ABBREVIATIONS

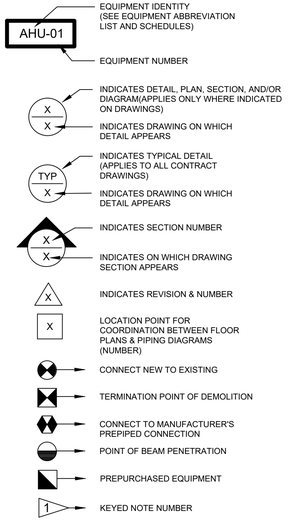
ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
AAV	AUTOMATIC AIR VENT	DAMP	DAMPER	H	HUMIDIFIER	P	PUMP	TDH	TOTAL DYNAMIC HEAD
ABV	ABOVE	DB	DRY BULB	HB	HOSE BIBB	P-BF	PUMP-BOILER FEED	TEMP	TEMPERATURE
AC	AIR CONDITIONING UNIT	DC	DUST COLLECTOR	HC	HEATING COIL	P-C	PUMP-CONDENSER WATER	TF	TRANSFER FAN
AD	ACCESS DOOR	DET	DETAIL	HD	HEAD	P-CF	PUMP-CHEMICAL FEED	TG	TRANSFER GRILLE
AFF	ABOVE FINISHED FLOOR	DIA	DIAMETER	HE	HEAT EXCHANGER	P-CH	PUMP-CHILLED WATER	TSP	TOTAL STATIC PRESSURE
AFS	AIR FLOW STATION	DIAG	DIAGRAM	HP	HEAT PUMP OR HORSE POWER	P-CO	PUMP-CONDENSATE	TT	TEMPERATURE TRANSMITTER
AHU	AIR HANDLING UNIT	DIFF	DIFFERENTIAL	HR	HOUR	P-ER	PUMP-ENERGY RECLAIM	TU	TERMINAL UNIT
AL	ACOUSTICAL LINING	DISCH	DISCHARGE	HRU	HEAT RECOVERY UNIT	P-FO	PUMP-FUEL OIL	TYP	TYPICAL
ALT	ALTERNATE	DIV	DIVISION	HT	HEIGHT	PBD	PARALLEL BLADE DAMPER		
ALUM	ALUMINUM	DN	DOWN	HTR	HEATER	PERF	PERFORATED	UC	UNDERCUT
AP	ACCESS PANEL	DWG	DRAWING	HV	HEATING AND VENTILATION UNIT	PH	PREHEAT COIL OR PHASE	UNOCC	UNOCCUPIED
APPROX	APPROXIMATE	DX	DIRECT EXPANSION	HWC	HOT WATER CIRCULATION	PNEU	PNEUMATIC	UH	UNIT HEATER
AVG	AVERAGE			HWP	HOT WATER PUMP	PRESS	PRESSURE		
		EA	EACH	HWR	HEATING WATER RETURN	PRV	PRESSURE REDUCING VALVE	WF	WATER FILTER
BB	ELECTRIC BASEBOARD HEATER	EAT	ENTERING AIR TEMPERATURE	HWS	HEATING WATER SUPPLY	PS	PRESSURE SWITCH	WB	WET BULB
B	BOILER	EC	ELECTRICAL CONTRACTOR	HX	HEAT EXCHANGER	PSI	POUNDS PER SQUARE INCH	WC	WATER COLUMN
BDD	BACK DRAFT DAMPER	EDH	ELECTRIC DUCT HEATER	HZ	HERTZ	PSIG	POUNDS PER SQUARE INCH GAUGE	WG	WATER GAUGE
BFC	BELOW FINISHED CEILING	EF	EXHAUST FAN			PT	PRESSURE TRANSMITTER	W/O	WITHOUT
BFP	BACKFLOW PREVENTOR	EFF	EFFICIENCY	ID	INTERNAL DIAMETER	PTAC	PACKAGED TERMINAL AIR CONDITIONER	WPD	WATER PRESSURE DROP
BG	BLAST GATE	EJ	EXPANSION JOINT	IN	INCHES			WTD	WATER TEMPERATURE DROP
BHP	BREAK HORSEPOWER	EL	ELEVATION	INCL	INCLUDING/INCLUDED	QTY	QUANTITY	W/	WITH
BLDG	BUILDING	ELEC	ELECTRIC	INT	INTERNAL				
BLW	BELOW	ENT	ENTERING	INV	INVERT	R-#	RETURN AIR GRILLE	V	VOLTS
BOB	BOTTOM OF BEAM	EQUIP	EQUIPMENT	IRH	INFARED HEATER	RAF	RETURN AIR FAN	VA	VALVE
BOD	BOTTOM OF DUCT	EQUIV	EQUIVALENT			RAH	RADIANT HEATER	VAV	VARIABLE AIR VOLUME UNIT
BOP	BOTTOM OF PIPE	ERC	ENERGY RECLAIM COIL	KW	KILOWATT	RCF	RECIRCULATION FAN	VB	VACUUM BREAKER
BSMT	BASEMENT	ERV	ENERGY RECOVERY UNIT			RCP	REFLECTED CEILING PLAN	VD	VOLUME DAMPER
BTU	BRITISH THERMAL UNIT	ESP	EXTERNAL STATIC PRESSURE	LAT	LEAVING AIR TEMPERATURE	RD	ROOF DRAIN	VEL	VELOCITY
BV	BUTTERFLY VALVE	ET	EXPANSION TANK	LBS	POUNDS	REQD	REQUIRED	VTR	VENT THRU ROOF
		EUH	ELECTRIC UNIT HEATER	LBS/HR	POUNDS PER HOUR	RET	RETURN		
C	CHILLER	EWT	ENTERING WATER TEMPERATURE	LF	LINEAR FEET	RF	RETURN FAN OR RELIEF FAN		
CAP	CAPACITY	EXIST	EXISTING	LRA	LOCK ROTOR AMPS	RFG	REFRIGERATION UNIT		
CBV	CIRCUIT BALANCING VALVE	EXPAN	EXPANSION	LVG	LEAVING	RH	RELATIVE HUMIDITY		
CC	COOLING COIL	EXT	EXTERNAL	LWT	LEAVING WATER TEMPERATURE	RHC	REHEAT COIL		
CD	CEILING DIFFUSER					RLA	RATED LOAD AMPS		
CF	CEILING FAN	F	FILTER	MAV	MANUAL AIR VENT	RM	ROOM		
CFH	CUBIC FEET PER HOUR	FA	FREE AREA	MAX	MAXIMUM	RPM	REVOLUTIONS PER MINUTE		
CFM	CUBIC FEET PER MINUTE	FC	FLEXIBLE CONNECTION	MBH	THOUSANDS OF BTU PER HOUR	RTU	ROOF TOP UNIT		
CFU	CHEMICAL FEED UNIT	FCU	FAN COIL UNIT	MC	MECHANICAL CONTRACTOR	RV	RELIEF VALVE		
CHWP	CHILLED WATER PUMP	FCV	FLOW CONTROL VALVE	MCA	MINIMUM CIRCUIT AMPACITY				
CHWR	CHILLD WATER RETURN	FD	FLOOR DRAIN	MED	MEDIUM	S-#	SUPPLY DIFFUSER		
CHWS	CHILLED WATER SUPPLY	F/D	FIRE DAMPER	MFR	MANUFACTURER	SA	SUPPLY AIR		
CI	CAST IRON	FIN	FINISHED	MH	MANHOLE	SCH	SCHEDULE		
CL	CENTERLINE	FL	FLANGED	MIN	MINIMUM	SCHEM	SCHEMATIC		
CLG	CEILING	FLA	FULL LOAD AMPS	MISC	MISCELLANEOUS	SD	SMOKE DAMPER		
CMU	CONCRETE MANSORY UNIT	FLEX	FLEXIBLE	MXB	MIXING BOX	SEF	SMOKE EXHAUST FAN		
CO	CLEANOUT	FLR	FLOOR	MTD	MOUNTED	SF	SUPPLY FAN		
COL	COLUMN	FM	FLOW METER	MD	MOTORIZED DAMPER	SP	STATIC PRESSURE		
COMP	COMPRESSOR	FOP	FUEL OIL PUMP	MUA	MAKE-UP AIR UNIT	SPEC	SPECIFICATION		
CONC	CONCRETE	FP	FIRE PROTECTION			SQ	SQUARE		
COND	CONDENSATE	FPM	FEET PER MINUTE	NEG	NEGATIVE	SRV	SAFETY RELIEF VALVE		
CONN	CONNECTION	FPS	FEET PER SECOND	NIC	NOT IN CONTRACT	SS	STAINLESS STEEL		
CONT	CONTINUATION	FRICT	FRICTION	NTS	NOT TO SCALE	ST	STORAGE TANK		
CONTR	CONTRACTOR	F/S/D	COMBINATION FIRE SMOKE DAMPER			STD	STANDARD		
CP	CONDENSATE PUMP	FT	FEET	OA	OUTSIDE AIR	STM	STEAM		
CT	COOLING TOWER	FTR	FINNED TUBE RADIATOR	OAT	OUTSIDE AIR TEMPERATURE	STP	SOUND TRAP		
CTF	COOLING TOWER FILTER	FV	FACE VELOCITY	OBD	OPPOSED BLADE DAMPER	STRUCT	STRUCTURE OR STRUCTURAL		
CWR	CONDENSER WATER RETURN			OD	OUTSIDE DIAMETER	SUP	SUPPLY		
CWS	CONDENSER WATER SUPPLY	GA	GAUGE	OC	ON CENTER	SYS	SYSTEM		
CU	CONDENSING UNIT	GAL	GALLONS	OCC	OCCUPIED				
CUH	CABINET UNIT HEATER	GALV	GALVANIZED	ORD	OVERFLOW ROOF DRAIN				
CV	AUTOMATIC CONTROL VALVE	GC	GENERAL CONTRACTOR	OV	OUTLET VELOCITY				
CVB	CONSTANT VOLUME BOX	GPH	GALLONS PER HOUR						
CWP	CONDENSER WATER PUMP	GPM	GALLONS PER MINUTE						
		GRD	GRILLE/REGISTER/DIFFUSER						
		GRS/LB	GRAINS PER POUND						

NOTE:
ALL ABBREVIATIONS AND SYMBOLS MAY NOT APPEAR ON THE DRAWINGS FOR THIS PROJECT.

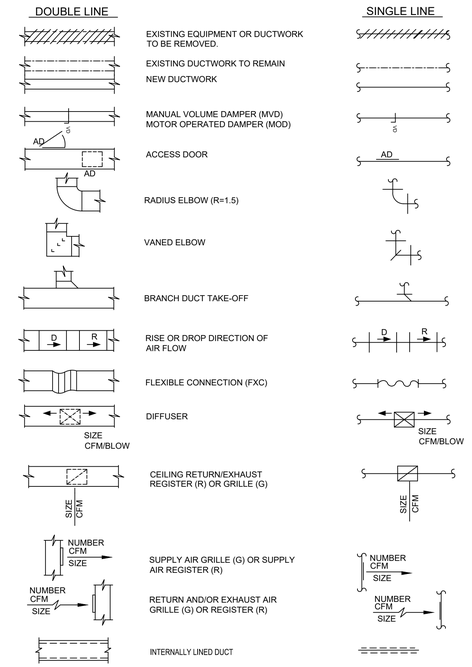
GENERAL

(E)	EXISTING EQUIPMENT TO REMAIN
R	EXISTING EQUIPMENT TO BE REMOVED
ER	EXISTING EQUIPMENT TO BE RELOCATED
RE	RELOCATED EXISTING EQUIPMENT
∅	ROUND
	OVAL
	SQUARE FEET

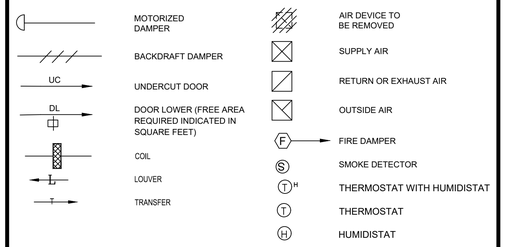
HVAC REFERENCE SYMBOLS



DUCTWORK SYMBOLS



MECHANICAL SYMBOLS



DRAWING INDEX

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stage. BID SET
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45821 RAILROAD AVE
CONCRETE,
WASHINGTON

drawn by. NH
original sheet size. 24x36
revision. None
date. 2025.02.18
scale.

LEGENDS AND ABBREVIATIONS

sheet.

M0.0

SPECIFICATIONS

GENERAL REQUIREMENTS

SUBMISSION OF PROPOSAL DIRECTLY OR INDIRECTLY IN CONNECTION WITH THIS WORK SHALL IMPLY THAT THE BIDDER HAS EXAMINED THE CONTRACT DOCUMENTS AND JOB SITE UNDER WHICH THEY WILL BE OBLIGATED TO OPERATE SHOULD THEY BE AWARDED THE WORK UNDER THIS CONTRACT. NO EXTRA CHARGE WILL BE ALLOWED FOR FAILURE OF ANY BIDDER TO EXAMINE THE SITE PRIOR TO BID. ANY DISCREPANCIES SHALL BE BROUGHT FORTH PRIOR TO THE SUBMISSION OF BIDS.

IN SUBMITTING THEIR BID THE CONTRACTOR ACKNOWLEDGES THEY SUFFICIENTLY REVIEWED AND UNDERSTAND THE SCOPE OF WORK, INCLUDING ALL ITEMS REQUIRED BY GOOD PRACTICE TO PROVIDE COMPLETE AND OPERATIONAL SYSTEMS, WHETHER SPECIFIED OR NOT.

DO NOT SCALE THIS DRAWING FOR EXACT DIMENSIONS. VERIFY ALL FIGURES, CONDITIONS, AND DIMENSIONS AT THE JOB SITE.

THE CONTRACTORS ARE RESPONSIBLE TO PROVIDE ALL LABOR AND MATERIALS AS REQUIRED WITHIN THE CONTRACT DOCUMENTS, APPLICABLE CODES AND MANUFACTURERS REQUIREMENTS FOR A COMPLETE AND OPERATIONAL SYSTEM.

THE CONTRACTOR SHALL MAINTAIN THE PROJECT SCHEDULE AS OUTLINED IN THE CONTRACT DOCUMENTS. THIS INCLUDES ORDERING OF EQUIPMENT. ANY LONG LEAD ITEMS ARE TO BE IDENTIFIED AND SUBMITTED TO ARCHITECT/ENGINEER FOR EXPEDITED REVIEW. LEAD TIME ISSUES ARE NOT ACCEPTABLE REASON FOR SUBMISSION OF ALTERNATE PRODUCTS UNLESS APPROVED BY ARCHITECT/ENGINEER.

CLEAN THE JOB SITE DAILY AND REMOVE FROM THE PREMISES ANY DIRT AND DEBRIS CAUSED BY THE PERFORMANCE OF THE WORK INCLUDED IN THIS CONTRACT.

USE OF THE OWNER'S ELEVATORS AND BUILDING CORRIDORS FOR HANDLING OF THE OWNER AND REMOVED EQUIPMENT AND MATERIALS SHALL BE AT THE DIRECTION OF THE OWNER AND SHALL BE COORDINATED WITH HIS OPERATIONS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFEKEEPING OF OWN PROPERTY ON THE JOB SITE. OWNER ASSUMES NO RESPONSIBILITY FOR PROTECTION OF PROPERTIES AGAINST FIRE, THEFT AND ENVIRONMENTAL CONDITIONS.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING A SAFE JOBSITE PER APPLICABLE LAWS AND INDUSTRY PRACTICES.

WHERE USED, THE TERM "PROVIDE" SHALL MEAN "FURNISH AND INSTALL".

CONTRACTOR SHALL BE RESPONSIBLE FOR WORKMEN'S IDENTIFICATION AND BADGING, SAFETY AND FIRE PROTECTION, CONTRACTOR'S LIABILITY INSURANCE, BARRICADES, WARNING SIGNS, TRASH REMOVAL, CUTTING AND PATCHING.

CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SHIPPING, RIGGING, HANDLING AND PROTECTION OF MATERIALS.

CONTRACTOR SHALL PROVIDE LABOR TO RECEIVE, UNLOAD, STORE, PROTECT AND TRANSFER TO POINT OF INSTALLATION, OWNER FURNISHED ITEMS.

CONTRACTOR SHALL PROVIDE ALL EQUIPMENT AND ACCESSORIES AS SPECIFIED OR SCHEDULE IN THE CONTRACT DOCUMENTS. CONTRACTOR SHALL COORDINATE WITH EQUIPMENT SUPPLIER TO VERIFY MODELS, FEATURES, ACCESSORIES AND CAPACITIES. CONTRACTOR SHALL INFORM ENGINEER OF ANY DISCREPANCIES PRIOR TO BIDDING.

ALL ELECTRICAL EQUIPMENT AND COMPONENTS SHALL BE UL LISTED.

CODE COMPLIANCE

ALL WORK SHALL CONFORM TO ALL STATE AND LOCAL CODES, RULES AND REGULATIONS AND ORDINANCES:

- ALL APPLICABLE INDUSTRIAL SAFETY AND HEALTH LAWS AND REGULATIONS
- LOCAL UTILITY CODES/REQUIREMENTS
- LOCAL MECHANICAL, PLUMBING, ENERGY, FIRE AND BUILDING CODES
- 2021 INTERNATIONAL BUILDING CODE WITH STATEWIDE AMENDMENTS (IBC)
- 2021 INTERNATIONAL EXISTING BUILDING CODE WITH STATEWIDE AMENDMENTS (IEBC)
- 2021 INTERNATIONAL FIRE CODE WITH STATEWIDE AMENDMENTS (IFC)
- 2021 INTERNATIONAL MECHANICAL CODE WITH STATEWIDE AMENDMENTS (IMC)
- 2021 UNIFORM PLUMBING CODE WITH STATEWIDE AMENDMENTS (UPC)
- 2021 WASHINGTON STATE ENERGY CODE (WSEC)
- 2021 INTERNATIONAL FUEL GAS CODE (IFGC)
- APPLICABLE NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) AND AMERICAN PETROLEUM INSTITUTE (API) INDUSTRY CODES
- ICC/ANSI A117.1-09, ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES, WITH STATEWIDE AMENDMENTS
- UNDERWRITERS' LABORATORIES
- NATIONAL ELECTRICAL CODE (NFPA 70) WITH STATEWIDE AMENDMENTS

PERMITS

CONTRACTOR SHALL SECURE AND PAY ALL FEES AND PERMITS PERTAINING TO THE CONTRACT.

SUBSTITUTIONS

CONTRACT SHALL SUBMIT PRODUCT SUBSTITUTIONS DURING THE BID PERIOD FOR PRIOR APPROVAL BY THE ARCHITECT/ENGINEER. CONTRACTOR SHALL BE RESPONSIBLE FOR THE SUBSTITUTE BEING EQUAL TO THE BASIS OF DESIGN PRODUCT. ANY COSTS FOR THE SUBSTITUTION SHALL BE COVERED BY THE CONTRACTOR.

PROJECT COORDINATION

THE CONTRACTOR SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES PRIOR TO FABRICATION, PURCHASE AND/OR INSTALLATION OF ALL WORK.

CONTRACTOR SHALL COORDINATE INSTALLATION OF EQUIPMENT AND SYSTEMS WITH OTHER TRADES INCLUDING INTERFERENCES WITH STRUCTURE, LIGHTING, ETC AS WELL AS REQUIRED MAINTENANCE CLEARANCES.

CONTRACTOR SHALL VISIT THE SITE AND VERIFY ALL DIMENSIONS IN THE FIELD, AND SHALL ADVISE THE ARCHITECT/ENGINEER AND THE OWNER OF ANY DISCREPANCIES BEFORE PERFORMING THE WORK.

CONTRACTOR SHALL PROVIDE EQUIPMENT AND MATERIAL SUBMITTALS FOR ALL PRODUCTS TO BE USED ON THE PROJECT FOR ARCHITECT/ENGINEER APPROVAL.

CONTRACTOR SHALL PROVIDE SHOP DRAWINGS AS INDICATED.

CONTRACTOR SHALL COORDINATE ELECTRICAL CLEARANCE REQUIREMENTS WITH OTHER TRADES PER NEC.

CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR FOR LOCATION AND WIRING OF HVAC EQUIPMENT.

CONTRACTOR SHALL COORDINATE INSTALLATION OF ROOF FLASHING PERTAINING TO THEIR WORK.

EXISTING BUILDINGS AND CONDITIONS

PRIOR TO SUBMITTING BID, THE CONTRACTOR SHALL CONDUCT A SITE VISIT TO REVIEW EXISTING CONDITIONS TO DETERMINE IMPACTS ON EXECUTION OF WORK DETAILED IN THE CONTRACT DOCUMENTS. IN SUBMITTING THEIR BID THE CONTRACTOR ACKNOWLEDGES THEY SUFFICIENTLY REVIEWED AND UNDERSTAND THE SCOPE OF WORK, INCLUDING ALL ITEMS REQUIRED BY GOOD PRACTICE TO PROVIDE COMPLETE AND OPERATIONAL SYSTEMS, WHETHER SPECIFIED OR NOT.

CONTRACTOR SHALL VERIFY DIMENSIONS AND EXISTING CONDITIONS PRIOR TO PROCEEDING WITH ANY WORK. WHERE DISCREPANCIES OCCUR BETWEEN THESE DOCUMENTS AND EXISTING CONDITIONS, THE DISCREPANCY SHALL BE REPORTED TO THE OWNER AND/OR ENGINEER FOR EXPEDITING AND RESOLVE.

ALL SHUT DOWNS OF EXISTING SYSTEMS SHALL BE SCHEDULED AND APPROVED BY THE OWNER PRIOR TO COMMENCING WITH WORK.

NO PIPING, EQUIPMENT, ETC. SHALL BE REMOVED, DISCONNECTED OR SHUT DOWN WITHOUT PRIOR REVIEW WITH THE OWNER AND/OR ENGINEER TO CONFIRM THAT AREAS TO REMAIN IN OPERATION WILL NOT BE AFFECTED. IF ANY AREAS NOT WITHIN THE SCOPE OF WORK ARE AFFECTED BY ANY SHUTDOWN, REMOVAL OR DISCONNECTION, SUFFICIENT ADVANCE NOTICE MUST BE GIVEN TO THE OWNER INDICATING WHICH AREAS WILL BE AFFECTED, WHEN THE PROPOSED SHUTDOWN WILL OCCUR, AND FOR HOW LONG A PERIOD OF TIME.

EXISTING MATERIALS THAT ARE REMOVED SHALL NOT BE REUSED IN NEW SYSTEMS, EXCEPT WHERE INDICATED AS BEING RELOCATED.

ALL EXISTING INSULATION FOR DUCTWORK AND PIPING PERTAINING TO THIS WORK SHALL BE PATCHED AND/OR REPLACED AS REQUIRED TO MAINTAIN VAPOR BARRIER.

CONTRACTOR SHALL INSPECT THE EXISTING DUCTWORK FOR DEFECTS AND REPORT TO THE ARCHITECT/ENGINEER AND THE OWNER ANY DEFICIENCIES PRIOR TO PERFORMING ANY WORK. CONTRACTOR SHALL CLEAN ALL EXISTING DUCTWORK, GRILLES, REGISTERS AND DIFFUSERS PRIOR TO INSTALLING THE NEW WORK.

RESTORATION OF EXISTING SYSTEMS, DEVICES, FINISHES, ETC. DAMAGED OR ALTERED BY NEW WORK TO ACCEPTABLE CONDITION AS DETERMINED BY THE OWNER, ARCHITECT AND/OR ENGINEER.

ISOLATE AND DRAIN EXISTING PIPING SYSTEM AS REQUIRED TO ACCOMMODATE INSTALLATION OF THE NEW WORK.

SUCCESSFULLY PRESSURE TEST ALL REROUTED PIPING SYSTEMS. TEST SHALL BE PERFORMED AT NORMAL SYSTEM OPERATING PRESSURES. REPAIR AND RETEST AS REQUIRED UNTIL SYSTEMS PROVE TIGHT.

ALL WORK SHALL BE PERFORMED IN A CLEAN AND WORKMANLIKE MANNER. CARE SHALL BE EXERCISED TO MINIMIZE ANY INCONVENIENCE OR DISTURBANCE TO OTHER AREAS OF THE BUILDING WHICH ARE TO REMAIN IN OPERATION. ISOLATE WORK AREAS BY MEANS OF TEMPORARY PARTITIONS AND/OR TARPS TO DEEP DUST AND DIRT WITHIN THE CONSTRUCTION AREA.

EXECUTION AND QUALITY

ALL EQUIPMENT SHALL BE INSTALLED IN STRICT COMPLIANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS. THE CONTRACTOR SHALL PROVIDE ALL HANGERS AND SUPPORTS REQUIRED FOR A COMPLETE INSTALLATION.

PROVIDE ALL NECESSARY TEMPORARY OR PERMANENT CAPS OR PLUGS FOR DUCTWORK AND PIPING. DO NOT LEAVE PIPING OPEN ENDED.

WHERE CONDUIT, CABLES, DUCTWORK OR PIPING PASSES THROUGH SMOKE/FIRE RATED FLOORS OR WALLS, THE SLEEVES SHALL BE COMPLETELY SEALED WITH A FIRE STOP MATERIAL THAT IS UL LISTED AND ACCEPTED BY THE BUILDING DEPARTMENT AND FIRE DEPARTMENT AS BEING SUITABLE FOR THIS SERVICE SUCH AS DOW CORNING CORP., SILICONE ELASTOMER, DOW CORNING 3-6548 SILICONE RTV FOAM, OR APPROVED EQUAL. THIS MATERIAL SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE MANUFACTURER TO MAINTAIN THE RATING OF THE PENETRATED WALL OR FLOOR.

CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SLEEVING, CUTTING, CORING AND PATCHING AS IT RELATES TO HIS WORK.

CONTRACTOR SHALL BE RESPONSIBLE FOR ALL BEAM PENETRATIONS AS IT RELATES TO HIS WORK. CONTRACTOR SHALL SUBMIT SIZE AND LOCATION TO THE STRUCTURAL ENGINEER FOR REVIEW AND DETAIL.

DRAWINGS INDICATED DIAGRAMMATICALLY THE EXTENT, GENERAL CHARACTER AND LOCATION OF THE WORK INCLUDED. OFFSETS AND/OR CHANGES IN ELEVATION OF PIPING AND DUCTWORK DUE TO STRUCTURAL OR OTHER INTERFERENCES SHALL BE PROVIDED WITHOUT EXTRA COST.

