

GENERAL SYMBOLS LEGEND

△ REVISION NUMBER - SHOWN ON PLANS

⊗ POINT WHERE NEW CONNECTS TO EXISTING

— NUMBER OF DETAIL ON SHEET

— NUMBER OF SHEET WHERE DETAIL APPEARS

① KEYNOTE

~ CONTINUATION SYMBOL

Room # ROOM NAME AND NUMBER

ITEM TO BE DEMOLISHED

AREA NOT IN CONTRACT

2" PIPE SIZE TAG (DIAMETER)

PIPE SLOPE TAG

1/8" / 12" SLOPE

PIPE INVERT ELEVATION TAG

EXISTING PIPE TAG

PIPING BEING DEMOLISHED

ABBREVIATIONS			
Ø	ROUND	LVR	LOUVER
ABV	ABOVE	LWT	LEAVING WATER TEMPERATURE
AC	AIR CONDITIONING	M/A	MIXED AIR
AD	AREA DRAIN	MAX	MAXIMUM
ADD	ADDENDUM	MBH	ONE THOUSAND BTU PER HOUR
AFF	ABOVE FINISHED FLOOR	MCF	ONE THOUSAND CUBIC FEET
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY	MD	MOTORIZED DAMPER
ALT	ALTERNATE	MECH	MECHANICAL
AP	ACCESS PANEL	MFR	MANUFACTURER
ARCH	ARCHITECT/ARCHITECTURAL	MIN	MINIMUM
BFF	BELOW FINISHED FLOOR	MISC	MISCELLANEOUS
BLW	BELOW	MTR	MOTOR
BTU	BRITISH THERMAL UNITS	MU/A	MAKE-UP/AIR
BTUH	BRITISH THERMAL UNITS PER HOUR	NC	NOISE CRITERIA
CAP	CAPACITY	NC	NORMALLY CLOSED
CB	CATCH BASIN	NC	NOT IN CONTRACT
CFM	CUBIC FEET PER MINUTE	NO	NUMBER
CLG	CEILING	NO	NORMALLY OPEN
CO	CLEAN OUT	NTS	NOT TO SCALE
CW	COLD WATER	O	OXYGEN
D	DEGREE	O/A	OUTSIDE AIR
DB	DRY BULB	ORD	OVERFLOW ROOF DRAIN
DIA	DIAMETER	ORD	PRESSURE DROP
DN	DOWN	P/V	POST INDICATOR VALVE
DW	DISTILLED WATER	PLBG	PLUMBING
EA	EACH	PRESS	PRESSURE
EAT	ENTERING AIR TEMPERATURE	PRV	PRESSURE REDUCING VALVE
ELEC	ELECTRICAL	PSI	POUNDS PER SQUARE INCH
EQUIP	EQUIPMENT	PSIG	POUNDS PER SQUARE INCH GAUGE
EWC	ELECTRIC WATER COOLER	PWR	POWER
EWT	ENTERING WATER TEMPERATURE	R	DUCT RISER
E/A	EXHAUST AIR	RA	RETURN AIR
EXIST	EXISTING	RCP	RADIANT CEILING PANEL
F	DEGREES FAHRENHEIT	RD	ROOF DRAIN
FCO	FLOOR CLEAN OUT	REC	RECESSED
FD	FLOOR DRAIN	RED	REDUCER
FDC	FIRE DEPARTMENT CONNECTION	RH	RELATIVE HUMIDITY
FL	FLOOR	RIA	RELIEF AIR
FO	FUEL OIL	RM	ROOM
FOV	FUEL OIL VENT	RPM	REVOLUTIONS PER MINUTE
FOR	FUEL OIL RETURN	RW	RAIN WATER
FOS	FUEL OIL SUPPLY	SF	SQUARE FOOT
FRM	FEET PER MINUTE	S/A	SUPPLY AIR
FS	FLOOR SINK	SAN	SANITARY
FT	FOOT/FEET	SF	SQUARE FOOT
FTR	FIN TUBE RADIATION	SD	SMOKE DAMPER
GAL	GALLON	SM	SURFACE MOUNT
GF	GAS-FIRED	SP	STANDPIPE
GC	GENERAL CONTRACTOR	SP	STATIC PRESSURE
GPM	GALLONS PER MINUTE	STM	STEAM
GW	GREASE WASTE	T	THERMOSTAT
HB	HOSE BIB	TD	TEMPERATURE DROP
HP	HORSE POWER	TR	TRENCH DRAIN
HTG	HEATING	TEMP	TEMPERATURE
HTR	HEATER	TYP	TYPICAL
HW	HOT WATER	UG	UNDERGROUND
HYD	HYDRANT	VAC	VACUUM
ID	INDIRECT	V	VENT
IN	INCH	V	VARIABLE AIR VOLUME
INV	INVERT	VENT	VENTILATION
LB	POUND	VTR	VENT THROUGH ROOF
LBHR	POUNDS PER HOUR	W	WASTE
LAT	LEAVING AIR TEMPERATURE	WB	WET BULB
LP	LOW PRESSURE	WCO	WALL CLEAN OUT
LPG	LIQUEFIED PETROLEUM GAS	WH	WALL HYDRANT

EQUIPMENT ABBREVIATIONS			
AC	AIR CONDITIONING UNIT	EDC	ELECTRIC DUCT COIL
ACCU	AIR COOLING CONDENSING UNIT	ET	EXPANSION TANK
AHU	AIR HANDLING UNIT	EW	ELECTRIC WATER HEATER
AS	AIR SEPARATOR	FCU	FAN COIL UNIT
B	BOILER	FP	FIRE PUMP
CH	CHILLER	GI	GREASE INTERCEPTOR
CT	COOLING TOWER	GRV	GRAVITY ROOF VENTILATOR
CU	CONDENSING UNIT	HWP	HEATING WATER PUMP
CUH	CABINET UNIT HEATER	HUR	HEAT RECOVERY UNIT
CHWP	CHILLED WATER PUMP	PRV	POWER ROOF VENTILATOR
DBP	DOMESTIC WATER BOOSTER PUMP	RE	RETURN/EXHAUST FAN
DC	DUCT MOUNTED COIL	RTU	ROOFTOP UNIT
DCP	DOMESTIC WATER CIRCULATING PUMP	SP	SUMP PUMP
DS	DUCTLESS SPLIT	UH	UNIT HEATER
EF	EXHAUST FAN	WH	WATER HEATER

NOTE

ALL OF GENERAL NOTES ON THIS SHEET ARE TO BE APPLIED TO ALL OTHER DRAWINGS IN THIS SET. THE SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET MAY OR MAY NOT BE USED IN THIS SET OF DRAWINGS.

MECHANICAL SYMBOLS LEGEND

18"x12" SQUARE DUCT SIZE TAG (WIDTH x HEIGHT)

18"x12" OVAL DUCT SIZE TAG (WIDTH / HEIGHT)

18"Ø ROUND DUCT SIZE TAG (DIAMETER)

18"Ø SPIRAL DUCT SIZE TAG (DIAMETER)

(E) EXISTING DUCT TAG

DUCT BEING DEMOLISHED

18"x18" S/A SUPPLY AIR

18"x18" S-O/A CONDITIONED OUTSIDE AIR

18"x18" O/A OUTSIDE AIR

18"x18" R/A RETURN AIR

18"x18" T/A TRANSFER AIR

18"x18" E/A EXHAUST AIR

18"x18" L/A RELIEF AIR

18"x18" GE/A GREASE EXHAUST AIR

18"x18" CE/A CONDENSATE EXHAUST AIR

18"x18" SE/A SMOKE EXHAUST AIR

6"Ø FLUE EXHAUST GAS FLUE

6"Ø C/A COMBUSTION AIR

MECHANICAL PIPING SYMBOLS LEGEND

CHWR CHILLED WATER RETURN

CHWS CHILLED WATER SUPPLY

CD CONDENSATE DRAINAGE

CWR CONDENSER WATER RETURN

CWS CONDENSER WATER SUPPLY

GWR GEOTHERMAL WATER RETURN

GWS GEOTHERMAL WATER SUPPLY

HWR HEATING WATER RETURN

HWS HEATING WATER SUPPLY

G NATURAL GAS

PG PROPANE GAS

REF-L REFRIGERANT-LIQUID

REF-S REFRIGERANT-SUCTION

REF-HG REFRIGERANT-HOT GAS

STM STEAM

CDR CONDENSATE RETURN

PIPE ACCESSORY TAGS

DOM. WM DOMESTIC WATER METER

BALANCING VALVE

SHUT-OFF 1/4 TURN BALL VALVE

CHECK CHECK VALVE

TMV 3-WAY MIXING VALVE

M-CNTRL MOTORIZED CONTROL VALVE

3-WAY CNTRL 3-WAY MOTORIZED CONTROL VALVE

PRV PRESSURE REDUCING VALVE

S SOLENOID REFRIGERANT SOLENOID VALVE

B BUTTERFLY BUTTERFLY VALVE

GRILLES, REGISTERS & DIFFUSERS TAG

TYP. # TYPICAL #

SD1 400 CFM

8'-0" AFF FINISHED FLOOR ELEVATION

SUPPLY GRILLE/SUPPLY DIFFUSER

RETURN GRILLE

EXHAUST GRILLE

ROUND SUPPLY DIFFUSER

LINEAR DIFFUSER

MECHANICAL EQUIPMENT TAG LEGEND

HEATING COIL FLOW

VAV-XX VAV BOX

RTU-XX 590 lb

OPERATING WEIGHT NOT INCLUDING CURB

BOTTOM OF EQUIPMENT ELEVATION

VAV-XX 10' - 0"

RTU-XX 4.0 ton

NOMINAL COOLING CAPACITY

EXISTING EQUIPMENT TO REMAIN

VAV-XX

RTU-XX 115000 Btu/h

FUEL INPUT GAS PIPE FLOW

EXISTING RELOCATED EQUIPMENT

VAV-XX

RTU-XX 115 CFH

EQUIPMENT BY OTHERS (REFER TO OTHER DISCIPLINE FOR ADDITIONAL INFORMATION)

VAV-XX

CARBON DIOXIDE SENSOR

CO2 TH

TEMPERATURE & HUMIDITY SENSOR

CARBON MONOXIDE SENSOR

CO TS

TEMPERATURE SENSOR

NITROGEN DIOXIDE SENSOR

NO2 T

THERMOSTAT

HUMIDITY SENSOR

HS MS

MANUAL SWITCH

HUMIDISTAT

H S

SENSOR

PANEL NAME

BMS CONTROL PANEL

HVAC-CP-X

COMB. FIRE/SMOKE DAMPER

SMOKE DAMPER

FIRE DAMPER

MANUAL BALANCING DAMPER

MOTORIZED DAMPER

BACKDRAFT DAMPER

12"x12" S/A

PROJECT GENERAL NOTES

A COORDINATE INSTALLATION OF PIPING, DUCTWORK, CONDUIT, LIGHTS, CABLE TRAY, STRUCTURE, AND EQUIPMENT TO PREVENT CONFLICTS.

B FINAL PRODUCT SHALL BE A COMPLETE AND FUNCTIONING SYSTEM, AND SHALL CONFORM TO ALL REQUIREMENTS OF APPLICABLE FEDERAL, STATE, AND LOCAL CODES, INCLUDING BUT NOT LIMITED TO THE INTERNATIONAL BUILDING CODE AND INTERNATIONAL MECHANICAL CODE.

C LOCATE EQUIPMENT REQUIRING ACCESS 2'-0" MAXIMUM ABOVE CEILING.

D LOCATE DUCTWORK, PIPING, AND MECHANICAL EQUIPMENT AWAY FROM THE SPACE ABOVE ELECTRICAL PANELS, TRANSFORMERS AND OTHER ELECTRICAL EQUIPMENT.

E PENETRATIONS OF RATED ASSEMBLIES SHALL BE FIRE STOPPED. FIRE STOPPING SHALL BE AN APPROVED MATERIAL AS PRESCRIBED IN CSFM STANDARD 43-1 AND SHALL BE U.L. LISTED.

F COORDINATE ALL EXTERIOR PENETRATIONS INCLUDING ROOF PENETRATIONS WITH OTHER TRADES TO PROVIDE A COMPLETE AND FULLY WEATHER-PROOF INSTALLATION. PROVIDE SLEEVES AND/OR OPENINGS TO RUN PIPES AND DUCTS THROUGH FOUNDATIONS, FLOORS, WALLS, AND ROOF.

G MAINTAIN CLEAR ACCESS TO SERVICE EQUIPMENT AND OTHER ACCESSORIES REQUIRING SERVICE, VISUAL INSPECTION OR HAND OPERATION. WHERE INDICATED OR REQUIRED, PROVIDE ACCESS PANELS OF THE TYPE SELECTED TO SUIT MATERIALS IN WHICH INSTALLED.

H ADJUST PIPING AND DUCTWORK SIZES TO PROPERLY CONNECT TO MECHANICAL EQUIPMENT.

I REFER TO HVAC OR PLUMBING DRAWINGS FOR GAS AND A.C. CONDENSATE DRAIN PIPING. ALL PRIMARY CONDENSATE DRAIN PIPING SHALL BE INSULATED TO A MINIMUM THICKNESS OF 1/2" AND SHALL INCLUDE A VAPOR RETARDANT OUTSIDE THE INSULATION. SEAL ALL JOINTS AND PENETRATIONS.

J PIPE SIZES SHOWN SHALL BE CONTINUED IN THE DIRECTION OF FLOW UNTIL ANOTHER SIZE IS SHOWN.

K FOR DETAILS, EQUIPMENT CONNECTIONS, AND PIPE SIZES NOT SHOWN ON THE SEGMENTS, REFER TO DETAILS, SCHEDULES, AND SPECIFICATIONS.

L INSTALL ALL EQUIPMENT IN ACCORDANCE WITH THE RESPECTIVE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS, AT A LEVEL OF QUALITY AND WORKMANSHIP CONSISTENT WITH THE SPECIFICATIONS.

M LOCATIONS OF PIPING, DUCTWORK AND EQUIPMENT AS INDICATED ON THE DRAWING, ARE APPROXIMATE AND SUBJECT TO MINOR ADJUSTMENTS IN THE FIELD. WORK SHALL BE COORDINATED WITH ALL OTHER TRADES TO AVOID INTERFERENCE IN THE FIELD.

N INSTALL EXPOSED PIPING AND DUCTWORK AS HIGH AS PRACTICAL IN ROOMS WITHOUT CEILINGS.

O THE CONTRACTOR'S WORK SCHEDULE SHALL BE SUBMITTED TO AND APPROVED BY THE OWNER.

P PRIOR TO STARTING WORK, SUBMIT SHOP DRAWINGS FOR ALL MECHANICAL EQUIPMENT, PLUMBING FIXTURES, AND DIFFUSERS.

Q CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND SHALL ARRANGE FOR ALL INSPECTIONS AS REQUIRED.

R PROVIDE ONE YEAR WARRANTY FOR ALL WORKMANSHIP AND MATERIALS AFTER THE DATE OF FINAL ACCEPTANCE.

GENERAL MECHANICAL NOTES

1 SUBMISSION OF PROPOSAL IN CONNECTION WITH THIS WORK SHALL IMPLY THAT THE BIDDER HAS EXAMINED THE JOB SITE UNDER WHICH HE WILL BE OBLIGATED TO OPERATE SHOULD HE 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.

2 DUCT SIZES SHOWN ARE CLEAR INSIDE DIMENSIONS. CONTRACTOR SHALL MAKE ALLOWANCE FOR ANY INTERIOR LINING, INSULATION, ETC. DUCT DIMENSIONS LISTED ON DRAWINGS REPRESENT THE AIRFLOW FREE AREAS AND DO NOT HAVE ALLOWANCES FOR INSULATION LINER, WHERE APPLICABLE, INSIDE THE DUCTS, OR DUAL WALL DIMENSIONS. DUCTS SHALL BE CONSTRUCTED TO INCLUDE INSULATION REQUIREMENTS AND MAINTAIN AIRFLOW DIMENSIONS INDICATED ON PLANS. FOR CLASH COORDINATION INCLUDE INSULATION THICKNESS PER SCHEDULE. INSTALL, SUPPORT, & BRACE NEW DUCTWORK AND ACCESSORIES PER SMACNA GUIDELINES.

3 ALL WORK SHALL CONFORM TO STATE AND LOCAL CODES, RULES, REGULATIONS, AND ORDINANCES WHICH SHALL TAKE PRECEDENCE OVER THE PLANS IF CONFLICTS EXIST BETWEEN THEM.

4 THE DRAWINGS INDICATE THE GENERAL LAYOUT REQUIREMENTS FOR EQUIPMENT, FIXTURES, PIPING, DUCTWORK, ETC. FINAL LAYOUT SHALL BE MODIFIED TO FIT ACTUAL SITE CONDITIONS. INSTALL EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. ROOFTOP EQUIPMENT SHALL BE LOCATED NO CLOSER THAN 10'-0" FROM THE ROOF EDGE. ALL REQUIRED REVISIONS SHALL BE RECORDED ON A DESIGNATED HARD COPY SET OF REDLINE PLANS TO BE KEPT CURRENT TO JOBSITE PROGRESS. AT MINIMUM, THIS DOCUMENT SHALL BE UPDATED WEEKLY BY CONTRACTOR AND REDILY AVAILABLE FOR REVIEW AND REFERENCE.

5 COORDINATE ALL WORK WITH THE OWNER AND ALL OTHER CONTRACTORS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RIGGING, HANDLING, AND PROTECTION OF MATERIALS. PROVIDE LABOR TO RECEIVE UNLOAD, STORE, PROTECT, AND TRANSFER TO POINT OF INSTALLATION OF ANY OWNER-FURNISHED ITEMS.

6 IN CASES OF EQUIPMENT SUBSTITUTION, CONTRACTOR IS RESPONSIBLE FOR VERIFYING THAT ALL SYSTEMS AND COMPONENTS WILL FIT PROPERLY PRIOR TO FABRICATION OR ORDERING. INSTALLED DUCTS MAY BE RESIZED BY THE CONTRACTOR TO FIT FIELD CONDITIONS AS LONG AS THE INSTALLED DUCTS SHALL HAVE EQUAL FRICTION LOSS TO THOSE SHOWN. PROVIDE COMPLETE SHEET METAL SHOP DRAWINGS TO ENGINEER SHOWING ACTUAL, DUCT SIZES, ARRANGEMENTS, AND UNIT LOCATIONS TO BE INSTALLED. THIS SHALL BE DONE PRIOR TO FABRICATION OR INSTALLATION.

7 INSTALL RADIUS TYPE ELBOWS IN RECTANGULAR DUCTS WHERE POSSIBLE.

8 USE 45 DEGREE TAKE-OFF FITTINGS AT ALL ROUND SUPPLY BRANCH TAKEOFFS. PROVIDE BALANCE DAMPERS AT ALL SUPPLY DUCT RUNOUTS TO GRILLES. LOCATE AS FAR AS POSSIBLE FROM GRILLES IN AN ACCESSIBLE LOCATION. PROVIDE ACCESS PANELS IN SOLID WALLS AND CEILINGS FOR BALANCING DAMPERS.

9 USE FLEX DUCTS FOR FINAL CONNECTION TO ALL CEILING DIFFUSERS, AND WHERE NECESSARY, SIDEWALL DIFFUSERS, AND LIMIT TO 3' MAX. LENGTHS.

10 PROVIDE A COMPLETE AND OPERATING MECHANICAL SYSTEM, INCLUDING ALL INCIDENTAL ITEMS AND CONNECTIONS NECESSARY FOR PROPER OPERATION OR CUSTOMARILY INCLUDED, EVEN THOUGH EACH AND EVERY ITEM MAY NOT BE INDICATED.

11 THE MECHANICAL INSTALLATION SHALL BE SAFE, RELIABLE, ENERGY EFFICIENT AND EASILY MAINTAINED WITH ACCESS TO EQUIPMENT. PROVIDE ACCESS PANELS IN SOLID WALLS AND CEILINGS FOR BALANCING DAMPERS. THE MECHANICAL CONTRACTOR SHALL ENGAGE A TESTING AND BALANCE FIRM CERTIFIED BY AABC TO PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM ACCORDING TO THE PROCEDURES CONTAINED IN AABC'S "NATIONAL STANDARDS".

12 FOR TESTING AND BALANCING HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS" AND PROVIDE TWO COPIES OF THE CERTIFIED TAB REPORTS.

13 THE MECHANICAL SYSTEM SHALL OPERATE QUIETLY WITH NOISE LEVELS BELOW THE CRITERIA RECOMMENDED FOR THE APPLICATION BY ASHRAE. PROVIDE CORRECTIVE ACTION AS REQUIRED TO REDUCE OBJECTIONABLE NOISE OR VIBRATION.

14 UNDERCUT DOORS 3/4 INCH WHERE NO RETURN NOR EXHAUST GRILLE IS SHOWN TO ALLOW FOR AIR TRANSFER (DO NOT UNDERCUT FIREDOORS. ALL TRANSFER DUCTWORK SHALL BE INTERNALLY LINED WITH MINIMUM 1/2" ACOUSTIC LINING.)

15 REFER TO ARCH. PLANS AND DETAILS FOR EXACT LOCATION OF ALL WALL AND CEILING MOUNTED DEVICES. ADJUST LOCATION OF SIDEWALL DEVICES AS NECESSARY TO AVOID INTERFERENCE WITH MANS OR OTHER ELECTRICAL DEVICES.

16 WHERE CONDUIT, CABLES, DUCTWORK OR PIPING PASSES THROUGH FIRE-RATED FLOORS OR WALLS, THE SLEEVES SHALL BE COMPLETELY SEALED WITH A FIRE STOP MATERIAL THAT IS UL LISTED AND ACCEPTED BY LOCAL AUTHORITIES HAVING JURISDICTION (AHJ) AS BEING SUITABLE FOR THIS SERVICE SUCH AS DOWN CORNING CORP "SILICONE ELASTOMER, RTV FOAM, OR SIMILAR MATERIAL TO MAINTAIN FIRE RATINGS OF THE WALL OR FLOOR.

17 CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COORDINATING BEAM PENETRATIONS AS IT RELATES TO HIS WORK. ANY REQUIRED BEAM PENETRATIONS MUST BE COORDINATED WITH THE STRUCTURAL ENGINEER PRIOR TO BEGINNING WORK.

18 PROVIDE FLAT BLADE MANUAL VOLUME DAMPERS AT ALL TERMINAL DUCT BRANCHES AND AS INDICATED. CONTRACTOR SHALL NOT INSTALL ANY MAINTENANCE ITEMS ABOVE HARD CEILINGS. THIS SHALL INCLUDE VALVES, DAMPERS, OR ANY OTHER ITEMS THAT REQUIRE ACCESS AFTER CONSTRUCTION IS COMPLETED. IF INSTALLATION ABOVE A HARD CEILING OF THESE ITEMS CANNOT BE AVOIDED, THEN PROVIDE CEILING ACCESS DOORS EQUAL TO ACDOR MODEL FW-505 WHERE REQUIRED. AT FIRE-RATED WALLS, USE EQUIVALENT OF ACDOR MODEL FB-500. MINIMUM SIZE SHALL BE 12"x12". USE 18"x18" WHEN PERSONNEL ACCESS IS REQUIRED.

19 PROVIDE AN INSULATED BACK ON ALL THERMOSTATS AND TEMPERATURE SENSORS THAT ARE MOUNTED ON CMU OR HOLLOW WALLS. PROVIDE SHALLOW DEVICE EXTENSION BOX BEHIND T-STATS AND SENSORS ON MASONRY WALLS IN COMMERCIAL / RETAIL SPACES.

20 PROVIDE FIRE DAMPERS AT ALL FIRE-RATED WALLS AND FLOOR PENETRATIONS. REFER TO ARCHITECTURAL DRAWINGS FOR FIRE BARRIER WALLS AND CEILINGS.

21 IF A CENTRAL FIRE ALARM SYSTEM IS REQUIRED FOR THIS PROJECT, MECHANICAL CONTRACTOR SHALL INSTALL DUCT MOUNTED SMOKE DETECTORS PROVIDED BY FIRE ALARM CONTRACTOR. REFER TO ELECTRICAL NOTES FOR EXACT REQUIREMENTS. MECHANICAL CONTRACTOR SHALL IDENTIFY A SET OF TERMINALS FOR EQUIPMENT SHUTDOWN ON ALL FAN POWERED EQUIPMENT REQUIRING SHUTDOWN CONTROLS. FIRE ALARM CONTRACTOR SHALL WIRE FROM DUCT MOUNTED SMOKE DETECTOR TO SHUTDOWN TERMINALS TO SHUT DOWN FAN OPERATION WHEN SMOKE IS DETECTED.

22 AT PENETRATIONS THROUGH FIRE WALLS, ANY NON-METALLIC PIPE OR DUCT SHOULD BE EXTERNALLY SLEEVED WITH STEEL, FERROUS, OR COPPER MATERIALS, SECURELY FASTENED TO THE FIRE RATED ASSEMBLY, AND ANY SPACE BETWEEN THE SLEEVE AND THE ASSEMBLY PENETRATED SHALL BE PROTECTED USING MATERIAL THAT CONFORMS TO ASTM E 814 OR UL 1479, SUCH AS FIRE STOP FS-1900, OR FLAME STOPPER 5000.

