ 7.4	0.79	VFB	208	3Y	Y2.9 & 20.6Y	40^6, 30 Y	TRANE	YCSAA021	163 x 80 x 53	3,425	1,4
AH-5	2,450	430	430	7.0	62.7	62.7	45/63	79.5	60.8	55	51	1,200	3.1	45.9	180/150	53	80	2" PLEAT	MERV13	1.6	2.3		VFD	2,450	0.8	4.2	0.50	VFD	208	3	17.3	20	TRANE	CSAA006	142 x 44 x 41	2,065		3

NOTES:
1. PROVIDE DIRECT-DRIVE, MOTORIZED IMPELLER TYPE FANS, OUTSIDE AIR DAMPERS WITH AIRFLOW MEASUREMENT
2. PROVIDE WITH SHIPPING SPLITS AS REQUIRED TO FIT THROUGH EXTERIOR DOORS. COORDINATE WITH ARCHITECTURAL PLANS AND GC.
3. ALTERNATE 1.
4. ROOF MOUNTED. PROVIDE 14" CURB, PIPING VESTIBULE, EXHAUST AND INTAKE AIR HOODS, SINGLE POINT POWER

4-PIPE FAN COIL UNIT SCHEDULE

TAG	TOTAL CFM	MIN. OUTSIDE AIR (CFM)	COOLING COIL						HEATING COIL					SUPPLY FAN			ELECTRICAL				MANUFACTURER	MODEL	WEIGHT
			GPM	EWT	TOTAL (MBH)	SENS (MBH)	EDB	EWB	GPM	EWT	TOTAL (MBH)	EDB	LDB	MOTOR HP	EXT. S.P.	CONTROL TYPE	VOLTS	PHASE	MCA	MOCP			
FC-1	490	55	1.7	45	11.2	10.0	74	62	0.6	180	16.4	66	99	1/2	0.50	CONSTANT VOL	115	1	9.3	15	TRANE	BCCD024	180
FC-2	850	0	3	45	19.7	18.4	75	62	0.8	180	24	70	98	1/2	0.75	CONSTANT VOL	115	1	9.3	15	TRANE	BCCD036	185

NOTES:
1. VERTICAL FAN COIL WITH BOTTOM RETURN
2. PROVIDE STAINLESS STEEL DRAIN PAN, ECM MOTOR, 2" MERV 13 PLEATED FILTERS

STEAM TO WATER HEAT EXCHANGER SCHEDULE

TAG	LOCATION	SERVICE	CIRCULATING FLUID (TUBE) SIDE							STEAM PSIG						MANUFACTURER	MODEL	NOTES
			FLUID	GPM	TEMP IN	TEMP OUT	MAX. PRESS. DROP, FT	FOULING FACTOR	NO. PASSES	ENTERING CONTROL VALVE	ENTERING CONVERTOR	CONTROL VALVE (LBS/HR)	MIN SQFT SURFACE AREA	TRAP (LBS/HR)	WEIGHT			
HEX-1	BASEMENT	HHW	H2O	140	150	180	15	0.0005	2	15	3	2,080	68	2,080		BELL & GOSSETT	QSU-88-2	
NOTES:																		

FAN SCHEDULE

TAG	SERVICE	TYPE	CFM	ESP	ELECTRICAL			MANUFACTURER	MODEL	WEIGHT	NOTES
					VOLTS	PHASE	HP / WATTS				
RF-1	AH-1 RETURN	INLINE	11,000	1.25	208	3	5	GREENHECK	BSQ-300	560	1,2
F-8	BASEMENT RESTROOMS	ROOF MNT	470	0.50	115	1	1/10	GREENHECK	G-090-VG	50	4
DEF-1	CLOTHES DRYER BOOSTER	INLINE	NA	NA	115	1	72 W	FANTECH	DEDPV-705	13	3,5

NOTES:
1. PROVIDE INSULATED HOUSING, BASE MOUNT SPRING ISOLATORS, AUTO BELT TENSIONER
2. PROVIDE PREMIUM EFFICIENT MOTOR WITH SHAFT GROUNDING RING FOR VARIABLE SPEED OPERATION
3. PRESSURE SWITCH, TEMPERATURE LIMIT SWITCH, TWO CLEANOUTS, REMOTE STATUS LIGHT(S).
4. PROVIDE CURB ADAPTOR, MOTORIZED DAMPER, EC MOTOR WITH SPEED CONTROL DIAL, DISCONNECT SWITCH W/ AUX CONTACT FOR DAMPER MOTOR
5. ALTERNATE 1

EXPANSION TANK SYSTEM SCHEDULE

TAG	SYSTEM	TANK TYPE	APPROX. SYSTEM VOL (GAL)	SYSTEM TEMP RANGE F		INITIAL PRESSURE IN TANK	PRV FILL PRESSURE AT TANK	MAX. OPERATING PRESSURE		MIN. VOL (GAL)	AIR SEPARATOR				PIPE SIZE TO TANK	COLD WATER FILL SIZE	MAX. OPERATING WEIGHT		MANUFACTURER	TANK MODEL	AIR SEPARATOR MODEL	NOTES
				MIN.	MAX.			RELIEF VALVE	AT TANK		SIZE	GPM	MAX. P.D.	STRAINER (Y/N)			TANK	AIR SEP				
ET-1	HEATING	COMPRESSION	520	45	200	12	12	60	45	60	3"	150	5'	Y	1"	3/4"	616	155	B & G	116033	R-3N	
NOTES:	1. ALL PRESSURES IN PSIG.																					

DUCT-LESS SPLIT SYSTEM SCHEDULE

TAG	TYPE	BTU	ELECTRICAL				SEER	MANUFACTURER	MODEL	WEIGHT	NOTES
			VOLTS	PHASE	MCA	MOCP					
AC-4	WALL MOUNT	18,000	208/230	1	12	15	18.5	MITSUBISHI	PKA-A18HA7	30	1,2,3,4
	CONDENSING UNIT								PUY-A18NKA7	100	

NOTES:
1. PROVIDE WIND BAFFLE FOR LOW AMBIENT COOLING.
2. PROVIDE CONDENSATE PUMP
3. PROVIDE 24V, HARDWIRED, WALL MOUNT THERMOSTAT. WIRELESS REMOTE CONTROLLERS ARE NOT ACCEPTABLE.
4. ALTERNATE 1

PUMP SCHEDULE

TAG	SYSTEM	CIRCULATING FLUID				% EFF.	BHP	CONTROL TYPE	ELECTRICAL			WEIGHT	MANUFACTURER	MODEL	NOTES
		FLUID TYPE	GPM	PUMP HEAD	TEMP.				MOTOR H.P.	VOLTS	PHASE				
P-1	HHW	H2O	75	60	180	56%	1.95	VARIABLE SPEED	3	208	3	216	BELL & GOSSETT	e-1510 1.25BC	1
P-2	HHW	H2O	75	60	180	56%	1.95	VARIABLE SPEED	3	208	3	216	BELL & GOSSETT	e-1510 1.25BC	1
P-3	FUTURE HHW	H2O	75	60	180	56%	1.95	VARIABLE SPEED	3	208	3				2

NOTES:
1. PROVIDE SUCTION DIFFUSER AND VFD RATED MOTOR
2. P-3 IS A FUTURE PUMP, LISTED HERE FOR INFO ONLY

LOUVER SCHEDULE

TAG	SYSTEM	TYPE	SIZE	CFM	MAX. AIR PD	MANUFACTURER	MODEL	NOTES
L-1	AH-2 INTAKE	DRAINABLE BLADE	44x40	4,000	0.08	GREENHECK	ESD-403	1,2,3
L-2	AH-2 RELIEF	DRAINABLE BLADE	36x33	4,000	0.15	GREENHECK	ESD-403	1,3
L-3	AH-3 INTAKE	DRAINABLE BLADE	32x30	3,000	0.16	GREENHECK	ESD-403	1,3
L-4	AH-3 RELIEF	DRAINABLE BLADE	32x34	3,000	0.10	GREENHECK	ESD-403	1,3

NOTES:
1. BAKED ENAMEL FINISH. COLOR SELECTED BY ARCHITECT FROM MANUFACTURER'S STANDARD COLORS.
2. FIELD VERIFY EXISTING WINDOW OPENING DIMENSIONS PRIOR TO ORDERING LOUVER.
3. ALTERNATE 1

VARIABLE VOLUME REHEAT BOX SCHEDULE

SYMBOL	MANUFACTURER	MODEL	INLET BOX SIZE	CFM			COIL LAT DEG F	GPM	MIN. REQ MBH	NOTES
				COOLING	HEATING	MINIMUM				
VV-11	ENVIRO-TEC	SDR	8	705	355	145	92.0	0.6	13.3	ALTERNATE 1
VV-12	ENVIRO-TEC	SDR	5	80	80	20	104.0	0.5	2.5	ALTERNATE 1
VV-13	ENVIRO-TEC	SDR	8	800	400	160	95.0	0.9	16.7	ALTERNATE 1
VV-14	ENVIRO-TEC	SDR	5	160	90	35	101.0	0.5	3.7	ALTERNATE 1
VV-15	ENVIRO-TEC	SDL	10	1320	660	265	85.0	0.9	16.6	ALTERNATE 1
VV-16	ENVIRO-TEC	SDR	6	260	130	55	93.0	0.5	3.3	ALTERNATE 1
VV-17	ENVIRO-TEC	SDR	12	2000	1000	400	82.0	0.9	25.5	BASE BID
VV-18	ENVIRO-TEC	SDR	12	2000	1000	400	82.0	0.9	25.5	BASE BID
VV-F	ENVIRO-TEC	SDR	10	1230	615	250	80.0	1.3	15.4	FUTURE
VV-F	ENVIRO-TEC	SDR	10	1230	615	250	80.0	1.3	15.4	FUTURE
VV-F	ENVIRO-TEC	SDR	8	720	360	145	85.0	0.5	9.0	FUTURE
VV-F	ENVIRO-TEC	SDR	8	510	255	105	83.0	0.5	6.4	FUTURE
VV-21	ENVIRO-TEC	SDL	14	1845	925	370	83.0	2.0	26.8	ALTERNATE 1
VV-22	ENVIRO-TEC	SDR	8	450	225	90	87.0	0.5	5.7	ALTERNATE 1
VV-23	ENVIRO-TEC	SDR	8	795	400	160	80.0	0.7	10.0	ALTERNATE 1
VV-24	ENVIRO-TEC	SDR	8	530	–	110	COOLING ONLY			ALTERNATE 1
VV-F	ENVIRO-TEC	SDR	8	390	195	80	80.0	0.5	4.9	FUTURE
VV-31	ENVIRO-TEC	SDR	8	400	200	80	89.0	0.5	5.8	ALTERNATE 1
VV-32	ENVIRO-TEC	SDR	8	575	290	115	97.0	0.6	12.0	ALTERNATE 1
VV-33	ENVIRO-TEC	SDL	12	1255	630	255	92.0	0.9	15.8	ALTERNATE 1
VV-F	ENVIRO-TEC	SDR	5	220	110	45	97.0	0.5	2.8	FUTURE
VV-F	ENVIRO-TEC	SDR	5	240	120	50	97.0	0.5	3.0	FUTURE

