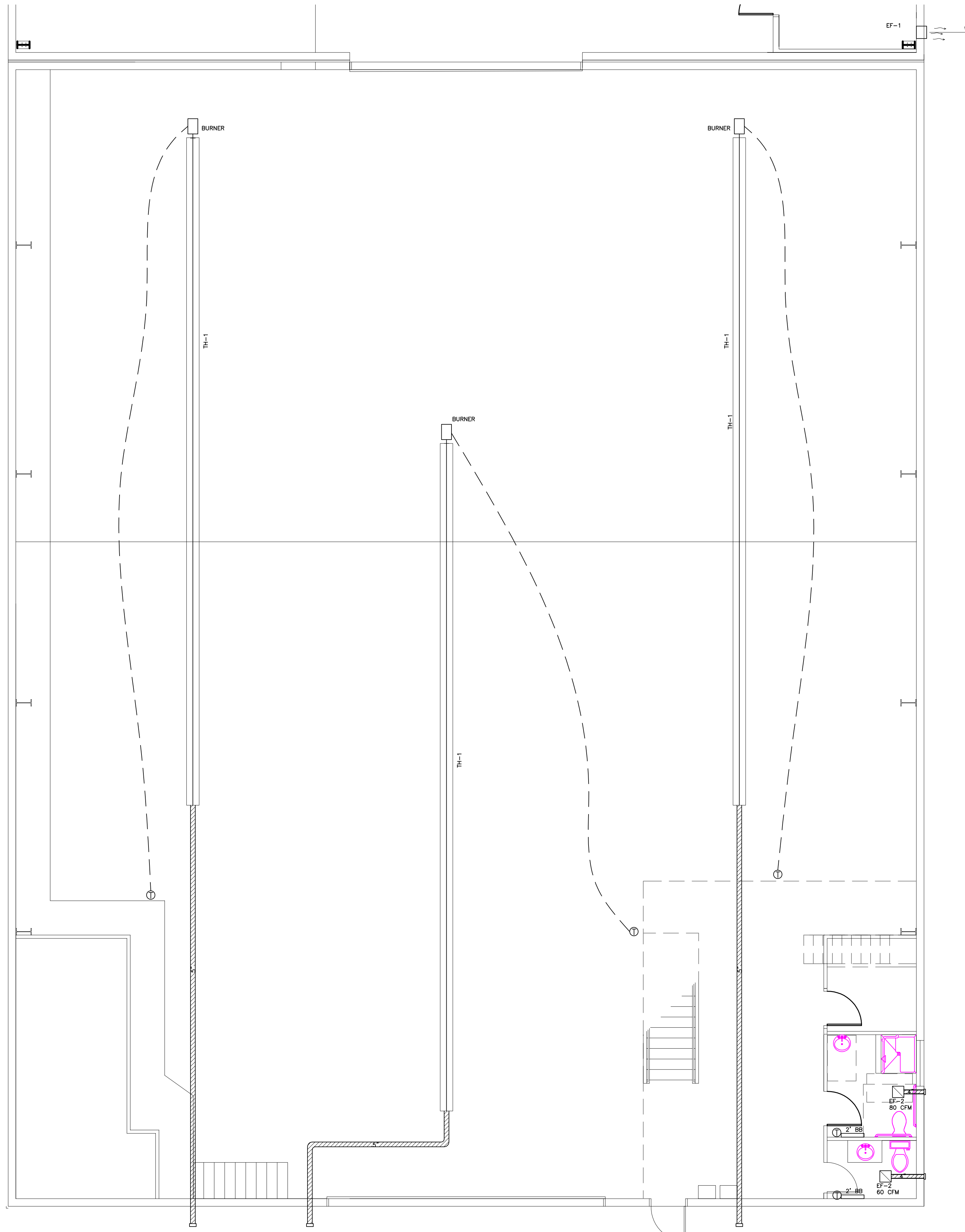


③ UPPER LEVEL HVAC PLAN
SCALE: 3/16" = 1'-0"



① HVAC PLAN 1A
SCALE: 3/16" = 1'-0"

HVAC LEGEND

	EXHAUST AIR DUCT
RH-1	RADIANT TUBE HEATER
EF-X	EXHAUST FAN
SF-X	SUPPLY FAN
X' BB	ELECTRIC BASEBOARD
⊙	THERMO-STAT

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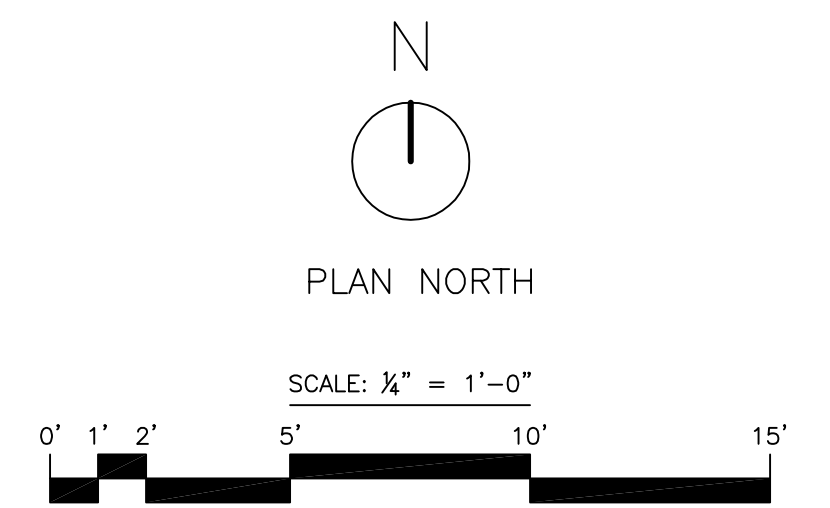
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1794 KAMAR PLAZA
P.O. BOX 772192
STEAMBOAT SPRINGS, CO
80477
970-870-9229
yvengr@yvengr.com

