GRILLE AND DIFFUSER SCHEDULE

SYMBOL	SERVICE	CFM RANGE	FACE SIZE	NECK SIZE	TYPE	OBD	PRICE
A	SUPPLY	266-400	(4) .75" SLOT 48"L 12" INLET		LINEAR SLOT	YES	SDA
B	SUPPLY	0-100	24x24	6"	SQUARE PLAQUE	YES	SPD
		105-175	24x24	8"	SQUARE PLAQUE	YES	SPD
		180-270	24x24	10"	SQUARE PLAQUE	YES	SPD
		275-390	24x24	12"	SQUARE PLAQUE	YES	SPD
		395-535	24x24	14"	SQUARE PLAQUE	YES	SPD

NOTES:

1. ALL DEVICES SHALL BE FURNISHED WITH AN ENAMEL OFF-WHITE FINISH.
2. ALL DEVICES SHALL BE FURNISHED WITH FRAMES SUITABLE FOR TYPE OF INSTALLATION REQUIRED.
3. ALL AIR TERMINALS THAT SERVE TOILETS SHALL BE ALUMINUM
4.
5. SUPPLY LINEAR SLOTS AND LINEAR BAR DIFFUSERS/GRILLES SHALL BE PROVIDED WITH INSULATED PLENUMS

* RETURN AIR GRILLE AIRFLOW BASED OFF SUPPLY AIRFLOW PROVIDED TO ROOM

EQUIVALENT MANUFACTURERS LISTING

LISTING OF MANUFACTURER'S NAME DOES NOT GUARANTEE APPROVAL. ALL EQUIPMENT MUST MEET OR EXCEED QUALITY AND CAPACITIES OF SPECIFIED EQUIPMENT. FINAL APPROVAL WILL BE BASED ON EQUIPMENT SUBMITTALS. ANY MANUFACTURER NOT LISTED BUT WISHING TO BID THIS PROJECT SHALL SUBMIT A WRITTEN REQUEST A MINIMUM OF 7 DAYS PRIOR TO BID DATE OR AS INDICATED IN THE SPECIFICATIONS, PRIOR APPROVAL IS REQUIRED FOR ALL MANUFACTURERS NOT LISTED.

AIR DISTRIBUTION: CARNES, METAL*AIRE, NAILOR, PRICE, TITUS

FIRE DAMPERS: AIR BALANCE INC., GREENHECK, NAILOR, RUSKIN

NOTE:
ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, PIPING, SHEET METAL, ELECTRICAL, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT WILL BE APPROVED DURING CONSTRUCTION AND ALL COST WILL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR.

OWNER TRAINING

ALL EQUIPMENT SHALL BE PROVIDED WITH OWNER TRAINING FROM FACTORY AUTHORIZED AND CERTIFIED TRAINING PERSONNEL. TRAINING SHALL BE PROVIDED WITHIN 5 DAYS OF OWNER ACCEPTACE OF OPERATIONAL EQUIPMENT. DURATION AND FORMAT OF TRAINING SHALL BE COORDINATED WITH OWNER, BUT SHALL BE A MINIMUM OF 8 HRS (2) 4 HR SESSIONS OF ONSITE TRAINING WITH THE REQUIRED OWNER PERSONNEL. MECHANICAL CONTRACTOR SHALL DOCUMENT TRAINING WITH DATE/TIME, DURATION, AND OWNER SIGNATURE.

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-1 (EXISTING)

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)	CALCULATED AREA E/A (CFM)
CLASSROOMS	7.5	-	35	0.000000	6421	224	1680	-	0
STORAGE ROOMS	-	0.12	-	0.000000	392	-	-	47	0
CORRIDOR	-	0.12	-	0.000000	1766	-	-	211	0

BLDG TOTAL OUTSIDE AIR REQ'D (Ez=0.8, CFM)	1938
BUILDING TOTAL OUTSIDE AIR PROVIDED (CFM)	RE-BALANCE UNIT OA DAMPER
BUILDING TOTAL EXHAUST AIR REQUIRED (CFM)	0
BUILDING TOTAL EXHAUST AIR PROVIDED (CFM)	0

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-4 (EXISTING)

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)	CALCULATED AREA E/A (CFM)
OFFICE	5	0.06	5	0.000000	3251	16	80	195	0
CLASSROOMS	7.5	-	35	0.000000	187	6	45	-	0
RECEPTION	5	0.06	30	0.000000	191	16	80	195	0
STORAGE	-	0.12	-	0.000000	296	-	-	36	0
LOBBY	5	0.06	10	0.000000	771	7	35	46	0
CONFERENCE	5	0.06	50	0.000000	183	9	45	11	0
CORRIDOR	-	0.12	-	0.000000	360	-	-	43	0

BLDG TOTAL OUTSIDE AIR REQ'D (Ez=0.8, CFM)	811
BUILDING TOTAL OUTSIDE AIR PROVIDED (CFM)	RE-BALANCE UNIT OA DAMPER
BUILDING TOTAL EXHAUST AIR REQUIRED (CFM)	0
BUILDING TOTAL EXHAUST AIR PROVIDED (CFM)	0

TESTING, ADJUSTING, AND BALANCING

1. THE MECHANICAL CONTRACTOR SHALL BALANCE ALL MECHANICAL SYSTEMS TO THE PERFORMANCE SPECIFICATIONS INDICATED ON PLANS AND PROVIDE THE ENGINEER WITH THREE COPIES OF A COMPLETE TEST AND BALANCE REPORT. THE REPORT IS TO BE ISSUED A MINIMUM OF TWO WEEKS PRIOR TO PROJECT COMPLETION. THE TEST AND BALANCE REPORT WILL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER. ANY ADDITIONAL TESTING, ADJUSTING AND BALANCING REQUIRED (AT ENGINEER'S REQUEST) AFTER REVIEW OF THE INITIAL REPORT SHALL BE PROVIDED AT NO ADDITIONAL COST. TEST AND BALANCE REPORT TO BE COMPLETED BY AN INDEPENDENT, CERTIFIED TEST AND BALANCE CONTRACTOR.
2. CONDUCT TEST AND BALANCING IN ACCORDANCE WITH TECHNICAL PORTIONS OF THE AABC "NATIONAL STANDARDS FOR TESTING AND BALANCING HVAC SYSTEMS", LATEST EDITION.
3. INSTRUMENTS USED FOR BALANCING MUST HAVE BEEN CALIBRATED WITHIN A PERIOD OF SIX (6) MONTHS PRIOR TO BALANCING. SUBMIT SERIAL NUMBERS, AND SATES OF CALIBRATION OF ALL INSTRUMENTS TO BE USED PRIOR TO THE START OF WORK.
4. SET HVAC SYSTEM AIRFLOW AND WATER FLOW RATES WITHIN THE FOLLOWING TOLERANCES:
    - 4.1. WATER FLOW RATE: 0 TO MINUS 5 PERCENT.
    - 4.2. AIR OUTLETS AND INLETS: 0 TO MINUS 10 PERCENT.

ELECTRICAL/MECHANICAL DEMARCATION

REFER TO DETAIL 9/M-501 FOR MECHANICAL CONTRACTOR'S RESPONSIBILITIES RELATED TO ELECTRICAL DISCONNECTS, STARTERS AND WIRING OF MECHANICAL EQUIPMENT. ALL DISCONNECTS, STARTERS AND WIRING (LOAD SIDE OF DISCONNECTS) SHALL BE FURNISHED AND INSTALLED BY M.C. UNLESS OTHERWISE NOTED IN DETAIL 9/M-501. COORDINATE ALL ELECTRICAL REQUIREMENTS WITH E.C. PRIOR TO ASSEMBLING SHOP DRAWING SUBMITTALS OR ORDERING EQUIPMENT.

COMMISSIONING NOTE

MECHANICAL CONTRACTOR SHALL COORDINATE WITH OWNER'S COMMISSIONING AGENT AND PROVIDE ALL NECESSARY TIME, MATERIALS, BAS NETWORK CONFIGURATION AND PROCEDURES REQUIRED FOR A FULLY COMMISSIONED PROJECT.

RETURN AIR PLENUM NOTE

THIS PROJECT WILL UTILIZE THE ABOVE CEILING SPACE FOR A RETURN AIR PLENUM, ALL ABOVE CEILING UTILITIES PROVIDED UNDER THIS PROJECT SHALL BE PLENUM RATED AND HAVE A FLAME SPREAD INDEX NOT MORE THAN 25 AND A SMOKE DEVELOPED INDEX OF NOT MORE THAN 50

2018 NORTH CAROLINA ENERGY CONSERVATION CODE COMMERCIAL ENERGY EFFICIENCY - MECHANICAL SUMMARY

501.1 METHOD OF COMPLIANCE

☒ 2018 NCECC CHAPTER 5
☐ ASHRAE 90.1-2010 PRESCRIPTIVE
☐ ASHRAE 90.1-2010 PERFORMANCE
☐ N/A (EXISTING LIGHTING, HVAC, AND DOM. WATER HEATING SYSTEMS TO REMAIN)
☐ COMCHECK PROVIDED (2012 NCECC)
☐ COMCHECK PROVIDED (90.1-2010)
☐ ENERGY MODELING DATA PROVIDED

501.2 APPLICATION COMPLIANCE

☐ 506.2.1 EFFICIENT MECH EQUIPMENT
☒ 506.2.2 REDUCED LTG DENSITY
☐ 506.2.3 ENERGY RECOVERY SYSTEMS
☐ 506.2.4 HI EFFICIENCY DOMESTIC HW
☐ 506.2.5 ONSITE RENEWABLE ENERGY
☐ 506.2.6 DAYLIGHTING CONTROLS

301.1 CLIMATE ZONE

3A MONROE, NC

DESIGN CONDITIONS

EXTERIOR (ASHRAE 90.1-2013 TABLE D-1)

winter dry bulb	18° F.
summer dry bulb	92° F.
summer wet bulb	74° F.

INTERIOR (2018 NCECC SECTION 302.1)

winter dry bulb	72° F.
summer dry bulb	75° F.

503.2 HEATING & COOLING LOADS AND EQUIPMENT & SYSTEM SIZING

BUILDING HEATING LOAD	REFER TO SCHEDULES
BUILDING COOLING LOAD	REFER TO SCHEDULES
INSTALLED HEATING CAPACITY	REFER TO SCHEDULES
INSTALLED COOLING CAPACITY	REFER TO SCHEDULES

503.2.3 & 506.2.1 - REQUIRED & INCREASED HVAC EQUIPMENT PERFORMANCE

SYSTEM DESCRIPTION - 4-PIPE VAV AHU WITH TERMINAL BOXES AND REHEAT COILS, AIR COOLED CHILLER, CONDENSING BOILERS

☒ MINIMUM HVAC EQUIPMENT EFFICIENCY COMPLIANCE - TABLE 503.2.3
☐ INCREASED HVAC EQUIPMENT EFFICIENCY COMPLIANCE - TABLE 506.2.1

503.2.4 THRU 503.2.9

☒ HVAC SYSTEMS ARE FULLY COMPLIANT WITH THE REQUIREMENTS FOR HVAC SYSTEM CONTROL, VENTILATION, ENERGY RECOVERY, DUCT AND PLENUM INSULATION AND SEALING, PIPING INSULATION, AND SYSTEM COMPLETION.

503.2.10 - AIR SYSTEM DESIGN AND CONTROL

☒ ALL FANS INSTALLED ON THE PROJECT ARE 5 HP OR LESS AND ARE EXEMPT FROM THESE REQUIREMENTS.
☐ FANS ABOVE 5 HP MEET THE CFM LIMITATIONS SHOWN BELOW:

OPTION 2 - FAN SYSTEM MOTOR BRAKE HP - TABLE 503.2.10.1(1)

SYSTEM/UNIT	ALLOWABLE MOTOR BRAKE HP	DESIGN MOTOR BRAKE HP	DESIGN CFM
7.5	6,818 CFM	5,000 CFM	SEE SCHEDULE
10	9,091 CFM	6,667 CFM	SEE SCHEDULE
15	13,636 CFM	10,000 CFM	SEE SCHEDULE
20	18,182 CFM	13,333 CFM	SEE SCHEDULE
25	22,727 CFM	16,667 CFM	SEE SCHEDULE
30	27,272 CFM	20,000 CFM	SEE SCHEDULE
40	36,364 CFM	26,667 CFM	SEE SCHEDULE
50	45,455 CFM	33,333 CFM	SEE SCHEDULE

IF YOU DONT MEET THESE REQUIREMENTS, CHECK THE CODE AND USE OPTION 2

503.3 - SIMPLE HVAC SYSTEMS AND EQUIPMENT (PRESCRIPTIVE)

☐ PROJECT CONSISTS OF ONLY DX SINGLE ZONE SYSTEMS FULLY COMPLIANT WITH THE SIMPLE PRESCRIPTIVE REQUIREMENTS OF 503.3.

503.4 - COMPLEX HVAC SYSTEMS AND EQUIPMENT (PRESCRIPTIVE)

☒ PROJECT CONSISTS OF HVAC SYSTEMS FULLY COMPLIANT WITH THE COMPLEX PRESCRIPTIVE REQUIREMENTS OF 503.4.

COORDINATION DRAWINGS

THE CONSTRUCTION MANAGER SHALL ORGANIZE COORDINATION MEETINGS TO DEVELOP A SET OF BIM COORDINATION DRAWINGS WITH ALL CONTRACTORS (ELECTRICAL, MECHANICAL, PLUMBING, FIRE PROTECTION, IT/DATA). THE CM WILL HAVE THE LEAD RESPONSIBILITY FOR THE COORDINATION DRAWINGS.
THE MECHANICAL CONTRACTOR SHALL PRODUCE THE ORIGINAL DRAWINGS AND FORWARD THE DRAWINGS TO EACH OF THE OTHER CONTRACTORS FOR THEM TO ADD THEIR SYSTEMS TO THIS SET OF COORDINATION DRAWINGS. THE CONTRACTORS WILL DEVELOP THE DRAWINGS IN THIS ORDER: MECHANICAL, FIRE PROTECTION, PLUMBING, ELECTRICAL, IT/DATA, AND GENERAL. THIS SHALL ALSO BE THE ORDER OF PRECEDENCE FOR INSTALLATION OF SYSTEMS. ANY RELOCATION OF SYSTEM ROUTINGS WILL BE FOUND IN THE COORDINATION PHASE AND NOTICED BY EACH OF THE CONTRACTORS. THESE DRAWINGS, WHEN COMPLETED, SHALL BE SIGNED OFF BY ALL OF THE ABOVE LISTED PARTIES. DRAWINGS SHALL BE COMPLETED PRIOR TO FABRICATION AND INSTALLATION OF DUCTWORK AND PIPING SYSTEMS, OR PURCHASE OF EQUIPMENT. THE FOLLOWING ITEMS REPRESENT THE MINIMUM REQUIREMENTS AND COORDINATION DRAWINGS:

1. ALL COORDINATION DRAWINGS WILL BE PRODUCED IN REVIT AT 1/4"= 1'-0" SCALE
2. COORDINATION DRAWINGS WILL BE DISTRIBUTED ON REPRODUCIBLE MATERIAL 48"x36"
3. COORDINATION DRAWINGS ARE NOT SHOP DRAWINGS AND ARE REQUIRED IN ADDITION TO SHOP DRAWINGS.
4. ONCE THE COMPLETE COORDINATION DRAWINGS HAVE BEEN COMPILED, THE MECHANICAL CONTRACTOR WILL DISTRIBUTE ONE SIGNED SET TO EACH OF THE FOLLOWING CONTRACTORS: ELECTRICAL, PLUMBING, FIRE PROTECTION, AND GENERAL. ADDITIONAL SETS WILL BE SENT TO THE OWNER, ARCHITECT, AND ENGINEER.

THE USE OF BUILDING INFORMATION MODELING (BIM) THROUGHOUT THE CONSTRUCTION PROCESS IS A REQUIREMENT FOR THIS PROJECT TO HELP REDUCE OR ELIMINATE FIELD DETECTED CONFLICTS, IMPROVE CONSTRUCTION QUALITY AND MAINTAIN AN AGGRESSIVE SCHEDULE. THE CONTRACTOR WILL BE RESPONSIBLE FOR CREATING THE MODEL AND MANAGING THE COORDINATION AND COLLISION DETECTION PROCESS. THE MODEL MUST CONTAIN COMPLETE ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING AND FIRE PROTECTION SYSTEMS CONSISTENT WITH THE DESIGN AND FABRICATION DRAWINGS.

MECHANICAL GENERAL NOTES

SEE SPECIFICATIONS FOR ADDITIONAL PROJECT REQUIREMENTS. THESE GENERAL NOTES ARE INTENDED TO SUPPLEMENT THE SPECIFICATIONS. IN THE EVENT THAT THE VERBIAGE IS IN CONFLICT OR CONTRADICTS THE REQUIREMENTS LISTED HERE, THE QUESTION SHALL BE ASKED BEFORE BIDDING OR THE MORE STRINGENT SHALL APPLY AT THE ENGINEER'S DISCRETION.

1. DO NOT SCALE DRAWINGS. SEE ARCHITECTURAL DRAWINGS AND REFLECTED CEILING PLANS FOR EXACT LOCATION OF DOORS, WINDOWS, CEILING DIFFUSERS, ETC.
2. ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, PIPING, SHEET METAL, ELECTRICAL, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT WILL BE APPROVED DURING CONSTRUCTION AND ALL COST WILL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR. THIS INCLUDES ANY MODIFICATIONS TO ANY ASSOCIATED MECHANICAL, PLUMBING, OR ELECTRICAL SYSTEMS REQUIRED BY THIS SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. ALL DUCTWORK SHALL BE GALVANIZED UNLESS NOTED TO BE ALUMINUM OR STAINLESS STEEL (SEE PLANS). CONSTRUCTION IN ACCORDANCE WITH THE LATEST SMACNA STANDARDS. ALL SUPPLY, RETURN AND OUTSIDE AIR DUCTWORK SHALL BE WRAPPED WITH 2" THICK DUCT WRAP WITH VAPOR BARRIER. INSULATION (INCLUDING FLEXIBLE DUCT INSULATION) SHALL HAVE A MINIMUM INSTALLED R-VALUE OF 5.0. AIR HANDLING UNIT RETURN DUCTWORK AND TRANSFER DUCTS SHALL BE LINED WITH 1" THICK FLEXIBLE ELASTOMERIC DUCT LINER FOR ACOUSTICAL PURPOSES. DUCT DIMENSIONS ON PLANS ARE FREE AREA SIZE. EXPOSED DUCTWORK IN MECH. ROOMS SHALL BE PROVIDED WITH CANVAS WRAP WITH MASTIC COATING.
4. ALL DUCTWORK SHALL BE SEALED PER THE REQUIREMENTS OF THE INTERNATIONAL MECHANICAL CODE. SEAL MEDIUM PRESSURE SUPPLY DUCTWORK FOR POSITIVE 3" PRESSURE CLASS, SMACNA SEAL CLASS A, SMACNA LEAKAGE CLASS 4. SEAL LOW PRESSURE SUPPLY, RETURN, OUTSIDE AIR, AND EXHAUST DUCTWORK FOR POSITIVE/NEGATIVE 2" PRESSURE CLASS, SMACNA SEAL CLASS A, SMACNA LEAKAGE CLASS 4.
5. ALL PIPING, DUCTS, VENTS, ETC., EXTENDING THROUGH WALLS AND ROOF SHALL BE FLASHED AND COUNTERFLASHED IN A WATERPROOF MANNER.
6. ALL PIPING AND DUCTWORK LOCATIONS SHALL BE COORDINATED WITH THE WORK UNDER OTHER DIVISIONS OF THE SPECIFICATIONS, TO AVOID INTERFERENCE.
7. THE MECHANICAL CONTRACTOR SHALL HAVE THE MECHANICAL SYSTEMS BALANCED TO THE PERFORMANCE SPECIFICATIONS INDICATED ON PLANS AND PROVIDE THE ENGINEER WITH THREE COPIES OF A COMPLETE TEST AND BALANCE REPORT. THE REPORT IS TO BE ISSUED A MINIMUM OF TWO WEEKS PRIOR TO PROJECT COMPLETION. THE TEST AND BALANCE REPORT WILL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER. ANY ADDITIONAL TESTING, ADJUSTING AND BALANCING REQUIRED (AT ENGINEER'S REQUEST) AFTER REVIEW OF THE INITIAL REPORT SHALL BE PROVIDED AT NO ADDITIONAL COST. TEST AND BALANCE REPORT TO BE COMPLETED BY AN INDEPENDENT, CERTIFIED TEST AND BALANCE CONTRACTOR (AABC OR NEBB).
8. UPON PROJECT COMPLETION, THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE OWNER INSTALLATION INFORMATION INCLUDING RECORD SUBMITTALS (WITH ANY SUBMITTAL REVIEW COMMENTS ADDRESSED) AND O&M MANUALS FOR EACH PIECE OF EQUIPMENT INCLUDING ALL SELECTED OPTIONS, THE NAME AND ADDRESS OF AT LEAST ONE SERVICE AGENCY, FULL CONTROL SYSTEM O&M AND CALIBRATION INFORMATION INCLUDING WIRING DIAGRAMS, SCHEMATICS, FULL SEQUENCE OF OPERATION, AND PROGRAMMED SETPOINTS.
9. PROVIDE A ONE YEAR WARRANTY FOR ALL WORK PERFORMED BEGINNING ON THE DAY THE SYSTEM IS COMPLETELY OPERATIONAL AND ACCEPTABLE BY THE OWNER.
10. PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCES AROUND ALL EQUIPMENT FOR MAINTENANCE AND FILTER REMOVAL.
11. CONDENSATE DRAIN PIPING SHALL BE SCHEDULE TYPE "L" HARD DRAWN COPPER AND SHALL BE INSULATED PER THE SPECIFICATIONS. DRAINS FROM ALL COOLING COILS SHALL BE TRAPPED. DRAIN SIZE SHALL BE EQUIPMENT DRAIN CONNECTION SIZE (3/4" MINIMUM) WITH A MINIMUM DEPTH OF 4" OR 1.5 TIMES THE UNIT FAN TSP, WHICHEVER IS GREATER
12. ALL REFRIGERANT PIPE SHALL BE NITROGENIZED ACR COPPER TUBE. SIZE, INSULATE, AND INSTALL REFRIGERANT PIPING PER MANUFACTURER'S RECOMMENDATIONS.
13. ANY DEVICE REQUIRING A TEMP SENSOR FOR CONTROL SHALL BE FURNISHED WITH A TEMP SENSOR WHETHER INDICATED ON THE DRAWINGS OR NOT.
14. INSTALL THE TOP OF ALL THERMOSTATS, SENSORS, AND SWITCHES AT 4'-0" (MAXIMUM) ABOVE FINISH FLOOR. COORDINATE EXACT THERMOSTAT LOCATION WITH OWNER PRIOR TO INSTALLATION. ANY DEVICE ON A PERIMETER WALL SHALL BE MOUNTED ON A FOAM-FILLED ELECTRICAL BOX, WITH ALL GAPS BETWEEN BOX AND WALL SEALED TO PREVENT INFILTRATION.
15. MECHANICAL CONTRACTOR SHALL VERIFY LOCATION OF ROOF PENETRATIONS FOR RELIEF HOODS WITH ARCHITECT & ENGINEER PRIOR TO INSTALLATION.
16. MECHANICAL CONTRACTOR SHALL LOCATE EXHAUST FANS, OUTLETS, AND GAS FLUES A MINIMUM OF 15'-0" FROM ANY OUTSIDE AIR INTAKE.
17. ALL HOT WATER PIPING 2" AND LESS SHALL BE HARD-DRAWN TYPE-L COPPER PIPE AND FITTINGS. ALL CHILLED WATER AND HOT WATER PIPING GREATER THAN 2" SHALL BE SCHEDULE-40 BLACK STEEL.
18. HOT WATER PIPING SHALL BE INSULATED WITH 1-1/2" THICK FIBERGLASS INSULATION WITH A DENSITY OF 1.5 LB PER CUBIC FOOT. INSULATION SHALL HAVE A FACTORY APPLIED PRESSURIZED VAPOR BARRIER JACKET WITH PRESSURE SENSITIVE ADHESIVE SELF-SEALING LAP. ALL FITTINGS SHALL HAVE PVC FITTING COVERS. ALL PIPING OUTSIDE SHALL HAVE A BITUMINOUS COATING, ALUMINUM JACKET AND PVC FITTING COVERS. ALL INSULATION AND JACKETING SHALL HAVE A SMOKE/FLAME RATING OF 25/50 AND SHALL BE APPROVED FOR INSTALLATION IN A RETURN PLENUM. EXPOSED PIPING IN MECH. ROOMS SHALL BE PROVIDE WITH COLOR CODED PVC JACKET
19. ALL HOT WATER PIPING SHALL PITCH DOWN IN DIRECTION OF FLOW WITH MANUAL AIR VENTS AT ALL HIGH POINTS AND 1/2" DRAIN VALVES AT ALL LOW POINTS.
20. PROVIDE UNIONS, FLANGES OR COUPLINGS AT CONNECTION TO ALL VALVES AND EQUIPMENT. DO NOT USE DIRECT WELDED OR THREADED CONNECTIONS TO VALVES, EQUIPMENT OR OTHER APPARATUS.
21. PROVIDE NON-CONDUCTING DIELECTRIC UNIONS WHENEVER CONNECTING DISSIMILAR METALS.
22. EQUIPMENT OPERATED DURING CONSTRUCTION SHALL USE FILTERED MEDIA TO PREVENT CONSTRUCTION DEBRIS FROM ENTERING COILS, DUCTWORK SYSTEMS, AIR TERMINALS ETC. AT COMPLETION OF CONSTRUCTION, MECHANICAL CONTRACTOR SHALL CLEAN ALL SYSTEMS WITH ALL CONTROL DEVICES WIDE OPEN AND REMOVE ANY REMAINING DEBRIS PRIOR TO TEST AND BALANCING. MECHANICAL CONTRACTOR SHALL REPLACE ALL FILTRATION WITH NEW FILTERS AT COMPLETION OF CONSTRUCTION. ANY DUCTWORK, AIR TERMINALS, AND/OR OTHER EQUIPMENT UPSTREAM OF FILTRATION SHALL BE CLEANED THOROUGHLY OF CONSTRUCTION DEBRIS BEFORE HANDING OVER TO OWNER. CHANGE OUT MEDIA AS NECCESSARY TO PROTECT NEW EQUIPMENT
23. MECHANICAL CONTRACTOR SHALL PROVIDE PRE-PRINTED COLOR-CODED PIPE LABELS WITH 1-1/2" HIGH LETTERING INDICATING SERVICE AND FLOW DIRECTION. ALL PIPING TO MATCH EXISTING FACILITIES STANDARD (IF APPLICABLE). OTHERWISE, PIPE LABELS SHALL MATCH THE FOLLOWING:
    HOT WATER PIPING: YELLOW BACKGROUND, BLACK LETTERING
    REFRIGERANT PIPING: YELLOW BACKGROUND, BLACK LETTERING
24. MECHANICAL CONTRACTOR SHALL PROVIDE FUSED DISCONNECTS AND STARTERS FOR ALL MECHANICAL EQUIPMENT REQUIRED FOR A COMPLETE AND FUNCTIONING SYSTEM. REFER TO DIVISION 23 & 26 SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS
25. ALL EQUIPMENT CONCRETE PAD SIZES FOR MECHANICAL EQUIPMENT SHALL BE CONFIRMED WITH APPROVED SHOP DRAWING SUBMITTALS AND ASSOCIATED UNIT MANUFACTURER ANCHOR LOCATIONS PRIOR TO FABRICATION/INSTALLATION. MINIMUM PAD THICKNESS SHALL BE 6" FOR AHU'S OR AS REQUIRED FOR CONDENSATE P-TRAP DEPTH (WHICHEVER IS GREATER). ALL OTHER PADS (PUMPS, BOILERS, TANKS, ETC.) SHALL BE 4" THICK (UNLESS OTHERWISE NOTED). REFER TO STRUCTURAL PLANS FOR CONCRETE PAD REQUIREMENTS
26. PROVIDE YOUNG REGULATOR ON ALL DAMPERS INSTALLED ABOVE INACCESSIBLE CEILINGS
27. ALL EQUIPMENT SHALL BE U.L. LISTED AND LABELED

DRAWING LIST

SHEET NUMBER	SHEET NAME
M001	MECHANICAL LEGEND AND NOTES
M100A	ENLARGED DEMOLITION MECHANICAL FLOOR PLAN A
M100B	ENLARGED DEMOLITION MECHANICAL FLOOR PLAN B
M101A	ENLARGED MECHANICAL FLOOR PLAN A
M101B	ENLARGED MECHANICAL FLOOR PLAN B
M501	MECHANICAL DETAILS

MECHANICAL LEGEND

SYMBOL	DESCRIPTION	ABBR.
CHS	CHILLED WATER SUPPLY	CHS
CHR	CHILLED WATER RETURN	CHR
HWS	HOT WATER SUPPLY	HWS
HWR	HOT WATER RETURN	HWR
D	CONDENSATE DRAIN	D
PD	PUMPED CONDENSATE	PD
CW	COLD WATER MAKE-UP	CW
	BUTTERFLY VALVE	
	3-PIECE BALL VALVE	
	CHECK VALVE	
	STRAINER WITH BLOWDOWN VALVE WITH HOSE CONN.	
	BALANCING VALVE	
	B&G CIRCUIT SETTER	
	UNION	
	THERMOMETER	
P	PRESSURE GAGE & COCK	
	GAGE COCK WITH T & P PLUG	
	FLOW SWITCH	
	ECCENTRIC REDUCER	
	CONCENTRIC REDUCER	
	CONTROL VALVE	
DP	DIFFERENTIAL PRESSURE SENSOR	
T	TEMPERATURE GAUGE	
FM	FLOW METER	
	PRESSURE REDUCING/REGULATING VALVE	
S	SOLENOID VALVE	
3WV	3-WAY VALVE	
T	THERMOSTAT / TEMP SENSOR (4'-0" AFF TO TOP)	
H	HUMIDISTAT (4'-0" AFF TO TOP)	
S	SWITCH (4'-0" AFF TO TOP)	
P	BUILDING PRESSURE SENSOR (4'-0" AFF TO TOP)	
⊠	SUPPLY AIR DIFFUSER (4-WAY)	
⧅	RETURN AIR GRILLE	
⧅	RETURN AIR GRILLE WITH SOUND ATTENUATION (SEE DETAIL)	
⧄	EXHAUST AIR GRILLE	
	DOUBLE LINE DUCTWORK	
	SINGLE LINE DUCTWORK	
	DOUBLE LINE DUCTWORK - DEMOLISHED	
FD	FIRE DAMPER DAMPER W/ ACCESS DOOR (SEE DETAIL)	
FSD	COMBINATION FIRE/SMOKE DAMPER W/ ACCESS DOOR (SEE DETAIL)	
20/14∅	20"x14" FLAT OVAL DUCT	
20x14	20"x14" RECTANGULAR DUCT	
20x14L	20"x14" RECTANGULAR DUCT LINED	
8∅	8" DIAMETER ROUND DUCT	
DD	DUCT MOUNTED SMOKE DETECTOR W/ ACCESS DOOR	
SP	STATIC-PRESSURE SENSOR (DUCT MOUNTED)	
A	AIRFLOW MONITORING STATION	
M	MOTORIZED DAMPER	
BD	BACKDRAFT DAMPER	
C	CARBON DIOXIDE SENSOR (4'-0" AFF TO TOP)	
CO	CARBON MONOXIDE SENSOR	
M.C.	MECHANICAL CONTRACTOR	
E.C.	ELECTRICAL CONTRACTOR	
P.C.	PLUMBING CONTRACTOR	
N.I.C.	NOT IN CONTRACT	
AFF	ABOVE FINISHED FLOOR	
DN	DOWN	
UP	UP	

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4209 Old Charlotte Hwy,
Monroe, NC 28110

BID DOCUMENTS

SCO # 19-21446-02A

MECHANICAL LEGEND AND NOTES

DATE: 09.27.22
PROJECT NO: 21-0029

REVISIONS

NO:	DATE:	DESCRIPTION:

SHEET NUMBER
M001

GRILLE AND DIFFUSER SCHEDULE

SYMBOL	SERVICE	CFM RANGE	FACE SIZE	NECK SIZE	TYPE	OBD	PRICE
A	SUPPLY	0-100	12x12	6"	SQUARE PLAQUE	YES	SPD
B	SUPPLY	0-100	24x24	6"	SQUARE PLAQUE	YES	SPD
		105-175	24x24	8"	SQUARE PLAQUE	YES	SPD
		180-270	24x24	10"	SQUARE PLAQUE	YES	SPD
		275-390	24x24	12"	SQUARE PLAQUE	YES	SPD
		395-535	24x24	14"	SQUARE PLAQUE	YES	SPD
C	SUPPLY	0-100	(1) .5" SLOT 36"L 6" INLET		LINEAR SLOT	YES	SDA
		101-185	(2) .75" SLOT 48"L 8" INLET		LINEAR SLOT	YES	SDA
		186-265	(3) .75" SLOT 48"L 10" INLET		LINEAR SLOT	YES	SDA
		266-385	(4) .75" SLOT 48"L 10" INLET		LINEAR SLOT	YES	SDA
D	SUPPLY	0-100	13x3	--	SPIRAL SIDEWALL	YES	LINX RGS-3
		105-200	21x3	--	SPIRAL SIDEWALL	YES	LINX RGS-3
		205-295	17x6	--	SPIRAL SIDEWALL	YES	LINX RGS-3
E	SUPPLY	SEE PLANS FOR SIZE AND AIRFLOW			LINEAR BAR	YES	LBPH-15
F	SUPPLY	0-945	30x10	--	SPIRAL SIDEWALL	YES	HCD
G*	RETURN	0-100	24x24	6"	PERFORATED	NO	PDDR
		105-175	24x24	8"	PERFORATED	NO	PDDR
		180-270	24x24	10"	PERFORATED	NO	PDDR
		275-390	24x24	12"	PERFORATED	NO	PDDR
		395-500	24x24	12x12	PERFORATED	NO	PDDR
		505-885	24x24	16x16	PERFORATED	NO	PDDR
		885-1800	24x24	22x22	PERFORATED	NO	PDDR
H*	RETURN	0-100	(1) .5" SLOT 36"L 6" INLET		LINEAR SLOT	YES	SDR
		101-185	(2) .75" SLOT 48"L 8" INLET		LINEAR SLOT	YES	SDR
		186-265	(3) .75" SLOT 48"L 10" INLET		LINEAR SLOT	YES	SDR
		266-385	(4) .75" SLOT 48"L 10" INLET		LINEAR SLOT	YES	SDR
I	EXHAUST	0-100	12x12	6"	PERFORATED	NO	PDDR
J	EXHAUST	0-100	24x24	6"	PERFORATED	NO	PDDR
		105-175	24x24	8"	PERFORATED	NO	PDDR
		180-270	24x24	10"	PERFORATED	NO	PDDR
		275-390	24x24	12"	PERFORATED	NO	PDDR
		395-500	24x24	12x12	PERFORATED	NO	PDDR
		505-885	24x24	16x16	PERFORATED	NO	PDDR
K	RETURN	0-600	14x10	14x10	SINGLE DEFLECT.	NO	520
L	SUPPLY	0-600	14x10	14x10	DBLE DEFLECT.	NO	620
M	RETURN	2750-3250	36x24	36x24	LOUVERED GRILLE	NO	610Z

NOTES:

1. ALL DEVICES SHALL BE FURNISHED WITH AN ENAMEL OFF-WHITE FINISH.
2. ALL DEVICES SHALL BE FURNISHED WITH FRAMES SUITABLE FOR TYPE OF INSTALLATION REQUIRED.
3. ALL AIR TERMINALS THAT SERVE TOILETS SHALL BE ALUMINUM
4. ALL AIR TERMINALS THAT SERVE POOL OR POOL EQUIPMENT AREAS SHALL BE ALUMINUM
5. SUPPLY LINEAR SLOTS AND LINEAR BAR DIFFUSERS/GRILLES SHALL BE PROVIDED WITH INSULATED PLENUMS

* RETURN AIR GRILLE AIRFLOW BASED OFF SUPPLY AIRFLOW PROVIDED TO ROOM

EQUIVALENT MANUFACTURERS LISTING

LISTING OF MANUFACTURER'S NAME DOES NOT GUARANTEE APPROVAL. ALL EQUIPMENT MUST MEET OR EXCEED QUALITY AND CAPACITIES OF SPECIFIED EQUIPMENT. FINAL APPROVAL WILL BE BASED ON EQUIPMENT SUBMITTALS. ANY MANUFACTURER NOT LISTED BUT WISHING TO BID THIS PROJECT SHALL SUBMIT A WRITTEN REQUEST A MINIMUM OF 7 DAYS PRIOR TO BID DATE OR AS INDICATED IN THE SPECIFICATIONS, PRIOR APPROVAL IS REQUIRED FOR ALL MANUFACTURERS NOT LISTED.

AIR DISTRIBUTION: CARNES, METAL*AIRE, NAILOR, PRICE, TITUS
FIRE DAMPERS: AIR BALANCE INC., GREENHECK, NAILOR, RUSKIN
DUCTLESS SPLIT SYSTEMS: DAIKIN, MITSUBISHI, PANASONIC
VAV TERMINAL UNITS: ENVIRO-TECH, NAILOR, PRICE, TITUS, TRANE, JCI
DDC CONTROLS PLATFORM: TRIDIUM NIAGARA (N4)
CONTROLS ACCESSORIES: ONICON, FLEXIM, JCI, EBTRON, ACI, CLEVELAND, SEIMENS, SCHNEIDER, FUNCTIONAL DEV., BELIMO
FANS: COOK, GREENHECK, PENN, TWIN CITY

NOTE:
ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, PIPING, SHEET METAL, ELECTRICAL, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT WILL BE APPROVED DURING CONSTRUCTION AND ALL COST WILL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR.

OWNER TRAINING

ALL EQUIPMENT SHALL BE PROVIDED WITH OWNER TRAINING FROM FACTORY AUTHORIZED AND CERTIFIED TRAINING PERSONNEL. TRAINING SHALL BE PROVIDED WITHIN 5 DAYS OF OWNER ACCEPTACE OF OPERATIONAL EQUIPMENT. DURATION AND FORMAT OF TRAINING SHALL BE COORDINATED WITH OWNER, BUT SHALL BE A MINIMUM OF 8 HRS (2) 4 HR SESSIONS OF ONSITE TRAINING WITH THE REQUIRED OWNER PERSONNEL. MECHANICAL CONTRACTOR SHALL DOCUMENT TRAINING WITH DATE/TIME, DURATION, AND OWNER SIGNATURE.

OWNER PREFERRED ALTERNATE

ALT-M1 - HVAC CONTROLS: HONEYWELL

COMMISSIONING NOTE

MECHANICAL CONTRACTOR SHALL COORDINATE WITH OWNER'S COMMISSIONING AGENT AND PROVIDE ALL NECESSARY TIME, MATERIALS, BAS NETWORK CONFIGURATION AND PROCEDURES REQUIRED FOR A FULLY COMMISSIONED PROJECT.

RETURN AIR PLENUM NOTE

THIS PROJECT WILL UTILIZE THE ABOVE CEILING SPACE FOR A RETURN AIR PLENUM, ALL ABOVE CEILING UTILITIES PROVIDED UNDER THIS PROJECT SHALL BE PLENUM RATED AND HAVE A FLAME SPREAD INDEX NOT MORE THAN 25 AND A SMOKE DEVELOPED INDEX OF NOT MORE THAN 50

VAV BOX SCHEDULE (HOT WATER HEAT)

SYMBOL	CFM		HOT WATER COIL			ENVIRO-TEC SDR	RUNOUT SIZE	REMARKS
	COOLING	MIN./HTG	BTUH	GPM	RUNOUT			
1.1	2900	725/1160	50200	3.4	3/4	16	18	
1.2	750	190/300	13000	0.3	1/2	10	10	
1.3	500	125/200	8700	0.3	1/2	8	10	
1.4	300	75/120	5000	0.3	1/2	6	8	
1.28	1300	1300	56200	3.8	3/4	12	14	CONSTANT VOL.
1.29	1000	1000	43200	2.9	3/4	10	12	CONSTANT VOL.
1.30	350	90/140	6100	0.3	1/2	6	8	
1.31	500	125/200	8700	0.3	1/2	8	10	
1.32	2000	500/800	34600	2.4	3/4	14	14	
1.33	400	100/160	7000	0.3	1/2	8	8	
1.34	250	65/100	4400	0.3	1/2	6	8	
1.35	575	145/230	10000	0.3	1/2	8	10	
1.5	250	65/100	4400	0.3	1/2	6	8	
1.6	400	100/160	7000	0.3	1/2	8	8	
1.7	550	40/220	9600	0.3	1/2	8	10	
1.8	400	100/160	7000	0.3	1/2	8	8	
1.9	425	110/170	7400	0.3	1/2	8	10	
1.10	175	45/70	3100	0.3	1/2	5	8	
1.39	275	70/110	4800	0.3	1/2	6	8	
1.40	950	240/380	16500	1.1	1/2	10	12	
1.44	950	240/380	16500	1.1	1/2	10	12	
1.41	950	240/380	16500	1.1	1/2	10	12	
1.42	850	215/340	14700	0.3	1/2	10	12	
1.45	850	215/340	14700	0.3	1/2	10	12	
1.46	950	240/380	16500	1.1	1/2	10	12	
1.11	800	200/320	13900	0.3	1/2	10	12	
1.12	325	85/130	5700	0.3	1/2	6	8	
1.13	925	235/370	16000	1.1	1/2	10	12	
1.14	350	90/140	6100	0.3	1/2	6	8	
1.15	250	65/100	4400	0.3	1/2	6	8	
1.16	425	110/170	7400	0.3	1/2	8	10	
1.17	250	65/100	4400	0.3	1/2	6	8	
1.18	375	95/150	6500	0.3	1/2	6	8	
1.19	300	75/120	5200	0.3	1/2	6	8	
1.20	100	25/40	1800	0.3	1/2	5	8	
1.21	300	75/120	5200	0.3	1/2	6	8	
1.22	450	115/180	7800	0.3	1/2	6	8	
1.23	300	75/120	5200	0.3	1/2	6	8	
1.24	600	150/240	10400	0.3	1/2	8	10	
1.25	700	175/280	12100	0.3	1/2	10	10	
1.26	400	100/160	7000	0.3	1/2	8	8	
1.27	1450	365/580	25100	1.7	1/2	12	14	
1.36	1000	250/400	17300	1.2	1/2	10	12	
1.37	150	40/60	2600	0.3	1/2	5	8	
1.38	300	75/120	5200	0.3	1/2	6	8	
1.43	1100	275/400	19100	1.3	1/2	10	12	
1.47	700	175/280	12100	0.3	1/2	10	10	
1.48	1100	275/440	19100	1.3	1/2	10	12	
1.49	1100	275/440	19100	1.3	1/2	10	12	
1.50	1200	300/480	20800	1.4	1/2	10	12	
1.51	350	90/140	6100	0.3	1/2	6	8	
1.52	525	135/210	9100	0.3	1/2	8	10	
1.53	175	45/70	3100	0.3	1/2	5	8	
1.54	250	65/100	4400	0.3	1/2	6	8	
1.55	1100	275/440	19100	1.3	1/2	10	12	
1.56	900	225/360	15600	1.1	1/2	10	12	
1.57	1000	250/400	17300	1.2	1/2	10	12	
1.58	900	225/360	15600	1.1	1/2	10	12	
1.59	900	225/360	15600	1.1	1/2	10	12	
1.60	1000	250/400	17300	1.2	1/2	10	12	
1.61	950	240/380	16500	1.1	1/2	10	12	
1.62	1100	275/440	19100	1.3	1/2	10	12	
1.63	225	60/90	3900	0.3	1/2	5	8	
1.64	150	40/60	2600	0.3	1/2	5	8	
1.65	200	50/80	3500	0.3	1/2	5	8	
1.66	200	50/80	3500	0.3	1/2	5	8	
1.67	150	40/60	2600	0.3	1/2	5	8	
1.68	450	115/180	7800	0.3	1/2	8	10	
1.69	1100	275/440	19100	1.3	1/2	10	12	
1.70	1500	375/600	26000	1.8	1/2	12	14	
1.71	1000	250/440	17300	1.2	1/2	10	12	
1.72	750	190/300	13000	0.3	1/2	10	10	
1.73	925	235/370	16000	1.1	1/2	10	12	
1.74	1000	250/400	17300	1.2	1/2	10	12	
1.75	1000	250/400	17300	1.2	1/2	10	12	
1.76	1100	275/440	19100	1.3	1/2	10	12	
1.77	1100	275/440	19100	1.3	1/2	10	12	
1.78	1200	300/480	20800	1.4	1/2	10	12	
1.79	1275	320/510	22100	1.5	1/2	10	12	
1.80	300	75/120	5200	0.3	1/2	6	8	
1.81	600	150/240	10400	0.3	1/2	8	10	
1.82	250	65/100	4400	0.3	1/2	6	8	
1.83	650	165/260	11300	0.3	1/2	8	10	
1.84	900	225/360	15600	1.1	1/2	10	12	
1.85	700	175/280	12100	0.3	1/2	10	10	
1.86	825	210/330	14300	0.3	1/2	10	12	
1.87	425	110/170	7400	0.3	1/2	8	10	
1.88	900	225/360	15600	1.1	1/2	10	12	
1.89	200	50/100	4400	0.3	1/2	6	8	

NOTES:

1. MINIMUM INLET PRESSURE TO TERMINAL UNITS SHALL BE 0.75" W.G.
2. MAXIMUM PRESSURE DROP THROUGH TERMINAL UNITS SHALL BE 0.25" S.P.
3. FURNISH TERMINAL UNITS WITH: FACTORY MOUNTED DDC CONTROLS, ACOUSTICAL LINING, THERMOSTAT, CONTROL VOLTAGE TRANSFORMER.
4. MECHANCIAL CONTRACTOR SHALL EXTEND CONTROL POWER WIRING (120 V) FROM J-BOX TO VAV BOX. 120 V J-BOX BY ELECTRICAL CONTRACTOR, WIRING FROM J-BOX AND FINAL CONNECTION TO UNIT BY MECHANICAL CONTRACTOR. COORDINATE LOCATION OF 120 V J-BOXES WITH ELECTRICAL CONTRACTOR.
5. DDC CONTROLS SHALL BE FURNISHED TO THE BOX MANUFACTURER BY THE CONTROLS VENDOR. BOX MANUFACTURER SHALL FACTORY MOUNT AND WIRE CONTROLS. INSTALLATION OF CONTROLS SHALL INCLUDE CONTROLS TRANSFORMER, DISCONNECT, CONTROL COVER, AND ALL WIRING AND LABOR FOR A COMPLETE AND OPERATIONAL SYSTEM.
6. THE ABOVE NOTED HEATING VALUES ARE BASED ON E.A.T. OF 60°F AND A L.A.T. OF 95°F
7. PROVIDE MINIMUM 2 ROW HEATING COILS
8. PROVIDE MINIMUM NEC CODE REQUIRED 36" CLEARANCE ON CONTROLS ENCLOSURES, AND ASSOCIATED CLEARANCE ACCESS, PROVIDE CODE REQUIRED DISCONNECT

TESTING, ADJUSTING, AND BALANCING

1. THE MECHANICAL CONTRACTOR SHALL BALANCE ALL MECHANICAL SYSTEMS TO THE PERFORMANCE SPECIFICATIONS INDICATED ON PLANS AND PROVIDE THE ENGINEER WITH THREE COPIES OF A COMPLETE TEST AND BALANCE REPORT. THE REPORT IS TO BE ISSUED A MINIMUM OF TWO WEEKS PRIOR TO PROJECT COMPLETION. THE TEST AND BALANCE REPORT WILL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER. ANY ADDITIONAL TESTING, ADJUSTING AND BALANCING REQUIRED (AT ENGINEER'S REQUEST) AFTER REVIEW OF THE INITIAL REPORT SHALL BE PROVIDED AT NO ADDITIONAL COST. TEST AND BALANCE REPORT TO BE COMPLETED BY AN INDEPENDENT, CERTIFIED TEST AND BALANCE CONTRACTOR.
2. CONDUCT TEST AND BALANCING IN ACCORDANCE WITH TECHNICAL PORTIONS OF THE AABC "NATIONAL STANDARDS FOR TESTING AND BALANCING HVAC SYSTEMS", LATEST EDITION.
3. INSTRUMENTS USED FOR BALANCING MUST HAVE BEEN CALIBRATED WITHIN A PERIOD OF SIX (6) MONTHS PRIOR TO BALANCING. SUBMIT SERIAL NUMBERS, AND SATES OF CALIBRATION OF ALL INSTRUMENTS TO BE USED PRIOR TO THE START OF WORK.
4. SET HVAC SYSTEM AIRFLOW AND WATER FLOW RATES WITHIN THE FOLLOWING TOLERANCES:
    - 4.1. WATER FLOW RATE: 0 TO MINUS 5 PERCENT.
    - 4.2. AIR OUTLETS AND INLETS: 0 TO MINUS 10 PERCENT.