NOTES
1. ENTERING AIR AT 55 DEG F AT 1950 FT. ELEVATION.
2. GPM BASED ON 180 DEG F ENTERING WATER TEMPERATURE
3. SELECT VAV BOXES WITH 105 F MAXIMUM LAT.
4. COIL MAXIMUM WATER P.D. AT 3.0 FT.
5. ALL BOXES 10" INLET AND UP SHALL BE LOW PROFILE TYPE

OUTSIDE AIR SCHEDULE

SYSTEM TAG	SPACE TYPE	AREA SQ.FT. (Az)	ZONE POP. (Pz)	CFM/ PERSON (Rp)	CFM/ SQFT (Ra)	Pz*Rp	Az*Ra	EFFECTIVE-NESS (Ez)	ZONE OA (Voz)	AIRFLOW TO ZONE		PRIMARY OA FRACTION (Zp)
										PRIMARY (Vpz)	MIN (Vpzm)	
AH-1	CONFERENCE / MEETING	314	12	5	0.06	60	18.84	0.8	99	575	115	0.86
	OFFICE SPACE	92	0.46	5	0.06	2.3	5.52	0.8	10	130	30	0.33
	OFFICE SPACE	92	0.46	5	0.06	2.3	5.52	0.8	10	80	20	0.49
	OFFICE SPACE	135	0.675	5	0.06	3.375	8.1	0.8	14	160	35	0.41
	MAIN ENTRY LOBBIES	1,073	10.73	5	0.06	53.65	64.38	0.8	148	690	140	1.05
	LOCKER/DRESSING ROOMS	125	0	0	0	0	0	0.8	0	50	10	NA
	STORAGE ROOMS	159	0.318	5	0.06	1.59	9.54	0.8	14	120	25	0.56
	STORAGE ROOMS	100	0.2	5	0.06	1	6	0.8	9	50	25	0.35
	STORAGE ROOMS	57	0.114	5	0.06	0.57	3.42	0.8	5	30	15	0.33
	LECTURE CLASSROOM	1,764	35	7.5	0.06	262.5	105.84	0.8	460	1,320	265	1.74
	LECTURE CLASSROOM	961	12	7.5	0.06	90	57.66	0.8	185	720	145	1.27
	OFFICE SPACE	185	0.925	5	0.06	4.625	11.1	0.8	20	140	30	0.66
	OFFICE SPACE	114	0.57	5	0.06	2.85	6.84	0.8	12	220	45	0.27
	OFFICE SPACE	204	1.02	5	0.06	5.1	12.24	0.8	22	150	30	0.72
	RECEPTION AREAS	5,402	80	5	0.06	400	324.12	1	724	4,050	810	0.89
	COMPUTER LAB	1,800	50	10	0.12	500	216	1	716	2,460	495	1.45
	TOTALS:	12,577	204.472							10,945	2,235	
	SYSTEM POPULATION (Ps)	150										
	DIVERSITY (D)	0.7										
	UNCORRECTED OSA (Vou)	1875										
	MAX Zp	1.74										
	VENT EFF. (Ev)	0.30										
	MIN. OUTSIDE AIR (Vot), CFM	2,481										
AH-2	LECTURE CLASSROOM	992	50	7.5	0.06	375	59.52	0.8	543	2,100	550	0.99
	COPY, PRINTING	193	0.772	5	0.06	3.86	11.58	0.8	19	145	29	0.67
	CORRIDORS	104	0	0	0.06	0	6.24	0.8	8	100	20	0.39
	LAUNDRY ROOMS, CENTRAL	166	1.66	5	0.12	8.3	19.92	0.8	35	125	35	1.01
	CLASSROOMS (AGE 9 PLUS)	176	6.16	10	0.12	61.6	21.12	0.8	103	270	100	1.03
	CORRIDORS	795	0	0	0.06	0	47.7	0.8	60	400	80	0.75
	OFFICE SPACE	159	0.795	5	0.06	3.975	9.54	0.8	17	120	24	0.70
	OFFICE SPACE	98	0.49	5	0.06	2.45	5.88	0.8	10	220	44	0.24
	STORAGE ROOMS	250	0.5	5	0.06	2.5	15	0.8	22	190	38	0.68
	STORAGE ROOMS	273	0.546	5	0.06	2.73	16.38	0.8	24	200	40	0.60
	TOTALS:	3,206	60.923							3,870	960	
	SYSTEM POPULATION (Ps)	50										
	DIVERSITY (D)	0.8										
	UNCORRECTED OSA (Vou)	599										
	MAX Zp	1.03										
	VENT EFF. (Ev)	0.30										
	MIN. OUTSIDE AIR (Vot), CFM	966										
AH-3	CONFERENCE / MEETING	299	12	5	0.06	60	17.94	0.8	97	415	100	0.97
	JANITOR CLOSET, TRASH ROOM	53	0	0	0	0	0	0.8	0	50	10	NA
	CORRIDORS	248	0	0	0.06	0	14.88	0.8	19	125	25	0.74
	CORRIDORS	762	0	0	0.06	0	45.72	0.8	57	380	76	0.75
	OFFICE SPACE	137	0.685	5	0.06	3.425	8.22	0.8	15	100	20	0.73
	OFFICE SPACE	97	0.485	5	0.06	2.425	5.82	0.8	10	220	44	0.23
	OFFICE SPACE	209	1.045	5	0.06	5.225	12.54	0.8	22	155	31	0.72
	STORAGE ROOMS	75	0.15	5	0.06	0.75	4.5	0.8	7	50	10	0.66
	STORAGE ROOMS	37	0.074	5	0.06	0.37	2.22	0.8	3	20	4	0.81
	CORRIDORS	219	0	0	0.06	0	13.14	0.8	16	110	22	0.75
	BREAK ROOMS-GENERAL	518	12.95	5	0.06	64.75	31.08	0.8	120	400	120	1.00
	BREAK ROOMS-GENERAL	237	5.925	5	0.06	29.625	14.22	0.8	55	490	98	0.56
	LECTURE CLASSROOM	441	25	7.5	0.06	187.5	26.46	0.8	267	700	270	0.99
	TOILET - PUBLIC	104	0	0	0	0	0	0.8	0	100	20	NA
	TOILET - PUBLIC	169	0	0	0	0	0	0.8	0	100	20	NA
	CONFERENCE / MEETING	166	8.3	5	0.06	41.5	9.96	0.8	64	220	65	0.99
	STORAGE ROOMS	159	0.318	5	0.06	1.59	9.54	0.8	14	120	24	0.58
	STORAGE ROOMS	163	0.326	5	0.06	1.63	9.78	0.8	14	120	24	0.59
	TOTALS:	4,093	67.288							3,875	983	
	SYSTEM POPULATION (Ps)	50										
	DIVERSITY (D)	0.7										
	UNCORRECTED OSA (Vou)	522										
	MAX Zp	1.00										
	VENT EFF. (Ev)	0.30										
	MIN. OUTSIDE AIR (Vot), CFM	823										

DIFFUSER AND GRILLE SCHEDULE

TAG	TYPE	INLET SIZE	FACE SIZE	THROW PATTERN	MFGR	MODEL	NOTES
SG-1	SUPPLY AIR	6"	24x24	4-WAY	TITUS	OMNI	1
SG-2	SUPPLY AIR	8"	24x24	4-WAY	TITUS	OMNI	1
SG-3	SUPPLY AIR	12x12	24x24	4-WAY	TITUS	TDC	1
SG-4	SUPPLY AIR	6x9	24x24	1-WAY	TITUS	TDC	1,2
SG-5	SUPPLY AIR	6x15	24x24	4-WAY	TITUS	TDC	1,2
SG-6	SUPPLY AIR	6x6	12x12	4-WAY	TITUS	MCD	2,3
SG-7	SUPPLY AIR	8x8	14x14	4-WAY	TITUS	MCD	2,3
SG-8	SUPPLY AIR	10x10	16x16	4-WAY	TITUS	MCD	2,3
SG-9	SUPPLY AIR	6x6	–	2-WAY	TITUS	300RL	2,3
SG-10	SUPPLY AIR	12x6	–	2-WAY	TITUS	300RL	2,3
SG-11	SUPPLY AIR	18x6	–	2-WAY	TITUS	300RL	2,3
SG-12	SUPPLY AIR	8x6	–	2-WAY	TITUS	300RL	2,3
SG-13	SUPPLY AIR	6x8	–	2-WAY	TITUS	300RS	2,3
SG-14	SUPPLY AIR	18x8	–	2-WAY	TITUS	300RL	2,3
SG-15	SUPPLY AIR	10x3	6" RND	2-WAY	TITUS	S301FL	4
SG-16	SUPPLY AIR	12x6	12" RND	2-WAY	SHOEMAKER	SD34-O	3,4
SG-17	SUPPLY AIR	24x10	–	4-WAY	TITUS	350RL	2,3
SG-18	SUPPLY AIR	10"	24x24	4-WAY	TITUS	OMNI	1
RG-1	RETURN AIR	10x22	12x24	–	TITUS	45F	1
RG-2	RETURN AIR	10x8	–	–	TITUS	350RL	2
RG-3	RETURN AIR	10x18	–	–	TITUS	350RS	2
RG-4	RETURN AIR	12x8	–	–	TITUS	350RL	2
RG-5	RETURN AIR	14x14	–	–	TITUS	350RL	2
RG-6	RETURN AIR	18x10	–	–	TITUS	350RL	2
RG-7	RETURN AIR	30x20	–	–	TITUS	350RL	2
RG-8	RETURN AIR	22x12	–	–	TITUS	350RL	2
RG-9	RETURN AIR	22x16	–	–	TITUS	350RL	2
EG-1	EXHAUST AIR	6x6	–	–	TITUS	350RL	2,3
EG-2	EXHAUST AIR	6x6	–	–	TITUS	50F	2,3
EG-3	EXHAUST AIR	10x10	–	–	TITUS	50F	2,3