SEAL ALL PENETRATIONS THROUGH BUILDING ENVELOPE WEATHER TIGHT WITH LONG LIFE CAULK/SEALANT RATED FOR THE ENVIRONMENT.

SEAL ALL SLEEVE PENETRATIONS THROUGH FLOORS WITHIN BUILDING WATER TIGHT.

UNLESS NOTED OTHERWISE ALL EQUIPMENT, DUCTWORK, CONDUIT, PIPING AND ASSOCIATED ACCESSORIES ARE TO BE CONCEALED ABOVE CEILINGS AND IN WALLS.

EQUIPMENT SHALL BE INSTALLED PER MANUFACTURERS REQUIREMENTS INCLUDING PIPING AND WIRING.

CONTRACTOR SHALL PROVIDE ALL INTERCONNECTING WIRING AND ACCESSORIES BETWEEN EQUIPMENT AND ACCESSORIES PER THE RESPONSIBILITY MATRIX IN THESE DOCUMENTS. ALL WORK SHALL CONFORM TO THE LOCAL ELECTRICAL CODE AND REQUIREMENTS WITHIN THE ELECTRICAL CONTRACT DOCUMENTS.

CONTRACTOR SHALL PROVIDE TESTING AND STARTUP OF ALL EQUIPMENT AND DEVICES AS WELL AS COORDINATE WITH COMMISSIONING AGENT AND BALANCER FOR COMPLETE OPERATION SYSTEM.

COORDINATE EQUIPMENT, DIFFUSER, REGISTER, DAMPER, ACCESS DOORS, ETC WITH ARCHITECTURAL CEILING PLANS AND ELEVATIONS AS WELL AS LIGHTING LAYOUT. VERIFY DIFFUSER/REGISTER FRAMES WITH CEILING PRIOR TO ORDERING.

THESE SPECIFICATIONS ARE INTENDED TO COVER THOSE ITEMS TYPICALLY ADDRESSED IN DIVISION 22 AND 23. REFER TO COMPLETE CONTRACT DOCUMENTS FOR ALL REQUIREMENTS, INCLUDING THOSE PROVIDED BY OWNER AND OTHER DISCIPLINES. WHERE MATERIALS OR EQUIPMENT ARE NOT COVERED IN THESE SPECIFICATIONS CONTRACTOR SHALL PROVIDE THE MATERIALS OR EQUIPMENT AS WOULD BE REASONABLY EXPECTED FOR COMPLETE AND OPERATIONAL SYSTEMS UTILIZED BY THE INDUSTRY FOR SIMILAR PROJECTS IN THE SAME GEOGRAPHIC AREA.

PROJECT CLOSEOUT

UPON COMPLETION OF CONSTRUCTION CONTRACTOR SHALL SUPPLY THE OWNER WITH AS-BUILT DOCUMENTS AND COMPLETE COPIES OF OPERATIONS AND MAINTENANCE MANUALS.

UNLESS NOTED OTHERWISE PROVIDE ONE YEAR GUARANTEE AGAINST DEFECTIVE MATERIALS AND WORKMANSHIP AFTER FINAL ACCEPTANCE BY OWNER.

PROVIDE TRAINING TO OWNERS STAFF TO INCLUDED AT MINIMUM
- OPERATIONS AND MAINTENANCE MANUAL REVIEW
- IDENTIFICATION OF SYSTEM SHUTOFFS AND ISOLATION
- EQUIPMENT OPERATION INCLUDING
  - ROUTINE MAINTENANCE
  - OPERATING MODES
  - SHUTDOWN AND STARTUP

PROVIDE ALL AHJ INSPECTION REPORTS, STARTUP REPORT, COMMISSIONING REPORT, BALANCING REPORT, TRAINING COMPLETION REPORT, COMPLETED PUNCH LISTS AND OTHER DOCUMENTS FOR ARCHITECT/ENGINEERING REVIEW FOR PROJECT CLOSEOUT VERIFICATION.

FINAL APPROVAL OF PROJECT COMPLETION WILL BE BY OWNER.

PRODUCT REQUIREMENTS

PRODUCT SHALL MEET SPECIFICATIONS AND SCHEDULED BASIS OF DESIGN EQUIPMENT AND MATERIALS.

ALL PRODUCTS SHALL BE FREE OF DAMAGE. REPAIR TO DAMAGED PRODUCTS (SCRATCHES, DENTS, CORROSION, ETC) SHALL BE AT CONTRACTORS COST. ANY REPAIRS SHALL BE APPROVED BY ARCHITECT/ENGINEER. IF DAMAGE IS DEEMED BEYOND ACCEPTABLE REPAIR BY THE ARCHITECT/ENGINEER THE CONTRACTOR SHALL REPLACE THE PRODUCT AT THEIR COST.

BASIC MATERIALS AND METHODS (APPLIES TO ALL WORK)

ALL PIPING SHALL BE INSTALLED AS INDICATED ON THE DRAWINGS IN A NEAT WORKMANSHIP-LIKE MANNER AND BE SUPPORTED AS REQUIRED BY CODES. PIPING SHALL BE SET UP AND DOWN AND OFFSET AS REQUIRED TO SUIT FIELD CONDITIONS. DIELECTRIC COUPLINGS/UNIONS SHALL BE USED WHERE DISSIMILAR METALS ARE JOINED.

WHERE CONDUITS, CABLES, DUCTWORK OR PIPING PASSES THROUGH FIRE RATED FLOOR OR WALL, THE SLEEVES SHALL BE COMPLETELY SEALED WITH A FIRE STOP MATERIAL THAT IS UL LISTED AND ACCEPTED BY THE BUILDING DEPARTMENT AND FIRE DEPARTMENT AS BEING SUITABLE FOR THE SERVICE. MATERIAL SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF THE MANUFACTURER TO MAINTAIN THE FIRE RATING OF THE PENETRATED WALL OR FLOOR.

CONTRACTOR SHALL COORDINATE INSTALLATION OF SLEEVES AS APPROPRIATE WITH CONSTRUCTION PHASING. ANY COST FOR FAILURE TO COORDINATE DURING THE APPROPRIATE CONSTRUCTION PHASE WILL BE COVERED BY THE CONTRACTOR.

PROVIDE ALL DUCT AND PIPE TRANSITIONS AS REQUIRED TO CONNECT TO EQUIPMENT.

SUPPORTS AND HANGERS:

PIPING HANGERS SHALL BE SPACED SO AS TO PREVENT SAG AND PERMIT PROPER DRAINAGE A HANGER SHALL BE PLACED WITHIN (1) FOOT OF EACH HORIZONTAL ELBOW.

CLEVIS OR RING HANGERS WITH STEEL HANGER RODS SHALL BE UTILIZED. HANGERS SHALL BE SIZED TO ACCOMMODATE PIPING INSULATION AND BE PROVIDED WITH 6" SHIELDS TO PROTECT PIPING AT ALL HANGER LOCATIONS.

PLASTIC SEPARATOR SHALL BE PROVIDED BETWEEN COPPER PIPING AND CLAMPS.

DUCT AND PIPING SHALL BE SUPPORTED BY CODE/STANDARD REQUIREMENTS.

USE MATERIALS COMPATIBLE WITH PIPING SYSTEMS AVOIDING ELECTROLYTIC ACTION AND CONFORM WITH ANSI/ASME B31, NFPA, MSS SP-58, 69, 89.

PROVIDE ADDITIONAL FRAMING/MEMBERS AS REQUIRED TO TRANSFER LOAD TO BUILDING STRUCTURAL ATTACHMENT LOCATIONS. FRAMING/MEMBERS SHALL BE OF MATERIAL AND SIZE FOR LOAD PER MANUFACTURER.

PROVIDE SEISMIC BRACING FOR PIPING, DUCTWORK AND EQUIPMENT PER APPLICABLE CODES. BRACING SHALL BE DESIGNED BY MANUFACTURER, MASON INDUSTRIES OR APPROVED.

CONNECTIONS TO BUILDING STRUCTURE SHALL BE PROVIDED BY CONTRACTOR IN COORDINATION WITH GENERAL CONTRACTOR. VERIFY CONNECTION LOCATIONS AND TYPE AND USE APPROVED CONNECTION METHOD FOR LOCATION I.E. CONCRETE, POST TENSION SLABS, WOOD OR STEEL.

EQUIPMENT SHALL BE SUPPORTED FROM ABOVE OR BELOW AT MINIMUM THE FOUR CORNERS OF THE EQUIPMENT.

PLENUM SPACES:

ALL MATERIALS IN PLENUMS SHALL BE LISTED AND LABELED FOR USE IN PLENUM SPACE WITH FLAME SPREAD LESS THAN 25 AND SMOKE SPREAD NO MORE THAN 50 PER ASTM E 84 OR UL 723.

ESCUTCHEONS:

PROVIDE CHROME ESCUTCHEONS AT ALL WALL AND FLOOR WALL PENETRATIONS IN EXPOSED LOCATIONS, INCLUDING INSIDE/UNDER CABINETS.

CONDENSATE DRAIN PIPING:

CONDENSATE DRAIN PIPE ROUTE SHALL BE FIELD COORDINATED. TERMINATION POINTS SHALL BE EXTERIOR PERVIOUS AREAS APPROVED BY ARCHITECT/ENGINEER, OR INDIRECT DISCHARGE TO DRAINS/MOP SINKS, SINK TAIL PIECE CONNECTIONS AS ALLOWED BY AHJ.

IDENTIFICATION (EQUIPMENT AND PIPING)

PROVIDE IDENTIFICATION OF ALL PIPES, VALVES, AND EQUIPMENT.

IDENTIFICATION DEVICES TO BE USED SHALL INCLUDE THE FOLLOWING:
- PLASTIC OR ADHESIVE PIPE MARKERS
  - PER ANSI A13.1 REQUIREMENTS
  - PROVIDE FLOW DIRECTION ARROWS
  - PROVIDE WITHIN 30" OF VALVES
  - PROVIDE ON EACH SIDE OF PARTITIONS
- VALVE TAGS AND EQUIPMENT TAGS
  - EQUIPMENT TAGS SHALL BE PLASTIC 3"x1" MINIMUM

PROVIDE VALVE SCHEDULE.

COMMON MATERIALS AND ACCESSORIES (APPLIES TO ALL WORK)

CONDENSATE DRAINAGE PIPING AND FITTINGS:

SHALL BE SEAMLESS TYPE L COPPER WITH 95-5 SOLDER.

REFRIGERANT PIPING:

CONTRACTOR SHALL PROVIDE PIPING, VALVES AND ACCESSORIES IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS.

PIPING SHALL BE TYPE "K" COPPER TUBING WITH WROUGHT COPPER SOLDER TYPE FITTINGS.

GAS PIPING:

ALL GAS PIPING SHALL BE SCHEDULE 40 BLACK STEEL WITH MALLEABLE IRON FITTINGS. WHERE GAS PIPE CONNECTS TO EQUIPMENT IT SHALL BE PROVIDED WITH
- A DRIP LEG THE FULL SIZE OF THE RUNOUT
- A LINE SIZED SHUTOFF VALVE AND A UNION

GAS PIPING OPERATING AT PRESSURES GREATER THAN 9" WATER GAUGE SHALL BE SCHEDULE 40 BLACK STEEL PIPE WITH WELDED JOINTS.

PIPE INSULATION:

ALL INSULATION SHALL HAVE A FLAME SPREAD RATING OF 25 OR LESS AND A SMOKE DEVELOPED RATING OF 50 OR LESS IN ACCORDANCE WITH ASTM E84 AND NFPA 90A. INSULATION SHALL BE INSTALLED PER MANUFACTURERS REQUIREMENTS AND INTENDED SERVICE.

PIPING SHALL BE INSULATED PER WSEC REQUIREMENTS. REFER TO INSULATION TABLES LOCATED IN DRAWING SET FOR ADDITIONAL INFORMATION.

MANUFACTURERS: ARMACELL, KNAUF, MANVILLE, OWENS-CORNING OR APPROVED.

PROTECTION OF OUTDOOR INSULATION:

PIPING INSULATION EXPOSED TO WEATHER SHALL BE PROTECTED FROM DAMAGE, INCLUDING THAT DUE TO
- SUNLIGHT
- MOISTURE
- EQUIPMENT MAINTENANCE
- WIND

PROVIDE PIPE SHIELDING FROM OUTDOOR ENVIRONMENT
- METAL JACKET 0.016 ALUMINUM
- SELF-SEALING
- INTEGRAL VAPOR RETARDER
- WATERTIGHT METAL BANDING FOR BUTT JOINTS
- SEALANT SHALL BE ALUMINUM PIGMENTED MASTIC VAPOR RETARDER
- ADHESIVE TAPES ARE NOT ALLOWED

INDOOR PIPING INSULATION:

- FIBERGLASS PIPING INSULATION WITH ALL SERVICE JACKET
- INSULATION AROUND FITTINGS TO MATCH REQUIRED PIPE INSULATION THICKNESS
- PVC PIPE JACKET ON ALL FITTINGS AS WELL AS PIPING SUSCEPTIBLE TO IMPACT DAMAGE
- SEAL VAPOR BARRIER AT ALL JOINTS ON PIPING CONVEYING COLD LIQUIDS
- ALL MATERIALS SHALL BE UL LISTED 25/50

REFRIGERANT PIPING INSULATION:

- 3/4" ARMAFLEX AP 25/50
- METAL JACKET 0.016 ALUMINUM ON OUTDOOR PIPING

CONDENSATE PIPING INSULATION:

- 3/4" ARMAFLEX AP 25/50
- METAL JACKET 0.016 ALUMINUM ON OUTDOOR PIPING

PIPING INSULATION AT HANGERS:

PROVIDE HALF SHELL HIGH DENSITY INSULATION ON PORTION RESTING ON HANGER. INSULATION THICKNESS AT HANGER SHALL MATCH ADJACENT PIPING.

MOTORS:

UNLESS NOTED OTHERWISE MOTORS SHALL MEET NEMA MG1. REFER TO ENERGY CODE NOTES FOR MOTOR EFFICIENCY REQUIREMENTS.

MOTOR STARTERS:

CONTRACTOR SHALL FURNISH A COMBINATION MOTOR STARTER SIZED IN ACCORDANCE WITH THE MOTOR RATING OF THE MECHANICAL EQUIPMENT. START SHALL BE SUPPLIED WITH FUSES OR CIRCUIT BREAKERS, CONTROL TRANSFORMER, OVERLOADS, ONE NORMALLY OPEN AND ONE NORMALLY CLOSED AUXILIARY CONTACT AND H.O.A. SWITCH MOUNTED IN THE COVER. STARTER ENCLOSURE SHALL BE NEMA RATED FOR ITS LOCATION. STARTER SHALL BE INSTALLED AND WIRED BY THE ELECTRICAL CONTRACTOR.

DUCT SMOKE DETECTORS:

CONTRACTOR SHALL PROVIDED UL LISTED DUCT SMOKE DETECTOR AS NOTED ON EQUIPMENT SCHEDULES OR ON PLANS. PROVIDE REMOTE MOUNTED TESTING/NOTIFICATION STATION. COORDINATE WITH ELECTRICAL CONTRACTOR TO PROVIDE POWER AND INTERCONNECTING WIRING.

PROVIDE INTEGRATION WITH FIRE ALARM AND CONTROLS SYSTEM FOR EQUIPMENT SHUTDOWN.

VIBRATION ISOLATION:

VIBRATION ISOLATION SHALL BE PER LATEST SMACNA GUIDELINES.

VIBRATION ISOLATION FOR HANGING EQUIPMENT SHALL BE EQUAL TO MASON INDUSTRIES MODEL 30N, COMBINATION SPRING AND DOUBLE DEFLECTION NEOPRENE HANGER OR AS RECOMMENDED BY MANUFACTURER FOR APPLICATION.

VIBRATION ISOLATION FOR BASED MOUNTED EQUIPMENT SHALL BE EQUAL TO MASON INDUSTRIES SLF OR AS RECOMMENDED BY MANUFACTURER FOR APPLICATION.

DUCT SYSTEMS

DUCTWORK SHALL BE CONSTRUCTED AND ERECTED IN ACCORDANCE WITH THE IMC AND SMACNA DUCT CONSTRUCTION STANDARDS AND UNLESS NOTED OTHERWISE SHALL BE 2" PRESSURE CLASS.

ALL DUCT DIMENSIONS INDICATED ON THE PLANS ARE INSIDE CLEAR DIMENSIONS. SHEET METAL DIMENSIONS SHALL BE INCREASED TO ACCOMMODATE LINING THICKNESS.

GENERAL DUCTWORK SHALL BE GALVANIZED SHEET METAL.

DUCTWORK CONVEYING OR IN HIGH MOISTURE AREAS SHALL BE ALUMINUM.

DUCTS EXPOSED IN OCCUPIED AREAS SHALL BE PAINTED PER ARCHITECT.

ALL MITERED RECTANGULAR ELBOWS SHALL HAVE TURNING VANES.

DUCTS BRANCHES DIRECTLY CONNECTED TO DIFFUSERS SHALL BE SIZED TO MATCH DIFFUSER NECK SIZE UNLESS NOTED OTHERWISE ON PER PLANS.

LOW PRESSURE DUCTWORK:
LONGITUDINAL AND TRANSVERSE JOINTS, SEAMS AND CONNECTIONS OF SUPPLY AND RETURN DUCTWORK OPERATING AT A STATIC PRESSURE LESS THAN OR EQUAL TO 2 INCHES WATER GAUGE SHALL BE SECURELY FASTENED AND SEALED WITH WELDS, GASKETS, MASTICS (ADHESIVES), MASTIC-PLUS, EMBEDDED-FABRIC SYSTEMS OR TAPES PER MANUFACTURER'S REQUIREMENTS.
- CONTINUOUSLY WELDED AND LOCKING-TYPE JOINTS AND SEAMS ON DUCTS ARE NOT REQUIRED TO BE SEALED PER WSEC C403.10.2.1

DUCT WALL PENETRATIONS SHALL BE SEALED WITH SMACNA CLASS A SEAL.

ALL SUPPLY AND RETURN DUCTWORK 15 FEET DOWNSTREAM OF HVAC EQUIPMENT SHALL BE INTERNALLY LINED WITH ACOUSTICAL DUCT LINER.

ALL SUPPLY DUCTWORK 15 FEET DOWNSTREAM OF SOUND ATTENUATORS SHALL BE INTERNALLY LINED WITH ACOUSTICAL DUCT LINER.

ALL RETURN DUCTWORK 15 FEET UPSTREAM OF SOUND ATTENUATORS SHALL BE INTERNALLY LINED WITH ACOUSTICAL DUCT LINER.

ALL SUPPLY DUCTWORK 5 FEET DOWNSTREAM OF TERMINAL UNITS AND FAN COILS SHALL BE INTERNALLY LINED WITH ACOUSTICAL DUCT LINER.

CONTRACTOR SHALL SPRAY PAINT INSIDE OF DUCT BLACK BEHIND ALL GRILLES AND REGISTERS.

DUCT INSULATION

ALL INSULATION SHALL HAVE A FLAME SPREAD RATING OF 25 OR LESS AND A SMOKE DEVELOPED RATING OF 50 OR LESS IN ACCORDANCE WITH ASTM E84 AND NFPA 90A. INSULATION SHALL BE INSTALLED PER MANUFACTURERS REQUIREMENTS AND INTENDED SERVICE.

DUCTING SHALL BE INSULATED PER WSEC REQUIREMENTS. REFER TO INSULATION TABLES LOCATED IN DRAWING SET FOR ADDITIONAL INFORMATION.

SUPPLY AND RETURN DUCTS, PLENUMS NOT IDENTIFIED IN THE INSULATION TABLES SHALL BE INSULATED WITH:
- MINIMUM OF R-6 INSULATION IN UNCONDITIONED SPACES
- MINIMUM OF R-8 INSULATION WHEN LOCATED OUTSIDE THE BUILDING IN CLIMATE ZONE 4
- MINIMUM OF R-12 INSULATION WHEN LOCATED OUTSIDE THE BUILDING IN CLIMATE ZONE 5
- WHERE LOCATED WITHIN A BUILDING ENVELOPE ASSEMBLY, THE DUCT OR PLENUM SHALL BE SEPARATED FROM THE BUILDING EXTERIOR OR UNCONDITIONED SPACE OR EXEMPT SPACES BY MINIMUM INSULATION MATCHING THE BUILDING ENVELOP.

MANUFACTURERS: ARMACELL, KNAUF, MANVILLE, OWENS-CORNING OR APPROVED.

PROTECTION OF OUTDOOR INSULATION:
PIPING INSULATION EXPOSED TO WEATHER SHALL BE PROTECTED FROM DAMAGE, INCLUDING THAT DUE TO
- SUNLIGHT
- MOISTURE
- EQUIPMENT MAINTENANCE
- WIND

ACOUSTICAL DUCT, PLENUM, TRANSFER INSULATION:
- AP ARMAFLEX, ASTM E 84 AT 25/50 FOR USE IN AIR PLENUMS UP TO 1" THICKNESS
- AP ARMAFLEX FS, ASTM E 84 AT 25/50 FOR 1-1/2" AND 2" THICKNESSES.
- 3M VENTURECLAD JACKETING SYSTEM (OR APPROVED) ON DUCTWORK LOCATED OUTDOORS

DUCT ACCESSORIES

MANUAL VOLUME DAMPERS:

GALVANIZED STEEL, PRE SMACNA EXCEPT PROVIDE BEARING AT ONE END OF DAMPER ROD AND QUADRANT, WITH LEVER AND LOCK SCREW AT THE OPPOSITE END FOR INSULATED DUCTS, QUADRANTS MOUNTED ON COLLAR TO CLEAR INSULATION. LEVERS MUST BE ACCESSIBLE. PROVIDE PINK PLASTIC RIBBON ON LEVERS TO VISUALLY IDENTIFY DAMPER LOCATIONS.

ALL BRANCH DUCTS CONNECTED TO GRILLES/RESISTERS/DIFFUSERS SHALL HAVE VOLUME DAMPERS.

REMOTE VOLUME DAMPERS SHALL BE PROVIDED FOR DAMPERS ABOVE HARD LID CEILINGS OR IN ACCESSIBLE LOCATIONS.

ACCESS DOORS:

PROVIDE ACCESS DOORS IN DUCTWORK WHEREVER CONTROLS, CONTROL DAMPERS, COILS, SECURITY BARS OR INSTRUMENTS ARE LOCATED. ACCESS DOOR SIZE BE APPROPRIATE FOR ITEM BEING ACCESSED. DOOR SHALL BE VENTLOCK WITH PIANO HINGE OR CAM LATCHES.

ACCESS DOORS ON SUPPLY DUCTWORK SHALL BE DOUBLE WALLED AND PROVIDED WITH MINIMUM 1 INCH INSULATION.

EQUIPMENT ACCESS DOORS FOR ALL EQUIPMENT LOCATED ABOVE HARD LID CEILINGS. ACCESS DOOR SHALL BE MINIMUM 24"x24".

ACCESS DOOR SIZES AND LOCATIONS TO BE COORDINATED WITH ARCHITECT/ENGINEER FOR FINAL APPROVAL.

FLEXIBLE DUCTWORK:

SHALL BE OF TWO ELEMENT SPIRAL CONSTRUCTION COMPOSED OF A CORROSION RESISTANT METAL SUPPORTING SPIRAL AND COATED FABRIC WITH A MINERAL BASE (FLEXMASTER OR APPROVED). FLEXIBLE DUCT CONNECTORS SHALL BE UL LISTED AND SHALL HAVE A FLAME SPREAD NOT EXCEEDING 25 AND A SMOKE SPREAD NOT EXCEEDING 50. SHALL BE CLASS 1 RATED PER UL 181.

USE OF FLEXIBLE DUCTWORK SHALL BE LIMITED TO NO MORE THAN 6 LINEAR FEET PER RUN.

CONTRACTOR SHALL TAKE CARE AS NOT TO ALLOW FLEXIBLE DUCT TO KINK OR COLLAPSE.

MAXIMUM 2 ELBOWS.

FLEXIBLE EQUIPMENT CONNECTIONS:
HVAC EQUIPMENT FLEXIBLE DUCT CONNECTIONS SHALL BE A MINIMUM OF 6 INCHES LONG AND HELD IN PLACE WITH HEAVY METAL BANDS, SECURELY ATTACHED TO PREVENT ANY LEAKAGE AT THE CONNECTION POINTS. FLEXIBLE CONNECTS SHALL BE FABRICATED FROM APPROVED FLAME PROOF FABRIC PER NFPA 90A (DURO DYNE OR APPROVED). ASBESTOS CLOTH IS NOT ACCEPTABLE.

NOT REQUIRED FOR EQUIPMENT WITH INTERNAL VIBRATION ISOLATION.

FIRE DAMPERS, SMOKE DAMPERS AND FIRE/SMOKE DAMPERS:

CONTRACTOR SHALL PROVIDE APPROVED DAMPERS AND ACCESS PANELS IN ANY AND ALL DUCTWORK THAT PENETRATES A HORIZONTAL OR VERTICAL FIRE/SMOKE PARTITION, OR AS OTHERWISE NOTED ON DRAWINGS.

INSTALL DAMPERS PER MANUFACTURERS INSTRUCTIONS AND CURRENT CODE REQUIREMENTS.

DUCT PRESSURE CLASSIFICATIONS ON THIS PROJECT

DUCTS ON THIS PROJECT ARE LIMITED TO **LOW PRESSURE** CLASSIFICATION.

GREASE DUCT SYSTEMS

IN CONCEALED LOCATIONS USE MINIMUM 18 GAUGE STAINLESS STEEL WITH ALL JOINTS WELDED LIQUID TIGHT OR PREFABRICATED GREASE DUCT, UNDERWRITERS LABORATORY, INC LISTED WITH ALUMINIZED STEEL SHELL

IN EXPOSED AREAS, USE 18 GAUGE OR HEAVIER STAINLESS STEEL WITH A NUMBER 3 FINISH AND WITH ALL JOINTS WELDED LIQUID TIGHT OR PREFABRICATED UNDERWRITERS LABORATORY, INC LISTED DUCT WITH STAINLESS STEEL SHELL. GRIND AND POLISH ALL WELDED JOINTS AND SEAMS TO A NUMBER 3 FINISH.

PROVIDE EXPANDED TAKE-OFFS FOR BRANCH DUCT CONNECTIONS OR 45 DEGREE ENTRY FITTINGS. SQUARE EDGE 90 DEGREE TAKE-OFF FITTINGS OR STRAIGHT TAPS WILL NOT BE ACCEPTED.