23 MECHANICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL DAMPERS WITH MOTORIZED ACTUATORS AND INSTALL SMOKE DETECTORS AND PROVIDE WIRING FOR FAN SHUTDOWN CONTROLS. COORDINATE WITH ELECTRICAL CONTRACTOR AND PROVIDE DAMPER ACTUATOR COMPATIBLE WITH ELECTRICAL WIRING PROVIDED. PROVIDE ANY WIRING OR COMPONENTS NOT PROVIDED BY THE ELECTRICAL CONTRACTOR THAT ARE REQUIRED TO PROVIDE A COMPLETE AND OPERATIONAL SYSTEM.

24 AHEAD OF ALL VAV BOX INLETS, INSTALL STRAIGHT DUCT EQUIVALENT TO AT LEAST 4 DIAMETERS IN LENGTH WHETHER SHOWN ON PLANS OR NOT.

25 NO RECTANGULAR DUCT SMALLER THAN 8"x8".

26 ANY LINE VOLTAGE WIRING ASSOCIATED WITH MECHANICAL SYSTEMS SHALL BE INSTALLED BY A LICENSED ELECTRICAL CONTRACTOR IN STRICT ACCORDANCE WITH THE ELECTRICAL PLANS, NOTES, AND SPECIFICATIONS.

WHERE DUCT PASS THROUGH 1 HOUR FIRE RATED WALL A FIRE DAMPER SHALL BE INSTALLED. IF WALL IS RATED AT 2 HOURS OR MORE THERE SHALL BE A FIRE SMOKE DAMPER.

GENERAL MECHANICAL SEISMIC NOTES

1 PROVIDE VIBRATION AND SEISMIC CONTROLS FOR MECHANICAL PIPING AND EQUIPMENT. COORDINATE ALL VIBRATION ISOLATION DEVICE INSTALLATION AND SEISMIC BRACING FOR MECHANICAL PIPING AND EQUIPMENT WITH OTHER SYSTEMS AND EQUIPMENT IN THE VICINITY, INCLUDING OTHER SUPPORTS AND RESTRAINTS, IF ANY.

2 TESTING AGENCY QUALIFICATIONS: AN INDEPENDENT AGENCY, WITH THE EXPERIENCE AND CAPABILITY TO CONDUCT THE TESTING INDICATED. THAT IS AN NRTL AS DEFINED BY OSHA IN 29 CFR 1910.7 AND THAT IS ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.

3 COMPLY WITH SEISMIC-RESTRAINT REQUIREMENTS IN THE INTERNATIONAL BUILDING CODE

4 WELDING QUALIFICATIONS: QUALITY PROCEDURES AND PERSONNEL ACCORDING TO AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE-STEEL."

5 SEISMIC-RESTRAINT DEVICES SHALL HAVE HORIZONTAL AND VERTICAL LOAD TESTING AND ANALYSIS AND SHALL BEAR ANCHORAGE PRE-APPROVAL OPA NUMBER FROM OSHPD, PRE-APPROVAL BY ICC-ES, OR PRE-APPROVAL BY ANOTHER AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, SHOWING MAXIMUM SEISMIC-RESTRAINT RATINGS. RATINGS BASED ON INDEPENDENT TESTING ARE PREFERRED TO RATINGS BASED ON CALCULATIONS. IF PRE-APPROVED RATINGS ARE UNAVAILABLE, SUBMITTALS BASED ON INDEPENDENT TESTING ARE PREFERRED. CALCULATIONS (INCLUDING COMBINING SHEAR AND TENSILE LOADS) TO SUPPORT SEISMIC-RESTRAINT DESIGNS MUST BE SIGNED AND SEALED BY A QUALIFIED PROFESSIONAL ENGINEER.

6 BUILDING IS CLASSIFIED AS SEISMIC DESIGN CATEGORY B. CONTRACTOR SHALL PROVIDE SEISMIC BRACING FOR PIPING, DUCTWORK AND EQUIPMENT TO MEET ALL LOCAL AND NATIONAL CODE REQUIREMENTS.

7 SEISMIC RESTRAINTS FOR MEP EQUIPMENT AND SYSTEMS

8 CONTRACTOR'S RESPONSIBILITIES SHALL INCLUDE PROVIDING ALL SUBMITTALS AND DETAILS WITH STRUCTURAL ENGINEER'S CERTIFICATION FOR PERMITTING.

9 SEISMIC PROTECTION FOR CONCERNS OF ALL BUILDING SYSTEMS INCLUDING BUT NOT LIMITED TO MECHANICAL, PLUMBING, AND ELECTRICAL MUST MEET MINIMUM REQUIREMENTS OF ALL APPLICABLE CODES FOR BUILDINGS CLASSIFIED SEISMIC PROTECTION MEASURES TO BE APPLIED SHALL BE INSTALLED IN STRICT ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND/OR FEDERAL CODES AND WITH MANUFACTURER'S REQUIREMENTS, THE MOST STRINGENT SHALL APPLY

M&P SHEET INDEX

MP-000 MECHANICAL LEGEND

MP-001 PLUMBING LEGEND

MP-101 M&P PLAN

MP-500 MECHANICAL DETAILS

MP-501 PLUMBING DETAILS

MP-502 PLUMBING DETAILS

MP-600 M&P SCHEDULES

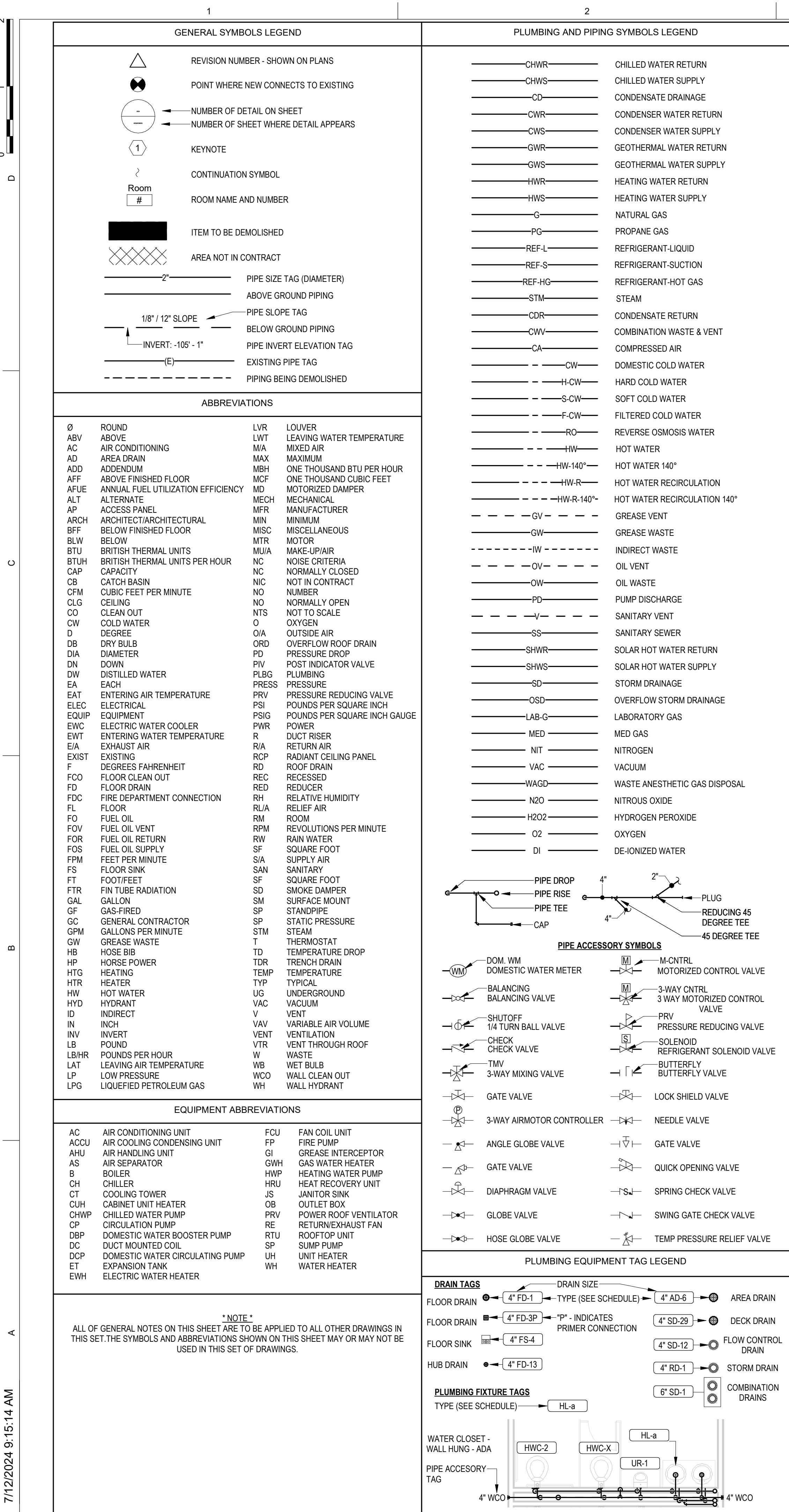
MP-900 PLUMBING RISERS

MP-901 MECHANICAL SPECIFICATIONS

MP-902 MECHANICAL SPECIFICATIONS

MP-903 PLUMBING SPECIFICATIONS

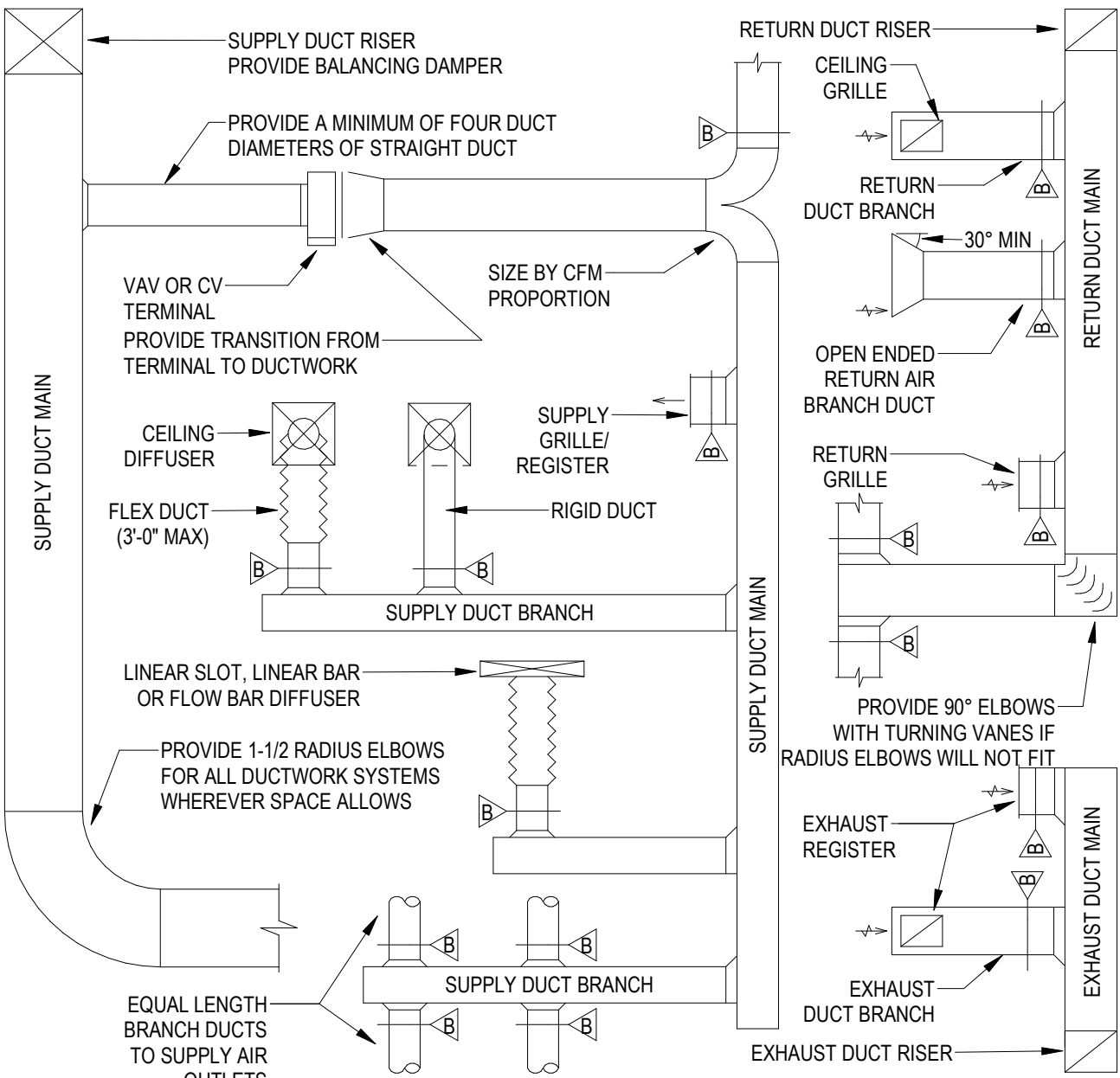
MP-904 PLUMBING SPECIFICATIONS



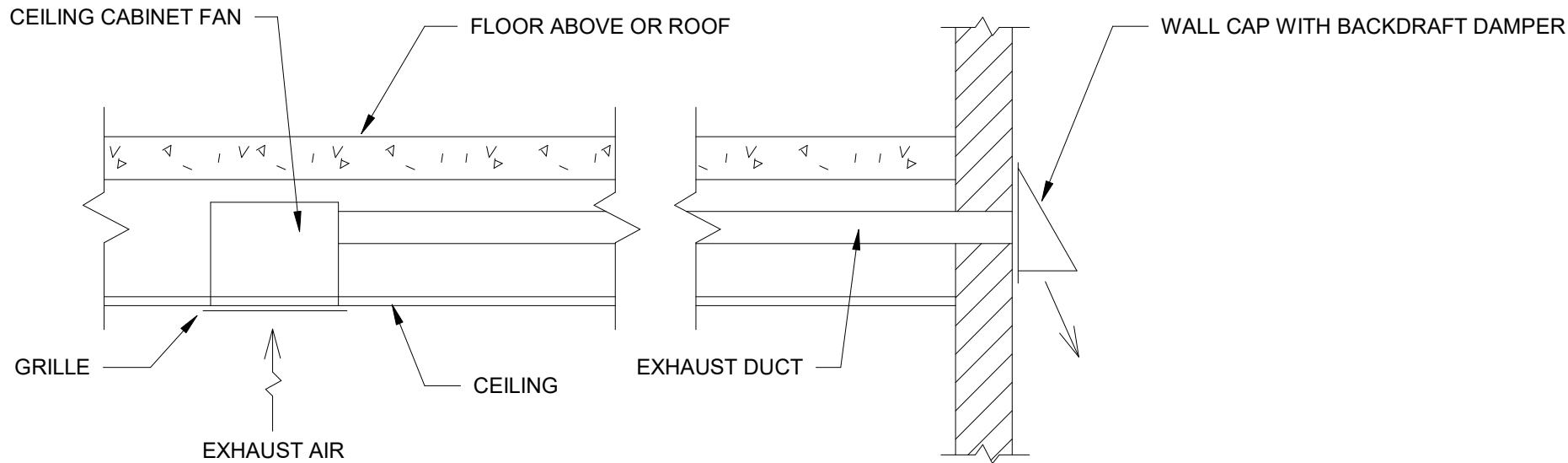
	3
1	THE ENTIRE PLUMBING SYSTEM SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE INTERNATIONAL ARKANSAS PLUMBING CODE REGULATIONS AND LOCAL PLUMBING INSPECTOR.
2	IT IS THE PLUMBING CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE SITE CONTRACTOR TO CONFIRM THAT THE INVERT AND LOCATION OF THE SANITARY SERVICE IS COMPATIBLE WITH THE SITE UTILITIES PRIOR TO BEGINNING WORK.
3	THE PIPING INDICATED ON THESE PLANS ARE DIAGRAMMATICAL. ALL WORK SHALL BE COORDINATED WITH ALL OTHER TRADES PRIOR TO INSTALLATION. CONTRACTOR SHALL COORDINATE ROUTING OF ALL PIPING WITH EXISTING CONDITIONS AND SHALL PROVIDE ANY NECESSARY OFFSETS, REROUTING, TEES, ELBOWS, ETC. REQUIRED FOR A COMPLETE AND COORDINATED INSTALLATION.
4	THE CONTRACTOR SHALL OBTAIN AND PAY ALL FEES RELATED TO PERMITTING, INSPECTIONS, TAP-ON FEES, ETC.
5	WATER HAMMER ARRESTORS SHALL BE INSTALLED AT DISHWASHERS, WASHING MACHINES, SUPPLY BOXES, AND QUICK CLOSING VALVES NOT LISTED. INSTALL WHA-1 AS CLOSE TO QUICK CLOSING VALVE AS POSSIBLE PER MANUFACTURER'S RECOMMENDATIONS. ISOLATION VALVES SHALL BE INSTALLED ON ALL SUPPLY FIXTURE GROUPS AND HOT WATER BALANCING VALVES. CONTRACTOR SHALL COORDINATE AND PROVIDE ALL NECESSARY PIPING & PLUMBING FITTINGS, PIPING, MISCELLANEOUS ITEMS REQUIRED FOR A COMPLETE INSTALLATION OF ALL PLUMBING RELATED ITEMS.
6	DOMESTIC WATER AND SEWER LOCATED OUTSIDE OF FOOTING SHALL MAINTAIN A MINIMUM OF 10' SEPARATION UNLESS WRITTEN PERMISSION IS OBTAINED FROM LOCAL AUTHORITIES AND/OR PROPER CONTAMINATION PROVISIONS PER LOCAL CODE HAVE BEEN MET.
7	ALL DOMESTIC WATER, NATURAL GAS, DEIONIZED WATER, CARBON DIOXIDE, COMPRESSED AIR, AND NITROGEN PIPING SHOWN IS ABOVE CEILING, EXPOSED OVERHEAD, AND WITHIN WALLS UNLESS OTHERWISE NOTED.
8	ALL SANITARY, GREASE, LAB, AND ACID WASTE PIPING SHOWN IS BELOW SLAB, BELOW FLOOR, OR WITHIN WALLS UNLESS OTHERWISE NOTED. ALL SANITARY VENT PIPING SHOWN IS ABOVE CEILING, EXPOSED OVERHEAD, OR WITHIN WALLS UNLESS OTHERWISE NOTED.
9	FROST PROOF HOSE BIBBS AND SUPPLY PIPING SHALL BE INSTALLED ON THE INSIDE OF THE INSULATION. SEAL SHEATHING PENETRATION TO PREVENT AIR FROM REACHING THE VALVE.
10	FLOOR DRAIN CONNECTION SIZE TO BE THE SAME SIZE AS THE DRAIN LINE IT CONNECTS UNLESS NOTED OTHERWISE. IF SIZE IS NOT INDICATED ON DRAWINGS REFER TO PLUMBING ROUGH-IN SCHEDULE FOR PROPER SIZE.
11	FLUSH CONTROLS FOR HANDICAPPED WATER CLOSETS ARE TO BE MOUNTED TO THE OPEN SIDE OF THE TOILET AREAS.
12	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.
13	ALL PIPING PENETRATIONS THROUGH NEW, EXISTING WALL, OR FLOOR SHALL BE SEALED TO EQUAL THE RATING OF THE NEW, EXISTING WALL OR FLOOR.
14	THE PLUMBING SYSTEM SHALL BE TESTED AS REQUIRED BY LOCAL CODE OR BY THE REQUIREMENTS OF THE LOCAL PLUMBING INSPECTOR.
15	THE ENTIRE DOMESTIC WATER SYSTEM (EXISTING/NEW) SHALL BE DISINFECTED IN ACCORDANCE TO THE LOCAL CODE & HEALTH DEPARTMENT REQUIREMENTS.
16	FINISHED FLOOR ELEVATION (F.F.E.) SHALL BE 0.00' FOR CALCULATION PURPOSES ONLY, UNLESS NOTED OTHERWISE.
17	THE BACKFLOW PREVENTION DEVICE SHALL BE INSTALLED PER LOCAL CODE & PER AUTHORITY HAVING JURISDICTION REQUIREMENTS. NON-LEAD TYPE ONLY.
18	ALL PIPING ON ROOF SHALL BE ANCHORED TO STEEL RIB FASTENERS APPROVED BY THE ROOF MANUFACTURER. INSTALL ANCHORS PER MANUFACTURER'S RECOMMENDATION.
19	ALL PLUMBING & PIPING SYSTEMS SHALL BE SUPPORTED AS REQUIRED BY THE LOCAL CODE REQUIREMENTS AND PER MANUFACTURER'S RECOMMENDATIONS.
20	ALL VENT THRU ROOF (VTR'S) 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.
21	ANY PVC PIPE PENETRATING A FIRE RATED ASSEMBLY SHALL BE EXTERNALLY SLEEVED WITH STEEL, FERROUS, OR COPPER MATERIALS, SECURELY FASTENED TO THE FIRE RATED ASSEMBLY. ANY SPACE BETWEEN THE SLEEVE AND THE FIRE RATED ASSEMBLY PENETRATED SHALL BE PROTECTED USING MATERIAL THAT CONFORMS TO ASTM E 814 OR UL 1479, SUCH AS FIRE STOP FS-1900 OR FLAME STOPPER 5000.
22	CONTRACTOR SHALL MAKE ALL FINAL CONNECTIONS FOR DISHWASHER, WASHING MACHINE, REFRIGERATOR, ETC.
23	PROVIDE SHUT-OFF VALVES FOR PROPER OPERATION AND SERVICING OF DOMESTIC WATER DISTRIBUTION SYSTEM. LOCATION SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING: AT EACH FIXTURE GROUP, AT EACH BRANCH TAKE-OFF FROM MAINS AND AT THE BASE OF EACH RISER. COORDINATE WITH ARCHITECTURAL PLAN FOR ACCESS DOOR LOCATIONS.
24	TEMPERED WATER, NOT EXCEEDING A MAXIMUM OF 110° F., SHALL BE DELIVERED FROM PUBLIC HANDWASHING FACILITIES THROUGH AN APPROVED WATER TEMPERATURE LIMITING DEVICE THAT CONFORMS TO ASSE 1070.
25	VALVES SHALL BE LOCATED 6" ABOVE ACCESSIBLE CEILING WHEN AT ALL POSSIBLE AND SHALL BE CLEAR OF ANY OBSTRUCTIONS FROM OTHER TRADES. MAINTENANCE SHALL BE ABLE TO ACCESS VALVES WITH STANDARD LADDER. SHOULD LOCATION NOT BE APPLICABLE CONTRACTOR SHALL PROVIDE A CONTROL CHAIN AND/OR ARM.
26	THE CONTRACTOR IS REQUIRED TO CONDUCT AND SUBMIT A FLOW TEST ALONG WITH THE BOOSTER PUMP SUBMITTAL. AS FLOW DATA WASN'T ACCESSIBLE DURING THE DESIGN PHASE, THE BOOSTER PUMP WAS SIZED BASED ON A 25 PSI INLET PRESSURE.
27	REGULATORS INSTALLED ON THE INTERIOR OF THE BUILDING SHALL BE VENTED TO THE EXTERIOR PER LOCAL AND STATE CODES.
28	IT IS THE PLUMBING CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE SITE CONTRACTOR TO CONFIRM THAT THE INVERTS AND LOCATIONS OF THE BUILDING UTILITIES ARE COMPATIBLE WITH THE SITE UTILITIES PRIOR TO BEGINNING WORK.
29	CONTRACTOR SHALL PROVIDE A PRESSURE REDUCING VALVE (PRV-1) SHOULD THE WATER PRESSURE EXCEED 75 PSI. CONTRACTOR SHALL CONFIRM WITH ON SITE CONDITIONS AND LOCAL UTILITY.
30	PROVIDE BALANCING VALVES FOR PROPER OPERATION AND PRESSURE OF DOMESTIC WATER DISTRIBUTION SYSTEM. LOCATION SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING: AT EACH FIXTURE GROUP, AT EACH BRANCH TAKE-OFF FROM MAINS AND AT THE EACH RISER. INSTALL PER MANUFACTURER'S REQUIREMENTS.
31	PROVIDE AUTOMATIC SHUT-OFF VALVE ON GAS LINE FEEDING KITCHEN EQUIPMENT BELOW TYPE-I HOOD PRIOR TO ANY TAKE OFF. VALVE SHALL BE CONNECTED TO FIRE ALARM SYSTEM.
32	PROVIDE DRAIN PANS FOR ALL WATER LINES CROSSING OVER "IT" CLOSET/ROOM. ROUTE DRAIN PAN(S) TO NEAREST APPROVED WASTE RECEPTAL.
33	PROVIDE DRAIN PANS FOR ALL OVER HEAD DRAIN PIPING CROSSING OVER KITCHEN. ROUTE DRAIN PAN(S) TO NEAREST APPROVED WASTE RECEPTAL.
34	ANY LINE VOLTAGE WIRING THAT IS RUN BY THE PLUMBING CONTRACTOR SHALL BE COORDINATE WITH ELECTRICAL CONTRACTOR ON SITE, AND INSTALLED IN ACCORDANCE WITH THE ELECTRICAL PLANS, NOTES, AND SPECIFICATIONS.
35	INSULATION JACKET SHALL BE PROVIDED WHEN PIPING INSULATION IS EXPOSED.