NOTES:
1. TEE BAR MOUNT
2. SURFACE MOUNT
3. WITH OBD
4. SPIRAL DUCT MOUNT

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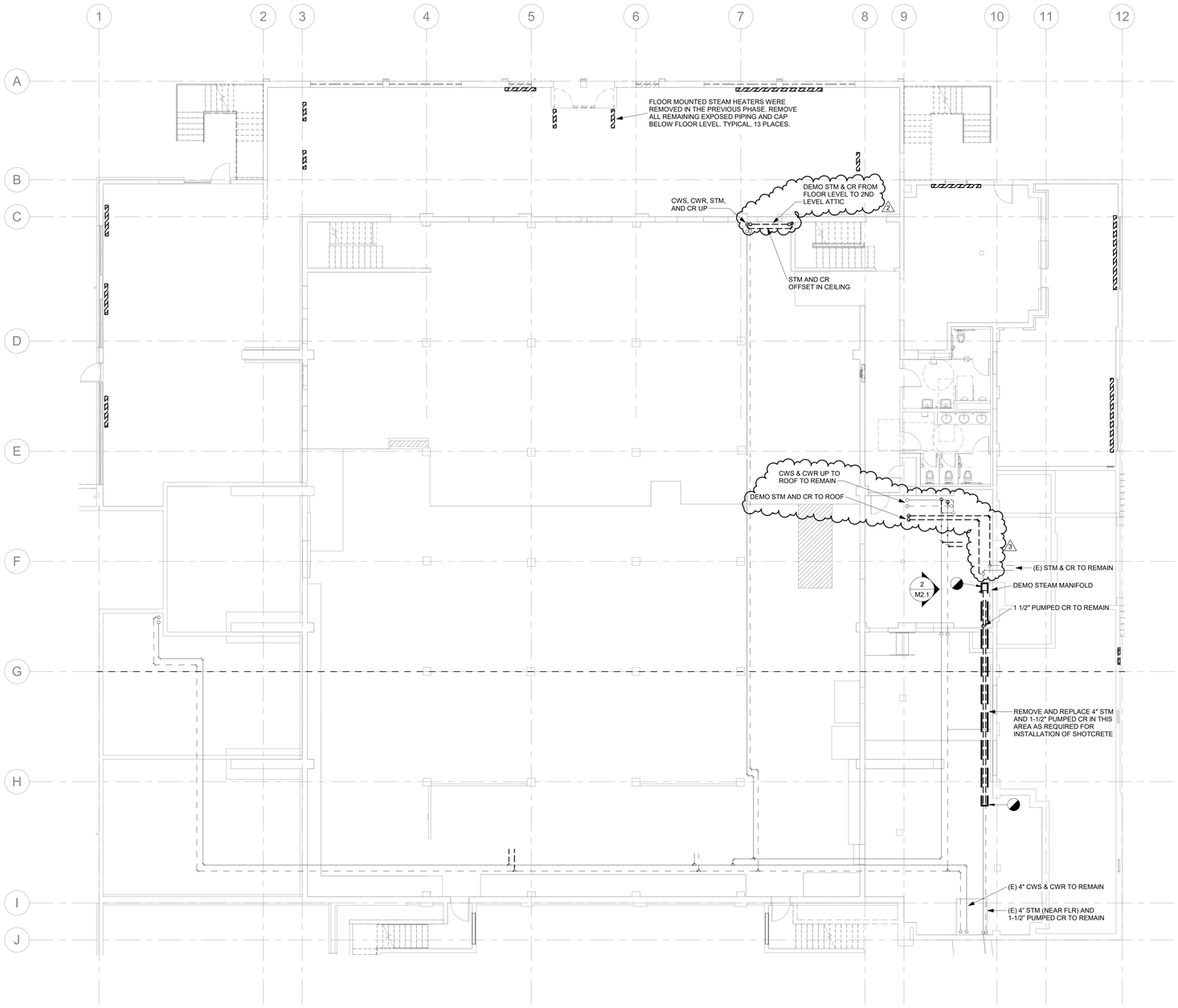
2 IB-1 07.24.2020
3 IB-2 07.24.2020

MECHANICAL SCHEDULES

PROJECT NO.: 1905
ISSUE DATE: 02.13.2020
SHEET:

M1.1



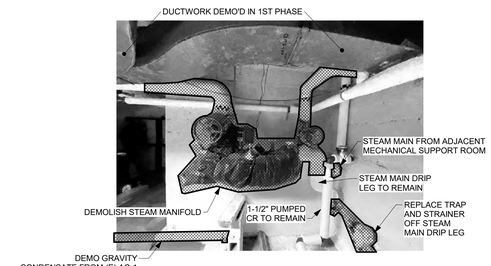
1 BASEMENT MECHANICAL DEMOLITION PLAN
1/8" = 1'-0"

SHEET NOTES

A. EXISTING INTERIOR PIPING, EQUIPMENT, AND DUCTWORK HAS BEEN LOCATED IN AN APPROXIMATE WAY ONLY. FIELD VERIFY LOCATION AND SIZE OF ALL EXISTING DUCTWORK, PIPING AND EQUIPMENT.

B. ABBREVIATIONS:
STM STEAM
CR STEAM CONDENSATE RETURN
CWS CHILLED WATER SUPPLY
CWR CHILLED WATER RETURN

POINT OF DEMOLITION. REMOVE PIPE FROM THIS POINT.



2 STEAM MANIFOLD
NOT TO SCALE

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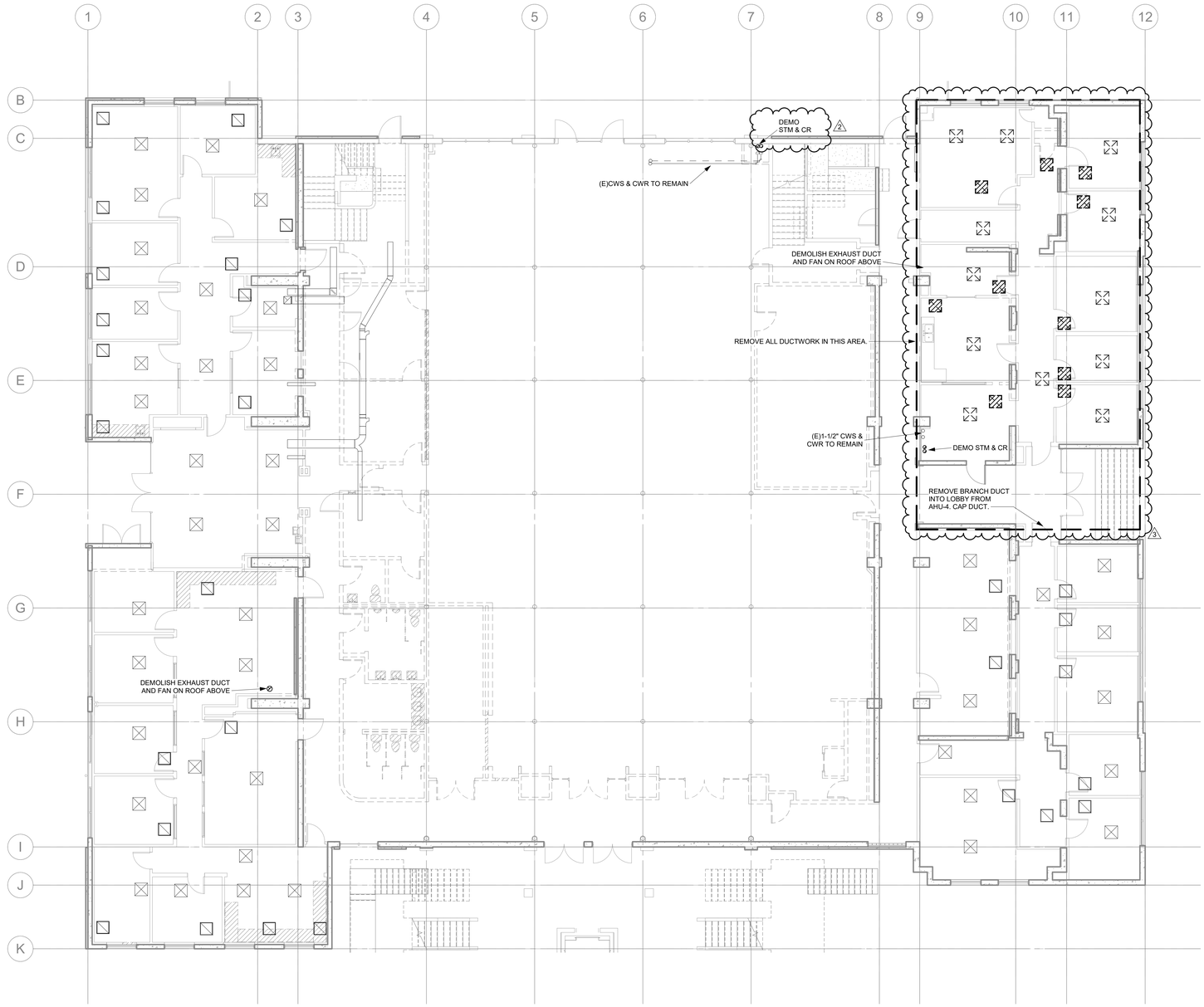
BASEMENT MECHANICAL DEMOLITION PLAN

PROJECT NO.: 1905
ISSUE DATE: 02.13.2020
SHEET:

M2.1



1 LEVEL 1 MECHANICAL DEMOLITION PLAN
1/8" = 1'-0"

SHEET NOTES

A. EXISTING INTERIOR PIPING, EQUIPMENT, AND DUCTWORK HAS BEEN LOCATED IN AN APPROXIMATE WAY ONLY. FIELD VERIFY LOCATION AND SIZE OF ALL EXISTING DUCTWORK, PIPING AND EQUIPMENT.