USE ELBOWS AND TEES WITH A CENTER LINE RADIUS TO WIDTH OR DIAMETER RATIO OF 1.5 WHEREVER SPACE PERMITS SHALL BE USED WHEREVER POSSIBLE. SHORTER RADIUS ELBOWS MAY BE USED IN AREAS WITH LIMITED SPACE WITH PRIOR APPROVAL OF THE ARCHITECT/ENGINEER.

NO TURNING VANES MAY BE USED IN KITCHEN EXHAUST DUCT.

SUPPORTING STEEL AND HANGERS SHALL NOT BE LIGHTER THAN THE DUCT GAUGE.

HIGH VOLUME LOW SPEED (HVLS) FANS

INSTALLATION OF FANS SHALL COMPLY WITH NFPA 13:
- MAXIMUM FAN DIAMETER SHALL BE 24 FT
- FANS SHALL BE APPROXIMATELY CENTERED BETWEEN FOUR ADJACENT SPRINKLERS
- THE VERTICAL DISTANCE BETWEEN THE HVLS FAN TO THE SPRINKLER DEFLECTOR SHALL A MINIMUM OF 3 FT
- ALL HVLS FANS SHALL BE INTERLOCKED TO SHUT DOWN IMMEDIATELY UPON RECEIVING A WATER FLOW SIGNAL FROM THE ALARM SYSTEM IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA 72

REFRIGERANT PIPING METHODS

ALL PIPING SHALL BE CONCEALED WITHIN BUILDING ASSEMBLIES (WALLS, CEILINGS, ETC). SOFFITS ARE NOT TO BE UTILIZED UNLESS NOTED ON DRAWINGS.

DRAWINGS ARE DIAGRAMMATIC, FINAL PIPE ROUTING SHALL BE BY CONTRACTOR IN COORDINATION WITH EQUIPMENT SUPPLIER TO OPTIMIZE SYSTEM LAYOUT.

DESIGN INTENT IS TO MINIMIZE PIPING ROUTING ON ROOF.

JTK ENGINEERING
HVAC I PLUMBING I ENERGY
WWW.JTKENG.COM

TAMAS BENCSIK
STATE OF WASHINGTON
48264
REGISTERED PROFESSIONAL ENGINEER
February 15, 2025

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SKAGIT COUNTY
Serving With Pride
WASHINGTON

SKAGIT COUNTY CONCRETE COMMUNITY CENTER

REVISIONS	
- - -	

stage.	BID SET
client.	CARLETTI ARCHITECTS
project.	CONCRETE COMMUNITY CENTER 45821 RAILROAD AVE CONCRETE, WASHINGTON
drawn by.	NH
original sheet size.	24x36
revision.	None
date.	2025.02.18
scale.	

SPECIFICATIONS

sheet.

M0.1

EFFICIENCY CONVERSION CU-1							
SYSTEM TYPE	SEER2	EER2	HSPF2	FACTOR	SEER	EER	HSPF
SPLIT SYSTEM AIR CONDITIONER AND HEAT PUMP	18	-	-	1.05	18.9	-	-
SPLIT SYSTEM AIR CONDITIONER AND HEAT PUMP	-	11.7	-	1.04	-	12.168	-
SPLIT SYSTEM HEAT PUMP	-	-	9.7	1.18	-	-	11.446
PACKAGED AIR CONDITIONER AND HEAT PUMP		-	-	1.04		-	-
PACKAGED AIR CONDITIONER AND HEAT PUMP	-		-	1.04	-		-
PACKAGED HEAT PUMP	-	-		1.18	-	-	0
DUCTLESS HEAT PUMP	-	-		1.12	-	-	0
SPACE CONSTRAINED SYSTEM		-	-	1.01	0	-	-
SPACE CONSTRAINED SYSTEM	-	-		1.17	-	-	0
SMALL DUCT HIGH VELOCITY SYSTEM		-	-	1	0	-	-
SMALL DUCT HIGH VELOCITY SYSTEM	-	-		1.18	-	-	0

EFFICIENCY CONVERSION CU-2							
SYSTEM TYPE	SEER2	EER2	HSPF2	FACTOR	SEER	EER	HSPF
SPLIT SYSTEM AIR CONDITIONER AND HEAT PUMP	16.9	-	-	1.05	17.745	-	-
SPLIT SYSTEM AIR CONDITIONER AND HEAT PUMP	-	11.7	-	1.04	-	12.168	-
SPLIT SYSTEM HEAT PUMP	-	-	8.8	1.18	-	-	10.384
PACKAGED AIR CONDITIONER AND HEAT PUMP		-	-	1.04		-	-
PACKAGED AIR CONDITIONER AND HEAT PUMP	-		-	1.04	-		-
PACKAGED HEAT PUMP	-	-		1.18	-	-	0
DUCTLESS HEAT PUMP	-	-		1.12	-	-	0
SPACE CONSTRAINED SYSTEM		-	-	1.01	0	-	-
SPACE CONSTRAINED SYSTEM	-	-		1.17	-	-	0
SMALL DUCT HIGH VELOCITY SYSTEM		-	-	1	0	-	-
SMALL DUCT HIGH VELOCITY SYSTEM	-	-		1.18	-	-	0

EFFICIENCY CONVERSION CU-3							
SYSTEM TYPE	SEER2	EER2	HSPF2	FACTOR	SEER	EER	HSPF
SPLIT SYSTEM AIR CONDITIONER AND HEAT PUMP	16.45	-	-	1.05	17.2725	-	-
SPLIT SYSTEM AIR CONDITIONER AND HEAT PUMP	-	10.1	-	1.04	-	10.504	-
SPLIT SYSTEM HEAT PUMP	-	-	8.75	1.18	-	-	10.325
PACKAGED AIR CONDITIONER AND HEAT PUMP		-	-	1.04		-	-
PACKAGED AIR CONDITIONER AND HEAT PUMP	-		-	1.04	-		-
PACKAGED HEAT PUMP	-	-		1.18	-	-	0
DUCTLESS HEAT PUMP	-	-		1.12	-	-	0
SPACE CONSTRAINED SYSTEM		-	-	1.01	0	-	-
SPACE CONSTRAINED SYSTEM	-	-		1.17	-	-	0
SMALL DUCT HIGH VELOCITY SYSTEM		-	-	1	0	-	-
SMALL DUCT HIGH VELOCITY SYSTEM	-	-		1.18	-	-	0

C406.2.2.2.2 COOLING EQUIPMENT EFFICIENCY - CU-1																
UNIT TYPE	UNIT SIZE	MINIMUM EFFICIENCY		DESIGN EFFICIENCY		SEER					IEER					
		SEER	IEER	SEER	IEER	EEC(5)	CEI	CM(des)	CM(min)	EEC(HEC)	EEC(5)	HEI	HM(des)	HM(min)	EEC(HEH)	MAX
VRF Air Cooled (cooling mode)	< 65,000 Btu/h (cooling capacity)	13	-	18.9	-	3	0.45	18.9	13	27	-	-	-	-	-	12

C406.2.2.2.2 COOLING EQUIPMENT EFFICIENCY - CU-2																
UNIT TYPE	UNIT SIZE	MINIMUM EFFICIENCY		DESIGN EFFICIENCY		SEER					IEER					
		SEER	IEER	SEER	IEER	EEC(5)	CEI	CM(des)	CM(min)	EEC(HEC)	EEC(5)	HEI	HM(des)	HM(min)	EEC(HEH)	MAX
VRF Air Cooled (cooling mode)	< 65,000 Btu/h (cooling capacity)	13	-	17.75	-	3	0.37	17.75	13	22	-	-	-	-	-	12

C406.2.2.2.2 COOLING EQUIPMENT EFFICIENCY - CU-3																
UNIT TYPE	UNIT SIZE	MINIMUM EFFICIENCY		DESIGN EFFICIENCY		SEER					IEER					
		SEER	IEER	SEER	IEER	EEC(5)	CEI	CM(des)	CM(min)	EEC(HEC)	EEC(5)	HEI	HM(des)	HM(min)	EEC(HEH)	MAX
VRF Air Cooled (cooling mode)	< 65,000 Btu/h (cooling capacity)	13	-	17.27	-	3	0.33	17.27	13	20	-	-	-	-	-	12

C406.2.2.3.2 HEATING EQUIPMENT EFFICIENCY - CU-1															
UNIT TYPE	UNIT SIZE	MINIMUM EFFICIENCY		DESIGN EFFICIENCY		HSPF					COP 47F				
		HSPF	COP 47F	HSPF	COP 47F	EEC(5)	HEI	HM(des)	HM(min)	EEC(HEH)	EEC(5)	HEI	HM(des)	HM(min)	EEC(HEH)	MAX
VRF Air Cooled (heating mode)	< 65,000 Btu/h (cooling capacity)	7.7	-	11.45	-	3	0.49	11.45	7.7	29	-	-	-	-	-	12

C406.2.2.3.2 HEATING EQUIPMENT EFFICIENCY - CU-2															
UNIT TYPE	UNIT SIZE	MINIMUM EFFICIENCY		DESIGN EFFICIENCY		HSPF					COP 47F				
		HSPF	COP 47F	HSPF	COP 47F	EEC(5)	HEI	HM(des)	HM(min)	EEC(HEH)	EEC(5)	HEI	HM(des)	HM(min)	EEC(HEH)	MAX
VRF Air Cooled (heating mode)	< 65,000 Btu/h (cooling capacity)	7.7	-	10.38	-	3	0.35	10.38	7.7	21	-	-	-	-	-	12

C406.2.2.3.2 HEATING EQUIPMENT EFFICIENCY - CU-3															
UNIT TYPE	UNIT SIZE	MINIMUM EFFICIENCY		DESIGN EFFICIENCY		HSPF					COP 47F				
		HSPF	COP 47F	HSPF	COP 47F	EEC(5)	HEI	HM(des)	HM(min)	EEC(HEH)	EEC(5)	HEI	HM(des)	HM(min)	EEC(HEH)	MAX
VRF Air Cooled (heating mode)	< 65,000 Btu/h (cooling capacity)	7.7	-	10.33	-	3	0.34	10.33	7.7	20	-	-	-	-	-	12

SKAGIT COUNTY CONCRETE COMMUNITY CENTER LOAD SUMMARY
LOAD CALCULATION SOFTWARE: OPENSTUDIO

ZONE	Sensible Sizing				
	Heating		Cooling		
	Watts	MBH	Watts	MBH	Tons
KITCHEN	1980.1	6.8	1972.0	6.7	0.6
OFFICE	1320.5	4.5	923.1	3.1	0.3
GATHERING	6110.5	20.8	8641.9	29.5	2.5
LOBBY	5942.2	20.3	3310.5	11.3	0.9
RESTROOM	1883.9	6.4	613.8	2.1	0.2
WATER HEATER	179.8	0.6	6.9	0.0	0.0
STORE			1657.7	5.7	0.5
ATTIC RESTROOM	2511.6	8.6	661.5	2.3	0.2
ATTIC KITCHEN	3482.1	11.9	914.3	3.1	0.3
ATTIC WATER HEATER	154.8	0.5	28.9	0.1	0.0
TOTAL	23565.4			63.9	5.3

COMMISSIONING

IT HAS BEEN DETERMINED THAT COMMISSIONING **IS NOT REQUIRED** FOR THIS PROJECT PER THE REQUIREMENTS OF SECTION C408 OF THE WSEC.

BALANCING

CONTRACTOR SHALL BALANCE THE SYSTEMS TO QUANTITIES INDICATED ON THE DRAWINGS AND SUBMIT THE BALANCE REPORT TO THE ENGINEER FOR APPROVAL.

BALANCING SHALL BE COMPLETED BY AN A/E APPROVED NEBB OR AABC CERTIFIED FIRM. MINIMUM 5 YEARS EXPERIENCE ON PROJECTS OF SIMILAR SCOPE AND COMPLEXITY. PROVIDE SUBMITTAL OF FIRM FOR APPROVAL TO A/E.

PROVIDE ALL EQUIPMENT, MATERIALS AND DEVICES NECESSARY TO ACCESS AND MEASURE SYSTEM PERFORMANCE AND ADJUST TO VALUES INDICATED ON PLANS.

COORDINATE SYSTEM READINESS WITH GENERAL CONTRACTOR PRIOR TO COMMENCING WITH WORK.

GENERAL CONTRACTOR SHALL:
- MAKE NECESSARY DRIVE CHANGES (INCLUDING PROVIDING SHEAVES AND BELTS) TO ACHIEVE BALANCED SET POINTS IN COORDINATION WITH BALANCER.
- TRIM PUMP IMPELLER TO ACHIEVE BALANCED SET POINTS IN COORDINATION WITH BALANCER. UPDATE NAMEPLATES TO REFLECT FINAL CONDITIONS.

AT COMPLETION OF BALANCING GENERAL CONTRACTOR SHALL:
- CLEAN STRAINERS OF PIPING SYSTEMS
- PROVIDE NEW FILTERS IN AIR DISTRIBUTION EQUIPMENT AND SYSTEMS

SUBMIT THE FOLLOWING WITHIN 30 DAYS AFTER AWARD OF CONTRACT:
- NAME OF TAB SUBCONTRACTOR.
- INDIVIDUAL QUALIFICATIONS OF PERSONS RESPONSIBLE FOR SUPERVISING AND PERFORMING THE WORK OF THIS PROJECT.
- TAB AGENDA LISTING METHODS AND PROCEDURES, AND INCLUDING BLANK FORMS APPLICABLE TO THIS PROJECT.
- LIST OF PROJECTS COMPLETED BY TAB SUBCONTRACTOR OF SIMILAR SIZE, SCOPE AND EQUIPMENT. INCLUDE NAME OF CONTRACTOR AND OWNER CONTACTS.
- LIST OF TEST INSTRUMENTS AND DATES AS TO LAST CALIBRATED.
  - CALIBRATION SHALL BE MINIMUM EVERY 12 MONTHS.
- SYSTEM FLOW DIAGRAMS WITH PERTINENT DATA (FLOW, PRESSURE, VELOCITY DESIGN) FOR EACH SYSTEM TO BE BALANCED.
- PROPOSED FINAL REPORT TABLE OF CONTENTS.

BALANCING REPORT:
PROVIDE COMPLETE BALANCING REPORT IN ACCORDANCE WITH NEBB REQUIREMENTS, INCLUDING THE FOLLOWING:
- SYSTEM FLOW DIAGRAMS AND FLOOR PLANS.
- PUMP CURVES.
- FAN CURVES.
- MANUFACTURERS' START-UP AND TEST DATA.
- FIELD START-UP AND TEST REPORTS.
- OTHER INFORMATION RELATIVE TO EQUIPMENT PERFORMANCE.

REPORT DATA:
- TITLE PAGE.
- NAME AND ADDRESS OF TESTING, ADJUSTING, AND BALANCING AGENT.
- PROJECT NAME.
- PROJECT LOCATION.
- ARCHITECT'S NAME AND ADDRESS.
- ENGINEER'S NAME AND ADDRESS.
- CONTRACTOR'S NAME AND ADDRESS.
- REPORT DATE.
- SIGNATURE OF TESTING, ADJUSTING, AND BALANCING SUPERVISOR WHO CERTIFIES THE REPORT.
- SUMMARY OF CONTENTS, INCLUDING THE FOLLOWING:
  - DESIGN VERSUS FINAL PERFORMANCE
  - NOTABLE CHARACTERISTICS OF SYSTEMS.
  - DESCRIPTION OF SYSTEM OPERATION SEQUENCE IF IT VARIES FROM THE CONTRACT DOCUMENTS.
- NOMENCLATURE SHEETS FOR EACH ITEM OF EQUIPMENT.
- TEST CONDITIONS FOR FANS AND PUMP PERFORMANCE FORMS, INCLUDING THE FOLLOWING:
  - SETTINGS FOR OUTDOOR, RETURN, AND EXHAUST AIR DAMPERS.
  - CONDITIONS OF FILTERS.
  - COIL WET- AND DRY-BULB CONDITIONS.
  - FAN DRIVE SETTINGS, INCLUDING SETTINGS AND PERCENTAGE OF MAXIMUM PITCH DIAMETER.
  - SETTINGS FOR SUPPLY AIR STATIC PRESSURE CONTROLLER.
- READINGS:
  - AIR QUANTITIES
    - SUPPLY, RETURN, EXHAUST AND OUTDOOR AIR.
    - DUCT TRAVERSE FOR ALL DUCTS CONVEYING AT LEAST 2,000 CFM.
  - AIR TEMPERATURES
    - SUPPLY, RETURN, OUTDOOR AIR AT EQUIPMENT
    - MIXED AIR TEMPERATURES BEFORE COILS AND HEAT TRANSFER EQUIPMENT
  - AIR HANDING EQUIPMENT
    - FAN RPM
    - SYSTEM STATIC PRESSURE
    - FAN SUCTION AND DISCHARGE PRESSURE
    - CLEAN FILTER PRESSURE DROP
    - SIMULATED DIRTY FILTER PRESSURE DROP
    - COIL AIR PRESSURE DROP
    - SHEAVE MAKE, SIZES AND SHAFT SIZE
    - NUMBER OF BELTS, MAKE AND SIZE
  - HYDRONIC SYSTEMS
    - WATER PRESSURE AT INLET AND OUTLET OF PUMPS
    - WATER PRESSURE DROP ACROSS SUCTION STRAINER OF PUMPS
    - WATER PRESSURE DROP ACROSS CHILLERS, BOILER AND OTHER SIMILAR EQUIPMENT
    - FLOW MEASURING SYSTEM DEVICES
    - INLET AND OUTLET TEMPERATURES OF CONNECTED EQUIPMENT AND ACCESSORIES
  - ELECTRICAL
    - VOLTAGE AND AMPS FOR EACH PHASE OF EACH MOTOR UNDER MAXIMUM NORMAL LOAD
    - NAMEPLATE VOLTAGE AND CURRENT FOR EACH MOTOR
- PROVIDE PRELIMINARY AND FINAL BALANCING REPORT
- SYSTEMS SHALL BE BALANCED WITHIN 10% OF DESIGN VALUES
- PROVIDE COMMENTARY WHERE SYSTEMS ARE UNABLE TO BE BALANCED WITHIN 10% OF DESIGN VALUES

ENERGY CODE NOTES

HVAC BUILDING HEATING AND COOLING LOAD CALCULATIONS HAVE BEEN PERFORMED USING LOAD CALCULATION SOFTWARE BASED ON ASHRAE STANDARDS.

HVAC EQUIPMENT SIZING SHALL NOT EXCEED THE NEXT LARGER UNIT SIZE OF THAT REQUIRED FROM THE LOAD CALCULATIONS.

HVAC EQUIPMENT SHALL MEET MINIMUM EFFICIENCY REQUIREMENTS UNLESS NOTED OTHERWISE IN THESE DOCUMENTS.

DUCTWORK SHALL BE LEAK TESTED PER CODE.

MOTORS:
- ALL MOTORS SHALL MEET THE MINIMUM EFFICIENCY REQUIREMENTS NOTED IN WSEC C405.8.
- FAN MOTORS SHALL BE SIZED TO BE SMALLEST MOTOR SIZE AVAILABLE GREATER THAN THE FAN BHP.
- INDIVIDUAL MOTORS SHALL MEET NEMA MG1 EFFICIENCY STANDARD
- PACKAGED EQUIPMENT MOTORS SHALL BE BASED ON OVERALL EQUIPMENT EFFICIENCY RATING.

ELECTRONICALLY COMMUTTED MOTORS:
- SHALL BE CAPABLE OF SPEED CONTROL
- MOTORS BETWEEN 1-1/2 HP AND 1 HP SHALL BE ELECTRONICALLY COMUTTED AND HAVE MINIMUM EFFICIENCY OF 70%

HVAC CONTROLS:
- PROVIDE 5°F MINIMUM DEADBAND BETWEEN HEATING AND COOLING
- PROVIDE AUTOMATIC SETBACK/SHUTOFF AND START/STOP CONTROLS

DAMPERS (OUTSIDE AIR, EXHAUST, RELIEF):
- LEAKAGE SHALL NOT EXCEED 4 CFM/SF AT 1.0 INCH W.G. FOR MOTORIZED DAMPERS
- LEAKAGE SHALL NOT EXCEED 20 CFM/SF AT 1.0 INCH W.G. FOR NONMOTORIZED DAMPERS
- MOTORIZED DAMPERS SHALL FAIL CLOSED.

PROVIDE ENERGY METERING AS REQUIRED BY THE WSEC.

CONTROLS

CONTRACTOR SHALL PROVIDE ALL CONTROLS INCLUDING LABOR, MATERIALS AND PROGRAMMING (INCLUDING THAT FOR CONNECTION TO PACKAGED CONTROLS) FOR A COMPLETE AND OPERATION SYSTEM.

IT IS RECOMMENDED A SEPARATE CONTROLS CONTRACTOR BE HIRED TO PERFORM THE WORK IF THE MECHANICAL CONTRACTOR DOES NOT HAVE THEIR OWN IN-HOUSE FULL-TIME CONTROLS TECHNICIANS.

CONTROLS SHALL MEET OPERATING REQUIREMENTS AS OUTLINED IN THESE DOCUMENTS AS WELL AS THE WASHINGTON STATE ENERGY CODE.

CONTRACTOR SHALL SELECT DEVICES TO MEET CONTROLS INTENT AND PROVIDE STARTUP AND TESTING TO VERIFY SYSTEM OPERATION MEETS DESIGN INTENT.

CONTRACTOR SHALL PROVIDE SHOP DRAWINGS, SEQUENCE AND POINTS LIST. DOCUMENTS SHALL BE PROVIDED TO AHJ UPON REQUEST FOR PERMIT REQUIREMENTS.

PER THE WSEC THIS PROJECT **DOES NOT REQUIRE** A DDC FULL CONTROLS SYSTEM.

THERMOSTATS SHALL BE INSTALLED AT 48 INCHES ABOVE FINISHED FLOOR. PROVIDE LOCKABLE COVERS AS NOTED ON PLANS.

COORDINATE FINAL THERMOSTAT LOCATIONS WITH ARCHITECT/ENGINEER PRIOR TO INSTALLATION.

JTK ENGINEERING
HVAC | PLUMBING | ENERGY
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SKAGIT COUNTY CONCRETE COMMUNITY CENTER

REVISIONS
- - -

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ENERGY RECOVERY UNIT SCHEDULE

EQUIP ID	SHEET LOCATION	AREA SERVED	BASIS OF DESIGN		FANS														ELECTRICAL							SENSIBLE EFFECTIVENESS		WINTER LAT	FILTERS		OPERATING	NOTES
					SUPPLY							EXHAUST																			WEIGHT	
			MAKE	MODEL	CFM	WATTS	KW INPUT	KW OPERATING	TSP	ESP	W/CFM	CFM	WATTS	KW INPUT	KW OPERATING	TSP	ESP	W/CFM	VOLTAGE	PHASE	HZ	MCA	MOP	RLA	FLA	WINTER	SUMMER	F	OA	RA	LBS	
ERV-1	M1.2	BLDG	RENEWAIRE	HE1.5JUNV-S15SS---DNT---L	1111	719	-	-	-	0.97	-	1085	715	-	-	-	1.01	-	208-230	1	60	7.7	15	-	-	70.3	70.3	54	MERV13	MERV8	504	1-6

NOTES:

1. PROVIDE SEISMIC CALCULATOINS FOR EQUIPMENT OVER 400 LBS.
2. UNIT SHALL OPERATE PER BUILDING OPERATING SCHEDULE.
4. UNIT SHALL BE CONTROLLED THROUGH STANDALONE PACKAGED CONTROLS.
5. PROVIDE REMOTE MOUNTED ELECTRICAL CONTROL BOX.
6. PROVIDE CONDENSATE DRAIN PIPING, FIELD COORDINATE ROUTING.

VARIABLE REFRIGERANT VOLUME - INDOOR UNIT SCHEDULE

TAG	SHEET LOCATION	AREA SERVED	BASIS OF DESIGN (DAIKIN)	NOMINAL TONNAGE	TYPE	CONNECTED TO:		SUPPLY FAN	COOLING CAPACITY				HEATING CAPACITY		ELECTRICAL			DIMENSIONS	WEIGHT	NOTES	ACCESSORIES
						CONDENSING UNIT	ZONE CHANGEOVER DEVICE	AIR FLOW RATE cfm	TOTAL BTU/h	SENSIBLE BTU/h	ENTERING AIR °F DB	ENTERING AIR °F WB	TOTAL BTU/h	ENTERING AIR °Fdb	POWER SUPPLY Voltage - Phase	Min Circuit Amps MCA	Max Overcurrent Protection MOP	HxWxD inch	Net lbs		
FCU-1	M1.1	KITCHEN	FFQ12W2VJU9	1	4-Way Discharge Ceiling Cassette Vista (2' x 2') white	CU-1	NO	425	10,800	-	70	60	13,500	47	208/230-1	5.45	15	10-1/4x22-5/8x22-5/8	36	1-4	
FCU-2	M1.1	OFFICE	FFQ09W2VJU9	0.75	4-Way Discharge Ceiling Cassette Vista (2' x 2') white	CU-1	NO	395	9,100	-	70	60	10,000	47	208/230-1	3.94	15	10-1/4x22-5/8x22-5/8	36	1-4	
FCU-3	M1.2	GATHERING	FBQ36TBVJU	3	MSP Concealed Ducted Unit (Medium Static)	CU-2	NO	1130	35,000	26,400	70	60	40,000	47	208/230-1	3.01	15	9-11/16x55-1/8x31-1/2	101	1-4	
FCU-4	M1.1	MEN'S RESTROOM	FFQ09W2VJU9	0.75	4-Way Discharge Ceiling Cassette Vista (2' x 2') white	CU-3	NO	395	9,100	-	70	60	10,000	47	208/230-1	3.94	15	10-1/4x22-5/8x22-5/8	36	1-4	
FCU-5	M1.1	WOMEN'S RESTROOM	FFQ09W2VJU9	0.75	4-Way Discharge Ceiling Cassette Vista (2' x 2') white	CU-3	NO	395	9,100	-	70	60	10,000	47	208/230-1	3.94	15	10-1/4x22-5/8x22-5/8	36	1-4	
FCU-6	M1.1	STORE	FDMQ09WVJU9	0.75	MSP Concealed Ducted Unit (Medium Static)	CU-3	NO	290	9,000	-	70	60	10,900	47	208/230-1	5.34	15	9-5/8x27-9/16x31-1/2	64	1-4	

NOTES:

1. PROVIDE BUILT-IN CONDENSATE PUMP FOR FCUs. PROVIDE SEPARATE CONDENSATE PUMP FOR DUCT COILS.
2. PROVIDE MERV 13 FILTERS AND FILTER BOXES TO BE SIZED TO MINIMUM PRESSURE DROP DUE TO INCREASED FILTRATION.
3. STANDARD LIMITED WARRANTY: 10-YEAR WARRANTY ON COMPRESSOR AND ALL PARTS.
4. SEE PLANS FOR THERMOSTAT/ROOM SENSOR LOCATIONS.