ELECTRICAL/MECHANICAL DEMARCATION

REFER TO DETAIL 6/M-502 FOR MECHANICAL CONTRACTOR'S RESPONSIBILITIES RELATED TO ELECTRICAL DISCONNECTS, STARTERS AND WIRING OF MECHANICAL EQUIPMENT. ALL DISCONNECTS, STARTERS AND WIRING (LOAD SIDE OF DISCONNECTS) SHALL BE FURNISHED AND INSTALLED BY M.C. UNLESS OTHERWISE NOTED IN DETAIL 6/M-502. COORDINATE ALL ELECTRICAL REQUIREMENTS WITH E.C. PRIOR TO ASSEMBLING SHOP DRAWING SUBMITTALS OR ORDERING EQUIPMENT.

2018 NORTH CAROLINA ENERGY CONSERVATION CODE COMMERCIAL ENERGY EFFICIENCY - MECHANICAL SUMMARY

501.1 METHOD OF COMPLIANCE

☒ 2018 NCECC CHAPTER 4
☐ ASHRAE 90.1-2010 PRESCRIPTIVE
☐ ASHRAE 90.1-2010 PERFORMANCE
☐ N/A (EXISTING LIGHTING, HVAC, AND DOM. WATER HEATING SYSTEMS TO REMAIN)
☐ COMCHECK PROVIDED (2012 NCECC)
☐ COMCHECK PROVIDED (90.1-2010)
☐ ENERGY MODELING DATA PROVIDED

501.2 APPLICATION COMPLIANCE

☐ 506.2.1 EFFICIENT MECH EQUIPMENT
☒ 506.2.2 REDUCED LTG DENSITY
☐ 506.2.3 ENERGY RECOVERY SYSTEMS
☐ 506.2.4 HI EFFICIENCY DOMESTIC HW
☐ 506.2.5 ONSITE RENEWABLE ENERGY
☐ 506.2.6 DAYLIGHTING CONTROLS

301.1 CLIMATE ZONE

3A MONROE, NC - UNION COUNTY

DESIGN CONDITIONS

EXTERIOR (ASHRAE 90.1-2013 TABLE D-1)

winter dry bulb	18° F.
summer dry bulb	92° F.
summer wet bulb	74° F.

INTERIOR (2018 NCECC SECTION 302.1)

winter dry bulb	72° F.
summer dry bulb	75° F.

503.2 HEATING & COOLING LOADS AND EQUIPMENT & SYSTEM SIZING

BUILDING HEATING LOAD	REFER TO SCHEDULES
BUILDING COOLING LOAD	REFER TO SCHEDULES
INSTALLED HEATING CAPACITY	REFER TO SCHEDULES
INSTALLED COOLING CAPACITY	REFER TO SCHEDULES

503.2.3 & 506.2.1 - REQUIRED & INCREASED HVAC EQUIPMENT PERFORMANCE

SYSTEM DESCRIPTION - EXISTING 4-PIPE VAV AHU WITH TERMINAL BOXES AND REHEAT COILS, AIR COOLED CHILLER, CONDENSING BOILERS

☒ MINIMUM HVAC EQUIPMENT EFFICIENCY COMPLIANCE - TABLE 503.2.3
☐ INCREASED HVAC EQUIPMENT EFFICIENCY COMPLIANCE - TABLE 506.2.1

EQUIP TYPE	SIZE CATEGORY (BTUH)	SUBCATEGORY	503.2.3 MINIMUM EFFICIENCY (b)	506.2.1 INCREASED EFFICIENCY	DESIGN EFFIC.
TABLE C403.2.3(2) - ELECTRICALLY OPERATED UNITARY AND APPLIED HEAT PUMPS					
AIR COOLED COOL MODE	< 65,000 (< = 5 TONS)	SPLIT SYSTEMS & SINGLE PACKAGE	14.0 SEER	15.5 SEER	SEE SCHEDULE

503.2.4 THRU 503.2.9

☒ HVAC SYSTEMS ARE FULLY COMPLIANT WITH THE REQUIREMENTS FOR HVAC SYSTEM CONTROL, VENTILATION, ENERGY RECOVERY, DUCT AND PLENUM INSULATION AND SEALING, PIPING INSULATION, AND SYSTEM COMPLETION.

503.2.10 - AIR SYSTEM DESIGN AND CONTROL

☒ ALL FANS INSTALLED ON THE PROJECT ARE 5 HP OR LESS AND ARE EXEMPT FROM THESE REQUIREMENTS.
☐ FANS ABOVE 5 HP MEET THE CFM LIMITATIONS SHOWN BELOW:

OPTION 2 - FAN SYSTEM MOTOR BRAKE HP - TABLE 503.2.10.1(1)

SYSTEM/UNIT	ALLOWABLE MOTOR BRAKE HP	DESIGN MOTOR BRAKE HP	DESIGN CFM
7.5	6,818 CFM	5,000 CFM	SEE SCHEDULE
10	9,091 CFM	6,667 CFM	SEE SCHEDULE
15	13,636 CFM	10,000 CFM	SEE SCHEDULE
20	18,182 CFM	13,333 CFM	SEE SCHEDULE
25	22,727 CFM	16,667 CFM	SEE SCHEDULE
30	27,272 CFM	20,000 CFM	SEE SCHEDULE
40	36,364 CFM	26,667 CFM	SEE SCHEDULE
50	45,455 CFM	33,333 CFM	SEE SCHEDULE

IF YOU DONT MEET THESE REQUIREMENTS, CHECK THE CODE AND USE OPTION 2

503.3 - SIMPLE HVAC SYSTEMS AND EQUIPMENT (PRESCRIPTIVE)

☐ PROJECT CONSISTS OF ONLY DX SINGLE ZONE SYSTEMS FULLY COMPLIANT WITH THE SIMPLE PRESCRIPTIVE REQUIREMENTS OF 503.3.

503.4 - COMPLEX HVAC SYSTEMS AND EQUIPMENT (PRESCRIPTIVE)

☒ PROJECT CONSISTS OF HVAC SYSTEMS FULLY COMPLIANT WITH THE COMPLEX PRESCRIPTIVE REQUIREMENTS OF 503.4.

C408 - SYSTEM COMMISSIONING

☐ PROJECT AREA IS LESS THAN 10,000 SQUARE FEET AND IS EXEMPT FROM THE SYSTEM COMMISSIONING REQUIREMENTS OF SECTION C408.
☒ PROJECT AREA IS GREATER THAN 10,000 SQUARE FEET AND REQUIRES SYSTEM COMMISSIONING PER SECTION C408.

COORDINATION DRAWINGS

THE CONSTRUCTION MANAGER SHALL ORGANIZE COORDINATION MEETINGS TO DEVELOP A SET OF BIM COORDINATION DRAWINGS WITH ALL CONTRACTORS (ELECTRICAL, MECHANICAL, PLUMBING, FIRE PROTECTION, IT/DATA). THE CM WILL HAVE THE LEAD RESPONSIBILITY FOR THE COORDINATION DRAWINGS.
THE MECHANICAL CONTRACTOR SHALL PRODUCE THE ORIGINAL DRAWINGS AND FORWARD THE DRAWINGS TO EACH OF THE OTHER CONTRACTORS FOR THEM TO ADD THEIR SYSTEMS TO THIS SET OF COORDINATION DRAWINGS. THE CONTRACTORS WILL DEVELOP THE DRAWINGS IN THIS ORDER: MECHANICAL, FIRE PROTECTION, PLUMBING, ELECTRICAL, IT/DATA, AND GENERAL. THIS SHALL ALSO BE THE ORDER OF PRECEDENCE FOR INSTALLATION OF SYSTEMS. ANY RELOCATION OF SYSTEM ROUTINGS WILL BE FOUND IN THE COORDINATION PHASE AND NOTICED BY EACH OF THE CONTRACTORS. THESE DRAWINGS, WHEN COMPLETED, SHALL BE SIGNED OFF BY ALL OF THE ABOVE LISTED PARTIES. DRAWINGS SHALL BE COMPLETED PRIOR TO FABRICATION AND INSTALLATION OF DUCTWORK AND PIPING SYSTEMS, OR PURCHASE OF EQUIPMENT. THE FOLLOWING ITEMS REPRESENT THE MINIMUM REQUIREMENTS AND COORDINATION DRAWINGS:

1. ALL COORDINATION DRAWINGS WILL BE PRODUCED IN REVIT AT 1/4"= 1'-0" SCALE
2. COORDINATION DRAWINGS WILL BE DISTRIBUTED ON REPRODUCIBLE MATERIAL 48"x36"
3. COORDINATION DRAWINGS ARE NOT SHOP DRAWINGS AND ARE REQUIRED IN ADDITION TO SHOP DRAWINGS.
4. ONCE THE COMPLETE COORDINATION DRAWINGS HAVE BEEN COMPILED, THE MECHANICAL CONTRACTOR WILL DISTRIBUTE ONE SIGNED SET TO EACH OF THE FOLLOWING CONTRACTORS: ELECTRICAL, PLUMBING, FIRE PROTECTION, AND GENERAL. ADDITIONAL SETS WILL BE SENT TO THE OWNER, ARCHITECT, AND ENGINEER.

THE USE OF BUILDING INFORMATION MODELING (BIM) THROUGHOUT THE CONSTRUCTION PROCESS IS A REQUIREMENT FOR THIS PROJECT TO HELP REDUCE OR ELIMINATE FIELD DETECTED CONFLICTS, IMPROVE CONSTRUCTION QUALITY AND MAINTAIN AN AGGRESSIVE SCHEDULE. THE CONTRACTOR WILL BE RESPONSIBLE FOR CREATING THE MODEL AND MANAGING THE COORDINATION AND COLLISION DETECTION PROCESS. THE MODEL MUST CONTAIN COMPLETE ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING AND FIRE PROTECTION SYSTEMS CONSISTENT WITH THE DESIGN AND FABRICATION DRAWINGS.

MECHANICAL GENERAL NOTES

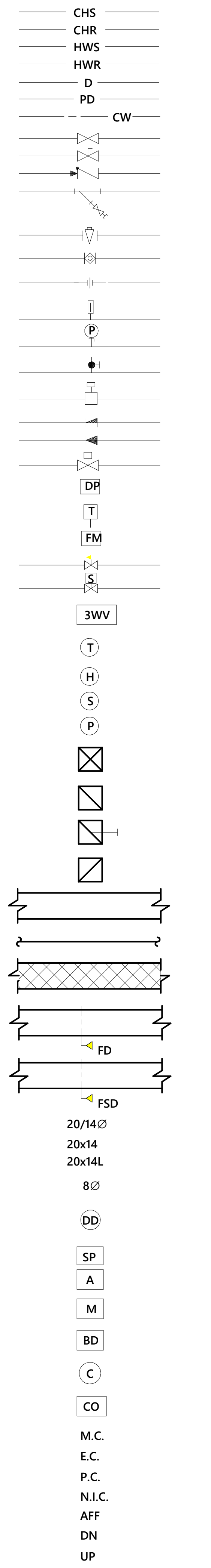
SEE SPECIFICATIONS FOR ADDITIONAL PROJECT REQUIREMENTS. THESE GENERAL NOTES ARE INTENDED TO SUPPLEMENT THE SPECIFICATIONS. IN THE EVENT THAT THE VERBIAGE IS IN CONFLICT OR CONTRADICTS THE REQUIREMENTS LISTED HERE, THE QUESTION SHALL BE ASKED BEFORE BIDDING OR THE MORE STRINGENT SHALL APPLY AT THE ENGINEER'S DISCRETION.

1. DO NOT SCALE DRAWINGS. SEE ARCHITECTURAL DRAWINGS AND REFLECTED CEILING PLANS FOR EXACT LOCATION OF DOORS, WINDOWS, CEILING DIFFUSERS, ETC.
2. ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, PIPING, SHEET METAL, ELECTRICAL, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT WILL BE APPROVED DURING CONSTRUCTION AND ALL COST WILL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR. THIS INCLUDES ANY MODIFICATIONS TO ANY ASSOCIATED MECHANICAL, PLUMBING, OR ELECTRICAL SYSTEMS REQUIRED BY THIS SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. ALL DUCTWORK SHALL BE GALVANIZED UNLESS NOTED TO BE ALUMINUM OR STAINLESS STEEL (SEE PLANS). CONSTRUCTION IN ACCORDANCE WITH THE LATEST SMACNA STANDARDS. ALL SUPPLY, RETURN AND OUTSIDE AIR DUCTWORK SHALL BE WRAPPED WITH 2" THICK DUCT WRAP WITH VAPOR BARRIER. INSULATION (INCLUDING FLEXIBLE DUCT INSULATION) SHALL HAVE A MINIMUM INSTALLED R-VALUE OF 5.0. AIR HANDLING UNIT RETURN DUCTWORK AND TRANSFER DUCTS SHALL BE LINED WITH 1" THICK FLEXIBLE ELASTOMERIC DUCT LINER FOR ACOUSTICAL PURPOSES. DUCT DIMENSIONS ON PLANS ARE FREE AREA SIZE. EXPOSED DUCTWORK IN MECH. ROOMS SHALL BE PROVIDED WITH CANVAS WRAP WITH MASTIC COATING.
4. ALL DUCTWORK SHALL BE SEALED PER THE REQUIREMENTS OF THE INTERNATIONAL MECHANICAL CODE. SEAL MEDIUM PRESSURE SUPPLY DUCTWORK FOR POSITIVE 3" PRESSURE CLASS, SMACNA SEAL CLASS A, SMACNA LEAKAGE CLASS 4. SEAL LOW PRESSURE SUPPLY, RETURN, OUTSIDE AIR, AND EXHAUST DUCTWORK FOR POSITIVE/NEGATIVE 2" PRESSURE CLASS, SMACNA SEAL CLASS A, SMACNA LEAKAGE CLASS 4.
5. ALL PIPING, DUCTS, VENTS, ETC., EXTENDING THROUGH WALLS AND ROOF SHALL BE FLASHED AND COUNTERFLASHED IN A WATERPROOF MANNER.
6. ALL PIPING AND DUCTWORK LOCATIONS SHALL BE COORDINATED WITH THE WORK UNDER OTHER DIVISIONS OF THE SPECIFICATIONS, TO AVOID INTERFERENCE.
7. THE MECHANICAL CONTRACTOR SHALL HAVE THE MECHANICAL SYSTEMS BALANCED TO THE PERFORMANCE SPECIFICATIONS INDICATED ON PLANS AND PROVIDE THE ENGINEER WITH THREE COPIES OF A COMPLETE TEST AND BALANCE REPORT. THE REPORT IS TO BE ISSUED A MINIMUM OF TWO WEEKS PRIOR TO PROJECT COMPLETION. THE TEST AND BALANCE REPORT WILL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER. ANY ADDITIONAL TESTING, ADJUSTING AND BALANCING REQUIRED (AT ENGINEER'S REQUEST) AFTER REVIEW OF THE INITIAL REPORT SHALL BE PROVIDED AT NO ADDITIONAL COST. TEST AND BALANCE REPORT TO BE COMPLETED BY AN INDEPENDENT, CERTIFIED TEST AND BALANCE CONTRACTOR (AABC OR NEBB).
8. UPON PROJECT COMPLETION, THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE OWNER INSTALLATION INFORMATION INCLUDING RECORD SUBMITTALS (WITH ANY SUBMITTAL REVIEW COMMENTS ADDRESSED) AND O&M MANUALS FOR EACH PIECE OF EQUIPMENT INCLUDING ALL SELECTED OPTIONS, THE NAME AND ADDRESS OF AT LEAST ONE SERVICE AGENCY, FULL CONTROL SYSTEM O&M AND CALIBRATION INFORMATION INCLUDING WIRING DIAGRAMS, SCHEMATICS, FULL SEQUENCE OF OPERATION, AND PROGRAMMED SETPOINTS.
9. PROVIDE A ONE YEAR WARRANTY FOR ALL WORK PERFORMED BEGINNING ON THE DAY THE SYSTEM IS COMPLETELY OPERATIONAL AND ACCEPTABLE BY THE OWNER.
10. PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCES AROUND ALL EQUIPMENT FOR MAINTENANCE AND FILTER REMOVAL.
11. CONDENSATE DRAIN PIPING SHALL BE SCHEDULE TYPE "L" HARD DRAWN COPPER AND SHALL BE INSULATED PER THE SPECIFICATIONS. DRAINS FROM ALL COOLING COILS SHALL BE TRAPPED. DRAIN SIZE SHALL BE EQUIPMENT DRAIN CONNECTION SIZE (3/4" MINIMUM) WITH A MINIMUM DEPTH OF 4" OR 1.5 TIMES THE UNIT FAN TSP, WHICHEVER IS GREATER
12. ALL REFRIGERANT PIPE SHALL BE NITROGENIZED ACR COPPER TUBE. SIZE, INSULATE, AND INSTALL REFRIGERANT PIPING PER MANUFACTURER'S RECOMMENDATIONS.
13. ANY DEVICE REQUIRING A TEMP SENSOR FOR CONTROL SHALL BE FURNISHED WITH A TEMP SENSOR WHETHER INDICATED ON THE DRAWINGS OR NOT.
14. INSTALL THE TOP OF ALL THERMOSTATS, SENSORS, AND SWITCHES AT 4'-0" (MAXIMUM) ABOVE FINISH FLOOR. COORDINATE EXACT THERMOSTAT LOCATION WITH OWNER PRIOR TO INSTALLATION. ANY DEVICE ON A PERIMETER WALL SHALL BE MOUNTED ON A FOAM-FILLED ELECTRICAL BOX, WITH ALL GAPS BETWEEN BOX AND WALL SEALED TO PREVENT INFILTRATION.
15. MECHANICAL CONTRACTOR SHALL VERIFY LOCATION OF ROOF PENETRATIONS FOR RELIEF HOODS WITH ARCHITECT & ENGINEER PRIOR TO INSTALLATION.
16. MECHANICAL CONTRACTOR SHALL LOCATE EXHAUST FANS, OUTLETS, AND GAS FLUES A MINIMUM OF 15'-0" FROM ANY OUTSIDE AIR INTAKE.
17. ALL HOT WATER PIPING 2" AND LESS SHALL BE HARD-DRAWN TYPE-L COPPER PIPE AND FITTINGS. ALL CHILLED WATER AND HOT WATER PIPING GREATER THAN 2" SHALL BE SCHEDULE-40 BLACK STEEL.
18. HOT WATER PIPING SHALL BE INSULATED WITH 1-1/2" THICK FIBERGLASS INSULATION WITH A DENSITY OF 1.5 LB PER CUBIC FOOT. INSULATION SHALL HAVE A FACTORY APPLIED PRESSURIZED VAPOR BARRIER JACKET WITH PRESSURE SENSITIVE ADHESIVE SELF-SEALING LAP. ALL FITTINGS SHALL HAVE PVC FITTING COVERS. ALL PIPING OUTSIDE SHALL HAVE A BITUMINOUS COATING, ALUMINUM JACKET AND PVC FITTING COVERS. ALL INSULATION AND JACKETING SHALL HAVE A SMOKE/FLAME RATING OF 25/50 AND SHALL BE APPROVED FOR INSTALLATION IN A RETURN PLENUM. EXPOSED PIPING IN MECH. ROOMS SHALL BE PROVIDE WITH COLOR CODED PVC JACKET
19. ALL HOT WATER PIPING SHALL PITCH DOWN IN DIRECTION OF FLOW WITH MANUAL AIR VENTS AT ALL HIGH POINTS AND 1/2" DRAIN VALVES AT ALL LOW POINTS.
20. PROVIDE UNIONS, FLANGES OR COUPLINGS AT CONNECTION TO ALL VALVES AND EQUIPMENT. DO NOT USE DIRECT WELDED OR THREADED CONNECTIONS TO VALVES, EQUIPMENT OR OTHER APPARATUS.
21. PROVIDE NON-CONDUCTING DIELECTRIC UNIONS WHENEVER CONNECTING DISSIMILAR METALS.
22. EQUIPMENT OPERATED DURING CONSTRUCTION SHALL USE FILTERED MEDIA TO PREVENT CONSTRUCTION DEBRIS FROM ENTERING COILS, DUCTWORK SYSTEMS, AIR TERMINALS ETC. AT COMPLETION OF CONSTRUCTION, MECHANICAL CONTRACTOR SHALL CLEAN ALL SYSTEMS WITH ALL CONTROL DEVICES WIDE OPEN AND REMOVE ANY REMAINING DEBRIS PRIOR TO TEST AND BALANCING. MECHANICAL CONTRACTOR SHALL REPLACE ALL FILTRATION WITH NEW FILTERS AT COMPLETION OF CONSTRUCTION. ANY DUCTWORK, AIR TERMINALS, AND/OR OTHER EQUIPMENT UPSTREAM OF FILTRATION SHALL BE CLEANED THOROUGHLY OF CONSTRUCTION DEBRIS BEFORE HANDING OVER TO OWNER. CHANGE OUT MEDIA AS NECCESSARY TO PROTECT NEW EQUIPMENT
23. MECHANICAL CONTRACTOR SHALL PROVIDE PRE-PRINTED COLOR-CODED PIPE LABELS WITH 1-1/2" HIGH LETTERING INDICATING SERVICE AND FLOW DIRECTION. ALL PIPING TO MATCH EXISTING FACILITIES STANDARD (IF APPLICABLE). OTHERWISE, PIPE LABELS SHALL MATCH THE FOLLOWING:
    HOT WATER PIPING: YELLOW BACKGROUND, BLACK LETTERING
    REFRIGERANT PIPING: YELLOW BACKGROUND, BLACK LETTERING
24. MECHANICAL CONTRACTOR SHALL PROVIDE FUSED DISCONNECTS AND STARTERS FOR ALL MECHANICAL EQUIPMENT REQUIRED FOR A COMPLETE AND FUNCTIONING SYSTEM. REFER TO DIVISION 23 & 26 SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS
25. ALL EQUIPMENT CONCRETE PAD SIZES FOR MECHANICAL EQUIPMENT SHALL BE CONFIRMED WITH APPROVED SHOP DRAWING SUBMITTALS AND ASSOCIATED UNIT MANUFACTURER ANCHOR LOCATIONS PRIOR TO FABRICATION/INSTALLATION. MINIMUM PAD THICKNESS SHALL BE 6" FOR AHU'S OR AS REQUIRED FOR CONDENSATE P-TRAP DEPTH (WHICHEVER IS GREATER). ALL OTHER PADS (PUMPS, BOILERS, TANKS, ETC.) SHALL BE 4" THICK (UNLESS OTHERWISE NOTED). REFER TO STRUCTURAL PLANS FOR CONCRETE PAD REQUIREMENTS
26. PROVIDE YOUNG REGULATOR ON ALL DAMPERS INSTALLED ABOVE INACCESSIBLE CEILINGS
27. ALL EQUIPMENT SHALL BE U.L. LISTED AND LABELED

DRAWING LIST

SHEET NUMBER	SHEET NAME
M001	MECHANICAL LEGEND, NOTES & SCHEDULES
M002	MECHANICAL SCHEDULES
M003	MECHANICAL POINTS AND SEQUENCE
M101	DEMOLITION MECHANICAL FLOOR PLAN - AREA A
M101P	DEMOLITION MECHANICAL PIPING FLOOR PLAN - AREA A
M102	DEMOLITION MECHANICAL FLOOR PLAN - AREA B
M102P	DEMOLITION MECHANICAL PIPING FLOOR PLAN - AREA B
M201	NEW WORK - MECHANICAL FLOOR PLAN - AREA A
M201P	NEW WORK - MECHANICAL PIPING FLOOR PLAN - AREA A
M202	NEW WORK - MECHANICAL FLOOR PLAN -AREA B
M202P	NEW WORK - MECHANICAL FLOOR PLAN - AREA B
M301	NEW WORK - MECHANICAL ROOF PLAN
M501	MECHANICAL DETAILS
M502	MECHANICAL DETAILS

MECHANICAL LEGEND



SYMBOL	DESCRIPTION	ABBR.
CHS	CHILLED WATER SUPPLY	CHS
CHR	CHILLED WATER RETURN	CHR
HWS	HOT WATER SUPPLY	HWS
HWR	HOT WATER RETURN	HWR
D	CONDENSATE DRAIN	D
PD	PUMPED CONDENSATE	PD
CW	COLD WATER MAKE-UP	CW
	BUTTERFLY VALVE	
	3-PIECE BALL VALVE	
	CHECK VALVE	
	STRAINER WITH BLOWDOWN VALVE WITH HOSE CONN.	
	BALANCING VALVE	
	B&G CIRCUIT SETTER	
	UNION	
	THERMOMETER	
P	PRESSURE GAGE & COCK	
	GAGE COCK WITH T & P PLUG	
	FLOW SWITCH	
	ECCENTRIC REDUCER	
	CONCENTRIC REDUCER	
	CONTROL VALVE	
DP	DIFFERENTIAL PRESSURE SENSOR	
T	TEMPERATURE GAUGE	
FM	FLOW METER	
	PRESSURE REDUCING/REGULATING VALVE	
S	SOLENOID VALVE	
3WV	3-WAY VALVE	
Ⓣ	THERMOSTAT / TEMP SENSOR (4'-0" AFF TO TOP)	
Ⓗ	HUMIDISTAT (4'-0" AFF TO TOP)	
Ⓢ	SWITCH (4'-0" AFF TO TOP)	
Ⓟ	BUILDING PRESSURE SENSOR (4'-0" AFF TO TOP)	
⊠	SUPPLY AIR DIFFUSER (4-WAY)	
⧅	RETURN AIR GRILLE	
⧅	RETURN AIR GRILLE WITH SOUND ATTENUATION (SEE DETAIL)	
⧄	EXHAUST AIR GRILLE	
	DOUBLE LINE DUCTWORK	
	SINGLE LINE DUCTWORK	
	DOUBLE LINE DUCTWORK - DEMOLISHED	
FD	FIRE DAMPER DAMPER W/ ACCESS DOOR (SEE DETAIL)	
FSD	COMBINATION FIRE/SMOKE DAMPER W/ ACCESS DOOR (SEE DETAIL)	
20/14∅	20"x14" FLAT OVAL DUCT	
20x14	20"x14" RECTANGULAR DUCT	
20x14L	20"x14" RECTANGULAR DUCT LINED	
8∅	8" DIAMETER ROUND DUCT	
DD	DUCT MOUNTED SMOKE DETECTOR W/ ACCESS DOOR	
SP	STATIC-PRESSURE SENSOR (DUCT MOUNTED)	
A	AIRFLOW MONITORING STATION	
M	MOTORIZED DAMPER	
BD	BACKDRAFT DAMPER	
Ⓒ	CARBON DIOXIDE SENSOR (4'-0" AFF TO TOP)	
CO	CARBON MONOXIDE SENSOR	
M.C.	MECHANICAL CONTRACTOR	
E.C.	ELECTRICAL CONTRACTOR	
P.C.	PLUMBING CONTRACTOR	
N.I.C.	NOT IN CONTRACT	
AFF	ABOVE FINISHED FLOOR	
DN	DOWN	
UP	UP	

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BID DOCUMENTS

SCO # 19-21446-02A

MECHANICAL LEGEND, NOTES & SCHEDULES

DATE: 09.27.22
PROJECT NO: 21-0029

REVISIONS
NO: DATE: DESCRIPTION:

SHEET NUMBER
M001

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): RTU-3 (EXISTING)

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)	CALCULATED AREA E/A (CFM)
OFFICE SPACES	5	0.06	5	0.000000	1595	7	35	95	0
CLASSROOMS	7.5	0	35	0.000000	192	6	45	0	0
ENTRY	5	0.06	5	0.000000	295	1	5	17	0
CORRIDORS	0	0.06	0	0.000000	892	0	0	53	0
LOBBIES	5	0.06	10	0.000000	3622	36	180	217	0
CONFERENCE ROOMS	5	0.06	50	0.000000	1546	77	385	92	0
			BLDG TOTAL OUTSIDE AIR REQ'D (Ez=0.8, CFM)				1405		
			BUILDING TOTAL OUTSIDE AIR PROVIDED (CFM)				1425**		
					BUILDING TOTAL EXHAUST AIR REQUIRED (CFM)				0
**REBALANCE UNIT FOR UPDATED OA AIRFLOW					BUILDING TOTAL EXHAUST AIR PROVIDED (CFM)				0

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): RTU-5 (EXISTING)

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)	CALCULATED AREA E/A (CFM)
CLASSROOMS	7.5	0	35	0.000000	4334	151	1132	0	0
OFFICE SPACES	5	0.06	5	0.000000	334	6*	30	20	0
CORRIDORS	0	0.06	0	0.000000	474	0	0	28	0
STORAGE ROOMS	0	0.12	0	0.000000	244	0	0	29	0
STAGES/STUDIO	10	0.06	70	0.000000	262	6*	60	15	0
CONFERENCE	5	0.06	50	0.000000	493	18*	90	29	0
			BLDG TOTAL OUTSIDE AIR REQ'D (Ez=0.8, CFM)				1791		
			BUILDING TOTAL OUTSIDE AIR PROVIDED (CFM)				1800**		
*OCCUPANCY BASED ON SEAT COUNT					BUILDING TOTAL EXHAUST AIR REQUIRED (CFM)				0
**REBALANCE UNIT FOR UPDATED OA AIRFLOW					BUILDING TOTAL EXHAUST AIR PROVIDED (CFM)				0

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): RTU-6 (EXISTING)

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)	CALCULATED AREA E/A (CFM)
OFFICE	5	0.06	5	0.000000	5022	25	125	301	0
CORRIDORS	0	0.06	0	0.000000	630	0	0	37	0
STORAGE	0	0.12	0	0.000000	1360	0	0	163	0
RECEPTION	5	0.06	5	0.000000	222	1	5	13	0
TOILET	0	0	0	70.000000	1 FIXTURE	0	0	0	70
PRINT SHOP	5	0.06	4	0.500000	1964	7	35	117	982
			BLDG TOTAL OUTSIDE AIR REQ'D (Ez=0.8, CFM)				995		
			BUILDING TOTAL OUTSIDE AIR PROVIDED (CFM)				1025**		
*OCCUPANCY BASED ON SEAT COUNT					BUILDING TOTAL EXHAUST AIR REQUIRED (CFM)				70
**REBALANCE UNIT FOR UPDATED OA AIRFLOW					BUILDING TOTAL EXHAUST AIR PROVIDED (CFM)				75

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): RTU-7 (EXISTING)

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)	CALCULATED AREA E/A (CFM)
CLASSROOMS	7.5	0	35	0.000000	5282	184	1380	0	0
STORAGE ROOMS	0	0.12	0	0.000000	63	0	0	7	0
OFFICES	5	0.06	5	0.000000	855	17*	0	9	0
			BLDG TOTAL OUTSIDE AIR REQ'D (Ez=0.8, CFM)				1734		
			BUILDING TOTAL OUTSIDE AIR PROVIDED (CFM)				1750**		
*OCCUPANCY BASED ON SEAT COUNT					BUILDING TOTAL EXHAUST AIR REQUIRED (CFM)				0
**REBALANCE UNIT FOR UPDATED OA AIRFLOW					BUILDING TOTAL EXHAUST AIR PROVIDED (CFM)				0

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): RTU-8 (EXISTING)

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)	CALCULATED AREA E/A (CFM)
CLASSROOMS	7.5	0	35	0.000000	6199	216	1620	0	0
CORRIDORS	0	0.06	0	0.000000	1241	0	0	74	0
			BLDG TOTAL OUTSIDE AIR REQ'D (Ez=0.8, CFM)				2117		
			BUILDING TOTAL OUTSIDE AIR PROVIDED (CFM)				2125**		
*OCCUPANCY BASED ON SEAT COUNT					BUILDING TOTAL EXHAUST AIR REQUIRED (CFM)				0
**REBALANCE UNIT FOR UPDATED OA AIRFLOW					BUILDING TOTAL EXHAUST AIR PROVIDED (CFM)				0

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-9 (EXISTING)

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)	CALCULATED AREA E/A (CFM)
CLASSROOMS	7.5	0	35	0.000000	7350	257	1928	0	0
STORAGE ROOMS	0	0.12	0	0.000000	769	0	0	92	0
CORRIDORS	0	0.06	0	0.000000	2023	0	0	121	0
RESTROOMS	0	0	0	70.000000	12 FIXTURES	0	0	0	840
OFFICES	5	0.06	5	0.000000	1204	32*	160	72	0
RECEPTION	5	0.06	5	0.000000	929	4	20	56	0
KITCHEN	0	0	0	0.7	173	0	0	0	121 - BY OTHERS
			BLDG TOTAL OUTSIDE AIR REQ'D (Ez=0.8, CFM)				3061		
			BUILDING TOTAL OUTSIDE AIR PROVIDED (CFM)				3075**		
*OCCUPANCY BASED ON SEAT COUNT					BUILDING TOTAL EXHAUST AIR REQUIRED (CFM)				961
**REBALANCE UNIT FOR UPDATED OA AIRFLOW					BUILDING TOTAL EXHAUST AIR PROVIDED (CFM)				1050

DUCTLESS SPLIT SYSTEMS (COOLING ONLY)

INDOOR UNIT						OUTDOOR UNIT									
SYMBOL	CFM	ELECTRICAL DATA		OPERATING	MANUFACTURER	SYMBOL	COOLING CAPACITY		COMPRESSOR	ELECTRICAL DATA			OPERATING	MANUFACTURER	ALLOWABLE LINE-SET
		MCA	VOLTAGE	WEIGHT	DAIKIN		TC (BTUH)	SHC (BTUH)	RLA	MCA	FUSE	VOLTAGE	WEIGHT	DAIKIN	LENGTHS
IDU-A	716	0.4	208/1/60	31 LBS	FTK24AXVJU	ODU-A	21,200	15,670	13.0	13.4	20	208/1/60	106 LBS	RK24AXJVU	98' TOTAL, 65' VERT.
IDU-B	716	0.4	208/1/60	31 LBS	FTK24AXVJU	ODU-B	21,200	15,670	13.0	13.4	20	208/1/60	106 LBS	RK24AXJVU	98' TOTAL, 65' VERT.
IDU-C	716	0.4	208/1/60	31 LBS	FTK24AXVJU	ODU-C	21,200	15,670	13.0	13.4	20	208/1/60	106 LBS	RK24AXJVU	98' TOTAL, 65' VERT.
IDU-D	436	0.4	208/1/60	22 LBS	FTK12AXVJU	ODU-D	10,900	9,090	7.5	7.8	15	208/1/60	106 LBS	RK12AXJVU	65' TOTAL, 49' VERT.
IDU-E	436	0.4	208/1/60	22 LBS	FTK12AXVJU	ODU-E	10,900	9,090	7.5	7.8	15	208/1/60	106 LBS	RK12AXJVU	65' TOTAL, 49' VERT.

NOTES:
1. ALL UNITS SHALL BE U.L. LISTED AND HAVE A MINIMUM SEER OF 20.
2. COOLING CAPACITIES ARE BASED ON 95° AMBIENT, 80° ENTERING AIR DRY BULB, 67° ENTERING AIR WET BULB. AIRFLOWS INDICATED ARE AT 'HIGH' SPEED.
3. UNITS MOUNTED ON ROOF TO BE PROVIDE WITH EQUIPMENT SUPPORT RAILS.
4. PROVIDE MANUFACTURER'S SUGGESTED CLEARANCES AROUND UNIT.
5. PROVIDE UNITS WITH MANUFACTURER'S LOW AMBIENT CONTROLS FOR OPERATION DOWN TO 0° F,CONDENSATE PUMP, INVERTER COMPRESSOR, 7-DAY PROGRAMMABLE THERMOSTAT (WALL-MOUNTED), NON-LOCKING DISCONNECT FOR INDOOR UNIT, HAIL GUARDS
6. PROVIDE OUTDOOR UNITS WITH 6 YEAR EXTENDED COMPRESSOR WARRANTY.
7. SEE MANUFACTURER'S RECOMMENDATIONS FOR REQUIRED ADDITIONAL REFRIGERANT CHARGE AND RECOMMENDED LINE-SET LENGTHS.
8. INDOOR UNITS WILL BE POWERED FROM THE ASSOCIATED OUTDOOR UNIT. THE POWER SUPPLY TO THE OUTDOOR UNITS IS A DEDICATED ELECTRICAL CONNECTION, THE OUTDOOR UNIT SHALL RECEIVE A SEPARATE ELECTRICAL CONNECTION AS NOTED IN THE SCHEDULE. THE MECHANICAL CONTRACTOR SHALL PROVIDE DISCONNECT SWITCHES, AND POWER WIRING BETWEEN DISCONNECT AND EQUIPMENT.
9. REFRIGERANT PIPING AND WIRING FOR WALL-MOUNTED INDOOR UNITS SHALL BE ROUTED IN WALL WHERE POSSIBLE.
10. MOUNT INDOOR AC UNIT 9'-0" A.F.F. COORDINATE WITH ALL UTILITIES, LIGHTS, CEILING, CABLE TRAYS, ETC.

EXHAUST FAN SCHEDULE

SYMBOL	LOCATION	MANUFACTURER	MODEL NO.	TYPE	CFM	APPROX. ESP	DRIVE TYPE	FAN RPM	SONES	ELECTRICAL DATA			ACCESSORIES	CONTROL TYPE
										WATTS	H.P.	VOLTAGE-PHASEØ		
F-1	TLT 251	GREENHECK	SP-80-VG	CEILING	75	0.300	DIRECT	935	0.29	6	0.00	120 V-1Ø	A,B,I	2
F-2	ELEC. 228	GREENHECK	SQ-99-VG	INLINE	500	0.500	DIRECT	1362	9.8	0	0.25	120 V-1Ø	A,B,F,G	1
F-4	ELEC. 195	GREENHECK	SQ-99-VG	INLINE	500	0.500	DIRECT	1362	9.8	0	0.25	120 V-1Ø	A,B,F,G	1
F-5	E.C. DATA 177	GREENHECK	SQ-99-VG	INLINE	500	0.500	DIRECT	1362	9.8	0	0.25	120 V-1Ø	A,B,F,G	1
F-6	PRINT SHOP 245	GREENHECK	G-095-VG	ROOF	800	0.300	DIRECT	1538	8.5	696	0.20	120 V-1Ø	A,B,D,E	8

** FAN F-3 NOT USED*

EXHAUST FAN SCHEDULE ACCESSORIES:

A. DISCONNECT SWITCH
B. GRAVITY BACKDRAFT DAMPER
C. MOTORIZED BACKDRAFT DAMPER
D. PREFAB, ROOF CURB
E. BIRDSCREEN
F. ACOUSTICAL LINING
G. HANGING BRACKETS WITH VIBRATION ISOLATION
H. WL, WALL LOUVER DISCHARGE
I. FCC OR GRS ROOF CAP (FLAT ROOF) OR RJ ROOF CAP (PITCHED ROOF)
J. WALL MOUNTING COLLAR
K. INLET GAUD
M. 2" WASHABLE ALUMINUM FILTERS
N. MOTORSIDE FAN GUARD
O. EXHAUST GRILLE
P. U.L. 762
Q. VENTED ROOF CURB EXTENSION
R. COMBINATION KITCHEN HOOD FAN CURB
S. INTERLOCK WITH FUME HOOD
T. PROVIDE DRAIN PLUG ACCESSORY
U. ROOF SUPPORT RAILS
V. VFD

EXHAUST FAN SCHEDULE CONTROLS:

1. WALL MOUNTED THERMOSTAT (REVERSE ACTING, SET FOR 80°)
2. INTERLOCK WITH ROOM LIGHT SWITCH (FAN SHALL OPERATE WHEN LIGHT IS ON IF ANY ROOM IS SERVED BY FAN)
3. WALL MOUNTED ON/OFF SWITCH WITH IDENTIFICATION LABEL
4. WALL MOUNTED MUSHROOM PUSH BUTTON SWITCH/STARTER WITH IDENTIFICATION LABEL
5. CONTROLLED BY BUILDING AUTOMATION SYSTEM
6. CONTINUOUS OPERATION
7. CONTROLLED BY THE FACP AND FIREMAN'S MANUAL OVER-RIDE CONTROL PANEL IN FIRE COMMAND ROOM. NO MECHANICAL CONTROL POINTS REQUIRED BY M.C. FOR SMOKE CONTROL FANS
8. INTERLOCK FAN WITH EXTG RTU-6 TO OPERATE WHEN ASSOCIATED UNIT IS IN OCCUPIED MODE

EXHAUST FAN SCHEDULE NOTES:

1. ALL FANS SHALL BE U.L. LISTED AND LABELED AND SHALL BE AMCA CERTIFIED FOR SOUND AND AIR FLOW. ALL FANS INSTALLED INSIDE, ABOVE, OR ADJACENT TO OCCUPIED SPACES SHALL HAVE A MAXIMUM 9.0 INLET SONE LEVEL.
2. ALL FANS SHALL BE SUPPLIED BY ONE MANUFACTURER UNLESS NOTED OTHERWISE.
3. MECHANICAL CONTRACTOR SHALL PROVIDE MAGNETIC STARTER WITH AUXILIARY CONTACTS AS REQUIRED.
4. PROVIDE ALL DIRECT DRIVE FANS WITH SPEED CONTROLLERS.
5. BACKDRAFT DAMPER ON ROOF SUPPLY FANS SHALL BE MOTORIZED.

EXISTING ROOFTOP UNIT SCHEDULE (DX COOLING, ELECT. HEAT)

*SCHEDULE FOR REBALANCING PURPOSES

SYMBOL	CFM	O.A. (CFM)	SUPPLY FAN E.S.P. (IN. W.G.)	COOLING CAPACITY	EFFICIENCY	HEATING CAPACITY	OPERATING WEIGHT (LBS)	MANUF.	MODEL
EXTG RTU-3	10,500	1,425	EXTG	EXTG	EXTG	EXTG	EXTG	McQUAY	OAH021FDAC
EXTG RTU-5	10,500	1,800	EXTG	EXTG	EXTG	EXTG	EXTG	McQUAY	OAH021FDAC
EXTG RTU-6	13,500	1,025	EXTG	EXTG	EXTG	EXTG	EXTG	McQUAY	OAH025FDAC
EXTG RTU-7	8,500	1,750	EXTG	EXTG	EXTG	EXTG	EXTG	McQUAY	OAH017FDAC
EXTG RTU-8	13,500	2,125	EXTG	EXTG	EXTG	EXTG	EXTG	McQUAY	OAH025FDAC
EXTG AHU-9	17,500	3,075	EXTG	EXTG	EXTG	EXTG	EXTG	McQUAY	EXTG

EXISTING ROOFTOP UNIT SCHEDULE NOTES:

1. PROVIDE NEW MOTOR OPERATED DAMPERS (M.O.D.) ON THE EXTG RTUS FOR OA CONTROL BASED ON NEW SEQUENCE.
2. NEW CO2 SENSORS SHALL BE INSTALLED IN THE RETURN DUCT FOR ALL EXTG UNITS THAT ARE INCLUDED IN THIS PROJECT.

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BID DOCUMENTS

SCO # 19-21446-02A

MECHANICAL SCHEDULES

DATE: 09.27.22
PROJECT NO: 21-0029

REVISIONS

NO:	DATE:	DESCRIPTION:

SHEET NUMBER

M002

SEQUENCE OF OPERATION

A COMPLETE AND OPERATIONAL DDC CONTROL SYSTEM (BAS) SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS (SECTION 230900) AND AS INTENDED ON THESE PLANS. ALL CONTROL POINTS AND EQUIPMENT SEQUENCES OF OPERATION LISTED IN SPECIFICATION SECTION 230900 SHALL BE CONSIDERED IN ADDITION TO THOSE LISTED HERE. IN THE EVENT THAT THE VERBIAGE IS IN CONFLICT OR CONTRADICTS THE REQUIREMENTS LISTED HERE, THE QUESTION SHALL BE ASKED BEFORE BIDDING OR THE MORE STRINGENT SHALL APPLY AT THE ENGINEER'S DISCRETION.