PLANS FOR:
COUNTY METAL BUILDING
24500 COUNTY ROAD 27
OAK CREEK, COLORADO

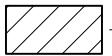





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DATE: 6-3-16

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NO.	DATE	DRAWN

SHEET NUMBER
M-1



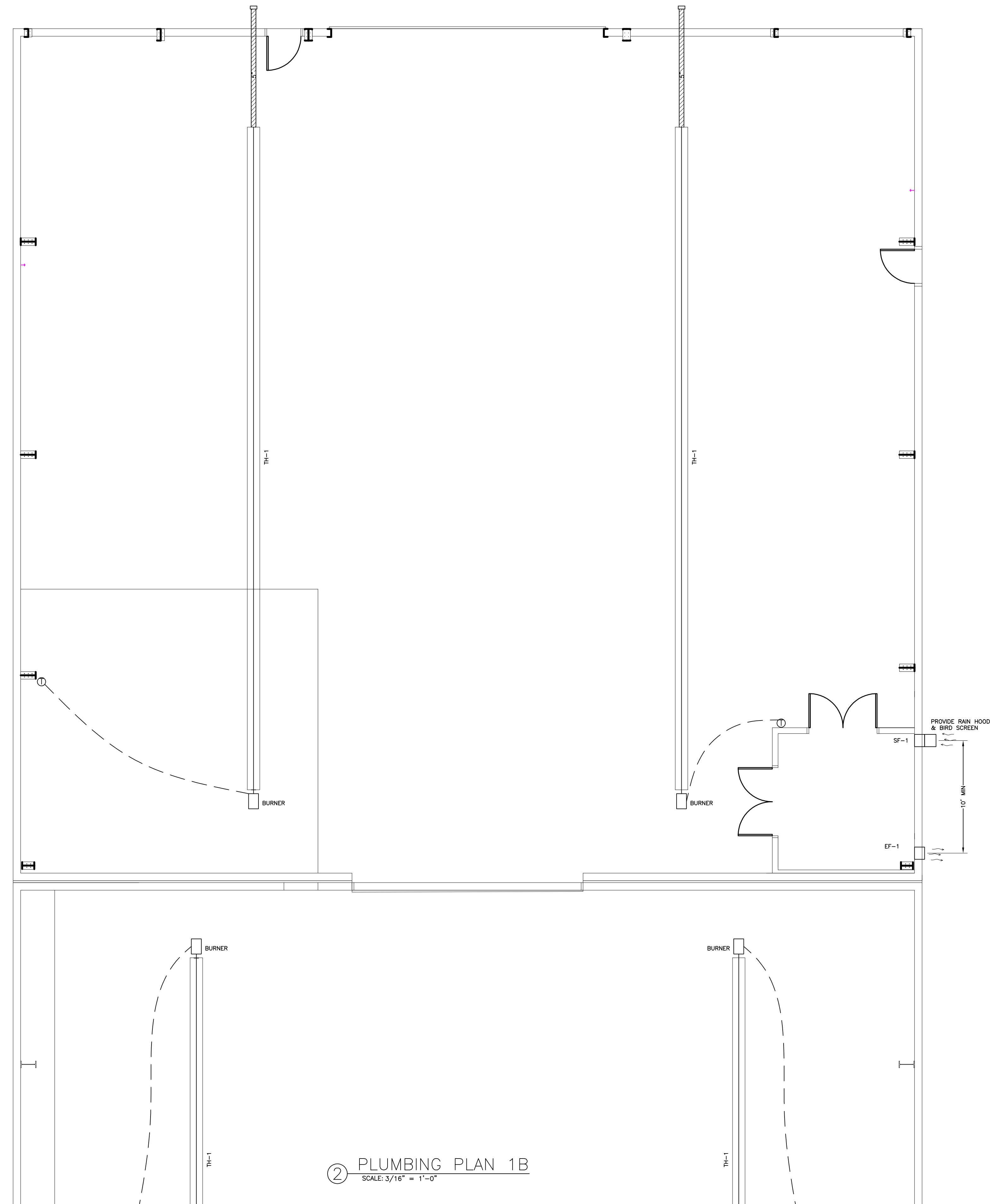
HVAC LEGEND

-  EXHAUST AIR DUCT
- RH-1  RADIANT TUBE HEATER
- EF-X  EXHAUST FAN
- SF-X  SUPPLY FAN
- X' BB  ELECTRIC BASEBOARD
-  THERMO-STAT

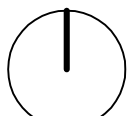
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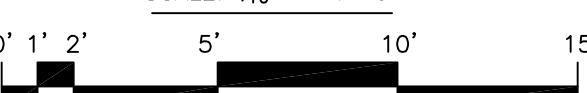
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1794 KAMAR PLAZA
P.O. BOX 772192
STEAMBOAT SPRINGS, CO
80477
970-870-9229
yvengr@yvengr.com



② PLUMBING PLAN 1B
SCALE: 3/16" = 1'-0"

N

PLAN NORTH

SCALE: 3/16" = 1'-0"


PLANS FOR:
COUNTY METAL BUILDING
24500 COUNTY ROAD 27
OAK CREEK, COLORADO

JOB NO: 16-024
DRAWN: JAS
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NO.	DATE	DRAWN

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AIR DISTRIBUTION

DESCRIPTION OF WORK

A. Mechanical contractor shall provide and install radiant tube heater system, exhaust fans, supply fan, ducts and grills, registers and diffusers as shown on the plans. Requirements for the air distribution system are as indicated herein.