VARIABLE REFRIGERANT VOLUME - AIR-COOLED CONDENSING UNIT SCHEDULE

TAG	SHEET LOCATION	BASIS OF DESIGN (DAIKIN)	NOMINAL TONNAGE	DESCRIPTION	COOLING CAPACITY		HEATING CAPACITY		REFRIGERANT CHARGE		CONNECTION RATIO (%)	ELECTRICAL												
												VOLTAGE-PHASE	MIN CIRCUIT AMPS (MCA)				MAX OVERCURRENT PROTECTION (MOP)				RUNNING CURRENT(RLA)			
					BTU/h	AMBIENT DESIGN (°F DB)	BTU/h	AMBIENT DESIGN (°F DB / WB)	Factory Charge (lbs)	Add'l Refrigerant (lbs)			mod #1	mod #2	mod #3	total	mod #1	mod #2	mod #3	total	mod #1	mod #2	mod #3	total
CU-1	M1.1	3MXS24WMVJU9	2	3-Port Heat Pump, Ductless ODU	24000		24000					208/230-1				18.1								15.5
CU-2	M1.1	RZQ36TBVJUA	3	Heat Pump, SkyAir ODU	35000		26400					208/230-1				29.1				35				
CU-3	M1.1	3MXS24WMVJU9	2	3-Port Heat Pump, Ductless ODU	24000		24000					208/230-1				18.1								15.5

TAG	DIMENSIONS (WxHxD) (inch)	WEIGHT (lbs)	EFFICIENCY (NonDucted/Ducted or Specific Combo) EER2	IEER	COP47	COP17	SCHE	SEER2	HSPF2	NOTES	ACCESSORIES
CU-1	28-15/16 x 34-1/4 x 12-5/8	140	11.7	-	4.4	-	-	18	9.7	1-19	
CU-2	52-15/16 x 35-7/16 x 12-5/8	225	11.7	-	-	-	-	16.9	8.8	1-19	
CU-3	28-15/16 x 34-1/4 x 12-5/8	140	10.1	-	3.7	-	-	16.45	8.75	1-19	

NOTES:

1. MANUFACTURER MUST BE CERTIEID, LISTED, AND LABELED PER AHRI 1230.
2. SYSTEM RATING DATA BASED ON DESIGN AMBIENT CONDITIONS FOR COOLING AND FOR HEATING.
3. SUBMITTED PERFORMANCE DATA MUST BE FULLY DE-RATED FOR ALL COMPONENTS AND ACCESSORIES, INCLUIDNG BUT NOT LIMITED TO, LINE LENGTH, VERTICAL SEPARATION, CONNECTION RATIO, DESIGN CONDITIONS, CONDENSER COIL COATING.
4. CONDENSING UNITS MUST HAVE FULLY MODULATING INVERTER COMPRESSORS.
5. CONDENSING UNITS MUST HAVE AUTO CHANGEOVER FUNCTIONS.
6. DEMAND LIMIT RELAY CONTACT MUST BE PROVIDED.
7. EEV ACTUATORS MUST BE REMOVEABLE VALVE BODY WITHOUT DISTURBING THE REFRIGERANT SYSTEM.
8. FCU THERMOSTATS MUST PROVIDE +/- 1 DEGREE OF DEAD-BAND SET-POINT AND CONTROL CAPABILITY.
9. SYSTEM SHALL BE PROVIDED WITH I-TOUCH MANAGER CONTROLLER WITH WEB BASED SORTWARE FOR DISPLAYING UP TO 8 DIII-NET SYSTEMS WITH 128 INDOOR UNITS PER SYSTEM. PC BY OTHERS.
10. MANUFACTURERS SUBMITTAL MUST INCLUDE REFRIGERANT PIPING DIAGRAM WITH PIPE DIAMETERS, LENGTHS, AND REFRIGERANT VOLUME.
11. SUBSITUTE MANUFACTURER SHALL BE RESPONSIBLE FOR ADDITIONAL PIPING AND REFRIGERANT.
12. CONTRACTOR TO VERIFY PIPING DIMENSIONS.
13. INSTALLING CONTRACTOR MUST HAVE SUCCESSFULLY COMPLETED MANUFACTURERS CERTIFIED INSTALLATION CLASS WITHIN PAST 36 MONTHS.
14. CONTRACTOR TO FURNISH AND INSTALL INSULATION ON REFRIGERANT PIPING.
15. MANUFACTURERS REPRESENTATIVE MUST HAVE LOCAL STOCK OF PARTS AND FACTORY CERTIFIED TECHNICIAN ON STAFF.
16. MANUFACTURERS REPRESENTATIVE SHALL PROVIDE PROOF OF ONGOING INSTLLATION TRAINING AT THEIR LOCAL FACILITY FOR AT LEAST THE PAST 5 YEARS.
17. MANUFACTURER MUST PROVIDE 10 YEARS PARTS WARRANTY ON ALL FCUS, CONDENSING UNITS, MODE CHANGEOVER DEVICES AND ZONE CONTROLS. WARRANTY CONDITIONS MUST BE CLARIFIED DURING SUMBITTAL PHASE.
18. 3-PHASE AIR COOLED CONDENSING UNITS MUST HAVE PUBLISHED PERFORMANCE DATA WITH 200% INDOOR CONNECTED CAPACITY.
19. CONDENSING UNITS MUST BE FURTNISHED WITH PROTECTIVE COIL COATING TO WITHSTAND ASTM B117 SALT SPRAY TEST FOR A MINIMUM OF 1000 HOURS. PERFORMANCE OF SYSTEM MUST BE DE-RATE FOR COIL COATING.

EXHAUST FAN SCHEDULE

EQUIP ID	SHEET LOCATION	AREA SERVED	LOCATION	CFM	ESP (IN WG)	FAN RPM	MOTOR HP	BHP	VOLTS	PH	FLA	FAN TYPE	DRIVE TYPE	BASIS OF DESIGN MAKE	MODEL	OPERATING WEIGHT LBS	NOTES
KEF-1	M1.1	KITCHEN HOOD	ROOF	1500	1.5	1469	1	0.574	115	1	11.6	UPBLAST	DIRECT	CAPTIVEAIRE	DU85HFA	94	1-4

NOTES:

1. CONTACT VENDOR FOR DRAWINGS FOR ADDITIONAL INFORMATION.
2. PROVIDE DISCONNECT SWITCH.
3. PROVIDE CURB ADAPTOR.
4. PROVIDE GREASE BOX/CUP.

MAKEUP AIR UNIT SCHEDULE

EQUIP ID	SHEET LOCATION	AREA SERVED	BASIS OF DESIGN MAKE	MODEL	FANS SUPPLY CFM	ESP	ELECTRICAL VOLTAGE	PHASE	AMPS	HZ	HEATER KW	TEMP RISE	FILTERS OA	WEIGHT LBS	CONTROL	NOTES
MAU-1	M1.2	KITCHEN	KING ELECTRIC	MAU2415-1-ECM-SSR	1200	0.4	240	1	63	60	15	40	MERV8	74	INTERLOCK WITH KITCHEN EQUIP	1
MAU-2	M1.2	KITCHEN	KING ELECTRIC	MAU2415-1-ECM-SSR	1200	0.4	240	1	63	60	15	40	MERV8	74	INTERLOCK WITH KITCHEN EQUIP	1

NOTES:

1. ECM MOTOR.

CEILING FAN SCHEDULE

EQUIP ID	SHEET LOCATION	AREA SERVED	LOCATION	BASIS OF DESIGN MAKE	MODEL	FAN DIA IN	AREA COVERAGE SQFT	RPM	ELECTRICAL HP	VOLTS	PH	MAX WATTS	OPERATING WEIGHT LBS	NOTES
CF-1	M1.1	LOBBY/GATHERING	HUNG	BIG ASS FANS	ES6	60	-	-		100-240	1	22	25	1-5

NOTES:

1. PROVIDE FIXED WALL CONTROLLER WITH LOCKABLE COVER.
2. CONNECT FAN CONTROLLER TO BUILDING FIRE ALARM SYSTEM.
3. PROVIDE WITH EXTENSION TUBE, FIELD VERIFY TUBE LENGTH AND COORDINATE LENGTH WITH LIGHT FIXTURES, STRUCTURE, SPRINKLERS.
4. FAN SHALL BE TESTED AND LABELED IN ACCORDANCE WITH AMCA 230.
5. CONFIRM COLOR WITH ARCHITECT PRIOR TO ORDERING.

ELECTRICAL WALL HEATER SCHEDULE

EQUIP ID	SHEET LOCATION	AREA SERVED	BASIS OF DESIGN MAKE	MODEL	ELECTRICAL VOLTAGE	PHASE	HZ	WATTS	OPERATING WEIGHT LBS	NOTES
EH-1	M1.1	WATER HEATER	KING	PAW	120	1	60	500	10	1-4
EH-2	M1.2	RESTROOM ATTIC	KING	PAW	120	1	60	500	10	1-4
EH-3	M1.1	KITCHEN ATTIC	KING	PAW	120	1	60	500	10	1-4
EH-4	M1.1	JANITORS	KING	PAW	120	1	60	500	10	1-4

NOTES:

1. PROVIDE REMOTE MOUNTED THERMOSTAT AS NOTED ON PLANS.
2. PROVIDE MOUNTING BRACKET. RECESSED MOUNTED IN FINISHED SPACES, SURFACE MOUNTING IN EQUIPMENT ROOMS UNLESS NOTED OTHERWISE.
3. DISCONNECT BY ELECTRICAL CONTRACTOR.
4. PROVIDE LOCKABLE COVER FOR THERMOSTAT AS INDICATED ON PLANS.

KITCHEN HOOD SCHEDULE

EQUIP ID	SHEET LOCATION	AREA SERVED	LOCATION	CFM	CFM/FT	BASIS OF DESIGN MAKE	MODEL	LENGTH	TYPE	OPERATING WEIGHT LBS	NOTES
KH-1	M1.1	KITCHEN HOOD	KITCHEN	1500	250	CAPTIVEAIRE	6012 SND-2	6'	1	424	1-5

NOTES:

1. CONTACT VENDOR FOR DRAWINGS FOR ADDITIONAL INFORMATION.
2. EXHAUST PLENUM 4" HEIGHT, 12" DIA CONNECTION.
3. CAPTRATE SOLID FILTER, 4 QTY 16x16, 85%.
4. LIGHTS - 2 QTY RECESSED ROUND.
5. WALL MOUNT UTILITY CABINET: 12x42x30, TANK FS FIRE SYSTEM SIZE 4.0, MODEL DCV-101; 240 LBS.

LOW PRESSURE DUCT SIZING REFERENCE TABLE

ROUND DUCT	DUCT LOSS/100 FT	CFM MIN	CFM MAX
4	0.08	0	30
6	0.08	30	80
8	0.08	80	200
10	0.08	200	395
12	0.08	395	600
14	0.08	600	850
16	0.08	850	1200
18	0.08	1200	1600
20	0.08	1600	2200
22	0.08	2200	2800
24	0.08	2800	3600

GRILLE, RESISTER, DIFFUSER SCHEDULE

EQUIP ID	SERVICE	BASIS OF DESIGN	MODEL	DEFLECTION	SPACING	MOUNTING
S-1	SUPPLY	PRICE	610			DUCT/WALL
S-2	SUPPLY	PRICE	SDCA			CEILING
R-1	RETURN	PRICE	530			CEILING
R-2	RETURN	PRICE	530			DUCT/WALL

FILTER HOUSING SCHEDULE

DAIKIN FAN COIL MODEL	MAX AIRFLOW CFM	FPM	HOUSING DIMENSIONS (IN) HxWxD	FILTER QUANTITY	FILTER SIZE HxWxD	REMARKS
FXMQ07	317	228	9.75"x17.125"x18.69"	1	10x20x2	1
FXMQ09	317	228	9.75"x17.125"x18.69"	1	10x20x2	1
FXMQ12	450	270	9.75"x17.125"x24.625"	1	10x24x2	1
FXMQ15	560	280	9.75"x??"x36.4375"	1	12x24x2	1
FXMQ18	635	318	9.75"x??"x36.4375"	1	12x24x2	1
FXMQ24	688	344	9.75"x??"x36.4375"	1	12x24x2	1
FXMQ30	1094	274	9.75"x20.625"x52.1875"	2	12x24x2	1
FXMQ36	1130	283	9.75"x20.625"x52.1875"	2	12x24x2	1
FXMQ48	1377	344	9.75"x20.625"x52.1875"	2	12x24x2	1
FXMQ54	1624	406	9.75"x20.625"x52.1875"	2	12x24x2	1
FXMQ72	2047	307	13"x30.125"x52.125"	2	20x24x2	1
FXMQ96	2541	381	13"x30.125"x52.125"	2	20x24x2	1
FXSQ05	281	202	8.25"x13.5"x21.65"	1	10x20x2	1
FXSQ07	281	202	8.25"x13.5"x21.65"	1	10x20x2	1
FXSQ09	318	228	8.25"x13.5"x21.65"	1	10x20x2	1
FXSQ12	335	242	8.25"x13.5"x21.65"	1	10x20x2	1
FXSQ15	530	265	8.274"x13.5"x27.556	1	12x24x2	1
FXSQ18	600	181	8.274"x13.5"x40"	2	12x20x2	1
FXSQ24	742	225	8.274"x13.5"x40"	2	12x20x2	1
FXSQ30	812	246	8.274"x13.5"x40"	2	12x20x2	1
FXSQ36	1130	283	8.274"x13.5"x50.02"	2	12x24x2	1
FXSQ48	1307	327	8.274"x13.5"x50.02"	2	12x24x2	1
FXSQ54	1377	276	8.274"x13.5"x61"	3	12x20x2	1

NOTES:
1. CONTRACTOR TO MATCH FILTER HOUSING TO FAN COILS PROVIDED ON PROJECT. NOT ALL SIZES MAY BE APPLICABLE TO PROJECT.

SUPPLY, RETURN, EXHAUST AND RELIEF AIR DUCTWORK INSULATION PER 2021 WSEC TABLE C403.10.1.2

DUCT SYSTEM	DUCT LOCATION AND USE	CLIMATE ZONE	MINIMUM INSTALLED DUCT INSULATION R-VALUE (a,b)	NOTES
SUPPLY AIR OR RETURN AIR	OUTSIDE BUILDING (OUTDOORS AND EXPOSED TO WEATHER), c	4C	R-8	SEE SECTION C403.10.1.2 FOR DETAILS
SUPPLY AIR OR RETURN AIR	OUTSIDE BUILDING (OUTDOORS AND EXPOSED TO WEATHER), c	5B	R-12	SEE SECTION C403.10.1.2 FOR DETAILS
SUPPLY AIR OR RETURN AIR	UNCONDITIONED SPACE (ENCLOSED BUT NOT IN THE BUILDING CONDITIONED ENVELOPE)	4C AND 5B	R-6	SEE SECTION C403.10.1.2 FOR DETAILS
SUPPLY AIR OR RETURN AIR	UNCONDITIONED SPACE WHERE THE DUCT CONVEYS AIR THAT IS WITHIN 15°F OF THE AIR TEMPERATURE OF THE SURROUNDING UNCONDITIONED SPACE	4C AND 5B	R-3.3	SEE IMC SECTION 603.12 FOR ADDITIONAL REQUIREMENTS FOR CONDENSATION CONTROL AT DUCTWORK
SUPPLY AIR OR RETURN AIR	WHERE LOCATED IN A BUILDING ENVELOPE ASSEMBLY	4C AND 5B	R-16	DUCT OR PLENUM IS SEPARATED FROM BUILDING ENVELOPE ASSEMBLY WITH THE MINIMUM INSULATION VALUE
SUPPLY AIR	WITHIN CONDITIONED SPACE WHERE THE SUPPLY DUCT CONVEYS AIR THAT IS LESS THAN 55°F OR GREATER THAN 105°F	4C AND 5B	R-3.3	SEE SECTION C403.10.1.2 FOR DETAILS
SUPPLY AIR	WITHIN CONDITIONED SPACE THAT THE DUCT DIRECTLY SERVES WHERE THE SUPPLY DUCT CONVEYS AIR THAT IS LESS THAN 55F OR GREATER THAN 105°F	4C AND 5B	NONE	SEE SECTION C403.10.1.2 FOR DETAILS
SUPPLY AIR	WITHIN CONDITIONED SPACE WHERE THE SUPPLY DUCT CONVEYS AIR THAT IS 55°F OR GREATER AND 105°F OR LESS	4C AND 5B	NONE	
RETURN OR EXHAUST AIR	WITHIN CONDITIONED SPACE, DOWNSTREAM OF AN ENERGY RECOVERY MEDIA, UPSTREAM OF AN AUTOMATIC SHUTOFF DAMPER	4C	R-8	
RETURN OR EXHAUST AIR	WITHIN CONDITIONED SPACE, DOWNSTREAM OF AN ENERGY RECOVERY MEDIA, UPSTREAM OF AN AUTOMATIC SHUTOFF DAMPER	5B	R-12	
RELIEF OR EXHAUST AIR	CONDITIONED SPACE AND DOWNSTREAM OF AN AUTOMATIC SHUTOFF DAMPER	4C AND 5B	R-16	

a. INSULATION R-VALUES, MEASURED IN h·ft²·°F/Btu, ARE FOR THE INSULATION AS INSTALLED AND DO NOT INCLUDE FILM RESISTANCE. THE REQUIRED MINIMUM THICKNESSES DO NO CONSIDER WATER VAPOR TRANSMISSION AND POSSIBLE SURFACE CONDENSATION. INSULATION RESISTANCE MEASURED ON A HORIZONTAL PLANE IN ACCORDANCE WITH ASTM C518 AT A MEAN TEMPERATURE OF 75°F AT THE INSTALLED THICKNESS.

b. SEE INTERNATIONAL MECHANICAL CODE SECTIONS 603.12 AND 604 FOR FURTHER DETAILS ON DUCT INSULATION REQUIREMENTS.

c. INCLUDES ATTICS ABOVE INSULATED CEILINGS, PARKING GARAGES AND CRAWL SPACES.

OUTSIDE AIR DUCTWORK INSULATION PER 2021 WSEC TABLE C403.10.1.1

DUCT SYSTEM	DUCT LOCATION AND USE	CLIMATE ZONE	AIRFLOW	MINIMUM INSTALLED DUCT INSULATION R-VALUE (a,b)	NOTES
OUTDOOR AIR	INSIDE CONDITIONED SPACE AND UPSTREAM OF AUTOMATIC SHUTOFF DAMPER	4C AND 5B	>= 2800 CFM	R-16	SEE SECTION C403.10.1.1 FOR ADDITONAL REQUIREMENTS
OUTDOOR AIR	INSIDE CONDITIONED SPACE AND DOWNSTREAM OF AUTOMATIC SHUTOFF DAMPER TO HVAC UNIT OR ROOM	4C	>= 2800 CFM	R-8	
OUTDOOR AIR	INSIDE CONDITIONED SPACE AND DOWNSTREAM OF AUTOMATIC SHUTOFF DAMPER TO HVAC UNIT OR ROOM	5B	>= 2800 CFM	R-12	
OUTDOOR AIR	INSIDE CONDITIONED SPACE	4C AND 5B	< 2800 CFM	R-7	SEE EXCEPTION 1 TO SECTION C403.10.1.1 FOR ADDITIONAL DETAILS.

a. INSULATION R-VALUES, MEASURED IN h·ft²·°F/Btu, ARE FOR THE INSULATION AS INSTALLED AND DO NOT INCLUDE FILM RESISTANCE. THE REQUIRED MINIMUM THICKNESSES DO NO CONSIDER WATER VAPOR TRANSMISSION AND POSSIBLE SURFACE CONDENSATION. INSULATION RESISTANCE MEASURED ON A HORIZONTAL PLANE IN ACCORDANCE WITH ASTM C518 AT A MEAN TEMPERATURE OF 75F AT THE INSTALLED THICKNESS.

b. SEE INTERNATIONAL MECHANICAL CODE SECTIONS 603.12 AND 604 FOR FURTHER DETAILS ON DUCT INSULATION REQUIREMENTS.

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SCHEDULES

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CONDENSOR SCHEDULE

EQUIP ID	QUANTITY	MANUFACTURER	MODEL	DESCRIPTION	ELECTRICAL				CONDITIONS	EVAPORATOR
					VOLTAGE-PHASE	RLA	MOPD	MCA		
Refrigeration Condensing Unit for Holding freezer	1	HTPG - RUSSELL DOE	RFO230L4SDANT	NEXT-GEN MINI-CON CONDENSING UNIT: LOW TEMPERATURE: SCROLL COMPRESSOR	208-230/1	12.4359	25	17.5	BTUH: 6370 Room Temp: -10°F Ambient: 95°F	Manufacturer: HTPG - RUSSELL DOE Electric defrost LOW-PROFILE WITH DUAL SPEED EC MOTOR : coil • Model: RL6E066DDARE • Extras: None • Electrical: 208-230/1/60, Fan amps 1, Defrost amps 9.8
Condensing Unit for Holding	1	HTPG - RUSSELL DOE	RFO060M4SDANT	NEXT-GEN MINI-CON CONDENSING UNIT: MEDIUM TEMPERATURE: SCROLL COMPRESSOR	208-230/1	5.4	15	15	BTUH: 6580 Room Temp: 35°F Ambient: 95°F	Manufacturer: HTPG - RUSSELL DOE • Description: Air defrost LOW-PROFILE WITH DUAL SPEED EC MOTOR : coil • Model: RL6A052ADARE • Extras: None • Electrical: 115/1/60, Fan amps 0.8, Defrost amps N/A

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SCHEDULES

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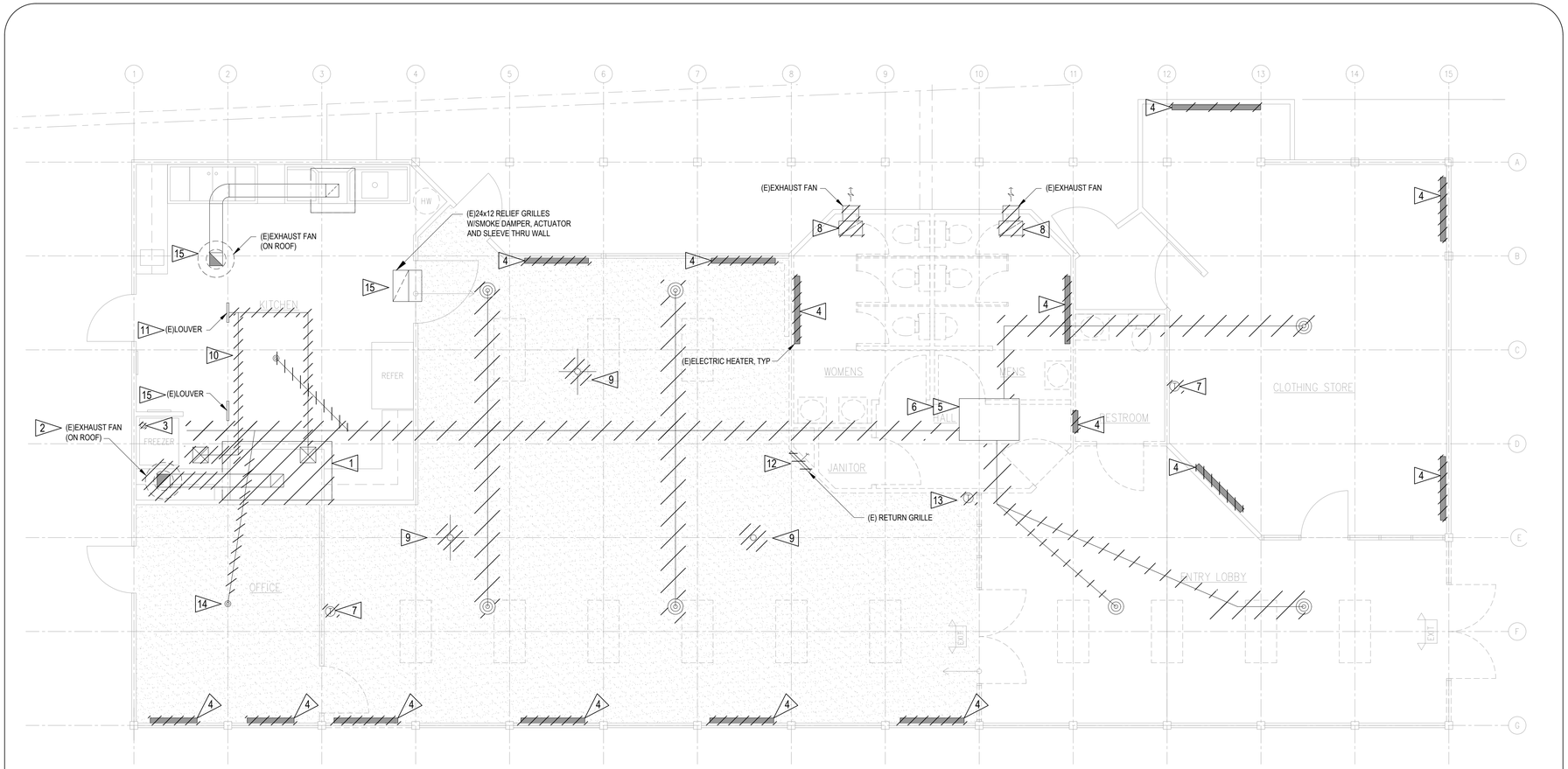

1 M1.0 MECHANICAL DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

N

KEYED NOTES:

1. DEMOLISH EXISTING KTICHEN HOOD AND ACCESSORIES.
2. DEMOLISH EXISTING KITHCEN HOOD EXHAUST FAN, DUCTWORK AND ACCESSORIES. EXISTING CURB TO REMAIN.
3. DEMOLISH EXISTING KITCHEN HOOD FIRE SUPPRESSION SYSTEM.
4. DEMOLISH EXISTING ELECTRIC HEATER.
5. DEMOLISH EXISTING PROPANE FURNACE IN ATTIC.
6. DEMOLISH EXISTING DUCTWORK.
7. DEMOLISH EXISTING THERMOSTAT, WIRING, CONDUIT AND ACCESSORIES.
8. DEMOLISH EXISTING EXHAUST FAN, DUCT AND ACCESSORIES.
9. DEMOLISH EXISTING CEILING FAN AND ACCESSORIES.
10. EXISTING MAKEUP AIR DUCTWORK TO BE DEMOLISHED.
11. EXISTING LOUVER TO BE BLANKED OFF WITH 2" RIGID INSULATION WITH SHEETMETAL BACKING.
12. DEMOLISH EXISTING RETURN GRILLE AND DUCT.
13. DEMOLISH EXISTING THERMOSTAT, WIRING, CONDUIT AND ACCESSORIES.
14. DEMOLISH DUCTWORK. CEILING DIFFUSER TO REMAIN.
15. EXISTING TO REMAIN.