GENERAL FIRE SPRINKLER NOTES	
1	RUN ALL PIPING PARALLEL OR PERPENDICULAR TO STRUCTURE IN ALL AREAS. SPRINKLER CONTRACTOR SHALL COORDINATE LOCATION OF HORIZONTAL SPRINKLER PIPING WITH OTHER TRADES TO MISS ALL LIGHT FIXTURES, DUCTS, VAV BOXES, AIR DIFFUSERS AND ALL OTHER ITEMS WHERE CEILING CLEARANCES ARE CLOSE.
2	DESIGN, FABRICATE, INSTALL THE FIRE PROTECTION AUTOMATIC SPRINKLER SYSTEM IN AN ACCEPTABLE MANNER TO THE STATE HEALTH DEPARTMENT, LOCAL FIRE MARSHALL AND THE ARCHITECT/ENGINEER.
3	PAY ALL PERMITS, LICENSES, FEES, DEPOSITS AND CHARGES IN CONNECTION WITH THE WORK, EXCEPT AS NOTED HEREIN. SECURE ALL NECESSARY APPROVALS.
4	DESIGN AND INSTALL THE SYSTEM PER THE REQUIREMENTS OF NFPA NO. 13. ALL DEFICIENCIES SHALL BE THE RESPONSIBILITY OF THE SPRINKLER CONTRACTOR AND ANY DEVIATIONS FROM THE REQUIREMENTS IN NFPA NO. 13 AND/OR THE APPROVED PLANS SHALL REQUIRE SPECIAL PERMISSION FROM THE ARCHITECT.
5	COMPLY WITH ALL RULES, REGULATIONS, LAWS AND ORDINANCES OF THE STATE, LOCAL, CITY OR COUNTY AUTHORITIES AND UTILITY COMPANIES.
6	THE AUTOMATIC SPRINKLER SYSTEM SHALL BE DESIGNED, FABRICATED, INSTALLED AND TESTED BY AN EXPERIENCED CONTRACTOR APPROVED BY THE ARCHITECT AND LICENSED BY THE STATE TO PERFORM SUCH WORK.
7	SUBMIT SHOP DRAWINGS TO THE ARCHITECT AND THE OWNER'S INSURANCE COMPANY FOR APPROVAL BEFORE BEING SENT TO THE ARCHITECT. ALL SHOP DRAWINGS MUST BEAR THE INSURANCE SERVICE OFFICES (ISO) STAMP OF ACCEPTANCE AND THE LOCAL FIRE MARSHALL'S STAMP OF APPROVAL.
8	SUBMIT COMPLETE LAYOUT DRAWING OF OVERHEAD SPRINKLER SYSTEM AND RELATED EQUIPMENT INDICATING RELATIONSHIP OF ALL THE OVERHEAD ITEMS INCLUDING CEILING AIR DIFFUSERS, LIGHTING FIXTURES, BEAMS AND ALL OTHER ITEMS. ALL SPRINKLER HEADS SHALL BE SPACED PER NFPA.
9	SUBMIT COMPLETE DETAILS AND SECTIONS TO CLEARLY DEFINE AND CLARIFY THE DESIGN, INCLUDING A LIST OF MATERIALS DESCRIBING ALL PROPOSED MATERIALS WITH MANUFACTURER'S NAME AND CATALOG NUMBER.
10	PROVIDE SPRINKLER HEAD(S) FOR EACH ROOM/SPACE FOR COMPLETE PROTECTION.
11	UPON COMPLETION OF THE SPRINKLER SYSTEM INSTALLATION, TEST AND RE-TEST THE COMPLETE INSTALLATION AND MAKE ALL CORRECTIONS AS NECESSARY TO SECURE ACCEPTANCE BY FIRE MARSHALL. FURNISH ALL TEST EQUIPMENT AND PERSONNEL REQUIRED.
12	AFTER THE FIRE SPRINKLER SYSTEM HAS BEEN COMPLETELY TESTED, INSPECTED AND APPROVED, SECURE A LETTER OF FINAL ACCEPTANCE FROM THE ADMINISTRATIVE AUTHORITY ADDRESSED TO THE SPRINKLER COMPANY RESPONSIBLE FOR THE INSTALLATION, PREPARED IN TRIPLICATE, DELIVER ALL THREE COPIES TO THE ARCHITECT.
13	UNDERWRITERS' LABORATORIES (UL) AND/OR FACTORY MUTUAL RESEARCH CORPORATION (FMRC) APPROVED EQUIPMENT SHOULD BE UTILIZED WHERE APPLICABLE, AND THE DETAILS OF THE INSTALLATION SHOULD CONFORM TO FACTORY MUTUAL ENGINEERING ASSOCIATION (FMEA) GOOD PRACTICES.
14	A CORROSIVE-RESISTANT PLACARD SHALL BE PLACED ON THE BASE OF THE RISER STATING THE DESIGN CRITERIA AND RESULTING DEMAND AT THE BASE OF THE RISER, INCLUDING HOSE STREAM ALLOWANCES, ALL PIPING, FITTINGS, HANGERS, VALVES, AND DEVICES ARE TO COMPLY WITH NFPA NO. 13.
15	ALL PIPES SHALL MEET OR EXCEED CORROSION RESISTANCE RATIO OF SCHEDULE 40 STEEL PIPE. FIELD COORDINATION IS REQUIRED ESPECIALLY WHEN CUTTING OR ADJUSTING PIPES FOR SPRINKLER INSTALLATION, AS PER THE REQUIREMENTS OF THE DEPARTMENT OF HEALTH, ALL UNDERGROUND PIPING IS TO BE CHLORINATED.
16	FLOW AND TAMPER SWITCHES SHALL BE PROVIDED BY FIRE ALARM CONTRACTOR AND INSTALLED BY SPRINKLER CONTRACTOR. WIRING SHALL BE PROVIDED BY FIRE ALARM CONTRACTOR. EXPOSED SPRINKLER PIPING SHALL BE PAINTED, COLOR SHALL BE SPECIFIED BY ARCHITECT.
17	PROVIDE COMPONENTS FOR FULL FLOW TESTING OF BACKFLOW DEVICE.
18	IN AREAS SUBJECT TO FREEZING, PROVIDE DRY SPRINKLER SYSTEM OR COORDINATE WITH MECHANICAL SUBCONTRACTOR TO PROVIDE HEATING EQUIPMENT TO MAINTAIN ANY SPACES AT 40°F OR ABOVE.
19	CONTRACTOR SHALL COORDINATE COLOR OF SPRINKLER HEADS WITH OWNER/ARCHITECT.
20	CONTRACTOR SHALL MATCH TYPE AND COLOR OF EXISTING SPRINKLER HEADS.
21	FIRE CONTRACTOR SHALL PROVIDE AS AN ADD ALTERNATE BID- HAVE A FLOW TEST DONE FOR THE FIRE SUPPRESSION TO DETERMINE IF A BOOSTER PUMP WILL BE REQUIRED. IF ONE IS REQUIRED, CONTRACTOR SHALL PROVIDE IT. COORDINATE ELECTRICAL REQUIREMENTS WITH THE ELECTRICAL CONTRACTOR.
GENERAL PLUMBING SEISMIC NOTES	
1	PROVIDE VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT.
2	COORDINATE ALL VIBRATION ISOLATION DEVICE INSTALLATION AND SEISMIC BRACING FOR PLUMBING PIPING AND EQUIPMENT WITH OTHER SYSTEMS AND EQUIPMENT IN THE VICINITY, INCLUDING OTHER SUPPORTS AND RESTRAINTS, IF ANY.
3	TESTING AGENCY QUALIFICATIONS: AN INDEPENDENT AGENCY, WITH THE EXPERIENCE AND CAPABILITY TO CONDUCT THE TESTING INDICATED, THAT IS AN NRTL AS DEFINED BY OSHA IN 29 CFR 1910.7 AND THAT IS ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.
4	COMPLY WITH SEISMIC-RESTRAINT REQUIREMENTS IN THE INTERNATIONAL BUILDING CODE
5	WELDING QUALIFICATIONS: QUALITY PROCEDURES AND PERSONNEL ACCORDING TO AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE-STEEL".
6	SEISMIC-RESTRAINT DEVICES SHALL HAVE HORIZONTAL AND VERTICAL LOAD TESTING AND ANALYSIS AND SHALL BEAR ANCHORAGE PRE-APPROVAL OPA NUMBER FROM OSHDP. PRE-APPROVAL BY ICC-ES OR PRE-APPROVAL BY ANOTHER AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, SHOWING MAXIMUM SEISMIC-RESTRAINT RATINGS. RATINGS BASED ON INDEPENDENT TESTING ARE PREFERRED TO RATINGS BASED ON CALCULATIONS. IF PRE-APPROVED RATINGS ARE UNAVAILABLE, SUBMITTALS BASED ON INDEPENDENT TESTING ARE PREFERRED. CALCULATIONS (INCLUDING COMBINING SHEAR AND TENSILE LOADS) TO SUPPORT SEISMIC-RESTRAINT DESIGNS MUST BE SIGNED AND SEALED BY A QUALIFIED PROFESSIONAL ENGINEER.
7	BUILDING IS CLASSIFIED AS SEISMIC DESIGN CATEGORY B. CONTRACTOR SHALL PROVIDE SEISMIC BRACING FOR PIPING, DUCTWORK AND EQUIPMENT TO MEET ALL LOCAL AND NATIONAL CODE REQUIREMENTS.
8	SEISMIC RESTRAINTS FOR MEP EQUIPMENT AND SYSTEMS
9	CONTRACTOR'S RESPONSIBILITIES SHALL INCLUDE PROVIDING ALL SUBMITTALS AND DETAILS WITH STRUCTURAL ENGINEER'S CERTIFICATION FOR PERMITTING.
10	SEISMIC PROTECTION FOR CONCERNS OF ALL BUILDING SYSTEMS INCLUDING BUT NOT LIMITED TO MECHANICAL, PLUMBING, AND ELECTRICAL, MUST MEET MINIMUM REQUIREMENTS OF ALL APPLICABLE CODES FOR BUILDINGS' CLASSIFIED SEISMIC PROTECTION MEASURES TO BE APPLIED SHALL BE INSTALLED IN STRICT ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND/OR FEDERAL CODES AND WITH MANUFACTURER'S REQUIREMENTS, THE MOST STRINGENT SHALL APPLY

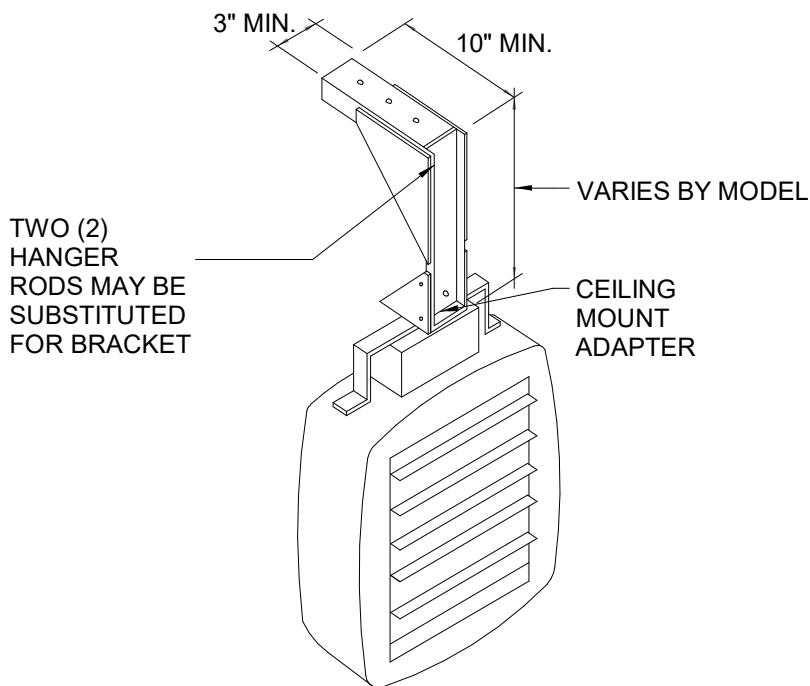
- NOTES:
1. REFER TO HVAC FLOOR PLANS FOR DUCT SIZES
 2. REFER TO SCHEDULES FOR GRILLES, REGISTERS, DIFFUSERS AND TERMINAL SIZES AND TYPES
 3. PROVIDE A MANUAL TYPE BALANCING DAMPER FOR EACH SUPPLY OUTLET AND RETURN INLET
 4. ALL DUCT RUNOUTS TO DIFFUSERS SHALL BE THE SAME SIZE AS DIFFUSER NECK SIZE, UNLESS OTHERWISE NOTED
 5. FLEX DUCT WILL NOT BE ALLOWED ON RETURN OR EXHAUST DUCTWORK SYSTEMS
 6. PROVIDE 12" AIR CUSHION AT THE END OF EACH SUPPLY MAIN AND BRANCH DUCT
 7. INDIVIDUAL BRANCH BALANCING DAMPERS NOT REQUIRED FOR SUPPLY OR EXHAUST REGISTERS