B. ABBREVIATIONS:
STM STEAM
CR STEAM CONDENSATE RETURN
CWS CHILLED WATER SUPPLY
CWR CHILLED WATER RETURN

POINT OF DEMOLITION. REMOVE PIPE OR DUCT FROM THIS POINT.

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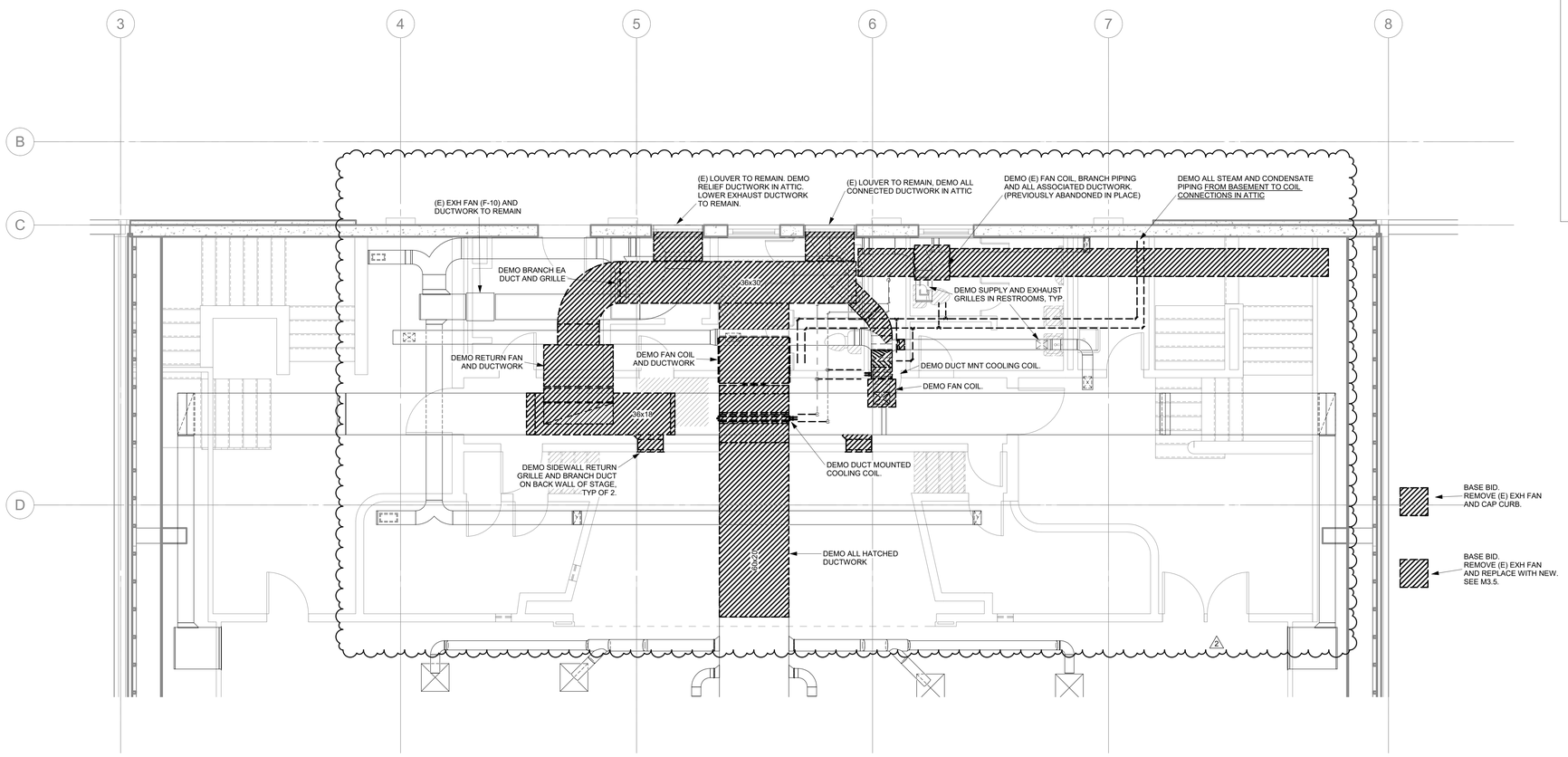
LEVEL 1
MECHANICAL
DEMOLITION PLAN

PROJECT NO.: 1905
ISSUE DATE: 02.13.2020
SHEET:

M2.2



1 LEVEL 2 MECHANICAL DEMOLITION PLAN
1/4" = 1'-0"

SHEET NOTES

A. FIELD VERIFY SIZE AND LOCATION OF ALL EXISTING DUCTWORK, PIPING AND EQUIPMENT.

B. DEMOLISH ALL HATCHED DUCTWORK AND EQUIPMENT. SEE SHEET M3.5 FOR NEW WORK.

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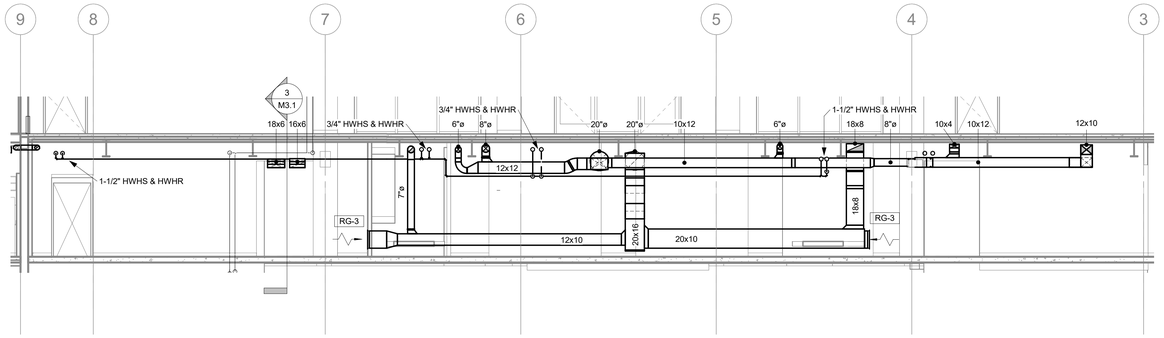
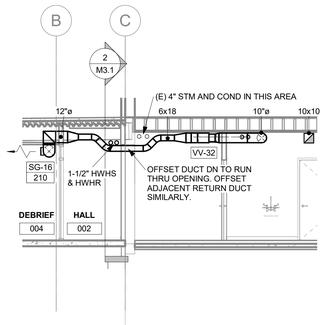
LEVEL 2
MECHANICAL
DEMOLITION PLAN

PROJECT NO.: 1905
ISSUE DATE: 02.13.2020
SHEET:

M2.3



2 BASEMENT SECTION - GRIDLINE C (ALTERNATE 1)
3/16" = 1'-0"



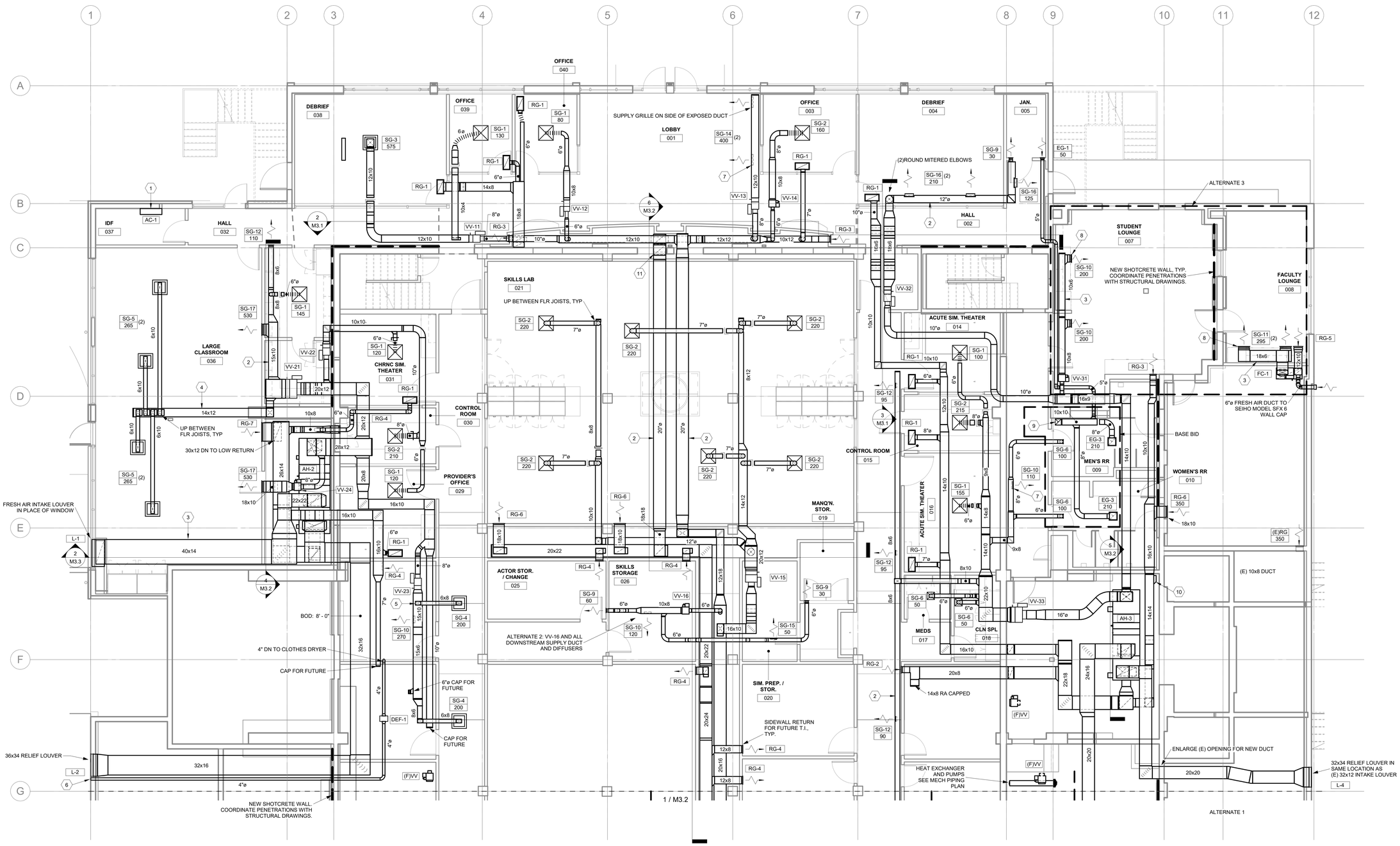
3 VV-32 SECTION (ALTERNATE 1)
3/16" = 1'-0"