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MECHANICAL DEMOLITION PLAN

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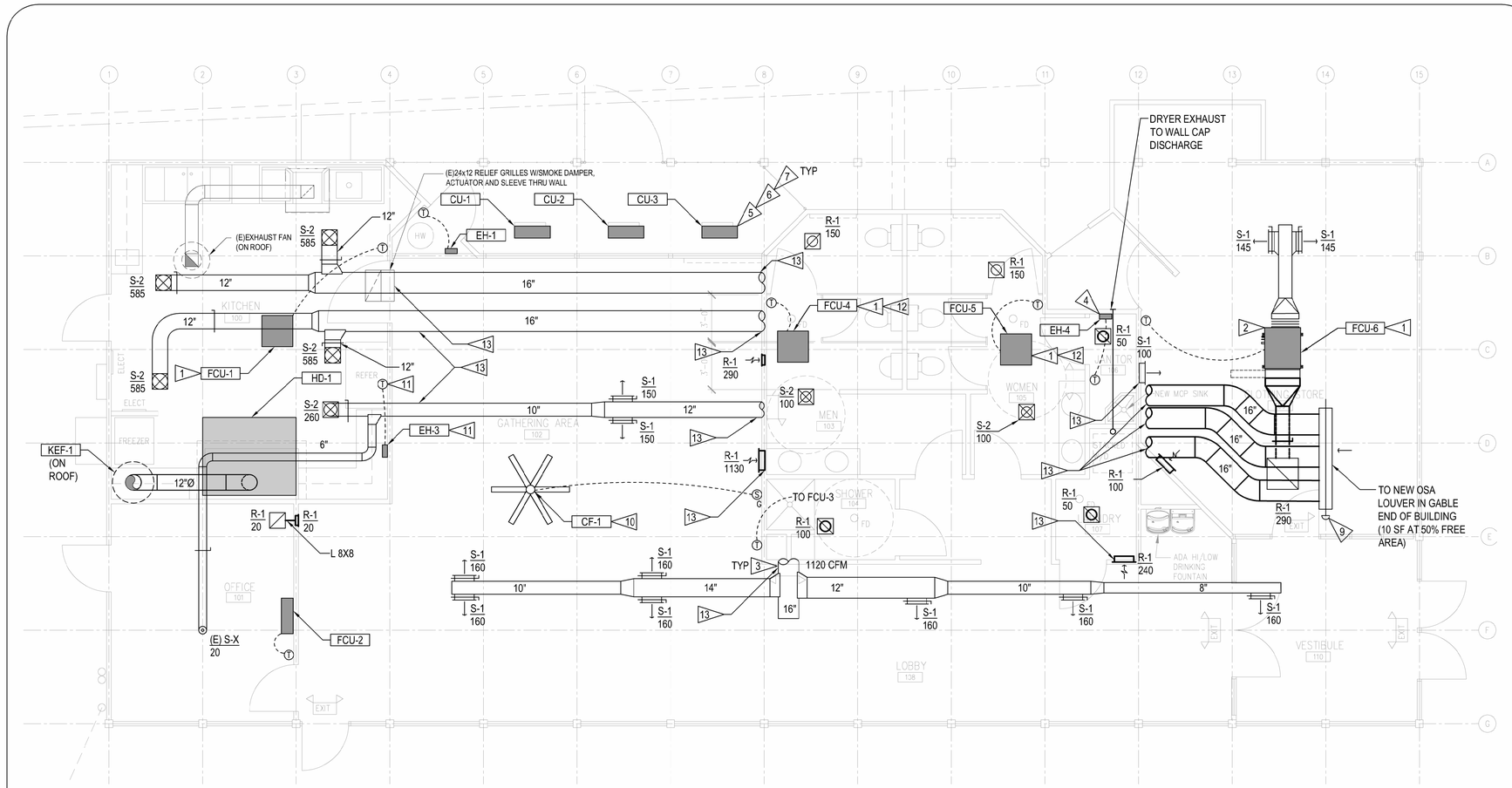

1 M1.1 MECHANICAL PLAN
SCALE: 1/4" = 1'-0"

N

GENERAL NOTES:

1. MAINTAIN MINIMUM 10 FT SEPARATION OF OUTSIDE AIR INTAKES FROM EXHAUST AIR OUTLETS:
   - LOT LINES (ON STREET OR PUBLIC WAY, DISTANCE SHALL BE MEASURED FROM OPPOSITE SIDE OF STREET OR PUBLIC WAY)
   - VENTS
   - STREETS
   - ALLEYS
   - PARKING LOTS
   - LOADING DOCKS
2. EXHAUST AIR OUTLETS, VENTS, FLUES SHALL MAINTAIN A MINIMUM OF:
   - 3 FT FROM OPERABLE OPENINGS (INCLUDES DOORS AND WINDOWS)
   - 3 FT FROM PROPERTY LINES
   - 10 FT FROM OUTSIDE AIR INTAKES
3. CONTRACTOR SHALL COORDINATE LOCATION OF ALL ACCESS DOORS AND PANELS FOR EQUIPMENT AND ACCESSORIES.
4. FIELD COORDINATE CONDENSATE DRAIN PIPING ROUTING TO APPROVED DISCHARGE LOCATION
5. PROVIDE VOLUME DAMPER FOR EACH GRILLE REGISTER AND DIFFUSER DUCT BRANCH

KEYED NOTES:

1. FIELD COORDINATE DRAIN ROUTING.
2. MOUNT HIGH IN SPACE. COORDINATE WITH TRADES.
3. SEE M1.2 FOR CONTINUATION.
4. PROVIDE DRYER EXHAUST WITH WALL CAP DISCHARGE. LOCATE MIN. 3' ABOVE TOP OF DOOR.
5. MAINTAIN DISTANCES FROM WALLS PER MANUFACTURERS INSTRUCTIONS.
6. PROVIDE PIPING VIA WEATHER TIGHT WALL PENETRATION FROM GROUND MOUNTED EQUIPMENT.
7. PROVIDE 4" HOUSEKEEPING PAD.
8. REFER TO CEILING FAN DETAILS FOR INSTALLATION REQUIREMENTS.
9. PROVIDE MOTORIZED DAMPER AT BUILDING ENVELOPE.
10. INSTALL CEILING FAN ABOVE PLANE OF LIGHT AS NOT TO CREATE STROBE AFFECT.
11. LOCATE MEZZANINE ABOVE KITCHEN.
12. COORDINATE FRAMING FOR CASSETTE FAN COIL UNITS.
13. COORDINATE FRAMING THROUGH EXISTING WALLS FOR NEW DUCTS.

13. COORDINATE FRAMING THROUGH EXISTING WALLS FOR NEW DUCTS.

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MECHANICAL PLAN

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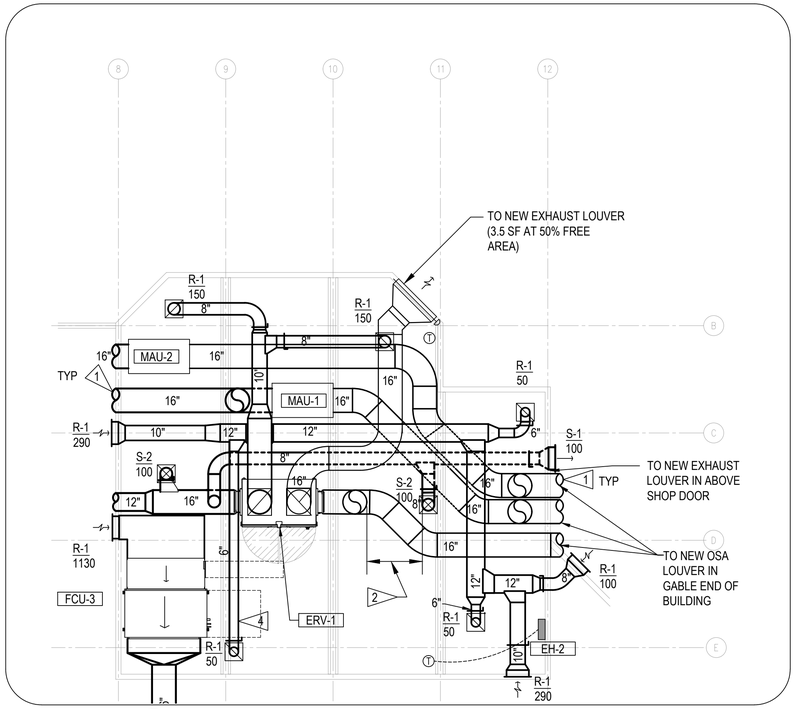
M1.1



1 M1.2 MEZZANINE MECHANICAL PLAN
SCALE: 1/4" = 1'-0"

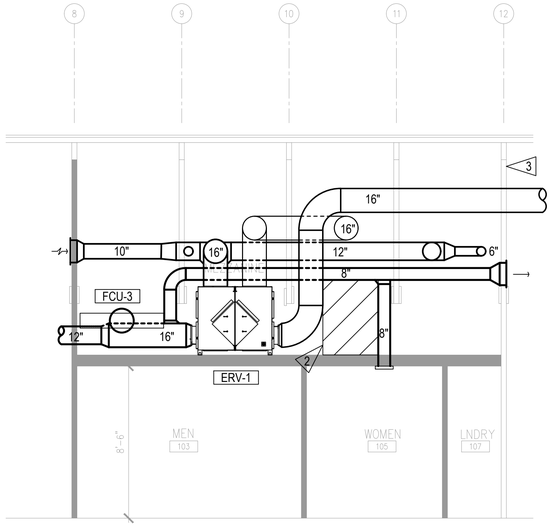
N

GENERAL NOTES:

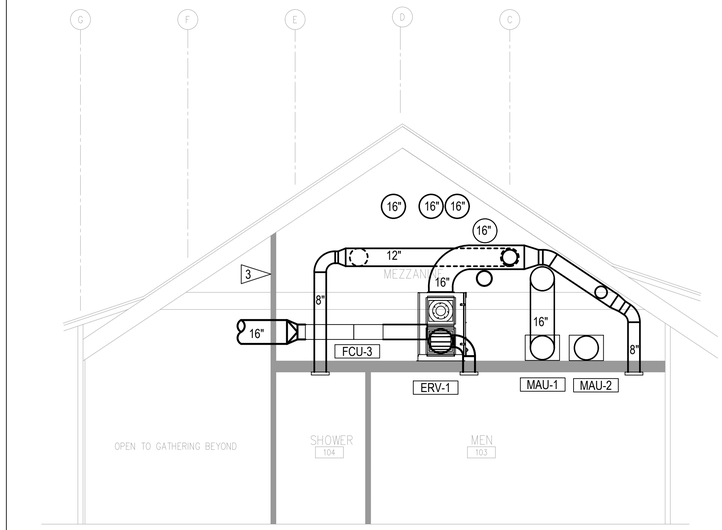
1. MAINTAIN MINIMUM 10 FT SEPARATION OF OUTSIDE AIR INTAKES FROM EXHAUST AIR OUTLETS:
   - LOT LINES (ON STREET OR PUBLIC WAY, DISTANCE SHALL BE MEASURED FROM OPPOSITE SIDE OF STREET OR PUBLIC WAY)
   - VENTS
   - STREETS
   - ALLEYS
   - PARKING LOTS
   - LOADING DOCKS
2. EXHAUST AIR OUTLETS, VENTS, FLUES SHALL MAINTAIN A MINIMUM OF:
   - 3 FT FROM OPERABLE OPENINGS (INCLUDES DOORS AND WINDOWS)
   - 3 FT FROM PROPERTY LINES
   - 10 FT FROM OUTSIDE AIR INTAKES
3. CONTRACTOR SHALL COORDINATE LOCATION OF ALL ACCESS DOORS AND PANELS FOR EQUIPMENT AND ACCESSORIES.
4. FIELD COORDINATE CONDENSATE DRAIN PIPING ROUTING TO APPROVED DISCHARGE LOCATION
5. PROVIDE VOLUME DAMPER FOR EACH GRILLE REGISTER AND DIFFUSER DUCT BRANCH

KEYED NOTES:

1. SEE M1.1 FOR CONTINUATION.
2. MAINTAIN 36" ACCESS PATH.
3. MAXIMIZED DUCT MOUNT HEIGHT IN ATTIC FROM MAINTAINANCE ACCESS.
4. KEEP DUCTS CLEAR OF MAINTAINANCE/ELECTRICAL CLEARANCES
4. PROVIDE MOTORIZED DAMPER AT BUILDING ENVELOPE.



2 M1.2 SECTIONS
SCALE: 1/4" = 1'-0"



2 M1.2 SECTIONS
SCALE: 1/4" = 1'-0"

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MEZZANINE MECHANICAL PLAN

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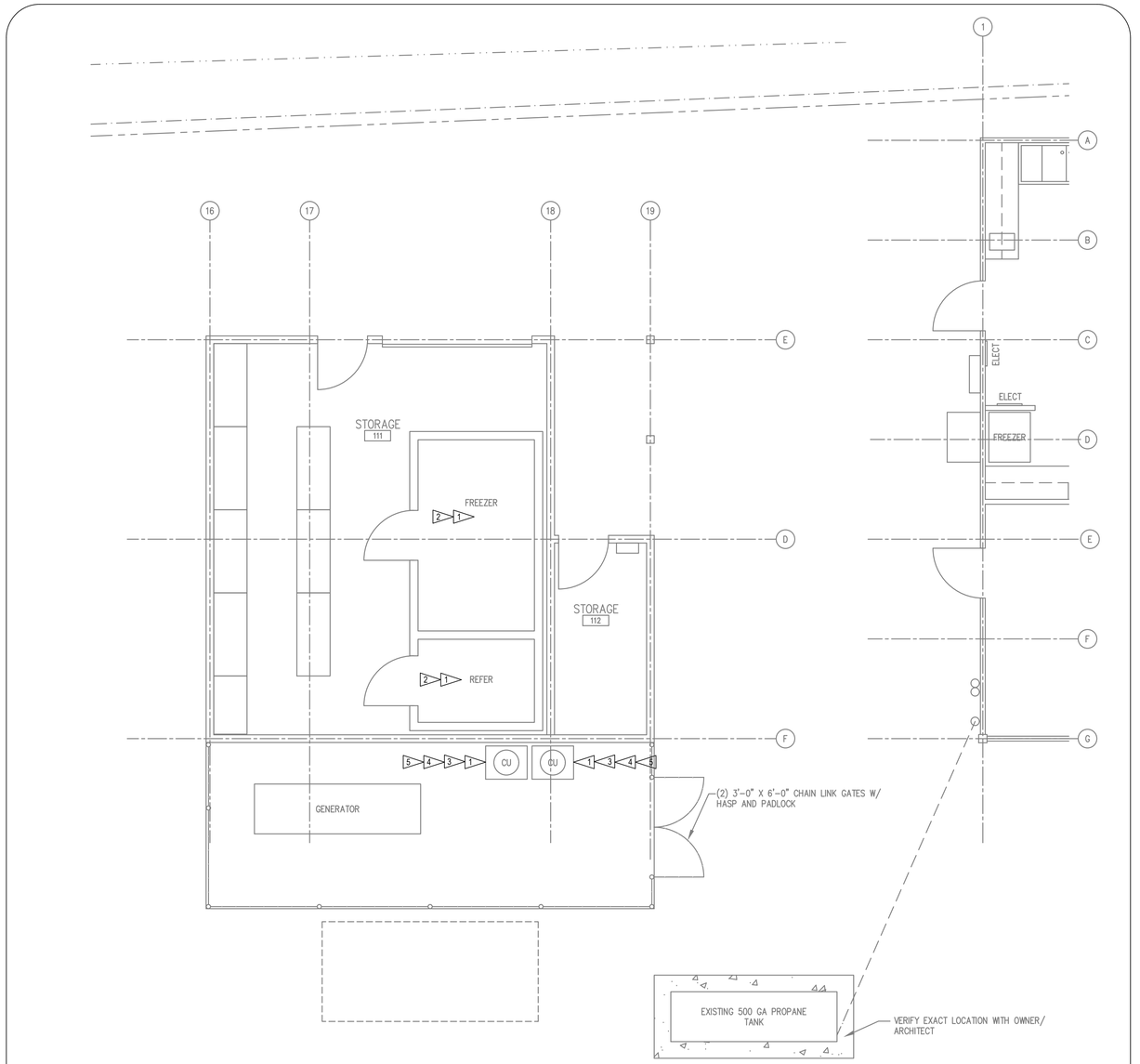
M1.2



1 M1.3 STORAGE MECHANICAL PLAN
SCALE: 1/4" = 1'-0"

N

GENERAL NOTES:

1. MAINTAIN MINIMUM 10 FT SEPARATION OF OUTSIDE AIR INTAKES FROM EXHAUST AIR OUTLETS:
   - LOT LINES (ON STREET OR PUBLIC WAY, DISTANCE SHALL BE MEASURED FROM OPPOSITE SIDE OF STREET OR PUBLIC WAY)
   - VENTS
   - STREETS
   - ALLEYS
   - PARKING LOTS
   - LOADING DOCKS
2. EXHAUST AIR OUTLETS, VENTS, FLUES SHALL MAINTAIN A MINIMUM OF:
   - 3 FT FROM OPERABLE OPENINGS (INCLUDES DOORS AND WINDOWS)
   - 3 FT FROM PROPERTY LINES
   - 10 FT FROM OUTSIDE AIR INTAKES
3. CONTRACTOR SHALL COORDINATE LOCATION OF ALL ACCESS DOORS AND PANELS FOR EQUIPMENT AND ACCESSORIES.
4. FIELD COORDINATE CONDENSATE DRAIN PIPING ROUTING TO APPROVED DISCHARGE LOCATION
5. PROVIDE VOLUME DAMPER FOR EACH GRILLE REGISTER AND DIFFUSER DUCT BRANCH

KEYED NOTES:

1. PROVIDE NEW REFRIGERATION EQUIPMENT.
2. FIELD COORDINATE CONDENSATE DRAIN ROUTING.
3. MAINTAIN DISTANCES FROM WALLS PER MANUFACTURERS INSTRUCTIONS.
4. PROVIDE PIPING VIA WEATHER TIGHT WALL PENETRATION FROM GROUND MOUNTED EQUIPMENT.
5. PROVIDE 4" HOUSEKEEPING PAD.

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STORAGE MECHANICAL PLAN

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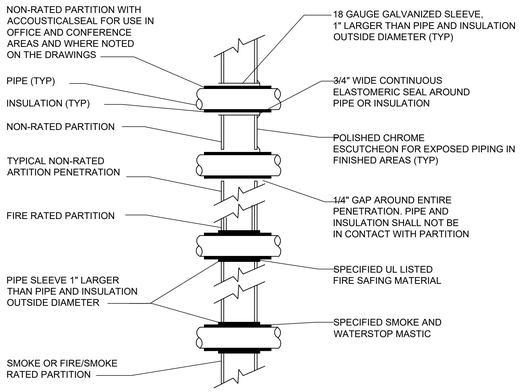
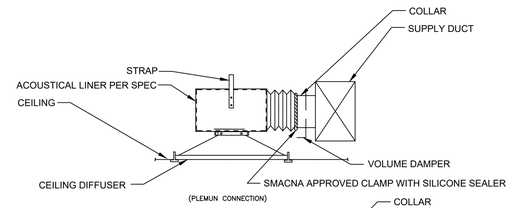


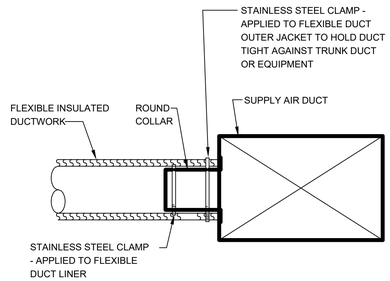
NOTES:
1. FIRE SAFING MATERIAL SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S UL LISTED INSTALLATION INSTRUCTIONS (TYP).
2. UNINSULATED PIPE INSTALLATION IS SIMILAR.

1 TYPICAL PIPE WALL SLEEVES DETAIL
N.T.S.

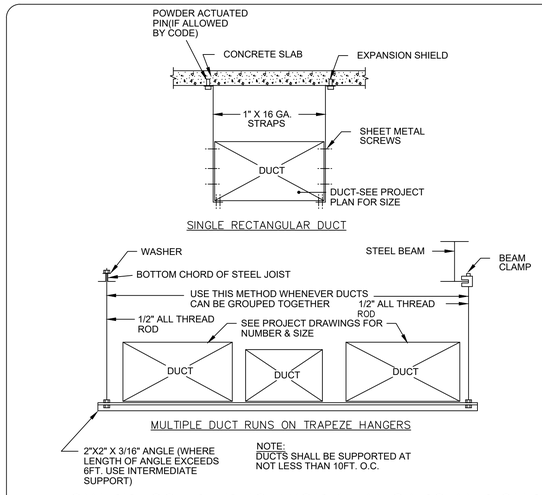


NOTES:
1. FLEXIBLE DUCT CONNECTIONS NOT ALLOWED ABOVE HARDLID/NONREMOVABLE CEILINGS/SOFFITS. PROVIDE RIGID DUCT CONNECTIONS

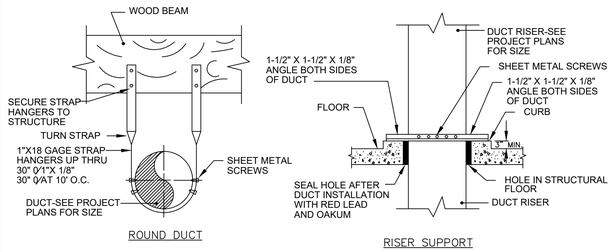
2 DIFFUSER CONNECTION DETAIL
N.T.S. (SIDE OF DUCT CONNECTION)



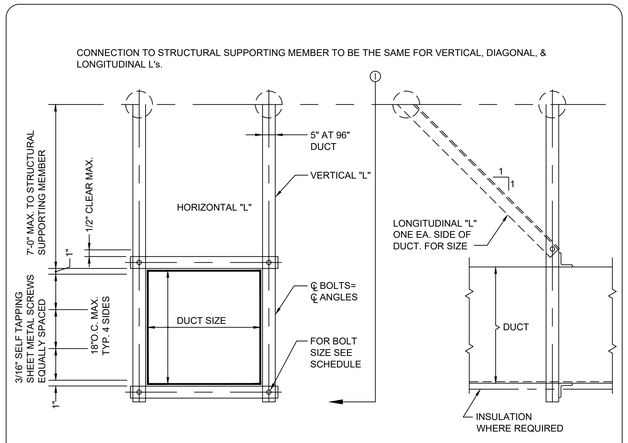
3 TYPICAL FLEXIBLE DUCT CONNECTION DETAIL
N.T.S.



4 LOW PRESSURE DUCTWORK HANGARS AND SUPPORTS
N.T.S. LOW PRESSURE DUCTWORK (UP THRU 2" WG)



5 LOW PRESSURE DUCTWORK HANGARS AND SUPPORTS
N.T.S. LOW PRESSURE DUCTWORK (UP THRU 2" WG)



6 RECTANGULAR DUCT BRACING DETAIL
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DETAILS

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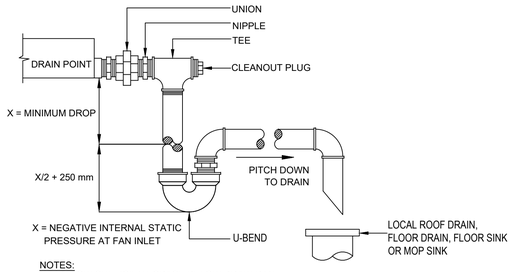
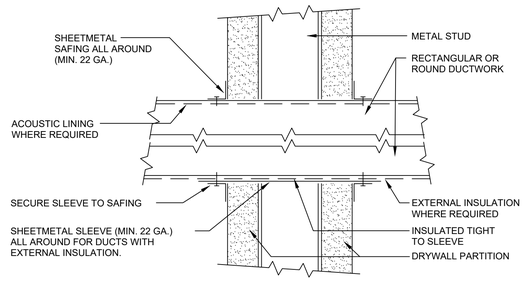
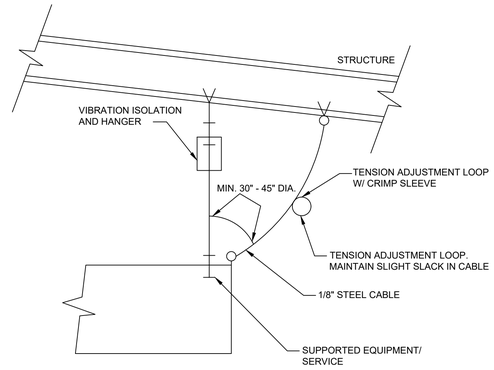


NOTES:
1. ALLOW SUFFICIENT SPACE BELOW DRAIN PAN FOR TRAP.
2. PITCH DRAIN FOR PROPER RUN OFF.
3. MANUALLY PRIME FILL TRAP BEFORE START UP TO FORM INITIAL DRAIN SEAL.
4. INSULATE PIPING PER SPECIFICATIONS.