MATERIALS

A. Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A 527, lockforming quality; with g 90 zinc coating in accordance with ASTM A 525; and mill phosphatized for exposed locations.

B. All duct dimensions shown are clear area dimensions.

MISCELLANEOUS DUCTWORK MATERIALS

A. General: Provide miscellaneous material and products of types and sizes indicated and, where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connection of ductwork and equipment.

B. Fittings: Provide radius type fitting fabricated of multiple sections with maximum 15-degree change of direction per section. Use 45-degree laterals and elbows for branch takeoff connections.

C. Duct Liner: Fibrous glass, complying with Thermal Insulation Manufacturers Association (TMA) AHC-101; of 1" thick. The liner shall meet the Life Safety Standards as established by NFPA 90A and 90B. The duct liner shall conform to the requirements of ASTM C 1071, with and NRC not less than .65 and a thermal conductivity no higher than .25 at 75 Degrees F mean temperature.

D. Low Pressure Flexible Ducts: Duct shall be factory pre-insulated with a solid inner liner formed by a reinforced aluminum laminate material mechanically locked or bonded together by a corrosive resistant galvanized steel helix covered with a minimum 1-1/2" thick fiberglass blanket and sheathed in a polyethylene vapor barrier.

FABRICATION

A. Shop fabricates ductwork in 4, 8, 10 or 12-Ft. lengths.

B. Shop fabricates ductwork of gages and reinforcement complying with SMACNA HVAC Duct Construction Standards.

C. Fabricate duct fittings to match adjoining ducts, and to comply with duct requirements and applicable to fittings. Except as otherwise indicated, fabricate to include turning vanes in elbows where shorter radius is necessary. Limit angular tapers to 30 degrees for contracting tapers and 20 degrees to expanding tapers.

FACTORY-FABRICATED LOW PRESSURE DUCTWORK

A. General: At installer's option, provide factory-fabricated duct and fittings, in lieu of shop-fabricated duct and fittings.

B. Material: Galvanized sheet steel complying with ASTM A 527, lock forming quality, with ASTM A 525, G90 zinc coating, mill phosphatized.

C. Gage: 28-gage minimum for round and oval ducts and fittings, 4" through 24" diameter.

D. Elbows: One piece construction for 90 degree and 45 degree elbows 14" and smaller. Provide multiple gore construction for larger diameters with standing seam circumferential joint.

EQUIPMENT INSTALLATIONS

A. The radiant tube heating system shall be installed per manufacture's requirements and recommendations.

EQUIPMENT CONNECTIONS

General: Connect metal ductwork to equipment as indicated, provide flexible connection for each ductwork connection to equipment mounted on vibration isolators, and/or equipment containing rotating machinery. Provide access doors as indicated.

GRILLS, REGISTERS AND DIFFUSERS

A. Provide grills, registers and diffusers of manufactures standard air device where shown on the mechanical plans as require for complete installation.

B. Ceiling Compatibility: Provide air devices with border styles that are compatible with adjacent ceiling or wall finish. Owner shall have approval prior to installation.

INSTALLATION OF METAL DUCTWORK

A. Assemble and install ductwork in accordance with recognized industry practices that will achieve airtight and noiseless systems, capable of performing each indicated service. Align ductwork accurately, supporting ducts rigidly and support vertical ducts at every floor.

B. Routing: Locate ductwork runs, vertically and horizontally and avoid diagonal runs whenever possible. Locate runs as indicated by diagrams, detail and notations or, if not otherwise indicated, run ductwork in shortest route, which does not obstruct usable space, or block access for servicing building and its equipment. Coordinate layout with suspended ceiling and lighting layout and similar finished work.