GENERAL:

BUILDING AUTOMATION SYSTEM (BAS) SHALL PROVIDE PROGRAMMED/TIMED OPERATION OF THE BUILDING HVAC SYSTEM AND SYSTEM COMPONENTS BY PLACING THE SYSTEM IN "OCCUPIED" OR "UNOCCUPIED" MODES BASED ON THE OWNERS OPERATING SCHEDULE. UNOCCUPIED MODE WILL BE A MANUAL OPERATION THROUGH THE BAS, OR AS SCHEDULED BY THE OWNER. (COORDINATE WITH OWNER FOR FINAL HOURS OF OPERATION), UNOCCUPIED WILL BE FOR THE REMAINING HOURS. MINIMUM ZONES FOR OCCUPANCY SETTINGS SHALL BE GROUPED AS FOLLOWS:

1. PER THE EXISTING RTU AND ASSOCIATED ZONING

BAS SHALL BE WEB (IP) BASED TO ALLOW INTERNET ACCESS FOR REMOTE OPERATION OF ALL SYSTEM FUNCTIONS. BAS SHALL ALLOW GLOBAL OPERATION OF COOLING AND HEATING SETPOINTS. BAS SHALL ALSO ALLOW EITHER ZONE BY ZONE OR GLOBAL OVERRIDE OF SYSTEM EQUIPMENT OPERATION WHILE IN THE UNOCCUPIED MODE. OVERRIDE SHALL ACTIVATE ALL SYSTEM EQUIPMENT, REQUIRED FOR PROPER OPERATION OF OVERRIDDEN EQUIPMENT TO MAINTAIN "OCCUPIED" SPACE CONDITIONS IN THE OVERRIDE ZONE FOR A TIME PERIOD OF 2 HOURS (ADJ.), TIME PERIOD SHALL BE ADJUSTABLE THROUGH THE BAS. ALL BAS COMPONENTS SUCH AS JACE CONTROLLERS, AHU CONTROLLERS, PUMP CONTROLLERS, ETC, SHALL BE FURNISHED WITH A LOCAL UPS WITH SURGE SUPPRESSION SIZED FOR DEVICE CONNECTED WATTAGE, VOLTAGE AND 2 HR. BATTERY OPERATION. UNLESS NOTED OTHERWISE THE OCC. & UNCOCC TEMPERATURE SETPOINTS SHALL BE:
OCCUPIED- 76F CLG / 70F HTG UNCOCCUPIED - 85F CLG / 55F HTG (MECH SPACES 80F CLG / 60F HTG)

EXISTING RTU UNITS

EXTG RTU OPERATION SEQUENCE SHALL REMAIN WHILE IN THE UNOCCUPIED MODE, THE UNIT SUPPLY FAN SHALL BE OFF, THE CHILLED WATER AND HOT WATER CONTROL VALVES SHALL BE CLOSED TO THE UNIT AND THE TERMINAL UNIT SPACE TEMPERATURE SETPOINTS SHALL BE SET TO UNOCCUPIED SETTINGS OF 60° FOR HEATING (ADJ) AND 85° FOR COOLING (ADJ). UPON A CALL FOR HEATING OR COOLING TO MEET UNOCCUPIED SETPOINTS, THE UNIT FAN SHALL BE STARTED AND THE HEATING OR CHILLED WATER CONTROL VALVES SHALL BE OPENED TO THE HEATING OR COOLING COIL AS REQUIRED BY THE SPACE TEMPERATURE. THE BOILER PLANT OR CHILLER PLANT SHALL ALSO BE STARTED AS REQUIRED TO SATISFY SETPOINTS. THE UNIT AND ASSOCIATED CENTRAL PLANT SHALL OPERATE FOR A MINIMUM OF 30 MINUTES (OR AS REQUIRED TO SATISFY UNOCCUPIED SETPOINT) AND SHALL NOT BE ALLOWED TO RESTART FOR A MINIMUM OF 15 MINUTES FOLLOWING SATISFACTION OF UNOCCUPIED SETPOINT AND SYSTEM SHUT-DOWN.

THE EXTG OUTSIDE AIR INTAKE SHALL BE PROVIDED WITH MOTORIZED DAMPER FOR THE CO2 & ECONOMIZER OA CONTROL. ON UNIT START UP, THE O.A. DAMPER SHALL REMAIN CLOSED UNTIL THE RETURN AIR TEMPERATURE RISES ABOVE 65° (ADJ) OR FALLS BELOW 78° (ADJ). ONCE RETURN AIR TEMPERATURE IS SATISFIED, THE O.A. DAMPER SHALL BE PARTIALLY OPEN WHILE THE RTU IS IN THE OCCUPIED MODE, DAMPER SHALL OPEN TO MAINTAIN THE MINIMUM OUTSIDE AIRFLOW (PER SCHEDULED AND T&B VALUE SETPOINT). DAMPER SHALL REMAIN CLOSED WHILE THE UNIT IS IN THE UNOCCUPIED MODE. BAS SHALL BE CAPABLE OF OPENING AND CLOSING OUTSIDE AIR DAMPERS.

CO2 SENSOR MOUNTED IN THE RETURN DUCT SHALL MODULATE THE CO2/ECONOMIZER OUTSIDE AIR DAMPER BASED ON CO2 LEVELS IN THE SPACE. DAMPER SHALL MODULATE OPEN AS REQUIRED TO MAINTAIN A SPACE CO2 LEVEL OF 700 PPM ABOVE THE OUTSIDE AIR CO2 LEVEL. AN ALARM SHALL BE ACTIVATED IF THE SPACE CO2 LEVEL RISES ABOVE 1200 PPM.

VARIABLE AIR VOLUME BOXES & FAN POWERED BOXES

A TEMPERATURE SENSOR SHALL BE UTILIZED TO MAINTAIN SPACE TEMPERATURE SETPOINT OF 75° (ADJ). ON RISE IN SPACE TEMPERATURE ABOVE SETPOINT, THE VOLUME DAMPER SHALL OPEN AS REQUIRED TO MAINTAIN SPACE TEMPERATURE. ON DROP IN SPACE TEMPERATURE BELOW SETPOINT, THE VOLUME DAMPER SHALL CLOSE UNTIL THE MINIMUM DAMPER POSITION IS REACHED. THE HOT WATER CONTROL VALVE SHALL BE MODULATED OPEN TO THE HEATING COIL AND THE TERMINAL UNIT DAMPER SHALL OPEN TO THE MIN. CFM AS INDICATED IN THE SCHEDULE. AS THE TEMPERATURE RISES ABOVE SET POINT THE HOT WATER CONTROL VALVE SHALL CLOSE AND THE DAMPER SHALL RETURN TO THE MINIMUM POSITION.

WHEN WARM AIR IS SENSED BY THE TERMINAL UNIT DURING MORNING WARM-UP, THE DAMPER SHALL RESPOND TO THE SPACE TEMPERATURE. THE TERMINAL UNIT DAMPER SHALL OPEN ON A CALL FOR HEATING AND SHALL REMAIN CLOSED IF THE SPACE TEMPERATURE IS AT OR ABOVE OCCUPIED SETPOINT.

THE TEMPERATURE SENSOR SHALL BE PROVIDED WITH AN OVERRIDE FUNCTION THAT WILL PLACE THE SYSTEM IN THE OCCUPIED MODE FOR A PERIOD OF UP TO 2 HOURS. THE OVERRIDE SHALL ACTIVATE THE SYSTEM AHU AND THE HEATING OR COOLING CENTRAL PLANT AS REQUIRE TO MAINTAIN SPACE TEMPERATURE. TEMPERATURE SENSORS SHALL BE PROVIDED WITH A 5°F DEADBAND BETWEEN HEATING AND COOLING SETPOINTS

DUCTLESS SPLIT SYSTEMS:

UNITS SHALL PROVIDE COOLING ON A CONTINUOUS BASIS. SUPPLY FAN SHALL RUN CONTINUOUSLY AND COOLING CYCLE SHALL CYCLE WITH A CALL FOR COOLING TO MAINTAIN ROOM TEMPERATURE SETPOINT OF 75° F. (ADJ.). UNITS SHALL BE PROVIDED WITH STANDALONE FACTORY CONTROLS.
A SEPARATE THERMOSTAT CONNECTED TO THE BAS SHALL BE PROVIDED, AND IF THE ROOM TEMPERATURE RISES ABOVE 85° F, AN ALARM SHALL BE SENT TO THE BAS UPON AN EQUIPMENT FAILURE OF THE UNIT.

EXHAUST FANS:

FANS SHALL BE CONTROLLED AS NOTED IN ASSOCIATED SCHEDULE

BREAK ROOM KITCHEN HOOD:

OPERATE FOR LOCAL USER INPUT FOR FAN CONTROL. FIRE SUPPRESSION SYSTEM SHALL OPERATE BASED ON MANUAL PULL STATION OR INTERNAL FIRE DETECTION SYSTEM

CONTROL SYSTEM NOTES

A. DIRECT DIGITAL CONTROL (DDC) TECHNOLOGY SHALL BE USED TO PROVIDE THE FUNCTIONS NECESSARY FOR CONTROL OF MECHANICAL SYSTEMS.
B. THE CONTROL SYSTEM SHALL BE DESIGNED SUCH THAT IN THE EVENT OF A NETWORK COMMUNICATION FAILURE, OR THE LOSS OF ANY OTHER CONTROLLER, THE CONTROL SYSTEM SHALL CONTINUE TO INDEPENDENTLY OPERATE UNDER CONTROL.
C. OWNER SHALL PROVIDE WAN/LAN CONNECTION TO THE BUILDING AUTOMATION SYSTEM.
D. NIAGRA PROTOCAL SHALL BE USED FOR WORKBENCH TO DAEMON COMMUNICATION
E. UNIT LEVEL CONTROLLERS SHALL USE BACNET MSTP PROTOCOL. CONTROLLERS SHALL BE BACNET BTL CERTIFIED.
F. THE SYSTEM MUST BE PROVIDED, INSTALLED, WIRED AND PROGRAMED BY THE MANUFACTURER'S LOCAL FACTORY OFFICE OR INDEPENDENT CONTROLS SPECIFIC CONTRACTOS. BIDS BY WHOLESALERS, CONTRACTORS OR FRANCHISED DEALERS OR ANY OTHER FIRM WHOSE PRINCIPLE BUSINESS IS NOT THAT OF MANUFACTURING AND INSTALLING BUILDING AUTOMATION SYSTEM IS NOT ACCEPTABLE.
G. PROVIDE ONE YEAR PARTS AND LABOR WARRANTY OF THE BAS.
H. PROVIDE 8HR (2) 4HR SESSIONS OF OWNER'S TRAINING AT JOBSITE ON THE BUILDING AUTOMATION SYSTEM OPERATION.

THE SYSTEM SHALL HAVE THE FOLLOWING FUNCTIONS:
A. TIME OF DAY SCHEDULING INCLUDING OPTIMAL START/STOP, HOLIDAY AND EXCEPTION SCHEDULES.
B. TIMED OVERRIDE BASED ON DURATION LIMIT OR FIXED UNTIL RELEASED.
C. DATA LOGGING AND TRENDING.
D. USER SECURITY LEVEL ASSIGNMENT.
E. SYSTEM AND ALARMS REPORTS.
F. FLOOR PLANS, SYSTEM, EQUIPMENT GRAPHICS WITH DYNAMIC DATA DISPLAY.
G. ALARM E-MAIL ROUTING.
H. GLOBAL NAVIGATION ICONS TO MANAGE ALARMS, USER CREDENTIALS, HELP FUNCTIONS.
I. SUPPORT A MINIMUM OF 10 CONCURRENT USERS.
J. FULL SEQUENCE OF OPERATION PAGE
K. ONE CLICK TREND(S) NEXT TO EACH POINT MIN 2 WEEKS OF DATA
L. EQUIPMENT DATA PAGE

THE SYSTEM SHALL HAVE THE FOLLOWING PROGRAMMING STANDARD APPLICATIONS:

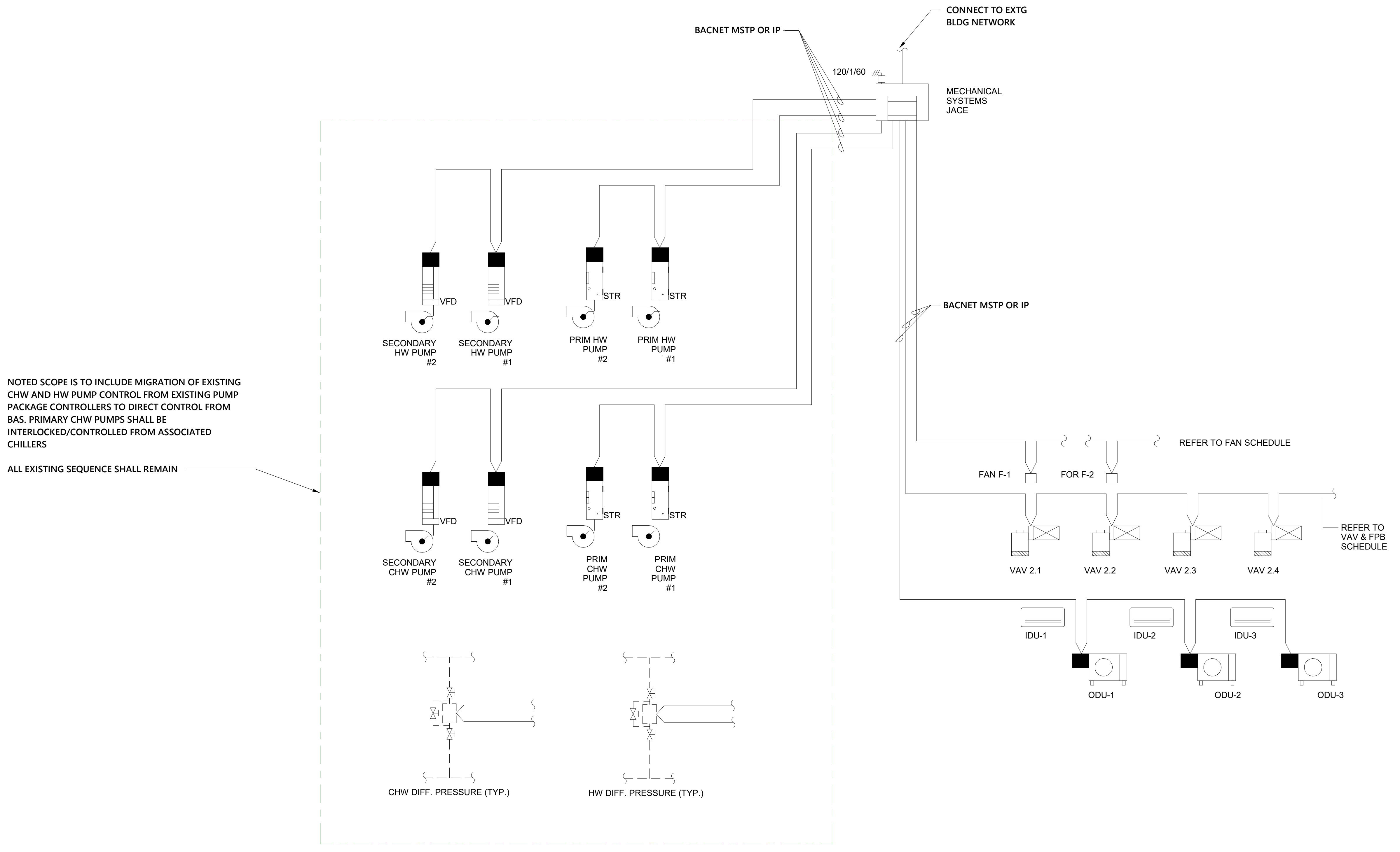
A. DEMAND CONTROL VENTILATION OPTIMIZATION AS DEFINED BY ASHRAE 62.1.

GENERAL NOTES:

1. A USER INTERFACE SHALL BE PROVIDED THAT PERMITS INTERACTION WITH THE NETWORK VIA DYNAMIC COLOR GRAPHICS WITH EACH MECHANICAL SYSTEM, BUILDING FLOOR PLAN, AND CONTROL DEVICE DEPICTED BY POINT-AND -CLICK GRAPHICS.
2. ALL INTEGRATION FROM EXTERIOR SYSTEMS (LIGHTING CONTROLS, ETC.) SHALL BE INCLUDED WITH THE SCOPE OF THIS PROJECT AS DEFINED WITH IN THIS PROJECT OR AS IMPLIED THROUGH NOTES AND OTHER DIVISIONS BY APPLICABLE TRADES (DIVISION 23, 22, 26, 28)
3. PROVIDE GRAPHICS REVIEW WITH OWNER PRIOR TO FINAL SYSTEM COMISSIONING AND TURNOVER
4. ALL EXTERIOR CONNECTIONS TO EXTERNAL WAN/LAN SHALL BE COORDINATED WITH OWNER IT DEPARTMENT
5. FINAL INTEGRATION INTO EXTERNAL WEB BAS ACCESS PLATFORM SHALL BE COORDINATED WITH OWNER

CONTROL SYSTEM NOTES

1. SEE SPECIFICATIONS (SECTION 23 09 00) FOR ADDITIONAL REQUIREMENTS.
2. THE SEQUENCE OF OPERATION OF OPERATION AND POINTS LIST IS INTENDED TO COMMUNICATE THE MINIMUM REQUIREMENTS AND GENERAL DESIGN INTENT TO THE CONTROLS CONTRACTOR AND IS NOT INTENDED TO BE A FULLY DEVELOPED OR COMPLETE SEQUENCE OF OPEARTION. IN THE CONTROLS SUBMITTAL THE CONTROLS CONTRACTOR SHALL FULLY DEVELOP THE SEQUENCE OF OPERATIONS FOR ALL SYSTEMS IDENTIFIED AN SHALL PRESENT ALL SETPOINTS, CONTROL PARAMETERS, TIME DELAYS, ALARM POINTS, ETC. AS REQUIRED TO COMPLY WITH THE DESIGN INTENT. THE CONTROLS CONTRACTOR SHALL INCORPORATE STANDARD FEATURES SUCH AS MINIMUM RUN TIME DELAYS AND DEAD BANDS TO PREVENT SHORT CYCLING. ALL MONITORED POINTS SHALL INCLUDE EARLY HIGH/LOW ALARM NOTIFICATIONS PRIOR TO REQUIRED CORRECTIVE ACTIONS OR UNIT SHUT-DOWNS. CONTROL CONTRACTOR SHALL SPECIFY IN THE CONTROL SUBMITTAL FAIL SAFE POSITION FOR OUT OF RANGE, FAIL SAFE POSITIONING FOR OPEN CIRCUITS OR LOSS OF COMMUNICATION.
3. SYSTEM SHALL USE GLOBAL OUTSIDE AIR TEMPERATURE AND HUMIDITY SENSORS FOR PRIMARY SYSTEM OPERATION. LOCAL OUTSIDE AIR TEMPERATURE AND HUMIDITY SENSORS SHALL BE PROVIDED FOR SYSTEM OPERATION UPON LOSS OF NETWORK COMMUNICATION.
4. ALL CONTROL SETPOINTS SHALL BE ADJUSTABLE AND TRENDABLE. INDICATED TEMPERATURE SETPOINTS SHOULD BE USED FOR ORIGINAL SYSTEM SET-UP. ANY CHANGES IN SETPOINT SETTINGS REQUIRED FOR INTENDED SYSTEM OPERATION SHALL BE NOTED ON AS-BUILT CONTROL DRAWINGS.
5. FLOW SWITCHES OR ADJUSTABLE TYPE CURRENT SWITCHES SHALL BE PROVIDED IN THE PIPING OF EACH PUMP TO VERIFY PUMP STATUS.
6. IONIZATION TYPE DUCT SMOKE DETECTORS SHALL BE FURNISHED AND WIRED TO THE FIRE ALARM SYSTEM BY THE ELECTRICAL CONTRACTOR. MECHANICAL CONTRACTOR SHALL INSTALL DETECTORS IN THE DUCT AND WIRE UNIT FROM FIRE ALARM SYSTEM (DRY CONTACTS) FOR UNIT SHUT-DOWN UPON ACTIVATION.
7. ELECTRICAL CONTRACTOR SHALL PROVIDE DEDICATED 120V CIRCUIT(S) IN A J-BOX FOR CONTROL POWER. CONTROLS CONTRACTOR SHALL EXTEND 120V POWER FROM J-BOX TO CONTROL PANELS, DAMPER ACTUATORS, TRANSFORMERS, ETC. AS REQUIRED FOR OPERATION OF CONTROL SYSTEM.
8. BAS SHALL ALLOW GLOBAL OPERATION OF HOT WATER CONTROL VALVES.
9. ALL CONTROL PANELS AND COMPONENTS SHALL BE UL LISTED
10. LOCATE MAIN DDC CONTROL PANEL(S) MECHANICAL ROOMS AS INDICATED ON PLANS COORDINATE EXACT LOCATION PANEL WITH ALL OTHER TRADES PRIOR TO INSTALLATION.
11. OUTDOOR TEMP/HUMIDITY SENSOR SHALL BE PROVIDED WITH AND ACCURACY OF +/- 2.5%
12. PROOF OF STATUS FOR UTILITY BEING MONITORED SHALL BE ACCOMPLISHED DIRECTLY, NOT INDIRECTLY; VIA CURRENT SENSOR MONITORING FOR PROOF OF STATUS
12. ALL AVAILABLE POINTS SHALL BE INTEGRATED BACK TO THE BAS FROM ASSOCIATED DEVICES, EQUIPMENT. I.E. VFDS, CHILLERS, PDUS, ETC.



NOTED SCOPE IS TO INCLUDE MIGRATION OF EXISTING CHW AND HW PUMP CONTROL FROM EXISTING PUMP PACKAGE CONTROLLERS TO DIRECT CONTROL FROM BAS. PRIMARY CHW PUMPS SHALL BE INTERLOCKED/CONTROLLED FROM ASSOCIATED CHILLERS

ALL EXISTING SEQUENCE SHALL REMAIN

1 BAS JACE SYSTEM DIAGRAM
NTS

MINIMUM INPUT/OUTPUT SUMMARY

SYSTEM, APPARATUS, OR AREA POINT DESCRIPTION	INPUTS																												OUTPUTS												SYSTEM FEATURES																			GENERAL					SUPPLEMENTAL NOTES
	ANALOG																			BINARY									DIGITAL							ANALOG					ALARMS								PROGRAMS											GENERAL					
	MEASURED											CALC.																																																					
	TEMPERATURE	PRESSURE	RH	KW	AIR FLOW	WATER FLOW	CO2	HERTZ	RPM	VOLTS	AMPS	KWH	ENTHALPY	RUN TIME	EFFICIENCY	BTU	CFH			STATUS	FILTER	SMOKE	FREEZE	AIR FLOW	METER	OVER-RIDE			OFF-ON	OFF-AUTO-ON	OFF-HI-LO	OPEN-CLOSE				DMPR. POS.	VALVE POS.	SETPOINT ADJ.	STEP CONTROL		HI ANALOG	LO ANALOG	HI BINARY	LO BINARY	PROOF				TIME SCHEDULING	DEMAND LIMITING	DUTY CYCLE	START/STOP OPT.	ENTHALPY OPT.	SMOKE CNT.	TREND	ALARM INSTRUCT	MAIN. WK. ORD.			COLOR GRAPHIC					
DX SPLIT SYSTEM																																																	X						X					X					
Indoor AC Unit																				X									X																X										X										
Outdoor Unit																				X									X																X										X										
Space Temp	X																																																						X										
Supply Temp	X																																																						X										
Setpoint Adjust																																						X																											
VAV / FPB BOXES																																									X									X					X					X					
Hot Water Re-Heat																																							X																X										
Space Temp	X																																																						X										
Supply Temp	X																																																						X										Mounted 24" downstream
Over-ride																										X																																							
Plenum Fan																													X																										X										
FANS																					X																								X															X					

GENERAL NOTE:
INPUT/OUTPUT SUMMARY IS A GENERAL LIST OF CONTROL POINTS REQUIRED FOR THE OPERATION OF THE MECHANICAL SYSTEM. IN ADDITION TO CONTROL POINTS INDICATED, THE CONTROLS CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADDITIONAL POINTS AS REQUIRED FOR OPERATION OF THE MECHANICAL SYSTEM AS SPECIFIED AND OUTLINED IN THE SEQUENCE OF OPERATION AND TO COMPLY WITH THE SPECIFICATIONS.

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09.27.22

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Monroe, NC 28110

BID DOCUMENTS

SCO # 19-21446-02A

MECHANICAL POINTS AND SEQUENCE

DATE: 09.27.22
PROJECT NO: 21-0029

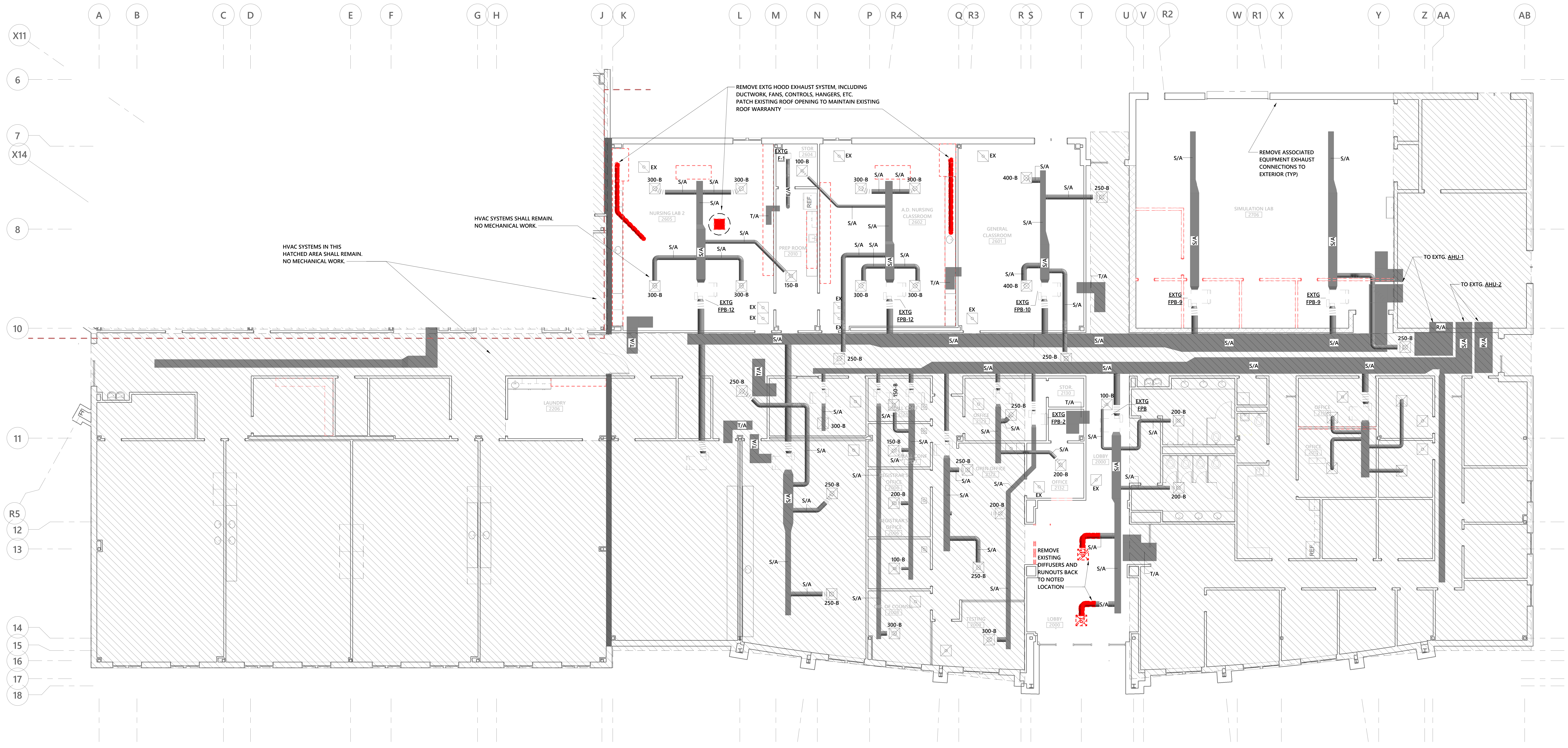
REVISIONS
NO: DATE: DESCRIPTION:

SHEET NUMBER
M003

RATED WALL LEGEND:

▬	EXISTING 4 HOUR RATED WALL
▬	EXISTING 2 HOUR RATED WALL
▭	EXISTING 1 HOUR RATED WALL

PLAN NORTH
TRUE NORTH



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AA
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R5
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18
NURSING LAB 2
2605
STOR
2604
PREP ROOM
2010
A.D. NURSING CLASSROOM
2602
GENERAL CLASSROOM
2601
SIMULATION LAB
2706
LAUNDRY
2206
STOR.
2130
SMALL CONF
2128
SMALL CONF
2127
OFFICE
2129
OPEN OFFICE
2122
REGISTRAR'S OFFICE
2006
OFFICE
2132
LOBBY
2000
DIR. OF COUNSEL
2008
TESTING
2009
OFFICE
2116
REF.
EXTG
F-1
E/A
EXTG
FPB-12
EXTG
FPB-10
EXTG
FPB-9
EXTG
FPB-2
EXTG
FPB
S/A
T/A
R/A
EX
100-B
150-B
200-B
250-B
300-B
400-B
TO EXTG. AHU-1
TO EXTG. AHU-2

REMOVE EXTG HOOD EXHAUST SYSTEM, INCLUDING DUCTWORK, FANS, CONTROLS, HANGERS, ETC. PATCH EXISTING ROOF OPENING TO MAINTAIN EXISTING ROOF WARRANTY

HVAC SYSTEMS SHALL REMAIN. NO MECHANICAL WORK.

HVAC SYSTEMS IN THIS HATCHED AREA SHALL REMAIN. NO MECHANICAL WORK.

REMOVE ASSOCIATED EQUIPMENT EXHAUST CONNECTIONS TO EXTERIOR (TYP)

REMOVE EXISTING DIFFUSERS AND RUNOUTS BACK TO NOTED LOCATION

1 ENLARGED DEMOLITION MECHANICAL PLAN A
1/8" = 1'-0"

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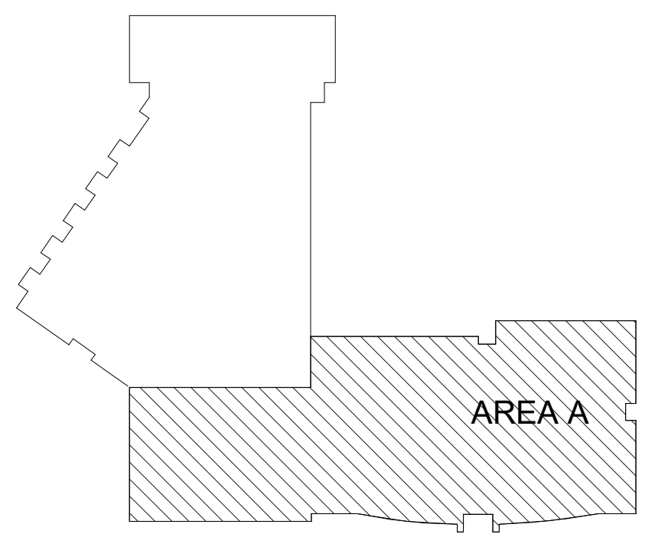

BRASWELL BUIDING

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Monroe, NC 28110

BID DOCUMENTS

SCO # 19-21446-02A

ENLARGED DEMOLITION MECHANICAL FLOOR PLAN A

DATE: 09.27.22
PROJECT NO: 21-0029

REVISIONS

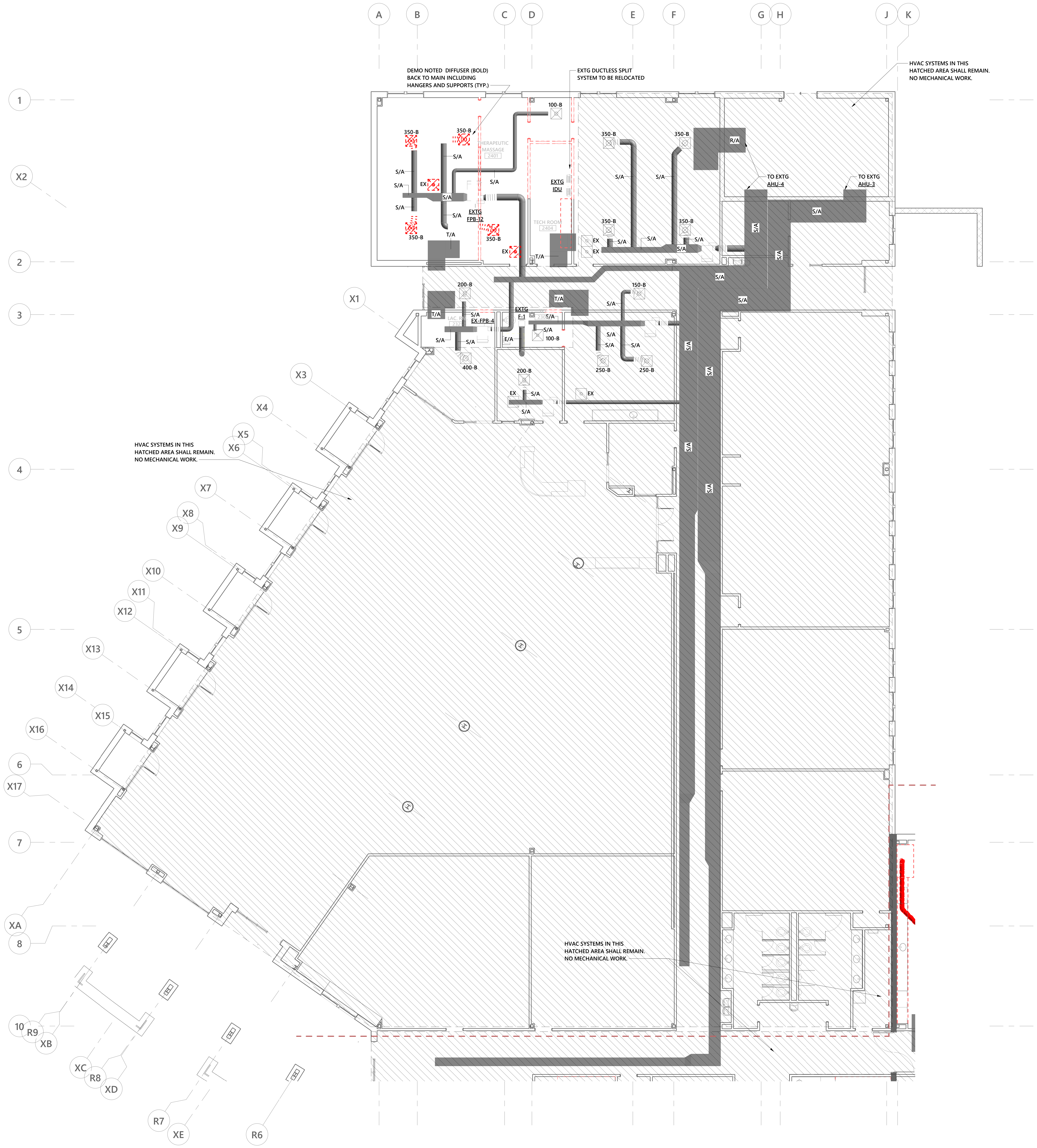
NO:	DATE:	DESCRIPTION:

SHEET NUMBER
M100A

RATED WALL LEGEND:

▨	EXISTING 4 HOUR RATED WALL
▨	EXISTING 2 HOUR RATED WALL
▨	EXISTING 1 HOUR RATED WALL

PLAN NORTH
TRUE NORTH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J
K
1
X2
2
3
X1
X3
X4
X5
X6
4
X7
X8
X9
X10
X11
X12
5
X13
X14
X15
X16
6
X17
7
XA
8
10
R9
XB
XC
R8
XD
R7
XE
R6
100-B
350-B
350-B
350-B
350-B
350-B
350-B
350-B
350-B
200-B
150-B
400-B
200-B
100-B
250-B
250-B
S/A
T/A
R/A
E/A
EX
THERAPEUTIC MASSAGE
2401
TECH ROOM
2404
LAC. RM.
2321
2306
EXTG FPB-12
EXTG IDU
EXTG F-1
EX-FPB-4
TO EXTG AHU-4
TO EXTG AHU-3

DEMO NOTED DIFFUSER (BOLD) BACK TO MAIN INCLUDING HANGERS AND SUPPORTS (TYP.)

EXTG DUCTLESS SPLIT SYSTEM TO BE RELOCATED

HVAC SYSTEMS IN THIS HATCHED AREA SHALL REMAIN. NO MECHANICAL WORK.

HVAC SYSTEMS IN THIS HATCHED AREA SHALL REMAIN. NO MECHANICAL WORK.

HVAC SYSTEMS IN THIS HATCHED AREA SHALL REMAIN. NO MECHANICAL WORK.

1 ENLARGED DEMOLITION MECHANICAL PLAN B
1/8" = 1'-0"

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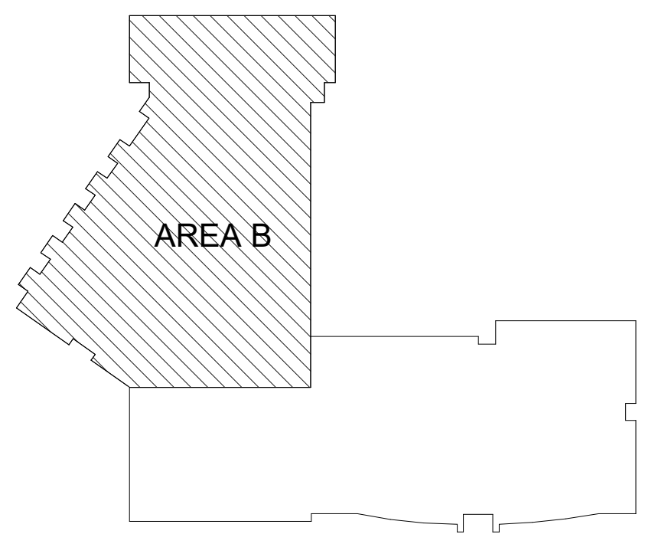
09.27.22



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BID DOCUMENTS

SCO # 19-21446-02A

ENLARGED DEMOLITION MECHANICAL FLOOR PLAN B

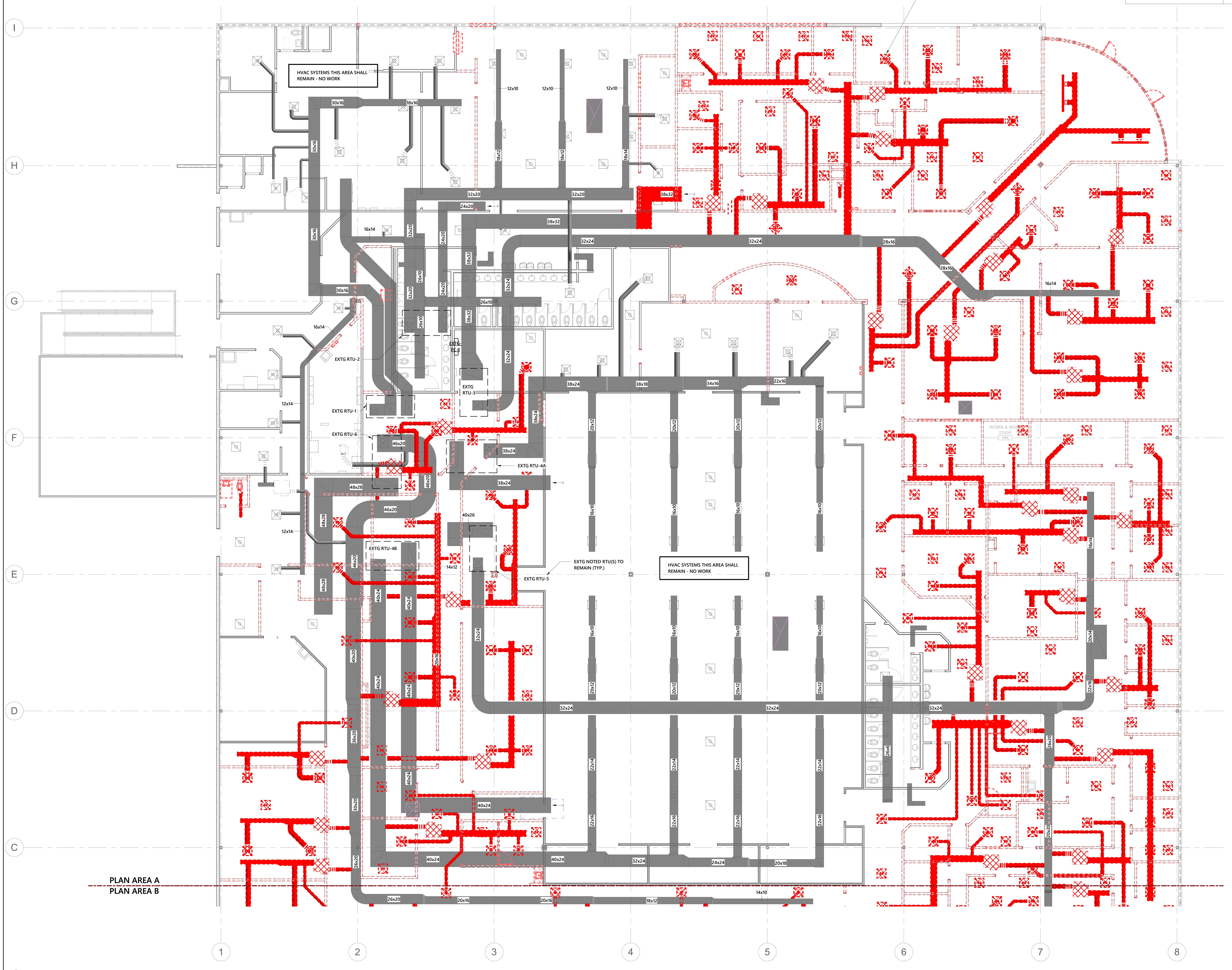
DATE: 09.27.22
PROJECT NO: 21-0029

REVISIONS
NO: DATE: DESCRIPTION:

SHEET NUMBER
M100B

RATED WALL LEGEND:	
▭	EXISTING 1 HOUR RATED WALL. UL 465
▬	2 HOUR RATED WALL. UL 411

ROOM HATCH LEGEND:	
▨	NOT IN RENOVATION SCOPE
▨	EXISTING UTILITY AREAS TO REMAIN


REMOVE EXTG DUCTWORK, HANGERS, TERMINAL UNITS, CONTROLS, ETC. SHOWN HATCHED/BOLD (TYP.)
HVAC SYSTEMS THIS AREA SHALL REMAIN - NO WORK
HVAC SYSTEMS THIS AREA SHALL REMAIN - NO WORK
EXTG NOTED RTU(S) TO REMAIN (TYP.)
EXTG RTU-1
EXTG RTU-2
EXTG RTU-3
EXTG RTU-4A
EXTG RTU-4B
EXTG RTU-5
EXTG RTU-6
INTERN & WORK STUDY
30x16
18x16
12x10
12x10
12x10
18x12
18x12
18x14
32x20
32x20
24x20
38x32
38x32
16x14
32x24
32x24
28x16
28x16
26x10
16x14
38x24
38x18
34x16
22x16
20x12
16x10
46x20
48x28
40x26
14x12
40x24
32x24
22x14
22x16
40x24
30x20
26x20
20x16
18x12
14x10
20x18
24x24
12x14
PLAN AREA A
PLAN AREA B
I
H
G
F
E
D
C
1
2
3
4
5
6
7
8

PLAN NORTH
TRUE NORTH

1 DEMOLITION MECHANICAL PLAN - AREA A
1/8" = 1'-0"

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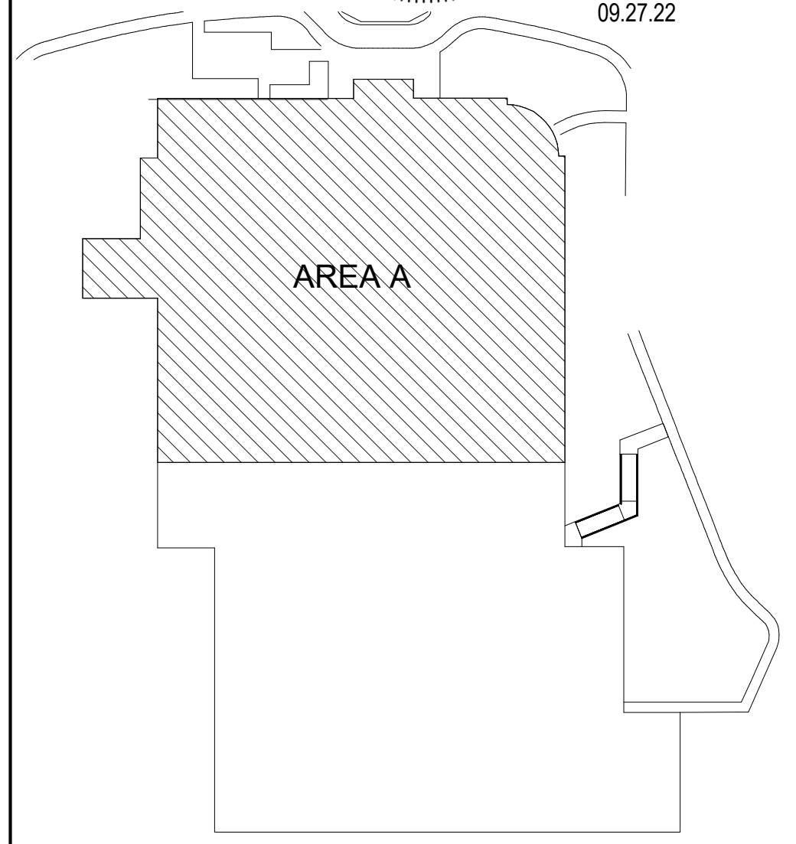
SEAL 17228
09.27.22



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Monroe, NC 28110

BID DOCUMENTS

SCO # 19-21446-02A

DEMOLITION MECHANICAL FLOOR PLAN - AREA A

DATE: 09.27.22
PROJECT NO: 21-0029

REVISIONS

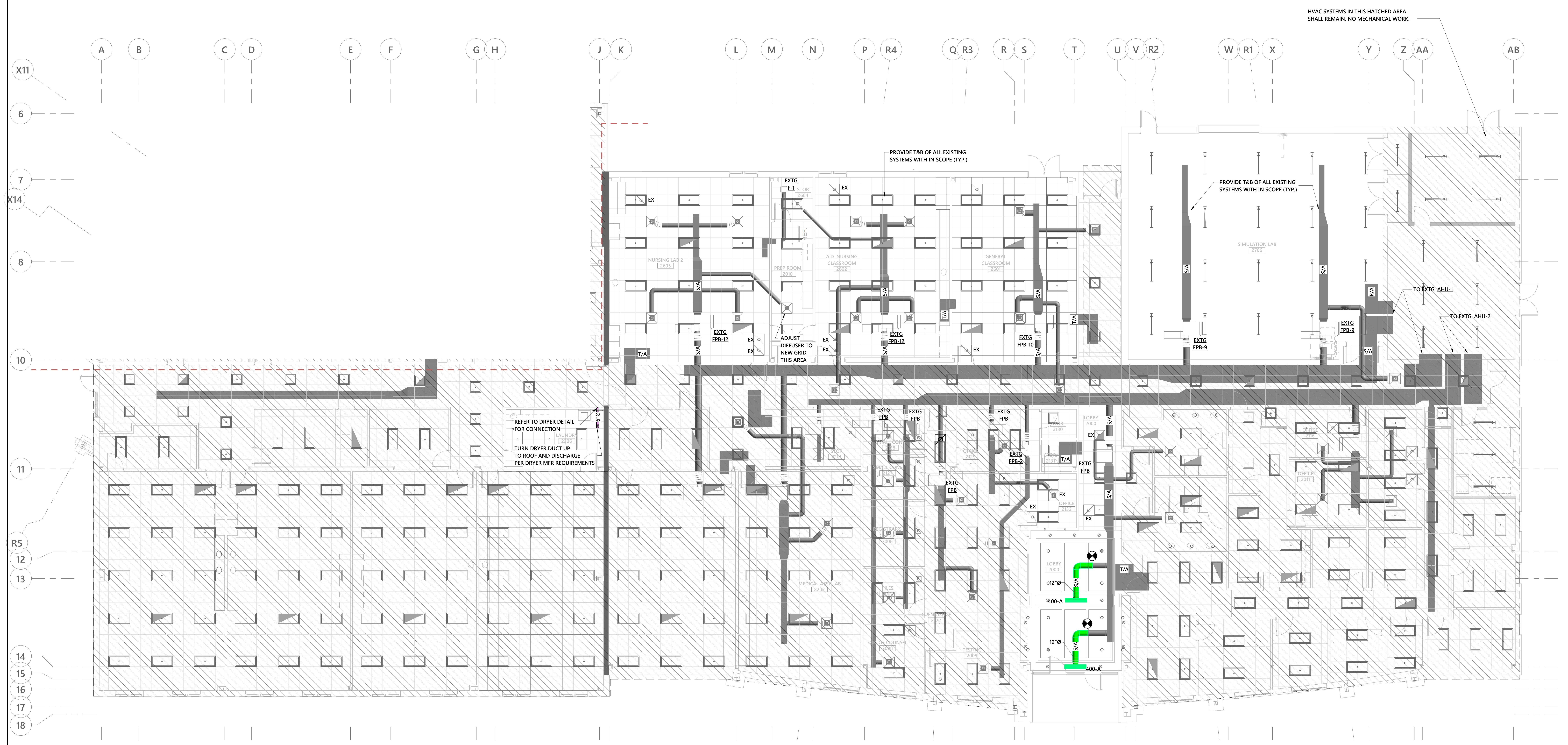
NO:	DATE:	DESCRIPTION:

SHEET NUMBER
M101

RATED WALL LEGEND:

▬ EXISTING 4 HOUR RATED WALL
▬ EXISTING 2 HOUR RATED WALL
▬ EXISTING 1 HOUR RATED WALL

PLAN NORTH
TRUE NORTH


HVAC SYSTEMS IN THIS HATCHED AREA SHALL REMAIN. NO MECHANICAL WORK.
A
B
C
D
E
F
G
H
J
K
L
M
N
P
R4
Q
R3
R
S
T
U
V
R2
W
R1
X
Y
Z
AA
AB
X11
6
7
X14
8
10
11
R5
12
13
14
15
16
17
18
PROVIDE T&B OF ALL EXISTING SYSTEMS WITH IN SCOPE (TYP.)
PROVIDE T&B OF ALL EXISTING SYSTEMS WITH IN SCOPE (TYP.)
EXTG F-1
STOR 2604
EX
NURSING LAB 2 2605
PREP ROOM 2010
A.D. NURSING CLASSROOM 2602
GENERAL CLASSROOM 2601
SIMULATION LAB 2706
S/A
T/A
R/A
EXTG FPB-12
EXTG FPB-12
EXTG FPB-10
EXTG FPB-9
EXTG FPB-9
ADJUST DIFFUSER TO NEW GRID THIS AREA
TO EXTG. AHU-1
TO EXTG. AHU-2
REFER TO DRYER DETAIL FOR CONNECTION
LAUNDRY 2206
6"Ø
TURN DRYER DUCT UP TO ROOF AND DISCHARGE PER DRYER MFR REQUIREMENTS
EXTG FPB
EXTG FPB-2
SMALL CONF 2128
SMALL CONF 2127
OFFICE 2129
REGISTRAR'S OFFICE 2006
FILES 2007
OPEN OFFICE 2122
DIR. OF COUNSEL 2008
TESTING 2009
STOR. 2130
STOR. 2131
LOBBY 2000
OFFICE 2132
STOR 2201
MEDICAL ASST LAB
12"Ø
400-A

1 ENLARGED MECHANICAL PLAN A
1/8" = 1'-0"

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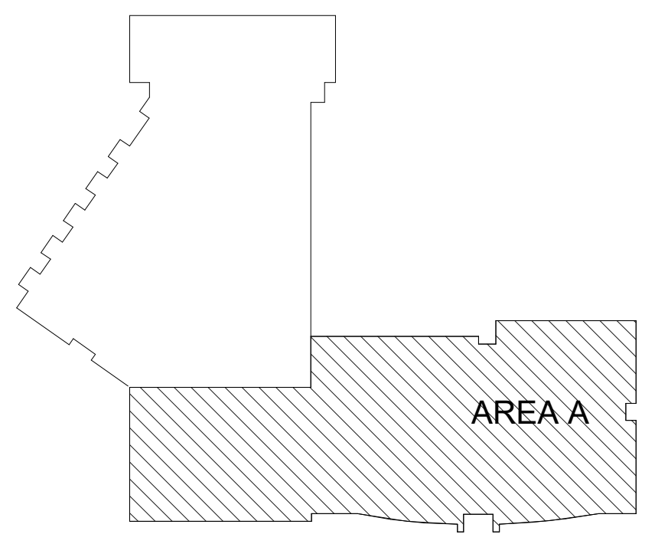

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BID DOCUMENTS

SCO # 19-21446-02A

ENLARGED MECHANICAL FLOOR PLAN A

DATE: 09.27.22
PROJECT NO: 21-0029

REVISIONS

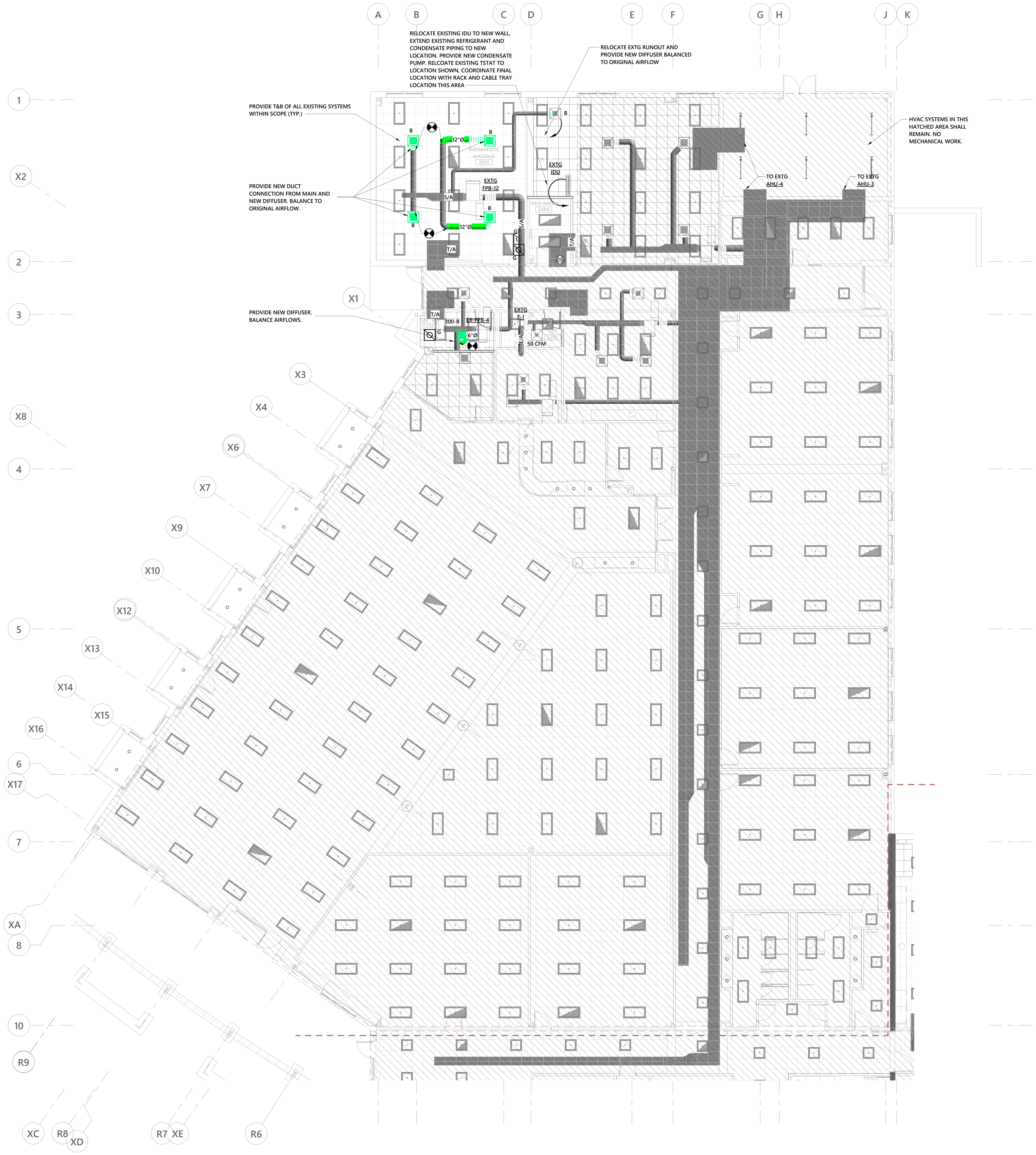
NO:	DATE:	DESCRIPTION:

SHEET NUMBER
M101A

RATED WALL LEGEND:

▬	EXISTING 4 HOUR RATED WALL
▭	EXISTING 2 HOUR RATED WALL
▭	EXISTING 1 HOUR RATED WALL

PLAN NORTH TRUE NORTH


A
B
C
D
E
F
G
H
J
K
1
X2
2
3
X1
X3
X4
X8
X6
4
X7
X9
X10
X12
5
X13
X14
X15
X16
6
X17
7
XA
8
10
R9
XC
R8
XD
R7
XE
R6
B
12"Ø
THERAPEUTIC MASSAGE 2401
EXTG FPB-12
S/A
T/A
G
EXTG IDU
TECH ROOM 2404
TO EXTG AHU-4
TO EXTG AHU-3
100-B
EX-FPB-4
6"Ø
LAC. RM. 2321
EXTG E-1
E/A
50 CFM
TLT 2306

RELOCATE EXISTING IDU TO NEW WALL, EXTEND EXISTING REFRIGERANT AND CONDENSATE PIPING TO NEW LOCATION. PROVIDE NEW CONDENSATE PUMP. RELCOATE EXISTING TSTAT TO LOCATION SHOWN, COORDINATE FINAL LOCATION WITH RACK AND CABLE TRAY LOCATION THIS AREA

RELOCATE EXTG RUNOUT AND PROVIDE NEW DIFFUSER BALANCED TO ORIGINAL AIRFLOW

PROVIDE T&B OF ALL EXISTING SYSTEMS WITHIN SCOPE (TYP.)

HVAC SYSTEMS IN THIS HATCHED AREA SHALL REMAIN. NO MECHANICAL WORK.

PROVIDE NEW DUCT CONNECTION FROM MAIN AND NEW DIFFUSER. BALANCE TO ORIGINAL AIRFLOW.

PROVIDE NEW DIFFUSER. BALANCE AIRFLOWS.

1 **ENLARGED MECHANICAL PLAN B**

1/8" = 1'-0"

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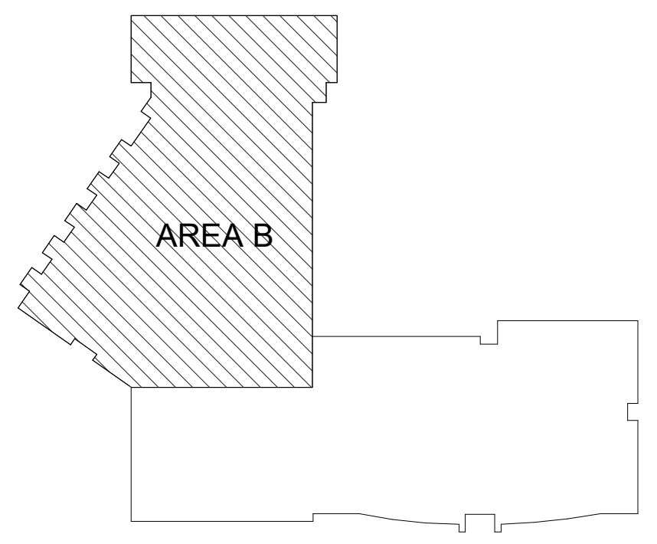
09.27.22



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BID DOCUMENTS

SCO # 19-21446-02A

ENLARGED MECHANICAL
FLOOR PLAN B

DATE: 09.27.22
PROJECT NO: 21-0029

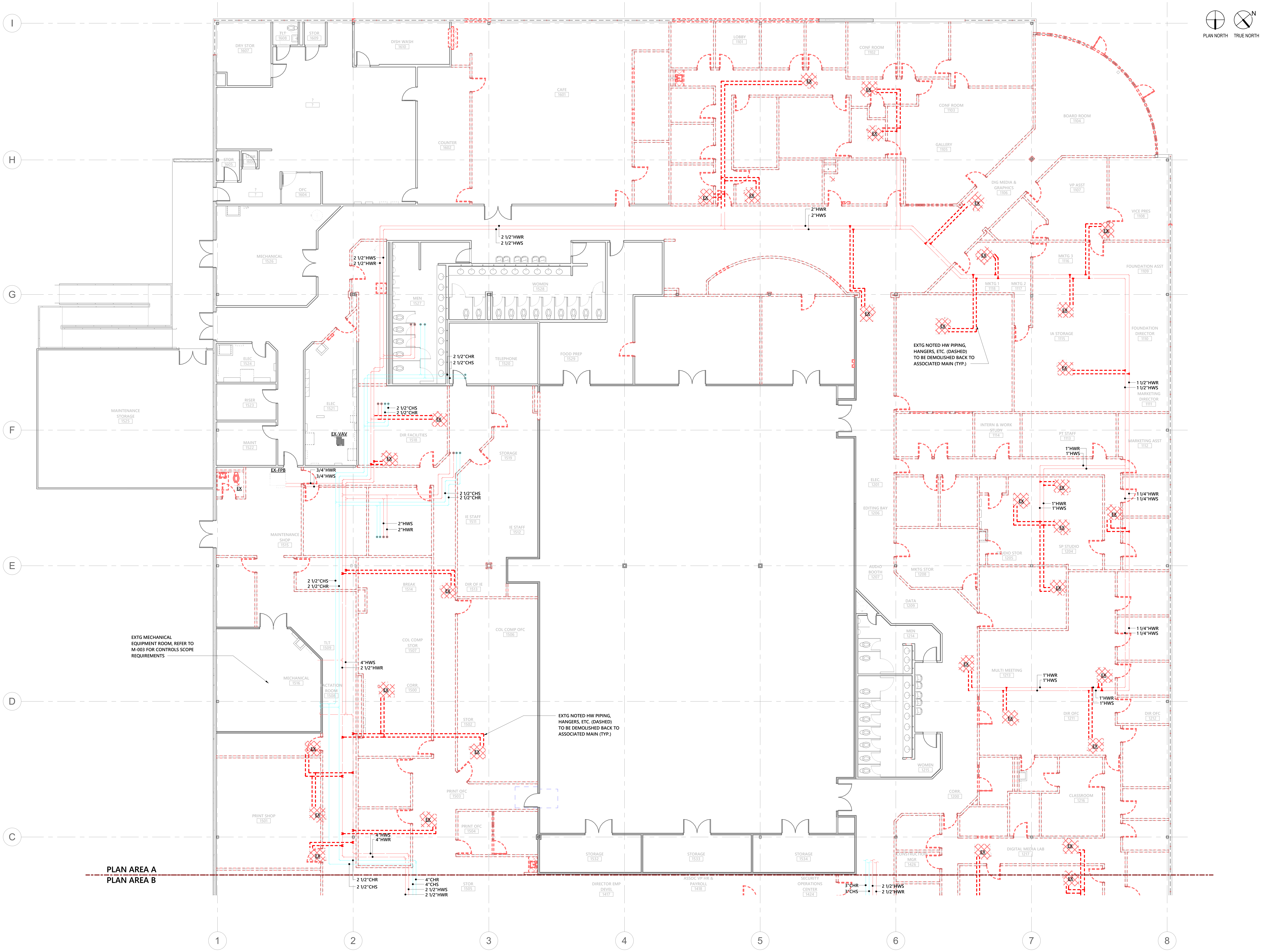
REVISIONS

NO: DATE: DESCRIPTION:

SHEET NUMBER

M101B

RATED WALL LEGEND:		**ROOM HATCH LEGEND:**	
▭	EXISTING 1 HOUR RATED WALL. UL 465	▨	NOT IN RENOVATION SCOPE
■	2 HOUR RATED WALL. UL 411	▨	EXISTING UTILITY AREAS TO REMAIN


PLAN NORTH
TRUE NORTH
N
I
H
G
F
E
D
C
1
2
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4
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8
EXTG NOTED HW PIPING, HANGERS, ETC. (DASHED) TO BE DEMOLISHED BACK TO ASSOCIATED MAIN (TYP.)
EXTG NOTED HW PIPING, HANGERS, ETC. (DASHED) TO BE DEMOLISHED BACK TO ASSOCIATED MAIN (TYP.)
EXTG MECHANICAL EQUIPMENT ROOM, REFER TO M-003 FOR CONTROLS SCOPE REQUIREMENTS
2 1/2"HWR
2 1/2"HWS
2"HWR
2"HWS
2 1/2"HWS
2 1/2"HWR
2 1/2"CHR
2 1/2"CHS
2 1/2"CHS
2 1/2"CHR
3/4"HWR
3/4"HWS
2 1/2"CHS
2 1/2"CHR
2"HWS
2"HWR
2 1/2"CHS
2 1/2"CHR
4"HWS
2 1/2"HWR
4"HWS
4"HWR
2 1/2"CHR
2 1/2"CHS
4"CHR
4"CHS
2 1/2"HWS
2 1/2"HWR
3"CHR
3"CHS
2 1/2"HWS
2 1/2"HWR
1 1/2"HWR
1 1/2"HWS
1"HWR
1"HWS
1 1/4"HWR
1 1/4"HWS
1"HWR
1"HWS
1 1/4"HWR
1 1/4"HWS
1"HWR
1"HWS
1"HWR
1"HWS
EX-VAV
EX-FPB
EX
PLAN AREA A
PLAN AREA B
MECHANICAL
MAINTENANCE STORAGE
MAINTENANCE SHOP
PRINT SHOP
WOMEN
MEN
TELEPHONE
FOOD PREP
CAFE
DISH WASH
COUNTER
LOBBY
CONF ROOM
CONF ROOM
GALLERY
BOARD ROOM
DIG MEDIA & GRAPHICS
VP ASST
VICE PRES
FOUNDATION ASST
FOUNDATION DIRECTOR
MARKETING DIRECTOR
MARKETING ASST
IA STORAGE
INTERN & WORK STUDY
PT STAFF
SP STUDIO
MKTG STOR
DATA
MULTI MEETING
DIR OFC
DIR OFC
CLASSROOM
DIGITAL MEDIA LAB
CORR
SECURITY OPERATIONS CENTER
ASSOC VP HR & PAYROLL
DIRECTOR EMP DEVEL
STORAGE
STORAGE
STORAGE
STOR
PRINT OFC
PRINT OFC
COL COMP OFC
COL COMP STOR
BREAK
DIR OF IE
IE STAFF
IE STAFF
STORAGE
DIR FACILITIES
ELEC
RISER
MAINT
DRY STOR
OFC
AUDIO BOOTH
EDITING BAY
ELEC

1 DEMOLITION MECHANICAL PIPING FLOOR PLAN - AREA A

1/8" = 1'-0"

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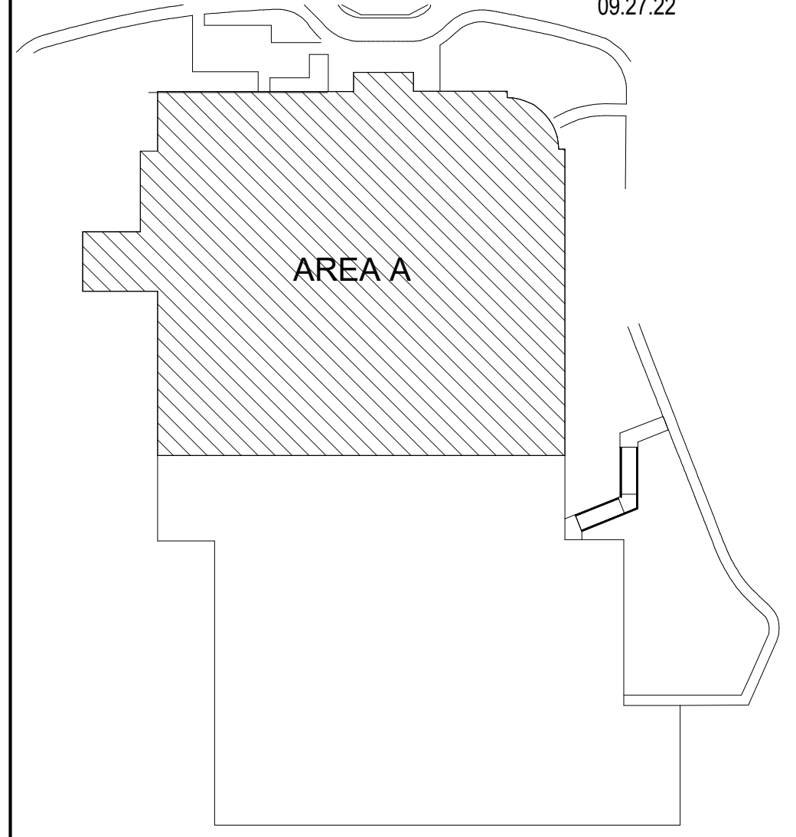

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BID DOCUMENTS

SCO # 19-21446-02A

DEMOLITION MECHANICAL PIPING FLOOR PLAN - AREA A

DATE: 09.27.22
PROJECT NO: 21-0029

REVISIONS

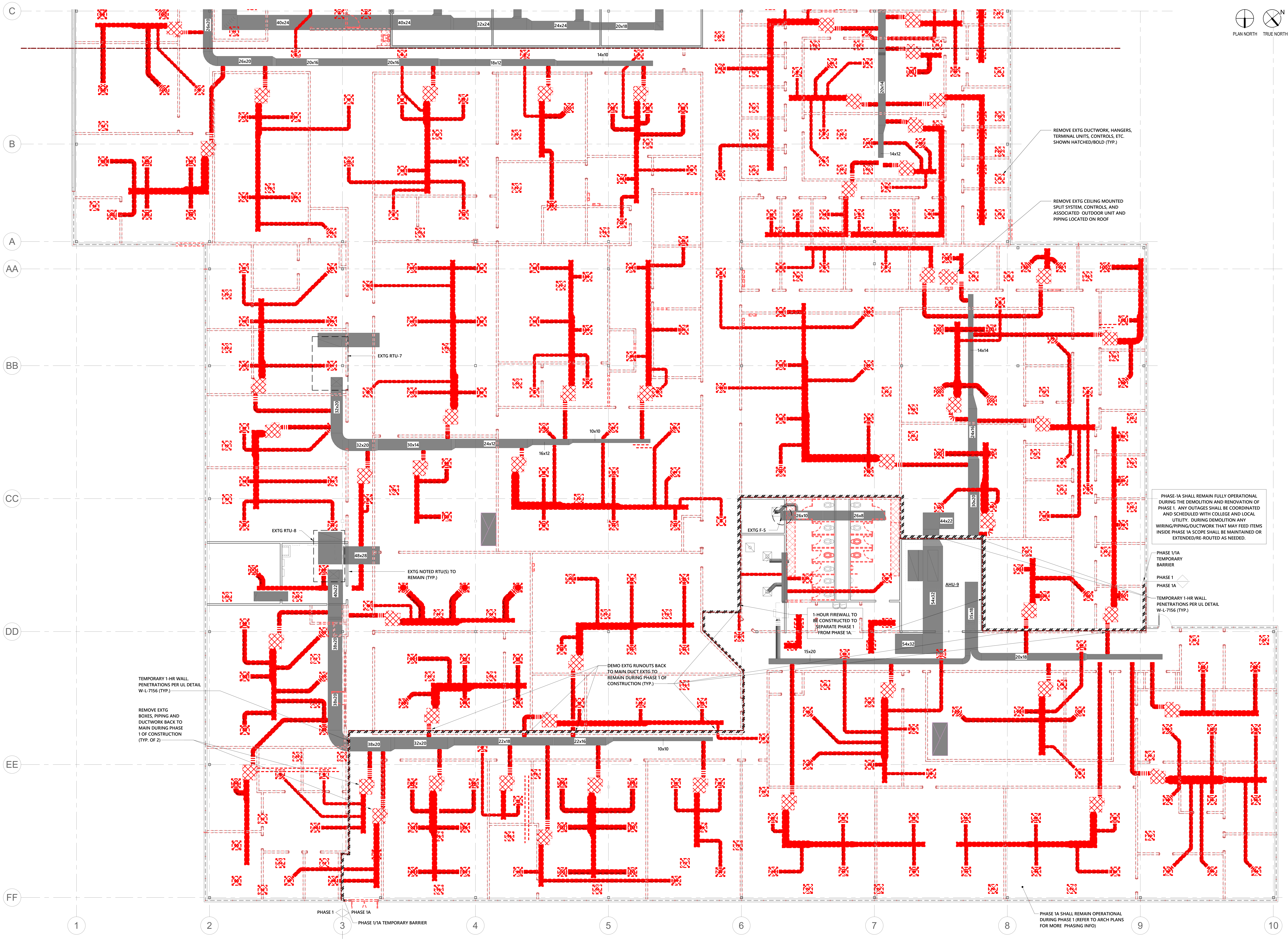
NO:	DATE:	DESCRIPTION:

SHEET NUMBER

M101P

RATED WALL LEGEND:		ROOM HATCH LEGEND:	
▭	EXISTING 1 HOUR RATED WALL. UL 465	▨	NOT IN RENOVATION SCOPE
▬	2 HOUR RATED WALL. UL 411	▨	EXISTING UTILITY AREAS TO REMAIN

PLAN NORTH
TRUE NORTH


C
B
A
AA
BB
CC
DD
EE
FF
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9
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26x20
40x24
40x24
32x24
24x24
20x18
14x10
26x20
20x16
20x16
18x12
20x14
14x12
EXTG RTU-7
32x20
32x20
30x14
24x12
10x10
16x12
14x14
24x16
30x20
EXTG RTU-8
48x28
40x22
38x20
38x20
38x20
32x20
22x18
22x16
10x10
EXTG F-5
26x10
26x8
44x22
AHU-9
54x32
54x32
35x18
15x20
20x18
PHASE 1
PHASE 1A

REMOVE EXTG DUCTWORK, HANGERS, TERMINAL UNITS, CONTROLS, ETC. SHOWN HATCHED/BOLD (TYP.)

REMOVE EXTG CEILING MOUNTED SPLIT SYSTEM, CONTROLS, AND ASSOCIATED OUTDOOR UNIT AND PIPING LOCATED ON ROOF

EXTG NOTED RTU(S) TO REMAIN (TYP.)

PHASE-1A SHALL REMAIN FULLY OPERATIONAL DURING THE DEMOLITION AND RENOVATION OF PHASE 1. ANY OUTAGES SHALL BE COORDINATED AND SCHEDULED WITH COLLEGE AND LOCAL UTILITY. DURING DEMOLITION ANY WIRING/PIPING/DUCTWORK THAT MAY FEED ITEMS INSIDE PHASE 1A SCOPE SHALL BE MAINTAINED OR EXTENDED/RE-ROUTED AS NEEDED.

PHASE 1/1A TEMPORARY BARRIER

TEMPORARY 1-HR WALL. PENETRATIONS PER UL DETAIL W-L-7156 (TYP.)

1-HOUR FIREWALL TO BE CONSTRUCTED TO SEPARATE PHASE 1 FROM PHASE 1A.

DEMO EXTG RUNOUTS BACK TO MAIN DUCT EXTG TO REMAIN DURING PHASE 1 OF CONSTRUCTION (TYP.)

TEMPORARY 1-HR WALL. PENETRATIONS PER UL DETAIL W-L-7156 (TYP.)

REMOVE EXTG BOXES, PIPING AND DUCTWORK BACK TO MAIN DURING PHASE 1 OF CONSTRUCTION (TYP. OF 2)

PHASE 1/1A TEMPORARY BARRIER

PHASE 1A SHALL REMAIN OPERATIONAL DURING PHASE 1 (REFER TO ARCH PLANS FOR MORE PHASING INFO)

2 DEMOLITION MECHANICAL PLAN - AREA B

1/8" = 1'-0"

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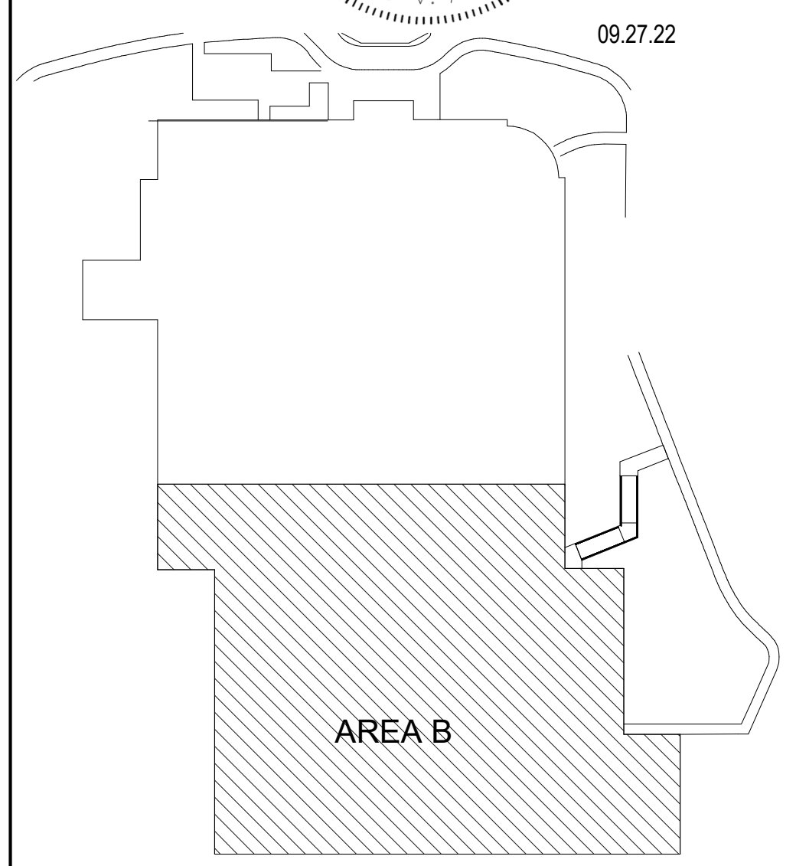
NORTH CAROLINA PROFESSIONAL SEAL 17228 ENGINEER RONALD V. ALMOND

09.27.22



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BID DOCUMENTS

SCO # 19-21446-02A

DEMOLITION MECHANICAL FLOOR PLAN - AREA B

DATE: 09.27.22
PROJECT NO: 21-0029

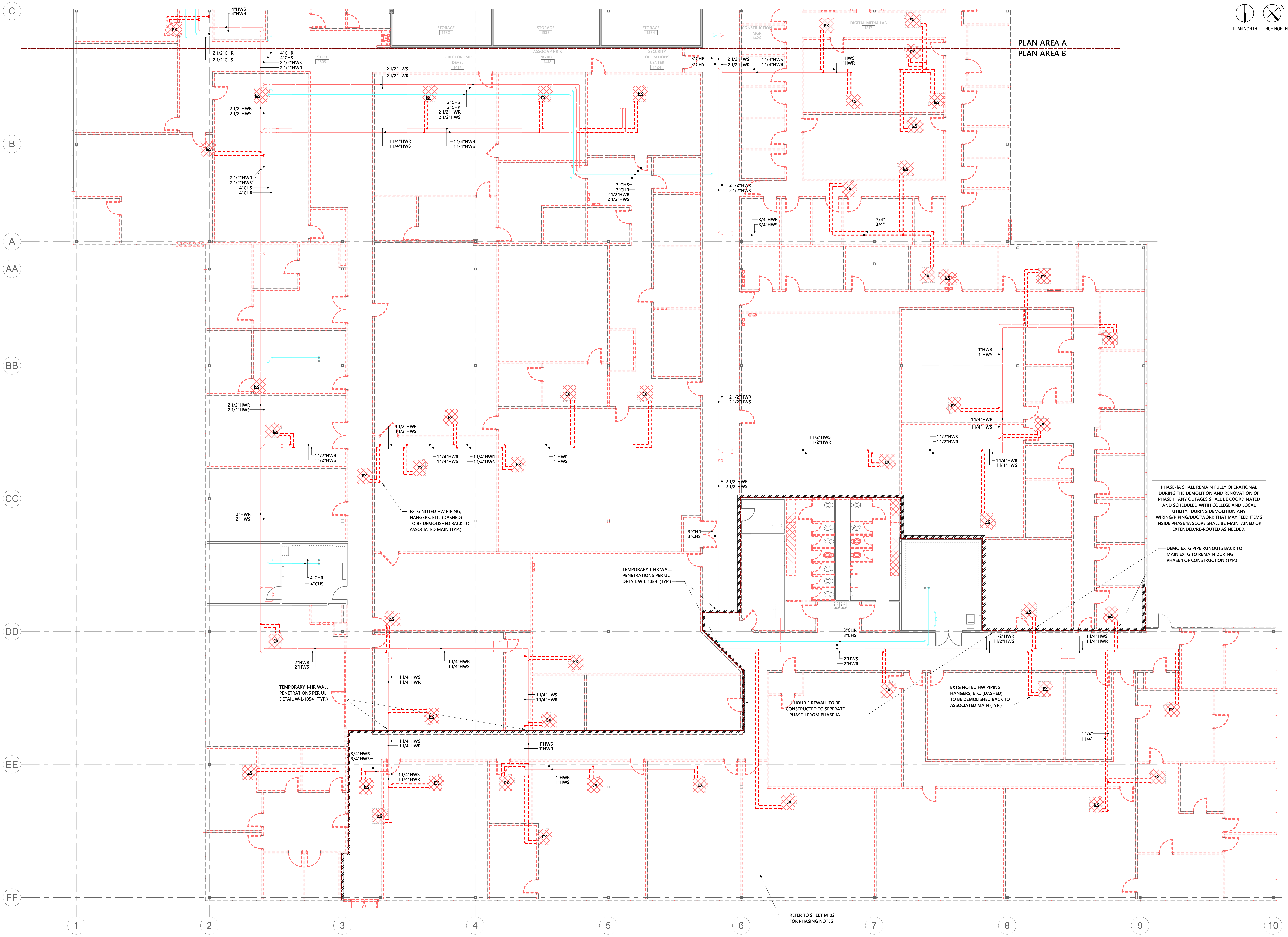
REVISIONS

NO:	DATE:	DESCRIPTION:

SHEET NUMBER

M102

RATED WALL LEGEND:		ROOM HATCH LEGEND:	
▭	EXISTING 1 HOUR RATED WALL. UL 465	▧	NOT IN RENOVATION SCOPE
▬	2 HOUR RATED WALL. UL 411	▨	EXISTING UTILITY AREAS TO REMAIN


PLAN NORTH
TRUE NORTH
N
PLAN AREA A
PLAN AREA B
C
B
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3
4
5
6
7
8
9
10
EX
4"HWS
4"HWR
2 1/2"CHR
2 1/2"CHS
4"CHR
4"CHS
2 1/2"HWS
2 1/2"HWR
STOR
STORAGE
DIRECTOR EMP DEVEL
ASSOC VP HR & PAYROLL
SECURITY OPERATIONS CENTER
DIGITAL MEDIA LAB
3"CHS
3"CHR
1 1/4"HWR
1 1/4"HWS
1 1/2"HWR
1 1/2"HWS
1"HWR
1"HWS
3/4"HWR
3/4"HWS
3/4"
2"HWR
2"HWS
1 1/4"

PHASE-1A SHALL REMAIN FULLY OPERATIONAL DURING THE DEMOLITION AND RENOVATION OF PHASE 1. ANY OUTAGES SHALL BE COORDINATED AND SCHEDULED WITIH COLLEGE AND LOCAL UTILITY. DURING DEMOLITION ANY WIRING/PIPING/DUCTWORK THAT MAY FEED ITEMS INSIDE PHASE 1A SCOPE SHALL BE MAINTAINED OR EXTENDED/RE-ROUTED AS NEEDED.

DEMO EXTG PIPE RUNOUTS BACK TO MAIN EXTG TO REMAIN DURING PHASE 1 OF CONSTRUCTION (TYP.)

EXTG NOTED HW PIPING, HANGERS, ETC. (DASHED) TO BE DEMOLISHED BACK TO ASSOCIATED MAIN (TYP.)

TEMPORARY 1-HR WALL. PENETRATIONS PER UL DETAIL W-L-1054 (TYP.)

1-HOUR FIREWALL TO BE CONSTRUCTED TO SEPERATE PHASE 1 FROM PHASE 1A.

REFER TO SHEET M102 FOR PHASING NOTES

1 DEMOLITION MECHANICAL PIPING FLOOR PLAN - AREA B

1/8" = 1'-0"

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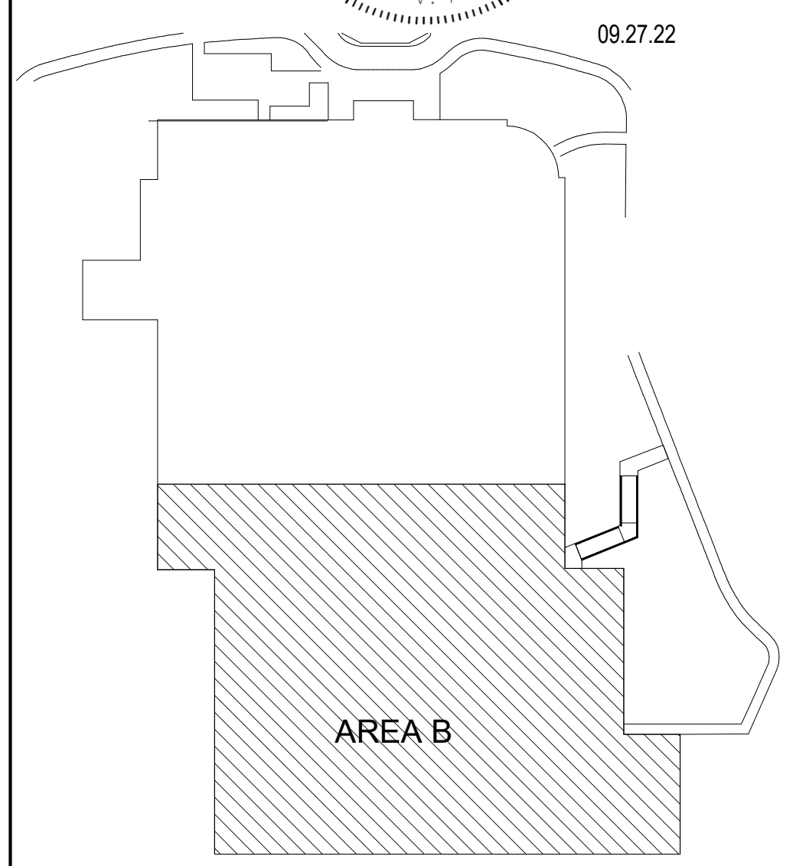

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BID DOCUMENTS

SCO # 19-21446-02A

DEMOLITION MECHANICAL PIPING FLOOR PLAN - AREA B

DATE: 09.27.22
PROJECT NO: 21-0029

REVISIONS

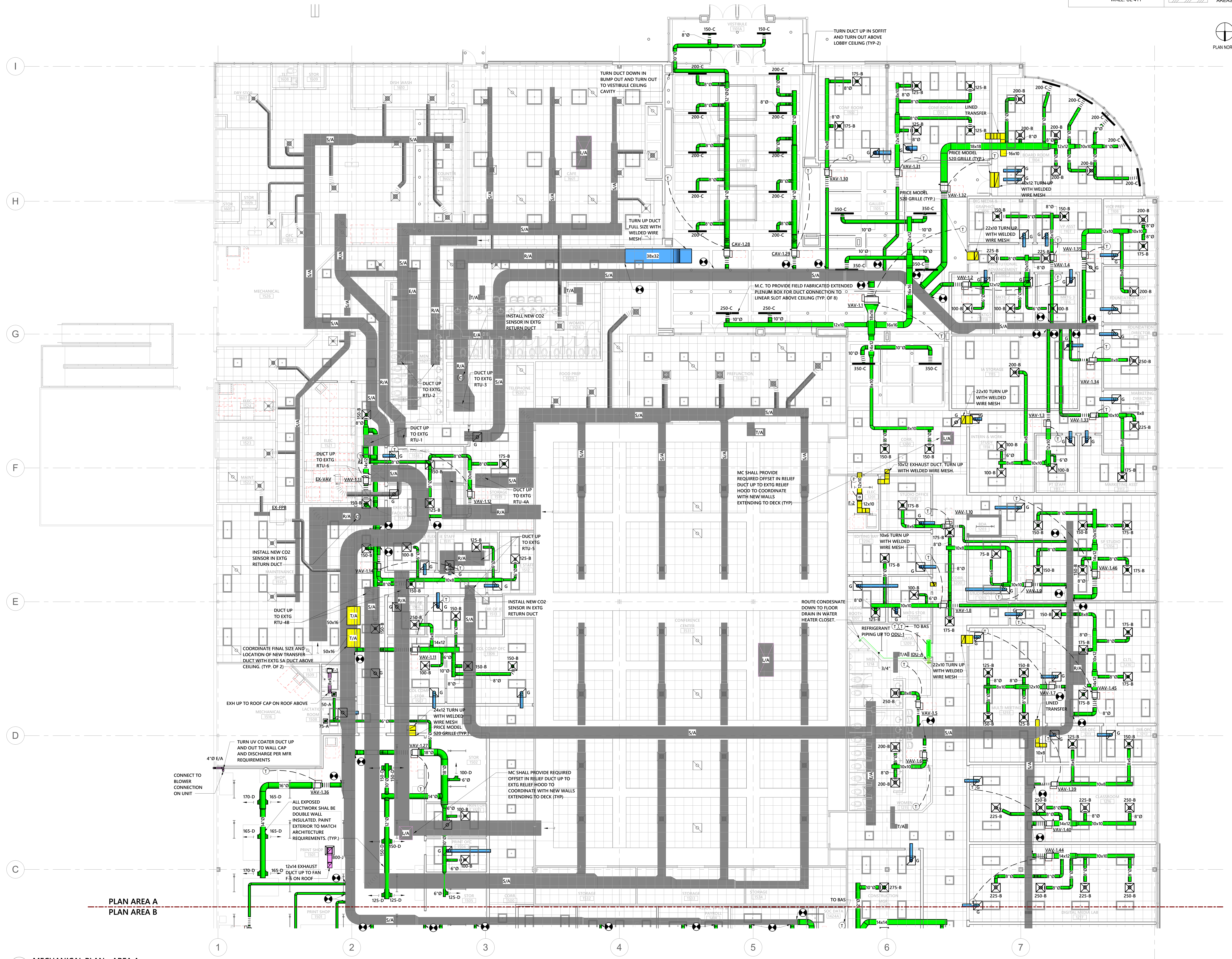
NO:	DATE:	DESCRIPTION:

SHEET NUMBER
M102P

RATED WALL LEGEND:	
▭	EXISTING 1 HOUR RATED WALL. UL 465
▬	2 HOUR RATED WALL. UL 411

ROOM HATCH LEGEND:	
▨	NOT IN RENOVATION SCOPE
▨	EXISTING UTILITY AREAS TO REMAIN

PLAN NORTH
TRUE NORTH



TURN DUCT DOWN IN BUMP OUT AND TURN OUT TO VESTIBULE CEILING CAVITY
TURN DUCT UP IN SOFFIT AND TURN OUT ABOVE LOBBY CEILING (TYP-2)
TURN UP DUCT FULL SIZE WITH WELDED WIRE MESH
M.C. TO PROVIDE FIELD FABRICATED EXTENDED PLENUM BOX FOR DUCT CONNECTION TO LINEAR SLOT ABOVE CEILING (TYP. OF 8)
LINED TRANSFER
PRICE MODEL 520 GRILLE (TYP.)
22x10 TURN UP WITH WELDED WIRE MESH
INSTALL NEW CO2 SENSOR IN EXTG RETURN DUCT
DUCT UP TO EXTG RTU-1
DUCT UP TO EXTG RTU-2
DUCT UP TO EXTG RTU-3
DUCT UP TO EXTG RTU-4A
DUCT UP TO EXTG RTU-4B
DUCT UP TO EXTG RTU-5
DUCT UP TO EXTG RTU-6
EX-VAV
EX-FPB
MC SHALL PROVIDE REQUIRED OFFSET IN RELIEF DUCT UP TO EXTG RELIEF HOOD TO COORDINATE WITH NEW WALLS EXTENDING TO DECK (TYP)
10x12 EXHAUST DUCT. TURN UP WITH WELDED WIRE MESH.
10x6 TURN UP WITH WELDED WIRE MESH
ROUTE CONDENSATE DOWN TO FLOOR DRAIN IN WATER HEATER CLOSET.
REFRIGERANT PIPING UP TO ODU-1
TO BAS
IDU-A
COORDINATE FINAL SIZE AND LOCATION OF NEW TRANSFER DUCT WITH EXTG SA DUCT ABOVE CEILING. (TYP. OF 2)
EXH UP TO ROOF CAP ON ROOF ABOVE
24x12 TURN UP WITH WELDED WIRE MESH PRICE MODEL 520 GRILLE (TYP.)
TURN UV COATER DUCT UP AND OUT TO WALL CAP AND DISCHARGE PER MFR REQUIREMENTS
4"Ø E/A
CONNECT TO BLOWER CONNECTION ON UNIT
ALL EXPOSED DUCTWORK SHAL BE DOUBLE WALL INSULATED. PAINT EXTERIOR TO MATCH ARCHITECTURE REQUIREMENTS. (TYP.)
12x14 EXHAUST DUCT UP TO FAN F-6 ON ROOF
MC SHALL PROVIDE REQUIRED OFFSET IN RELIEF DUCT UP TO EXTG RELIEF HOOD TO COORDINATE WITH NEW WALLS EXTENDING TO DECK (TYP)
PLAN AREA A
PLAN AREA B
I
H
G
F
E
D
C
1
2
3
4
5
6
7
8