1 CONDENSATE DRAIN DETAIL
N.T.S.



2 DUCT PENETRATION THROUGH NON-FIRE RATE WALL
N.T.S.



3 SEISMIC SWAY-BRACING DETAIL
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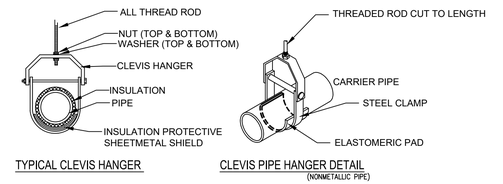
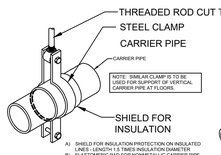
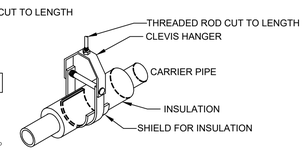


TYPICAL CLEVIS HANGER

CLEVIS PIPE HANGER DETAIL
(NONMETALLIC PIPE)

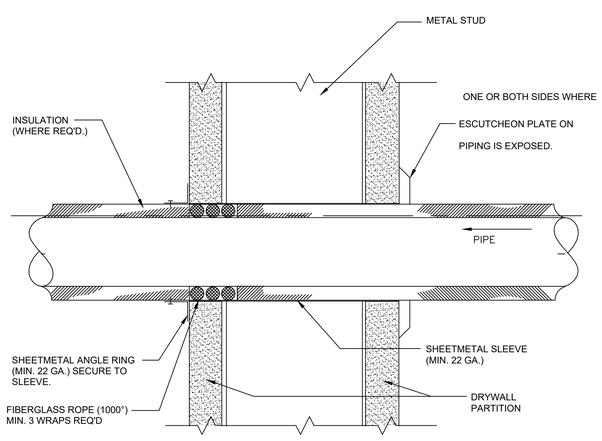


CLAMP TYPE PIPE HANGER DETAIL

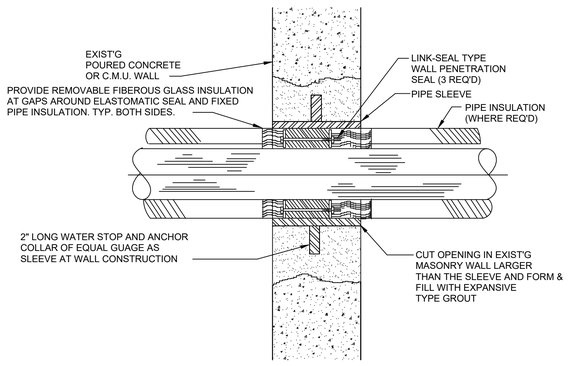


CLEVIS PIPE HANGER DETAIL
(INSULATED PIPE)

4 PIPE HANGER DETAILS
N.T.S.



5 PIPE SLEEVE THROUGH WALL DETAIL
N.T.S.



6 PIPE SLEEVE THROUGH WALL DETAIL
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February 15, 2025

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SKAGIT COUNTY
Growing With Pride
WASHINGTON

SKAGIT COUNTY CONCRETE COMMUNITY CENTER

REVISIONS
- - -

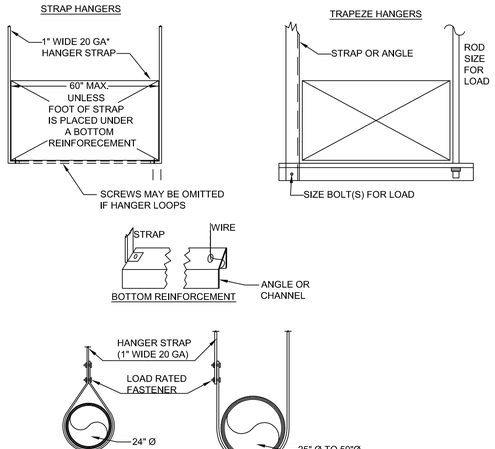
stage. BID SET
client. CARLETTI ARCHITECTS

project. CONCRETE COMMUNITY CENTER
45821 RAILROAD AVE
CONCRETE, WASHINGTON

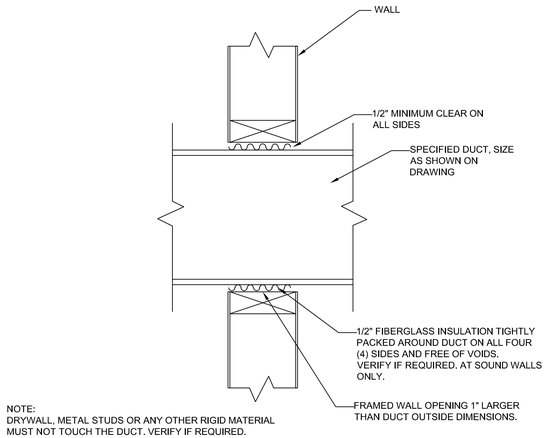
drawn by. NH
original sheet size. 24x36
revision. None
date. 2025.02.18
scale.

DETAILS

sheet. **M3.1**

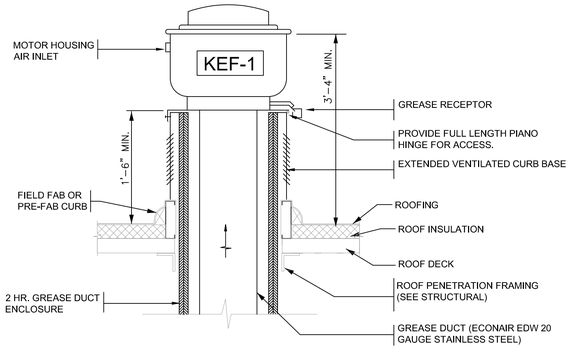


1 LOWER HANGER ATTACHMENTS
N.T.S.



2 SOUND WALL DUCT PENETRATION DETAIL
N.T.S.

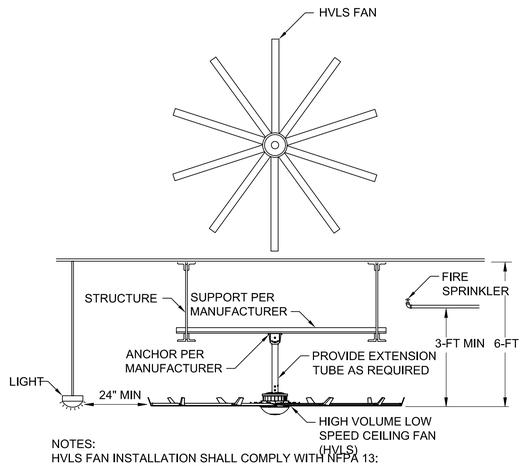
3 RESERVED
N.T.S.



DUCT CLEARANCE NOTES:
PROVIDE LISTED DOUBLE WALL GREASE DUCT OR DOUBLE WALL CHIMNEY FOR INSTALLATIONS WHERE DUCT IS WITHIN 18 INCHES OF COMBUSTIBLE MATERIAL.

SEE ECONAIR VENDOR SHEETS WITHIN THIS SET FOR GREASE DUCT INFORMATION.

4 KITCHEN EXHAUST THRU ROOF DETAIL
N.T.S.



NOTES:
HVLS FAN INSTALLATION SHALL COMPLY WITH NFPA 13:

- MAXIMUM FAN DIAMETER SHALL BE 24FT
- FANS SHALL BE APPROXIMATELY CENTERED BETWEEN FOUR ADJACENT SPRINKLERS
- THE VERTICAL DISTANCE BETWEEN THE HVLS FAN TO THE SPRINKLER DEFLECTOR SHALL BE A MINIMUM OF 3FT
- ALL HVLS FANS SHALL BE INTERLOCKED TO SHUTDOWN IMMEDIATELY UPON RECEIVING A WATER FLOW SIGNAL FROM THE ALARM SYSTEM IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA 72

5 HVLS FAN DETAIL
N.T.S.

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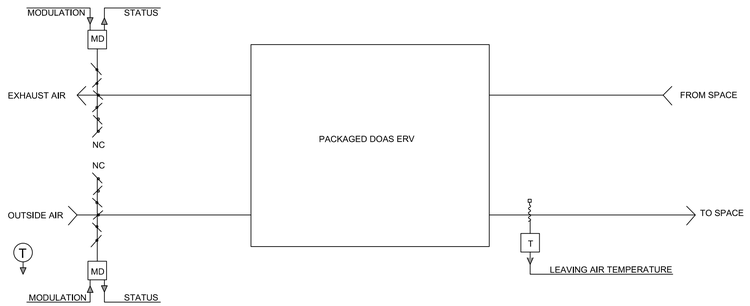


DOAS SYSTEM DESCRIPTION:

DOAS UNIT SHALL OPERATE UNDER FACTORY PACKAGED CONTROLS TO PROVIDE SPACE VENTILATION PER USER DEFINED SCHEDULE.

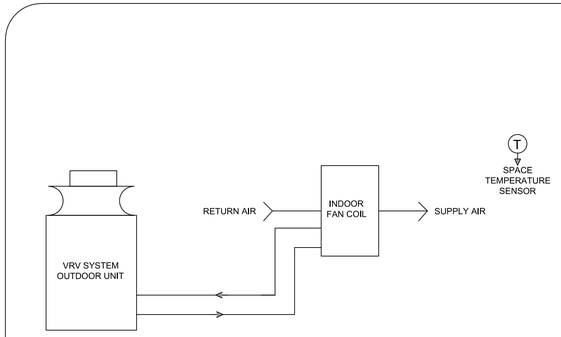
SYSTEM SHALL INTEGRATE ALL AUXILIARY EQUIPMENT, DAMPERS, SENSORS AND ACCESSORIES.

1 DEDICATED OUTDOOR AIR SYSTEM CONTROLS N.T.S.

HVAC CONTROL SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	GATE VALVE	T	ROOM OR ZONE THERMOSTAT, MISC SENSOR
	GLOBE VALVE	T	DUCT THERMOSTAT
	GAS COCK		THERMOMETER
	SOLENOID VALVE		EXPANSION VALVE
	CONTROL VALVE , 2-WAY	MD	DAMPER MOTOR
PRV	PRESSURE REDUCING VALVE		DAMPER
	CHECK VALVE	M	MOTOR
	CENTRIFUGAL FAN PLUG FAN		PLUG VALVE
F	FLOW SWITCH	/	PRESSURE GAGE
FS	FIRE SAFETY SWITCH	P	PRESSURE SWITCH
H	HUMIDISTAT, ROOM		PUMP
H	HUMIDISTAT, DUCT	R	RELAY
	BALL VALVE		PRESS./TEMP. RELIEF VALVE
	CONTROL VALVE , 3-WAY	SD	SMOKE DETECTOR
F	FLOW SWITCH		CONTROL WIRING
	STEAM TRAP	DP	STATIC PRESSURE CONTROLLER

NOTES:
1. CONTRACTOR SHALL PROVIDE ALL PROGRAMMING, LABOR, INTERFACE/INTEGRATION DEVICES AND MATERIALS FOR A FULLY OPERATIONAL CONTROLS SYSTEM.
2. PROVIDE CONTROLS FLOOR PLANS, DRAWINGS, PROGRAMMING AND PRODUCT SUBMITTALS TO ENGINEERING FOR REVIEW.

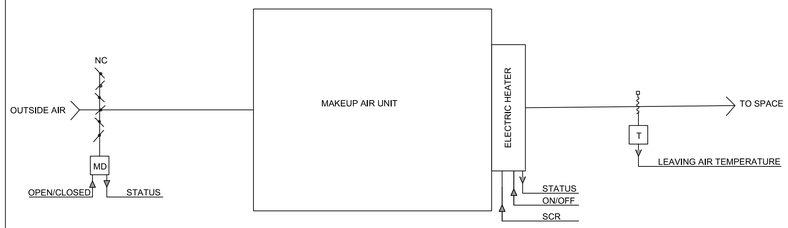


VRV SYSTEM DESCRIPTION:

VRV SYSTEM SHALL OPERATE UNDER FACTORY PACKAGED CONTROLS TO PROVIDE SPACE HEATING/COOLING PER USER DEFINED SCHEDULE AND SET POINTS.

SYSTEM SHALL INTEGRATE ALL AUXILIARY EQUIPMENT, DAMPERS, SENSORS AND ACCESSORIES.

2 VRV HEAT PUMP SYSTEM CONTROLS N.T.S.



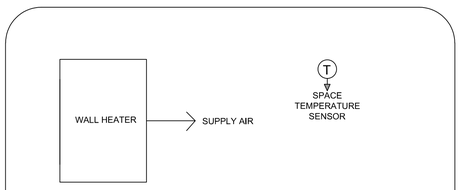
MAKEUP AIR SYSTEM DESCRIPTION:

MAKEUP UNIT SHALL OPERATE UNDER FACTORY PACKAGED CONTROLS TO PROVIDE MAKEUP AIR IN CONJUNCTION WITH KITCHEN EXHAUST SYSTEM OPERATION. UNIT SHALL STAGE CFM BASED ON KITCHEN EQUIPMENT IN OPERATION.

SYSTEM SHALL INTEGRATE ALL AUXILIARY EQUIPMENT, DAMPERS, SENSORS AND ACCESSORIES.

SCR CONTROLLED ELECTRIC DUCT HEATER SHALL MAINTAIN 65F DISCHARGE TEMPERATURE MAXIMUM.

3 MAKEUP AIR SYSTEM CONTROLS N.T.S.

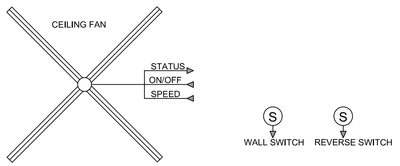


ELECTRIC WALL HEATER SYSTEM DESCRIPTION:

ELECTRIC WALL HEATER SHALL OPERATE UNDER FACTORY PACKAGED CONTROLS TO PROVIDE SPACE HEATING PER USER DEFINED SCHEDULE AND SET POINTS.

SYSTEM SHALL INTEGRATE ALL AUXILIARY EQUIPMENT, SENSORS AND ACCESSORIES.

5 ELECTRICAL WALL HEATER SYSTEM CONTROLS N.T.S.

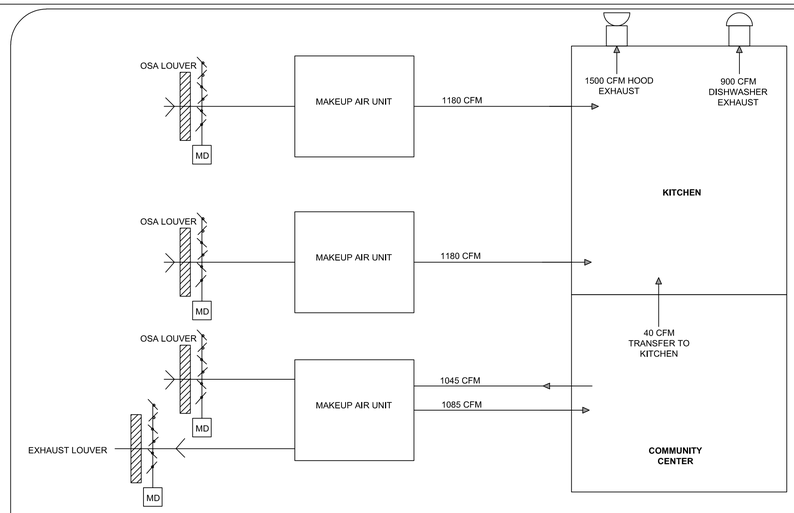


CEILING FAN SYSTEM DESCRIPTION:

CEILING SHALL OPERATE THROUGH WALL SWITCH.

SYSTEM SHALL INTEGRATE ALL AUXILIARY EQUIPMENT, DAMPERS, SENSORS AND ACCESSORIES.

6 CEILING FAN SYSTEM CONTROLS N.T.S.



4 AIR SYSTEM BALANCING DIAGRAM N.T.S.

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CONTROLS

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ABBREVIATIONS

ABV	ABOVE
AFF	ABOVE FINISHED FLOOR
AP	ACCESS PANEL
-	-
BFP	BACK FLOW PREVENTOR
BLDG	BUILDING
BLW	BELOW
BSMT	BASEMENT
-	-
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CHP	CONCRETE HOUSEKEEPING PAD
CI	CAST IRON
℄	CENTER LINE
CLG	CEILING
CO	CLEAN OUT
COL	COLUMN
COMP	COMPRESSOR
CONC	CONCRETE
CONN	CONNECTION
CONT'N	CONTINUATION
CONTR	CONTRACTOR
CP	CONCRETE PIPE
CS	CUP SINK
°C	DEGREES CENTIGRADE
-	-
DIA	DIAMETER
DIAG	DIAGRAM
DISCH	DISCHARGE
DIW	DOWN IN WALL
DN	DOWN
DWG	DRAWING
-	-
(E)	EXISTING
EA	EACH
ELEV	ELEVATION
ENT	ENTERING
EQ	EQUAL
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
ETC	AND SO FORTH
EWC	ELECTRIC WATER COOLER
EW	EYE WASH
EXT	EXTERNAL
-	-
°F	DEGREES FAHRENHEIT
FA	FROM ABOVE
FB	FROM BELOW
FD	FLOOR DRAIN
FIN	FINISHED
FL	FLANGE
FLEX	FLEXIBLE
FLR	FLOOR
FP	FIRE PROTECTION
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FS	FLOW SWITCH
FT	FEET
FTB	FLOOR TO BOTTOM
FTC	FLOOR TO CENTERLINE
FPH	FROST PROOF HYDRANT
FXC	FLEXIBLE CONNECTION
-	-
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
-	-
HT	HEIGHT
HB	HOSE BIBB
HD	HEAD (SEE SCHEDULES)
HR	HOUR
HTR	HEATER
-	-
ID	INTERNAL DIAMETER
INCL	INCLUDING
INV	INVERT
-	-
K	TYPE OF COPPER TUBING
-	-
LT	LEVEL TRANSMITTER
LAV	LAVATORY
MAX	MAXIMUM
MC	MECHANICAL CONTRACTOR
MR	MOP RECEPTOR
MED	MEDIUM
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MTD	MOUNTED
M	TYPE OF COPPER TUBING
(N)	NEW
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NH	NO HUB
No	NUMBER
NO	NORMALLY OPEN
NPW	NON-POTABLE WATER
NOM	NOMINAL
NTS	NOT TO SCALE
OD	OUTSIDE DIMENSION
OPG	OPENING
OS	OPEN SITE
OT	OFF TOP
OZ	OUNCE
-	-
PART	PARTIAL
PDR	PLENUM DRAIN
PERF	PERFORATED
P-	PLUMBING FIXTURE IDENTIFICATION
PH	PHASE
PIV	POST INDICATOR VALVE
POS	POSITIVE
PRESS	PRESSURE
PS	PRESSURE SWITCH
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAUGE
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PT	PRESSURE TRANSMITTER
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE
PVS	POLYVINYL COATED STEEL
PC	PLUMBING CONTRACTOR
PI	PRESSURE INDICATOR
-	-
QUAN	QUANTITY
QD	QUICK DISCONNECT
-	-
RA	RETURN AIR
RAC	RUN ABOVE CEILING
RAF	RUN ABOVE FLOOR
RATC	RUN AT CEILING
RBC	RUN BELOW CEILING
RBF	RUN BELOW FLOOR
RBG	RUN BELOW GRADE
RBJ	RUN BETWEEN JOIST
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
REL	RELIEF
REQD	REQUIRED
RICW	RUN IN CASEWORK
RIE	RUN IN ENCLOSURE
RIW	RISE IN WALL
RM	ROOM
ROD	ROOF OVERFLOW DRAIN
-	-
SA	SHOCK ABSORBER
SCH	SCHEDULE
SCHEM	SCHEMATIC
S/S	SERVICE SINK
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL
SST	SUPPORT STEEL
STD	STANDARD
STL	STEEL
STR	STRUCTURAL
SUP	SUPPLY
SYS	SYSTEM
SIP	STEAM IN PLACE
S/SHO	SAFETY SHOWER
-	-
TDH	TOTAL DYNAMIC HEAD
TEMP	TEMPERATURE
TP	TOTAL PRESSURE
TT	TEMPERATURE TRANSMITTER
TYP	TYPICAL
TI	TEMPERATURE INDICATOR
-	-
VI	VIBRATION ISOLATOR
VTR	VENT THRU ROOF
-	-
W	WIDTH
W/	WITH
W/O	WITHOUT
WC	WATER CLOSET
WCH	WATER CLOSET-HANDICAPPED
WM	WATER METER
-	-

PIPING ELEMENTS/VALVING

- PRESSURE REDUCING VALVE (PRV)
- GATE VALVE
- GLOBE VALVE
- PLUG VALVE
- BUTTERFLY VALVE
- VALVE IN RISE OR DROP
- BALL VALVE
- SWING CHECK VALVE
- LIFT CHECK VALVE
- GATE VALVE, ANGLE
- GLOBE VALVE, ANGLE
- THREE WAY CONTROL VALVE
- TWO WAY CONTROL VALVE
- SOLENOID VALVE
- TEMPERATURE AND PRESSURE RELIEF VALVE
- RELIEF/SAFETY VALVE
- GAS COCK
- GAS PRESSURE REGULATOR
- STRAINER
- STRAINER WITH BLOW OFF VALVE
- FLEXIBLE-CONNECTION
- SPRINKLER HEAD
- PIPE RISING UP
- PIPE DROPPING DOWN
- UNION - SCREWED OR FLANGED
- FS — FLOW SWITCH
- TT — TEMPERATURE TRANSMITTER
- PT/PS — PRESSURE TRANSMITTER OR PRESSURE SWITCH
- TH/TI — THERMOMETER/TEMPERATURE INDICATOR
- PI/GA — GAUGE WITH GAUGE COCK/ PRESSURE INDICATOR
- BACKFLOW PREVENTOR (REDUCED ZONE)
- BACKFLOW PREVENTOR (DOUBLE CHECK VALVE ASSEMBLY)
- SA — WATER HAMMER ARRESTER
- CBV — CIRCUIT SETTING BALANCING VALVE
- HB — HOSE BIBB
- RD — ROOF DRAIN
- OS — OPEN SITE DRAIN
- FD — FLOOR DRAIN
- ADR — AREA DRAIN
- TD — TRENCH DRAIN & SPEC REFERENCE
- CO — CLEANOUT
- CO — WALL CLEAN OUT

GENERAL SYMBOLS

E	EXISTING EQUIPMENT TO REMAIN
R	EXISTING EQUIPMENT TO BE REMOVED
ER	EXISTING EQUIPMENT TO BE RELOCATED
RE	RELOCATED EXISTING EQUIPMENT

REFERENCE SYMBOLS

- AHU-01 — EQUIPMENT IDENTITY (SEE EQUIPMENT ABBREVIATION LIST AND SCHEDULES) / EQUIPMENT NUMBER
- X / X — INDICATES DETAIL LETTER (APPLIES ONLY WHERE INDICATED ON DRAWINGS) / INDICATES DRAWING ON WHICH DETAIL APPEARS
- X / X — INDICATES SECTION NUMBER / INDICATES ON WHICH DRAWING SECTION APPEARS
- X / X — INDICATES RISER DESIGNATION / INDICATES PIPE SIZE
- X — INDICATES REVISION & NUMBER
- X — LOCATION POINT FOR COORDINATION BETWEEN FLOOR PLANS & PIPING DIAGRAMS (NUMBER)
- CONNECT NEW TO EXISTING
- TERMINATION POINT OF DEMOLITION
- CONNECT TO MANUFACTURER'S PREPIPED CONNECTION
- POINT OF BEAM PENETRATION
- PREPURCHASED EQUIPMENT
- X — STACK/VENT THRU ROOF NUMBER
- X — SHEET NOTE NUMBER

PIPING SYMBOLS

- EXISTING PIPING TO REMAIN (SERVICE AS INDICATED)
- EXISTING PIPING TO BE REMOVED (SERVICE AS INDICATED)
- NEW PIPING (SERVICE AS INDICATED)
- PIPE RISING UP
- PIPE DROPPING DOWN
- DIRECTION OF FLOW
- DIRECTION OF PITCH
- BS — BRINE SUPPLY
- BR — BRINE RETURN
- CWS — CONDENSER WATER SUPPLY
- CWR — CONDENSER WATER RETURN
- CHWS — CHILLED WATER SUPPLY
- CHWR — CHILLED WATER RETURN
- CGS — CHILLED GLYCOL SUPPLY
- CGR — CHILLED GLYCOL RETURN
- DOMESTIC COLD WATER
- DOMESTIC HOT WATER
- DOMESTIC HOT WATER CIRCULATION
- HGS — HEATING HOT GLYCOL SUPPLY
- HGR — HEATING HOT GLYCOL RETURN
- HWS — HEATING HOT WATER SUPPLY
- HWR — HEATING HOT WATER RETURN
- G — NATURAL GAS
- N — NITROGEN
- O_2 — OXYGEN
- LV — LABORATORY VACUUM
- A — COMPRESSED AIR
- LPS — LOW PRESSURE STEAM (PSI 15)
- MPS — MEDIUM PRESSURE STEAM (PSI 30)
- HPS — HIGH PRESSURE STEAM (PSI 125)
- LPC — LOW PRESSURE CONDENSATE
- PC — PUMPED CONDENSATE
- SP — SPRINKLER PIPING
- GATE VALVE
- GLOBE VALVE
- CIRCUIT BALANCING VALVE
- P.V. — PLUG VALVE
- BUTTERFLY VALVE
- BALL VALVE
- CHECK VALVE
- AUTOMATIC CONTROL VALVE
- AUTOMATIC CONTROL VALVE (3-WAY)
- SOLENOID VALVE
- PRESSURE REDUCING VALVE (PSI)
- RELIEF SAFETY VALVE (PSI)
- TEMPERATURE AND PRESSURE RELIEF VALVE
- FLOAT AND THERMOSTATIC TRAP
- BUCKET TRAP
- THERMOSTATIC AIR VENT
- V.B. — VACUUM BREAKER
- THERMOSTATIC TRAP
- BOILER FEED WATER
- BD — BOILER BLOW DOWN
- CF — CHEMICAL FEED
- V — VENT PIPING
- VTR — VENT THRU ROOF
- R — RELIEF PIPING
- FL — FILL LINE
- OF — OVERFLOW
- D — DRAIN
- RS — REFRIGERANT SUCTION
- RL — REFRIGERANT LIQUID
- FOS — FUEL OIL SUPPLY
- FOR — FUEL OIL RETURN
- STRAINER
- UNION-SCREWED OR FLANGED
- A — ANCHOR
- G — GUIDE
- EJ — EXPANSION JOINT - BELLOWS
- FLOW METER
- VENTURI METER
- F.S. — FLOW SWITCH
- THERMOMETER
- GAUGE W/GAUGE COCK AND SNUBBER (WATER)
- GAUGE W/GAUGE COCK AND SYPHON (STEAM)
- MANUAL AIR VENT
- AUTOMATIC AIR VENT (EXTEND DISCH. TO DRAIN)
- HEAT TRACED PIPE
- PIPE WELL
- PIPE CAP
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- PIPE CONNECTION/FITTING

DRAWING INDEX

NOTE:
ALL ABBREVIATIONS AND SYMBOLS MAY NOT APPEAR ON THE DRAWINGS FOR THIS PROJECT.

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LEGENDS AND ABBREVIATIONS

sheet. P0.0

GENERAL PLUMBING NOTES

GENERAL

CONTRACTOR SHALL COORDINATE AND PROVIDE ALL NECESSARY PIPING & PLUMBING FITTINGS, PIPING, MISCELLANEOUS ITEMS REQUIRED FOR A COMPLETE INSTALLATION OF ALL PLUMBING RELATED ITEMS.

THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL UNDER SLAB PIPING WITH EXISTING STRUCTURAL FOUNDATIONS. UNDERGROUND UTILITY LOCATIONS SHALL BE VERIFIED PRIOR TO ANY WORK BEING PERFORMED. CONTRACTOR SHALL REPAIR OR REPLACE ALL PIPING NOT IN PROPER WORKING ORDER OR DAMAGED DURING INSTALLATION OF THE NEW UNDERGROUND PIPING.

ALL PLUMBING & PIPING SYSTEMS SHALL BE SUPPORTED AS REQUIRED BY THE LOCAL CODE REQUIREMENTS AND PER MANUFACTURER'S RECOMMENDATIONS.

ALL PIPING PENETRATIONS THROUGH NEW, EXISTING WALL, OR FLOOR SHALL BE SEALED TO EQUAL THE RATING OF THE NEW, EXISTING WALL OR FLOOR.

THE PLUMBING SYSTEM SHALL BE TESTED AS REQUIRED BY LOCAL CODE OR BY THE REQUIREMENTS OF THE LOCAL PLUMBING INSPECTOR. PROVIDE REPORT TO ENGINEER. DO NOT COVER PIPING UNTIL APPROVED BY ENGINEER AND PLUMBING INSPECTOR.

PVC PIPING SHALL NOT BE USED IN THE AIR PLENUM FLOOR/CEILINGS AND SHALL NOT CROSS FIRE RATED WALLS, CEILINGS, OR FLOORS.

STUB-UPS SHALL BE COORDINATED WITH GENERAL CONTRACTOR FOR SLAB INSTALLATION AND CONNECTION OF PIPING SYSTEMS.

COORDINATE PIPING INSTALLATION WITH FOUNDATIONS AND FOOTINGS. FIELD ADJUST AS REQUIRED IF INSUFFICIENT SPACE BETWEEN SLAB AND FOUNDATION OR FOOTING. COORDINATE WITH ENGINEER PRIOR TO INSTALLATION IF ADJUSTMENT IS REQUIRED.

COORDINATE UTILITY TIE-IN LOCATIONS AND ELEVATIONS WITH CIVIL DRAWINGS AND CIVIL CONTRACTOR.

HOT WATER SUPPLY SYSTEM SHALL BE COMMISSIONED PER WASHINGTON STATE ENERGY CODE.

PROVIDE BACKFLOW DEVICE FOR ALL CODE REQUIRED FIXTURES AND EQUIPMENT INCLUDING BUT NOT LIMITED TO:

- DISHWASHERS
- ICE MACHINES
- COFFEE/ESPRESSO MACHINES
- SODA MACHINES
- GLASS WASHERS
- DIPPER WELLS

TESTING OF SYSTEMS:

PLUMBING SYSTEMS SHALL BE TESTED AND APPROVED IN ACCORDANCE WITH THE UNIFORM PLUMBING CODE OR AS REQUIRED BY THE AUTHORITY HAVING JURISDICTION. TESTS SHALL BE CONDUCTED IN THE PRESENCE OF THE AUTHORITY HAVING JURISDICTION OR DULY APPOINTED REPRESENTATIVE.

SPECIFICATIONS

REFER TO M0.1 AND M0.2 SPECIFICATIONS SHEETS FOR GENERAL REQUIREMENTS

PIPE SUPPORTS

PIPING SUPPORTS (BELOW GRADE):

BELOW GRADE EARTH SHALL BE EXCAVATED TO A MINIMUM DEPTH WITH AN EVEN SURFACE TO INSURE SOLID BEARING OF PIPE FOR ITS ENTIRE LENGTH.

INTERIOR: THE PIPE SHALL BE INSTALLED (UNLESS OTHER-WISE SPECIFIED) A MINIMUM OF 4 INCHES BELOW THE BOTTOM OF THE SLAB AND SHALL NOT BE IN ANY DIRECT CONTACT WITH THE CONCRETE AT ANY POINT. INSTALL INTERIOR PIPING BELOW CAPILLARY BREAK LAYER.

EXTERIOR: THE WATER PIPE SHALL HAVE A MINIMUM OF 42" OF COVER AND THE SANITARY WASTE PIPE SHALL HAVE A MINIMUM OF 24" OF COVER.

PIPE SUPPORTS (ABOVE GRADE):

ALL PIPE SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE IN A NEAT AND WORKMANLIKE MANNER. THE USE OF WIRE AND PERFORMED METAL TO SUPPORT PIPES WILL NOT BE PERMITTED. SPACING OF PIPE SUPPORTS SHALL BE AS SPECIFIED IN THE UNIFORM PLUMBING CODE.

HANGARS AND SUPPORTS SHALL BE PROVIDED BY TABLE 313.3 OF THE UNIFORM PLUMBING CODE FOR THE RESPECTIVE PIPE MATERIAL.

VENT PIPING

ALL FIXTURES SHALL BE TRAPED AND VENTED PER CODE.

ALL VENT PIPING SHALL BE SLOPED TO DRAIN BACK TO FIXTURES.

CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER FLASHING OF THE VENT PIPING RUN THROUGH THE ROOF.

ADJACENT VENTS SHALL BE GROUPED AS ALLOWED BY CODE TO MINIMIZE ROOF PENETRATIONS.

ALL STUB-INS AND/OR SLAB OR WALL PENETRATION TO BE PER UNIFROM PLUMBING CODE. ALL PIPING PENETRATIONS OF BUILDING FOUNDATIONS OR FOOTINGS SHALL BE SLEEVED.

ALL (VTR'S) VENT THRU ROOF PENETRATIONS INDICATED ON PLANS ARE PRELIMINARY. FINAL LOCATIONS SHALL BE COORDINATED WITH ALL TRADES. ALL VTR'S SHALL BE A MINIMUM OF 10'-0" FROM ALL FRESH AIR INTAKE OPENINGS.

PIPING SHALL BE ASTM A74 STANDARD WEIGHT HUBLESS CAST IRON PIPE, CISPI 301.

COUPLINGS SHALL BE SHALL BE NEOPRENE SLEEVE GASKET, STAINLESS STEEL SHIELD AND BANDS.

FITTINGS SHALL BE HUBLESS CAST IRON CISPI 301, ANSI A112.5.1 AND ASTM A74.

VENT CAPS:

PROVIDE FOUR POUND SHEET LEAD FLASHING AND COUNTER-FLASHING NOT LESS THAN 16" SQUARE. TURN DOWN COUNTER FLASHING INSIDE THE VET AT LEAST 1".

WASTE AND VENT PIPING

DRAINAGE PIPING SHALL BE RUN AS STRAIGHT AS POSSIBLE AND SHALL HAVE LONG TURN FITTINGS.

ALL HORIZONTAL WASTE PIPING SHALL BE INSTALLED AT 1/4" PER FOOT SLOPE. 4" AND LARGER PIPING MAY BE INSTALLED AT 1/8" PER FOOT SLOPE ONLY IF NECESSARY AND WHEN APPROVED BY THE AHJ.

PIPING SHALL BE ASTM A74 STANDARD WEIGHT HUBLESS CAST IRON PIPE, CISPI 301.

COUPLINGS SHALL BE SHALL BE NEOPRENE SLEEVE GASKET, STAINLESS STEEL SHIELD AND BANDS.

FITTINGS SHALL BE HUBLESS CAST IRON CISPI 301, ANSI A112.5.1 AND ASTM A74.

WATER PIPING

ALL COMPONENTS THAT ARE PART OF THE DOMESTIC WATER SYSTEM SHALL COMPLY WITH NSF-61, INCLUDING BUT NOT LIMITED TO PIPING, VALVES, SOLDER, SEALANTS, PUMPS, EQUIPMENT AND ACCESSORIES.

PIPING:

SHALL BE TYPE L COPPER WATER TUBE, HAND DRAWN, ASTM B88 OR PEX UPONOR OR EQUAL. PEX PIPING SHALL BE UPSIZED PER UNIFORM PLUMBING CODE TO ACCOUNT FOR PIPE VELOCITY.

FITTINGS AND ADAPTORS:

SHALL BE WROUGHT COPPER SOLDER OR SCREWED PER ANSI B16.22.J.

SOLDER:

SHALL BE 95% TIN, 5% ANTIMONY SOLDER PER ASTM 32, 95TA.

BASIC MATERIALS AND METHODS

UNIONS:

PROVIDE UNIONS AS REQUIRED FOR DISCONNECTION FOR PIPING FOR MAINTENANCE AND REPAIR OF SYSTEM. PROVIDE VALVES AND UNIONS AT EQUIPMENT CONNECTIONS.

PROVIDE INSULATING UNIONS AT CONNECTIONS BETWEEN DISSIMILAR METALS.

NIPPLES:

PROVIDE STANDARD SHORT NIPPLES OR BUSHING FOR SHORT PIPE CONNECTIONS. CLOSE NIPPLES NOT ALLOWED.

AIR ELIMINATORS:

PROVIDE AIR ELIMINATORS AT HIGH POINTS OF SYSTEM WHERE NO FIXTURES IS AVAILABLE FOR VENTING OF AIR.

PROVIDE DRIP PAN AT EACH LOCATION.

MANUFACTURER TACO HYVENT OR EQUAL.

PRESSURE RELIEF VALVES:

PROVIDE AS REQUIRED BY UNIFORM PLUMBING CODE FOR PROTECTION OF EQUIPMENT AND PIPING.

ISOLATION VALVES:

PROVIDE LINE SIZED ISOLATION VALVES ON ALL BRANCH PIPING TAKE OFFS FOR CW, HW, HWC.

PROVIDE ISOLATION VALVES ON CONNECTIONS TO EQUIPMENT.

SMALL VALVES UNDER 2-1/2" SHALL BE BALL VALVES, WW-V-35, 250-PSIG BRONZE OR BRASS BODY, BALL AND STEM, SOLDERED OR SCREWED ENDS. TEFLON SEAT AND SEAL.

LARGE VALVES 2-1/2" AND GREATER SHALL BE BUTTERFLY TYPE, DUCTILE IRON BODY, 400 SERIES STAINLESS STEEL STEM, ALUMINUM BRONZE DISC, EPDM LINER AND SEALS, UPPER AND LOWER STEM BEARING, BLOWOUT PROOF STEM, EXTENDED NECK FOR 2" MINIMUM INSULATION.
BI-DIRECTIONAL DEAD END SERVICE AT FULL RATED PRESSURE WITHOUT A DOWNSTREAM FLANGE.

- 2-1/2" THRU 4" LEVER OPERATED, 200 PSI CWP
- 6" THRU 12" SHALL BE GEAR OPERATED, 150 PSI CWP

CHECK VALVES:

SHALL BE BALL BRONZE BODY AND DISC, SOLDERED JOINT ENDS, HORIZONTAL SWING CHECK, SCREWED CAP, 125 WSP, 200 WOG.

GATE VALVES:

SHALL BE BALL VALVES, MSS SP80, 125-PSIG BRONZE BODY, SCREWED OR SOLDERED ENDS, UNION BONNET, RISING STEM, SOLID BRONZE DISC.

BALANCING VALVES:

PROVIDE BELL AND GOSSETT RS-1/2S OR EQUAL.

THERMAL MIXING VALVES:

LAVATORY MIXING VALVES SHALL BE WATTS HYDROGUARD LFL

MASTER MIXING VALVES SHALL BE WATTS HYDROGUARD XP LF

EMERGENCY MIXING VALVES SHALL BE WATTS HYDROGUARD XP ETV

BACKWATER VALVES:

SHALL BE WATTS BV-200 OR EQUAL

TRAP PRIMERS:

TRAP PRIMER LINES SHALL BE 1/2" COPPER.

VACUUM BREAKER TYPE SHALL BE PRECISION PLUMBING PRODUCTS OR EQUAL

ELECTRONIC TRAP PRIMER SHALL BE PRECISION PLUMBING PRODUCTS PT SERIES OR EQUAL

MECHANICAL TRAP PRIMER SHALL BE J.R. SMITH 2699 OR EQUAL

DRAINAGE TRAP PRIMER SHALL BE J.R. SMITH 2698 OR EQUAL

CLEANOUTS:

PROVIDE CLEANOUTS AT THE BASE OF ALL SANITARY DRAINAGE, PROCESS WASTE, AND RAIN WATER CONDUCTORS.

LOCATE CLEANOUTS SUCH THAT THEY CAN BE SERVICED FROM CORRIDORS, TOILERS OR JANITOR AREAS AS FEASIBLE.

NOT ALL CLEANOUTS THAT MAY BE REQUIRED ARE SHOWN ON DRAWINGS. FIELD COORDINATE LOCATION OF CLEANOUTS IN ACCORDANCE WITH UNIFORM PLUMBING CODE.

FLOOR CLEANOUTS SHALL BE J.R. SMITH 4023, CAST IRON WITH ROUND ADJUSTABLE SCORIATED SECURED NICKLE BRONZE TOP OR EQUAL.

WALL CLEANOUTS SHALL BE J.R. SMITH 4452, ROUND FACE-OF-WALL COVER AND SCREW OR EQUAL.

CLEANOUT TO GRADE SHALL BE J.R. SMITH 4250, ROUND FLANGED HOUSING DOUBLE EXTRA HEAVY DUTY CAS IRON COVER OR EQUAL.

PROVIDE SQUARE COVER FOR CLEANOUTS IN TILE OR CERAMIC FLOORS. PROVIDE CARPET CLEANOUT MARKERS IN CARPETED AREAS.

WATER HAMMER ARRESTORS:

SHALL BE PISTON TYP SIOUX CHEIF OR EQUAL

HOSE BIBS AND WALL HYDRANTS:

INSTALL ALL FROST PROOF HYDRANTS 30" ABOVE FINISHED GRADE.

REFER TO PLUMBING FIXTURE SCHEDULE FOR ADDITIONAL INFORMATION.

ACCESS PANELS:

COORDINATE ACCESS PANEL SIZES AND LOCATIONS WITH FINAL SYSTEM LAYOUT. SUBMIT PROPOSED ACCESS PANEL LOCATIONS AND SIZES DURING SHOP DRAWING PROCESS FOR ARCHITECT TO REVIEW WITH MATERIALS AND FINISHES.

LOCATE ACCESS PANELS IN NON ACCESSIBLE CEILINGS AND WALLS FOR ALL VALVES, SHOCK ABSORBERS, CLEANOUTS AND ALL OTHER ITEMS THAT REQUIRE ACCESS TO PROPERLY MAINTAIN OR SERVICE THE BUILDING.

PRESSURE RELIEF VALVES:

SHALL BE WATTS OR EQUAL SIZED FOR APPLICATION.

PRESSURE GAGES:

SHALL BE TRERICE 600 SERIES OR EQUAL, 4-1/2 INCH DIAMETER

TEST PLUGS:

SHALL BE TRERICE PBF OR EQUAL. MINIMUM RATING 500 PSIG, 200 F

THERMOMETERS:

SHALL BE TRERICE BX OR EQUAL.

SERVICE RANGE

- DOMESTIC HOT WATER 0-250 F
- DOMESTIC COLD WATER 30-130 F
- NON-POTABLE HOT WATER 0-250 F
- NON-POTABLE COLD WATER 30-130 F

PIPING EXPANSION JOINTS:

VACUUM BREAKERS:

VACUUM BREAKERS SHALL BE PROVIDED AS REQUIRED BY CONTRACTOR.

- ANTI-SIPHON WATTS NO LF288A OR EQUAL
- ANTI-SIPHON PRESSURE TYPE WATTS 800 SERIES OR EQUAL

BACKFLOW PREVENTOR:

THE BACKFLOW PREVENTION DEVICE SHALL BE INSTALLED PER LOCAL CODE & PER AUTHORITY HAVING JURISDICTION REQUIREMENTS.

PROVIDE CERTIFICATION OF DEVICE BY STATE CERTIFIED SPECIALIST.

SIZES 3/4" TO 2" SHALL BE BRONZE WITH ISOLATING BALL VALVES, STRAINER AND AIR GAP DRAIN FITTING.

PROVIDE WATTS 909 SERIES OR APPROVED FROM STATE LIST.

POINT OF USE WATER HEATERS:

PROVIDE HEAT TRAPS PER WASHINGTON STATE ENERGY CODE ON SUPPLY AND DISCHARGE PIPING.

STRAINERS:

SHALL BE WATTS LF OR EQUAL

PRESSURE REDUCING VALVES:

PROVIDE WATTS NO U5B OR EQUAL

FLOOR DRAINS/FLOOR SINKS:

REFER TO PLUMBING FIXTURE SCHEDULE FOR ADDITIONAL INFORMATION.

METERS:

WATER METER SHALL BE BADGER METER RECORDALL DISC SERIES, LEAD FREE

ESCUTCHEONS:

PROVIDE CHROME PLATED ESCUTCHEONS AT ALL PIPE PENETRATIONS THROUGH EXPOSED WALLS, FLOORS AND CEILINGS, INCLUDING INSIDE/UNDER CASEWORK.

BURIED PIPING:

AN INSULATED COPPER TRACER WIRE OR OTHER APPROVED CONDUCTOR SHALL BE INSTALLED ADJACENT TO UNDERGROUND NONMETALLIC (PLASTIC) PIPING. ACCESS SHALL BE PROVIDED TO THE TRACER WIRE OR THE TRACER WIRE SHALL TERMINATE ABOVE GROUND AT EACH END OF THE NONMETALLIC PIPING. THE TRACER WIRE SHALL NOT BE LESS THAN 18 AWG AND THE INSULATION TYPE SHALL NOT BE LESS THAN 18 AWG AND THE INSULATION TYPE SHALL BE SUITABLE FOR BURIAL.

PROVIDE 10 MIL PLUMBERS TAPE TO PROTECT DRAINAGE PIPING FROM CONCRETE.

WATER PIPING SHALL BE INSTALLED OUTSIDE OF THE BUILDING FOOT PRINT SHALL BE INSTALLED AT LEAST 12 INCHES BELOW FROST DEPTH WITH A MINIMUM DEPTH OF 30 INCHES.

ADA FIXTURES:

ADA FIXTURES, TRIM AND ACCESSORIES SHALL COMPLY WITH ADA STANDARDS AS WELL AS STATE/LOCAL REQUIREMENTS.

PLUMBING FIXTURE CARRIERS:

WALL HUNG FIXTURES CARRIERS SHALL BE CAST IRON OR STEEL. CARRIER SHALL BE HEAVY DUTY WITH ANCHORAGE TO STRUCTURE.

WATER CLOSET CARRIER BACK LUG SHALL BE ANCHORED TO FLOOR.

PLUMBING FIXTURE DRAINS AND TRAPS:

ALL LAVATORIES SHALL BE PROVIDED WITH GRID STRAINER FOR DRAINS UNLESS NOTED OTHERWISE IN PLUMBING FIXTURE SCHEDULE.

ALL SINK SHALL BE PROVIDED WITH BASKET STRAINER UNLESS NOTED OTHERWISE IN THE PLUMBING FIXTURE SCHEDULE.

TRAPS AND TAIL PIECES SHALL BE PROVIDED FOR ALL FIXTURES UNLESS FIXTURE HAS INTEGRAL TRAP OR TAIL PIECE.

PROVIDE UNDER SINK ADA COMPLIANT PROJECTOR ON TAIL PIECE AND TRAP, IPS CORP LAV GUARD2 OR EQUAL.

PLUMBING FIXTURE CAULKING:

PROVIDE GENERAL ELECTRIC SCS1202 OR EQUAL CAULK TO SEAL TOP AND SIDES OF ALL PLUMBING FIXTURES AT WALLS AND FLOORS.

PLUMBING FIXTURE STOPS:

PROVIDE LOOSE KEY STOPS FOR EACH WATER CONNECTION TO EACH PLUMBING FIXTURE UNLESS PROVIDED INTEGRAL TO FIXTURE.

PROVIDE UNDER SINK ADA COMPLIANT PROJECTOR ON STOPS AND PIPING, IPS CORP LAV GUARD2 OR EQUAL.

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SPECIFICATIONS

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PLUMBING FIXTURE SCHEDULE

TAG	FIXTURE TYPE	BASIS OF DESIGN		CONNECTION SIZE				DESCRIPTION	NOTES
		MAKE	MODEL	WASTE	VENT	HOT WATER	COLD WATER		
WC-1	TOILET	AMERICA STANDARD	CADET	4"	2"	-	1-1/2"	BEMIS SEAT OPEN FRONT	
UR-1	URINAL	AMERICA STANDARD	PINTBROOK	2"	1-1/2"	-	1-1/4"	W/AMERICA STANDARD SELECTRON FLUSH VALVE, HARDWIRED	
LAV-1	LAVATORY	AMERICA STANDARD	DECORUM 21x20.25	1-1/2"	1-1/2"	1/2"	1/2"	W/KOHLER K-97282-4 MANUAL FAUCET	
DF-1	DRINKING FOUNTAIN	ELKAY	LZWS-LRPBM28K	2"	1-1/2	-	3/4	BI LEVEL REFRIGERATED DRINKING FOUNTAIN WITH BOTTLE FILLING STATION; 115V, 10 AMPS	
SH-1	SHOWER	FREEDOM SHOWERS	APF3838 BF RRF	2"	1-1/2"	1/2"	1/2"	FREEDOM ADA TRANSFER SHOWER, RIGHT VALVE WALL	
MS-1	MOP SINK	FIAT	TSBC1610 24x24	3"	1-1/2"	1/2"	1/2"	W/SERVICE FAUCET WITH 3/4" HOSE THREAD SPOUT, PAIL HOOK, HOSE AND HOSE BRACKET, MOP HANGER	
FD-1	FLOOR DRAIN	SIOUX CHIEF	-	2"	1-1/2"	-	-	PVC BODY WITH FLASHING COLLAR AND ADJUSTABLE STRAINER HEAD	
HB-1	FROST PROOF HOSE BIB	WOODFORD	MODEL 65	-	-	-	3/4"	-	
WB-1	WASHER BOX	GUY GRAY	MWB	2"	1-1/2"	1/2"	1/2"	REVERSIBLE DRAIN, WHITE POWDER COATED, QUARTER TURN VALVES	
WCO	WALL CLEANOUT	JR SMITH	-	-	-	-	-	PER PLANS	
FCO	FLOOR CLEANOUT	JR SMITH	-	-	-	-	-	PER PLANS	
COTG	CLEANOUT AT GRADE	JR SMITH	-	-	-	-	-	PER PLANS	

NOTES:
1. INSTALL ADA FIXTURES PER LATEST ADA STANDARDS. INSTALL FLUSH VLAVES WITH HANDLES TOWAORD THE WIDE SIDE OF THE STALL.
2. PROVIDE SINKS AND LAVATORIES WITH INSUALTED TRAPS, STOPS AND SUPPLIES.
3. PROVIDE CHORME PLATES COMMERCIAL GRADE STOPS AND SUPPLIES.
4. VERIFY EXACT LOCATION OF DRAINS WITH ARCHITECT/GENERAL CONTRACTOR PRIOR TO INSTALLATION.
5. PROVIDE FLOOR DRAINS/SINKS/MOP SINKS WITH TRAP PRIMER PORT. PROVIDE TRAP PRIMER VALVE WITH DISTRIBUTION UNIT. CONNECT UP TO FOUR DRAINS TO ONE TRAP PRIMER. CAP ANY UNSED CONNECTIONS. PROVIDE BALL VALVE AND TOP PIPE CONNECTION FOR EACH VALVE.

TABLE C403.3.1
PIPING VOLUME AND MAXIMUM PIPING LENGHTS

NOMINAL PIPE SIZE (inches)	VOLUME (liquid ounces per foot length)	MAXIMUM PIPING LENGTH (feet)	
		Public lavatory faucets	Other fixtures and appliances
1/4	0.33	6	50
5/16	0.5	4	50
3/8	0.75	3	50
1/2	1.5	2	43
5/8	2	1	32
3/4	3	0.55	21
7/8	4	0.55	16
1	5	0.55	13
1-1/4	8	0.55	8
1-/1/2	11	0.55	6
2 or larger	18	0.55	4

TABLE C403.10.3
MINIMUM PIPE INSULATION THICKNESS (thickness is in inches)[a]

FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F)	INSULATION CONDUTIVITY		NOMINAL PIPE OR TUBE SIZE (inches)				
	Conductivity Btu · in./(h · ft² · °F)[b]	Mean Rating Temperature, °F	<1	1 to < 1-1/2	1-1/2 to < 4	4 to < 8	≥ 8
> 350	0.32 – 0.34	250	4.5	5.0	5.0	5.0	5.0
251 - 350	0.29 – 0.32	200	3.0	4.0	4.5	4.5	4.5
201 - 250	0.27 – 0.30	150	2.5	2.5	2.5	3.0	3.0
141 - 200	0.25 – 0.29	125	1.5	1.5	2.0	2.0	2.0
105 - 140	0.21 – 0.28	100	1.0	1.0	1.5	1.5	1.5
40 - 60	0.21 – 0.27	75	0.5	0.5	1.0	1.0	1.0
<40	0.20 – 0.26	75	0.5	1.0	1.0	1.0	1.5

a. For piping smaller than 1-1/2 inch (38 mm) and located in partitions within conditioned spaces, reduction of these thicknesses by 1 inch (25 mm) shall be permitted (before thickness adjustment required in footnote b) but not to a thickness less than 1 inch (25 mm).

b. For insulation outside the stated conductivity range, the minimum thickness (T) shall be determined as follows:
T = r{(1 + t/r)
K/k – 1}
where:
T = minimum insulation thickness,
r = actual outside radius of pipe,
t = insulation thickness listed in the table for applicable fluid temperature and pipe size,
K = conductivity of alternate material at mean rating temperature indicated for the applicable fluid temperature (Btu × in/h × ft2 × °F) and
k = the upper value of the conductivity range listed in the table for the applicable fluid temperature.

c. For direct-buried heating and hot water system piping, reduction of these thicknesses by 11/2 inches (38 mm) shall be permitted (before thickness adjustment required in footnote b but not to thicknesses less than 1 inch (25 mm).