C. Install metal ductwork in accordance with SMACNA HVAC Duct Construction Standards.

D. Turning vanes shall be located in all 90 degrees turns and tees.

E. Use 45 degree laterals and elbows for branch takeoff connections.

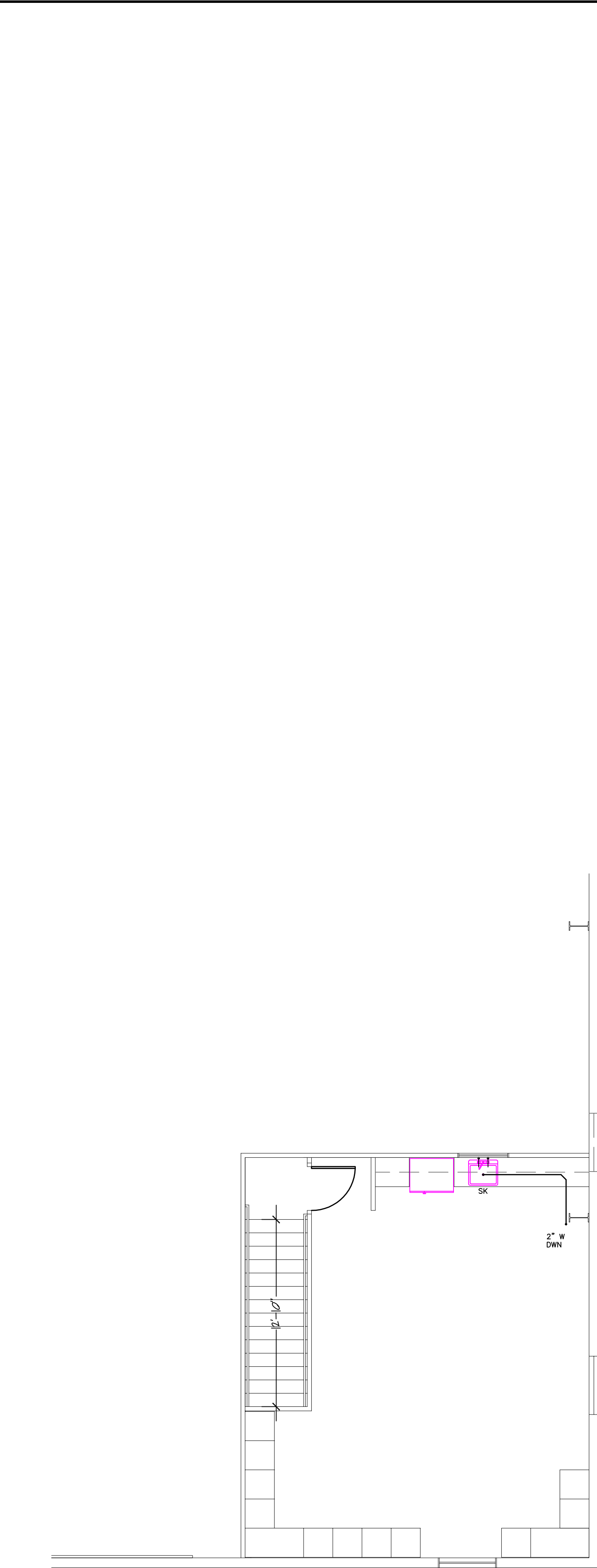
ADJUSTING AND CLEANING

Clean duct work internally, of dust and contractor. A balance report shall be furnished to the Project Manager and the Designer.

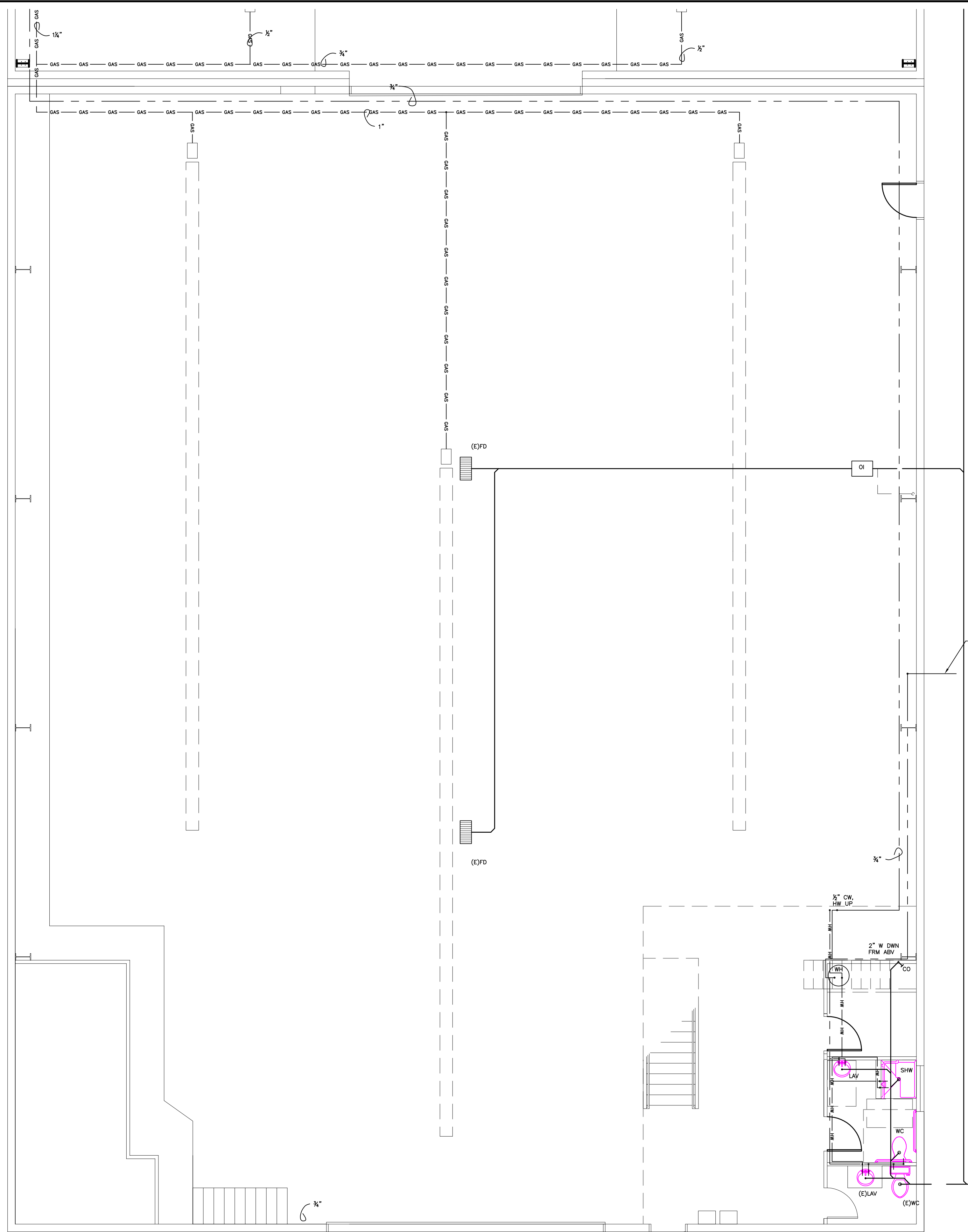
Start-up:

Operate installed system to demonstrate compliance with requirements. Check for leakage while system is operating and adjust or repair as necessary.