SHEET NOTES

A. WITH THE EXCEPTION OF RESTROOMS 009 AND 010, ALL WORK ON THIS SHEET IS PART OF ALTERNATES 1, 2, OR 3. EXTEND SUPPLY DUCTS FROM RESTROOM DIFFUSERS OUT INTO HALLWAY FOR FUTURE CONNECTION.

KEYED NOTES

1 SIDEWALL DUCTLESS SPLIT SYSTEM FAN COIL. CONNECT TO CONDENSING UNIT ON LEVEL 1 ROOF. COORDINATE LOCATION WITH SOU I.T. DEPARTMENT. COORDINATE INSTALL OF REFRIGERANT LINES WITH STRUCTURAL WORK ON FLOOR ABOVE.
2 EXPOSED DUCT.
3 DUCT IN SOFFIT.
4 DUCT RUNS BETWEEN WIDE FLANGE (WF) BEAMS.BRANCH DUCTS TO DIFFUSERS OFF TOP OF 14x12, OVER WF BEAMS AND BETWEEN FLOOR JOISTS.
5 DUCT UP TO RUN BETWEEN FLOOR JOISTS, TYP.
6 PROVIDE 4"ø DRYER EXHAUST DUCT OUT THROUGH WALL TO CAP. COORDINATE LOCATION WITH ARCHITECT.
7 SUPPLY AIR GRILLE ON SIDE OF EXPOSED DUCT, TYP.
8 SUPPLY GRILLE IN SIDEWALL OF SOFFIT, TYP.
9 EXHAUST DUCT UP TO FAN ON ROOF.
10 POINT OF CONNECTION, TYP. FIELD VERIFY SIZE AND LOCATION OF EXISTING DUCT/PIPE.
11 TRANSITION TO 20x16, DROP IN EXISTING OPENING, AND OFFSET INTO CHASE. SEE 6/M3.2.



1 BASEMENT MECHANICAL PLAN - NORTH
3/16" = 1'-0"

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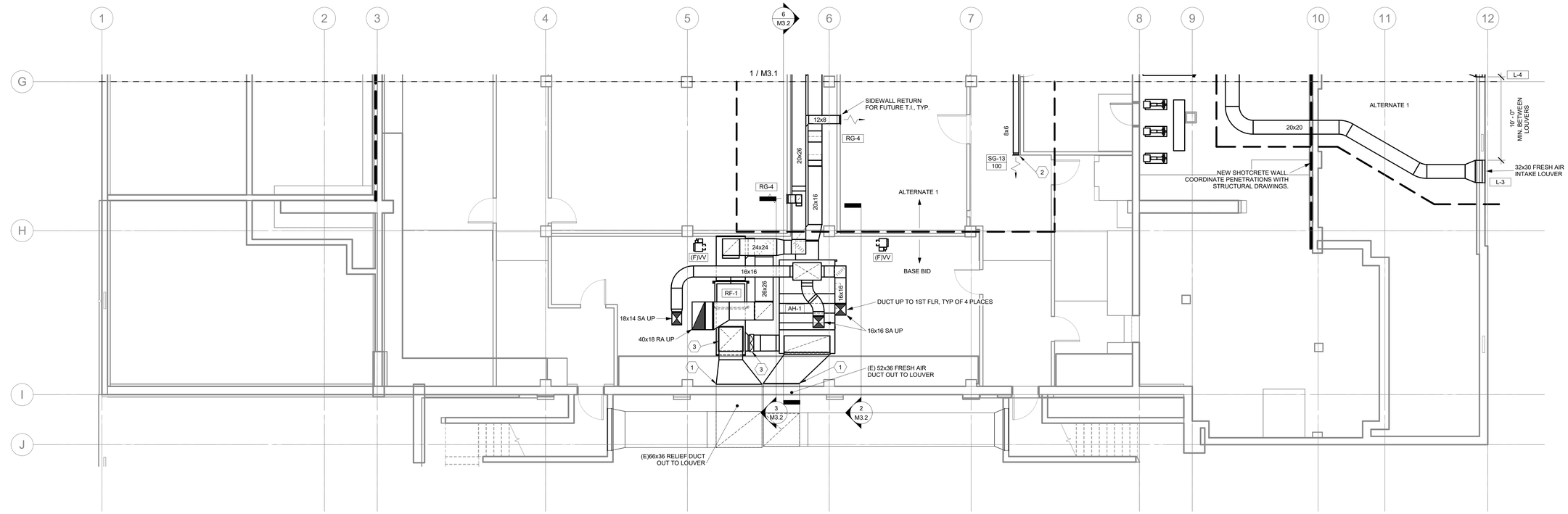
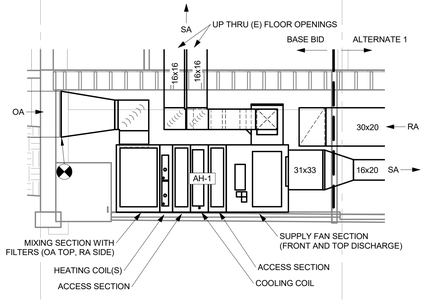
BASEMENT MECHANICAL PLAN - NORTH

PROJECT NO.: 1905
ISSUE DATE: 02.13.2020
SHEET:

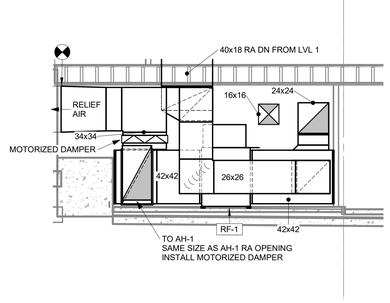
M3.1



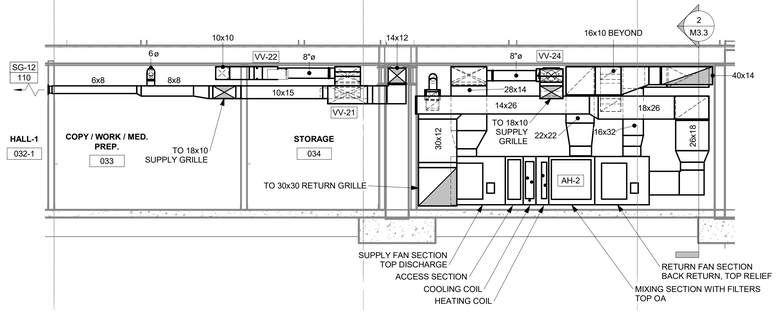
1 BASEMENT MECHANICAL PLAN - SOUTH
3/16" = 1'-0"



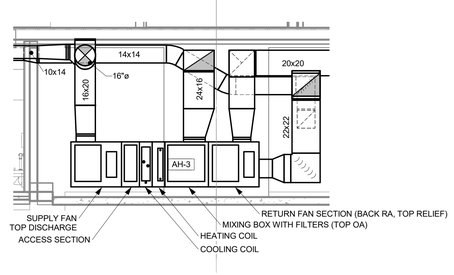
2 AH-1 SECTION
1/4" = 1'-0"



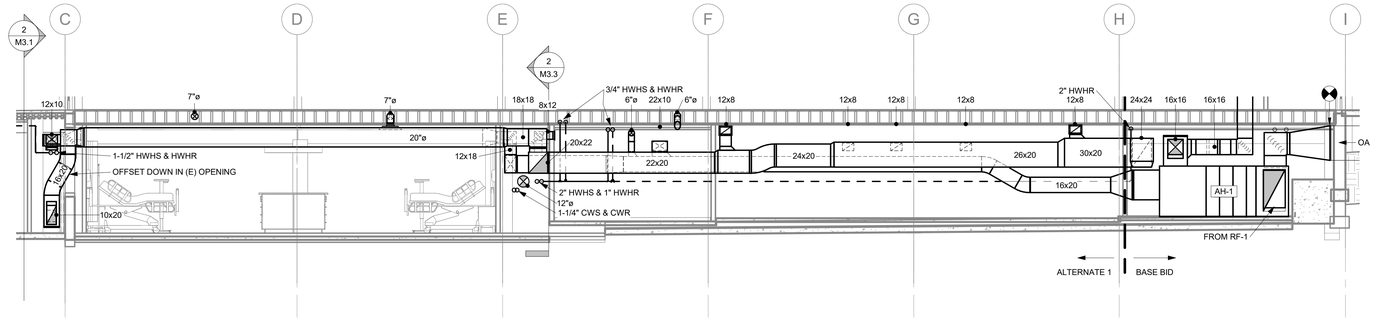
3 RF-1 SECTION
1/4" = 1'-0"



4 AH-2 SECTION (ALTERNATE 1)
1/4" = 1'-0"



5 AH-3 SECTION (ALTERNATE 1)
1/4" = 1'-0"



6 BASEMENT SECTION - NORTH/SOUTH
3/16" = 1'-0"

KEYED NOTES

1 POINT OF CONNECTION, TYP. FIELD VERIFY SIZE AND LOCATION OF EXISTING DUCT/PIPE.
2 SUPPLY GRILLE ON END OF EXPOSED DUCT.
3 INSTALL MODULATING CONTROL DAMPERS IN RELIEF AIR AND RETURN AIR DUCTS