1 DUCTWORK INSTALLATION DIAGRAM
MP-500 N.T.S

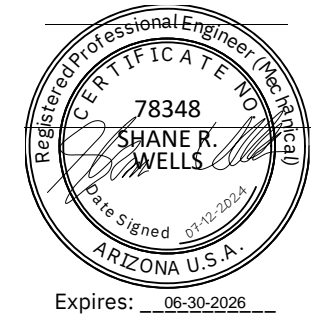


2 233416 EXHAUST FAN -BATHROOM-SIDEWALL DISCHARGE
MP-500 N.T.S



3 M_ELECTRIC UNIT HEATER
MP-500 1/8" = 1'-0"

LA PRIVADA COMMUNITY PARK
N.E.C. OF 183RD AVENUE & YUMA ROAD
GOODYEAR, ARIZONA
ISSUE FOR PERMIT - 07.12.2024



△ DATE REVISION

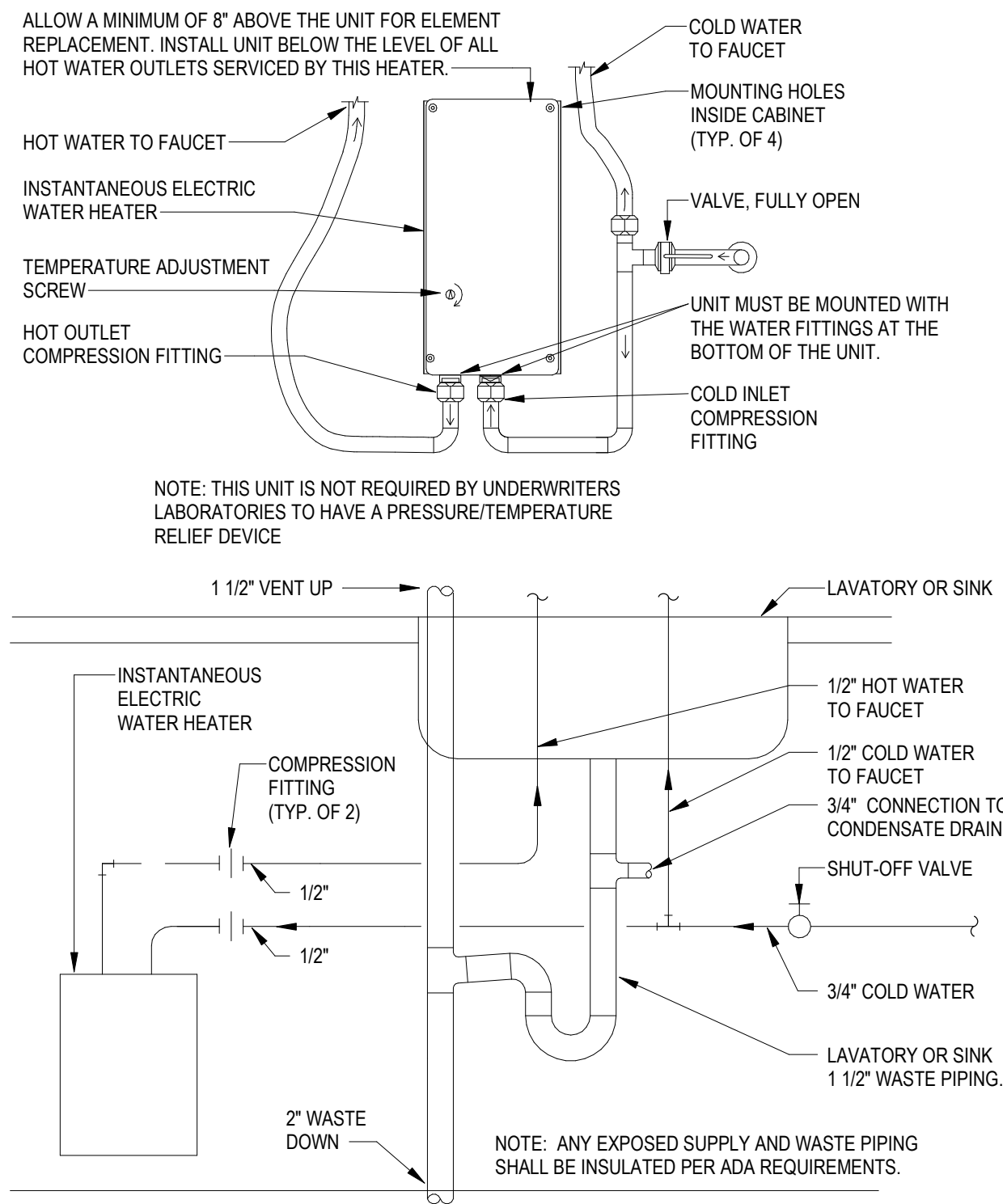
PROJECT NUMBER 201253R

MECHANICAL
DETAILS

MP-500

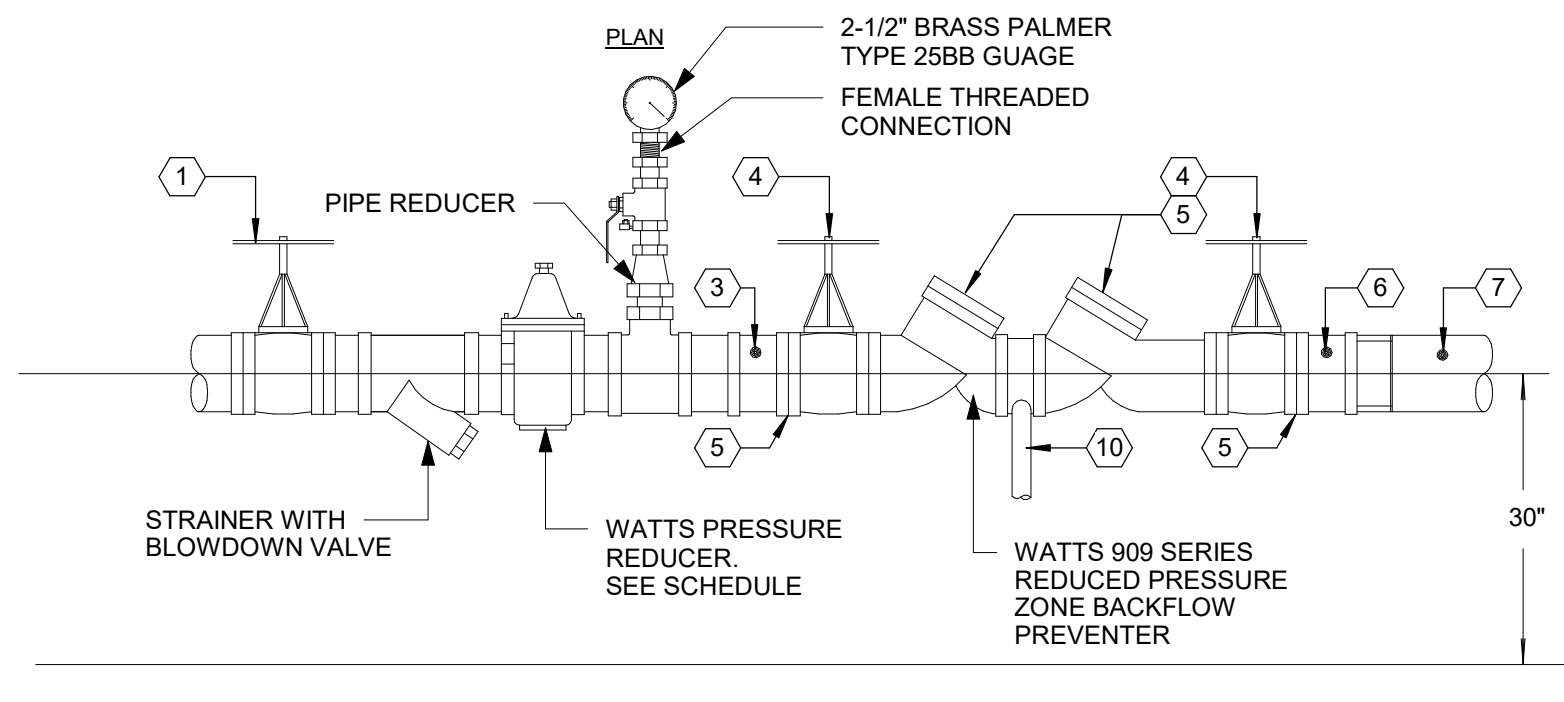
FFKR ARCHITECTS

58 S River Drive, Suite 380, Tempe, AZ 85288
480.362.1361 FFKR.COM

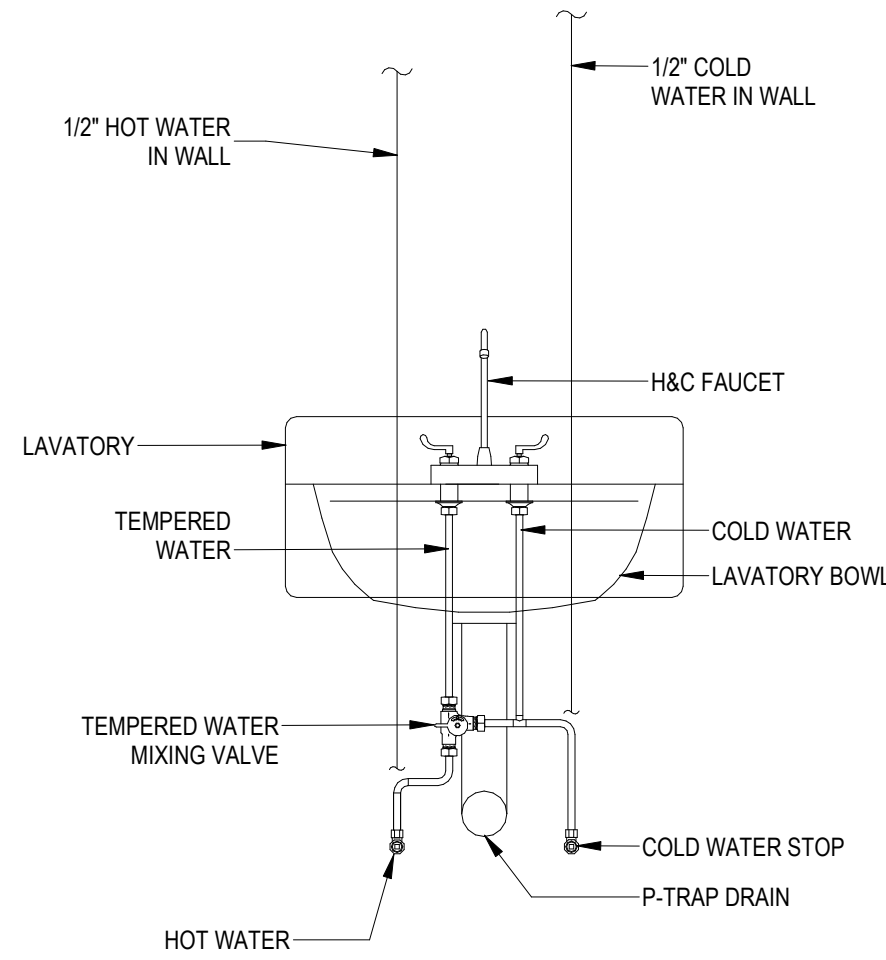


8 INSTANTANEOUS ELECTRIC WATER HEATER
MP-501 1/8" = 1'-0"

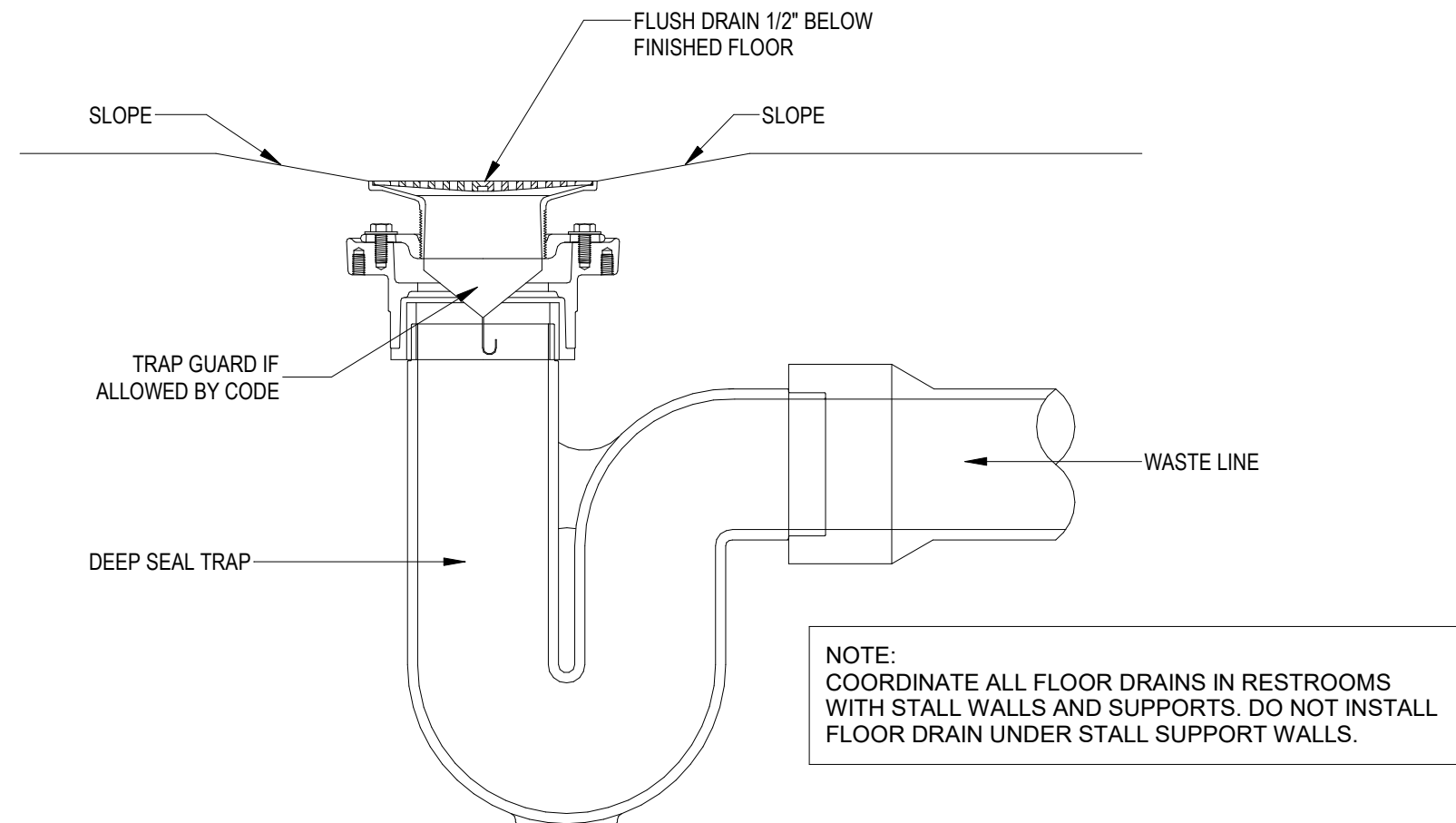
- NOTES:
1. PIPE SPOOL (FLANGED DUCTILE IRON PIPE)
 2. 90 DEG. BEND (FLANGED D.I.P.)
 3. PIPE SPOOL (FLANGED DUCTILE IRON PIPE)
 4. OS & Y RESILIENT SEATED WHEEL GATE VALVE
 5. APPROVED REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY
 6. ROCKWELL 913 STEEL FLANGED COUPLING ADAPTER OR APPROVED EQUAL
 7. PLAIN END DUCTILE IRON PIPE (ALLOW 1" GAP AT FLANGE TO ALLOW FOR REMOVAL OF ASSEMBLY)
 8. ADJUSTABLE PIPE SUPPORT PERMANENTLY ATTACHED TO FLOOR
 9. TEST COCKS (4 REQUIRED, SHALL BE FITTED WITH BRASS PLUGS)
 10. AIR GAP DRAIN. ROUTE 2" DRAIN LINE TO FUNNEL DRAIN



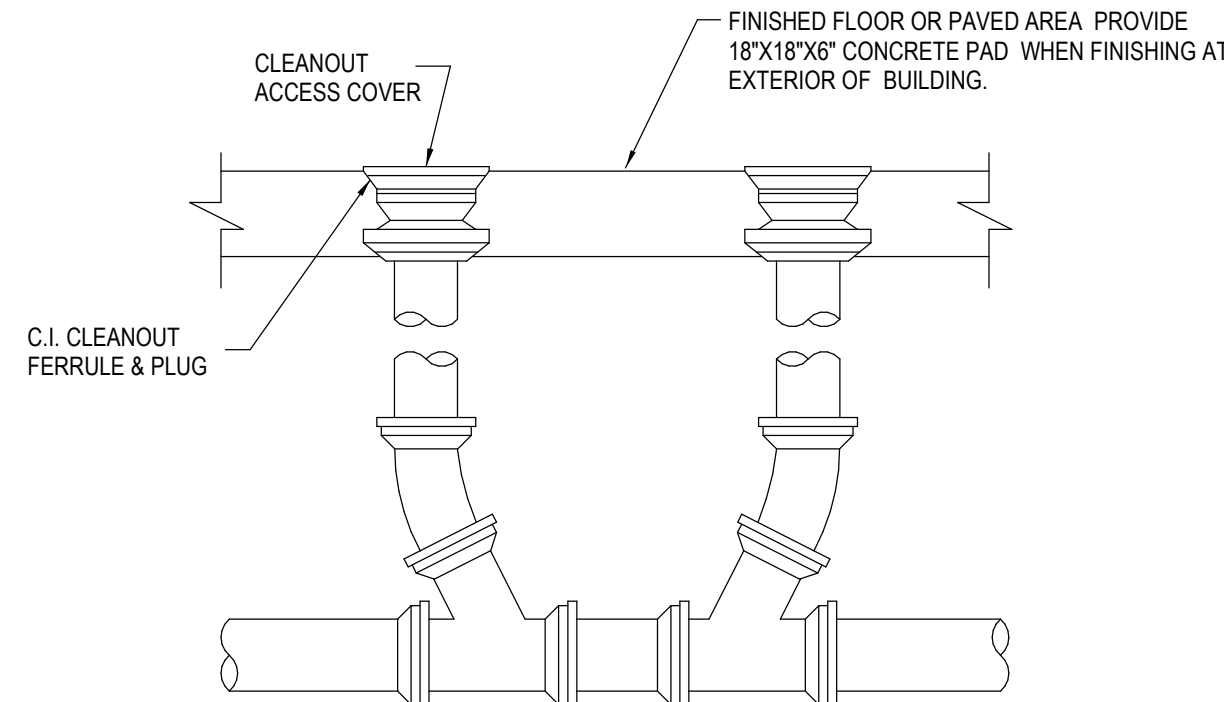
7 P. DOMESTIC WATER BACKFLOW PREVENTER
MP-501 SCALE: N.T.S.



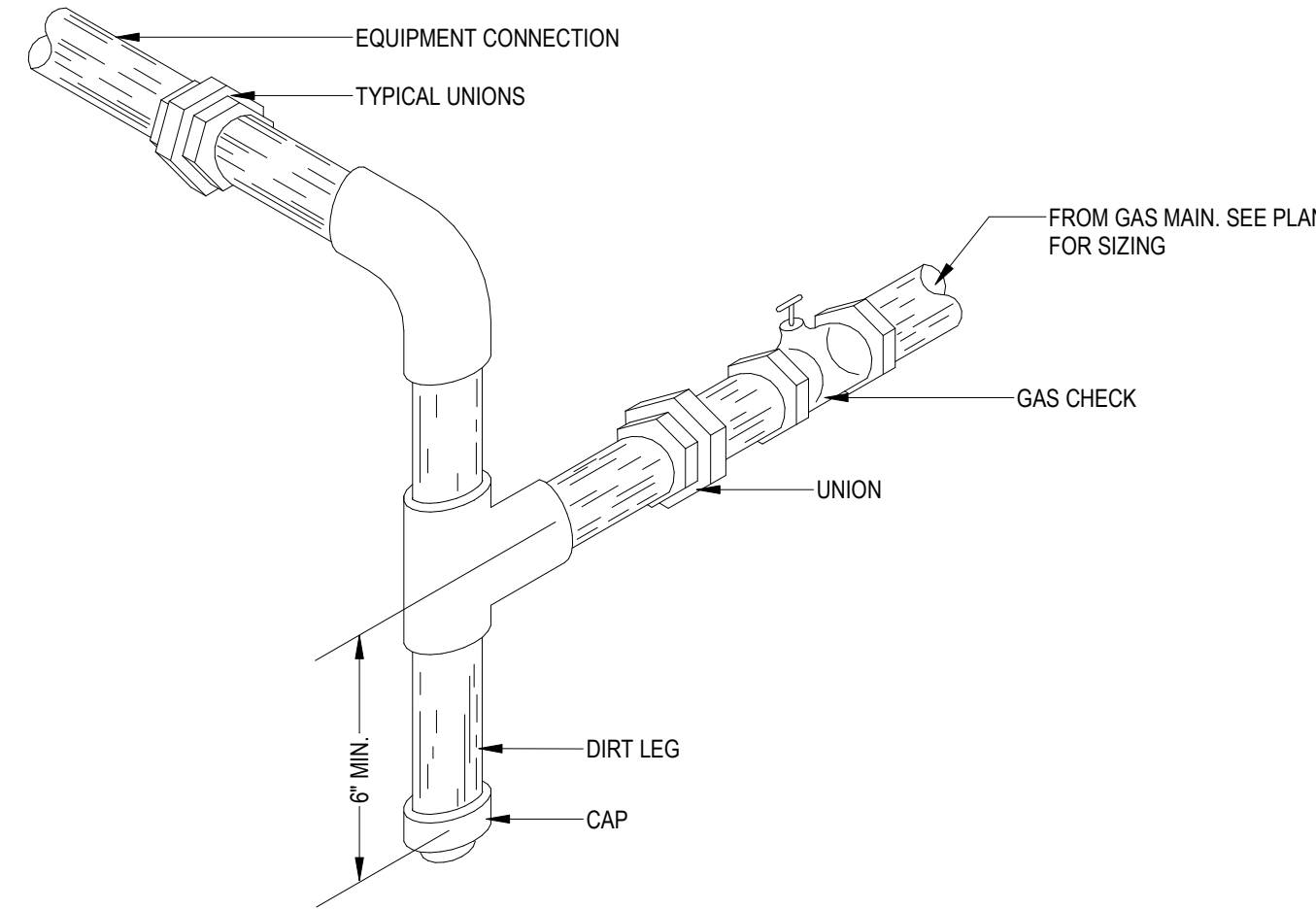
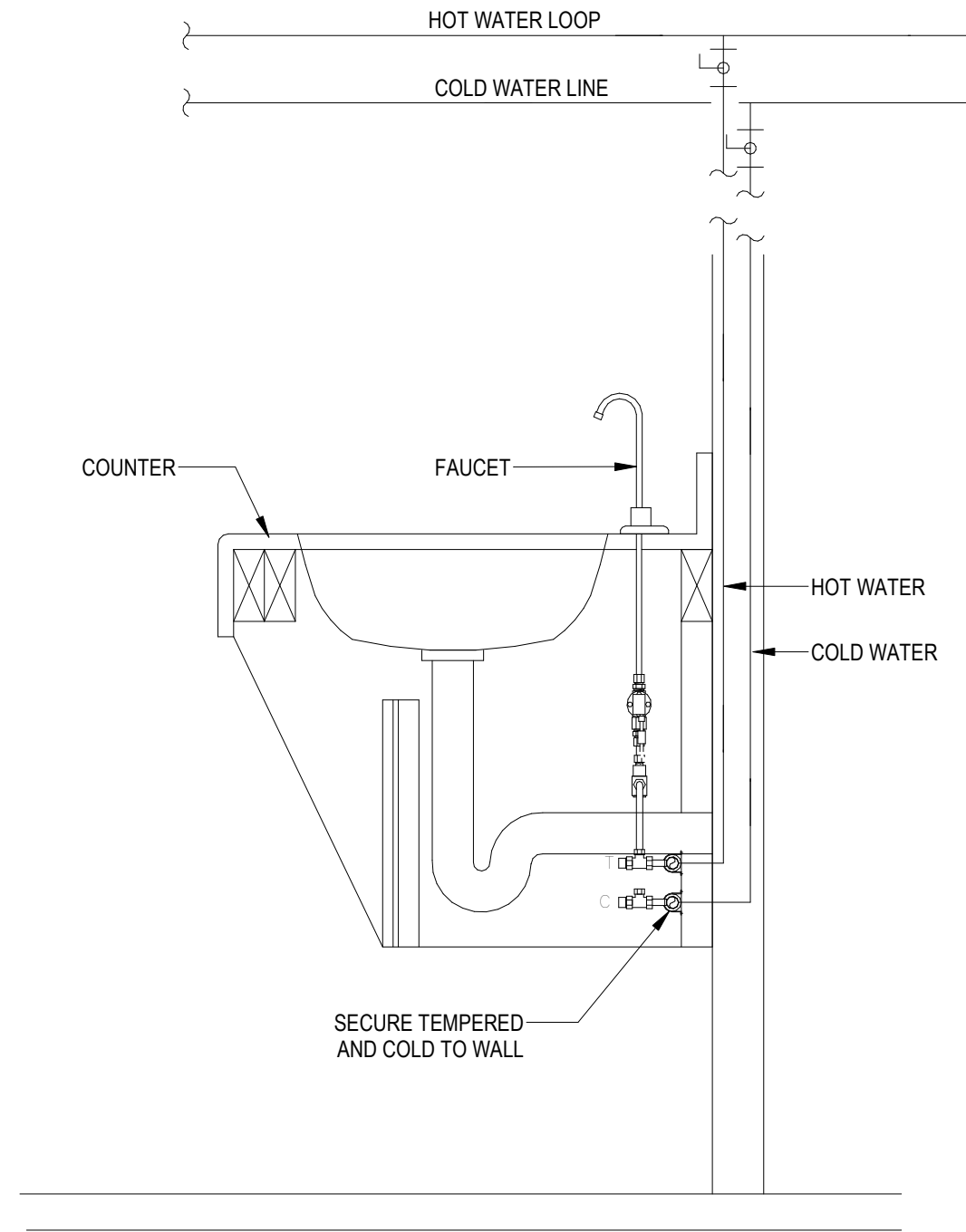
6 224100 - LAVATORY-COUNTER TOP
MP-501 N.T.S.



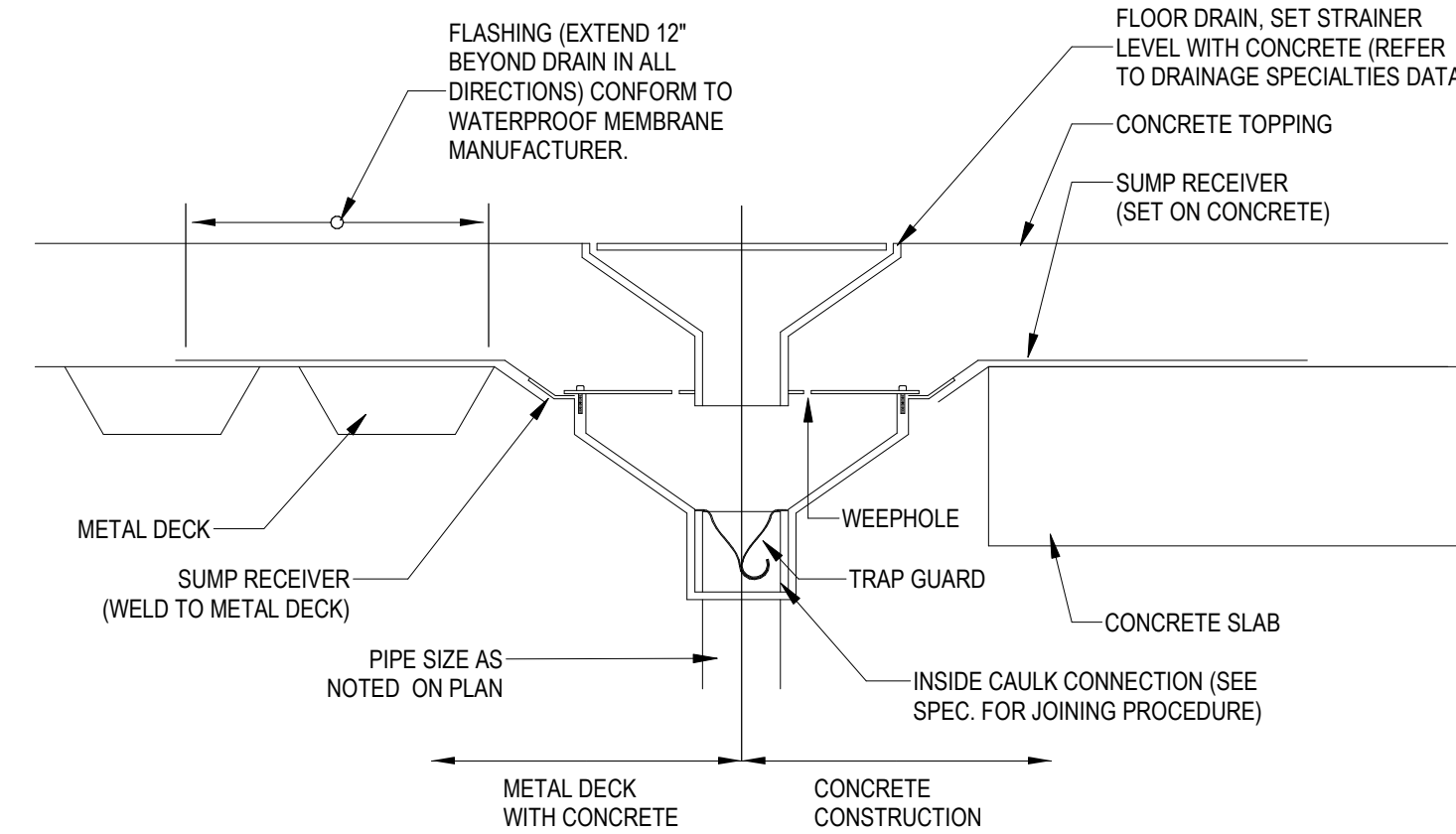
4 221319 - FLOOR DRAIN-FLAT TOP-CONCRETE SLAB
MP-501 SCALE: N.T.S.



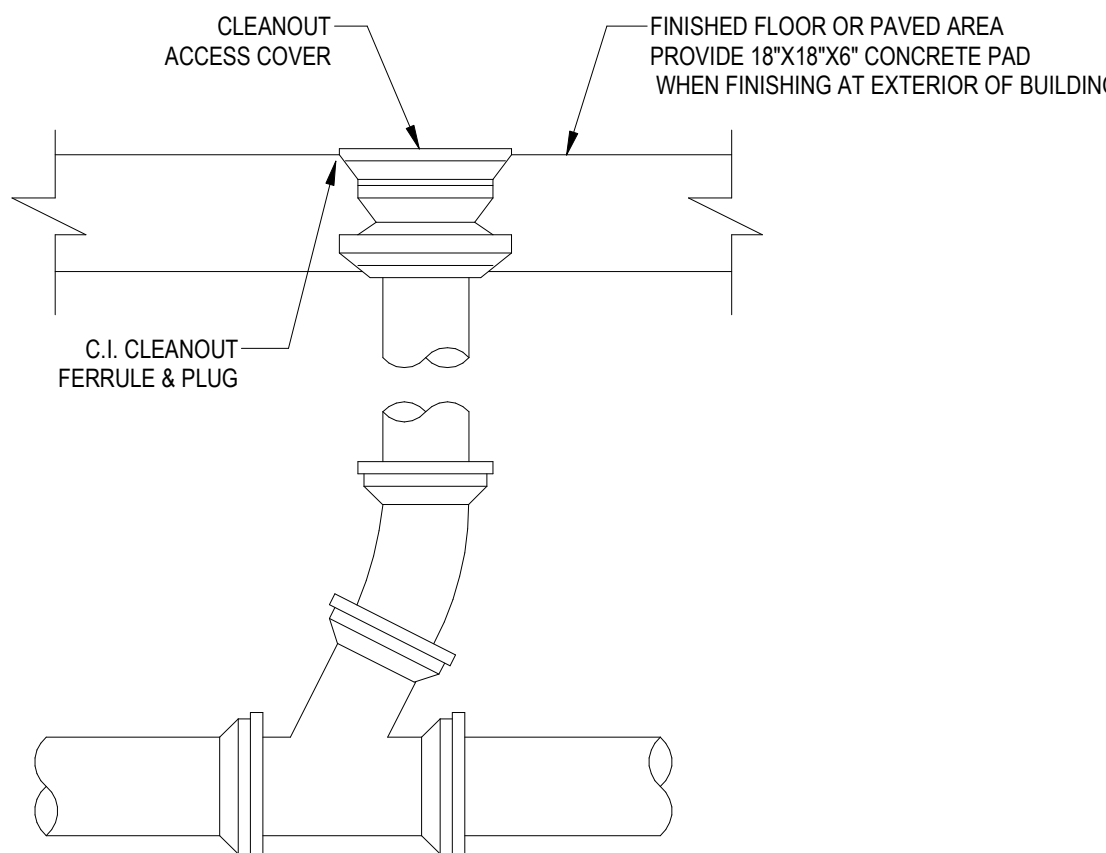
2 221319 - TWO WAY CLEANOUT
MP-501 NOT TO SCALE



5 222311 - GAS DIRT LEG W/SHUTOFF VALVE
MP-501 SCALE: N.T.S.



3 221319 - FLOOR DRAIN-FLAT TOP
MP-501 N.T.S.



1 221319 - FLOOR CLEANOUT-SINGLE
MP-501 N.T.S.