HVAC EQUIPMENT SCHEDULE									
MARK	DESCRIPTION	MANUFACTURE & MODEL	HEATING (MBU)	COOLING (MBU)	CFM @ 0.0 SP (UON)	ELECTRICAL			REMARKS
						VAC	PHASE	AMPS	
X-BB	ELECTRIC BASEBOARD	KING ELECTRIC	250W/FT	-	-	230	1	*	*1.04 AMP PER FT
TH	RADIANT TUBE HEATER	INFRASAV IQ-155-60	150	-	-	115	1	1.0	-
EF-1	SHUTTER MOUNTED EXHAUST FAN	DAYTON 1HLA1	-	-	585	120	1	1.50	-
SF-1	SHUTTER MOUNTED SUPPLY FAN	DAYTON 1HLA1	-	-	585	120	1	1.50	-
EF-2	BATH EXHAUST FAN	PANASONIC 80 CFM	-	-	80	120	1	1.0	-



⊕ UPPER LEVEL PLUMBING PLAN
SCALE: 3/16" = 1'-0"



⊕ MAIN LEVEL PLUMBING PLAN
SCALE: 3/16" = 1'-0"

PLUMBING LEGEND

—	NEW WASTE PIPING
- - -	EXISTING WASTE PIPING
- - -	VENT PIPING
—	DOM COLD WATER PIPING
— HW —	DOM HOT WATER PIPING
- GAS - GAS -	LP GAS PIPING
4"	DRAIN/VENT SIZES
(E)	EXISTING
CO	DRAIN CLEAN-OUT
LAV	LAVATORY
WC	WATER CLOSET
SHW	SHOWER
HB	HOSE BIB
SK	SINK
WH	WATER HEATER
OI	SAND OIL INTERCEPTOR
VTR	VENT TO ROOF
⊕	THERMO-STAT

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yvengr@yvengr.com

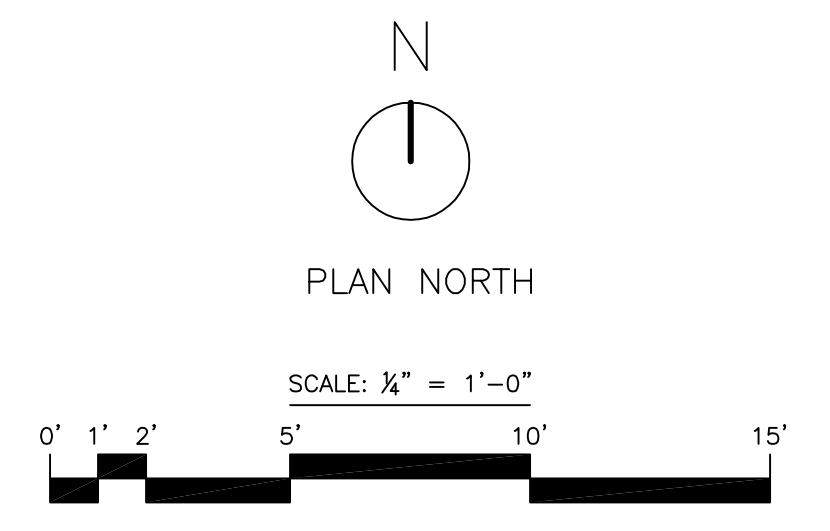
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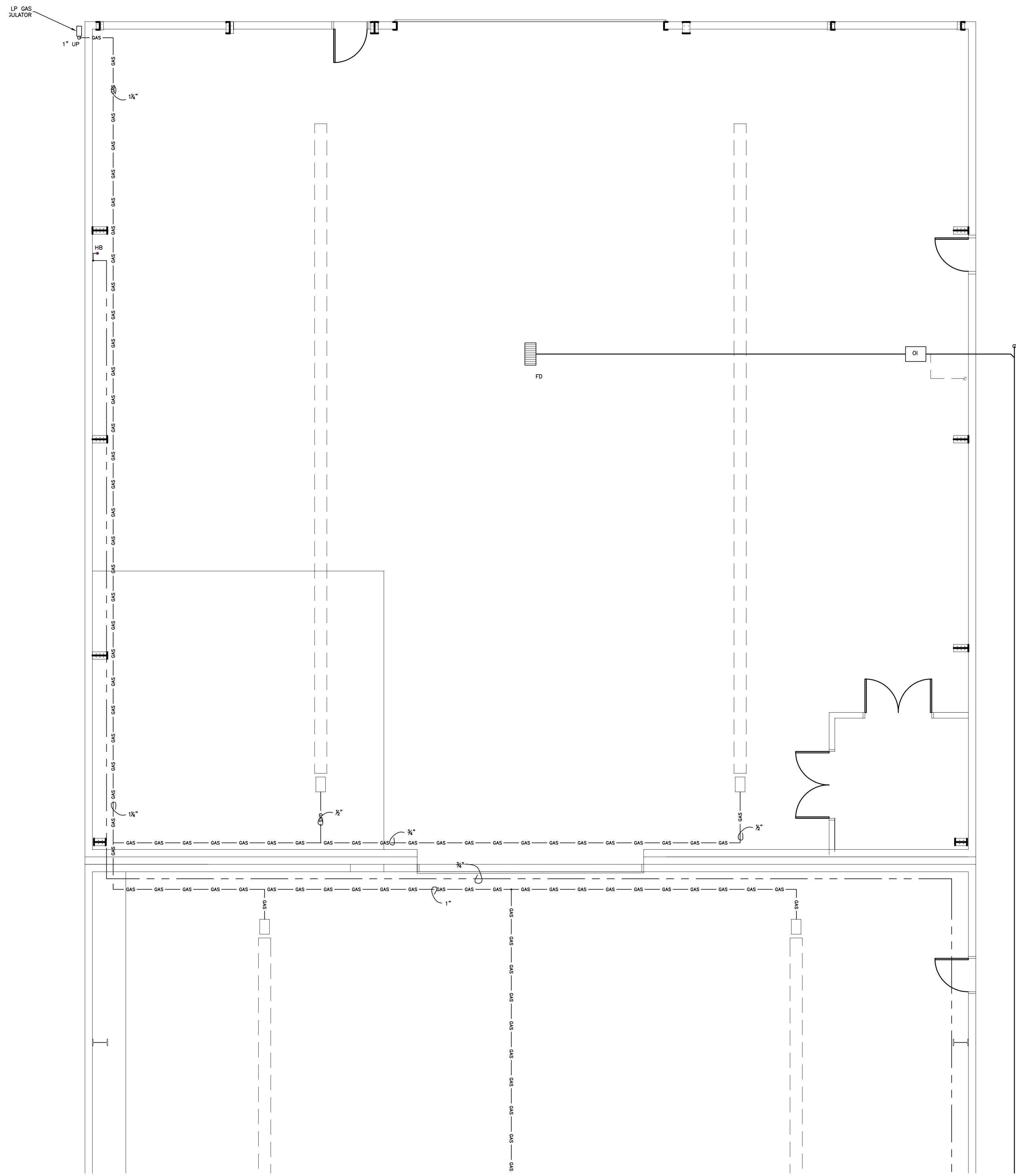
COUNTY METAL BUILDING
24500 COUNTY ROAD 27
OAK CREEK, COLORADO