1 MECHANICAL PLAN - AREA A
1/8" = 1'-0"

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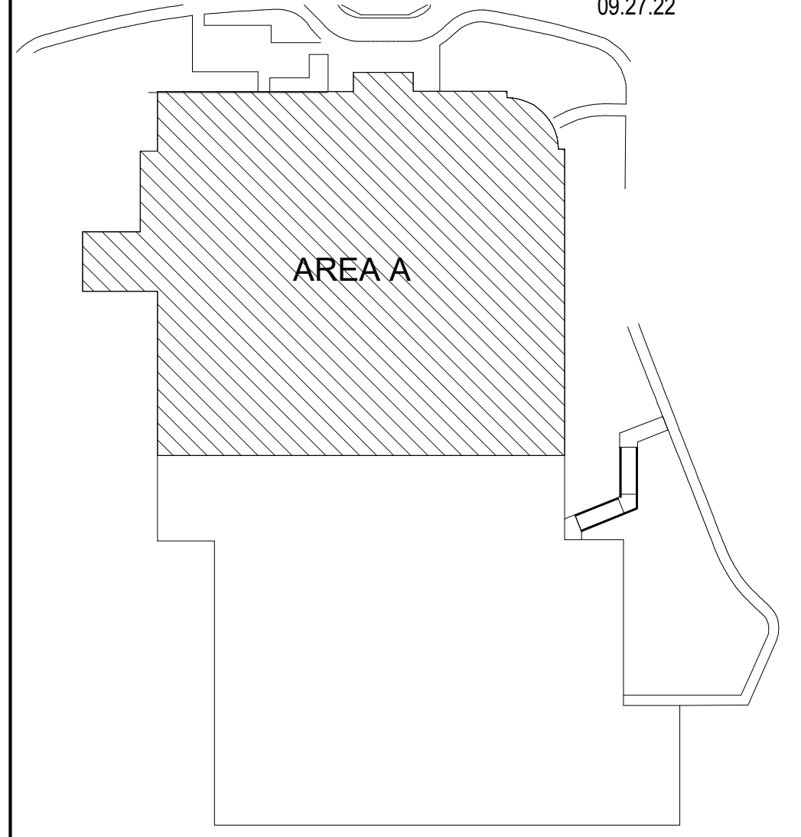
SEAL 17228 RONALD V. ALMOND
09.27.22



South Piedmont Community College OCH Campus - BUILDING A

4209 Old Charlotte Hwy,
Monroe, NC 28110

BID DOCUMENTS

SCO # 19-21446-02A

NEW WORK - MECHANICAL FLOOR PLAN - AREA A

DATE: 09.27.22
PROJECT NO: 21-0029

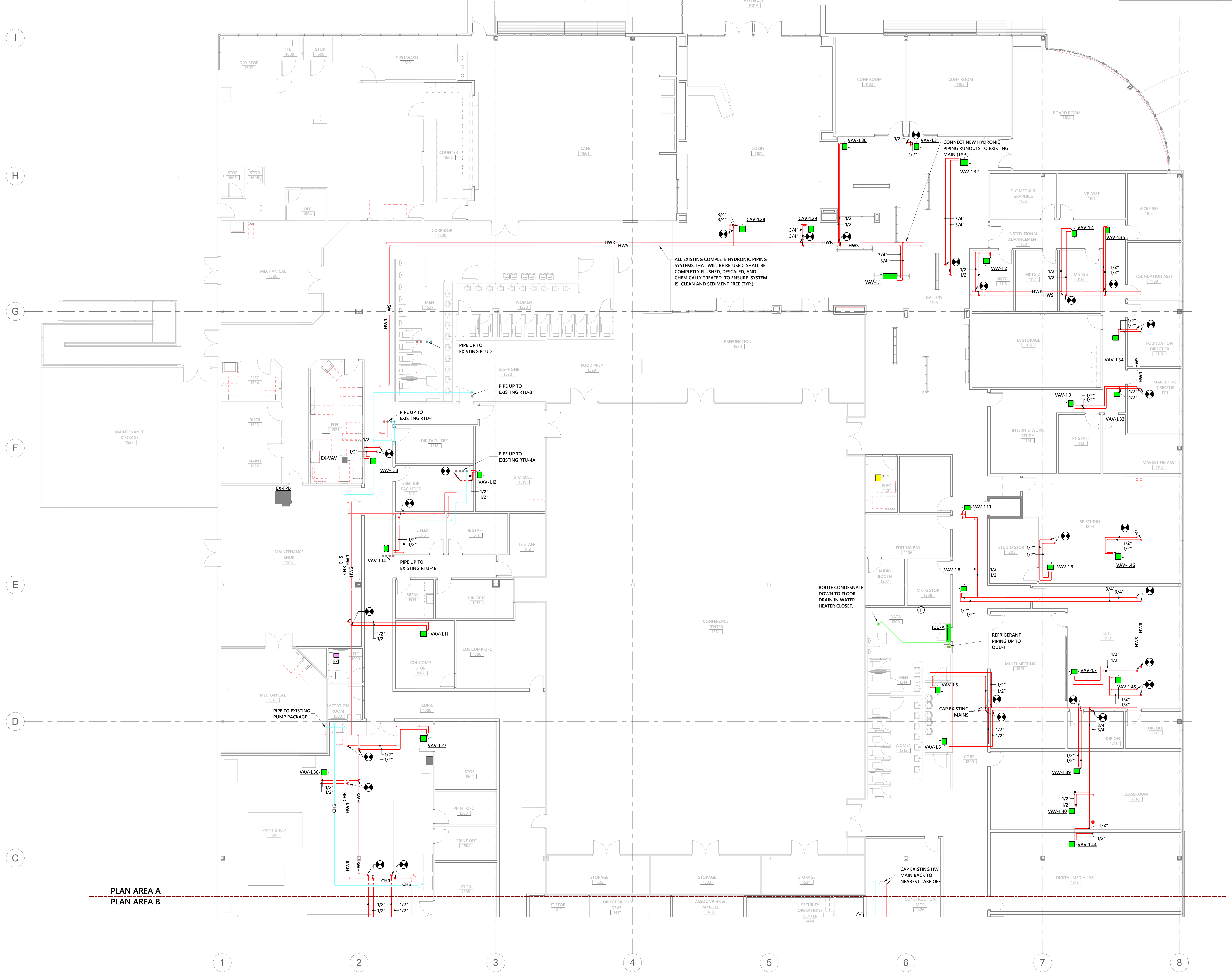
REVISIONS

NO:	DATE:	DESCRIPTION:

SHEET NUMBER
M201

RATED WALL LEGEND:		ROOM HATCH LEGEND:	
▭	EXISTING 1 HOUR RATED WALL. UL 465	▧	NOT IN RENOVATION SCOPE
▬	2 HOUR RATED WALL. UL 411	▨	EXISTING UTILITY AREAS TO REMAIN

PLAN NORTH TRUE NORTH



I
H
G
F
E
D
C
1
2
3
4
5
6
7
8
VAV-1.30
VAV-1.31
VAV-1.32
CONNECT NEW HYDRONIC PIPING RUNOUTS TO EXISTING MAIN (TYP.)
CAV-1.28
CAV-1.29
HWR
HWS
ALL EXISTING COMPLETE HYDRONIC PIPING SYSTEMS THAT WILL BE RE-USED, SHALL BE COMPLETLY FLUSHED, DESCALED, AND CHEMICALLY TREATED TO ENSURE SYSTEM IS CLEAN AND SEDIMENT FREE (TYP.)
VAV-1.1
VAV-1.2
VAV-1.4
VAV-1.35
VAV-1.34
VAV-1.3
VAV-1.33
PIPE UP TO EXISTING RTU-2
PIPE UP TO EXISTING RTU-3
PIPE UP TO EXISTING RTU-1
PIPE UP TO EXISTING RTU-4A
PIPE UP TO EXISTING RTU-4B
EX-VAV
VAV-1.13
VAV-1.12
EX-FPB
VAV-1.14
VAV-1.11
E-1
E-2
VAV-1.10
VAV-1.8
VAV-1.9
VAV-1.46
ROUTE CONDENSATE DOWN TO FLOOR DRAIN IN WATER HEATER CLOSET.
IDU-A
REFRIGERANT PIPING UP TO ODU-1
VAV-1.5
CAP EXISTING MAINS
VAV-1.6
VAV-1.7
VAV-1.45
VAV-1.39
VAV-1.40
VAV-1.44
PIPE TO EXISTING PUMP PACKAGE
VAV-1.27
VAV-1.36
CHS
CHR
CAP EXISTING HW MAIN BACK TO NEAREST TAKE OFF
1/2"
3/4"
PLAN AREA A
PLAN AREA B

1 **MECHANICAL PIPING FLOOR PLAN - AREA A**
1/8" = 1'-0"

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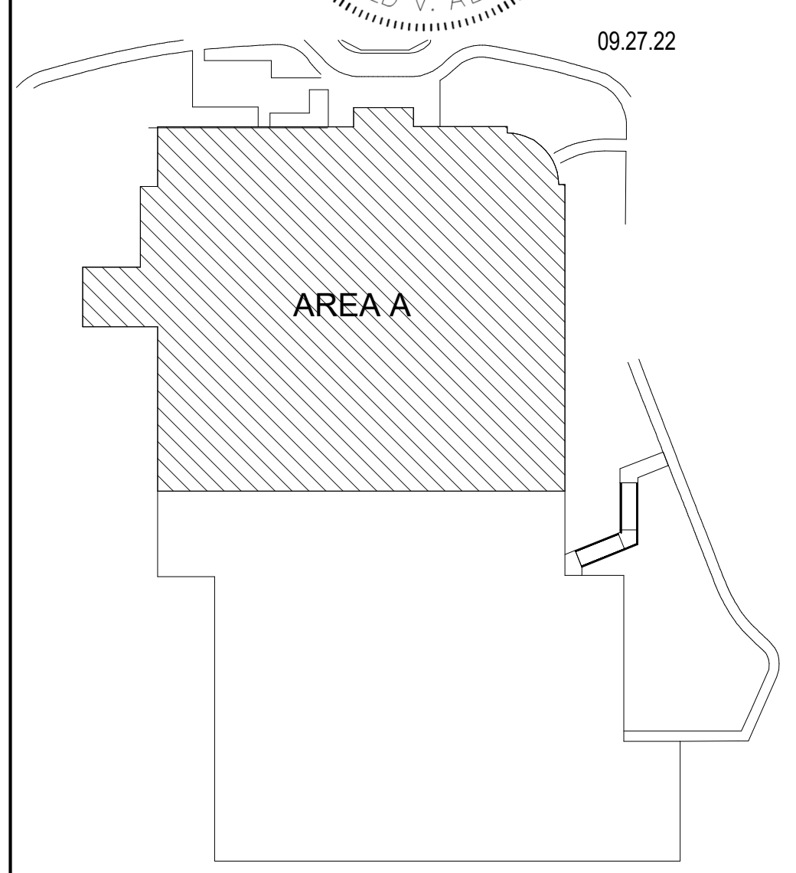
09.27.22



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BID DOCUMENTS

SCO # 19-21446-02A

NEW WORK -
MECHANICAL PIPING
FLOOR PLAN - AREA A

DATE: 09.27.22
PROJECT NO: 21-0029

REVISIONS

NO:	DATE:	DESCRIPTION:

SHEET NUMBER
M201P

RATED WALL LEGEND:		**ROOM HATCH LEGEND:**	
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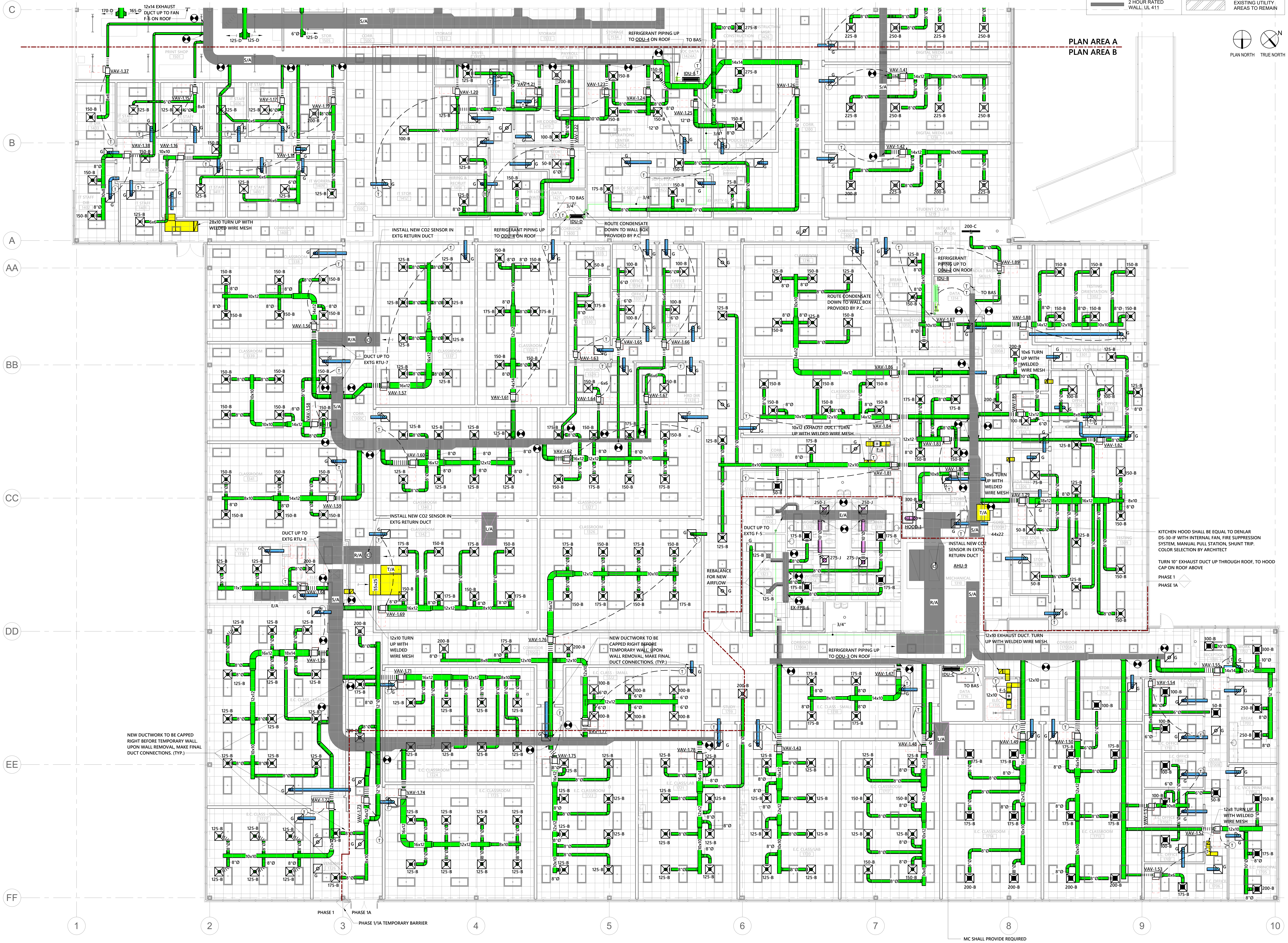
▬	2 HOUR RATED WALL. UL 411	▨	EXISTING UTILITY AREAS TO REMAIN

PLAN NORTH
TRUE NORTH


PLAN AREA A
PLAN AREA B
C
B
A
AA
BB
CC
DD
EE
FF
1
2
3
4
5
6
7
8
9
10
12x14 EXHAUST DUCT UP TO FAN F-5 ON ROOF
REFRIGERANT PIPING UP TO ODU-4 ON ROOF
TO BAS
IDU-E
IDU-D
28x10 TURN UP WITH WELDED WIRE MESH
INSTALL NEW CO2 SENSOR IN EXTG RETURN DUCT
REFRIGERANT PIPING UP TO ODU-4 ON ROOF
ROUTE CONDENSATE DOWN TO WALL BOX PROVIDED BY P.C.
REFRIGERANT PIPING UP TO ODU-1 ON ROOF
IDU-B
ROUTE CONDENSATE DOWN TO WALL BOX PROVIDED BY P.C.
DUCT UP TO EXTG RTU-7
INSTALL NEW CO2 SENSOR IN EXTG RETURN DUCT
DUCT UP TO EXTG RTU-8
10x6 TURN UP WITH WELDED WIRE MESH
10x12 EXHAUST DUCT. TURN UP WITH WELDED WIRE MESH
10x6 TURN UP WITH WELDED WIRE MESH
DUCT UP TO EXTG F-5
REBALANCE FOR NEW AIRFLOW
INSTALL NEW CO2 SENSOR IN EXTG RETURN DUCT
AHU-9
HOOD-1
EX-FPB-6
12x10 TURN UP WITH WELDED WIRE MESH
NEW DUCTWORK TO BE CAPPED RIGHT BEFORE TEMPORARY WALL. UPON WALL REMOVAL, MAKE FINAL DUCT CONNECTIONS. (TYP.)
REFRIGERANT PIPING UP TO ODU-3 ON ROOF
IDU-C
12x10 EXHAUST DUCT. TURN UP WITH WELDED WIRE MESH.
12x8 TURN UP WITH WELDED WIRE MESH
NEW DUCTWORK TO BE CAPPED RIGHT BEFORE TEMPORARY WALL. UPON WALL REMOVAL, MAKE FINAL DUCT CONNECTIONS. (TYP.)
KITCHEN HOOD SHALL BE EQUAL TO DENLAR DS-30-IF WITH INTERNAL FAN, FIRE SUPPRESSION SYSTEM, MANUAL PULL STATION, SHUNT TRIP. COLOR SELECTION BY ARCHITECT
TURN 10" EXHAUST DUCT UP THROUGH ROOF, TO HOOD CAP ON ROOF ABOVE
PHASE 1
PHASE 1A
PHASE 1
PHASE 1A
PHASE 1/1A TEMPORARY BARRIER
MC SHALL PROVIDE REQUIRED OFFSET IN RELIEF DUCT UP TO EXTG RELIEF HOOD TO COORDINATE WITH NEW WALLS EXTENDING TO DECK (TYP)

1 MECHANICAL PLAN - AREA B
1/8" = 1'-0"

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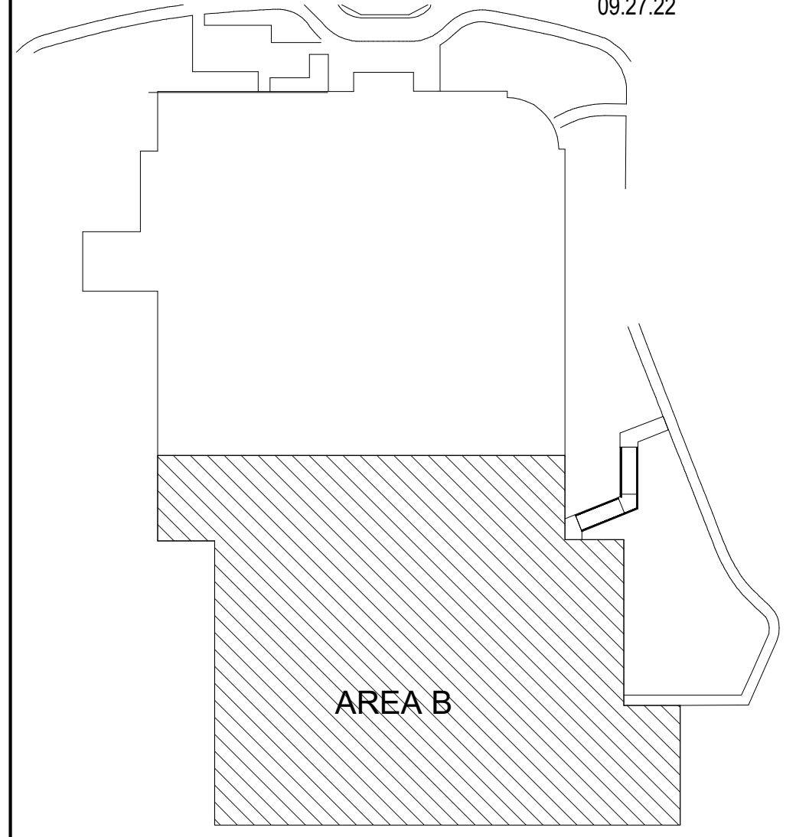

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BID DOCUMENTS

SCO # 19-21446-02A

NEW WORK - MECHANICAL FLOOR PLAN -AREA B

DATE: 09.27.22
PROJECT NO: 21-0029

REVISIONS
NO: DATE: DESCRIPTION:

SHEET NUMBER
M202

RATED WALL LEGEND:		ROOM HATCH LEGEND:	
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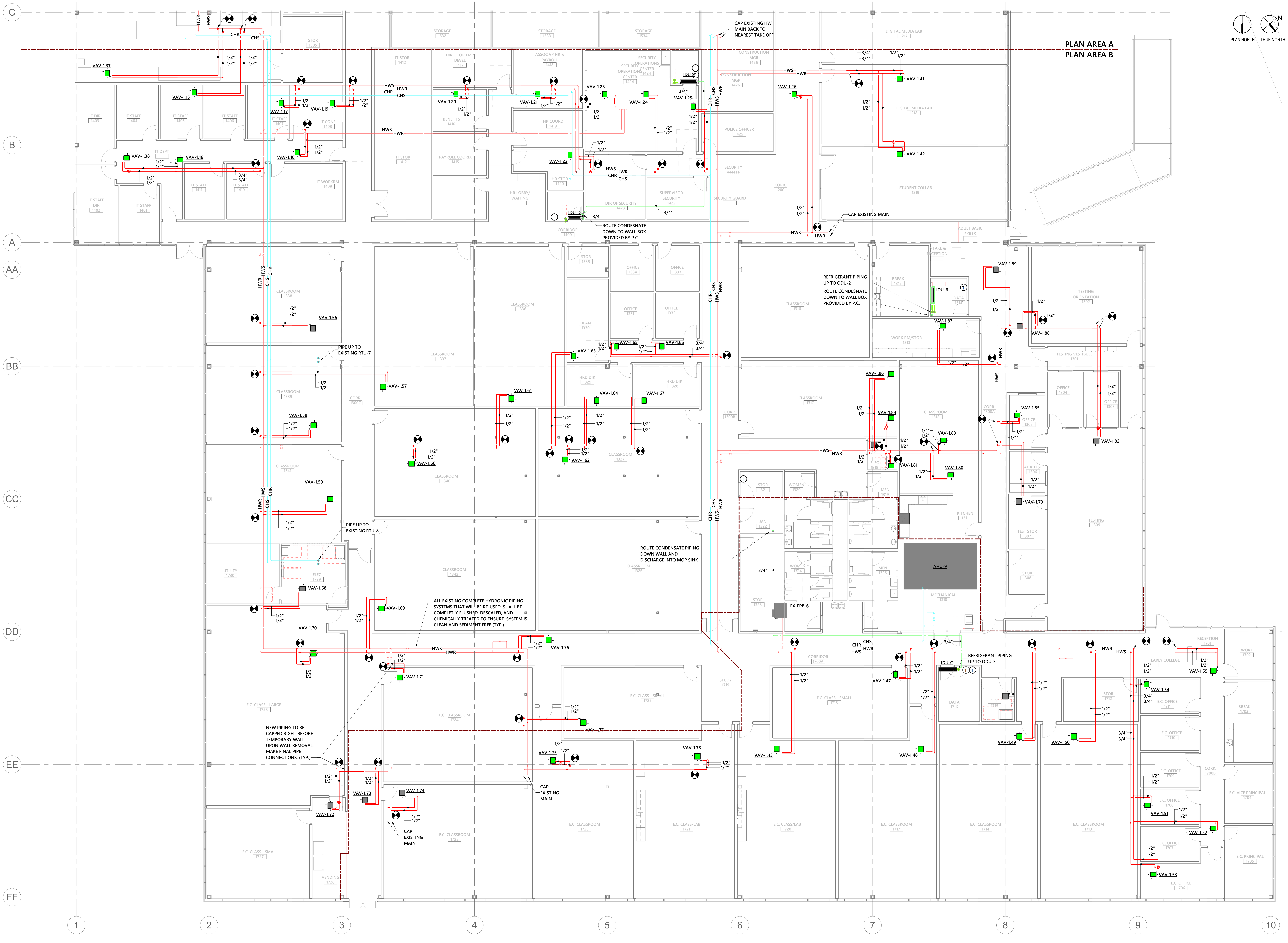
PLAN NORTH
TRUE NORTH
N
PLAN AREA A
PLAN AREA B
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3
4
5
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7
8
9
10
CAP EXISTING HW MAIN BACK TO NEAREST TAKE OFF
CAP EXISTING MAIN
ROUTE CONDENSATE DOWN TO WALL BOX PROVIDED BY P.C.
REFRIGERANT PIPING UP TO ODU-2
ROUTE CONDENSATE DOWN TO WALL BOX PROVIDED BY P.C.
PIPE UP TO EXISTING RTU-7
PIPE UP TO EXISTING RTU-8
ROUTE CONDENSATE PIPING DOWN WALL AND DISCHARGE INTO MOP SINK
ALL EXISTING COMPLETE HYDRONIC PIPING SYSTEMS THAT WILL BE RE-USED, SHALL BE COMPLETLY FLUSHED, DESCALED, AND CHEMICALLY TREATED TO ENSURE SYSTEM IS CLEAN AND SEDIMENT FREE (TYP.)
NEW PIPING TO BE CAPPED RIGHT BEFORE TEMPORARY WALL. UPON WALL REMOVAL, MAKE FINAL PIPE CONNECTIONS. (TYP.)
CAP EXISTING MAIN
CAP EXISTING MAIN
REFRIGERANT PIPING UP TO ODU-3
IDU-B
IDU-C
IDU-D
AHU-9
EX-FPB-6
HWS
HWR
CHS
CHR
1/2"
3/4"
VAV-1.15
VAV-1.16
VAV-1.17
VAV-1.18
VAV-1.19
VAV-1.20
VAV-1.21
VAV-1.22
VAV-1.23
VAV-1.24
VAV-1.25
VAV-1.26
VAV-1.37
VAV-1.38
VAV-1.41
VAV-1.42
VAV-1.43
VAV-1.47
VAV-1.48
VAV-1.49
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VAV-1.55
VAV-1.56
VAV-1.57
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VAV-1.74
VAV-1.75
VAV-1.76
VAV-1.77
VAV-1.78
VAV-1.79
VAV-1.80
VAV-1.81
VAV-1.82
VAV-1.83
VAV-1.84
VAV-1.85
VAV-1.86
VAV-1.87
VAV-1.88
VAV-1.89
CLASSROOM 1342
E.C. CLASS - LARGE 1728

1 MECHANICAL PIPING FLOOR PLAN - AREA B

1/8" = 1'-0"

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RONALD V. ALMOND
17228
09.27.22

AREA B

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SCO # 19-21446-02A

NEW WORK - MECHANICAL FLOOR PLAN - AREA B

DATE: 09.27.22
PROJECT NO: 21-0029

REVISIONS

NO:	DATE:	DESCRIPTION:

SHEET NUMBER
M202P

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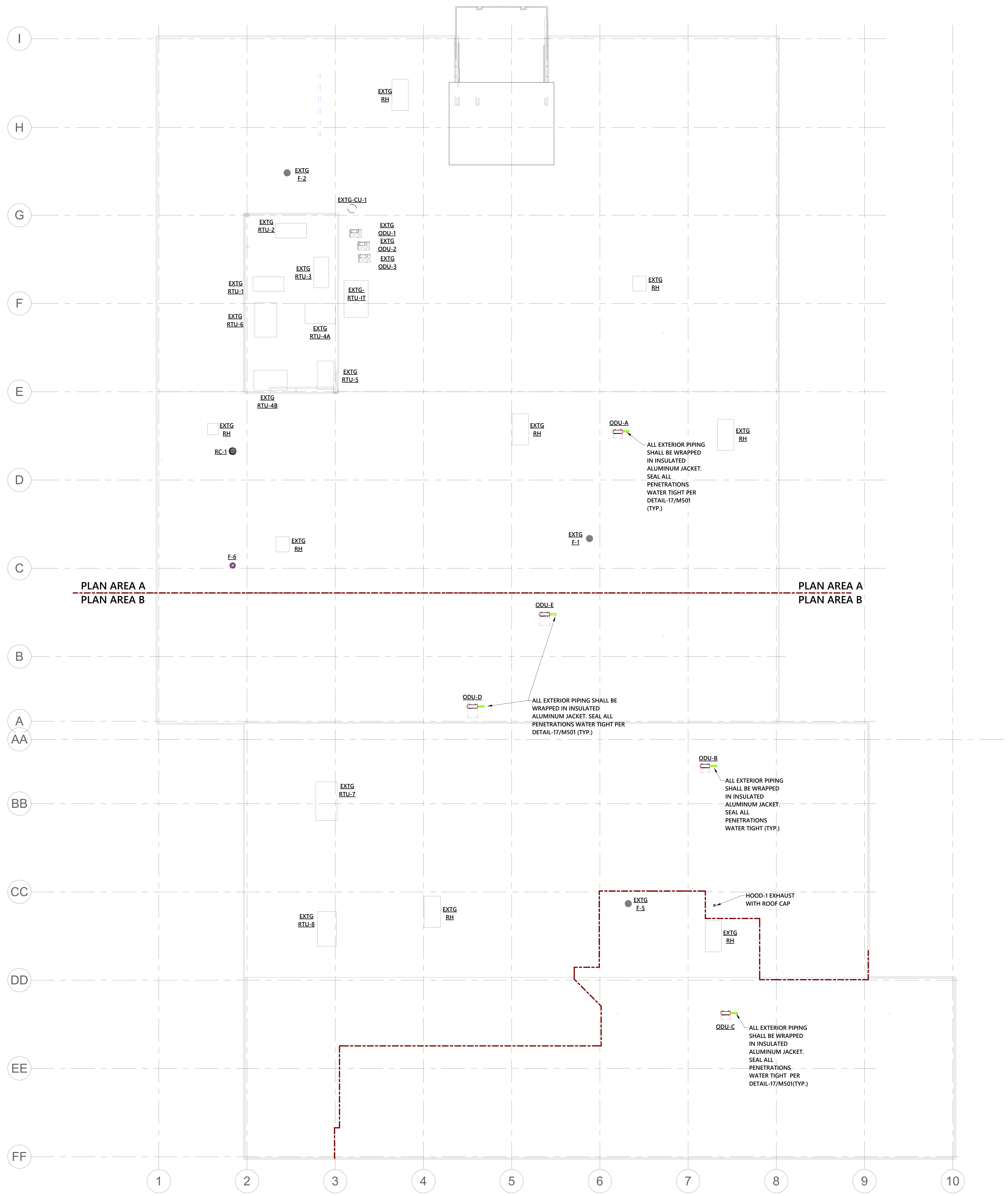
PLAN NORTH TRUE NORTH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7
8
9
10
EXTG RH
EXTG F-2
EXTG-CU-1
EXTG RTU-2
EXTG ODU-1
EXTG ODU-2
EXTG ODU-3
EXTG RTU-3
EXTG RTU-1
EXTG- RTU-IT
EXTG RTU-6
EXTG RTU-4A
EXTG RTU-5
EXTG RTU-4B
EXTG RH
RC-1
EXTG RH
ODU-A
EXTG RH
EXTG RH
EXTG RH
EXTG F-1
F-6
PLAN AREA A
PLAN AREA B
PLAN AREA A
PLAN AREA B
ODU-E
ODU-D
ODU-B
EXTG RTU-7
EXTG F-5
EXTG RTU-8
EXTG RH
EXTG RH
ODU-C

ALL EXTERIOR PIPING SHALL BE WRAPPED IN INSULATED ALUMINUM JACKET. SEAL ALL PENETRATIONS WATER TIGHT PER DETAIL-17/M501 (TYP.)

ALL EXTERIOR PIPING SHALL BE WRAPPED IN INSULATED ALUMINUM JACKET. SEAL ALL PENETRATIONS WATER TIGHT PER DETAIL-17/M501 (TYP.)

ALL EXTERIOR PIPING SHALL BE WRAPPED IN INSULATED ALUMINUM JACKET. SEAL ALL PENETRATIONS WATER TIGHT (TYP.)

HOOD-1 EXHAUST WITH ROOF CAP

ALL EXTERIOR PIPING SHALL BE WRAPPED IN INSULATED ALUMINUM JACKET. SEAL ALL PENETRATIONS WATER TIGHT PER DETAIL-17/M501(TYP.)

1 OVERALL MECHANICAL ROOF PLAN
1/16" = 1'-0"

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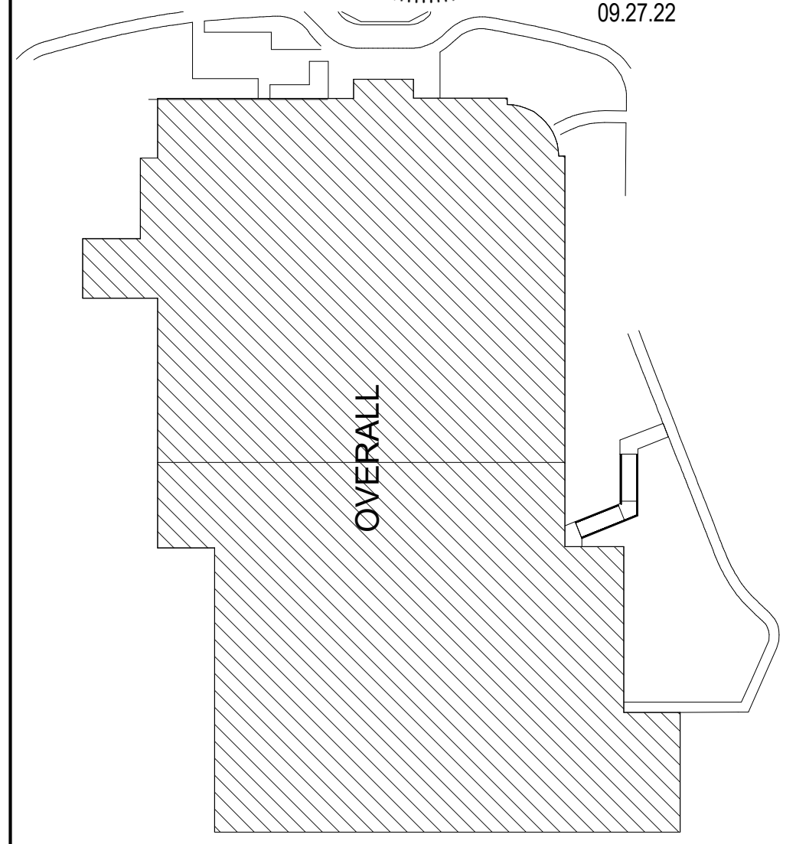

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BID DOCUMENTS

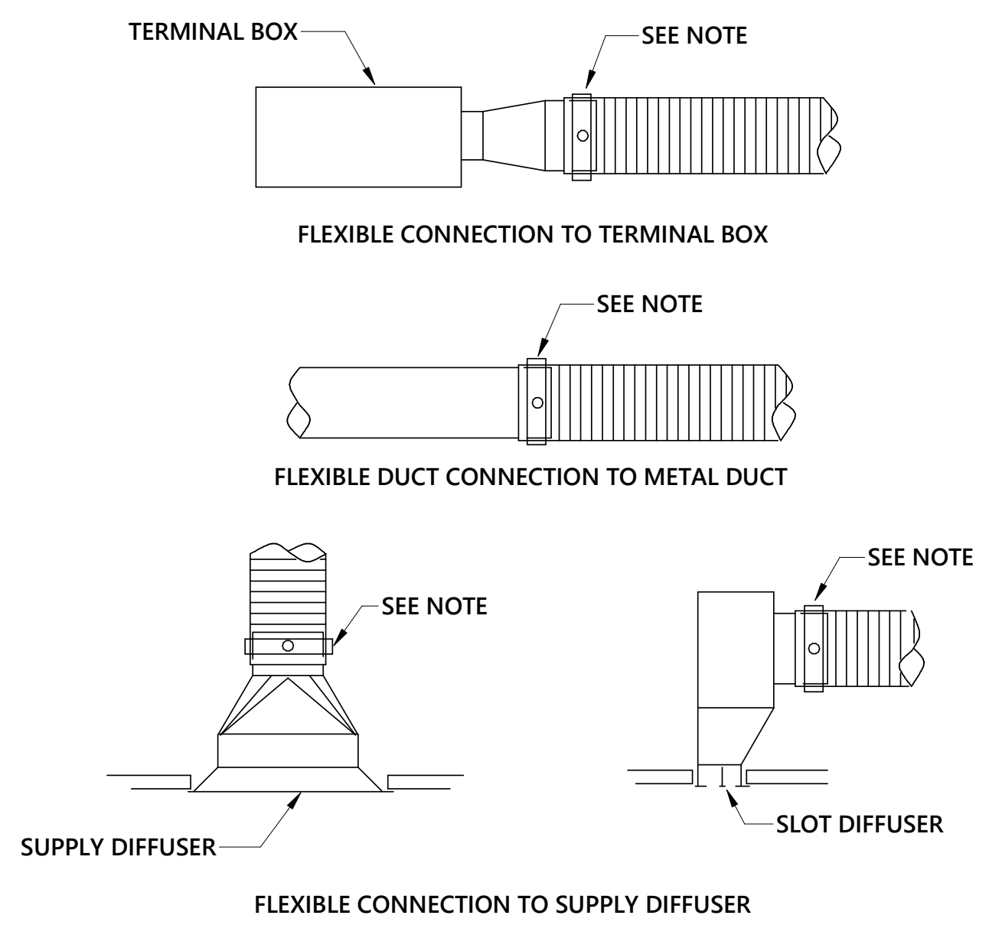
SCO # 19-21446-02A

NEW WORK -
MECHANICAL ROOF PLAN

DATE: 09.27.22
PROJECT NO: 21-0029

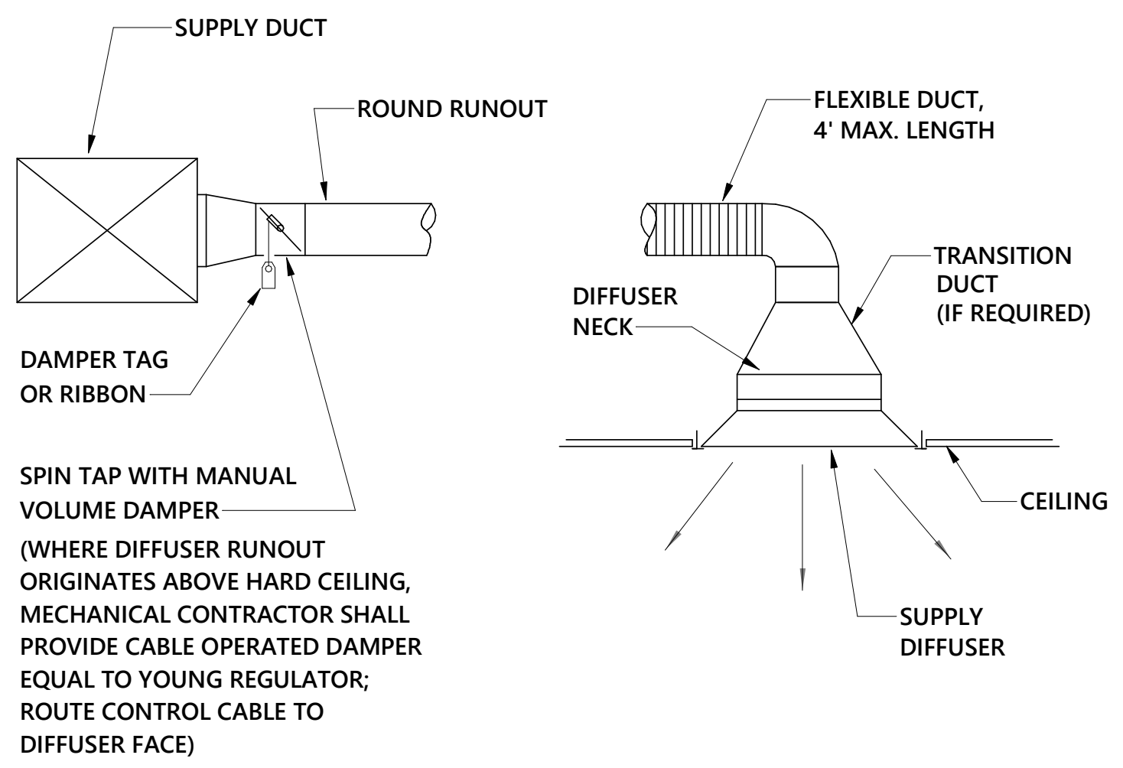
REVISIONS
NO: DATE: DESCRIPTION:

SHEET NUMBER
M301


TERMINAL BOX
SEE NOTE
FLEXIBLE CONNECTION TO TERMINAL BOX
SEE NOTE
FLEXIBLE DUCT CONNECTION TO METAL DUCT
SEE NOTE
SEE NOTE
SUPPLY DIFFUSER
SLOT DIFFUSER
FLEXIBLE CONNECTION TO SUPPLY DIFFUSER

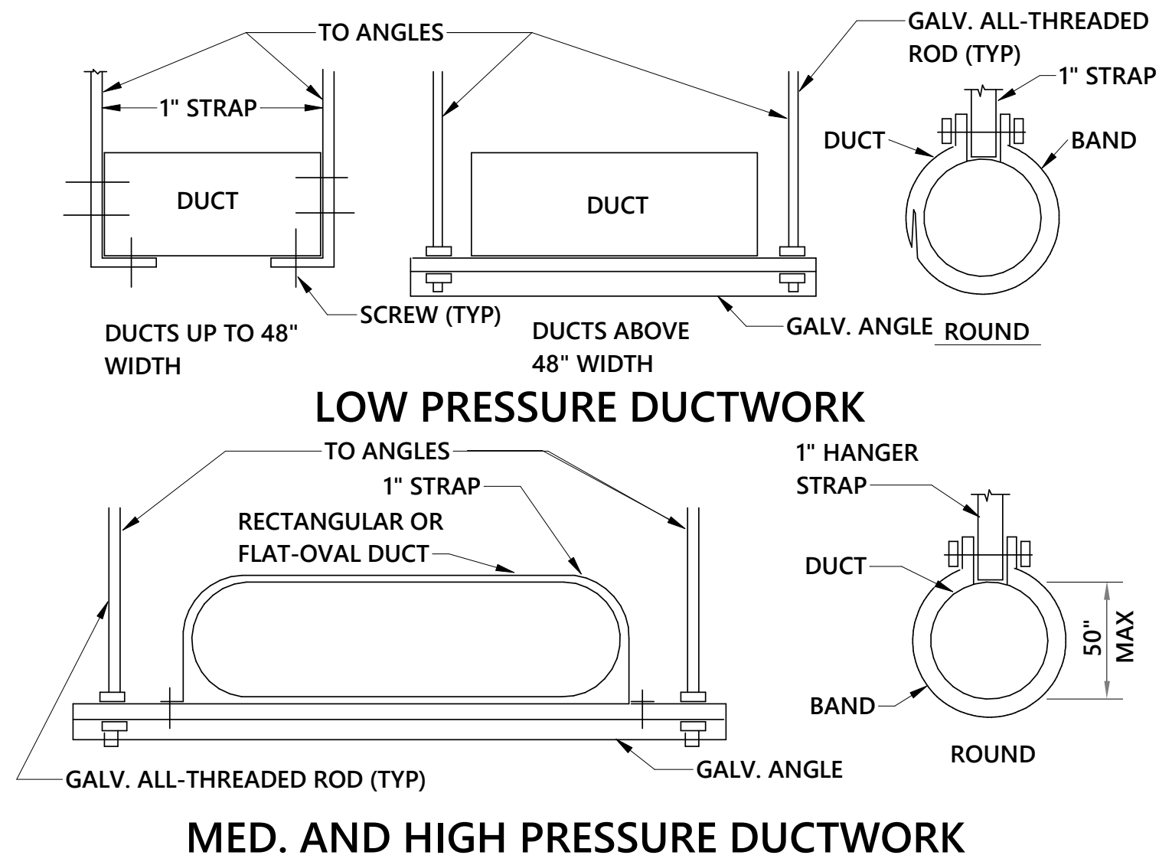
NOTE:
ALL FLEXIBLE DUCT CONNECTIONS TO SHEET METAL SHALL BE SECURED WITH
NYLON STRAP AND 2 SHEET METAL SCREWS (MIN.).

1 FLEX. CONNECTION DETAIL
NO SCALE


SUPPLY DUCT
ROUND RUNOUT
FLEXIBLE DUCT, 4' MAX. LENGTH
TRANSITION DUCT (IF REQUIRED)
DIFFUSER NECK
DAMPER TAG OR RIBBON
SPIN TAP WITH MANUAL VOLUME DAMPER
(WHERE DIFFUSER RUNOUT ORIGINATES ABOVE HARD CEILING, MECHANICAL CONTRACTOR SHALL PROVIDE CABLE OPERATED DAMPER EQUAL TO YOUNG REGULATOR; ROUTE CONTROL CABLE TO DIFFUSER FACE)
CEILING
SUPPLY DIFFUSER

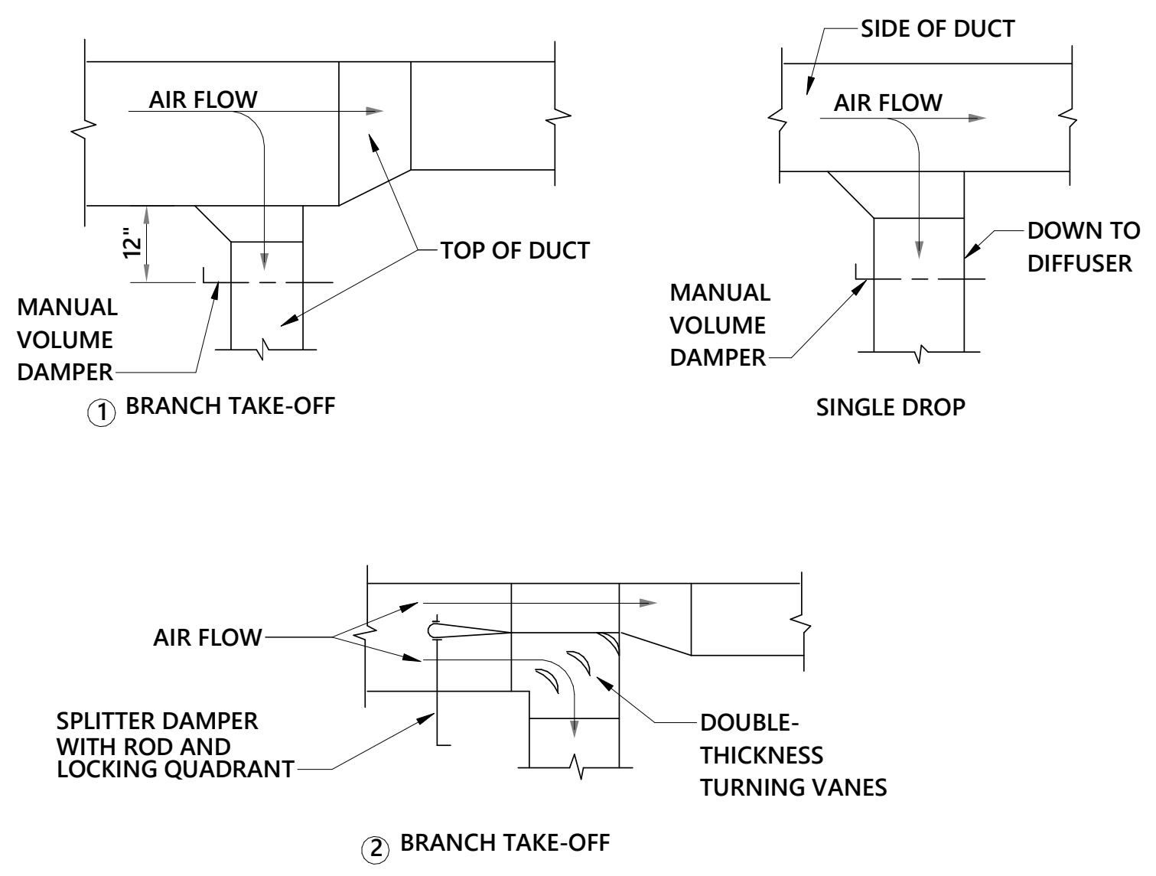
NOTE:
ALL MANUAL VOLUME DAMPERS (FOR INSULATED DUCTWORK) SHALL BE PROVIDED WITH AN ELEVATED REGULATOR (STAND-OFF) STAND SHALL EXTEND A MINIMUM OF 2" BEYOND DUCTWORK WITH EXTENDED TAB/SHAFT.