LA PRIVADA COMMUNITY PARK
N.E.C. OF 183RD AVENUE & YUMA ROAD
GOODYEAR, ARIZONA
ISSUE FOR PERMIT - 07.12.2024



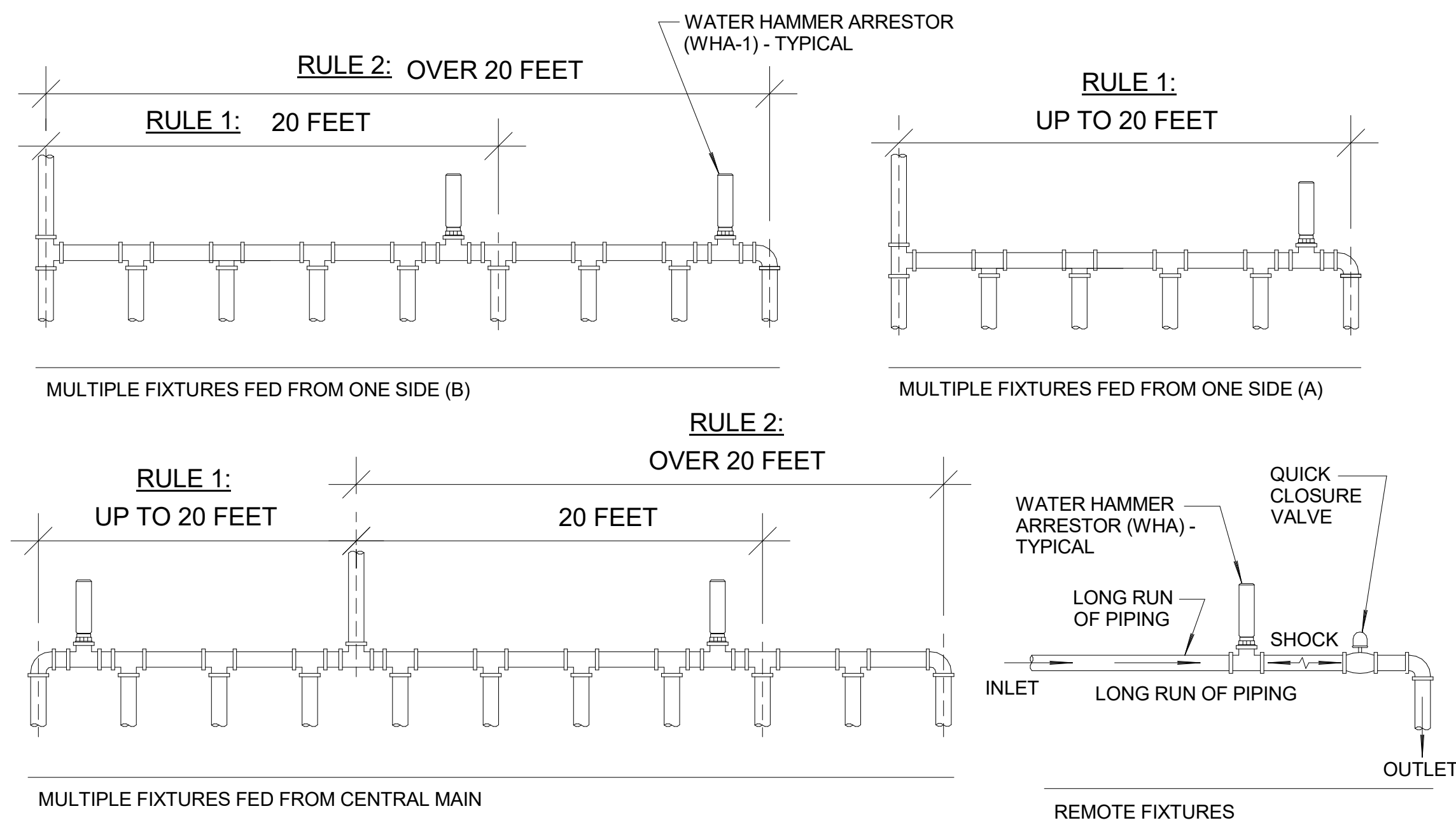
DATE REVISION

PROJECT NUMBER 201253R

PLUMBING
DETAILS

MP-501

FFKR ARCHITECTS
58 S River Drive, Suite 380, Tempe, AZ 85288
480.362.1361 FFKR.COM



1 WATER HAMMER ARRESTOR DETAIL
N.T.S.

SIZING AND PLACEMENT:

AS SHOWN IN THE DIAGRAMS, IT HAS BEEN ESTABLISHED THAT THE PREFERRED LOCATION FOR THE WATER HAMMER ARRESTOR IS AT THE END OF THE BRANCH LINE BETWEEN THE LAST TWO FIXTURES SERVED. THE LOCATION OF THE WATER HAMMER ARRESTOR SHOWN IN THE DIAGRAMS APPLIES TO BRANCH LINES THAT DO NOT EXCEED 20 FEET IN LENGTH, FROM THE START OF THE HORIZONTAL BRANCH LINE TO THE LAST FIXTURE SUPPLIED. ON THIS BRANCH LINE, BETWEEN THE LAST TWO FIXTURES, IF THE 20 FOOT LENGTH, AN ADDITIONAL WATER HAMMER ARRESTOR SHOULD BE USED. REFER TO THE TWO RULES LISTED TO COVER THE PLACEMENT OF WATER HAMMER ARRESTORS.

RULE 1:

RULE 1 COVERS MULTIPLE FIXTURE BRANCH LINES WHICH DO NOT EXCEED 20 FEET LENGTH.
EXPLANATION: - FIXTURE UNIT SIZING AND SELECTION TABLE IS USED TO SELECT THE REQUIRED PDI UNIT (WATER HAMMER ARRESTOR).

RULE 2:

RULE 2 COVERS MULTIPLE FIXTURE BRANCH LINES WHICH EXCEED 20 FEET IN LENGTH.
EXPLANATION: - FIXTURE UNIT SIZING AND SELECTION TABLE IS USED TO SELECT THE REQUIRED PDI UNIT (WATER HAMMER ARRESTOR). THE SUM OF THE FIXTURE UNIT RATING OF UNITS X AND Y SHALL BE EQUAL TO OR GREATER THAN THE DEMAND OF THE BRANCHES.

WATER HAMMER ARRESTORS	
SIZE	WATTS MODEL
THREADED	
1/2"	15M2-A
3/4"	15M2-B
1"	15M2-C
1"	15M2-D
1"	15M2-E
1"	15M2-F
SOLDER	
1/2"	15M2-AS
3/4"	15M2-BS
1"	15M2-CS
1"	15M2-DS
1"	15M2-ES
1"	15M2-FS

MODELS ABOVE ARE WATTS AND IS A BASIS OF DESIGN. THE FOLLOWING MANUFACTURERS ARE ACCEPTED IN NAME ONLY:
 SIOUX CHIEF, WATTS, PPI, PROFLO, ZURN-WILKINS

MODELS ABOVE ARE WATTS AND IS A BASIS OF DESIGN. THE FOLLOWING MANUFACTURERS ARE ACCEPTED IN NAME ONLY:
SIOUX CHIEF, WATTS, PPI, PROFLO, ZURN-WILKINS

SELECTION FOR LONG PIPING RUNS:

THE MAJORITY OF SIZING AND SELECTION APPLICATIONS WILL INVOLVE SINGLE AND MULTIPLE FIXTURE BRANCH LINES. THESE ARE EASILY HANDLED WITH THE SIZING AND SELECTION TABLE. THE REMAINDER OF THE APPLICATIONS INVOLVE INDIVIDUAL RUNS OF PIPING TO A REMOTE ITEM OF EQUIPMENT. THE PROPERLY SIZED WATER HAMMER ARRESTOR FOR SUCH APPLICATIONS CAN BE DETERMINED BY THE TABLES BELOW.

IDEALLY, THE FLOW PRESSURE IN BRANCH LINES SERVING FIXTURES SHOULD NEVER EXCEED 55 PSI. PRESSURE REDUCING VALVES SHOULD BE INSTALLED TO MAINTAIN PROPER PRESSURE. WHEN FLOW PRESSURES ARE 65 TO 85 PSI THE NEXT SIZE WATER HAMMER ARRESTOR SHOULD BE SELECTED. REFER TO SIZING TABLE FOR WATER PRESSURE OVER 65 PSI.

ALL SIZING DATA IN THIS SECTION IS BASED ON FLOW VELOCITIES OF 10 FPS OR THE CERTIFICATION TESTING WAS CONDUCTED WITH A VELOCITY OF 10 FPS TO OFFER ASSURANCE THAT PDI APPROVED UNITS WERE CAPABLE OF HANDLING SHOCK OF MAXIMUM INTENSITY THAT MAY BE ENCOUNTERED.

WHEN LONG RUNS OF PIPING ARE EMPLOYED TO SERVE A REMOTE ITEM OF EQUIPMENT, THE WATER HAMMER ARRESTOR SHOULD BE LOCATED AS CLOSE AS POSSIBLE TO THE POINT OF QUICK CLOSURE. AT THIS LOCATION THE WATER HAMMER ARRESTOR WILL CONTROL THE DEVELOPED ENERGY AND PREVENT THE SHOCK WAVE FROM SURGING THROUGH THE PIPING SYSTEM. A TYPICAL EXAMPLE OF PLACEMENT IS AS SHOWN.

SIZING TABLE						
FOR WATER PRESSURE UP TO 65 PSI						
LENGTH OF PIPE (ft)	NOMINAL PIPE DIAMETER - IN.					
OF PIPE	1/2"	3/4"	1"	1.25"	1.5"	2"
25'	A	A	B	C	D	E
50'	A	B	C	D	E	F
75'	B	C	D	AE	F	EF
100'	C	D	E	F	CF	FF
125'	C	D	F	AF	EF	EFF
150'	D	E	F	DF	FF	FFF
OVER 65 PSI AND UP TO 85PSI						
LENGTH OF PIPE (ft)	NOMINAL PIPE DIAMETER - IN.					
OF PIPE	1/2"	3/4"	1"	1.25"	1.5"	2"
25'	B	B	C	D	E	F
50'	B	C	D	E	F	CF
75'	C	D	E	F	CF	FF
100'	D	E	F	CF	EF	EFF
125'	D	E	CF	DF	FF	BFFF
150'	E	F	CF	FF	DF	FFFF

SIZING AND SELECTION TABLE

SIZE (DN)	MODEL	ORDER CODE	MODEL	ORDER CODE	CROSS FIXTURE	REF. PDI STANDARD UNITS
IN	THREADED			SOLDER		
1/2"	15M2-A	0750140	15M2-AS	0750150	1-11	A
3/4"	15M2-B	0750141	15M2-BS	0750151	12-32	B
1"	15M2-C	0750142	15M2-CS	0750152	33-60	C
1"	15M2-D	0750143	15M2-DS	0750153	61-113	D
1"	15M2-E	0750144	15M2-ES	0750154	114-154	E
1"	15M2-F	0750145	15M2-FS	0750155	155-330	F

FLUSHOMETER VALVE:

A VALVE ATTACHED TO A PRESSURIZED WATER SUPPLY PIPE AND SO DESIGNED THAT WHEN ACTIVATED TO OPENS THE LINE FOR DIRECT FLOW INTO THE FIXTURE AT A RATE AND QUANTITY TO OPERATE THE FIXTURE PROPERLY, AND THE GRADUALLY CLOSES TO RESEAL FIXTURE TRAPS AND AVOID WATER HAMMER.

QUICK-CLOSING VALVE:

A VALVE OR FAUCET THAT CLOSES AUTOMATICALLY WHEN RELEASED MANUALLY OR THAT IS CONTROLLED BY A MECHANICAL MEANS FOR FAST-ACTION CLOSING.

1 221119 - WATER HAMMER ARRESTOR
IP-502 SCALE: N.T.S.

IPC-INTERNATIONAL PLUMBING CODE

604.9 WATER HAMMER. THE FLOW VELOCITY OF THE WATER DISTRIBUTION SYSTEM SHALL BE CONTROLLED TO REDUCE THE POSSIBILITY OF WATER HAM-MER. A WATER HAMMER ARRESTOR SHALL BE INSTALLED WHERE QUICK-CLOSING VALVES ARE UTILIZED. WATER HAMMER ARRESTORS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS. WATER HAMMER ARRESTORS SHALL CONFORM TO ASSE 1010.

UPC-UNIFORM PLUMBING CODE

609.10 WATER HAMMER. ALL BUILDING WATER SUPPLY SYSTEMS IN WHICH QUICK-ACTING VALVES ARE INSTALLED SHALL BE PROVIDED WITH DEVICES TO ABSORB THE HAMMER CAUSED BY HIGH PRESSURES RESULTING FROM THE QUICK CLOSING OF THESE VALVES. THESE PRESSURE-ABSORBING DEVICES SHALL BE APPROVED MECHANICAL DEVICES. WATER PRESSURE-ABSORBING DEVICES SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO QUICK-ACTING VALVES.

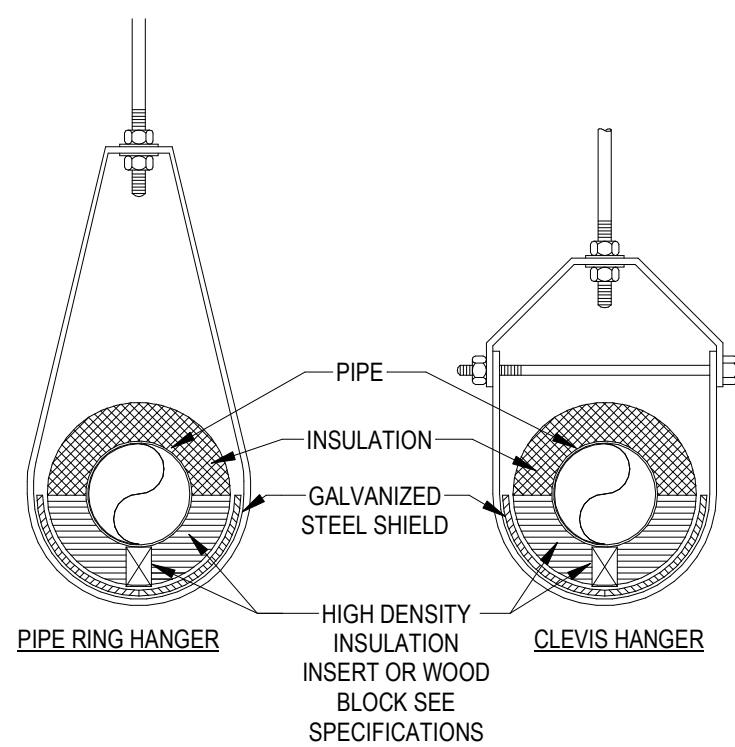


△	DATE	REVISION

PROJECT NUMBER 201253F

PLUMBING DETAILS

MP-502



3 INSULATED PIPE AT HANGER DETAIL
MP-502 N.T.S

FIXTURE SCHEDULE									
FIXTURE TAG	FIXTURE				FAUCET/VALVE			DESCRIPTION	NOTES
	TYPE	MANUFACTURER	MODEL	MATERIAL DESCRIPTION	MANUFACTURER	MODEL	TYPE		
EW-C	WATER COOLER - DUAL-HEIGHT- BOTTLE FILLER - ADA	ELKAY	VRCTLF88SC	STEEL				ADA APPROVED, OUTDOOR RATED, 1/1" TOUCH PADS ON FRONT, FLEXIBLE SAFETY BUBBLER, P-TRAP, WATER VALVE, MLP200 CARRIER, MOUNT UNTIL ADA COMPLIANT HEIGHT.	115V, 1PH, 370W
HB-1	HOSE BIBB	WATTS	HY-440				MANUAL	INTERIOR HOSE BIBB WITH VACUUM BREAKER, 3/4" HOSE THREAD OUTLET, LOCK SHIELD CAP, AND REMOVABLE "TEE" HANDLE. PROVIDE SHUTOFF VALVE IN COLD WATER SUPPLY AHEAD OF HOSE BIBB.	
L-1	LAVATORY - COUNTER - ADA	SLOAN	ELGR-83000	STONE	SLOAN	EAF-150-BAT-CP-1.0G FM-AER-1Q-FCT	BATTERY	224000	
S-1	SINGLE BOWL SINK - DROP-IN	ELKAY	LRAD221955	STAINLESS STEEL	ELKAY	LK7921SSS	MANUAL	224000	
WC-1	WATER CLOSET - FLOOR - FLUSH VALVE - ADA	ZURN	Z5662-BWL1	WHITE VITREOUS CHINA	ZURN	Z6000AV-HET	MANUAL	224000	

NOTES:

1. INSTALL PER MANUFACTURER GUIDELINES.
2. CONTRACTOR SHALL COORDINATE WITH ARCHITECT FOR APPROVALS ON ALL FIXTURE MODELS, COLORS, AND FINISHES PRIOR TO ORDERING.
3. PROVIDE OPTIONAL BUFFER TANK AND PRESSURE REDUCING VALVES FOR EACH FLOOR OF THE DOMESTIC WATER PIPING SYSTEM.

FLOOR DRAIN SCHEDULE								
ID	DESCRIPTION	MANUFACTURER	MODEL	MATERIAL DESCRIPTION		WASTE	SPECIFICATION	NOTES
				DRAIN BODY	STRAINER	PIPE SIZE		
FD-1	FLOOR DRAIN	MIFAB	F1000	EPOXY COATED CAST IRON	STAINLESS STEEL	4"	CAST IRON BODY, ANCHOR FLANGE, SECURED ROUND ADJUSTABLE STRAINER HEAD WITH HOLE GRATE, LOOSE GRATE AND SEDIMENT BUCKETS, MIFAB TRAP GUARD OR EQUAL IF ALLOWED BY AHJ, REFER TO PLANS FOR SIZES.	
FS-3	FLOOR SINK	WATTS	FS-730	EPOXY COATED CAST IRON	ALUMINUM	4"	12" SQUARE, 1/8" DEEP SANITARY FLOOR SINK WITH WHITE PORCELAIN ENAMEL COATED INTERIOR, LOOSE SET PORCELAIN ENAMEL COATED CAST IRON GRATE, ALUMINUM DOME BOTTOM STRAINER, AND NO HUB OUTLET. PROVIDE WITH MANUFACTURER RECOMMENDED TRAP GUARD.	

ELECTRIC WATER HEATER SCHEDULE														
ID	MANUFACTURER	MODEL NO.	TYPE	ELECTRIC HEAT EXCHANGER				FLA	VOLT	PH	UNIT WEIGHT	MCA	MOCP	REMARKS
				EWI	LWT	MAX TEMP RISE	POWER							
EW-H-1	CHRONOMITE	CM-20L	TANKLESS	50 °F	105 °F	55 °F	4.8 kW	20.0 A	240 V	1	6 lb	25.0 A	30.0 A	PROVIDE EXTERNAL ASSE 1070 COMPLIANT MIXING VALVE OR AN INTEGRAL ASSE 1070 RATED MIXING VALVE IN THE UNIT.
EW-H-1	CHRONOMITE	CM-20L	TANKLESS	50 °F	105 °F	55 °F	4.8 kW	20.0 A	240 V	1	6 lb	25.0 A	30.0 A	PROVIDE EXTERNAL ASSE 1071 COMPLIANT MIXING VALVE OR AN INTEGRAL ASSE 1070 RATED MIXING VALVE IN THE UNIT.
EW-H-2	CHRONOMITE	CM1-20L	TANKLESS	50 °F	105 °F	55 °F	4.8 kW	20.0 A	240 V	1	4 lb	25.0 A	30.0 A	PROVIDE EXTERNAL ASSE 1071 COMPLIANT MIXING VALVE OR AN INTEGRAL ASSE 1070 RATED MIXING VALVE IN THE UNIT.

NOTES:

1. INSTALL PER MANUFACTURER GUIDELINES.

GENERAL NOTE:
DUCT DIMENSIONS LISTED ON DRAWINGS REPRESENT THE AIRFLOW FREE AREAS AND DO NOT HAVE ALLOWANCES FOR INSULATION LINER, WHERE APPLICABLE. INSIDE THE DUCTS, OR DUAL WALL DIMENSIONS, DUCTS SHALL BE CONSTRUCTED TO INCLUDE INSULATION REQUIREMENTS AND MAINTAIN AIRFLOW DIMENSIONS INDICATED ON PLANS.
ALL INSULATION SHALL BE PROVIDED AT ASHRAE 90.1 MINIMUM REQUIREMENTS, REGARDLESS OF INSULATION THICKNESS RECOMMENDATIONS NOTED.
NOTE: NO LINED DUCT IN KITCHEN

MECHANICAL DUCTWORK & INSULATION SCHEDULE			
SERVICE	DUCT TYPE	INSULATION TYPE	INSULATION THICKNESS
RESTROOM EXHAUST DUCT	ROUND OR RECTANGULAR, AS INDICATED ON PLANS.	FIBERGLASS WRAP OR MATTE FACED FIBERGLASS LINER, AS INDICATED ON PLANS	2" WRAP OR 1-1/2" LINER, R VALUE=6.0

EXHAUST FAN SCHEDULE															
ID	MANUFACTURER	MODEL NO.	TYPE	ARRANGEMENT	FAN				WEIGHT	FLA	MCA	MOCp	VOLT	PH	NOTES
					AIRFLOW DESIGN	PRESS ESP	DRIVE TYPE	MOTOR POWER							
EF-1	GREENHECK	SP-110-VG	CEILING	ROUND OUTLET	75 CFM	0.20 in-wg	DIRECT	0.01 hp	12 lb	0.2 A	0.3 A	15.0 A	120 V	1	1-7
EF-1	GREENHECK	SP-110-VG	CEILING	ROUND OUTLET	75 CFM	0.20 in-wg	DIRECT	0.01 hp	12 lb	0.2 A	0.3 A	15.0 A	120 V	1	1-7
EF-1	GREENHECK	SP-110-VG	CEILING	ROUND OUTLET	75 CFM	0.20 in-wg	DIRECT	0.01 hp	12 lb	0.2 A	0.3 A	15.0 A	120 V	1	1-7

NOTES:

1. PROVIDE FACTORY WIRED AND INSTALLED DISCONNECT SWITCH, FAN TIME DELAY SWITCH, AND SPEED CONTROLLER.
2. PROVIDE BACKDRAFT DAMPER, VIBRATION ISOLATIONS ON MOTOR MOUNTS AND FLEX CONNECTIONS ON OUTLET.
3. INTERLOCK FAN POWER WITH LIGHTS.
4. PROVIDE BACKDRAFT DAMPER.
5. PROVIDE MANUFACTURER'S WHITE ALUMINUM GRILLE.
6. PROVIDE MANUFACTURER'S WALL CAP.
7. PLASTIC HOUSING

ELECTRIC UNIT HEATER SCHEDULE										
ID	MANUFACTURER	MODEL NO.	FAN	HEATING ELEMENT	UNIT DIMENSIONS	UNIT WEIGHT	FLA	VOLT	PH	REMARKS
			AIRFLOW	POWER	AFF					
			DESIGN		ELEVATION					
UH-1	MARLEY ENGINEERED PRODUCTS	MUHJ03-21	350 CFM	3.0 kW	8" - 0"	27 lb	12.5 A	240 V	1	1-3

1. PROVIDE INTERNAL SINGLE STAGE THERMOSTAT 55° SET-POINT, INTERGAL DISCONNECT SWITCH, CEILING SUSPENSION KIT
2. PROVIDE MANUFACTURER'S HANGING BRACKET FOR MOUNTING UNIT AT DESIRED HEIGHT.
3. PROVIDE EXTENSION SLEEVE FOR FULL SURFACE MOUNTING

HVLS CEILING FAN SCHEDULE										
ID	MANUFACTURER	MODEL NO.	FAN DIA.	RPM	DB	VOLT	PH	RLA	MCA	UNIT WEIGHT
CF-1	BIG ASS FANS	E 7	7"	198	<35	110	1	5.5A	10	69

NOTES:

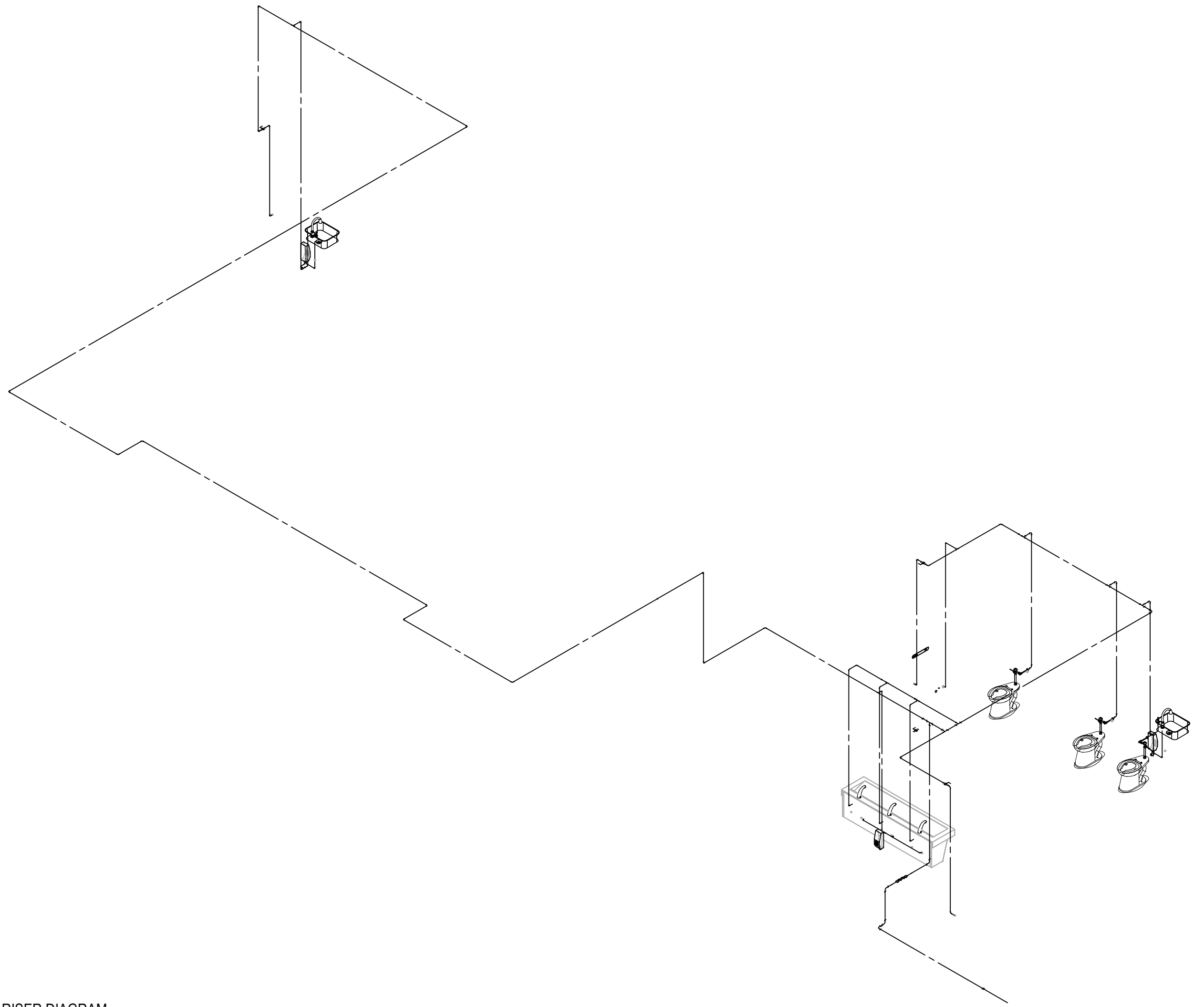
1. INCLUDE MANUFACTURERS UPPER MOUNT & UPPER MOUNTING BRACE.
2. INCLUDE EXTENSION TUBE & SAFETY CABLES. EXTENSION TUBE TO ONLY BE USED AFTER HEIGHT COORDINATION WITH ARCHITECT IF REQUIRED.
3. INCLUDE MANUFACTURES WALL CONTROLLER AND ANY OTHER MANUFACTURER REQUIRED ACCESSORIES FOR INSTALLATION.
4. REFER TO ARCHITECT FOR SELECTION OF FINISH COLOR.