JOB NO: 16-024
DRAWN: JAS
DATE: 6-3-16

REVISIONS		
NO.	DATE	DRAWN

SHEET NUMBER
P-1





PLUMBING LEGEND

———	NEW WASTE PIPING
- - - - -	EXISTING WASTE PIPING
———	VENT PIPING
- - - - -	DOM COLD WATER PIPING
———	HW ——— DOM HOT WATER PIPING
- GAS — GAS —	LP GAS PIPING
⌀ 4"	DRAIN/VENT SIZES
(E)	EXISTING
CO	DRAIN CLEAN-OUT
LAV	LAVATORY
WC	WATER CLOSET
SHW	SHOWER
HB	HOSE BIB
SK	SINK
WH	WATER HEATER
OI	SAND OIL INTERCEPTOR
VTR	VENT TO ROOF
⊕	THERMO-STAT

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JAMES STEGMAIER, P.E.
 1794 KAMAR PLAZA
 P.O. BOX 772192
 STEAMBOAT SPRINGS, CO
 80477
 970-870-9229
 yvengr@yvengr.com

PLANS FOR:

COUNTY METAL BUILDING
 24500 COUNTY ROAD 27
 OAK CREEK, COLORADO

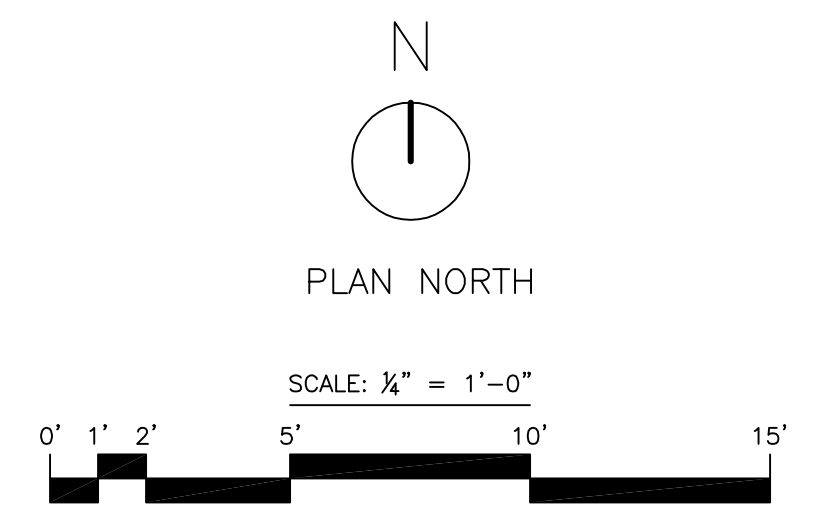
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NO.	DATE	DRAWN

SHEET NUMBER

P-2



REVISIONS		
NO.	DATE	DRAWN

- Plumbing System
- A. Plumbing contractor shall provide all labor, materials and equipment to install water, sewer piping and gas piping where indicated. All work shall be in accordance with the current IBC, IPC and all state and local codes and regulations. Only licensed plumbing contractors shall install water, sewer or gas piping.
- B. All appropriate plumbing permits shall be issued prior to work commencing in those areas.
- D. Coordinate work with other trades to eliminate conflicts. Verify dimensions and sizes and report errors, conflicts and inconsistencies to the Designer before starting work. Execute work in accordance with best current standard practices to contribute to the efficiency of operation, accessibility, slightness and minimal maintenance. Conform and accommodate systems to building structure, equipment and usage so that they do not interfere with the operation of other systems or operational parts of the building.