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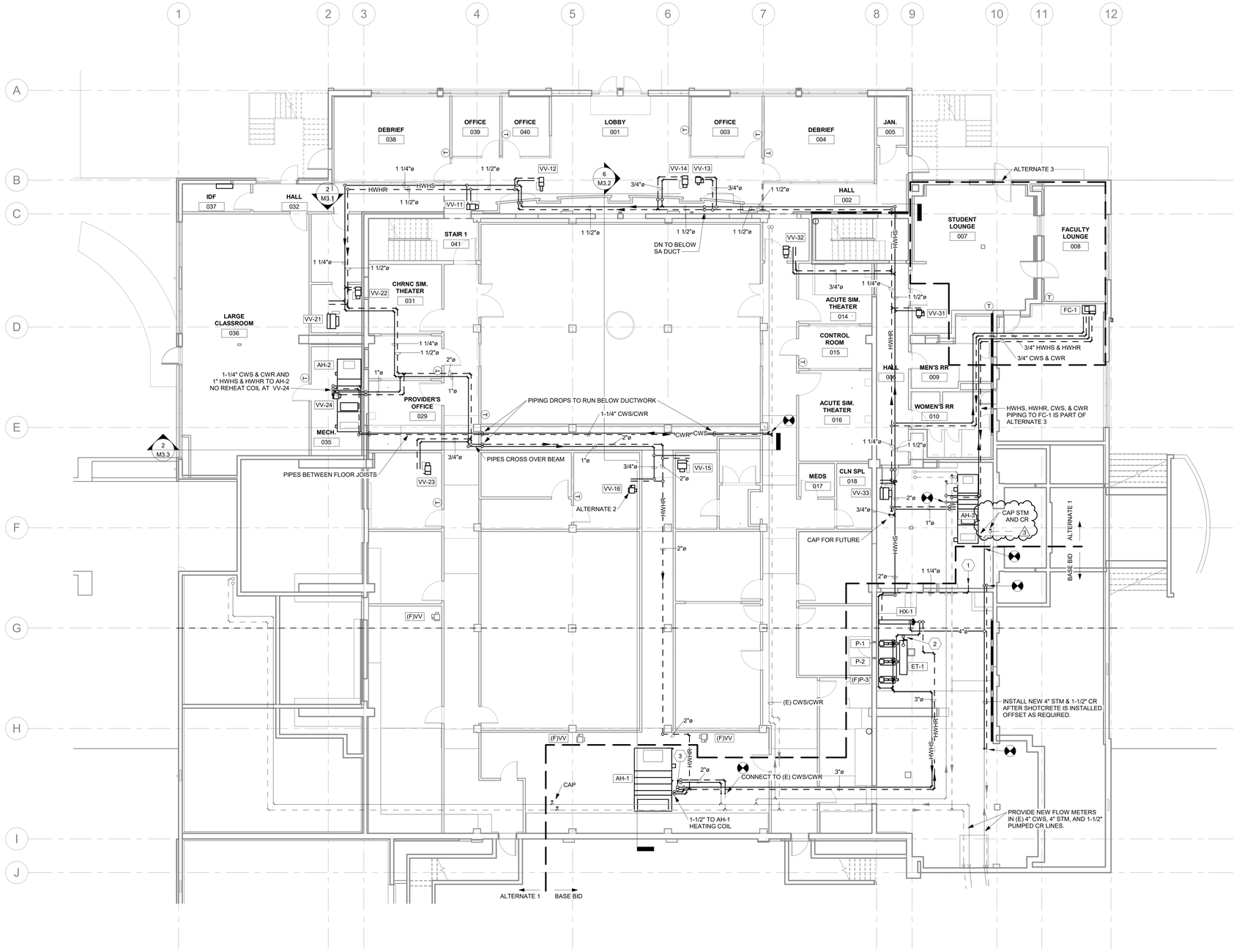
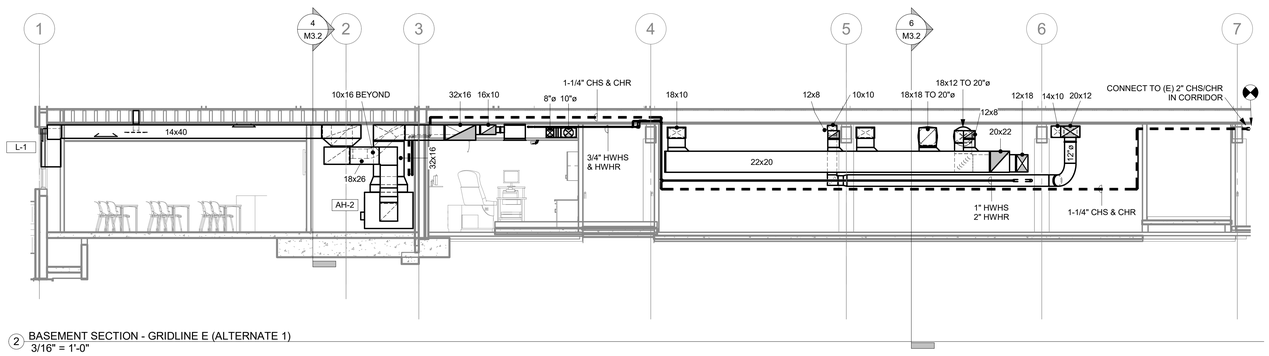
BASEMENT MECHANICAL PLAN - SOUTH

PROJECT NO.: 1905
ISSUE DATE: 02.13.2020
SHEET:

M3.2



1 BASEMENT MECHANICAL PIPING PLAN
1/8" = 1'-0"



2 BASEMENT SECTION - GRIDLINE E (ALTERNATE 1)
3/16" = 1'-0"

SHEET NOTES

A. OTHER THAN THE LOWER RIGHT HAND CORNER, ALL WORK ON THIS SHEET IS PART ALTERNATES 1, 2, OR 3.

B. SEE PIPING SCHEMATIC ON SHEET M4.1 FOR PIPING CONNECTION DETAILS FOR HEAT EXCHANGER, PUMPS, EXPANSION TANK, AIR SEPARATOR, HEATING AND COOLING COILS, ETC.

C. COORDINATE CONDENSATE DRAIN PIPING WITH PLUMBING CONTRACTOR.

D. NEW STEAM, PUMPED CONDENSATE, AND CHILLED WATER FLOW METERS SHALL BE PROVIDED BY THE CONTROLS CONTRACTOR (SEE SECTION 23 09 23) AND INSTALLED BY THE MECHANICAL CONTRACTOR. INSTALL PER MANUFACTURER'S INSTRUCTIONS WITH RECOMMENDED UP AND DOWN STREAM CLEARANCES, ECCENTRIC REDUCERS, FLOW STRAIGHTENERS, ETC. AS REQUIRED. CONTRACTOR TO FIELD VERIFY EXACT LOCATIONS FOR NEW METERS.

KEYED NOTES

1 CONNECT CONDENSATE FROM HX-1 TO EXISTING BELOW GRADE CONDENSATE RETURN TANK.
2 AIR SEPARATOR IN THIS AREA. SEE EXPANSION TANK SCHEDULE FOR SIZE.
3 3" HWHS & HWHR UP IN (E) CHASE. PROVIDE ISOLATION VALVES ON PIPING RISING TO LEVEL 1. PROVIDE DRAIN DOWN VALVES WITH HOSE CONNECTIONS.

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3 IB-2 07.24.2020

BASEMENT MECHANICAL PIPING PLAN

PROJECT NO.: 1905
ISSUE DATE: 02.13.2020
SHEET:

M3.3

1 LEVEL 1 MECHANICAL PLAN
3/16" = 1'-0"

SHEET NOTES

A. THE CEILINGS IN THE EAST AND WEST WINGS WERE REMOVED DURING PHASE 1 AND WILL BE REPLACED IN PHASE 2. THE CONTRACTOR SHALL RE-INSTALL THE GRILLES, REGISTERS, AND DIFFUSERS (GRD) IN THE NEW CEILING. PROVIDE NEW FLEXIBLE DUCT TO CONNECT TO THE (E) DUCTWORK. PROVIDE NEW MANUAL BALANCING DAMPERS WHERE (E) DUCT MOUNTED OR DIFFUSER MOUNTED DAMPERS ARE NOT PRESENT.

B. TEST AND BALANCE THE EXISTING HVAC SYSTEMS TO THE LISTED SUPPLY AIR VOLUMES (COPIED FROM THE EXISTING DRAWINGS).

C. COPIES OF THE EXISTING DRAWINGS ARE AVAILABLE FROM THE SOU FACILITIES PROJECT MANAGER.

KEYED NOTES

1. 1-1/4" CWS & CWR AND 3/4" HWHS & HWHR UP TO AH-5.
2. 3/4" HWHS & HWHR TO REHEAT COILS. INSTALL 3/4" TO EACH COIL.
3. CAP 2" HWHS & HWHR FOR FUTURE.
4. CONNECT TO (E) 1-1/2" CWS & CWR RISING UP FROM BASEMENT. FIELD VERIFY LOCATION.