ROUGH-IN AND MOUNTING HEIGHT SCHEDULE					
<p>NOTES:</p> <p>1. ALL VENT LINE SIZES SHOWN ARE MINIMUM UNLESS SHOWN LARGER ON RISER DIAGRAMS.</p> <p>2. SIZES SHOWN FOR WASTE ARE FOR RISERS ONLY.</p> <p>3. ALL DRAIN AND VENT LINES BELOW SLAB SHALL BE 2" OR LARGER.</p> <p>4. VENT LINES SHALL RISE 6" ABOVE FLOOD LEVEL RIM BEFORE OFFSETTING HORIZONTALLY, EXCEPT FOR INTERCEPTORS LOCATED OUTDOORS.</p> <p>5. SIZES SHOWN APPLY UNLESS NOTED DIFFERENTLY ON PLANS.</p> <p>6. IN APPLICATIONS WHERE PEX PIPING IS USED, CONTRACTOR SHALL NOT STUB ANY PEX PIPING DIRECTLY OUT OF THE WALLS. CONTRACTOR SHALL MAKE TRANSITION TO COPPER AT ALL STUB OUT LOCATIONS AND ENSURE PIPING CLIPS BETWEEN STUDS ARE PROVIDED TO SECURE CONNECTIONS. ROUGH IN PANELS FOR PEX PIPING APPLICATIONS ARE ACCEPTABLE ALTERNATIVE TO STUBOUTS WITH COPPER. PROVIDE OMNI PANELS BY SIOUX CHIEF OR EQUAL FOR ALTERNATIVE ROUGH IN INSTALLATIONS WITH PEX.</p>					
FIXTURE	WASTE	VENT	COLD WATER	HOT WATER	HEIGHT OF INSTALLATION
DRINKING FOUNTAIN	1-1/2"	1-1/2"	1/2"		NON-ADA 40" TO TOP OF ORIFICE ADA 36" TO TOP OF ORIFICE
FLOOR DRAINS/SINKS	2"	1-1/2"			
HOSE BIBB			3/4"		18" ABOVE GRADE OUTSIDE, 18" A.F.F. INSIDE
JANITOR'S SINK	3"	1-1/2"	1/2"	1/2"	
LAVATORIES AND SINKS, COUNTER MOUNTED	1-1/2"	1-1/4"	1/2"	1/2"	
LAVATORIES AND SINKS, WALL MOUNTED	1-1/2"	1-1/4"	1/2"	1/2"	NON-ADA 31" TO TOP OF RIM ADA 34" TO TOP OF RIM
OPEN HUB DRAIN	2"	1-1/2"			PROVIDE 3" PVC REDUCER, MOUNT AT HEIGHT REQUIRED FOR INSTALL LOCATION
SUPPLY BOX			1/2"		12" TO BOTTOM OF BOX
URINAL FLUSH VALVE WALL MOUNTED	2"	1-1/4"	1"		NON-ADA 24" TO TOP OF FLOOD LEVEL ADA 17" TO TOP OF FLOOD LEVEL GRADES K-3, 18" TO TOP OF FLOOD LEVEL GRADES 4-6, 20" TO TOP OF FLOOD LEVEL GRADES 7-9, 22" TO TOP OF FLOOD LEVEL GRADES 10-12, 24" TO TOP OF FLOOD LEVEL
UTILITY BOX	2"	1-1/2"	1/2"	1/2"	36" TO BOTTOM OF BOX
WATER CLOSET FLUSH TANK FLOOR MOUNTED	3"	1-1/2"	1/2"		
WATER CLOSET FLUSH VALVE FLOOR MOUNTED	3"	1-1/2"	1-1/4"		
WATER CLOSET FLUSH VALVE WALL MOUNTED	3"	1-1/2"	1-1/4"		NON-ADA 15" TO TOP OF BOWL ADA 17" TO TOP OF BOWL GRADES K-3, 12" TO TOP OF BOWL GRADES 4-12, 15" TO TOP OF BOWL

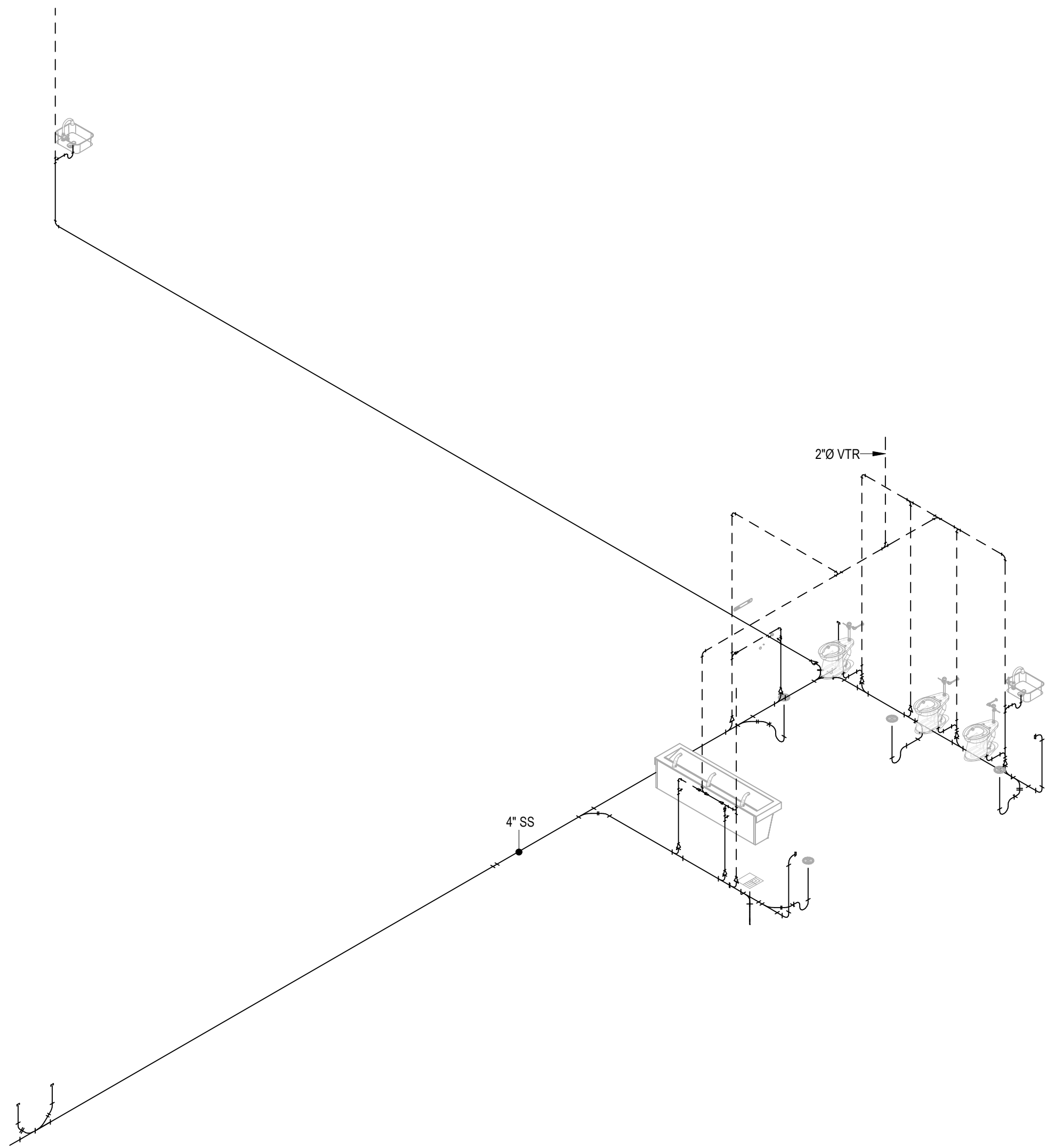
PIPING MATERIAL SCHEDULE	
DESCRIPTION	MATERIAL
ABOVE GROUND GAS	SCHEDULE 40 BLACK STEEL WITH MALLEABLE IRON FITTINGS OR WELDED JOINTS WITH BUTT WELD FITTINGS. PROVIDE CORROSION-RESISTANT MATERIAL ON PIPING EXPOSED TO ATMOSPHERE OR IN CONTACT WITH MATERIAL EXERTING A CORROSIVE ACTION
ABOVE GROUND SANITARY SEWER AND VENT	ASTM D2665 PVC SCHEDULE 40 PIPE AND FITTINGS, SOLVENT WELDED, WITH ASTM D2664 SOLVENT CEMENT. SHALL NOT BE USED IN PLENUM RETURN AREAS.
FLEXIBLE GAS PIPING INSIDE BUILDING	FOR FINAL CONNECTION TO EQUIPMENT ONLY. CORRUGATED STAINLESS STEEL GAS LINE WITH POLYETHYLENE JACKET AND FITTINGS BY MFG. MUST MEET ANSI, NFPA, FACTORY MUTUAL CODE AND LISTINGS AS AN ACCEPTABLE GAS PIPING MATERIAL, ALL STATE AND LOCAL CODE APPROVALS. PROVIDE PIPING EQUIVAL TO TRACPIPE BY OMEGA FLEX. SIZE PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
KITCHEN DRAIN PIPING	EPOXY-COATED CAST IRON PIPE OR CPVC AND FITTINGS
STORM DRAIN PIPING, ROOF DRAIN PIPING BELOW GROUND	ASTM D2665 PVC SCHEDULE 40 PIPE AND FITTINGS, SOLVENT WELDED, WITH ASTM D2664 SOLVENT CEMENT. SHALL NOT BE USED IN PLENUM RETURN AREAS.
UNDERGROUND GAS	APPROVED PLASTIC WITH COMPATIBLE FITTINGS CONFORMING WITH ASTM D 2513, SDR 11 AND SHALL BE INSTALLED IN ACCORDANCE WITH GAS CODE AND GAS UTILITY COMPANY. PROVIDE CATHODIC PROTECTION ON ANY STEEL PIPING. SCH. 40 STEEL WITH MALLEABLE IRON FITTINGS OR WELDED JOINTS WITH BUTT WELD FITTINGS. MIN. COAT PIPE WITH HIGH DENSITY POLYETHYLENE OVER ADHESIVE UNDERCOATING WRAP FIELD JOINTS AND FITTINGS WITH REPUBLIC "X-TRU-TAPE" OR EQUAL. PROVIDE WITH MARKER TAPE.
UNDERGROUND SANITARY SEWER AND VENT PIPING INSIDE BUILDING AND OUTSIDE BUILDING	ASTM D2665 PVC SCHEDULE 40 PIPE AND FITTINGS, SOLVENT WELDED, WITH ASTM D2664 SOLVENT CEMENT. SHALL NOT BE USED IN PLENUM RETURN AREAS.
WATER DISTRIBUTION PIPE	WATER DISTRIBUTION PIPE SHALL CONFORM TO NSF 61 & NSF 14. PIPING SHALL BE COPPER AND/OR PEX-A CONFORMING TO THE STANDARDS LISTED IN TABLE 605.4 OF THE I.P.C. PEX-A DISTRIBUTION SYSTEM CONFORMING TO THE STANDARDS. ASTM F 876, ASTM F 877, SDR 9 TUBING. FITTINGS FOR PEX-A TUBE CONFORMING TO THE STANDARD ASTM F 1960 COMPATIBLE COLD EXPANSION FITTINGS WITH PEX REINFORCING RINGS, MATCHING PEX TUBE DIMENSIONS.
WATER SERVICE PIPE	WATER SERVICE PIPE SHALL CONFORM TO NSF 61 AND TO THE STANDARDS LISTED IN TABLE 605.3 OF THE I.P.C. COPPER PIPE, ASTM B42, HARD DRAWN, FITTINGS: ASME B16.18, CAST COPPER ALLOY OR ASME B16.22 WROUGHT COPPER AND BRONZE. JOINTS: ASTM B32, ALLOY 5N65 SOLDER.

PLUMBING PIPING INSULATION SCHEDULE						
		MINIMUM INSULATION THICKNESS PER ASHRAE 90.1				
		NOMINAL PIPE SIZE RECOMMENDATIONS				
DESCRIPTION	INSULATION TYPE	<1	1 TO <1-1/2	1-1/2 TO <4	4 TO <8	≥8
DOMESTIC COLD WATER PIPING BELOW GRADE	PVC OR HDPE JACKET ONLY	1	1	1.5	1.5	1.5
CONDENSATE PIPING ABOVE GRADE	ELASTOMERIC, ADD ASTM E84 COMPLIANT JACKET IN AIR PLENUM SPACES	0.5	1	1.5	1.5	1.5
PVC WASTE VENT AND WASTE DRAIN IN AIR PLENUM SPACE	COMPRESSED FIBERGLASS OR ELASTOMERIC WITH ASTM E84 COMPLIANT JACKET	0.5	0.5	0.5	0.5	0.5
PVC AND CAST IRON ROOF DRAINS IN ALL AREAS ABOVE GRADE	COMPRESSED FIBERGLASS OR ELASTOMERIC WITH ASTM E84 COMPLIANT JACKET	1	1	1.5	1.5	1.5
WATER COOLER TRAPS, ALL EXPOSED LAVATORY AND SINK TRAPS, TAILPIECES, HOT AND COLD WATER SUPPLY LINES/ANGLE VALVES TO THESE DEVICES	EQUIVALENT TO TRUEBRO 102 E-Z PIPE COVER	0.125	0.125	0.125	0.125	0.125
DOMESTIC HOT WATER AND HOT WATER RETURN PIPING BELOW GRADE	ELASTOMERIC OR FOAM. ENCAPSULATE WITH PVC OR HDPE JACKET	1	1	1.5	1.5	1.5
DOMESTIC COLD WATER, HOT WATER, AND HOT WATER RETURN PIPING ABOVE GRADE	ELASTOMERIC, ADD ASTM E84 COMPLIANT JACKET IN AIR PLENUM SPACES	1	1	1.5	1.5	1.5
PVC WASTE DRAIN IN WALLS, AND WASTE VENT IN ALL AREAS ABOVE GRADE	COMPRESSED FIBERGLASS OR ELASTOMERIC WITH ASTM E84 COMPLIANT JACKET	1"	1"	1.5"	1.5"	1.5"

1 DOMESTIC WATER RISER DIAGRAM
MP-900



2 WASTE & VENT RISER DIAGRAM
MP-900



△ DATE REVISION

PROJECT NUMBER 201253R

PLUMBING
RISERS

MP-900

LA PRIVADA COMMUNITY PARK
N.E.C. OF 183RD AVENUE & YUMA ROAD
GOODYEAR, ARIZONA
ISSUE FOR PERMIT - 07.12.2024

FFKR ARCHITECTS
58 S River Drive, Suite 380, Tempe, AZ 85288
480.362.1361 FFKR.COM

Z	1	23A HEATING, VENTILATING, AND AIR CONDITIONING rev – 20150529	2	23A 1-9 SUBSTITUTIONS	3	23A 1-19 ACCESS DOORS	4	23A 1-29 VIBRATION ISOLATION	5
		23A 1 GENERAL INSTRUCTIONS							
		23A 1-1 GENERAL REQUIREMENTS							
		Requirements under Division 1 and the general and supplementary conditions of these specifications apply to this section and division. Where the requirements of this section and division exceed those of Division 1, this section and division take precedence. Become thoroughly familiar with all their contents as to requirements that affect this division, section or both. The work required under this section includes material, equipment, appliances, transportation, services, and labor required to complete the entire system as required by the drawings and specifications, or reasonably inferred to be necessary to facilitate each system's functioning as implied by the design and the equipment specified.							
		The specifications and drawings for the project are complementary, and portions of the work described in one, shall be provided as if described in both. In the event of discrepancies, notify the engineer and request clarification prior to proceeding with the work involved.							
		Drawings are graphic representations of the work upon which the contract is based. They show the materials and their relationship to one another, including sizes, shapes, locations, and connections. They also convey the scope of work, indicating the intended general arrangement of the equipment and other materials without showing all of the exact details as to elevations, offsets, control lines, and other installation requirements. Use the drawings as a guide when laying out the work and to verify that materials and equipment will fit into the designated spaces, and which, when installed per manufacturers' requirements, will ensure a complete, coordinated, satisfactory and properly operating system. Determine exact locations by job measurements, by checking the requirements of other trades, and by reviewing all contract documents. Correct errors that could have been avoided by proper checking and inspection, at no additional cost to the owner.							
		Specifications define the qualitative requirements for products, materials, and workmanship upon which the contract is based.							
		23A 1-2 DEFINITIONS							
		Whenever used in these specifications or drawings, the following terms shall have the indicated meanings:							
		Furnish: "to supply and deliver to the project site, ready for unloading, unpacking, assembling, installing, and similar operations."							
D	2	Install: "to perform all operations at the project site, including, but not limited to, and as required: unloading, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, testing, commissioning, starting up and similar operations, complete, and ready for the intended use."	3		4		5		6
		Provide: "to furnish and install complete, and ready for the intended use."							
		Furnished by owner (or owner-furnished) or furnished by others: "an item furnished by the owner or under other divisions or contracts, and installed under the requirements of this division, complete, and ready for the intended use, including all items and services incidental to the work necessary for proper installation and operation. Include the installation under the warranty required by this division.							
		Engineer: where referenced in this division, "engineer" is the engineer of record and the design professional for the work under this division, and is a consultant to, and an authorized representative of, the architect, as defined in the general and/or supplementary conditions. When used in this division, it means increased involvement by, and obligations to, the engineer, in addition to involvement by, and obligations to, the "architect".							
		AHJ: the local code and/or inspection agency (authority) having jurisdiction over the work.							
		NRTL: nationally recognized testing laboratory, as defined and listed by OSHA in 29 CFR 1910.7 (e.g., UL, ETL, CSA), and acceptable to the AHJ over this project.							
		The terms "approved equal", "equivalent", or "equal" are used synonymously and shall mean "accepted by or acceptable to the engineer as equivalent to the item or manufacturer specified". The term "approved" shall mean labeled, listed, certified, or all three, by an NRTL, and acceptable to the AHJ over this project.							
		23A 1-3 PRE-BID SITE VISIT							
		Prior to submitting bid, visit the site of the proposed work and become fully informed as to the conditions under which the work is to be done. Failure to do so will not be considered sufficient justification to request or obtain extra compensation over and above the contract price.							
		23A 1-4 MATERIAL AND WORKMANSHIP							
C	3	Provide all material and equipment new and in first class condition. Provide markings or a nameplate for all material and equipment identifying the manufacturer and providing sufficient reference to establish quality, size and capacity. In general, provide the following quality grade(s) for all materials and equipment:	4		5		6		7
		Commercial Specification Grade							
		Light Duty and Residential Grade							
		Pipe, pipe fittings, pipe specialties and valves shall be manufactured in plants located in the United States.							
		Work performed under this contract shall provide a neat and "workmanlike" appearance when completed, to the satisfaction of the architect and engineer. Workmanship shall be the finest possible by experienced mechanics of the proper trade.							
		The complete installation shall function as designed and intended with respect to efficiency, capacity, noise level, etc. Abnormal or excessive noise from equipment, devices or other system components will not be acceptable.							
		Remove from the premises waste material present as a result of work. Clean equipment installed under this contract to present a neat and clean installation at the termination of the work.							
		Repair or replace public and private property damaged as a result of work performed under this contract to the satisfaction of authorities and regulations having jurisdiction.							
		23A 1-5 MANUFACTURERS							
		In other articles where lists of manufacturers are introduced, subject to compliance with requirements, provide products by one of the manufacturers specified.							
B	4	Where a list is provided, manufacturers listed are not in accordance with any ranking or preference.	5		6		7		8
		Where manufacturers are not listed, provide products subject to compliance with requirements from manufacturers that have been actively involved in manufacturing the specified product for no less than 5 years.							
		23A 1-6 COORDINATION							
		Coordinate all work with other divisions and trades so that the various components of the systems will be installed at the proper time, fit the available space, and will allow proper service access to those items requiring maintenance. Refer to all other division's drawings, and to relevant equipment submittals and shop drawings to determine the extent of clear spaces. Components which are installed without regard to the above shall be relocated at no additional cost to the owner.							
		Unless otherwise indicated, the general contractor will provide chases and openings in building construction required for installation of the systems specified herein. Contractor shall furnish the general contractor with information where chases and openings are required. Make all efforts required to clear equipment, beams and other structural members, and to facilitate concealing system components in the manner anticipated in the design. Keep informed as to the work of other trades engaged in the construction of the project, and execute work in a manner as to not interfere with or delay the work of other trades.							
		Figured dimensions shall be taken in preference to scale dimensions. Contractor shall take his own measurements at the building, as variations may occur. Contractor will be held responsible for errors that could have been avoided by proper checking and inspection							
		Provide materials with trim that will properly fit the types of ceiling, wall, or floor finishes actually installed. Model numbers listed in the construction documents are not necessarily intended to designate the required trim.							
		23A 1-7 ORDINANCES, CODES, AND STANDARDS							
		Work performed under this contract shall, at a minimum, be in conformance with applicable national, state and local codes having jurisdiction. Equipment furnished and associated installation work performed under this contract shall be in strict compliance with current applicable codes adopted by the local AHJ, including any amendments and standards as set forth by the National Fire Protection Association (NFPA), Underwriters Laboratories (UL), Occupational Safety and Health Administration (OSHA), American Society of Mechanical Engineers (ASME), American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), American National Standards Institute (ANSI), American Society of Testing Materials (ASTM) and other national standards and codes where applicable. Additionally, comply with rules and regulations of public utilities and municipal departments affected by connection of services.							
		Where the contract documents exceed the requirements of the referenced codes, standards, etc., the contract documents shall take precedence.							
A	5	Promptly bring all conflicts observed between codes, ordinances, rules, regulations, referenced standards, and these documents to the engineer's attention for final resolution. Contractor will be held responsible for any violation of the law.	6		7		8		9
		Procure and pay for permits and licenses required for the accomplishment of the work herein described. Where required, obtain, pay for and furnish certificates of inspection to owner. Contractor will be held responsible for violations of the law.							
		23A 1-8 PROTECTION OF EQUIPMENT AND MATERIALS							
		Store and protect from damage equipment and materials delivered to job site, in accordance with manufacturers' recommendations. For materials and equipment susceptible to changing weather conditions, dampness, or temperature variations, store inside in conditioned spaces. For materials and equipment not susceptible to these conditions, cover with waterproof, tear-resistant, heavy tarp or polyethylene plastic as required to protect from plaster, dirt, paint, water, or physical damage. Equipment and material that has been damaged by construction activities will be rejected, and contractor shall furnish new equipment and material as required at no additional cost to the owner.							
		Keep premises broom clean from foreign material created during work performed under this contract. Piping, equipment, etc. shall have a neat and clean appearance at the termination of the work.							
		Plug or cap open ends of ductwork and piping systems while stored and installed during construction when not in use to prevent the entrance of debris into the systems.							
7/12/2024 9:15:31 AM									



23A 2-2 DUCTWORK

Provide galvanized steel ductwork and housings as shown on drawings. Construct ductwork including fittings and transitions in conformance with current SMACNA standards relative to gauge, bracing, joints, etc. Minimum thickness of duct shall be 26-gauge sheet metal. Reinforce housings and ductwork over 30" with 1-1/4" angles not less than 5'-6" on centers, and closer if required for sufficient rigidity to prevent vibration. Support horizontal runs of duct from strap iron hangers on centers not to exceed 8'-0". Do not support ceiling grid, conduits, pipes, equipment, etc. from ductwork. Coordinate routing of ductwork with other contractors such that piping, electrical conduit, and associated supports are not routed through the ductwork.

Construct supply ducts to meet SMACNA positive pressure of 3" w.g. Construct return, outdoor and exhaust ductwork upstream of fans to meet SMACNA negative pressure of 2" w.g. Construct exhaust ductwork downstream of fans to meet SMACNA positive pressure of 2" w.g. Provide mill phosphatized or galvanized finish for exposed ductwork to be field painted. Shop treated sheet metal shall have galvanized metal primer applied in the shop after fabrication and prior to shipping.

Ductwork above roof or otherwise exterior to building shall be minimum #18 gauge with longitudinal and transverse joints welded.