- WARRANTIES**
- A. Plumbing contractor shall provide a written warranty to the owner covering the entire mechanical or plumbing work to be free from defective materials, equipment and workmanship for a period of one year after Date of Acceptance.

- OPERATING AND MAINTENANCE DATA**
- A. Submit two (2) bound copies of the operating and maintenance manuals to the owner for review and approval. The operating instructions shall contain complete procedures for fire or failure of major equipment and procedures for normal starting, operating, shutdown and long term shutdown. The maintenance instructions shall cover all aspects for properly maintaining the equipment including cleaning, replacing and adjusting schedules.

- PIPE AND FITTINGS**
- A. Domestic Water: All above slab DW piping shall be Type M copper or an approved Cross-linked polyethylene (PEX) or Polyethylene (PE). All piping products shall comply with IPC Table 605.4 Water Service Distribution Piping. Joints shall be up of 95-5 tin-antimony solder metal per ASTM B 32-70, alloy Grade 95TA.
- B. All below slab water piping shall be Type L soft copper. The piping shall be continuous without joints and wrapped in closed cell insulation.
- C. Drain and Waste Piping - Above and Underground
Sewer pipe shall be PVC. PVC pipe and fittings shall comply with ASTM D2665-85. PVC fittings shall correspond to pipe in material, class and ASTM designation
Joints: Solvent cement shall be as specified in ASTM D2564-80 and primer shall be as specified in ASTM F656-80.

- D. LP Gas Piping
All gas pipe shall be black steel pipe and comply with ASTM A 53-B3. Ferrous metals in exposed exterior location shall be protected from corrosion with a rust inhibiting coating such as enamel paint. All joints in the piping system shall have screwed joints, having approved standard threads. Such screwed joints shall be made up with approved pipe joint material, insoluble in the presence of natural gas and applied to the male threads only. Fittings 1/2" and less shall be 300 lb. Class per ANSI B16.3. Fittings greater than 1/2" shall be 150 lb. Class per ANSI B16.3.

- MISCELLANEOUS PIPING MATERIALS/PRODUCTS**
- A. Soldering Materials: Provide soldering materials as determined by installer to comply with installation requirements.
- B. Piping Connectors for Dissimilar Non-Pressure Pipe: Elastomeric annular ring insert or elastomeric flexible coupling minimizes flexible duct lengths and sharp bends.

- VALVES**
- A. General: Provide valves of types and pressure ratings indicated by application and comply with all state and local codes.

- HANGERS AND SUPPORTS**
- A. Horizontal and Vertical Piping Hangers, Clamps and Supports:
Use either factory fabricated piping hangers and supports or strapping which provides enough stability to comply with manufactures published product information and complies with the UPC and local codes. Provide copper-plated hangers and supports for copper-piping systems.

- PIPE AND PIPE FITTING INSTALLATION**
- A. Install pipes and pipe fittings in accordance with recognized industry practices which will achieve permanently leakproof piping systems, capable of performing each indicated service without piping failure.

- PIPING SYSTEM JOINTS**
- A. Thread natural gas pipe in accordance with ANSI B2.1. Cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint or pipe joint tape where recommended by pipe/fitting manufacturer.
- B. Solder copper tube-and-fitting joints where indicated, in accordance with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Use only flux with no lead content.
- C. DWV pipe and fittings shall be cleaned using approved primer and glued with approved glue. If outside temperatures are 30 degrees or below, cold weather glues shall be used.
- D. Hydronic piping shall be installed per manufactures recommendations and requirements.

- INSTALLATION OF HANGERS AND SUPPORTS**
- A. All suspended domestic pipe shall be suitable braced to prevent horizontal movement.
- B. Prevent electrolysis in support of copper tubing by use of hangers and supports that are copper plated, or by other recognized industry methods or by plastic coated hangers.
- C. All soil, waste and vent piping shall be supported from the building structure at not more than 4-Ft. intervals, at end of branches and at change of direction or elevation. PVC pipe and fittings shall be supported within one foot of each side of couplings.
- D. All gas piping shall be adequately supported per the table below:
- | Pipe Size (In) | Maximum distance between supports (Ft) |
|----------------|--|
| 1/2 | 6 |
| 3/4 - 1-1/2 | 8 |
| 2-3 | 10 |

- PIPES, PIPE FITTINGS AND ACCESSORIES**
- A. Potable Water Systems:
- Shut-off Valves: 2" and smaller: Ball Valves
 - Drain Valves: 2" and smaller: Ball Valves

- B. Waste and Vent Systems:
- Wall Clean-outs and Floor cleanouts : PVC clean-out fitting shall be applicable to pipe size served and in compliance with the UPC.

- C. Drains
Floor Drain: Floor drains shall be of standard duty for working areas.

- PLUMBING FIXTURES**
- A. Provide factory fabricated fixtures of type, style and material indicated. Where more than one is indicated, selection is installer's option when approved by owner. All fixtures of the type specified on the mechanical plans, unless approved by the engineer and/or owner.