WATER HEATER SCHEDULE

TAG	SHEET LOCATION	BASIS OF DESIGN		TYPE	EWT F	LWT F	ELECTRICAL					CONNECTION SIZE	TANK CAPACITY	WEIGHT (lbs)	ACCESSORIES
		MAKE	MODEL				KW	ELEMENTS	VOLTAGE	PHASE	FLA	IN	GAL		
WH-1	P1.3	RHEEM	ELD-120	ELEC	40	140	6.05 (EA)	2	240	1		3/4	119	1385	

CIRCULATION PUMP SCHEDULE

TAG	SHEET LOCATION	BASIS OF DESIGN		FLOW GPM	FT HD	ELECTRICAL					CONNECTION SIZE	WEIGHT (lbs)	ACCESSORIES
		MAKE	MODEL			WATTS	RPM	VOLTAGE	PHASE	CONTROL	IN		
CP-1	P1.3	BELL AND GOSSETT	ECOCIR 20-18	20	10	70	-	115	1	-	1	10	

EXPANSION TANK SCHEDULE

TAG	SHEET LOCATION	BASIS OF DESIGN		CAPACITY GAL	ACCETPANCE FACTOR	TANK DIA	RATING	CONNECTION SIZE	WEIGHT (lbs)	ACCESSORIES
		MAKE	MODEL			IN	PSI	IN		
ET-1		AMTROL	THERM-X-TROL ST-20VC-DD	8.6	0.37	12	150	3/4	110	

NOTES:
1. PROVIDE WITH ASME RATING.

CLEANOUTS UPC TABLE 707.1

SIZE OF PIPE (INCHES)	SIZE OF CLEANOUT (INCHES)	THREADS (PER INCHES)
1-1/2	1-1/2	11-1/2
2	1-1/2	11-1/2
2-1/2	2-1/2	8
3	2-1/2	8
4 & LARGER	3-1/2	8

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SCHEDULES

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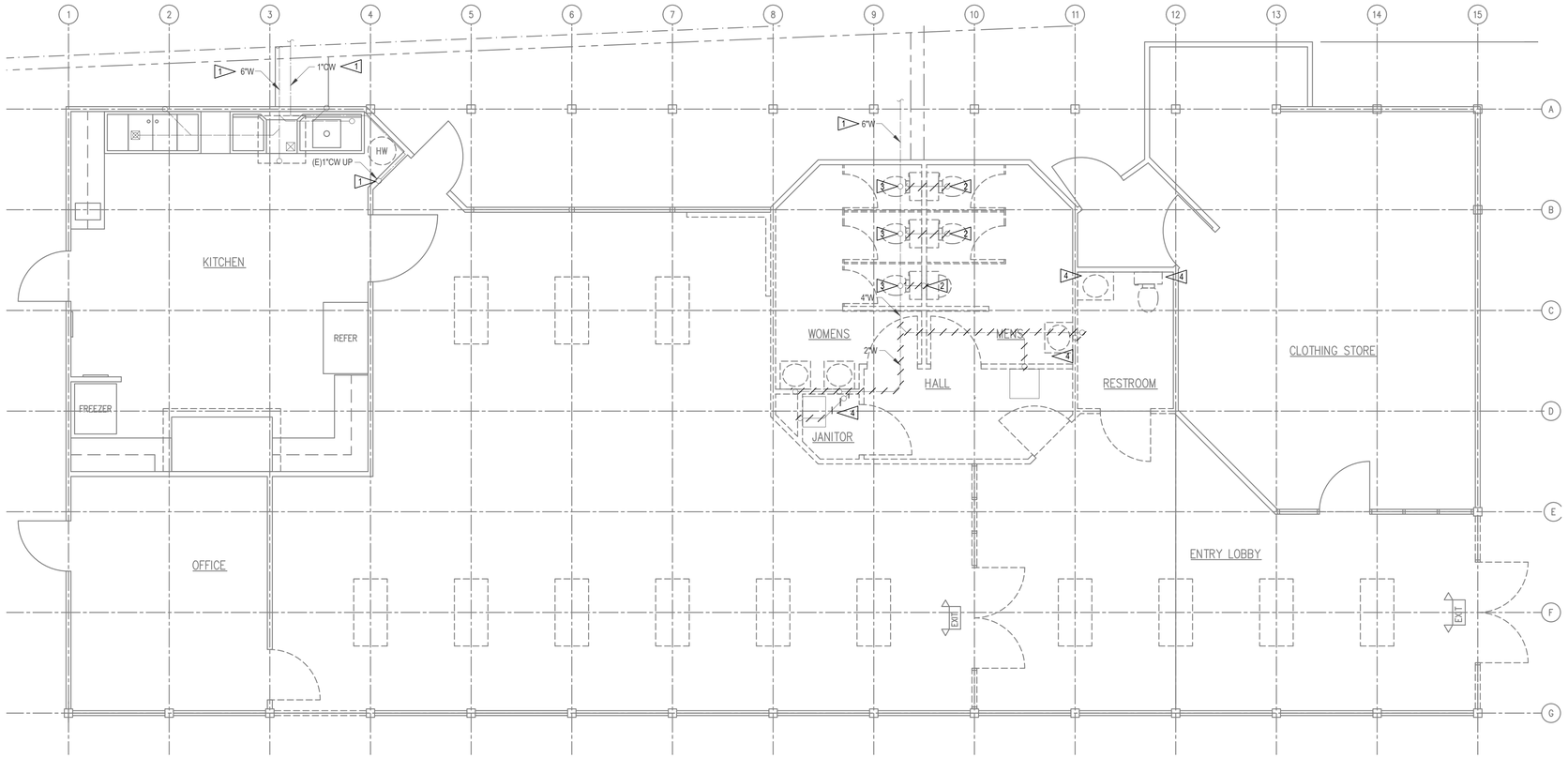

1 / P1.0 UNDERGROUND PLUMBING DEMOLITION PLAN

SCALE: 1/4" = 1'-0"

N

KEYED NOTES:

1. EXISTING TO REMAIN.
2. DEMOLISH EXISTING WASTE PIPING AND CAP AT MAIN.
3. CAP EXISTING WASTE PIPING.
4. SELECTIVELY DEMOLISH EXISTING WASTE PIPING.

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UNDERGROUND PLUMBING DEMOLITION PLAN

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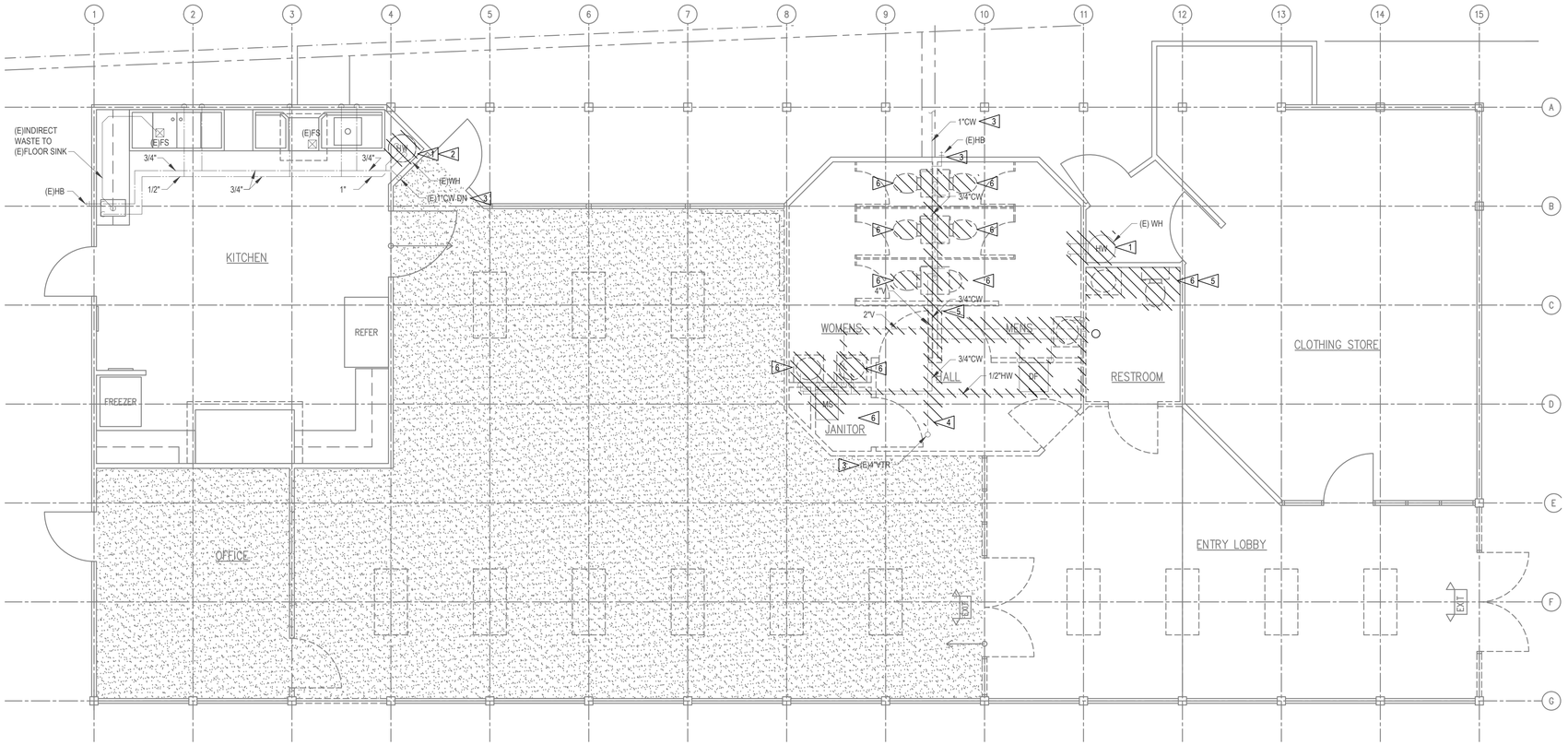

1 / P1.1 FIRST FLOOR PLUMBING DEMOLITION PLAN

SCALE: 1/4" = 1'-0"

N

KEYED NOTES:

1. DEMOLISH EXISTING WATER HEATER.
2. SELECTIVELY DEMOLISH EXISTING PIPING TO ACCOMMODATE DEMOLITION OF WATER HEATER AND INSTALLATION OF NEW WATER HEATER IN NEW LOCATION.
3. EXISTING TO REMAIN.
4. DEMOLISH EXISTING WASTE/VENT PIPING.
5. SELECTIVELY DEMOLISH EXISTING HOT WATER AND COLD WASTER PIPING.
6. DEMOLISH EXISTING PLUMBING FIXTURE AND ACCESSORIES.

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FIRST FLOOR PLUMBING DEMOLITION PLAN

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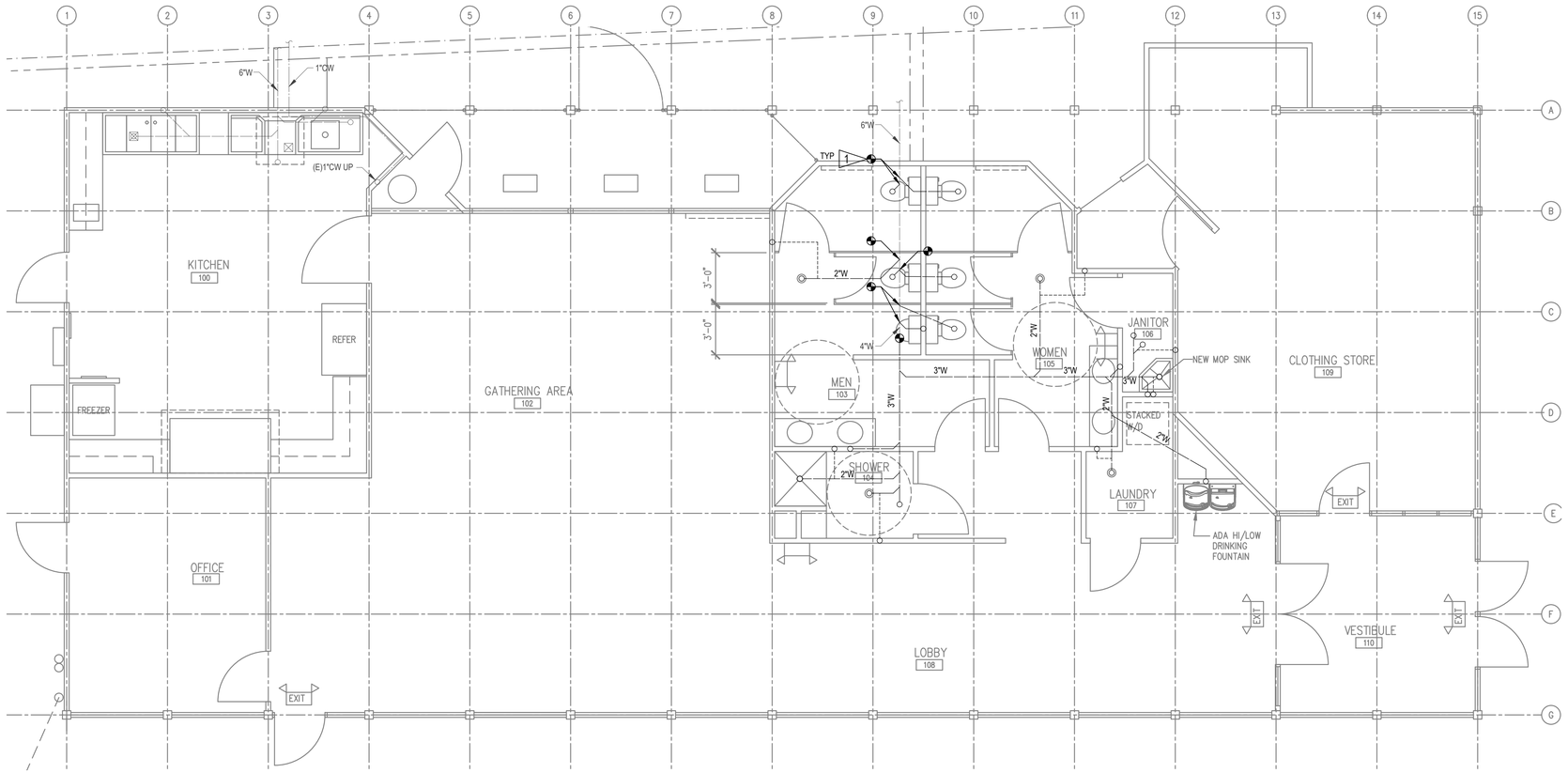

1 P1.2 UNDERGOUND PLUMBING PLAN

SCALE: 1/4" = 1'-0"

N

GENERAL NOTES:

1. BUILDING IS SLAB ON GRADE. ROUTE HORIZONTAL PIPING BELOW THE CAPILLARY BREAK LAYER. REFER TO STRUCTURAL AND ARCHITECTURAL DRAWINGS FOR FLOOR ASSEMBLE THICKNESS.
2. REFER TO PLUMBING FIXTURE SCHEDULE FOR FIXTURE BRANCH PIPE SIZES.
3. PROVIDE TRAP PRIMER FOR EACH FLOOR DRAIN, SINK AND HUB DRAIN.

KEYED NOTES:

1 PROVIDE CONNECTION TO EXISTING PIPING.

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SKAGIT COUNTY
CONCRETE COMMUNITY CENTER

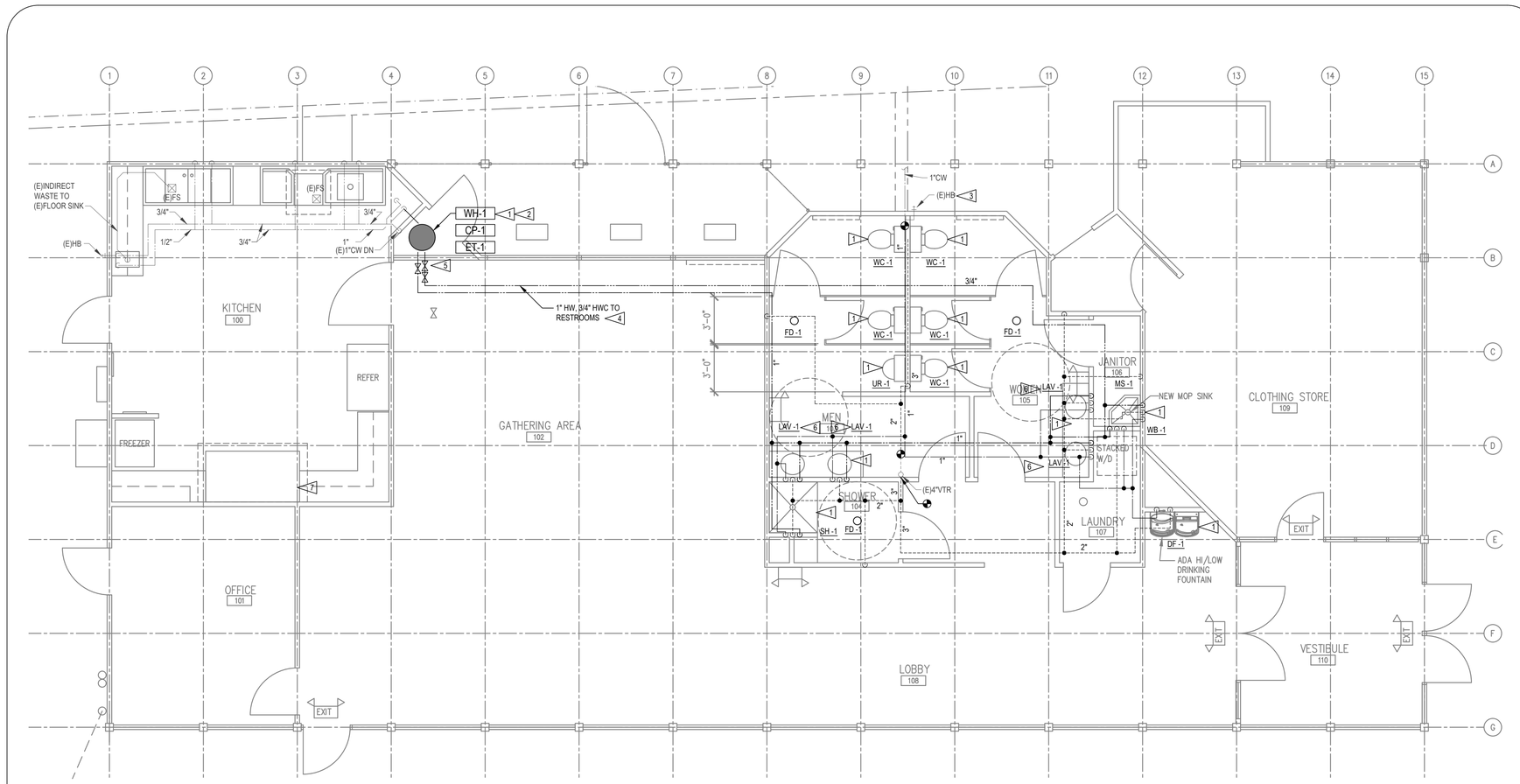
REVISIONS

stage.	BID SET
client.	CARLETTI ARCHITECTS
project.	CONCRETE COMMUNITY CENTER 45821 RAILROAD AVE CONCRETE, WASHINGTON
drawn by.	NH
original sheet size.	24x36
revision.	None
date.	2025.02.18
scale.	

UNDERGOUND PLUMBING PLAN

sheet.

P1.2



1 / P1.3 FIRST FLOOR PLUMBING PLAN

SCALE: 1/4" = 1'-0"

N

GENERAL NOTES:

1. CONTRACTOR SHALL COORDINATE LOCATION OF ALL ACCESS DOORS AND PANELS FOR EQUIPMENT AND ACCESSORIES.
2. FIELD COORDINATE CONDENSATE DRAIN PIPING ROUTING TO APPROVED DISCHARGE LOCATION.
3. PROVIDE TRAP PRIMER TO EACH FLOOR DRAIN/FLOOR SINK. FIELD LOCATE.
4. PROVIDE LINE SIZED ISOLATION VALVES ON ALL BRANCH PIPE TAKE OFFS FOR HW, CW HWC,
5. REFER TO PLUMBING FIXTURE SCHEDULE FOR FIXTURE BRANCH PIPE SIZES.

KEYED NOTES:

1. PROVIDE PLUMBING FIXTURE AND CONNECT TO NEW UTILITIES.
2. PROVIDE WATER HEATER AND CONNECT TO EXISTING PIPING AND PROVIDE EXTENSION OF HW AND HWC TO RESTROOMS.
3. PROVIDE CONNECTION TO EXISTING HOSE BIB.
4. ROUTE PIPING TIGHT TO ROOF.
5. PROVIDE CIRCUIT SOLVER DEVICE WITH ISOLATION VALVE ON INLET AND OUTLET.
6. PROVIDE THERMAL MIXING VALVE FOR LAV.
7. PROVIDE GAS SOLENOID VALVE ON EXISTING GAS PIPING TO COOKING APPLIANCES. INTEGRATE VALVE OPERATION WITH ANSUL SYSTEM.

JTK ENGINEERING
HVAC | PLUMBING | ENERGY
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TAMAS BENCSIK
STATE OF WASHINGTON
49264
REGISTERED PROFESSIONAL ENGINEER

February 15, 2025

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FIRST FLOOR PLUMBING PLAN

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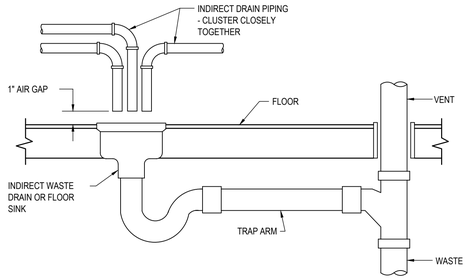
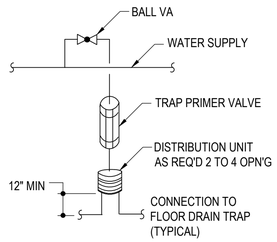
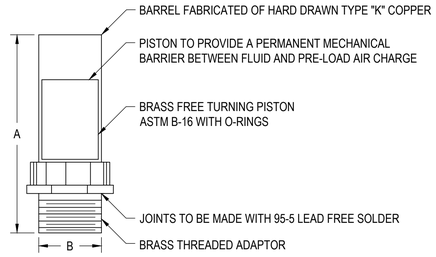
P1.3



1 INDIRECT WASTE DRAIN DETAIL
N.T.S.

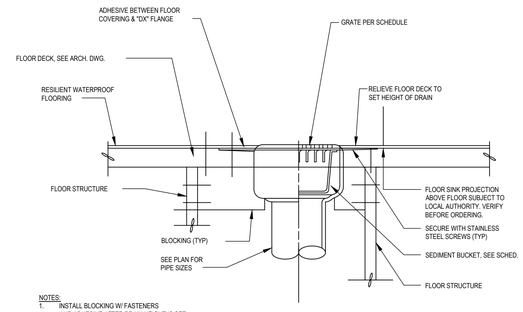


2 TRAP PRIMER DETAIL
N.T.S.



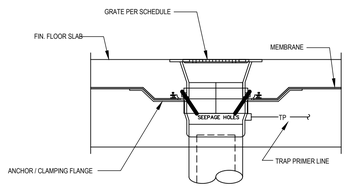
PPP SIZE	P.D.I. SYMBOL	FIXTURE UNIT RATINGS	A SIZE	B SIZE
1/2"	A	1 - 11	5"	1/2"
3/4"	B	12 - 32	5"	3/4"
1"	C	33 - 60	7"	1"
1-1/4"	D	61 - 113	7"	1-1/4"
1-1/2"	E	114 - 154	9"	1-1/2"
2"	F	155 - 330	9"	2"

3 WATER SHOCK ARRESTOR DETAIL
N.T.S.



NOTES:
1. INSTALL BLOCKING W/ FASTENERS AND ADHESIVE AFTER DRAIN HEIGHT IS SET.
2. VERIFY ASSEMBLY PROCEDURE W/ FLOORING MFGR.
3. INSTALL ONLY "SL" OR "DX" STYLE FLOOR DRAINS & FLOOR SINKS FOR WOOD CONST.
4. VERIFY FLOORING CONSTRUCTION BEFORE ORDERING DRAINS.
5. FLOOR DRAINS SHALL BE FLUSH TO 1/4" BELOW FIN. FLOOR. SINKS SHALL BE 1/2" ABOVE TO 1/4" BELOW FIN. FLOOR. VERIFY W/ LOCAL PLUMBING INSPECTOR.
6. PROVIDE TRAP PRIMER CONNECTION.

4 FLOOR DRAIN DETAIL
N.T.S. WOOD/RAISED FLOOR



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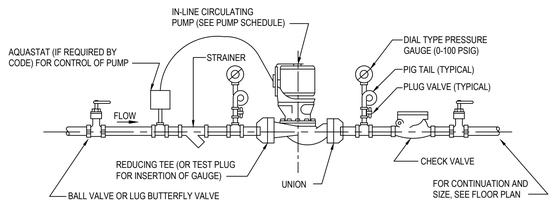
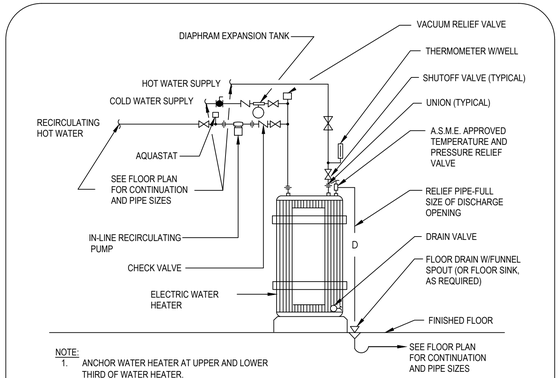
3. PROVIDE TRAP PRIMER CONNECTION.

5 FLOOR DRAIN DETAIL
N.T.S. CONCRETE FLOOR W/MEMBRANE

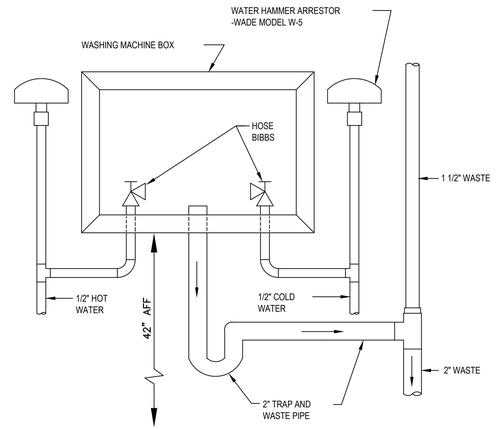


6 IN-LINE CIRCULATING PUMP DETAIL
N.T.S.



NOTE:
1. ANCHOR WATER HEATER AT UPPER AND LOWER THIRD OF WATER HEATER.
2. PROVIDE R-10 INSULATION BOARD UNDER WATER HEATER PER WSEC.

7 ELECTRIC WATER HEATER DETAIL
N.T.S.



8 WASHING MACHINE BOX DETAIL
N.T.S.

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SKAGIT COUNTY — Scenery With Pride — WASHINGTON

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DETAILS

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