2 SPIN TAP TO DIFFUSER
NO SCALE


TO ANGLES
1" STRAP
DUCT
DUCT
GALV. ALL-THREADED ROD (TYP)
1" STRAP
DUCT
BAND
SCREW (TYP)
DUCTS UP TO 48" WIDTH
DUCTS ABOVE 48" WIDTH
GALV. ANGLE
ROUND
LOW PRESSURE DUCTWORK
TO ANGLES
1" STRAP
RECTANGULAR OR FLAT-OVAL DUCT
1" HANGER STRAP
DUCT
50" MAX
BAND
GALV. ALL-THREADED ROD (TYP)
GALV. ANGLE
ROUND
MED. AND HIGH PRESSURE DUCTWORK

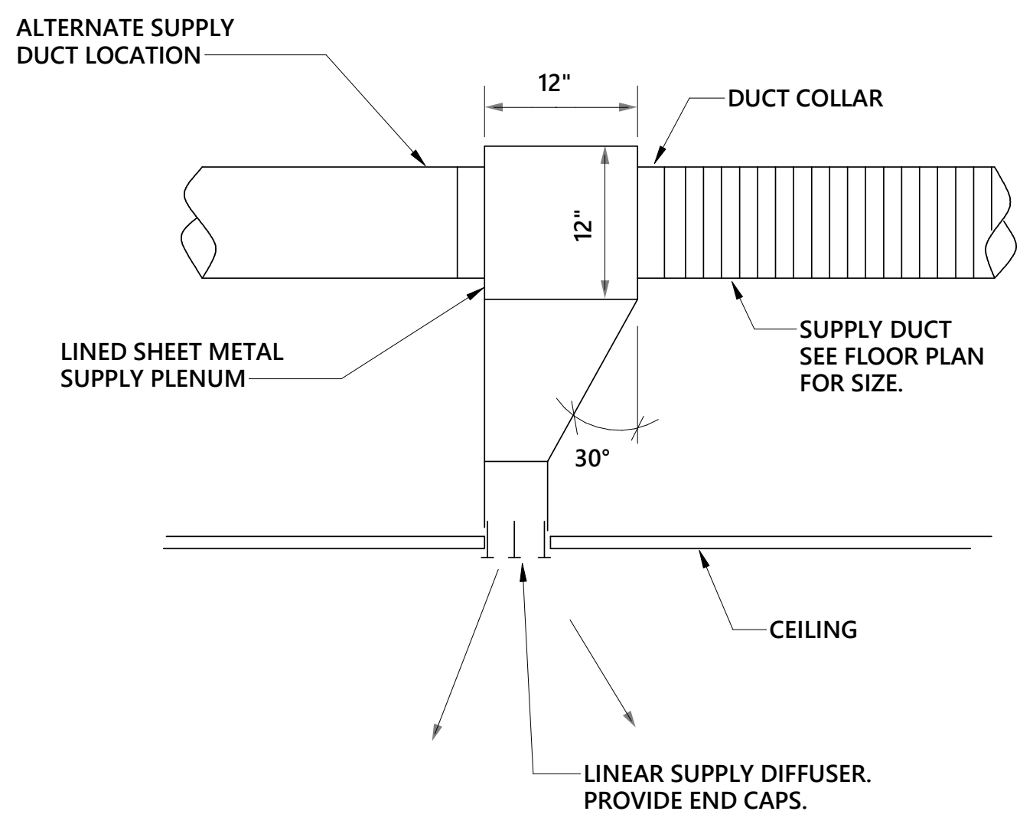
NOTE
1. PROVIDE HOT-DIPPED GALVANIZED SUPPORTS/RAILS/ANGLES/ETC. FOR ALL DUCTWORK INSTALLED IN POOL EQUIPMENT ROOMS AND ASSOCIATED AREAS

3 DUCTWORK HANGER DETAILS
NO SCALE


AIR FLOW
12"
MANUAL VOLUME DAMPER
TOP OF DUCT
① BRANCH TAKE-OFF
SIDE OF DUCT
AIR FLOW
DOWN TO DIFFUSER
MANUAL VOLUME DAMPER
SINGLE DROP
AIR FLOW
SPLITTER DAMPER WITH ROD AND LOCKING QUADRANT
DOUBLE-THICKNESS TURNING VANES
② BRANCH TAKE-OFF

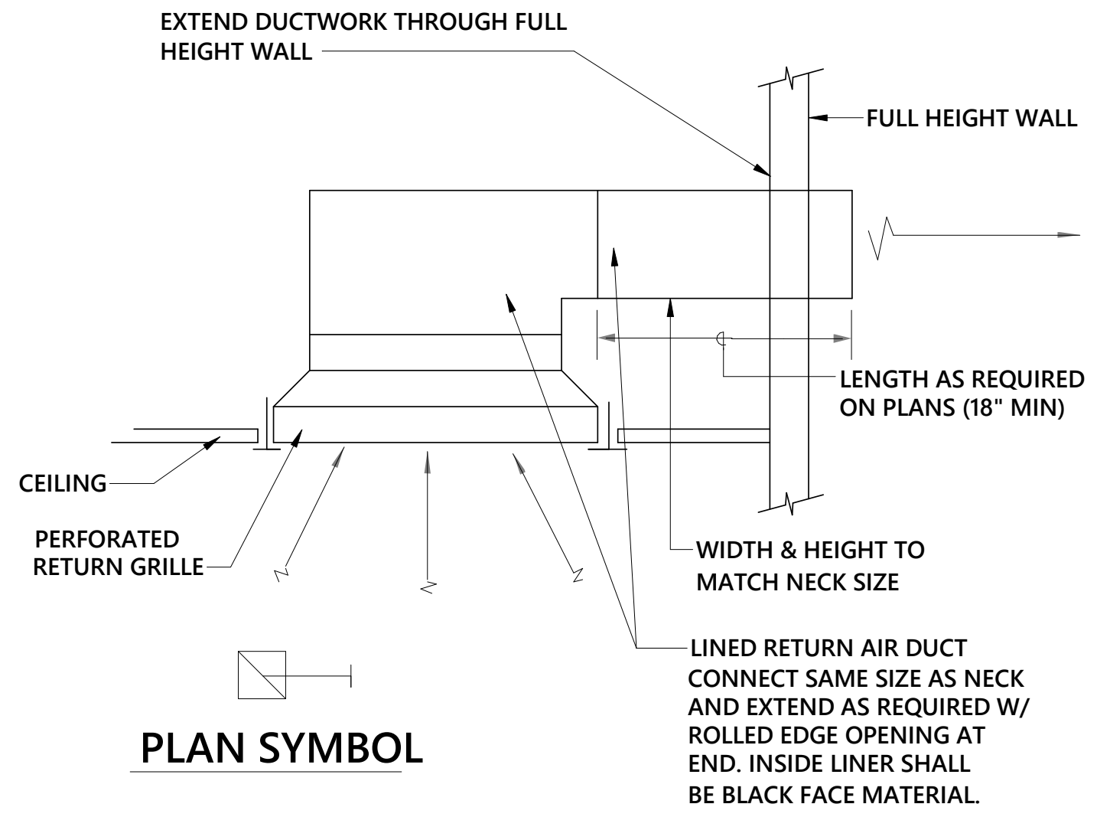
NOTE:
1. USE BRANCH TAKE-OFF ① WHEN MAIN AND BRANCH DUCTS ARE DIFFERENT DEPTHS
2. USE BRANCH TAKE-OFF ② WHEN MAIN AND BRANCH DUCTS ARE SAME DEPTHS

4 DUCTWORK DETAILS
NO SCALE


ALTERNATE SUPPLY DUCT LOCATION
12"
DUCT COLLAR
12"
LINED SHEET METAL SUPPLY PLENUM
SUPPLY DUCT SEE FLOOR PLAN FOR SIZE.
30°
CEILING
LINEAR SUPPLY DIFFUSER. PROVIDE END CAPS.

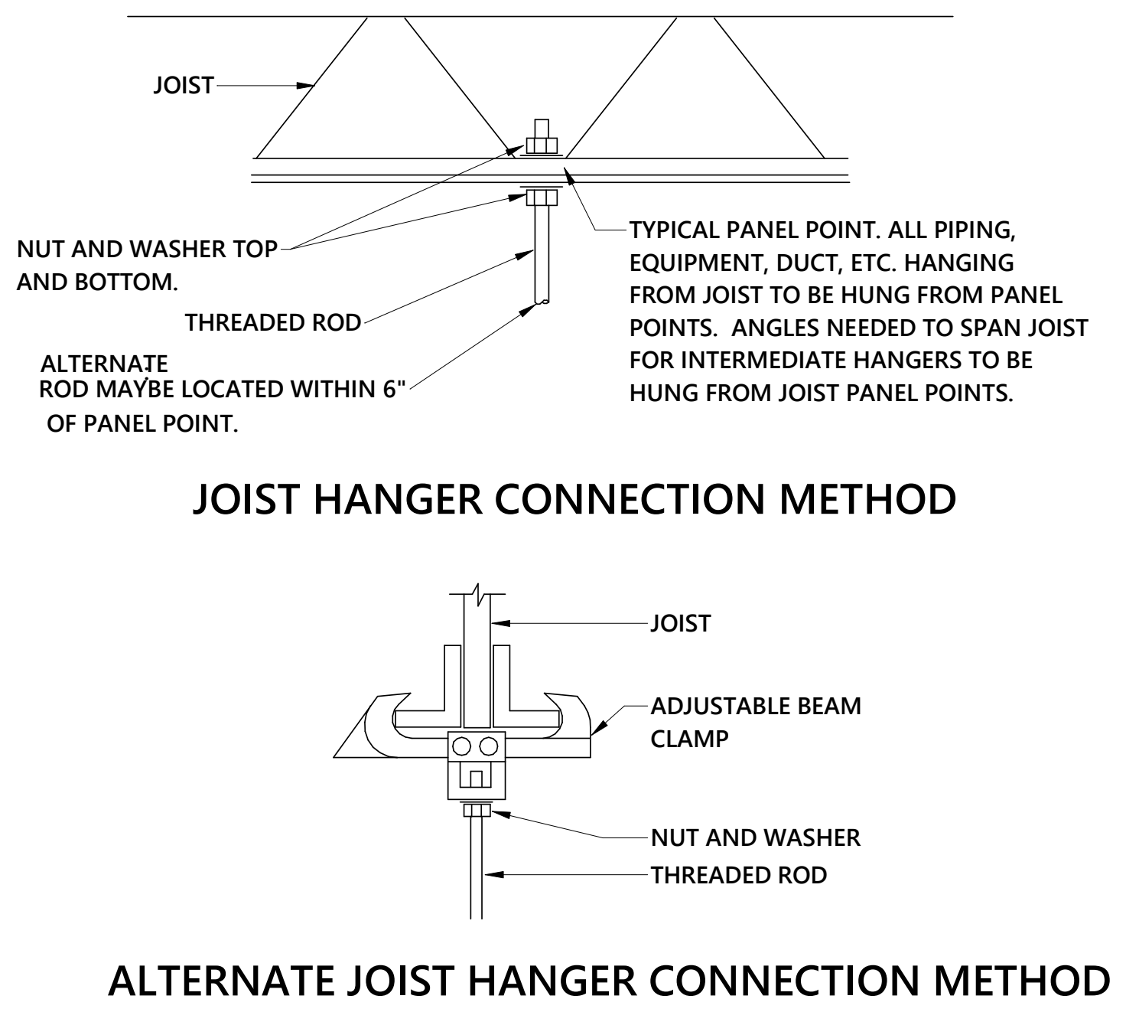
NOTE:
LINEAR DIFFUSER SHOWN ON FLOOR PLANS WITHOUT SUPPLY PLENUM TO BE USED AS RETURN.

5 DIFFUSER PLENUM DETAIL
NO SCALE


EXTEND DUCTWORK THROUGH FULL HEIGHT WALL
FULL HEIGHT WALL
LENGTH AS REQUIRED ON PLANS (18" MIN)
CEILING
PERFORATED RETURN GRILLE
WIDTH & HEIGHT TO MATCH NECK SIZE
LINED RETURN AIR DUCT CONNECT SAME SIZE AS NECK AND EXTEND AS REQUIRED W/ ROLLED EDGE OPENING AT END. INSIDE LINER SHALL BE BLACK FACE MATERIAL.
PLAN SYMBOL

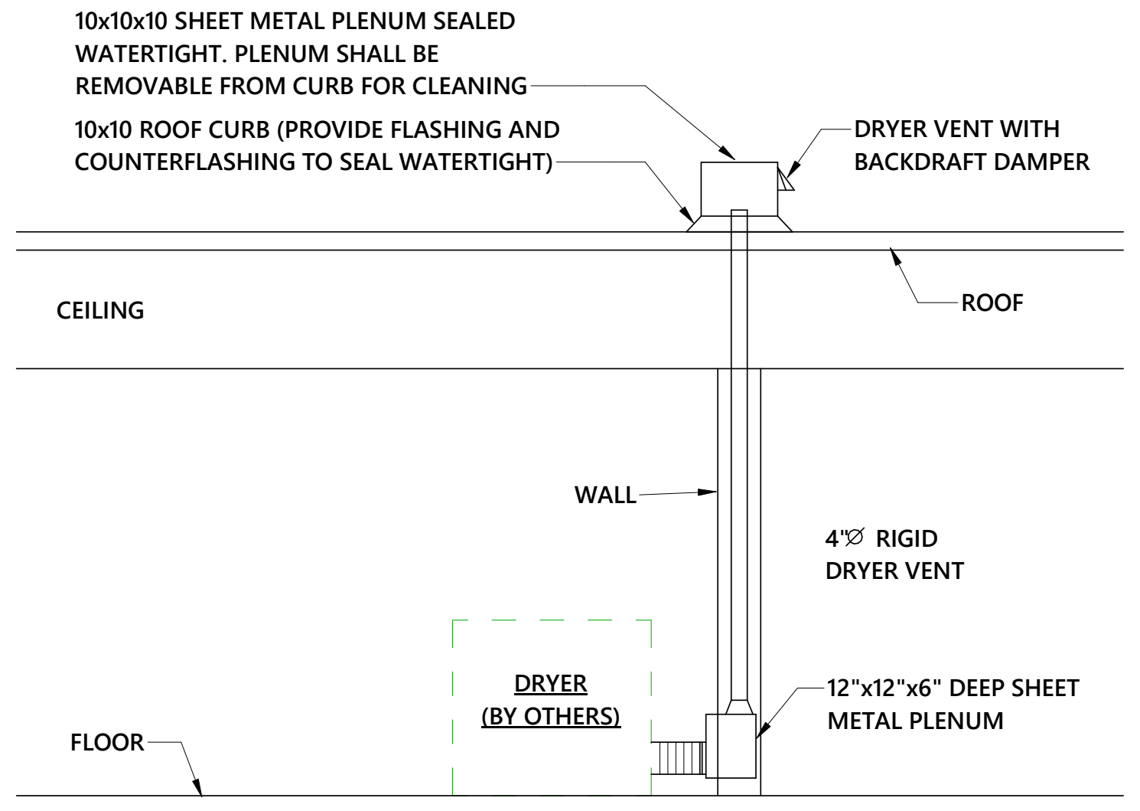
NOTE:
1. ROUND NECK RETURN GRILLES ARE SIMILAR. SOUND ATTENUATION DUCT AND ELBOW SHALL BE NECK SIZE OF GRILLE.

6 RETURN GRILLE WITH SOUND ATTENUATION
NO SCALE


JOIST
NUT AND WASHER TOP AND BOTTOM.
THREADED ROD
ALTERNATE ROD MAYBE LOCATED WITHIN 6" OF PANEL POINT.
TYPICAL PANEL POINT. ALL PIPING, EQUIPMENT, DUCT, ETC. HANGING FROM JOIST TO BE HUNG FROM PANEL POINTS. ANGLES NEEDED TO SPAN JOIST FOR INTERMEDIATE HANGERS TO BE HUNG FROM JOIST PANEL POINTS.
JOIST HANGER CONNECTION METHOD
JOIST
ADJUSTABLE BEAM CLAMP
NUT AND WASHER
THREADED ROD
ALTERNATE JOIST HANGER CONNECTION METHOD

NOTE
1. PROVIDE HOT-DIPPED GALVANIZED SUPPORTS/RAILS/ANGLES/ETC. FOR ALL DUCTWORK INSTALLED IN POOL EQUIPMENT ROOMS AND ASSOCIATED AREAS

7 JOIST CONNECTION DETAIL
NO SCALE


10x10x10 SHEET METAL PLENUM SEALED WATERTIGHT. PLENUM SHALL BE REMOVABLE FROM CURB FOR CLEANING
10x10 ROOF CURB (PROVIDE FLASHING AND COUNTERFLASHING TO SEAL WATERTIGHT)
DRYER VENT WITH BACKDRAFT DAMPER
CEILING
ROOF
WALL
4"∅ RIGID DRYER VENT
DRYER (BY OTHERS)
12"x12"x6" DEEP SHEET METAL PLENUM
FLOOR

NOTES:
1. DRYER VENT PIPING SHALL BE GALVANIZED SHEET METAL AND SHALL HAVE A SMOOTH INTERIOR FINISH WITH JOINTS RUNNING IN THE DIRECTION OF THE AIR FLOW.
2. MAXIMUM LENGTH OF DRYER VENT SHALL NOT EXCEED 45' IN TOTAL LENGTH (DEDUCT 10' FOR EACH 90° ELBOW AND 5' FOR EACH 45° ELBOW).
3. DRYER VENT SHALL BE NONSCREENED WITH A BACKDRAFT DAMPER AND MINIMUM SIZE OF 4".

8 DRYER VENT THRU ROOF
NOT TO SCALE

NOTES:

① EQUIPMENT OF TRADES OTHER THAN ELECTRICAL.

② CONDUIT AND WIRING BY MECHANICAL, PLUMBING CONTRACTOR OR OTHER TRADES.

③ IF AN ADDITIONAL DISCONNECT IS REQUIRED BY NEC, IT SHALL BE PROVIDED AND INSTALLED BY THE EQUIPMENT CONTRACTOR.

④ A COMBINATION STARTER OR VFD MAY BE USED IN LIEU OF A SEPARATE DISCONNECT SWITCH AND STARTER LOCATE ADJACENT TO EQUIPMENT.

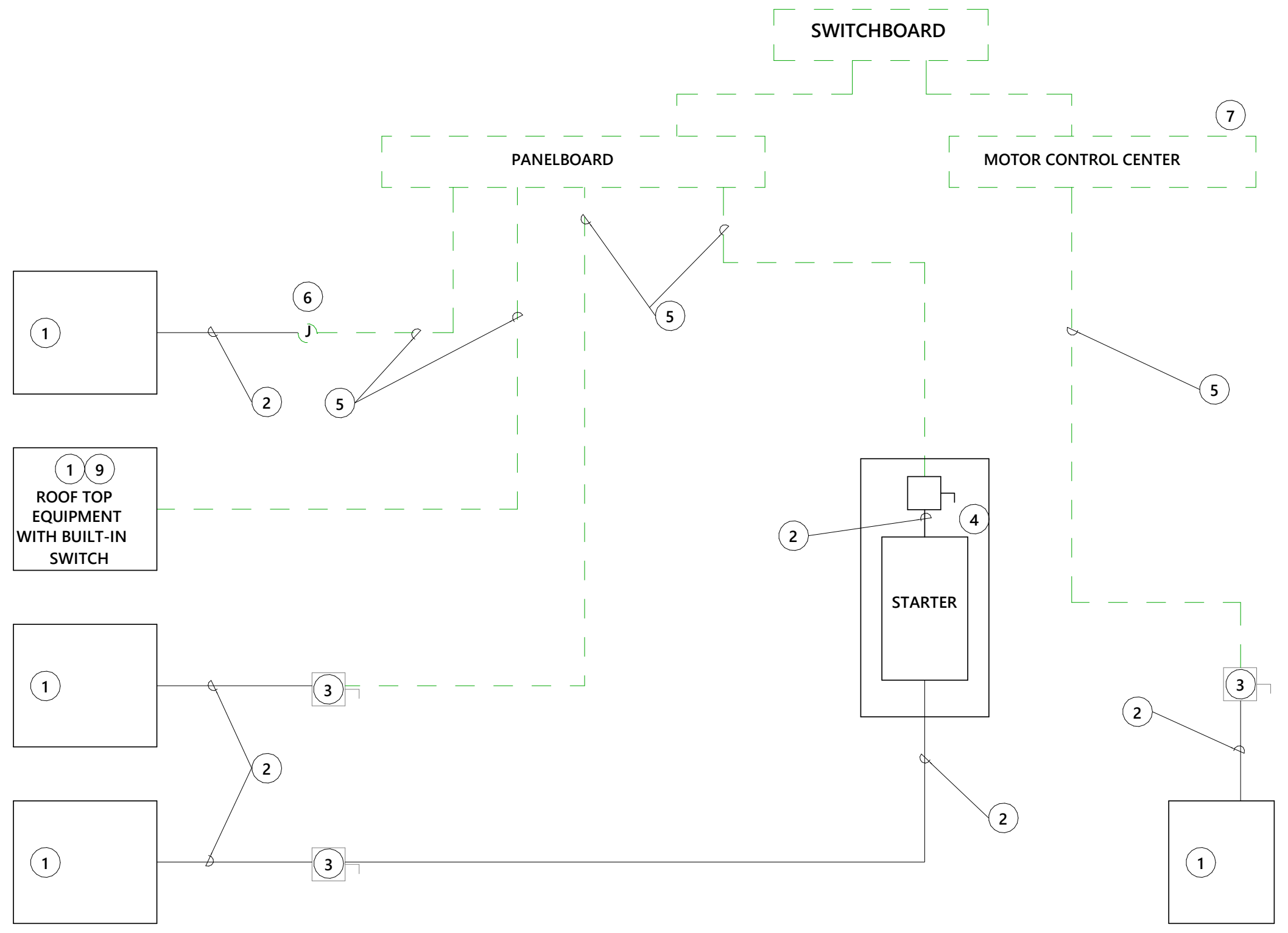
⑤ FEEDER CIRCUIT WIRING AND CONDUIT IN ELECTRICAL WORK SEE PANELBOARD SCHEDULES FOR WIRE AND BREAKER SIZES.

⑥ JUNCTION BOX MAY BE SHOWN ON ELECTRICAL PLANS FOR SOME EQUIPMENT. IF NO STARTER OR DISCONNECT IS SUPPLIED, A JUNCTION BOX SHALL BE INSTALLED ADJACENT TO EQUIPMENT. THE ELECTRICAL CONTRACTOR SHALL PROVIDE LINE SIDE WIRING TO THE JUNCTION BOX. LOAD SIDE WIRING WILL BE PROVIDED BY MECHANICAL CONTRACTOR OR OTHER TRADES.

⑦ PROJECTS UTILIZING AN MCC. THE STARTER, CB, OR VFD IN THE MCC ARE PROVIDED BY THE ELECTRICAL CONTRACTOR.

⑧ IN ALL CASES THE EQUIPMENT CONTRACTOR SHALL MAKE FINAL CONNECTIONS STARTUP, AND TEST EQUIPMENT.

⑨ IF THE ROOF TOP EQUIPMENT IS NOT PROVIDED WITH BUILT IN SWITCH, THE ELECTRICAL CONTRACTOR SHALL PROVIDE A DISCONNECT SWITCH.


SWITCHBOARD
PANELBOARD
MOTOR CONTROL CENTER
⑦
①
⑥
J
②
⑤
⑤
⑤
① ⑨
ROOF TOP EQUIPMENT WITH BUILT-IN SWITCH
②
④
STARTER
①
③
②
①
③
②
③
②
①

9 ELECTRICAL REQUIREMENTS FOR MECHANICAL CONTRACTOR (DIVISION 23/26 DEMARCATION)
NO SCALE

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RONALD V. ALMOND
17228
09.27.22

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BID DOCUMENTS

SCO # 19-21446-02A

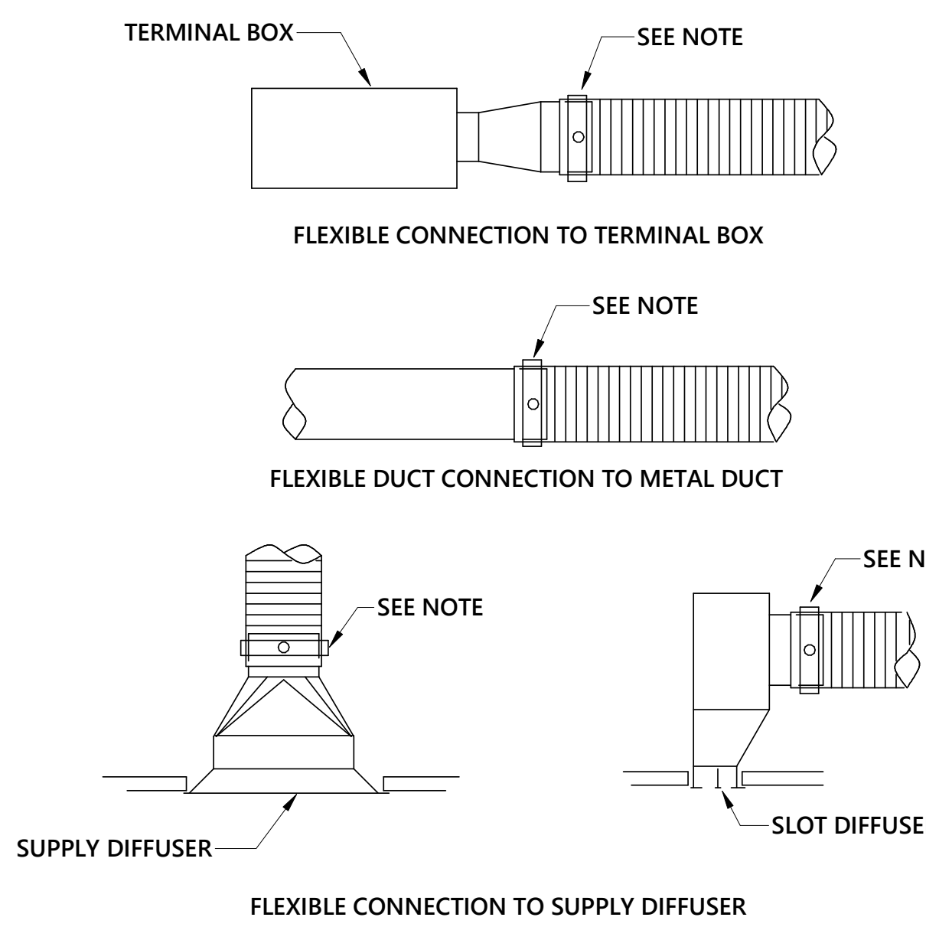
MECHANICAL DETAILS

DATE: 09.27.22
PROJECT NO: 21-0029

REVISIONS
NO: DATE: DESCRIPTION:

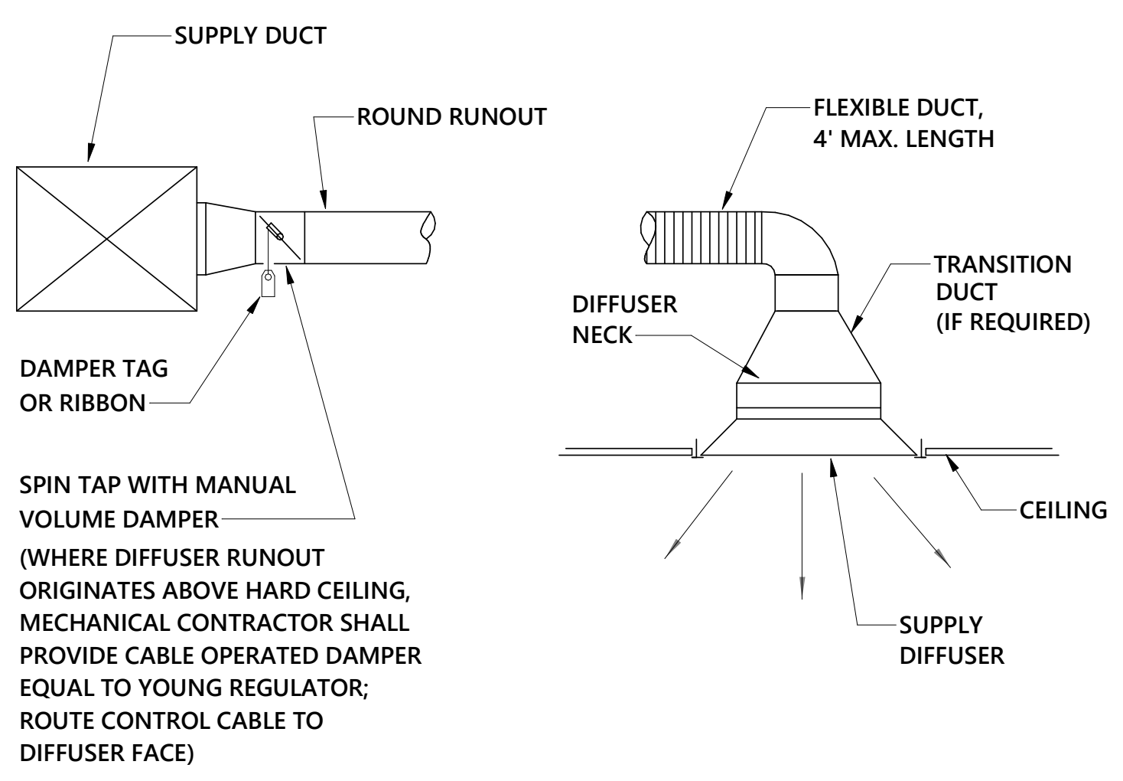
SHEET NUMBER
M501

1 FLEX. CONNECTION DETAIL
NO SCALE


TERMINAL BOX
SEE NOTE
FLEXIBLE CONNECTION TO TERMINAL BOX
SEE NOTE
FLEXIBLE DUCT CONNECTION TO METAL DUCT
SEE NOTE
SEE NOTE
SUPPLY DIFFUSER
SLOT DIFFUSER
FLEXIBLE CONNECTION TO SUPPLY DIFFUSER

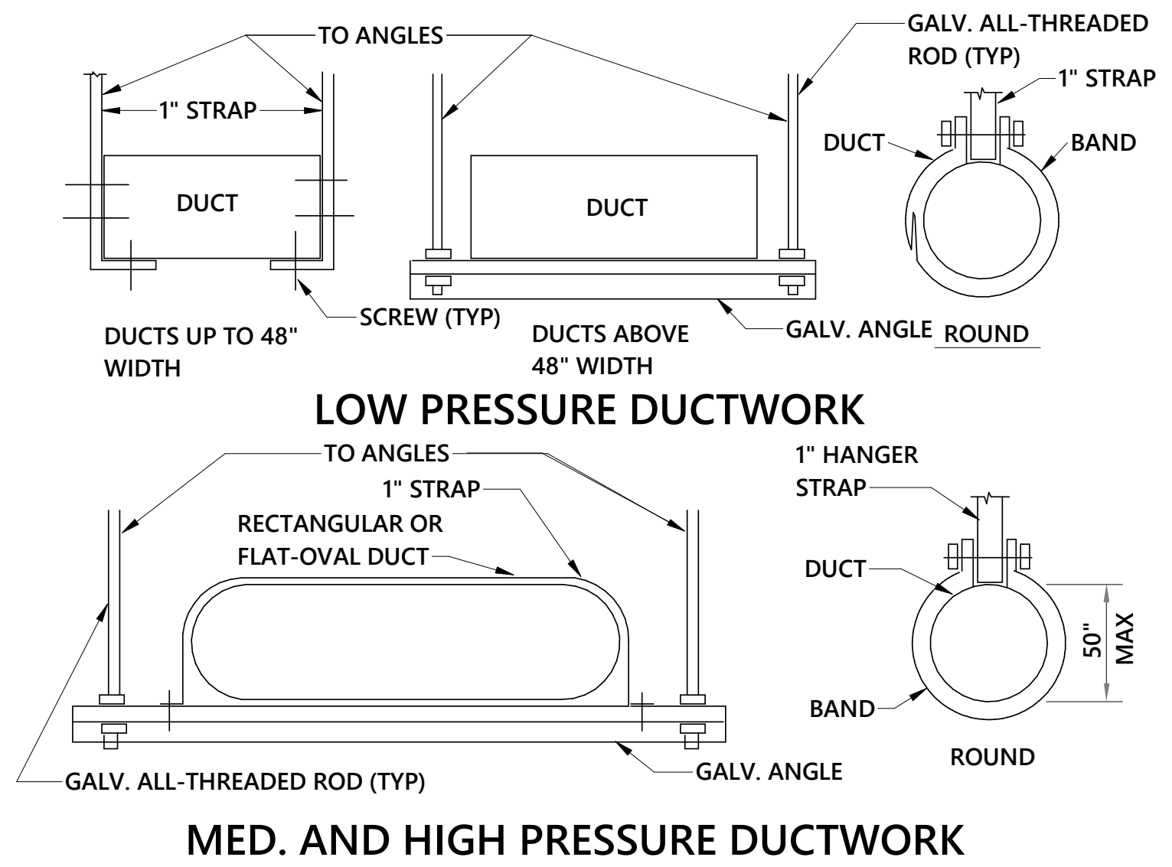
NOTE:
ALL FLEXIBLE DUCT CONNECTIONS TO SHEET METAL SHALL BE SECURED WITH
NYLON STRAP AND 2 SHEET METAL SCREWS (MIN.).

2 SPIN TAP TO DIFFUSER
NO SCALE


SUPPLY DUCT
ROUND RUNOUT
DAMPER TAG OR RIBBON
SPIN TAP WITH MANUAL VOLUME DAMPER (WHERE DIFFUSER RUNOUT ORIGINATES ABOVE HARD CEILING, MECHANICAL CONTRACTOR SHALL PROVIDE CABLE OPERATED DAMPER EQUAL TO YOUNG REGULATOR; ROUTE CONTROL CABLE TO DIFFUSER FACE)
FLEXIBLE DUCT, 4' MAX. LENGTH
DIFFUSER NECK
TRANSITION DUCT (IF REQUIRED)
CEILING
SUPPLY DIFFUSER

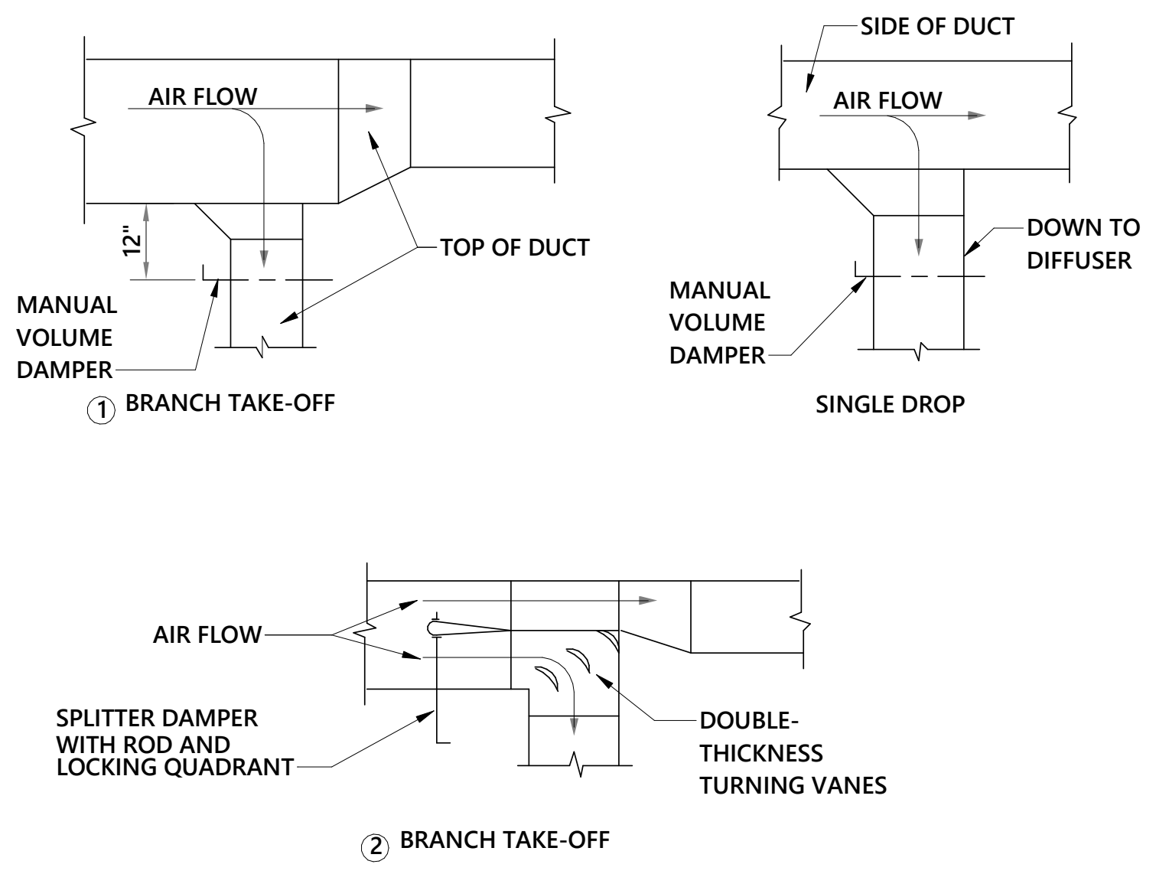
NOTE:
ALL MANUAL VOLUME DAMPERS (FOR INSULATED DUCTWORK) SHALL BE PROVIDED WITH AN ELEVATED REGULATOR (STAND-OFF) STAND SHALL EXTEND A MINIMUM OF 2" BEYOND DUCTWORK WITH EXTENDED TAB/SHAFT.

3 DUCTWORK HANGER DETAILS
NO SCALE


TO ANGLES
1" STRAP
DUCT
DUCT
GALV. ALL-THREADED ROD (TYP)
1" STRAP
DUCT
BAND
SCREW (TYP)
DUCTS UP TO 48" WIDTH
DUCTS ABOVE 48" WIDTH
GALV. ANGLE
ROUND
LOW PRESSURE DUCTWORK
TO ANGLES
1" STRAP
RECTANGULAR OR FLAT-OVAL DUCT
1" HANGER STRAP
DUCT
50" MAX
BAND
ROUND
GALV. ALL-THREADED ROD (TYP)
GALV. ANGLE
MED. AND HIGH PRESSURE DUCTWORK

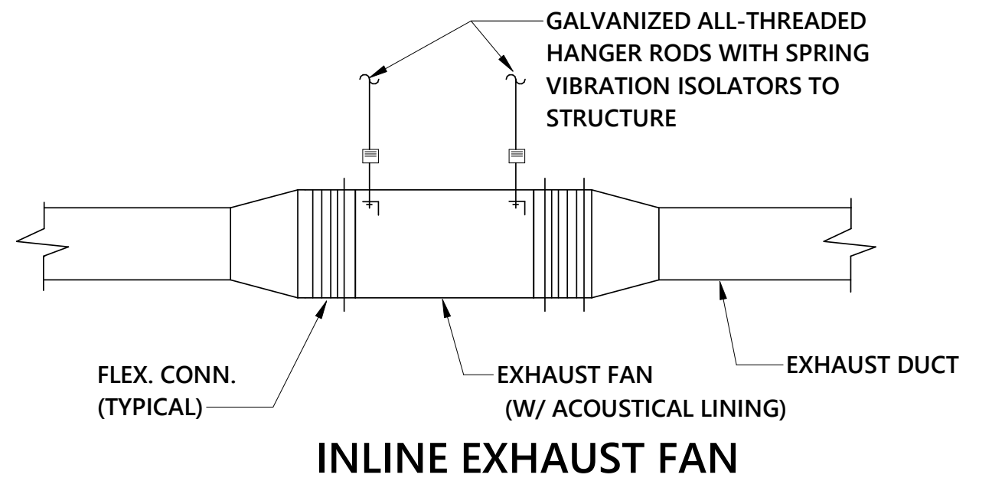
NOTE
1. PROVIDE HOT-DIPPED GALVANIZED SUPPORTS/RAILS/ANGLES/ETC. FOR ALL DUCTWORK INSTALLED IN POOL EQUIPMENT ROOMS AND ASSOCIATED AREAS

4 DUCTWORK DETAILS
NO SCALE


AIR FLOW
12"
TOP OF DUCT
MANUAL VOLUME DAMPER
① BRANCH TAKE-OFF
SIDE OF DUCT
AIR FLOW
DOWN TO DIFFUSER
MANUAL VOLUME DAMPER
SINGLE DROP
AIR FLOW
SPLITTER DAMPER WITH ROD AND LOCKING QUADRANT
DOUBLE-THICKNESS TURNING VANES
② BRANCH TAKE-OFF

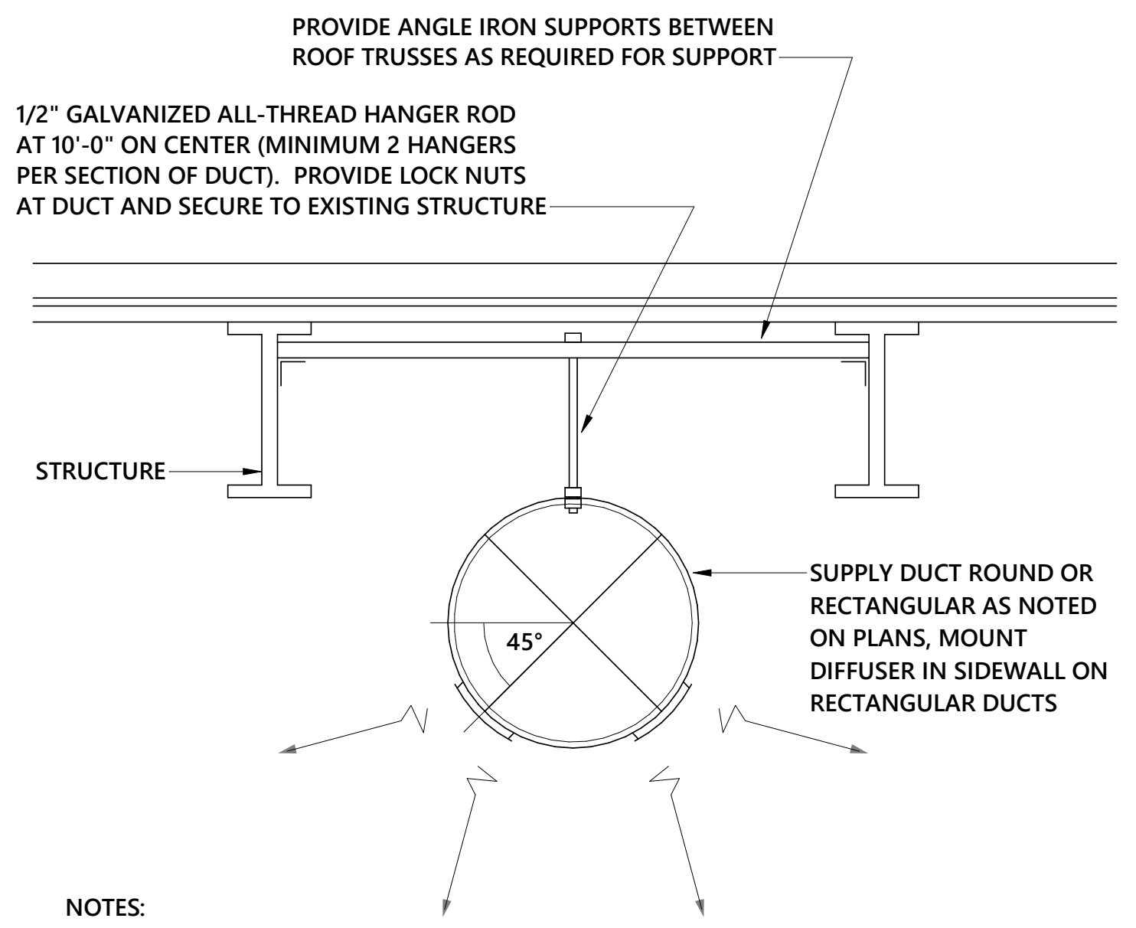
NOTE:
1. USE BRANCH TAKE-OFF ① WHEN MAIN AND BRANCH DUCTS ARE DIFFERENT DEPTHS
2. USE BRANCH TAKE-OFF ② WHEN MAIN AND BRANCH DUCTS ARE SAME DEPTHS

5 EXHAUST FAN DETAIL
NO SCALE


GALVANIZED ALL-THREADED HANGER RODS WITH SPRING VIBRATION ISOLATORS TO STRUCTURE
FLEX. CONN. (TYPICAL)
EXHAUST FAN (W/ ACOUSTICAL LINING)
EXHAUST DUCT
INLINE EXHAUST FAN

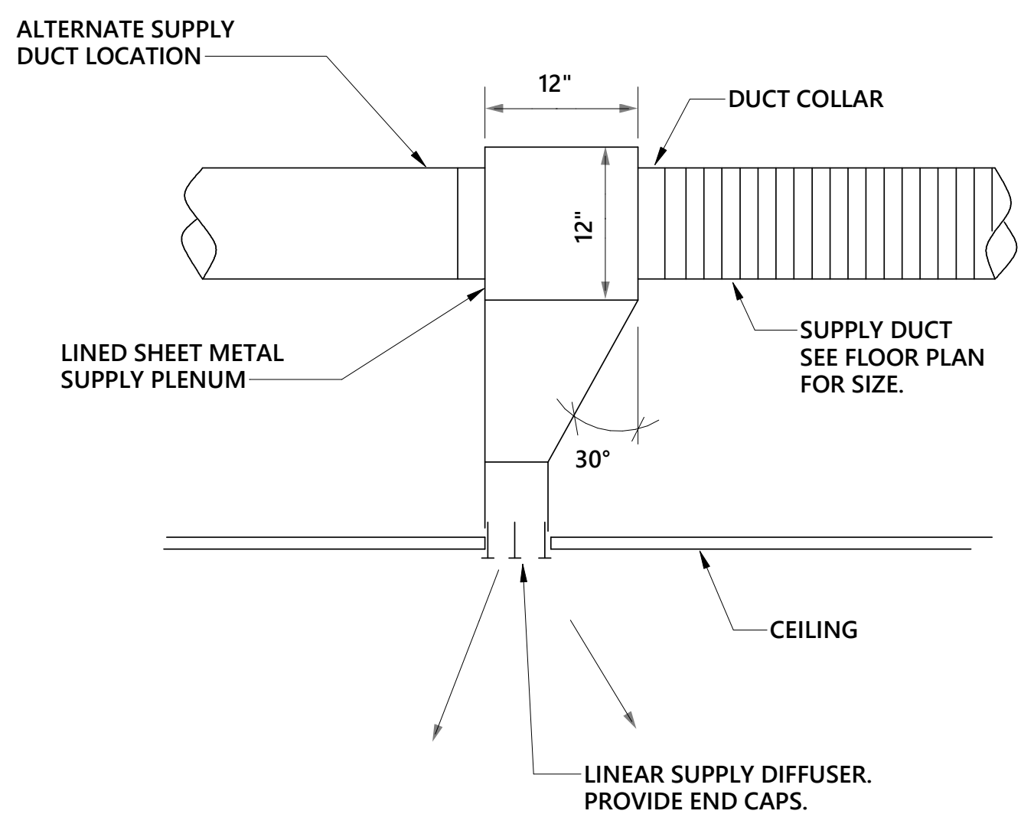
NOTES:
1. COORDINATE LOCATION OF FAN WITH OTHER TRADES TO INSURE SERVICE CLEARANCES.
2. MECHANICAL CONTRACTOR SHALL PROVIDE ACCESS DOOR IN CEILING IF REQUIRED.
3. PROVIDE HOT-DIPPED GALVANIZED SUPPORTS/RAILS/ANGLES/ETC. FOR ALL FANS INSTALLED IN POOL EQUIPMENT ROOMS AND ASSOCIATED AREAS

6 DBL. DEFL. DIFFUSER MOUNTING DETAIL
NO SCALE


PROVIDE ANGLE IRON SUPPORTS BETWEEN ROOF TRUSSES AS REQUIRED FOR SUPPORT
1/2" GALVANIZED ALL-THREAD HANGER ROD AT 10'-0" ON CENTER (MINIMUM 2 HANGERS PER SECTION OF DUCT). PROVIDE LOCK NUTS AT DUCT AND SECURE TO EXISTING STRUCTURE
STRUCTURE
45°
SUPPLY DUCT ROUND OR RECTANGULAR AS NOTED ON PLANS, MOUNT DIFFUSER IN SIDEWALL ON RECTANGULAR DUCTS

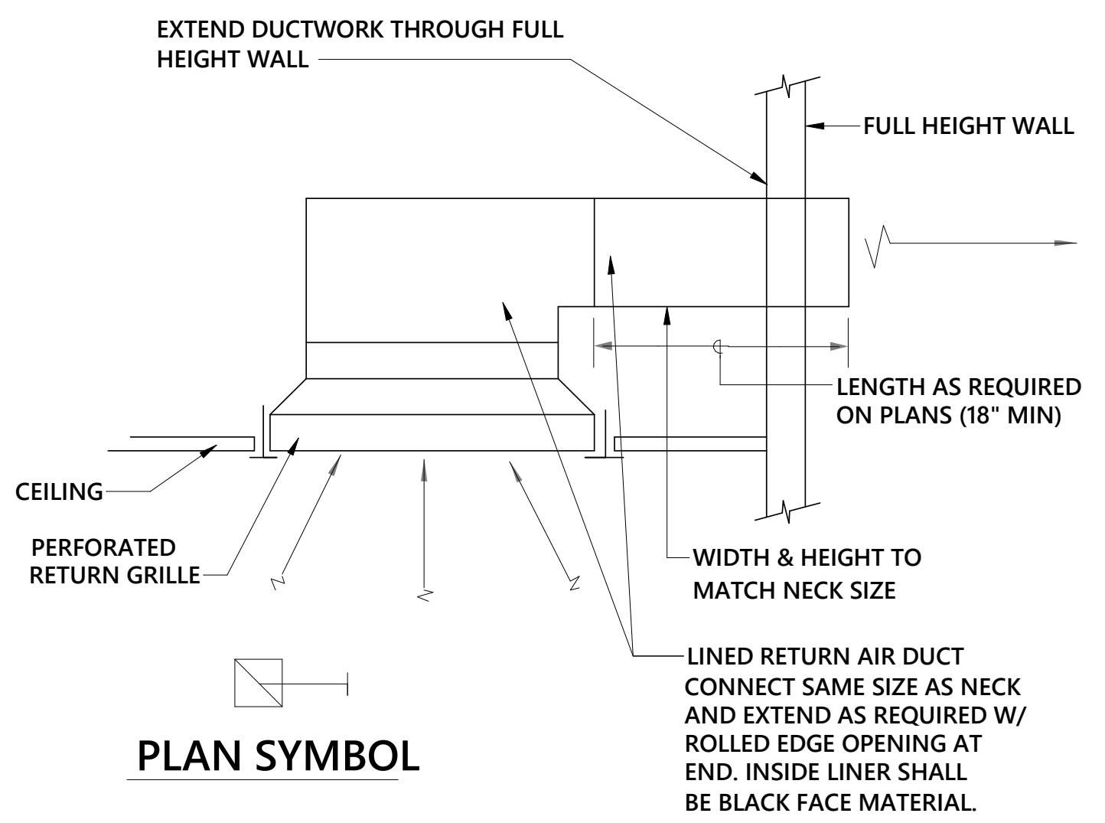
NOTES:
1. DUCTWORK SHALL BE INSTALLED LEVEL, AS HIGH AS POSSIBLE (UNLESS OTHERWISE NOTED).