Seal ductwork with heavy liquid sealant, Hardcast Irongrip 601, Design Polymer DP 1010, United McGill duct sealer or approved equal, applied according to sealant manufacturer's instructions. For ducts with pressure classification of 2" w.g. and greater seal longitudinal and transverse ductwork joints airtight to meet SMACNA Class B. For ducts with pressure classification less than 2" w.g. seal transverse joints airtight to meet SMACNA Class C. Tapes and mastics shall be listed and labeled in accordance with UL 181A.

Provide radius elbows, turns, and offsets with a minimum centerline radius of 1-1/2 times the duct width. Where space does not permit full radius elbows, provide short radius elbows with a minimum of two continuous splitter vanes. Vanes shall be the entire length of the bend. Provide mitered elbows where space does not permit radius elbows, where shown on the drawings, or at the option of the contractor with the engineer's approval. Mitered elbows less than 45 degrees shall not require turning vanes. Mitered elbows 45-degrees and greater shall have single thickness turning vanes of same gauge as ductwork, rigidly fastened with guide strips in ductwork. Vanes for mitered elbows shall be provided in all supply and exhaust ductwork and in return and outside air ductwork that has an air velocity exceeding 1000 fpm. Do not install vanes in grease ductwork.

Ducts shall be connected to fans, fan casings and fan plenums by means of flexible connectors. Flexible connectors shall be neoprene coated glass cloth canvas connections, Duro-Dyne, Elgen, Ventilabric or equal. Flexible connectors shall have a flame spread of 25 or less and smoke developed rating not higher than 50. Make airtight joints and install with minimum 1-1/2" slack.

Provide balancing dampers, manufactured by Ruskin, Greenheck, Nailor Industries, Cesco, Louvers & Dampers, Potliff or approved equal, where shown on drawings and wherever necessary for complete control of air flow. Splitter dampers shall be controlled by locking quadrants; provide Young's Regulator or Ventlok end bearings for the damper rod. Rectangular volume dampers shall be opposed blade interlocking type. Round volume dampers shall be butterfly type consisting of circular blade mounted to a solid shaft. Damper leakage for outside air dampers shall not exceed 6.5 cfm/square foot in full closed position at 4" wg pressure differential across damper. Reference manufacturer and model number for outside air dampers is Ruskin model CD-50.

Provide Flexmaster model STO or equal 45 degree rectangular/round side takeoff fitting with model SLBO double bearing damper with insulation build out for round ductwork branch takeoffs to individual air devices. Omit damper at takeoff fitting when damper is located downstream of takeoff.

Where access to dampers through a hard ceiling is required, provide a Metropolitan Air Technology model RT-250 or equal by Young's Regulator concealed, cable operated volume damper with remote operator. Damper shall be adjustable through the diffuser face or frame with standard 1/4" nutdriver or flat screwdriver. Cable assembly shall attach to damper as one piece with no linkage adjustment. Positive, direct, two-way damper control shall be provided with no sleeves, springs or screw adjustments to come loose after installation. Support cable assembly to avoid bends and kinks in cable.

Where approved by architect, a ceiling cup with cover plate can be used for access to cable operator.

Round or oval ductwork shall be Semco, United, Wesco or equal, sheetmetal, with smooth interior surface, with low pressure (duct pressure class up to and including 2" w.g.) round ductwork gauges per the following table (reference SMACNA HVAC duct construction standards for gauges when pressures exceed 2" w.g.):

Size	Duct gauge	Fitting gauge
14" & under	26	24
15" thru 26"	24	22
28" thru 36"	22	20
38" thru 50"	20	20
52" thru 60"	18	18

Provide double wall insulated round ductwork where exposed or as otherwise indicated. Fabricate double-wall insulated ducts and fittings with an outer shell, insulation, and an inner liner as specified below. At dual wall ducts, the dimension shown is the outside metal duct size and already has allowances for the insulation thickness.

Outer shell shall be 2" longer than inner shell and insulation and shall be gauge as specified for single wall duct.

Inside dimensions. Outer shell shall be 2" longer than inner shell and insulation and shall be gauge as specified for single wall duct.

Insulation shall be fiberglass with thickness as required for thermal resistance of R-6.

Perforated inner liner shall be 24 gauge up to 34 inches, 22 gauge from 35 to 58 inches, and 20 gauge above 60 inches. Provide 3/32" perforations with an overall open area of 23 percent.

Maintain concentricity of liner to outer shell by mechanical means. Retain insulation from dislocation by mechanical means.

Linings Spirosafe, Lewis & Lambert or approved equal factory manufactured round ductwork and fittings may be substituted for specified round branch ductwork, at contractor's option. Heavy liquid joint sealant may be omitted on factory-manufactured round ductwork.

Low pressure (duct pressure class up to and including 2" w.g.) fittings 24" in diameter and less shall be prefabricated, spotwelded and internally sealed. Continuously weld fittings larger than 24" in diameter. Fitting gauge shall be 22 gauge for 36" fittings and under, 20 gauge for larger sizes. 90 degree tee's shall be conical type. Seal longitudinal and transverse ductwork joints airtight with heavy liquid sealant applied according to manufacturer's instructions. Provide gauge thickness in medium pressure (duct pressure class 3" to 6" w.g.) Ductwork as recommended by SMACNA.

At contractor's option, provide Ductmate, Gripple, or approved equal wire rope duct hanging system. Provide Ductmate WR40 or gripple No. 1 through No. 5 wire rope using 7x7 or 7x19 aircraft quality zinc coated cable or galvanized steel wire rope. Secure wire rope to duct using Ductmate Clutcher or Gripple Hang Fast adjustable rope attachment. Where applicable for upper attachment, provide Ductmate E2-Lock wire rope beam clamp with locking nut adjustment or Gripple ceiling, beam, or purfin clips. Wire rope, adjustable duct attachment, and upper attachment to structure shall each have minimum 5 to 1 load safety factor.

23A 2-3 FLEXIBLE DUCT

Low pressure (duct pressure class up to and including 2" w.g.) and medium pressure (duct pressure class 3" to 6" w.g.) flexible duct shall be Flexmaster Type 8B, Thermaflex Type G-KM, M-KE, or equal (fire retardant polyethylene) protective vapor barrier, UL181 Class 1, acoustical insulated duct, R-6.0 fiberglass insulation. Provide CPE liner with steel wire helix mechanically locked or permanently bonded to the liner.

High pressure (duct pressure class over 6" w.g.) flexible duct shall be Flexmaster Type 4B, Thermaflex Type M-KC, or equal (fire retardant polyethylene) protective vapor barrier, UL181 Class 1, acoustical insulated duct, steel wire helix core, mechanical lock construction, R-6.0 fiberglass insulation. Connect each end with stainless steel screw operated metal draw bands.

Flexible duct runs shall not exceed 5 feet in length, and shall be installed fully extended and straight as possible avoiding tight turns. Install flexible duct in accordance with manufacturer's instructions. Support flexible duct at maximum 5 feet on center and ends. Bands shall not exceed a centerline radius of one duct diameter. Duct sag shall not exceed 1/2". Supporting material in direct contact with the duct shall not be less than 1-1/2" in width.

Connect flexible duct to rigid metal duct or air devices as recommended by the manufacturer. At a minimum, install two wraps of duct tape around the inner core connection and a metallic or non-metallic clamp over the tape and two wraps of duct tape or a clamp over the outer jacket. Duct clamps shall be labeled in accordance with UL-181b and marked 181b-c. Duct tape shall be labeled in accordance with UL 181b and marked 181b-x.

23A 2-4 FLUES

Where flues are indicated on the drawings, provide Selkirk Metalbestos model QC or RV or equal by Metal-Fab, Simpson or Van-Packer, Type "B" double wall gas vent flues from the various items of gas-fired equipment up to flue caps above the roof. Single wall flues are unacceptable. Flues shall be complete with necessary fittings, connectors, flashing cone, storm collar, thimble supports, guy wires, and other accessories, and shall be installed as recommended by the manufacturer, and in conformance with applicable codes. Flash flues watertight at the roof line.

23A 2-5 SPECIAL GAS FLUES

Where special gas flues are indicated on the drawings, provide Selkirk Metalbestos model DCV double wall or equal by Heat-Fab Type 29-4c stainless steel special gas vent. Flues shall be complete with necessary fittings, connectors, flashing cone, storm collar, thimble supports, guy wire, and other accessories, and shall be installed as recommended by the manufacturer, and in compliance with applicable codes.

23A 2-6 CONDENSING GAS FURNACE AND APPLIANCE VENT

Vents and combustion air ducts for condensing type appliances shall be Schedule 40 PVC, DWV, meeting ASTM D1784 Grade 1, Type 1, with dimensions meeting ASTM D2665. Fittings shall be DWV, PVC meeting ASTM D2665 with solvent cement socket joints. Solvent used for joints shall meet ASTM D2564.

23A 2-7 AIR DEVICES

Provide air devices as scheduled on drawings, manufactured by Carnes, Price, Krueger, Nailor Industries, Titus, or Tuffie & Bailey. Select air devices to limit room noise level to no higher than NC-30 unless otherwise shown. Provide devices with a soft plastic gasket to make an airtight seal against the mounting surface. Coordinate final location, frame, and mounting type of air devices with architectural reflected ceiling plans.

Submit complete shop drawings including information on noise level, pressure drop, throw, cfm for each air device, styles, borders, etc. clearly marked with specified equipment number. Submit samples of each air device as requested by the engineer.

Provide wall supply air registers with double deflection blades and opposed blade dampers unless indicated otherwise. Provide wall return air grilles and exhaust air registers with horizontal 35 or 45 degree angle vision-proof bars. Provide concealed fasteners for wall mounted registers and grilles.

Provide ceiling supply air registers of aluminum curved blade type with blades parallel to long dimension and with throw pattern as indicated on drawings. Provide opposed blade dampers for supply air registers and exhaust air registers unless indicated otherwise.

Provide ceiling supply air diffusers and return air grilles of lay-in or surface mounted type as required to be compatible with ceiling construction. Provide ceiling diffusers and grilles with white enamel finish unless noted otherwise. Provide linear slot diffusers of standard one-piece lengths up to 6-feet and furnish in multiple sections greater than 6-feet. Join multiple sections together end-to-end with alignment pins to form a continuous slot appearance. Provide alignment components by the manufacturer. Provide plenums by the slot diffuser manufacturer.

Provide drop box diffusers with minimum 22 gauge galvanized steel construction, factory assembled and welded, and provided with standard duct connections and mounting brackets for field installation. Diffusers shall have double deflection grilles or drum louvers that are individually adjustable to customize horizontal and vertical throw and factory installed air diverters or turning vanes. Insulate diffusers with 1" thick, 1.5 lb duct liner insulation. Provide factory primed and painted diffusers, color as selected by the architect.

Provide drop box diffusers as manufactured by AES Industries, Can Fab, Custom Curb, Inc. or Plenums, Inc.

23A 2-8 FIRE DAMPERS

Provide fire dampers where shown on drawings, and as required by code enforcing authority. Damper ratings shall be as required to maintain the fire and/or smoke ratings noted on the architectural drawings. Provide fire dampers conforming to NFPA-90a and UBC standard 43-7 with recommended steel sleeves of length as required to meet the installed location, 165 degrees Fahrenheit fusible link, spring catches and non-corrosive bearings. Dampers shall be UL listed, manufactured by Ruskin, Greenheck, Air Balance, Cesco, United Air or Nailor Industries.

Provide access door, sized per SMACNA with minimum size of 10" by 10", in duct for inspection and service to fire damper and fusible link. Provide duct access door(s) within 12 inches of the device to allow for testing and maintenance. Label each door (with minimum 1" lettering) indicating which damper type is served. Door should be capable of being fully opened or provide removable door. Provide removable section of duct where duct size is too small for 10" by 10" access door. Provide access door in ceiling or wall as required to access damper.

23A 2-9 COMBINATION FIRE/SMOKE DAMPERS

Provide combination fire/smoke dampers where shown on drawings and as required by code enforcing authority with fire/smoke ratings as required to maintain the fire rating noted on the architectural drawings. Dampers shall meet UL 555 classification for fire rating and UL 555s classification of leakage class ii smoke damper; damper shall bear a UL label attesting to these classifications.

Provide fire damper with a 165 degrees Fahrenheit resettable temperature device. Rate fire/smoke dampers for a minimum velocity of 2,000 fpm and pressure of 4" w.g. Provide manufacturer recommended steel sleeve of length as required to meet the installed location.

Provide a qualified 24 volt electric actuator installed by the manufacturer at time of damper fabrication. Actuators shall be rated for a minimum of 20,000 cycles of operation, shall comply with the locally adopted building code and shall open in 15 seconds or less and close in 15 seconds or less after alarm or smoke detection has occurred. Provide stainless steel spring loaded leakage seats in sides of casing, and Damper shall be manufactured by Ruskin, Air Balance, Greenheck, Cesco, United Air or Nailor Industries.

Provide access door, sized per SMACNA with minimum size of 10" by 10", in duct for inspection and service to fire damper and fusible link. Provide duct access door(s) within 12 inches of the device to allow for testing and maintenance. Label each door (with minimum 1" lettering) indicating which damper type is served. Door should be capable of being fully opened or provide removable door. Provide removable section of duct where duct size is too small for 10" by 10" access door. Provide access door in ceiling or wall as required to access damper.

23A 2-10 LOUVERS, PLENUMS, SCREENS

Provide intake and exhaust air louvers by Ruskin model ELF375DX or equal Greenheck, American Warming & Ventilating, Cesco, Industrial Louvers or Louvers & Dampers as scheduled on the drawings. Coordinate exact size and location with architectural drawings. Louvers shall be stationary, with mill finish. Louvers shall have extruded aluminum blades, 0.080" wall thickness, 45 degree blade angle, blades on 5" centers; frame shall be extruded aluminum, 0.080" wall thickness; with expanded flattened aluminum insect screen. Provide louvers with a minimum free area of 45 percent, with a maximum air pressure drop of 0.1" at scheduled airflow.

Construct plenums with galvanized steel framing members and galvanized sheetmetal, braced with galvanized angles. Gauges and bracing shall conform to SMACNA recommendations for ductwork of like sizes. Where access doors are shown, provide hinged doors with #202 Ventlok latch. Make watertight connections to louvers, sloping bottom of plenum to drain water to weepholes in bottom of louver.

Provide screens on louvers, ducts, hoods, fans, and openings to the outdoors as scheduled and/or noted on the drawings. Insect screens shall be 0.009 thickness, 1/4" mesh, stainless steel wire. Bird screens shall be 0.047-inch, 1/2" mesh stainless steel wire.

23A 2-11 DUCT SILENCERS

Provide duct silencers as scheduled on drawings, manufactured by I.A.C., Aeronosics, Dynasonics or Vibro-Acoustics. Silencers shall be rated for low frequency attenuation and low air pressure drop.

23A 2-12 ROOF MOUNTED INTAKE AIR AND RELIEF AIR HOODS

Provide air intake and relief hoods as scheduled on drawings. Hoods shall be low silhouette, aluminum, square curb cap, with birdscreen, roof curb, and barometric or motorized backdraft damper as scheduled. Manufactured by Cook, Greenheck, Acme, Carnes, Cesco or equal.

23A 2-13 EXHAUST AIR SYSTEMS

Provide roof mounted exhaust fans as scheduled on the drawings, or equal manufactured by Cook, Greenheck, Carnes, Twin City Fans, Acme or Penn-Barry complete with aluminum housing, aluminum centrifugal wheel, motor with integral thermal overload protection, disconnect switch mounted inside the housing, birdscreen, backdraft damper, and pate prefabricated roof curb with minimum height of 12" inches for roofs with no insulation, 15" for roofs with insulation or as scheduled on the drawings. Three phase fans shall be furnished with magnetic starters with push button station.

Provide roof mounted upblast exhaust fans as scheduled on the drawings, or equal manufactured by Cook, Greenheck, Carnes, Twin City Fans, Acme or Penn-Barry complete with aluminum housing, aluminum centrifugal wheel, motor with integral thermal overload protection, disconnect switch mounted inside the housing, drain trough, birdscreen and pale prefabricated roof curb with minimum height of 12" inches for roofs with no insulation, 15" for roofs with insulation or as scheduled on the drawings. Exhaust fans serving Type I kitchen exhaust hoods shall discharge a minimum of 40" above the roof surface, shall have hinged access including access for blade inspection and cleaning per NFPA 96, grease drain trough with cup and insulated curb, and shall be installed in accordance with NFPA 96 and local codes.

Provide wall mounted exhaust fans as scheduled on the drawings, or equal manufactured by Cook, Greenheck, Carnes, Twin City Fans, Acme or Penn-Barry heavy-duty wall-mounted propeller fans, complete with belt drive with minimum of two belts, ball bearing supported fan shaft, ball bearing motor, magnetic starter, inlet screen, and motor-operated shutter. Inlet louvers shall be Ruskin ELF81 with heavy duty motor operated damper, Ruskin CD35 with parallel blades and Honeywell M-445 damper motor. Provide transformer for damper motors if different voltage.

Provide ceiling mounted exhaust fans as scheduled on the drawings, or equal manufactured by Cook, Greenheck, Carnes, Twin City Fans, Acme or Penn-Barry complete with isolated blower unit and ceiling grille. Provide disconnect switch, backdraft damper, discharge duct, wall louver, and neoprene vibration isolators with all-thread hanging rods.

Provide in-line (duct) mounted exhaust fans as scheduled on the drawings, or equal manufactured by Cook, Greenheck, Carnes, Twin City Fans, Acme or Penn-Barry complete with isolated blower unit and ceiling grille. Provide backdraft damper, discharge duct, wall louver, and vibration isolation as scheduled or shown on the drawings.

23A 3 HVAC EQUIPMENT

Provide UL listed smoke detectors as required by code to shut down rooftop unit upon detection of smoke. Division 28 contractor shall provide and wire UL listed duct type smoke detectors as required by code to shut down rooftop unit upon detection of smoke

23A 4 TEMPERATURE CONTROLS

23A 4-1 GENERAL REQUIREMENTS

Provide a system of temperature controls including thermostats, control panels, time switches, override timers, damper motors, and relays required to provide the desired sequence of operation. Contract with Building Owner's Building Automation System contractor for new devices, programming, and interconnection with the existing BAS system. Provide integrated wiring diagrams showing interconnections between field installed equipment and package wiring furnished with the HVAC equipment.

Provide supervision and on-job checkout service as required to ensure that installation meets requirements of the specification. The system shall be guaranteed for a period of one year following the acceptance of the system by the architect/engineer. Correct defects occurring during this period at no additional cost to the owner.

23A 4-2 EQUIPMENT

Manufacturers and model numbers are listed for reference as to quality and features required for the control devices. Provide control devices by Barber-Colman, Alerton, Honeywell, Johnson Controls, Carrier, Trane or White Rodgers with quality and features as indicated. Low voltage type non-programmable heating and cooling thermostats shall be Honeywell series T FocusPro 5000 or equal with integral subbase.

23A 6 ALTERNATES

23A 6-1 DESCRIPTION

Provide all work contemplated under the different alternates to include labor, materials, equipment and services necessary for and incidental to the completion of work under each particular alternate. Furnish separate bids for each alternate applicable to contractor's proposal, stating the amount to be added or deducted from the base bid in case the alternate is accepted. Comply with applicable sections of the base specifications for work required by the alternate unless otherwise specified. Refer to the architectural portion of the specification.

END OF SECTION 23A



△ DATE REVISION

PROJECT NUMBER 201253R

MECHANICAL
SPECIFICATIONS

22A PLUMBING
rev - 20150529

22A 1 GENERAL INSTRUCTIONS

22A 1-1 GENERAL REQUIREMENTS

Requirements under Division 1 and the general and supplementary conditions of these specifications apply to this section and division. Where the requirements of this section and division exceed those of Division 1, this section and division take precedence. Become thoroughly familiar with all their contents as to requirements that affect this division, section or both. The work required under this section includes material, equipment, appliances, transportation, services, and labor required to complete the entire system as required by the drawings and specifications, or reasonably inferred to be necessary to facilitate each system's functioning as implied by the design and the equipment specified.

The specifications and drawings for the project are complementary, and portions of the work described in one, shall be provided as if described in both. In the event of discrepancies, notify the engineer and request clarification prior to proceeding with the work involved.

Drawings are graphic representations of the work upon which the contract is based. They show the materials and their relationship to one another, including sizes, shapes, locations, and connections. They also convey the scope of work, indicating the intended general arrangement of the equipment and other materials without showing all of the exact details as to elevations, offsets, control lines, and other installation requirements. Use the drawings as a guide when laying out the work and to verify that materials and equipment will fit into the designated spaces, and which, when installed per manufacturers' requirements, will ensure a complete, coordinated, satisfactory and properly operating system. Determine exact locations by job measurements, by checking the requirements of other trades, and by reviewing all contract documents. Correct errors that could have been avoided by proper checking and inspection, at no additional cost to the owner.

Specifications define the qualitative requirements for products, materials, and workmanship upon which the contract is based.

22A 1-2 DEFINITIONS

Whenever used in these specifications or drawings, the following terms shall have the indicated meanings:

Furnish: "to supply and deliver to the project site, ready for unloading, unpacking, assembling, installing, and similar operations."

Install: "to perform all operations at the project site, including, but not limited to, and as required: unloading, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, testing, commissioning, starting up and similar operations, complete, and ready for the intended use."

Provide: "to furnish and install complete, and ready for the intended use."

Furnished by owner (or owner-furnished) or furnished by others: "an item furnished by the owner or under other divisions or contracts, and installed under the requirements of this division, complete, and ready for the intended use, including all items and services incidental to the work necessary for proper installation and operation. Include the installation under the warranty required by this division.

Engineer: where referenced in this division, "engineer" is the engineer of record and the design professional for the work under this division, and is a consultant to, and an authorized representative of, the architect, as defined in the general and/or supplementary conditions. When used in this division, it means increased involvement by, and obligations to, the engineer, in addition to involvement by, and obligations to, the "architect".

AHJ: the local code and/or inspection agency (authority) having jurisdiction over the work.

NRTL: nationally recognized testing laboratory, as defined and listed by OSHA in 29 CFR 1910.7 (e.g., UL, ETL, CSA), and acceptable to the AHJ over this project.

The terms "equivalent", "equivalent", or "equal" are used synonymously and shall mean "accepted by or acceptable to the engineer as equivalent to the item or manufacturer specified". The term "approved" shall mean labeled, listed, certified, or all three, by an NRTL, and acceptable to the AHJ over this project.

22A 1-3 PRE-BID SITE VISIT

Prior to submitting bid, visit the site of the proposed work and become fully informed as to the conditions under which the work is to be done. Failure to do so will not be considered sufficient justification to request or obtain extra compensation over and above the contract price.

22A 1-4 MATERIAL AND WORKMANSHIP

Provide all material and equipment new and in first class condition. Provide markings or a nameplate for all material and equipment identifying the manufacturer and providing sufficient reference to establish quality, size and capacity. In general, provide the following quality grade(s) for all materials and equipment:

Commercial Specification Grade

Pipe, pipe fittings, pipe specialties and valves shall be manufactured in plants located in the United States.

Work performed under this contract shall provide a neat and "workmanlike" appearance when completed, to the satisfaction of the architect and engineer. Workmanship shall be the finest possible by experienced mechanics of the proper trade.

The complete installation shall function as designed and intended with respect to efficiency, capacity, noise level, etc. Abnormal or excessive noise from equipment, devices or other system components will not be acceptable.

Remove from the premises waste material present as a result of work. Clean equipment installed under this contract to present a neat and clean installation at the termination of the work.

Repair or replace public and private property damaged as a result of work performed under this contract to the satisfaction of authorities and regulations having jurisdiction.

22A 1-5 MANUFACTURERS

In other articles where lists of manufacturers are introduced, subject to compliance with requirements, provide products by one of the manufacturers specified.

Where a list is provided, manufacturers listed are not in accordance with any ranking or preference.

Where manufacturers are not listed, provide products subject to compliance with requirements from manufacturers that have been actively involved in manufacturing the specified product for no less than 5 years.

22A 1-6 COORDINATION

Coordinate all work with other divisions and trades so that the various components of the systems will be installed at the proper time, fit the available space, and will allow proper service access to those items requiring maintenance. Refer to all other division's drawings, and to relevant equipment submittals and shop drawings to determine the extent of clear spaces. Components which are installed without regard to the above shall be relocated at no additional cost to the owner.

Unless otherwise indicated, the general contractor will provide chases and openings in building construction required for installation of the systems specified herein. Contractor shall furnish the general contractor with information where chases and openings are required. Make all offsets required to clear equipment, beams and other structural members, and to facilitate concealing system components in the manner anticipated in the design. Keep informed as to the work of other trades engaged in the construction of the project, and execute work in a manner as to not interfere with or delay the work of other trades.

Figured dimensions shall be taken in preference to scale dimensions. Contractor shall take his own measurements at the building, as variations may occur. Contractor will be held responsible for errors that could have been avoided by proper checking and inspection

Provide materials with trim that will properly fit the types of ceiling, wall, or floor finishes actually installed. Model numbers listed in the construction documents are not necessarily intended to designate the required trim.