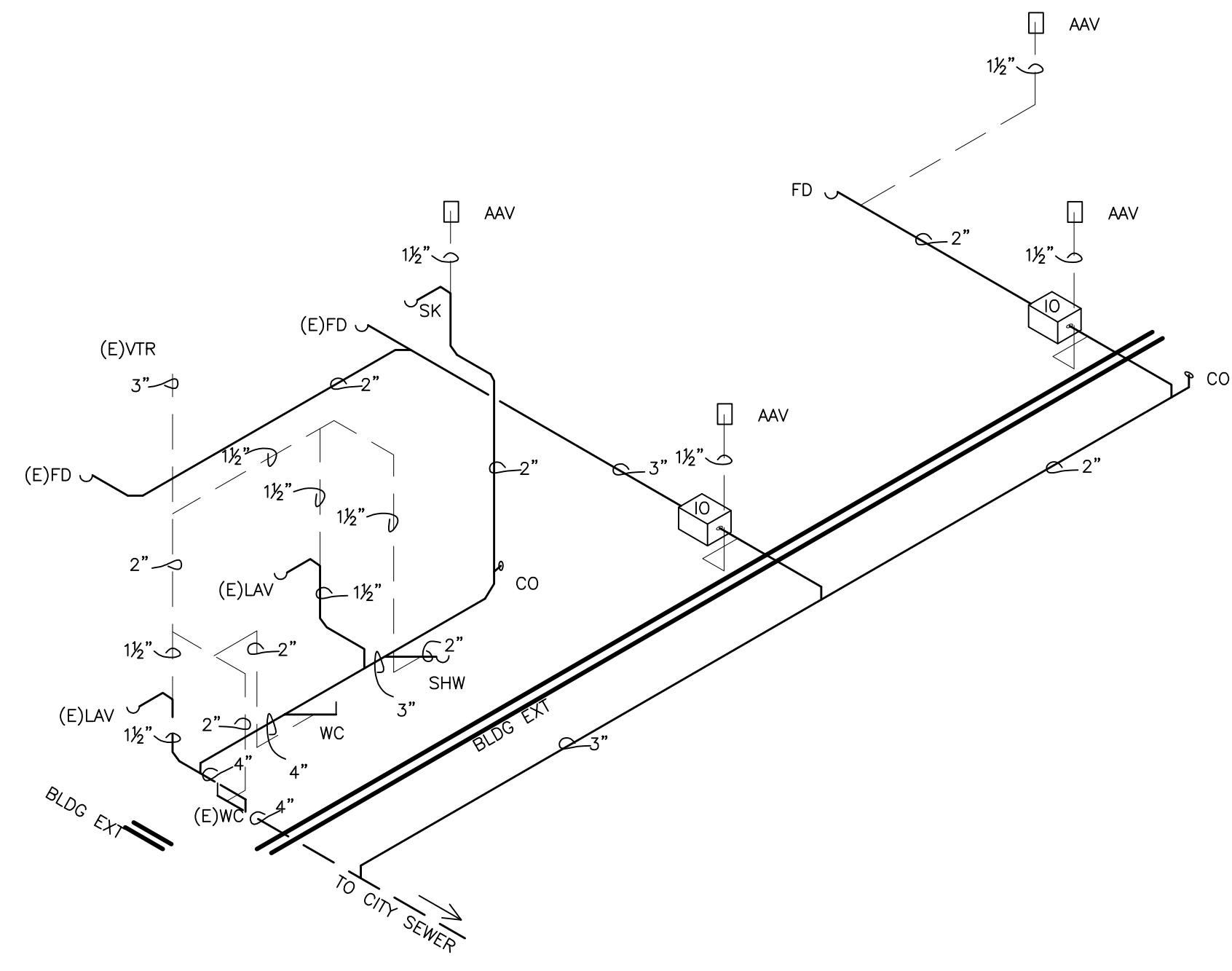
- PLUMBING FITTINGS, TRIM AND ACCESSORIES**
- A. Water Outlets: At locations where water is supplied to a fixture or device, provide manual shut-off valves and connecting stem pipes to permit outlet (i.e. faucet), servicing without shut-down of water supply piping systems.

- A. Install piping level with no pitch. Keep runs as neat as possible, grouping together whenever possible. Isolators shall be used where piping runs through wood products.

- INSTALLATION OF ABOVE GROUND DRAIN, WASTE & VENT**
- A. Provide restraints and hangers as appropriate and in accordance with UPC based upon type of pipe, fittings and joints. All soil and waste piping shall be run at a slope not less than 1/4" per foot for piping up to 4" in size.

- INSTALLATION OF PLUMBING FIXTURES**
- A. General: Install plumbing fixtures of types indicated where shown and in accordance with fixture manufacturer's written instructions. Secure plumbing supplies and fixtures where applicable behind or within wall construction so as to be rigid and not subject to pull or push movement. Coordinate with general contractor to obtain proper backing in walls for hanging plumbing fixtures.

- INSTALLATION OF lp GAS PIPING**
- A. All exposed gas piping shall be kept at least six- (6) in. above grade or structure.
- B. All gas appliances unit shall have an accessible main gas shut-off located at unit. Shut-offs shall be AGA approved gas ball valve type, Nibco or equal. Gas piping sizes indicated assume gas meter is located directly in front of building and adjacent to corresponding units.



③ DWV DIAGRAM
SCALE: NONE

PLUMBING EQUIPMENT SCHEDULE					
MARK	DESCRIPTION	MANUFACTURE & MODEL	FAUCET & ACCESSORIES	FINISH	REMARKS
WC	WATER CLOSET	KOHLER HIGHLINE K-3519	-	WHITE	-
LAV	LAVATORY	KOHLER CHESAPEAKE K-1722	KOHLER CORALAIS 15592	WHITE CP	REQUIRES WALL CARRIER
SK	SINK	OWNER	-	SS CP	-
WH	GAS WATER HEATER	BRADFORD WHITE RG2DV50S6N	-	-	50 GAL. 40,000 INPUT
OI	SAND OIL INTERCEPTOR	WATTS OI-15	-	-	-