7 DIFFUSER PLENUM DETAIL
NO SCALE


ALTERNATE SUPPLY DUCT LOCATION
12"
12"
DUCT COLLAR
LINED SHEET METAL SUPPLY PLENUM
SUPPLY DUCT SEE FLOOR PLAN FOR SIZE.
30°
CEILING
LINEAR SUPPLY DIFFUSER. PROVIDE END CAPS.

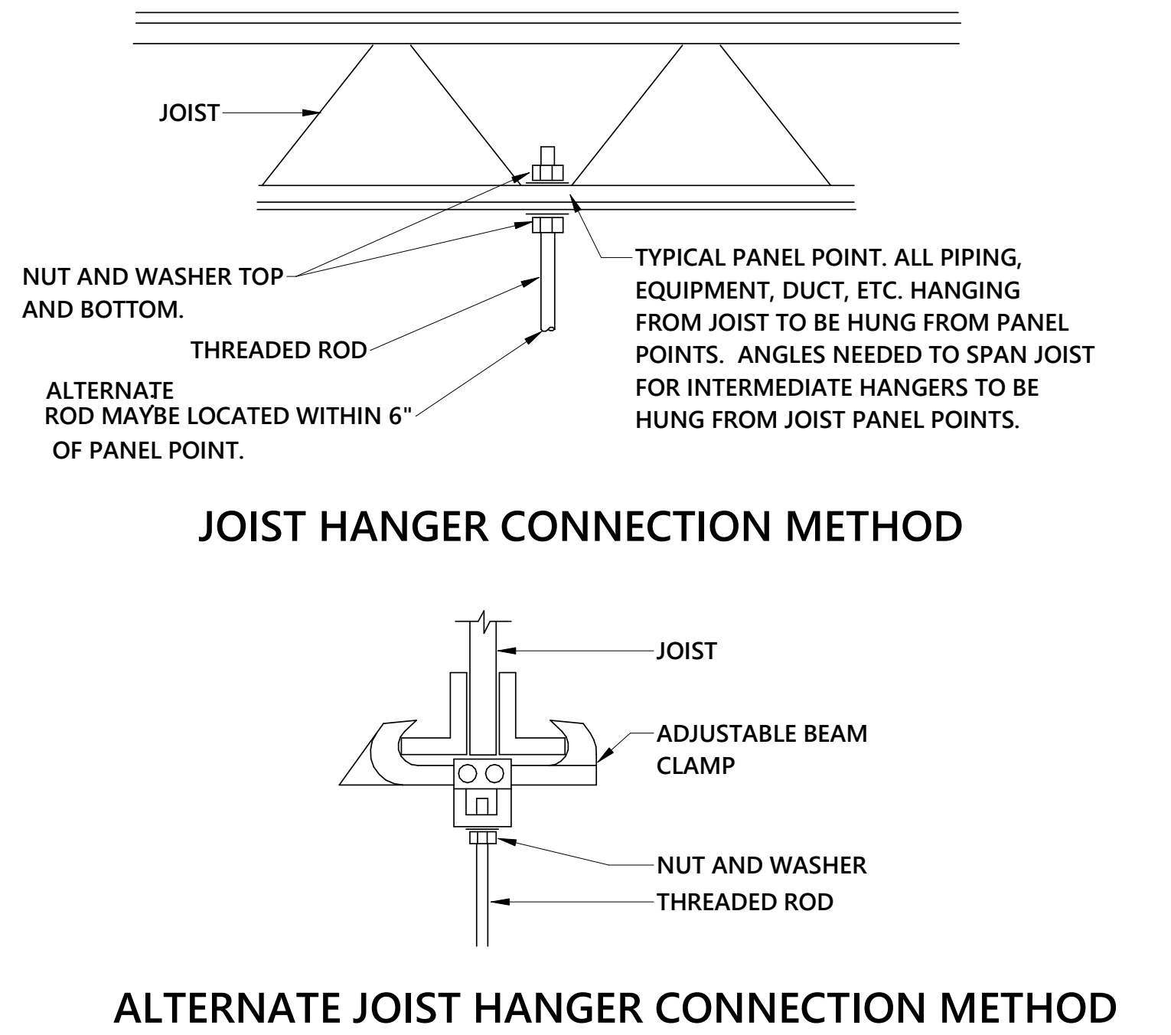
NOTE:
LINEAR DIFFUSER SHOWN ON FLOOR PLANS WITHOUT SUPPLY PLENUM TO BE USED AS RETURN.

8 RETURN GRILLE WITH SOUND ATTENUATION
NO SCALE


EXTEND DUCTWORK THROUGH FULL HEIGHT WALL
FULL HEIGHT WALL
LENGTH AS REQUIRED ON PLANS (18" MIN)
CEILING
PERFORATED RETURN GRILLE
WIDTH & HEIGHT TO MATCH NECK SIZE
LINED RETURN AIR DUCT CONNECT SAME SIZE AS NECK AND EXTEND AS REQUIRED W/ ROLLED EDGE OPENING AT END. INSIDE LINER SHALL BE BLACK FACE MATERIAL.
PLAN SYMBOL

NOTE:
1. ROUND NECK RETURN GRILLES ARE SIMILAR. SOUND ATTENUATION DUCT AND ELBOW SHALL BE NECK SIZE OF GRILLE.

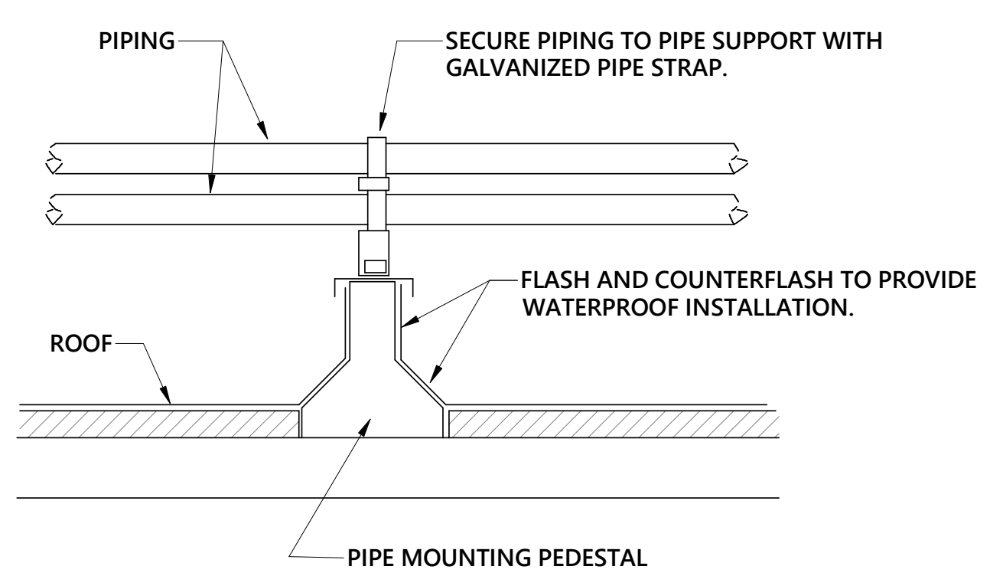
9 JOIST CONNECTION DETAIL
NO SCALE


JOIST
NUT AND WASHER TOP AND BOTTOM.
THREADED ROD
ALTERNATE ROD MAYBE LOCATED WITHIN 6" OF PANEL POINT.
TYPICAL PANEL POINT. ALL PIPING, EQUIPMENT, DUCT, ETC. HANGING FROM JOIST TO BE HUNG FROM PANEL POINTS. ANGLES NEEDED TO SPAN JOIST FOR INTERMEDIATE HANGERS TO BE HUNG FROM JOIST PANEL POINTS.
JOIST HANGER CONNECTION METHOD
JOIST
ADJUSTABLE BEAM CLAMP
NUT AND WASHER
THREADED ROD
ALTERNATE JOIST HANGER CONNECTION METHOD

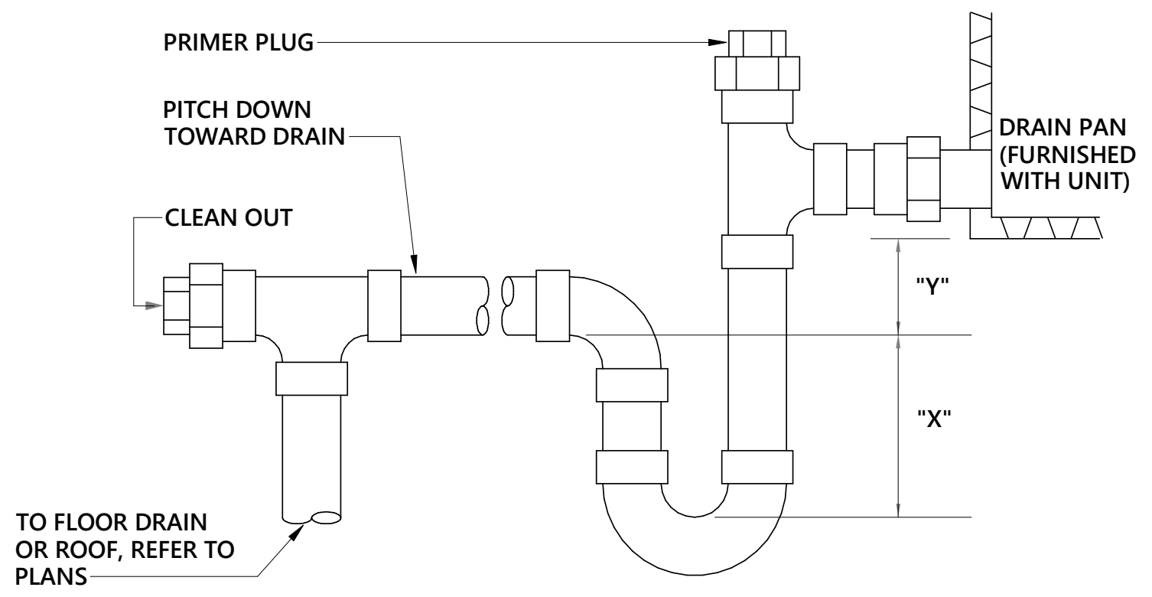
NOTE
1. PROVIDE HOT-DIPPED GALVANIZED SUPPORTS/RAILS/ANGLES/ETC. FOR ALL DUCTWORK INSTALLED IN POOL EQUIPMENT ROOMS AND ASSOCIATED AREAS

10 ROOF PIPING SUPPORT DETAIL
NO SCALE

NOTES:
1. PROVIDE PIPE SUPPORTS AT 6'-0" ON CENTER, OR AS REQUIRED TO PREVENT SAGGING.
2. PROVIDE ADDITIONAL SUPPORTS AT EQUIPMENT TO PREVENT THE WEIGHT OF PIPING BEING PLACED ON THE EQUIPMENT.


PIPING
SECURE PIPING TO PIPE SUPPORT WITH GALVANIZED PIPE STRAP.
FLASH AND COUNTERFLASH TO PROVIDE WATERPROOF INSTALLATION.
ROOF
PIPE MOUNTING PEDESTAL

11 P-TRAP PIPING DETAIL
NO SCALE

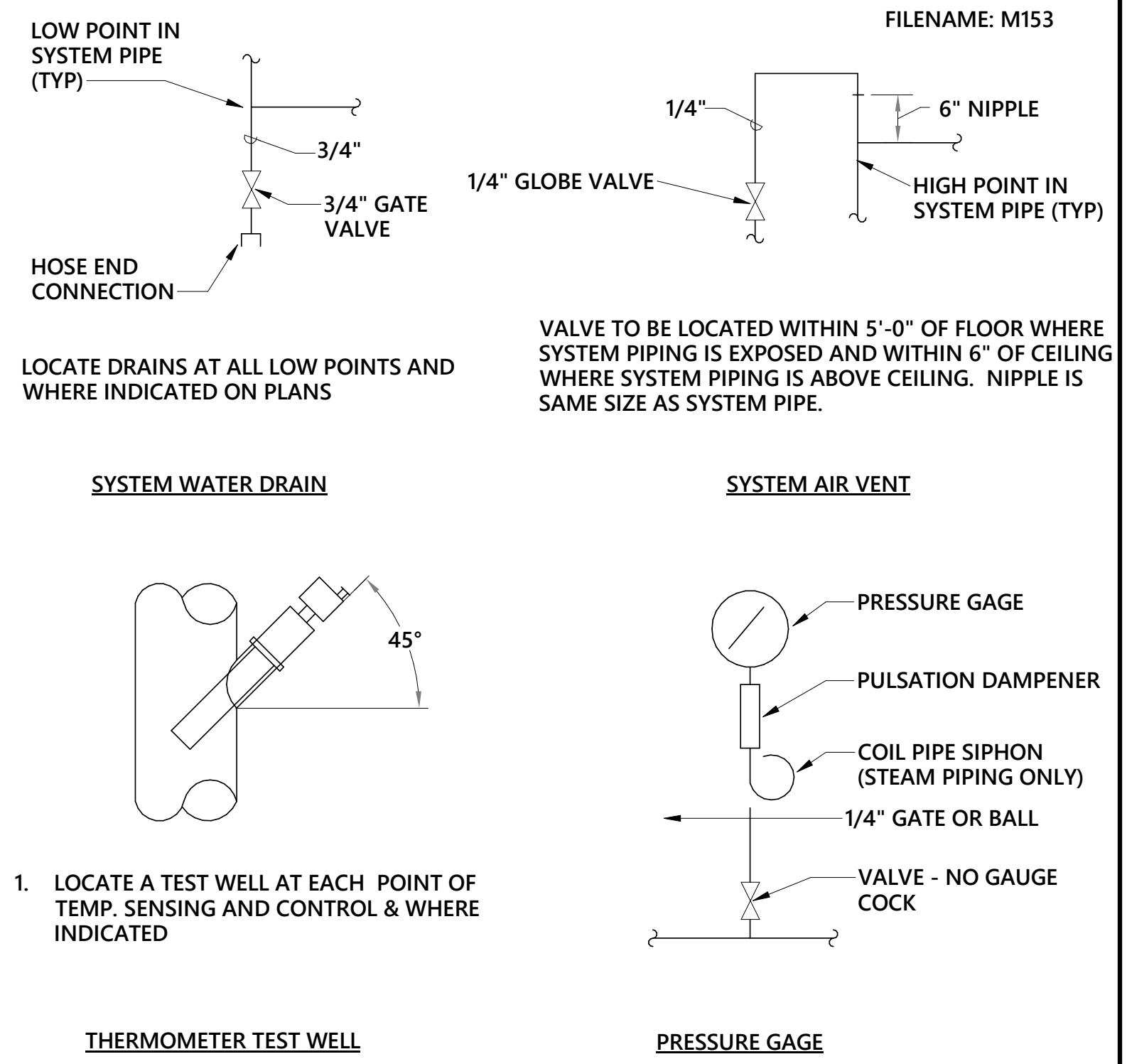

PRIMER PLUG
PITCH DOWN TOWARD DRAIN
CLEAN OUT
DRAIN PAN (FURNISHED WITH UNIT)
"Y"
"X"
TO FLOOR DRAIN OR ROOF, REFER TO PLANS

DIMENSIONS
P = PRESSURE INSIDE AHU CASING (INCHES W.G.)
Y = P + 2"
X = Y

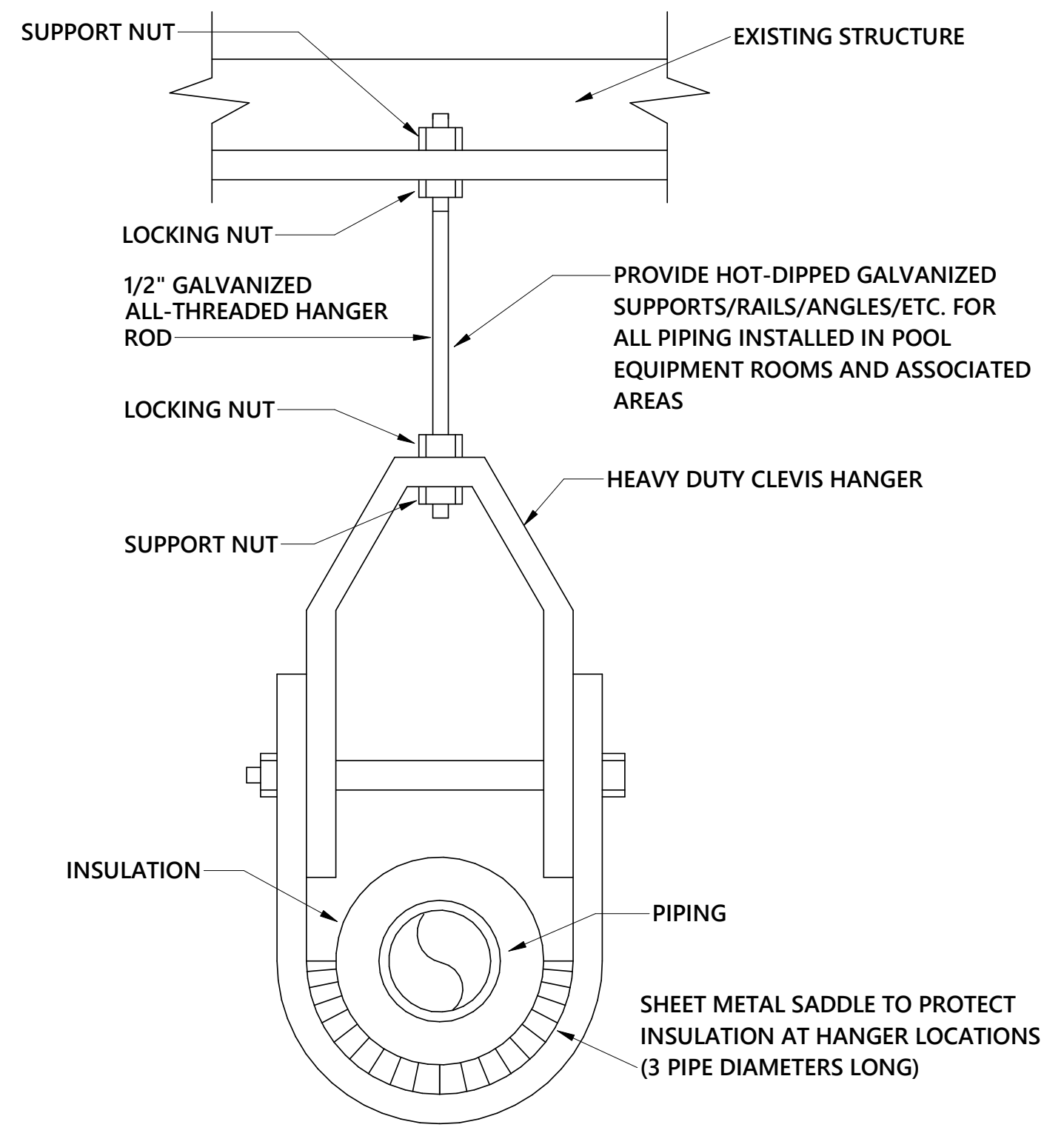
MINIMUM PIPE SIZE	MAXIMUM COIL LOAD (TONS)
3/4"	2
1"	5
1 1/4"	30
1 1/2"	50
2"	160
3"	300
4"	430
5"	1000

12 PIPING SPECIALTIES
NO SCALE

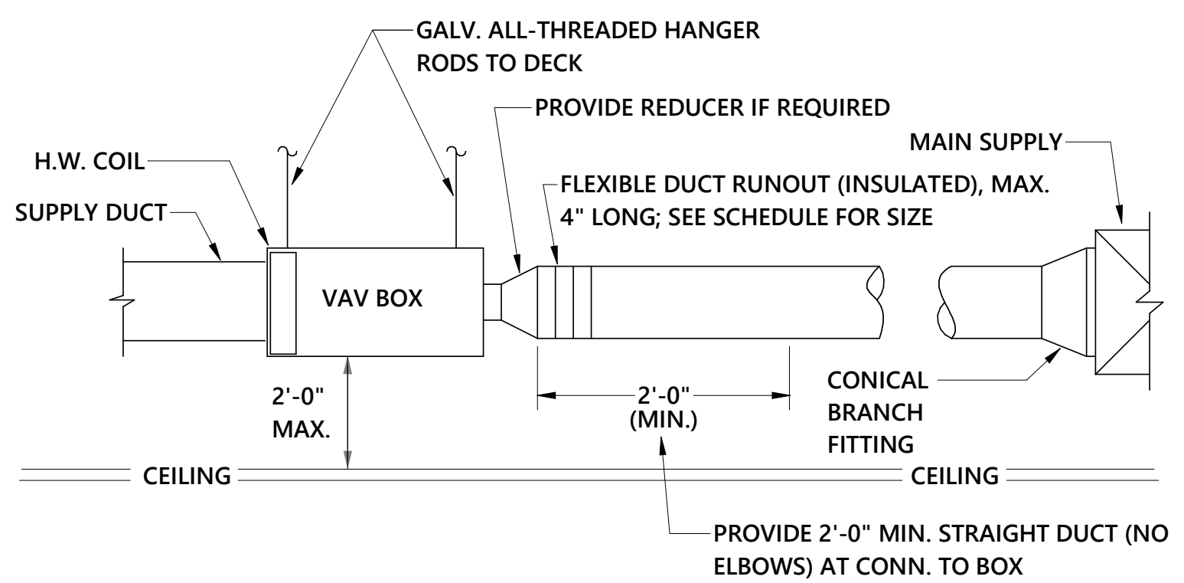
FILENAME: M153


LOW POINT IN SYSTEM PIPE (TYP)
3/4"
3/4" GATE VALVE
HOSE END CONNECTION
LOCATE DRAINS AT ALL LOW POINTS AND WHERE INDICATED ON PLANS
SYSTEM WATER DRAIN
1/4"
6" NIPPLE
1/4" GLOBE VALVE
HIGH POINT IN SYSTEM PIPE (TYP)
VALVE TO BE LOCATED WITHIN 5'-0" OF FLOOR WHERE SYSTEM PIPING IS EXPOSED AND WITHIN 6" OF CEILING WHERE SYSTEM PIPING IS ABOVE CEILING. NIPPLE IS SAME SIZE AS SYSTEM PIPE.
SYSTEM AIR VENT
45°
1. LOCATE A TEST WELL AT EACH POINT OF TEMP. SENSING AND CONTROL & WHERE INDICATED
THERMOMETER TEST WELL
PRESSURE GAGE
PULSATION DAMPENER
COIL PIPE SIPHON (STEAM PIPING ONLY)
1/4" GATE OR BALL
VALVE - NO GAUGE COCK
PRESSURE GAGE

13 PIPE HANGER DETAIL
NO SCALE

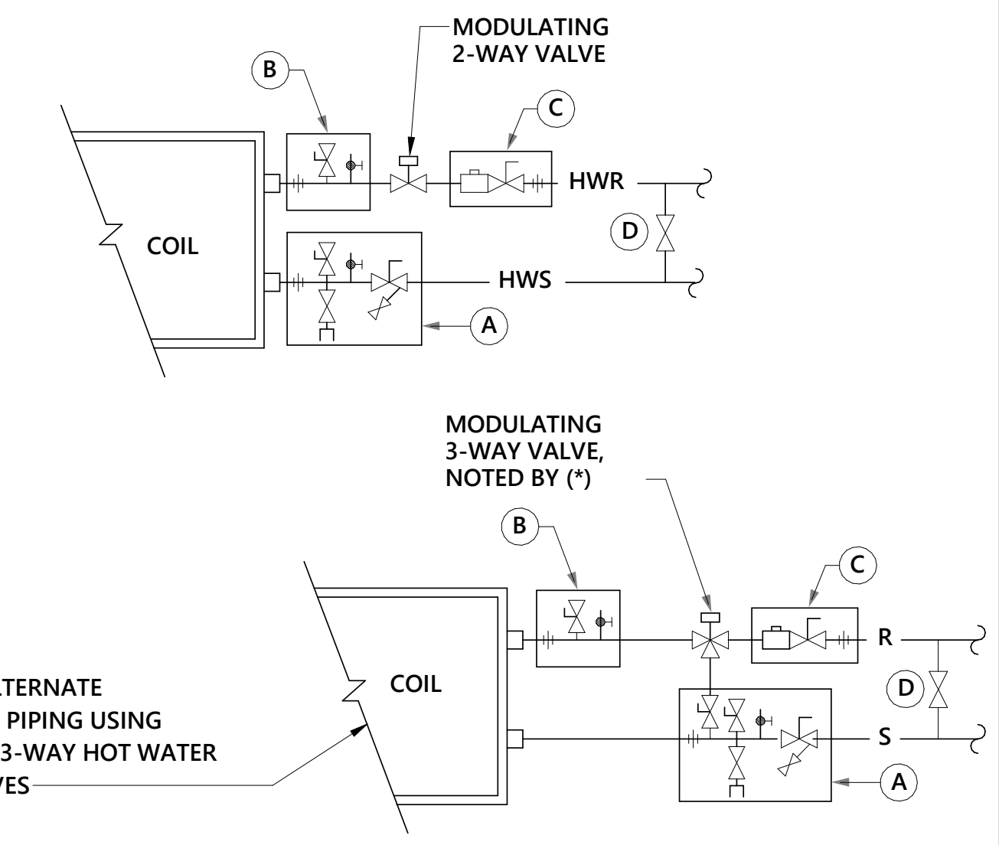

SUPPORT NUT
EXISTING STRUCTURE
LOCKING NUT
1/2" GALVANIZED ALL-THREADED HANGER ROD
PROVIDE HOT-DIPPED GALVANIZED SUPPORTS/RAILS/ANGLES/ETC. FOR ALL PIPING INSTALLED IN POOL EQUIPMENT ROOMS AND ASSOCIATED AREAS
LOCKING NUT
HEAVY DUTY CLEVIS HANGER
SUPPORT NUT
INSULATION
PIPING
SHEET METAL SADDLE TO PROTECT INSULATION AT HANGER LOCATIONS (3 PIPE DIAMETERS LONG)

14 VAV BOX DETAIL WITH HOT WATER HEAT
NO SCALE


GALV. ALL-THREADED HANGER RODS TO DECK
PROVIDE REDUCER IF REQUIRED
MAIN SUPPLY
H.W. COIL
SUPPLY DUCT
FLEXIBLE DUCT RUNOUT (INSULATED), MAX. 4" LONG; SEE SCHEDULE FOR SIZE
VAV BOX
2'-0" MAX.
2'-0" (MIN.)
CONICAL BRANCH FITTING
CEILING
CEILING
PROVIDE 2'-0" MIN. STRAIGHT DUCT (NO ELBOWS) AT CONN. TO BOX

NOTES:
1. MECH. CONTR. SHALL PROVIDE ACCESS DOOR IN CEILING IF REQUIRED
2. PROVIDE AND MAINTAIN CODE REQUIRED CLEARANCE TO CONTROLS ENCLOSURE 36", AND 24"x24" ACCESS PATHWAY TO CONTROLS ACCESS

VAV BOX COIL PIPING DETAIL

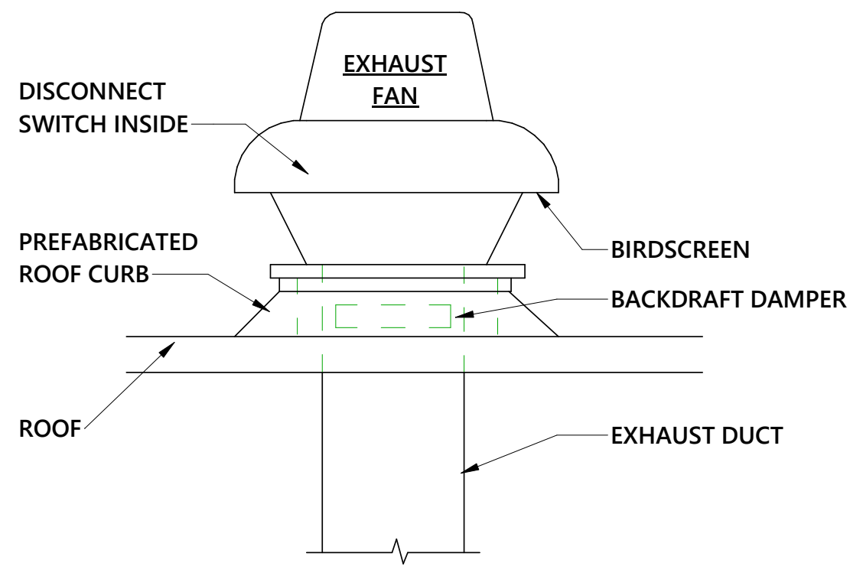

B
MODULATING 2-WAY VALVE
C
HWR
D
COIL
HWS
A
MODULATING 3-WAY VALVE, NOTED BY (*)
B
C
R
D
COIL
S
A

NOTE:
(*)- DENOTES ALTERNATE TERMINAL BOX PIPING USING MODULATING 3-WAY HOT WATER CONTROL VALVES

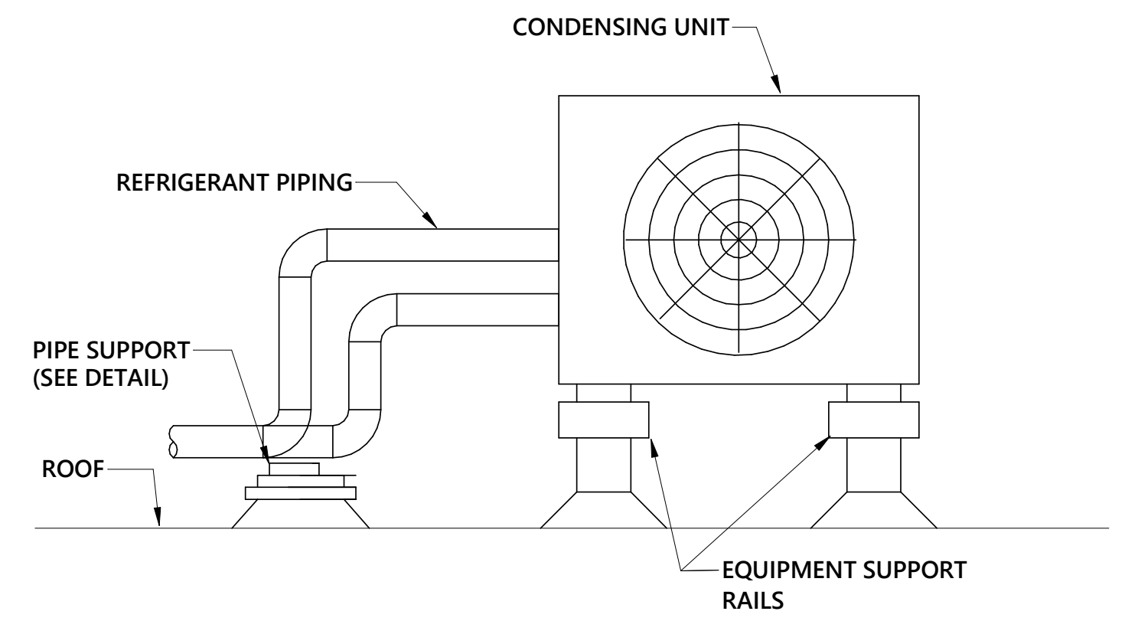
- Ⓐ COMBINATION Y-STRAINER, BALL VALVE, COMBINATION PRESSURE & TEMPERATURE TEST VALVES AND MANUAL AIR VENT, AND DRAIN VALVE WITH 3/4" HOSE CONNECTION, AND UNION
- Ⓑ COMBINATION PRESSURE & TEMPERATURE TEST VALVES AND MANUAL AIR VENT, AND UNION
- Ⓒ AUTOMATIC CONTROL VALVE ASSEMBLY WITH BALL VALVE AND STAINLESS STEEL FLOW CONTROL CARTRIDGE, AND UNION
- Ⓓ FULL SIZE BYPASS VALVE (SEE NOTE 2)

NOTES:
1. PROVIDE 8" OF STRAIGHT PIPE BETWEEN BOX AND VALVE ASSEMBLY. PROVIDE 36" CLEAR SPACE IN FRONT OF CONTROLLER BOX FOR ACCESS. PROVIDE PIPE SUPPORT AT 18" FROM BOX COIL CONNECTION
2. PROVIDE FULL SIZE BYPASS VALVE FOR SYSTEM FLUSHING. COIL ISOLATION VALVES SHALL REMAIN CLOSED UNTIL SYSTEM HAS BEEN FLUSHED AND VERIFIED "CLEAN" BY THE CHEMICAL TREATMENT SUPPLIER. UPON UNIT START-UP, FOLLOWING CLEANING, BYPASS VALVE SHALL BE PERMANENTLY CLOSED.

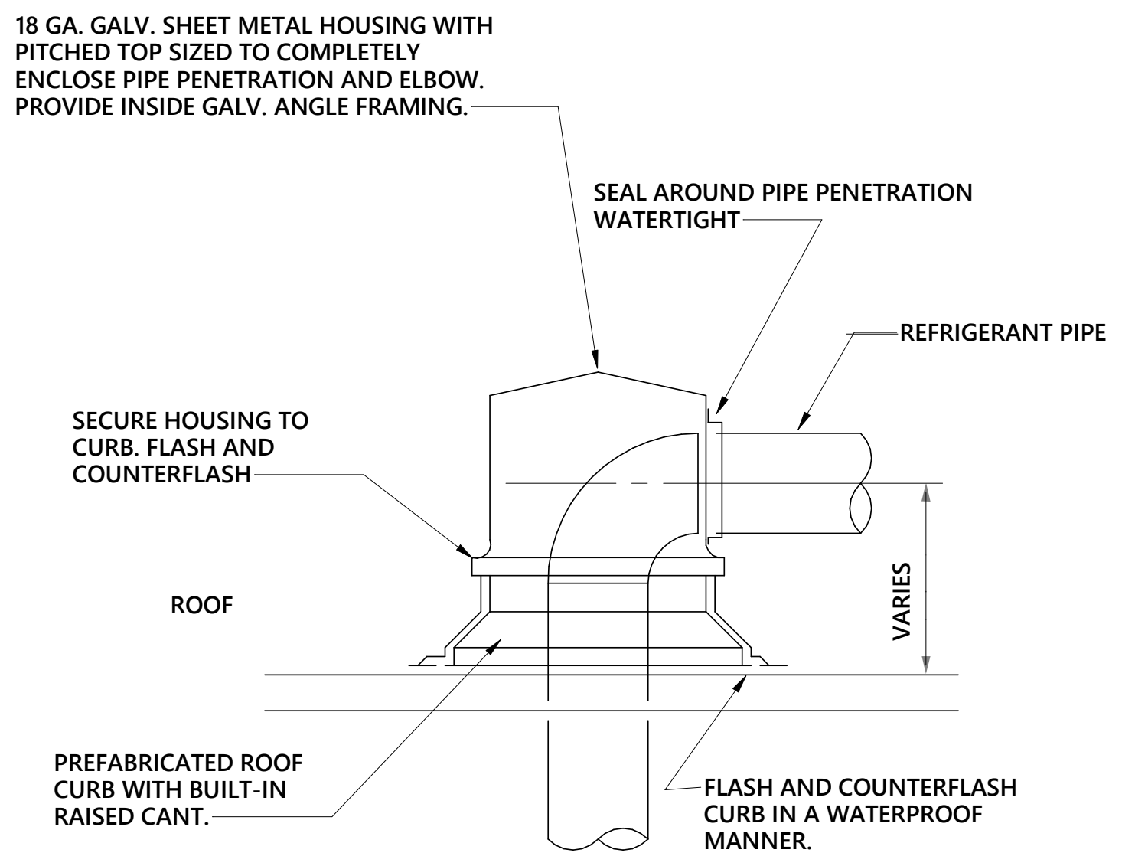
15 EXHAUST FAN ON FLAT ROOF DETAIL
NOT TO SCALE


EXHAUST FAN
DISCONNECT SWITCH INSIDE
PREFABRICATED ROOF CURB
BIRDSCREEN
BACKDRAFT DAMPER
ROOF
EXHAUST DUCT

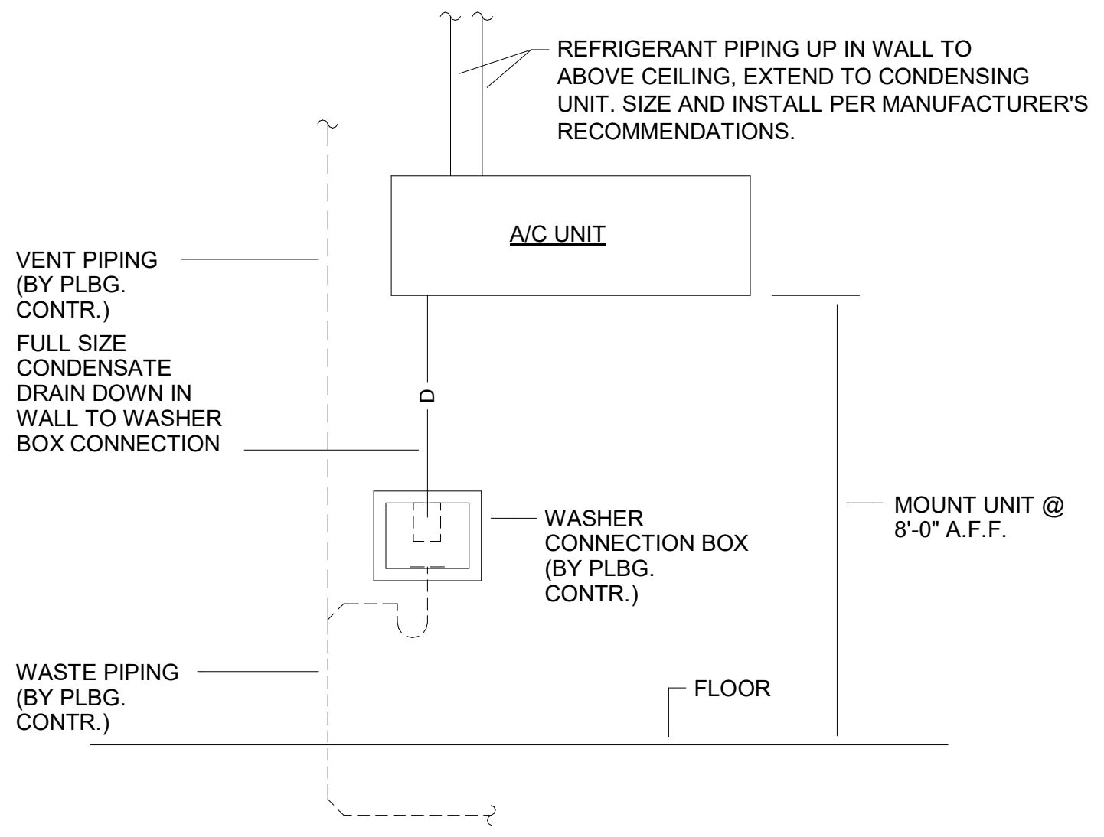
16 ROOF-MOUNTED CONDENSING UNIT
NO SCALE


CONDENSING UNIT
REFRIGERANT PIPING
PIPE SUPPORT (SEE DETAIL)
ROOF
EQUIPMENT SUPPORT RAILS

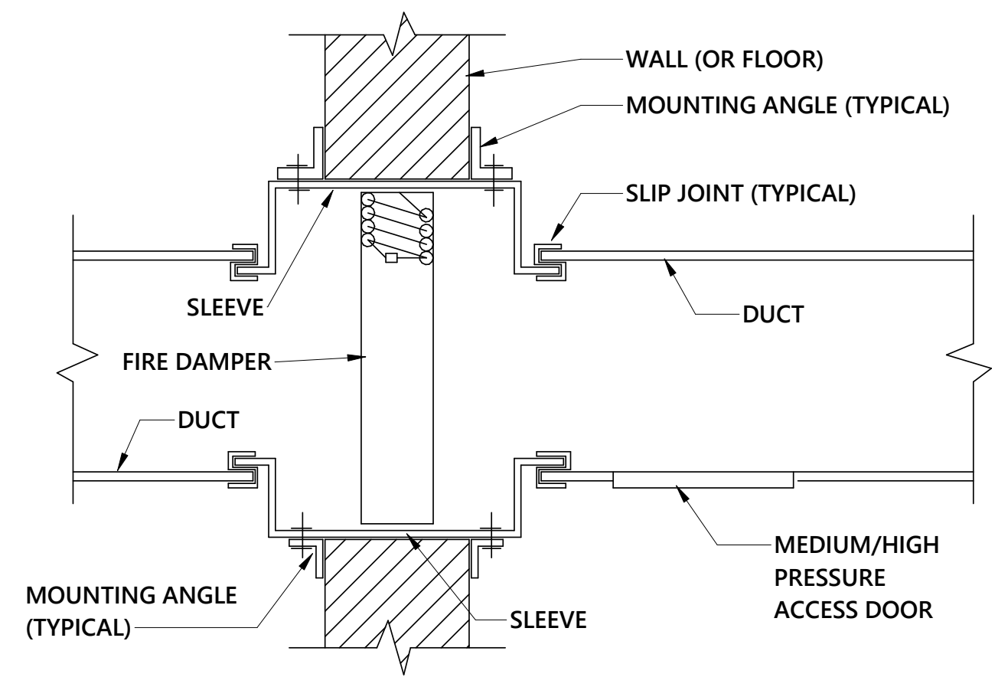
17 PIPE PORTAL DETAIL
NO SCALE


18 GA. GALV. SHEET METAL HOUSING WITH PITCHED TOP SIZED TO COMPLETELY ENCLOSE PIPE PENETRATION AND ELBOW. PROVIDE INSIDE GALV. ANGLE FRAMING.
SEAL AROUND PIPE PENETRATION WATERTIGHT
REFRIGERANT PIPE
SECURE HOUSING TO CURB. FLASH AND COUNTERFLASH
ROOF
VARIES
PREFABRICATED ROOF CURB WITH BUILT-IN RAISED CANT.
FLASH AND COUNTERFLASH CURB IN A WATERPROOF MANNER.