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2	IB-1	07.24.2020
3	IB-2	07.24.2020

LEVEL 1
MECHANICAL PLAN

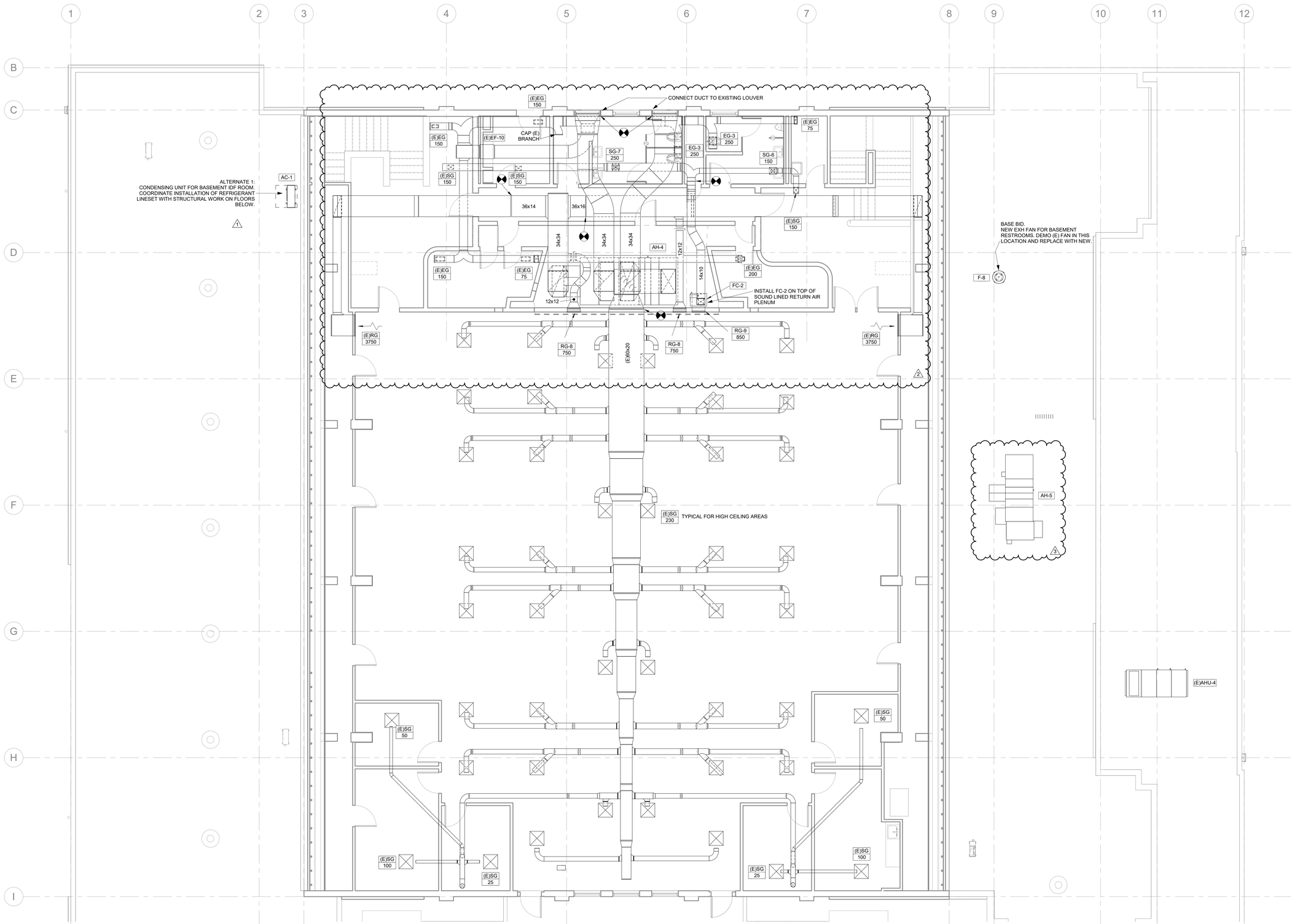
PROJECT NO.: 1905
ISSUE DATE: 02.13.2020
SHEET:

M3.4

SHEET NOTES

A. SEE SHEET M2.3 FOR 2ND LEVEL MECHANICAL DEMOLITION.
B. SEE SHEET M3.6 FOR 2ND LEVEL MECHANICAL PIPING AND SECTIONS.
C. TEST AND BALANCE ALL NEW AND EXISTING DIFFUSERS AND GRILLES SERVED BY (E)EF-10, AH-4 AND FC-2.
D. TEST AND BALANCE (E)EF-10 TO 1,300 CFM.

2



1 LEVEL 2 MECHANICAL PLAN
3/16" = 1'-0"

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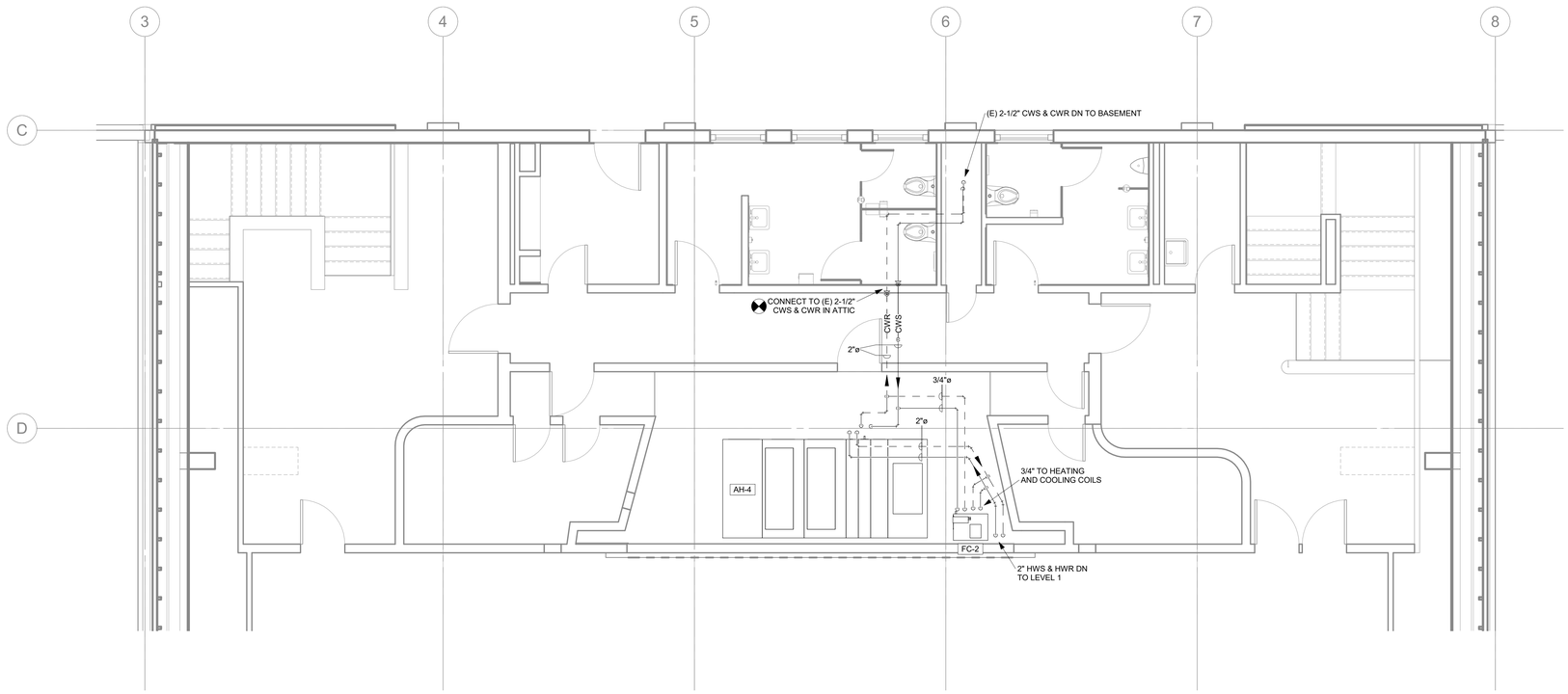
1	REVISION 1	02.07.2020
2	IB-1	07.24.2020
3	IB-2	07.24.2020

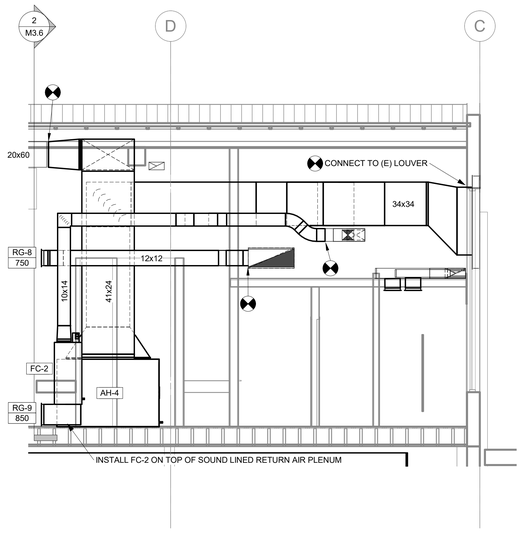
LEVEL 2
MECHANICAL PLAN

PROJECT NO.: 1905
ISSUE DATE: 02.13.2020
SHEET:

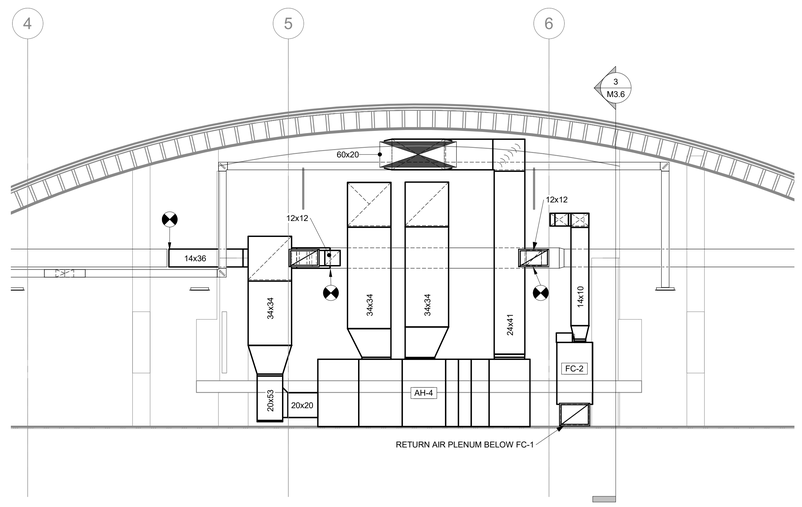
M3.5



1 LEVEL 2 MECHANICAL PIPING PLAN
1/4" = 1'-0"



3 AH-4 CROSS SECTION
1/4" = 1'-0"



2 AH-4 SECTION
1/4" = 1'-0"

SHEET NOTES

A. ALL WORK ON THIS SHEET IS ALTERNATE 3.

B. SEE SHEET M2.3 FOR LEVEL 2 MECH DEMOLITION.

C. SEE SHEET M3.5 FOR LEVEL 2 DUCTWORK.

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LEVEL 2
MECHANICAL
PIPING PLAN AND
SECTIONS

PROJECT NO.: 1905
ISSUE DATE: 02.13.2020
SHEET:

M3.6

SHEET NOTES

A. PUMP SIZING / DESGIN INTENT: THE TWO PUMPS SHALL OPERATE IN A LEAD / STANDBY MODE WITH 100% REDUNDANCY. WHEN THE REMAINING STEAM HEAT AIR HANDLERS ARE CONVERTED TO HOT WATER HEATING, A THIRD PUMP WILL BE ADDED AND THE PUMPS WILL OPERATE IN A LEAD/LAG/STANDBY MODE WITH 50% REDUNDANCY.