22A 1-7 ORDINANCES, CODES, AND STANDARDS

Work performed under this contract shall, at a minimum, be in conformance with applicable national, state and local codes having jurisdiction. Equipment furnished and associated installation work performed under this contract shall be in strict compliance with current applicable codes adopted by the local AHJ including any amendments and standards as set forth by the National Fire Protection Association (NFPA), Underwriters Laboratories (UL), Occupational Safety and Health Administration (OSHA), American Society of Mechanical Engineers (ASME), American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), American National Standards Institute (ANSI), American Society of Testing Materials (ASTM) and other national standards and codes where applicable. Additionally, comply with rules and regulations of public utilities and municipal departments affected by construction of services. Where the contract documents exceed the requirements of the referenced codes, standards, etc., the contract documents shall take precedence.

Promptly bring all conflicts observed between codes, ordinances, rules, regulations, referenced standards, and these documents to the engineer's attention for final resolution. Contractor will be held responsible for any violation of the law.

Procure and pay for permits and licenses required for the accomplishment of the work herein described. Where required, obtain, pay for and furnish certificates of inspection to owner. Contractor will be held responsible for violations of the law.

22A 1-8 PROTECTION OF EQUIPMENT AND MATERIAL

Store and protect from damage equipment and materials delivered to job site, in accordance with manufacturers' recommendations. For materials and equipment susceptible to changing weather conditions, dampness, or temperature variations, store inside in conditioned spaces. For materials and equipment not susceptible to these conditions, cover with waterproof, tear-resistant, heavy tarp or polyethylene plastic as required to protect from plaster, dirt, paint, water, or physical damage. Equipment and material that has been damaged by construction activities will be rejected, and contractor shall furnish new equipment and material as required at no additional cost to the owner.

Keep premises broom clean from foreign material created during work performed under this contract. Piping, equipment, etc. shall have a neat and clean appearance at the termination of the work.

Plug or cap open ends of piping systems while stored and installed during construction when not in use to prevent the entrance of debris into the systems. Keep the manufacturer provided protective coverings on floor drains, floor sinks and trench drains during construction. Remove coverings at the termination of the work and polish exposed surfaces

22A 1-9 SUBSTITUTIONS

Include in the base bid the products specifically named in these specifications or on the drawings. Submit, in the form of alternates, with bid, products of any other manufacturers for similar use, provided the differences in cost, if any, are included for each proposed alternate.

No substitutions will be considered with receipt of Bids, unless the Architect and Engineer have received from the Bidder a written request for approval to bid a substitution at least ten calendar days prior to the date for receipt of Bids, and have approved the substitution request. Include, with each such request, the name of the material or equipment for which substitution is being requested, and a complete description of the proposed substitution, including drawings, cut sheets, performance and test data, and all other information necessary for an evaluation. Include also a statement setting forth changes in other materials, equipment or other work that would be required to incorporate the substitution. The burden of proof of the merit of the proposed substitute is upon the proposer. The proposer of any substitutions shall compensate the Engineer at a rate of \$150.00 per hour for time spent evaluating proposed substitutions and the subsequent revisions to the design required to utilize the substitution.

The Architect's or Engineer's decision to approve or disapprove a substitution in a Bid is final.

If the proposed substitution is approved prior to receipt of Bids, such approval will be stated in an Addendum. Bidders shall not rely upon approvals made in any other manner, including verbal.

No substitutions will be considered after receipt of Bids and before award of the Contract.

No substitutions will be considered after the Contract is awarded unless specifically provided in the Contract Documents.

22A 1-10 SUBMITTALS

Assemble and submit to the architect, for engineer's review, manufacturers' product literature for material and equipment to be furnished, installed, or both, under this division, including shop drawings, manufacturers' product data and performance sheets, samples, and other submittals required by this division. Highlight, mark, list or indicate the materials, performance criteria and accessories that are being proposed. Provide the number of submittals required by division 1; however, at a minimum, submit two (2) sets. Before submitting, verify that all materials and equipment submitted are mutually compatible and suitable for the intended use, fit the available spaces, and allow ample and code-required room for access and maintenance. Submittals shall contain the following information: Submittals not so identified will be returned to the contractor without action:

The project name.
The applicable specification section and paragraph.
The submittal date.
The contractor's stamp, which shall certify that the stamped drawings have been checked by the contractor, comply with the drawings and specifications, and have been coordinated with other trades.

Submittals and shop drawings shall not contain HP Engineering's firm name or logo, nor shall it contain the HP Engineering's engineers' seal and signature. They shall not be copies of HP Engineering's shop work product.

Transmit submittals as early as required to support the project schedule. Allow for two weeks engineer review time, plus mailing time, plus a duplication of this time for re-submittals, if required. The engineer's submittal reviews will not relieve the contractor from responsibility for errors in dimensions, details, size of members, or quantities; or for omitting components or fittings; or for not coordinating items with actual building conditions.

Refer to division 1 for acceptance of electronic submittals for this project. For electronic submittals, contractor shall submit the documents in accordance with the procedures specified in division 1. Contractor shall notify the architect and engineer that the shop drawings have been posted. If electronic submittal procedures are not defined in division 1, contractor shall include the website, user name and password information needed to access the submittals. For submittals sent by e-mail, contractor shall copy the architect and engineer's designated representatives. Contractor shall allow the engineer review time as specified above in the construction schedule. Contractor shall submit only the documents required to purchase the materials and/or equipment in the electronic submittal and shall clearly identify the materials, performance criteria and accessories being proposed. General product catalog data not specifically noted to be part of the specified product may be rejected and returned without review.

22A 1-11 ELECTRONIC DRAWINGS

In preparation of shop drawings or record drawings, contractor may, as an option, obtain electronic drawing files in Revit, AutoCAD, or DXF format from the engineer for a fee of \$200 for the first sheet and \$100 per sheet for each additional sheet. Contact the architect for written authorization; and, contact the engineer to obtain the necessary release agreement form and to indicate the desired shipping method and drawing format. In addition to payment, architect's written authorization and engineer's release agreement form must be received before electronic drawing files will be sent.

22A 1-12 OPERATION AND MAINTENANCE INSTRUCTIONS

Submit to the architect, for engineer's review, copies each of operations and maintenance instruction manuals, appropriately bound into manual form including approved copies of the following, revised if necessary to show system and equipment as actually installed. Paper clips, staples, rubber bands, and mailing envelopes are not considered approved binders. Provide the number of submittals required by Division 1; however, at a minimum, submit two (2) sets, and include, at a minimum, the following information:

Cover sheet that lists the project name, date, owner, architect, consulting engineer, general contractor, sub-contractor, and an index of contents.
Manufacturers' catalogs and product data sheets
Wiring diagrams
Operation and Maintenance instructions
Parts lists
Approved shop drawings
Test reports as defined for the systems and equipment provided or furnished or installed under this contract.
Names, addresses, telephone numbers, and e-mail addresses of local contacts for warranty services and spare parts.

Submit manuals prior to requesting the final punch list and before any requests for substantial completion. Final approval of this division's systems installed under this contract will be withheld until this equipment brochure is received and deemed complete by the architect and engineer.

Provide "as-built" drawings (see Division 1 and general conditions).

22A 1-13 TRAINING

At a time mutually agreed upon between the owner and contractor, provide the services of a factory trained and authorized representative to train owner's designated personnel on the operation and maintenance of the equipment provided for this project.

Provide training to include but not be limited to an overview of the system and/or equipment as it relates to the facility as a whole; operation and maintenance procedures and schedules related to startup and shutdown, troubleshooting, servicing, preventive maintenance and appropriate operator intervention; and review of data included in the operation and maintenance manuals.

Submit a certification letter to the architect stating that the owner's designated representative has been trained as specified herein. Letter shall include date, time, attendees and subject of training. The contractor and the owner's representative shall sign the certification letter indicating agreement that the training has been provided.

Schedule owner training with at least 7 days' advance notice.

22A 1-14 WARRANTIES

Warrant each system and each element thereof against all defects due to faulty workmanship, design or material for a period of 12 months from date of substantial completion, unless specific items are noted to carry a longer warranty in the construction documents or manufacturer's standard warranty exceeds this duration. Warranties shall include labor and material. Remedy all defects, occurring within the warranty period(s), as stated in the general conditions and Division 1 without any additional costs to the owner.

Perform any required remedial work promptly, upon written notice from the engineer or owner.

At the time of substantial completion, deliver to the owner all warranties, in writing and properly executed, including time limits for warranties extending beyond the required period, each warranty instrument being addressed to the owner and stating the commencement date and term.

22A 1-15 EXCAVATION AND BACKFILLING

Perform excavation and backfill required for installation of underground work under this contract. Trenches shall be of sufficient width. Crib or brace trenches to prevent cave-in or settlement. Do not excavate trenches close to columns and walls of building without prior consultation with the architect. Use pumping equipment if required to keep trenches free of water. Backfill trenches in maximum 6" layers of well-tamped dry earth in a manner to prevent future settlement.

Excavation as herein specified shall be classified as common excavation. Common excavation shall comprise the satisfactory removal and disposition of material of whatever substances and of every description encountered, including rock, if any, within the limits of the work as specified and shown on the drawings. Excavation shall be performed to the lines and grades indicated on the drawings. Excavated materials which are considered unsuitable for backfill, and surplus of excavated material which is not required for backfill, shall be disposed of by the contractor at his own expense and responsibility, and to the satisfaction of the architect.

22A 1-16 COINCIDENTAL DAMAGE

Repair all streets, sidewalks, drives, paving, walls, finishes, and other facilities damaged in the course of this work. Repair materials shall match existing construction. All backfilling and repairing shall meet all requirements of the owner, city and others having jurisdiction. Repair work shall be thoroughly first class. Conform to all requirements of Division 2 of these specifications.

22A 1-17 CUTTING AND PATCHING

Following the requirements in Division 1, cut walls, floors, ceilings, and other portions of the facility as required to perform work under this division. Obtain permission of the architect, owner, or both, before doing any cutting. Cut all holes as small as possible. Patch walls, floors, and other portions of the facility as required by work under this division. All patching shall be thoroughly first class and shall match the original material and construction, including fire ratings if applicable in a manner satisfactory to the architect.

22A 1-18 ROUGH-IN

Coordinate without delay all roughing-in with other divisions. Conceal all piping and rough-in except in unfinished areas and where otherwise indicated in the construction documents.

22A 1-19 CONCRETE BASES

Provide concrete bases for equipment where indicated on the drawings. Concrete bases shall have chamfered edges. Size of pad shall be a minimum of 4" greater than the footprint of the equipment that it is supporting.

Construct equipment bases and housekeeping pads of a minimum 28 day, 4000 psi concrete conforming to American Concrete Institute standard building code for reinforced concrete (ACI 318-09) and the latest applicable recommendations of the ACI standard practice manual. Concrete shall be composed of cement conforming to ASTM C 150 Type I, aggregate conforming to ASTM C33, and potable water. Exposed exterior concrete shall contain 5 to 7 percent air entrainment.

Unless otherwise specified or shown on the structural drawings, reinforce equipment bases and housekeeping pads with No. 4 reinforcing bars conforming to ASTM A 615 or bar #6 - W2.9 x W2.9 welded wire mesh conforming to ASTM A185. Place reinforcing bars 24" on center with a minimum of two bars each direction.

Provide galvanized anchor bolts for equipment placed on concrete equipment bases and housekeeping pads or on concrete slabs. Anchor bolts size, number and placement shall be as recommended by the manufacturer of the equipment.

Concrete equipment bases shall have minimum heights in accordance with the following: for water heaters, water softeners and other equipment not listed, minimum height is 4". For water heaters over 200 gallons capacity and domestic water booster pumps, minimum height is 6". Height of equipment bases applies to equipment installed on slab-on-grade. For equipment installed on floors above grade and on the roof, refer to the drawings.

22A 1-20 STRUCTURAL STEEL

Structural steel used for pipe supports, equipment supports, etc., shall be new and clean, and shall conform to ASTM designation A-36.

Support plumbing equipment and piping from the building structure. Do not support plumbing equipment and piping from ceilings, other mechanical or electrical components, and other non-structural elements.

22A 1-21 ACCESS DOORS

Provide access doors in ceilings and walls where indicated or required for access to concealed valves and equipment installed under this section. Provide concealed hinges, screwdriver-type lock, anchor straps; manufactured by Milcor, Zum, Titus, or equal. Obtain architect's approval of type, size, location, and color before ordering.

22A 1-22 PENETRATIONS

Provide sleeves for pipes passing through above grade concrete or masonry walls, concrete floor or roof slabs. Sleeves are not required for core drilled holes in existing masonry walls, concrete floors or roofs. Provide 10 gauge galvanized steel sleeves for sleeves 6" and smaller. Provide galvanized sheet metal sleeves for larger than 6". Schedule 40 PVC sleeves are acceptable for installation in areas without return air plenums.

Seal elevated floor, exterior wall and roof penetrations watertight and weathertight with non-shrink, non-hardening commercial sealant. Pack with mineral wool and seal both ends with minimum of 1/2" of sealant.

Seal around penetrations of fire rated assemblies. Coordinate fire ratings and locations with the architectural drawings. Refer to architectural specifications for fire stoppings. Provide a product schedule for UL listing, location, wall or floor rating and installation drawing for each penetration fire stop system.

Extend pipe insulation for insulated pipe through floor, wall and roof penetrations, including fire rated walls and floors. The vapor barrier shall be maintained. Size sleeve for a minimum of 1" annular clear space between inside of sleeve and outside of insulation.

Seal concrete or masonry exterior wall penetrations below grade with "wall pipes" and mechanical sleeve seals. Provide cast iron "wall pipes" with integral watertop ring manufactured by Josam, Jay R. Smith, Wade, Watts or Zum. Provide modular mechanical sleeve seals, manufactured by Thunderline / Link Seal, Calpicco, Inc., and Metrelux.

Seal elevated concrete slab with water proof membrane penetrations with "wall pipes" and water proof sealant. Secure waterproof membrane flashing between "wall pipe" clamping flange and clamping ring. Provide cast iron "wall pipes" with integral watertop ring manufactured by Josam, Jay R. Smith, Wade, Watts or Zum.

Provide sleeves for horizontal pipe passing through or under foundation. Sleeves shall be cast iron soil pipe two nominal pipe sizes larger than the pipe served.

Provide Schedule 40 PVC pipe sleeves for vertical pressure pipe passing through concrete slab on grade. Sleeves shall be one nominal pipe size larger than the pipe served and two pipe sizes larger than pipe served for ductile iron pipes with restraining rods. Seal water-tight with silicone caulk.

Provide 1/2" thick cellular foam insulation around perimeter of non-pressure pipe passing thru concrete slab on grade. Insulation shall extend to 2" above and below the concrete slab.

22A 1-24 ELECTRICAL WIRING

Line Voltage control and interlock wiring shall be provided by the Division 26 contractor. Low Voltage control wiring shall be provided by the Division 23 contractor. Required conduit and rough-ins for low Voltage control wiring shall be provided by the Division 26 contractor. Furnish wiring diagrams to the Division 26 contractor as required for proper equipment hookup. Coordinate with the Division 26 contractor the actual wire sizing amps for the equipment (from the equipment nameplate) to ensure proper installation.

22A 1-25 EQUIPMENT FURNISHED BY OTHERS

Furnish and install roughed-in wastes, vents and water services. Provide final connection to kitchen equipment, furnished by others, in locations as indicated on the drawings. Provide accessory items that are required but not furnished with the equipment, including traps, stop valves, PRV's, indirect drain from equipment to floor drains, and accessory items indicated or required for the proper operation of the complete system at the termination of the work.

Contractor shall be responsible for correct rough-in dimensions, and shall verify same with architect and/or equipment supplier prior to service installations.

22A 1-26 ALTERNATES

Refer to the architectural portion of the specification for list of alternates. Applicable sections of the base specifications shall apply to all work required by the alternate unless otherwise specified. Determine whether or not and how each alternate affects work. Include labor, materials, equipment and transportation services necessary for and incidental to the completion of work under each particular alternate. Furnish separate bid for each alternate applicable to work, stating the amount to be added or deducted from the base bid.

22A 1-27 EXTERIOR UTILITY CONNECTIONS

Terminate domestic water, storm, and sewer lines at a point approximately five feet from the building wall, or as shown on the drawings. Make connection to the various services provided by others and coordinate connection requirements with civil engineer. Verify that installation will tie into the various services provided by others at the indicated invert elevation point prior to installation. If the installation will not tie into the indicated invert elevation point while maintaining proper fall, notify architect and civil engineer so that an alternative may be determined.

Provide service piping and accessories required to complete utility connections that are not furnished by the serving utility.

Coordinate with the local gas service company to provide a new gas service, including gas meter, shut-off valves, and regulator as indicated on the drawings. Installation shall be in complete conformance with the requirements of the local gas service company.

22A 1-29 BUILDING OPERATION

Comply with the schedule of operations as outlined in the architectural portions of this specification. Building shall be in continuous operation. Accomplish work that requires interruption of building operation at a time when the building is not in operation, and only with written approval of building owner and/or tenant. Coordinate interruption of building operation with the owner and/or tenant a minimum of 7 days in advance of work.

22A 1-30 SYSTEM TESTING AND ADJUSTING

Upon completion of each phase of the installation, test each system in conformance with local code requirements and as noted below. Furnish labor and equipment required to test plumbing work installed under this contract, and assume costs involved in making the tests, and repairing and/or replacing damage resulting therefrom.

Notify the architect and the authority having jurisdiction, three (3) working days prior to making plumbing system tests. Leave concealed work uncovered until the required tests have been completed, but if necessary due to construction procedure, tests on portions of the work may be made, and when satisfactory, the work may be concealed. Test piping before insulation is installed, and before backfill. Pipes, joints, flanges, valve stems, etc., shall be leak tight. Repair or replace system defects with new materials. Caulking of defective joints, cracks or holes will not be permitted. Repeat tests after defects have been eliminated. Make tests in the presence of the administrative authority and/or the owner's authorized representative.

Upon completion of the systems installation, and prior to acceptance by the architect and engineer, make general operating tests to demonstrate that equipment and systems are in proper working order, and are functioning in conformance with the intent of the drawings and specifications. As a part of these tests, open every water outlet to ensure complete system flushing, remove and clean faucet aerators, clean strainers, light pilot lights, and operate every piece of equipment furnished under this contract to demonstrate proper functioning.

Test the drainage and vent system by plugging openings with test plugs, except those at the top of the stacks. Fill the system with water; test results will be satisfactory if the water level remains stationary for not less than one (1) hour. Subject the drainage and vent system to a pressure of at least ten (10) feet of water. If leaks develop, repair them and repeat the test.

Test the domestic water system by filling it with water and then isolating the system from its source. Keep the system closed for a period of twenty-four hours, with no fixture being used. The pressure differential for this test period shall not exceed 10 psig. Test water piping to a 125 psi hydrostatic pressure.

For low pressure natural gas systems, subject the pipe to 10 psig air pressure for a period of one hour. The resultant pressure differential for this period shall be 0 psig. Test per gas company requirements where required.

22A 2 PLUMBING PIPING

22A 2-1 PIPING MATERIALS

Materials specified or noted on the drawings are subject to the approval of local code authorities. Verify approval before installing any material or joining method.

Domestic Water (cold, hot and hot water recirculation): Domestic water piping installed above the floor slab inside the building shall be type "L" hard temper copper tube with wrought copper fittings and soldered connections made up with 95/5 solder. Brazed mechanically formed tee connections (T-drill) may be used in copper lines where approved by code; connection shall be made with brazed silver solder (Silfos) joints in conformance with manufacturer's instructions.

Underground domestic water piping 2" and smaller shall be type "K" soft temper copper tubing with flared copper alloy fittings and connections, or type "K" hard temper copper tubing with conventional wrought copper fittings and silver solder (Silfos) joints. Install as few underground copper piping joints as possible. At building service entrance, no joints shall be installed under or within 5 feet of the building. Install domestic water piping below grade outside building at adequate depth to prevent freezing.

Underground domestic water piping 3" and larger shall be Class 52 ductile iron meeting the requirements of ANSI / AWWA Standard C151/A21.51. Fittings shall be double cement lined in accordance with ANSI / AWWA Standard C104/A21.4. Fittings shall have mechanical joints. At contractor's option, pipe joints in straight runs (not at fittings) and not installed under or within 5 feet of the building slab may be push-on joints. Joints shall conform to the requirements of ANSI 21.11.

Interior Waste and Vent Below Slab: Waste and vent pipe below slab inside building shall be service weight cast iron soil pipe with hub and spigot fittings with neoprene gasket joints, meeting ASTM A74, manufactured by AB & I Foundry, Charlotte or Tyler Pipe and bearing the trademark of the CISPI and NSF. Hubless waste and vent pipe is not permitted below base slab. PVC Schedule 40 DWV ASTM D2665 pipe with PVC meeting ASTM B1784, "solid wall" cell Class 12454-B with ASTM 2665 socket fittings with solvent weld joints is also permitted where approved by code.

Interior Waste and Vent Above Slab: Waste and vent pipe above slab inside building shall be hubless cast iron soil pipe and fittings, meeting ASTM A888 and CISPI 301, manufactured by AB & I Foundry, Charlotte or Tyler Pipe and bearing the trademark of the CISPI and NSF. PVC Schedule 40 DWV ASTM D2665 pipe with PVC meeting ASTM B1784, "solid wall" cell class 12454-B with ASTM 2665 socket fittings with solvent weld joints is also permitted where approved by code. (Note: PVC piping is not allowed in ceiling return air plenums)

Interior Storm: Inside building shall be same as specified for interior waste and vent pipe.

Natural Gas: Gas piping above ground shall be Schedule 40 black steel with malleable iron screwed fittings, or standard welded fittings, where indicated on the drawings, gas piping above slab shall be semi-rigid corrugated stainless steel tubing (CSST) by Omegaflex, Inc., Tracpipe or Titeflex Corp., "GasTite", Type 304 stainless tubing meeting ASTM A240, with UV resistant polyethylene jacket meeting ASTM E-84 flame and smoke rating, and yellow brass auto-flare ends with stainless steel inserts. Gas piping below slab shall be semi-rigid corrugated stainless steel tubing (CSST) by Omegaflex, Inc., Tracpipe or Titeflex Corp., "GasTite", Type 304 stainless tubing meeting ASTM A240, with UV resistant polyethylene jacket meeting ASTM E-84 flame and smoke rating, encased in a polyethylene ventable sleeve and yellow brass auto-flare ends with stainless steel inserts. Underground gas piping shall be welded, coated, and wrapped with coal tar enamel and 15 pound felt. Install underground steel gas piping at least 30" below grade, and provide with cathodic protection per gas company details. Underground gas piping shall be high density or ultrahigh density polyethylene pipe as required by the gas utility company. Polyethylene pipe shall conform to ASTM D1248, D3350 and D2513, as appropriate. Polyethylene pipe shall be Phillips Driscopipe Series 8800 or 8000, Omega Engineering, Pepco, or equivalent. Installation shall be in conformance with utility company rules. Provide polyethylene to steel pipe transition fittings by Perfection Corporation, R W Lyall or Central Plastics at transitions from below grade to above grade. Factory assembled and pressure tested one piece design, with steel half of Schedule 40 steel pipe with beveled edge for welding and polyethylene half shall be of ample length for making welds. Steel pipe shall have epoxy protective coating.

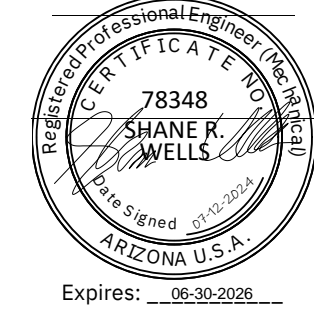
Liquefied Petroleum Gas: Same as specified for natural gas pipe.

Deionized Water: Schedule 80 PP Kynar PVDF by Orion in return air plenums pipe and fittings, mechanical couplings above grade and thermal fusion welded below grade, installed per manufacturer's recommendations. Pipe shall be carefully cut and assembled to avoid creating pits and crevices where contamination may accumulate. Slope piping at a 1% grade to allow for drainage. Coordinate requirements for PP pipe with ASTM type I quality deionized water.

Connections To Plumbing Fixtures And Equipment: 1-1/4" and larger waste connections from fixture traps to cast iron pipe shall be "DWV" copper with wrought copper drainage pattern fittings with copper sweat or compression joints at fixture trap connections and threaded joints at connections to cast iron pipe.

Indirect and Condensate Drain Inside Building: Indirect and condensate drain pipe installed inside the building shall be Type "M" hard copper with wrought copper fittings for 1" and smaller and "DWV" copper with wrought copper drainage pattern fittings for 1-1/4" and larger. Install cleanouts at elbows greater than 45 degrees.

Indirect and Condensate Drain Outside Building: Indirect and condensate drain pipe installed outside the building above ground shall be Type "M" for 1" and smaller and "DWV" for 1-1/4" and larger. Terminate at nearest roof drain, gutter or other location as shown drawings. Install cleanouts at elbows greater than 45 degrees.



PROJECT NUMBER 201253R

PLUMBING SPECIFICATIONS