18 A/C UNIT CONDENSATE DRAIN
NO SCALE


REFRIGERANT PIPING UP IN WALL TO ABOVE CEILING, EXTEND TO CONDENSING UNIT. SIZE AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
A/C UNIT
VENT PIPING (BY PLBG. CONTR.)
FULL SIZE CONDENSATE DRAIN DOWN IN WALL TO WASHER BOX CONNECTION
D
WASHER CONNECTION BOX (BY PLBG. CONTR.)
MOUNT UNIT @ 8'-0" A.F.F.
WASTE PIPING (BY PLBG. CONTR.)
FLOOR

19 DAMPER - HIGH OR MEDIUM PRESSURE FIRE
NOT TO SCALE


WALL (OR FLOOR)
MOUNTING ANGLE (TYPICAL)
SLIP JOINT (TYPICAL)
SLEEVE
DUCT
FIRE DAMPER
DUCT
MOUNTING ANGLE (TYPICAL)
SLEEVE
MEDIUM/HIGH PRESSURE ACCESS DOOR

NOTE:
DAMPER SHALL BE INSTALLED PER THE MFG'S RECOMMENDATIONS.

FIRE DAMPER SHALL BE RUSKIN TYPE IBD2 STYLE C,CR (ROUND), CO (OVAL), 1 1/2 HOUR UL; INSTALLED IN ACCORDANCE WITH NFPA. ACCESS DOOR SHALL BE RUSKIN TYPE ADHP-3 LOCATED ON ACCESSIBLE CEILING SIDE OF WALL. IF ACCESSIBLE CEILING NOT AVAILABLE, MECHANICAL CONTRACTOR SHALL PROVIDE ACCESS DOOR IN CEILING (OF WALL) TO MATCH FINISH COLOR. DAMPER SHALL BE EQUIPPED FOR HORIZONTAL OR VERTICAL MOUNTING AS REQUIRED. ALL MODELS ARE RUSKIN (APPROVED EQUAL ACCEPTABLE)

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09.27.22

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4209 Old Charlotte Hwy,
Monroe, NC 28110

BID DOCUMENTS

SCO # 19-21446-02A

MECHANICAL DETAILS

DATE: 09.27.22
PROJECT NO: 21-0029

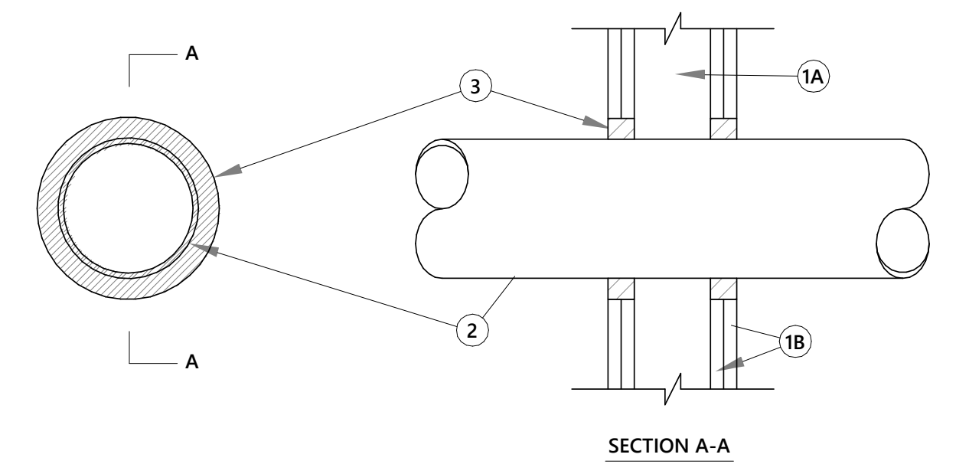
REVISIONS
NO: DATE: DESCRIPTION:

SHEET NUMBER
M501

System No. W-L-1054

METAL PIPE THROUGH GYPSUM WALL ASSEMBLY

F Ratings - 1 and 2 Hr (See Items 1 and 3)
T Rating - 0 Hr
L Rating At Ambient - Less Than 1 CFM/Sq Ft
L Rating At 400 F - 4 CFM/Sq Ft



SECTION A-A

2. THROUGH-PENETRANTS -- ONE METALLIC PIPE, CONDUIT OR TUBING TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. THE ANNULAR SPACE SHALL BE MIN 0 IN. TO MAX 2-1/4 IN. PIPE MAY BE INSTALLED WITH CONTINUOUS POINT CONTACT. PIPE, CONDUIT OR TUBING MAY BE INSTALLED AT AN ANGLE NOT GREATER THAN 45 DEGREES FROM PERPENDICULAR. PIPE, CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED:
   A. STEEL PIPE -- NOM 30 IN DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
   B. IRON PIPE -- NOM 30 IN. DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.
   C. CONDUIT -- NOM 4 IN DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR 6 IN. DIAM STEEL CONDUIT.
   D. COPPER TUBING -- NOM 6 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.
   E. COPPER PIPE -- NOM 6 IN. DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.

3. FILL, VOID OR CAVITY MATERIAL* -- SEALANT -- MIN 5/8 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH BOTH SURFACES OF WALL. AT THE POINT OR CONTINUOUS CONTACT LOCATIONS BETWEEN PIPE AND WALL, A MIN 1/2 IN. DIAM BEAD OF FILL MATERIAL SHALL BE APPLIED AT THE PIPE WALL INTERFACE ON BOTH SURFACES OF WALL .

*BEARING THE UL CLASSIFICATION MARK

1. WALL ASSEMBLY -- THE 1 OR 2 HR FIRE-RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
   A. STUDS -- WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN. LUMBER SPACED 16 IN. OC. STEEL STUDS TO BE MIN 2-1/2 IN. WIDE AND SPACED MAX 24 IN. OC. WHEN STEEL STUDS ARE USED AND THE DIAM OF OPENING EXCEEDS THE WIDTH OF STUD CAVITY, THE OPENING SHALL BE FRAMED ON ALL SIDES USING LENGTHS OF STEEL STUD INSTALLED BETWEEN THE VERTICAL STUDS AND SCREW-ATTACHED TO THE STEEL STUDS AT EACH END. THE FRAMED OPENING IN THE WALL SHALL BE 4 TO 6 IN. WIDER AND 4 TO 6 IN. HIGHER THAN THE DIAM OF THE PENETRATING ITEM SUCH THAT, WHEN THE PENETRATING ITEM IS INSTALLED IN THE OPENING, A 2 TO 3 IN. CLEARANCE IS PRESENT BETWEEN THE PENETRATING ITEM AND THE FRAMING ON ALL FOUR SIDES.
   B. GYPSUM BOARD* -- 5/8 IN. THICK, 4 FT WIDE WITH SQUARE OR TAPERED EDGES. THE GYPSUM BOARD TYPE, THICKNESS, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES DESIGN IN THE UL FIRE RESISTANCE DIRECTORY. MAX DIAM OF OPENING IS 32-1/4 IN. FOR STEEL STUD WALLS. MAX DIAM OF OPENING IS 14-1/2 IN. FOR WOOD STUD WALLS.
   THE F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE FIRE RATING OF THE WALL ASSEMBLY.

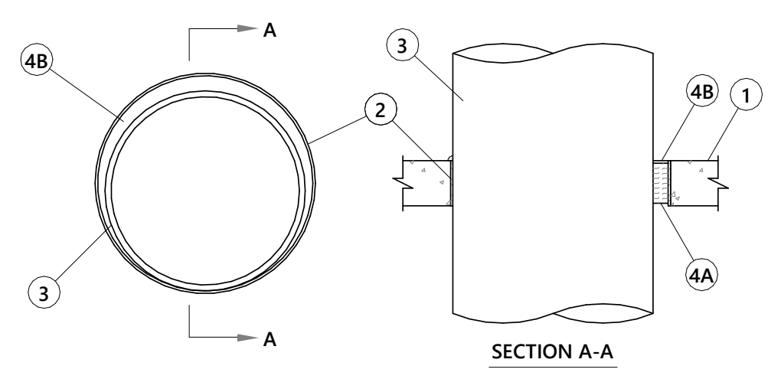
1 U.L SYSTEM NO W-L-1054 DETAIL

NO SCALE

System No. C-AJ-1226

METAL PIPE THROUGH CONCRETE WALL ASSEMBLY

F Rating — 3 Hr
T Rating — 0 Hr
L Rating At Ambient — Less Than 1 CFM/Sq Ft
L Rating At 400 F — 4 CFM/Sq Ft



SECTION A-A

1. FLOOR OR WALL ASSEMBLY -- MIN 4-1/2 IN. THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX DIAM OF OPENING IS 32 IN.
2. METALLIC SLEEVE -- (OPTIONAL) NOM 32 IN. DIAM (OR SMALLER) SCHEDULE 40 (OR HEAVIER) STEEL SLEEVE CAST OR GROUTED INTO FLOOR OR WALL ASSEMBLY, FLUSH WITH FLOOR OR WALL SURFACES OR EXTENDING A MAX OF 3 IN. ABOVE FLOOR OR BEYOND BOTH SURFACES OF WALL.
2A. SHEET METAL SLEEVE -- (OPTIONAL) MAX 6 IN. DIAM, MIN 26 GA GALV STEEL PROVIDED WITH A 26 GA GALV STEEL SQUARE FLANGE SPOT WELDED TO THE SLEEVE AT APPROX MID-HEIGHT, OR FLUSH WITH BOTTOM OF SLEEVE IN FLOORS, AND SIZED TO BE A MIN OF 2 IN. LARGER THAN THE SLEEVE DIAM. THE SLEEVE IS TO BE CAST IN PLACE AND MAY EXTEND A MAX OF 4 IN. BELOW THE BOTTOM OF THE DECK AND A MAX OF 1 IN. ABOVE THE TOP SURFACE OF THE CONCRETE FLOOR.
2B. SHEET METAL SLEEVE -- (OPTIONAL) - MAX 12 IN. DIAM, MIN 24 GA GALV STEEL PROVIDED WITH A 24 GA GALV STEEL SQUARE FLANGE SPOT WELDED TO THE SLEEVE AT APPROX MID-HEIGHT, OR FLUSH WITH BOTTOM OF SLEEVE IN FLOORS, AND SIZED TO BE A MIN OF 2 IN. LARGER THAN THE SLEEVE DIAM. THE SLEEVE IS TO BE CAST IN PLACE AND MAY EXTEND A MAX OF 4 IN. BELOW THE BOTTOM OF THE DECK AND A MAX OF 1 IN. ABOVE THE TOP SURFACE OF THE CONCRETE FLOOR.
3. THROUGH-PENETRANT -- ONE METALLIC PIPE, TUBE OR CONDUIT TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. THE ANNULAR SPACE BETWEEN PENETRANT AND PERIPHERY OF OPENING SHALL BE MIN 0 IN. (POINT CONTACT) TO MAX 1-7/8 IN. PENETRANT MAY BE INSTALLED WITH CONTINUOUS POINT CONTACT. PENETRANT TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PENETRANTS MAY BE USED:
A. STEEL PIPE -- NOM 30 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
B. IRON PIPE -- NOM 30 IN. DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.
C. COPPER PIPE -- NOM 6 IN. DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
D. COPPER TUBING -- NOM 6 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.
E. CONDUIT -- NOM 6 IN. DIAM (OR SMALLER) STEEL CONDUIT.
F. CONDUIT -- NOM 4 IN. DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING (EMT).
4. FIRESTOP SYSTEM -- THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
A. PACKING MATERIAL -- MIN 4 IN. THICKNESS OF MIN 4 PCF MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR SLEEVE OR FROM BOTH SURFACES OF WALL OR SLEEVE AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.
B. FILL, VOID OR CAVITY MATERIAL* -- SEALANT -- MIN 1/4 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH TOP SURFACE OF FLOOR OR SLEEVE OR WITH BOTH SURFACES OF WALL OR SLEEVE. AT THE POINT OR CONTINUOUS CONTACT LOCATIONS BETWEEN PENETRANT AND CONCRETE OR SLEEVE, A MIN 1/4 IN. DIAM BEAD OF FILL MATERIAL SHALL BE APPLIED AT THE CONCRETE OR SLEEVE/ PIPE PENETRANT INTERFACE ON THE TOP SURFACE OF FLOOR AND ON BOTH SURFACES OF WALL.
*BEARING THE UL CLASSIFICATION MARK

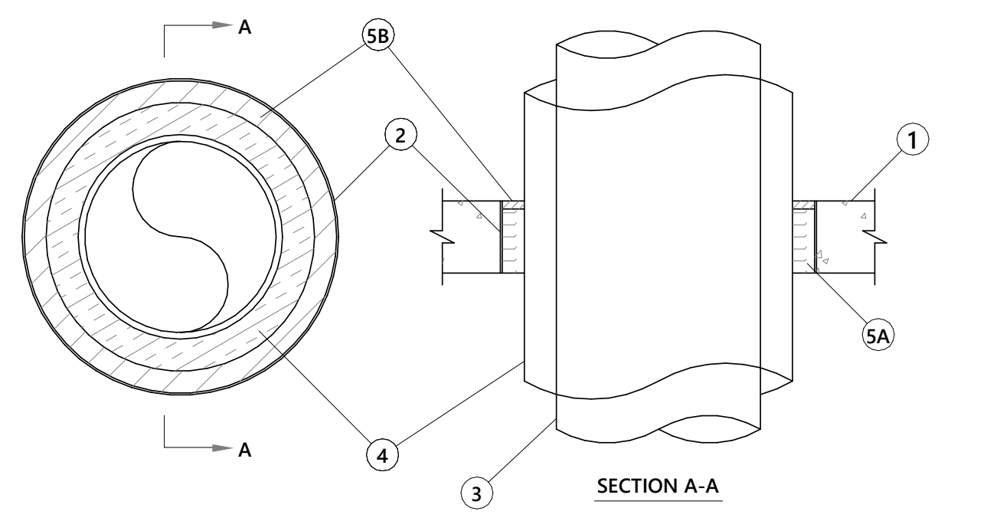
2 U.L SYSTEM NO C-AJ-1226 DETAIL

NO SCALE

System No. C-AJ-5091

INSULATED METAL PIPE THROUGH CONCRETE WALL ASSEMBLY

F Rating — 2 Hr
T Rating — 1 Hr
L Rating At Ambient — 4 CFM/Sq Ft
L Rating At 400 F — Less Than 1 CFM/Sq Ft



SECTION A-A

1. FLOOR OR WALL ASSEMBLY — MIN 4-1/2 IN. THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX DIAM OF OPENING IS 19-1/2 IN. SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.

2. METALLIC SLEEVE — (OPTIONAL) — NOM 20 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
2A. SHEET METAL SLEEVE — (OPTIONAL) - MAX 6 IN. DIAM, MIN 26 GA GALV STEEL PROVIDED WITH A 26 GA GALV STEEL SQUARE FLANGE SPOT WELDED TO THE SLEEVE AT APPROXIMATELY MID- HEIGHT, OR FLUSH WITH BOTTOM OF SLEEVE IN FLOORS, AND SIZED TO BE A MIN OF 2 IN. LARGER THAN THE SLEEVE DIAM. THE SLEEVE IS TO BE CAST IN PLACE FLUSH WITH BOTTOM SURFACE OF FLOOR AND MAY EXTEND A MAX OF 1 IN. ABOVE THE TOP SURFACE OF THE FLOOR.

2B. SHEET METAL SLEEVE — (OPTIONAL) - MAX 12 IN. DIAM, MIN 24 GA GALV STEEL PROVIDED WITH A 24 GA GALV STEEL SQUARE FLANGE SPOT WELDED TO THE SLEEVE AT APPROXIMATELY MID- HEIGHT, OR FLUSH WITH BOTTOM OF SLEEVE IN FLOORS, AND SIZED TO BE A MIN OF 2 IN. LARGER THAN THE SLEEVE DIAM. THE SLEEVE IS TO BE CAST IN PLACE FLUSH WITH BOTTOM SURFACE OF FLOOR AND MAY EXTEND A MAX OF 1 IN. ABOVE THE TOP SURFACE OF THE FLOOR.

3. THROUGH PENETRANTS — ONE METALLIC PIPE OR TUBING TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. PIPE OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES OR TUBING MAY BE USED:

A. STEEL PIPE — NOM 12 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
B. IRON PIPE — NOM 12 IN. DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.
C. COPPER PIPE — NOM 6 IN. DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
D. COPPER TUBING — NOM 6 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.

4. PIPE COVERING -- NOM 2 IN. THICK HOLLOW CYLINDRICAL HEAVY DENSITY (MIN 3.5 PCF) GLASS FIBER UNITS JACKETED ON THE OUTSIDE WITH AN ALL-SERVICE JACKET. LONGITUDINAL JOINTS SEALED WITH METAL FASTENERS OR FACTORY-APPLIED, SELF-SEALING LAP TAPE. TRANSVERSE JOINTS SECURED WITH METAL FASTENERS OR WITH BUTT TAPE SUPPLIED WITH THE PRODUCT. THE ANNULAR SPACE BETWEEN THE INSULATED PIPE AND THE EDGE OF THE PERIPHERY OF THE OPENING SHALL BE MIN 1/2 IN. TO A MAX 2-1/4 IN. E-017,L0.4;SEE PIPE EQUIPMENT COVERING -- MATERIALS -- (BRGU) CATEGORY IN THE BUILDING MATERIALS DIRECTORY FOR NAMES OF MANUFACTURERS. ANY PIPE COVERING MATERIAL MEETING THE ABOVE SPECIFICATIONS AND BEARING THE UL CLASSIFICATION MARKING WITH A FLAME SPREAD INDEX OF 25 OR LESS AND A SMOKE DEVELOPED INDEX OF 50 OR LESS MAY BE USED.
4A. PIPE COVERING -- (NOT SHOWN) -- AS AN ALTERNATE TO ITEM 4, MAX 2 IN. THICK CYLINDRICAL CALCIUM SILICATE (MIN 14 PCF) UNITS SIZED TO THE OUTSIDE DIAM OF THE PIPE OR TUBE MAY BE USED. PIPE INSULATION SECURED WITH STAINLESS STEEL BANDS OR MIN 8 AWG STAINLESS STEEL WIRE SPACED MAX 12 IN. OC. THE ANNULAR SPACE SHALL BE MIN 1/2 IN. TO MAX 2-1/4 IN.

5. FIRESTOP SYSTEM -- THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
   A. PACKING MATERIAL -- MIN 4 IN. THICKNESS OF MIN 4 PCF MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.
   B. FILL, VOID OR CAVITY MATERIAL* -- SEALANT -- MIN 1/2 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH TOP SURFACE OF FLOOR OR WITH BOTH SURFACES OF WALL.

*BEARING THE UL CLASSIFICATION MARK

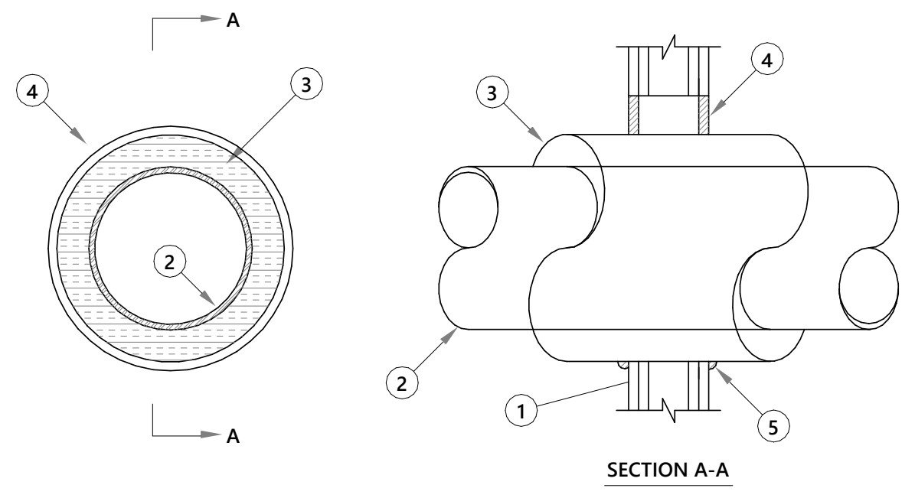
3 U.L SYSTEM NO C-AJ-5091 DETAIL

NO SCALE

System No. W-L-5029

INSULATED METAL PIPE THROUGH GYPSUM WALL ASSEMBLY

F Ratings — 1 and 2 Hr (See Item 1)
T Ratings — 1/2, 3/4, 1, 1-1/2 and 1-3/4 Hr (See Item 3)
L Rating At Ambient — 4 CFM/Sq Ft
L Rating At 400 F — Less Than 1 CFM/Sq Ft



SECTION A-A

1. WALL ASSEMBLY -- THE 1 OR 2 HR FIRE-RATED GYPSUM BOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
   A. STUDS -- WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN. LUMBER SPACED 16 IN. OC. STEEL STUDS TO BE MIN 2-1/2 IN. WIDE AND SPACED MAX 24 IN. OC.
   B. GYPSUM BOARD* -- 5/8 IN. THICK, 4 FT WIDE, WITH SQUARE OR TAPERED EDGES. THE GYPSUM BOARD TYPE, THICKNESS, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAX DIAM OF OPENING IS 18-5/8 IN.
   THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED.
2. THROUGH PENETRANTS -- ONE METALLIC PIPE OR TUBING TO BE CENTERED WITHIN THE FIRESTOP SYSTEM. PIPE OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES OR TUBING MAY BE USED:
   A. STEEL PIPE -- NOM 12 IN. DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
   B. IRON PIPE -- NOM 12 IN. DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.
   C. COPPER TUBING -- NOM 6 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.
   D. COPPER PIPE -- NOM 6 IN. DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
3. PIPE COVERING* -- NOM 1, 1-1/2 OR 2 IN. THICK HOLLOW CYLINDRICAL HEAVY DENSITY (MIN 3.5 PCF) GLASS FIBER UNITS JACKETED ON THE OUTSIDE WITH AN ALL SERVICE JACKET. LONGITUDINAL JOINTS SEALED WITH METAL FASTENERS OR FACTORY-APPLIED SELF-SEALING LAP TAPE. TRANSVERSE JOINTS SECURED WITH METAL FASTENERS OR WITH BUTT TAPE SUPPLIED WITH THE PRODUCT.
SEE PIPE AND EQUIPMENT COVERING - MATERIALS (BRGU) CATEGORY IN THE BUILDING MATERIAL DIRECTORY FOR THE NAMES OF MANUFACTURERS. ANY PIPE COVERING MATERIAL MEETING THE ABOVE SPECIFICATIONS AND BEARING THE UL CLASSIFICATION MARKING WITH A FLAME SPREAD INCEX OF 25 OR LESS AND A SMOKE DEVELOPED INDEX OF 50 OR LESS MAY BE USED.
THE HOURLY T RATING OF THE FIRESTOP SYSTEM IS DEPENDENT ON THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED, THE SIZE AND TYPE OF THROUGH PENETRANT AND THE PIPE COVERING THICKNESS, AS SHOWN IN THE TABLE BELOW:

Wall Assembly Rating	Through Penetrant		Pipe Covering Thkns	Annular Space		T Rating Hr
	Type +	Max Diam In.		Min In.	Max In.	
Hr	A	4	In.	0	1-1/2	1/2
1	B or C	2	1 or 1-1/2	0	1-1/2	1/2
1	A	4	1-1/2	0	1-1/2	1
1	A	12	2	0	1-7/8	3/4
1	B or C	6	2	0	1-7/8	1
2	A	4	1	0	1-1/2	1
2	B or C	4	1 or 1-1/2	0	1-1/2	1
2	B or C	6	2	0	1-7/8	1
2	A	4	1-1/2	0	1-1/2	1-3/4
2	A	12	2	0	1-7/8	1-1/2
2	B or C	6	2	0	1-7/8	1

+INDICATES PENETRANT TYPE AS ITEMIZED IN ITEM 2.
3A. PIPE COVERING* -- (NOT SHOWN) -- AS AN ALTERNATE TO ITEM 3, MAX 2 IN. THICK CYLINDRICAL CALCIUM SILICATE (MIN 14 PCF) UNITS SIZED TO THE OUTSIDE DIAM OF THE PIPE OR TUBE MAY BE USED. PIPE INSULATION SECURED WITH STAINLESS STEEL BANDS OR MIN 8 AWG STAINLESS STEEL WIRE SPACED MAX 12 IN. OC. WHEN THE ALTERNATE PIPE COVERING IS USED, THE T RATING SHALL BE DETERMINED FROM THE TABLE ABOVE.
SEE PIPE AND EQUIPMENT COVERING -- MATERIALS (BRGU) CATEGORY IN THE BUILDING MATERIALS DIRECTORY FOR NAMES OF MANUFACTURERS. ANY PIPE COVERING MATERIAL MEETING THE ABOVE SPECIFICATIONS AND BEARING THE UL CLASSIFICATION MARKING WITH A FLAME SPREAD INDEX OF 25 OR LESS AND A SMOKE DEVELOPED INDEX OF 50 OR LESS MAY BE USED.

4. FILL, VOID OR CAVITY MATERIAL* -- SEALANT -- MIN 5/8 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH BOTH SURFACES OF WALL . AT THE POINT CONTACT LOCATION BETWEEN PIPE COVERING AND GYPSUM BOARD, A MIN 1/2 IN. DIAM BEAD OF FILL MATERIAL SHALL BE APPLIED AT THE PIPE COVERING/GYPSUM BOARD INTERFACE ON BOTH SURFACES OF WALL.
*BEARING THE UL CLASSIFICATION MARK

4 U.L SYSTEM NO W-L-5029 DETAIL

NO SCALE

PIPE AND DUCTWORK WALL PENETRATION NOTES (MECHANICAL)

1. ALL INSULATED METAL PIPING PENETRATING A ONE HOUR OR MORE RATED ASSEMBLY SHALL BE SEALED AROUND INSULATION ON BOTH SIDES OF WALL WITH AN APPROVED FIRE STOP WRAP/STRIP MATERIAL. NUMBER OF WRAPS AROUND INSULATION WITHIN WALL OPENING SHALL BE AS REQUIRED FOR THICKNESS OF INSULATION AND MFG. RECOMMENDATIONS. COVER EXPOSED SURFACE AND SEAMS WITH AN APPROVED FIRE STOP CAULK ON BOTH SIDES OF WALL.
2. ALL NON-INSULATED METAL PIPING PENETRATING A ONE HOUR WALL OR MORE RATED WALL OR FLOOR SHALL BE SEALED AROUND PIPE ON BOTH SIDES OF WALL WITH AN APPROVED FIRE STOP CAULK. THICKNESS SHALL BE AS RECOMMENDED BY MANUFACTURER FOR WALL RATING REQUIRED TO MAINTAIN U.L. CLASSIFICATION.
3. ALL DUCTWORK PENETRATING A TWO HOUR OR MORE RATED WALL OR FLOOR SHALL BE PROVIDED WITH A FIRE DAMPER INSTALLED AS DETAILED.
4. NO FLEXIBLE DUCTWORK WILL BE ALLOWED TO PENETRATE ONE HOUR WALLS, TWO HOUR WALLS, SMOKE WALLS, CORRIDOR WALLS OR WALLS CLOSED-OFF TO STRUCTURE. METAL RIGID DUCTWORK SHALL EXTEND A MINIMUM OF 5'-0" FROM WALL BEFORE THE FIRST AIR DISTRIBUTION DEVICE IS INSTALLED OR BEFORE FLEXIBLE DUCT IS STARTED. FLEXIBLE DUCTWORK IN A SINGLE DUCT RUN IS ALLOWED ON ONE SIDE OF A RATED WALL BUT NOT BOTH SIDES.
5. ACCEPTABLE MANUFACTURERS OF FIRE STOP MATERIALS ARE AS FOLLOWS:

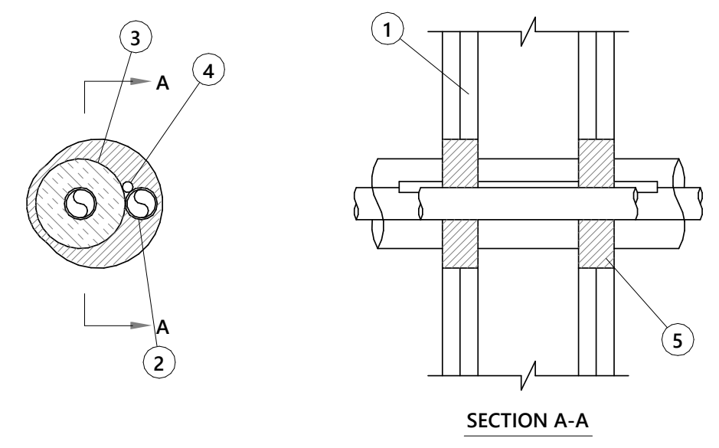
   NELSON FLAMESEAL PUTTY+
   CROUSE-HINDS CABLE BARRIER SYSTEM
   DOW CORNING FIRE STOP SEALANT/FOAM
   3M FIRE BARRIER
   T&B FLAMESAFE
   THERMAFIBER BRAND SAFING

   ALL MATERIALS AND METHODS OF INSTALLATION SHALL BE U.L. APPROVED FOR THAT INSTALLATION. SHOP DRAWING SUBMITTALS OF MATERIALS AND METHOD OF INSTALLATION, INCLUDING DRAWINGS, SHALL BE SUBMITTED TO THE ARCHITECT FOR REVIEW.
6. WHEN A PIPE, WIRE, OR DUCT PENETRATES A NON-RATED SMOKETIGHT PARTITION, THE MECHANICAL CONTRACTOR SHALL SEAL AROUND ALL PIPES WIRES AND DUCTS WITH SEALANT MATERIAL TO MAKE IT SMOKETIGHT. SEE ARCHITECTURAL PLANS FOR LOCATION OF THESE PARTITIONS.
7. SEE ARCHITECTURAL PLANS FOR WALL TYPES.
8. ALL RATED WALL PENETRATIONS SHALL BE IN ACCORDANCE WITH UNDERWRTIERS LABORATORIES PENETRATION FIRESTOP SYSTEM REQUIREMENTS. ALL MATERIALS USED IN PENETRATION FIRESTOP SYSTEMS SHALL BE APPROVED BY UNDERWRITERS LABORATORIES AND SHALL BE U.L. LABELED.

System No. W-L-8047

HVAC LINE SET THROUGH GYPSUM WALL ASSEMBLY

F Rating -- 2 Hr
T Rating -- 1/4 Hr



SECTION A-A

1. WALL ASSEMBLY -- THE 2 HR FIRE-RATED GYPSUM BOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER DESCRIBED IN THE INDIVIDUAL U300 OR U400 SERIES WALL OR PARTITION DESIGN IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
A. STUDS -- WALL FRAMING SHALL CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN. LUMBER SPACED MAX 16 IN. OC. STEEL STUDS TO BE MIN 3-1/2 IN. WIDE AND SPACED MAX 24 IN. OC.
B. GYPSUM BOARD* -- THE GYPSUM BOARD TYPE, THICKNESS NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN IN THE UL FIRE RESISTANCE DIRECTORY. MAX DIAM OF OPENING IS 4-1/2 IN.
2. THROUGH PENETRANTS -- ONE OR MORE PIPE OR TUBING TO BE INSTALLED CONCENTRICALLY OR ECCENTRICALLY WITHIN THE OPENING. THE SPACE BETWEEN ANY PENETRANT AND THE PERIPHERY OF THE OPENING SHALL BE MIN 0 IN. (POINT CONTACT) TO MAX 1-1/4 IN. PIPES OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES OR TUBING MAY BE USED:
A. COPPER TUBE -- NOM 1 IN. DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBE.
B. COPPER PIPE -- NOM 1 IN. DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
3. TUBE INSULATION - PLASTICS+ -- NOM 3/4 IN. THICK ACRYLONITRILE BUTADIENE/POLYVINYL CHLORIDE (AB/PVC) FLEXIBLE FOAM FURNISHED IN THE FORM OF TUBING. TUBE INSULATION TO BE INSTALLED ON ONE OR MORE OF THE METALLIC PIPES OR TUBES.
SEE PLASTICS+ (QMFZ2) CATEGORY IN THE PLASTICS RECOGNIZED COMPONENT DIRECTORY FOR NAMES OF MANUFACTURERS. ANY RECOGNIZED COMPONENT TUBE INSULATION MATERIAL MEETING THE ABOVE SPECIFICATIONS AND HAVING A UL 94 FLAMMABILITY CLASSIFICATION OF 94-5VA MAY BE USED.
4. CABLES -- MAX OF ONE 4 PAIR NO. 18 AWG (OR SMALLER) CABLE WITH PVC INSULATION AND JACKET MATERIALS.
5. FILL, VOID OR CAVITY MATERIAL - SEALANT* -- MIN 1-1/4 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN ANNULUS BETWEEN PENETRANTS AND GYPSUM BOARD, FLUSH WITH BOTH SURFACES OF WALL. AT POINT CONTACT, A 1/4 IN. BEAD OF FILL MATERIAL SHALL BE APPLIED AT THE PENETRANT/GYPSUM BOARD INTERFACE ON BOTH SIDES OF WALL.

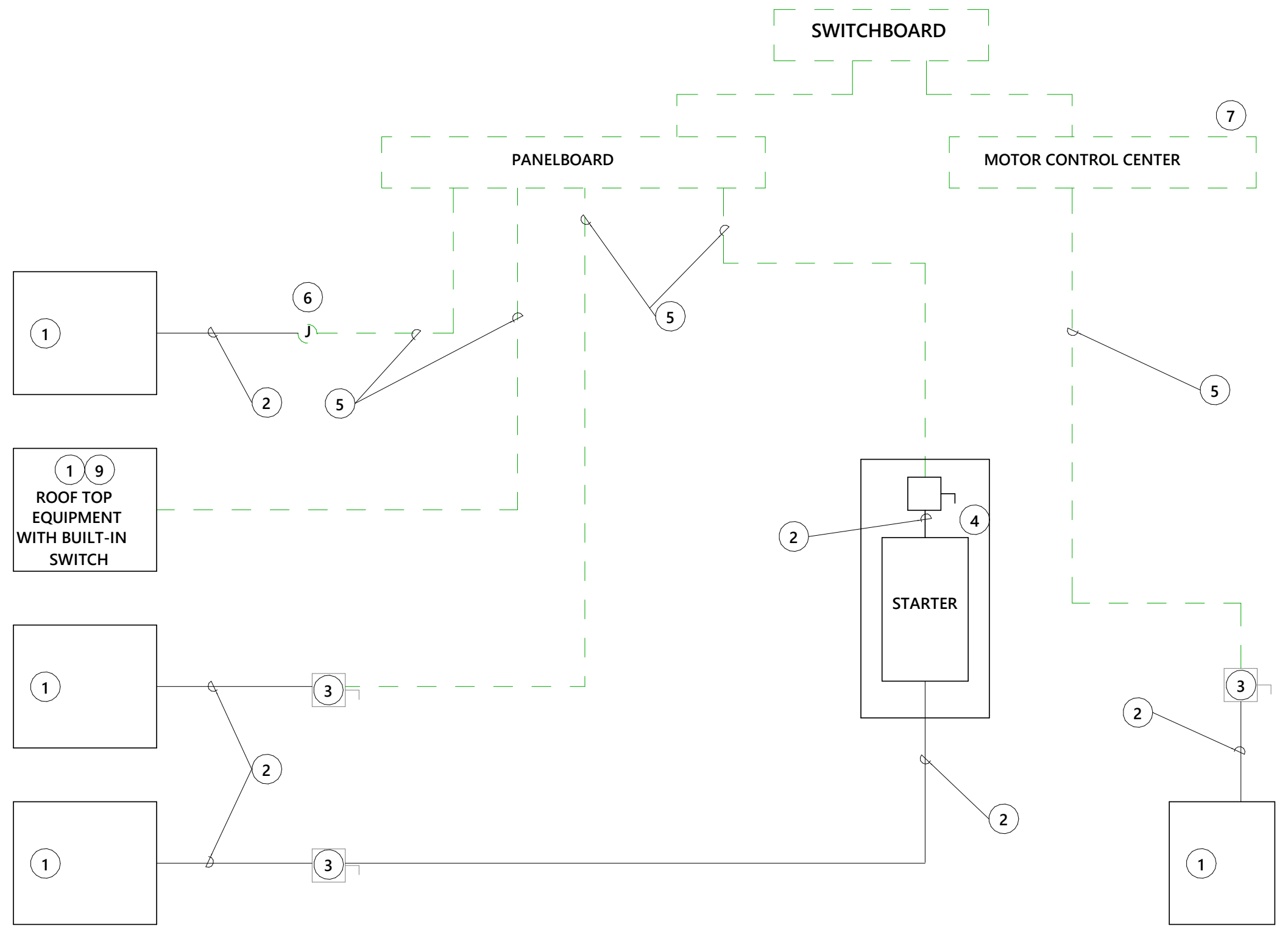
*BEARING THE UL CLASSIFICATION MARK

5 U.L SYSTEM NO W-L-8047 DETAIL

NO SCALE

NOTES:

① EQUIPMENT OF TRADES OTHER THAN ELECTRICAL.
② CONDUIT AND WIRING BY MECHANICAL, PLUMBING CONTRACTOR OR OTHER TRADES.
③ IF AN ADDITIONAL DISCONNECT IS REQUIRED BY NEC, IT SHALL BE PROVIDED AND INSTALLED BY THE EQUIPMENT CONTRACTOR.
④ A COMBINATION STARTER OR VFD MAY BE USED IN LIEU OF A SEPARATE DISCONNECT SWITCH AND STARTER LOCATE ADJACENT TO EQUIPMENT.
⑤ FEEDER CIRCUIT WIRING AND CONDUIT IN ELECTRICAL WORK SEE PANELBOARD SCHEDULES FOR WIRE AND BREAKER SIZES.
⑥ JUNCTION BOX MAY BE SHOWN ON ELECTRICAL PLANS FOR SOME EQUIPMENT. IF NO STARTER OR DISCONNECT IS SUPPLIED, A JUNCTION BOX SHALL BE INSTALLED ADJACENT TO EQUIPMENT. THE ELECTRICAL CONTRACTOR SHALL PROVIDE LINE SIDE WIRING TO THE JUNCTION BOX. LOAD SIDE WIRING WILL BE PROVIDED BY MECHANICAL CONTRACTOR OR OTHER TRADES.
⑦ PROJECTS UTILIZING AN MCC. THE STARTER, CB, OR VFD IN THE MCC ARE PROVIDED BY THE ELECTRICAL CONTRACTOR.
⑧ IN ALL CASES THE EQUIPMENT CONTRACTOR SHALL MAKE FINAL CONNECTIONS STARTUP, AND TEST EQUIPMENT.
⑨ IF THE ROOF TOP EQUIPMENT IS NOT PROVIDED WITH BUILT IN SWITCH, THE ELECTRICAL CONTRACTOR SHALL PROVIDE A DISCONNECT SWITCH.



6 ELECTRICAL REQUIREMENTS FOR MECHANICAL CONTRACTOR (DIVISION 23/26 DEMARCATION)

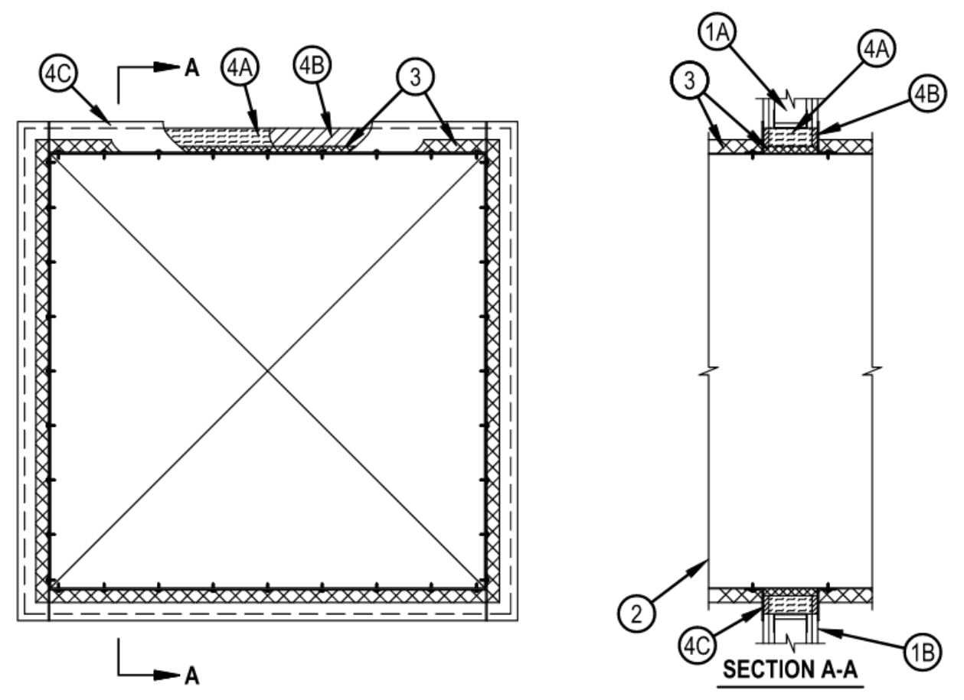
NO SCALE

Classified by Underwriters Laboratories, Inc. to UL 1479 and CAN/ULC-S115

System No. W-L-7156

WL 7156

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F Ratings — 1 and 2 Hr (See Item 1)	F Ratings — 1 and 2 Hr (See Item 1)
T Rating — 0, 1 and 2 Hr (See Item 4C)	FT Rating — 0, 1, and 2 Hr (See Item 4C)
	FH Ratings — 1 and 2 Hr (See Item 1)
	FTH Rating — 0, 1, and 2 Hr (See Item 4C)



SECTION A-A

1. Wall Assembly — The 1 or 2 hr fire-rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner specified in the individual U300, U400, V400 or W400 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Wall framing shall consist of either wood studs or steel channel studs. Wood studs to consist of nom 2 by 4 in. (51 by 102 mm) lumber spaced max 16 in. (406 mm) OC. Steel studs to be min 3-1/2 in. (89 mm) wide and spaced max 24 in. (610 mm) OC. Additional framing members shall be used to completely frame around opening.
   B. Gypsum Board* — Min 5/8 in. (16 mm) thick, 4 ft (1.2 m) wide with square or tapered edges. The gypsum board type, thickness, number of layers and orientation shall be as specified in the individual Wall and Partition Design. Max size of opening is 210 sq in. (1355 cm2) with a max width of 14-1/2 in. (368 mm) for wood studs. Max size of opening is 76.2 sq ft. (7 m2) with a max width of 105-1/2 in. (2.7 m) for steel studs.
   The hourly F and FH Ratings of the firestop system are equal to the hourly fire rating of the wall in which it is installed.
2. Steel Duct — Max 100 by 100 in. (2.5 by 2.5 m) steel duct to be installed within the framed opening. The duct shall be constructed and reinforced in accordance with SMACNA construction standards. Steel duct to be rigidly supported on both sides of wall assembly.

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August 22, 2018

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System No. W-L-7156

WL 7156

3. Batts and Blankets* — Nom 1-1/2 or 2 in. (38 or 51 mm) thick glass fiber batt or blanket (min 3/4 pcf or 12 kg/m3) jacketed on the outside with a foil-scrim-kraft facing. Longitudinal and transverse joints sealed with aluminum foil tape. During the installation of the fill material, the batt or blanket shall be compressed minimum 50% such that the annular space within the firestop system shall be min 1/2 in. (13 mm) to max 3-1/2 in. (89 mm); refer to the table below.
   See Batts and Blankets (BKNV) category in the Building Materials Directory for names of manufacturers. Any batt or blanket meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index 50 or less may be used.
4. Firestop System — The firestop system shall consist of the following:
   A. Packing Material — Min 3-5/8 (92 mm) or 4-7/8 in. (124 mm) thickness of min 4 pcf (64 kg/m3) mineral wool batt insulation firmly packed into opening as a permanent form for 1 or 2 hr fire-rated walls, respectively. Packing material to be recessed from both surfaces of wall to accommodate the required thickness of fill material.
   B. Fill, Void or Cavity Material* — Sealant — Min 5/8 in. (16 mm) thickness of fill material applied within annulus, flush with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE MAX Intumescent Sealant
   C. Steel Retaining Angles — Min No. 16 gauge (0.059 in. or 1.5 mm) galv steel angles sized to lap steel duct a min of 2 in. 51 mm) and lap wall surfaces a min of 1 in. (25 mm). Angles attached to steel duct on both sides of wall with min No. 10 steel sheet metal screws spaced a max of 1 in. (25 mm) from each end of steel duct and spaced a max of 6 in. (152 mm) OC. When max duct dimension does not exceed 48 in. (122 cm) and duct area does not exceed 1300 in2 (8387 cm2), angles may be min No. 18 gauge galv steel. Angles attached to steel duct on both sides of wall with min No. 10 by 1/2 in. (13 mm) long steel sheet metal screws located a max of 1 in. (25 mm) from each end of steel duct and spaced a max of 6 in. (152 mm) OC. In addition, see table below for additional conditions and options regarding retaining angles.

Max Duct Dimension	Duct Thickness	Max Insulation Thickness (Item 3)	Annular Space	Packing Material (Item 4A) Required	Angle (Item 4C) Required	T-Rating Hr
**24 in. (610 mm)	24 ga or heavier	1-1/2 in. (38 mm)	1/4 in. min to 1 in. max (6 to 25 mm)	No	No	0
25 in. (635 mm) wide by 45 in. (1143 mm) high	24 ga or heavier	2 in. (51 mm)	1/4 in. min to 3-1/2 in. max (6 to 89 mm)	Yes	No	1 and 2 (Same as wall rating)

** Indicates that when max 1-1/2 in. (38 mm) thick insulation is used, steel angles are optional for those sides of the duct that do not exceed the dimension specified.

* Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.

Hilti Firestop Systems

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NORTH CAROLINA PROFESSIONAL SEAL 17228 ENGINEER RONALD V. ALMOND

09.27.22

South Piedmont Community College OCH Campus - BUILDING A

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Monroe, NC 28110

BID DOCUMENTS

SCO # 19-21446-02A

MECHANICAL DETAILS

DATE: 09.27.22
PROJECT NO: 21-0029

REVISIONS
NO: DATE: DESCRIPTION:

SHEET NUMBER
M502