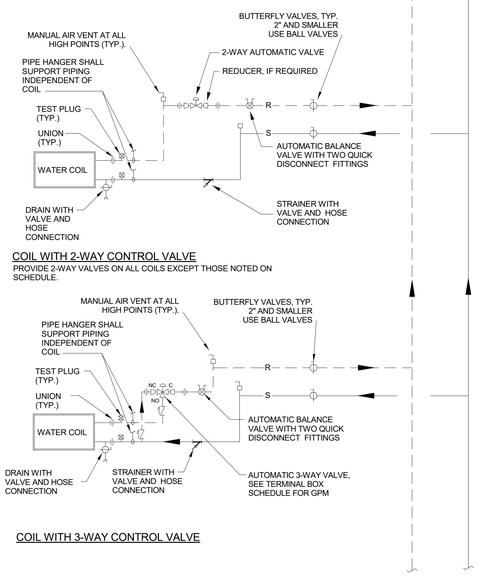
B. THE STEAM TO HOT WATER CONVERTOR IS SIZED TO PROVIDE HEATING HOT WATER TO THE ENTIRE BUILDING. IT INCLUDES CAPACITY FOR THE FUTURE CONVERSION OF THE REMAINING STEAM AIR HANDLERS TO HOT WATER HEAT.

C. WHEN COIL IS INCLUDED IN CASING MOUNTED ON VIBRATION ISOLATORS THE FIRST 2 HANGERS FOR EACH PIPE SHALL BE SPRING & NEOPRENE TYPE.

D. PIPING SHALL BE INSTALLED IN SUCH MANNER THAT IT WILL NOT BLOCK THE SWING OR USE OF ACCESS DOORS OR PANELS; NEITHER SHALL IT BLOCK THE SERVICING OF FILTERS, VALVES, OR EQUIPMENT.

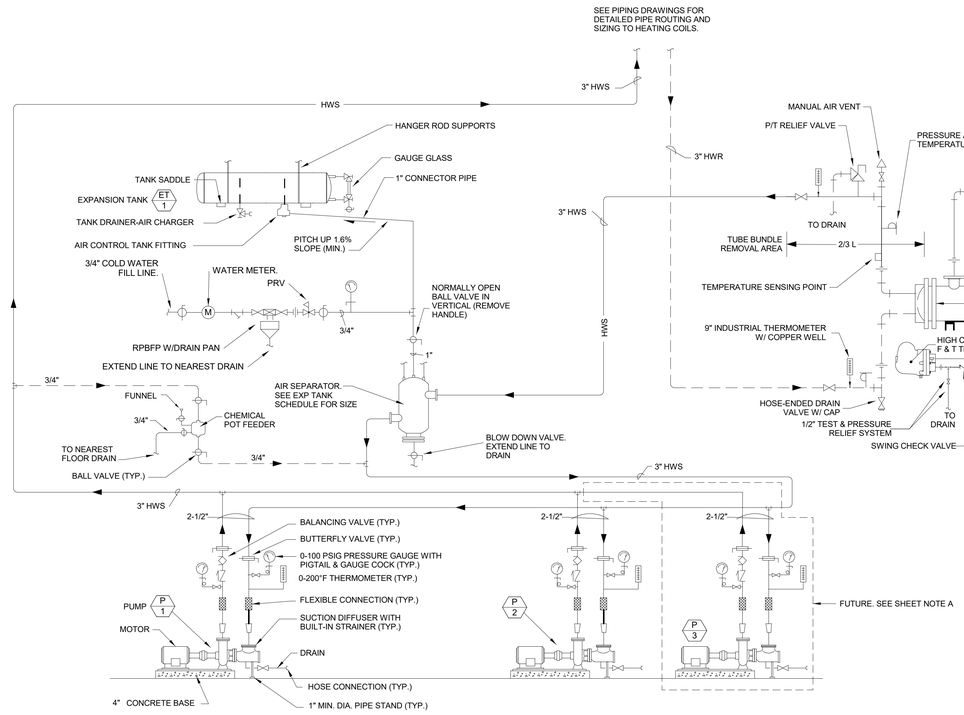
E. SEE EXPANSION TANK SYSTEM SCHEDULE FOR COMPONENT SIZES.

F. PROVIDE UNIONS FOR THE REMOVAL OF VALVES WITH SCREWED CONNECTIONS.



2 COIL PIPING CONNECTIONS

NONE



1 PIPING SCHEMATIC

NONE

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MECHANICAL
PIPING SCHEMATIC

PROJECT NO.: 1905
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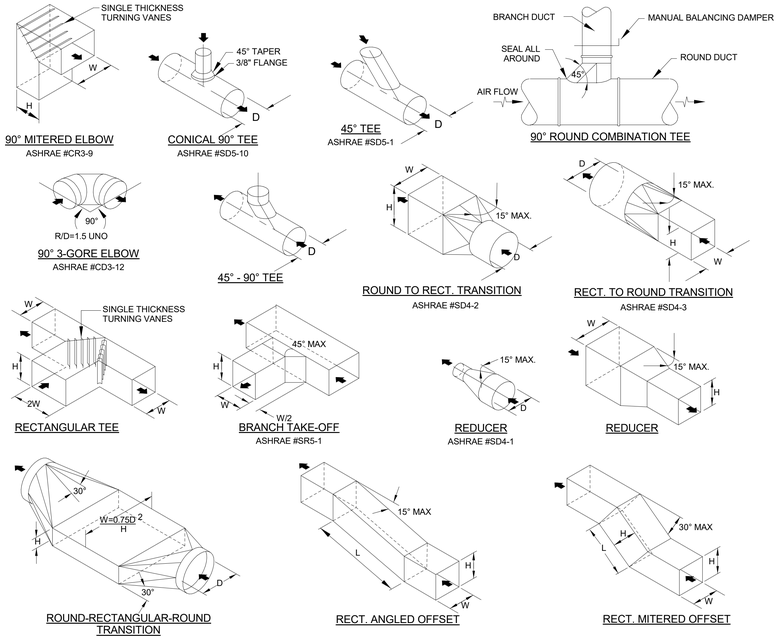
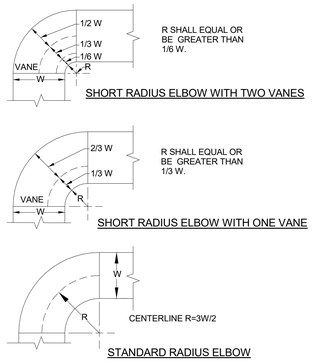
M4.1



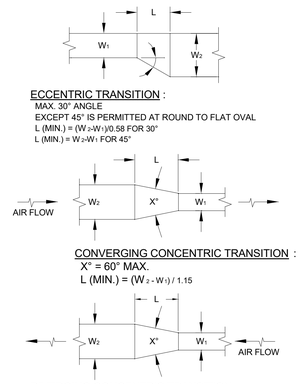
6 LOW PRESSURE DUCT CONSTRUCTION DETAILS
NTS



NOTES:

1. THIS DETAIL APPLIES TO RECTANGULAR DUCT ONLY.
2. THE INTERIOR SURFACE OF ALL RADIUS ELBOWS SHALL BE MADE ROUND.
3. ALL STANDARD RADIUS ELBOWS SHOWN ON DRAWINGS MAY BE MADE SHORT RADIUS ELBOWS. ALL SHORT RADIUS ELBOWS SHALL HAVE VANES. VANES SHALL BE CONSTRUCTED, SUPPORTED AND FASTENED AS RECOMMENDED BY SMACNA.

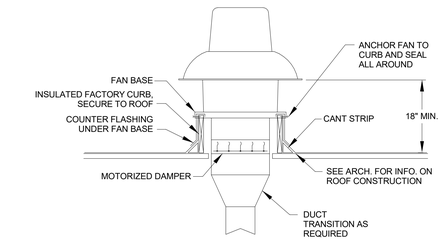
5 RADIUS ELBOWS
NTS



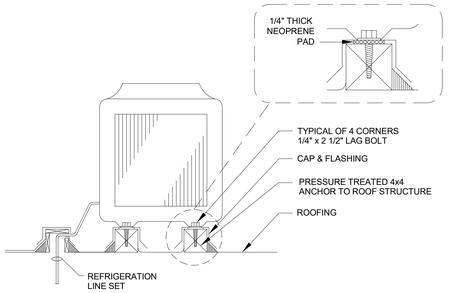
NOTE:

1. UNLESS OTHERWISE INDICATED ON PLANS, MAXIMUM ANGLES SHOWN SHALL APPLY.

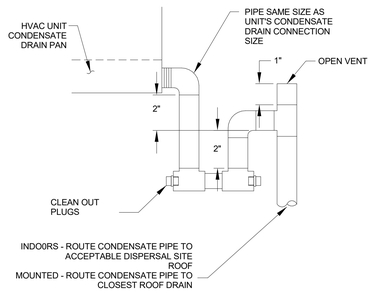
4 DUCT TRANSITIONS
NTS



1 ROOF MOUNTED EXHAUST FAN
NTS



2 OUTDOOR HEAT PUMP UNIT
NTS



3 CONDENSATE TRAP DETAIL
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PROJECT NO.: 1905
ISSUE DATE: 02.13.2020
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